Local Food Production and Community Illness Narratives: Responses to Environmental Contamination and Health Studies in the Mohawk Community of Akwesasne

By Elizabeth Hoover

B.A., Williams College 2001

A.M., Brown University, 2003

A Dissertation submitted in Partial Fulfillment of the Requirements

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This dissertation by Elizabeth Hoover is accepted in its present form by the Department of Anthropology as satisfying the dissertation requirements for the degree of Doctor of Philosophy

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Education

Brown University, Providence, RI.
PhD in Anthropology, 2010
Dissertation: *Local Food Production and Community Illness Narratives: Responses to Environmental Contamination in the Mohawk Community of Akwesasne*
Sheridan Teaching Certificates I, II, and III 2006-2009
Certificate I: "The Teaching Seminar," Certificate II: "The Classroom Tools Seminar," Certificate III: "The Professional Development Seminar"
MA in Anthropology, 2003
Master's Paper: *Arbiters of Authenticity; Living History in Native American Museums.*

Williams College, Williamstown, MA. BA in Anthropology and Psychology, 2001
Honors Thesis: *The Self-Identification of Mixed-Blood Indians in the United States and Canada.*

Research Interests

Environmental contamination in Native American communities, subsistence revival and community garden efforts, environmental justice, community based participatory research, political ecology, and health research conducted in Native American communities.

Teaching Competencies

Environmental Anthropology, Anthropology of Native North America, Northeast Native American History and Culture, Environmental Justice, Issues of Food and Community Agriculture, Cultural Anthropology, Environmental Health, Community Based Participatory Research, Insider and Indigenous Anthropology, Native Americans and the Media, Museum Studies.

Teaching Experience

Environmental Anthropology **(Instructor)**
* Elizabethtown College, Sociology/Anthropology Department, Spring 2010
This class introduces some of the main theoretical approaches and practical applications of the study of environmental anthropology. We examine some of the main cultural and social aspects of the human-environment interface, such as different belief and value systems relating to the environment, resource conflict

and management, conservation and biodiversity, agriculture and food security, climate change, and the environmental justice movement.

Native North America; Political and Cultural Issues **(Instructor)**,

***** Elizabethtown College (Elizabethtown PA), Sociology/Anthropology Department, Fall 2009

***** Brown University (Providence RI), Ethnic Studies Department, Fall 2006 and Spring 2005

* University of Rhode Island (Kingston RI), Anthropology Department, Fall 2005

This class gives a broad over view of the diverse politics, cultures, histories, and representations of the Native peoples of North America, focusing on several key issues in the scholarship about, and lives of, Native peoples. I expected students to finish the class with a comprehension of the present day status of American Indians, in addition to an appreciation of their historical circumstances.

Native Americans in the Media, **(Instructor)**

* Brown University, Ethnic Studies Department, Spring 2006

This course explores the ways in which Indigenous Americans have been constructed in the White American imagination, as well as through self-representation from Frontier phase of American history, through contemporary images in American popular culture and media.

War and Society, served as a teaching assistant for Professor Catherine Lutz, Brown University Anthropology Dept, Spring 2004.

American Indian Education, served as the moderator for a student-run independent study, Brown University Ethnic Studies Program, Spring 2004.

From Coyotes to Casinos, served as a teaching assistant for Professor Shepard Krech III, Brown University Anthropology Dept, Fall 2003.

<u>Grants, Fellowships, Awards</u>

Society for Applied Anthropology Beatrice Medicine Travel Award 2010

Provided travel funds to Merida, Mexico to present at the annual SfAA meeting

K Patricia Cross Future Leaders Award 2010

Recognizes graduate students who show exemplary promise as future leaders of higher education; who demonstrate a commitment to developing academic and civic responsibility in themselves and others; and whose work reflects a strong emphasis on teaching and learning.

Ford Foundation Diversity Fellowship 2009-2010

Provides funding for dissertation completion.

Swearer Center (Brown University) Dissertation Award 2009-2010

For students who are engaged in a community-based dissertation.

NSF Cultural Anthropology Dissertation Improvement Grant 2008-2009

Provides funds for students to conduct dissertation field research

Switzer Environmental Fellowship 2008—2009

Academic awards for early-career environmental leaders working on projects that aim to directly improve environmental quality.

ELP Environmental Leadership Program Fellowship 2008-2009
Series of workshops designed to build the leadership capacity of emerging environmental leaders

Ford Foundation Diversity Fellowship, Honorable Mention List 2008-2009

Graduate Fellowship, Brown University Graduate School 2008-2009

Lynn Reyer Tribal Community Development Grant, issued by the Society for the Preservation of American Indian Culture 2008-2009
For MA or PhD research relevant to Tribal community development

Pre-dissertation Research Fellowship, Brown University Graduate School, 2006
To conduct exploratory research on environmental justice issues in Akwesasne prior to dissertation proposal writing

Travel Fellowship Haffenreffer Museum of Anthropology, 2005
To conduct research on Iroquois beadwork at the Salamanca and Akwesasne reservations

Summer Research Fellowship, Brown University Graduate School 2003
To conduct research on the formation of a Wampanoag cultural center

Summer Masters Research Fellowship, Brown University Grad School 2002
To conduct research on Native American living history museums for MA thesis

Irene Diamond Fellowship, Brown University, 2001-2002
To cover tuition and stipend for select minority first year students

Ronald McNair Scholars Program, Williams College, 1999-2001
To increase attainment of PhD degrees by students from underrepresented segments of society

Institute for the Recruitment of Teachers (IRT) Fellowship, Andover MA, July 2000
To encourage more students of color to become teachers

Class of 1957 Scholarship, Williamstown MA, October 1999 and October 2000
Awarded to Juniors and Seniors who have successfully combined campus leadership with academic achievement

Research Assistantships

Brown Superfund Basic Research Program, **Outreach Core** May 2005-June 2008
The Outreach Core was part of a NIEHS funded project led by Professor Phil Brown in the Sociology and Environmental Studies departments. My duties involved assisting local community groups dealing with issues of environmental contamination through research, advocacy, public outreach and education, as well as working with state and federal environmental agencies.

Social and Environmental Implications of Nanotechnology, September 2005- May 2008
NSF funded NIRT (Nanoscale Interdisciplinary Research Teams) grant project also led by Professor Brown, which involved interviewing scientists and surveying students about their views on the social and ethical implications of nanotechnology research.

Iewirokwas Program/First Environment Research Project of Akwesasne, January 2007- Present

Aboriginal midwifery and environmental health project directed by Katsi Cook. Work involves attending environmental health conferences, archival research, and assisting her with the editing of numerous grant and book projects.

Publications

Brown, Phil; Stephen Zavestoski , Sabrina McCormick , Brian Mayer , Rachel Morello-Frosch , Rebecca Gasior Altman , Crystal Adams , and **Elizabeth Hoover**. In Press. "Embodied Health Movements: Uncharted Territory in Social Movement Research" In *Contested Illnesses: Ethnographic Explorations*. Edited by Phil Brown, Rachel Morello-Frosch, and Stephen Zavestoski. University of California Press. (In press)

Brown,Phil; Rachel Morello-Frosch, Stephen Zavestoski, Laura Senier, Rebecca Altman, **Elizabeth Hoover**, Sabrina McCormick, Brian Mayer, and Crystal Adams. In Press. "Health Social Movements : Advancing Traditional Medical Sociology Concepts" In *Handbook of Health, Illness & Healing: Blueprint for the 21st Century*. Ed by Bernice A. Pescosolido, Jack K. Martin, Jane McLeod, and Anne Rogers, New York: Springer (in press).

Brown, Phil; Rachel Morello-Frosch , Stephen Zavestoski, Laura Senier, Rebecca Altman, **Elizabeth Hoover** , Sabrina McCormick, Brian Mayer, and Crystal Adams. In Press. "Field Analysis and Policy Ethnography: New Directions for Studying Health Social Movements." IN *Social Movements and the Development of Health Institutions*. Edited by Mayer Zald, Jane Banaszak-Holl, and Sandra Levitsky. Oxford University Press (in press).

Hoover, Elizabeth, Phil Brown, Mara Averick, Robert Hurt, and Agnes Kane. 2009. "Teaching Small and Thinking Large: Effects of Including Social and Ethical Implications in an Interdisciplinary Nanotechnology Course." *Journal of Nano Education*. 1(1): 86-95

Senier, Laura; Benjamin Hudson; Sarah Fort; **Elizabeth Hoover**; Rebecca Tilson; Phil Brown.
2008. "The Brown Superfund Basic Research Program: A Multistakeholder Partnership
Addresses Real-World Problems in Contaminated Communities" *Environmental Science and Technology*. ***42*** (13), pp 4655–4662

Hoover, Elizabeth. 2006. "Transfer Print Earthenwares from Cocumscussoc." *Castle Chronicle*; 15(3): 1,11-23.

Hoover, Elizabeth. 2004 "Arbiters of Authenticity: Living History in Native American Museums." *New Directions in American Indian Research.* The Graduate School; University of North Carolina Chapel Hill.
http://gradschool.unc.edu/natam/panels/hoover.html

Scholarly Presentations

"'Those Farmer Kids Are More Sovereign Than You Are:' Working towards Increased Local Food Production on a Mohawk Reservation" Paper presented at the Society for Applied Anthropology (SfAA) Meeting in Merida Mexico, March 24-27,2010.

"It May be Contaminated, but this is Home: Perceptions of Health and the Environment in the Mohawk Community of Akwesasne." Paper presented at the American Anthropological Association (AAA) meeting in Philadelphia, PA. December 2, 2009.

"Environmental Health of the Three Bodies in the Mohawk Community of Akwesasne" paper presented at the Conference of Ford Fellows, October 19,2009 AND at the "Bodies in Motion," University of Rhode Island's Third Annual Interdisciplinary Graduate Conference, Kingston RI. Saturday, March 28th, 2009.

"'My people are distrustful of nature:' Responses to Environmental Contamination and Health Research in the Mohawk Community of Akwesasne."Poster presented at the *"Legacy of Scholarship and Community" Graduate Students of Color Conference*, sponsored by the Samuel M Nabrit Black Graduate Student Association, Brown University, Providence RI. March 12, 2008.

"Native American Living History Museums: Bringing to Light the People Behind the Artifacts," paper presented at *Sight Lines: An American Studies Conference on the Culture and Science of Vision*, New England American Studies Association, Worcester MA, September 23-24, 2005.

"Arbiters of Authenticity: Living History in Native American Museums" paper presented at:

**Pathways: A Graduate Conference on American Indian Studies,* Yale Univ, April 23-25 2004.

** New Directions in American Indian Research*, UNC Chapel Hill, March 18-20 2004.

**New Voices in Indigenous Research,* UC Berkeley. April 24-25 2003

"Beyond Thanksgiving; Enabling Teachers to Broaden their Tools for Teaching Postcontact Northeastern Native America" poster presentation, *Native American Arts Studies Association (NAASA),* Peabody Essex, Salem MA, November 5, 2003.

"From the Hands of Ancestors: The Role of Native American Living History Museums in Teaching Ancient Arts" paper presented at *Native American Arts Studies Association (NAASA),* Peabody Essex, Salem MA, November 5, 2003.

Invited Lectures

"Women as the First Environment: Industrial Contamination and Environmental Health Studies in a Mohawk Community," invited presentation at Elizabethtown College, Elizabethtown PA. March 17, 2010.

"'Women on Top': The Truth and Exotification of Matrilineal Societies" invited presentation at Elizabethtown College, Elizabethtown PA. November 13, 2008.

"Colonialism from a Native Perspective" at the Tomaquag Indian Memorial Museum Fourth Annual Teacher Institute, Exeter RI, July 11th 2006. Scheduled to speak again on the same topic July 2007.

"Teaching Native American History from an Indigenous Perspective." *Teaching American History* workshop for Massachusetts middle school teachers, Bristol Community College (Fall River, MA), August 9, 2005.

"Native American Living History Museums." University of Rhode Island (Kingston, RI), for Don Holley's *Anthropology of Native North America* class, November 14, 2003 and May 2003.

"Traditional Eastern Native American and Pow-wow Dance," lecture and interactive demonstration conducted at Russell Sage College (Troy, NY), for Alice Oatmann's *Dance Therapy* class, October 24, 2003.

"Arbiters of Authenticity: Living History in Native American Museums," lunch forum at Williams College (Williamstown, MA) for Native American History Week, October 17, 2003.

"Pow-wow Regalia," Rhode Island School of Design (Providence, RI) for Michele Smith's class ARTH*H *An Anthropology of Dress and Adornment*, October 15, 2003.

"Arbiters of Authenticity: Living History in Native American Museums," Haffenreffer Museum (Bristol, RI), May 2003.

"The History, Use and Creation of Wampum" lecture and workshop at the Robbins Museum (Middleborough, MA), Fall 2002.

"The Self-Identification of Mixed-Blood Indians in the United States and Canada." Williams College, Native American History Week, October 2001.

Related Experience

Environmental Justice League of Rhode Island—Outreach Committee, 2007-2008

* We organized an environmental justice conference in Providence RI, November 8,2007

*Worked on outreach materials to educate community on EJ issues

Native American Women in Providence (NAWIP), 2007- 2008

*****I founded this group to help conduct after school program with urban Native youth through the Rhode Island Indian Council

ALANA mentor to Native American Students, Brown University**,** Fall 2007- Spring 2008

* I helped Native students with academic and social issues, as well as event planning, through the Third World Center

Native Americans at Brown (NAB), 2001- 2009

* Serve as mentor for undergraduate Native American students at Brown

* Organized the seven annual Brown University Spring Thaw Pow-wows from 2001-2008. This entailed advertising, fundraising, and booking drum groups, vendors and one hundred dancers.

Contested Illness Research Group, Brown University, 2005- 2009

* Interdisciplinary team that researches and writes about issues of environmental health and health social movements

Native American Students at Williams (NASAW), 1997-2001

* Founded and ran group for Native students

* Organized field trips, history weeks, and lectures, worked with the admissions to boost Native American student recruitment, and organized three annual Intertribal Powwows.

Professional Memberships:

*American Anthropological Assoc (AAA)

* Anthropology and the Environment section

*Association of Indigenous Anthropologists

* Society for the Study of Social Problems

*Society for the Anthropology of North America (SANA)

* Culture and Agriculture Division

*Society for Applied Anthropology

Acknowledgements

First and foremost, I would like to thank the people of Akwesasne who generously shared their time and lives with me. This project was inspired in part by Katsi Cook, and over the past three years the hundreds of e-mails exchanged and the hours and hours spent talking and brainstorming have been an invaluable experience. I would also like to extend a special thanks to Jean, my "Akwesasne mama" and "Buba" Henry Laffin who opened their home to me and took me into their family. I am also grateful to Josh Sargent and Natasha Smoke-Santiago and their family, who have become dear friends, and the other members of Kanenhi:io Ionkwaienthon:hakie—Dean George, who shared hours of gardening knowledge, as well as Elizabeth Perkins, Chris Burns, and Alicia and Steve Cook. Lorraine Gray helped to found Kanenhi:io and brought me into the group and her home, and I am grateful to her for the experience. Niawen:kowa to Elvera Sargent who has patiently answered my many Kanienkeha language questions (although all errors are my own). Special thanks also to Gina Jacobs, who first educated me about the gardening situation at Akwesasne when we stood in her yard on Cornwall Island. Members of the Akwesasne Task Force on the Environment (ATFE), especially Dave Arquette, Craig Arquette, and Brenda LaFrance, were very helpful in guiding this project over the past several years, ever since Joyce King first handed me a copy of the Good Mind Research Protocol. Thank you to Jim Ransom who loaned me his collection of newspaper articles covering twenty years of environmental issues at Akwesasne. Les Benedict and Ken Jock at the St. Regis Mohawk Tribe Environment Division, and Henry Lickers and Richard David at the Mohawk Council of Akwesasne Department of Environment also provided me with a great deal of valuable information. I also want to thank Louise McDonald, who provided me with the wonderful experience of becoming involved in many of her projects, programs and ceremonies. In addition, a special thanks to the ladies of the Akwesasne Library, where I spent many hours set up with my laptop.

I would also like to thank the SUNY Albany Superfund Basic Research Program (SBRP) researchers who took time out of their busy schedules to speak candidly about their research experiences.

Thank you to my committee: to my advisor, Shep Krech, who forced me to find my place in this field, and to Pat Rubertone and Bill Simmons for sticking with me all these years. I owe a special debt of gratitude to Phil Brown, who patiently guided me over the past five years, as his research assistant and student. He has been an extraordinary mentor and a model for how to blend scholarship, community activism, and teaching. Special thanks also to women of the Anthropology department who keep the whole show running: Matilde Andrade, Margie Sugrue and especially Kathy Grimaldi, who has the patience of a saint who and has kept me on track through this entire process.

I would also like to thank the Ethnic Studies Program at Brown University, especially Evelyn Hu-Dehart and Pat Balsofiore, who brought me back to Brown after my short time away and provided me with teaching experience and an office from which to base my studies. The students of NAB (Native Americans at Brown), provided me with much needed support and social interaction during my tenure at Brown. A very special thanks to my dearest friends Jennifer Edwards Weston and Jamie Spears Vanderhoop who held me up during my entire Brown education. Their constant support, humor and companionship brought me to where I am today. Thank you also to my fellow members of CIRG (the Contested Illness Research Group), especially Laura Senier and Rebecca Altman. They have provided me with invaluable advice and support throughout my research efforts, as well guidance through the graduate education process. Thank you also to anthropology graduate students Simone Poliandri, Christine Reiser and Susi Keefe who have also provided support and advice through this process.

Last, and most importantly is my foundation: Thank you especially to my family, who supported me even as they wondered why a person would want to be in school for so long. To my parents, Anita Ovitt and Robert Hoover, who provided me with a love of learning and the outdoors, the confidence to pursue my educational goals, and the resilience and determination to finish what I set out to accomplish. To my stepmom Karen, who has provided the support and patience that only a family member could, and continues to serve as my guide to the English language (although she cannot be blamed for any errors in the following dissertation). Thank you to my sisters, Rebecca and Amanda who remind me not to take myself too seriously. And of course to my love and my partner, Julius, who has supported me through this long, exhausting process and who was always there to ask the right questions to help me to think, breathe, and just be.

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1. Introduction, Theory, Methodology

"This is God's country here," an Akwesasne Mohawk woman explained to me as we sat at her kitchen table over cups of coffee. She stared past me out her kitchen window that overlooks the St. Lawrence River, and the General Motors plant. She had just been describing how she stood in her front yard and watched men in "moon suits" work to clean up the industrial site a few years prior. As a resident of the Raquette Point region of the reservation, she has the dubious honor of both beautiful waterfront property, and a front row seat to observe a Superfund cleanup. Another resident farther down the Point had described to me his battle with cancer and how the residents of Raquette Point are constantly barraged with pollution from General Motors, as well as the two aluminum foundries farther upriver. When I asked him if he had ever considered moving to even another portion of the reservation, he replied, "Are you kidding me, I live in heaven!" There are dozens of other examples of the complex factors affecting the perceptions residents of Akwesasne have of their environment, health and homes. In the following dissertation, I explore community members' conceptions of health and the environment, and the ways in which they are inextricably linked. Further, I describe a series of health studies conducted in the community, and the effect these had on residents' perceptions of both science and their bodies. After speaking with most people a decade after they took part in these studies, I examine how concerns about health and the environment have grown to incorporate concerns about the effect of a drastically changed diet on community health. I conclude with the desires of some Akwesasronon[1] to alleviate diet

[1] People of Akwesasne

and health related problems with projects that promote gardening and local food production.

Geopolitical Background

Akwesasne is a Mohawk community of about 13,000-15,000 people[2] adjacent to New York, Ontario, and Quebec, encompassing about 25,712 acres (see Figure 1)[3]. Located on the confluence of the St. Lawrence, St. Regis, Raquette, Grasse and Salmon Rivers, the community relied for generations on the abundance of fish and wildlife, as well as the rich alluvial soils for farms. French Jesuits named the village St. Regis in honor of Jean Francois Regis, a Jesuit who was canonized by Pope Clement XII in 1737 (Frisch 1970:61). Mohawk named the area "Akwesasne," meaning "land where the partridge drums," (Fenton and Tooker 1978: 479) which some have said was due to the great number of partridges which once inhabited the area, and others have described how the locals falls, before being reshaped by the Seaway, once made sound like the mating dance of the male partridge.[4] The Mohawk, or *Kanienkehaka* "People of the Flint" (Alfred 1999), are part of the Haudenosaunee ("People of the Longhouse") Confederacy of Six Nations, known to the French as the Iroquois.[5] In my experience in the community,

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[2] The population in this community is notoriously difficult to enumerate. Residents have been suspicious of and resistant to national censuses and some residents are enrolled with both federally recognized tribal governments.

[3] The community is commonly referred to in written work as overlapping or being based in Ontario and Quebec in the region north of the US/Canadian border, and within New York State's St. Lawrence and Franklin Counties south of the border. Community members have pointed out to me that they were there long before these entities formed themselves around Akwesasne, and so to say that their community falls within these other political boundaries normalizes the unfair claims these other entities have on Akwesasne's land and political independence.

[4] According to Akwesasne Mohawk scholar Salli Benedict (2007:422 footnote 1) "Our oral history says that the loud roar of the rapids that once existed near Akwesasne, at what is now known as Long Sault, could be heard for great distances, far in advance of our approach to the area. It is said that the sound of the rapids under freezing ice sounded like the drumming sound that emanates from the chest of a partridge in its spring courtship rituals."

[5] In tracing the roots of the word "Iroquois," Dean Snow (1994) describes how Basque fishermen came to know the Algonquian-speaking people that lived along the northeast coast from southern Labrador to New

Mohawk[6] was the term most frequently applied, except in the presentations and writings of people who subscribed to a more traditional way of life, and who preferred the more indigenous name of Kanienkhaka. Haudenosaunee and Iroquois are used interchangeably, with people who identify as traditional applying the former term most frequently. Throughout this dissertation, I will be referring primarily to the term "Mohawk." In speaking of the indigenous people of North American more broadly, both the interviewees and I use the terms Native American, Indian, or Native, or in the case of referral to Canadian sources, First Nations or Aboriginal.

Due to the presence of multiple borders through Akwesasne, governance of the community is complex. Currently the portion of the community that New York State considers within its borders is governed by the St. Regis Mohawk Tribe (SRMT or "Tribe"[7]), with three elected chiefs, three elected subchiefs, and a tribal clerk comprising the tribal council. Maps of the United States refer to this portion of the community as the St. Regis Mohawk Reservation, although some residents take issue with the term 'reservation,' asserting that Mohawks were never conquered and relocated like other Native nations who live on reservations. For the portion of the community that is

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England, including the shores of the Gulf of St Lawrence. A pidgin language developed so they could communicate. One of the words that survived was one that referred to a feared nation of Indians that lived far to the interior, and who sometimes came down the St Lawrence to trade. The local Algonquians and Basques called them by the pidgin Basque name Hilokoa 'The killer people," thus they became known through an unflattering second-hand description provided by rivals. Algonquian language lacked "l" sound in their language, so the name became Hirokoa to their ears. By the time the French followed Cartier's earlier route into the St Lawrence in the late 16th century, they adapted the name from the Algonquians, revised the spelling to fit into their own language, and it became Iroquois. Canadians still pronounce it closer to its original sound (ir-o-kwa), but speakers of New York English have long since changed it, as with other French words, and so it now rhymes with Illinois. (Snow 1994:1-2)

[6] According to Alfred (1999), Mohawk is an Algonquian term meaning "cannibal monster," reflecting a similar etiology as footnote 5. For this reason, and a loyalty for the indigenous term, he prefers Kanienkehaka.

[7] Throughout the manuscript, Tribe (with a capital 'T'), refers to the St Regis Mohawk Tribe government (who residents often referred to as "the Tribe"), whereas tribe (with a lower case 't') can refer to the collective group of Mohawks living in Akwesasne.

encompassed by the Canadian boundaries (and divided by the Quebec/Ontario border), the federal government recognizes the Mohawk Council of Akwesasne (MCA), composed of 12 district chiefs and a Grand Chief. This portion of the community is known in Canada as the Akwesasne Mohawk Reserve. The Mohawk Nation Council of Chiefs (or "Nation") represents the traditional government and considers the entire territory of Akwesasne within its jurisdiction, although the United States or Canadian federal governments do not recognize it. Residents of this geo-politically complex homeland generally refer to the entire community as Akwesasne.

The "northern portion" of the reservation as many people prefer to refer to it (rather than the "Canadian" side versus the "American" side), consists of three districts: Kawehno:ke (or Cornwall Island), Kana:takon (St. Regis), and Tsi-Snaihne (Snye). The border between the New York portion of the community and the portion that falls within Quebec's borders, (St. Regis and Snye), runs over land, but is barely marked and not perceivably monitored (during the fall of 2009 residents pulled up the Canadian boundary marker in St. Regis). Snye and St. Regis are sandwiched between New York and the St. Lawrence River, and while people can easily drive between the New York and Quebec portions of the community, they do not have access to the rest of Canada (except by boat) unless they go through the border crossing at the other end of the community. Similarly, in order to drive to Cornwall Island, which is located within the Ontario boundaries, one has to leave the borders of the reservation on the western side to drive into New York State, and over a bridge that houses the United State customs on one end, and Canadian

customs on the other end[8]. Another bridge leads from Cornwall Island to Cornwall, Ontario in mainland Canada.

Raquette Point, a peninsula framed by the Raquette River to the East and the St. Lawrence River to the north and west, lies in the southern portion of the community, which is contained within the United States border. Frogtown is the region southeast of Raquette point, on the opposite side of Route 37, and borders Rooseveltown, a town that is mostly off the reservation, but is home to a large number of Mohawks. A majority of the land mass on the Southern portion is referred to as Hogansburg (or "Hogan"), for the town that borders it. State Route 37 is the main thoroughfare through the southern portion, and is dotted with homes, businesses, and signs reminding passerby that they are no longer in New York State; they are on Mohawk land. It is along this route that a majority of the reservation's businesses are congregated, consisting of dozens of gas stations, smoke shops, and restaurants, as well as a library and museum, an art gallery, Tribal government offices, a health clinic, a grocery store, the casino, and the Bingo Palace.

The community is bisected by the St. Lawrence River, or *Kaniatarowan'neh* ("Big River") as it is known in Mohawk. The St. Lawrence Seaway project, begun in 1954, widened and deepened the river, and created a series of canals and locks that

[8] In June of 2009, Canada declared that all border guards were to begin carrying guns. The residents of Akwesasne, who are in the process of filing a complaint about racial profiling and mistreatment at the hands of some of these border guards, found this to be an unacceptable risk to them . The bridge to Cornwall Island was blocked and an encampment was set up. The border crossing has since been relocated to mainland Canada in Cornwall Ontario, which was a short victory, until Canadian border guards set up a camera that records the license plates of everyone who drives onto Cornwall Island. The driver is expected to proceed over the second bridge to the mainland to check in at Customs, before turning around and returning to the Island, a process that has turned a five-minute drive into a multi-hour process in many cases. For those who refuse and simply drive back and forth to the Island, upon their next trip into Cornwall their cars are seized until a fine is paid. Many residents have described to me now having to designate one of the family cars to go to the Island, and another that legitimately checks in with the border guards every time they go into Canada, so that they can still shop in Cornwall.

opened the region to ocean-going vessels. The Moses-Saunders Power Project built upriver from Akwesasne brought cheap hydroelectricity to the area, drawing industry to the banks of the St. Lawrence. The fluoride emissions from these industries decimated the cattle population on Cornwall Island, which was directly downwind from the Reynolds Aluminum plant. Sludge pits and wastewater lagoons from another plant General Motors (GM), leached into the river, contaminating the fish and other wildlife. Midwife Katsi Cook became concerned that this contamination might move up the food chain to Akwesasne's most vulnerable members. With the support of mothers and the newly forming St. Regis Mohawk Tribe Environment Division, she engaged the New York State Department of Environmental Conservation (NYSDEC), the Department of Health (DOH), and eventually State University of New York (SUNY) Albany to come to Akwesasne and conduct the necessary studies to determine the impact of PCBs on breastmilk and human health. This initial project grew into a decade long community based participatory research project (CBPR) which, in addition to providing data, provided a valuable experience for both sides.

Methods

I first became interested in issues of gardening and health at Akwesasne while standing in Gina Jacob's front yard on Cornwall Island in 2005 (see photo in Appendix). Gina described to me how she grew up around extensive gardens, and had always tended a garden of her own until she was advised not to, due to concerns about the contamination that might be coming from the neighboring industrial plants. From Gina's front yard, there is a very clear view of the General Motors Central Foundry Division, directly across the river on the New York shore of the St. Lawrence River. She pointed

farther upstream, where you could see the smoke stacks of Reynolds Aluminum (now ALCOA East since the same company who owns another problematic plant about 3 miles further upstream, now known as ALCOA West, purchased the plant). Concerns about the possible effects on gardens of fluoride contamination from Reynolds and PCB contamination from General Motors led to the warning that Gina should not plant food. As someone who grew up planting gardens with my family, this seemed like a terrible and unfair imposition, especially for people with a culture so based on the interconnectedness of people and food plants. Literature published by members of the grassroots organization Akwesasne Task Force on the Environment (ATFE) illustrated a trajectory of health and social ills, prompted by environmental contamination. They describe how Mohawks had been robbed of the ability to harvest free, healthy, culturally relevant food, and were left only with the option of purchasing cheap, processed foods, with the end result of an increasingly unhealthy population.

I became further interested in health studies that had been conducted in an effort to try to determine the PCB body burden of community members, after meeting Katsi Cook at her home near Ithaca New York. She passionately described her work in helping nursing mothers in the community determine the safety of their breast milk. Although her formal education is in midwifery, she is an incredibly autodidactic woman, who has striven over the years to combine her knowledge of women's health issues, traditional Mohawk culture, and scientific health studies. As someone who helped to initiate the health studies at Akwesasne, but who has since taken on several other projects, she was interested in having me dedicate part of my fieldwork to learning about people's opinions of, and reactions to, these health studies.

As I began to conceive of this project as an exploration of health, gardening and the environment in Akwesasne, I was approached by Lorraine Gray, a family friend who, although of Kahnawake[9] Mohawk descent, had moved to Akwesasne because it was the community of the father of her four children. She was involved in the founding of *Kanenhi:io Ionkwaienthon:hakie,* (We Are Planting Good Seeds), a grassroots organization with a focus on supporting families interested in starting farming or gardening projects. She invited me to stay with her, and become involved in Kanenhi:io's activities.

Akwesasne was one of the first Native communities to develop their own Institutional Review Board (IRB), in this case known as the Akwesasne Task Force on the Environment Research Advisory Council (ATFE RAC). With the help of ATFE members Joyce King and Dave Arquette, I developed a proposal that addressed how community input had shaped my project, and the ways I would bring information gained in the process of collecting data back to the community. My proposal received approval in June 2007, and I was able to meet with ATFE members in person during my stay in 2008 to further discuss the proposal and incorporate their suggested changes in my interview questions.

Interview Sample

I visited Akwesasne several times in 2006, 2007, and early 2008 in the process of developing my research proposal and getting to know members of Kanenhi:io so I could witness the group's projects unfold. In March of 2008, I went to the State University of New York (SUNY) Albany and the New York State Department of Health (DOH) to interview seven scientists who had conducted health studies at Akwesasne from 1986-

[9] Kahnawake is a Mohawk community about 80 miles east of Akwesasne, near Montreal, Quebec.

2000. While there were dozens of scientists working on studies through the Superfund Basic Research Program, I only spoke with those who had direct contact with community members, as opposed to only working in labs. I spoke with each of them about their experiences in organizing the study, in working directly with Akwesasne community members, and their ideas about how the studies could have been conducted differently were they to do the study again. The researchers had the option as to whether or not to remain confidential, which determines in the following pages whether I associate their direct quotes with names or merely descriptions. My own experience as a research assistant in the Outreach Core of a Superfund Basic Research Program at Brown University (2005 through 2008) informed my discussions with these researchers. My duties in this capacity involved assisting community groups in Rhode Island in dealing with issues of environmental contamination through research, advocacy, public outreach and education, as well as working with state and federal agencies. While my work was very different from that of the scientists whom I was interviewing, this experience provided me with background as to how SBRP grants operate, and provided me something in common with these researchers.

From June 1 through the end of November 2008, I lived at Akwesasne, first house-sitting for Lorraine in a little house on the river at Raquette Point, and then later with a wonderful family, Henry and Jean Laffin, farther inland on the New York portion of the reservation. Living in both locations was a good opportunity to witnesses the differences in activity in these two different regions. Residents expressed that different portions of the reservation were more polluted or greater hotbeds of smuggling, and I was able to relate to these first hand.

During my residence in Akwesasne, I conducted 63 interviews with 66 Akwesasronon (people of Akwesasne) who ranged in age from 25 to 90, with a majority in their 40's and 50's. I targeted several interviewees because of their role in Kanenhi:io (n=10); or their involvement with the St. Regis Mohawk Tribe or Mohawk Council of Akwesasne environment divisions (n=7); or because of their experience in working on the health studies as field workers (n=6). A majority of the rest of the interview sample was located through referrals from these interviewees. At the conclusion of each interview, I would ask if the participant knew of any other people who might be interested in speaking with me, and then I contacted the referral by either phone to set up an interview, or by a visit to their home. Interviews generally took about an hour, and took place wherever was most convenient for the interviewee—most frequently at their homes, but occasionally over breakfast or lunch at one of the local restaurants, or at their place of employment.

The interview was structured similarly from one interviewee to the next, although I focused most on what each individual could bring to the discussion. When time was limited, I focused on the individual's area of expertise, and what they could bring to the project, i.e. their experience as an environment division worker, a health-study field-worker, a health study subject, an experienced gardener, or as a community health expert. The questions (see Figure 2) pertained to the health studies, perceptions of change the health and environment of the community, and their suggestions for how to improve the health of the community. We also discussed changes in diets related to a decrease in farming and fishing, and the possibilities of community members returning to either of those activities with the proper support.

For the health study fieldworkers, Environment Division employees, and community health workers, I focused less on these more general questions and more on their specific experiences in those areas. For members of Kanenhi:io, I asked the more general questions, and then followed with inquiries as to their experiences in the group, what motivated them to join, and what they would like to see done differently.

Every interviewee was presented with an informed consent form which gave them the opportunity to select if they wanted to remain confidential (I would remove their name and identifying information from the transcript), or if they were comfortable leaving their identifying information on the transcript. In the following pages in which I will share and discuss their words, I have given direct credit by use of names for those who checked the box allowing me to do so. Those who preferred to remain confidential are identified through the code I labeled their interview with in my records, usually a one or two digit number followed by a C, for example (8C) or (26C). I also gave each interviewee the option to have a copy of their transcript sent to their families, stored with the St. Regis Mohawk Tribe, the Mohawk Nation Council of Chiefs, the Mohawk Council of Akwesasne, or only stored in my personal filing cabinet. The interviewee was allowed to choose as many or as few options as they wanted. At the completion of this project, a CD containing the appropriate interview transcripts in Word documents will be given to Craig Arquette at the St. Regis Mohawk Tribe Environment Division, to Dave Arquette at the Mohawk Nation office, and Sheree Bonaparte at the Mohawk Council of Akwesasne history department. A copy of my dissertation will also be placed in the Akwesasne Library, and distributed to the Akwesasne Task Force on the Environment

(ATFE), the St. Regis Mohawk Tribe Environment Division, Mohawk Healthy Heart, Kanenhi:io, the SUNY SBRP, and with anyone else who expresses an interest.

I transcribed each of the 63 community interviews, and then uploaded both the interviews and field notes into NVivo 7 in order to code for relevant themes. Some of these themes arose from the interview questions, like references to health studies and fish consumption, and others arose independently, like references to distrust of the state and federal government, and concerns about the amount of TV that youth watch. My interviews with Katsi Cook, one of the women who has supported me through this entire project, have extended into January 2010—through dozens of conversations and hundreds of e-mails over the past three years she has patiently addressed all of my inquiries.

My questions introduced certain themes into the interviews, which inevitably brought them to the forefront of the discussion, and gave them them weight over what the interviewee might have considered other important themes. Dwyer (1982:284) writes: "The anthropologist, in the very act of singling out events for attention and asking questions about them, cannot avoid defining topics in ways that reflect the concerns and style of his own society, [including] certain intellectual strategies on the anthropologist's part that tend to dominate academic anthropology and other 'scientific' fields." I recognize that in asking people about gardening and health, I was placing importance on these things. I took on this project because I believe that healthy eating is fundamental to positive wellbeing and that gardening is an important way for people to both connect to their natural environment and acquire healthy food. Knowing that about me, people engaged with me accordingly. As with any anthropologist conducting fieldwork, I could

hardly be considered an unbiased, objective observer. At the same time, because these were also issues brought to me by members of the community, and others in the community have made it their life's work to promote the health of the individual, community, and environment, I feel as though the questions guiding these interviews arose from interests other than my own. Nonetheless, my sample was not random and so the following opinions expressed might not be taken as completely representative of the community. However, to my observation the lack of consensus among community opinion on many of the issues we will be discussing in the following chapters proves that there is suitable variety in the interview sample.

Participant Observation

To complement the information I gained through the recorded interviews, I actively took part in participant observation, with the understanding that "being actively engaged in the lives of people brings the ethnographer closer to understanding the participants' point of view" (DeWalt et al. 1998: 261). In an effort to learn more about and become more involved in helping Kanenhi:io, I attended as many of their meetings and functions as I was able, and kept minutes of each of the meetings, which I then shared with the group for their own records. I also took an active role in maintaining the community garden, and worked with individual members in their gardens. I recorded all of my experiences in the community in daily field notes.

For Clifford Geertz (1973), his breakthrough in creating rapport with the Balinese villagers with whom he had been living came when he fled a police raid on a cockfight, hurling himself over a wall into the garden below with others from the village. For the Dewalts (1998), their rapport building moment was when they returned to Temascalcingo

after a break in fieldwork, which convinced the residents of this Mexican community of their dedication to it. While most people were polite to me, the rapport building experience for me was built around work in people's gardens. I found that in working hard alongside people, I not only learned more about them as I enjoyed their company, but in the act of contributing to the success of Kanenhi:io projects, which I will discuss in greater detail in Chapter 6, I became an active and invested ally of the group. One of the members, in trying to convince another man to stop giving away his labor free of charge while he was unemployed and trying to make ends meet, made the joke "Nobody works for free. Well, except Liz."

Actively working in the dirt alongside community members also helped me to avoid the stigma pinned on many researchers, in a community that has seen more than its fair share of scientists, historians and anthropologists. Akwesasne Mohawk midwife Katsi Cook stated that "For generations we've seen anthropologists and social scientists come in, do studies, earn academic laurels, build careers, and do absolutely nothing for the community" (Johnson 1996:20A). Even worse, as I will describe in detail below, anthropology PhD dissertations have been used against the Mohawks at Akwesasne in lawsuits (Ciborski 1990, Frisch 1970). Deloria's picture of anthropologists in *Custer Died for Your Sins* (1969) while humorous, is one that has persisted in many communities, supplemented at Akwesasne with local examples of researchers who came to the community, collected information, acquired their degrees, and never returned. In Deloria's chapter on anthropologists, he humorously described a plague of gawky, pale individuals descending on the reservations every summer with their cameras and safari hats. In their more warlike times, Deloria is certain that Indians would rather have

battled the 'anthros' than the cavalry. However, his essay also takes a serious and critical tone. He laments that funding is given to individuals for the purpose of observing Indians and compiling "useless knowledge," out of which theories are constructed to battle with other anthropologist. In his opinion, the Indians receive nothing in return, because "The fundamental thesis of the anthropologist is that people are objects for observation, people are then considered objects for experimentation, for manipulation, and for eventual extinction" (Deloria, 1969:81). He ends the essay with the advice that it would "be wise for anthropologists to get down from their thrones of authority and pure research and begin helping Indian tribes instead of preying on them" (Deloria 1969:100). As Randall (1971:985) summarizes in his review of the book, "what Deloria, as a spokesman for all Indians, wants from anthropologists, is to either be left alone, or to be shown some tangible advantage to being studied." An American Anthropological Association conference was organized around the issue, and later distilled into the book "Anthros, Indians, and Planetary Reality" (Biolsi and Zimmerman 1997). In his contribution to this volume, Deloria concedes that "some immensely useful work has been done by anthropologists on behalf of American Indians" (Deloria 1997: 210), and gives examples of individuals who have helped tribes with fishing rights, land rights suits, repatriation, and federal recognition petitions.

As a future anthropologist first reading this essay and the debate it sparked, I at first experienced panic as to what I had gotten myself into,[10] and then a determination to

[10] I first met Lakota anthropologist Bea Medicine in 2005 at the American Anthropological Association annual meeting in Washington DC. Even though she was a celebrity figure at this event, she took the time to sit and talk with me, and encourage me to continue in the discipline. At the time, I was having difficulty reconciling criticisms that indigenous scholars like Deloria, as well as other Native people I had spoken with had about anthropology as a discipline and anthropologists as individuals, with what I saw as the potential for social science to assist Native communities in environmental, cultural and political goals. I had found Bea's book (2001) to be an encouraging affirmation, both in the work she had done, and the way

produce a “tangible benefit” from whatever research I conducted in Native communities. For this reason and others, when people asked me about the project I was working on, I often described myself as an “environmental anthropologist,” and the community wide concern about environmental issues often tempered any preconceived opinions they had of anthropologists. The only person who referred to me as an “anthropologist” was my friend Henry, who usually introduced me to people with that title while laughing, as I was frequently covered in garden dirt or elbow deep in chicken guts at the time of the humorous introduction.

In addition to my work with Kanenhi:io, Katsi also put me in touch with Louise, a Bear Clan mother at Akwesasne, who has been working to restore rites of passage ceremonies to adolescents. In order to support her in this endeavor, as well as to gain a deeper understanding of Mohawk culture, I helped her to set up and run the three day fast for the adolescent girls in June of 2008. I mostly worked on the covering of the main lodge and the sweat lodge, harvesting cedar and procuring sage, carrying wood for the fires, water for the bathing tub, and soil for the Mother Earth garden, which I will describe below. I also helped the girls to plant the garden, providing Haudenosaunee heritage seeds that were given to me by a seed collector botanist friend. In addition, I attended the monthly moon ceremonies that Louise conducted for women, as well as several Longhouse ceremonies. Due to an inappropriate amount of culturally sensitive material published by non-Natives who had attended Longhouse ceremonies, non-Natives

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she was encouraging other anthropologists to involve tribal members in research, and emphasizing the importance of reporting-back to the tribe on research that was done, in a manner they can understand. She patted my hand and said not to worry about people like Vine; she always had a good time bantering with him. She reaffirmed that the research I wanted to do about environmental issues in Native American communities was important and necessary, and I was a good person to do it. I spent the next two days of the conference pushing her wheel chair from one session to the next and listening to her describe her own research experiences—it was a wonderful experience that I will never forget.

are no longer allowed to attend Longhouse ceremonies, although Native people from other communities are welcome. Because I am of Mohawk and Mi'kmaq descent, (my mother has ancestors from Kahnawake, a Mohawk community to the east of Akwesasne, and my father has Mi'kmaq ancestors from Quebec), I was invited to attend Longhouse events. In recognition of the acquired distrust that Mohawks have for academics at their ceremonies, I will not describe any of these events in detail, but rather use those experiences to inform my descriptions of traditional Mohawk culture.

During the girls' rites of passage, Louise had asked me if I would like to fast with the adolescents, each of whom had constructed her own small lodge in a large circle around the larger lodge in which most of the group activities took place. I told her that because I was much more chronologically advanced than the girls were (by at least a dozen years for the most part), I was not sure I fit into the adolescent category. To which Louise pointed out that I have never been married and do not have children, so I am essentially an adolescent. Nonetheless, she invited me that October to take part in the women's three day fast. This was a wonderful experience, although among these women, who ranged in age from their 30's to late 50's, I was not only the only childless woman, but also the only one without grandchildren. As a woman who has chosen an academic path, which has delayed the attainment of some of the more obvious markers of adulthood in this community, I was something of an anomaly.[11] Most people assumed I was much younger than I am, which for convenience sake I often allowed to stand unless I was directly asked.

[11] Bea Medicine describes a similar experience, as a childless woman working as an anthropologist among other Sioux women (Medicine 2001).

Care with Words

With the trust of community members to document, compile, and analyze their words comes great responsibility. This community has been in conflict with state and federal governments, industry, lawyers, reporters, and amongst themselves for decades. There is always the danger that one's words can, and will, be used against them. Sara Ciborski wrote an Anthropology doctoral thesis 1990 entitled "Culture and Power: The Emergence and Politics of Akwesasne Mohawk Traditionalism." She learned in 1995 that her work was used in court by the Canadian government against the community (Ciborski, personal communication). Ciborski (1990:47), also notes that some Akwesasne residents felt resentment towards Frisch's (1970) dissertation on St. Regis Mohawk cultural revitalization after a local judge decided not to recognize the legitimacy of the Longhouse government during a 1979-1980 dispute, based on a reading of the manuscript. When I first contacted the SUNY scientists to schedule interviews, many of their records from the studies they had conducted in Akwesasne had been subpoenaed by lawyers representing General Motors as part of a lawsuit the community had filed against them. One of the members of the MCA Department of Environment described taking reporters on a boat, and one peered into the water, commenting how clean it was, since he could see all the way to the bottom. The Environment worker was quick to correct him that the clarity could not necessarily be equated with cleanliness, and encouraged him not to publish anything describing it as such, because this could have implications for the ongoing environmental cleanup. Words published about a community like Akwesasne cannot be undertaken as simply an academic exercise, and I have tried to keep in mind any potential negative repercussions on the community of anything I have written. While

I have used community interviews to explore beyond the over-simplified correlation that industrial contamination has caused all of the social, environmental and health problems in Akwesasne, this should in no way be interpreted to excuse the industries from the role they did have in each of these issues.

The most popular topic of late to be published about Akwesasne is in regard to the smuggling (or the “inter-territorial import/export” depending on who you talk to) of cigarettes, drugs and weapons through Akwesasne and over the US/Canadian border. This is a topic that would take a whole other manuscript to cover in detail, and so I have chosen not to focus on it to any great degree in mine, as the community has already receive much unwanted attention in this area in recent years. Some community members related to me that they thought the rise in smuggling was directly related to the environmental contamination, since out-of-work fishermen with boats had to use them to make a living somehow. However, most other residents conveyed that smuggling of goods across the border has existed as long as the border has been enforced, and attribute the contemporary popularity of smuggling to residents eager to make quick easy money.

Linda Tuhiwai Smith (2005:97) states that research ethics in indigenous and other marginalized communities is "about establishing, maintaining, and nurturing reciprocal and respectful relationships, not just among people as individuals but also with people as individuals, as collectives, and as members of communities, and with humans who live in and with other entities in the environment." I think that this is an important aspect of any anthropological project, and I have done my best to maintain a relationship both with individual Akwesasronon who took me into their homes and their lives, as well as the organizations at Akwesasne whom I am hoping will benefit from this information.

Dissertation Chapters

Chapter 2 places the health studies, and efforts to reclaim health through social support and subsistence revival projects, in the context of the current political, cultural and economic situation at Akwesasne, as well as in the tenets of Haudenosaunee culture. I lay out the three major cultural events that structure Haudenosaunee ceremonial life, and that community members have incorporated into culturally relevant research protocols, and discussions around land claims and environmental cleanup. The epochs of time in which these three epics emerge, the Creation Story, The Great Law, and the Good Word of Handsome Lake, stretch from time immemorial through the 19th century, demonstrating an ability to maintain or reinstitute a salient cultural identity through a great deal of change. Explored within those epics are the three core values of peace, power, and righteousness, which structure the Great Law, and provide current Mohawk people with a model for maintaining balance. In addition, I will briefly describe the very complex antecedents that have led to the three tribal governments at Akwesasne today, and the struggle the community has faced in their efforts to remain sovereign from New York State. These interactions with the state, and the connection that community members see between the state and the Tribe and its affiliated departments have led to expressions by some of distrust of these institutions, which has had, and will continue to have implications for the implementation of any programmatic solutions to the community's difficulties

Chapter 3 documents the multifaceted history of health research at Akwesasne, beginning with the unpopular Mount Sinai School of Medicine study, and extending through the community based participatory research (CBPR) project established between

Akwesasne community members and researchers from the State University of New York (SUNY) at Albany. I explore the effort it took for Mohawk people to work past their distrust of state entities to form a collaborative project with a state university, and the challenges faced by researchers attempting to adapt to a new model of research. The results of each of the studies themselves are also included, as a way of providing Akwesasne community members, as well as others who may have an interest in this history of PCB-centered health studies, with a brief and accessible archive of this research. This includes levels of contaminants found in each group of participants, and the thresholds at which health effects were noticed. The study results, published between 1992 and 2010, move from documenting the levels of contaminants measured in Mohawk breastmilk and blood, to more recent analyses pointing to some potential health effects of these burdens. I will also discuss the ways in which the results from Akwesasne were contextualized by the researchers within the virtual community of other studies conducted in communities concerned about PCB exposure, of which Akwesasne often ranked as "average." However, this ranking has not necessarily led some Akwesasronon to be less concerned about the potential of contamination in their bodies. In the end, even though science was not able to answer many Akwesasronon's questions about their individual health state, recent papers have begun showing possible trends between the presence of PCBs and other contaminants, and certain health conditions in the community.

For some readers the treatment in this chapter of each scientific paper may seem excessive in a study focused on individuals' experiences with, and perceptions of the research process and outcomes. A vast majority of community members, even those who

would be deemed “science literate,” have not read these studies and are not familiar with the results. For the most part, the average study participant received information about their individual results, and if they attended a community presentation (which most did not), they would learn about the overall SUNY SBRP research project. What frustrated many of study participants whom I spoke with was that what they wanted to learn about were the affects of PCBs on their health and the health of the community. It is only recently, after the grant money has long since run out, SUNY researchers began working on additional projects and the FERP staff found other employment, that papers finding potential links between levels of PCBS, and health effects have been published. These effects include abnormal thyroid functioning in adolescents (Schell et al. 2004, Schell et al. 2008, Schell et al. 2009, Schell et al.2010), diabetes (Codru et al. 2007), higher levels of total serum lipids, which contribute to heart disease (Goncharov 2008), cognitive function in adolescents (Newman et al.2006; Newman et al. 2009) and older adults (Haase et al. 2009); and reduced testosterone levels in men (Goncharov 2009). Some of SUNY researchers described to me their process of submitting each paper to ATFE, but some of the ATFE members I spoke with denied ever receiving some of them. Either way, part of my reciprocity to this community has been to access those papers through library databases, and summarize those studies here in this document so that community members have easy access to each of these studies and their results. One Akwesasronon health study participant, whose views I will elaborate on in the following chapters, expressed the importance of using the statistics and results that came out of the health studies for the community, for health education programs or outreach materials. It was my goal here to help make this information available. Already, community members

who have seen drafts of this dissertation have expressed excitement at having this resource available from which to draw citations. Now they do not have to just say "our youth have elevated rates of thyroid disorder and we think this is because of the PCB contamination," they can reference Schell et al. (2004, 2008, 2009, 2010) to help support this claim.

In Chapter 4, I move beyond the results themselves to discuss the disparate experiences of the SUNY researchers, the First Environment Research Project (FERP) field workers, and the study participants themselves to examine the benefits both to the local and scientific communities of this approach. In addition, I discuss some of the challenges that arose when two groups of people with very different histories and cultural paradigms came together to work collectively, yet from very different seats of power. By "studying up" (Nader 1969) in addition to addressing the study participants, or as Ingold (2004) would describe, conducting an anthropology *of* science as well as an anthropology *between* science and society, I have constructed a (albeit incomplete) quasi-discussion between the various participants of the project. In many cases, due to time constraints, power differentials, and lack of opportunity these individuals were never able to have this conversation in one location. This "dialog" can be viewed as the beginning of a discussion around the successes and the difficulties each party experienced in working on the project, and their suggestions for future research like this.

In examining the cultural context of science, I also discuss the importance of scientists communicating the CBPR aspect of their study design within research papers designed for a biochemical, toxicological, or epidemiological audience, rather than relegating all discussions of CBPR to journals that seek out this type of article (for

example *Environmental Health Perspectives*). Nowotny et al. (2001) have argued that that rather than trying to place science more firmly within society by revealing that it has a culture too, just like everything else (which was the focus of most of the early anthropology of science), it is more beneficial to bring society *into* science, making science more accountable to society. In this context, I would argue that community based participatory research (CBPR) is one way of doing this, through efforts to make researchers and communities of study partners in defining and implementing research projects. Finally, I will discuss the importance for the CBPR stipulation of capacity building in the community of study, and its implications to eventually support entirely indigenously- run research projects.

Chapter 5 stemmed from an interest in exploring the extent to which, a decade after the health studies concluded, Akwesasne residents were still concerned about the potential effects of environmental contamination on their health, or whether new issues had taken the forefront of concern. I spoke to a small, but varied assortment, of the health care practitioners at Akwesasne, a majority of whom said that their patients/clients were not as concerned about contamination in their bodies as they were about conditions like diabetes, rates of which have skyrocketed over the past several years. Through our conversations, some of these practitioners mentioned the link that some of the patients saw between the contamination and their illnesses, but for the most part their concern as health care providers was with lifestyle issues, and the emotional stress in the community that has also contributed to health problems. When I asked several of the community members about their perceptions of the health of the community, and if they thought that the industrial contamination had affected their health or the health of community

members, they theorized disease etiologies that ranged from simple causation stemming either from individual behavior or exposure to contamination, to more complex ideas about how these two factors might play off each other.

All of the interviewees acknowledged that there had been a rapid change in the diet of the community over the past generation, even if they did not all agree as to who was responsible for an individual's change in diet. Fish, local beef and dairy, and garden vegetables have been largely replaced with junk food or fast food (most commonly referred to as "McDonalds" or "pizza"). The reasons for this shift in diet were attributed to the contamination, which destroyed the dairy and cattle industry on Cornwall Island and the fishery in the St. Lawrence River, but also to an increase in the number of community members who did not have time to cook at home. This was often because all adults in the home are now working, and because more youth are involved in sports and other activities. There were also complicated economic stories behind the affordability of junk food, with some community members recalling a time when their families did not have the money for such 'luxuries,' and others bemoaning that this was the only food that they could afford.

Akwesasne is not unique in its high rates of diabetes. Indigenous people the world over are suddenly finding they have this 'disease of modernity' in common, and in the past thirty years, medical anthropologists and health care workers have worked to understand both the medical and local etiologies of the disease. Chapter 5 explores some of this research, and the ways in which the opinions of the Akwesasne community members I spoke with can contribute to this. Finally, I conclude with community member

suggestions for ways in which the community as a whole can work towards improved health, including family diets, exercise and education programs, and gardening.

Chapter 6 examines the history of 20th century farming and gardening at Akwesasne and its decline among recent generations. In addition to the concerns about contamination mentioned earlier, Akwesasne farms faced a multitude of other challenges, including the cost of modernization, the entry of most residents into the wage economy, and a lack of interest among the younger generation. Within this context, I explore the two main suggestions that have been considered to help financially support residents interested in farming: the formation of a Tribal Conservation District, and a proposed form of subsidized farming from potential Cultural Impact Assessment funds. I asked residents whether they thought the community would take advantage of either of these opportunities, and while some would, the general consensus was that most people were not ready to return to full scale farms, but rather smaller projects like gardening. Within this context, I discuss community member's opinions on the importance of maintaining gardens, because of their connection to the ceremonial cycle, the importance of food sovereignty, and the responsibility that Mohawk people have to their heritage seeds. Despite these sentiments, everyone agreed that there are far fewer gardens in the community currently than in previous generations. This is due to concerns about potentially contaminated soil, but also due to a lack of free time in households where all members work, and the ease at which many community members can acquire their food from the grocery store rather than growing it. Community members had a number of ideas, however, for ways in which to encourage people to get back into gardening, including soil tests to assuage fears about contamination, education for adults and

children to provide information about growing food and storing it, and a reshaping of the local economy to better support farmers and gardeners.

In conclusion, the link binding each of these seemingly disparate topics are the frameworks which community member suggest as solutions, for everything from health study report back, health interventions, and for creating healthier bodies through growing traditional foods. Within the suggestions of community members around each of these topics I have structured in three layers, and the bodies they incorporate. This is based loosely on the three bodies (the Individual Body Self, the Social Body, and the Body Politic), laid out by Scheper-Hughes and Lock in their 1987 article "The Mindful Body." Scheper-Huges and Lock created this model to explicate on different perspectives in which medical anthropologists can view culturally perceived bodies. I utilize this framework a little differently, as I find that these three levels of the body are useful ways of examining what community members see as the locus of control or source of some of their health issues, and how those can be addressed. Akwesasne community member suggestions for remedies to many of the local issues fell into three categories: individual, communal—involving social bodies, and structural—involving political bodies. While any issue should be tackled from all three levels, the communal or social level was often the middle ground where many community members felt that the most feasible solutions would be implemented. In a similar vein, I draw from a model described by Sillitoe (2002) which consists of overlapping spheres that illustrate the meeting ground between local science or traditional environmental knowledge (TEK) on one side and global or technoscience on the other side (see Figure 5). I argue that community based participatory research (CBPR), effective health interventions, and environmental

education outreach exist in the middle ground where the spheres meet, and the views of both the community and science are taken into consideration.

In speaking to one member of the community who has been involved in both environmental organization and the health studies, Brenda, she described how when people focus only on the negative history of environmental contamination, it draws the energy out of them. Conversely, when people speak about positive things, and focus on ways they can bring about change, it lifts the energy:

> You see how the energy changes? Like when you talk about the contamination and the losses and you could feel the energy go down but when you start talking about these things the energy goes up and you can feel that energy and you can feel that energy go up. I think that's more important than the contamination, that we start to gain and recover and reassert our own who we are in spite of what's around us.

My effort throughout this manuscript is to present the struggles and issues facing Akwesasronon, but also to bring the energy back up by bringing together all of the suggestions and solutions from both the community's perspectives as well as examples I have read about or witnessed in other communities. I recognize that many of the suggestions that I have compiled here are directed towards departments of hard working individuals with limited budgets who might find it nearly impossible to implement all of them, or who may have tried similar plans in the past without success. However, I found it important to bring awareness to the variety of community opinion, and begin a dialog around some of these solutions.

Chapter 2:
Peace, Power, and Righteousness:
Epics of History, Change, and a Legacy of Distrust

There is no a-political telling of history. The history of Akwesasne as written by outside versus Native scholars, and even from different parties within the community, can tell a very different story. What I have attempted to construct below is a version of aspects of the community's cultural and political history that includes several voices, from academic non-Native "Iroquoianists," Mohawk scholars and historians, and newspaper articles, federal reports, and interviews. My goal is to place the current political, cultural and economic situation at Akwesasne in the context in which the events explored in the rest of this dissertation are taking place. In laying out three major cultural events in which a great deal of Mohawk cultural explanation is couched today, I have organized the early portion of history into three epics,[12] which "is done deliberately in order to describe the culture in its own terms, for locked up in these three Iroquoian epics are the major institutions of their culture as well as the themes that guide behavior throughout their history and illuminate certain actions even today" (Fenton 1962:283 and 1998: 34). Explored within these epics are the three core values of peace, power, and righteousness, which structure the Great Law and provide current Mohawk people with a model for maintaining balance. In addition, I will briefly describe the very complex antecedents that have led to the three tribal governments at Akwesasne today, and the struggle the community has faced in their efforts to remain sovereign from New York

[12] Johansen and Mann (2000) and Mann (1997) use the term "epoch," indicating periods of time in Haudenosaunee culture, and describe that we are currently in the third epoch. On the other hand, Fenton (1962, 1998) uses the term "epics," which refer more to the specific events that shape these periods of time. While Mann's "epochs" make more sense in defining and discussing Haudenosaunee history more broadly, for the purpose of this particular chapter, I use "epics," as I am demonstrating how these culturally defining narratives shed light on particular aspects of Mohawk history relevant to the issues at Akwesasne that I will be discussing later.

State. These interactions with the state, and the connection that community members see between the state and the Tribe and its affiliated departments have led to expressions by some of distrust of these institutions, which has had, and will continue to have implications for the implementation of any programmatic solutions to the community's health and environmental difficulties.

History: The Three Epics

Haudenosaunee (Iroquois) history can be divided into three epics that have loosely come to define traditional Haudenosaunee culture: the Creation Story, The Great Law of Peace, and Handsome Lake and the founding of the Longhouse religion (Johansen and Mann 2000; Fenton 1962, 1998). Within the context of this framework I have also laid out the aspects of Haudenosaunee and Mohawk history relevant to later explorations of health and environmental change.

I. The Creation Story

The Mohawk Creation Story,[13] *Tsi Kiontonhwentsison*,[14] tells of a pregnant woman who fell through a hole in the Sky World, bringing with her the seeds of strawberries and tobacco. As she plummeted towards the watery world below, birds caught her in their wings and laid her on the back of a large turtle. A number of water creatures attempted to bring up sediment from far below the water's surface, each returning to the surface gasping and empty handed. The muskrat finally succeeded in grasping some sediment, although perishing in the process. Sky Woman spread this sediment over the turtle and danced in counter clockwise circles to enlarge the surface.

[13] What I have provided is a succinct summary of a story that has many nuanced versions depending on the teller and their nation of origin. Many older versions of the story go into greater detail regarding life in the Sky World, and the adventures of the twins, with some recitations taking up to two days.
[14] literally "When the Earth Was Made" (Gray and Lauderdale 2006:40)

She gave birth to a daughter who matured and was impregnated by the West Wind. The daughter in turn gave birth to twin sons, the good-minded right hand son who was born naturally, and his contrary left-handed brother who insisted on making his own entrance through her armpit, killing her. Sky Woman buried her daughter's body, and from it sprouted the tobacco and strawberries that Sky Woman had brought with her, as well as corn, beans and squash; the three sisters crops that would sustain the Haudenosaunee. These two brothers fought constantly, the good twin *(Sonkwaienthison*, Creator) forming plants, animals, and humans in his image and his brother corrupting them. Through a series of events, *Sonkwaienthison* gave ceremonies to the people to celebrate all that they were thankful for, and to remain triumphant over the evil brother. These ceremonies are still practiced in Haudenosaunee Longhouses today and many are based on the horticultural cycle, celebrating events around maple sugar, seed planting, strawberries, string beans, green corn, and the fall harvest. Some aspects of the ceremonies reflect qualities of the plants being celebrated: Akwesasne midwife Katsi Cook described to me how when the women dance during ceremonies, they "weave like bean runners." This horticultural tradition that began in the body of Sky Woman's daughter continues to shape Haudenosaunee culture today.

Akwesasne residents today still relate the importance of taking part in the growing cycle as a necessary tie to the Creation Story. One woman, Gina, described to me how her father would instruct her in growing, based around this story:

> He'd tell me plant three seeds, one for the birds, one for the creator and one to grow up. And then he'd make me dance around it and --I guess that was his way of giving thanks or praying, saying "please grow"… and then as I got older and I read the Creation story and that's what it says in there that she danced around and Mother Earth became bigger and bigger. So maybe he was teaching me the story and I didn't know it.

Another man (8C) explained, “We relate everything to the Creation Story. Our answers are in the Creation Story. So that’s how we plant.”

Louise, a Bear Clan mother at Akwesasne, has begun to host rites of passage ceremonies for the young women. These ceremonies bring them together as a cohort for fasting, sweats and ceremonies, as well as for teachings from older women in the community about coming into womanhood, learning necessary skills, and respecting their bodies. Louise decided to develop a Mother Earth garden based on the Creation Story mentioned above, so that the girls could understand the importance of planting at the same time as coming into an understanding of their own fertility. She created a mound of dirt in the shape of a woman, and just as the crops sprang forth from the body of Sky Woman’s daughter, she had the girls tuck in plants and seeds around the figure. They planted tobacco at her head, because burning tobacco brings a good mind. A strawberry plant, whose crushed berries resemble blood, sprang from her heart. Corn, whose kernels turn milky as they ripen, was planted at her breasts. Squash, with a curly vine like an umbilical cord grew from her belly button. String beans were planted at her hands, the long beans which would grow later in the season dangling from the plants like fingers. At her feet, they planted potatoes, which grow to look like the bottoms of human feet that have been walking in fresh dirt. When they were finished, Louise explained to the girls that they would have to come back and take care of this garden—seeds are like babies and need to be nurtured and cared for properly.

Louise also described to me how she had heard of elderly people inviting pregnant women to spend time in their gardens. These women were in the prime of their fertility, and elders believe that this fertility would be passed along to the garden plot. In

Mohawk culture, understandings of the garden and the body are woven together—women and plants share qualities in common and sustain each other. Qualities of the human body are passed along to plants, which then nourish Mohawk bodies.

Mohawk villages were historically located in what is now eastern and central New York State. Families, related through matrilineal clans (the Bear, Wolf and Turtle) lived in longhouses, typically consisting of an elder woman, her husband, their daughters and daughters' families, and the couple's unmarried sons. Clans determined descent, and controlled and distributed farmland to members (Bonvillain 2001). Women planted varieties of corn, beans, squash and sunflowers, and men supplemented these foods by hunting deer, bear, and fishing. Strawberries, raspberries, blackberries, and blueberries were gathered in season, dried in the sun on bark trays and stored in sacks for the winter to be baked into bread. They also gathered hickory nuts, walnuts, beechnuts, chestnuts and acorns. In the spring, wild onions and other succulents like skunk cabbage, pokeweed, milkweed, as well as groundnuts (wild potatoes *Apios Americana*) were collected (Fenton 1978). In early spring, women also extracted sap from maple trees, and boiled it into syrup to sweeten corn dishes and teas. Women were responsible for the food production and its distribution, which was a crucial factor in their status in households and communities. They allotted food for daily consumption, collected and distributed supplies for public feasts and ceremonial occasions, and dispensed the food (typically in the form of dried cornbread and meat) to men setting out on hunting, trading or warring expeditions. If women were opposed to a mission, they could withhold food from the men (Bonvillain 2001).

In addition to providing a framework for the spiritual aspects of Haudenosaunee culture, horticulture served as a main source of food, the ability for many communities to thrive, and ultimately the development of political power and strength among the Haudenosaunee. Thomas Wessel (1976) attributes much of the Iroquois confederacy military success to the consistent supply of food provided through their crops. Jacques Cartier, in his exploration of the Saint Lawrence River in 1535, reported in his journal seeing large fields of corn under cultivation surrounding Iroquois villages. Henry Hudson, during his 1609 travels on his travels up what is now called the Hudson River, reported in his journals that he saw extensive fields of corn under cultivation and large stores of grain (Mt Pleasant 1989:38). Another Dutchman, Arendt Van Curler, who traded with the Mohawks in the 1630's and 40's, wrote similarly that, "The houses were full of corn ... we call maize; yes, in some houses more than 300 bushels... We ate heartily of pumpkins, beans and venison…so we were not hungry but were treated as well as possible on their land" (cited in Goodman-Draper 1994:43).

Corn production was such a key component to Haudenosaunee survival that Europeans and Euro-American seeking to defeat them attempted to destroy Indian agriculture. For example, during his campaign in 1687 to try to destroy the Haudenosaunee Confederacy, the Frenchman Marquis de Denonville reported that he destroyed more than one million bushels of corn (Mt Pleasant 1989:33; Parker [1910]1968a:18). This trend continued into the 1700's: General Sullivan in 1779, described cornfields of 60 and 200 acres, and claimed that his military campaign against the Iroquois destroyed 160,000 bushels of corn and a vast amount of vegetables of every kind (Waugh 1916; Parker 1968a:19). Journals written by soldiers documenting the

Sullivan campaign also documented the variety of vegetables and fruits being grown in Iroquois fields; corn, beans, squash, cucumbers, watermelons, pumpkins, muskmelons, and orchards of apples, peaches, and plums trees (cited in Parker [1910]1968a).

The traditional territory of the Mohawks, the region where their principal villages were located, was a section of the middle Mohawk Valley in what is now part of Montgomery County. Their hunting territories extended north into the Adirondack Mountains and south down to the East branch of the Susquehanna nearly to Oneonta. As the easternmost of the Haudenosaunee tribes, the Mohawk were the first to feel the impact of European activities along the eastern seaboard (Fenton and Tooker 1978: 466-467).

Like much of Akwesasne's history, the description of its settlement is not clear-cut nor free of political implications. Most historical descriptions (Bonavillian 2001; Fenton and Tooker 1978) place the founding settlement of Mohawk people at what is now referred to as Akwesasne in the mid 18th century. The nearby Mohawk communities of Kahnawake (originally Caughnawaga) and Kanesatake were established as Catholic mission settlements around what is currently Quebec City and Montreal in the late 17th century. The settlement at Akwesasne was founded sometime between 1747 and 1755 by emigrants from Kahnawake who were seeking additional land to grow crops, as the land in Kahnawake was becoming rapidly depleted. In his history of Akwesasne, Mohawk scholar Ray Fadden (1947) attributed the influence of fire water among the Caughnawaga Mohawks was one of the reasons why some Mohawks left. The archaeological and historical record show the presence of earlier communities, but Trigger and Pendergast (1978) refer to previous residents along the St. Lawrence as the "Saint Lawrence

Iroquoians," as distinct from the Mohawk, who were encountered and described by Cartier's descriptions, but who had disappeared by the beginning of the 17th century. These archaeologists deny that these residents were related to the Mohawk, based on linguistic evidence gathered by Cartier, and their subsistence patterns determined through the archaeological record. They instead posit that "the Saint Lawrence Iroquoians as a whole represent a distinct branch of northern Iroquoians who lived in the Saint Lawrence valley at the same time that the Iroquoian groups who survived into the seventeenth century were living in Ontario and New York" (Trigger and Pendergast 1978: 360).

Some Mohawk scholars however, like Salli Benedict, assert that Akwesasne is territory that has been utilized by Mohawk people since time immemorial:

> Our Mohawk place names record our ancient sites, activities, and relationship with the environment here… Our oral traditions are maintained and often guarded from external review. Some of the stories that have been transferred generation after generation record the first human habitation of this region and record the retreat of the ice sheet and the succession of plant and animal life that reinhabited this area once the area rebounded from the weight of the ice… Our people maintain knowledge of the traditional territory and a strong bond with the place and people encompassed by Akwesasne in all phases of its existence (Benedict 2007: 425).

Benedict asserts that her ancestors and predecessors are all from Akwesasne, and claims that arguments for later settlement are part of efforts to dispossess Mohawk people of proper title to the land. In this way, scholars are alienating Akwesasne Mohawks from land through historical writing as well as the land claims process. Tarbell and Arquette (2000:94) similarly describe: "Akwesasne includes the land and waters where the Mohawk people have raised their families, fished, hunted, and buried their dead for thousands of years." Doug George-Kanentiio (2006) cites oral tradition around a large Mohawk village on the peninsula that juts into the confluence of the St. Lawrence and St. Regis rivers, where a Catholic church now stands. By the end of the 16th century, the

Mohawks had retreated from Akwesasne, due to various European-born plagues and the onset of war with Algonkians and their allies, which compelled the Mohawk to retreat to the Mohawk Valley area in central New York State. After several generations, Mohawks returned to the area, after first settling at Kahnawake. Akwesasne Mohawk historian Darren Bonaparte, through examining Pendergast and Trigger's work (1978) describing Cartier's meeting with the Hochelaga, as well as the "Jesuit Relations and Allied Documents" concludes that the St. Lawrence Iroquoians "spring from the same ancestral source as the Five Nations." These Saint Lawrence Iroquoians of Hochelaga, "although scattered and absorbed by the Five Nations and other surrounding tribes, would one day return to that region where their adoptive nations established settlements there in the 17th Century" (Bonaparte 2007: Chap 1). While Pendergast and Trigger's description of the separate origins and distinct culture of the Saint Lawrence Iroquoians preclude them from being the ancestors of any contemporary Iroquois group, they suggest the possibility of "using later Iroquois victories as analogies, it appears highly likely that some of the defeated Saint Lawrence Iroquoians were absorbed by the Mohawks" (Trigger and Pendergast 1978: 361). Similarly, Bonaparte agrees that the Saint Lawrence Iroquois were adopted by the Mohawk, as were some Abenakis and Onondagas during the 18th and 19th centuries. The presence in Akwesasne today of deer clan and snipe clan people among the traditional Mohawk bear, turtle and wolf clans are evidence of this adoption (Bonaparte 2007: Chap1). While some historians and archaeologists prefer to draw tidier lines of descent and cultural boundaries, for some Mohawk historians, cultural processes of adoption and diffusion have connected the nations of this region.

II. Great Law of Peace, founding of the Haudenosaunee (Iroquois) Confederacy

The Great Law of Peace "*Kaienerekowa*" is cited today as the source of traditional laws and principles that provides the political and spiritual structure of the Haudenosaunee Confederacy. The Great Law also reaffirms sacred ceremonies, songs, dances, and the clan system (Gray and Lauderdale 2006:34; King 2007). The telling of the entire story can take days, according toformer Wolf Clan subchief of the Mohawk Nation Council, Jake Swamp, whom I heard narrate what he called a "Reader's Digest," one-and-a-half hour version of the story in which he was only able to scratch the surface. Similar to the Creation Story, Iroquoianist scholars have also collected a number of slightly nuanced versions of the League's foundation (Fenton 1949; Hale 1963; Hewitt 1920, 1930, 1892; Morgan 1851; Parker 1916; Johansen & Mann: 2000). The variety of stories share some common elements.

The separate nations who would eventually come to form the Confederacy were in a time of war, struggle and strife. A man known as the Peacemaker was born to a Huron woman on the shores of Lake Ontario. When he grew older, he carved a canoe from stone and paddled across Lake Ontario where upon he then traveled throughout territories of the warring nations spreading a message of peace and strength in unity. He recruited Jigonsaseh, a female Seneca leader, to join in his cause and promote peace, initially by withholding food from passing warriors. For her cooperation, she was made the head clan mother, and the roles of other clan mothers were revived and strengthened. The Peacemaker also recruited Hiawatha (or Aiionwatha), a Mohawk man who created the condolence prayer after the death of his daughters, and who became the spokesperson for the movement. Together, they worked to recruit each of the five Haudenosaunee

(Iroquois) Nations to come together to form a confederacy that would bring peace among member nations and strengthen them to act as a unified body in peace and war with other nations. They demonstrated to the people how one arrow could be easily broken, but when brought together, the bundle was almost impossible to break. The last nation to agree was the Onondaga, led by an evil sorcerer named Tadodaho (or Adodaroh) who had a nest of snakes for hair. The Peacemaker (or in some versions Hiawatha) combed the snakes from his hair and straightened his twisted and misshapen body and thereby his mind. The Onondaga nation was then offered the position of fire keepers. A great white pine tree was uprooted, and the weapons of war from each nation were buried under it. An eagle was placed atop the tree to keep guard, and sound a warning should anyone try to disturb the peace. The tree is said to have four white roots, which nations can follow back to the tree to achieve peace.[15]

The confederacy is symbolized as a great Longhouse, with the Mohawk as the keepers of the eastern door, the Seneca the keepers of the western door, and the Oneida, Onondaga, and Cayuga in between. Within each nation, clan mothers, who are select older women of each clan, choose and depose chiefs. Each clan mother appoints a r*oiane* (chief), as well as a subchief, a male faithkeeper and a female faithkeeper, bringing together five people working together under one hereditary title. For the Mohawk Nation, there are nine hereditary titles, three in each of the turtle clan, wolf clan, and bear clan (King 2007). Decisions are made through consensus rather than through a democratic vote. As an entire council, the Five (later Six) Nations, comprised of 50 chiefs, meet at Onondaga, the most centrally located nation and the seat of the fire. Before any action

[15] In the late 1960's and early 1970's, a group of Haudenosaunee known as the 'White Roots of Peace" traveled around the country carrying the message of the Great Law of Peace

can be taken by the Confederacy, all the chiefs who constituted the council of the league have to agree, have to be of "one heart, one mind, one law." If not, the issue is set aside (Tooker 1978:422).

The *Kaienerekowa* is not just an origin story for the Confederacy, but represents "a complex combination of spiritual and political rules… containing regulation for spiritual ceremonies, political leadership, warfare against external enemies, justice, international relations, funerals, adoptions and the resolution of internal disputes" (Fenton 1986:20). Three concepts have come to be synonymous with the Great Law of Peace: *skennen* (peace), *kasatstenhse:ra* (power), and *kanikonri:io or kariwiio* (righteousness).[16,17] The Kaienerekowa is based on six principles, all of which are captured in the three terms mentioned above.

The Peacemaker brought *skennen*, peace, in order to end the bloodshed between nations. The white pine tree under which the weapons of the warring nations were buried has come to stand for peace.[18] Skennen, as applied to the body politic, denotes peace and tranquility. As applied to the individual human mind/body, it denotes health or soundness, the normal functioning condition. Its antithesis is war, strife and contention, or disease, illness, and obsession.

The second term, *kasatstenhse:ra* (power), was demonstrated by the Peacemaker when he held up the bundle of arrows to demonstrate that unification meant strength. Hewitt notes that for this word the first denotation is force, expressed in the war power of

[16] I have taken the spelling of these terms from King 2007

[17] The following synopsis is taken from Hewitt's papers, published as footnote 3 in Fenton 1998:86, as well as a lecture by Akwesasne Mohawk Kanentohare (2010). Hewitt uses the words ne?skennon', ga:I'hwi yo and ga?shasdensa? In his lecture "Ohontsiawakon," Kanetohare (2010) uses the Mohawk terms, skennen, *kanikonri:io, and kasatstenhse:ra.*

[18] Jake Swamp, former Wolf Clan subchief of the Mohawk Nation Council of Chiefs founded the Tree of Peace Society , for which has traveled around North American and the world, planting thousands of white pine trees and doing presentations to share the message of the Great Law of Peace.

the people. The second meaning is the power, force, authority of the *orenda* or as Kanetohare (2010) terms it, the life energy force. A strong healthy society has the power to enact peace.

The third term, *kanikonri:io,*(literally "good mind") *or kariwiio* (good word, or good message*),*[19] is not as easy to translate into English but has generally come to be called righteousness. Hewitt states that the first denotation is wholesome doctrine, what is good to be heard, ethical teaching, values, and righteousness. The second meaning, which Kanetohare (2010) highlights, denotes justice, right, as formulated in the customs, manners, religion, and ritualistic summations of past experience of the people. The first is the teaching of the good doctrine, the second is the establishment of the good doctrine in institutional form. Together, these terms create the Great Law. As I will discuss in Chapter 4, when the Akwesasne Task Force on the Environment (ATFE), an environmental organization at Akwesasne, sat down to develop the Good Mind Research Protocol for any researchers coming to Akwesasne to follow, they based it on the principles of peace, power, and righteousness.

At the turn of the 17th century, Mohawks at the eastern door of the confederacy, occupied three main fortified villages in the Mohawk River valley, which they customarily remained in only as long as the palisades and the local resources lasted, typically about twenty-five years (Frey 1898:13). This century was characterized by plagues, wars between Europeans and Native people, and among Native nations, and the work of missionaries to convert the Iroquois to Christian religions. Caughnawaga

[19] I have seen both terms used to express this third concept in the triad, righteousness. Kanikonri:io (used in King 2007 and Kanetohare (2010) literally means "good mind" and kariwiio (used in ATFE 1996) literally means "good word." An informal survey among Mohawk friends returned mixed opinions on which was the more appropriate term to fill this spot.

(present day spelling Kahnawake, meaning "at the rapids") was a village initially founded by French Catholics near present day Fonda New York, but relocated to the banks of the St. Lawrence River near Montreal in 1669 (Frisch 1970). In 1755, a few families moved from Caughnawaga and started a new settlement farther upriver on the St. Lawrence, called by the Mohawk "Akwesasne," named St. Regis by the French after a Jesuit missionary (Frisch 1970:61). The community's alliance switched from French to British in 1760 as the British began defeating the French during the French and Indian War.

The Akwesasne Mohawks belonged to the Seven Nations of Canada,[20] a loose confederation formed sometime during the 18th century. The cultural model of this new confederacy was an altered version of the Haudenosaunee Confederacy, with 12 chiefs[21] chosen for life by clan mothers. Member Nations were initially all allies of the French, but then transferred this alliance to the English in exchange for a guarantee that their land rights would be protected. After the American Revolution, the Treaty of Paris (1783) drew the boundary between British North American and the United States at the 45th parallel. In 1791, Alexander Macomb bought over 3 million acres of land in northern New York, setting aside 6 square miles and two islands for the use of the Mohawks (Fenton and Tooker 1978: 477; Frisch 1970: 72). A series of delegations met with New York State to assert their claims to land that had been taken by the state. The dispute was resolved in 1796 when a treaty was signed with the Seven Nations of Canada ceding all of the St. Regis Lands on the American side, except for the six miles square near Saint

[20] Member nations included Caughnawaga Mohawks; Kanesatake (Oka) Mohawks, Algonkian, and Niippisings; Abenakis of Odanak (St Francis); Hurons of Wendake (Lorette); and the Iroquois (mostly Onondagas and Cayugas) of Oswegatchie who the St Regis Mohawk replaced (Frisch 1970; Bonaparte

[21] Three chiefs each were chosen for the Turtle, Wolf and Bear Clans, as well as the Snipe clan, which had come into the community with an influx of Onondagas.

Regis Village, a square mile on the Salmon River (now in Fort Covington), a square mile on the Grasse River, and meadows on both sides of this river. A series of treaties between 1816 and 1845 sold off most of the land that the Mohawks had claim to, except for about 14,000 acres in New York, 7,384 acres in Quebec and 2,050 acres on Cornwall Island in Ontario, which make up the current community (Fenton and Tooker 1978: 477). In recent decades, Akwesasne Mohawks have begun to pursue land claims against the State of New York for acquiring these lands from the Mohawk without the intervention of the United States federal government, contrary to the 1790 Trade and Intercourse Act that prohibits such exchanges.

As New York State became more involved in the affairs of its indigenous residents, this came to affect how Akwesasne was governed. In 1802 the New York State legislature appointed three trustees for the tribe, (two of whom had signed the 1796 treaty mentioned previously), and stipulated that from then on males 21 years of age and older would elect a clerk and trustees to make rules and regulations. This new government directly contradicted the previous form of government, in which clan mothers chose chiefs that served for life terms, or as long as they were deemed qualified. In 1890, New York State created the St. Regis Tribal Council from its earlier composite of the three trustees, who were now recognized as chiefs for the American half of the community, although not accepted by a portion of the community who pledged allegiance to the traditional government. Mohawk people who currently support the present elective form of government, the St. Regis Mohawk Tribe, contend that the 1802 statute was enacted at the request of the Mohawks at Akwesasne, and it incorporated elements of the traditional

system, including sitting some of the life chiefs as trustees (Starna 1993).[22] Mohawks who currently support the traditional government, the Mohawk Nation Council, describe this new government as forced on the people.

The twelve life chiefs continued to serve as the governing body on the Canadian portion of the reserve until the Canadian Indian Act of 1876 provided for elected tribal leaders, as well as the registration of Indians according to patrilineal descent. This led to a loss of status among Indian women who married non-Indian men, or men from the American half of the reservation. A supporter of the life chiefs, Jake Ice, or *Saiowisaké:ron*, was shot and killed by Canadian police on May 1, 1899, as they arrested the life chiefs for preventing elections from being held the previous summer. The chiefs were released from jail when they agreed not to oppose future elections and thereupon became something of an "underground" movement with no formal recognition by outside authorities (Bonaparte 2007). A large wooden statue of Jake Ice stands at the (currently abandoned) Canadian customs office on Cornwall Island. During the summer of 2009 when Mohawks were protesting the decision by the Canadian government to arm their border guards, Jake Ice was held up as an example of past aggression by armed Canadian authorities.

In April of 1888, a general council of the Six Nations Confederacy was held at the Allegany Seneca Reservation. The council passed a resolution adopting the St. Regis Mohawks as the successors to the Mohawk position in the Confederacy, essentially making Akwesasne the capital of the Mohawk Nation. The nine original Mohawk titles were given over to Akwesasne and nine chiefs were selected. However, the federal

[22] The end of every press release issued by the SRMT includes the clause: "The St. Regis Mohawk Tribal Council is the duly elected and federally recognized government of the St. Regis Mohawk People."

governments, who only recognized the tribal governments that they had installed, did not recognize these chiefs.

In 1948, in an attempt to eliminate the state-supported elected tribal government, Mohawks supported a slate of tribal chiefs who dissolved the state-sanctioned council upon taking office, in an attempt to turn power over to the traditional chiefs. New York State refused to recognize these traditional chiefs, and then staged an "election" under state police guard in which low number of Mohawk voted (Bonaparte 2007: Johansen 2000). This same year, on July 1, 1948, Congress passed the criminal jurisdictional transfer bill, and then in 1950 a civil jurisdiction bill, that transferred jurisdiction over all Indians in the state of New York over to the state (Hauptman 1986, 1988, 2008). The transfer bill was "opposed by 99 percent of all Indians in the state of New York" but passed nonetheless (Hauptman 1986:38). This bill declared that tribes within New York "freed from Federal supervision and control" and in the hands of the state.

Currently, the portion of the reservation that falls within the borders of New York State is governed by the St. Regis Mohawk Tribe (SRMT or "Tribe"[23]), with three elected chiefs, three elected subchiefs, and a tribal clerk comprising the tribal council. The Tribe became federally recognized and eligible for federal funds in 1973. On the portion of the community that falls within the Canadian border, the federal government recognizes the Mohawk Council of Akwesasne (MCA), composed of 12 district chiefs and a Grand Chief. The Mohawk Nation Council of Chiefs (or "Nation") represents the traditional government of chiefs selected by clanmothers, and considers the entire territory of

[23] Throughout the manuscript, Tribe (with a capital 'T'), refers to the St Regis Mohawk Tribe government (who residents often referred to as "the Tribe"), whereas tribe (with a lower case' t') can refer to the collective group of Mohawks living in Akwesasne.

Akwesasne within its jurisdiction, although the United States or Canadian federal governments do not recognize its status.

The St. Regis Mohawk Tribe Environment Division (SRMTED) grew out of a single position sponsored by the federal Indian Health Service (IHS) and today has developed into a larger unit funded in part through the federal Environmental Protection Agency (EPA), with divisions for air quality, forestry, solid waste management, water resources management and a wetlands protection program. The Mohawk Council of Akwesasne also has a Department of Environment, run through grants acquired for each individual project they take on, and through funds from the MCA government and the International Joint Commission, which was established by the Boundary Waters Treaty signed by the US and Canada in 1909. Because they do not receive the federal support that the SRMTED does, they are a much smaller department. Each tribal government also has an affiliated medical clinic, which receives funds from the federal, state and provincial governments in which each clinic is located. This divided political body has meant that rather than focusing collectively on issues of health and the environment, the efforts of individuals are divided by the funding limitations of the sponsoring parties for their specific department. Many supporters of the Mohawk Nation Council are also resistant to accepting federal or state money for projects.

III. Handsome Lake and the Development of the Longhouse Religion

While the Great Law is seen as providing the structure of Haudenosaunee politics and religion, the *Kariwiio* or Good Word of Handsome Lake adapted and reaffirmed aspects of it for Haudenosaunee people in a changing era. At the turn of the 19th century, the Haudenosaunee had suffered poverty, defeat, loss of land, the hostility of white

settlers, and the crushing blow of Sullivan's campaign. In 1799 Seneca chief Handsome Lake fell into a coma, and awoke with a vision given to him by four beings for the Haudenosaunee, who were becoming increasing fragmented due to alcohol, disease, war, and other outside cultural influences. Parker (1968[1910]:14) notes, "the success of Handsome Lake's teachings did much to crystallize the Iroquois as a distinct social group." His teachings, known as the *Kariwiio*[24] or Good Word created a revolution in Iroquois religious life, reviving the traditional religion and mixing with it elements borrowed from the Christian faith. A Wallace (1966: 32) describes, "His code was a blueprint of a culture that would be socially and technologically more effective in the new circumstances or reservation life than the old culture could ever have been." The Code of Handsome Lake recommended that the Haudenosaunee preserve traditional ceremonies, like the cycle of ceremonies celebrated around the growing cycle, but also take on some practices of their white neighbors. This included cultivating fields, building houses, and keeping horses and cattle, with the belief that each of these things would help to sustain the family if the man of the house should die (Parker 1968[1913]:38). The Handsome Lake Code also proscribes that its followers will not drink alcohol, gamble, gossip, or engage in witchcraft. Parker reported that there is no record of Handsome Lake visiting St. Regis, with the result that at the time of his writing in 1910, the community contained "only Indians who are nominally Christian" (1968[1910]:14) .

During the early 1930's Onondaga Longhouse faithkeeper Alex Clute settled at Akwesasne and began to teach the Kariwiio. The Handsome Lake Code fit into an already existent culture pattern there: the Code urged men to take up agriculture, which

[24] This is the Mohawk term for Good Word. Each of the other nations in the Confederacy have their own linguistic terms.

had formerly been considered women's work, but this was not incompatible with the St. Regis culture of the early twentieth century where many men were successful farmers[25] (Wallace 1966; Frisch 1970). With the restructuring of many Haudenosaunee communities after conflicts with the Americans, men joined in the work of cultivating food. As Seneca historian and archaeologist Arthur Parker writes:

> With the breaking up of the military power of the Iroquois and the subjection of all Indian tribes to the federal government, the men were left freer. War with them was over. The disdain which they had for field labor, and the feeling that it was not a part of their work clung for some time, but as the old reason for abstaining from field work passed away and as the environment of the white man was forced up on them, the Iroquois man gradually became the man with the hoe and thought it no disgrace (Parker [1910] 1968a: 24).

In writing about Akwesasne's neighboring reserve, Kahnawake, Bonvillain (2001:83) notes, "during the 18th century, Kahnawake Mohawks pursued a mixed economy of farming, hunting and fishing. In addition, they raised European livestock such as pigs, poultry and horses." In the 19th century, Kahnawake men had less access to the forests necessary for their hunting expeditions as Canadian settlements expanded. As a result, they gradually abandoned these expeditions, and farming gained in importance in providing food for residents and produce for sale in neighboring communities. Ricciardelli (1963) provides a similar story for the 19th century Oneida, who transitioned from hunting and war activities to farming as the principal ideal role for men.

As the 20th century progressed, the Longhouse religion slowly gained in numbers at Akwesasne—at the time Wilson (1959:8) was writing, there were 300 Longhouse

[25] The 1890 census notes a number of farms on the St Regis reservation, and when Parker was writing of the Code of Handsome Lake in 1910 (Parker 1968:14), he noted that the Indians at St Regis were "progressive enough not only to use all their own lands but to rent from the whites."

followers, 300 Protestants, and 1700 Catholics. Seneca scholar Barbara Mann (2000:151) notes, "During the general Native renaissance of the 1970's, many young New York Haudenosaunee began looking to it (the Longhouse) as a way back to their roots." Currently about a quarter of the community belongs to the Longhouse.[26] Ceremonies held in the Longhouse include marriages, namings, mourning rites, healing rituals, and condolences for new chiefs. In addition, there are an almost monthly series of ceremonies whose precise times are determined by the faithkeepers, and are generally based around the growing cycle. The cycle begins with the Midwinter Ceremony held in January, followed by the Maple Ceremony in late February, the Thunder Dance in March, the Seed Ceremony and Planting Ceremony in May, Strawberry Ceremony in June, the String Bean ceremony in July, the Green Corn Ceremony in August, the Harvest Ceremony in September or October, another Thunder Ceremony in November, and the End of Season Ceremony in December (George-Kanentiio 2000). When the date for each ceremony is set, the event is advertised through word of mouth, and in ads in the local newspaper announcing the date and requesting that those attending wear traditional clothes, bring strawberries which are made into a drink for everyone to share, and each their own bowls, which women carry in baskets. Participants also contribute bread to be distributed to participants, and meat, corn, beans, or squash to add to the large soup that women prepare in the cookhouse. Each ceremony is opened with The *"Ohenton Kariwahtekwen"* or Thanksgiving Address, which addresses different aspects of the environment as family. The Address gives thanks to the natural elements, including

[26] Ciborski (1990: 78) cites community quotes that about 75% of the community was Catholic and 20% Longhouse, 5% Protestant and 1% "Jehovas" In a random sample of 353 Akwesasne Mohawk adults, Santiago-Rivera et al. 200 reported that "religious affiliations were predominantly Catholic, protestant, and traditional Longhouse religions, with 50%, 6% and 28% membership respectively. About 16% did not wish to respond or did not have affiliation."

Mother Earth, grandfather thunderers, eldest brother the sun, grandmother moon, as well as waters, fish, plants, food plants, medicine herbs, animals, trees, birds, the four winds, stars, enlightened teachers, and the Creator. Each section is concluded with "now our minds are one," addressing the importance of peace, balance, and consensus.

In recent years, there has been a division in the Longhouse community, between those who follow the Kariwiio, and another group, affiliated with the Warrior Society movement founded in Kahnawake. The Warrior Society rejects the Kariwiio (Code of Handsome Lake) as the product of white, Christian religion, and thereby the Nation Council as the creation of this illegitimate religion. This group rejects the Kariwiio, and utilizes only the Great Law. These two factions have used different interpretations of the Great Law to support their divergent opinions regarding activities such as gambling and the "inter-territorial import-export business," as one man described it to me. In the early 1990's they separated and a new Longhouse was built down the road from the original. The two Longhouses run a similar cycle of ceremonies, but function separately.

From its inception, a majority of residents of Akwesasne are, or have been, at least nominally Catholic, with many of the first Native American Jesuits coming from the Mohawk. Many are devotees of Kateri Tekakwitha, a 17th century woman born in the Mohawk Valley of a Mohawk father and Algonquian mother who converted to Catholicism. After living a very austere and pious life, she died at the age of 24, and became an example of Catholic devotion held up for other Native people to emulate. She was recommended for canonization in 1844, and beatified in 1980. An effort is currently being mounted to raise her to sainthood (Bonaparte 2009). The Kateri Tekakwitha Hall was constructed on the southern portion of Akwesasne in the 1960's and serves as a

meeting place for the Kateri Tekakwitha prayer circle and other Catholic community events.

Contemporary Issues and Community-shaping Events

Environmental Events: Seaway and Superfund

Mohawk people adapted to a series of dramatic economic changes—the fur trade of the 17th and 18th centuries and in the 19th century work as canoe men, timber rafters, farmers and dairy men. Mohawks were also exposed to the bridge construction trades from the 1870's onward, and have become internationally famous as ironworkers. This skill in high steel has led Mohawks to seek employment in cities, adjusting to urban life, and forming new communities even as they commute home every weekend. Despite these shifts in economy and lifestyle, "the Mohawks of St. Regis (Akwesasne) and Caughnawaga (Kahnawake) had faced their first major modern day crisis to their homeland with the coming of the St. Lawrence Seaway" (Hauptman 1986:135).

The Seaway was a joint project between the United States and Canada, conceived with the plan of opening the Great Lakes to greater traffic, and constructing a hydroelectric power dam to provide electricity and spur industry. Despite staunch efforts to relocation, 1,260 acres of Indian land were expropriated along the Seaway's route, (Hauptman 1986:134) including 130 acres on Cornwall Island for the toll gates, custom house garages, offices, roads and bridge built there after the Seaway was developed (Hauptman 1988: 20). On the southern side, Mohawk land claims to Barnhart Island dating back to 1822 were swept aside by Robert Moses and NYS power authority with the building of two major power houses, high voltage power lines, tow ship locks, and a major beach camp recreation area constructed on the island (Hauptman 2008:175). Eighty-eight acres were also appropriated from Raquette Point. Mohawks sued for

compensation in the 1950's, but the courts denied the claim (Hauptman 2008:177). Construction began in the summer of 1954, and over the next five years, a 27-foot deep channel was opened, stretching the 2,350 miles from the Atlantic Ocean to Duluth Minnesota. The Seaway contains 15 locks and is capable of lifting ships about 600 feet above sea level as they sail inland. Throughout the construction, more than 9,000 individuals were relocated, nearly one hundred square miles were condemned, and $1 billion was spent building it (Hauptman 1986:133). On April 25, 1959, the first ships entered the waterway. Thousands would follow, bringing invasive species from around the world to the St. Lawrence River.

Elders in the community who witnessed firsthand the building of the Seaway noted the social and environmental changes that it brought. Howard has lived most of his life on Cornwall Island and worked on the Seaway construction. He described how previously there had been farmers with cattle, but the Seaway brought jobs, and the men left the farms to work:

> Farmers with cattle before the Seaway. After the Seaway, ruined everything. The money was there to work. They all went to work and then they gave up the farms. Terrible. There were a lot of big farms, a lot of cattle. Now there's only two farmers left...after the Seaway left, after they finished, nobody wanted to farm. The money was good, uh? It wasn't good after though.

He noted that the coming of the Seaway with all of its workers drove up the cost of living in the neighboring town of Massena. When the Seaway was completed, the prices stayed high. He also described how the influx of money, and a decrease in farms, ruined the local bartering economy. He worked on the Power Dam and the Long Sault Dam, but reconciled that "I didn't realize this was going to happen but there's nothing I could do about it. A lot of people worked there. It ruined them. Big money."

The creation of the Seaway also had a dramatic effect on wildlife. Ernie described to me how efforts to deepen the river destroyed the fish habitat. The blasting of rocks:

> Affected the spawning grounds of fish, not only by the blasting but also because of when the blasting was done, they had to clean out all the broken bottom soil and then deposit it somewhere. And of course the easiest place to do it were the inlets and the bays where there were spawning areas and so for a long time fish couldn't make a living out there and so a lot of their work was not done. The fish as you know, have sort of a cleaning action there in swimming – absorbing the water and taking in contaminants deposit it down it in the bottom of the river so getting it out of the way. And so now we had to do without the fish for years.

Islands in the river were covered over "with diggings from the river. And all of these operations, the river was getting pretty messy." Formerly good farmland along the shore continues to be covered with material periodically dredged from the bottom of the river. With the installation of the power dam, he also began noticing cut up eels festering on the shores of the river, creating a stench and attracting birds and insects.

The Seaway also brought industrial plants to the shores of the St. Lawrence. In 1896, the NYS legislature formed the St. Lawrence Power Company with the goal of developing the St. Lawrence River as an energy source (Hauptman 1986). This led to the Aluminum Company of America (ALCOA) in 1903 to locate a plant in Massena, a few miles from Akwesasne on the Grasse River, which flows into the St. Lawrence. Less than 30 years later a biological survey noted serious local pollution problems (Hoover 1986). The power dam, built during the construction of the Seaway, was a draw to additional industries. In the 1950's, Reynolds was the second biggest producer of aluminum in the world. They sought to set up operations in the region after the power dam was built because its operations required a great deal of electricity, and they were seeking cheaper electric rates. They induced the Chevrolet Division of General Motors to set up a plant

nearby to cast auto parts from Reynolds' molten aluminum. Between the two plants, 57% of the American share of the St. Lawrence power was allocated to these two industries, in what was a clear violation of New York State law that required preference to domestic and rural customers (Hauptman 1986:143). The State Power Authority was happy to bring employment to the region, and welcomed the plants.

All three industrial plants are upwind, upstream, and up-gradient of Akwesasne. Before 1968, Reynolds was emitting 300 pounds of fluoride per hour, which were settling directly on the Cornwall Island, Ontario portion of Akwesasne (Hoover, 1986). The environmental crisis was publicized in 1970 before the Assembly subcommittee on Indian Affairs by prominent Mohawk, Dr. Solomon Cook, then a dairy farmer, who blamed the declining prosperity of his herd and the reservation dairy cattle industry on the fluoride pollution from Reynolds and other factories (Hauptman 1988:63). Pollution controls brought the levels down to 75 pounds per hour in 1973 (Hoover 1986), but in 1979 a study published by Cornell University showed the fluoride contamination to be responsible for the death of cattle on Cornwall Island through flouridosis (brittling of bones and teeth) (Krook and Maylin 1979). The effects of this fluoride on the farming culture of Akwesasne will be discussed in Chapter 6.

In 1978 polychlorinated biphenyls (PCBs), which were used in the hydraulic fluids of many industrial plants, were designated a hazardous substance by the Clean Water Act and their manufacture, processing and distribution were banned by the Toxic Substances Control Act. While the official health effects of PCBs are inconclusive, some studies point to nervous system delays, cancer, decreased thyroid function, and autoimmune disorders (Carpenter 2002). PCBs enter the body, either through

occupational exposure or for many people through food, where they are metabolized by the liver. Some are excreted, some are stored in the body's fat. The term PCBs includes over 200 different forms, or congeners. Die-casting machines installed in 1968 at the General Motors plant initially used hydraulic fluids containing a mixture of PCBs called Aroclor 1248,[27] a commercial mixture manufactured by Monsanto Chemical up until 1977. These fluids were replaced with non-PCB fluids in 1973 but residual PCB contamination remained until 1980 when hydraulic fluid reservoirs were twice flushed and refilled (Skinner 1992).

PCB hydraulic fluids were disposed of in reclamation lagoons that were periodically drained and the sludge was buried onsite in unlined pits. The intention of the lagoons was to prevent the direct contamination of the rivers, but these lagoons overflowed into the St. Lawrence at least seven times between January and September 1982 alone (Grinde and Johansen 1995:181). The riverbeds of the St. Lawrence River, Raquette River and Turtle Creek became contaminated. In 1981 the New York State Department of Environmental Conservation (NYSDEC) also found groundwater to be contaminated with PCBs, heavy metals, chromium, mercury and cadmium. GM began distributing bottled water to reservation families (Negoita and Swamp 1996).

In 1983 the 270 acre General Motors site was placed on the National Priorities List as a Superfund site (proposed 1983, finalized 1984)[28], and the company was fined $507,000 for 21 counts of illegally dumping and storing PCB laden waste. In 1985, changes in Superfund law gave the Tribe more power in the process and forced GM to

[27] The four digit number to indicate the weight of the chlorine in the mixture
[28] http://www.epa.gov/region02/superfund/npl/0201644c.pdf

deal with them as a political entity as well. Under EPA's oversight GM placed a cap on the Industrial landfill in 1987 to prevent further migration of contaminants.

Katsi Cook, a Mohawk midwife, began to notice an increase in birth defects like intestinal disorders and cleft palates among the infants she delivered. She and Cornell Researcher Lin Nelson asked NYSDEC Wildlife Epidemiologist Ward Stone to come to the reservation to find out if the toxic contaminants were working their way up the food chain. Stone's results, which will be discussed in greater detail in Chapter 3, found animals in the vicinity of the GM plant that contained thousands of parts-per-million of PCBs, classifying them as toxic waste. Tests done around the area also showed concentrations of PCBs ranging up to 40,000ppm in on-site soils and sludges and up to 5,700 ppm offshore in St. Lawrence River sediment (RMT 1986).

The Tribe's Health Services issued an advisory in July of 1986 recommending that Mohawk residents not eat more than one fish meal per month, lactating women and women of childbearing age not eat any fish, and that everyone should consider fish from the St. Lawrence to be contaminated (Tarbell and Arquette 2000). A year later, the Tribe negotiated with New York State and GM to fund a fish, wildlife and health assessment to determine the effects of the PCBs. The results of the studies in each of these areas will be discussed in Chapter 3. This news destroyed the local fishing economy, which had previously supported a number of Mohawk families.

Ward Stone and Mohawk biologist Ken Jock also began testing in wildlife and sediment in the cove adjacent to Reynolds, and found them to also be high in PCB levels, due to the contaminated effluents that Reynolds had denied and covered up for years. After a great deal of controversy directed towards Stone by a resistant Reynolds, it was

determined that they, and also ALCOA had contributed to the PCB contamination in the river. ALCOA and Reynolds were declared state NPL (National Priority List) sites, and ordered to design a system to clean up the contamination. The ALCOA clean-up on the Grasse River, which flows into the St. Lawrence, is ongoing.

Because the General Motors site was so large, the clean up process was addressed in stages. In 1990, the Environmental Protection Agency (EPA) issued a Record of Decision (ROD), which divided the GM site into two operable units (OU). OUI pertained to the cleanup of the settling lagoons, the North Disposal Area and the contaminated river sediments. The ROD called for the excavation of all contaminated soils on Tribal lands and the GM site, dredging of contaminated river sediment, pumping and treating the groundwater, and treating onsite the contaminated sludge and soil. A 1999 amendment allowed for the waste to be transported offsite to be disposed of in a landfill elsewhere. The cleanup occurring on tribal land had to adhere to the standards set by the SRMT of .1ppm of PCBs for sediments, 1ppm for soils, and 10ppt (parts per trillion) for surface and groundwater. For soils on GM property, the clean up standard was 10ppm (ATFE 1997).

Residents of the neighboring town of Massena and the Tribe had diametrically opposed positions on this cleanup. The tribe called for the landfill to be excavated to prevent any further exposure of Mohawk people in the future, and Massena residents called for it to be capped, concerned that too great a financial hardship would cause GM to lay off more workers. In 1992, OUII was released, addressing the East Disposal Area and the Industrial Landfill, which covered 11 acres and contained waste that was buried between 10-20 feet below the landfill. This operable unit reflected the financial interests

of the industry, stating that GM was to excavate materials from East Disposal area in excess of 500ppm followed by a cap over the area. For the industrial landfill, EPA chose to upgrade the cap and continue to collect and treat groundwater. NYSDEC and the SRMT were outraged, and refused to sign the consent decree because it was not stringent enough (ATFE 1997).

In addition, GM threatened legal challenges to the 1990 remedy, and under their influence in 1995, the EPA proposed that the treatment levels associated with the OUI decision be raised from 10ppm to 500 ppm, meaning that any waste with concentrations below 500 ppm would be contained on-site rather than excavated. This change would mean that GM would have to dredge and/or treat 54,000 cubic yards of soils versus 171,000 cubic yards, helping them to save $15 million. After much public outcry, EPA withdrew the plan (ATFE 1997).

In the fall of 1995 GM completed the dredging of PCB-contaminated St. Lawrence River sediments. The cleanup goal was not met in all areas, so a multilayer cap was placed over the sediments. Dredged sediments were shipped by rail to a hazardous waste disposal facility. The cap has proved problematic—according to members of the SRMTED, the engineers initially did not believe their assertions that ice scouring (damage inflicted on the cap by sharp chunks of ice) would be a problem. Such damage has occurred, necessitating multiple attempts to install a cap that will not be compromised by the elements.

From July of 2000 to August of 2004, GM worked on the remediation of the two inactive lagoons at the facility. Contaminated sludge and soils surrounding a1.5 million-gallon lagoon and a 350,000-gallon lagoon were excavated, stabilized and shipped to an

offsite facility. From August 2002 to September 2003, GM remediated the Raquette River bank soils and sediments, meeting the goals of 10ppm soils and 1ppm PCBs for sediments. In the fall of 2003 GM completed removal of contaminated soils at toe of the slope of Industrial Landfill, which reached out towards the St. Regis reservation. From October of 2004 to March of 2005 GM remediated Turtle Cove, which had been renamed "Contaminant Cove" by NYSDEC workers. Here Tribal standards were applied: 1ppm for soil and .1ppm sediment. Groundwater remediation is currently ongoing. (USEPA 2005). The GM plant closed in May 2009, and is slated to be bulldozed beginning in July 2010.

A great deal regarding their interaction with the state and federal agencies through this process reaffirmed for Akwesasne Mohawks that these entities were not working in their best interest. The newspapers depicted a DEC that concealed results and moved slowly. When it was discovered in 1981 that the groundwater at the GM foundry was contaminated, and that those contaminants may have possibly migrated onto the reservation, the Mohawks found out about it through the local newspaper. DEC blamed the breakdown in communication on the fact that the border that splits DEC Region 5 and Region 6 also splits Franklin and St. Lawrence Counties, which runs between the GM plant and the reservation. Even after DEC said it suspected the contamination from GM's wastewater lagoons had spread to the reservation, the landfill remained open without a permit for six years. When the Mohawks asked DEC to close the landfill, the director of DEC's Division of Solid and Hazardous Waste conceded that the landfill was operating in violation of the law, but noted that it was only one of 300 illegal landfills in New York (Andrews 1989). Even though it was suspected that Reynolds was releasing PCBs into

the river, when they applied for a wastewater discharge permit, the permit issued by DEC set no limits for PCBs. In the midst of the bureaucracy, the Mohawk found an ally in the state agency they felt they could trust: Ward Stone (discussed further in Chapter 3). Much to the chagrin of the agency, Stone reported results to the Mohawk, and to the local press, as soon as he found them, and was not shy to point at the local industries as the source of the high levels of toxins he was finding. The head of the DEC, Thomas Jorling, ordered Stone to follow due process and report to the agency prior to announcing results to the public. Jorling persuaded the governor to withhold extra funding approved by the State Legislature for Stone's wildlife pathology lab, and shifted Stone's lab to the Division of Environmental Enforcement, where he would be required to have all investigations and the public release of results approved by a director (Post Standard 1989). While these moves were justified by the state as a means of "strengthening the DEC team," (Post Standard 1989), for reporters and Mohawks, it appeared that State bureaucracy was out to stifle the only meaningful voice among them.

Community Division

In addition to battles against the industry and the state, Akwesasne has also experienced a number of internal conflicts that continue to shape community relationships today. Conflicts often pitted neighbors and family members, as well as members of the same governing bodies, against each other. In each case, New York State is in the background, either directly or indirectly fueling the fire.

In May of 1979, a traditional chief found a work group cutting down trees on his property as part of a Tribe and state-supported "boundary delineation project" for a proposed fence around the reservation. This delimitation of the reservation symbolically

weakened Mohawk claims to traditional territories, and so the chief and a friend confiscated the youths' chainsaws. This, and the confrontation that followed with the Tribal council and State police, led to 23 indictments of traditional people. To avoid arrest, the group of traditionals and their supporters created a defensive encampment in a region of the reservation known as Raquette Point, a peninsula bordered by the St. Lawrence and Raquette Rivers. There they harvested wildlife and rabbits, and ate fish from the river, since the state police and St. Regis Mohawk Tribe's deputized officials had established roadblocks to cut off their supplies. The standoff ended in August of 1980, but the repercussions from the event carried into the fall, with a bomb exploding outside the house of Solomon Cook, the only St. Regis Mohawk Tribe chief who had lobbied for unity, and then a week later the house of Tom Porter, a traditional chief, was burned to the ground. The charges against the traditionals were dropped in 1981 (Matthiessen 1984; Lemelin 1996; Bonaparte 2007).

Conflict arose again during the late 1980's, as individual entrepreneurs began building casinos at Akwesasne, which were illegal under New York and federal laws at the time, but these Mohawks declared that this was within their sovereign rights. The community was feeling the pressure of the general economic downturn in state, and a ruined traditional economy after it was discovered that the local fish were contaminated with PCBs. FBI agents and New York State Troopers raided the community, closed down casinos, and arrested their supporters. In response, the Sovereignty Security Force, affiliated with the Warrior Society described above, set up roadblocks along the highway, to which the State troopers responded by setting up check points of their own. For the next year, the community was engaged in conflict. On one side stood the Longhouse

supporters (the Anti's) who were opposed to casino gambling and the corruption they feared it would bring to the community. On the other side, the Warrior Society and their supporters who wanted the opportunity to become economically successful through gambling and smuggling, which they saw as their sovereign rights within Mohawk territory. The dividing lines were not tidy—within the elected Tribal government, some chiefs felt gambling should be recognized as a legitimate industry and that New York state should not get involved, and others thought the state police should help instill order as shootouts became more frequent. The outbreak proved to be a vexing challenge to Governor Cuomo, with a divided tribal leadership, and concerns of escalating violence. The state police remained on the fringes concerned about the amount of firepower possessed by each Mohawk faction. Major Robert B Leu, the state officer in charge, gave the analogy of a big family wedding where the groom's family and the bride's family all get into a fight. "But they're really all still family. And if the cops come in, they would all turn against the cops" (Verhovek April 1990).

In May 1990, 10 months of bitter tension spilled over into violence, leaving two Mohawks dead, while others had evacuated to Cornwall. The North American Traveling College was firebombed; a traditional chief's and then a Warrior's house were burned to the ground (Johansen 1993). After the killings, Governor Cuomo dispatched several hundred police officers to the reservation to keep peace, and to escort Quebec police through the New York portion of the reservation, to investigate the shootings, which took place on the New York/Quebec line (Sack 1990). This civil war left painful divisions within the community, which persist to this day. Doug George-Kanentiio (2000a:193) describes that "Our dreams for a united Mohawk Nation died in the spring of 1990, when

we were in a state of civil war from which the wounds have yet to heal." Akwesasne residents similarly mentioned to me the continued emotional and psychological effects of this conflict on community members.

Land Claims

While the battle over the entrepreneurial future of the community left deep divisions between the different governments and factions within the community, the land claims process gave the different governments an opportunity to come together for a common goal. There are two aspects of the claim that have been pushed for multiple times over the past decade, the mainland claim and the island claim. The mainland claim is based on the 1796 treaty between the Mohawks and state of New York that guaranteed a reservation of 36 square miles, two areas of one square mile situated around mills the Mohawks had constructed (currently in the middle of the towns of Massena and Fort Covington) and meadows on the Grasse River. New York later purchased much of this land, but without federal consent (King 1996). The island claim is primarily for three islands (Barnhart, Croil and Long Sault) that were thought to be in Canada at the time the treaty was made, but were later determined to be in the US. In the 1840, New York recognized that the Mohawks owned the islands and should be paid for them, since New York had sold them to developers. New York did not return the islands but rather in 1856, the legislature appropriated $5960 dollars for payment and full claim of the islands. They did not consider this an outright purchase of land, which would have been in violation of the Trade and Intercourse Act, but rather an "adjustment of a claim that had arisen as the result of the ambiguous language of the 1796 treaty" (Hauptman 1986:146). The Robert Moses Power Dam is anchored on Barnhart Island and federal laws provide

Indian with rights to share in power revenues when their reservations are used for power production (King 1996).

In 1996, land claims negotiations derailed when New York State insisted that as part of the settlement Mohawks also agree to collect all state taxes on sales to non-Indians on their reservation and turn them over to State. New York was interested in the additional revenue that would come from these taxes, and non-Indian convenient storeowners had been pressuring the State to remove what they saw as an unfair price advantage that on-reservation storeowners had in not charging taxes. The Mohawks wanted this issue handled separately from land claim, since it involved other Native nations living in New York as well. The federal judge handling the Mohawk case in Syracuse agreed with the Mohawks and urged the State to handle tax issues separately from land settlement, to which the State refused and broke off negotiations (King 1996).

In 2005, there was a second effort to reclaim the aforementioned land, and an agreement was reached between State and all three governments and Akwesasne that would end land claim litigation involving 12,000 acres of land. 13,463 acres would be returned to Akwesasne Mohawks, including Long Sault and Croil Islands returned, and a 215-acre parcel on Massena point. The total agreed upon acreage of 14,778 would double the land holdings of southern half of the reservation. The Tribe would receive $100 million in cash over 35 years, and qualified students would get free tuition to New York State colleges. The agreement allowed for lands to be purchased from willing settlers. It also provided that nine megawatts of power from the power dam would be made available to Akwesasne Mohawks at the lowest available rate. In return, they would be giving up claims to 1 square mile in Massena and Fort Covington, claims to the

Grasse River meadows, and claims to Barnhart Island--and with it the challenges to the New York Power Authority's license, and any claims to ownership of the power dam project. The State would provide an estimated $10 million dollars in community development fund to assist local governments, who would be losing taxable land from their bases (White, Benedict and Gray 2004). While the agreement acknowledged that the tax issue would be handled separately from the land claim, it stipulated that the Tribe would address issues of pricing and taxation related to sales of tobacco, fuel and alcoholic beverages (Indian Law Resource Center 2005). All parties had signed the agreement, but in 2006, the local counties withdrew support after a series of federal court decisions against other tribes' land claims as well as the state Legislature's failure to enact the settlement. Legislators opposing the settlement in 2005 said they were upset that the state reached a settlement with the tribe without county involvement (Graham 2009).

Trust

Akwesasne has weathered all of the issues, conflicts, contentions, from within as well as outside the community. While the community is distrustful of the federal governments that surround them, New York State has been especially vilified because they gained more legal and civil jurisdiction than other states over the Native population living within its borders. As demonstrated above in the brief history, there has been conflict between New York State and the different Haudenosaunee nations they have attempted to subsume over the past two centuries. Through the forced change of Akwesasne's governing bodies, the lack of stringent enforcement of polluting industries which border Akwesasne, conflict over land claims and tax collection, and the presence

of New York State police during times of conflict, the state has come to symbolize for some Mohawk people, as one man described, "the enemy." There are signs in the community reminding visitors that "This is Not New York state. You are on Mohawk Land." To some extent, which I will discuss below, this hatred for the state colors opinions of any tribal organization affiliated with it, namely the St. Regis Mohawk Tribe and the Environment Division. Because they are tied to the state and federal government through funding and legal relationships, these tribal government organizations are also viewed by some with distrust.

Of the Akwesasne community members I interviewed, several articulated a general distrust for the state or federal government, and others took the view a step further with the belief that these entities were actively working to undermine Akwesasne. Two different men explained that the industrial plants were placed in the vicinity of Akwesasne not only to poison its residents, but also to lure men off the farms and into the factories, in order to assimilate them as taxpayers and make the community less self sufficient. One man, Rob, described it as a slightly more subtle approach than "when they were burning longhouses and killing people." In describing the importance of gardening and growing food, he explained:

> I think that the future of Akwesasne really hinges on a few people that are going to keep going and live off the land again and save the culture. Because I know there's a time coming when the government is just going to come here and say "Well, what do you have left of your people, is there anything you can show us? Is anybody growing their own food or is anybody taking care of the environment? Do you have anybody doing what you say that you do? Does anybody know their language, their culture?" And if we can't produce anything then they're just going to say "Well, we declare this the township of St. Regis."

Another man, Loran, described that there are spies on the reservation paid by the state, federal, and county governments. When I asked him what kind of things these

governments are interested in learning about the community that they would pay people to be informants about, he replied, "Well, if we are going to start a march to go and shut down that plant they want to know so that they get their police ready. Is it a violent protest, is it a peace protest, is it somewhere in between? All of that stuff. They put their information feelers in there." Another man, Henry, expressed the belief that Mohawks have their current status because they were never defeated by the federal government. "If they got the opportunity they'd come in, shoot people, and declare the Mohawks defeated. Then the state would have control of the place."

Another interviewee (8C) was hired to work on a project on the Canadian side, interviewing elders and documenting where they gathered their medicines and food resources. In the end, he refused to hand over the data because he was afraid of what it would be used for.

> We found out it was related to the government. You see, what happened is, the government wanted to know where we picked our medicine, where we harvest our fruits, and what areas we were using and weren't using. So when they found out that, they're going to start taking over our land again but after the project was done, I didn't give it to them. I said 'this has got to go to the Council, Nation Council before I even hand it over' and they got pissed. Yeah. So we did what we did but a lot of the old people were suspicious too.

In light of these concerns about the state and federal governments, the fact that the Mohawk people, SUNY Albany, and members of the Department of Health (NYSDOH) were able to collaborate on the project I will be describing in Chapters 3 and 4 is that much more impressive. It also alludes to some of the difficulties inherent in trying to introduce programs like the Tribal Conservation District (described in Chapter 6).

Seven of the interviewees I spoke with expressed at some point in our conversation that in addition to federal and state governments, they did not trust the Tribal government because of issues around money. There were suspicions that the

"tribal governments has already made agreements with GM….you know, the tribal council just sold our asses down the river for their few cents on the dollar." Or the concern that the Tribe is "tied" to the state "through the funding they get." An employee for the Environment Division described for me the Tribal Conservation District (TCD) that members of the Environment Division are working to bring to Akwesasne to support farmers. He expressed an understanding that people are always worried about the implications of accepting federal funding for a project:

> It's always the same question you know. We are going to be accepting funding from a federal agency and we are going to just be a puppet or an arm of the federal government…it's an ingrained mistrust of the outside governments and outside agencies. And fear of losing your identity or whatever."

On the other hand, he feels that it is important to let these government agencies know that this is how the community feels, and to tell the agencies upfront that:

> We are not going to do it your way. We are going to do it our way, and just tell them that up front. And if they are not willing to do that and are not able to do that, then fine, you now. No hard feelings - no we're not going to work with you. But unless you ask and find out, you're not going to know. And it's funny because I think a lot of agencies aren't used to that. You know when you talk to them like that they are not used to--them being told what you can and can't do here. But that's just the way I think this community is you know, I mean, they don't want to be told what to do.

The issue of community member's distrust of many of the levels of government at Akwesasne became especially apparent in discussing the issue of future fish consumption. As mentioned above and discussed in greater detail in Chapter 3, after seeing the results of tests done on fish in the local rivers, the Tribe issued a fish advisory in 1986 warning residents to restrict or eliminate fish consumption. To gain an indication as to the level at which people had been permanently turned off to fish, twenty years after this warning had first been issued, I asked interviewees "if the Environment Division announced tomorrow that they had done tests and the fish were safe, would you go back

to eating them?" Many people's answers were more reflective of their opinions of the Environment Division and the Tribe than of their feelings towards fish.

Seven people replied to the question that they did not think that the community would go back to eating more local fish because they did not trust the Environment Division to give them accurate information. When I prompted them to explain why they did not trust the division, even though it appeared to me that individual members of the division were well liked and well respected in the community, most of these interviewees stated that the Environment Division was run by the Tribe, which was too closely connected to the state and federal governments, politically and financially.

One man felt that any results announced by the Environment Division were not trust worthy because "I think they can be bought, you know, if you have enough money, it's like the tests they do on all kinds of drugs you know. You can skew the results any which way you want. You know and I am just safer if I don't eat it." When I asked him who he thought would pay off the Environment Division to say that the fish are safe, he replied "Who knows. Someone with a lot more money than me." Two other women thought that any information that came out of the Environment Division was tainted with concerns that individuals there had about keeping their jobs. One woman described an incident when, during the construction of the hotly contested casino, the water table was contaminated with salt. She described how between the first and second community meetings held about the issue, the Environment Division members went from describing how high the levels of salt were in people's water, to saying "'no it's not correct; that first meeting we had wasn't right.' I don't like it when people are so afraid of their jobs that they can't give the right information and treat people the way they should." Another

woman, when I told her about some results of soil sampling that I had learned from an employee of the Environment Division, replied: “I know, he has got a good paying job. Those are always factors…don’t tell you too much because it could jeopardize his job. It’s a funny game, it’s a funny world, it is a funny thing.” Another woman was skeptical about any information coming from the Environment Division “because their hands are tied to the Tribe and the state with the funding they get, so they’re limited in what they are doing.”

Returning to the fish consumption question, another woman thought that eventually people would go back to eating fish if this announcement were made, but ultimately, “I think the issue would be, can we trust the Environment Division. (laughs) That’s all, you know. It ultimately goes back to sadly people’s trust in Tribal government because the Environment is a branch of the government here so you know I think there is that nagging suspicion all of the time for anything that might be good for you or bad for you, that ultimately it is going to come down to can we trust the Tribe to tell us.”

Another woman stated that it would not be enough for the community to hear results released by the Environment Division saying the fish were safe, because “they’d probably be too suspicious right now.” The Environment Division would need the backing of the fishermen in the community to also say that they thought the fish were safe. Another woman similarly reflected, “You would have to make sure that there was no sores on the fish. I mean, the pollution studies can say one thing, but the physical says another.” These women felt that if these two groups, fishermen and the Environment Division, worked together in spreading a message, people would be more likely to believe it.

When I posed this scenario of the Environment Division releasing these hypothetical study results to an elder, he paused, and then explained:

> Over the years we have an issue of trust with the people that had done the studies. Mainly because they're always differing in opinion and it's not real clear how they're put out. So when you look at that then it makes you nervous if that's really true or is it not. So I imagine if that were to happen, that they would issue a statement saying you can go back and eat fish, I would probably tend to be careful, not really jump into it and jump in the air. I'd probably take a time out and go into it slowly.

In this case, it is not as much the reputation of the department itself as much as a reflection on how the scientific process does not always provide one, definitive, trustworthy answer to be immediately acted upon. In light of this, he would need additional sources of information, like the woman above who would want to also hear it from the fishermen. Later in our conversation, he mentioned that "people are starting to go back into their gardens. I think the fear factor is probably going away a little bit at a time because… they get reports that things are starting to get better. So I guess people tend to trust that and they go back into it slowly." In some cases at least, time, in addition to studies, can help make people feel more comfortable with their surroundings.

Four other interviewees were less critical of the Environment Division, but stated that they would need more than the results of one study, they would need to hear about multiple studies, and then might still wait a few years to see if opinions changed on the matter. As one man, Mark, stated:

> I would need more than one individual announcement and I would need some proof, you know and I don't know what form that proof would take but I know that unless there has been an ongoing process to clean up you know it doesn't reverse itself overnight. So I would need more information than just a public announcement that it's okay.

Another woman similarly reflected "They'd probably need to have more studies that would show that this is okay, this is no longer here or it's not as high as it was, its

dropped this much percent. I think they have to see the proof, and it would have to be more than just…it would have to be long term." Jann, the third Raquette Point resident to speak on the matter in this paragraph, similarly reflected on the skepticism people might have towards this hypothetical announcement:

> It would be nice to hear, but I think people are a little bit more skeptical and maybe they'd say, 'Well, what was the study? What did the study consist of? How come it changed? What was done all these years?' Because we hear about the bottom dwellers and the bottom feeders and things like that, so what changed in our system that now it's okay. But it would be nice to hear again.

As a community, and especially in the region of Raquette Point, these residents have been exposed to more scientific study than most communities, and accordingly have grown savvy and skeptical of any results, not quite willing to trust them until that trust has been earned through multiple sources of information. Even though multiple people prefaced their opinions with "I'm not a scientist," they seemed to have gained enough experience through this process to know when they needed more data.

Even though some residents described the Tribe as untrustworthy, and the Environment Division as part of this organization, they often spoke highly of individual employees of the division. One woman, who had earlier disparaged the Environment Division, later described having a friend who works there: "She, you know, gives me inside scoops. She's devoted to her job. They are doing a good job." When I asked interviewees whom they rely on for information about the environment, a majority (14) responded that they rely on the Environment Division.[29] Four respondents replied that if the Environment Division did issue this hypothetical report that the fish was safe, they

[29] Four interviewees said they look to the ATFE for information about the environment, 4 said the MCA environment department, 4 mentioned the newspaper or news, 4 rely on family members or friends, and seven said they rely on themselves to seek out information, through the internet, reading different sources, or through direct observation.

would go back to eating fish.

Conclusion

As seen in the two major conflicts suffered by the community, there are also deep divisions within the community, along political, cultural, and spiritual lines that often are not clear. The result is a level of stress that both the health clinic nurses and the traditional medicine practitioners reported to me as affecting the health of the community. When I asked an employee of the St. Regis Mohawk Health Services clinic (37C) what she saw as a solution to get the community to a healthier place, she replied with conviction that peace and tranquility were the only solutions, and the community cooperating with one another had to come through the leadership. "I think leadership themselves are battling and because they battle, you know when leadership battles the rest of the people don't know what to do, so they battle. They don't know what to do so the next generation battles, so this to me is the fix, it can't be anyplace else." She described generations of historical trauma, rooted in all of the conflicts that Mohawk people have faced. For the current generation of elders, this includes attempts by the federal government and New York State to terminate the status of Mohawk people, the coming of the Seaway and industrial contamination, and the internal conflicts mentioned above. The stress produces physical effects, which she felt she was seeing in the clinic patients. The man who runs the traditional medicine program for Kanonkwatseri:io, the clinic on the Canadian side, similarly reported that anger at outside law enforcement entities raised the blood pressure in his patients, for which he had herbal medicines and ceremonies to remedy this.

The foundation of Haudenosaunee culture is built on the principles of the Great Law: peace, power, and righteousness, which lead to health and unity. In the following chapters, I will elaborate on how the community has worked to put aside some of these divisions and issues of distrust towards the state to work towards a common goal, like the health studies conducted to determine the impact of local industry on residents' health. I will also explore other solutions offered by community members to help the community become a healthier place, including a return to the traditions of growing food that have been important to Haudenosaunee people since time immemorial. In discussing the conflicts and distrust experienced by the community, my intention was not to rehash painful times that the community feels has already been over-publicized, but to give recognition to what community leaders from all organizations and governments face in crafting workable solutions to Akwesasne's problems.

Chapter 3
"If this is in the river and in the GM dump, then the dump is in us": Environmental Contamination and Health Studies at Akwesasne

The development of the St. Lawrence Seaway in the 1950's brought industry to the region, and with these industries the byproduct of their production—namely fluoride emissions from the smoke stacks of the aluminum plants, and PCBs in the effluents of the General Motors foundry. Residents began noticing dying and deformed wildlife, livestock, and plant life. In addition to cows suffering from fluorosis on Cornwall Island, the trees around the Reynolds plant withered, and fishermen caught fish that were deformed or had spots and sores on them. Others began noticing "frogs with the eyes on one side of the head, all kinds of mutations of the animals" (14C). With the discovery of various forms of contamination emanating from these industries, residents began to have concerns about the potential effects on their own health as well.

Beginning in the late 1970's, the tribal governments at Akwesasne, and in some cases concerned residents themselves, contacted universities and medical schools to conduct scientific studies in order to determine the effect of the contamination on the environment and human health. Akwesasronon have had a variety of experiences with these researchers, both positive and negative, and through the process have developed their own ability to shape the research conducted in the community. The resultant health studies, beginning with the Mount Sinai School of Medicine and continuing through a more than decade-long relationship with the State University of New York (SUNY) at Albany, document the contaminant body burdens of Akwesasne residents, and potential health effects from those burdens.

In this chapter, I explore the history behind these various health studies, and the effort it took for Mohawk people to work past their distrust of state entities to form a collaborative project with State University of New York (SUNY) Albany researchers. The results of each of the studies themselves are also included, as a way of providing Akwesasne community members, as well as others who may have an interest in this history of PCB-centered health studies, with a brief and accessible archive of this research, including levels of contaminants found in each group of participants, and the thresholds at which health effects were noticed. The study results, published between 1992 and 2010, move from documenting the levels of contaminants measured in Mohawk breastmilk and blood, to more recent analyses pointing to some potential health effects of these burdens. I will also discuss the ways in which researchers contextualized the results from Akwesasne within the virtual community of other studies conducted in populations concerned about PCB exposure, of which Akwesasne often ranked as "average." However, in many cases, having their results normalized in the context of other suffering communities did not make Akwesasronon feel less concerned about the presence of contamination in their bodies. In the end, even though science was not able to answer many of the residents' questions about their individual health state, recent papers have begun showing possible trends between the presence of PCBs and other contaminants, and certain health conditions in the community.

Mount Sinai School of Medicine Health Study

Three years after the Reynolds plant began operation farmers directly downwind from them on Cornwall Island began noticing health issues in their cattle: swelling in their leg bones caused them to become so lame that they had to crawl across the pasture

to eat. Then their teeth failed, making chewing impossible, and many cows died during delivery of calves. In 1973, the St. Regis Band Council (now known as the Mohawk Council of Akwesasne) was informed that fluoride was killing the pine trees neighboring the plant, and in 1975 urine samples taken from cows showed abnormally high levels of fluoride. In 1977 Cornell University scientist Leonnart Krook traveled to Akwesasne to conduct a study on fluoride contamination in response to residents' concern for the sick and dying livestock. Krook (1979) found that despite the fact that Reynold's emissions were within New York State standards, the fluoride emitted from the smokestack was settling on the grass on the Island, leading to fluorosis (brittling of the bones and teeth) and prematurely killing the cattle.

These results led to concerns about how the contamination might be potentially affecting the health of the Island's human residents. The St. Regis Band Council (MCA) initiated a health study with the Canadian government to examine the effects of fluoride and other environmental contaminants on Mohawk residents. In August of 1979, an international panel of scientists visited the reservation to begin work on a $1.6 million study, financed by the Canadian government, initiated by the Canadian Ministry of Health and Welfare (now known as Health Canada) and the St. Regis Band Council (MCA). In 1981, Dr. Irving Selikoff of the Mount Sinai School of Medicine in New York City entered into an agreement to conduct the study. He led a team of 40 physicians, dentists and environmental specialists who established an onsite clinic to conduct physical exams, x-rays, pulmonary function studies and lab tests, as well as dental exams to measure fluoride. They also collected samples of garden vegetables, fish and water. To determine exposure, blood and urine samples were tested, and household

interviews conducted (Emery 1985a). The study was prepared in two phases: the first phase dealt only with medical findings related to fluoride. The second phase researched the health effects of methyl mercury, PCBs and Mirex.

On January 12, 1982, researchers from the Mount Sinai School of Medicine revealed that traces of PCBs had shown up in fat specimens of reserve residents. The tests had been conducted before the problem of the contamination leaching from the General Motors foundry (GM) had surfaced, but in light of the ongoing discoveries, Mount Sinai officials emphasized that the presence of PCBs in Mohawks bodies did not necessarily correlate with tainted GM groundwater (Goldstein 1983). In March 1984, the first results were released in a 400-page report. The first phase found no adverse human health problems as a result of fluoride exposure, but recommended monitoring of individuals with high levels of fluoride in their systems. Investigators found 40 Mohawks had elevated blood fluoride levels, but no higher than those in people with fluoridated water (McIntyre 1985). The study results of phase one did find some areas of the reservation to be contaminated by industrial fluoride emissions and did not rule out the possibility of adverse health problems within the next two decades. Dr. Stephen Levin of Mount Sinai said the study was “not a clean bill of health,” since while the study found “no current gross health affects,” there was “basis to be concerned in the future.” The second phase of the study, a 250-page report, was released in December of 1985. Altogether, the study took six years to complete (Emery 1985a).

Part of the second phase of the Mount Sinai study included results of the relationship between Mohawk PCB blood levels and fish consumption, including data on blood PCB levels for 47 adult residents of Akwesasne. Although fish consumption was

positively associated with blood PCB levels, the average blood PCB levels in these subjects were comparable to the levels found in individuals without occupational or other identified PCB exposures. Members of environment divisions with both SRMT and MCA attributed the lower than expected levels to the fish advisories they had issued, which caused a reduction in fish consumption (Ransom and Lickers 1988). In 1976 Health and Welfare Canada approached MCA to determine if there were elevated mercury levels in people of Akwesasne, since mercury had been identified as a problem in Native communities across Canada. The presence of paper companies adjacent to and upstream from Akwesasne led to the concern that mercury could be a threat to this community as well. In 1978 MCA took samples of fish, and found PCBs, mercury and Mirex, which led them to make the recommendation that women of childbearing age, children under 15 and pregnant women cease consumption of fish from the St. Lawrence. This led to a decrease in fish consumption in the years leading up to the Mount Sinai study. The Selikoff report concluded that fish consumption per week be further reduced for men from 2 lb to .2 lb, for women from 1.6 lb to .16 lb, for pregnant women or those planning pregnancy from .16 to 0, and for children from .07 to 0 (Selikoff vol II, p 126 cited in Hauptman 1988:64). Hauptman (1988) further notes that for an Indian society that has partially subsisted over the years as fishermen, the impact of this crisis is even greater than the health implications caused by a contaminated environment.

With the conclusion of the Mount Sinai report, the SRMT also issued a warning on fish consumption, recommending that adults restrict local fish consumption to no more than one-half pound per week. They recommended that women of childbearing age, pregnant and nursing women and children under 15 should avoid entirely the

consumption of contaminated fish.[30] They also gave a list of species for everyone to avoid[31], and a separate list from which residents should only eat one half pound per week.[32]

Akwesasne residents' main criticism regarding the Mount Sinai study was that at its conclusion, the researchers packed up and left, and the community felt that they were left with nothing useful. Katsi, a community midwife who I will introduce further below, expressed frustration at figuring out "How do we badger Mount Sinai to get that data back to the community" (Cook 2008). As another health professional in the community, Agnes, recalled "I think the community did go and look for the information. I think one of the end results was that it was gone. So nobody ever really knew what they did with all that and those were like adipose samples, nail clippings, hair clippings." The physical samples collected, along with the data, vanished with the scientists.

Contemporary community response to the Mount Sinai study ranges from vague memories to anger. Seven of the community members I interviewed had been subjects in the Mount Sinai study, but since it took place over 25 years ago, most had only cloudy memories on the subject. Most remember giving samples, being not entirely sure what any of it meant, and then at the end being told that everything was pretty much ok. One elder, Ernie, recalled:

> There was a team that came from New York City and they were pretty gung ho at the start of the project, but when it came time to get the results, there are meager results in the reports (laughs). I don't know, also real big language they were using.

[30] carp, catfish and suckers
[31] carp, channel catfish, walleye, pike, red horse suckers, white suckers, brown bullhead
[32] yellow perch, pumpkinseed, rock bass, whitefish, bowfin.

Others, who see their health as having been dramatically affected by fluoride exposure, expressed anger at the lack of action that was taken on the results that were given back. As one woman angrily expressed, "They got results and they had forewarning. People from China came and said 'in 25 years you're going to see health problems in the population.' So what was the plan 25 years before? " She faults the environment program for not working to help people to reduce their fluoride exposure in ways they could control, since they had little control over their environmental exposure to it:

> Well what do you do? Nothing! Nothing. You wait for people to come 25 years later and say uht![33] They were right! Twenty-five years right on the button people got sick. And now everybody knew so they should have done it themselves, figured out what to do. So that's my gripe, is they knew, Mount Sinai said something, so why didn't somebody make a plan? And say 'this is how you reduce fluoride'…Where was the awareness? Where was the education campaign? Where was anything that made people aware of where fluoride was? Nobody knew fluoride was in tuna fish. Nobody knew fluoride was in shrimp. Nobody knew fluoride occurred naturally. Nobody knew it's in every canned food, in water. Who knew that? Nobody knows fluoride is high in grapes, in grape jelly? Who knew that? Well I know it now. And toothpaste…There's alternatives. Nobody knew that, nobody said. So do a study, a big big big study, and then what? No plan. Very disappointing (23C).

This woman is part of a cohort of women who live on Cornwall Island who all have terrible arthritis problems in addition to myriad other health conditions that they attribute to exposure to contamination. As quoted above, Dr. Levin of Mount Sinai said there was "basis to be concerned in the future." This woman, and many others her age, were away at college when the sampling occurred for the Mount Sinai study, and even thought they were not part of the sample feel that the prediction has borne out.

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[33] Sound of feigned surprise

Katsi Cook, a midwife in the community, was critical from the start that the study did not include breast milk sampling. She recalled how staff from the MCA Department of Environment and Mount Sinai staff did presentations at a local newspaper office, *Akwesasne Notes* and at the Akwesasne Freedom School, a Mohawk immersion school located on Raquette Point, detailing how and why people should sign up to take part in the study. At one of these meetings, Katsi asked if they would be including breast milk, to which they responded that this would not be necessary since they would be doing fat biopsies. She recognized that in reality they could not have done milk samples because most of the researchers were men. She also expressed frustration at the lack of usefulness of the data that came out of the study:

> "Even before we got to see the study in its finished form in our community, the analytical methods they used for the chemistry analysis of the bloods were already obsolete, because by then, we understood that PCB is not just one kind of a chemical. It's over 200 different species of this chemical. And they all have fingerprints, chemically, and they have different impacts on different body tissues. And so, this multimillion-dollar study by a very well-known research organization led to a dead end (Cook 2005).

Henry Lickers, a biologist with the MCA Department of Environment who worked on the Mount Sinai study who defended aspects of the research. He noted that Selikoff was not allowed to give people their individual results because of medical confidentiality issues, so they did presentations to the community, but not to individuals. When they first started this study in the 1970's and 1980's doctors

> Had to swear oaths to not reveal anything that was going on in this whole concept of medical confidentiality was right up the wazoo. The concept of community participatory research, that wasn't even considered a viable way of doing research. One of the reasons why the health study that we did with Selikoff, at least got better data than others, was because the community participated in it.

Lickers said the results were given to doctors, but the doctors did not feel compelled to share anything with their patients because they did not think they would understand. The positive outcomes of the study were that it gave long-term trends for the SUNY Albany scientist to start looking at, and science experience for some community members: "For a number of our people here, it meant very good reputations in those fields, and we were able to spring off those into other jobs." However, it was a struggle at first to convince the Mount Sinai scientists to allow even as much community participation as they did. As Henry describes, "when we first started this, oh jeez I'll tell you, I can remember the arrogance of these doctors was just too much. It was like they came up here to help the Natives, you know."

The negative impression created by the Mount Sinai study left a difficult legacy for other researchers seeking to conduct studies in Akwesasne. When I spoke with scientists who came to the community throughout the following two decades for a two phase SUNY Albany Superfund Basic Research Program (SBRP),[34] several referenced the Mount Sinai study as having left a negative impression on the community that they then had to contend with. Ed Fitzgerald, the PI (principal investigator) for the first SUNY study, explained how the Mount Sinai study

> Went poorly. They just came in their white coats, did their medical thing and left. And there was very little community involvement, very little feedback to the community, and that went quite poorly, I think there was some bad memories of that. So we kind of had to go out of our way to convince people that no, we are different, we are not like Mount Sinai, we want to include you as partners and we are going to keep you, you know in the loop at every stage of the way.

[34]The Superfund Basic Research Project (SBRP) is a large and competitive grant funded through the National Institute of Environmental Health Sciences (NIEHS) which I will describe in greater detail below. This was the first big health study project in Akwesasne following the Mount Sinai study.

David Carpenter, who worked on both phases of the SUNY study, also commented that the Mount Sinai Study "led the community to believe that they would be given feedback, that they would be given assistance, and it just didn't happen at all… there was just a great amount of hostility to academic institutions." Joan Newman, another SUNY researcher, emphasized, "We were trying not to be people who went up there, got our data and disappeared and then benefitted from the data. I mean Larry and I were very explicitly trying not to be like that."

In order to ensure that the community was not taken advantage of further for research purposes, the Akwesasne Task Force on the Environment (ATFE) was formed in 1987, in an effort to bring together all three Akwesasne governments for the purposes of addressing environmental issues in the community. As I will discuss below, in 1994 they created the Research Advisory Committee (RAC), a community run internal review board (IRB) that approved or denied all potential studies that would take place in the community. One of the requisites for the applying organization to prove to the RAC was how they would bring information back to the community.

Katsi Cook: Midwife, Activist, and Grassroots Leader

The history of community based participatory research at Akwesasne really begins with a remarkable woman who has made it her life's work to help indigenous women reclaim sovereignty over their bodies, birthing practices, and the health of their communities.[35] Katsi was delivered at home by her midwife grandmother, and raised in

[35] Katsi's story, as described below, is pieced together through several conversations I had with her in 2007, a formal interview in 2008, and follow-up conversations in 2009 and 2010; a folder of papers she loaned to me containing grant applications and articles written by her and letters to her from SUNY Albany personnel; the collection of Katsi Cook Papers (1976-2005) in the Sophia Smith Collection Smith College, Northampton MA; the transcript of an interview conducted with her in 2005 by Joyce Follett of Smith College; and her published articles. Direct quotes taken from our 2008 interview are cited as (Cook 2008)

Akwesasne. As she prepared for the birth of her first child in 1975, Katsi sought out traditional birthing methods, as a means to avoid the sterile "white" institution of the hospital, and to assert herself as a Mohawk woman. Throughout the 1970's, as she became more involved in Indian activism and took part in the founding of WARN (Women of All Red Nations[36]), she identified control over reproduction as one of the essential elements of Native sovereignty, and decided to take up midwifery, a profession in her family for generations prior. In 1978 she completed an apprenticeship in spiritual midwifery at The Farm in Tennessee, a completely self-sufficient "hippie commune," as she describes it, which trained midwives and EMTs for Akwesasne through their own medical programs. This was followed by clinical training at the University of New Mexico Women's Health Training Program, which included working with Navajo and Pueblo women, whom Katsi also lamented had become estranged from their traditional birthing methods. She also did a clinical placement in the Twin Cities at the Red Schoolhouse Clinic, a WARN project in Minneapolis-St. Paul, where she trained an Anishnaabe Birthing Crew and created the Women's Dance Health Program in November 1978 through a grant administered by the Youth Project, Minneapolis, to develop a community health project.

The Women's Dance is a traditional Iroquois dance where the women's feet never leave the ground, performed to remind women of their connection to the earth. In the Creation Story, Sky Woman made the earth larger through a dance done on the back of

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to differentiate from Follett's 2005 interview and published works. Other information gained from our various conversations, meetings and e-mails from 2007-2010 is cited only as "personal communication"

[36] An organization of American Indian women formed initially in South Dakota in the 1970's which was affiliated with the American Indian Movement, but provided a female complement to the largely male-dominated movement. WARN supported improved educational opportunities, health care, and reproductive rights for American Indian women; pushed to combat violence against women; to end stereotyping and exploitation of American Indians; to uphold treaties over Indian lands; and to fight against contamination of American Indian lands and environments. .

the turtle, and women carry on this reminder of creation through a traditional, shuffling dance. Katsi organized a core group of four women to continue the project, and in 1980 returned to Akwesasne, where she gave birth at home to her second son,[37] and then became involved in a standoff against New York State and the Tribe over jurisdictional issues described in Chapter 2. From May of 1979 through August of 1980, a group of traditional people and their supporters created a defensive encampment in a region of the reservation known as Raquette Point, where they harvested wildlife and rabbits, ate fish from river, and grew gardens. Katsi helped develop the Akwesasne Freedom School, an alternative school that taught students only in Mohawk, and served to educate children who lived in the encampment as well as the rest of the reservation.

Katsi also continued her midwifery practice. While the battle over jurisdictional issues raged, outside communities would no longer provide emergency medical services, so Akwesasne developed their own volunteer EMT service, trained at The Farm, and Katsi delivered babies in mothers' homes. In a 1981 grant application for funding for the Women's Dance project, she describes how on average she did a home delivery every six weeks. In the interim, she provided complete prenatal care, labor and delivery assistance at home and in hospital, post-partum care, family planning, family counseling, and general obstetrical, gynecological and infant care, which she estimated to be about $1600 worth of services. She describes, "While we do not charge for our services, this does not mean that it is free. Our birthing families are primarily motivated by their commitment to traditional understandings of health and community. Along these lines, they are encouraged to offer their volunteer services to other nation projects, such as the

[37] An experience she describes in "The Coming of Anontaks" (Cook 1997)

Akwesasne Freedom School, community gardens, and Akwesasne Emergency Team." (Cook, 1981:6)

Katsi also worked with her husband, Jose Barreiro, at Akwesasne Notes, a periodical that published news articles from around the country that held relevance to Akwesasne community members, in addition to pieces about the community. The Notes office and the Freedom School were directly adjacent to the GM dump. Katsi described to me how the children swam in "Contaminant Cove" (originally called "Turtle Cove") and played "mudmen," covering their bodies with the thick mud. In 1981, two dormant sludge pits filled with PCBs were discovered behind GM, and in December of 1981, the New York State Department of Environmental Conservation (NYS DEC) announced that PCBs had contaminated the groundwater on the GM property. A month later, tests found PCBs in the private well of Raquette Point residents Tony and Ella Cole. The next month the newly formed community group MASH (Mohawks Agree on Safe Health) hired a private lab to test the water in 12 wells, half of which showed positive signs of contamination. The Department of Health officials were skeptical of the results, but in 1983, the NYS DOH announces the discovery of PCBs, benzene and trichloroethylene in the groundwater near the GM Central Foundry (Hart 1982; Goldstein 1983). Katsi recalls reading these articles in local newspapers, and realizing that they were on the same water table.

Some of the women in the community began expressing to Katsi concerns about the number of miscarriages among young mothers. Katsi also felt that she was seeing an unusual number of birth defects, especially of the intestinal nature. One child was born with no intestines. Another had a torsion of the intestines that had to be surgically

corrected and another was born with the stomach and intestines on the outside of the abdomen. Later, when Katsi began to do literature searches, she found that exposure of female beagles to PCBs produced puppies with intestinal abnormalities. This caused her to become concerned about the babies in her community: "I don't have an engineering, environmental engineering degree, I don't have anything like that, but what I do have as a midwife and as a Mohawk woman moving through the small world webs of the community, I would hear this one had a miscarriage, that one over here is sick with this" (Cook 2008).

There was already a heightened consciousness in the community about contamination because of the fluorosis suffered by cows on Cornwall Island in 1970's (Krook 1979), and the Mount Sinai researchers who had been taking samples all over the reservation. However, as expressed above, Katsi and the mothers she worked with were frustrated that breastmilk had not been sampled:

> At the same time, mothers in my care who also lived in some of these geographic areas of our communities that were under special focus of the Mount Sinai study because they were practicing traditional subsistence lifestyles — raising their own food, raising their own animals — and so the scientists were taking samples of ducks, of cattle, of vegetables, and the mother, who's ready to have her baby at home, is saying, 'Gee, Katsi, these scientists are coming to my home taking samples of everything but me. Is it safe to breastfeed?' And I said, "You know what? I don't really know. I wish I did." And so, the Akwesasne Mothers' Milk Project began as an effort to find that out (Cook 2005).

One of these mothers, who lived on Raquette Point at the time, described to me conversations she had with Katsi, who delivered four of her children in her home. She recalls asking Katsi, "'Well, if everything is so bad around here, what about our milk, the mother's milk? I mean, if I'm drinking the water here, what's happening to our

milk?'...And so then we started the breast milk study. And obviously, I was one of the ones that they had tested" (14C).

In January of 1984, as she began an undergraduate degree in Biology and Society in the School of Human Ecology at Cornell University, Katsi met medical sociologist Lin Nelson, who assisted her with literature searches about PCB contamination. These searches led her to articles written by New York State Department of Environmental Conservation (NYSDEC) wildlife epidemiologist Ward Stone. Stone had reported on samples of owls and turtles he had found along the St. Lawrence River that were convulsing or already dead, and had high levels of PCBs in their livers and brains. Katsi also discovered papers by Brian Bush, a chemist at the New York State Department of Health (NYSDOH) about breastmilk studies he had done in Oswego NEW YORK, a town about 150 miles southwest of Akwesasne, on the shores of Lake Ontario.

In April of 1984 Katsi, Lin Nelson, Janet Rith-Najarian, and Doug Brown (Cornell, Department of Rural Sociology) met with Brian Bush about constructing a breast milk study at Akwesasne. They set out to: "1) obtain as much data as possible of previous epidemiologists' work done on the cohort 2) commence location of nursing mothers at Akwesasne 3) prepare questionnaire in collaboration with Dr. Fitzgerald, after reference to Dr. Selikoff's questionnaire and 4) prepare sampling kits for Mrs. Cook" (Bush 1984).

Katsi also met with Ward Stone at his office that fall, and invited him to come to Akwesasne and test the wildlife there. He did, and with startling results that he began announcing throughout the summer of 1985: A snapping turtle taken from Raquette Point registered 835ppm of PCBs, which is 7 to 28 times higher than levels found in turtles

taken from the upstream Thousand Islands region the year prior. Chicken containing more than 3ppm of PCBs is considered unfit for human consumption, and over 50ppm qualifies as toxic waste. High levels were also found in frogs, mice and shrews taken from the area (Skoog 1985). A masked shrew found 150 feet from the GM dump had 11,520ppm PCBs (Foy 1985a). There was 2,290ppm in an owl, 190ppm in a duck, 11ppm in a sturgeon, and 3,067ppm in a male snapping turtle (Andrews 1989). Much to the chagrin of the NYSDEC, Stone shared his results with the Mohawk and the press immediately, recognizing the painful connection between the contaminated turtles and the Mohawk creation story. While he was criticized and later censured by NYS DEC, the Mohawks, including Katsi, took an immediate liking to Stone, giving him the name *Rahontsiohares*, a Mohawk term for "He who washes the land" (Foy 1985b). According to Jim Ransom, who worked for the Tribe's Environment Division at the time, "Without Ward, we'd still be thinking groundwater was the major concern. It's not. It's the wildlife and the fish. And the food chain. Stopping the pollution becomes even more urgent" (Andrews 1989).

In 1985, with a small grant from the Need More Foundation, the Women's Dance Project became the Mother's Milk Project. Katsi presented a proposal to the St. Regis Mohawk Health Services and to the Mohawk Council of Akwesasne's Health Department, and then collected samples of milk from 30 women:

> The first 30 or so samples I collected myself, beginning with clients, women that I had delivered their babies, and then extended out into the broader base of Mohawk women who were nursing. And it was fun. I'd go to their homes and hold their babies, visit with them, talk about their birth stories. They'd go take a warm shower, their milk would let down, and the next thing I knew, we had a milk sample of 500 mills [ml]. You know, piece of cake. (laughter) And those would get frozen and shipped, and attached with it a legal document, chain of

> custody, so that we could be assured that nobody in between was messing with those samples (Cook, 2005).

Katsi describes this work as "barefoot epidemiology," where indigenous women develop research projects based on community concerns and collect their own data.

With Stone's encouragement, and due to her own distrust of New York State, Katsi initially sent the samples to a private lab in Wisconsin rather than the Department of Health lab in Albany:

> I wanted to use a private lab in Wisconsin that I had located, because none of our women would believe in the Health Department of the State of New York. I mean, we have always fought with New York State, ever since New York State created itself. And there was just no trust for it. I mean, my child was born on a day when New York State sent its SWAT teams to close up the reservation. So, there was no trust in New York State. So we sent them to a private lab and we got the initial samples and it was in the milk. There was PCBs in mothers' milk. And not only PCBs but agricultural products: Mirex, which is a flame retardant, all kinds of — hexachlorobenzene — different chemicals that at that time, it astonished me. And I began to realize, we're part of the dump. If this is in the river and in the GM dump, then the dump is in us (Cook 2005).

Residents often refer to how in the past the St. Lawrence River was the lifeblood of the community; by its pollution Mohawks realized that their bodies were polluted as well.

Despite the Mohawk's distrust of the state, samples were also sent to Brian Bush at the Wadsworth Laboratory at the NYSDOH, which he analyzed for "chlorinated pollutants, PCB and TCDD [dioxin] systems." He agreed that "PCB, DDE, Mirex, fat content and protein content data will be returned to you within a month of sampling in the form, normal or abnormal… I understand that you need a turnaround time of 1 month for this process to maintain credibility with the women you have motivated to participate in the study" (Bush 1985). In a letter to Katsi the following year, Bush (1986) sent back the results of seven milk samples, none of which he considered to be dangerously elevated (they range from 6.7 to 38.08ppm). He wrote, "You will be glad to note that the present levels are well below those of the 1979 suburban Americans."

Although Bush did not feel that the levels were terribly high, he felt that the results warranted further investigation, and so he approached NYS epidemiologist Ed Fitzgerald. After the Health Risk Assessment (described below) was negotiated between the state, federal and Tribal governments and GM, Fitzgerald and Katsi began work on designing a full-scale breastmilk study at Akwesasne.

Health Risk Assessment: Fish, Wildlife and Breastmilk

Jim Ransom, currently an elected chief with the SRMT, and at the time a representative from the Environment Division, described to me the meeting in the summer of 1987 at which the Tribe sat down with the US EPA, the NYS DEC, and representatives from General Motors. They sent GM out of the room, and then Jim and a chief from the Tribe discussed their options with the agencies. The agencies acknowledged that the company was not likely to pay for all that they wanted, and they would have to accept what GM offered. Jim said to the agency representatives, "Well, I think they are responsible for all of it, so I think they should pay for all of it. But if you are telling us that you can't force them then I want a commitment from you to make up the difference," to which the agencies agreed. The GM representatives were then called back into the room, at which time they agreed to pay for 80% of the cost of a health risk assessment ($370,000), the remaining 20% of the $461,300 coming from the NYS DEC Conservation Fund (Forti et al. 1995; Emery 1987). GM agreed to pay for all of the wildlife study and the breastmilk study, but did not feel they were responsible for all of the PCBs in the river, as it was being discovered that Reynolds had also leached PCBs into the river, and therefore should not have to pay for all of the fish study. The three-part

project developed with these funds examined contaminant levels in fish (Sloan and Jock 1990), wildlife (Skinner 1992), and breastmilk (Fitzgerald et al. 1992).

Fish Results

Three hundred forty three (343) fish were collected from 12 locations and analyzed for several organic chemical and heavy metal contaminants. For each species of fish, data from all samples from the nine Akwesasne angler locations were pooled to obtain a species-specific mean contaminant levels. Separate averages were calculated for Turtle Cove (at this point more often referred to as Contaminant Cove) as a "worst-case scenario." Fish caught at the mouth of Turtle Creek, which runs past GM site had the highest levels, with the lowest species average being Rock Bass with an average PCB level of 1.04ppm to Brown Bullhead with an average of 20.55ppm. Of the fish caught in other parts of the St. Lawrence River, they ranged from an average of .17pm for the White Sucker to 11.83ppm for American Eel (Sloan and Jock 1990).

They found that fish, especially those with high body fat, had total PCB levels ranging between 3ppm and 8,000ppm (lipid basis) which is much higher than the surrounding environment. Often levels exceeded the tolerance limits established by the federal government of 2ppm (wet weight). The New York State background level is generally considered less than 5ppm (lipid basis) (Kinney et al. 1997:314).

Wildlife Results

Specimens of 19 wildlife species were collected from 18 locations and analyzed for contaminants. As opposed to Ward Stone's samples, of which he was reporting the PCB levels found in the fat of the animals (which would have the highest PCB levels of any part of the body), Skinner (1992) reported the average contaminant levels in fat and

muscle tissue. The edible portion of duck meat consists of 14% fat and 86% muscle. If the average PCB levels for those tissues were 50ppm and .5ppm respectively, the PCB level in the edible portion would be .14x50ppm (fat contribution) plus .86x.5ppm (muscle contribution) or 7.4ppm (Forti et al. 1995:8).

Waterfowl (ducks, geese, and mergansers), and turtles taken from near GM and off of Raquette Point were found to contain detectable levels of PCBs[38]. According to the Selikoff dietary survey, and the survey that was part of the breastmilk study described below, deer were eaten with the greatest frequency of all wild game, but deer showed non-detectable levels of PCBs and other pollutants.

Breastmilk Study

When Katsi first approached Brian Bush about analyzing breast milk, he took the project to state epidemiologist Ed Fitzgerald. The first pilot samples Bush analyzed as a favor for Katsi. Since the pilot study indicated that there were some levels of PCBs in breast milk, they decided that it was necessary to collect more samples to be sure (Fitzgerald, personal communication).

The pilot project that was run with ten mothers in 1986-1987 had indicated that fish consumption correlated with higher levels of PCBs in breastmilk. The human health component of the Health Risk Assessment built upon this pilot study, opening it to all Mohawk women who lived in Akwesasne and who gave birth between March 1, 1988 and December 31, 1990. The total number of live births at Akwesasne at that time was estimated to be around 100 per year, although it is difficult to determine the exact number

[38] PCB levels in samples taken near GM: snapping turtle (2.7ppm), mallard (5.8ppm), Common Merganser (3.3ppm), Gadwell duck (.3ppm). Samples taken off Raquette Point: mallard (.1ppm), merganser (4.5ppm), Canada goose (.1ppm). Kinney et al. (1997:314), report that the average total PCB concentration for mallard ducks found on and around the Akwesasne reservation was 70ppm (fat basis) in muscle tissue. Assuming that the fat is consumed and not just the muscle, this might be a better reflection of dietary exposure to PCBs.

since “as citizens of an independent and sovereign nation, Akwesasne residents are not required to register vital events with the US or Canadian authorities” (Fitzgerald et al. 1992:4). It was estimated that about 50% of mothers nursed their infants per year, suggesting that there would be about 136 mothers eligible to participate during the 34-month study period. Project staff identified and personally contacted potential participants through the outreach department of SRMT Health Services, local WIC program, and private physicians before they delivered, or within one month after their child was born. Katsi served as a liaison between the mothers, tribal leaders, and project personnel, some of whom were the Mohawk women she insisted the NYSDOH hire. Sixty-five nursing mothers were identified and invited to participate, and 53 completed the process. The samples of four of the women from the 1985-1987 pilot project were included to increase the sample size to 57. Project personnel interviewed participants at home within 2-4 weeks post-partum, about sociodemographic characteristics, height and weight, health conditions, use of medications, occupational, reproductive and residential histories, cigarette smoking, alcohol and coffee consumption, drinking water source, and diet. Comparative data were obtained from 109 women from the WIC clinics of Warren and Schoharie counties who gave birth during the same period.

The results showed that among participants from 1986-1989, Mohawk women with the greatest estimated lifetime exposure to PCBs through consuming local fish had higher concentrations of PCBs in their milk (geometric mean milk total PCB concentration of .640ppm) than the controls (.385ppm) or Mohawk women who did not report eating local fish (.368ppm). This was especially true for the PCB congeners found in fish taken from near the GM site, as well as for Mirex. However, for the women who

participated in the study in 1990, these differences were no longer apparent, probably as a result of the decline over time of fish consumption in the community, especially during pregnancy. This was evidenced in the decrease in reported number of fish meals between the Selikoff dietary surveys in 1979-1980, and the dietary portion of the interviews conducted with these women participants[39]. Although actual concentrations were low, the Mohawks did have significantly higher levels of 2,5,3'-trichlorobiphenyl (a lightly chlorinated congener present in Aroclor 1248, the PCB mixture used at GM), than the control group. This congener is not typically found in human milk because it is easily metabolized and excreted, and hence this pointed to a local and continuous source of PCB exposure.

Upon receiving the results from the breastmilk study, the Akwesasne Task Force on the Environment issued a press release (May 12 1992) titled "Mohawk Mothers Responsible to Their Future Generations; Tell Local Industries: Now It's Your Turn to DO the Right Thing!" The press release pointed out that:

> "Our traditional lifestyle has been completely disrupted and we have been forced to make choices to protect our future generations. We feel anger at not being able to eat the fish. Although we are relieved that our responsible choices at present protect our babies, this does not preclude the corporate responsibility of General Motors and other local industries to clean up the site," said the mothers. The Mohawk mothers were congratulated for leading healthy lifestyles and drastically reducing the amount of fish they eat. "Why do we have to be the ones to make the adaptations? Our traditional economic base, our very culture has suffered severe impacts from industrial hazardous waste. Our children are growing up with pollution, they see it every day… in spite of reassurances from the scientists, we are concerned about our babies who are breastfeeding now and those who are about to be born. The only reason our milk levels are not higher

[39] According to the Selikoff 1979-1980 dietary survey, 90% of Mohawks surveyed reported consuming locally caught fish, and the average Mohawk obtained 89% of their total fish intake locally (cited in Forti 1995). The dietary information collected in the breastmilk study indicated that 79% of the women ate locally caught fish more than one year before pregnancy, 58% ate these fish one year or less before pregnancy, and 45% ate locally caught fish during pregnancy (Fitzgerald et al. 1992).

> is because we were responsible enough to do the right thing, not because GM did the right thing.

As seen in the press release above, and the following excerpt from an article written by Akwesasne community members, there were different reactions to the results of this health study from the scientific community, and from the mothers themselves:

> In speaking about Akwesasne, a prominent health researcher suggested that the community should be considered a success story because Mohawk people had eliminated their exposure to PCBs and other toxic substances. Mohawk people, however, have argued strongly that eliminating the consumption of local fish, wildlife, and plants is no solution to the problem of environmental contamination. Unfortunately, the voice of the community is not heard as often as that of prominent government scientists. To suggest that Akwesasne is a success story is to suggest that it is acceptable for the victims of environmental contamination to continue to pay the price for pollution (Tarbell & Arquette 2000: 101).

By decreasing what had been traditional levels of fish consumption in order to reduce their PCB body burdens and protect their infants, Mohawk women had shown that exposure to the contamination was in some ways avoidable. In this sense, the health studies and fish consumption warnings were a success. However, at the same time, this avoidance of a traditional and nutritious food was unacceptable from a cultural, health, and justice standpoint. As I will discuss further below, the avoidance of fish may have helped to prevent further PCB exposure, but the community lost a primary source of protein and other nutrients such as iron, calcium, zinc and essential omega-3 fatty acids. This further exacerbating chronic, diet-related health problems in the community, such as diabetes and cardiovascular disease, as well as an erosion of the fishing culture of the community (Akwesasne Task Force on the Environment 1997; Arquette et al. 2002; Tarbell and Arquette 2000; Schell et al. 2003).

Health Risk Assessment: Bringing Together Wildlife, Fish and Breastmilk

Forti et al. (1995) brought together the three studies described above as part of the overall remedial investigation/feasibility study (RI/FS) conducted by GM. This final report summarized the findings of the first two tasks regarding the contamination of local fish and wildlife, and the third study, which demonstrated that Mohawk women who consumed local fish contained measurable amounts of PCBs in their breastmilk. Forti et al. (1995) highlight the decrease in fish consumption in the community over the past two decades, as a result of fish advisories issued by NYSDOH and tribal governments since 1976. They point to WHO (World Health Organization) conclusions that the benefits of breastfeeding—immunologic, nutritional and economic benefits-- outweigh the risks from chemical contaminants at low levels found in this study, but advise women to refrain from eating contaminated fish and wildlife.

Continued Breastmilk Study

With funding from Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute of Environmental Health Sciences (NIEHS), the research team carried the breast milk study into a second phase, collecting additional samples in 1991-1992, which brought the total number of participants up to 97. Breastmilk samples were analyzed using a new "fingerprinting" method to identify the point source of PCB exposure by matching congener patterns in breast milk with those in fish. In addition, this study also developed and field-tested a new technique for the analysis of PCBs in the urine of the Mohawk mother and their infants, examining 67 urine samples from mothers and 5 urine samples from infants. The comparison population consisted of 154 nursing women from the WIC clinics of Warren and Schoharie Counties (Fitzgerald et al. 1995b).

Beginning in 1990, the researchers found a difference in breastmilk PCB levels between the study and control groups, but it was no longer statistically significant (Fitzgerald et al. 1995b; Hwang et al. 1996). Fingerprinting analyses demonstrated that fish collected near the GM, ALCOA and Reynolds site had PCB congener patterns that more closely resembled Aroclor 1248 (the PCB mixture used at all three locations) than did fish obtained elsewhere near Akwesasne. Although not statistically significant, the results of the breast milk fingerprinting suggested that the Mohawk mothers, especially those with the greatest estimated lifetime exposure to PCBs from consuming local fish, had a congener pattern that was closer to that of perch (the species of fish the women most reported consuming) caught near GM than did the controls.

Levels of PCBs detected in the urine of Mohawk mothers were low, with half of the Mohawk and control mothers having a reported concentration. In contrast, each of the five infants tested had detectable PCBs in their urine that was ten times higher than that of their mothers. There was also a significant association between the PCB concentration in the urine of the infants and how long they were breast-fed, which confirmed that nursing infants are exposed to PCBs from breastmilk.

Superfund Basic Research Program Projects at Akwesasne

Round 1: SBRP Research 1990-1995

As described above, the health studies were essentially initiated when Katsi approached NYSDOH chemist Brian Bush about sampling breastmilk. Bush approached epidemiologist Ed Fitzgerald because they had worked together on other PCB projects and Bush felt he needed assistance on the epidemiological aspect in designing a human health study and recruiting participants. After the completion of the Health Risk

Assessment breastmilk study, David Carpenter, a researcher in the SUNY Albany School of Public Health, thought a continuation of the study would make a good topic for a Superfund Basic Research Program (SBRP) project, a program developed by the National Institute of Environmental Health Sciences (NIEHS).[40] The team decided to design a number of projects around the PCB contamination at Akwesasne: to continue the human health studies, and then add toxicology experiments, engineering studies to find the best ways to remediate PCBs, and studies examining how PCBs degrade in the environment. The SBRP application was first submitted in 1988, and was not funded, but then in 1990 NIEHS program director Bill Suk informed the SUNY researchers that additional money had become available, and the project would receive funding. As Fitzgerald recalled:

> They were most interested I think in the fact that this was a Native American population and they have a mandate, you know, from Congress, to help fund the research on environment contamination and minority groups, there wasn't a lot, at least at that time, not a lot going on about environmental contamination among Native peoples. So I think that is where his interest was I think in that regard. They thought this would be an important addition to their portfolio and they can show Congress not only are they doing good science but they also looking at environmental problems and Native Americans.

The SUNY team was funded from 1990-1992 to continue the breastmilk studies, and then the project was renewed in 1992 for a three year period, with Fitzgerald as the PI (principal investigator) for the human health component, and David Carpenter as the lead PI on the entire grant. After the grant was renewed in 1992, they expanded the focus beyond nursing women to look at all pregnant women, as well as men who were related to or affiliated with the women, since there was concern that men ate more fish and were

[40] The Superfund Basic Research Program (SBRP), developed in 1987 and renamed the Superfund Research Program (SRP) in 2009, is a network of university grants that are designed to seek solutions to the complex health and environmental issues associated with hazardous waste sites. A university will develop a multi-disciplinary project around a particular hazardous site, usually but not always a Superfund site that seeks to study health risks, toxicity, exposure predictions, fate and transport, and potential treatments for the hazardous waste. For more information see the NIEHS website http://www.niehs.nih.gov/research/supported/srp/ .

not following the advisories as stringently as the women were. Breastmilk and blood samples were collected from pregnant women, as well as blood samples from their male partners or relatives. Some men and women underwent a caffeine breath test to look at the activation of P-450 liver enzymes, which are the first biological response to exposure to PCBs and other chemicals. Detailed interviews were conducted to see how PCB levels were related to fish consumption and other avenues of exposure. In addition, samples of air, soil, local produce, meat, and dairy products were collected to further determine routes of exposure to contaminants.

The Mother's Milk Project founded by Katsi morphed into the First Environment Research Project (FERP), in recognition that mothers are the first environment experienced by each human. As I will describe below, Mohawk fieldworkers and their director were paid by SUNY, but worked together under FERP project. The First Environment Communications Project was an offshoot of this, and worked to educate the community about environmental health issues through health fairs, workshops, a radio show in the Mohawk language, and a publication. As described by two ATFE members (one who was also a FERP employee), the Communications Project "helps provide the community with information on how to cope with contaminants by using culturally relevant strategies. For example, an alternative proteins workshop provided information and training on how to prepare meals using alternative sources of proteins" (Tarbell and Arquette 2000:107). This came in the form of the First Environment publication and a series of videos on preparing protein rich PCB-free foods like tofu.

All of the papers published regarding the results of the first round of research were reporting on measurements, quantifying the exact amount of each specific

contaminant identified in the blood or breastmilk of each study subject-- numbers which, as I will discuss below, did not necessarily mean much to the participants they signified. What the community was eager to learn was how the contamination was going to affect their health. In the first decade after the first samples were taken what they received back were dozens of papers that demonstrated only measurements of contaminant levels, attesting to the limitations of scientific understanding of PCBs at the time, and what some scientists described as a sample size too small to show epidemiologically statistically significant results.

Study Results for SBRP Round One

Contaminants in Breastmilk Samples:

The breastmilk samples, collected between 1986-1992, were analyzed in greater detail as time passed, initially expressed as overall levels of PCBs for the women, and then by 1998 reported as levels of specific PCB congeners in each sample. As described above, the Task #3 breast milk study (Fitzgerald et al. 1992) demonstrated that for breastmilk samples taken between 1986 and 1989, there was a positive association between estimated lifetime exposure to PCBs from consumption of local fish among Mohawks and their milk PCB concentrations. During this period, Mohawk mothers had twice the PCB level of control women.[41] Beginning in 1990, there was no significant difference between the Mohawk and control group, due to a decrease in fish consumption as described above. Women who nursed previous children had lower milk PCB levels, since the longer amount of time spent breastfeeding meant more PCB excreted from the body through milk fats. Concentrations of PCBs increased with maternal age (older

[41] The adjusted geometric-mean breast milk total PCB concentration of Mohawk mothers who gave birth in 1986-1989 was .602ppm compared with .375ppm for the controls during same period

women had consumed more fish over their lifetime) and alcohol consumption during pregnancy, due to the adverse effects of alcohol on the liver's ability to metabolize PCBs (Fitzgerald et al. 1998).

While the concern and assumption had been that PCBs would migrate from the General Motors site to the fish in the St. Lawrence, and then into Mohawk bodies, Fitzgerald and his team were able to show definitively that this was in fact happening. Fitzgerald et al. (1995a) analyzed samples of 348 local fish (the same sample used by Sloan and Jock in the 1990 report mentioned above), and found that fish collected near GM were contaminated with the same lightly chlorinated congeners as the sediment collected off-shore from the GM plant. This was primarily comprised of Aroclor 1248, the commercial mixture used by all three industries near Akwesasne on the New York side. Fish taken from other locations not near GM were contained with the more heavily chlorinated congeners characteristic of Aroclor 1260, a ubiquitous contaminant more typical of Lake Ontario, the source of the St. Lawrence. Fitzgerald et al. (1998) then took the same samples as in the earlier breastmilk articles, and analyzed them greater detail, showing that the Mohawk mothers who gave birth between 1986 and 1989 had higher levels especially of nine particular congeners (related to Aroclor 1248 from local industries and Aroclor 1254 and1260 from Lake Ontario).

Hwang et al. (2001) looked at 97 Mohawk and 154 control breast milk samples, and found that the breastmilk of the Mohawk women who ate the most local fish had a congener pattern that more closely resembled that of perch caught near the waste site or average sampled fish caught near the reserve than Mohawk women who ate less fish or the controls. Hwang cites an earlier study they conducted (Hwang et al. 1993) which

showed that fish caught in the St. Lawrence River offshore from GM had a PCB congener pattern that most closely resembled Aroclor 1248, the commercial mixture used by GM. This study further showed that the closer the fish lived to GM, the more their congener profile was dominated by Aroclor1248—the fish caught from farther away contained more heavily chlorinated congeners (the variety more likely to have traveled down from the Great Lakes). The women who consumed more fish had a congener pattern in their milk that was much closer to perch, the preferred species of fish, than low- and non- fish eaters. This study was significant because it shows how PCBs can be fingerprinted as they migrate offsite from industrial sources, and definitively traced the PCBs to the fish, and from the fish to the women.

While most of the breastmilk studies focused on PCBs, Mohawk women faced other chemical exposures as well. Fitzgerald et al. (2001) examined the same samples mentioned above, and found that Mohawks who gave birth from 1986-1990 had significantly (two times) higher levels of p,p'-DDE[42] than the control group, but they decreased over time and by 1991-1992 cohort there were no significant differences between Mohawks and controls, due to decreased fish consumption. Mirex[43] levels were significantly elevated among Mohawks throughout study period.[44] The difference does not seem to be due to fish consumption since Mohawk women who never ate local fish still had a greater mean than the controls. Levels also remained high despite decrease in fish consumption over time. Both of these chemicals are found in the Great Lakes. Lake

[42] p,p'-dichlorodiphenyldichloroethylene, or what DDT (dichlorodiphenyltrichloroethane), turns into when it is metabolized by the liver
[43] industrial flame retardant and insecticide used until 1977
[44] Average levels among Mohawk mothers were between 2.3 and 3.0 ppb, or approx twice the range of 1.0 and 1.6ppb for the controls.

Ontario and the St. Lawrence River, which were contaminated with Mirex by Hooker Chemical, but the pathways to these women's breastmilk are undetermined.

Contaminants in Blood Samples

From 1992-1995, the sample collection expanded beyond breastmilk to also include blood analysis of 111 pregnant women, as well as their male partners and relatives (139 men). Fitzgerald et al. (1996) and (1999) report that for the men tested, the mean serum PCB concentration of 3.2ppb was determined, which is similar to general population value of 3.1 ppb noted in other studies.

Among the women, Fitzgerald et al. (2004) found that the geometric mean concentration of PCBs in the serum was 1.2 ppb, a level similar to that in other studies of women with no unusual exposures to PCBs. Despite people's concerns about whether residing closer to the industrial site would affect the levels of PCBs in their blood, Fitzgerald et al. (2004) report that residing on Raquette Point or eating food from there was not related to total PCB serum, but rather was more related to fish consumption.

After testing air, soil, fish and produce samples, Fitzgerald et al. (2007) report that for the men in the study, those who ate the most fish had a congener pattern similar to the fish (but from Great Lakes pollution more so than from Aroclor 1248). Occupationally exposed Mohawk men were more likely to have congener patterns like the locally used PCB mixture Aroclor 1248. Fish consumption was more indicative of PCB levels than the region of the reservation the men lived on. Men who did not eat much fish and were not exposed occupationally and lived on Raquette Point had a serum PCB congener that more closely matched that found in outdoor air (volatile, lightly chlorinated congeners). Otherwise, the impact of fish consumption overwhelmed that of outdoor air in the congener profile of the blood of those exposed through both pathways. In the case of fish

consumption, the heavier congeners obtained from the fish dominated the congener profile of the men's blood, effectively drowning out the presence of the lighter congeners that they might have acquired through breathing volatized PCBs. Only in the absence of these heavier congeners, as in the case of the men who did not eat fish or who were not occupationally exposed, were researchers able to see the presence of the lighter congeners.

Round 2: SBRP 1995-2000

In 1995, the SUNY SBRP team received a renewal of their grant to continue to conduct studies at Akwesasne. Fitzgerald left the project at this time because his time was stretched thin over too many other research commitments. David Carpenter continued to serve as the main PI, and was at this point joined by Lawrence Schell, jointly appointed to the Anthropology and the Epidemiology and Biostatistics departments, and Joan Newman from the Educational Psychology department, who developed a project to examine the effect of PCBs on adolescent development. Azara Santiago-Rivera and Gayle Morse in the Counseling Psychology department began a project to examine bio-psychosocial well-being among adult residents. Maria Schymura in the School of Public Health ran the Epidemiology/Biostatistics core, which oversaw all data collection activities, and additionally examined the effects of PCBs on older adults.[45] The second round of studies not only reported on measurements of PCBs found in Mohawk subjects, but also linked PCB levels with potential health effects.

[45] The SBRP also included projects that were limited to laboratory science, but here I am only focusing on those that dealt directly with Mohawk community members.

MAWBS, the Mohawk Adolescent Well Being Study

The MAWBS study, run by Dr. Schell and Dr. Newman, gathered data between February 1996-January 2000 on 271 youth, ages 10-16.9, and their mothers. They found that Akwesasne youth were largely over weight, and that the levels of PCBs found in their blood were related to the timing of menarche, cognitive effects, and thyroid functioning. Each of these results, as I will discuss later, are considered scientifically significant but the researchers were in many cases quick to point out that some of the differences detected by the study, especially in the cognitive tests, were barely perceptible.

The mean concentration of serum PCBs for the youth was 1.72ppb (Gallo et al. 2002).[46] In examining additional contaminants, P'p'-DDE and HCB[47] were detected in 100% and 98% of the samples, and Mirex was detected in 46% of samples. None of the participants had lead levels considered elevated according to CDC standards, and only one youth had an elevated mercury level. PCB levels were considered consistent with chronically exposed groups, although lower than those associated with severe food contamination (Schell et al. 2003). Relatively high detection rates of shorter-lived congeners in the youth's blood suggested a more recent and continuing source of exposure. Although that source of recent exposure was not known, the authors conjecture that it might have been related to ambient exposure to PCB contaminated environmental media (air, soil, sediment). Breast-feeding was potentially a significant source of the persistent congeners in this study, consistent with previous analyses of PCB content in breast milk (Fitzgerald et al. 1998). The high prevalence of persistent

[46] Twenty PCB congeners were present in 50% of samples, 13 congeners were detected in 75% of samples.
[47] DDE is Dichlorodiphenyldichloroethylene, which results from the breakdown of DDT, and HCB is hexachlorobenzene, a fungicide formerly used as seed treatment. PCBs, DDT and HCB are all persistent organic pollutants (POPs) whose use has been banned, but which persist in the environment.

congeners 118 and 138 in conjunction with relatively low levels of 199, 203, and 206 is consistent with the known discharge of Aroclor 1248 as the major contaminant to the river (Schell et al. 2003: 960). The research team, as discussed below also weighed and measured the youth. For all of adolescents, they found a significant inverse relationship between BMI[48] and concentrations of seven persistent PCBs in their blood. Researchers found that age and maternal BMI had greater impact on adolescent BMI than the sum of seven persistent congeners. In this study, they measured PCBs in serum, which is a measure of circulating PCBs, rather than total PCB body burden. Therefore, in this sample, youth with a high BMI (i.e. more fat) had comparatively lower serum PCBs, consistent with the theory that greater adipose tissue acts as a storage organ for PCBs and reduces circulating PCB levels (Gallo et al. 2002: 285).

Obesity in Youth

Due to concerns about rising rates of diabetes and obesity in the community, the research team also weighed and measured the children, and took dietary surveys. They found that Mohawk adolescents consume more calories, fat and protein on a daily basis than the average US adolescent (Gallo et al. 2002). Akwesasne Mohawk children measured to be the average height as compared to other US children, but at every age males were in the 90 percentile and females were in the 85th percentile for weight. 26% of Akwesasne youth in this sample were at risk of being overweight and 33% were already overweight (Gallo et al. 2005). Compared to other Canadian Mohawks measured in a separate study, Akwesasne females were similar in weight, but males were significantly heavier. Researchers are finding this to be a problem among Native children in general: a survey conducted in 1990 with over 9000 Native American school children

[48] Body Mass Index is a measure of body fat based on weight and height

aged 5-18 living on or near reservations, found that Native American children had significantly higher BMIs for most age and sex groups. 29% were at or above the 85th percentile (Jackson 1993). Compared to Jackson's Native American survey sample, Akwesasne males are heavier still, while their height is similar. Gallo et al. (2005) note that sudden alterations in the community away from traditional diet, and the curtailment of outdoor activities, could have contributed to this problem.

Because not all fat affects the body equally, the research team also measured height, weight, fat folds, body circumference, arm and leg circumferences, as well as a number of other body measurements. They found that male and female Akwesasne youth had significantly larger suprailiac skinfolds[49] at all ages, with means exceeded the 80th percentile and the 75th percentile respectively (Gallo et al. 2007:530). Akwesasne youth had thicker skin folds and larger circumferences than youth in the national surveys, and their body fat was more centrally distributed, which is predictive of weight related disease. Gallo et al. (2007) note that the limited variety of food eaten by participants was characteristic of the rural poor: the deterioration of the ecosystem contributed the shifting of food choices away from traditional foods to processed foods high in fat and calories.

Timing of Menarche and Contaminant Levels

Of the sample mentioned above, Denham et al. (2005) drew out 138 girls to see if contaminant levels affected attainment of menarche. The median predicted age of menarche was 12.2 years old. The results of the study found that attainment of menarche might be sensitive to relatively low levels of lead and certain estrogenic PCB congeners. Higher levels of lead[50] led to a later menarche of 12.7 years. Below the median lead level

[49] A fold of fat on the subject's side, just above the hip bone
[50] geometric mean for the group was .49ug/dl

of 1.2 ug/dl girls attained menarche at 11.8 years, 10.6 months earlier than girls with higher lead. The CDC action level for lead is 10ug/dl—the highest lead level for a girl in this sample was less than one half that, and yet menarche might have been affected. Higher levels of PCBs[51], which are estrogenic, led to earlier menarche. SUNY Albany has just begun a new study (2010) in Akwesasne that will follow up on this trend to determine how PCBs or other contaminants there may have affected the female reproductive cycle.

Adolescent Cognitive Studies

Using the youth sample described above, Newman et al. (2006) found a significant negative relationship between PCB levels and two separate measures of long term memory. There was also a negative relationship with a measure of comprehension and knowledge (Comprehensive-Knowledge, Long Term Retrieval and Delayed Recall subtests). The significant relationships were not large, but provided evidence of subtle negative effects of PCB exposure, and were sufficient to justify continuing study. Newman et al. (2006:442) emphasized that overall, "The data indicate that the participants in the study were functioning cognitively, on average, similar to comparison adolescents in the normative groups." In a continuation of the examination of this data, Newman et al. (2009) grouped the Mohawk adolescents according to the structure (dioxin-like or non-dioxin-like) and persistence levels (persistent or low-persistent) of the PCBs in their systems. They examined relationship of each congener group to scores on three cognitive tests. Five subtests from these cognitive tests were found to be associated with one or more PCB congener groups, most often at a moderate level. Two measures of long-term memory were associated with all four congener groups. Almost all

[51] geometric mean.12ppb

congeners associated with cognitive outcomes were non-dioxin-like and ortho-substituted. The exception to this was the Ravens test (a problem solving task involving visual-perceptual reasoning and requires no spoken language in either administration or response), where scores were associated only with dioxin-like congeners. Auditory Processing was related only to the persistent congener group. The association of non-persistent congener group with three cognitive test scores (Delayed Recall, Long Term retrieval, and Comprehension-knowledge) suggested that Mohawk adolescents had experienced continuing or recent environmental exposure to PCBs that was sufficient to result in detectable cognitive decrements. Newman et al. (2009) also recognize that effects evident in adolescence at the time of study could have resulted from exposure that occurred much earlier, from congeners that are no longer detectable in the youths' blood.

Adolescent and Young Adult Thyroid Function

From the sample mentioned above, Schell et al. (2004) looked at 115 Akwesasne youth and examined the relationship between measures of thyroid function and endocrine disrupting toxicants. They found that several measures of PCB burden were related to measures of thyroid function, specifically to T4, FT4 and TSH, but not to T3. The thyroid operates by combining iodine and the amino acid tyrosine to make the thyroid hormones thyroxine (T4) and triiodothyronine (T3). These hormones are then released into the blood stream and transported around the body, where they control metabolism. When the level of thyroid hormones T3 and T4 drops too low, the pituitary gland produces Thyroid Stimulating Hormone (TSH), which stimulates the thyroid gland to produce more hormones. TSH influences the thyroid to manufacture and secrete T3 and T4, raising their blood level, which causes the pituitary gland to decrease TSH production. Most of the thyroxine (T4) in the blood is attached to a protein called the

thyroxine-binding globulin. Less than 1% of the T4 is unattached, or free (FT4). Unattached thyroxine affects tissue function in the body, but attached thyroxine does not (Rosenthal 2008).

In their sample of Akwesasne youth, Schell et al. (2004) detected that there was specifically an increase in TSH and lower T4 and FT4. This was not due to age, lipid level, lead, p,p'-DDE, Mirex or HCB. They hypothesize that either direct action of PCBs on the thyroid gland to caused increased uptake of T4 (which would result in lower T4 levels), or that the PCB metabolites displaced the T4 hormones from the serum carrier proteins which would then result in the body clearing the displaced circulating hormone. The pituitary gland would then produce TSH in an effort to stimulate the thyroid to produce more T4. [52]

Schell et al. (2008) expanded this study to look at 232 Mohawk youth, and again found that exposure to PCBs affected the thyroid hormone profile in the adolescents. The results found a reduction in thyroid function in relation to the adolescents' serum levels of PCBs, but demonstrated that this relationship is much stronger in adolescents who were not breastfed, even though breast-fed adolescents had higher serum PCB levels. They found these observations to be consistent with the hypothesis that prenatal exposure to PCBs alters thyroid function in a long-lasting manner. Breastfed adolescents had higher levels of persistent PCBs and p,p'-DDE but not of non-persistent PCBs or any other toxicant when compared to non-breastfed adolescents. Though having lower levels of persistent PCBs and p,p'-DDE, non breastfed adolescents exhibited significant relationships between persistent PCBs and TSH and FT4, but breastfed adolescents did

[52] In this study, persistent PCBs were positively associated with TSH, while inversely related to FT4. Non-persistent PCBs were significantly and negatively related to FT4. HCB levels were negatively associated with T4, and lead was positively associated with T.3

not. It appeared that PCBs from breast milk obscured the relationship between prenatal PCB exposure and thyroid function by adding random variation to PCB levels. These observations were seen to be consistent with the hypothesis that prenatal exposure to PCBs alters thyroid function in a long lasting manner, but does not exclude possibility that postnatal exposure is influential also.

Schell and his research team obtained funding to do a follow up study with the youth, in 2000-2003. This was the Young Adult Well Being Study (YAWBS), and enrolled the previous participants, who were then 17-21 years old. With this funding, they continued to study the impact of PCBs on thyroid levels. Schell et al. (2009) describe how TPOAb (anti-thyroid peroxidase antibodies) which are produced by the immune system, may attack thyroid cells and damage thyroid function. While not a test of thyroid function, serum TPOAb measurements are useful as a biomarker of thyroid dysfunction, as well as a diagnostic tool for some autoimmune diseases. Of the 115 youth sampled, 18 participants[53] had TPOAb levels above the normal lab reference range. Among participants who were breast-fed (n=47), those with an elevated TPOAb level had significantly higher levels of all PCB groupings with the exception of levels of non-persistent PCBs which did not differ significantly. Levels of p,p'-DDE were also significantly elevated. This showed that groups of more persistent PCBs were unambiguously associated with an elevated TPOAb level among late teens and young adults who had been breast-fed as infants, demonstrating that postnatal exposure is influential, although cause was not proven. The levels found in the youth in this study were lower than those found in other studies, suggesting that "PCB exposures at levels commonly found in the US population and elsewhere could promote autoimmune disease

[53] 15.4% of the sample: 23% of females, 9% of males

if exposure occurred during a critical window as is suggested here. Considering these findings, we conclude that exposure to background levels of PCBs may in fact increase the risk of acquiring an autoimmune disease" (Schell et al. 2009:91). In their most recent paper, Schell and Gallo (2010) summarized results from the previous two thyroid studies, and conclude that PCB effects on thyroid hormone levels appear most evident in relationship to exposures that are likely to have occurred prenatally, while relationships with TPOAb are related more to markers of postnatal exposure. From this they concluded that the sensitive period for the effects of PCBs and other toxicants on thyroid hormone levels may be prenatal, while that for the development of autoimmune responses it may be postnatal.

Bio-Psychosocial Adult Well-Being

The project examining "Bio-Psychosocial Well-Being Among Akwesasne Residents" was headed by Azara L Santiago-Rivera and Gayle Morse in the Clinical Psychology department, in order to examine the extent to which exposure to PCBs, as determined by body burden levels and perceived exposure, affect cultural identity and practices, neuropsychological functioning and quality of life. They also examined the extent to which these factors are related to depression and psychological distress. Thyroid functioning, a secondary biological marker was also examined since it had been demonstrated that PCBs alter thyroid functioning. Santiago-Rivera and Morse published one paper in 1998 about building a community based research partnership at Akwesasne, and two papers were subsequently published which gave the results of their work. Santiago-Rivera et al. (2007) interviewed 353 men and women from February 1996-January 2000 selected through random sampling. Participants completed a demographics questionnaire and measures assessing quality of life, psychological distress and

depression. Blood samples were obtained for chemical analyses of PCBs and thyroid hormone levels, and urine samples were obtained to conduct analysis of homovanillic acid (HVA) a proxy for dopamine function. Results revealed that PCB exposure, as measured by body burden levels, was not significantly related to distress and depression or quality of life perception. PCBs were averaged 3.5ppb,[54] which the authors noted is higher than the EPA established background levels in the general population of 2ppb (citing ATSDR 2000). In this particular study, there was not a significant correlation between thyroid functioning and PCBs. Quoting an EPA 2006 report, Santiago-River et al. (2007: 40) note, "There is little convincing, replicated evidence of adverse health effects due to exposure to PCBs in adult samples." However, they note one cannot say with certainty that there are no long-term adverse psychosocial effects of PCB exposure, since there is no longitudinal data available. The authors cite Michael Edelstein's (2002) work, which demonstrated that it was not always direct exposure to contamination, but rather the stress of suddenly finding out that one has been exposed to a toxic substance that poses a threat to one's health. The impact may go beyond the individual to affecting families and communities. The perceived threat of harm, lack of control, and uncertainty about future illness may result in stress responses, and more profound psychological problems such as PTSD and depression.

The second paper published from this research team (Haase et al. 2009) reported on the neuropsychological evaluation of 277 Akwesasne residents, age 18 to 79. Using the same sample group as above, this study showed that after adjusting for age, gender, and education, PCB levels above a threshold of 2ppb[55] were significantly related to

[54] range= .18ppb- 25.18ppb
[55] median exposure was 2.25ppb

outcome variables in the domains of executive functioning, motor functioning, and memory. These results appeared only in the 37–79-year-old group, while within the younger group of 18–36 year olds the PCBs show no discernable linear or threshold effect. Below this level of 2ppb there is virtually no observable effect of PCBs on higher-order cognitive functioning, planning, and behavioral organization. At levels between 2 and 25 ppb, however, they observed significant deterioration in two of the three variables that make up the executive functioning cluster. It should be noted however, "Even the poorest level of performance on these variables does not rise to the level of clinical concern" (Haase et al. 2009: 83). In addition to executive function, the authors also found a similar threshold effect, largely among the older group, for a test of fine motor behavior and finger dexterity required to manipulate pegs on a grooved pegboard test. Finally, they observe a weaker, but discernable, threshold effect of PCB exposure on a measure of logical memory. They noted that this result was similar to a 2001 study among adult Great Lakes fish eaters.

The Epi-Core: PCBs and Diabetes, Heart Disease, Testosterone, and Hypothyroidism

The Epi-Core charged with managing the collection of data, as well as conducting studies on the adult (over 35) population. Papers from this core covered a number of suggested health effects, including diabetes, potential thyroid disorder, cardiovascular disease, and testosterone levels. As Decaprio et al. (2005) mention, the Epi-Core collected exposure, health and clinical data for more than 1000 Mohawk adults and children. For each participant, data on levels of 91 serum PCB analytes were collected, making this perhaps the largest congener-specific PCB database available for a Native American population.

Sukdolova, et al. (2000) examined the health records at the St. Regis Mohawk Health Services (SRMHS), an IHS (Indian Health Service) funded clinic, and described how the incidence rate in Akwesasne between 1992 and1996 for hypothyroidism in the adult population was twice what it was estimated it should have been. In this paper they described an ongoing study which was following Mohawk women over 30 years old who are part of the other studies (although results of this particular study have yet to be published).

Negoita et al. (2001) also examined health records at the St. Regis Mohawk Health Services (SRMHS), of patients who presented from January 1992-1997. They found that hypothyroidism and diabetes showed higher age-specific prevalence than in the general U.S. population. Trends for asthma and hypothyroidism showed increases over study period, and were especially high in women. They conclude, "If the incidence levels at the rate measured in 1994-1996 persist, it may pose a great burden on the general health of this community." This survey also found that 40.5/1000 people in Akwesasne had been diagnosed with diabetes, which was close to the Martinez et al. (1993) which calculated 48.8/1000 people with diabetes at Akwesasne. Diabetes rates were much higher in older people—for those75 years and older, the prevalence was twice the US population.[56] "This observation indicates the importance of establishing a comprehensive prevention program with regular surveillance in this community. The differences in age distribution suggest that the latency of diabetes is longer in Mohawks, and therefore it implies that prevention may be more effective in this population" (Negoita et al. 2001: 90). They also found that sex and age distribution of morbidity

[56] 21.3 per 1000 people at Akwesasne rather than 10.1 per 1000 people as the national rate

from asthma similar to that of U.S., but there was a sharp increase in prevalence shown in study, fueled by many new cases of childhood asthma

DeCaprio et al. (2005) drew their sample from across several projects and reported on the PCB levels in 753 adults collected between 1998-2000, ranging in age from 18-95 years old. They found that the total serum PCB ranged from .29 to 48.32 ng/g (ppb) and was higher in adult men than in women.[57] They discussed the process by which organisms break down PCBs, and note that in the present study, the mean Mohawk serum PCB congener profile did not closely correspond to that of unaltered Aroclor1248, the primary PCB source contaminant at Akwesasne, which suggested minimal current exposure among most Mohawks. They did detect the presence of congeners for Aroclor1254, and although they are not sure of the source, they note that this Aroclor was widely used in electrical transformers and capacitors and other industrial equipment, so potential sources could include manufacturing plants of hydroelectric power-generating facilities upstream from Akwesasne on the St. Lawrence River. They also found in the study population a congener in vapor derived from Aroclor1248 liquid, which could come from Contaminant Cove. Most Mohawk subjects exhibited low contributions from the congener that would come from volatized PCBs to their overall congener profile, but the data did provide evidence that inhalation might have been a quantifiable exposure pathway for at least a subset of Mohawks.

Codru et al. (2007), studied 352 adults (≥30 yrs of age), recruited between 1995 and 2000. They collected fasting serum samples that were analyzed for 101 PCB congeners, DDE, HCB and Mirex, along with fasting glucose, triglycerides, and cholesterol. Participants who had fasting glucose values greater than 125 mg/dL and /or

[57] median of 3.81 vs 2.94 ng/g

who were taking antidiabetic medication were defined as persons with diabetes. The prevalence of diabetes was 20%. They found a significant association between serum PCB and pesticide levels and diabetes after adjustment for age, BMI, serum lipid levels, sex and smoking. Although they noted that these results do not establish cause and effect, they pointed to a growing body of evidence that environmental exposure to persistent organochlorine compounds are associated with elevated incidence of diabetes. But they noted that singling out which contaminants could be attributed to increased rates of diabetes would be difficult, since they found "a statistically significant elevations in risk of diabetes for total PCBs, the 2 PCB congeners reported separately and DDE and HCB….. therefore caution must be taken in drawing conclusion on the question of which substances are more important in explaining the relationships observed" (Codru et al.2007:1446).

Goncharov et al. (2008) analyzed data from 277 adult Akwesasne Mohawks, collected between 1995-2000, for 101 PCB congeners, Mirex, DDE, HCB, as well as serum triglycerides and cholesterol. The average value for the sum of PCB congeners in this cohort was 4.2ppb.[58] They report that the average values of cholesterol and triglycerides are not extreme for a population of this age range, but the population as a whole is relatively overweight. They found that the distribution indicated that individuals with higher levels of PCBs tended to have higher levels of total serum lipids. They tested a number of theories about causation, and concluded, "The more reasonable explanation is that PCB exposure induces P450s and stimulates liver function, leading to increased

[58] range=.2 to 25.8ppb

synthesis of lipids" (Goncharov et al. 2008: 234). [59] The causal pathway would be that PCBs affect production of lipids by the liver, and this causes cardiovascular disease. The researchers further argued:

> We propose that the relative high or low levels of serum lipids in our participants is causally related function of the magnitude of individual PCB body burden. We make this argument on the logical ground that the induction of P450 enzymes for the purpose of riding the body of the PCBs, causes the overactive liver to synthesize excessive amounts of cholesterol and triglycerides, obviously an undesirable side effect" (Goncharov et al. 2008: 237).

There were significant associations among PCBs, lipids, age and BMI. Results of the study were consistent with the conclusion that PCBs, acting through p450 enzymes, are directly responsible for increased synthesis of cholesterol and trigylcerides, substances known to be major risk factors for cardiovascular disease.

Goncharov et al. (2009) collected fasting serum samples from 703 adult Mohawks (258 men and 436 women), from 1995-2000, and analyzed the sample for 101 PCB congeners, HCB, DDE, and Mirex, as well as testosterone, cholesterol, and triglycerides. They found that testosterone concentrations in males were inversely correlated with total PCB concentrations. They did not detect any statistically significant relationship between toxicants and testosterone levels in females, nor any significant association with the three pesticides. They found that total serum PCBs, four individual PCB congeners, and several PCB groups were negatively correlated with serum testosterone concentrations in adult males after adjusting for BMI and concentration of three pesticides. Congeners found in fish were among those associated with lower testosterone. They concluded that

[59] The average U.S. diet provides 300 to 500 milligrams (mg) cholesterol per day—less than one-third the cholesterol needed daily. Your liver makes approximately 700 to 900 mg cholesterol daily. (Schafer 1996)

exposure to some, not all PCB congeners were associated with lower concentration of circulating testosterone in males.

Results Comparison and Normalization

Scientists, for the purpose of understanding the implications of research results, compare contaminant levels found across study groups in an attempt to determine a toxicity threshold, with the notion that the "The presence of a chemical does not imply disease. The levels or concentrations of the chemical are more important determinants of the relation to disease, when established in appropriate research studies, than the detection or presence of a chemical" (CDC 2005, cited in Hood 2009)[60]. In this sense it is taken as a given, an almost tacit acceptance, that as Hood (2009:1) states "Environmental chemicals and their breakdown products are always present in our body fluids and tissues." We all have thousands of chemicals in our bodies, which we are in many cases powerless to do anything about. For many Akwesasne residents, participation in these studies was their first real exposure to the enlightenment of this precise toxic body burden. For some of these participants, it was not satisfying to hear that their levels were comparable to other communities who had also had the dubious honor of being studied.

In nearly all of the papers written from the first round of research, Fitzgerald's team highlighted that the levels they were finding in participants at Akwesasne were not elevated in comparison to other studies. Results found at Akwesasne were compared to a variety of populations, from the Inuit of Hudson Bay, Great Lakes residents, upstate New

[60] In the newer 4th Report, the CDC altered this phrase, placing less emphasis on the research studies, and more on individual susceptibility to the effect of toxics: "The presence of an environmental chemical in people's blood or urine does not mean that it will cause effects or disease. The toxicity of a chemical is related to its dose or concentration, in addition to a person's individual susceptibility." (CDC 2009)

York housewives in the 1970's, and a selection of studies from around the US and the world. In each case, Akwesasne results were found to be comparable to, or below these other findings.

Just as Brian Bush had noted earlier in his letter to Katsi, Fitzgerald et al. (1992) reiterated that the levels detected in Mohawk women were approx 50% lower than reported by Bush et al. (1985) in their 1977 investigation of 40 women from maternity facilities in Albany, Rochester and Oswego NY. Mohawk women also had lower levels than a North Carolina study of nursing mothers conducted by Rogan et al. (1986a)[61]. In comparing results to more recent studies, levels of PCBs found in men from Akwesasne[62] (Fitzgerald et al. 1999), and the median for the overall Mohawk population[63] (Fitzgerald 2005), were similar to or less than a general population value of 3.1ppb noted by Patterson et al. (1994) in his report on his own research in Atlanta Georgia, and a comparison of studies from around the world.[64] Fitzgerald et al. (1992) and Fitzgerald et al. (1998) also noted that the PCB concentrations of Mohawk women[65] were at the low end of the .5 to 1.5ppm range for average background levels in breast milk studies in the United States.[66] Similarly, Mohawk women's blood samples showed serum PCB levels similar to those found in other studies of women with no unusual exposure to PCBs (ATSDR 2000 cited in Fitzgerald et al.2004).

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[61] Geometric mean of 1.5 ppm for the North Carolina mothers as opposed to .404ppm geometric mean for the Mohawk mothers. Cited in Fitzgerald et al. (1992).
[62] the median serum PCB concentration of 3.2ppb
[63] 1.8ppb
[64] Although at the same time, Patterson warns against placing too much stock in comparisons of studies across time and countries, in which many of the samples were not random.
[65] In this study the arithmetic mean .554ppm, geometric mean .404ppm.
[66] (based on 9 studies they examine which looked at residents from NY, NC, Hawaii, Michigan, and two studies with broader (but small) US samples studies compiled by Jensen 1991 Fitzgerald et al. 1992:92.

In comparing Akwesasne residents' results to Great Lakes residents, in all cases they were found to be equivalent or lower. Fitzgerald et al. (1992) noted that the PCB concentrations of Mohawk women were comparable to or below two studies of Lake Michigan fish eaters (Humphrey 1983; Schwartz et al. 1983).[67] In reporting the PCB levels found in men from Akwesasne, Fitzgerald et al. (1999) described the median serum PCB concentration for Mohawks as similar that of Wisconsin anglers, but less than that of Lake Michigan charter boat captains described by DeVoto et al. (1997).[68] Fitzgerald et al. (2004) also reference the results of a 1992 study of two Ontario communities in which Kearney et al. (1999) reported a mean PCB concentration among women of reproductive age who did not consume Great Lakes fish that was slightly higher than that of Mohawk women.[69]

Fitzgerald et al. (2004) also report that higher serum PCB levels have been found among other Native populations that consume more local fish. Gerstenberger et al. (1997) for instance found that the Ojibwa people of Wisconsin consume on average 29 local fish meals a year, or approximately twice that observed by Fitzgerald et al. (2004), which resulted in higher levels of PCBs[70]. The Inuit of Hudson Bay Quebec, as reported by DeWally et al. (1989), were especially held up as an example of a population with much higher levels of PCBs.[71] They note that Inuit people are more dependent on fish

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[67] arithmetic mean .554ppm, geometric mean .404ppm for Mohawk women, and reported medians of .82 and .74 ppm for Great Lakes residents

[68] Median serum concentration of 3.2ppb for Mohawks, 2.8ppb for anglers, and 8.0ppb for charter boat captains

[69] arithmetic mean total serum PCB concentration of 2.8ppb among women of reproductive age who did not consume Great Lakes fish, compared to the 1.8ppb arithmetic mean for Mohawk women.

[70] The Ojibwa arithmetic mean serum total PCB concentration was 3.7ppb, compared to 1.8ppb for Mohawk women

[71] In the DeWally study the arithmetic mean was 3.6ppm for Inuit women vs .77 ppm for Caucasian women elsewhere in Quebec. PCB concentrations of Mohawk women were lower: arithmetic mean .554ppm, geometric mean .404ppm (Fitzgerald et al. 1992).

and seals for food, consuming 18 fish meals and 10 sea mammal meals per month, compared to Mohawk mothers' .5 fish meals per month. While these studies could not tell Mohawks what these numbers meant for their health, they could confirm that they were in good company, faring better than the Inuit, Great Lakes boat captains, and a collection of other individuals from around the country.

One of the problems that residents saw with the first round of studies was that all that was determined were numbers that represented the amounts of contamination present inside them. Not concrete predictions for their health or well-being, or a correlation between the illnesses they saw in the community and the contamination. Neither of these was considered possible due to the small size of the community and the lack of scientific understanding about PCBs actually affected the human body through chronic low-level exposure. This study determined numbers that represented people, and then compared them to other studies that determined numbers to represent levels of contamination in other people. Because these studies agree with each other that these are the numbers present in different populations, these numbers are not considered alarming, although Akwesasne community members expressed to me that "zero would be a good level."

After the first seven milk samples were returned to Katsi in 1986, Brian Bush wrote to her "You will be glad to note that the present levels are well below those of the 1979 suburban Americans." Yet Katsi continued to press for more studies, more research. I asked her if receiving this letter made her feel any better, and she replied that she was used to science "poo-pooing" their concerns, and felt that it ran deeper than that. She did not think that Mohawk women were like 1970's housewives, physically, culturally, politically, or environmentally, and so was not comforted by the information

that they had levels of PCBs in common, even if nothing else. She likened it to the fact that most science and the determination of acceptable exposures are based on white, college-age men. Katsi was also trying to drive home the concept that while everyone was discussing the Mohawk subsistence lifestyle, that breastmilk is the most important part of that subsistence. In addition, she was beginning an "empowerment model of research" as she calls it, a concept she carries through to today in her push for "centering pregnancy" programs in local clinics.[72]

In many of the more recent papers published by SUNY researchers based on what I have called above the Round 2 research, closer analyses of PCB levels and the presence of illness indicators are being found in Akwesasne community members. As demonstrated, these include abnormal thyroid functioning adolescents (Schell et al. 2004, Schell et al. 2008, Schell et al. 2009, Schell et al.2010), diabetes (Codru et al. 2007), higher levels of total serum lipids, which contribute to heart disease (Goncharov 2008), cognitive function in adolescents (Newman et al.2006; Newman et al. 2009) and older adults (Haase et al. 2009); and reduced testosterone levels in men (Goncharov 2009). Fitzgerald and his research team qualified many of their attempts to normalize the levels they are reporting by comparing them to other study populations by making statements like "caution must be exercised regarding health implications, and the possibility of subtle, long-term effects such as disruption of the endocrine system cannot be ruled out" (Fitzgerald et al. 1998: 170). It is possible that the most recent analyses of data might be uncovering that possibility.

The comparisons are made between the Akwesasne data to other studies in order to situate each published study within the scientific literature, but at the same time, by

[72] Personal contact, January 22, 2010 in Washington DC

reporting Akwesasne residents' results alongside results from other communities that are similar or higher, the general impression that one comes away with is that one should not be too concerned. Even within the research team, there was not necessarily consensus as to the level of hazard that the Akwesasne community was facing. One of other the researchers from SUNY Albany, David Carpenter, who has been known to take a much more (and even self-proclaimed) activist stance towards community health issues recalled for me "I remember long arguments about what we say, about what levels were dangerous. We tried to avoid that as much as possible. I'd still tend to think it's more dangerous than some of my colleagues do. I think time is proving me right but, you still--there's no benefit by frightening people and they can't do anything about them." Several of the health studies participants, whose experiences I will explore in detail in the following chapter, expressed frustration at receiving numbers back that represented levels of PCB in their blood, but not having any sort of understanding of what this meant for their personal health, or the steps they should take to rid their systems of these contaminants other than the continued avoidance of local fish.

Limitations of Science

Part of what participants were looking for in the results was information that was not possible to present at the time. Joyce kept mentioning that she was looking for the results to give her "an assessment, overall assessment of what does it mean? You know, what are the long term effects?... What's the impact long range on our family? Or, you know, our grandchildren?" Some of the scientists expressed to me that this was one of their greatest frustrations—that the community wanted them to be able to spell out what the contamination meant for the health of individuals and the community, and they could not.

One of the SUNY/NYS DOH scientists who worked on the earlier studies expressed to me an understanding of these frustrations in the community, noting that one of the most dissatisfying things about the science that came out of their work with the community,

> Was our inability to really be able to determine scientifically and statistically the health impact of the PCB exposure on the community. My work was able to tell that they were exposed at least in the past and that exposure had some biological impact as indicated by those P450 enzymes but-- And I said that in turn might indicate some cancer risk, but-- I wasn't able to address what I think is their primary health, primary question which is you know 'how have these PCBs effected my health?' I think I have alluded to the primary problem there was that the Mohawk population is relatively small, so I'm just not going to be able to statistically demonstrate excesses of cancer, but even if you do, be able to relate it to PCB exposure, see that was the basic problem, and also those kinds of studies are very expensive too.

Alice, the director of FERP, expressed similar frustrations with the limitations of the ability of science to answer the community's questions. She noted that the studies "opened up a lot more concerns and questions without answering some of the basic things." Some of the concerns she mentioned included what level of cognitive delays could be attributed to PCBS, potential affects to people's metabolisms and reproductive systems. Unfortunately, with these kinds of questions "technology, at the time, couldn't answer them. I'm not sure we're really ready to be able to understand what that meant." This was frustrating to the community because the studies "raised more questions than we can even answer initially. It kind of shook my faith in the system. I really put my heart and soul into wanting this project to work and to mean something." Alice personally believes that people's health has been affected by the contamination, but

> How do you pinpoint exactly what caused it?... Yes, I think people's health are affected. But to what extent, we still can't prove it. You can't make that direct connection, and that's what people wanted to find out, how it's directly affecting themselves. The level of PCB or lead or whatever they had, if you have this then you should have this. I think that had a lot to do with the limitations of

> technology then. I don't know if they can even do that now or ever. But that was one of the limitations we really couldn't get around.

Little (2009) and the Health Investigations Communications Work Group (2004) both found similar issues among ATSDR scientists regarding the challenges they faced with the communities they were working with misinterpreting the actual ability of environmental health science to create "clean, useful, and evidence-based theories of causation" (Little 2009:100). To avoid this disappointment, a

> Considerable amount of work is needed to help community residents understand what a health study can and cannot do, and this effort needs to occur during the planning phase. If this interaction does not occur, community residents may feel that they have been misled when the results and conclusions are presented. Of course, investigators also need to understand the needs and concerns of community residents so that studies can be tailored to address these needs (HICWG 2004: 487).

Many of the papers from the second round of research, which are beginning to show possible connections between PCB levels and health issues, were only published very recently (several after I conducted these interviews). In addition, while they note trends, each of these research papers also cautions that they cannot definitively say that PCBs cause any of the illnesses studied, and cannot make predictions for anyone's individual health.

ATSDR and the "average PCB level" for Americans

While the first found of research papers normalized their results in comparison to Inuit women and Great Lakes residents, the second round of papers describing the results of adult participants in 1995-2000 used a number selected by the Agency for Toxic Substances and Disease Registry (ATSDR) as the norm. Seven papers[73] all refer to the

[73] DeCaprio et al. 2005, Santiago-Rivera et al. 2007, Codru et al. 2007, Goncharov et al. 2008, Goncharov et al. 2009, and Haase et al. 2009

levels of PCBs found in their study subjects as being slightly above the average for the general population, as established by ATSDR (2000). These SUNY scientists, reported average levels of total PCBs as between 2.5ppb (Santiago-Rivera 2007) to 5ppb (Codru 2007). Each of the authors mentioned above stated that Akwesasne subjects were slightly elevated above the ATSDR (2000) determination of "average" American PCB body burden of between .9ppb and 1.5ppb, for non-occupationally and non-environmentally exposed individuals. I went to the ATSDR 2000 report to see how the 'average American PCB body burden' had been calculated. In the executive Summary of this 948 page report, it states (p16) that the "mean serum PCB levels range from 0.9–1.5 ppb (μg/L), in recent years, in individuals who do not have diets high in fish from waters contaminated with PCBs." Within the text, the source of information for the aforementioned summary, it states: (p557 &560) "Currently, mean serum PCB levels range from 0.9 to 1.5 ng/mL in individuals who do not have a diet high in fish, especially fish from the Great Lakes (Anderson et al. 1998; Hanrahan et al. 1999)." The Anderson et al. (1998) study only had a sample size of 41 "non-consumers of Great Lakes Sport fish", and the Hanrahan et al. (1999) study has a sample size of 57 "infrequent male consumers of Great Lakes sport caught fish" and 42 "infrequent female consumers of Great Lakes sport caught fish." It hardly seems that we could extrapolate the average PCB body burden for the entire country based on 140 Great Lakes residents (a sample size less than1/3 of Decaprio 2005), but this is how ATSDR in 2000 established the average, and it is upon this average that some SUNY researchers writing about Akwesasne determined that the residents there had 'slightly elevated' levels.

As opposed to the ATSDR (2000) report which drew comparisons across studies conducted in communities who presumably had reason to believe they were being affected by the contaminants they were being tested for, the Center for Disease Control (CDC) has been conducting an ongoing survey that samples the US population every two years for 212 chemicals. The blood and urine samples are collected from participants in CDC's National Health and Nutrition Examination Survey (NHANES), which is an ongoing survey that samples the US population every two years. Each sample consists of about 2,400 persons. The Fourth Report (2009) includes findings from national samples for 1999-2000, 2001-2002, and 2003-2004. The data area analyzed separately by age, sex and race/ethnicity groups (although Native Americans are not listed as a separate group). The CDC Fourth Report separates out the 209 congeners of PCBs into Non-dioxin-like PCBs and dioxin-like PCBs, including mono-ortho-substituted and coplanar PCBs, and examines levels of each specific congener within these sub categories, as opposed to providing a single range as the average PCB level contained in the subjects.

For some residents, having their results normalized on the basis of conforming with these other studies did not make them feel better about their own results, but rather concerned for the 'norm.' One woman, Leona, was worried about her breast milk and wondered in regards to her infant daughter at the time, "What am I passing on to her? Is she going to be all right?" She was surprised when the results letter informed her "well, you're about equal to everybody else. So it's like, holy! What kind of world are we living in!? (laughs)." Her expectation was that as a woman living on Raquette Point, considered to be one of the most contaminated regions of the reservation, her levels would be dangerously high. The fact that they were comparable to other Americans

made her feel concerned for those other Americans more so than being relieved for herself. Another woman, Jean, and her husband received results back that indicated that they were in the normal range, but they felt that the ranges must have been pretty wide for them to be considered normal, again finding concern with what defined the "normal range" at the same time that they were somewhat relieved to be considered within that range.

Despite these comparisons of Akwesasne results to 'average' PCB levels, when I directly asked some community members if they worry about contamination in their bodies, more responded "yes" (n=21) than "no" (n=15). Of those who are concerned, many cited either their own past health concerns, including battles with cancer, thyroid disease and fertility issues, or what they saw to be elevated rates of diseases like cancer in the community. Among those residents who were not concerned, for two of them this is specifically because they use traditional and Eastern medicines to cleanse their systems, in order to ensure that they do not have to worry about the presence of contaminants in their bodies. In many ways, the political bodies that were supposed to ensure that these contaminants did not find their way into their individual bodies in the first place (federal and state regulations regarding pollution emissions, and the agencies that were supposed to police these industries and ensure a thorough hazardous waste cleanup) have failed them. In light of this, these individuals have taken it upon themselves to rid the contaminants from their own bodies. Another man, Jake, who described to me that he was too concerned about the scope of environmental issues in general to be worried about contamination in his own body, joked later outside of the interview that he was afraid to lose weight because then all the PCBs in his fat would enter into his blood stream. Three

individuals of the "non-concerned," stated that they did not worry about contamination in their bodies because the study results they received back told them their levels were low. Two of these women happened to be FERP employees who both were initially subjects of, and who also later worked on these studies. Having closer contact with the scientists who ran the studies and the work that went into it could have played a part in establishing their trust in the study results. Another woman (31C) thought for a moment, and then replied, "No, I don't worry about it. I'd rather be at peace."

Conclusion:

After experiencing a health study conducted by Mount Sinai that left them feeling uniformed and disempowered residents at Akwesasne were better prepared to take greater initiative in the second large health study to come to Akwesasne. Women had watched as scientists collected fat samples from fish, livestock and residents, but were not convinced that this necessarily informed them whether the community's most basic form of subsistence, breastmilk, was safe for their infants. Intent to find out, they overcame ingrained distrust towards New York State and initiated a partnership with them. The resultant health studies were valuable in that they supplied the information that Mohawk mothers were initially seeking—that the levels of contaminants in their milk were low enough that it was considered more beneficial for them to continue to breast feed than to switch to bottle-feeding. The studies also demonstrated a mechanism by which Mohawks could decrease further exposure: the unjust and highly inconvenient remedy of decreased fish consumption. What the studies were not able to answer were participants' questions about their individual health, at present and into the future. As seen above, it took a decade of academic papers before the SUNY research team was able to potentially link levels of PCBs with conditions in the community, illnesses that some community

members were certain were caused by contamination. The residual effects of these studies in the community vary from person to person. Individuals who worked on the studies as fieldworkers still have strong opinions about how things were done, and how they potentially could have been done differently, which I will discuss in the next chapter. Many others only remember that they are not supposed to eat the fish because that is where you are exposed to PCBs, and PCBs are bad for your health. Others like MCA Department of Environment employee Henry Lickers point to the fact that just "just the mention of PCBs, whether seen as high or low, is enough scare people and screw everything up." Some of the results of these fears will be explored further below.

Chapter 4:
"We're not going to be guinea pigs"
Lessons from Community Based Participatory Research in Akwesasne

I: Science, Knowledge, and Community Based Participatory Research

Science: how it is defined, who has it, who can understand it, and how and by whom it should be used has become a subject of increasing interest among social scientists in recent decades. As part of a larger exploration of what 'knowledge' is, anthropologists have sought to examine science as a culturally specific form of reasoning (Franklin 1995: Edwards et al. 2007) rather than a rational method of drawing objective truth from the physical universe. "Science always occurs in a cultural context; its conceptual categories, its rule of evidence, its distinction between appropriate and inappropriate subjects for investigation all reflect the society within which scientists work" (Tesh 2000:101). The anthropological study of various forms of indigenous knowledge has been a staple for the discipline, but it is only recently that this lens has been turned on laboratory science (ex: Latour 1987; Gusterson 1996), what Ingold (2004) would describe as anthropology *of* science, or Laura Nader's (1969) "studying up". In addition, Ingold (2004) describes anthropology *between* science and society, examining the impacts of scientific knowledge and practices on social life, and how people have responded to them (ex: Duster 1996; Rapp 1999). I would also add as a separate category the examination of the interface of "traditional" or "local" knowledges or sciences, and Western or "or "global" sciences (Nadasdy 1999 and 2003; Sillitoe 2007; Ellen 2004). Like any other form of cultural knowledge, they argue that science too is "embedded in larger social processes which give it meaning" (Nadasdy 1999). By demystifying science and drawing it down from its positivist pedestal and into the culture-bound masses,

scholars hope to bring light to the social and political processes that govern knowledge production in science.

Nowotny et al. (2001) on the other hand argue that rather than trying to place science more firmly within society by revealing that it has a culture too, just like everything else, it is more beneficial to bring society into science, making science more accountable to society. In this context we have witnessed rise of ethical monitoring in Western knowledge institution, with scientific proposals are increasingly judged by the explicitness with which they identify both the usefulness of their research (to society) and their provisions for ethical monitoring (Edwards et al. 2007:9). I would argue that another way to bring society into science is through community based participatory research (CBPR), which strives to make researchers and communities of study partners in defining and implementing research projects.

In the following chapter, I will draw on some of the anthropological examinations of the complicated divides and interfaces between indigenous/local knowledge/science and Western/global/techno[74] science, as well as the sociological and public health discussions around the 'public understanding of science' (PUS) to examine community based participatory research (CBPR) as an effective (although not yet perfect) approach to environmental health research in Native American communities. Drawing on interviews with SUNY Albany researchers, First Environment Research Project Fieldworkers, and health study participants, I will examine the benefits both to the local and scientific communities of this approach. In addition, I will examine some of the challenges faced when two groups of people with very different histories and cultural

[74] Barnes (2005: 142) notes that "Technoscience" is now most commonly used in academic work to refer to sets of activities wherein science and technology have become inextricably intermingled, or else have hybridized in some sense.

paradigms came together to work collectively, yet from very different seats of power. Through interviewing individuals from all three groups of people involved in the health studies, they have been able to address some of each other's comments and questions, through the (albeit incomplete) quasi-discussion I have assembled here from those 39 interviews. The successes and challenges faced in this project can serve to inform other research projects, both in this and other native communities. Finally, I will discuss the importance for the CBPR stipulation of capacity building in the community of study, and its implications to eventually support entirely indigenously- run research projects.

Science for all?

Science, according to the Oxford English Dictionary definition, is the intellectual and practical pursuit that seeks to further understanding of the "physical and natural world through observation and experiment." Sillitoe (2007:3) argues that in extending this definition of science to local contexts, "we have to interpret behavior broadly, such that experiment includes noting the results of everyday experiences." However, he concludes that "while local scientific knowledge may not be systematically recorded like that of global science, nor feature such prescribed theories, it is nonetheless formalized to a varying extents in cultural heritage" (Sillitoe 2007: 3). Similarly, in examining the traditional environmental knowledge (TEK) of Cree hunters, Scott (1996:69) argues that if science is defined as

> A social activity that draws deductive inferences from first premises, that these inferences are deliberately and systematically verified in relation to experience, and that models of the world are reflexively adjusted to conform to observed regularities in the course of events, then, yes, Cree hunters practice science—as surely all human societies do.

On the other hand, Ellen (2004:411) argues that to even find technoscience's equivalent in indigenous knowledge and compare the two is "a reflection of our urge to impose

simple, and often sterile dichotomies on the world." Nadasdy (1999: 2003) has argued extensively that attempts to integrate TEK with technoscience requires a dismantling and decontextualizing of indigenous knowledge, due to the often very different cultural frameworks from which the two originate. But at the same Edwards et al. (2007:9) argue that "a recent tendency to local what has been dubbed technoscience in its organizational, political and global settings, and traditional knowledge systems with their lay beliefs in local/indigenous settings, feeds the current vision of a hierarchy of separate and discrete knowledge systems." Sillitoe (2007:9) notes that the entire discussion prompts "a furious debated over the meaning of such terms as local, indigenous, traditional and citizen knowledge, among others, and the correctness of using such terms at all. It smacks for some of the discredited distinction between primitive and civilize thought, which some have dubbed the great cognitive divide." Indeed, as Edwards et al. (2007:9) note, "the new 'primitive' is the scientifically illiterate."

Similar discussions within the sociology of science and public health note the blending boundaries between 'the public' and science. Corburn (2005) notes that residents of contaminated communities typically adopt scientific approaches to toxic pollution conflicts, which complicates assumptions that "laypeople" and "experts" have clearly partitioned epistemic cultures. Scholars are calling for a reconfiguration of the citizen–knowledge interface, whereby "the tacit division of labor between an expert who produces knowledge and a citizen who consumes it has to be rendered less asymmetrical by understanding the citizen as a person of knowledge" (Visvanathan 2005:91). Little (2009:106) argues that residents encourage and call on scientific agencies, in the case of his research the federal Agency for Toxic Substance Disease Registry (ATSDR),

precisely because they already have a shared concern, a similar and compatible epistemic commitment. In examining concerns of scientific literacy in the public, Roth (2004:7) argues that "studies in public understanding of science construct an image of the interaction between scientist and non-scientist that is much more complex, dynamic, and interactive than the traditional opposition between 'scientific expertise' and ignorance or rejection of scientific knowledge may lead us to believe." Rather, he argues, "citizen thinking" offers a comprehensive basis for action that combines the aspects of science they may see as useful to them with their own observations and analogies.

Corburn (2005) has coined the term "street science" to describe an approach to environmental health justice that joins local insights with professional techniques, suggesting that street science does not devalue technoscience, "but rather revalues forms of knowledge that professional science has excluded and democratizes the inquiry and decision-making processes." (Corburn 2005:3). In examining the interface between indigenous or local knowledge and global science, rather than viewing them as separate poles, Sillitoe (2002) created a diagram of linked spheres of knowledge, with a shaded area of overlap where the two spheres connect. The 'public understanding of science' described by Roth and the 'street science' described by Corburn could just as easily fit into this diagram as the TEK of the Cree hunter.

Language of Science and Power

Citizen groups often seek to utilize science because of the power that scientifically derived results have in either reassuring community members or giving them cause for concern about their health. As noted in the previous chapter, Katsi went to the NYS Department of Health looking for numbers to help Mohawk women decide if they should

continue to breast feed, as well as to better understand if some of the reproductive affects she had been seeing could be attributed to the contamination. These scientific results are also a necessary component of policy change or legal recourse, especially in battles with polluting industries, where observations of environmental destruction or poor health are often considered insufficient evidence.

Bourdieu (1991) notes that by virtue of their relation to state power, some ways of speaking are legitimized as 'official' or 'formal', while others are suppressed. "Because of their legitimacy, these official ways of speaking become the only acceptable ways of talking about and analyzing those languages, dialects and ways of speaking that they marginalized or replaced in the first place" (Nadasdy 1999:11). Similarly, the people of Akwesasne found it difficult to describe and draw attention to the environmental contamination in the community without couching it in the language of scientific study results. Mohawk 'science,' based on generations of observations and interactions with the physical environment could not provide sufficient legal evidence for the changes in and destruction of this environment. Akwesasne Mohawks Alice Tarbell and Mary Arquette (2000:93) note, "There is not even a word for pollution in the Mohawk language" and go on to discuss the difficulties Mohawks faced in telling their story of the effects of pollution on their territory. In another article, Arquette et al. (2002:261) describe how:

> Vastly different languages, cultures, and worldviews present real barriers to effective communication. At Akwesasne for example, elders, mothers, children and other community members have presented eloquent testimony about social, cultural and health effects they have experienced as a result of contamination of area ecosystems. The presentation of effects such as these have been met with resistance, a few yawns, and overt eye-rolling, and deemed 'nice stories' with little relevance to scientific discussions of risk-based scientific decision making.

It was only when a sufficient number of wildlife, sediment and breastmilk samples were demonstrated to contain high enough levels of PCBs that some action has been taken, although still not to the level that Mohawk people would prefer. Nadasdy (2003:5), again referring to Bourdieu (1991) also describes that if a

> Speaker wishes to successfully produce discourse in a particular field, then he or she must observe the forms and formalities of that field. This leads to a process of 'self-censorship' in which speakers modify their linguistic production according to how they expect their utterances to be received in the particular linguistic field in which they are interacting. That is, whenever people speak, they must adapt their speech to the demands of the linguistic field that is their audience.

To speak to the scientific, political and legal communities about damages inflicted by contamination on a community, the public needs to take on the language of science, demonstrating levels of contamination discovered and numbers of community members ill, using scientifically sound methods. To acquire this language, community groups will often engage in what Brown (1992:4) has coined "popular epidemiology," a

> Process by which lay persons gather scientific data and other knowledge and resources of experts in order to understand the epidemiology of disease… further it involves social movements, utilizes political and judicial approaches to remedies, and challenges basic assumptions of traditional epidemiology, risk assessment and public health regulation.

However, with the language of science, and specifically epidemiology, comes a difficult set of principles that often run counter to a community's belief about life itself. The Health Investigations Communications Work Group (HICWG), (2004:488) in their discussion of ATSDR's interactions with the public over sites of environmental contamination, note that:

> Accepting language of epidemiology along with its principles—requires reconceptualizing things like death. Epidemiologic principles and terminology routinely accepted by researchers can be complex or controversial in the community setting. For instance, the concepts of ''expected'' deaths or the

> ‘‘significance’’ of an event can connote something different to a resident than it does to a researcher. Training can be provided to help community residents become more informed users of epidemiology, but this training should be tailored to local needs

Note that training is recommended for community residents only in order to overcome the shock of this use of language. As purveyors of the language of power, the epidemiologists in this case, can speak of concepts like “expected deaths” while training is mentioned as a solution to make community members less alarmist, and less sensitive to the language. In the case of Akwesasne, more than one community member asked me “how many of our people have to die?” in order for the numbers to be considered significant, noting that in their families each death from illnesses like cancer felt incredibly significant. “So how many people have to die?” asked Lloyd. “We don’t have that many around here to decide that.” However, in order to garner the necessary support to take political or legal action against the polluting industries, the community had to engage with science, observing the “forms and formalities of the field” and at least tacitly accepting some of its assumptions.

Native American Communities and Research Studies

One of the difficulties in many Native communities in the decision to embark on a research study as a method of addressing a community problem is overcoming the legacy of past, exploitive research projects. As several public health researchers have noted, for a number of racial and ethnic minority groups in the United states, mistrust of research ‘is rooted in a general mistrust of mainstream society,” while the possibility of exploitative or unethical treatment remains a serious one (Epstein 2007; Moreno-John et al. 2004; Lex and Norris 1999).

In some cases, the confidentiality of the community has been violated, as in one situation where a Native community received negative attention after their reservation was identified in a study on syphilis, and another community received adverse credit ratings by lenders after they were identified in a study on alcoholism (Moreno-John et al. 2004). In many cases, as was demonstrated in the description of the Mount Sinai research study at Akwesasne described previously, results were not properly reported back to the community. Schnarch (2004:82) similarly gives a long detailed list regarding what has been done wrong in research relationship with First Nations—namely that researchers came in with pre-developed projects, did not ask for community input, pressured people into taking part in the studies, treated Native as subjects or informants and not colleagues, sensationalized problems in the community in their publications, and used blood samples for unauthorized projects.

Many of the past problems surrounding research in Native American communities boil down to issues of power: the researchers coming into the community had most of the power over the research project, and the Native subjects had very little. Much of the literature on community based participatory research, which I will discuss below, connects the issue of trust directly to that of transforming the power imbalance between the researcher and the community under study, through properly implemented CBPR. Mohawk Native Studies professor Marlene Brant Castellano (2004:98) recalled sitting at a community meeting at which community members were complaining that they had been "researched to death" (a comment I also heard, verbatim, more than a few times at Akwesasne). She describes how one elder spoke up and declared, "If we have been researched to death, maybe it's time we started researching ourselves back to life."

Castellano (2004:98) describes that "researching ourselves may mean self-initiated action or it may mean entering into effective partnerships." The framework of these effective partnerships will be discussed below, and this chapter will conclude with ideas around community capacity building, and the prospect of indigenous research in the future.

Community Based Participatory Research (CBPR)

Community-based participatory research (CBPR) is an approach that focuses on conducting research with--- rather than on—communities. It is "a collaborative process that equitably involves all partners in the research process and recognizes the unique strengths that each brings. CBPR begins with a research topic of importance to the community with the aim of combining knowledge and action for social change to improve community health and eliminate health disparities" (Minkler et al. 2008:7). CBPR is not a method, but rather an orientation to research (Cornwall & Jewkes 1995), that takes "a more democratic and ecological approach to scientific study" (Wing 1998:205). In addition, CBPR has been embraced by the public health field as a means of creating more inclusive and effective public health interventions, and by social sciences as a means for achieving broader community input and greater community acceptance of research projects. CBPR was named by the Institute of Medicine (IOM) as one of the eight new content areas in which all schools of public health should offer training (Minkler and Wallerstein 2008:7).

CBPR has received considerable attention in the past decade as a recognized and important approach in addressing a previous model of research that separated the researchers from the researched and applied a top-down model of scholarship. Chavis et al. (1983) used the term "experimental colonization" to characterize the traditional

relationship of scientists to many host communities, where subjects are often left feeling exploited and believing that they will not benefit from the research. The main tenet of CBPR is a reshaping of the research process to include community members as co-producers of knowledge rather than passive subjects. Schell et al. (2007:512) note that part of the ongoing postmodern critique of how knowledge is produced within the humanities and social sciences is a "critique of the essentialized and disempowered research subject. This critique reconceptualizes the people who we study, or the researched, from passive objects/subjects of our research to one of active agents or participants in research who have their own interests, priorities and agendas." In light of this, Schell et al. (2007) describe the implications for research design and results that this shift from research "subject" to research "participant" has for the field of human biology. "Fundamental to this approach is breaking down barriers between the researcher and researched and the sharing of power, with an emphasis on co-learning and dialogue" (Schell et al. 2007:512).

Israel et al. (1998) note that the rationale for conducting CBPR research includes the need to improve the quality and validity of research by engaging local knowledge and local theory based on the lived experiences of the people involved (Bishop 1996; Vega 1992). CBPR also acknowledges that knowledge is power and thus the knowledge gained can be used by all partners involved to direct resources and influence policies that will benefit the community (deKoning and Martin 1996). In addition, community based research increases the possibility of overcoming the understandable distrust of research on the part of communities that have historically been the 'subjects' of such research (Hatch et al. 1993).

In their review of community-based research, Israel et al. (1998) list several of the principles of CBPR, which include recognizing the community as a unit of identity and building on the strengths and resources in the community. CBPR also facilitates collaborative equitable partnership in all phases of the research and promotes co-learning and capacity building among partners. Rather than the researchers providing the sole source of design for the research project and educating the community with the results, they are expected to elicit and incorporate community suggestions, and be open to learning along the way. CBPR also emphasizes local relevance of public health problems and ecological perspectives that recognizes and attend to the multiple determinants of health and disease. Importantly, CBPR also requires that researchers report back to the community of study with results include community in the analysis of these results.

SUNY researchers published several papers, many in conjunction with the Akwesasne Task Force on the Environment, describing this CBPR relationship (Carpenter 1995, Schell and Tarbell 1998; Santiago-Rivera et al. 1998; Carpenter et al. 2002; Schell et al. 2005, Schell et al. 2007.) These papers all describe the general structure of ATFE's Good Mind Research Protocol, which will be described below, and the ways in which they strove to work with the community under the guidance of this protocol, and their advice to other research teams to conduct similar research. The authors of each of these articles highlight that there are some challenges to working with communities, like the extra time and money required by this process, but the end result is information that is more valuable to both the community and the scientists. Schell and Tarbell (1998) recommend to scientists the following action steps in order to conduct a successful CBPR project:

1) Involve the community in research planning at the earliest stages

2) Obtain consent from the community leaders and representatives as well as from individual participants

3) Hire community members as field staff and train them to collect data rather than hire already trained personnel from outside the community

4) Keep the lines of communication open and communication flowing in both directions

5) Involve community research partners in communication of research results to the participants

6) inform the community not just the study participants

7) Publish (sharing authorship with community members) the research results for the larger community without denigrating the community in which the research was conducted.

CBPR in Native American Communities

Additionally, a number of researchers have begun discussing the challenges specific to implementing CBPR in Native American communities (Strickland 2006; Burhansstipanov et al. 2005; Smith 1998; Garwick and Auger 2003; Fisher and Ball 2003; Dignan et al. 2005; Burhansstipanov 2003; Dickson 2000; Chrisman 1999; Dickson 2000). Each of these researchers include discussions on the importance of respecting traditional and cultural values in the communication of CBPR work, adhering to timelines, maintaining sustainable funding that will cover all of the aspects of the work necessary to maintaining the project, and interpreting data in conjunction with the tribe. Smith (1998) and Chrisman et al. (1999) in particular discuss the challenges in navigating tribal politics in CBPR work. The aforementioned papers also stress the absolute importance of working with Native communities in the selection and implementation of research projects, the analysis of the data, and the report back of results to the community. Navigating these challenges provides the researchers with increased

community willingness to take part in the study. In a survey, Noe et al. (2007) found a number of factors would lead Native people to be more likely to take part in a study, including: 1) having the study conducted by a tribal organization and involving the community in study development, 2) having a Native person in a leading role in the study, 3) the study addressing serious health problems of concern to the community, 4) the study bringing money to the community, 5) the study providing new treatments or services, or using the information to answer new questions. As I will discuss below, many Mohawk fieldworkers felt that Akwesasne residents took part in the study because familiar faces were collecting the data, and the study was addressing an issue of concern for the community.

Indigenous IRBs

Increasingly with the formation of tribal Internal Review Boards (IRBs), working collaboratively with the community is considered a necessary condition to conducting research at all in Native communities. Some Native nations, like the Navajo and the Mohawk, have taken to creating their own Internal Review Boards (IRBs) to control the types of research that is done in their communities, and to take agency over how the results are disseminated. In addition to those discussed in detail below, the Kahnawake Schools Diabetes Prevention Project adopted the KSDPP Code of Research Ethics to guide collaboration between the Mohawk community of Kahnawake, community-based researchers and academic institutions (Macaulay et al. 1997). In 1999, the Grand Council of the Mi'kmaq ratified a Mi'kmaw Ethics Watch, which set out "Principles and Guidelines for Researchers Conducting Research With and/or Among Mi'kmaq People" (Mikmaw Ethics Watch 2000; Castellano 2004).

In their discussion of the formation by the Navajo of their own IRB, Brugge and Missaghian (2006) discuss how U.S. federal regulations reflect a society that values individual autonomy, yet some culture place a higher or equal value on family, clan, or other identity group beside the individual. Drawing from this, if individual rights are to be protected, so too should cultures or communities that may have different needs or be affected differently by research than are individuals. For this reason, since 1989 Navajo Nation law has required that all ethnographic research conducted on Navajo Nation lands be authorized by a formal permit that is issued by the Navajo Nation Historic Preservation Department. In addition, the Navajo Nation was the first U.S. Tribe to establish its own IRB called the Health Research Review Board (HRRB). Its purpose is to "govern all medical, health, behavioral, social science, and other studies that are conducted within the jurisdiction of the Navajo Nation to provide protection, beneficence and justice for individuals and communities participating in research activities" (Brugge and Missaghian 2006:499). According to the Research Code, the HRRB must continually review any research being conducted in the Navajo Nation and has the power to revoke any research permit or limit the scope of research activities. A distinctive feature of this IRB, as compared to most university IRBs, is that it requires researchers to submit manuscripts or oral presentations for review and approval prior to publication or presentation. As the authors describe some researchers find this a problematic infringement on academic freedom, although "others may see it as an opportunity to catch mistakes and correct misunderstandings" (Brugge and Missaghian 2006:501). The Navajo Nation Government views their regulations as a protection against being stigmatized by research reports harmful to the Navajo people.

The Akwesasne Task Force on the Environment (ATFE) formed a similar IRB for the community of Akwesasne. The organization, composed of members of the community and the staff of tribal environmental agencies, formed in 1987 in order to contend with environmental problems at Akwesasne. As mentioned in Chapters 1 and 2, Akwesasne is a politically fractious community, consisting of three tribally based governing bodies: the St. Regis Mohawk Tribe (SRMT or the Tribe) endorsed by the United States federal government, the Mohawk Council of Akwesasne (MCA) recognized by the Canadian federal government, and the traditional government of Mohawk Nation Council of Chiefs (the Nation). The ATFE was a means for members of all three of these entities to work together on a common threat. As one member, Dave, explained to me, "We had to come together as one or we would lose everything." Because ATFE saw itself removed from this political process, they could better advocate for community-based solutions to environmental issues.

The ATFE mission statement is "to conserve, preserve, protect and restore the environment, natural and cultural resources within the Mohawk territory of Akwesasne in order to promote the health and survival of the sacred web of life for future generations and to fulfill our responsibilities to the natural world as our Creator has instructed." They are also actively advocating the permanent cleanup of toxic waste sites bordering the community. "We have worked to educate the community about the impacts of toxic substances on the environment and human health and have sought the assistance of technical experts from surrounding universities."[75] In 1995 ATFE became incorporated so that they would be able to apply for their own grants, conduct their own research, and

[75]ATFE website: http://www.northnet.org/atfe/atfe.htm

eventually have control over the use of their own data, as well as to ensure that money that is received on behalf of Akwesasne is spent to benefit the community.

The ATFE Research Advisory Council was formed in 1994 to develop and review proposals that affect the people of Akwesasne. The Good Mind Research Protocol was developed by the RAC under three main guiding principles—(*skennen*) peace, (*kariwiio*) good word, and (*kasastensera)* strength, with the idea that from peace comes respect, from a good mind comes equity, and from strength comes empowerment, three components of a fair and successful research process (ATFE RAC 1996). A research proposal submitted to the ATFE RAC needs to demonstrate that the cultural and needs of the community will be respected, that resources and power will be shared with the community, and that the project will empower the community by hiring and training community members, and providing useful information back to the community.

As they state in an article introducing the RAC and the Good Mind Research Protocol,

> Researchers need to have the opportunity to deal with a community entity in order to be respectful and not take advantage of intra-tribal differences. In addition, it is important for scientists to recognize the need for community empowerment, control of the research process and ownership of the data" (ATFE 1996: 95).

The goal of the advisory committee is to help ensure that the proposed research benefits the whole community, gives the people of Akwesasne an opportunity to be involved in the decision making processes, and empowers those involved through education, training and/or authorship.

As detailed in the Good Mind Research Protocol, researchers must begin working with ATFE in earliest stages of planning their proposal in order to allow for sufficient time for community members to thoroughly review and understand all aspects of study,

and taking into account that ATFE meets monthly. The research team must submit a five page single-sided synopsis of their project which includes the following 12 points: 1) statement of problem/research question 2) intent of the research and the benefits the project will have to the community 3) methods for collecting data 4) how confidentiality will be protected 5) disposition of the data 6) any potential legal, financial, social, physical or psychological risks 7) funding/budget 8) arrangements for all principal investigators, researchers, graduate students and any others involved in data collection to undergo cultural sensitivity training provided at researchers expense 9) Equity: how study participants and the community at large will be given fair and appropriate return, including copies of research findings, authorship, co-authorship or acknowledgements, royalties, fair monetary compensation, copyrights, and patents 10) Empowerment: mechanisms for informed consent as well as how individuals and community members will be empowered by the research process through employment, training, or outreach efforts 11)Intellectual property rights and review of product or research results, which must include community authorship. Community access to the results of the project, and use of the research data for own their use must also be included. Researchers must inform the RAC of journals, publishing houses or conferences that they plan to print or present the results of their studies before papers are submitted or presented. 12) Data ownership/archive—ATFE reserves right to require the deposit of raw materials or data, working papers or product in a tribally designated repository, with specific safeguards to preserve confidentiality. Duplicates of data or split samples may be required to be stores in such a local archive.

If the above stipulations are not met, ATFE reserves the right to 1) with draw consent to use or release information and/or prevent publication of data which is unauthorized, sensitive, misrepresents or stereotypes Mohawk people or will harm the health, safety or welfare of the Mohawk people of Akwesasne or their environment. 2) deny researchers (and future researchers from the same university or institution) the opportunity to conduct research in Akwesasne, and 3) withdraw approval for projects, in which case all information and copies of data must be returned to the community.

ATFE formed the RAC and published the Good Mind Research Protocol in 1995, at the halfway point in the SUNY Superfund project. Some of the SUNY researchers had felt that they were working with the community in an equitable and empowering way, and so were a bit surprised to be presented with this document. As David Carpenter, the lead PI on the project, described to me, the research experience there

> It hasn't been necessarily easy or without a lot of bumps in the road but we did negotiate very directly about what the respective roles would be and who would do what…at the last moment, after we had pretty much done all these- what they issued was not the joint document we had expected but a 'this is the way it will be' kind of document which was fairly irritating for a number of our people. I mean I sort of understood it, I didn't get terribly upset about it.

SUNY signed on to the agreement, and continued to work with the community members collecting data and publishing results.

Not all researchers have been so fortunate to receive approval. In his 2002 PhD dissertation *Talking Toxics: Narrative Constructions of Environmental Risk Conflict*, Stephen Garson of George Mason University describes how he wanted to use in-person interviews with both Akwesasne and Massena community members about the local Superfund site as primary source material to answers questions about the elements of concern that constitute a community's construction of risk. He prepared a research

protocol and submitted it to ATFE. Much to his dismay "ATFE rejected my proposal on the grounds that it did not see how the research would benefit tribal members…ATFE also noted the amount of research that had been performed on the Akwesasne community—some of it much needed human and environmental health research, but some of it unwanted and unsolicited political research" (Garson 2002:157). In lieu of in person interviews, Garson turned to the transcripts from public meetings held by EPA to receive public comments on three separate cleanup proposals.

As described in Chapter 1, to receive approval for my dissertation research I submitted a document to ATFE containing all of the required information mentioned above. After consulting with Akwesasne community members about a series of appropriate research topics, I consulted with ATFE members on the best way to meet the stipulations required. I mailed the research protocol to ATFE on April 3, 2007 and I received an e-mail on June 13, 2007 granting approval. During the spring of 2008, I further met with individual ATFE members to discuss my interview questions, and ensure that they were appropriate. Additionally, the final draft of this document was submitted to them for approval.

II: CBPR and the SUNY SBRP at Akwesasne

Having previously described some of the concerns and motivations that led to the initiation of the health studies at Akwesasne in Chapter 3, I will now discuss the details of how the SUNY Superfund Basic Research Program (SBRP) project was conducted at Akwesasne, some of the participants and researchers reactions to the studies, and reflections on how this can be applied to future research and publishing.

First Environment Research Project (FERP)

Part of empowering the community through the research process was hiring Mohawk women as field staff to help vet the surveys and collect the samples and interviews from community members. This also provided members of the community with the opportunity to gain experience in community health, and ensured better study participation. The First Environment Research Project (FERP), the organization begun by Katsi to collect and coordinate the community's data for the health studies, had an office in Akwesasne, and met periodically with SUNY researchers either there or in Lake Placid NEW YORK, a town halfway between Akwesasne and Albany. Aside from Katsi, whose experiences I have described above, I interviewed five other women who were employed by FERP. Alice was the lead coordinator for the Superfund project, and the other field staff members were assigned to a specific project initially, although most ended up working on several of the projects. Staff members were selected by the epidemiology core (Epi-Core). The researcher at the head of the Epi-Core described to me that since the fieldworkers were to become research foundation employees, SUNY had to follow their usual hiring procedures, advertising the position and conducting interviews, with the exception of Mohawk preference in hiring. The fieldworkers were each trained in the necessary methods, and then were periodically videotaped while collecting data, so that the SUNY scientists could view the videotapes to make sure the staff maintained all the standardized procedures. Fieldworkers were retrained periodically in order to prevent measurement drift, in order to ensure that they were conducting the protocol in the same way for the whole five years of the study.

Trudy, who was recruited as a participant for the first Mother's Milk project, was among the first recruited as a field worker. She was trained to draw blood, and to conduct the questionnaire to collect the necessary information from participants. She also made sure the chains of custodies were signed off on in the proper way, and that the information was all shipped correctly. She began by working on the continuation of the breastmilk study, and by the end of the last Superfund grant she had worked on five different projects: the men's and women's studies run by Ed Fitzgerald's team, the psychological study[76] run by Azara Santiago-Rivera's team, the grandparent's study[77] run by Maria Schymura's team, and the adolescent study run by Larry Schell's team. Trudy was sent to trainings for each of these projects, to ensure that she would do the interview protocols properly. She went to each participants home three or four times; once to secure participation and set up future visits, then a return for blood draw and psychological evaluation for some of the participants, and then a repeat visit to see if there were any differences. She noted that she never had trouble getting participants to answer questions for her, even though they were asking for some very confidential information. She "was impressed with the participants that they trusted me to give that information." The $25 given to people to compensate them for their time was also a nice incentive to participate, and Trudy still has community members approach her asking if she is doing a study.

[76] FERP staff interchangeably referred to this particular study as the depression study, psychological study, and adult well-being study. The official title was "Bio-psychosocial Well-Being Among Akwesasne Residents". In each of the individual fieldworker's descriptions of their job, I have maintained the titles they used.

[77] Initially, all participants 18-55 who were randomly selected for the study would be part of the Adult well-being study, and older residents would be part of a project that the Epi-Core was conducting on older residents they referred to as the grandparents study, to give it a generational connection to the babies of the first group of study participants in the breastmilk study. According to the head of the Epi-core, other groups did not adhere to this age cut off (for example Santiago-Rivera et al. 2007 lists their participants as ranging in age from 18-79), and a specific study exclusively on the older residents never materialized.

Agnes, or "Sweets" as she is more generally known, began employment with FERP as they were collecting breastmilk samples, one month after graduating from a registered practical nursing program at St. Lawrence College. She then worked on the men's study: while she was in the house collecting breastmilk samples from the women, she would invite the male partner or relatives to take part in the study. She worked for the Epi-Core, which collected data that was utilized by multiple projects, and also worked on the depression study, and the adolescent study. She was one of the last FERP employees to remain on the project as the study slowly wound down, working to tie up any loose ends.

Loralee, who accepted the job just after graduating from Cornell with a major in statistics and biometry, conducted interviews for the Epi-Core, and worked on the adult well-being project, collecting blood and urine samples. For this project, there was a series of four interviews; the first three done shortly after the participant agree to take part in the project, and the last one conducted six months later. The meetings involved a basic demographic interview, a dietary survey, and questions on general emotional issues, depression and well-being. There was also neurological testing, including memorization, finger tapping tests and a smell test.[78]

Alice originally began working with the men's health study with Dr. Fitzgerald. When the Superfund project began, she applied for and received the position of director of FERP. She operated mainly as the liaison between the researchers at SUNY and the community field workers, coordinating the data gathering between all of the different groups who were collecting data simultaneously for the different studies, compiling all of

[78] The inability to correctly identify smells can be a flag for the first signs of schizophrenia or other psychoses, as well as Alzheimer's.

the data, and then arranging for its transportation down to Albany. She completed the work necessary to finish the men's and women's health studies, and then began with the four ongoing SUNY run studies, including the adolescents, the adult well being, the grandparents, and the Epi-Core. The actual collection of the data was usually left up to the other fieldworkers, but "in a pinch" she was trained along with the staff members so that she would be able to collect data as well.

The last woman I spoke with, who elected to remain confidential, worked collecting data for the Epi-Core, and the adolescent study. A few other women worked on the study throughout the years, but were either unavailable for interviews or no longer lived in the community. At one point there was one male on the team, but according to one of the other women he had difficulty drawing blood, and then decided he did not like the job.

Some of the FERP staff remembered their jobs fondly, and some recalled them as being difficult. In particular, one woman (26C) found it to be a difficult job:

> Sometimes you go to people's houses, and they see you coming and they won't answer the door. So, you go back to SUNY Albany and say 'they won't answer the door.' And it's like 'well, keep going back.' They couldn't believe that people wouldn't participate.

She felt that the community in general had become "tired of being studied," and often "we had to appeal to people personally to help us with the study." She noted that some of the interviews were long and grueling, some people found them boring, and others "felt funny" about giving away blood and urine samples.

Another field worker, Loralee, noted that people in the community knew that they were going to be coming around, and that "they were either interested, or they said no." Either way, she thought everyone was very polite to her. "Some were too busy, some just

weren't interested." Some community members had also recently taken part in the US census, the long version of which involved an hour-long interview and offensive questions inquiring about family income and the number of toilets in the house. "After that, they were kind of turned off by any kind of survey," Loralee noted. She liked the job, but was not sure she would want to do it again because the scheduling could be difficult. For many of the blood samples the participant had to fast for 8 hours before the sample was drawn, which meant they usually wanted her to come before they went to work or school, generally around 5:00 in the morning. There was also a great deal of training and re-training to ensure that they were consistent in their data collection.

Other FERP staff really enjoyed the job. Agnes, who is now a community health worker, gained her first practical experience in this field through working on these health studies. She expressed that she "got a lot out of it. I was in the community, I had a job, I felt I was doing something." Trudy was similarly pleased with the work, remarking that she "thought it was the best job I ever had." When I asked her why, she replied "because it was so easy to approach people and I was always welcomed into these homes. People that didn't even know who I was but they welcomed me in and it was very easy to persuade them to participate." When I mentioned that one of the other women sometime had trouble getting people to come to the door, Trudy answered, "I never came across that. That's why I said I really enjoyed working on the project, the projects altogether. Everyone that I went to, I think I had one person deny me participating," because she was uncomfortable giving away her blood for cultural reasons. Trudy felt that she had an easy time getting people to answer because she was related to many people in the sample. Working from the list of randomly generated houses, she started by approaching those

who were members of her family or extended family, and then branched out from there. She collaborated with one of the other field workers who also had a large family, and if someone was hesitant to participate in the study at the request of one woman, they would often agree to participate at the request of the other woman. "I believe that's why our projects were so successful. It's because they took somebody from here that knows everybody and they sent them out." Trudy worked for eleven years collecting data for the studies, and was always hoping that they would do a follow up study so that she could continue the work.

Community Responses to Health Studies:

In addition to interviewing those who had worked on the study, I was interested to hear about the perspective of the participants, and their family members, who had taken part in the health studies. Thirty-two (32) of the community members I interviewed were involved in the health studies run thorough SUNY Albany: five served as fieldworkers to collect the data, six consulted with SUNY as members of ATFE. Two of those consultants were also among the four people who had children enrolled in a study. Five women participated in the adolescent well being study with their children, since the adolescent study also tested the mothers. One man was part of the caffeine breath-test study, and four other men gave blood for the men's study. Four women were involved in the breast milk study (two of those women would later become fieldworkers and so have been counted above as well), and four women gave blood for a study. One woman remembers being part of the cognitive study, and another woman insists that someone from the Superfund project came by and did a survey with her asking a lot of questions about fish consumption, but did not take any samples from her. Everyone I spoke with in

the community was aware that the health studies had been done, and many others not counted here had family members who were participants.

As part of this dissertation project Katsi as well as some of the SUNY researchers, were interested to know what people remembered about being in these studies, and their opinions on how they could have been conducted better. One researcher in particular expressed that "I would love to know if they think we should have done anything better, but if they give us that feedback I want them to give it specifically about our study rather than all the Superfund studies, because everyone handled it a bit differently, and it's partly personalities in terms of who relates well and who doesn't." Whereas the fieldworkers and some community members remembered specifics about which of the human health studies they participated in, for others it could only be estimated by combining what kind of sample they recalled giving and the interviews they took part in, with what year they remembered taking part in the study (late 1970's would have been the Mount Sinai study, late 1980's breastmilk study would be as part of the Health Risk Assessment conducted by NYSDOH and SUNY, and 1990's would be the SUNY Superfund project). Some people were involved in multiple studies in multiple roles, so it is sometimes difficult for them, over 10 years after their experience with data collection ended, to tease out which of their impressions originated from which study. For each opinion and suggestion below, I have attempted to indicate the speaker's involvement in the studies. Nonetheless, most of these reactions and reflections speak more to the collective community memory as a place well sampled and well studied more so than the particulars of any one specific SUNY study core.

The general procedure that accompanied being a health study participant was that a field worker, often collecting data for a specific project, would approached a house that had been randomly selected, and asked the appropriate resident (or their mother in the case of the adolescents) to take part in the study. If the resident complied, their information and biological samples (usually breastmilk or blood) was collected through a series of visits. The data was then sent down to SUNY Albany, where samples were tested in one of the labs in Albany, and cognitive tests were analyzed. Eventually, a letter was sent back to the participant explaining their individual results. As Schell et al. (2007:516) describe:

> Participants received results from individual testing (toxicant profiles, hormone levels, cognitive assessments, and growth assessment). Each participant received several letters relaying these results back to him or her as they became available. The letters were carefully crafted in tandem with the community partners, and in accord with community values and concerns. Special attention was paid to translating results into layperson's terms and providing an explanation of the available toxicant standards, so that participants could better understand their individual results. This may be one of the most significant steps in the research process from the community's perspective, as it represents the delivery of ''product from research'' back to the community.

Periodically, the SUNY SBRP scientists would also host retreats at Akwesasne, where the full team of over 60 scientists would spend a weekend at Akwesasne, camping in local cabins. They would host presentations to the community in order to describe the progress of the studies, and aggregate findings. Reactions to each of these forms of information report back were mixed, and will be explored in depth below.

Results Report Back, Reactions, and Suggestions

Many of the study participants (n=10) I spoke with remember being surprised when they received their results back, expecting that they would contain higher levels,

and pleased when they did not. A former Raquette Point resident (14C), who had her breastmilk tested, remembered: “I was thinking it was going to be horrible, but it wasn’t. So I was really happy about that.” As noted in the previous chapter, for some participants the fact that their levels fell into the “normal” range caused them to be as alarmed about what would constitute “normal.” If Akwesasne residents, living next door to a Superfund site, could have normal levels, imagine what other Americans were being exposed to! These residents were relieved to be in the normal range, but concerned with how this range must have been defined. As described in the next chapter, these individuals all described to me limiting their fish consumption after hearing about the advisories, and before these tests were done, which in all likelihood helped to ensure that their levels were not elevated.

Four study participants mentioned being happy with the report back on their information. One woman (26C) mentioned being pleased to even get results back considering the track record of previous studies. Another (30C) was happy with the results because she had been concerned about what her levels might be, and these results brought a measure of relief to her. Two of these women who expressed to me that they were happy with the report back they received, later worked on future health studies. It is possible that as they became part of the process and gained a greater understanding through that experience, they also gained a better appreciation of what went into reporting results back to the community, and what some of the limitations of that data were. With this greater understanding of the process, and its limitations, they could be happy with what they had previously received.

Six of the study participants told me that they received their study results through a letter in the mail, but they did not really understand what those results meant. As Rob describes "there were a lot of words describing the toxins and stuff like that, levels that I didn't really understand." He was generally able to understand that his levels were not considered high. Others did not gain even that much understanding. One woman (12C), who took part in a study with her daughter, did not understand the results at all "They gave the results but they didn't give me reference to what was normal. Just my results." When I asked her how the results made her feel, she said, "Well I was trying to figure out, but I had nothing—I had no idea. They didn't do anything." Another woman (27C) did not understand her results at first, but then asked some questions of the woman who took her blood, and "a few years after" came to understand what those results meant.

Joyce described how she received her daughter's results, but thought that the paper sent in the mail "doesn't really tell you very much. You know, they talk like co-genitors [sic] and things like that. I don't know if that was in particular to my daughter's blood sample, but if the community can't understand it, then why go (to a presentation), eh? I mean …some of the concept that they used were, you know, I misunderstood them until somebody took me aside and explained it to me." As a well-educated woman, she was concerned that if she had trouble understanding these results, other community members must have as well.

One woman (23C) got her results back after giving a breast milk sample, but did not understand what it really meant for her:

> They didn't say 'this is what this means.'…. I lost it (paper with the results) because what does it mean to me? I don't know what a triglyceride level is or whatever or this is really high. How do I know?...It made me feel worse. You get something and people don't help you, don't tell you about it. So it makes me

> feel bad because what you expect is that somebody is going to show this to you. You participate in this study and then they're going to say 'this is what this means, this is what you should do. This is our advice.' So you got none of that so it makes you feel bad… like it's a waste of time. You participated in a study where you don't have the proper follow up, and they didn't follow up. You know what I mean? You have value as a part of a statistic but not as an individual.

Many of the individuals who stated above that they did not understand their study results felt that in future studies, results could be better explained to participants, in a simpler language.

Part of what led some participants to not understand their results was that, as I described in the preceding chapter, they were expecting the report back letter to give them an assessment of their health, not just numbers that held no meaning on their own. As discussed, scientists were not able to tell individual community members what the health implications for their particular results were. This failed expectation made the letters that much more frustrating or disappointing for some participants. Little (2009) and the Health Investigations Communications Work Group (2004) both found similar issues among ATSDR scientists regarding the challenges they faced with the communities they were working with misinterpreting the actual ability of environmental health science to create "clean, useful, and evidence-based theories of causation" (Little 2009:100). To avoid this disappointment, a "considerable amount of work is needed to help community residents understand what a health study can and cannot do, and this effort needs to occur during the planning phase. If this interaction does not occur, community residents may feel that they have been misled when the results and conclusions are presented" (HICWG 2004: 487).

Some of the women who worked in the field collecting the samples and data from the participants confirmed that several participants did not understand their results as they were reported back to them, but as they noted, it was not for lack of effort on their part, or the part of the scientists they were working with. One woman, who was in the breastmilk study and also worker later for FERP, thought that the letter with results sent back to people in the later rounds of studies was more understandable, as opposed to the letter she received as a participant, which:

> Was kind of scientific in that type. I believe someone wouldn't really understand the significance of the numbers and that. But I kind of had an idea and then I knew more about it later when I was part of the Superfund. We kind of made it culturally integrated with the people here in trying to make it more understandable to mainstream people here, non-scientific people.

Agnes, another one of the field workers, noted that study participants would not contact the PI's (principle investigators) with questions. However, when they ran into her in the community, they would comment to her that they got a letter back with their results, but they did not understand it, so often they "either toss it or it's just sitting in a pile there." Agnes would offer to have a look at the paper with them, but most times it was just in passing that they would mention this to her, and rarely did they follow up with a visit to her with their results.

When I asked each of the women fieldworkers if participants approached them to have their results clarified, Loralee responded that she explained to them from the beginning of the study that their results would come straight from the lab, so if they had any questions, she gave them a list of people to call. She and the other fieldworkers helped the SUNY scientists to develop a template for results report back that they thought would be understandable to the community:

> Before the results were sent back the first time, they actually gave us kind of like a template they wanted to use and then staff read the template and said, 'Okay, this is going to confuse some people. They're not going to understand what this means. You got to make it easier to understand.' And some people are going to get numbers back and they don't know what the numbers mean then they're going get worried. The original letter never had a scale on it and says this is-- there really is no safe level for PCBs. There's nothing out there, but they gave them a scale and basically said the average level in the United States is whatever.

So when people from the community approached her with questions about their results, they were instructed to "call SUNY Albany directly, and they would explain everything."

Community Presentations

In addition to the report back letters, SUNY researchers organized information sessions for the entire community to describe basic study details and results. When I spoke to the researchers at SUNY Albany, several of them described to me the community presentation they would put together in an effort to bring the information gained from the studies back to the community. Dr. Fitzgerald described how during the initial breastmilk study meetings, attendance was good, but with time, attendance to these meetings diminished. As the years passed, these presentations were very poorly attended, despite efforts on the part of the researchers and the FERP staff, and the researchers wanted to know why. Dr. Newman described that at the beginning of the first adolescent study, the issue was much more present in the community, and when they had community meetings some people would come. By the time they got to the second five years, "it was no longer hot news." She recalled having a meeting where one community member attended. Another scientist who worked on the adolescent study described a couple of meetings, sometime between 1995-2000 "where there were more scientists in the room than community people." Dr. Carpenter laughed about how "our public meetings would

have ninety people from Albany and maybe two or three people from Akwesasne (chuckles.) It wasn't always that bad, but the funniest time was only two people showed up," and it turned out one of the men was at the wrong meeting. They all laughed about it, and the man stayed for the meeting. One scientist described how they sent letters to all of the participants, but "if you have 260 people in the study and sent letters to all of them, 20 people show up. Those are the most interested people." He had some concerns about whether all the letters they mailed actually got to people before the meeting occurred, recognizing that people move, mail is not always forwarded efficiently, and perhaps there were delays with some mail at the border. He noted that sometimes events get better attendance when you have kids make posters for which they can receive prizes, and you have a raffle. He concluded that "now, I have no criticism for how the community reacted to what we were doing," but was curious why there was such a lack of attendance when the community had insisted that the scientists conduct these meetings.

The fieldworkers I spoke with commented on the effort they and the scientists put into drawing community members to these presentations: "It was like we tried everything. They had meetings, they didn't show up. We gave you your letter. We did everything we possibly could," noted one woman (26C). Trudy described how "I think they tried everything just to give the information back to the participants, but it always seemed like the timing was never right or there wasn't enough interest to find out what the results were….Oh my God, I remember we tried everything. We would be there at different areas and different—like we put everything out there. They had a projector there with the overview and everything. We just didn't get the participants to come back. There was not enough interest out there." Alice similarly expressed that "a lot of people

got their paper in the mail, they don't know what it means. So we did try to hold some information sessions, and those rarely go over well." Looking back, Trudy suggested that maybe the information session could have been put on the radio as a program, maybe through a venue like *Tetewatha:ren* (Let's All Talk), an hour long program on the local channel, CKON, in which people are invited on to present and take call in questions.[79]

When I posed the question directly to study participants as to why the presentations were poorly attended, their answers ranged from opinions that the venues chosen were not conducive to draw people in, to concerns that the presentation would be too technical or boring.

Some community members I spoke with felt that the setting chosen for the meetings was wrong. One woman, Brenda, who is a member of ATFE and helped Katsi coordinate the data in the early breastmilk studies, described how the meetings were held in large conference rooms, and people in the community are unlikely to attend that kind of event. She noted that if you want to educate people about something like a health study:

> You go to their homes and say 'can we have a family meeting?' The family all comes and they sit and they talk because families are not going to go out and get the information. If you want to tell somebody something, you go to them. That's the way it is here. They'll come together. They'll have the snacks, they'll have the beverages and whatever. They'll ask the questions.

She noted that people were unlikely to raise their hands and ask questions in a larger meeting, "because they don't want to feel stupid but in a family setting, in a family environment, they'll ask questions."

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[79] One of the scientists for the adolescent study described going on CKON for an interview, and also how the SBRP grant supported a radio show, in Mohawk, where the announcer was supposed to periodically mention that the show was supported by SUNY.

Another FERP staff member, Agnes, also felt that participants needed a more personalized invitation, or smaller meetings over coffee. She pointed out that tribal meetings are also poorly attended "Out of 10,000 there are 20 people at the Tribal meeting and the same thing goes for the other side of the so-called reservation. The same thing there, you have a district meeting, there would be 10 people there." A participant in the breastmilk study, who also had a daughter in the adolescent study (14C) also felt that small focus groups would have worked better than trying to bring the whole community together for a meeting. Because of the numerous political, spiritual, and regional divisions in the community, as a whole it does not always function as an efficient social body. The most efficient social bodies in the community are extended family network, and it is this group that would be most effectively targeted for meetings and presentations.

Other study participants mentioned to me that when they found out that their levels were not considered high, they did not feel compelled to attend the community meetings. Trudy, one of the FERP staff, felt that people were mostly interested in their or their family member's individual results, more so than a general presentation about the entire community. She also thought that the few influential people who attended these meetings brought the information back to their families, and it traveled through the community in that way. Community members did not feel compelled to attend the meeting knowing that they would hear through family and neighbors if there was any important information presented. This idea of community representation came out in other conversations. Henry Lickers, who has worked in the community on environmental issues for over thirty years explained that in many families who choose to vote in the

elected system, it is the key family members who vote. "So your grandma goes in to vote, the whole family says 'Why in the hell do we have to vote?' she's going. Because it's a different structure of system that doesn't-- It requires consensus for that voter, but it doesn't require absolute democracy at the upper end." A similar dynamic could have been at work in the attendance at these SUNY presentations

Some community members and FERP staff mentioned that there was concern that these meetings would be boring or there would scientific language that they would not understand. As Joyce mentioned, "if the community can't understand it, then why go?" Leona, who took part in the breastmilk study, attended some of the meetings, but just wanted to know "is the turtle good or bad? I think they've got to bring it down to our language…people felt intimidated by the language that was used." Agnes, one of the FERP staff, thought that when she went to the conferences, "there was a lot of big words used. They're a little dry." Another FERP employee remarked, "I think the community is really sick of meetings."

Lastly, some people I spoke with in the community said they had not heard about the meetings. These respondents felt that it was not enough to advertise on the radio and in the newspaper, because it would be easy to miss the notification there. In response, one FERP staff member (26C) expressed, "despite everything we did, there were always people who came back saying 'we did that, but we never heard anything back.'" The community radio station (97.3 CKON) and the local newspaper "Indian Time," and a monthly newsletter by the SRMT called "Kawenni:ios" seem to be the main outlets for sharing news and advertising events, in addition to the occasional sandwich board signs outside of the Tribal office or the American Legion sign.

Suggestions to Improve Studies

I asked each of the participants, staff and consultants, from SUNY Albany and Akwesasne, to look back on the experience of taking part in these health studies, and reflect on how they thought it could have been done differently, or could be improved upon for future studies. In addition to the suggestions mentioned above by people who had difficulty understanding their results that study report back be done in a way that is more understandable to participants, other suggestions included a more personalized delivery of results, and the need for the community to be better educated.

Some of the fieldworkers, participants and consultants felt that what would have been more helpful for community members to better understand their results would have been a more personalized delivery of the study results, rather than letters in the mail and meeting held in conference rooms. One woman (14C), who was a participant in the breastmilk study, and whose daughter took part on the adolescent study, noted that they received a paper about what the results were, "But I think it would have been nice if they put as much into dispensing that information through the results as they did in trying to get us involved." Two of the fieldworkers also noted that they thought it would have been more effective for someone to have gone back to the participants and delivered the results individually, so they could be sure that each participant understood their results. Trudy commented that the participants "just need that personal touch instead of getting a letter in the mail and it's all scientific, plus they can't understand it…I think if you went back and try to explain that [the numbers] to an individual face to face, I think it would probably have made a difference." Agnes similarly noted that community members "like the one-on-one thing or let's go to their house and sit down and have coffee."

A previously conducted study on reducing childhood obesity at Akwesasne concluded that an obesity prevention plus parenting support (OPPS) intervention would reduce the prevalence of obesity in high-risk Native-American children when compared with a parenting support (PS)-only intervention. The major finding of this study was that a home-visiting program, in which the intervention was delivered one-on-one in homes by an indigenous peer educator focused on changing lifestyle behaviors and improving parenting skills, showed promise for obesity prevention in high-risk Native-American children (Harvey-Berino and Rourke 2003). In a previous study of diabetes in Akwesasne, Hood et al. (1997) distributed the information gathered in the surveys through attending and presenting to 17 community organizations, two public fora, letters to participants and articles in local newspapers. In this way, they were able to reach hundreds of community members, present their results, and get feedback. This is clearly more work for the researchers and their staff, but they felt that by fully utilizing these pre-existing networks they achieved better results. Future health studies could follow a similar model

Dr. Newman, who ran the cognitive tests of the adolescents, offered in the first five years of the study to meet with anyone who wanted feedback on their child's results. Only three or four parents took advantage of her offer, out of 271. "Now you know that tells us something about our relationship to them," she stated, not faulting anyone in the equation, but recognizing that community members were not comfortable just approaching her, even when the offer was explicitly made. Perhaps if the appointments had been scheduled through the FERP employees, or presentations had been made at organization meetings, there would have been a more vigorous response.

Other community members suggested that in future studies, scientists should do more to educate the community more about the basics of the science in the studies, and the results. Leona stated that she would "really like them to educate the people, really educate the people on what's going on. Have the people involved and let them know the results of it." But she makes the distinction that she would not want them to go so far as to scare everyone, " to educate them but no to a point of fear because I think our kids today are faced with a lot of fear with TV and everything." She recognized that the breast milk study, of which she was a participant, worked to educate the community, and that it was really up to the individual to "take the step to find out what's going on. Some aren't going to and others are. But I think it's up to the programs to get that information out no matter how it is, whether it's mail, radio, TV or newspaper." Another woman also from Raquette Point felt that the research team should "have a lot of workshops or a lot of education seminars on it. Not just one but many, and it would have to be at different times when people are available." She feels that they need to target people who are proactive, and vocal, and who will redistribute the information. "They can take what they learn and take it home, take it to their friends, take it to their community members or little network and people that they have, and educate them." She feels that this is the way to most effectively touch and educate the most people. Another woman, whose son was in the adolescent study, thought that the education should have been even more basic than that. "It would have been a good idea to tell us what the heck PCB's were and what effects it does on your body, how do you get rid of it, whether you can or whether you can't. If it's stored in your body fat, and if it stays there for the rest of your life. We don't know." I think that many of these questions were left unaddressed because

scientists cannot definitively answer them, but perhaps even this admission of the overall unknown would help community members in understand that they are not the only ones who do not know the answers to some of these questions about the effects of PCBs on the human body. I think the SUNY team attempted to address some of these issues through their community presentations, but as discussed above, these were not well attended.

Some people in the community, especially those more familiar with the sciences, were more lenient in their assessment of the researchers' performance in regards to results report back. A member of the Environment Division (15C) expressed to me:

> I think they did as much as they could. And I think they – you know they have their limitations too as far as what they can do on their grant. I think they tried. That they could've done more outreach in the community, but that's something they always could do better you know. And, we could do more outreach in the community you know, it's something that we kind of…. it's probably one of the most important things that you can do. You think the work you are doing yourself is more important, but getting that information out is just as important. And so, I think that's the situation that Carpenter and his people have too, so they really wanted to find out what was going on. And I think they did some good studies you know. And they tried to be responsive so, you know but I think they can only do so much depending on what your funder says, you know."

Two women health study participants mentioned that they thought it would be nice if someone did follow-up presentations periodically to the community to update them on the health and environment situation, report any new tests or studies that have come out, and to remind them of what they should be avoiding. One woman (14C) pointed out that "every four years, you've got a whole new generation of people that needs to be educated." For this reason, she thinks that someone should go into middle schools to educate the students, and also target young people planning on becoming parents, so that they limit their exposures and know what to look out for in their babies

In addition to education, Randi, who participated in the cognitive study, thought

that future health campaigns in Akwesasne should incorporate the information learned in these studies. Rather than stating statistics about Native Americans in general, she thinks that programs at Akwesasne could use information gained from these studies in the designs of and literature about health programs:

> Because that work has already been done why not use it now? I think that's what people would like to see, is what are all these studies, absent any sort of long term reporting of it. People just trying to feel like we got used for data and then we never heard from them again. So I think it is an empowering thing to do to take all this data that's public information and then have it incorporated into existing programs that we were already familiar with.

These health studies have provided Akwesasronon with a base of information about themselves, which can provide useful in health outreach, and future potential health studies.

CBPR Reflections

Most of the SUNY scientists believed that the framework of CBPR provided benefits to the community, benefits to the scientists, and overall helped to create better science. SUNY provided tangible benefits to the community, through employing 10 community members full time with health and retirement benefits, and purchasing everything locally for their conferences. Three scientists also mentioned the educational benefits FERP employees received. One of the psychologists described how, with SUNY's cooperation, they provided two classes on research methods and testing measurements, so that FERP employees received college credit. They also received training with licensed psychologists to do the neuro-psych battery, which could potentially help them get jobs in hospitals. Another scientist, Dr. Schell, described how

data collectors would have to get their certification in phlebotomy[80] in order to work on the project, a certification they can also use for employment. Beyond these concrete skills, "a lot of people involved in the Task Force did get some greater exposure to science, to the industry of science, how papers are produced and do on, and to methods of analysis and questions that scientists have." Dr. Schell described how one of the goals of the researchers "was that people in the community would have skills for research methods so that when other researchers would come in and they would be able to say 'we have expertise too.' That was kind of the goal."

Dr. Schell also expressed that while it is economically and educationally beneficial to the community, CBPR-framed studies also provided better results for the scientist. "I really believe that it worked better when it involves a community, it's better scientific work. And one reason why it is, is because you often get better interviews and of course you're probably going to get more cooperation in terms of people wanting to be in the study that they're getting asked, especially up there if they're being asked by someone they know and hopefully trust." He told me that he learned a lot from working on this project, and when I asked for specifics, he included "how to talk better." Another researcher who was in the room and who had worked with him on the project remarked, "They taught me a lot about their culture and taught me how to look at and perceive things in a different light, in a different point of view." This two-way education was highlighted by Schell and Tarbell in their 1998 article, which described the university-community partnership as "an opportunity for researchers to learn as well as teach" (p838).

[80] The practice of collecting blood samples

Similarly, several of the Akwesasne community members I spoke with described aspects of their collaboration with SUNY Albany that they were happy with. Jim, who is currently a SRMT chief but was working for the Environment Division at the time when the studies were being conducted, expressed that "looking back I have been pretty pleased with them." Another community member, Randi, who was part of the studies and has family members who worked on them, expressed that

> We've always had visitors you know who come and share things with us, want to take things from us and, you know, short term things. But here was a group that kind of established a long term study. They had people from the community working for them, it's very hard to develop trust like that, but I think they did. I think it was a delicate thing they did.

Even so, she wishes that the community had been able to take away more from the studies than "don't eat the fish."

Three of the fieldworkers also expressed to me that they were pleased that the SUNY Albany team was fairly flexible. Loralee described to me how aspects of the surveys were altered when the community did not like them, and the study was eventually opened up to anyone who was interested in participating. Alice also described how the fieldworkers and the SUNY team would work together on the surveys, and if something did not work, they would take that part out or reword it. "So we had input but it wasn't 50/50 because we didn't really have the experience then to really go forward that much with it. But I think later on, toward the end of it once we got the idea of what we're looking for and the best way to approaching the data without offending people, we had more input. We did have some say." She noted that some university researchers were not always keen to "leave their titles at the door," but for the most part many were willing to collaborate in order to make it the best study possible. Agnes thought the

SUNY researchers "bent over backwards to please ATFE. They were actually the only compliant research project that ever did." She also noted that sometimes she felt like academia was held up here (puts her hand over her head), above the community people were doing the work on the ground, but who were unable to understand the "high level scientific information" that was put out there. However, she thought that the lead investigators for the project she worked on, the adolescent study (Dr Schell and Dr Newman), did a good job reporting back to the community, and did everything that the Task Force asked of them, and they brought resources to the community. They spent money in the community for their conferences, with catering, cabins and boats and also hired staff from the community, opposed to other studies that wanted to come in with their own people.

In addition to these beneficial aspects of the collaboration, there were also difficulties that the two parties worked to overcome, including time, and control over what data was collected and how. These are common challenges in CBPR work, as cited by Minkler et al. (2008) and Israel et al. (1998) in their reviews of the practice, but with specific challenges relative to the history and culture of Native communities

Time: Sample Processing and Report Publication

In addition to the benefits of the CBPR approach, almost all of the scientists admitted that there were some difficulties to it, including adapting to a different time frame than they were used to in developing studies. One of the psychologists noted that the project took quite a while because it was important "that we work with the community to develop it rather than do what the scientists think we should do. Which was a different focus and it takes a little longer to put together a project that way."

Another scientist had a slightly more skeptical view. She at first pointed out that doing the study with staff from the community was "a definite plus in terms of enrolling people." Then as she began to describe how, in her eyes, the study would have run more smoothly in another community. She asserted that "even with the recruitment I think given the amount of time we spent there, you know how many years we recruited subjects for, I think, you know, that was fairly slow. I mean if you think we were in the field for five years and we have, you know, like for my component 400 people roughly, that's very inefficient you know." Dr. Newman also admitted the difficulties in the experience:

> It was hard doing research there, much tougher than with any other population I have worked with because—I guess we were so careful, so careful to collaborate at every stage of this…I mean, like you have a deadline for something but you have to go through them. They have a meeting. It's not that week, you know it is slow so it really meant that output from the study in terms of publication and presentations has been slower than it might be from another population because of all of these necessary steps. I recognize the need for them, but it's been slow.

FERP staff also mentioned time issues as problematic, but in regards to the return of study results to the participants. Several fieldworker suggested that future studies should try to get individual's results, as well as an analysis of aggregate results back to the community in a timely fashion. Alice, Trudy and Agnes all mentioned that the participants they worked with complained about waiting for their results, and suggested that future studies ensure that results are returned to participants more promptly.

Alice described how they would collect dozens and dozens of samples, freeze them, and then meet members of the SUNY team in Lake Placid to deliver the results down to Albany. "So it took a long time to get those results back, and when they got it down there they didn't run it right away, it would take months. Sometimes it was years

before people got their results back, and it was embarrassing…They're [results] irrelevant, and it was embarrassing to us. We would go to the post office, we would go to the supermarket and people would run into us and say, 'where's my results?' Our hands were tied." She described that there was a problem with the person who ran the clinical laboratory at Wadsworth, who "did not like us, he held onto them for years," giving the excuse that he did not have the time and did not have the staff to run the samples.

> Whether it was intentional or not, it came across being intentional. But it really delayed them. Even though we weren't given the results back, we have people at SUNY Albany saying, 'You still have to go and collect more, go get more people.' It was hard, they put us all on a very odd spot. So little things like that, personally lose faith in the whole process of how that was set up. If we had seen that early on, if we had the foresight to see that we would have had it done some place closer. They had the money, that was written into the grant that they would run all these tests. There was this other tests that had cholesterol and sugar – these things that people want to know, immediate health impacts.

These tests were an added incentive to encourage people to want to be in the study, which did not work out when the results were coming three years later. "We realized at how bad this was getting, the lack of information coming back. They did say, 'If there is something out of whack or abnormal, we'll let you know.' Still, that was a flaw in the system." Similarly, Agnes mentioned studies that were done on thyroid levels, because it was becoming apparent that thyroid disorders were becoming more prevalent in the community. Her complaint was that the participants' doctors did not receive the results for up to a year in many cases, "and the doctor would look at it and says, 'what do you want me to do with this, this was done over a year ago!?'"

One of the SUNY scientists addressed this issue in our interview, describing legal and logistical complications that led to the long delay before results were reported back. According to this scientist, they found out that under New York state law, specific test

results cannot be returned to the subject unless they are done in a clinically certified lab. Ordinarily, “PCBs they don't have an intrinsic health meaning tied to them so they aren’t normally thought of as clinical results,” but in this case because they were being reported back to the participants, they were considered as such. Since many of the scientists were not aware of this law at the inception of the study, blood was collected before the lab was fully prepared, and the blood sat stored until Dr. DeCaprio had his lab properly running as a certified lab. Because establishing a whole new lab and getting it certified took years, individuals in the first couple of years of the study did not get their PCB results quickly. The other issue was that running clinical measures like tests for cholesterol was not the main function of the Wadsworth Lab, so those types of tests were not run immediately either, “so there was a big lag in reporting those out too. So that whole process from a participant’s point of view did not run very smoothly,” this scientist recognized. A researcher for the adolescent study described to me how, for their analyses there were several different labs involved, and thus the lab results came in pieces. One was a lab doing metals, the second was the PCB lab at the university, and the third was a lab in the Department of Health (Wadsworth lab) which performed some of the clinical assays, measuring hormones, triglycerides, liver enzymes, and glucose. It was from this state lab that his team had difficulty in getting back results. “We were really good at getting everything but the clinical labs. Those took forever and we had to go back to this guy over and over again to get him to cough up the rest of the results. He kept saying ‘We need more money to do it.’”

As stated above in Alice’s remarks, the community felt that the delays in reporting had more to do with the personality of the lab director than logistical issues

over lab certification, indicating that 1) either the staff were not made sufficiently aware of the complicated logistics of assuring that the labs were in proper order or 2) they were, and this still came across as another example of the State not working to help the Mohawk people. Other FERP staff members mentioned community frustrations with having to wait so long in the initial part of the project to get their results back. Trudy described how "they want answers, but like within a month, they don't want to wait for three years down the road to get the answers." When I described to her the conversation I had with the scientist about problems with lab certification, she responded that the research team needed to ensure that they had everything in order, including their labs, before commencing with a project, and in future projects be able to tell participants with certainty that they would get their results back in six weeks. In this particular situation, the clock was already running on the time frame designated by that grant for data collection, and so putting off the collection of study results could have led to other time issues. But for future studies, both parties will be aware of the necessary lab specifications at the inception of the study.

In addition to a lag in the processing of samples, fieldworkers and participants were also hoping to get information about what everyone's results actually meant in terms of health trends in a much more timely fashion. When it came to analyzing the data, Alice noted that they had five years to collect the data for the Superfund Basic Research Program, and then at the end of five years, the funding ran out. The researchers still needed to analyze the data, but this was done at a slower pace, because the money was gone and the scientists took on other projects. As a result, the analysis "wasn't happening as fast as the collection period was," with the result that some community

members were "waiting and waiting and waiting and waiting," as Alice described it, to see what would come out of all of the data. In the descriptions of the study results given above, it is noted that even though data collection for most of the studies ended in 2000, and the Young Adult data collection ended in 2003, papers linking the community's PCB levels with potential health effects were not published until starting in 2004, with a majority after 2007 up until 2010.

One of the researchers, Dr. Newman, addressed this, recognizing that the research process takes longer than most people realize, with often a delay of years between when the data is collected and the reports are produced. While this, and many other communities engaged in CBPR research, insisted on the importance of the community seeing the results before publication, Newman felt that the scientific peer review was important in ensuring that the results and analyses they were giving back to the community were sound and valid:

> The way in science that you accept that something is valid is you go through the peer review process and you have experts review what you have written and say 'okay your conclusions are warranted.' The whole process is incredibly long and not to mention that you have to do your analysis and write it up and submit it and resubmit it and such….it wasn't that we wanted to keep it from them. We wanted to not be just giving, you know, things that were going to be proven invalid because we knew people's lives were impacted. So it was long, so I'm sure they must have felt at some point, and maybe still do, that we didn't give them all the results back, we are still doing that, I have still got students analyzing the stuff and writing it up and I am doing it so it is still coming and it is eleven years later. So I don't see how they could understand that, you know, not being part of the professional community, the academic community. So I hope they don't feel that we've done that.

From this scientist's perspective, delays in study feed back to the community are part of the reality of the scientific peer review process, working around grant cycles and other

projects. From the community's perspective, this is too long to wait for information about their health.

Issues of 'ownership' by researchers over particular data can also slow down the rate at which the papers are published. Dr. Schymura described to me how none of the adult thyroid data had been analyzed or published, because one particular graduate student was working on it for his doctorate in Public Health, and "we wanted to wait until he was done so I am envisioning some papers coming out of that." Dr Carpenter also noted his regret that he as the PI allowed individual research projects to hold on to "their little pots of data" for too long, in an effort to respect their concerns about authorship. "Everybody's always going to write the paper and analyze the data tomorrow. Well, I waited six years…And, but the problem is, of course, when the funding ends people get other jobs," and then it is even more difficult for them to publish on the data. He regrets currently that he now has less money to employ students to look at the data, but feels that he has an obligation to the community to learn all that he can from it. In writing about their research experience at Akwesasne, Schell et al. (2007:521) describe that at the inception of the adolescent study they discussed with the community what the product of the research would be, and "we agreed that peer-reviewed publication would be of value to the community. A part of the community's interest focused on the utility of such publications in furthering legal attempts to redress the impact of pollutants in the community." Attempts at litigation against General Motors to date have not been successful because lawyers for the community have not been able to prove a link between the contamination and community health. With the recent publication of the papers about adolescent thyroid, linking exposure to PCBs in utero and in breast milk to thyroid

dysfunction, some community members are again taking up the issue. If further connections between PCB levels and health are determined as additional data is analyzed, this too could be potentially helpful in this cause.

Control over Data, and Distrust of Its Use

Deciding what data would be collected, by whom, and how was also occasionally an area of contention for the research partners. Although understood as necessary, it was difficult in some sense for the scientists to give equal control over the data to the community. The anthropologist/epidemiologist I spoke with described how field staff would go and collect all of the data. "It was very unlike anthropology, having someone else do your data collection. Would you have someone do your interviews?... We had to do that….It's a kind of letting go. You can't be a control freak. You have to really channel that control." Even beyond relinquishing control of the data collection, as the Good Mind Research Protocol states that if the community feels that harmful data is being collected, they reserve the right to retrieve it and bring it back to the community. Dr. Newman described bringing students up to Akwesasne for a meeting to discuss one of the measures that the ATFE RAC members found problematic. The CAS or Cultural Affiliation Scale, which has been used in numerous other studies in Native American communities, allowed people to say how much they maintained Native American cultural practice as well as non-Native practices. The researchers intended to use this scale to determine whether degree of affiliation with Native culture, or the degree of exposure and acculturation to the non-Native community, influenced performance on the cognitive tests. As Dr, Newman described:

> Basically it's a validity check of whether this particular test was appropriate for a group of people who may not have been exposed to some of the sorts of

> information that's measured in the test. And you know if we had found a strong correlation between say this scale, the cultural affiliation scale, and scores on the test, I would worry about the usage of that test, generalizing about the community.

At the beginning when the Task Force approved the grant, the CAS was approved as well, but as the study progressed, Dr. Newman described that "it became problematic. People were uncomfortable with having to do it, and they let us know that." Dr. Newman and her students traveled to Akwesasne to discuss the use or alteration of the CAS with the ATFE RAC. However, when she arrived, she found a group of what she described as hurt, angry women who were not there to discuss, but to tell the researchers that they were not going to continue to use this measure, and that one of their members would be heading down to Albany to collect any data they had acquired thus far using this measure. While this was the RAC asserting its position to protect the community from research that they viewed as harmful or unnecessary, this is also the worst nightmare of researchers who have carefully selected the types of data they feel they need to conduct a fully accurate and valid study.

When I asked the fieldworkers about why the women who met with Joan demanded the return of the data, three of the five I spoke with had no idea that this confrontation had occurred. Alice remembered how the depression study, run by Santiago-River and Morse, had used a very similar scale, which many community members did not like, but they all worked together to revise the scale. One of the SUNY researchers on that team described the process of pilot studies, meetings and revisions that went into adjusting that scale, and thought that maybe the community did not demand back their results because they had worked collaboratively to make adjustments. This researcher thought the scale used by Newman's team was very similar, if not the

same, but conjectured that maybe the angry community members were not sufficiently aware of the collaborative work that had gone into the development of the scale.

Two other fieldworkers I spoke to were familiar with the incidence of the retracted surveys, and explained the occurrence based on displeasure with the questions, and a distrust of the possible use of the data collected. One woman (26C) remembers it as eight questions, and from these "they could determine how Indian you were, and we didn't like that at all (sarcastic laugh). We made them return them all, and I think they were destroyed… We didn't think it was their place to determine peoples' heritage. And that kind of thing could be used against you. It just didn't serve a good purpose." In my interview with Agnes, she elaborated further that in a community like Akwesasne, a question like "do you participate in traditional gatherings?" is a difficult one to answer. Many people in the community were divided from indigenous Mohawk traditions though experiences like boarding schools or Christian religions, and consider holidays like Christmas to be a traditional gathering. Other people continued to practice the traditional religion, but also celebrate Christmas and Easter. Agnes felt that people were afraid that the data collected about people's adherence, or lack of, to "traditional customs" like "harvesting, fishing, agriculture, farming" would get back to the industrial plants that they are currently trying to sue. These industries would then be able to say, "They're not doing it anyways, so why are they concerned?"

This distrust towards the possible use of results extended not only to cultural information collected, but to the use of blood as well. Two of the SUNY scientists I spoke with described that when they began to develop a continuation plan for the Superfund project renewal grant, the Mohawks refused to allow for genetic study of any

kind. Because genetics were the hot issue at the time, and their renewal grant did not contain a genetic component, the SUNY team was not renewed. The scientists respected that these were the wishes of the community, but never fully understood why the Mohawks were so opposed to genetic testing. When I was interviewing the FERP employees, I asked them why they thought the community was so resistant to this form of study, especially after being party to so many other types of research. The answers were similar to the resistance to the Cultural Affiliation Scale described above: the government could and would distort and use any information gained from these measures to "prove" somehow that Akwesasne Mohawks are no longer Indians. Not because the community felt that this was true, but because past experiences, especially with the State government, have supported this concern.

One of the fieldworkers, Loralee, described the scenario in terms of government programs that non-Native people thought they no longer deserved on the basis of being a distinct population:

> The big concern among the staff is that there's always been this big push to prove that Mohawks aren't Indian any more…because the big thing that people would say is "oh, you're not anything special. You've been mixed up with all these other races for so long that there's no such thing as a Mohawk anymore."

She pointed out that there are plenty of people who think that Mohawks should be paying taxes, and if scientists can use their blood to say that Mohawks are not that different genetically from their white neighbors, then this group can say, "Well you're just like everybody else. You should be paying taxes." She pointed out that it would be difficult to do any kind of genetic analysis on the data they collected anyway, because some of the people who took part in the study were not Mohawk by blood. Some couples included a non-Native, but if they had been living in the community for more than 20 years they

were included, since they had been just as exposed as anyone else had. “We figured they are just as exposed as everybody else here. They’re eating the same food, drinking the same water so we let them take part too.”

Throughout the study, there was the concern that New York State would misappropriate the blood samples in some way. As described in the previous chapter, Katsi initially sent the first blood samples to an outside lab, because she did not trust that the NYS DOH lab would give her accurate results. After the SBRP project began, the first batch of blood samples that were sent down to Albany to the Wadsworth Lab and were stored for an extended period of time but not analyzed, which caused the community get nervous. Alice described the concern in the community: “They weren’t letting us have the blood samples, and there was a fear at the time that New York State, the Department of Health, Wadsworth Center is going to use those blood samples for genetic testing. At the time, the Human Genome Project was a big thing and they really wanted Native blood to look at.” Because Wadsworth lab had been storing the samples without analyzing them, likely for reasons discussed above, the community became anxious and increasingly distrustful. FERP decided that the best thing to do would to bring the samples back to Akwesasne. They had a -8 degree freezer to keep the samples preserved until a course of action around analysis could be set. They stored over 200 samples there until an epic ice storm struck the community. They lost power, but Alice managed to secure a generator to keep the freezer operating. She was eight and a half months pregnant at the time, but she and another worker, Agnes, took turns going down to the office three or four times a day to make sure the generator had enough gasoline and oil. It was imperative to preserve these samples, because if they tried to go back and re-

collect them, the samples would not match the interview data, and an incredible amount of time would be lost. They kept the generator going for five days before making an arrangement with researchers at SUNY Albany to meet them in Lake Placid NEW YORK, where they handed off the samples and the chains of custody. Shortly after, the lab was able to begin processing the samples.

Once the samples began running, since the serum was the only part of the blood analyzed, Loralee explained that the Mohawks insisted anything left over be destroyed. "So somebody couldn't come in and say 'oh, well, you're not using these red blood cells, I'll just take them for my study,'" thereby conducting research with Mohawk blood that they might not approve of and could prove detrimental to them

The Mohawk's fear of having their blood misappropriated for unauthorized testing is not unfounded: the Havasupi tribe in Arizona took part in a study on incidence and possible solutions to diabetes, only to find themselves featured in a doctoral presentation reporting on the use of Havasupi blood samples to uphold the Bering Strait Theory, which directly challenges Havasupi oral history. The community felt deeply betrayed that they had allowed their blood to be collected for a project that was supposed to help them, and the samples were then used without their permission to conduct a study they did not agree with. The geneticist who was the key person responsible for the misuse of the blood samples was awarded the Presidential Award for Excellence in Science, Mathematics, and Engineer Mentoring, followed by a million dollar NIEHS grant (LaDuke 2005).

While to some scientists, especially those convinced of their own ethics and good intentions, these fears may seem paranoid. Akwesasne is clearly a Native American

community, culturally, ethnically, linguistically, politically, and as their membership records with blood quantum requirements would show, "racially." But as described previously [history chapter], Akwesasne has a long standing well-founded distrust of New York State and the neighboring industrial plants. History has demonstrated that in most cases, the state has operated against their best interests. Episodes of direct conflict between Akwesasne Mohawks and the state government are still recent in the community memory, and so the possibility of being maltreated at the genetic level as well does not seem farfetched.

Concerns about Diligence of Staff

Along the lines of relinquishing control over data collection, some of the researchers expressed concern about the diligence of the staff in maintaining study protocols. As one scientist stated, "we worried sometimes about how diligent the staff were- and they weren't always very—but they were essential for the project to be successful." Another was not so judicious: she felt that with the staff,

> There was no understanding of 'we have to do it this way' (tapping hand on desk to emphasize each word) and you can't deviate from that, you know. I mean Alice was very very good but she had to deal with the staff and she couldn't be on top of everything you know, and I think all of the staff were extremely nice people and really invested in the studies and wanting to do a good job, but they just didn't have enough of, you know—I don't know what to call it, interviews skills or sticking to the protocol skills or that kind of stuff.

Some of the other researchers stated just the opposite. Dr. Newman described how they would videotape the FERP staff collecting data and then view the videotapes to make sure they maintained all of the standardized procedures. She emphasized that for intelligence tests, the data collector has to be very consistent, or the scores do not mean anything. Newman described, "I've got to say they were really good at learning how to

do it, and they respected the need to be standardized and such." Another woman who was part of the same research core, noted that they would watch the data very carefully and if there were things missing they would call up the field staff and ask them to go find the missing data "But for the most part that was minimal. They did a very thorough job."

Authorship

In addition to concerns about the collection and use of data, there were concerns about whether the ATFE stipulation about co-authoring was always being met. One ATFE member, Brenda, thought that in the end the SUNY team did a good job, but "one thing they constantly violated was the authorship. That before things went out it had to come to the community. We had to review it." She thought David Carpenter "tried really hard to keep the researchers under control but you could see that drive to publish which was really sad. But that's how they survive." On the other hand, Dr. Carpenter described to me that they still follow the procedures that were set up set up:

> The Task Force is listed as an author on any publication that involves the human data. I send drafts of the manuscripts to the chair of the Task Force, welcoming comments. Now we don't often get comments. In order to get any kind of response, we usually set a deadline. If you have any comments, give them to us by this date; otherwise we'll submit the manuscript. My perception is that has worked pretty well. We invite ourselves up to give oral reports quite frequently. Not very often do we get taken up on our offers.

Another scientist also explained, "We've tried or have put all of our publications through the Task Force. It's gotten difficult lately. The last publication we sent through the Task Force, we never got a response. The responses were 'I sent them around. I haven't heard from anybody.' On some of the most recent articles published, (Schell et al. 2006, 2007, 2008, 2010)—there are no Akwesasaronon co-authors. Dr. Carpenter attributed the slow response by ATFE to the submission of their papers as an indicator that "maybe the level

of suspicion about them has faded and that is why ATFE is not as diligent as they once were about reviewing the manuscripts."

Scientists' Reflections

Now that they could reflect back on the experience of working on the health study, one of the things I was interested in learning from the scientists was what they would have done differently if they were able to do it all over again. Similarly, from the point of their experiences, I was curious to know what they would recommend to scientists embarking on a similar project.

Of the six scientists, most reflected on things they could have done, and one chose to give advice. Dr. Schell suggested, "I think that anyone going into this kind of work should be very open to community contributions and concerns. Likewise, I hope that any Native communities working with scientists are as diligent, as careful and as educational as the Mohawk were." Each of the others reflected a different aspect of the process that would have liked to improve on. Dr. Fitzgerald described how, similar to the community comments discussed above, "In retrospect I am not sure we could have done anything significantly different to have a better impact, except maybe more efforts at health communication, because you know scientists are not the best at trying to translate their results into, you know, something the general public can understand."

Others recognized the limitation of their roles, but reflected on things they would have like to have done anyway. Dr. Newman, who worked on the cognitive studies, wishes they had been able to get to know more community members better, "but in reality we tried hard and I don't know that we could have done more than we did really. We can't live up there, we've got careers down here." Similarly, another researcher who

worked on psychological projects, would have liked to have done more "Ethnographic work of, you know, how things have changed and so forth, that would be amazing. I would have liked to be able to get data on what things are in place right now. What kind of interventions. And that's kind of what I want to do next is hopefully create a project on culturally appropriate interventions" against negative psychological outcomes of dealing with contamination. Dr. Carpenter, in discussing the "empowerment" portion of the RAC protocol, wants to involve higher education to a greater extent, and get more Mohawks to come down to SUNY Albany for advanced degrees, with the goal that they can eventually do independent research, so that they would not need groups like the SUNY research team.

Dr. Schymura had thoughts about the data collection process of the research itself. "If I had to do it all over again I would have made sure we adhered to protocol. And I would have made some more face to face contact….more face to face time at least with Alice, with the interviews. I would have insisted on sticking more to our protocols or I guess it's not even a question of sticking more it's like to have more interim reporting back of their record keeping so I could have realized earlier what was going on."

Effect of Study on Lifestyle

In going to Akwesasne to speak with people about their experiences in being part of this momentous research effort, one of the things I was interested in learning about was whether study participants thought that they had altered their lifestyle in any way as a result of this experience. Five of the study participants I spoke with said that they did not change anything about their lives after receiving the results back. One woman who lives on Raquette Point said that since she lived so close to the site of contamination, she

had already altered her lifestyle before the studies came in. Another couple both received results back that were within the normal range, so they felt as though they did not need to change anything, and could feasibly maintain their level of fish consumption, since it had not already led to abnormal results.

Two respondents felt that gardens in the community were affected as a result of the health studies being conducted. Leona, who lives on Raquette Point, described how she switched to raised bed gardens and no longer planted anything directly in the soil. Another woman, who lives on Cornwall Island, described how her family's and neighbor's gardens got smaller in the years after the studies were conducted. It is likely that the environmental testing had as much if not more of an effect on people's concerns about gardens, but since many of these tests were occurring simultaneously, it is difficult to tease out the direct results of each.

Two other women mentioned that after receiving their results back, they tried to eat healthier and live better lifestyles. Elizabeth worked hard to cut down on fat in her diet, and began buying magazines with articles about things that are not good for you, like plastics. She does not remember her own results, but does remember that her daughter had "a high level of some kind of cancerous causing agent in her." She recalls, "I don't remember mine, I just remember hers. It was horrible because there was nothing you can do about it." By trying to cut more fat out of the family's diet and trying to avoid harmful plastics (even though she said her daughters would roll their eyes at her), she was doing all that she felt she was able to in order to protect her family's health. Randi felt that because she lives in Akwesasne and took part in the health studies, she has a greater awareness of chemicals that affect the ecosystem and her body. Being a

participant in the health studies and a resident of Akwesasne during this pivotal time in its environmental history has given her the vocabulary to both understand and speak about environmental contamination in a different way than a community who had not been exposed to this form of education.

Nine of the health study participants I spoke with said that being part of these studies led them to decrease their fish consumption. The advisories put out by the Tribe about limiting fish consumption, in addition to learning that this was how many of them came by the levels of PCBs that the study results revealed for them, caused these participants to limit or eliminate fish from their diets. As Randi mentioned previously "don't eat the fish" was the message that most community members, whether or not they were study participants, took away from the studies.

Research Papers and Social Realities: "They couldn't have done it without us"

While Akwesasne community members learned about the details of the health studies and their results through report back letters, community presentation, and local popular media, the scientific community learned about Akwesasne predominantly through the vast number (at least 45 that I am aware of) of research papers that were published disseminating the results of these studies. Within the two rounds of SBRP studies, different research teams took different approaches in conveying (or not) their relationship with Akwesasne community members through the course of the study.

For the first round of SBRP studies, the final products of the health studies process was papers written by Fitzgerald's research team, and co-authored by members of the Akwesasne Task Force on the Environment. The papers discussed the process by which the community had been exposed to environmental contamination, described the

scientific methods used to determine PCB levels in biological samples, and then discussed the levels found in relationship to other study populations that had been published on, populations who had undergone similar processes of sampling and publishing and who had become part of the textually based knowledge record.

As described over the course of the past two chapters, completion of these health studies was accomplished through a complex series of negotiations between scientists, ATFE, predominantly female fieldworkers with FERP, and study subjects. The quote in the section title above came through to be from both community members and scientists, both of whose efforts were truly necessary to make the project a success. The tensions-- both for scientific researchers who had to relinquish some control over data gathering and study design, and Akwesasne community members who had to play by the rules that determine a legitimate scientific research project-- are not apparent when reading any of the scientific papers written by the Fitzgerald research team. The studies meant one thing to the community—determinations of body burden, extent of exposure, potential health risk-- and another to scientific world—numbers figures, something to be built on for future studies. Fitzgerald and his team were writing for their audience of chemists and epidemiologist, in the style in which they were all accustomed. But for some of the women involved, this study amounted to little more than a pat on the back for decreased fish consumption and the assertion that no one really knows what this means for your health. None of the history of the tension of these differing goals and outcomes for all parties involved are apparent in these scientific studies. The paper written about some of the CBPR struggles and benefits (Carpenter 1995), was written and published as an entity separate from the research that this relationship produced (and was published in

Environmental Health Perspectives, a journal which frequently contains articles on CBPR). Each portion of the research experience went to a separate audience—the data and research methods went to chemists and epidemiologists, and the information about CBPR went to people seeking information on that topic.

What made the breastmilk study, starting from its inception as pilot samples in 1986, so incredible, and so different from other human health studies that had been conducted in communities in the past, was the level to which Mohawk women were involved, both in the selection of the community for a study, the planning of research protocols, and the collection of data. This was a stipulation of Katsi's before the study even began:

> At the very outset, I demanded that the only way we're going to work with Mohawk women in the precious intimacy of Mohawk mothers' milk and our relationship to our young is to ensure the mothers that they are co-investigators in this study. There's not going to be any one of you researchers that stand taller than the Mohawk mothers. We're all of the same height, which is a traditional principle in our Longhouse. That we're not going to be guinea pigs. You're not going to run back to your funding agency with our analyses before you tell us. Those are our tissues. That's our data. It doesn't belong to your funding agency first. We want control over how this happens. And so, in fact, in the generations of research that followed from that, we were able to position fluent Mohawk women speakers to do the field work, to go collect the samples (Cook, 2005).

As described previously, Katsi collected most of the samples for the pilot study herself. She also recruited women whose babies she had delivered at home, like Trudy Lauzon, a bright woman who was fluent in Mohawk and has an extensive network of relatives, which was helpful in identifying who was going to give birth and could be recruited into the study. When Katsi became pregnant with twins, she suggested that the scientists hire Trudy to take her place. She said the initial response from the scientists was "She doesn't have a degree." To which Katsi replied:

> Why does she need a degree?! Train her in venopuncture, train her in the protocols you don't have to be--this is not rocket science, this is human

> interaction to get a milk sample. The women have got to know you, got to trust you. You've got to know what it feels like to nurse a baby, what it means when--to know how to recognize when your milk lets down. How to problem solve in that visit. 'I can't get a sample,' well you know what, let's take it easy, let's make tea, go have a hot shower I will watch the baby. Don't you know, they've got to trust that you are not going to be doing something odd to their baby while they are in the shower. You know, it has got to be complete trust and who are you going to have that for, except someone you have known all your life (Cook 2008).

Trudy, whose milk Katsi collected in the pilot study, ended up working on all of the SUNY SBRP human health studies in the follow years, describing for me a very rewarding 11-year job for her.

However, this wonderful underlying story is missing from most of the scientific papers and reports, especially from the first round of research described in the previous chapter. Katsi is listed as a coauthor on the Task #3 Breastmilk study (Fitzgerald et al. 1992), and the women who helped to collect interview information and samples are listed in the acknowledgements. In the way that is appropriate for scientists, Katsi and the other women were acknowledged for their part. I asked Katsi how much input she actually had on the writing of the papers, and she replied that she received drafts of the papers for comments and final approval before they were published. She recalls "feeling very included and very respected." She acknowledges that she and the fieldworkers were not "burning the midnight oils crunching data" since not they are not epidemiologists, but that those epidemiologists could never have achieved the data gathering without them. In her mind, the scientific papers were not as important as "the interpretation of the data and the results at the community level, and designing interventions of empowerment, including the research process itself, are the big difference."[81] But while the inclusion of

[81] Email contact with Katsi Cook, January 30 2010.

the Mohawk voice in constructing the epidemiological paper might not have been terribly important to the Mohawks (who were busy at the time concerning themselves with any practical application of the data), the loss can be considered on behalf of "science" and what the scientist readers could have gained from this case history.

What is missing from the report, and all subsequent papers written using this data, is the integral role Mohawk women played in this study, both in its inception, and its success in data collection. The report references "project staff" or "project personnel" without mentioning the Mothers Milk Project or the role played by Mohawk women in collecting data. Three of the papers[82] report on the same research as discussed above in Fitzgerald et al. (1992) and Fitzgerald et al. (1995b) but make no mention of the Mohawk women—their names are listed at the end in Acknowledgements without saying who they are and what they did. Katsi is listed as a co-author on six of the papers.[83] Priscilla Worswick, a resident of Akwesasne who helped with data collection, is listed as a co-author on three of the papers.[84] Their affiliation is Akwesasne Task Force on the Environment—probably due to the ATFE RAC Good Mind Research Protocol developed in 1995 that included equity and co-authorship as one of its standards. In the Mount Sinai study, Mohawks were hired as interpreters, but they were not given equity in the construction and running of the study, and in sharing of the data. As Katsi describes, "the main flaw of the Mount Sinai study was they hired research assistants who were fluent in Mohawk but they really didn't give them any positioning. They really didn't give them any equity" (Cook 2008). Katsi made sure this was different with the human health risk

[82] Hong et al. (1994), Fitzgerald et al. (1995a), Hwang et al. (1996)
[83] Fitzgerald et al. (1992), Fitzgerald et al. (1995a), Hwang et al. (1996), Fitzgerald et al. (1998), Hwang et al. (2001), Fitzgerald et al. (2001
[84] Fitzgerald et al. (1995a), Fitzgerald et al. 1998, Fitzgerald et al. (2001), Fitzgerald et al. (2004

assessment and the ensuing SBRP studies. Including Mohawk (for the most part non-scientist) co-authors on the papers published by Fitzgerald's team was a progressive step on their part. My critique lies not as much with them as with the fields of biochemistry, toxicology and epidemiology, which are only looking for numbers and results and do not care to hear about the complex social processes that are involved in producing science in a Native community.

All of these papers reported that there was a better response rate among Mohawk women than among control women to take part in the study, and the researchers attribute this to the Mohawk mothers' concerns about the potential effects of living near a Superfund site. What is also likely to have contributed to the Mohawk mothers' willingness to participate is the fact that the "project personnel" who were contacting them about participation in the study, and who were coming to their homes to collect the samples, were women from their community with whom they were familiar.

Fitzgerald acknowledges the importance of these Mohawk women in an interview I did with him. When I asked him how he came to be involved at Akwesasne, he stated "not surprisingly we owe it all to Katsi," although he later gave the researchers some credit for working hard to collaborate in a cooperative fashion with the Mohawk. He described the SUNY project as "a good example of community based participatory research," because it was

> Planned in conjunction with the Akwesasne Task Force on the Environment and all of the staff, all the local staff at least were Mohawk, and everybody who worked for us on the human health studies were Mohawk and a lot of the environmental sampling was taken by the Mohawks too, mostly in conjunction with the Ken Jock's unit on the environmental health…I do think it was one of the early examples of a successfully community based participatory research and that the Mohawks really were partners, in fact they would not have let us do it any other way and I can't say I blame them I don't think if I lived I would want

> these strangers coming into my community and doing all this stuff to me and my relatives without you know my involvement and consent.

This novel community involvement in study design and data collection, as well as results report-back was never mentioned in Fitzgerald's papers until the Carpenter et al. (2002) paper about university-community partnership for the study of environmental contamination, which described both the research outcomes and the community collaboration, on which Fitzgerald was a co-author. The other papers were written specifically for biochemists, toxicologists and epidemiologists, and were written in the appropriate style for this field. Nonetheless, it would have been beneficial to mention to the other scientists reading these papers at the time that this collaboration was happening, and that this was a positive model to follow.

The extent to which the community collaborative aspect was published on changed fairly dramatically in the second round of SBRP grant papers produced, with the introduction of researchers to the team with social science backgrounds. In all of the papers published about the Mohawk Adolescent Wellbeing Study (MAWBS), the CBPR relationship between Akwesasne community and SUNY researchers is highlighted, in addition to results on PCB levels.[85] In addition to incorporating the details of the collaborative work in his scientific papers, Schell and his team also write separate papers solely on the topic of CBPR in the community, collaborating with community members to write papers that specifically address this teamwork, and how this model of research benefited both parties (Schell and Tarbell 1998; Schell et al. 2005, Schell et al. 2007).

[85] In addition other publications from this second round of research like Santiago et al. (2007), Decaprio et al. (2005), and Codru et al. (2007) make brief mention that the field staff used to collect study data were Mohawk community members. The other papers from this second round of research (Haase et al2009, Goncharov et al. 2008, and Goncharov et al. 2009) refer to the first three mentioned for details about method.

Highlighted in these papers is how both sides came together under ATFE RAC protocol to create a mutually respectful environment in which the study was accomplished. These papers were produced through much of the same process as the first round, but CBPR was becoming more well known as a legitimate way to conduct science (although certainly still not the norm). Schell's team was more willing to explore and share this process in the context of scientific papers. To date, Schell et al. (2007) have the only paper in the *Journal of Human Biology* about CBPR. This paper not only describes the results of the thyroid studies among the adolescents, but also devotes half of its space to describing for biologists the importance of community based participatory research. In addition, Schell describes his own shift away from the more dominant research paradigm, as illustrated by his past research on lead levels among urban women, to a community based paradigm in working with the Akwesasronon community members.

Community Capacity and Indigenous Research

Despite the abuses described earlier that some Native communities have faced in the name of-- or as an indirect consequence of-- research, many Native communities still see a value in conducting scientific and social science research projects. What is criticized is not necessarily the need for research, but how it has been conducted in the past, who has controlled it, and who has benefitted from it. Castellano (2004:104) recognizes that there are many research needs identified by Aboriginal communities—environmental degradation, epidemic health threats, culturally appropriate economic development to name a few. The Akwesasne Mohawk authors of Arquette et al. (2002:261) highlight the importance of continued research in Native communities:

> The need for better site- and Nation- specific data emphasizes an important area of research for Native Nations. In addition to providing Native decision makers with very practical information about contaminant levels in various media and biota, collecting information about traditional cultural practices and natural resource use can have far reaching effects. The collected information can be used to support the protection of important natural resources both on Native lands and in aboriginal territories protected by treaty rights. More important, the research itself can support the transfer of traditional knowledge and cultural practices to future generations.

Additionally, other sectors of the community have highlighted that in order to press for any kind of political or legal recourse against polluting industries, data from scientific studies is needed to definitively 'prove' harm done.

Many of the past problems surrounding research in Native American communities boil down to issues of power, which can be reflected in the language used to separate out the various positions occupied by everyone involved in a study. As Schnarch (2004:96) notes:

> It is, by definition, the researcher – whether doctor, scientist, expert, academic, student or government agent – who does the research. Communities are consulted, involved or are supportive. They consent. They may be partners. Generally speaking, they are not researchers. Restrictive definitions of research and researchers are spelled out in project and program funding criteria.

Schnarch (2004) notes that Native communities have limited access to research funds unless they partner with a proper researcher. The researcher must have the appropriate credentials—conferred by peers—and must be affiliated with a recognized institution. The research institution receives the funding, and is responsible for its use, as well as the completion of the project. In the case of environmental health research, the appropriate credentials of the research institution are seen as necessary to validate the objectivity of the results acquired.

For these reasons, in order to piggyback on the scientific experience and credibility of larger research institutions, Native communities often partner with these

institutions. However, many Native scholars across disciplines have begun to call for greater indigenous control of research. Castellano (2004:101-102) notes:

> Fundamental to the exercise of self-determination is the right of peoples to construct knowledge in accordance with self-determined definitions of what is real and what is valuable. Just as colonial policies have denied Aboriginal Peoples access to their traditional lands, so also colonial definitions of truth and value have denied Aboriginal Peoples the tools to assert and implement their knowledge. Research under the control of outsiders to the Aboriginal community has been instrumental in rationalizing colonialist perceptions of Aboriginal incapacity and the need for paternalistic control.

Maori scholar Linda Tuhiwai Smith (2002:7) calls for indigenous communities to begin "researching back," similar to talking back. It involves a "knowing-ness of the colonizer and a recovery of ourselves, an analysis of colonialism, and a struggle for self-determination. Research is one of the ways in which the underlying code of imperialism and colonialism is both regulated and realized." She does not propose that indigenous scholars move entirely away from their disciplines. "Decolonization…does not mean and has not meant a total rejection of all theory or research or Western knowledge. Rather, it is about centering our concerns and world views and then coming to know and understand theory and research from our own perspectives and for our own purposes" (Smith 2002:39). Smith supports the use of indigenous methodologies, developed in the communities in which they will be applied, for the purpose of conducting research. "Indigenous Methodologies tend to approach cultural protocols, values and behaviors as an integral part of methodology. They are 'factors' to be built in to research explicitly, to be thought about reflexively, to be declared openly as part of the research design, to be discussed as part of the final results of a study, and to be disseminated back to the people in culturally appropriate ways and in a language that can be understood" (Smith 2002:15).

Theoretical underpinnings aside, what is additionally necessary for communities to be able to embark on the research that they see necessary is the capacity for the community to be able to carry out that research. Chavis et al. (1983) advocated that scientists and community collaborators create linkages and partnerships in research that would help the people help themselves, a trait that the ATFE labeled "empowerment." These partnerships would mean more than just returning the study results to community members, but also helping to build a community that is more knowledgeable about research methods and is more self-sufficient. Schell et al. (2007:522) note "as we trained research partners in data collection and management, they became better informed about specific research methodologies, and, more importantly, about the conduct of a logistically complex operation." This type of experience, combined with a greater number of Akwesasne community members who are acquiring scientific degrees,[86] can eventually lead to an empowered community able to conduct its own research projects. One of the FERP fieldworkers (26C) noted "That's why I think the Task Force really started going with their incorporation so we could do research the way we wanted to. We didn't need them [outside scientists], just kind of like a consultant kind of basis where we just did our own thing. It would have been nice if we had people from the community as the scientists and then gone through the whole community with all the employees….It

[86] "Members of this group hold formal academic degrees (i.e. AA, BS, BA, MS, PhD degrees) and have expertise in a variety of areas including wildlife biology, ecotoxicology, aquaculture, civil and environmental engineering, biology and in traditional medicine, environmental and cultural knowledge. Through formal training, life experiences, and leadership roles, they are well respected in their community." (Santiago-Rivera et al. 1998: 165). Since this list was compiled over a decade ago, the list has grown to contain more scientific fields, and a greater number of degree holders.

would be nice, but I know there'd be a lot of problems with the scientific community believing it."

Follow up studies: solutions

Despite the assertion by some that the Akwesasronon had been "researched to death," several other community members, when asked about how future health studies should be done differently-- if at all-- expressed ideas for follow-up studies in the community. Trudy, who was a field worker for 11 years with FERP mentioned that she always hoped that they would find funding to do a follow up study to the SBRP research "Because a lot of these people, they were so young when they started out with them. Here we are just how many years later. There were kids that they probably had in that time who also probably have kids of their own now." Reflecting on the cognitive studies conducted among the adolescents, Randi thought that someone should find out how those individuals continued to develop, and how they are doing today. One man, Richard D, who was not himself a participant but who had family members who were, wants someone to do a study to see who is currently better off health-wise: the individuals who ignored the fish warnings and continued to eat a traditional diet, or those who heeded the warnings to avoid fish and instead substituted a high carbohydrate, high fat diet, "like me, and developed obesity and blood pressure and diabetes and stuff like that. Like whose better off? I'd like to see a study of that." All of these suggestions show a certain valuation of the study process as it has been conducted in the community, by expressing interest in its continuation.

Other community members specified that they thought enough studies had been done to show that there is a problem in the region. They feel as though they have known

for a long time that a problem is present, and now they want studies into solutions. Agnes, one of the FERP field workers, stated that "Yes, we have a problem. Those are all studies that have been done to say, 'Yes, there is a problem.' How about coming up with the solution now?! We know there is a problem with this, we know there is a problem with that. All right, find a solution and let's work together." Brenda similarly expressed:

> We've been studied, we know what the problems are, so now what are we going to do about it? So now instead of getting down and depressed over what we have, how can we be more upbeat about what are some of the solutions that we can do to try and be in control of our community again and our land base and our natural world.

Lloyd, a man who has worked on a number of projects to try to help the community--including helping with the founding of the local radio station and newspaper, and a fascinating but fiscally unsuccessful aquaculture project[87]-- felt that enough effort had been put into proving that problems exist, and that now more time and energy needed to be invested in finding community- relevant solutions. "Health studies I guess are good, but in a way there isn't enough...Why get a health study? Why? To show how decrepit we are? We already know that. So, how do we do something about it?"

Conclusion:

Community based participatory research (CBPR) at Akwesasne was applied in an effort to even out the power differentials between the researcher who had control of funding and knowledge of scientific processes, and FERP and ATFE, who to some extent controlled access to the community, the source of data for the study. Both of these

[87] Lloyd described some very interesting and novel things he learned about cultivating yellow perch, a community favorite but not a species about which much had been documented as far as aquaculture projects. Unfortunately was not able to sustain the million dollar project financially.

factors were imperative in reaching the final product—published articles, which described levels of contaminants found, and potential health effects from contamination exposure. This research paradigm was a way of linking the spheres described by Sillitoe (2002) at the beginning of this chapter—a way of bringing the community and the scientists together to produce a research project within that area of overlap. I think Nadasdy and Bordieu would note the final product of the collaboration, the published research papers, are for the most part couched in the language of epidemiology and biostatsitics, the powerful language of science. However, at the same time, as participants like Randi have noted, these statistics produced have relevance for the community in developing future health-education materials. In addition, researchers like Schell have brought the discussion about the importance of community inclusion in scientific research into the science journals.

The reflections of study participants, FERP fieldworkers, and SUNY researchers on their experiences with the health studies at Akwesasne provide valuable guidance for future research in this and other Native communities. Time was a pressure felt by both sides, although differently. Community members became concerned and angry when samples were not processed and results were not returned to them in a timely fashion. This led some to become concerned about the use of blood samples, and others to disparage the out-of-date nature of some results (like cholesterol or insulin levels) when they did receive them back. Other universities should learn from this experience and make certain that they are apprised of the regulations surrounding lab requirements to be met for clinical results. SUNY researchers also experienced time conflicts regarding passing all information through the community IRB before it went to conferences or

publication. While they understood the principle of this, there were concerns about the pace at which information was reviewed and approved. Other conflicts centered on concerns about the possible misuse of data, issues based on over two hundred of years of poor relations with the state of New York, and historically poor relationships between researchers and the indigenous communities where they carried out their research. An understanding of the full history of the community, as well as the range of concerns in the community at the outset of a project could possibility help to predict or mitigate such confrontations.

Participants and fieldworkers also had suggestions regarding the means of feedback which, while inevitably more time consuming and expensive for the project, would prove to be a more successful way of getting results to community members in a setting that is comfortable to them. Several Akwesasronon suggested that in addition to (or some might say rather than) letters to participants and community presentations, fieldworkers should adopt a more personalized approach to data delivery and meet with family groups to discuss the study. In this setting, community members would feel more comfortable to ask questions and become better acquainted with the science. Simpler language used in the report-back letter, and a personal meeting with a fieldworker and/or scientist would help the community to become better educated about the issues, a concern that was also expressed by community members.

The fact that some respondents described the need for follow up studies, and that a new research project has just begun in the community with Lawrence Schell and his team, attest to the gradual level of trust and negotiation that developed between the Mohawks and this research team. It also demonstrates the Mohawk recognition of the

importance of this type of research, in monitoring any potential additional health effects that might be related to the contamination, or other goals they have set out.

Chapter 5:
"A lot of pollutions" and "the wrong foods:"
Lifestyle Change and Diabetes

For many Akwesasronon whom I interviewed during 2008 and 2009, it had been almost a decade since they had contact with the health studies, prompted by concerns about the effects of the neighboring industries on health. General Motors (GM) had been gradually cleaning up their Superfund site, and lawsuits filed against them to date had been unsuccessful. In light of this, while interviewing residents I was interested to learn the extent to which they were still concerned about the potential effects of the contamination on their health, or whether new issues had taken the forefront of concern.

I spoke to a small, but varied assortment, of the health care practitioners at Akwesasne: the director and a nurse from the St. Regis Mohawk Health Services (SRMHS) clinic, as well as their one-man traditional medicine department; a traditional medicine practitioner at Kanonkwatsheri:io-- the tribal clinic on the Canadian side; the two women who run the Thompson Memorial Wellness Center-- an alternative healing center on Cornwall Island; and one of the women who runs the Eagle Spirit Teaching Lodge, another alternative healing center on the southern half of the international border. With the exception of the two women from Thompson, the other individuals I spoke with said that their patients/clients were not as concerned about contamination in their bodies as they were about conditions like diabetes, rates of which have skyrocketed over the past several years. Through the conversations, some mentioned the link that some of the patients saw between the contamination and their health issues, but for the most part their concern was with lifestyle issues, and the emotional stress in the community that has also contributed to health issues.

I asked several of the community members about their perceptions of the health of the community, and if they thought the industrial contamination had affected their health or the health of community members. More people than not expressed that many of the illnesses that they felt disproportionately affected the community could be traced either directly to exposure to contamination, or indirectly, as a result of a rapidly changed lifestyle precipitated by the discovery of the contamination. Yet others pointed to the lifestyle choices that community members had made—namely poor diet and lack of physical activity—and called on people to take responsibility for their behavior and work towards improved health. Many individuals referred to several etymologies, implying a variety of sources for the most prevalent health conditions in the community, like diabetes, and cannot be fit neatly into any one of the categories

All of the interviewees acknowledged that there had been a rapid change in diet in the community over the past generation. A majority of the interviewees were in their 40's and 50's, and remembered well a time when the community subsisted mainly off of fish, local beef and dairy products, and garden vegetables, supplemented with commodity foods. Today that diet has shifted dramatically to include a far greater amount of junk food or fast food (most commonly referred to as "McDonalds" or "pizza"). The reasons for this shift in diet were attributed to some extent to the contamination, which destroyed the dairy and cattle industry on Cornwall Island and the fishery in the St. Lawrence River. Diet change was also attributed to an increase in the number of community members who did not have time to cook at home, because all adults in the home are now working, and because more youth are involved in sports and other activities. There were also complicated economic stories behind the affordability of junk food, with some

community members recalling a time when their families did not have the money for such 'luxuries' and others bemoaning that this was the only food that they could afford.

In the following chapter, I will focus on the illness mentioned with the greatest frequency by Akwesasne community members: diabetes (see Figure 4). A vast majority of the other illnesses mentioned (cancer, respiratory problems, thyroid disorders, rashes, reproductive issues, cognitive disorders, arthritis, autoimmune disorders, headaches, digestive disorders, unidentifiable illnesses and allergies) were blamed directly on the industrial plants, and some of the recently published papers by the SUNY SBRP team are beginning to support some of these concerns.[88] Opinions on the root of the diabetes 'epidemic' proved to be slightly more complicated, weaving between individual responsibility and an environment altered by environmental contamination. Akwesasne is not unique in its high rates of diabetes—indigenous people the world over are suddenly finding they have this 'disease of modernity' in common, and in the past thirty years medical anthropologists and health care workers have worked to understand both the medical and local etiologies of the disease. Below I will explore some of this research, and the ways in which the opinions of the Akwesasne community members I spoke with can contribute to this. I will also discuss dramatic shift in diet over the past generation, and the various explanations and implications of this change. Finally, I will conclude with community member suggestions for ways in which the community as a whole can work towards improved health, including a greater number of exercise and education programs, as well as gardening.

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[88] As discussed in Chapter 3, these include abnormal thyroid functioning adolescents (Schell et al. 2004, Schell et al. 2008, Schell et al. 2009, Schell et al.2010), diabetes (Codru et al. 2007), higher levels of total serum lipids, which contribute to heart disease (Goncharov 2008), cognitive function in adolescents (Newman et al. 2006; Newman et al. 2009) and older adults (Haase et al. 2009); and reduced testosterone levels in men (Goncharov 2009).

Etiology of Disease

Biomedical explanations for diseases tend to focus on pathologies within the individualized body—illnesses brought on by exposure to germs or viruses, organs or cells malfunctioning as a result of maladaptive lifestyle practices or exposure to chemicals. Epidemiology seeks to quantify numbers of people within a social body who suffer from the same affliction, to determine if those numbers are above what one should expect for that population. Social scientists, and here I will be referencing mainly critical medical anthropologists, explore patients' or sufferers' own explanations for the source of their afflictions, which often point to influencing factors beyond their own individual, seemingly maladaptive, lifestyle choices. In addition, historical, political, economic and environmental factors are explored and implicated in a network of disease causation, which extends from political and social bodies, down to the individual body. Hamdy (2008) notes that in exploring how power inequalities produce and distribute illness, she came to understand that patients were formulating "political etiologies," extending the pain of their illness beyond the diseased body to implicate corrupt institutions, environmental pollution, and inadequate food. Often these etiologies find their root in what Nancy Scheper-Hughes (1993, 2006) has referred to as "every day violence," and Paul Farmer (1997) refers to as "structural violence"-- the normalized suffering, disease and premature death among certain marginalized populations. Structural violence is achieved

> By allowing affliction to be related to prevailing ideologies that inform policy, configurations of social violence, the way misfortune is conceptualized and managed, and how meaning systems influence how individuals interpret their bodily states, seek care, and fashion themselves according to prevailing moral notions (Nguygen and Peschard 2003:459).

On the other hand, exploring the historical, political, economic and environmental factors behind illness in Native communities "Shifts the medical gaze from the diseased body to a diseased colonial and post-colonial history of genocide, the collective experience of trauma reproduced in many 'small wars and invisible genocides' practiced against Indigenous Peoples to this day" (Scheper-Hughes 2006:xviii).

The importance of exploring diverse disease etiologies lies in the creation of prevention programs and strategies that can "transcend exclusive biomedical focus on [the] physiological body, also as to include aspects of the social and political bodies as well" (Ferreira and Lang 2006:25). In clinical interactions with patients, physicians are the "architects of meaning and explanations" (Hagey 1984, 1989) about the disease. Considering some of the patient perceived causes behind illness allows them to build on their own meanings and explanations to create interventions that are more effective.

Highlighting the social, political, and environmental factors in disease etiology is not meant to dismiss the contribution of lifestyle factors in the prevention and treatment of disease, but rather to demonstrate that traditional biomedical explanations and statistics do not tell us the whole story of affliction or of its causation. To say that a condition like diabetes is a "socio-political pathology" is not to deny the medical model of disease,

> But rather to search for ultimate, rather than immediate causes and to recognize that what medical anthropologist Margaret Lock calls 'local biologies'… emerge out of distinctive and collective experiences and histories of embodiment and risk producing local and even culture bound symptoms and experiences of supposedly universal illnesses and disease (Scheper-Hughes 2006:xviii-xix).

Health

To determine disease, we have to start with an understanding of how a community defines health. Baer et al. (2003:5) contend, "Health is not some absolute state of being

but an elastic concept that must be evaluated in a larger socio-cultural context." In her work with Native Hawaiians, McMullin (2010:159) noted that "examining intersections between health and cultural identity helps to denaturalize biomedical definitions of health and moves us toward including knowledge that is based on a shared history of sovereignty, capitalist encounters, resistance, and integrated innovation."

In retrospect, a flaw of my interviews is that I never explicitly asked the community members to define "health" for me. I asked them to *describe* the health of the community, if they thought their health had *been affected* by the contamination, and how they thought the community could get back to a *healthier place,* but all the while what I was assuming was that "healthier place" would equal the community minus the health problems they had mentioned. To reconstruct an image of health from these interviews I would have to work backwards, and paint health as simply the absence of illness, which would be an incomplete picture. In lieu of this, Akwesasne community members Arquette et al. (2002:262) describe that

> Health, then, has many definitions for the Mohawk people of Akwesasne. Health is spiritual. Health is rooted in the heart of the culture. Health is based on peaceful, sustainable relationships with other people including family, community, Nation, the natural world, and spiritual beings. Health is supported by the solid foundations of a healthy natural world. To support healthy communities, empowerment is an essential component of any assessment, action, or intervention (Arquette et al. 2002:262).

As discussed in Chapter 2, the *Kaienerokowa* or Great Law lays out *skennen,* or peace, as a term denoting not only political peace and tranquility, but when applied to the individual human mind/body as an indication of soundness and the normal functioning condition. Skennen is the antithesis of war and illness. Being at peace leads to the other tenets of the Great Law-- namely strength through unity, a healthy life force, and a good mind, both individual and collective. Inherent in the notion that each term has an

individual and body politic denotation implies that for a society to be healthy each of its individual members must be, and vice versa.

When I asked interviewees to broadly "rate the health of the community," most answered with negative responses, noting that it is "poor," "very poor," "terrible," "it sucks," "there's something wrong with everybody that I know," "a lot of health issues," "so-so? Worse than the average American, suburbia guy I guess;" "a lot of people are not well," "not very good," "not the best," "oh, there are so many issues," and "like that big river in Africa; in de-Nile." A few people had more positive opinions, including "pretty good," and "fair, but it's getting better, it's improving." Three people independently offered to rank community health from a 1 to 10, with 1 being the worst: two people ranked it 6 out of 10, and one rated the health of the community to be a 5 out of 10. The reasons for this generally low grade came from the preponderance of illnesses that community members mentioned (see Figure 4): diabetes, cancer, heart disease, respiratory ailments, thyroid disorders, rashes, reproductive issues, cognitive issues, autoimmune disorders, emotional issues, headaches, digestive disorders, unidentifiable illnesses, and allergies. Most of the illnesses the community is facing (85% of the list above) they attribute to contamination from the local industrial plants, while some aspects of diabetes, cancer and heart disease, the top three mentioned on the list, are attributed to lifestyle choices by some members of the community.

For the top-mentioned health problem on the list, diabetes, the local explanations for this disease diverged and converged in interesting ways, placing differing weights on self-care versus uncontrolled exposure, and images of what it meant for the community to suffer from this illness. Below I will discuss specifically how medical anthropology has

shown diabetes to be an illness with roots much more complex than lack of individual compliance, and how Akwesasneronon, with their distinct etiologies for these illnesses in their community, contribute to critical medical anthropology's efforts to broaden the biomedical scope of illness explanation.

Diabetes in Indigenous Communities

In the following, I will discuss Type 2 diabetes, formerly known as adult-onset diabetes or Non Insulin Dependent Diabetes Mellitus (NIDDM). Insulin, produced in the pancreas, is necessary for the body to break down sugars and starches into glucose for energy, and then transport the sugar from the blood into the cells. In a person diagnosed with diabetes, either the body does not produce enough insulin, or the cells ignore the insulin. As a result, glucose builds up in the blood rather than being transported into the cells and the patient is described as having elevated blood sugar. These are now what McMullin 2010(141) describes as "failed bodies and 'unhealthy others," bodies which the medical community perceives as having not maintain the health that nature has given them, and are not disciplined in the knowledge of health.

Upon being assigned this diagnosis, the patient will be instructed to alter their diet to include more vegetables, fruits, and other healthy sources of fiber, and to decrease their consumption of sugars, fats and refined carbohydrates. Fiber is capable of slowing down the digestion and absorption of carbohydrate and increasing the sensitivity of tissues to insulin, thereby preventing a rise in blood sugar. Foods that are high in simple sugars and low in fiber are considered to have a high glycemic index, meaning they break down quickly during digestion and rapidly raise blood sugar. Foods that are high in saturated fats interfere with the pancreas' insulin producing capabilities, and are also to

be avoided (Hull et al. 2003). In addition, since adiposity is considered a contributing factor to the disease, the patient will be told to get more exercise to improve their metabolism and assist in the weight loss process. If the patient's blood sugar has not gone down, as measured by future tests, the health care practitioner will know that the patient has been non-compliant, and has not followed the prescribed diet and exercise. Oral insulin agents may be added to help the diabetic body to better process the sugars in the blood. If this is also unsuccessful, the patient will then be prescribed insulin injections.

While becoming a worldwide epidemic, diabetes is especially rampant in American Indian and other Indigenous communities.[89] During WWII, when Denis Burkitt was serving as a physician in Africa, he noticed that chronic degenerative disease seemed to follow in the wake of a diet that more closely matched that of industrialized countries, and labeled these 'western diseases' (Burkitt 1994). He noted that as populations around the world adopted a western diet and lifestyle, western diseases emerged in a distinct order: obesity is among the first to appear, paralleled closely by a rising incidence of Type 2 diabetes, and cardiovascular disease (Milburn 2004). Diabetes was first documented among Native Americans around the mid 20th century, and first studied by anthropologists in the late 1970's (Judkins 1978; Wiedman 1979 and 1987).

Large disparities exist in the rates at which different populations suffer from diabetes. The American Indian or Alaska Native population's number of overall cases of

[89] Indigenous here can be defined as people which have a historical continuity with pre-invasion and pre-colonial societies which developed on their territories, and consider themselves distinct from other sectors of the societies now prevailing in those territories (United Nations 1983).

diabetes is twice that observed in the white non-Hispanic population.[90] According to a 2005 survey, almost 17% of the total adult population served by Indian Health Services (IHS) had diagnosed diabetes, with rates varying by region, from 6.0% among Alaska Native adults to 29.3% among American Indian adults in southern Arizona. In comparison, among the same age group 6.6% of non-Hispanic whites had diabetes (CDC 2007).[91] Adults with diabetes have twice the risk of death of people without diabetes, and have heart disease and stroke death rates that are two to four times higher than adults without diabetes. Other outcomes of diabetes include blindness, kidney failure, nervous system damage, amputations of lower-limbs, gum disease, complications of pregnancy, and a susceptibility to other diseases—for example they are more likely to die with pneumonia or influenza than people who do not have diabetes. Measures recommended to prevent these complications include glucose control, blood pressure control, and control of blood lipids, generally through diet, exercise, and insulin therapy.

Racial/Genetic Explanations: Poor Diet and the "Thrifty Gene"

The CDC lists "race/ethnicity" among the factors that can contribute Type 2 diabetes (along-side behaviors like "physical inactivity," traits like "obesity," and dysfunctions like "impaired glucose metabolism").[92] Frequently cited biomedical reasons for why Native people would be especially susceptible to the disease range from lifestyle factors of poor quality diet and lack of adequate physical activity to genetic theories

[90] United States Department of Health and Human Services. Healthy People 2010 Midcourse Review. Section 5: Diabetes. Accessed at http://www.healthypeople.gov/data/midcourse/pdf/fa05.pdf April 12, 2010.
[91] After adjusting for population age differences, 2004–2006 national survey data for people aged 20 years or older indicate that 6.6% of non-Hispanic whites, 7.5% of Asian Americans, 10.4% of Hispanics, and 11.8% of non-Hispanic blacks had diagnosed diabetes. Among Hispanics rates were 8.2% for Cubans, 11.9% for Mexican Americans, and 12.6% for Puerto Ricans.
[92] Center for Disease Control (CDC) National Diabetes Fact Sheet. Accessed at http://www.cdc.gov/diabetes/pubs/general.htm#what April 12 2010.

about a “thrifty gene.” First proposed by geneticist James Neel (1962), the “thrifty gene” protected the bodies of hunter/gatherers against starvation in times of great season fluctuation, but became maladaptive with modern patterns of food consumption, leading Native people to store unhealthy amounts of fat. While a genetic factor provides a convenient explanation for the disproportionate rates at which Native Americans suffer from diabetes, a number of scholars have spoken out against the idea. They argue that the notion that Indians carry a maladaptive gene is “scientific racism” (Ferreira and Lang 2006:13), and that it suggests that “indigenous blood carries a taint—the threat of passing on an inherited risk of diabetes” (Scheper-Hughes 2006:xx). Kozak (1997) contends that the message that being Indian can lead to being diabetic leads to an “attitude of surrender,” which disempowers individuals and communities by leaving them to feel as though there is nothing that can be done about it.

Chaufan (2004, 2008) argues against the utility of conceiving of a strictly genetic cause for diabetes, as this masks the underlying structural inequalities that cause people of color to be more susceptible to diseases like diabetes. By placing “race/ethnicity” unexplained on a list of diabetes causes, the CDC is neglecting the underlying root cause—that race/ethnicity are often associated also with class, education, and access to health care and fresh foods. The addition of low-income Appalachian whites currently joining ranks of “at high risk for diabetes” populations is proof of this (Bailey et al. 2003). Chaufan (2004) calls the race/diabetes correlation an “individual fallacy,” a spin on the ecological fallacy, where a researcher makes an inference about an individual based on the aggregate for the group (Brown 2000; Freedman 1999). Rather than focusing on the medicalized aspects of diabetes, which has led to the individualization

and depoliticization of the issue, Chaufan (2008) calls for a political ecology framework to be applied to diabetes, one that is concerned with social, economic, and political institutions of human environments where diabetes is emerging. While Chaufan (2004) considers 'environment' in the sociological sense as encompassing the principles of distribution of social resources such as institutional arrangements, power arrangements, and formal and informal normative structures, many residents of Akwesasne define "environment" in the traditional sense, implicating environmental contamination of fish and gardens in the root causes of diabetes in the community.

In reflecting on their research in the Mohawk community of Kahnawake, Macaulay et al. (2006: 409) note, "In Aboriginal communities, chronic diseases such as diabetes are considered indicative of the negative socio-cultural changes, the long term results of colonization, disempowerment (Friedman and Satterfield 2003; Israel, et al. 1997; Joe 2001; Durie 2003), decreased land base, loss of traditional ways, social stressors, and a lifestyle that is increasingly mechanized and no longer includes the former high level of physical activity for daily living." None of this complex picture is captured in a biomedical model, which only points to the 'faulty gene' or non-compliant behavior of an individual suffer of diabetes.

Community Explanations for Diabetes at Akwesasne:

Diabetes was the most frequently mentioned health problem in my interviews with Akwesasne community members. They cited figures that ranged between 25% and 70% of the community suffer from diabetes. The upper range is much higher than research and clinical estimates, but serves as in indicator of community concern, and the extent to which this illness has affected some people's families. Janine Rourke, director

of the Tsitewatakari:tat "Lets Get Healthy!" Program that serves residents with diabetes, told me that 13-16% of the community is diabetic, while another 7-10% go undiagnosed. It is clear that the personal impact that diabetes is having on many residents' lives has made the problem seem even more immense and ubiquitous, as reflected in the numbers they quoted to me. In 1989, Martinez and Strauss (1993) conducted a survey of the St. Regis Mohawk reservation (the southern portion of Akwesasne) and found that the age-adjusted prevalence of diabetes in the Mohawk population was two times the national average. There was a high prevalence (21%) among New York Mohawks under 45 years of age, compared to 17% of diabetic patients in the US population (Martinez and Strauss 1993). In reviewing records from the tribal clinic from 1992-1997, Negoita et al. (2001) also found that diabetes showed a higher age-specific prevalence among Akwesasronon than the general US population, the age being lower than the national average among young Mohawks and higher among older Mohawks. Janine noted that the largest growth is in the 35-50 age groups, but also, "we're definitely seeing and feeling the impact of the 25-year-old coming in, the 28-year-old coming in and the 12-year old."

In explaining why the community suffered from high rates of diabetes, some interviewees' explanations agreed with, and others explicitly challenged the more common biomedical explanations of a population with a poor diet that does not exercise enough, or a people whose genetic make-up had turned on them in times of consistent food access.

Genetics: "We have a completely different medical makeup"

A biologist in the community explained to me that the way that Haudenosaunee bodies respond to alcohol or sugar "shows that we have a completely different medical

makeup. And when you say that, everybody goes 'ooh what do you mean?' Well, you know that's been called—what was it—the thrifty gene, the survival gene. But it does have a really serious impact on the metabolism." He went on with an elaborate description of how Haudenosaunee body breaks down and stores sugars and carbohydrates differently from Europeans, and how the traditional Haudenosaunee diet, with crops that were bred to be high in protein and complex carbohydrates, was better adapted to this process. Agnes, while citing diet change as the main culprit in diabetes, also made a genetic link between Mohawk bodies and their traditional foods: "You know, going back to diabetes, that's [fish] a key protein missing in our diet right now. That's got something to do with it. We're genetically made to have that in our bodies. And now we're just eating McDonalds, Kentucky Fried Chicken." The genetic need for fish is being met with an inferior food, and diabetes is resulting in part from this substitution.

Two other community members mentioned diabetes as something that could be inherited. Robert went through list of family members, some who had diabetes, and some who never did. "See, it's hereditary. It's a hereditary thing. My sister didn't get it. My mother and father didn't have it. I got it from my father's mother, my grandmother. So that stinks. And it killed my two older brothers." While he connected concerns about cancer to contamination later in the interview, he was one of the few community members who never drew a link, even tangentially, between contamination and diabetes.

The two women who run the Thompson Memorial Wellness Center, an alternative medicine center on Cornwall Island, while both emphasizing strongly that they think the environmental contamination has adversely impacted Akwesasronon health in a number of ways, also mentioned a genetic component to the difficulties they were having in

relation to outside foods, which was also contributing to illness. One woman explained that:

> Our genes are not made to mix with another breed. The immune system goes down…So the genes of a Native person cannot digest all the white processed foods. Then when you're mixing the genes together, it makes the immune system of that person even weaker. We start developing all these different illnesses like stomach problems and stuff like that…You can see it happen with our people now because we all have mixed.

Her co-worker at the Center similarly expressed the genetic preference of the Mohawk body for local traditional foods. She expressed that "any of the foods that have been produced in the northeastern part of our country was specifically made for that people." Foods grown in other territories, like the fruits imported from South America, are designed for people who are from those regions:

> But now because of our plants and everything are not being grown healthily around here anymore that we are forced to eat bananas. Fruits and things all year around and our bodies weren't built to eat that. We were only made to eat strawberries in the springtime. That was it. We weren't supposed to have that kind of fruit through our diets and to our nutrition and the bread that we're eating and stuff, we're not supposed to have that. We were supposed to just have corn because corn is a part of the thing that we've had here all through the generations. So all that food that we have available here – the fish, we were supposed to eat fish, muskrat, all that. We were supposed to. But because of the way that society has changed, the way the [industrial] plants contaminated the soil and the sickness that goes on in our community and stuff, people are buying at the grocery store. It's coming all the way from the south which our bodies were never built to eat anyway because our genetic makeup tells us that we have to eat the food that's here, and we can't anymore. So now what's happening to us as a society?

The connection between health and traditional foods was a popular theme in many of the interviews, and will be explored further below. Some of these lay conceptions of genetics may not always fall within the parameters of biomedically defined genetics, but they provide insight into the ways these individuals have made sense of the social, environmental and health changes that have accompanied diet change in the community.

Individual responsibility: “It’s your choice”

Eight community members who mentioned the issue of diabetes expressed that this was because of poor diet, and as a result, Akwesasronon needed to take responsibility for their own behaviors and diet, and work to improve their health. One woman cited diabetes as an issue of control: “Diabetes is so high on our reservation here. I believe that it has nothing to do with the contamination. It’s really their eating habits; it’s about control of their weight.” Later in the conversation, while she was describing cancer and other “long term diseases” that had resulted from environmental contamination, she re-emphasized that “I think diabetes could have been—that’s all your food intake—it’s your choice, right. So I think that’s just out of control.” Another woman also paused in the middle of a description of cancer as an environmentally caused disease to specify, “I don’t know if diabetes resulted from contamination. I just think that’s the lifestyle of the people.”

In describing the community health trajectory, which he saw as steadily declining once residents reach their fifties, one young man bluntly stated, “A lot of it is self-inflicted. I know better than to eat at McDonald’s, I do anyway.” He also pointed to smoking as additionally self-destructive behavior that people knowingly engaged in. Two community members expressed that Akwesasronon need to move beyond blaming outside entities for their poor diets and health. As one woman stated, “It is somebody else’s fault that we had to find another diet. You know, and the diet that we choose, we choose it, it’s not very good. So whose fault is that?” Another man wishes that people would move beyond

> Always saying, “oh, the white man this, the white man that.” It can't be about that anymore, you know, you have to -- there is the blame there and there is the

> obstacles in your path, it's enough, you know, you have to say, "well, I can do this, I can do that," you know, and the sooner we realize that, the sooner we'll be healthier.

A brief article published in 2008 in the St. Regis Mohawk Tribe newsletter by the "Lets Get Healthy!" Program draws on both cultural connections to healthy ancestors and an individual responsibility to follow a similar lifestyle in an effort to raise awareness regarding the connections between Mohawks' diet and modern sedentary lifestyle, and their diabetes. The article states:

> Our elders didn't always have diabetes or high blood pressure. They grew up working hard, gardening, gathering, trapping, farming and fishing. Every day they had to work to eat. Indian country today fills up on pizza, poutine,[93] and chicken wings. Many people only cook a full meal once or twice a week. Does this sound like you or anyone you know? (SRMT 2008a)

In this way, fellow residents are asking Akwesasronon to take responsibility for their own diets and health. While many community members, as discussed below, attribute their current poor diet to fears of contamination in local food, these individuals (none of whom were diabetes sufferers) each expressed a need for residents to move beyond assigning blame to an outside entity for their poor health, in order to improve on this health.

"It's like chain reaction": Contaminated Environment, Changed Diets, and Diabetes

Other community members linked diabetes to diet and lifestyle choices, but expressed that those choices had been limited for them because the free healthy foods that they once had access to were now perceived as unsafe to eat. The problem that some people expressed to me with biomedical explanations for diabetes at Akwesasne were that the individual was often implicated for their poor diet, which some residents saw as an oversimplification. Henry Lickers noted that these explanations do not point to the

[93] French fries covered in gravy and melted cheese

contamination that ruined the fish, they point to the person who changed their diet: "Again, epidemiology isn't pointing to the contaminant, it's actually pointing to the person and saying that you've changed your diet to a high-carbohydrate diet. Therefore, what's the cure for that? Ah, insulin. And again, the medical people go back to the treatment of the symptom, not to the source cause."

Most scholarly articles published by ATFE members connect the rising rates of diabetes in the community with the forced change in diet spurred by the contamination. The article cited below, written by two ATFE members, argues that environmental risk assessments need to more broadly incorporate the cultural viewpoints and lifestyles of indigenous residents when determining what levels of exposures are acceptable. They draw a direct correlation between the contamination of the environment by industrial plants, to the rapid change in diet and lifestyle of Mohawk people, to the current rates of diabetes in the community, an unplanned outcome of the cessation of fish consumption. Tarbell and Arquette (2000:102), note that:

> Sometimes the greatest health effects are seen without any exposure and thus would not be included in risk assessments. At Akwesasne human health has been affected by toxicants even without the ingestion of fish, wildlife, or water. For example, Mohawk people have customarily relied heavily on fish and wildlife as low-fat sources of protein, vitamins, and other important nutrients. Many health care providers at Akwesasne fear that rapid changes in diet associated with the fish and wildlife advisories may be leading to diet-related illnesses such as heart disease, hypertension, stroke, and diabetes. The loss of fish in their diets represents the loss of an excellent source of protein. Thus, many Mohawks must turn to unhealthy, high-fat sources of protein, such as those found in fast-food places. Recent reports indicate that diabetes is on the rise because more people no longer eat traditional foods and no longer participate in cultural activities that once provided healthy forms of exercise.

In each of their articles reporting results of the SUNY Albany Mohawk Adolescent Well Being Study (MAWBS), Schell and his team included a paragraph indicating that the cessation of fishing that followed advisories against consumption of local fish at

Akwesasne altered traditional subsistence patterns. This, they state, had a profound effect on the preservation of indigenous Mohawk culture, as avoidance of foods and activities that may expose people to PCBs means that traditional activities are not performed and social bonds forged between generations through the transfer of culture are not created (see for example, Schell et al. 2003:960-961 and Schell et al. 2004:97). In addition, while they might have diminished fish-borne contamination exposures, the community has lost a primary source of protein and other important nutrients such as calcium, iron and zinc, and onega-3 fatty acids (Schell et al. 2004). The replacement of fish with cheap foods has had the effect of "further exacerbating chronic, diet-related health problems in the community, such as diabetes and cardiovascular disease" (Schell et al. 2003: 961).

Fourteen community members I spoke with attributed the diabetes problem in Akwesasne to a diet high in sugar and fat, and a lack of exercise, but rather than placing the blame on the individual for poor diet choice, they expressed the opinion that the contamination of their natural food sources forced this change in diet on them. As Trudy described,

> I think right now with the changes that they have nowadays, where they tell you 'you can only consume so much fish.' It's all substituted with all these fast foods. This is where our diabetes comes in. It's like a chain reaction….you change over from fish to what? Pizza and wings? Of course, it's going to change things.

Richard D estimated that over half of adult males in Akwesasne are diabetic. "That's mostly based on diet. There's a lack of healthy food here. I mean, used to be we'd get bullheads out of here for consumption. I wouldn't touch them now." Jim, who currently serves as a SRMT chief, but worked for the Environment Division at the time when the contamination was discovered, expressed mixed feelings for the fish advisories that

strongly encouraged people to change their diets: “The problem we didn’t anticipate though was the change in the diet and the change in lifestyle we feel has contributed to the diabetes in the community and to the other illnesses in the community that has occurred since then. So that concerns me.” On the other hand, SUNY researcher David Carpenter has argued that, especially as more recent studies are connecting PCB levels with potential health effects, the cessation of fish consumption was the best option for Mohawks, although more should have been done to help people find healthier substitutes.

Some people were especially sensitive to the implication that people should be held responsible for their dietary choices and diabetic conditions. As one woman described,

> I don’t think everybody knows yet what are all the reasons that cause diabetes. Of course they’re going to say “well you stopped growing a garden and therefore you did less exercise and you ate less fresh fruits and vegetables.” Well that’s true. But it sounds like it’s your fault, and that ain’t all it is.

She went on to describe how before the Seaway she and other people in the community lived off the land and out of the river. After she found out about the fluoride emissions from Reynolds settling on the island where she raised her garden, and about the PCB contamination of the fish in the river, she stopped eating local food, and turned to the grocery store. But whereas she could eat almost for free prior to the contamination, food at the grocery store was very expensive, and her purchases were limited to inexpensive, but unhealthy food. The connections between finances and food choices will be discussed in greater detail below.

Some interviewees who connected the increase in diabetes with changes wrought in the community by contamination mentioned not only the changes in food consumed, but also the loss in activities that was once required to acquire those foods. After

describing how she thinks the community is “in a crisis with diabetes” and its related complications, Barbara continued:

> Why are we diabetic? Because our lifestyle has changed and our food has changed. So we don’t spend three hours a day in a garden; and we don’t make sure our children are out there weeding and doing things like that; and we don’t-- we’ll have the big gardens. We don’t have them trapping along the-- you know, in the spring and whatever. We don’t have them out in the woods picking nuts and stuff like that. So a lot of things, you know, we’ve changed. And so, yeah, our environment has changed. We don’t swim in the rivers any more. And that’s where everybody used to swim, whether it was on the St. Regis River or the St. Lawrence River, that’s where there were swimming holes. And people don’t swim there anymore. They have pools.

She cites the reasons as not simply changes that came to the community with time, but because people became afraid to interact with the environment as they once had, and now, even though the immediate threat may have passed, they are used to a different way of living.

To some extent, linking the suspected contamination of food sources to diabetes has also become an accepted community rhetoric that serves to ease some of the blame from the patient or their parents. One woman, after I commented that her kids seemed healthy, replied:

> Well, my son just got diagnosed with diabetes so I can’t say they are that healthy you know. I think he got diabetes because we can’t eat the food out of the garden; we can’t make juice from the apples that are growing here. So you’ve got to run to the store and buy the canned jars of food. Right, so that processed foods-- we can’t make a garden you know, so you buy processed foods

Just an hour before this conversation, she and I had walked to her neighbor’s house to pick bags full of pears. Her mother kept a garden, within sight of where we were sitting during the interview and she had described to me her own small garden. When I asked her about whether she thought these details went against the reasoning she had just laid

out, she thought about it for a moment, and replied that we don't *really* know if those pears are safe. And people might still plant gardens, but they are not the big gardens they used to plant. They still plant because it connects them to their ancestors—in her case it made her feel closer to her deceased father. This is not to discredit concerns that this woman may have about the safety of foods grown on the Island, but rather to point out that some residents, in attempting to find explanations for illnesses like diabetes, may reach for an explanation that has been laid out by community leaders, that both reflects their anger towards the industrial plants, and deflects some of the blame than can be placed on a family with diabetic adolescents as having "failed" to help them maintain health.

Diabetes as "directly related to contamination"

Four interviewees told me that they thought the high rates of diabetes in the community could be attributed, at least in part, to exposure to the local industrial contamination. As one woman stated, "I think a lot of the health problems we have are directly related to the contamination. I think the diabetes, hypothyroidism, all of your endocrine disorders is a direct correlation and we can't prove it." A recently published study by the SUNY SBRP team (Codru et al. 2007) concluded that in their Akwesasronon subjects, elevated serum levels of PCBs, DDE, and HCB[94] were positively associated with diabetes after controlling for potential confounders. They state, "although these results do not establish cause and effect, there is a growing body of evidence that environmental exposure to persistent organochlorine compounds is

[94] DDE is Dichlorodiphenyldichloroethylene, which results from the breakdown of DDT, and HCB is hexachlorobenzene, a fungicide formerly used as seed treatment. PCBs, DDE and HCB are all persistent organic pollutants (POPs) whose use has been banned, but which persist in the environment.

associated with elevated incidence of this disease" (Codru et al. 2007: 1444). Three of the interviewees I spoke with who felt that the contamination was responsible for elevated rates of diabetes at Akwesasne were aware of this study.

Multifarious Etiologies: "A lot of pollution" and "the wrong foods"

For many Akwesasne community members there was not a single root cause for an illness as pervasive as diabetes. As some wove through descriptions of the environmental, cultural, and social changes they had seen over the years, diabetes presented itself as having multiple roots. Howard is in his 80's and lives on a small farm on Cornwall Island. As we sat on his back porch, which overlooks his gardens and off in the distance, the river, he launched into his story about the changes he has seen over the years, and the effects that he and others have felt:

> Well of course ALCOA was here before that [the Seaway] and ever since then they started up pollution. I do believe this is where we're getting our diabetes too, lot of pollution. I've been diabetic, I just found out there 2 years back now and that's what brought a lot of disease, a lot of stuff from these pollutions. And the fish we used to eat, I know one guy used to catch sturgeon, I'd go every spring and then take one and have a good feast. And the muskrats we used to eat them, too. Now I don't dare to eat them even though they might be clean. A lot of change in life.

Later in the conversation, after we had talked about his work on the Seaway, the effect of the fluoride on his neighbors' cows, and his vitamin regiment he uses to cleanse his body of any contamination, I asked him, "Do you think that this contamination has affected people's health in Akwesasne?," to which he replied:

> Yes. See, I didn't see that when I was a kid and like it wasn't that bad. Ever since all this pollution coming in, it got worse and worse. The first thing I found out, diabetes. Everybody has it, after I got it. And I find out that everybody's getting it. I know when you eat the wrong food that's what causes it. Then again, we don't know what's in the food now today. Yeah, we used to have our

> own milk and our own beef, our own meat, pork, everything. Now, we don't keep nothing no more.

Howard has lived along the river since before the Seaway came through, and admits ambivalence to working on the Seaway that brought the destruction to the community. He has seen the dramatic change in both diet and health, and quality of the environment. In our conversation, he blames diabetes directly on the pollution, as having "brought" the disease to the community, like an unwelcome guest or an unwanted gift. He reinforces this by offering diabetes as an example for my question about the effects of contamination on health. In the same breath, he describes that diabetes is caused by eating "the wrong foods," although all foods are considered somewhat suspect because "we don't know what's in the food now today." He also cites a change in farming practice, brought on by environmental contamination, which has contributed to the diet change. This brief snippet of my conversation with Howard captures much of the ambivalence that many of the residents I spoke with felt about the root causes of diabetes in the community. The blame is diffuse: it does not rest long on the diabetes sufferer—who may be at fault for eating the wrong foods, but who also cannot trust any food these days, and who has been subjected to a half of century of pollution.

"Eating is a social experience"

In the explanations detailed above, and throughout our conversations, twenty interviewees recognized that some of the most pressing illnesses in the community are tied to diet and lifestyle choice, even if those choices are constrained by perceptions of environmental threats. The conversation around diet change mainly involved two factors: the reduction of healthy traditional food like fish, and the increase in consumption of calorie-dense fast food. While some people saw the two as directly connected, others

noted the complicated relationship that Akwesasronon have with junk food, and the variety of reasons that people cook fewer meals at home than they once did. For various reasons, including money and time, fast food (for most people expressed as "McDonalds" or "pizza") has largely replaced traditional foods. In looking at these altered diets, which some people felt Mohawk people were not genetically suited for, some residents described concern that maybe these newer foods full of preservatives and other unknowns might be just as bad as the contaminated foods they replaced.

As in many places, food is an integral part of the culture and everyday of Mohawks. The Creation Story describes how the three sisters crops-- corn, beans and squash—came to the earth through Sky Woman and her daughter. These crops were grown in great abundance in Haudenosaunee villages, forming the base of the diet, along with wild game and fish. Morals around cooperation and how one should behave are built on stories about eating, especially the "one dish- one spoon" philosophy. The Peacemaker, a prophet who brought together the warring tribes to become the Haudenosaunee Confederacy, demonstrated this principle among a circle of 50 chiefs that he had brought together. The Peacemaker passed around a bowl of beavertail, a delicacy, of which the leaders were expected to take only as much as they needed, so that there would be enough for all in the circle. This dish demonstrated the collective responsibility of the people to share equally (King 2007). During the Mohawk wedding ritual, women are asked if they accept the responsibility of preparing food for their husband and children. It is also mentioned that sometimes the children born to the new couple will be playing outside at dinnertime when they are called into eat. If the neighbor children are among them, they are to be fed as though they were their own children. (Porter 2008).

In looking back on her experience with the first large group of health researchers to descend on Akwesasne, Katsi described how the differences between Mount Sinai researchers and Mohawk became especially apparent at meal times. Mohawks would sit down together and eat their ham sandwiches and mashed potatoes, while the researchers would stand with their apples looking out the window. They would turn from the window to tell the Mohawk:

> "Oh, what you're eating is really unhealthy. No wonder you have such diabetes and heart disease"—and stare out the window and eat their apple. You know, the dynamics of eating and food are very culturally ingrained, and our people like to sit and visit and eat as part of that social—eating is a social exercise as well as to nourish your body. And here is the outsider, the scientist, telling people how they should be, and how they, you know, eat by yourself, look out the window, which, to me, is not a very healthy thing to do (Cook 2005).

Throughout discussions about how study report-back and outreach could be done differently, a number of people mentioned that food at events always improves success. As Henry described, "If you feed Mohawks, they're happy." To which his wife Jean replied, "That's the problem with my culture, everything involves food." My entire stay in Akwesasne I was never for want of food, and often had to find a way to eat more than one lunch or dinner to avoid offending anyone. My slightly underweight frame concerned some people, and prompted them to want to feed me more (one man referred to me as "skinny Liz" to differentiate me from another Liz). Drawing attention to my thinness was not a compliment, but rather a marker of concern that I was not being properly nourished, and a reminder that I was not the average or expected body type. When I was recruited to take part in a three day fast with a group of other women, some of my Akwesasronon friends expressed concern that I did not have the necessary "stores" that a proper Mohawk woman did, and might not make it through the experience.

Fortunately, I did survive, and the end of the fast was celebrated with a lavish feast of the types of traditional foods described at the end of this chapter.

Fishing Tradition

When people discussed the rapid change in diet the community had seen, the most dramatic aspect was the cessation of fish consumption for many of them. Almost everyone I spoke to in the community had a connection in some way to fish or fishing. People reminisced fondly fishing with their fathers on the river, or helping their fathers prepare fishing equipment, or their mothers clean and cook the fish. Species like sturgeon, perch and bullhead were mentioned most frequently, and they were eaten smoked or fried. Fish was eaten several times a week for an ordinary dinner, and in large quantities at "fish fries" to celebrate special occasions and family gatherings.

Aside from just being a dietary mainstay, community members described fish and fishing as a livelihood, a lifestyle, and a culture. The process of catching and cooking fish out of the river was at the root of many of the interviewees' childhoods, and something that connected them back to the original residents of the area. People in their fifties, sixties, seventies recalled to me with youthful excitement their childhood experiences of going to the fish boxes that each family kept on the shore of the river to pull out each night's supper. When Canada, the SRMT and New York State issued advisories for people to diminish or eliminate fish from their diet, many of the residents I spoke with felt that they had lost more than just omega fatty acids from their diet; another part of their culture was being eroded from outside influences. Some of the residents expressed to me how a cessation in fishing gradually diminished Mohawk culture in several ways. As Henry Lickers described, the language and culture around tying knots

in nets, as well as the social interactions that occurred around the process of creating these nets is lost when there is no longer a use for those nets. Similarly, the language around the names and descriptions of certain fish is lost. As one older man (39C) described to me, "A lot of that has been forgotten, and the fish names in our language. Because a lot of the fishermen when they go fishing they talk about their Indian names to them, there is no English part of it, but that has been sort of forgotten now."

Community Fish Consumption: "You can't eat the fish anymore" and "I don't care, I eat the fish"

Eating less or no fish was one of the outcomes participants reported to me of taking part in or hearing about the various health studies that took place in Akwesasne. The dietary surveys conducted as part of the early Superfund studies with both Mohawk women and men showed a self-reported decrease in fish consumption over the period of three years, in response to the fish advisories that had been issued [Figure 3]. Other community members who were not involved in health studies also reported to me a general decrease in fish consumption. Even though fish have been an important cultural and economic component to Akwesasne life, the visible changes in fish, the advisories issued warning against fish consumption, and the general community perception that the fish are contaminated, coupled with a rapid decline in the fish populations over the years have led to a decrease in fish consumption. Nonetheless, some community members have maintained or returned to consuming fish, after reconciling with this information.

Thirty-three people said that they have decreased, or cut entirely, their fish consumption, even though for most of them it was previously an important part of their diet. For some, it has become an infrequent activity for special occasions. As Howard described "I eat fish once or twice a year, not like every day." Some remarked that when

do have a little bit of fish, they have concern: “When you are eating the fish, you know in the back of your mind that you’re going to be glowing (laughs). You know what I mean? You know it is there, the fear is still there” (27C). Others expressed an aversion even to the idea. As Gina described, the only circumstance under which she would eat local fish would be “maybe if somebody raised them and then threw them in the river and you caught them that same day.” Even though the fish advisories targeted women of childbearing age and children, a couple of the men I spoke with said that they assumed if it was bad for the women, they should not eat it either. These interviewees reported that this was predominantly the case for their family members as well-- they had either severely reduced their fish consumption or cut it entirely.

Even prior to the announcement of fish advisories, which many interviewees indicated to me were what drove them from eating fish, residents began noticing visual clues that fish were not safe. One Raquette Point resident, Mark described to me catching “fish with humungous tumors on them,” or funny color eyes. Four different women described to me how the fishermen were catching fish with black spots on them. Henry T, an older man on Cornwall Island, described with horror cutting open fish and finding bugs inside. Two women described seeing fish with sores on them. Another man, Robert, described cutting open fish with black spines, which he described as being from heavy metals contamination. Gina described to me “we’d see like a big black spot on them or a glob of green and they would tell us that’s what the PCBs are doing.” Neddie told me about catching walleye with holes in them, like bullet holes.

Studies have shown that PCB concentrations in fish can lead to increased lesions and tumors (NOAA[95]; Baron et al. 2000). It is likely that the black spots that residents were describing in fish could be caused by parasites in the St. Lawrence, namely *Uvulifer* and *Apophallus*. A study published by Environment Canada showed a higher level of parasitism among Yellow Perch from Lake Saint-François, a regulated aquatic environment,[96] than among those from Lake Saint-Pierre, where water levels vary significantly.[97,98] Since Akwesasne is directly west of Lake Saint-François, it is quite possible that Mohawk fishermen were catching fish tainted by this parasite. Since the levels of the river became regulated during the building of the Seaway, which directly preceded the building of the industrial plants, it is likely that fish would have begun contracting parasites around the time when General Motors began contaminating the river. This is also the time when the invasive lamprey eel was making its way upriver with the ships. The eels have round mouths full of razor sharp teeth, which they use to latch onto other marine life, and likely cause the holes that Neddie was describing. While the causes of the observed fish deformities that residents were noticing are several, the general impression was that the fish had changed, and they were now contaminated.

Problematically, not all contaminated fish showed such visual cues. In 1985, Ward Stone took samples of a sturgeon caught by Mohawk fishermen in order to test it for PCBs. When he came back with his results, which showed the fish to contain above

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[95] National Oceanic and Atmospheric Administration (NOAA) Fall 2001 Status report on the Hudson River Natural Resource Damage Assessment. Assessing Fish Health http://www.darrp.noaa.gov/northeast/hudson/pdf/hrfish.pdf

[96] fluctuations of approximately 15cm

[97] fluctuations of approximately 2 m

[98] http://www.qc.ec.gc.ca/CSL/pro/pro011dm_e.html Environment Canada study, "Effects of Water Level and Flow Fluctuations in the St. Lawrence River on Fish Health" Published 1/24/2001, updated 7/18/2006

what EPA considered safe levels for consumption, he was aghast to learn that in the mean time the fishermen had already eaten the sturgeon.

The fact that fish could be contaminated without showing visible evidence led many community members (for whom it was available) to rely solely on outside sources of fish. Eleven community members mentioned that they would only eat fish if it came from outside the community. For some this fish was coming from as far away as British Columbia, for others it was from other communities nearby, like Tyendinaga.[99] Some realized the irony in that they were probably still consuming contamination. Chris described how "people think that if the fish comes from someplace else rather than right here, then it is ok. They don't realize every Great Lake dumps into the next Great Lake which dumps into the St. Lawrence River. It is one big sewer." Robert explained how gets his perch "out of upper Canada where they're not polluted yet." Some also described how they would only eat fish from the supermarket.

Fourteen community members I spoke with either never stopped eating fish because they felt a cultural obligation to continue eating it, were not concerned about the warnings, or have recently gone back to it because they feel that it is no longer a problem for their health. Richard S described to me the traditional connection and responsibility that Mohawks and the fish have to each other, and for this reason, he continues to eat the fish. The Creator put the food in the water,

> We give thanks for that food and we have to use it… I mean it doesn't make sense scientifically, but it makes sense spiritually and mentally that you should eat that, you know. You can't just put it aside and say, "well your work is not good enough," or something, you know? They're still given out what their original instructions were, and it's us that are at fault, it's our fault that they're like that, you know.

[99] A Mohawk community about 150 miles west of Akwesasne in Deseronto, Ontario

Even though as a Mohawk he is not responsible for the contamination that has affected the fish, as a human being he is implicated in the problem, and therefore it is even more important that he works to maintain this relationship with the fish.

One woman who is an ATFE member and who was a fieldworker in the health studies described how her family continued to eat fish, and her kids "love it. They eat it whenever they can get it. I know that the area has been remediated and the fish isn't that bad anymore. So I hadn't told them not to eat it. So we just continue." Another ATFE member, Joyce, described how "the levels with the fish going down, the PCB levels going down…I feel more comfortable eating fish now. So I don't think I'm going to pick up that much contamination with PCBs anymore." Another woman, Randi, who had relatives who worked on the health studies and was herself part of the cognitive study, noted that many people in the community have vilified the consumption of all fish, especially for pregnant women, similar to the reaction one would expect if smoking or drinking while pregnant. She is disappointed that the only lesson that people seemed to take away from the health studies is not to eat fish " I feel like sometimes I could try to educate people about what fish is good for you and what is bad for you, but sometimes it is just why bother? You know my 30-second conversation is not going to undo twelve years of ingrained messages. Don't eat any more fish… So I don't fight it too much, I just eat my fish in private." She laughs that people can eat fast food, and then criticize her for eating fish.

Nelson expressed skepticism at all of the fish advisories because "we've been fishing all of our lives and we're still here. And my aunt, we just buried her last week. My great aunt was 102." Agnes similarly describes how "we were brought up by the river

and on the river. We were brought up to fish, we were brought up to swim in the river, and we were brought up on a boat. I don't have no fear of contamination. It was just a part of my life." She still eats fish as well.

To some extent, fish consumption that does exist in the community is divided along generational lines. In several families, community members described to me that younger women who were planning to have children would not eat fish, but older women would go back to eating fish. As Brenda expressed, "I'm not young anymore so it doesn't matter. I eat the fish." Elizabeth also described how she went ten years without eating fish, and would not let her kids have any. But she has gone back to it recently: "Let's just say I'm getting older now. I don't care, I love fish." However, even though this more advanced generation has returned to fish consumption, many interviewees are not convinced that the younger generation, even if given the change, would eat fish. Six middle age and older community members noted that even though they had gone back to eating fish, they had not raised their kids to do so because of the warnings, and now they "didn't develop a taste for it" as Joyce describes. They all described that their children and grandchildren have no desire to eat fish now, and would not likely show an interest in it even if it were determined to be clean at some point. As Agnes describes "they weren't brought up with the fish so they're not going to turn around and change their ways."

Henry, who works for the MCA Department of Environment described the rapid decline in fish consumption since moving to the community 30 years ago. He said that when he first arrived in the community, when he went visiting people, 90% of them were eating fish. Then as the fish advisories became more prominent, people began changing their behavior. When he would stop by their house at dinnertime:

> Suddenly, the old man or whoever it is was cooking the fish, would put it in the cupboard and shut the door. And then they would be cooking something else, you know. "Well, you know, Henry has been talking about this. And you don't want to show him that you don't believe what he's talking about, because I really like fish, you know. And besides, I'm over 60, and it's not going to hurt me. And I don't want to have any more kids, so I'm okay." But you got funny things like that occurring.

He no longer eats fish because he feels that he has a responsibility to set an example: "I don't eat fish from the St. Lawrence. I believe the same way, if people saw me eating, then they would say 'oh, then we can go back.' And I don't think that that's responsible. If I'm going to tell them not to, well then I better not too, as well." At the same time, he recognizes that some people do still eat fish, even if they do not openly admit it.

Even aside from the issue of contamination, some community members have expressed the opinion that the fish population is too low to support the community. As Joyce, whose father was a fisherman noted "there isn't enough of a fish population to make a living off of anymore." She and others noted that the cormorant, a voracious bird that is new to the area, has been decimating fish stocks, especially the perch populations. Ernie, an elder who witnessed the coming of the Seaway, described how in the process of dredging channels and blasting through rock ledges in the river, the fish spawning grounds were destroyed. Two other men, (Robert, Richard D), mentioned that the dams and locks put in prevent the fish from getting upstream and spawning as they once did.

It is difficult to say if and when the fish will be officially declared safe to eat. Members of the Environment Division described the process by which the source of the contamination is being taken care of, through digging out contaminated sediment and capping the river bottom in places. The goal is to keep the pollutants out of the benthos and prevent them from migrating up the food chain. However, several community members also recognized that the St. Lawrence River is the drain for the Great Lakes,

which are also suffering from industrial contamination. As discussed above in the health studies, contaminants from the Great Lakes were found in Akwesasne St. Lawrence fish. Although there is evidence that the levels of contaminants in the fish have been decreasing, and are expected to continue to drop, the testing of the fish from Turtle (Contaminant) Cove directly adjacent to the General Motors plant, showed no marked improvement, even though it was drained and dredged in 2005 (Litwhiler, personal communication 1/12/2010). An aquaculture project was attempted first in the river (until, as one man told me, PETA, or People for the Ethical Treatment of Animals, released them), and then in large indoor tanks, but this latter project proved to be too expensive to sustain. Members of the SUNY research team as well as the Environment Division told me that they recommend that people go upstream from the contamination (south of the reservation) on the Raquette, St. Regis or Raquette Rivers, or buy their fish from the store. As one woman, Alice, described, "So we end up being supermarket Indians, buying tilapia from Hannaford's, not so much perch or walleye."

Processed, Fast, Junk, Commodity Foods: "What the hell am I putting in my body!?"

While some community members began to avoid local foods like fish in an effort to avoid exposure to contaminant, some also recognized that the processed foods they turned to contain other unhealthy ingredients. Jean noted that people stopped eating local foods because of concerns about contamination, but " I don't know why because we don't know where the hell this other food is coming from, and we're eating it, or how they're processing it….they put these things in their mind that you can't do this because our foods are poisoned or whatever, so we eat other stuff which we have no idea where it comes from." Howard similarly lamented, "Then again, we don't know what's in the

food now today. “ He went on to describe how all the canned goods you buy in the store has salt and preservatives. “What I’ve been seeing, stuff in there isn’t good.”

Beatrice, who helps run an alternative healing center, has been working to make people “more aware about the additives, preservatives, things that are inside manufactured food that you buy grocery stores and stuff like that.” She is trying to encourage people to buy more organic food, as a way of avoiding pesticides and preservatives, which have “higher cancer causing rates and it accelerates your diseases.” She also expressed concern about the growth hormones in the meat and dairy products they are consuming, and the effects they can have on young girls who she sees as physically maturing too fast.

Chris expressed concern that the “processing is taking the nutrients out of your foods and it is adding stuff to keep it good on the shelf. You know like nitrates and sodium and all these other chemicals and preservatives.” As a solution to this, he conjectures, “if you could get the people out of that and get them back little by little start steering them back to the garden, you know whole foods, whole grains, you know and get rid of all this processing.”

The source of this canned food full of preservatives for many residents is commodity surplus foods, provided by the federal government through a food distribution center run by the Tribe. Foods provided through the center include canned foods like meats, vegetables and fruits; envelopes of powdered foods like eggs, milk and potatoes; dry goods like rice, noodles and beans; peanut butter; and commodity cheese. While these foods often help residents supplement their diets when they are short on income, some of the interviewees I spoke with expressed concerns about their health value. Joyce

pondered, “What is a commodity food? You wonder what's in it” at which point we got into a conversation about the famous commodity cheese, in all of its orange brick-shaped glory. “Ugh! And it doesn't taste really like cheese. And all that starch that they give you, you know? We're not used to it,” again indicating that Mohawk bodies have a preference for traditional foods, which have little in common with most commodity foods.

Community members referred to the foods that have replaced the traditional diet as junk foods or fast food, with the most frequently referenced fast food being “McDonalds” or “pizza.” When I asked community members who mentioned the poor diet of many Akwesasronon, and the ensuing health difficulties, why the diet had changed, one of the main reasons given why people ate this type of food was due to a lack of time necessary to cook a full meal. As one older woman, Sarah, described, people changed to fast food “Because it’s so easy for you to go out and get it. It’s better than making it in the kitchen. It is easy, huh. I can put number one there. ‘Cause it takes time to prepare and some people don’t have time.” Six other community members echoed her thoughts, describing how home cooked meals were especially difficult for working mothers trying to balance their own schedules with that of shuttling children to sports and taking care of the household. As one of the nurses at the clinic described, “Every kid is doing something, which is really good except that they’re never home. So they don’t eat at home, so they don’t cook, and they eat out a lot, so there’s obesity is rampant in the community for adults and for kids.” Interviewees recognized that people need to start making their own meals at home again, although according to Chris, “A lot of people will

balk at it because of the convenience of the fast food. You know it has just totally taken over everything."

Some people discussed giving up contaminated fish for fast food as a lateral move, rather than one that was protective of health. One woman, Randi, who has continued to eat a moderate amount of fish because she considers it a healthy food, described feeling irritated that people "can be sitting there eating McDonalds telling you how bad it is to eat fish and it just doesn't make any sense, and you can't really make people understand that." One of her in-laws is one of those people. While I sat at this other woman's kitchen table, she realized mid conversation-- as she was talking about how she does not eat the fish because in doing so she does not know what she is putting in her body-- that eating McDonalds is not really any better. "What the hell am I putting in my body!?" she exclaimed laughing. A few minutes later, her husband walked in the door with a paper sack full of fast food for her for lunch. "Here I am talking about health" she laughed.

In her writings on the eating habits of the British, Caplan (1997: 19) writes that people live in a complex landscape of relative risk and are thus led both to believe and disbelieve the health food messages, forming 'skeptical eaters.' She notes that people will continue to eat high fat food even with risk of heart disease, but food scares like salmonella in eggs, something with immediate danger, causes people to abandon foods quickly. I would argue that people have similarly responded to food in Akwesasne, many abandoning fish because of the frightening and somewhat mysterious implications of PCB contamination, and yet continuing to consume high fat- high sugar foods which are known to have more banal, yet serious, consequences on the health.

Community members described their relationship with junk food as ranging in severity from temptation that draws people from a traditional diet, to an addiction, something as unhealthy as alcohol or cigarettes, and as difficult to give up. As one woman (14C) described, “I think there’s a lot of people who love junk food. You know, they’ve gotten addicted to it. If you look at us, you can tell that we eat a lot of junk food.” In order to address this issue, Chris believes that “you’d have to go slowly step by step and trying to wean them off the fast food.” Others suggested that since individuals were not able to move away from junk food on their own, the authorities should help. As Joyce, who expressed concern about the diets of children in the community, commented “I think the school also has to step in. You know, to stop letting the kids bring in sugar. I think some schools are doing that already, you know, no soft drinks, no candy at school. Yeah, but what can you do? I mean it should come from the parents.” Elvera was more blunt: “They need to ban putine,” she said laughing, recognizing that while French fries drowned in gravy and melted cheese are something that people should avoid, they will not.

Comfort Food, “It makes you feel good”

Even among foods cooked at home, people I spoke with recognized that they were eating more energy-dense foods than they should be. Emmy, who runs the Thompson Memorial Wellness Center, described how she was doing better with her diet and eating healthier, but the summer had seen several deaths in the community, and with all of the wakes she had been assisting with, she was surrounded by “comfort food.” This, combined with the summer cookouts, “and the big dinners that our community has and

the feasts and stuff like that," led her astray from the diet that she perceived as more healthy.

Randi similarly described the struggle to buy and cook healthy food in her own home, but in such a tight knit community, it is difficult to

> Combat the birthday cake and the parties and just Sunday dinner and Saturday dinner and bingo night. You know it is like a constant-- and I don't want to say it is like a constant trap, but it can feel that way if you are trying to avoid food. If you are trying to avoid food that is high in sugar high in fat, it's like it can drive you crazy….You know, just being around my grandparent's house for the past three weeks very intensively-- I've eaten more eggs that I have ever have in such a small period of time and-- it just, and I would never do it home, but at grandmas you just put a big old teaspoon of butter in the pan before you cook your egg and it just seems right because that's way they do it there. Even though at home I would probably be disgusted by that, and that is how it is, it's—'God I would never make this cake and I would never eat this,' when you go to grandmas and it like feels so good you know. It makes you feel good yes. So it is all these feel good things and this is why we are so close with our families you know part of it because of the food, we like to eat together. So I don't know I think any solution that is going to come has to start there.

This element of the communal enjoyment of food means that the individualistic attitude of dieting targeted towards most Americans will not necessarily work in a community like Akwesasne. Healthy eating is going to have to start at grandma's house. At the same time, the new dietician I spoke with at the Mohawk Healthy Heart Program described efforts to help clients eat better, teaching them how to make healthy snacks. Many of the grandmothers in her program were worried that their grandchildren were not going to like these snacks, preferring chips and candy. Evidently, the entire family needs to come together under the opinion that the collective diet needs to change in order for this change to come about.

<u>Money and Food: "We can't afford all that stuff" or "You've got the money to buy it":</u>

Two different economic stories surfaced as people discussed why community members ate so much fast food. On one hand, when people stopped growing gardens and catching fish, a nearly free (monetarily speaking) source of food was lost. Many of these people then had to use their very limited income to buy what food they could afford, which was most often energy-dense foods, high in sugars, or sodium, carbohydrates and preservatives. One woman (23C) described, after spending a good portion of her life producing her own food, going to the store to buy food, and

> When you went to the store, it was pretty intimidating. Everything costs a whole lot of money. Beef and all that, you're going "well if we don't grow our own beef you have to pay (gasp) this price!" When our income is low, we look at that and we can't afford all that stuff. So we buy macaroni and cheese because it was very very inexpensive. So we'd buy a whole bunch of that. And then I would hear this is not nutritious. The box is more nutritious.

Other people described foods like Ramen noodles, which are filling and very inexpensive. One woman who was formerly an administrator for the Freedom School, described a student who would bring in Ramen noodles for breakfast and lunch, every day, for months. The student started to get frequent nosebleeds, probably because of the massive amounts of sodium she was ingesting, so one of the teachers had to speak to her mother about providing her with another type of food. The Freedom School tries to provide hot lunches to its students, until it runs out of funds for the school year, at which point parents send their children to school with food. Many people described resident's preference for fast food because "you know it's cheap, it's easy, it's fast" (Chris).

On the flip side, some community members described a time when they could not afford fast food. At one time, as I will discuss in the next chapter, most families raised all of their own food, and traded for commodities like flour, sugar and coffee. For many of the community members I interviewed, this was still the way of life when they were

growing up. People did not buy junk food because they did not have any money to do so. Now they can afford the treat of junk food and fast food. Joyce describes how fast money flooding into the community brought about this change:

> Money was really short. You couldn't afford, you know, that fast food. All of a sudden, it's at your fingertips and it's like, you know, this is good thing and you don't have to do anything with it. And, you know, you've got the money to buy it. And they're not considering what the effects of what that food is doing to their body. So, the complicated question is, you know, if people didn't have fast cash, would they have that access to that fast food?

Even for people who work hard to acquire their money by legal means, "probably half of them eat out every day in McDonalds and pizza. Plus they have a job they make good money and they can afford to have a good meal" (Judy).

Physical Activity: "They had a lifestyle to burn it off"

In addition to a change in diet, community members also noted that a decrease in physical activity was at the root of a number of health issues. Some people specifically blamed the environmental contamination for limiting the activity of community members, who formerly spent a great deal of time fishing, swimming, and working in gardens. As Jim, a chief with the SRMT stated:

> If you are out there fishing and farming and doing these things physically they're invigorating, they're healthy, spiritually and mentally they're healthy, and you switch that to going to work in a gas station, cigarette shops, it's much more sedentary and you are physically inactive and that connection with the natural world is just not there. So all of that has a bearing on your health.

In addition to the physical health repercussions of a more sedentary lifestyle, he has also tied this diminishment of traditional activities to deeper cultural and psychological effects.

Others saw this diminishment of physical activity as a result that many people can now afford more motorized forms of transportation and recreation. As a nurse at the

clinic noted to me, “very few people are riding bicycles or are walking or are swimming or are canoeing or doing anything physical with the elements that are around here. It’s all motorized and doesn’t require any physical exertion at all.” I noticed while I lived in the community that many youth have ATVs (all terrain vehicles) and 4 wheelers that they race up and down the roads with. I saw kids on bicycles far less frequently.

Community members were especially cognizant of the decreased physical activity among the youth, among whom diabetes and obesity are rapidly becoming more prevalent. Several grandparents specifically mentioned kid’s fondness for TV and video games as a challenge in relating to them, and getting them to work on anything. As Louie described, “Can’t even get my grandkids off the couch once they’re on there. They’ve got Nintendo and everything hooked up to the big screen.” Elizabeth similarly expressed that **“**they watch TV, play video games, ride their four wheelers. They don’t work. It’s so hard to get them out there. It’s sad isn’t it?” Conversely, getting people moving again was seen as a way to improve health. As one elder described to me, looking back to a time before he saw so much illness in the community, “we weren’t sickly because you wouldn’t sit around and get fat because we had to work. So, my feeling is that if people got back to that and there wouldn’t have as many overweight people. Kids wouldn’t be couch potatoes. That’s the whole truth, we’ve gotten lazy. “

Other people from the older generation reflected that it was not so much the change in diet that affected people, as it was that the community is eating as much as their relatives used to, but not engaging in enough activity afterwards to burn the calories off. People used to have rich diets and eat a lot of food, but they also worked very hard, and burned off those calories. Now people want to eat a similarly rich diet, but without

the hard work. People described how their parents used to eat fattening foods like salt pork, bacon, home fries, fry bread, but then they worked hard all day. As Joyce described, "they had a lifestyle to burn that off. You know you can't do that. You can't do that anymore." Gina described how now if you eat a big meal:

> I want to lay down on the coach and watch Oprah or something, you know? Whereas before - I remember as a child that people in the garden, we'd be in the house making them a big meal, I mean tomatoes potatoes, cucumbers, roast beef. They'd all come and eat like (chew, chew, chew, chew, chew) and then got out in the garden again. And then call them back in for supper, feed them supper and then back out in the garden again. Whereas now we eat, lay down watch TV or lay down or eat and play videos or eat and, you know, yeah I think it affected our bodies.

Diabetes Programs at Akwesasne

The "Let's Get Healthy!" Program is a department at the St. Regis Mohawk Health Services (SRMHS), an IHS clinic in Hogansburg. In 1998 "Let's Get Healthy!" began to operate based on grants from the Special Diabetes Program for Indian (SDPI) funding, and has resulted in what the director, Janine Rourke, calls the "diabetes clan:" a group of programs that work to educate people about diabetes. Participants have a supervised fitness program and are encouraged to take part in community based exercise programs. The office houses a nurse educator, a community health educator and two fitness staff.

In 2005, another track of funding came out of the original SDPI funding to create a demonstration project called the Mohawk Healthy Heart Project. This project uses a model of case management for people with diabetes, specifically to reduce or prevent heart disease. Each participant works with a case manager, a registered dietitian, a fitness staff, a lifestyle coach. It was originally intended as a 4-5 year demonstration project,

which as of July 2009 was extended for another three years, and as of August 2009 had a little over 100 people enrolled.

Currently, the program is working the construction of a diabetes center that would bring together the diabetes programs under one roof with an exercise facility. The current cost is projected at $6.8 million, with funds "coming from a lot of different pockets" as Janine described, including federal government grants, construction grants, housing grants, as well as grassroots contribution beginning in 2006. The Seven Generations Walk to raise funds celebrated its second year in October 2008, the medical team sponsored its third Diabetes Center for Excellence Golf tournament in April 2009, and the Housing Authority 20th anniversary celebration was a black-tie event whose proceeds went towards the building. A garden club has offered to donate money and plant gardens for the center once it is constructed.

I mentioned to Janine that people I had spoke with tended to attribute the cause of diabetes in the community to either contamination, a forced change in diet due to contamination, or to lifestyle choices. She was pleased that people had considered lifestyle as cause of diabetes, and thought that maybe their programs had helped to inform this. "The fact they're thinking of lifestyle change in preventing diabetes makes me feel really good." When I asked her what people who came to the program were attributing their diabetes to, Janine commented that while her patients might have different notions as to the root cause of their diabetes, their job at the program is not to spend a lot of time on the "why," but rather to work as quickly as possible to control or reduce eye complications and risk of heart disease and other diabetes related illnesses. "So we actually just don't go that conversation because we're providing direct caring

now. So it's like let's deal with your blood sugar right now, let's get up that area and stuff like that. So clinically, we're just not opening that door whether it is contamination issue." Generally, she feels that most of the patients know they are at risk because family members have diabetes:

> Some of them are to the point of saying that 'it is because of what I ate, because of what I failed to do.' Some people are saying that in terms of exercise and lifestyle. There is a sense of there's still contamination issues, but where we are right now is we're like dealing with real term, we're dealing with 'what can we do for you now.' …That's where our thinking is. So that's not to say we don't think that there are other reasons why they're crossing our door, but that's for other people to think about. We're the medical managers.

Suggestions for a Healthier Community

The recognition that may of the illnesses that currently affect the community are impacted in part by diet and lifestyle shows that these illnesses are potentially preventable or reversible, if people are provided with proper resources and support to help themselves and each other. As part of most interviews, I asked participants what they thought the community could do to become healthier. The predominance of responses centered on ideas around gardening projects, managing the land in Akwesasne differently, and developing a better food system, which I will discuss in the next chapter about gardening and farming in Akwesasne. In addition, to these suggestions, people also promoted the need for community cooperation, greater individual agency, and education, community facilities and programs. Some of these suggestions, if implemented, would be structurally imposed or supported, others focus on a collective cooperation, and others call for greater individual agency and responsibility on the part of individual community members.

<u>Structural: Education, programming, environmental</u>

Several suggestions involved the community's leadership working to help people to improve health. One health worker suggested that they need to ban cigarettes, a difficult prospect in a community where a high proportion of the population smokes or makes their money from selling cigarettes. Elvera half-jokingly commented above that, "They need to ban putine." Others mentioned more broadly that education was needed—about diet, exercise and cultural knowledge. Two women mentioned facilities that could be built to help the community to get more exercise: one woman wants a community pool so kids can swim in the summertime without worrying about e. coli or PCBs or eels. Agnes, a diabetes educator, would like to see more sports facilities for the kids, and a walking path, like the ones she has seen in the neighboring communities of Cornwall and Massena. Her sister, Joyce had been on the radio the same week I interviewed Agnes, talking about how members of the community need to tie up their dogs, or the animal control officer would take them away. As on many reservations, 'rez dogs,' large mutts of ambiguous breed who often roam in packs, are ubiquitous along the roadsides in Akwesasne. While I lived in the community, I eventually gave up attempts to continue my jogging routine because I was tired of being chased by rez dogs. In her radio interview, Joyce emphasized to the listeners that in a community with soaring rates of diabetes and obesity, exercise was important, and people did not need to be discouraged from this pursuit for fear of being bitten by a dog. The creation of a walking path would create a space where people could come together and make walking a social activity, and a place that could be monitored more closely for stray dogs.

Other community members also mentioned exercise programs that were affordable to the whole community. One woman mentioned frustration with the fact that

to join the gym "if you're not low income, you don't have diabetes, you spend like $40 a month." She had already spent $500 on the gym so far that summer for her and her family to join. She sees a problem with only offering the service free *after* you get fat and diabetic, as opposed to as a preventative measure. She also endorsed the idea of a walking program, especially one that involved families.

Bev, one of the nurses at the clinic, also mentioned diabetes prevention programs in the community, and described how she encouraged people to take full advantage of these programs in order to improve their health. She recognized that the "reeducation" as she called it, of the community around issues of physical fitness may be slow going, but thinks that these programs will help because "they are essentially eliminating all barriers to those things." Another woman, Trudy, also mentioned that it was important that people take advantage of the programs that are available. Above all, in speaking about the various programs available to the community, some interviewees expressed optimism. In describing sports programs for the kids, Hawi expressed, "I mean we can probably do a little more in that area but I think we are doing well, and I think we are getting people back into activity and eating right, so I think they are doing a good job and I don't feel like it's hopeless."

On the environmental side, two women suggested the only way to improve the community's health was to improve the condition of the environment, which would necessarily involve getting rid of the industrial plants so the river could clean itself. Richard, who works for the MCA Department of Environment, expressed that while the Mohawks were not necessarily responsible for the contamination of the river, it was their duty to ensure that it was cleaned up, and the next generation inherits something better.

He explained: “We used to say ‘leave Mother Earth the way you found it.’ But that’s not good enough anymore. We have to make it better.”

Community Cooperation: “We all have to work in a concerted effort”

Six community members felt that for any improvement in community health to come about, it would require cooperation, between family members, community members, and the various governments. This would be no small feat in a community divided politically, spiritually, economically and geographically. During his 1967-1970 fieldwork among the Akwesasne Mohawk, Jack Frisch noted that there were many political and religious divisions (or “factions” as he called them) within the community. However, “when the Mohawks are politically threatened by the dominant non-Indian society, their response to this threat is manifest as tribalism and their extratribal political behavior tends to bring the community together and a sense of Mohawk ethnic identity is shared by all” (1971:81). Frisch defines tribalism as “the process whereby a society, such as the Mohawks, with a common territory, common traditions, and common values and interests, goes about establishing its self identity. The need for establishing this self-identity arises out of specific socio-political conditions.” Frisch (1971:79) sees tribalism as “a healing bridge between factions”. These divisions in the community are as strong today as observed by Frisch in the late 1960’s, and threats from the outside have come to include factors of diet and health.

One man cited times when the community had come together during crisis, like a recent ice storm. He felt that maybe the community needed another crisis like that to learn to work together. Janine, a diabetes educator, recognized that while deaths that occur in the community are difficult, they remind everyone to come together and

volunteer. She emphasized that she was not hoping for more death:

> That's a crazy analogy, but it reminds me every time of the things that we've lost, because it takes a death for us to get together. So I think we have to work at that. We have to work at not waiting for trauma to pull us together: just developing good things because it's good to do. So I think definitely schools, definitely non-traditional things, definitely it's community projects. I think the health system has to take another look at what they do and not think it has to be also medicals or clinical

Examples that she gives in this regard are supporting projects like gardens as part of the responsibilities of wellness center staff.

Joyce felt that cooperation between families, children and schools would help to improve children's diets, and form a support network so that parents would not have to use the TV to babysit their kids. A similar program was enacted in a neighboring Mohawk community with the Kahnawake Schools Diabetes Project (KSDP). This program provided outreach to students and their parents, and limited the types of foods that students were allowed to bring to school in an effort to diminish the rates of obesity and diabetes they were witnessing (Macaulay et al. 1996; 2006).

Three other women felt that there needed to be cooperation among all the leadership in Akwesasne. As I described earlier, there are three governments within the community. There are also two health clinics and two environment divisions, each supported in part by a different external government. A number of people noted what the absurdity of having to keep these departments separate, when they could be working more effectively together. Unfortunately, federal funding issues necessitate that for the present time they will have to operate separately. Another woman felt that in order for there to be an improvement in the health of the community, there needed to be cooperation among the leadership, because "when leadership battles, the rest of the people don't know what to do, so they battle. They don't know what to do so the next

generation battles, so that to me is the fix, it can't be anyplace else." She talked about how this stress is passed from one generation to the next and people do not even know why they're stressed. Generations of conflict has been passed down since the formation of all of these separate governments. In addition to the elected St. Regis Mohawk Tribe and Mohawk Council of Akwesasne, and the traditional Mohawk Nation Council of Chiefs, during the summer of 2008 there was also a group who called themselves the Community Spokespeople. This group was looking to replace the SRMT with what they saw as a more effective, more traditional form of government.

Barbara also expressed that the whole community needs the leadership to come together and say "there needs to be a change here. And we all have to work in a concerted effort to make those changes." She recognizes that this will not happen overnight. It took the past forty years for the health of the community to reach the condition that it is in, and so it could potentially take that long to improve. However, she feels that people need another way to make money besides the casino and gas stations, and the people in office need to recognize this. Actually, the current Tribal leadership is pushing for an additional casino in the Catskills, as a means to fund more tribal programming. The first time the referendum went to a vote in late 2009, the community members ruled against it, but this vote was then considered invalid, and was held again in February 2010, at which point it was passed.

Individual Agency: "We can start picking ourselves up and do something"

In order for people in the community to become healthier, three community members expressed that they need to shift their way of thinking, and take agency. Rather than looking to someone else to help them, people need to, according to Richard S, "wise

up and stop blaming people, and say 'well, what can I do? You know, they've got to make that statement to themselves because the more you blame somebody, the more of that power goes to them, you know, you are lessening yourself." Brenda similarly described how going to meetings with the SUNY scientists describing the things they were finding, she started feeling down. "So I said to the group, 'we've got to start looking at survival. How do we get beyond this? We can study ourselves to death and feel down, or we can start picking ourselves up and do something.'"

One young man discussed how people need to take greater accountability for their own health, and not rely on the clinics and programs at Akwesasne to tell them how to improve their behavior "Right now they basically bribe you. They give you a free gym membership. They make you feel bad about being fat, but it's ok to have a positive body image. They don't just say, 'fat fuck get off your ass and eat less and you won't be fat.' It really comes down to that, uh?" While his approach would probably not go over well with most community members, his notion is that people have been coddled too long, and need to take action on their own behalf.

Change in Diet: Education, Agency, and Traditional Foods

Suggestions for how the community could improve its diet, seen to be the root of many of the health problems, fell into both of the aforementioned categories. Some people believe that people needed to start eating better, putting the agency with the individual to take control of their food intake. As one older woman, Sarah stated, if people wanted to be healthier they need to "prepare food the proper way, that will help." Similarly, others suggested that people needed to start eating more traditional foods, or healthier foods. Rob expressed that people need to get sober to have better mental health

and then pull themselves into better physical health from there. Others saw the issue of diet improvement as something that agencies or community members would need to support. Robert explained that people need to be "taught to eat a balanced dinner." Randi, who described above the predicament of going on a diet when the rest of your tight-knit family is still eating calorie-dense comfort food, has described how the entire family needs to work together and cooperate among each other in order for individual diets to improve. Most diet plans in the United States are targeted towards the individual—to entice them to buy a plan, buy certain foods, and follow a certain diet. In a community where many people eat together as a communal activity, individual diet change is not going to be effective—the family as a unit needs to be involved. In their study around diabetes at Akwesasne, Hood et al. (1997) found that community members had knowledge about healthy lifestyles but lacked confidence and social support for bringing about desired changes. One of the eventual outcomes of this study was the founding of the "Let's Get Healthy!" Program to support diabetic patients in improving their lifestyle. However, at the same time, these principles of social support would be beneficial to explore in a family setting, before the onset of diabetes.

Traditional Foods

Aside from just taking more time to cook and eating a balanced meal, some community members felt that traditional Mohawk foods were specifically what Akwesasne community members needed to re-incorporate into their diets. Foods that are considered traditional incorporate wild game and garden staples that Mohawks have been consuming for centuries: venison, fish, corn, beans and squash, and berries. At the conclusion of most Longhouse ceremonies, participants are fed cornbread; soup that

contains corn, beans and squash as well as meat (usually venison, buffalo or pork); and strawberry drink. The ceremonies and rites of passage that one clan mother, Louise, was hosting throughout the summer and fall of 2008 while I was in Akwesasne, focused as much as possible on the consumption of traditional foods. Roasted venison and moose meat with gravy or in stews, squash, carrots, wild rice, boiled corn bread, corn mush, fish, and green beans were all served. Fruit drinks made from smashed raspberries, strawberries or blueberries mixed in water accompanied each meal.

Some community members described traditional foods as having health-providing medicinal qualities that Mohawk people are intended to consume. As one man (8C) described, "we have to get more back to our natural way of eating. Corn, beans, and squash--that also is a medicine. It's not just a food. It's a medicine too." Another man described how, when he eats his traditional corn, beans and squash, his blood sugar stabilizes, and he feels healthy. When he strays from this diet, he gets sick. John Mohawk (2008) discusses this idea of food as medicine in his essay "From the First to the Last Bite: Learning from the Food Knowledge of Our Ancestors," describing how Haudenosaunee people spent a great deal of time developing and cultivating foods that came together to form a balanced nutrition, which kept them healthy past 100 years of age. He contrasts this with modern American society where "I've been in a hospital and they'll kill you from the kitchen. They clearly don't believe that food is a medicine" (p174).

Other interviewees also took up the call for a return to traditional foods as an avenue to health. Elvera pointed to the diabetes problem as a sign that "we just got to get back to our traditional foods." As mentioned previously the women who run the

alternative health center expressed the opinion that Mohawks have a genetic connection to traditional foods, and are not supposed to be eating foods from around the world, and especially not processed foods. Instead, they should be eating local foods: corn, beans, squash, fish, and muskrat; "Our genetic makeup tells us that we have to eat the food that's here." Another woman (26C) described how the community needs "an overall campaign to connect back to the earth and just remind people we're O*nkwehonwe*[100] people still. We're not supposed to eat McDonalds so much." As seen here, food is a marker of identity and a responsibility: as the 'original people' or Onkwehonwe, Mohawk people have a responsibility to their traditional foods that I will explore further in the next chapter in a discussion on efforts to plant more heritage seed varieties.

Muskrat was once a well-loved and frequently eaten food in Akwesasne that people have uniformly given up since the issuance of the fish advisories. Gina described how people used to eat muskrat all the time "That used to be medicine because muskrat lives on our roots," which would transfer their medicinal qualities to the meat of the muskrat. Unfortunately, because of the concern about contamination, people avoid muskrat now. Snye, the region of the reservation above the Quebec border that exists in lowlands on the banks of the St. Lawrence River, was an area where people were especially reliant on muskrat. Emmy, who grew up in Snye, told me about how "we always had muskrat, I haven't eaten muskrat since" hearing about how contaminated the fish were. Henry remembers when he was a kid, when he would go visit people in Snye, "every house you used to go to had a pot of muskrat." His wife Jean reminisced with sad fondness about "muskrat cheeks" which she has not had in decades. "When all this pollution and the don't-eat-the-fish came, and can't eat the muskrat because they're all

[100] Means "original people" in Mohawk

polluted, too. They still don't eat muskrat. But they started to eat fish again, but nobody eats muskrat," Jean lamented. Howard, an elderly man from Cornwall Island, also reminisced about catching and eating muskrat "Now I don't dare to eat them even though they might be clean. A lot of change in life." Even though some people, as I will discuss below, have gone back to eating local fish, there has not been a movement to return to eating muskrat. One woman (14C) noted:

> When you start seeing people eating muskrat again, then you'll have an idea that we're getting back to where we were. Now, I mean, a whole generation has gone without eating muskrat. So to think of eating a muskrat-- "Ew!" you know. But we did, and they were good. And people knew how to cook it. And that's another thing, is to be able to use them again before people forget how to cook them, you know. Or we'll be going to the white man for recipes.

There has been a push among many Native communities to return to traditional foods, as suggested by the Akwesasne community members above, as a means to regain health. In her chapter "Decolonizing Indigenous Diets," Wilson (2005) provides a decolonization plan for the contemporary indigenous diet, promoting a lifestyle centered around indigenous foods, and questioning more contemporary (and less healthy) Indian foods such as fry bread. Wilson links the recovery of traditional foods to broader indigenous struggles such as land rights, environmental protection and ecological restoration.

As touched on by Henry Lickers earlier, the traditional crops grown by the Haudenosaunee complemented each other to form complementary proteins and amino acids. These plants grow symbiotically: beans fix the necessary atmospheric nitrogen for the corn, which in turn provides structure for the winding bean plant, while squash kept weeds and herbivores away. Similarly, these foods complement each other as a meal. Protein is composed of the basic building blocks amino acids, nine of which the human

body cannot make, and so they must be consumed in the diet. Milburn (2004) notes that both corn and beans are low in some amino acids, but each is short on amino acids abundant in the other, dramatically increasing the protein quality of the combination. Corn is low in the water-soluble B-vitamin niacin, but a dietary combination of corn and beans avoids the problem of niacin deficiency (and diseases like pellagra) since beans are good sources of niacin. Haudenosaunee corn is treated with lye or wood ash before it can be eaten, a process that also makes more niacin available for absorption, as well as increasing the calcium content of the corn. Traditional varieties of corn, both from the Northeast and Southwest of North America, are higher in protein than modern corn varieties, which have been bred for their sugar content (Milburn 2004:423). A corn, bean, and squash diet is high in complex carbohydrates and low in fat. Beans also have low glycemic index, which means they are a good food for moderating blood sugar. Research done in Native communities has shown that while the consumption of some foods high in saturated fats and sugars can be linked to diabetes, others that are high in fiber and low in fats and sugar, like vegetables, whole grains can have a protective effect (Gittelsohn 1998).

Many Native communities have responded to the growing Indian health crisis through the revival and support of traditional subsistence methods, as a way of improving diet and exercise, and reviving and maintaining traditional culture and plant varieties. Studies have shown that consumption of a traditional Native American diet, in conjunction with exercise and subsequent weight loss assists in improving the condition of patients with type 2 diabetes (O'Dea 1984; Swinburn et al. 1991). The incidence rate of type 2 diabetes may also be lowered by a dietary preference for traditional foods when

compared with an Anglo diet (Williams et al. 2001). Native communities around the country, faced with disproportionately high rates of diabetes and obesity, are turning to gardening programs to improve the health of community members. For example, members of the Toho O'odham nation began organizing a traditional foods program when rates of diabetes in community reached epic proportions (Fazzino 2008). In addition, other Native communities recognize the importance of maintaining gardening knowledge for food sovereignty and cultural preservation, knowledge that is not being passed on to the next generation at the rate at which it once was. By supporting a resurgence in "civic agriculture" (Lyson 2005; DeLind 2002), which connects the community to food production and transforms individuals from "passive consumers into food citizens" (DeLind 2005: 97), these tribal organizations can accomplish the multiple goals of improving health and preserving culture. Efforts at Akwesasne to develop similar projects will be discussed in the following chapter.

Conclusion: Environmental Contamination, Diet, and Diabetes

At Akwesasne, community perceptions of the etiologies of current health issues like diabetes and obesity reflect a generalized understanding of how the biomedical health world perceives these conditions, as an issue of diet and lifestyle. However, they also incorporate a history of environmental contamination, and the changes that have come as a result. Rather than focusing solely on a patient's maladaptive behavior as the root of a disease, it is important to focus on perceptions of what has led to their choices, in order to design the appropriate interventions. At Akwesasne, some community members focus on the environmental contamination as either the direct source of diabetes, or more commonly as the reason they can no longer eat fish or other traditional

foods. As demonstrated in the sections above, many Akwesasronon believe that a change in diet and lifestyle, including more physical activity and a return to a more traditional diet, can help to reverse or prevent conditions like obesity and diabetes.

One program at Akwesasne is working to help individuals with diabetes produce their own food, while recognizing concerns about contamination, are the raised bed gardens funded by Mohawk Healthy Heart. The coordinator of the project, Mera, described the cost of fresh produce as prohibitive to participants of the program who are on a fixed income. Mera and Janine, the direct of "Let's Get Healthy!" developed the idea of building these gardens for the program participants, so that they would not have to worry even about the *possibility* that their gardens might be contaminated. As Janine reported, they labeled the project:

> "Raise Bed Gardens" primarily because of the issues, that we wanted to knock down the wall of contamination. We knew that going in that that was the fear and anxiety of many people, so we figured Raise Bed Gardens would help alleviate that or will move them forward to doing this, plus it had the element of physical activity and tending to something and seeing success and seeing harvest.

The first year of the project, they established 32 gardens that were approximately 4'x4'x10.' They built the boxes from rough-cut lumber, to avoid concerns about chemicals leaching from treated wood, and filled them with bags of topsoil. Tomato, cucumber, zucchini, and pepper plants were then give to the participants because, as Mera described "people don't want to wait for seeds." The second year the number of gardens in the program grew to 42. When I spoke to Mera during the summer of 2008, they had just finished building five new boxes, and delivering fresh soil to 30 previous gardens. They also had six people who build their own gardens in the ground, who were not concerned about contamination. She described how "We told them to call the

Environment Division for soil testing but their theory is that 'we don't know where the store vegetables are being grown, can't be any worse here on our own land.' The soil looks wonderful there." In addition to the gardening project, the program also started cooking classes to show participants how to turn these fresh vegetables into a meal. Janine described how "I thought that was an important both cultural and traditional way of putting that into a very clinically designed program. It's turned out to be very rewarding in a lot of ways."

This is an excellent way to address the concerns that barriers that some community members had identified to growing gardens—concern about coming in contact with contaminated soil. However, these, and the majority of the other programs offered, are directed towards individuals who already suffer from diabetes and heart disease. As some of the other community members have indicated, both in this chapter and prior, is that any viable solutions to alter the health of the overall community need to be addressed at family groups. In Chapter 4, Brenda suggested that researchers should call a family meeting to distribute information about health study results. As Randi expressed above, when only one family member tries to switch to a healthier diet, they are running into difficulties maintaining that diet in an environment where families share food on a regular basis.

Katsi, the Akwesasne midwife and community leader discussed in Chapter 3, and Bev, a nurse at the SRMHS clinic have begun implementing a Centering Pregnancy model at the clinic. Rather than each woman going through her pregnancy as an individual, meeting with the doctors and nurses by herself to receive information about the gestation process, this model brings together a cohort of women to support each other

through the pregnancy. Katsi was interested in my interview findings that people who were in the health study expressed the need for a more personalized, yet family group setting in which to talk about the studies and results, since this also matched what they were trying to do at the clinic with pregnancy. A model like this could also be attempted in diabetes prevention. Rather than waiting for an individual to go to the clinic and be diagnosed, or take the initiative to attend one of the cooking programs or workshops advertised, perhaps diabetes educators could meet with willing family groups. They could discuss nutritional and exercise needs and environmental concerns. As I will discuss in the next chapter, many of the soil tests that were done--by the SUNY researchers in the 1990's and more recently by the Tribe (SRMT 2008c)-- indicate that for a vast majority of the reservation, with the exception of a few areas in the direct vicinity of the industrial plants, the soil is safe to plant in.

Studies have shown that women who develop diabetes during pregnancy are more likely to have children with diabetes, continuing the cycle (Smith-Morris 2006). In her review of obesity and diabetes programs in Native communities, Halpern (2007) noted that the problem with many of the attempted interventions is that they catch the kids too late—after they are already set in their diet, already obese, and already predisposed. While I feel it is still important to target interventions to community members of every age, beginning with pregnant mothers, in interventions like this centering pregnancy model, may help next generation to avoid diabetes.

Chapter 6:
"You were born to go out in the Garden:"
Tradition, Food, and the Local Economy

Akwesasne has seen a great deal of change over the past fifty years. Haudenosaunee culture is well known for its base in agriculture, a practice that, although significantly altered from pre-contact era, had been important for many Akwesasne residents up until recently. In this chapter, I briefly explore the history of farming and gardening in Akwesasne, and the reasons these practices have been altered in the past fifty years. Some community members point to a decrease in local food production as one of the many factors in the health problems affecting Akwesasne, and have therefore begun to work towards encouraging and supporting farming and gardening in the community. For the purposes of this chapter, I have separated discussions around farming, and those around gardening. Farming can be defines as larger more intense operations which often include animals and intend to fully provide for a family and in many cases garner profit and provide a livelihood. Gardening refers to more casual small-scale efforts to produce fruits and vegetables. The USDA Census of Agriculture definition of a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. The USDA designated places with agricultural activity that do not qualify as farms as "agricultural places" (USDA 2009:VI). For the purpose of this chapter, I will simply call most of these "agricultural places" gardens. Within each section, I will discuss the various reasons why community members feel there has been a reduction in local farming and gardening, and ways in which they feel residents could be successfully supported in increasing these efforts.

20th Century Farming, and Its Decline

Early in the 20th century, agricultural production was one of the main economic activities of the Iroquois in New York State, important enough that the Cornell University Agriculture Extension Services implemented an Iroquois white corn breeding project in order to generate varieties of this type of corn suitable for mechanized harvest (Quintana 1991). However, in the latter half of the 20th century, farming began to decline in Akwesasne, as well as other communities across upstate New York. In examining photos taken in 1943 of northeastern family dairy farming for a project sponsored by Standard Oil of New Jersey, Harper (2001) found images that portrayed agriculture in era moving from largely animal powered and cooperatively organized harvests to the industrialized and non-cooperative forms that are prevalent today. Through interviewing contemporary farmers, Harper (2001:24) found that expensive modernization, as well as an increase in industrialized wage labor "drew agricultural labor from small farms, hastening both industrialization and the demise of small operations."

After World War I Haudenosaunee communities experienced drastic changes. There was a move towards a more wage-based economy, and people left reservations to take jobs or to attend school. "Farming began to decline and suffer. By the 1970's and 80's iron working and other construction, service, factory jobs had taken the place of the main economic activity of the Haudenosaunee" (Quintana 1991:32). Mohawk scholar Rowen White (2002) notes that during this era fields in Akwesasne went fallow, as people were encouraged by industry to seek wage-earning work. "Serious social and cultural disintegration resulted from the migration of these traditional peoples off the reservation in search of such work. With many of the younger generations leaving the

reservations in search of better economic opportunities, agriculture within Six Nations has taken a hard hit" (White 2002:100). In 1989, a team from Cornell University visited New York State's Haudenosaunee communities to measure how much land was still in agricultural production. At Akwesasne, they found:

> A total of nine full or part-time farming families were identified in this reservation. The total area used in their operations is about 370 acres, a very small fraction of the land with agricultural potential available in the reservation. Much land is not currently being worked and former production fields are abandoned. A few small patches (two or three) are being rented to non-Indian farmers outside the reservation. Thirty-four head of beef and thirty head of cattle are being raised with a total of 360 acres of hay production. Almost all of these farmers also have small family gardens where they produce corn, beans, squash and other food crops or medicine plants for family consumption. Only two farmers produce corn in commercial scale: a retired white farmer living on the reservation who produces about two acres of sweet corn, and the local participant in the Agriculture & Market White Corn Project who planted eight acres of white corn last year. Despite the reduced number of families dedicated to economic farming activities, many local Mohawks still preserve agriculture traditions and produce part of their need for traditional crops. Between thirty and thirty-five percent of the houses have family gardens (Quintana 1991:34).

The Integrated Resource Management Plan (IRMP), published by the St. Regis Mohawk Tribe in March 2009, notes that of the 15,569.16 acres of reservation land in New York State, 1,585.65 acres are agricultural land, although the report does not specify if this is land currently in agricultural production or land with agricultural potential. In my observations, which community members supported, there were fewer than nine full time farmers in Akwesasne.

The other reservations the team from Cornell visited (Onondaga, Oneida, Allegany, Cattaraugus, Tuscarora, Tonawanda) also saw a decrease in area being farmed, as well as number of families and family members involved. On many reservations, white farmers who rented the land were doing a good portion of the cultivation. Quintana (1991) found that when the farms were run by Iroquois, they were using modern practices

involving chemicals on commercial crops in their fields, and traditional practices in their home garden plots. Cleveland and Soleri observed similar trends in their work with Native farmers in the Southwest. Among the Hopi they found that "Penetration of the market economy into the Hopi communities has discouraged food production in favor of income generating work…Older Hopis talked frequently of how their ceremonies, agriculture and ultimately Hopi culture are falling victim to the pursuit of the 'almighty dollar'" (Soleri and Cleveland, 1993:212). Similarly, among the Zuni, "in addition to planned change directed by the US government, the decline of farming at Zuni has been in part a result of the overall change in US society in which the importance of farming for households has decreased, while that of wage labor and other economic pursuits has increased" (Cleveland et al. 1995:9).

This decline is not unique to Native run farms. Ostendorf and Terry (1995) discuss the devastating effects of federal policies on family farms across America, many of which dried up in the 1980's. Government policies pushed for maximum production at the expense of small farmers, Third World farmers, and of the land. "In the US there were close to 7 million farms in the 1930's, but less than 1.8 by the mid-1990s" as large agribusinesses producing monocultures have driven smaller farms out of business (Lang and Heasman 2004:149). Small farms have diminished in number all over the country, and indeed the world. Kendall Thu (2009) described how the global decline in farmers parallels the inverse growth of multinational agribusiness. Global food giants like Cargill (responsible for half of the world's global grain production), Kraft, Nestle, and ConAgra have pushed many smaller farms out of business. Thu notes that in 1950, when farming at Akwesasne was a profitable venture, two thirds of the world's population was

principally engaged in agricultural activities. In 2000, a mere fifty years later, this number had dropped to 40%. "The staggering numbers of people involved, the speed of change, and the social and cultural consequences of this metamorphosis reflect a vital change in our world order." (Thu 2009:14). This general trend is reflected at Akwesasne as well, where wage labor, the cost of modernization, and the effects of environmental contamination have driven farm workers to other careers.

Despite the decline of farming in Akwesasne, it was not uncommon to hear "I grew up on a farm," while I was interviewing community members, followed by descriptions of the animals and crops raised. For some it was a casual venture to provide food to supplement other income the family was receiving, and for others it was the sole source of sustenance. Solomon Cook, who received his PhD in agriculture at Cornell in 1950, is proud of his scientific knowledge on the topic, speaking of his preference for "super" hybrid seeds and purebred animals, as opposed to his father's "subsistence" way of farming. Solomon taught agricultural classes, and is proud to report that he passed along to his students his appreciation for well-bred animals, particularly registered Holsteins. Another elder, Howard, also reminisced about growing up on a farm, raising horses and milking cows. His family would take the milk to the neighboring town of Cornwall to sell, and this income sustained them for several years. A number of others spoke about raising pigs, chickens, dairy cows, and beef cattle, and living off the products they produced, bartering with neighbors, and selling the surplus for income. Despite these nostalgic memories, very few of the people I spoke with, or their families, were currently living on farms or raising any of these animals.

Despite the importance of producing food locally for Akwesasne, farming has seen a rapid decline in the past couple of generations, for reasons in common with small farmers nationwide and more specific to Akwesasne.

Contamination and the Demise of Farming

While Akwesasne's farms began to diminish for many of the same reasons as other farms, one of the main difference between this and other farming communities was the presence of environmental contamination. As mentioned earlier, Akwesasne is down wind and downstream from the PCB-leaching General Motors Foundry, and the fluoride-emitting Reynolds (now ALCOA East) and ALCOA (now ALCOA West) plants. The fluoride emissions had an especially dramatic affect on the dairy cows grazing in the vicinity of the Reynolds Plant.

The Aluminum Company of America (ALCOA) established a factory a few miles west of Akwesasne in 1903 on the Grasse River. Less than 30 years later a biological survey noted serious local pollution problems (Hoover 1986). ALCOA was joined by the General Motors aluminum plant in 1958 and Reynolds Metals in 1959, both just west of the reservation, upstream and upwind. Before 1968, Reynolds was emitting 300 pounds of fluoride per hour, which were settling directly on the Cornwall Island, Ontario portion of Akwesasne. Pollution controls brought the levels down to 75 pounds per hour in 1973, (Hoover 1986) but in 1979 a study published by Cornell University showed the fluoride contamination to be responsible for the death of cattle on Cornwall Island through flouridosis (brittling of bones and teeth) (Krook & Maylin 1979).

Leonart Krook from Cornell University came to Akwesasne in 1977 to conduct a study on fluoride contamination in response to resident's concern about sick and dying

livestock. He found that Cornwall Island is directly downwind from Reynolds Metals Co more than half the time. In 1959, the year Reynolds Metals began operation, there were 364 mostly dairy cattle, in 39 barns on Cornwall Island. According to the memories of the farmers on the Island, the first signs of cattle disease related to Reynolds became apparent in 1962-1964, The cattle developed swelling in their leg bones and became lame, to the extent that they would lie down in the pasture to eat, crawling to a new patch of grass to continue grazing. With increasing age, the cows' teeth began to fail and mastication became difficult—cows would grab hay but drop it because it was too painful to chew. They were also unable to drink the cold river water that farmers were pumping into their barns. For the young cows, their first pregnancy would be uneventful, but by the time of the third pregnancy, they were unable to drink or chew, leading to the death of many cows during delivery and a high calf mortality rate. In 1973, the St. Regis Indian Band Council (now the Mohawk Council of Akwesasne) was informed that damage to white pines on the reservation was caused by fluoride emitted by Reynolds. In 1975 urine samples from cows were tested, and found to have abnormally high levels of fluoride. By 1977, when Krook began his study, cattle population on the island was down to 177 (Krook 1979:14). He found that:

> Several expressions of chronic fluorosis were documented in Cornwall Island cattle, *viz* stunted growth, dental fluorosis manifested by brown discoloration of enamel, mottling and excessive wear, further, delayed eruption of permanent teeth, fluoride accumulation in bone, osteosclerosis and osteonecrosis, and also failure of modeling of bone. The degree of stunting was severe. The economical implication of stunted growth in beef cattle operations is self evident…The analyses of the dental fluorosis scores of the entire herd showed, with statistical certainty, that all cattle are doomed to exhibit severe teeth lesions in due time. The fluorotic teeth were subject to excessive wear to a degree where cattle would not drink cold water or properly chew the forage. The fate is starvation and death if the cows are not slaughtered at a relatively young age.

> Fluoride accumulations were severe in the bone ash and the anatomical changes were advanced even in young, mature animals….The total picture of Cornwall Island cattle is one of severe chronic fluorosis. Cattle are exposed in utero and then uninterruptedly for life. Cattle have only fluoride contaminated forage for consumption. Fluoride polluted air is inhaled through the years—the contribution to the total picture of that source is unknown (Krook 1979:61).

Part of the problem was that the emissions coming from Reynolds were in compliance with New York State and United States standards, and the fluoride contamination of the forage was within the tolerance levels set by the National Academy of Sciences. These numbers were based on studies conducted with cows that were not chronically exposed the way Cornwall Island cattle were. "The experimental designs have little relevance to the field situation under study," (Krook 1979: 62) as demonstrated by the fact that the cattle population on Cornwall Island was suffering from severe chronic fluorosis.

Six years after the publication of Krook's study, an article in the local paper (McIntyre 1985) cited the case of Noah Point, who lived and raised cattle one mile downwind from Reynolds plant. In the mid 1960's, Point's Herefords were lame and dying. The pine trees and maple trees around his farm turned brown and died. Scientists discovered fluoride emissions from Reynolds to be responsible. Reynolds installed air pollution controls on their smelter, after which the maples and pines no longer died. Point rebuilt his herd, but the cows were still crippled. The average life span was down to 5 or 6 years, as opposed to 11 years before Reynolds came. In the settlement of a federal lawsuit by Mohawk ranchers against Reynolds, Point was paid a few thousand for the damage to his cows. At that time, Reynolds had not cut emissions because their current pollution was within New York State standards. A fluoride report published by the Tribe cites that "fluoride emissions from these facilities (ALCOA East and West)

were responsible for causing the deaths of cattle in the 1960's and are at least partially responsible for causing the ultimate collapse of the cattle industry in the immediate vicinity of the plants" (SRMT 2008c:3).

The memory of these lame and dying animals from farms on Cornwall Island and Raquette Point still affects Akwesasne residents who think about farming. They spoke to me of cows losing their teeth, and then failing to thrive: "It's made people think twice I think about doing anything with farm animals or farming" (12C). Loran, who grew up directly adjacent to the GM plant, recalled how his father had to get rid of their horses when they all started dying because of the pollution. As Randi expressed, "when you live on Raquette Point and you see your cows barely able to walk and their teeth falling out, that's a pretty good visual of what is happening." Another former farmer from Raquette Point recalled how they could not keep the cows "for more than two years, because they would be contaminated from the fluoride pollution" (14C). Memories of affected animals, both on people's own farms or those of their neighbors, affect people's perceptions regarding the viability of maintaining farms at Akwesasne

Modernization of Farms

Many people believe that while the effect of fluoride on dairy cows negatively impacted farming at Akwesasne, the main reasons for the closure of most farms were due to economic issues that affected small farms across the country. Harper (2001) points out that most dairy farms in upstate New York folded, as farmers were unable to compete with large agribusinesses. Many farmers at Akwesasne were also unable to keep up financially with the changes in technology that accompanied the modernization of farms in America. Before recent health and sanitation requirements, cows were hand milked,

the milk was placed into steel milk cans that were then placed into cookers, and then placed into boxes that used well water to chill the milk. About thirty years ago, many farmers began switching to a bulk tank, where mechanized milkers sent the milk through a pipeline from the cow to a sterilized container, all of which is very expensive equipment. This mechanization began in the 1970's, at the same time as the fluoride contamination was affecting Akwesasne farmers. While many off-reservation farmers were able to secure loans to purchase this costly equipment, banks would not give loans to Indian farmers.

Many older former farmers had experiences and stories of friends who had difficulty or were unable to secure the necessary loans to sustain their farms. One elderly man, Solomon, went to the bank as a young man to try to borrow money to purchase a farm. The treasurer of the farmers' cooperative told him that they did not loan money to Indians. However, when he realized that Solomon had gone to school with his son, he considered this education and his son's friendship as the appropriate backing, and he loaned Solomon $10,000 to buy the farm. Most farmers were not that lucky. Ernie, another elderly gentleman, relayed the story of Mose Cook, who retired to the family farm and set about to restore it. He rebuilt the barn, and put in a herd of over 100 dairy cattle. He then paid cash for milking machinery, new tractors, and new conveyers in the barn. He was selling his dairy products, but having a difficult time paying for all of the improvements. A health inspector then came and recommended additional new equipment to maintain the necessary sanitation standards. Mose went to an equipment dealer to purchase the necessary machinery, but because he had been paying cash for all of his improvements, he had no credit history, and the company refused to provide him

the equipment on credit. Despite the small fortune Mose had invested, it was not enough and he went out of business. The farm has since been divided into smaller plots, on which no one is raising cows. Other farms similarly folded and were divided up.

Native Americans in other communities have similarly suffered difficulties in procuring loans and subsidies for their farms, even where they should have been eligible. Currently several members of western tribes are involved in the civil rights lawsuit Keepseagle v Johanns, which alleges government discrimination against Native American farmers and ranchers in the allocation of USDA loans. Attorneys for the plaintiffs say the case could ultimately cover tens of thousands of Native American farmers and ranchers who may have been discriminated against by the USDA, dating back to 1991. If the lawsuit is successful, the damages could be worth hundreds of millions of dollars (Schaper 2006). An economist hired as an expert witness used government loan and population data to show that Indian farmers lost out on more than $14 billion in loans from 1981 to 2006. Along with damages, the plaintiffs are seeking changes in how USDA administers its loan programs, as well as a moratorium on foreclosures against struggling Indian farmers and ranchers (Evans 2009). While this case does not affect farmers at Akwesasne, it demonstrates that Indian farmers nationwide have had a struggle in maintaining their operations.

Wage Economy

In his study on the demise of family dairy farms in upstate New York, Harper (2001:24) describes how “the building of the St. Lawrence Seaway in the 1950’s drew agricultural labor from small farms, hastening both industrialization and the demise of small operations.” Howard, an elderly farmer who lives on Cornwall Island, also blames

the Seaway for bringing wage labor to the region, and contributing to the demise of farming in Akwesasne. “The Seaway ruined everything. The money was there to work. They all went to work and then they gave up farms. Terrible. There were a lot of big farms, a lot of cattle. Now there’s only two farmers left.” Howard’s establishment currently consists of a series of raspberry and strawberry patches, and large vegetable gardens. He had a stroke a few years ago, and walks with great difficulty with the help of a cane. Howard’s adult children and a few hired helpers assist him in the gardens, but he has trouble even attracting enough hired help because community members are not interested in this type of work. Because he has trouble with balance, he has rigged a platform with a lawn chair to the back of his tractor so that he can sit and hoe his vegetables, and then pull it a little farther down the row to sit and weed some more. He is proud of the fact that he persists in his farm work, but laments the lack of assistance he receives.

Loran, who has lived in close proximity to the General Motors plant for most of his life, sees the introduction of wage labor as a more deliberate method of drawing Indian people off the land:

> There was a decision made in government and corporate structure to put those plants on the outskirts of Indian reservations, to pull the men off the farms on the reservations because as long as the farms were there, they could argue, the Indians could argue their points and stand together. Bur if you pull the men out of the farms, on the reservation and pull them into the plants and the workforce, they would be the taxpayers that would assimilate the rest of the people.

Deliberate or not, the prospect of steady wages and an eight-hour workday have proven more popular with residents than the farming lifestyle. Farming is, as one woman (30C) pointed out “a 24 hour job.” Her sister chimed in “24, 7 days. No vacations.” “The cows don’t say you can go,” she agreed laughing. Another woman, Judy, pointed out “farming

is out. I don't think even if they raise horses or pigs or cows, I don't think there is enough money in it. Not when you can go out and make twenty-five dollars an hour doing something else you know, that's guaranteed. Something happens to your animals, you haven't got a dime." Even on farms that were once fairly successful, the next generation in line to inherit the farm has tended to not take interest in the business, either "splitting for the city" as one man, Richard S, described or divvying up the land among surviving family members to build houses on. One elderly farmer, Henry T, has resigned himself to the fact that his children, most of whom have moved to Syracuse, are not interested in carrying on his farm: "They are all working their ways, and they don't even know squat about cows. They're scared of them." To which his wife laughed hysterically, and then sighed.

Solutions to Increase Farms

Some organizations within Akwesasne are working to try to support current farmers and encourage others to become involved in farming practices, in order to reverse the declining trends in farming in the community. The two main sources of proposed funds would be through a Tribal Conservation District (TCD) and a Cultural Impact Assessment settlement.

Tribal Conservation Districts

One of the employees of the St. Regis Mohawk Tribe (SRMT) Environment Division, Les Benedict, is currently working to create a Tribal Conservation District (TCD) at Akwesasne that would help bring in resources to support reservation farmers. In general, conservation districts are local units of government established under state law to carry out natural resource management programs at the local level. Districts work

with cooperating landowners and operators to help them manage and protect land and water resources on private and public lands, using funds provided through the National Resource Conservation Services (NRCS), one of the agencies under the United States Department of Agriculture (USDA). Districts are often created at the state level, but frequently fall along county lines. A board comprised of representatives of the various constituencies within the district determines which conservation and farming projects to pursue funding for, and how that funding will then be spent. Akwesasne currently falls under the Franklin County Conservation District, but according to Les the predominance of dairy farmers on the board means that this is where most of the district's money is spent, and the concerns of Akwesasne farmers and conservationists are not met. For this reason, Les is interested in creating a Tribal Conservation District (TCD) at Akwesasne.

The USDA defines a TCD as "A conservation district, soil and water conservation district, or resource conservation district which has been constituted under tribal law and recognized by the USDA's Secretary of Agriculture through a Mutual Agreement (MA) signed by the Secretary of Agriculture, the Tribal Leader (Chair, Governor, President, War Chief, Chief, etc.), and the Tribal Conservation District Chair (or interim chair)."[101] The creation of a TCD provides an entity for the UDSA and the tribe to work together to bring necessary programs to the reservation in order to meet conservation, farming and ranching goals set by the tribe. The USDA consists of 17 different agencies, of which the average state organized conservation district only works with the NRCS. If a tribe chooses to create a TCD, they can now work with any or all of the appropriate 17 agencies of the USDA they and the agency choose to enter into a cooperative working agreement with. By working together through a TCD to provide

[101] http://directives.sc.egov.usda.gov/RollupViewer.aspx?hid=17072

local leadership to the USDA, there is an expanded opportunity for the district to bring needed USDA programs to the reservation.

Indian Nations Conservation Alliance (INCA) is a nonprofit organization that works to:

> Assist all US Tribal Nations/Alaska Villages to establish, maintain and /or strengthen Tribal Conservation Districts to protect the air, land, water, cultural and natural resources, and Mother Earth for future generations. And assist Tribal conservation districts in helping Tribal Businesses and Tribal members to improve economic opportunities and to own and operate farms and ranches.[102]

They have created a handbook for tribes interested in creating a TCD which walks them through the necessary paper work and administration.

In the case of Akwesasne, the community would vote in a referendum as to whether or not they wanted to establish a TCD in Akwesasne. An ad hoc board would then be chosen, most likely by members of the Environment Division, until a more permanent committee could be voted in. A district supervisor would need to be chosen, as well as a chair of the board, a secretary, and a treasurer. INCA emphasizes the importance of keeping board membership representative of all types of landowners or operators, community groups, and conservation interests in the district. The more representative the board is, the broader the base of support for the district's activities. In a community with as many diverse constituencies as Akwesasne, this would be an important factor.

If a TCD is established, it is the Tribe's responsibility to fund the administration of this district, including office space, mailings, and any salaried positions necessary. As we will discuss below, some TCDs in other communities have had difficulties with

[102] http://www.inca-tcd.org/index.php

completing their necessary paperwork through volunteers because the Tribe has not provided them with the funding needed to hire someone to accomplish this.

In an effort to help Les gather more information about establishing a TCD at Akwesasne, during the fall of 2008 I attempted to contact representative from the 23 tribal conservation districts in the lower 48 states listed in the directory provided by INCA.[103] I was able to interview administrators for seven different tribal conservation districts across the country: 1) Dawn Kier, chairperson for the White Earth Tribal Conservation District in Minnesota, *2*) Frank, District Chairman for the Colorado River Indian Tribes Natural Resources Conservation District in Parker, Arizona, 3)Kurt Kates at the Shoshone Bannock Conservation District in Ft Hall, Idaho 4) Terry Buck at the Fort Belknap Indian Conservation District in Harlan, Montana, 5)a representative of the Tiicham Conservation District in Pendleton, Oregon, 6) John George at the Blackfeet Natural Resources Conservation District in Browning, Montana, and 7) Douglas Saunders at the Tohono O'odham Soil and Water Conservation District in Sells, Arizona. In order to provide more information to Les about how well these districts have worked for other Native nations, I asked each of these representatives about the history of their district, how it has benefitted them, some of the projects which have been made possible, some of the difficulties they have faced, and some of the recommendations they have for a community seeking to start a tribal conservation district of their own.

Benefits of Being a Tribal Conservation District

Some of the representatives mentioned that they were pleased with the additional projects they were able to work on with the money they received through the TCD

[103] http://www.inca-tcd.org/tri_dist.htm

program. Dawn from White Earth mentioned that prior to creating a TCD, there were several small groups on the reservation with small projects. Now under the district they are all working together, and are able to sign up for bigger EQIP (Environmental Quality Incentive Program, administered through the NRCS) projects. Instead of 10-acre projects, they are now doing 30-acre projects.

The Tiicham representative felt that having a tribal conservation district provided more leeway for the tribe to create its own conservation projects. Through the funding they have received from USDA programs, they have been able to operate fairly independently from the Tribe, which they feel makes them more autonomous. Douglas Sanders at Tohono O'odham was pleased with the more extensive programs they were now able to offer with the support of the district. They are able to provide incentive payments to farmers to be more efficient in farming practices, bring in technical assistance to test fields for water retention and nutrient content, and teach farmers about irrigation and pest management.

Challenges and Recommendations

The challenges that most of the representatives mentioned in running their TCDs centered on funding and lack of paid staff. Dawn at White Earth recommends that TCDs devote one staff person to do all the necessary writing. The White Earth district does not have a staff member dedicated just to writing, so Dawn is currently trying to accomplish this while running other projects as well, which she finds difficult. She has been working for an entire year on the Seven Generations Vision portion.[104]

[104] According to the Tribal Conservation District hand book set up by INCA, "You must have a Seven Generations Plan to develop and maintain effective programs. It must include the Shared Visions and methods to achieve them, identify local conservation needs and set corresponding goals and plans. You

Terry at the Ft. Belnap TCD said that lack of funds to finish the paperwork slowed the progress of this district, which has been going for 11 years, but with no funding from the tribe. There is no administrator because there is no funding, so the constitution and bylaws have not been completed. Board members tried to complete the writing at home, but have not been successful. There was one council chair in office who was excited about farming and ranching issues, but he left office so now there is no money dedicated to the issue. Terry has tried talking to tribal planners to get them to find grants so they can pay someone to do the paper work, but so far has been unsuccessful. She is currently very overworked, managing 70 contracts with one assistant. At the Tiicham TCD, they preferred not to accept funding from the Tribe, in order to keep the district separate and autonomous, with no strings attached. They amended this view, and now apply for stipends of $50-75 per director per meeting, plus travel funds, which comes out to about $8000 a year. John George at the Blackfeet TCD said that there are seven reservations in Montana, and he sees the same issues on every one: no administrator and no funding. He emphasized that tribal members need to buy into these districts: either you need funding from the Tribe to get your district going, or you need a really dedicated volunteer administrator until a grant comes in.

Projects Completed under TCD

The projects that these various districts have been working on are as varied as their individual geographies. At White Earth, they are working on restoring wetlands, rebuilding existing dike structures, Native prairie planting, tree planting projects, and an

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have a choice – react to the future created by others or work together with your Tribal members and others to develop a Seven Generations Plan to achieve your Visions."

invasive species project. The Farm Service Agency (FSA, one of the agencies of the USDA) is also giving them insurance on their wild rice crops to help in years when there is no rice. At the Colorado River TCD, they established an education center that has an animal clinic for the 4H and Future Farmers of America (FFA). They also use their funding to help the FFA to purchase jackets and go on trips. The district has 37 acres of alfalfa hay growing, which they sell for some income. At the Shoshone TCD, they are working on stock water developments, rehabilitating stream banks, educating farmers on how to go from floodwater to sprinkler systems, and providing education about pasture maintenance. At Ft. Belnap the biggest project was a range inventory of 350,000 acres via satellite. Future projects there include a tree nursery. At Tiicham, they redesigned and rebuilt an animal feeding operation. The Tribe kept finding E coli in a stream, and traced it to rancher's feeding operation. By working together, they were able to move cattle away from the stream, blast the rock, make a sediment basin for waste, and keep the waste out of the stream. Conservation district members also own a livestock company with 130 mother cows. The ranch is a cooperative effort, with families working together to do the work, although they are currently working to hire a cowhand. In addition, the TCD is working with the Oregon Watershed Coalition to restore stream banks, native vegetation, shrubs and trees with additional funding from the Oregon Water Enhancement Board. The Blackfeet TCD is currently working on a weed control project, and just completed a large range inventory administered through an extension agent. The Tohono O'odham TCD was able to provide incentive payments to farmers to be more efficient in farming practices, as well as bring in technical assistance to test fields for

water retention and nutrient content, and to teach them about irrigation and pest management.

TCD at Akwesasne

The formation of a TCD at Akwesasne has the potential to support community members who are interested in establishing farms, by bringing in funds and consultants from USDA agencies. As mentioned above by other TCD representatives, the most important thing would be to establish the necessary community and Tribal support to establish the district. The TCD fact sheet being distributed by the Environment Division, which was also published in the Tribe's April 2008 newsletter *Kawenni:ios,* mentions that a referendum would be put forward for the community to vote on in order to proceed with the establishment of a TCD. Voter turnout in Akwesasne is notoriously low, and so additional work would have to be done to gauge whether there was sufficient community support.

One of the challenges in garnering support for a TCD is the fact that it operates through federal funding. While the representative from the Tiicham TCD mentioned that they were happy to rely on federal rather than Tribal funds because they felt there were fewer strings attached, some individuals I spoke with at Akwesasne are equally suspicious of accepting federal funding. However, if there are enough farmers in Akwesasne who are interested in receiving assistance in either maintaining or establishing farms, this program could be potentially very useful to them.

Cultural Impact Assessment Restoration Options: Subsidized Agricultural Activity

As described earlier, the General Motors (GM) plant bordering Akwesasne was declared a federal Superfund site, and the Reynolds and ALCOA plants were declared

state Superfund sites. As part of this process, laid out by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), a Natural Resources Damage Assessment (NRDA) was conducted to assess the injury to, destruction of, or loss of natural resources.[105] Professor Taiaiake Alfred (a Mohawk from Kahnawake, and director of the School of Indigenous Governance at the University of Victoria) was hired to assess the cultural impacts of this loss of environmental resources on Akwesasne Mohawk territory. In his report Alfred (2006: i) describes: "Damage to natural resources caused by the release of hazardous substances has severely impaired the cultural uses of resources by the Mohawks of Akwesasne," including farming and cultivation. Alfred concludes the report with 20 Restoration Options, which he feels should be funded by the responsible industries. One of these options states, "Agriculture must be restored as a viable economic activity in Akwesasne. The community must be provided with the necessary training, capital and clean land areas so that an agricultural sector can be reestablished and the community can re-achieve self-sufficiency (in conjunction with the revitalization of its fisheries) in its food supply" (Alfred 2006:24).

Community Support for Subsidized Farming

While interviewing community members, I posed a question based on this restoration option in order to gauge whether residents thought a form of subsidized farming, as described by Alfred's suggestions, would be well received in Akwesasne, or if most residents were too used to working nine-to-five jobs and shopping for their groceries to be enticed back in to food production. A majority of the people I asked directly about the issue (n=26) thought that this idea of providing people with start up

[105] http://www.epa.gov/superfund/programs/nrd/primer.htm

money for farming would work on some level. Three were quick to qualify their answers that "some" people, rather than a majority of the community, would go for it. "I don't know that the majority would go for it but some people would," noted one woman, Bev. She then described a coworker she thought would benefit from a program like this, since her family was having a difficult time balancing nine-to-five jobs and growing their own food. "You might get pockets that would do that," said another woman, Elvera, "it's a certain mindset I think that's involved in it." Seven other interviewees were quick to mention that they would take advantage of such a program should it exist. Judy commented: "If they would get the equipment and kind of help me I would do it. I would do as much land as I could get my hands on or get permission to plant on their land and stuff I would do that. I would do that for the community."

Eleven of these twenty-six people who thought the program would work cited that it was the money specifically that would draw people to the program, and make it possible to start up farming again. Three people specifically mentioned the need for gardening and farming machinery and tools that are cost prohibitive for the average community member who might have an interest in farming. One woman (27C) stated "if I had a tractor, I would be out there," and so she felt that if more community members were provided with the necessary start up equipment, they would want to farm too. Another woman, Gina expressed that "I think if the band office, gave everybody a tractor, a plow, you know, all the items they need to garden, I think they would. A lot of it is the price of the tractor, the price of the tools."

Five people mentioned specifically that providing farmers with a guaranteed income that could take the place of a current job would make it possible for people to

take up farming again. Two men mentioned that if they were paid to farm, they would readily quit their current nine-to-five jobs to do so. As one of these men, Rob, stated:

> If I could get on my tractor and go out in the garden and work all day and use my hoe and work all day and know that I was going to get something out of it, you know, pay out of it, something to buy gas for the tractor, to buy all necessities, you know? Now I have to go and do it and then rush back to my job to make the money, going to do it again which I'm doing now, you know? I'd be more than happy to sit and garden and take care of the land and do what I used to do when I was a kid.…And that's the way it probably is going to work best, there has to be a value of money incentive, a kind of monetary, something has to be there for the people to be rewarded, you know. People aren't rewarded by just the fact that they're going to eat anymore, they need, the cash. And I've noticed that I even, when I get paid for a job in here I feel ten times better than when I'm sitting here worried if I'm going to be paid for it, you know? It's like everybody likes to feel the security of money.

One woman mentioned that even though *she* probably would not be interested, other people in the community would want to become involved in farming;

> If there was a funding available for that to start up, yes, a lot of people would. That's the thing is a lot of people are financially strapped, they don't want to give up their--you're talking benefits, job security. Monday through Friday you have to be working, what are you going to do if it rains and rains and rains, and the crops are you know, or your animals. But I think a lot of times people would like to do it just to stay with their family. If you could survive on it, definitely (50C).

Alfred gave a talk on a similar topic at McGill University in Montreal on October 2, 2008, positing that part of decolonization is getting back on the land, and learning one's tribal language. He mentioned a program he would like to see which pays people with farming knowledge to take on apprentices. After his talk I approached him and asked him how he was going to get people to be apprentices, when, as I will discuss below, most young people are not very interested in farming. His answer was simple: bribe them—they'll be more interested then. His idea is to engage the realities of the capitalist society that Akwesasne has become part of, in which residents can no longer

rely on a bartering system but need to pay their bills with cash. Hence, if farming is going to become a reality again for Akwesasne residents, it will need to be accompanied by funding.

In addition to financial support, as Alfred's apprentice idea indicates, community members would also need to be educated about agriculture. A number of interviewees mentioned that while the money offered might draw people's interest in farming, any potential farming program should have an educational component, so that people with a lack of proper farming knowledge did not waste the money. Howard advised: "Yeah. There's still people out there that want to do it, you know to live healthier and you better show them. The kids don't know today how to work the garden." A few people suggested that they create an apprenticeship program, similar to what Alfred was suggesting, hiring people with extensive farming knowledge to coach those with less knowledge. They would take apprentices "under their wing" as two different women suggested (Alicia, 58C).

Income, Motivation, Lack of Land: Subsidized Farming Would Not Work

On the other hand, about twenty two other community members I spoke with either did not think that subsidized farming would be feasible at Akwesasne, or were skeptical at best. Among the reasons for their skepticism is the lack of available farmland in Akwesasne, concerns about how the money would be handled, a changed work ethic in the community, and disinterested youth.

Three women stated that they did not think that a subsidized farming project in Akwesasne would work because "I don't know if we have the land capacity to do it" as Joyce noted. Or as Agnes described, "There's no land left. The few people that do have

land they might do that, but they're few and far between." As we will discuss below, lack of land was a concern for community members even to have gardens, much less larger farms.

Three community members mentioned specifically that they did not think that subsidized farming would work to increase the number of people growing food in the community, because if this was something that people wanted to do, it had to be because they had a genuine desire to do it, not because there was money available. One man, Richard S, felt that the money would just be wasted because throwing money at a problem does not necessarily solve it. He likened the proposed program to a guilty parent throwing money at their child, or the residential schools paying off survivors; the money might make the giving party look or feel better, but does not actually fix anything. Another man, Josh, felt that:

> I don't think it would have any long-term consequences. If you subsidize something it will increase until the subsidy money runs out then it goes back to the way it was. Bribing people to do things, I don't think it works… People have to want to do something or they don't. I think it would be foolish because you'd also create another massive bureaucracy just overseeing that because what constitutes a garden and how big, what size, what standards, what are you planting…That's why I don't think we need subsidies because if people want something they will pay for it. If they're not willing to pay for it, they don't really want it.

Another five residents expressed concerns about whether the money would actually come through, and how the money would be handled if such a project were to get off the ground. One neighbor to the industrial plants expressed extreme skepticism that a project like this would ever be funded. Loran remarked: "You're never going to get anything out of the plants, never, never. They've already made their settlement. The Tribe didn't come up to bat when it was supposed to. The Environment (Division) didn't

come up to bat the way it should have. They had no backbone. They were more friends to the plant than they were to its own people." Another man (Henry) felt as though the Tribe "will take the money and just won't do it. The Tribe is so corrupt here, it's unbelievable." Other residents, assuming the money for the project did come through, were concerned about residents wasting it. As Judy stated, "It all depends how they put the money out (laughs). It is down to the bottom line again. I think if they put the money out first, that it will fail... I think somehow they will have to give me the money little bit at a time or whatever have you." Another woman (58C) was concerned that in regards to the money, "more than half of it would get pissed away, because when they're bribing somebody really, I mean, really--I don't know. If somebody really wanted to do it bad enough, they're going to be working that whatever space they have after they get out of work."

Six other residents felt that farm work is much more difficult than most people's nine-to-five jobs, and that residents were not going to give up these easier jobs to take up farming. Edith used to live on a farm, and says she much prefers her nine-to-five job, because it is less physical work and more steady income. Chris expressed: "I think the majority of the people would probably just want to go to work and buy their food. Because if you are raising your own food, it is a lot of work, it is back breaking work to get in there and weed your garden." One woman (14C) also described: "I would have thought most people would want to go back to the old ways. And then I started asking people, and a lot of people don't, you know, especially the older people. They'll say 'I remember how hard it was. I'm not going back there.'"

Because farming is hard work, and because the community is a generation or two removed from working larger farms, one woman, Randi, expressed concern about whether people would be able to follow through with large farming projects:

> We have to take as many steps to reverse this as it took to get to this point. You can't just say 'alright everybody lets go fishing! Let's build a giant farm and have people around to do it.' It is going to take years and I always fear that there is not an investment in those years. What is it going to take? We're not dealing with the same people. Now there is like, two generations who have grown up but now are decision makers….As long as there is a demand you know and somebody is supplying them we can make an industry out of it, so I think it's a good thing, I just worry about what the steps are going to be to get there.

Five other interviewees also mentioned concerns about a generation gap between the last group of farmers in the community and most of today's residents. They mentioned difficulties in even getting young people to help in the garden, which led them to be doubtful that many in this younger generation would make good farmers. Leona remarked, "You have the next generation coming up who haven't been brought up on planting and like raising pigs or cows and chickens. So you would have to reeducate that group, and are they willing to do it? I don't know. Do they have the ambition to do it? I don't think so (laughs)."

Gardening Tradition

While most families have not been able to maintain the larger farms that once sustained the community, many residents have been able to maintain smaller gardens, although not to the same extent as once existed. Many respondents expressed the importance of preserving Akwesasne's gardening tradition because of the importance of cultivation in Mohawk traditional culture. As mentioned, the Longhouse ceremonies are structured around the growing cycle. Others addressed gardening as a component of the

community's identity even aside from religion; gardening at one time was just something that everyone did.

Family Gardens

Almost everyone I spoke to grew up tending large gardens. Several people stated that "everyone" had gardens when they were growing up. Substantial gardens: "I mean we had rows and rows and rows and rows of fields and fields of corn, potatoes, string beans, cucumbers, tomatoes" (Gina). "We used to have about an acre of garden." (Richard D). "The gardens used to be a mile long" (Emmy). A few people described how when they were younger their families grew all of their own food, except for sugar and flour. People would nostalgically recall the corn, beans, squash, potatoes, tomatoes and cucumbers. A few others also mentioned turnips, carrots, onions, beets, raspberries, blueberries and apples. Many told stories of working in the garden all morning before they were allowed to swim in the afternoons. Others recalled hours toiling in the garden pulling weeds or plucking bugs from the plants, and do not miss these activities. Mothers would can the produce, especially tomatoes and string beans, to "put up food" for the winter. As we will discuss below, this generation's lack of knowledge regarding how to "put up a garden" is a lamentable situation for some Akwesasronon.

Community Members who Currently Have a Garden

Despite the challenges we will describe below, some community members told me that they had always kept a garden. For some it was the principle of the matter, or because they felt the fresh food was important, even if they did have some concerns about their soil. As one resident of Raquette Point, Mark, stated, "I decided to keep eating…No, I never did stop planting." For some it was maintaining this family tradition

mentioned above that was important. As one man (39C) described, "I plant every year because I am used to planting every year since I was small." Another man (57C) similarly expressed: "As far as the gardening, I still do it because it always fed me and the farm has always fed me…I was brought up that way and that's the way I live today."

Some people, who remembered planting as part of their childhood, have recently gone back to planting gardens. One woman, who lives across the river from the General Motors and Reynolds plants, initially stopped gardening because she was concerned about contaminated vegetables. She has recently gone back to keeping a small garden, using imported topsoil.

Some residents, who admitted that they did have some concerns about the possibility of their soil being contaminated, decided to keep growing their own food because at least then they would have some level of control over what went into their food. As one gardener from Raquette Point (Mark) stated,

> I never did stop planting, you know. Hoping that…the stuff I produced was healthier than what I bought from an unknown source, you know, at least I knew the pollutants I was getting from the yard, so I could say yeah, mine is polluted but it's my own pollution. I don't know, that doesn't make sense but somewhere in my head it did.

Another woman (58C), who lives on the eastern end of the community stated that she gardens because she wants to know what is in her food, and she wants to provide for her family. "I really want to know what I'm feeding my kids. And also, we don't have a lot of money so it would help us. I like the idea of providing for my family and to know that I did that, I grew that, and it feels really good."

Reasons to Maintain Gardening

Many community members, including some who do not currently have gardens, mentioned the importance of maintaining gardens for the community. They see gardens as symbolic of the cultural identity of the community, and part of the maintenance of the reciprocal responsibility between Mohawks and their food crops.

Ceremonies are Based on Gardens

Several people mentioned to me that to understand Mohawk ceremonial structure, people needed to have experience in planting. As one woman, Joyce, expressed, "if you look at all the ceremonies, all the ceremonies are based on the natural world and they're based on thanking that natural world for whatever it provides for us." Traditional varieties like the white corn are a staple in Longhouse ceremonies. One family who as members of the organization Kanenhi:io (described below) are cultivating white corn, expressed its importance in teaching young women about Mohawk culture. Sodi used some of the corn they cultivated to teach the adolescent girls going through the rites of passage ceremony about how to properly lye the corn, grind it into flour, and then make mush or corn bread, which is distributed to participants during ceremonies.

Some community members expressed that to be an active participant in, and fully understand traditional culture you need to maintain a garden. As Katsi stated "we all had a garden. You can't be traditional unless you have a garden." One elderly gentleman (57C) who has always kept a garden spoke disapprovingly of people who, rather than garden, live "payday to payday, that's not the real, that's not the traditional way to live, but my way is to store your nuts for the winter and we'll always have food ahead." Another man, Rob, after choosing to become sober in his mid-thirties, became involved

in Longhouse culture and found a mentor there who coached him that "growing your own food is a big thing in our culture. Taking care of yourself with the earth is the biggest thing and I found it very, very satisfying." He also feels that the future of Akwesasne "really hinges on a few people that are going to keep going and live off the land again and save the culture" because he predicts there will come a time when the government is going to come to Akwesasne and demand to see evidence of Mohawk culture. "And if we can't produce anything then they're just going to say 'well, we declare this the township of St. Regis.'" To him, the fate of the Akwesasne as an Indian community relies on the efforts of individuals like himself and his mentor who are trying to preserve this aspect of Mohawk culture.

Gardening: Who We Are

While the Longhouse culture is an important component to the gardening movement and culture at Akwesasne, most residents at Akwesasne belong to other faiths (namely Catholic, although there are Methodist and Baptist churches as well), and still consider gardening to be an important aspect of community identity. The ability to garden, hunt and fish was how Akwesasne supported itself for most of its history, regardless of the predominant religious faith practiced by the community, and most still see these as important rights. As one man, Lloyd, expressed, "You were born to go out in the garden, or go out on the river or go hunting. You were born to do those." Another woman, Hawi, reflected back to her childhood "That's all our life was in certain times of the year, you know, our planting and harvest." The garden is not only a component of community identity, but where one can find one's self. As one woman (14C) described, "Yeah, everybody dabbles in testing the outside world. But when you need that time to

find yourself, go back to the garden." One Catholic woman (31C) even described to me seeing a vision of the Virgin Mary in her garden while she was out weeding one evening. The garden is an important and often spiritual place for people of a variety of faiths in Akwesasne.

Food Sovereignty

In his essay "Food Security - It Takes a Community," Mark Winne gives the definition of community food security, first developed by Michael Hamm, as "a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice." He feels that community food security recognizes the importance of a host of community-based institutions and sectors, like agriculture, community development, public health, and government assistance, to achieve true food security in a given area or region. Concerns about the true sovereignty of the community if it is not able to provide for itself on the most basic level is one of the things that motivates some people in Akwesasne to produce their own food. Clayton Brascoupe, a Mohawk who is currently living and working in Tesuque NM, writes:

> The activity of generating food for ourselves and our community also becomes a political act. We are maintaining sovereignty and an area of self-sufficiency by growing food for ourselves and our community. This concern was always in the conversations with other community members. If it was not said out-right, it was implied. By growing food for ourselves, we are maintaining our political sovereignty... through the activity of growing food for ourselves, we can regain culture (Brascoupe 1998:26).

Jim, one of St. Regis Mohawk Tribe's elected chiefs, spoke about the prophecies that describe the world as we know it coming to an end, and the ones that have the best chance of survival are those that live closest to the land, and know how to grow food.

"We need to return to that, remake that connection for nutritional reasons, for spiritual reasons, and for physical health reasons," he stated. Some community members expressed to me that food sovereignty existed in Akwesasne's past, but not today. One woman, Elvera, mentioned that during the Great Depression people in the community were able to get by because they were self-sufficient and able to provide for each other. Now that the community is more money based, they would not be able to survive such an experience as easily. Her son, Josh, remembered his youth and "gung-ho warrior" kids that spoke the rhetoric of sovereignty, but "would make fun of farmer kids, while those farmer kids are more sovereign than you are. If you're really into sovereignty and strength than you should be growing your own food." He recognizes that not everyone is a good farmer, but that people should do what they are good at, and then support their neighbors by trading for what they need. According to Joyce, if the land claims were successful, the Mohawk Nation Council of Chiefs planned to look at land use plans and decide how many acres of vegetables to plant to feed the community, so they would have to be less reliant on food from outside the community.

Responsibility

Several people spoke to me about the reciprocal responsibility between Haudenosaunee people and the seeds that they have been given. One October afternoon I sat beside a pile of white corn ears with Dean, a man who has been involved with gardening projects for a number of years. We would peel back the husks, tear off all but three, and then weave those three husks into a braid; working in new ears the way one would French braid hair, until we had a braid several feet long. These braids were then hung from barn rafters to dry. While we were braiding, Dean described how back in the

beginning of time, people had corn, beans and squash readily available to them. However, the people began to neglect these plants, failing to harvest them properly, and the food rotted into the ground and was eaten by animals. When the Creator saw this, he became angry, and decided from then on that the people would have to work for their food. The people asked forgiveness, and burned a pure white dog as a sacrifice. After the coming of Europeans, their dogs mixed with Native dogs and "now you can hardly find a pure white dog." The Europeans also discouraged the sacrificing of animals. In contemporary ceremonies, a pure white basket decorated with ribbons is burned instead. In working with youth, Dean tells them that they need to be grateful for what they have and work hard to maintain gardens, or they will lose the plants completely. As he finished his story, he looked down at the pile of corn we were braiding and expressed sadness that this was something that most people were not doing anymore.

Another woman, Brenda, who was part of an effort started by the Mohawk Nation Council to increase the preservation of heritage seed varieties, also expressed the need to recognize the responsibility that Mohawk people have to the maintenance of traditional crops:

> As O*nkwehonwe*[106] this is your responsibility because every time you plant those seeds you're giving thanks to the plants of the world and you're showing them respect. That you remember them every year and you're asking them to come back every year. You're giving thanks for everything that they've given you. That's part of our responsibility because when we stop doing that-- and that's the big thing with that heirloom seed project-- because when we stop, the plants will go back to the Sky World because they volunteered to come to the earth and help man to survive. And so when they don't hear us say those words anymore or care for them they may think that their job here is done and they go back to the Creator.

[106] Mohawk word meaning "original people"

Interesting to note is the reciprocal nature of this responsibility: the plants have fulfilled their end of the bargain by sprouting every spring and bearing seeds every fall. It is then up to the humans to maintain their end of the responsibility by giving the proper thanks to these plants, and maintaining them. Otherwise, the covenant between the two groups is broken, and humans, especially O*nkwehonwe* will suffer as a result.

Tsí Yotsihstokwáthe Dakota Brant, a Mohawk woman from the Six Nations Reservation northwest of Akwesasne, writes of this responsibility in her essay "*Onhehste'ón:we*: 'The Original Corn'"(2009):

> The relationship between corn and Our People can be regarded as the first treaty of this land; between Natural Law and the human being in the Americas. It is the place where the offerings of life, medicine and sustenance from nature have gone beyond just natural offerings to a place where human beings have a hand in the crafting of food plant and medicine life, forging a type of relationship that embodies every connotation from basic nutritional values, the cropping of it, the ceremonies and songs involved with it, the whole cycle of life; all represented by this one plant.

Heritage Seeds

White corn is the traditional variety that has persisted to the greatest extent in the community, as it is necessary for foods like corn soup, corn mush, and boiled rounds of corn bread, which also include kidney beans. During the summer of 2008, the period in which I spent the most time in Akwesasne, I spoke with three people who were growing enough white corn for themselves, and for Longhouse ceremonies. In her 2002 dissertation about heritage seeds at Akwesasne, Rowen White notes that:

> Community members mostly eat non-traditional food from the grocery, allowing themselves to prepare traditional foods and crops for special occasions. This not only has severe personal health implications for Haudenosaunee people, but also affects the genetic integrity of their heirloom cultivars. When they are taken from daily life and place into a more 'ceremonialized' forum, they too lose part of their life and dynamics (White 2002: 18).

With the modernization of farming in Akwesasne came the introduction of new hybridized seeds, which elder farmer Solomon has had a preference for since receiving his degree in agriculture in 1950. However, with the increased use of these newer seeds came a decline in the use and preservation of heritage seeds. Unfortunately with the loss of traditional varieties, comes the loss of some of the understanding about how Mohawk farmers and gardeners once operated. Gary Nabhan (1989:5) notes, "In a gourdful of seeds taken from fields of Native American farmers, we have a living reverberations of how past cultures selected plant characters that reflected their human sense of taste, color, proportion, and fitness in a particular environment." Varieties used by Haudenosaunee farmers over centuries were selected for their ability to thrive in local climate and soil conditions, their resistance to local pests and diseases, and for characteristics that were useful for storage or cooking. For example, the white corn variety typically used by Haudenosaunee farmers has a stockier base, which allows it to hold up well in the long braids in which it is stored. Organizations and individuals Akwesasne who work to preserve heritage seed varieties, which we will discuss below, recognize "Cultivating heritage and heirloom varieties is a way of mediating between past and present, and important mechanism of cultural memory and history" (Dove 1999:2).

Henry Lickers, a Seneca biologist who works for the Mohawk Council of Akwesasne Department of the Environment, described to me how traditional Haudenosaunee heritage seed varieties are more nutritious than many conventional vegetable varieties that people eat today. Traditional corn and beans were bred for protein. The corn contains long chained carbohydrates and simple proteins, which is why white corn needs to be soaked in lye or hard wood ash to break down some of the long

chains of carbohydrates before it can be consumed. Beans were bred to contain lysergic acids, which complement the proteins. Therefore corn, beans and squash not only grew complimentarily, but also formed a complete diet. According to Mohawk midwife Katsi Cook: “They say corn is the breast milk of the Mother Earth, and it is very true. Complemented with the beans and squash they create the perfect protein… The very act of husking the corn, is like seeing a new born baby, my how beautiful it is!.. In Mohawk the word for bundling a newborn baby is ‘putting the husk back onto the corn’ so every one of these babies that comes to us is an ear of corn!” (Brant 2009).

Nelson, one of the farmers who are currently growing white corn at Akwesasne, explained to me the importance of different parts of the perfect ear of traditional corn. The kernels at the tip of the cob are for ceremonies, from the butt of the cob are for soup, and the perfect kernels in the middle are for seed for the following year. Each year he will take a perfect ear of white corn to an old man who will “put a story on it” for him, or read the kernels to tell him how long and severe the winter will be. According to Nelson, the previous year the old man had been accurate in predicting the number of days of snow the region would receive, based on his corn reading.

Some people have maintained collections of heritage seeds within their families. One woman, Neddie, keeps a small garden expressly for the purpose of preserving her family’s seeds. “We were always told about the prophecies. So, it’s always good to keep the family seeds going, and that’s what I am doing.” The farmer previously mentioned, Nelson, described how his family had both saved seeds and passed them down, and also had gone out to other communities to seek out different heritage seed varieties. His mother would pull out her seeds in the spring, and then make sure to harvest and dry

them in the fall to prepare for the next year. Cranberry beans are one variety that he received as a gift – seven beans. Now many people in the area grow them, after he began donating some to the seed give away that ATFE hosts every year (described below).

Other heritage seeds were introduced or reintroduced to the community by Haudenosaunee gardeners from other communities, or through non-native heritage seed collectors. In 1998 a group based out of the Longhouse, the Mohawk Nation Agricultural Project, cleared two acres behind the Longhouse where they planted white corn, and two kinds of beans supplied by Kahnawake Mohawk elders—Bear Paw and Mohawk Vermont beans. These were supplemented with gifts of seed from Doug Egeland, a non-Native seed collector, and Steve Mccomber, a Mohawk from Kahnawake (White 2002, Joyce, Brenda). Steve McComber travels to Akwesasne periodically to give presentations on heritage seeds. In the 2001 growing season, ATFE community gardeners grew out Calico Flint corn, Tonawanda Seneca Bean, Deseronto Potato Bean, Mohawk Bush Bean, Iroquois Brown Bean, Seneca Striped bean, Hodson's silver wax bean, true red cranberry bean, and Seneca pole bean (Dave Arquette). Members of ATFE collected more seed from Tuscarora—Cornplanter beans, Gaigai beans, Bread beans, and a Tuscaroran strain of white corn

One of my colleagues, Bryan Connolley,[107] who used to work with the Eastern Native Seed Conservancy, sent heritage seeds with me to Akwesasne, including Mohawk Vermont beans, Gonyea Yellow Eye beans, Tonawanda beans, Hodson Silver Wax beans, Gonondagon Flint corn, and Darwin John Calico corn. In conjunction with Kanenhi:io, an organization described below, I planted them in the community garden, and helped to take care of them all summer. Teenagers from the local group home came

[107] We were both selected as Environmental Leadership Program (ELP) fellows in 2008

periodically to help weed and tend to them, and Kanenhi:io members helped me to harvest and dry them. We hosted a harvest dinner in which participants were invited to take seeds home for their own gardens. Most of these seeds are still sitting in glass jars in a garage. People like the idea of heritage seeds, but when it came to planting their gardens, dried beans (which made up a majority of the varieties saved) are not as popular as vegetable varieties like cucumbers and tomatoes. Preserving distinct heritage corn varieties is difficult, since they need to remain at least 500 yards away from other corn varieties in order to prevent cross-pollination. These corn varieties are also not usually eaten green like sweet corn, but dried, at which point they need to be boiled in lye or hardwood ash, and then the can either be added to soup or crushed to make cornmeal. From what I observed, traditional foods that incorporated soup corn or cornmeal and reconstituted beans were eaten at special occasions or in the Longhouse, but not on a regular basis. The community members who took interest in this project seemed to do so because they liked the idea of preserving a traditional variety, not because they necessarily had an interest in incorporating these varieties into their daily diets. For these purposes, they had devoted their limited time and garden space to more frequently consumed varieties. In order for heritage seed varieties to make a concerted comeback in Akwesasne gardens, someone will need to either promote recipes to community members, or perhaps sell prepared foods containing heritage seeds, like the jars of corn soup sold by the Wisconsin Oneida.

Reasons for Fewer Gardens

Despite the importance placed by some on the practice of maintaining gardens, people acknowledge that there are currently many fewer gardens in the community than

in the past. When I asked them why they thought that was, interviewees responded that either 1) people were concerned about the possibility that their soil might be contaminated, 2) people didn't have the time to devote to a garden because they were too busy with work and other obligations, 3) people were both worried about possible contamination AND too busy to tend to a garden, 4) some people are too lazy to work in a garden , and 5) in many areas there is not enough available land for people to put in a garden.

Contaminated soil concerns

When I asked interviewees why fewer people were planting gardens in the community now than in the past, twenty-one responded that community concerns about contaminated soil were to blame. As one woman stated "I think people have stopped putting in gardens because they feel that the soil is contaminated. They might grow food, but you don't know what's in it. Some people have stopped." Louie described how the effect of the fluoride emissions on the cattle have continued to influence people's feelings about planting "I mean if the grass is poison to that extent you wouldn't want to be planting a garden either." One man, Jake, stated:

> People are now afraid to go and plant crops anymore and also to make a living off of the land because you don't know what's there. That's the hard part about it, is not being sure, not being certain anymore, what you're eating or what you're coming in contact with…The whole community just came to a complete stop, especially during the early 70's because the information that they were getting is that the whole area is contaminated. So these guys would think, well if I plant crops, will I be eating contaminated food? So it was the fear that was driving us.

Others spoke very personally about how concerns about contaminated soil stopped them from putting in further gardens. Gina, who lives on Cornwall Island directly across the river from the General Motors foundry described how "they told me

not to plant a garden anymore because of the plant, and Reynolds is right there and ….they told me to check my plants in the morning and see if there's that white powder and there was. There's a white powder on my car, white powder on my plants." New York State has since forced Reynolds to put new scrubbers on their smoke stacks to cut down on these fluoride emissions, but this still leaves some people to wonder what residuals lay in their soil.

Other people spoke about concerns that they had about the potential of growing poisoned vegetables if they continued to plant in contaminated soil. Even in areas that might be safe, "There's that inkling in the mind—is it good stuff? Is it good food?" (10C). One woman, 23C, who also lives on Cornwall Island noted:

> You're hearing all the stuff's landing on the island. So then I'm thinking so I plant these plants, I canned them, I give them to my family so they can eat fluoride. Why would I do that? So I stopped. This is big and abrupt for me. All of a sudden my life growing vegetables stopped. Next year I got no heart to plant. So I'm not going to plant because I'm planting poison food. Why would I do that?

Another Cornwall Island resident, Richard D described the discomfort of "wondering if the stuff is god to eat. We were discouraged from eating anything that the airborne particles could land on. We said hey, there goes the tomatoes and string beans."

Some people had stories of strange vegetables growing in their gardens that they attributed to the contamination. Gina, who lives on Cornwall Island, described how people came to check out her garden because "they found it weird that my lettuce grew taller than my corn." She pointed to a plant in the corner of her living room that stood about four and a half feet tall, and described her lettuce as growing that tall. Phil, a resident of Raquette Point, described the broccoli in his and his neighbors, gardens as growing strangely: "It looked funny. They grew up taller than you usually see it with odd

sprouts and it just grew odd, and none of the food tasted right." Another Raquette Point resident noted that her neighbor's tomatoes grew in strange shapes with deep pockmarks in them. In other cases, blights that might be considered somewhat ordinary in other gardens were attributed to the contamination when they appeared on Cornwall Island or Raquette Point. One woman (27C) described "you get a tomato out of your garden and there is little black dots on there, but didn't understand what it was, so right away, you know, you didn't want to eat it, because you think it is the contamination, contaminated right away." Another man, Nelson, described his brother's garden on Cornwall Island "if you grow potatoes it's not so good… they look like they're moldy or something. They get white spots on them. It's got to be the soil." This man is an avid gardener, and has complete confidence in his own soil because he lives on the opposite end of the community from his brother.

Lack of Time

Other people who were not necessarily even worried specifically about contamination expressed that they and others just did not have the necessary time to dedicate to the maintenance of a garden. As one woman, Joyce, stated "I tried to garden but I just don't have the time. You know, with raising the kids and everything. Trying to be involved in the community, there's almost no time for gardening." As another woman, Alice, bluntly stated "We're just busy. We're supermarket Indians."

Some people felt that residents' jobs are specifically what are taking up the time necessary for gardening. "People are just busy with their jobs and other things," noted Barbara. Trudy also stated, "It's just the nine-to-five jobs, the benefits." Another woman, Judy, pointed out that even among the traditional Longhouse people, who in her

mind were most affiliated with subsisting on gardens “They are not too successful either because how are they going to work in the garden? How are they going to plow fields when they have to look for a job to support themselves, they can’t do it, unless they do it on weekends.”

For some people it is not just that man of the house has to be off working, but the fact that in many families “everybody’s got to work, it’s all hands on deck as far as paying for fuel and food, keeping the house warm in the winter” (Bev). In both one and two parent families in many cases, all of the adults of the house are working, “and then you have the next generation coming up who haven’t been brought up on planting and raising pigs or cows and chickens” (Leona).

For many community members, the time spent away working provides a more comfortable material life than attempting to subsist entirely from a farm or garden. In his work with farming communities in Belize, Wilk (2006) noted how the younger generation has started to shift their patterns of agriculture and living, motivated in good part by want of consumer goods. He points out that as people then become part of the wage economy, there are often good economic reasons to buy something in the market place instead of producing it yourself. Heyman (1997) points out that when people can put a cash value on their own labor time, they start to find that it makes economic sense to buy things that take a lot of time to make. As the value of labor goes up, the range of purchases goes up. In Akwesasne, some people feel it is easier to buy than grow vegetables, especially if they work all day and their free time is at a premium. Now that money from wage labor is available, some community members cited that it was just easier for people to buy vegetables than to put the time into growing them. Henry L

notes, “People get lazy when things are so available. So it’s easier to buy it than to grow it.” An older farmer, Henry T, observed, “They just change the way they live. Lot easier to go and buy it.” Another older farmer (57C) similarly noted, “It’s too easy to just go to the store and buy whatever you need. Who’s going to raise-- because some people would just say ‘Well it’s easier and the food is very cheap’ and that’s why people just live from pay day to pay day.”

Other community members also pointed to the increased amount of time that some people are involved in sports as also detracting from time that could be spent in the garden. As Solomon recollected:

> The way I grew up with, we all did our share of the weeding, planting, harvesting, everything. It was a family project. But things have changed so much. The guys, the husbands, are busy…getting involved in sports. The children now that are going to school are involved in sports. And the wives have to provide transportation for the kids to participate in sports. So the time for labor is very limited. The whole gardening enterprise is faded away. They don’t have time for it.

Another older gentleman, Henry T, in reference to his own children stated, “No room for farming too when they get home. They’re all into lacrosse, hockey.” As discussed previously in Chapter 6, other community members cited that while being involved in sports is good for the actual athlete in the family, this is not necessarily the case for the other family members. They are sitting in the stands not getting exercise, and eating fast food because they have less time at home to grow vegetables and prepare home cooked meals.

“It’s just laziness”

This observation that many community members would rather buy food than grow it was made by several gardening members of the community who felt that many people in the community now are too lazy to work a garden, now that they have been

exposed to less labor intensive manners of procuring food. “Years ago everybody planted because they have to plant. But now, we got the option and we always pick the lazy way out of it” (8C). Edith expressed a similar sentiment: “Everybody is just lazy now…when I ask people how come you don’t have a garden, they always say that ‘I did that when I was growing up and I am never going to do it again’…It’s just laziness.” Faced with the prospect of trying to teach the next generation how to garden, one woman (30C) sighed and said “kids are lazy today, real lazy.”

Some even felt that when people said they did not garden because of environmental concerns, this was actually an excuse for their own laziness “Using the environmental issues is usually an excuse not to do anything” stated one man, Rob, who had recently made gardening more of a priority in his own life. Another avid gardener, Nelson, declared, “They can’t blame it on the soil. They can’t blame it on the—it’s lazy.” He pointed to the pile of white corn sitting in his driveway that we were busy husking as proof that the soil is fine. “There’s nothing wrong with the soil. There’s nothing wrong with it because we have a proven fact right here in this soup corn that there’s nothing wrong with that ground. And it’s 106 days to grow that stuff to look like this. And it’s beautiful. And the people been eating it.”

Easier Money

Aside from the recognized need for community members to make money to support themselves, even the lure of pay will not entice many community members to work in gardens or on farms, because there are less labor intensive jobs for which people can make as much if not more money. Some people mentioned relatives who sold off their farms and took up nine-to-five jobs in local industry, because it was easier than

getting up at 4:00 in the morning to milk cows. Other older people complained that they could not even pay youth to work in their gardens. Solomon explains "So that's why I'm shorthanded, this happened too with our youth, they're getting easier jobs than to be pulling weeds." Howard also complained that kids got away from the farm and "got the taste of that money. You tell them, and they don't want to do nothing. I can't even get anyone to pick berries. And that's not a hard job." Mark stated pointedly that he cannot hire someone to help in his garden or cut the grass because the wages he can offer cannot compete with what kids can earn smuggling. "I mean kids can make a couple thousand dollars a week running goods across the border. Who is going to mow my lawn?"

Not Enough Land

A large number of the people I spoke with about gardens at Akwesasne mentioned that part of the problem was that there is not enough land available in the community for everyone to have a garden. Ernie noted that on Cornwall Island, "In fact there's quite a bit of acreage that was spoiled for gardens by the dredgings that came out of the river, and then they didn't have any other place to put it, so they put it down on the land, and the part of the island where they had spread it out lost quite a few acres." The contaminants that came up with the river dredging have made these areas unsuitable for gardening, taking even more land out of commission. However, the main issue is the growing population of the reservation, while the land base remains the same. As Jean mentioned, "Nobody has land. Nobody has any land to have any sizeable gardens. Everybody has these one-acre lot, it has to have their house, their garage, all the necessities of a family, all that stuff." Barring any success with land claims, which have been in limbo for decades, the population is outgrowing the land base. Many people who

reminisced about gardens of the past noted this land now has houses on it. Joyce noted, "where my mom's garden used to be, there's now two houses. You know, there's goes the garden." Housing is currently difficult to find on the reservation, and people predict more houses will continue to go up. Beatrice described, "Like when you have five kids and I only have one acre. So how am I going to house all these children or how am I going to get land for these children to even have a garden, because oftentimes a garden is the perfect size for a house to be built on…We're running out of land to even have gardens."

Repercussions of Less Gardening

Lack of Transmission of Gardening Knowledge

Many people are concerned that now that parents are too busy or are disinclined to maintain gardens, the next generation is not learning the necessary skills to take it up themselves. Moreover, once this knowledge and these habits are not passed along, it is then even harder to convince young people to take up gardening. As Jim explained, "What happens is all it takes is one generation of stopping it and suddenly you have got a whole new generation that doesn't even know how to garden, doesn't appreciate growing your own vegetables and now it certainly becomes convenient to just say 'well I am used to going to the supermarket so I will continue doing that.'" Another woman, Gina, similarly expressed:

> So that generation is not helping the next generation now because they don't know—they don't know the importance of planting, they don't know the importance of culture, they don't know the importance of having a child dig their own potatoes, or do the hard work, they don't know that—and it's sad. It's sad because they are only a handful of people that know that…Because they don't know, they haven't been taught, their parents don't know so they haven't been taught.

The generational differences became especially apparent when middle aged and older residents spoke about the difficulties of trying to interest community members in planting gardens. As Leona described, "You have the next generation coming up who haven't been brought on planting and like raising pigs or cows and chickens. So you would have to reeducate that group." Bev mentioned the fading generational connections to gardening ranging from "the older generations that remember working hard, working in the garden, working on farms and then you have the ones that remember seeing it, you know, and then you have kids that have never seen it." An older man, who prides himself in working a nine-to-five job and maintaining a large garden, described, "This generation, I don't think they know how to plant a garden. I don't think they know how to take care of a garden." For this reason, Elizabeth says a solution is "going to come very slow because there's like a whole generation or two that haven't been taught how to work. They watch TV, play video games, ride their four wheelers. They don't work. It's so hard to get them out there. It's sad isn't it." This preference by the younger generation for more mechanized forms of entertainment was mentioned with frustration by Henry T as well: "It's going to be hard to teach them over. Kids come over they go right to the TV or right to a machine and you try to talk to them and it's like 'hey I'm trying to talk to you!'"

Once that knowledge has not been passed on and the family falls out of the gardening habit, it is then more difficult for the family to become re-involved in food production. As Jean stated, "Hardly anybody I think gardens anymore anyway. That's why it's so—this garden that's going up here (the community garden), is so difficult for

people to get going, is because nobody's done that—they don't have like a pattern every year of doing this stuff, like we've been doing it every year since we've been married."

Food Crises

Several people expressed the sentiment that it was going to be a food crisis that would push people in the community back into farming and gardening. In the past when the community did not have money, people grew their own food, and were able to weather the Great Depression as a result. In order for people to return to local food production, there was going to need to come a time when people could not afford to buy food. As one gardener Rob expressed, the rise of the wage economy and easy access to food through grocery stores helped lead to the diminishment of gardening in Akwesasne. However, "when the economy does collapse and there's no food left on the shelves, that'll bring people back. That's what took it away."

Half of the people I spoke with about what it would take to get more community members gardening, mentioned a food crisis. Either they felt that an impending food crisis was on the horizon, based on prophecies, the economy, and the prices they were beginning to see in the grocery store, or they felt that it would take something as extreme as a food crisis to prompt people to give up their free time to take up gardening. These responses ranged in urgency and foreshadowing of extremity. Solomon, an elder gardener, felt that "If the food prices go higher and higher, they might start considering producing their own food. That's the only way that I can see that would make them realize is they've got to cut expenses and one way they could do it is through gardening." Other residents also noted the increase in prices in the grocery store, which corresponded with increasing gas prices, and felt that this would push people to want to plant gardens.

Richard S noted, “If they go to the grocery store now, they should say ‘holy crap! I got to plant next year!’ You know, because we had a birthday party for my youngest granddaughter here in May and someone bought a watermelon and it was $10.” Barbara similarly remarked, “I think that right now, the U.S. economy is going to maybe show the people that they have to find alternative ways to make sure they have food for the winter.” Others saw the situation as more dire. As Jean remarked:

> The only thing that’s going to make people go back is if this economy stays the way it is, going downhill like this. If things go really bad, people will start doing that. Then we’re going to see people raiding our gardens and raiding the pastures, taking our cows or something. They’ll come in to the house and what are they going to steal? They won’t steal money, they’ll steal food. They’ll come in… if they broke in here. They would come in and steal meat, and they’d steal all the vegetables I have.

Some members of the community, who work hard to grow their own food in abundance, related to me food crises of their pasts. These were mostly middle-aged community members, whose often single parent had trouble providing them and their siblings with enough to eat when they were younger. The Mohawk ethos dictates that it is proper to share food, and so when a few of the members of a community planting group got into a confrontation over giving away vegetables one of the members had grown, he admitted outright to me “I have a problem with food. My wife says I have a problem with food.” She chastised him for planting more than they could use, but he stated that when he was younger he and his seven siblings did not always have enough to eat, and so now, he makes it a priority to make sure that he and his children have enough. Other residents told me stories of their grandmothers who keep multiple freezers full of produce, and who line their basements with canning jars, to ward off the hunger they faced in their youth. Another member of the group relayed stories of running wild as a

child, stealing food out of other people's gardens so that he would have enough to eat. He also plants more than he can eat, but has a habit of giving away everything he produces, to ensure no one else wants for food. Other community members also couched their current planting habits in stories of going hungry as children. However, they were only a few among the many community members who saw impending food crises as what would prompt the rest of the community to want to grow gardens.

Community Organizations to Promote Planting: ATFE & Kanenhi:io

As mentioned in Chapter 4, the Akwesasne Task Force on the Environment (ATFE) was formed in 1987 in an effort to bring together people from all three governments at Akwesasne, in order to address issues of environmental change in the community. In addition to pressing the governments at Akwesasne to push for the most stringent environmental cleanup possible, and publishing scholarly articles about the effects the contamination was having on the culture of Akwesasne, ATFE has also supported a number of agricultural projects. As one member, Dave, described to me, many of their efforts were to get people off subsidized foods, and back to growing and eating healthy traditional foods. ATFE started a community garden in conjunction with the Longhouse, and started a greenhouse project on Cornwall Island, although they ran out of funds and were unable to maintain it. Since the early 1990's, ATFE had been funded principally through the American Friends Society, who gave money towards the black ash project, fruit trees, sustainable agriculture, environmental education, and the ATFE webpage. An article was published in the local paper in the fall of 2009 alerting the community that the American Friends Society was no longer able to fund ATFE, and they would appreciate any community donations. As Dave, one of the principal members

told me, “You live by the grant, you die by the grant. But the work continues, it just falls on a chosen few,” primarily he and his brother. The organization worked intensively throughout the 1990’s lobbying for the cleanup of contamination, and community control over health studies, as well as these agricultural projects. Some former ATFE members expressed to me that they suffered burnout, after they felt “There were no more burning questions about the environment that we needed to know. So, we didn't want to write a grant just to make people work or have jobs--We wanted to do something that was really important to the community…There's no more burning issues about the environment” (26C). I think current AFTE members would argue that their work is as important as ever, but their group has diminished in size since its founding.

To continue to fund their environmental projects, ATFE has put in proposals to receive potential money from the Cultural Impact Assessment. Alfred (2006) recommended that money go from the industrial plants to ATFE to help restore the environment. Alfred’s recommendations are based on plans that ATFE has already created, but has been unable to fund. One of these projects is the Kaniatarowaneneh Research Institute, which would conduct research and develop programs to protect and restore the environmental and cultural resources within Akwesasne. Specific funding needs include construction and administration costs, Community Environmental Education Project Fund, Sustainable Forestry Program, Medicine Plant Restoration Program, Community Environmental Health Education and Outreach, ATFE Environmental Laboratory, Biological Monitoring Program, Community Sustainable Projects Fund, Sustainable Agriculture Program, and an interpretive center for a habitat education program (Alfred 2006: 26-27).

ATFE has been working on the Sustainable Agriculture Program for a number of years, which includes support for organic gardening projects, including the annual seed, plant and tree give away. Each spring ATFE hosts a give away to provide seeds to community members for their gardens, and includes vegetables like squashes, zucchini, carrots, string beans, corn, cucumbers. They also give away tree seedlings, providing red and silver maple, red and white pine, white spruce, red oak, black oak, and burr oak. There are also heritage seeds available, mostly different types of Haudenosaunee beans like Cranberry, HiYo, Yellow Gonyea, Desoronto Potato and Six Nations beans. Several people above who spoke about heritage seeds have worked at one point with ATFE's heritage seed efforts. In the spring of 2008, 85 community members attended the giveaway.

For the past couple of years, ATFE members have planted a garden at the Tsionkwanati:io[108] Heritage Center, a nineteenth century house and barns formerly belonging to an Indian agent, and rumored to once be a stop on the Underground Railroad. The property, with adjacent fields, is currently owned by the Traveling College, a cultural organization based in Akwesasne. Some years the children from the Akwesasne Freedom School (AFS), an independently run Mohawk language school, come to help with the planting, and some of the vegetables are then used in preparing their lunches. Since AFS is a parent-run school, as the previous generation of parents who were more concerned that the students learn about gardening have cycled out, other parents with different priorities have cycled in. Some parents expressed to one of the teachers that they did not want their kids put to work in the fields like migrant workers; they wanted them to get a good education. However, although their participation is

[108] Mohawk for "We Have a Nice Place Again"

reduced in scale, according to the ATFE 2006 year-end report the AFS students were on hand to plant a variety of vegetables, including squash, beans, cucumbers, zucchini, carrots, beets, tomatoes and green peppers. Also at the site that year, they planted a number of heritage seed varieties, including Haudenosaunee beans (HiYo, Iroquois brown, true Cranberry bush, Deseronto Potato, Tonawanda, Yellow Gonyea, True Cranberry Pole, Six Nation, and Gai Gai pole beans), and Boston Marrow, a traditional Haudenosaunee squash (renamed by New Englanders). The group provided Blue Flint Corn seed to one elder, Richard Cook, to grow out, and he was successful enough to provide seed to give away to the community the following year. Also in the summer of 2006, ATFE members planted 2000 strawberry plants at Howard's farm, to revive his plant population and ensure that there would be strawberries for the community members to pick for their own consumption and for ceremonies, where strawberry drink is ubiquitous. In 2008, ATFE bought bales of straw and spread them among Howard's strawberries. This was the first year he was able to hire a few youth to pick fruit to sell to the public, providing income for his family as well as the workers, and strawberries for the community.

ATFE also works to maintain an apple orchard behind elder farmer Solomon Cook's house, hiring a tree expert to prune the trees into shape, and spraying them periodically. Seventy of the eighty trees produced well, and in 2008, the apple crop (ten thousand apples) was twice what it had been the year before.

If ATFE receives funding, future projects include hiring people to work with the greenhouse on Cornwall Island that they began to set up. Currently, as part of their Black Ash Project, black ash seeds are collected in Akwesasne and sent away to be grown, and

then the saplings are planted in the community. With their own greenhouse, ATFE could start the black ash seeds rather than paying to send them out to another greenhouse. Since community members who attend the seed and tree give away have expressed a desire for more fruit trees, the greenhouse would also provide ATFE the opportunity to grow these otherwise too expensive saplings. ATFE also at one time hosted workshops with fruit trees to teach about pruning and grafting. If they were able to pay a full time coordinator through money from an NRD settlement, they would be able to restart these workshops.

Kanenhi:io

Kanenhi:io Ionkwaienthon:hakie, or "We Are Planting Good Seeds," is a newer organization at Akwesasne dedicated to helping families with agricultural projects. The organization is funded through Heifer International, a connection that was created when an Akwesasne Freedom School administrator, Elvera, first met representatives from Heifer International, as well as a Wisconsin Oneida group funded by them, at a First Nations Development Institute conference. Hoping to raise money for the school, Elvera invited representatives of the organization to Akwesasne. Aley Kent of Heifer International, and Paul Smith (better known as Sugar Bear) from the Wisconsin Oneida attended a meeting at the AFS, where they presented information on the organization for the parents. Elvera had originally brought them to the community in the hopes of gaining funding for the new building the school is attempting to erect on a plot of land on the eastern end of the reservation that was donated to them. However, Heifer does not fund large single expenses like buildings, so Elvera passed the project to Lorraine, one of the mothers of Freedom School students, who was interested in developing a new

organization to promote gardening and farming projects. Loraine makes soaps from buffalo fat, and hoped to bring buffalo to Akwesasne to help further pursue that interest. She had a vision of creating a bison farm that would be a tourist attraction for Akwesasne, where people could come to watch the bison graze, and buy a bison burger or hotdog. She also envisioned a U-pick berry operation so they could sell fruit as well, as a healthy and sustainable way of bringing money to the community. In addition, she had plans to grow food for the Freedom School and other schools in Akwesasne, as well as for the old age homes. Lorraine went from being a participant in the Heifer planning meeting, to a facilitator in order to try to fund this dream. It took two years to develop the organization, which they chose to name Kanenhi:io Ionkwaienthon:hakie (We Are Planting Good Seeds), and at the time when I began working steadily with the group in 2008, they were in their fourth year.

Lorraine found that initially people had a difficult time with the bureaucracy that needed to be developed in order for Heifer to grant money to Kanenhi:io. She credits Aley with being "really good about trying to fit us, a square peg into a round hole and she even changed and altered their rules a lot for Akwesasne, because there's so much distrust in the government, in the land, in the environment, and in non-native people and/or people outside of the community." Sugar Bear, who works at the Oneida farm Tsyunhehkwa, came and presented at the first Kanenhi:io dinner, which drew about 26 people (although Lorraine credits the free food for the turnout). Only some of these initial members remained involved, and during the summer of 2008, approximately nine members regularly attended meetings and worked on group projects.

After drawing up an extensive multi-year plan and creating a budget, Heifer granted Kanenhi:io their first check in April of 2007. The planned projects included a bison farm, community garden, community greenhouse, a farmer's market, and improvements on the sugar shack where maple syrup is made, as well as personal projects set out by the individual members. In July 2007, they hosted a farmer's market grand opening, although the event happened later in the season than initially planned, and ended up costing the group money instead of breaking even.

Kanenhi:io also used the funding for training, both to send members on trips and to bring in outside speakers. In 2007, Lorraine took two youth to Santa Fe to the Slow Foods Convention where they met the Traditional Native American Farmers Association members at the Tesuque Pueblo and visited the Tesuque farm. Also in July 2007, Josh and Lorraine attended a permaculture course[109] in New Mexico, after which they became excited about that method of growing, and planned to do everything as cheaply and naturally as possible. That same year other members, Dean, Chris and Anne Marie went to Tsyunhehkwa in Wisconsin, an Oneida farm that operates with large expensive machinery, which inspired this subset of the group. According to Lorraine, this difference in training caused the "battle of the planting theories," and led to conflicts about whether to spray chemicals on the gardens, and about using "big leaky tractors to rip everything up." Lorraine thinks it would have helped to decide in advance what kind of philosophy to subscribe to as a group and attend trainings that support that-- although

[109] Permaculture is "A system of perennial agriculture emphasizing the use of renewable natural resources and the enrichment of local ecosystems" (Dictionary.com). Permaculture is the antithesis of most large agricultural operations—the focus is on integrating complementary crops, working around the natural landscape, and incorporating found objects into garden designs for purposes of cost and sustainability.

it may have been difficult for people to decide which method they agree with before being exposed to a variety.

Lorraine also brought in speakers to give presentations: a permaculture expert and an organic farmer from New Mexico, and a biodynamic farmer from Long Island. These speakers were met with mixed results: some members found them interesting, others were angry that the group's money had been spent to bring in outsiders with new and sometimes strange ideas, when they felt the money would have been better spent bringing in farmers from the local region.

While people's individual projects are at their homes, the community based projects are stabled at Tsionkwanati:io and the newer Freedom School site at the eastern end of the community. The AFS started a building at this site several years ago for their new school, but was unable to procure the funding to finish it. The Freedom School board agreed to allow Kanenhi:io utilize the surrounding land for the community garden and greenhouse, since it was sitting unused. In the fall of 2008 Kanenhi:io considered buying an aluminum building in which to store group-owned equipment, but instead paid half of the expenses to have the roof repaired on the future school building on the site, under the agreement that they can use the building until the school finds enough money to finish it. The relationship between Kanenhi:io and the Freedom School has waxed and waned over the years, depending on the membership of the group, and their relationship to the school. When the group was first formed, three members had children attending the school. Then one member moved away and the other couple decided to home school their children. Recently however, a woman who teaches at the school joined Kanenhi:io, and the relationship has been reestablished.

While other community members will often attend workshop and events hosted by Kanenhi:io, there are approximately nine regular members, each of whom has developed a personal project. Lorraine's personal project involved making soap with buffalo tallow, a process made more efficient through equipment she was able to purchase through Kanenhi:io. Josh and his wife Natasha raise sheep, goats and pigs, and with Kanenhi:io funds were able to purchase additional fencing and housing for their animals. Josh explained that he initially joined because he wanted a fence, and then ended up becoming one of the facilitators. His wife Natasha joined after taking a trip to Italy for the Terra Madre sustainable food conference with Lorraine, at the invitation of Winona LaDuke, a well know activist and scholar who runs a farming program for the White Earth Anishnaabe. Another couple, Henry and Jean, became involved in the group at Lorraine's persistent encouragement, and because they felt the knowledge they had gained through decades of raising animals and gardens would be helpful for the other members. They used Heifer money to buy laying hens and meat chickens, and a portable electric fence to contain them. Jean encouraged her sister Elizabeth, who works at the Freedom School, to join the group, and she now involves the students in working in the community greenhouse. Another active member, Dean, also joined at Lorraine's invitation, since he was interested in gardening and farming. He maintains a large garden in the fields adjacent to Tsionkwonati:io with Chris, a friend who he began bringing to meetings. Chris planted a large field of white corn, which he is eventually looking to process and sell. Another couple, Alicia and Steve, became involved in the organization through Josh and Natasha, who they know through artist events. They are in the process of establishing a small buffalo farm in their yard. Josh noted that the benefits of being

such a diverse group, coming from a variety of personal, religious and political backgrounds and interests, is that everyone has a different set of contacts to draw on to help the group. Henry knows the farmers, Mike (who was just in the process of joining when I left) knows the union crowd, Elizabeth knows the Freedom School staff and parents, and Josh knows "the wacky, crazy revolutionary crowd."

When each member officially joins Kanenhi:io, they fill out a form describing the project they want to work on, the amount of money it will cost, and the way in which they will then repay the group. The pay-back can be accomplished either by selling the fruits of their labor and giving the money directly back to Kanenhi:io, or by donating their labor to group projects. The group decided that manpower hours are worth $15 an hour, and labor hours in which the person brings their own machine, like a tractor, are worth $40.

Early in its creation, Kanenhi:io as a group was more focused on community projects. This changed in 2008, and they became more focused on member's individual projects when Lorraine, who was the most invested in the community projects, left the group to accept a job in New Mexico. This decision came as people with projects at their homes became concerned about finding additional time to spend on the community sites. The most time consuming of these projects was the construction of the greenhouse. Collectively they erected the greenhouse frame, built the end walls and covered it with plastic. Henry contracted for a water line and electricity to be put in to the greenhouse. His constant mantra in trying to improve the community site was "if you build it they will come," referring to new members. Chris used his tractor to plow up the land adjacent to the greenhouse for the community garden, but became aggravated when no one planted in

there. He plowed it up again when I agreed to take care of the garden, as described below. Henry did a great deal of driving around to track down the necessary people and resources to finish the greenhouse, even as his wife became concerned about time she felt he should be spending on their own farm, and in procuring a paying job.

One of the main complications of working under Heifer International is the way in which the money spent has to be reported. When the group first formed, the group had a hard time keeping track of receipts and expenses. Nelson, who was one of the original members of the group, told me stories about the group fighting over figures and how money had been spent. Receipts were difficult in the line of work he is in—he bought seed potatoes from the Amish and seed corn from a farmer in Six Nations. Neither seller provided receipts, which made it difficult for him to be reimbursed. "The Amish don't give you receipts, they write it on a piece of paper, that's as close as you're going to get." Chris, who spent time on his tractor at the community site, found it difficult to get reimbursed for the fuel he spent money on, and Henry had similar difficulty in being reimbursed for gas money spent on the greenhouse project. Other members had a difficult time keeping track of labor that would qualify for their "give back." There were complications in determining what counts as a payback-- whether only assistance in the community garden counted, or work in another member's garden as well. The process of quantifying favors became complicated. Some members were also resentful that their physical labor would only be credited $15 an hour, where as someone with a machine who would be credited $40 an hour. Josh, one of the coordinators, decided to create a website for the group,[110] a service for which he is ordinarily paid $85 an hour. However, other members questioned whether this service was helpful to the group, many of whom

[110] www.kanenhiio.org

do not have internet access. The general constrictions on how the money could be spent provided contentious for the group. Chris was determined to get a tractor for the group, but Heifer will not pay for expensive equipment such as this, and group members had concerns about how well a collective piece of machinery would be maintained.

What the group really needs, that Heifer will not fund, is a paid staff person. Lorraine, the original organizer who left the group for a paying job, became burned out because she was devoting all of her time to Kanenhi:io, which was a volunteer position, and not to artwork and writing, which she is paid for. In October 2008, as Henry was between painting jobs, his wife Jean became concerned about the amount of time he was spending volunteering for Kanenhi:io instead of looking for work. The farmer's market, which I will describe below, never got off the ground in 2008 because there were no volunteers to run it. Halfway through the summer, Dean, who had been most interested in the market, took an ironworking job that kept him away from his gardens, which were then assailed by weeds. Currently Kanenhi:io is funded entirely through Heifer International which, as mentioned will not pay for Kanenhi:io to hire a coordinator. Some members of the group do not want to be involved in any kind of federal or Tribal funding, because of concerns about the strings that could be attached, which might compromise the group's values. Lorraine argued that if someone in the group was paid through the Tribe to do the administration, the organization would be more effective, since volunteers get burned out. She gave the example of the tribal-funded farm at Tesuque Pueblo in New Mexico that pays its workers and manager. Kanenhi:io took the first step in hiring an accountant to handle the checkbook and keep track of expenses, which should cut down on the stress around the handling of money. However, a full time coordinator

could keep track of member's give-back work hours, handle the necessary paperwork to satisfy Heifer, as well as look for additional grants for the group, and provide a contact point for all the members. Some individuals had difficulty in coordinating the group members to work on projects at their homes—a coordinator could take care of communicating with everyone to set up work parties that fit into everyone's schedules, and then keep track of the hours everyone spends. Nonetheless, as a volunteer organization, Kanenhi:io continues to progress with member's individual projects and the community greenhouse.

Past Community Growing Projects

In addition to the ATFE and Kanenhi:io projects described above, a series of community gardens and farmer's markets, founded by different groups of community members, have been implemented in Akwesasne. These have been met with varying degrees of success and conflict, all in an effort to try to involve more community members in growing and eating fresh food.

Community Gardens

In the early 2000's, a group of women got together and started a community garden, in an effort to teach their children and grandchildren to plant, and to involve more members of the community in growing food. One of the women involved, Edith, worked in the nutrition program at the clinic, and this prompted her to want to involve members of the community in producing healthy food. She described the beautiful produce that came out of the garden, but was discouraged by the lack of interest on the part of the community in becoming involved. "It was kind of like not very many people participated, so then it was--we told them all you have to do is help us weed here or

whatever and just help yourself to whatever you know, nobody wanted to do it". When I asked her how she attempted to recruit people into this garden, she replied "Oh we put notices in the paper. We went on the radio. We offered food, and what else did we do? We tried everything. We just didn't-- people weren't interested I guess." When I spoke with the other women who were involved in the garden with her, they also described their discouragement that no one came to help. Community members, including the 4H, were interested in planting, but not in the necessary weeding, watering, and harvesting of the plants. Despite their efforts to advertise, when I mentioned the "community garden" to one of their friends, she said she was not aware that it was a community garden. She was interested in gardening, but had assumed that the plot they were working on was the personal garden of these women, one of whom, she claimed, spoke of it as "her" garden.

Longhouse Garden

Tekanatisiasere (Brian Skidders), a condoled chief at the Longhouse, started a community garden in a field behind the Longhouse, in an effort to increase heritage seeds. As one of the women involved, Brenda, explained:

> There's a big field, in there we planted corn, beans and squash. Then we harvested it, we used it on our Longhouse ceremonies. We gave it to anybody that wanted it. We divvied it up among ourselves, whatever we could take. Our big thing was to learn how to work together again and that's what Brian was really wanting us to do, how to become cooperative farmers again like we used to be. We planted in a spiritual way and then we harvested in a spiritual way. It was a very wonderful experience.

Unfortunately, when Brian suddenly passed away, the project faded. A fence was also constructed to contain a horse that now lives adjacent to the Longhouse, which makes the field harder to get to. One man, Dave, no longer plants in this Longhouse garden because

he cannot drive back to the field with his tools and water. He prefers now to plant his seeds in the fields adjacent to Tsionkwanati:io, which are much more accessible.

Kanenhi:io Garden

Kanenhi:io has a garden at the AFS site that they call a community garden, which was planted in early summer of 2008 by one member who considered it a priority for Kanenhi:io and the Freedom School. After a turnover in leadership, this member moved away for another job, and the community garden was left up in the air. I planted the heritage seeds described above donated by Bryan Connolley, and spent several hours a week there, resolved not to let all of the plants be overrun by weeds. Jean, a Kanenhi:io member who works with Intensive Prevention Program (IPP), brought youth from this program once a week, weather permitting, to help weed. IPP serves at-risk youth who may be, have been, or are currently subject to compulsory placement, treatment supervision, and/or incarceration in public or private institutions. Jean, her husband Henry, and I would explain the different plants and their purpose to the youth, and instruct them on how to weed and care for the crops. Unfortunately, for at least a few of the weeks that the IPP kids were scheduled to come, rain kept them at home. As the weeds began to overtake the garden, I began paying a teenage boy to help me weed the garden. One neighbor who was interested in gardening came a few times with his son. He told me that he had always wanted to teach his son about gardening, but their yard was too shaded to grow one. Unfortunately, I do not think he ever really felt properly included in the garden activities. Because the plants had already been put in before he became involved, I think it was difficult for him to feel any ownership in the garden. He was also interested in working in the garden as a communal activity, and aside from the

attempts to bring in the IPP kids regularly, work in the garden happened in a rather unscheduled fashion. The garden spent the summer in an ambiguous state—it was referred to as a community garden, but never really advertised as such to the rest of the community. Most of the Kanenhi:io members had their own personal gardens that they were working on, and the woman who did most of the planting in the "community garden" left the community. Because of its distance from the current location of the Akwesasne Freedom School (about a 10 to15 minute drive), it was difficult to involve those students, who also were on vacation in the summer. Kanenhi:io members prepared the soil in the spring, and throughout the summer would stop by when they saw me there. However, because I was putting in a majority of the labor, people began referring to it as "Liz's garden" which I had been trying to avoid in order to maintain it as a "community garden." At the end of the season, I gave away bags and boxes of beets, chard, basil, potatoes, tomatoes and peppers to anyone who expressed interest to me. One of the Kanenhi:io members and her children helped me to pick the heritage beans and corn, and we hung them in a greenhouse to dry before storing them in jars.

Suggestions to Improve Community Garden Participation

Despite the lack of sustained success thus far in past community gardens, multiple interviewees mentioned community gardens as something they thought would encourage more people to garden. Mera, from Mohawk Healthy Heart program for diabetic community members, would like to see a community garden set up by Health Services. Another interviewee felt that a community garden would be nice for people who might be worried about contamination in their own soil. Another community member, Richard D, liked the idea of a community garden that could provide the necessary tools for people

who cannot afford to buy machinery like a rototiller on their own. Yet, when I mentioned the currently running Kanenhi:io community garden, to which other Kanenhi:io members loaned equipment, people did not jump on the idea of joining into any of these projects. For some, the idea of working in a community garden was more appealing that actually committing to work in one. Henry, one of the Kanenhi:io members who helped with that community garden, told me about a meeting he attended during the summer of 2009 of people interested in starting a food co-op, and possibly a community garden behind the IGA grocery store. Henry told them that they should just join forces with the Kanenhi:io community garden, rather than trying to plow up a whole new plot of ground. He said no one seemed to jump on the idea. Again, for some it seems, the idea of starting fresh with a new community garden seems to appeal to them more than attempting to work with a pre-existing garden. Nonetheless, several interviewees I spoke with had suggestions for ways in which organizations could improve their participation rates in community garden projects, including promoting increased awareness of the projects, and dividing gardens into individual plots for participants.

Increase Awareness of Community Projects

Several people who were aware of community growing projects, past and present, felt that these organizations needed to work harder to better inform the rest of the community about them if they wanted greater participation. Elvera, who is loosely affiliated with Kanenhi:io, described that the group could have a part in the growing trend of people wanting to raise their own foods, “But they have to get out there more, get on the radio and stuff, in the newspaper.” Of the people I interviewed, 10 were members or involved in Kanenhi:io. Of the other interviewees, when I asked about the presence of

community groups working to get people back into gardening, eight mentioned Kanenhi:io, or "the Heifer group." As Leona described, "We have a group of people that do community gardens and we have – it's called Heifer Organization. They're trying to get people to do projects like maybe raise deer, go back to doing different things like that. You know with the community gardens, they just put up a greenhouse, so things like that." When I asked her how she thought the group was doing, she responded, "It looks pretty good. I go by there a lot to see and there's people working and stuff." Others mentioned watching the progress of the greenhouse and the garden, without being entirely sure of who was responsible for it. Some conflated the organization with the Freedom School because of the use of the current site.

If Kanenhi:io was interested in increasing community garden participation, they could begin by publishing regular excerpts in the local paper, Indian Time. After some college students from St. Lawrence College volunteered in June in the garden, I took a photo and a paragraph thanking them for their help to the newspaper office, where they offered to publish it free of charge. Kanenhi:io could regularly publish meeting times and details about the garden. There is also a radio program on the local radio station (97.3 CKON) called Tetewataron (Lets All Talk) in which people are interviewed about issues of importance to the community. This is another possible venue the group could utilize to create greater awareness in the community, and recruit community garden participants.

Individual Plots in the Community Garden

Some residents, both members of Kanenhi:io and others, mentioned that it was possibly the collectiveness of the garden that was leading to its failure as a group venture.

As one Kanenhi:io member, Chris, stated: “Because if it’s your own, if it something that you want, you are going to make sure it succeeds. Whereas people planting community gardens, well they didn’t weed this week, they will get to it next week and if they don’t weed it next week, well, nobody cares about it anyway. So you know, and it usually always fell upon one or two people and the community never shows up to help. Oh, they’ll help you harvest it but they sure don’t help you weed it. So I had a big problem with community based projects, and I steered Kanenhi:io towards the personal projects.” Another member, Josh, expressed a similar opinion: “I think our forays of community gardening are exactly why socialism and collectivism don’t work. It’s just that. Humans are biologically individuals. I don’t care what anybody’s dogma says.” Another woman in the community who is not a Kanenhi:io member (14C), observed “I think it’s called Heifers International has helped start with a group. And they do community planting. The hard part about it, it’s a nice hippie idea for everybody to do a garden together. But it’s hard work, you know. So you need either very dedicated people, or you need to do it with people who you eat with. Your family is who you have to do it with.”

In order for the garden to be fully utilized by the community, I think the ground needs to be prepared by Kanenhi:io members who have proper equipment, and then the garden divided into individual sections for people to plant their own gardens. Kanenhi:io would have to advertise to the broader community that this option was available to them, and then assign interested parties to individual plots. In this way, residents would have a small garden that would be “theirs,” at least for the growing season. If they took good care of it, they would likely harvest a good amount of produce. If they failed to take care of it, only their garden would die. This would be a way for Kanenhi:io to draw new

members from areas of the cmunity like St. Regis Village or the apartment complexes that border the reservation like Iroquois Village, where residents do not have enough land to put in gardens. In order for this to run smoothly though, there would still need to be someone in the group who could serve as a supervisor or coordinator, as well as a resource to some gardeners who may not have all of the necessary knowledge to optimally maintain their garden. In the past, some Kanenhi:io members were paid through the Heifer funds to host workshops—perhaps similar workshops on gardening could be held for the newly involved gardeners.

This individual yet community garden would provide the benefit of dedication that people have towards their personal property over collective property, but also provide the social experience that people look forward to with a community garden. A number of times when I was working in the garden, others would drop in when they saw multiple cars there, just out of curiosity. The neighbor who wanted to be more involved in the garden only wanted to be there when others would be there as well. Perhaps if more people had an individual stake in the garden, it would be full of people more often.

Farmers Markets

Farmer's markets are another venture that community members have begun on multiple occasions, as a means of providing income for growers, and fresh produce for the community. Edith, who as mentioned previously worked to try to start a community garden, also established a farmer's market. Seniors in the community were receiving vouchers to spend at a farmer's market, but according to a survey Edith conducted, the vouchers were not being redeemed because people did not know where the farmer's markets were, or did not have transportation to get to the towns of Malone or Massena to

attend those markets. She contacted people involved in the Adirondack farmer's market and they instructed her as to how to go about setting up one at Akwesasne. They had to follow New York state rules and standards in order to be able to accept the food vouchers from the state. These rules involved having at least three stalls of vegetables, from local farmers. Edith ran the market for about four years, during which they generally had four or five vendors. After four years Edith decided that she wanted to retire from running it, but none of the other farmers stepped up to take her place. "They need a leader. They need somebody up there to organize the whole thing and so they just come in and put their wares out, they sit and sell, they don't want to be bothered with the business end of it. That was my job."

Another community member, Nelson, also started a farmer's market in the community. He became interested in the idea when visiting a farmer's market in Syracuse, where upon he learned more about the process of setting up a market and decided to bring the concept to Akwesasne. According to Nelson, there were 12 different vendors who would come set up at the weekly market until the Tribe interfered. A representative from the Tribe showed up at the market and asked one of the off-reservation vendors to pay a 22% sellers fee. Nelson claims that technically the site of the market was not within reservation boundaries and so that man would not have been able to collect this fee, but regardless the next week no one showed up for the market and the operation declined.

Kanenhi:io Market

Kanenhi:io also ran a farmers market, for two summers, with Nelson's help. Lorraine, one of the founders of Kanenhi:io, felt that the market helped to give an

additional purpose in growing food: “Well, what am I growing this food for besides my family. You only need so much. Well, the rest I can sell the farmer’s market.” They decided to host the market at Tsionkwanati:io to bring more community members to the site. According to Lorraine, elders would come to the market, eat the hot lunch provided by Kanenhi:io, and reminisce about childhoods spent gardening and fishing.

Personality conflicts and issues of time management ultimately led to the demise of this market. Some individuals felt that they were “pushed” out of managing the market, others felt that these individuals were not putting in the necessary time to run the market. Then there was disagreement over who was supposed to run the market during the summer of 2008. One of the founding members had a falling out with other members, and then left the region. The remaining members were unsure as to who was supposed to run the market. The community garden, where a majority of the produce was supposed to come from, was not planted in time to provide vegetables for the market. None of the other members who had produce wanted to spend every weekend devoted to staffing a table. Unfortunately, the entire growing season went by without the resurrection of any farmer’s market, with the exception of an off-reservation farmer who periodically sold produce out of the back of a pickup truck in front of a local business. This is a situation where some people were interested in selling their produce, but not in devoting the time necessary to run a market. Similar to the demise of the market formerly run by Edith, without a dedicated leader, it could not get off the ground.

While the market provided a pleasant place to gather and have a farmer-customer interaction, selling produce directly to the local grocery store, IGA, when it is ready, and when the farmer is able to deliver it, would prevent the need to have a community

member seated at table for an entire day. The other option is to find a way for the community member who elects to supervise the market to charge a commission on goods sold, so that they are able to be compensated for their time

Solutions to Increase Gardens in the Community

Recognizing some of the factors mentioned above which have led to the decline of gardening in the community, like concerns about contamination in the soil, and the lack of space, time, and knowledge to grow a garden, several residents had opinions as to how community members—from individuals, to community organizations, to the Tribe, could work to ameliorate the situation. These suggestions included efforts on the part of the Environment Division to determine the extent of soil contamination and educate the community about this, as well as the implementation of the Integrated Resource Management Plan (IRMP) to ensure the space for gardens. Suggestions also included education programs to give interested gardeners the information they would need, and a reshaping of the local economy to better support growers.

Address Fears of Contamination: Soil Tests

Uncertainty about potential contaminants in their soil is what has caused some residents to stop gardening, an issue that that some interviewees thought could be solved through soil testing. To some extent, this testing was already done; during the health studies that were conducted in the 1990's soil samples from around the reservation were tested, but a majority of the residents I spoke with were not aware of these results.

Fitzgerald et al. (1996) describes 37 soil samples taken on the southern portion (New York side) of the reservation (mean total PCB concentration .053ppm) and 37

samples taken on the northern (Canadian) portion of the reservation in 1994 (mean concentration .052ppm).[111] The only samples that registered greater than or equal to .1ppm were collected on Raquette Point near the GM site, and Cornwall Island on the shore that faces the dumpsite.

Hwang et al. (1999) describes a GIS database assembled encompassing data from 40 documents and consisting of over 8000 records regarding samples taken around Akwesasne. Most of data that was previously available was from the area directly around GM so they had to conduct their own environmental sampling to develop a representative sampling scheme for the reserve. They took the samples from 1993-1994 (described above in Fitzgerald et al. 1996), and then in 1995 when they received additional funding they took additional samples from specific residences where participants had relatively elevated serum PCB levels, and areas that had not been adequately covered geographically by previous sampling and mapping strategies. One hundred nineteen (119) surface soil samples were collected and in general, all results were within background ranges for upstate New York. The highest samples were in St. Regis Village (.215ppm) and on Raquette Point (.886ppm).[112]

One of the main concerns about the possibility of contaminated soil is the potential that the pollutants will make their way into garden vegetables. Fitzgerald et al. (1996) collected and tested 18 vegetable samples, and found that for the most part they did not contain levels that could be detected, which is .2ppb per congener. The only produce in the study that contained significant levels of PCBs was obtained from a garden directly adjacent to GM: the highest levels there were 29ppb and 119.7ppb in corn

[111]To put the numbers into context, during the remediation process, soils that contained above 1ppm PCBs were excavated

[112] Also described in Fitzgerald et al. 2004:165

and 26.5ppb and 149.5 ppb in tobacco (also reported in Fitzgerald et al. 2004). I noticed this garden when I went to interview the resident there. The corn stalks made a stark picture, the length of a football field from the base of the GM landfill, which rose ominously behind them. I asked the man who lives there why plant a garden so close to a landfill, and he replied that he just started it up again that year. "I just started again because I want to check to see just how true the Environment Akwesasne is keeping tabs with it because they say that nature has cleansed the surface. That's what they tell me. Well, when you plant corn, the fine hairs go down into the ground a long ways and others go down further. So we'll see." He sent away some of the vegetables to a lab for testing, but had not yet gotten the results back.

Fitzgerald et al. (2004) notes that the elevated levels in vegetables from that location probably reflect atmospheric and vapor-phase deposition rather than uptake through the plant roots, given the lipophilic nature of PCBs. The 10 fold increase in ambient air concentrations near the General Motors site during the warmer months suggests the volatization of Aroclor 1248 (Chiarenzelli et al. 2000; Fitzgerald 2004: 167.) They analyzed the blood samples they had taken to see if residing on or eating food from Raquette Point resulted in higher PCB blood serum concentrations, and found that none of these factors were related. According to the scientific evidence, a vast majority of residents should not be worried about PCBs in their gardens.

For one woman in the community, Alice, it was some of the soil tests that she assisted with that allayed some of her concerns about gardening. "We did collect soil samples from different gardens from different parts of the reserve. It didn't seem to be as bad as we feared. So that kind of made me feel better." In October of 2007, Kanenhi:io

members, a permaculture expert they had brought in to help them plan the following year's garden, and I approached the director of the Environment Division about the possibility of contamination in the soil where the community garden would be planted. The director replied that there had been a PCB report done, compiling all of the information about samples taken from around the reservation that he would get the group a copy of. There was also a fluoride report coming out describing testing was done all over the reservation and he did not feel that any of the soil samples had tested very high. This was enough to convince this community group that their community garden site was safe.

I went back almost a year later to interview an Environment Division employee (15C) about farming and gardening in the community, and people's concerns about contaminated soil. He responded, "I think you'll find out from the fluoride study. I think that people kind of carried away and I think the gardens are not really a problem. Maybe the ones that are just immediately adjacent, but the air emissions, whatever is in the air drops off pretty quickly." He explained that dust settling on vegetables planted close to the industrial plants could contain contaminants, but as long as they were washed off before the vegetables were consumed there would not be any problems. "But as far as the soil, we tested the soils in the Raquette Point area, and like I said in the whole area and they were quite clean….accumulation (of these contaminants in the soil) is so miniscule that I don't know it would take maybe hundreds of years before anything accumulated. And the way you work soil, you turn it over all the time you know."

The "Fluoride Report" completed by SRMT (2008c) lays out a three-part study: Environment Division employees collected deer jaws from road kill and hunters, hay and

grass that people would feed to cows, and vegetables out of resident's gardens. Two data sources were included. The first was data generated by the Tribe as part of an assessment of fluoride contamination in the community, and consists of concentrations of fluoride in vegetables, soil, and water, white tail deer jaw bones and ambient air particulate fluoride concentrations. The second set of data comprises results from yearly monitoring of fluoride in grasses measured cooperatively by ALCOA and the Tribe. The Environment Division collected samples of garden vegetables, soil and water in 2005. Water used on the gardens was sampled at the beginning of the study, at planting in May or June and end of the growing season, in October. Water sources varied at each of the gardens; some participants in the study watered with well water, while others watered with river water or water from rain barrels. Two replicates of composite soil samples were collected from each garden by Environment Division personnel. Two typical hay or feed varieties of grasses, timothy grass and orchard grass, were sampled annually from 2000-2006 from 12 plots, as part of an ongoing monitoring of fluoride in grasses, performed by representatives of ALCOA and the Tribe (SRMT 2008c:5).

According to the report, "The data indicate that contamination from fluoride in garden vegetables decreases with increasing distance from the ALCOA plants" (SRMT 2008c: 17). Regarding the grass, the highest levels of fluoride were found in the testing location north of the ALCOA West facility. "To address risks associated with the consumption of home grown vegetables, we calculated a risk of developing adverse health effects associated with hypothetical exposure scenario that involved consumption of home grown vegetables, taking into consideration ingestion of water." (SRMT 2008c: 21). They used the highest average wet weight concentration of fluoride for all

vegetables from a given garden (4.05ug/g) and assumed consumption of 4.88 g of vegetables per kilogram of body weight per day (the average quantity of vegetables consumed by a sub-population of Native Americans polled by the EPA). Consumption of vegetables at this rate, in addition to ingestion of fluoridated water at a concentration of 2.0ppm (highest concentration measured among the gardeners) leads to a daily dose for a 70 kg adult of .077 mg fluoride/kg/day, which is below the safe level of .12 mg fluoride/kg/day indicated by the EPA. The grass concentrations of fluoride only exceeded the thresholds established by the State of New York at the location north of the ALCOA West facility (SRMT 2008c:22). The deer jawbones showed very low concentrations of fluoride, and the filters set up to test for ambient air particles also showed very low levels. The report concludes that the low levels of fluoride contamination in the soils and flora of Akwesasne is still apparent after historical contamination by the ALCOA facilities, but that the data collected on vegetables grown in community members' gardens "indicate that the risk of adverse health effects from fluoride exposure via the consumption of home grown vegetables is likely below the level the USEPA considers to be safe" (SRMT 2008c:24).

In speaking with one woman who was expressing concerns about possible soil contamination, I mentioned to her the conversation described above with the Environment Division employee, stating that for the most part soils in Akwesasne appear to be safe to plant in. She replied, "They don't tell people. We just kept planting. It's been three years since the (fluoride) study started and we never heard anything. Now I hear my results are back but she had already told me that they were high and wanted to do a test block but I don't know how high they are. I have to stop and get the results."

When I picked up a copy of the report, I noted that she had the second worst levels of fluoride in her vegetables of all the gardens tested (24.3 uG/G dry weight). However, even though she felt these levels were high, they still fall below the threshold for concern laid out by EPA described above.

For some people, the soil tests were not enough to convince them that the soil was not going to pose a hazard. One woman, Hawi, a former Freedom School employee, told me that they had testing done there, which came back with heartening results: "We had soil testing done and the soil is fine. It's not contaminated so we can actually take the food out and eat it." One of the Freedom School staff who has advanced degrees in toxicology explained this to the parents, but according to Hawi, the other parents were not willing to trust the soil reports, and still did not want their children planting food outside the school.

For some people, the same studies and soil tests elicited different responses and feelings. One person who works for the Traditional Medicine program (39C) described to me how they did tests on the plants they were picking to ensure they were safe. "We did a GPS on the areas that we picked to see the contaminants of the soil, to see if we are not going to damage the people more. So we did a soil test with the conservationist, so we had all the soil tested, the first year, the beginning stages of it, that is what we did, and we laid out a map of our picking areas and later on we got back the stuff was very, very low, just a touch of it, so it was really good areas that we pick." Another woman, Emmy, who formerly worked with the program told me "when I was in Traditional Medicines, what we did was we went to all the different districts and we tested the soil and the plants. Every one of them came back with carcinogens, dust mites, PCB, all these things

in the plants." Whereas the first respondent was relieved to find that if the plants did contain levels of contaminants they were very low, the second respondent was upset and alarmed that the plants contained ANY level of contamination.

One scientist who was involved in the health tests at Akwesasne described to me residents' opinions that ALL contamination should be removed and any levels of contaminants detected are unacceptable. This scientist was of the opinion that this was impossible: people all over the world have levels of contaminants in their bodies and surroundings, and so to live in fear of even low levels was counterproductive. Others have expressed to me concerns about the levels EPA has set as an acceptable amount of a contaminant like fluoride to consume. As Leonart Krook's study showed in 1977, the levels of fluoride at which regulators thought was safe for cattle, turned out to be maiming Akwesasne cattle under chronic exposure conditions. The National Academies published a "Fluoride in Drinking Water: A Scientific Review of EPAs Standards" in 2006, in which they concluded unanimously that the present maximum contaminant level goal (MCLG) of 4 mg/L for fluoride should be lowered. A thorough review of the scientific literature, like that done by the National Academies, should be done for the contaminants of concern in Akwesasne, and then the information residents are receiving about contaminant levels in their soil can be placed in this context.

Even if some doubt them, additional soil tests were something that many residents felt would alleviate their concerns about contaminated soil. Brenda, who is a member of ATFE, believes that it is important that ATFE promote food security in the community, "but first we need the environmental testing to make people comfortable that the land is clean enough to support raising cattle, raising chickens, pigs, deer farms, buffalo and

produce." A few people have not given up gardening or using traditional herbal medicines, but say that their minds would be more at ease if they knew for certain that these plants were not taking up contamination. Referring to the medicines that grow in her yard, Gina stated "it would be nice to get it tested because I have a whole bunch of plantain growing back there and I made salve the other day." One farmer who has gardens in Cornwall Island, Howard, mentioned that he was interested in getting his soil tested, but found the cost to be prohibitive. When I mentioned this to one of the staff of the Environment Division, they said they would test the soil for him if he brought them a sample. I do not know if he has followed through with this, or if this is an offer they would also extend to other community members, since this particular farmer sells a large quantity of berries to the community and it may be for that reason that the offer was extended.[113]

Outreach

As previously mentioned, the Environment Division has done some testing recently, examining fluoride uptake in residents' gardens around the community and PCB levels in some areas, but as the staff person stated, "We've released the soil report…And we provided it on our website, and we presented it, it's in library and so on. But you know people don't want to read a report" (15C). The Environment Division Staff is currently stretched thin, their attention occupied by a number of important environmental issues. If they could procure the funding, it would be helpful for the Environment Division to have a staff person dedicated to outreach, in order to properly inform the community about issues such as soil and environmental tests. As mentioned in Chapter

[113] I consumed a large quantity of this farmer's strawberries and raspberries throughout the summer of 2008 and am happy to report no known adverse affects.

4, some participants felt that there should have been a more personalized outreach effort on the part of the researchers in order to convey the information to community members. People would be more likely to attend a family meeting in which an extended family gathered at one person's house, and then a researcher came to them to explain study results. A member of the Environment Division expressed a similar sentiment regarding environmental information outreach:

> I think it's just that people are too busy or too lazy to come up to a meeting. They would rather go and visit somebody and talk about it, you know, so I think that's always been the problem. It's how do you get the information up? And really it's not – you wouldn't think it's very efficient—well, probably the most effective way is just go to people's houses and visit with them. Just spend time explaining it; it takes a lot longer, a lot longer but it's going to be a lot more effective (15C).

While it may be difficult at first to spare a staff person to visit with and inform community members, the Division could begin by writing short articles in colloquial language for the local newspaper Indian Time. I read one article by a staff person from the Environment Division about the issue of bacterial levels in the river as the reason for beach closure. However, it was written in such scientific language that someone not familiar with the issue would have no idea that the actual reason the beaches were being closed was due to faulty sewage disposal by riverside residents which led to high levels of bacteria in the river. What would be more effective in the case of soil tests would be a series of simple articles in fairly non-scientific language, summing up the results of soil tests done in different districts of the reservation. In a conversation with Mark, the editor of the local paper Indian Time, he agreed:

> Yeah, I had asked them (the Environment Division) several times, but I have never really received anything out of it, because they have a tight budget and everybody thinks that those are things the paper should be putting in there. And I agree and we have for years but I can't pay a staff on no budget and it takes all

> those little agencies that have small budgets in advertising to put it into the paper. You know what I mean, to say here is your communication link to the community. And then it has to be consistent and it can't be once every six months. They should come up with a weekly thing to say—to teach--, you know make it a few paragraphs. It doesn't have to be War and Peace it can be just a few paragraphs saying here is what parts per million are, here is what this means, or just small bits of knowledge and people can digest something that's a few paragraphs.

When information about the environment is published in local media it is either done in very brief articles, using advanced vocabulary, or announcing reports that have been published, without mentioning any of the results. As mentioned above, the fluoride report recently published by the Environment Division concluded that low levels of fluoride contamination in the soils and flora of Akwesasne are still apparent after historical contamination by the ALCOA facilities, but that the data collected on vegetables grown in community members' gardens "indicate that the risk of adverse health effects from fluoride exposure via the consumption of home grown vegetables is likely below the level the USEPA considers to be safe" (SRMT 2008c:24). A summary of this report could be written in simple terms and submitted to the local media. Instead, a vague description addressing the reasons for the study was published in the Tribe's newsletter, stating that:

> Some water supplies are artifically fluoridated, although not within Akwesasne, and most soils have fluoride. If more fluoride is introduced by air the amount contained in the vegetables from a garden may exceed a healthy limit. In order to ensure our people are not getting more fluoride than is needed sampling and analysis was done on vegetation. The soil, the air and the water was sampled and analyzed as well (SRMT:2008b).

By re-emphasizing the concern that people have about fluoride, rather than what the report actually concluded, this statement only leads residents to continue to fear the possibility of contamination in their soil.

The Environment Division website has a section titled “fluoride vegetation” which describes how the Mohawk community has always sustained themselves through farming and fishing. However, “With the threat of fluoride contamination, that is not a choice for our members any longer.” They go on to describe testing efforts by the SRMT Environment Office and NYS DEC, which involved collecting vegetation samples from the area surrounding the three industrial plants and several places on the reservation, even though the NYS DEC decided to halt all fluoride sampling effective January 1998. The Tribe protested because Reynolds was restarting a third pot-line, which they were concerned would increase the amount of fluoride deposition from Reynolds. DEC reinstated the program with personnel help from the Tribe, and they have been sampling from May to October every year since it has been reinstated. The page does not describe what any of the result of these tests are, and there is no link to or discussion of the fluoride report published by the Tribe. Even though director of the division has told me that he does not think that fluoride contamination is currently a threat to the community, the website opens with “threat of fluoride contamination.” While most of the farmers and gardeners in Akwesasne are probably not regularly consulting the Environment Division’s website, it would still be beneficial to ensure that the website is consistent with the research being published by the Division.

Address the Increasing Shortage of Land: Integrated Resource Management Plan (IRMP)

The increasingly diminished land on which farming and gardening activities would take place was a frequently mentioned concern of the interviewees. One way to ensure that the rapid rate of development in the community does not make these activities impossible is through the implementation of an Integrated Resource Management Plan

(IRMP). The Tribe began brainstorming about a plan in 2005 and recently published the results (SRMT 2009b). A brochure for community members defines an IRMP as a "long range plan to manage the natural resources of the reservation" that "Links the natural environment and social realities, creating resource policies that support a healthy ecosystem while taking into account a community's social, cultural and economic needs." (SRMT, 2009b-- Appendix L: Brochure 1 Spring 2005).

Recognizing that Akwesasne has a finite amount of land, even if the land claims described in Chapter 2 are successful, the IRMP core team set out to explore the best way this land should be managed. One of the goals of the IRMP was to examine all of the known plans from various tribal entities—housing authority, infrastructure and planning, forestry, environment, solid waste, wetlands and others. The other goal was to learn from community members what their priorities were for the management of reservation land. Members of the integrated resource management plan core team—who were interviewed to produce "The Community Context for Integrated Resource Management Planning on the St. Regis Mohawk Reservation (2005)-- recognized that among other things, a lack of interest among community members in attending public meetings would pose barriers to community involvement in the development of the IRMP (SRMT 2009b: Appendix C). They also felt that it was important for the community to feel ownership of the IRMP because "the success of the IRMP will depend on community members' willingness to cooperate with it—the lack of strong enforcement mechanisms means it will be difficult to enforce compliance" (SRMT 2009b: Appendix C:8).

In light of this, they chose to obtain community input through focus groups and phone surveys. Seven focus groups involving 52 individuals were conducted from

December 8, 2005 through April 6, 2006. The participants were divided according to predetermined categories and were place in one of the following groups: youth, hunters and fishers, elders, plants and basketry, businessmen, farming and agriculture, and general if they could not make it to one of the other groups or did not fit into one of the categories. In conjunction with Cornell University, a phone survey was conducted, in which participants were randomly selected from 1702 residential listings. Three hundred thirty (330) individuals completed the survey from January 3, 2006 through January 17, 2006. After compiling all of the responses, the IRMP core team determined that people's main goals for land resources are: A) improve land availability for agricultural production, B) educate community on agricultural production C) significantly reduce contamination of land to safe levels and D) manage land efficiently to house growing population.

"Section 5: Chapter 1, Land" of the IRMP focused on land development and the maintenance of agricultural and recreational land. The St. Regis Mohawk Tribe portion of Akwesasne consists of 15,569.16 acres: among those, 1,585.65 are agriculture and 1,712.41 residential/commercial. In this chapter, the IRMP core team laid out six Alternative Management Approaches (AMA), including no action, a regulatory management approach, a traditional practices approach, education and outreach, and a soils management approach. The 6th AMA is the "Best Practices" approach, which took the best elements of one or more of the previous AMAs to develop the most appropriate approach. Outcomes of this practice include soil conservation, preservation, and optimal land use for sustainability. If necessary, regulations can be used to support and reinforce some more sensitive, urgent, or immediate preservation or protection needs. Traditional

approaches can be integrated where cultural uses of the land are important, and outreach and education can round out the overall effort to sustain and maintain land for housing, development, and economic gain. This approach incorporates decision making into the overall process through informed decisions with regard to regulatory development. The end of the chapter displays two maps: one of "Current Land Use Projection of SRMT," and another with "Ideal Land Use of the St. Regis Mohawk Tribe," which places industrial/commercial in less ecologically sensitive areas, has fewer projected new roads, and housing that is more concentrated.

As the IRMP core team states, "The development of the Integrated Resource Management Plan (IRMP) for the Akwesasne community represents an examination of cultural values, previous uses, current social and economic settings and a vision for the future to create a plan of action for the future of natural resources in Akwesasne" (SRMT, 2009b: 6). What remains to be seen will be how this plan will be implemented. Just as the individuals I interviewed expressed, the residents who took part in their focus groups and phone interviews emphasized that ensuring that the community had farmland was important.

Gardening Education

Fifteen of the community members I interviewed felt that in order for residents of Akwesasne to begin producing a greater amount of their own food again, they would need to "to relearn and re-teach the importance of growing our own vegetables" (Jim). One woman, Brenda, felt that the resurgence of pride of community members in being *Onkwehonwe* could be incorporated into gardening education. One day[114] as we hoed rows of beans, Dean, an avid gardener explained to me that *Kanienkeha* (Mohawk) is a

[114] June 17 2008

lived language, and cannot just be taught in the classroom. He tried to take a classroom language class, but kept falling asleep. However, when he is out in the garden with elders who speak Mohawk, he picks it right up. Dean suggested that they begin a gardening language class, as a way of educating people about *Kanienkeha* and planting food simultaneously. Several other community members felt that gardening classes should be offered for residents who were interested in learning more about food production. The Mohawk Healthy Heart, which as mentioned previously works with diabetic community members was planning to do a series of cooking and canning classes, and was trying to get a local greenhouse operator to conduct a class on gardening.

Thirteen interviewees mentioned specifically that it is especially important that the youth be educated about farming and gardening. Brascoupe (1998:31) writes:

> You start teaching kids sustainable agriculture when they are small. This should probably begin in the third grade when the children are 8 or 9 years old. How do you do that? You have to start working with school, school boards, and communities. We need to introduce sustainable agriculture into the school curriculum.

Other community members also emphasized the importance of having classes for kids to learn about gardening, classes which treat it as a serious subject. One woman, (23C), emphasized that "If you didn't have horticulture classes taught as if it was a 'BOCES trade school, you're not too smart kind of a person,' then you would attract more people. Because they think oh it's something for kids who can't do anything else." One man in his late twenties, Josh, remembers hating agriculture class when he was in eighth grade, and making fun of that class. "Now I think that was the most useful class I had in all of high school and I could just take that." Lessons about gardening could be used to teach students about biology, nutrition, and chemistry among other things. If not taught as a

regular class, one woman, (23C) recommends that a summer program be developed around gardening. She emphasizes that in addition to the sciences mentioned above, students could learn economics through marketing and selling their produce. The only problem I can foresee with a summer based program is that the seeds need to be planted in May, before school is out, and a good portion of the produce would be harvested in September and October, after school is already back in session. But the program could possibly be started as an afterschool program in the spring and fall, and a more full time program in the summer.

Reshape the Local Economy

Part of encouraging a return to a greater amount of food production in Akwesasne is altering the current economy to better support these farmers and gardeners. Ostendorf and Terry (1995:170) emphasize that "we must imagine how to creatively disengage from the dominant economy" which would mean that "farm and rural people exercise control over the development process and engage in acts of self-determination, rooted in fundamental commitment to both short- and long-term community benefits." Part of this necessitates that "progressive communities and organizations must begin to look at the possibilities for locally based, locally controlled capital development" (Ostendorf and Terry 1995: 170). Part of this control over the development process has been discussed in the IRMP. However, what Akwesasne community members need to focus on is the locally controlled capital development that would support farmers and gardeners. In order to accomplish this, the community needs to develop a structure in which a larger percentage of the community is buying directly from growers.

Akwesasne needs to develop, as DeLind (2002) and Lyson (2005) call it, "civic agriculture," which is:

> The embedding of local agricultural and food production in the community. Not only is civic agriculture a source of family income for the farmer and food processor, but civic agricultural enterprises also contribute to the health and vitality of communities in a variety of social, economic, political and cultural ways (DeLind 2002).

Civic agriculture is characterized by networks of producers who are bound together by place, and embodies a commitment to developing and strengthening an economically, environmentally, and socially sustainable system of agriculture and food production that relies on local resources and serves local markets and consumers (Lyson 2005:94). Most importantly, "civic agriculture has the potential to transform individuals from passive consumers into active food citizens." Lyson defines a food citizen is someone who has "not only a stake but a voice in how and where his or her food is produced and processed" (Lyson 2005:97).

The formation of a tribal conservation district to support Akwesasne farmers is a start, but as some community members have objected to, this money is still federally provided. The foundation of a more sustainable future would be achieved if community could support its own growers. One way to accomplish this is to establish a farm-to-school program similar to that of the White Earth Land Recovery Project Farm to School Program in Minnesota.[115] The Farm to School Program provides the venue for farmers to sell directly to local schools, and began with a revamping of the breakfast and lunch menu at the Pine Point School. They have added fresh, local and organic ingredients wherever possible to the school menu, and removed processed foods and foods

[115] http://nativeharvest.com/node/255

containing dyes and high fructose corn syrup. Students and staff have enjoyed new menu items ranging from yellow watermelon, organic carrots, organic pork sausage, organic highlander beef, buffalo, multi-grain cereal, and organic whole-wheat cream of wheat. In addition to regular meals, each month the Farm to School Program has catered a community feast and an Elders lunch. Akwesasne could create something similar, which would provide farmers a regular market to feed the three public schools in the community and the Akwesasne Freedom School. There are also homes for the elderly run by the Mohawk Council of Akwesasne (Tsiiokwanonhso:te and Iakhihsohtha), and the St. Regis Mohawk Tribe facility (Tsi'tetewatatkens),as well as the Akwesasne Group Home, two Individual Residential Alternative (IRA) homes for residents with special needs, and the substance abuse recovery center (Partridge House). In addition to the myriad restaurants in the community, these are all institutions that, with the proper structure in place, could work with local farmers and gardeners to provide a stable market for growers.

IGA Supermarket

IGA is a grocery store franchise established at Akwesasne in 2005 by a private owner. The Tribe purchased the store and surrounding 609 acres in April of 2008, in order to build tribal housing.[116] That plan is currently on hold, but the Tribe decided to continue running the grocery store, even though it is not currently a profitable venture. An article in Indian Time (Summer 2009) implored Akwesasne residents to shop at IGA rather than the Super Walmart (which is a 15-minute drive away) so that the community could continue to have a grocery store. This might be an easier sell if the IGA were supporting community growers to a greater extent. Six of the community members I

[116] http://www.watertowndailytimes.com/article/20080312/NEWS05/550642272/-1/news, http://www.pressrepublican.com/breakingnews/local_story_076164421.html?start:int=0

spoke with felt that the IGA should be included in any plans to support farmers in Akwesasne. These interviewees complained about the current quality and quantity of the produce at IGA, and felt that incorporating more local produce, especially organic, would be beneficial to everyone. If produce from local farmers was sold at reasonable rates at the store, this would both encourage more local food production and provide fresh healthy food to residents. As mentioned previously, the community has had some difficulty in sustaining farmers markets. If farmers and gardeners could sell directly to IGA, this would prevent having to spend time staffing a booth.

In order to provide at least some fresh local produce to the store year round, Akwesasne farmers and gardeners would have to develop new methods of growing. Elliot Coleman, an organic farmer from Maine, has published two books (1999, 2009) about his techniques to grow vegetables year round in cold climates using unheated, or minimally heated, moveable plastic greenhouses. Using these techniques, he is able to sell vegetables year round. I attended a presentation of his titled "Making a Difference in your Local Food Market: The Winter Harvest" during which he described how he is selling fresh spinach, leeks, onions and carrots from November through March. Through research and experimentation he found that with each layer he place over his crops, he could increase the temperature enough for his plants that it was like he was moving the covered soil 1.5 zones to the south. Normally Maine is zone 5, but under his frames, it was zone 8 (similar to Georgia). He modified his greenhouses to move along tracks, so that he can be growing different plots of vegetables throughout the year, moving the greenhouse to the next plot as needed. Since Akwesasne is within the same agricultural zone as Maine, the application of Coleman's techniques could extend the growing season

for Akwesasne farmers, who could then continue to supply community members with fresh vegetables.

Conclusion

The history of the decline of 20th century farming and gardening at Akwesasne in many ways reflects trends apparent in other parts of upstate New York: the cost of mechanization in the face of competition from factory farms in the Midwest, and the loss of farm labor to easier and better paying employment. However, in addition to these factors, community members at Akwesasne have also had to contend with past contamination from local industry, and the mark that this has left on people's perceptions of the viability of maintaining farms and gardens.

Despite these trends, there is an interest in the community of increasing the number of farms. Within this context, I explored the two main suggestions that have been considered to help financially support residents interested in farming: the formation of a Tribal Conservation District, and a proposed form of subsidized farming from potential Cultural Impact Assessment funds. Some residents felt that there was a "pocket" of people within the community who would be willing to participate in these programs, especially if they would receive financial support. The barrier for some people might be that the TCD is based on federal funding, which some community members are hesitant to become involved in.

The general consensus was that most people were not ready to return to full scale farms, but rather smaller projects like gardening. Within this context, I discussed community member's opinions on the importance of maintaining gardens, because of their connection to the ceremonial cycle, the importance of food sovereignty, and the

responsibility that Mohawk people have to their heritage seeds. Despite these sentiments, everyone agreed that there are far fewer gardens in the community currently than in previous generations. This was due to concerns about potentially contaminated soil, but also due to a lack of free time in households where all members work, and the ease at which many community members can acquire their food from the grocery store rather than growing it. Organizations like ATFE and Kanenhi:io are working to provide the necessary support to help interested residents begin farming and gardening projects. Community members also had a number of ideas for ways in which to encourage people to become more involved in gardening, including soil tests to assuage fears about contamination, outreach to inform the public about contamination levels, education for adults and children to provide information about growing food and storing it, and a reshaping of the local economy to better support farmers and gardeners.

Chapter 7: Conclusion

Akwesasne is a community that has weather dramatic environmental, economic and social change over the past 50 years. The St. Lawrence Seaway and contamination by local industries transformed the heart of the community-- the St. Lawrence River, and had a profound effect on how some Mohawks in this region interact with their environment and perceive their health. Increased involvement in wage labor and other income-earning activities, as well as a desire for sedentary entertainment and fast food have also affected Mohawks' lifestyle and health. I came upon the dual topics of environmental health studies and a diminished rate of gardening at Akwesasne through different people with various questions they hoped I could explore. I set out to determine if any connection existed—to learn if the presence of the health studies in the community affected people's perceptions of the environment and thereby their gardens. I came to see that the issue is complex: the health studies have had varied effects and impacts on the different people who were involved in them, and there are myriad reasons why many people had not maintained gardens in the past several years. In the process of talking through these issues with people, current health concerns came to the fore: concerns about rates of diabetes, cancer, heart disease and a multitude of other afflictions that many people could tie in some way, even tangentially, to the presence of industrial contamination adjacent to the community. Within each of these subject areas, community members had a variety of suggestions as to how these problems could be addressed. Drawing from Schepher-Hughes and Lock's (1987) model of three bodies, I sorted these suggestions into three categories: those that addressed the individual body, the communal or social body, or the structural/ political body. Many of these suggestions also fell into

the nexus of the sphere diagram illustrated in Figure 5: at the confluence of local science and disease etiologies on one side, and technoscience and biomedical disease eitiologies on the other. I argue that at the center of these spheres lies the space where community based participatory research (CBPR), effective health intervention, and environmental education outreach can be designed.

After being subjected to an intensive but uninformative health study through the Mount Sinai School of Medicine, Akwesasne Mohawks took charge of the health research process and developed an extensive community based participatory research (CBPR) project with the State University of New York (SUNY) Albany and the New York State Department of Health (NYSDOH). The resultant health studies demonstrated a (albeit unfair) mechanism by which Mohawks could decrease further exposure to contamination, by avoiding the consumption of local fish. While earlier publications compared the body burden results found at Akwesasne to other similarly affected communities, later papers published by this project demonstrated that PCB levels were potentially causing: abnormal thyroid functioning in adolescents (Schell et al. 2004, Schell et al. 2008, Schell et al. 2009, Schell et al.2010), diabetes (Codru et al. 2007), higher levels of total serum lipids that contribute to heart disease (Goncharov 2008), decreased cognitive function in adolescents (Newman et al.2006; Newman et al. 2009) and older adults (Haase et al. 2009); and reduced testosterone levels in men (Goncharov 2009).

In addition, these studies shaped how research and science are conducted and perceived in this community. Through conducting this anthropology *of* science and anthropology *between* science and society at Akwesasne, I have attempted to build a

dialog between researchers and community members that can help to inform how future research is conducted in this and other Native communities. Both scientists and study participants recognized the benefits of the community based participatory research (CBPR) model that was implemented by the project, which included greater community participation, better data acquired, co-learning on the part of the researchers and the researched, and a resulting study that addressed both the concerns of community members and the interests of the researchers. However, there were also challenges faced in this collaboration, which included varying perceptions between the two parties as to the time scale of different aspects of the study, and control over data collection and use. In addition, study participants had suggestions to improve future health studies done in this and other Native communities.

Most of these suggestions centered on the delivery of study results. Some participants expressed that they did not understand their results—for some this would require a more thorough explanation of the results themselves in colloquial language. On the other hand, some participants expected the study to answers to their questions about how this would affect their health, answers that science could not provide. In future health studies, work needs to be done to better inform participants as to what kind of information would be available. In addition to individual results, there were also attempts on the part of the scientists to educate the broader community about the project through community presentations. These presentations were not well attended because, according to participants, the setting (large conference rooms) was wrong, community members were afraid the presentations would be boring or technical, and because they were trying to target the entire community. Participants and field staff suggested a more

personalized delivery of results; have the staff go ‘visiting,’ or speak to family meetings about the study. Visiting is a valued form of social interaction in this community. My interviews with people were often treated as a “visit” over coffee, and people were envious that I had managed to obtain a grant that allowed me to spend several months visiting with people. Informative “visits” by health study field staff could provide participants with the opportunity learn about the study and their results at a level the each individual could understand.

Explorations of the health studies conducted in Akwesasne through the past three decades led to discussions of current health concerns in the community. S*kennen,* one of the concepts that structures the Great Law of Peace, is most often translated as peace and tranquility in the political sense-- an important struggle that Akwesasne has been engaged in for a number of years. However, skennen also denotes a healthy and normally functioning individual mind and body. Skennen leads to strength through unity, a healthy life force, and a good mind. For a society, or a political body to be healthy, individual members must be healthy, and vice versa. Most of the interviewees conveyed the impression that this community is not healthy, due to illnesses brought about by contamination and by lifestyles that have been altered for a number of reasons. While the typical biomedical model of illnesses like diabetes point to a failed individual body that has not complied with prescribed diet and exercise, community disease etiologies at Akwesasne additionally point to environmental and social stressors as contributing factors. Therefore, in addressing illnesses like diabetes in this community, all of these factors, as well as considerations of the social as well as the individual body will have to be taken into consideration.

In brainstorming ways for the community to become healthier, interviewees suggested actions that can be taken by Akwesasne's political, social and individual bodies. The role of the community's leadership became apparent in suggestions that additional education program and exercise facilities, like a walking path, should be provided to residents. Of course while these programs and facilities can be provided for the people, it would take individual motivation to "pick yourself up" as one interviewee described, and take advantage of what was offered. In addition, while most diet and exercise programs target individuals, Akwesasronon have described the importance of family in social activities as well as the consumption of food. When fish advisories were issued, and some people became concerned about whether their gardens were contaminated, in many cases the entire family shifted their diet to more processed food. In addition, now that all of the adults in many households are busy with outside activities, the time necessary to grow and prepare healthy food is not available. This has led to younger generations who now express a preference for what community members have called comfort food, junk food and fast food. As one interviewee pointed out, a shift in diet has to begin at grandma's house, and has to involve the entire family. In addition to cooperation within the family, interviewees suggested that there needed to be cooperation between parents and the schools to improve children's diets, in order to ensure the health of Akwesasne's future.

One of the activities that Akwesasronon pointed to as promoting health through diet and exercise, was gardening. Horticulture has always been important in Haudenosaunee culture, from the first seeds planted on Turtle Island by Sky Woman to the present. Many people in Akwesasne stopped farming and gardening for complex

reasons, including concerns about environmental contamination, lack of time due to increased participation in the wage economy, lack of sufficient land to plant on, and the ease of which they can go to the store and purchase food. However, concerns about food sovereignty, the preservation of heritage seeds, and the general conviction that community members will eat healthier if they have access to garden produce have convinced some community organizations to seek out ways to encourage residents to return to gardening.

Since many people named concerns about contaminated soil as a deterrent to gardening this would need to be addressed by informing people as to the actual extent of the PCB and fluoride contamination in Akwesasne's soils. As described in Chapter 6, tests done by SUNY researchers as well as by the Environment Division show the majority of the soil in the community to be safe. However, here is where many of the trust issues mentioned in Chapter 2 come into play—to what extent do some community members feel they can trust the intentions behind the production of these results? In his book *A Social History of Truth*, Shapin (1994) points to the centrality of trust relationships in the development of modern science. According to Shapin, much of what we count as knowledge comes to us second hand, through the reports, testimonies and writings of others. The assessment of this information is based on our moral estimate of those upon whom we depend on for information. For Shapin, knowledge rests on trust, and is inseparable from social relations. "Knowledge is a collective good. In securing our knowledge, we rely upon others and we cannot dispense with that reliance. That means that the relations in which we have and hold our knowledge have a moral character, and the word I used to indicate that moral relations is trust" (Shapin1994:xxv).

With this in mind, “the identification of trustworthy agents is necessary to the constitution of any body of knowledge” (Shapin 1994: xxvi). Evaluations of the expertise as well as the trustworthiness of person or institution that is a source of information are important to people in deciding whether to accept information. Often the evaluation of trustworthiness of an information source will outweigh the level of expertise accorded to the source when it comes to deciding whether or not to believe the information (Mackie 2000). For some people at Akwesasne, although they would not necessarily question the expertise of the SUNY or Environment Division scientists in conducting soil sampling and testing, they nonetheless question whether they can trust the final published results. They also question if other interests, namely the industrial plants or the state of New York, have somehow insinuated themselves into the final written product. A lack of trust in the political process has led for some to a lack of trust for the scientific results.

However, many residents I spoke with were interested to hear about soil testing, or eager to have it done on their properties, expressing that it was the cost of this procedure that hampered them from having it done themselves. Of course an issue would be the source of funding for the Environment Division to conduct a massive soil-sampling project, which would then add to the concerns an additional layer of trust issues-- concerns about the motivations of the funder. Also important for the transmission of this information, gained in the past or future, would be an outreach campaign. Environment Division members mentioned to me past reports done which were placed in the library and put on their website, but as one conceded “But, you know, people don’t want to read a report” (15C). He mentioned, similar to the suggestions for health study report-back, that the most effective way to convey environmental

information to residents would be through visiting families to discuss it with them. Unfortunately, he does not feel that his division has the staff or the funding to accomplish this. In lieu of this, the editor of the local newspaper, Indian Time, expressed interest in publishing frequent short articles explaining issues of contamination and testing to the community.

Concerns about contaminated soil were only one of the many reasons that Akweasronon explained to me as to why people do not garden anymore. Other suggested solutions posited by community members included more educational programming for the youth, especially interweaving a school garden into the curricula of biology, chemistry, nutrition, and after school programs. Issues of time and money were also frequently broached when discussing gardening as well as diets. Some people felt they did not have the time to grow a garden or cook complicated healthy meals when it was much easier just to pick up a sack of McDonald's food or order a pizza. Others mentioned that they would garden more if they had a venue in which to sell their produce, which might free them from working other jobs. Farmers markets have been tried in the past, but have not been sustainable. Other possible means to supporting farmers and gardeners would be through developing an ethos of "civic agriculture" in the community by creating a farm-to-school (or other institutions) program, which would ensure income for growers, and healthy foods for those attending the schools or institutions. It would also benefit the community if IGA could work to better support local growers, which would provide them with income, and improve the quality of fresh foods currently offered in the store.

While environmental change and contamination has been an important and powerful factor in the rapid change in lifestyle and health status, other additional factors have had a hand in the decrease in growing and eating traditional foods, and to increased weight and decreased health status among community members. Recognizing these additional factors does not ameliorate the blame deservedly placed at the doorsteps of General Motors, Reynolds, and ALCOA for their role in the environmental contamination. Rather, recognizing these various contributors to the health and lifestyle issues today lends itself towards the possibility of addressing some of these factors successfully, in an effort to work towards better health, and a balance of *skennen* (peace), *kasatstenhse:ra* (power), and *kanikonri:io* (righteousness).

While Akwesasne has had to struggle through immense social and environmental change over the past fifty years, as a community they have emerged with a strong, political, cultural and scientific awareness. One community activist, Brenda, notes that in coming together to fight the industrial contamination,

> It's changed the fabric of who we are from a colonized community that I grew up in, in the 50's, 60's and 70's; to a community that's very aware of who they are as Haudenosaunee people. That strength, I think is something that nobody can ever take that away from us, whether we die of cancer of we have endocrine disorders or whatever. It's a strength that's evolved from having to deal with all the hazards here. We're not a sleeping community anymore either. We watch out, we're on guard and we won't let major industries or our own people pollute.

As part of the goal stated in the introduction to "lift the energy" I want to conclude with the observation that while Akwesasne is fighting a number of political, social and environmental battles, the strong creative thinking and cultural connections present in the community will ensure its continued survival.

Bibliography

Agency for Toxic Substances and Disease Registry. 2000. *Toxicological profile for polychlorinated biphenyls (PCBs)*. Atlanta, GA: US Department of Health and Human Services, Public Health Service\

Akwesasne Task Force on the Environment, May 12 1992, Press Release "Mohawk Mothers Responsible to Their Future Generations; Tell Local Industries: Now It's Your Turn to Do the Right Thing!"

Akwesasne Task Force on the Environment Research Advisory Committee (ATFERAC). 1996. "Akwesasne Good Mind Research Protocol." *Akwesasne Notes* 2(1): 94-99. Also found at www.northnet.org/atfe/Prot.htm

Akwesasne Task Force on the Environment Research Advisory Committee (ATFE RAC). 1997. " Superfund Clean-up at Akwesasne: A Case Study in Environmental Justice." *International Journal of Contemporary Sociology* 34(2):267-290.

Alfred, Taiaiake.
1999. *Peace, Power, Righteousness: an indigenous manifesto.* Oxford: Oxford University Press.

2006. *Cultural Impact Study: Assessment and Overview of the Effects of Environmental Contamination on the Mohawks of Akwesasne*

American Anthropological Association. 2009. Code of Ethics. http://www.aaanet.org/_cs_upload/issues/policy-advocacy/27668_1.pdf Accessed April 4th

Anderson Henry A, Claire Falk, Larry Hanrahan, Joe Olson, Virlyn W. Burse, Larry Needham, Daniel Paschal, Donald Patterson Jr, Robert H. Hill Jr, and The Great Lakes Consortium. 1998. "Profiles of Great Lakes critical pollutants: A sentinel analysis of human blood and urine." *Environmental Health Perspectives* 106(5):279-289.

Andrews, Roberts. 1989. "Ruin on the Reservation." *Post Standard*, Syracuse NY. P A4-A6

Arquette, Mary, Maxine Cole, Katsi Cook, Brenda LaFrance, Margaret Peters, James Ransom, Elvera Sargent, Vivian Smoke, Arlene Stairs. 2002. "Holistic risk-based environmental decision making: A Native perspective." *Environmental Health Perspectives* 110 (supplement 2): 259-264.

Baer, Hans A, Merrill Singer, and Ida Susser. 2003. Medical Anthropology and the World System, 2nd ed. Westport, CT: Praeger.

Bailey, James E, Deborah V. Gibson, Manoj Jain, Stephanie A. Connolley, Kathryn M. Ryder and Samuel Dagogo-Jack. 2003. "Source quality initiative. Reversing the Diabetes Epidemic in Tennessee." *Tennessee Medicine* 96 (12): 559-563.

Barnes, Barry. 2005. "Elusive Memories of Technoscience." *Perspectives on Science* 13(2):142-165.

Barreiro, José. 1990. "Return of the Wampum." *Northeast Indian Quarterly* 7:1 (Spring): 8-30.

Barron, Mace G.; Michael J. Anderson, Dave Cacela, Josh Lipton, Swee J. Teh, David E. Hinton, Judith T. Zelikoff, Audrey L. Dikkeboom, Donald E. Tillitt, Mark Holey and Nancy Denslow. 2000. "PCBs, Liver Lesions, and Biomarker Responses in Adult Walleye (*Stizostedium vitreum vitreum*) Collected from Green Bay, Wisconsin." *Journal of Great Lakes Research* 26(3):250-271

Benedict, Salli M Kawennotakie. 2007. "Made in Akwesasne." In *Archaeology of the Iroquois*. Ed. Jordan E Kerber. Syracuse NY: Syracuse University Press. p 422-441.

Berglund, Eeva. 2007. "Information Society Finnish-style, or an Anthropological View of the Modern." *Anthropology and Science: Epistemologies in Practice*. Ed. Jeanette Edwards, Penny Harvey and Peter Wade. Oxford and NY: Berg. P75-92

Biolsi, Thomas and Larry Zimmerman (eds). 1997. *Indians and Anthropologists: Vine Deloria Jr and the Critique of Anthropology*. Tuscon: University of AZ Press.

Bishop R. 1996. "Addressing issues of self-determination and legitimation in Kaupapa Maori research." In *Research Perspectives in Maori Education*. Ed. B. Webber, 143–60. Wellington, NZ: Council on Education Research

Blaikie, P and H Brookfield. 1987. Land Degradation and Society London and NY: Methuen and Co Ltd

Bonaparte, Darren.

2007. "The 1970's." In *Too many Chiefs, Not Enough Indians. The History of the Three Chief System and the Constitution of the St. Regis Mohawk Tribe.* http://www.wampumchronicles.com/toomanychiefs17.html. Submitted to the St. Regis Mohawk Tribal Council August 26, 2007.

2007a "The Rise of the Longhouse." IN *Too many Chiefs, Not Enough Indians. The History of the Three Chief System and the Constitution of the St. Regis Mohawk Tribe*. http://www.wampumchronicles.com/toomanychiefs17.html. Submitted to the St. Regis Mohawk Tribal Council August 26, 2007

2009. A *Lily Among Thorns: The Mohawk Repatriation of Kateri Tekahkwi:tha*. BookSurge Publishing

Bonavillain, Nancy. 2001. "The Mohawks." *In Native Nations: Cultures and Histories of Native North Americans*. Upper Saddle River NJ: Prentice Hall. P 66-94.

Bourdieu, Pierre. 1991. Language and Symbolic Power. Cambridge: Harvard University Press

Brant, Tsí Yotsihstokwáthe Dakota. 2009. "Onhehste'ón:we: 'The Original Corn'" Posted March 1st 2009 on the Indigenous Food Sovereignty Network Facebook site established by Brant. Cited with her written permission (11/7/09) http://www.facebook.com/group.php?gid=45114828317#/topic.php?uid=45114828317&topic=7635

Brascoupe, Clayton. 1998. "The Unwitting Student: Listening to the Natural World through Traditional Farming." *Winds of Change* 13(2): 25-33

"Breast Milk Program to Begin Soon." July 2, 1987. *Indian Times*, Akwesasne.

Brettell, CB (editor) 1996. *When they read what we write: the politics of ethnography.* Westport, CT: Bergin & Garvey

Brody C., and Lovera P. 2000. "Community health studies: what can they give you?" *Everyone's Backyard* Fall: 26–28.

Brown, Phil.
1992. "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing." *Journal of Health and Social Behavior* 33(3):267-281.

2000. "Environment and Health." In *Handbook of Medical Sociology*. Ed CE Bird, P Conrad and A Fremont. Upper Saddle River NY: Prentice Hall. P 143-159

2007. "Toxic Exposues: Contested Illnesses and the Environmental Health Movement." NY: Columbia University Press

Brown, Phil; Stephen Zavestoski, Sabrina McCormick, Joshua Mandelbaum, Theo Leubke, and Meadow Linder. 2001. "A Gulf of Difference: Disputes over Gulf War-Related Illnesses." *Journal of Health and Social Behavior* 42:235-57

Brown, Phil; Stephen Zavestoski, Sabrina McCormick, Brian Mayer, Rachel Morello-Frosch and Rebecca Gasior Altman. 2004. "Embodied health movements: new approaches to social movements in health." *Sociology of Health & Illness* 26(1):50-80

Brugge, Doug and Mariam Missaghian. 2006. "Protecting the Navajo People through tribal regulation of research." *Science and Engineering Ethics* Volume 12, Issue 3, 2006

Burhansstipanov L, Christopher S, Schumacher SA. 2005. "Lessons learned from community-based participatory research in Indian Country." *Cancer Control* 12(suppl 2):70-76.

Burkitt, Denis Parsons 1994. "The Emergence of a Concept." In *Western Diseases:Their Dietary Prevention and Reversibility*. Ed Norman J Temple and Denis Parsons Burkitt. Totowa NJ: Humana Press p 1-13

Burhansstipanov L, Krebs LU, Bradley A, et al.. 2003. "Lessons learned while developing the 'Clinical Trials Education for Native Americans curriculum.'"*Cancer Control* 10(5 suppl):29-36.

Burns, Shannon C. 2005. "Mohawks file class action suit against companies for river contamination." *Indian Country Today* December 14 2005 (27): B1.

Bush, Brian. 1984. Letter to Dr. Eadon regarding "Meeting Concerning Mohawk's Milk." Dated April 18 1984.

1985. Letter to Katsi Cook. Dated May 22 1985.

1986. Letter to Katsi Cook. Dated November 24 1986.

1988. Letter to Dr. Edward Fitzgerald re: Akwesasne Milk Reports. Dated June 20 1988.

Bush, B; J Snow, S Connor, and R Koblintz. 1985. "Polychlorinated biphenyl congeners (PCBs) p,p1-DDE and hexachlorobenzene in human milk in three areas of upstate New York." *Archives of Environmental Contamination and Toxicology* 14:443-450.

Cajete, G 1999. "'Look to the Mountain': Reflections on Indigenous Ecology." *In A People's Ecology: Explorations in Sustainable Living*. G Cajete, ed. Santa Fe: Clear Light Publishers. p 3-20.

Calabrese, E. J., 1982. "Human breast milk contamination in the United States and Canada by chlorinated hydrocarbon insecticides and industrial pollutants: current status." *Journal of the American College of Toxicology* 1(3):91-8.

Campisi, Jack. 1974. Ethnic Identity and Boundary maintenance in Three Oneida Communities. PhD dissertation, State University of New York at Albany.

Canadian Institutes of Health Research (CIHR). 2007. Guidelines for Health Research Involving Aboriginal People. http://www.cihr-irsc.gc.ca/e/29134.html Accessed April 5, 2010.

Caplan, Pat. 1997. "Approaches to the study of food, health and identity." *In Food Health and Identity*. Edited by Pat Caplan. Routledge; London and New York. P1-31

Carpenter, David. 1995. "Communicating with the Public on Issues of Science and Public Health." *Environ Health Perspectives* 103(Suppl 6):127-130

Carpenter, David O; Alice Tarbell, Edward Fitzgerald, Michael J Kadlec, David OHehir, and Brian Bush. 2002. "University-Community partnership for the study of environmental contamination at Akwesasne." *In Biomarkers of Environmentally Associated Disease*. Ed Samuel H Wilson and William Suk. Lewis Publishers. P507-523

Castellano, Marlene Brant. 2004. "Ethics of Aboriginal Research." *Journal of Aboriginal Health* January:98-114 (2004:98)

Center for Disease Control (CDC). 2005. "National Diabetes Fact Sheet." Accessed at http://www.cdc.gov/diabetes/pubs/general.htm#what April 12 2010.

Centers for Disease Control (CDC). 2007. "National Diabetes Fact Sheet." http://www.cdc.gov/diabetes/pubs/estimates07.htm Accessed April 15, 2010.

Center for Disease Control (CDC). 2009. "Executive Summary." *Fourth National Report on Human Exposure to Environmental Chemicals*. Accessed at: http://www.cdc.gov/exposurereport/pdf/FourthReport_ExecutiveSummary.pdf

Charmaz, Kathy. 2006. Constructing Grounded Theory. Los Angeles: Sage

Chaufan, Claudia. 2004. "sugar blues: a social anatomy of the diabetes epidemic in the united states." *In Unhealthy Health Policy a critical anthropological examination*. Ed Arachu Castro and Merrill Singer. Walnut Creek: Alta Mira Press 257-274

Chaufan, Claudia. 2008. "What does justice have to do with it? A Bioethical and sociological perspective on the diabetes epidemic." In *Bioethical issues, sociological perspectives*. Ed Barbara Katz Rothman, Elizabeth Armstrong, Rebecca Tiger. 269-301

Chiarenzelli, Jeff, Brian Bush, Ann Casey, Ed Barnard, Bob Smih, Patrick O'keefe, Eileen Gilligan, and Glen Johnson. 2000. "Defining the sources of airborne polychlorinated biphenyls: eveidence for the influence of microbially dechlorinated congeners from river sediment?" *Canadian Journal of Fish and Aquatic Sciences* 57(Supplement 1): 86-94.

Chavis, DM, Stucky PM, Wanderman A. 1983. "Returning basic research to the community: a relationship between scientist and citizen." *American Psychologist* 38:424-434.

Children's Environmental Health Network. 1997. "Chapter 7: Communities in Action: Initiatives and Success Stories—Akwesasne Mothers Milk Project." *In Preventing Child Exposures to Environmental Hazards; Research and Policy Issues*. http://www.cehn.org/cehn/research/symposium1997.html Accessed 12/11/2006

Chrisman Noel J., C. June Strickland, Kolynn Powell, Marian Dick Squeochs, and Martha Yallup 1999. "Community partnership research with the Yakama Indian Nation." *Human Organization* 58:134-141.

Ciborski, Sara. 1990. "Culture and power: The emergence and politics of Akwesasne Mohawk traditionalism." PhD dissertation, Department of Anthropology, College of Social and Behavioral Sciences, State University of New York (SUNY) Albany, Albany NY.

Claeson, Bjorn; Emily martin, Wendy Richardson, Monica Schoch-Spana, and Karen-Sue Taussig. 1996. "Scientific Literacy, What it is, Why It's Important, and Why Scientists Think We Don't Have it." In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*. Ed by Laura Nader. NY: Rutledge p101- 116

Cleveland, David A, Fred Bowannie JR, Donald F Eriacho, Andrew Laahty, and Eric Perramond. 1995. "Zuni Farming and United States Government Policy: The Politics of Biological and Cultural Diversity in Agriculture." *Agriculture and Human Values* Summer 1995: 2-18.

Cockburn, A and J Ridgeway (eds). 1979. *Political Ecology*. NY: New York Times Book Company.

Codru, Neculai: Maria Schymura; Serban Negoita; Akwesasne Task Force on the Environment; Robert Rej; and David Carpenter. 2007. "Diabetes in Relation to Serum Levels of Polychlorinated Biphenyls and Chlorinated Pesticides in Adult Native Americans." *Environmental Health Perspectives* 115(10): 1442-1447.

Coleman, Eliot.

1999. *Four-Season Harvest: Organic Vegetables from Your Home Garden All Year Long*. Chelsea Green Publishing

2009. The Winter Harvest Handbook: Year Round Vegetable Production Using
2010. *Deep Organic Techniques and Unheated Greenhouses*. Chelsea Green Publishing

2009. "Making a Difference in your Local Food Market: The Winter Harvest." Presentation at the Eco Farm Day conference in Cornwall Ontario on February 28, 2009.

Cook, Katsi.

1976-2005. “Katsi Cook Papers.” Sophia Smith Collection Smith College, Northampton MA. Three boxes (3.75 linear ft.), collection number: MS 528.

1981. “Akwesasne Community Health Project.” Grant application submitted by the Women’s Dance Health Program. 1981. Submitted to John H Whitney Foundation in New York, NY. Provided to me from Cook’s personal files.

1992. “Mother’s Milk Project.” *First Environment* Spring 1992 1(1):8-9

1997. “The Coming of Anontaks” in *Reinventing the Enemy’s Language: Contemporary Native Women’s Writings of North America*.” Ed by Joy Harjo and Gloria Bird. New York, London: WW Norton & Company.

2005. Interview by Joyce Follet. Transcript of video recording, October 26 and 27, 2005. Voices of Feminism Oral History Project, Sophia Smith Collection. http://www.smith.edu/library/libs/ssc/vof/transcripts/Cook.pdf

2008. Interview with Elizabeth Hoover March 17, 2008. Syracuse, NY.

Cooper, Matthew

2007. “Sharing data and results in ethnographic research: Why this should not be an ethical imperative.” *Journal of Empirical Research on Human Research Ethics* 2(1):3-19.

2008. “Sharing Data and Results with Study Participants: Report on a Survey of Cultural Anthropologists.” *Journal of Empirical Research on Human Research Ethics* 3(4):19-34.

Corburn, Jason. 2005. Street Science: Community Knowledge and Environmental Health Justice. Cambridge, MA: MIT Press.

Cornwall, A and Jewkes, R. (1995). “What Is Participatory Research?”. *Social Science & Medicine* 41, 1667-1676.

DeCaprio, Anthony; Alice Tarbell, A Bott, DL Wagemaker, RL Williams; CM O’Hehir.. 2000. “Routine Analysis of 101 polychlorinated biphenyl congeners in human serum by parallel dual-column gas chromatography with electron capture detection.” *Journal of Analytical Toxicology* 24(6): 403-20.

DeCaprio, Anthony P; Glen W Jaonson; Alice M Tarbell; David O Carpenter; Jeffrey R Chiarenzelli; Gail S Morse; Azara L Santiago-Rivera; Maria J Schymura; Akwesasne Task Force on the Environment. 2005. "Polychlorinated biphenyl (PCB) exposure assessment by multivariate statistical analysis of serum congener profiles in an adult Native American population." *Environmental Research* 98:284-302.

De Koning K, Martin M. 1996. "Participatory research in health: setting the context." In deKoning K, Martin M. (ed) *Participatory Research in Health: Issues and Experiences.* London: Zed Books. p1–18.

DeLind, Laura B. 2002. "Place, Work, and Civic Agriculture: Fields for Cultivation." *Agriculture and Human Values* 19:217-224.

Denham; Melinda; Lawrence M Schell; Glenn Deane; Mia V Gallo; Julia Ravenscroft; Anthony P DeCaprio; Akwesasne Task Force on the Environment. 2005. Relationship of Lead, Mercury, Mirex, Dichlorodphenyldichloroethylene, Hexachlorobenzene and Polychlorinated Biphenyls to Timing of Menarche Among Akwesasne Mohawk Girls." *Pediatrics* 115:e127-e134.

DeVoto, E., Fiore, B., Millikan, R., Anderson, H., Sheldon, L., Sonzogni, W., and Longnecker, M. 1997. "Correlations among human blood levels of specific PCB congeners and implications for epidemiologic studies." *American Journal of Industry and Medicine* 32**:** 606-613.

Dewally, Eric, Albert Nantel; Jean-P. Weber, and Francois Meyer. 1989. "High levels of PCBs in breastmilk of Inuit Women from Arctic Quebec." *Bulletin of Environmental Contamination and Toxicology* 43:641-646.

DeWalt, Kathleen M, Billie R DeWalt, with Coral B Wayland. 1998. "Participant observation." In *Handbook of Methods in Cultural Anthropology*. Ed H Russell Bernard. Lanham: Altamira Press. P259-300

DeWalt, Kathleen M and Billie R DeWalt. 2002. *Participant Observation: A Guide for Fieldworkers*. Walnut Creek: AltaMira Press

Dickson G. 2000. "Aboriginal grandmothers' experience with health promotion and participatory action research." *Qualitative Health Research* 10:188-213.

Dignan MB, Burhansstipanov L, Hariton J, et al. 2005. “A comparison of two Native American navigator formats: face-to-face and telephone.” *Cancer Control* 12(suppl 2):28-33.

Dove, Michael. 1999. “The Agronomy of Memory and the memory of Agronomy.” In *Ethnoecology* ed Virginia Nazera. Tucson: University of AZ press.

Durie, Mason H. 2003. “The Health of Indigenous Peoples.” *British Medical Journal* 326;510-511.

Duster, Troy. 1996. “The Prsim of Heritability and the Sociology of Knowledge.” In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*. Laura Nader, ed. New York: Routledge. 119-130

Dwyer, Kevin. 1982. *Moroccan Dialogs: Anthropology in Question*. Baltimore: John Hopkins University Press.

Edwards, Jeanette; Penny Harvey and Peter Wade. 2007. “Introduction: Epistemologies in Practice.” *Anthropology and Science: Epistemologies in Practice*. Ed by Jeanette Edwards, Penny Harvey and Peter Wade. Oxford and NY: Berg. P1-18.

Ellen, RF. 2004. “From Ethno-Science to Science, or ‘What the Indigenous Knowledge Debate Tells Us about How Scientists Define their Project’.” *Journal of Cognition and Culture* 4 (3&4): 409-450.

Emery, Ellen.
December 3, 1985a. “Mt Sinai Study Took Six Years.” *Massena Observer.* Massena, NY.

December 3, 1985b. “Fish Consumption Warning Issued.” *Massena Observer*. Massena, NY.

July 2, 1987. “Study Only Partly GM Funded.” *Massena Observer*, Massena NY.

Environmental Protection Agency. March 2006. “Health effects of PCBs.” Online: /http://www.epa.gov/opptintr/pcb/pubs/effects.htmlS http://www.epa.gov/waste/hazard/tsd/pcbs/pubs/effects.htm

Epstein, Steven. 2007. Inclusion*: The Politics of Difference in Medical Research*. Chicago and London: The University of Chicago Press.

Evans, Ben. March 9 2009. “Indian farmers to outline discrimination claims.” *Business Week*. http://www.businessweek.com/ap/financialnews/D96NGIN00.htm

Fadden, Ray. 1947. History of the St. Regis Akwesasne Mohawks. Malone, New York.

Farmer, Paul.

1997. On Suffering and Structural Violence: A View from Below. In *Social Suffering*. Arthur Kleinman, Veena Das and Margaret Lock, eds. Pp 261-284. Berkeley: Univ of CA Press

1999. *Infections and Inequalities: The Modern Plagues*. Berkeley: Univ of CA Press.

2003. *Pathologies of Power: Health, Human Rights, and the New War on the Poor*. Berkeley: Univ of CA press

Fazzino, David. 2008. “Continuity and Change in Tohono O’odham Food Systems: Implications for Dietary Interventions.” *Culture* & Agriculture.30(1 & 2): 38–46.

Fenton, William N.

1949. “Seth Newhouse’s [Dayodekane’s] Traditional History and Constitution of the Iroquois Confederacy.” *Proceedings of the American Philosophical* Society 93:2: 141-158

1962. This Island, the World on the Turtle's Back. Journal of American Folklore 75:283-300.

1971. “The Iroquois in History.” In *North American Indians in Historical Perspective*. Ed by Eleanor B Leacock and Nancy O Lurie. New York: Random House. P 129-168.

1971a ”The New York State Wampum Collection: The Case for the Integrity of Cultural
Treasures.” *Proceedings of the American Philosophical Society* 115(6): 437-461

1972. “Introduction.” *League of the Iroquois* by Lewis Henry Morgan. Secaucus, NJ: The Citadel Press.

1978. Northern Iroquoian Culture Patterns. In *Northeast, Bruce Trigger, ed. Handbook of North American Indians v 15*. William C Sturtevant, gen ed. Washington: Smithsonian Inst. p 296-321

1986. "Leadership in the Northeastern Woodlands of North America." *The American Indian Quarterly* X(1):21-43

1987. *The False Faces of the Iroquois*. Norman: University of Oklahoma Press.

1998. *The Great Law and the Longhouse: A Political History of the Iroquois Confederacy*. University of Oklahoma Press, Norman.

Fenton, William N and Elisabeth Tooker. 1978. "Mohawk." In *Northeast. Bruce Trigger, ed. Handbook of North American Indians v 15*. William C Sturtevant, General ed. Washington: Smithsonian Inst. P 466-480

Ferreira, Mariana Leal and Gretchen Chesley Lang. 2006. "Introduction: Deconstructing Diabetes." In *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press.

Finnis, Elizabeth. 2007. "The political ecology of dietary transitions: Changing production and consumption patterns in the Kolli Hills, India." *Agriculture and Human Values* 24:343-353.

Fisher PA, Ball TJ. 2003. "Tribal participatory research: mechanisms of a collaborative model." *American Journal of Community Psychology* 32:207-216.

Fitzgerald, Edward F; Syni-An Hwang; Kelley A Brix; Brian Bush; Judith Quinn and Katsi Cook. 1992. "Chemical Contaminants in the Milk of Mohawk Women from Akwesasne." *Report for the Health Risk Assessment of the General Motors Central Foundry Division Superfund Waste*. Albany: New York State Department of Health.

Fitzgerald, E; HWANG, S; BRIX, K; COOK, K; AND WORSICK, P. 1995a. "Fish PCB concentrations and consumption patterns among Mohawk women at Akwesasne." *Journal of Exposure Analysis—Environmental Epidemiology* 5:1-19.

Fitzgerald E, Syni-Ann Hwang, Kellley Brix et al. 1995b. "Exposure to PCBs from hazardous waste among Mohawk women and infants at Akwesasne." *Report for the Agency for Toxic Substances and Disease Registry*, PB95-159935 ATSDR, Atlanta.

Fitzgerald, Edward F; Kelley A Brix; Debra A Deres; Syni-An Hwang; Brian Bush' George Lambert; Alice Tarbell. 1996. "Polychlorinated Biphenyl (PCB) and Dichlorodiphenyl Dichloroethylene (DDE) Exposure Among Native American Men from Contaminated Great Lakes Fish and Wildlife." *Toxicology and Industrial Health* 12 (3/4)361-368.

Fitzgerald, E; Syni-An Hwang; Brian Bush; Katsi Cook; Priscilla Worswick. 1998. "Fish Consumption and Breast Milk PCB Concentrations among Mohawk Women at Akwesasne." *American Journal of Epidemiology* 148(2):164-172.

Fitzgerald, E; Deres, D; Hwang, S; BUSH, B; YANG, B; TARBELL, A; JACOBS A. 1999. "Local fish consumption and serume PCB concentrations among Mohawk men at Akwesasne." *Environmental Research* 80(2): S97-S103.

Fitzgerald, Edward F; Syni-An Hwang; Debra A Deres; Brian Bush; Katsi Cook and Priscilla Worswick. 2001. "The association between local fish consumption and DDE, mirex, and HCB concentrations in the breast milk of Mohawk women at Akwesasne." *Journal of Exposure Analysis and Environmental Epidemiology*. 11: 381-388.

Fitzgerald, Edward F; Syni-An Hwang, Karyn Langguth, Michael Cayo, Bao-Zhu Yang; Brian Bush; Priscilla Worswick; and Trudy Lauzon. 2004. "Fish consumption and other environmental exposures and their associations with serum PCB concentrations among Mohawk women at Akwesasne." *Environmental Research* 94:160-170.

Fitzgerald, EF; Hwang, SA; LAMBERT, G; GOMEZ, M; TARBELL, A. 2005. "PCB exposure and in vivo CYP1A2 activity among Native Americans." *Environmental Health Perspectives* 113(3):272-7.

Fitzgerald, E: S Hwang; M Gomez; B Bush; B Yang; and A Tarbell. 2007. "Environmental and occupational exposures and serum PCB concentrations and patterns among Mohawk men at Akwesasne." *Journal of Exposure Science and Environmental Epidemiology* 17:269-278.

Forsyth, Tim. 2003. *Critical Political Ecology: The politics of environmental science.* London and NY: Routledge.

Forti, Anthony; Kenneth G Bogdan, E Horn. 1995. *Health risk assessment for the Akwesasne Mohawk population from exposure to chemical contaminants in fish and wildlife.* Albany, NY: New York State Bureau of Toxic Substance Assessment.

Foy, Paul. 1985a. "Animals at Massena GM Dump Laden with PCBs." *Watertown Daily Times*, Watertown, NY. August 24, 1985.

Foy, Paul. 1985b. "State Biologist Finds Poison in Two Ducks." *Watertown Daily Times*, Watertown NY. September 19, 1985

Foucault, Michel. 1980. *Power/Knowledge: Selected Interviews and Other Writings 1972-1977*. Brighton: Harvester Press

Franklin, Sara (1995) "Science as Culture: Culture of Science." *Annual Review of Anthropology*, 24:163-84

Freedman, David A. 1999. "Ecological Inference and the Ecological Fallacy." *International Encyclopedia of the Social and Behavioral Sciences*. Technical Report NO 549

Frey, S.L. 1898. "The Mohawks." *Transactions of the Oneida Historical Society* 8:1-41.

Friedman, DJ and Barbara Starfield. 2003. "Models of Population Health: Their Value for US Public Health Practice, Policy, and Research." *American Journal of Public Health* 93(3):366-369.

Frisch, Jack

1970. Revitalization, Nativism, and Tribalism Among the St. Regis Mohawk. PhD dissertation, Department of Anthropology, Indiana University.

1970a. "Tribalism Among the St. Regis Mohawks: A Search for Self-Identity." *Anthropologica* 12(2):207-19.

1971. “Factionalism, Pan-Indianism, Tribalism, and the Contemporary Political Behavior of the St. Regis Mohawks.” *Man in the Northeast*, 2;75-81.

Garson, Stephen C. 2002. Talking Toxics; Narrative Constructions of Environmental Risk in Conflict. PhD dissertation, Institute for Conflict Analysis and Resolution, George Mason University, Fairfax VA.

Garwick AW, Auger S. 2003. “Participatory action research: the Indian family stories project.” *Nursing Outlook*.51:261-266.

Gallo, MV: J Ravenscroft, M Denham, LM Schell, A DiCaprio; Akwesasne Task Force on the Environment.. 2002. “Environmental Contaminants and Growth of Mohawk Adolescents at Akwesasne.” In *Human Growth from Conception to Maturity.* Edited by G Gilli, L Benso and L Schell, p 279-287. London: Smith-Gordon. .

Gallo, Mia V; Lawrence M Schell; Akwesasne Task Force on the Environment. 2005. “Height, weight, and body mass index among Akwesasne Mohawk Youth.” *American Journal of Human Biology*. 1(3):269-79.

Gallo, Mia V; Lawrence M Schell; Akwesasne Task Force on the Environment. 2007. “Selected Anthropometric Measurements of Akwesasne Mohawk Youth: Skinfolds, Circumferences, and Breadths.” *American Journal of Human Biology* 19:525-536.

Garro, Linda C. 1995. “Individual or Societal responsibility? Explanations of Diabetes in an Anishnaabe (Ojibway) community.” *Social Science and Medicine* 40(1):37-46.

Geertz, Clifford. 1973. “Deep Play: Notes on the Balinese Cockfight.” *The Interpretation of Cultures*. New York: Basic Books. Pp. 412-453.

George-Kanentiio, Doug.
2000. “Mohawk Ceremonial Cycle.” In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy)*. Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press. p 203-205

2000a. *Iroquois Culture & Commentary*. Santa Fe NM: Clear Light Publishers

2006. *Iroquois on Fire: A Voice from the Mohawk Nation*. Lincoln: University of Nebraska Press

Gerstenberger, S.L., Tavris, D.R., Hansen, L.K., Pratt-Shelley, J.Dellinger, J.A., 1997. "Concentrations of blood and hair mercury and serum PCBs in an Ojibwa population that consumes Great Lakes region fish". *Clinical Toxicology*. 35:377–386.

Gieryn, Thomas F. 1999. *Cultural Boundaries of Science: Credibility on the Line.* Chicago and London: University of Chicago Press.

Gittelsohn, Joel; Thomas MS Wolever, Stewart B Harris, Robert Harris-Giraldo, Anthony JG Hanley and Bernard Zinman. 1998. "Specific Patterns of Food Consumption and Preparation are Associated with Diabetes and Obesity in a Native Canadian Community." *American Society for Nutritional Sciences* 128:541-547

Goldstein, Mark. October 5, 1983. "PCBs Dump Poses 'Danger to Health'" *Watertown Daily Times*. Watertown, NY.

Goncharov, Alexey; Richard Haase, Azara Santiago-Rivera; Gayle Morse; Akwesasne Task Force on the Environment; Robert J McCaffrey; Robert Rej; David O. Carpenter. 2008. "High serum PCBs are associates with elevation of serum lipids and cardiovascular disease in a Native American population." *Environmental Research* 106(2008) 226-239.

Goncharov, Alexey; Robert Rej, Serban Negoita, Maria Schymura, Azara Santiago-Rivera, Gayle Morse, the Akwesasne Task Force on the Environment, and David O. Carpenter. 2009. "Lower Serum Testosterone Associated with Elevated Polychlorinated Biphenyl Concentrations in Native American Men." *Environmental Health Perspectives*. 117(9): 1454-1460.

Goodman-Draper, Jacqueline. 1994. "The Development of Underdevelopment at Akwesasne: Cultural and Economic Subversion." *American Journal of Economics and Sociology* 53(1): 41-56.

Goran Michael; Mary Kaskoun; Rachael Johnson; Charlene Martines; Benson Kelly; Virginai Hod 1995. "Energy Expenditure and Body Fat Distribution in Mohawk Children." *Pediatrics 95*(1)89-95.

Graham, Elizabeth. 2009. "Issue of Mohawk land claim lawsuit resurrected." *Watertown Daily Times*, May 23 2009. http://www.watertowndailytimes.com/article/20090523/NEWS05/305239970/0/FRONTPAGE. Accessed March 15 2010.

Gray (Kanatiyosh), Barbara A. 2000. "Ceremony, as Haudenosaunee way of life." In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy).* Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press. p 51-54.

Gray (Kanatiiosh), Barbara and Pat Lauderdale. 2006. "The Web of Justice: Restorative Justice Has Presented Only Part of the Story." *Wicazo Sa Review* 21(1): 29-41.

Grimen, Harald. 2009. "Power, Trust and Risk: Some Reflections on an Absent Issue." *Medical Anthropology Quarterly*. 23(1) 16-33.

Grinde, Donald and Bruce Johansen. 1995. *Ecocide of Native America*. Clear Light Publishers; Santa Fe NM. p181.

Gusterson, Hugh. 1996. "Nuclear Weapons Testing: Scientific Experiment as Political Ritual." In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*.
Laura Nader, ed. New York: Routledge. 131-147.

Haase, Rf; RJ McCaffrey; AL Santiago-Rivera; GS Morse; A Tarbell. 2009. "Evidence of an age-related threshold effect of polychlorinated biphenyls (PCBs) on neuropsychological functioning in a Native American population." *Environmental Research* 109(1):73-85.

Hagey, Rebecca.
1984. "The Phenomenon, the Explanations and the Responses: Metaphors Surrounding Diabetes in urban Canadian Indians." *Social Science and medicine*. 18(3):265-72

1989. "The Native Diabetes Program: Rhetorical Process and Praxis." *Medical Anthropology* 12(1):7-33.

Hale, Horatio, ed. 1963 (1883). *The Iroquois Book of Rites*. Toronto: University of Toronto Press.

Halpern, Peggy. 2007. "Obesity and American Indians/Alaska Natives" Prepared for the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. Washington DC. Accessed at http://aspe.hhs.gov/hsp/07/AI-AN-obesity/report.pdf.April 2, 2010.

Hamdy, Sherine F. 2008. "When the state and your kidneys fail: Political etiologies in an Egyptian dialysis ward." *American Ethnologist* 35(4):553-569.

Hanrahan Lawrence P; Claire Falk, Henry A Anderson, Laurie Draheim, Marty S. Kanarek, Joe Olson, and The Great Lakes Consortium. 1999. "Serum PCB and DDE levels of frequent Great Lakes sport fish consumers-A first look." *Environmental Research* 80:S26-S37

Harding, Sandra. 2008. *Science from Below*. Durham and London: Duke University Press.

Hart, Bill. 1982. "State is Skeptical of Pollutant Claim from Reservation." *Post Standard*, Syracuse NY. February 19, 1982.

Harper, Douglas. 2001. *Changing Works; Visions of a Lost Agriculture*. University of Chicago Press, Chicago and London.

Harper, Janice. 2004. "Breathless in Houston: A Political Ecology of Health Approach to Understanding Environmental Health Concerns," *Medical Anthropology* 23:295-326.

Harvey-Berino, Jean; Virginia Hood; Janine Rourke; Terrie Terrance; Anne Dorwaldt; Roger Secker-Walker. 1997. "Food preferences predict eating behavior of very young Mohawk children." *Journal of the American Dietetic Association* 97(7):750-753

Harvey-Berino, Jean and Janine Rourke. 2003. "Obesity Prevention in Preschool Native American Children : A Pilot Study using Home Visits." *Obesity Research* 11(5):603-611

Hatch J, Moss N, Saran A, Presley-Cantrell L, Mallory C. 1993. "Community research: partnership in Black communities." *American Journal of Preventative Medicine.* 9(Suppl.): 27–31

Hauptman, Laurence M.

1986. The *Iroquois Struggle for Survival: World War II to Red Power*. Syracuse NY; Syracuse University Press

1988. *Formulating American Indian Policy in New York State, 1970-1986*. Albany NY: State University of New York Press.

2008. *Seven Generations of Iroquois Leadership*. Syracuse NY: Syracuse University Press.

Health Investigations Communications Work Group (HICWG). 2004. "Communicating Results to Community Residents: Lessons from Recent ATSDR Health Investigations." *Journal of Exposure Analysis and Environmental Epidemiology* 14(7):484–491.

Hennare, Amiria. 2007 "Nga rakau a te Pakeha: Reconsidering Maori Anthropology." *Anthropology and Science: Epistemologies in Practice*. Ed by Jeanette Edwards, Penny Harvey and Peter Wade. Oxford and NY: Berg. P93-113

Hewitt, JNB.

1920. "A constitutional League of Peace in the Stone Age of America: The League of the Iroquois and Its Constitution." *Smithsonian Institution Series*: 527-545.

1930. "The 'League of Nations' of the Iroquois Indians in Canada." *Explorations and Field-work of the Smithsonian Institution* for 1929: 201-206.

1982. "Legend of the Founding of the Iroquois League." *American Anthropologist* (old series)5(April): 131-148.

Heyman, Josiah. 1997. "Imports and Standards of Justice on the Mexico-United States Border." In *The Allure of the Foreign*, ed Benjamin Orlove, 151-83. Ann Arbor: University of Michigan Press.

Hodson, Derek 1999. "Going Beyond Cultural Pluralism: Science Education for Sociopolitical Action." *Science Education* 83:775-796

Hong, C.S.; J Xiao; AC Casey; B Bush; EF Fitzgerald; SA Hwang. 1994. "Mono-Ortho- and Non-Ortho-Substituted Polychlorinated Biphenyls in Human Milk from Mohawk and Control Women: Effects of Maternal Factors and previous Lactation". *Archives of Environmental Contamination and Toxicology*. 27:431-437.

Hood, Virginia L; Kelly, Benson; Martinez, Charlene; Shuman, Shevonne; Secker-Walker, Roger. 1997. "A native American community initiative to prevent diabetes." Ethnicity & Health 2(4):277-285

Hood, Ronald D. 2009. "The importance of toxicity thresholds for biomonitoring." Accessed at http://www.biomonitoringinfo.org/cordblood/The%20importance%20of%20toxicity%20thresholds%20for%20biomonitoring%2012-02-09.pdf

Hoover, Mary. 1986. "The Dying Turtle: Mohawk Lands Under Siege." *Akwesasne Notes* 18(5):18

Hull, RL, S Andrikopoulos, CB Verchere, J Vidal, F Wang, M Cnop, RL Prigeon and SE Kahn. 2003. "Increased Dietary Fat Promotes Islet Amyloid formation and Beta-cell Secretory Dysfunction in a transgenic Mouse Model of Islet Amyloid." *Diabetes* 52(2):372-79.

Humphrey HEB. 1983. Population studies of PCBs in Michigan residents. In: *D'Itri FM*, Kamrin MA, eds. *PCBs: Human and environmental hazards.* Boston, MA: Butterworth, 299-310.

Hwang, S; L Gensburg, E Fitzgerald; P Herzfeld, and B Bush. 1993. "Fingerprinting sources of contamination: statistical techniques for identifying point sources of PCBs." *Journal of Occupational Medicine and Toxicology*. 4(365-382.

Hwang, Syni-An; Edward Fitzgerald; Brian Bush; Katsi Cook. 1996. "Exposure to PCB's from Hazardous Waste Among Mohawk Women and Infants at Akwesasne." *Technology Journal of the Franklin Institute*.333A:17-23.

Hwang, Syni-Ann; Edward F Fitzgerald; Mike Cayo; Bao-Zhu Yang; Alice Tarbell; and Agnes Jacobs. 1999. "Assessing Environmental Exposure to PCBs among Mohawks at Akwesasne through the Use of Geostatistical Methods." *Environmental Research* Section A 80: S189-S199.

Hwang, Syni-An; Bao-Zhu Yang; Edward Fitzgerald; Brian Bush; Katsi Cook. 2001. "Fingerprinting PCB patterns among Mohawk women." *Journal of Exposure Analysis and Environmental Epidemiology*. 11; 184-192.

Indian Law Resource Center. 2005. "Governor and Akwesasne Mohawks Announce Historic Settlement of Mohawk Indian Land Claim." Press Release, February 1 2005. http://www.indianlaw.org/sites/indianlaw.org/files/resources/Mohawk%20Pataki%20Press%20Release%20200502.pdf

Indian Nations Conservation Alliance Website. Tribal Districts. www.inca-tcd.org/files/tri_dist.doc

Ingold, T. 2004. "Introduction: Anthropology after Darwin," *Social Anthropology* 12(2)Z: 177-79.

Israel, Barbara A., Amy J. Schulz, Elizabeth A. Parker and A. B. Becker. 1997. "It Takes a Community: framework for the First Nations and Inuit Fetal Alcohol Syndrome and Fetal Alcohol Effects Initiative". Ottawa: Health Canada minister of Public works and Government Services.

Israel, B. A., A. J. Schulz, E. A. Parker, and A. B. Becker. 1998. "Review of community based research: Assessing partnership approaches to improve public health". *Annual Review of Public Health* 19:173–202.

Israel, Barbara A, Eurenia Eng, Amy J Schultz, Edith A Parker (eds) 2005. *Methods in Community Based Participatory Research for Health*. San Francisco, California: Jossey Bass.

Jaarsma, SR (ed). 2002. *Handle with care: Ownership and control of ethnographic materials*. Pittsburg PA: University of Pittsburg Press.

Jackson, MY. 1993. "Height, weight, and body mass index of American Indian schoolchildren, 1990-1991". *Journal of American Dietetic Association* 93:1136-1139

Jameson, Franklin. 1909. *Narratives of New Netherland 1609-1664*. New York. (cited in Goodman-Draper)

Jensen, A. A., 1989**. "**Background levels in humans", in *Halogenated Biphenyls, Terphenyls, Naphthalenes.Dibenzodioxins and Related Products,* Kimbrough, R. D. and Jensen, A. A,, Eds., Elsevier Biomedical Press, Amsterdam. p 345.

Jensen,AA. 1991. "Levels and trends of environmental chemicals in human milk." *In Chemical Contaminants in Human Milk.* Ed AA Jensen and SA Slorach. Boca Raton FL: CDC Press. 45-198.

Jessa, Sultan. December 3, 1985. "Indian People told to eat less fish" *Standard-Freeholder*. Cornwall, Ontario.

Joe, Jennie R. 2001. "Out of Harmony: Health Problems and Young Native American Men". *Journal of American College of Health* 49:237-42.

Johansen, Bruce.

1993. *Life and Death in Mohawk Country*. Golden Colorado: north American Press/Fulcrum.

2000. "Preface" In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy).* Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press. p vii-xi.

2000a "Fenton, William N., b 1908." In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy)*. Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press. p 80-82.

Johansen, Bruce Elliot and Barbara Alice Mann (editors). 2000. *Encyclopedia of the Haudenosaunee (Iroquois Confederacy).* Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press.

Judkins, Russell A. 1978. "Diabetes and Perception of diabetes among Seneca Indians". *New York State journal of medicine* 78(8):1320-23.

Kanetohare. 2010. "Ohontsiawakon" *Ronathahonni Cultural Center*. [video]. Retrieved April 15, 2010, from http://vimeo.com/7433043

Kaspin, Deborah. 1996. "A Chewa Cosmology of the Body" *American Ethnologist*, 23(3):561-578.

Kearney Jill P., Donald C. Cole, Liliane A. Ferrona, Jean-Philippe Weber. 1999. "Blood PCB, *p,p*-DDE, and mirex levels in Great Lakes fish and waterfowl consumers in two Ontario communities." *Environmental Research* 80(A):S138-S149.

Kerber, Jordan E (editor) 2007. *Archaeology of the Iroquois*. Syracuse NY: Syracuse University Press. p 422-441.

Kimbrough, Renate D. 1995. "Polychlorinated Biphenyls (PCBs) and Human Health: An Update" *Critical Reviews in Toxicology* 25(2): 133-163.

King, Joyce Tekahnawiiaks.
1996. "New York State Breaks off negotiations." Press Release, Syracuse, October 3. By the Kahniakehaka (Mohawk) Nation Council of Chiefs (Traditional government), the St. Regis Mohawk Tribe (United States); and the Mohawk Council of Akwesasne (Canada)". Posted at http://www.tuscaroras.com/pages/newyorkEX.html Accessed March 15, 2010

2007. "The Value of Water and the Meaning of Water law for the Native Americans Known as the Haudenosaunee." *Cornell Journal of Law and Public Policy*. 16(3). Available at http://www.tekahnawiiaks.com/article.html

Kinney, A; E Fitzgerald, S Hwang; B Bush; A Tarbell. 1997. "Human exposure to PCBs: modeling and assessment of environmental concentrations on the Akwesasne reservation." *Drug and Chemical Toxicology* 20(4): 313-28.

Kolbert, Elizabeth 1989. "Armed Standoff on Mohawk Reservation." *The New York Times*, July 27 1989
http://www.nytimes.com/1989/07/27/nyregion/armed-standoff-on-mohawk-reservation.html?pagewanted=1
Accessed March 15, 2010

Kozak, David. 1997. "Surrendering to diabetes: An Embodied Response to Perceptions of Diabetes and Death in the Gila River Indian Community." *Omega, journal of death and Dying* 35(4):347-59.

Knowler, William C, E Barrett-Connor, SE Fowler, RF Hamman, JM Lachin, EA Walker, and DM Nathan. 2002. "Diabetes Prevention Program Research Group Reduction in the Incidence of type 2 Diabetes with Lifestyle Intervention or Metaformin." *New England Journal of Medicine* 345(6);393-403.

Krook, L and G Maylin. 1979. “Industrial Fluoride Pollution: Chronic Fluoride Poisoning in Cornwall Island Cattle.” *Cornell Veterinarian*. 69(supplement 8).

Kutz FW, Strassman SC. 1976 “Residue of polychlorinated biphenyls in the general population of the United States.” In *Proceedings of the National Conference on Polychlorinated Biphenyls* (Nov. 19-21, 1975, Chicago, IL). Washington, DC: Environmental Protection Agency, March 1976. EPA Pub. No. 560/6-75-004:139-143.

Krook, L and G Maylin. 1979. “Industrial Fluoride Pollution: Chronic Fluoride Poisoning in Cornwall Island Cattle.” *Cornell Veterinarian*. 69(supplement 8).

LaDuke, Winona. 2005. *Recovering the Sacred: The Power of Naming and Claiming*. Cambridge, MA: South End Press.

Landsman, Gail and Sara Ciborski. 1992. “Representation and Politics: Contesting Histories of the Iroquois.” *Cultural Anthropology* 7(4): 425-447.

Lang, Gretchen Chesley.

2006a. “’In their Tellings’: Dakota Narratives about History and the Body.” 2006. *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press.P 53-72.

2006a. “Talking about a New Illness with the Dakota: Reflections on Diabetes, Foods and Culture.” 2006. *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press.P 203-230

Lang, Tim and Michael Heasman. 2004. *Food Wars: The Global Battle for Mouths, Minds and Markets*. London, Sterling VA: Earthscan.

Latour, Bruno. 1987. *Science in Action*. Cambridge MA: Harvard University Press.

Leach, Melissa, Ian Scoones, and Brian Wynne 2005 “Introduction: Science, Citizenship, and Globalization”. In *Science and Citizens: Globalization and the Challenge of Engagement*. M. Leach, I. Scoones, and B.Wynne, eds. Pp. 3–14. London: Zen.

Lemelin, Raynald Harvey. 1996. Social Movements and the Great Law of Peace in Akwesasne. Thesis deposited at the School of Graduate Studies in order to obtain a Master's Degree in Arts. University of Ottawa.

Lex, Barbara W and Janice Racine Norris. 1999. “Health Status of American Indian and Alaska Native Women” In *Women and Health Research* ed Mastroianni, Faden and Federman 2:192-215.

Little, Peter 2009. “Negotiating Community Engagement and Science in the Federal Environmental Public Health Sector” *Medical Anthropology Quarterly. 23(2):* 94–118.

Litwhiler, Stephen. 2010. NYS DEC Region 6 Citizen Participation Specialist: personal communication 1/12/2010

Lock, Margaret

1993. “Cultivating the Body: Anthropology and Epistemologies of Bodily Practice and Knowledge”. *Annual Review of Anthropology*. 22:133-155

1993 *Encounters with Aging: Mythologies of Menopause in Japan and North America. Berkeley*: University of CA Press

2001. “The Tempering of Medical Anthropology: Troubling Natural Categories”. *Medical Anthropology Quarterly* 15(4):478-492

Lyson, Thomas. 2005. “Civic Agriculture and Community Problem Solving.” *Culture and Agriculture* 27(2): 92-98

Macaulay, Ann C. Gilles Paradis, Louise Potvin, Edward J. Cross, Chantal Saad-Haddad, Alex McComber, Serge Desrosiers, Rhonda Kirby, Louis T. Montour, Donna L. Lamping, Nicole Leduc, and Miche`le Rivard. 1997. “The Kahnawake Schools Diabetes Prevention Project: Intervention, Evaluation, and Baseline Results of a Diabetes Primary Prevention Program with a Native Community in Canada.” *Preventive Medicine* 26:779-790.

Macaulay, Ann C, Margaret Cargo, Sherri Bisset, Treena Delormier, Lucie Levesque, Louise Potvin, and Alex M McComber. 2006. "Community Empowerment for the Primary Prevention of Type 2 Diabetes: Kanien'keha:ka (Mohawk) Ways for the Kahnawake Schools Diabetes Prevention Project."*Indigenous Peoples and Diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press. P407-434.

Mackie D, Quellar S. 2000. "The impact of group membership on persuasion: revisiting "Who says what to whom in what effect?"" In *Attitudes, Behavior, and Social Context: The Role of Norms and Group Membership*. Ed D Terry and M Hogg. Mahwah NJ: Erlbaum. p 135-155

Mann, Barbara A.
1997. "The Lynx in Time: Haudenosaunee Women's Traditions and History." American Indian Quarterly 21(3):423-449

2000. "Handsome Lake (Sganyadai:yoh, Skaniadario) (Seneca), C 1734-1815." In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy).* Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press. p 145-151.

Mann, Barbara A, and Jerry L Fields. 1997. "A Sign in the Sky: Dating the League of the Haudenosaunee." *American Indian Culture and Research Journal* 21(2):105-163.

Martin, Kallen. 1996. "Akwesasne; Industrial Contamination, Environmental Recovery." *Winds of Change* Summer: 16-21.

Martinez, Charlene and Karen Strauss. 1993. "Diabetes in St. Regis Mohawk Indians." *Diabetes Care* 16(supplement 1):260-262.

Matthiessen, Peter. 1984. *Indian Country,* New York: The Viking Press.

McIntyre, Mark. October 13, 1985. "Pollution Clouds Indian Way of Life" *Newsday.* Long Island, NY.

McMullin, Juliet. 2010. *The Healthy Ancestor: Embodied Inequality and the Revitalization of Native Hawaiian Health*. Walnut Creek CA: Left Coast Press.

Medicine, Beatrice. 2001 Learning to Be an Anthropologist and Remaining "Native". Urbana and Chicago: University of Illinois Press.

Megapolensis, Johannes. 1857. "A Short Sketch of the Mohawk Indians in New Netherland". *Col lections of the New York Historical Society*, 2nd Series 3: 137-60 (cited in Goodman-Draper).

Miewald, Christina E. 1997. "Is Awareness Enough? The Contradictions of self-Care in a Chronic Disease Clinic." *Human Organization* 56(3):353-63.

Mi'kmaw Ethics Watch. 2000. *Principles and Guidelines for Researchers Conducting Research With and/or Among Mi'kmaq People.* Accessed at http://mrc.cbu.ca/prinpro.html April 15, 2010.

Milburn, Michael P. 2004. "Indigenous Nutrition: Using Traditional Food Knowledge to Solve Contemporary Health Problems." *The American Indian Quarterly*. 28(3&4):411-434.

Minkler M. 2005. 'Using Participatory Action Research to Build Healthy Communities." *Public Health Reports*. 115:191-197.

Minkler, Meredith; Victoria Breckwich Vasquez, Charlotte Chang, Jenesse Millerr, Victor Rubin, Angela Glover Blackwell, Mildred Thompson, Rebecca Flournoy, Judith Bell. 2008 "Promoting Healthy Public Policy through Community-Based Participatory Research: Ten Case Studies." **Funder:** W.K. Kellogg Foundation **Publishers:** University of California, Berkeley. School of Public Health; PolicyLink (Organization). http://depts.washington.edu/ccph/pdf_files/CBPR_final.pdf

Minkler, Meredith and Nina Wallerstein (eds) 2008 *Community-Based Participatory Research for Health: From Process to Outcomes.* San Francisco: Jossey-Bass.

Mohawk, John.

2000. "Fort Stanwix Treaty (1784)." In *Encyclopedia of the Haudenosaunee (Iroquois Confederacy).* Edited by Bruce Elliott Johansen and Barbara Alice Mann. Westport, CT: Greenwood Press.

2008. "From the First to the Last Bite: Learning from the Food Knowledge of Our Ancestors." In *Original Instructions: Indigenous Teachings for a Sustainable Future*. Ed by Melissa K Nelson. Rochester VT: Bear & Company. 170-179.

Moreno-John, Gina; Anthony Gachie, Candace M. Fleming, Anna NÁpoles-Springer, Elizabeth Mutran, Spero M. Manson and Eliseo J. Perez-Stable. 2004. "Ethnic Minority Older Adults Participating in Clinical Research: Developing Trust." *Journal of Aging and Health* 16(5 suppl):93S-123S.

Morgan, Lewis Henry. 1972(1851). *League of the Haudenosaunee, or Iroquois*. Secaucus, NJ: The Citadel Press.

Mt Pleasant. 1989. "The Iroquois Sustainers; Practices of Long term Agriculture in the North East." *Northeast Indian Quarterly,* Spring/Summer: 33-39

Nabhan, Gary Paul

1987. "Native Seeds; Challenging the Policy of Neglect." *Northeast Indian Quarterly*. Spring/Summer p 18-20.

1989. *Enduring Seeds: Native American Agriculture and Wild Plant Conservation*. San Francisco: North Point Press

Nadasdy, Paul.

1999. "The Politics of TEK: Power and the 'Integration' of Knowledge." *Arctic Anthropology* 36(1-2): 1-18

2003. *Hunters and Bureaucrats: Power, Knowledge and Aboriginal-State Relations in the Southwest Yukon*. Vancouver and Toronto: UBC Press.

Nader, Laura

1969. "Up the Anthropologist—Perspectives Gained from Studying Up". In *Reinventing Anthropology*. Dell Hymes, ed. Pp. 284–311. New York: Pantheon.

1996 "Introduction: Anthropological Inquiry into Boundaries, Power, and Knowledge". In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*.
Laura Nader, ed. Pp. 1–25. New York: Routledge.

2001 "Anthropology! Distinguished Lecture—2000". *American Anthropologist* 103(3):609–620.

National Academies. 2006. "Fluoride in Drinking Water: A Scientific Review of EPA's Standards."

Neel, James. 1962. "Diabetes Mellitus: A 'thrifty' Genotype Rendered Detrimental by 'Progress'?" *American Journal of Human Genetics* 14:353-52.

Negoita, S., and L.Swamp, 1997. *Human Health & Disease Patterns at Akwesasne*. Akwesasne Task Force on the Environment.

Negoita, Serban; Levi Swamp; Benson Kelley; and David O Carpenter. 2001. "Chronic Diseases Surveillance of St. Reis Mohawk Health Service Patients." *Journal of Public Health Management and Practice* 7(1):84-91

Newman, Joan; Amy Aucompaugh; Lawrence Schell; M; Melinda Denham; Anthony P DeCaprio; Mia V Gallo; Julia Ravenscroft; Chin-Cheng Kao; MaryEllen Rougas Hanover; Dawn David ; Agnes Jacobs; Alice Tarbell; Priscilla Worswick; The Akwesasne Task Force on the Environment. 2006. "PCBs and cognitive functioning of Mohawk adolescents." *Neurotoxicology and Teratology* 28:429-445.

Newman, Joan; and Mia V. Gallo, Lawrence M. Schell, Anthony P. DeCaprio, Melinda Denham, Glenn D. Deane and the Akwesasne Task Force on the Environment. 2009. "Analysis of PCB congeners related to cognitive functioning in adolescents." *NeuroToxicology*, 30(4):686-696.

New York State Department of Health Center for Environmental Health. 2007. "Public health Consultation: general Motors/Central Foundry Division—Update" September 28, 2007.. From http://www.health.state.ny.us/environmental/investigations/gm/docs/gm.pdf. Accessed on April 14, 2010

Nguyen, Vinh-Kim and Karine Peschard. 2003. "Anthropology, Inequality and Disease: A Review". *Annual Review of Anthropology* 32:447-474.

Noe TD, Manson SM, Croy C, McGough H, Henderson JA, Buchwald DS. 2007. "The influence of community-based participatory research principles on the likelihood of participation in health research in American Indian communities." *Ethnicity and Disease* 2007 Winter;17(1 Suppl 1):S6-14.

Norton, Ilena M and Spero M Manson. 1996 "Research in American Indian and Alaska Native Communities : Navigating the Cultural Universe of Value and Processes." *Journal of Consulting and Clinical Psychology* 64(5): 856-860.

Novick LF. 1995. “Research linkages between academia and practice”. *American Journal of Preventative Medicine*. 11(3 suppl):8.

Nowotony, H; P Scott and M Gibbons. 2001. *Re-thinking Science: Knowledge and the Public in an Age of Uncertainty*. Oxford:Polity.

O’Dea, K. 1984. “Marked Improvement in Carbohydrate and Lipid Metabolism in Diabetic Australian Aborigines After Temporary Reversion to Traditional Lifestyle.” *Diabetes* 33: 596-603.

O’Flaherty, R Michael. 2000. “Ecological Agriculture: Situating the Garden in the Study of Agriculture.” *Culture & Agriculture*, 22(2): 16-26.

Ostendorf, David and Dixon Terry. 1995. “Toward a Democratic Community of Communities: Creating a New Future with Agriculture in Rural America.” In *Environmental Justice: Issues, Policies and Solutions*. Edited by Bunyan Bryant. Washington DC: Island Press. P 149-171 and 261-263.

Parker, Arthur C.
1916. *The Constitution of the Five Nations*, or, *The Iroquois Book of the Great Law*. Albany: University of the State of New York.

1968. “The Code of Handsome Lake, the Seneca Prophet”. In *Parker on the Iroquois*. Syracuse University Press.

Pasquaretta, Paul. 1994. “On the 'Indianness' of Bingo: Gambling and the Native American community”. *Critical Inquiry* 20(summer): 694-714

Patterson, D; G Todd; W Turner; V Maggio; L Alexander; and L Needham. 1994. “Levels of non-ortho-substituted (coplanar), mono- and diportho-substituted polychlorinated biphenyls, dibenzo-p-dioxins, and dibenzofurans in human serum and adipose tissues.” *Environmental Health Perspectives*. 102(Supplement 1): 195-204.

Porter, Tom. 2008. *And Grandma Said…Iroquois Teachings: as passed down through the oral tradition*. Xlibris Corporation.

Potvin, L Desorosiers S, Trifonopoulos M, Leduc N , Rivard M, Macaulay AC, Paradis G. 1999. “Anthropometric characteristics of Mohawk children aged 6 to 11 years”. *Journal of American Dietetic Association* 99:955-961.

Quintana , Jorge. 1991. "Agricultural Survey of New York State Iroquois Reservations 1990." *Northeast Indian Quarterly*, Spring: 32-36.

Ransom, James and Henry Lickers. 1988. "Akwesasne environment: Appraisals of Toxic Contamination at the St. Regis Mohawk Reservation" *Northeast Indian Quarterly*, Fall: 22-26

Rapp, Rayna. 1999. *Testing the Women, Testing the Fetus: The Social Impact of Amniocentisis in America*. New York: Routledge.

Raymer, Terry. 2006. "Diabetes as a Metaphor. Symbol, symptom or Both?" *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press. P 313-334.

Ricciardelli, Alex F. 1963. "The Adoption of White Agriculture by the Oneida Indians." *Ethnohistory* 10(4): 309-328.

RMT. 1986. "Draft Remedial Investigation (Task 10)". *Report for Remedial Investigation/Feasibility Study at GM-CFD Massena NY*. Madison, WI: RMT Inc.

Rogan WJ, Bagniewska A, Damstra T. 1980. "Pollutants in breast milk." *New England Journal of Medicine.* 302: 1450-1453.

Rogan, W; B Gladen, J McKinney. 1986. "Polychlorinated biphenyls (PCBs) and dichlorodiphenydichloroethene (DDE) in human milk: Effects of maternal factors and previous lactation". *American Journal of Public Health*. 76:172-177.

Rosenthal, M Sara. 2008. *The Thyroid Source Book, fifth edition*. McGraw Hill.

Roth, Wolff-Michael and Angela Calabrese Barton. 2004. *Rethinking Scientific Literacy*. New York and London: RoutledgeFalmer.

Roumain, Aramesh Saremi, Andrea M Kriska, Peter H Bennett, and Robert G Nelon. 2001. "The Effect of Indian or Anglo Dietary Preference on the Incidence of Diabetes in Pima Indians." *Diabetes Care* 24(5): 811-816.

Salmon, Enrique. 2000. "Kincentric Ecology: Indigenouse Perceptions of the Human-Nature Relationship" *Ecological Applications* 10(5): 1327-1332

Santiago-Rivera, Asara; Gayle Skawennio Morse; Anne Hunt; Henry Lickers. 1998. "Building a Community–Based Research Partnership: Lessons from the Mohawk Nation of Akwesasne." *Journal of Community Psychology* 26(2) 163-174.

Santiago-Rivera, Asara; Gayle Skawennio Morse, Richard F Haase, Robert J McCaffrey and Alice Tarbell. 2007. "Exposure to environmental Toxin, quality of life and psychological distress." *Journal of Environmental Psychology* 27(1): 33-43.

Satterfield, D., Volansky, M., Caspersen, C., Engelgau, M., Bowman, B., Gregg, E., Geiss, L.,Hosey, G., May, J., & Vinicor, F. 2003. "Community-Based Lifestyle Interventions to Prevent Type 2 Diabetes." *Diabetes Care*, 26(9): 2643-2652.

Schafer, Elisabeth Schafer and Diane Nelson. 1996. "Cholesterol in Your Body" North Central Regional Extension Publication 332 Sponsored by the Extension Services of Indiana, Iowa, Kansas, Lincoln University, Minnesota, North Dakota, and Ohio. In cooperation with Extension Service, U.S. Department of Agriculture, Washington, D.C.
May 1996 "http://www.extension.iastate.edu/publications/ncr332.pdf

Schaper, David**.** Nov 22 2006 **"**Native American Farmers Allege Loan Bias" **http://www.npr.org/templates/story/story.php?storyId=6524797**

Schell, Lawrence, and Alice Tarbell. 1998. "A Partnership Study of PCBs and the Health of Mohawk Youth: Lessons from Our Past and Guidelines for Our Future." *Environmental Health Perspectives* 106 (Supplement 3): 833-840.

Schell, Lawrence M; Lech A Hubicki; Anthony P DeCaprio; Mia V Gallo; Julia Ravenscroft; Alice Tarbell; Agnes Jacobs; Dawn David; Priscilla Worswick; The Akwesasne Task Force on the Environment. 2003. "Organochlorines, Lead and Mercury in Akwesasne Mohawk Youth". *Environmental Health Perspectives* 11(7): 954-961.

Schell, Lawrence M; Mia V Gallo; Anthony P DeCaprio; Lech A Hubicki; Melinda Denham; Julia Ravenscroft; The Akwesasne Task Force on the Environment. 2004. "Thyroid function in relation to burden of PCBs, p,p'-DDE, HCB, mirex and lead among Akwesasne Mohawk youth: a preliminary study." *Environmental Toxicology and Pharmacology* 18: 91-99.

Schell, LM; J Ravenscroft; M Cole; A Jacobs, A; J Newman; The Akwesasne Task Force on the Environment. 2005. "Health disparities and toxicant exposure of Akwesasne young adults: a partnership approach to research." *Environmental Health Perspectives* 113(12):1826-1832.

Schell, Lawrence M; Mia V Gallo; Melinda Denham and Julia Ravenscroft. 2006. "Effects of Pollution on Human Growth and Development; An Introduction." *Journal of Physical Anthropology*, 25:103-112.

Schell, Lawrence M; Julia Ravenscroft; Mia Gallo and Melinda Denham. 2007. "Advancing Biocultural Models by Working with Communities: A Partnership Approach." *American Journal of Human Biology* 19:511-524.

Schell, Lawrence M.; Mia V. Gallo, Melinda Denham, Julia Ravenscroft, Anthony P. DeCaprio, and David O. Carpenter. 2008. "Relationship of Thyroid Hormone Levels to Levels of Polychlorinated Biphenyls, Lead, *p,p′*- DDE, and Other Toxicants in Akwesasne Mohawk Youth" *Environmental Health Perspectives*. 116(6): 806–813.

Schell, LM; Mia V Gallo; Julia Ravenscroft. 2009. "Environmental influences on human growth and development: historical review and case study of contemporary influences" *Annals of Human Biology***,** 36(5):459-77.

Schell, Lawrence M; Mia V. Gallo, Julia Ravenscroft, Anthony P. DeCaprio. 2009. "Persistent organic pollutants and anti-thyroid peroxidase levels in Akwesasne Mohawk young adults." *Environmental Research* 109(1):86-92.

Schell, LM and MV Gallo. 2010. "Relationships of putative endocrine disruptors to human sexual maturation and thyroid activity in youth." *Physiology and Behavior*. 99(2010):246-253.

Scheper-Hughes, Nancy. 1993. *Death Without Weeping: The Violence of Everyday Life in Brazil*. Berkeley: University of California Press.

Scheper-Hughes, Nancy. 2006. "Diabetes and Genocide—Beyond the Thrifty Gene." In *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press.

Scheper-Hughes, Nancy and Margaret M Lock. 1987. "The Mindful Body: A Prolegomenon to Future Work in Medical Anthropology." *Medical Anthropology Quarterly*, New Series 1(1) 6-41

Schnarch, Brian. 2004 "Ownership, control, access, and possession (OCAP) or self-determination applied to research: a critical analysis of contemporary First Nations Research and some options for First nations communities". *Journal of Aboriginal Health* 1(1) 80-95

Schwartz, Charles. 1996. "Political Structuring of the Institutions of Science." In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*. Ed by Laura Nader. NY: Routledge p148-159.

Schwartz, Pamela; Sandra W. Jacobson, Greta Fein, Joseph L Jacobson, and Harold A Price. 1983. "Lake Michigan Fish consumption as a Source of Polychlorinated biphenyls in human cord serum, maternal serum and milk. *American Journal of Public Health* 73(3):293-296.

Scott, Colin. 1996. "Science for the West, Myth for the Rest? The Case of the James Bay Cree Knowledge and Construction." In *Naked Science: Anthropological Inquiry into Boundaries, Power, and Knowledge*. Ed by Laura Nader. NY: Routledge p 69-86

Selikoff, IJ, E.C. Hammond, and SM Levin 1982. "Environmental Contaminants and the Health of the People of the St. Regis Reserve". Volume II. Mount Sinai School of Medicine of the City University of New York. Environmental Sciences Laboratory, New York City, NY

Selikoff I; E. Hammond, S. Levin. 1984-1985. "Environmental Contaminants and the Health of the People of the St. Regis Reserve: A Report Submitted to the Minister of Health and Welfare Canada". Two Volumes. New York: Mount Sinai School of Medicine. (As cited in Hauptman 1988)

Selikoff, IJ, E.C. Hammond, and SM Levin 1986. "Environmental Contaminants and the Health of the People of the St. Regis Reserve :Methyl Mercury, Polychlorinated Biphenyls and Mirex—Medical Survey Findings". New York: Mount Sinai School of Medicine

Shapin, Steven. 1994. *A Social History of Truth: Civility and Science in Seventeenth century England. Chicago*: University of Chicago Press.

Sillitoe, Paul

2002. “Globalizing Indigenous Knowledge.” In *Participating in ‘Development: Approaches to Indigenous Knowledge*. Eds Paul Sillitoe, Alan Bicker and Johan Pottier. P 108-138. London: Routledge.

2007. “Local Science vs Global Science: an Overview.” In *Local science vs. Global Science: Approaches to Indigenous Knowledge in International Development*. Sillitoe, Paul (ed) NY: Berghahn Books.

Skaare, JU and A Polder. 1990. “Polychlorinated biphenyls and organochlorine pesticides in milk of Norwegian women during lactation.” *Archives of Environmental Contamination and Toxicology*. 19:640-645

Skinner, Lawrence C 1992. “Chemical contaminants in wildlife from the Mohawk Nation at Akwesasne and the vicinity of the General Motors Corporation/Central Foundry Division, Massena, NY Plant”. Albany, NY: New York State Department of Environmental Conservation

Skoog, Joanne. 1985. “Stone Finds GM Contaminating Animals.” Massena NY Observer Aug1 1985.

Sloan, R; K Jock. 1990 “Chemical Contaminants in the Fish from the Mohawk Nation at Akwesasne and the Vicinity of the General Motors Corporation/Central Foundry Division, Massena NY Plant”. Albany, NY: New York State Department of Environmental Conservation

Smith, DM. 1998. “Interorganizational collaboration: a cautionary note for tribal health nurses.” *Public Health Nursing*. 15:131-135.

Smith, Janell and Dennis Wiedman. 2001. “Fat content of South Florida Indian Frybread: Health implications for a Pervasive Native-American Food.” *Journal of the American Dietetic Association*. 101 (5): 582-85.

Smith, Linda Tuhiwai. 2002. *Decolonizing Methodologies; Research and Indigenous Peoples*. London & NY: Zed Books Ltd.

Smith-Morris, Carolyn. 2006. “Prenatal Mysteries and Symptomless Diabetes in the Gila River Indian Community.” In *Indigenous Peoples and diabetes: Community Empowerment and Wellness.* Edited by Mariana Leal Ferreira and Gretchen Chesley Lang. Durham NC: Carolina Academic Press. P187-202.

Snow, Dean R. 1994. *The Iroquois*. Oxford: Blackwell.

Soleri, Daniela and David A Cleveland. 1993. "Hopi Crop Diversity and Change." *Journal of Ethnogiology* 13(2): 203-231.

Stott, P and S Sullivan (eds). 2000. *Political Ecology: Science, Myth and Power*. London: Arnold

Strickland CJ. 2006. "Challenges in community-based participatory research implementation: experiences in cancer prevention with Pacific Northwest American Indian tribes."*Cancer Control*. 2006 Jul;13(3):230-6.

St. Regis Mohawk Tribe Environment Division, Fluoride Vegetation http://www.srmtenv.org/index.php?spec=vegetation

St. Regis Mohawk Tribe (SRMT).

2005. "Governor Pataki Signs Tribal Police Bill." Press Release, September 1 2005. http://www.srmt-nsn.gov/press_releases/pr_090105-2.html Accessed March 15 2010.

2008a. "Diabetes Center of Excellence". *Kawenni:ios*, February: 14-15.

2008b. "What is a Tribal Conservation District" fact sheet, distributed by SRMT ED. Also published in SRMT *Kawenni:io*s April 2008:3.

2008c. "St. Regis Mohawk Tribe Data Report: Fluoride." *St. Regis Mohawk Tribe Environment Division*. Akwesasne.

2008d. "Fluoride Report Available." *Kawenni:ios*, September 2008:8.

2009a. St. Regis Mohawk Tribe Press Release "St. Regis Tribal Election Board Announces Official Election Results", 6/12/09. http://www.srmt-nsn.gov/press_releases/UnofficialElectionResults_060609.pdf

2009b. *Integrated Resource Management Plan*. Prepared by Lawrence Swamp, Lindsay Tarbell, Jessica Cree-Alvarez, Les Benedict, Environment Division St. Regis Mohawk Tribe.

Appendix C: "The Community Context for Integrated Resource Management Planning on the St. Regis Mohawk Reservation (2005) Prepared by: T. Bruce Lauber, Barbara A. Knuth, and Tommy L. Brown Human Dimensions Research Unit, Department of Natural Resources, Cornell University.

Appendix L: Brochure 1 Spring 2005.

Starna, William A. 1993. "The Repeal of Article 8: Law, Government, and Cultural Politics at Akwesasne." *American Indian Law Review* 18(2):297-311.

Sugiura-Ogasawara M, Ozaki Y, Sonta S, Makino T, Suzumori K. 2003. "PCBs, hexachlorobenzene and DDE are not associated with recurrent miscarriage." *American Journal of Reproductive Immunology*. 50(6):485-9.

Sukdolova, V; S Negoita; L Hubicki; A DeCaprio; David O Carpenter. 2000. "The assessment of risk to acquired hypothyroidism from exposure to PCBs; a study among Akwesasne Mohawk women." *Central European Journal of Public Health* 8(3):167-8.

Surdu, Simona; Lupita D Montoya, Alice Tarbell, and David O Carpenter. 2006. "Childhood asthma and indoor allergens in Native Americans in New York." *Environmental Health: A Global Access Science Source* July 21 2006. Accessed at http://www.ehjournal.net/content/pdf/1476-069X-5-22.pdf

Swamp, Lawrence C. 1997. "St. Regis Mohawk Division." *Akwesasne Notes* 12(2):16.

Swinburn, B.A., V.L. Boyc RN Bergman, BV Howard, and C Bogardus. 1991. "Deterioration in Carbohydrate Metabolism and Lipoportein Changes Induced by Modern, High Fat in Pima Indians and Caucasians". *Journal of Clinical Endocrinology and Metabolism*. 73:156-165.

Tarbell, Alice and Mary Arquette. 2000. "Akwesasne: A Native American Community's Resistance to Cultural and Environmental Damage." In *Reclaiming the Environmental Debate: The Politics of Health in a Toxic Culture*. Ed Richard Hofrichter. Cambridge MA: MIT Press.

Ten Fingers, Keeley. 2005. "Rejecting, Revitalizing, and Reclaiming: First Nations Work to Set the Direction of Research and Policy Development." *Canadian Journal of Public Health*. 96(January-February supplement 1):s60-s63.

Tesh, Sylvia Noble. 2000 *Uncertain Hazards: Environmental Activists and Scientific Proof*. Ithaca, NY: Cornell University Press.

Thompson, Dan. 1985. "The Language of Survival." *Indian Studies*, Winter: 26-29.

Thompson, Samantha J and Sandra M Gifford. 2000. "Trying to Keep a Balance: The Meaning of Health and Diabetes in an Urban Abroginal Community". *Social Science and Medicine* 51(10): 1457-72.

Thu, Kendall. 2009. "The Centralization of Food Systems and Political Power**."** *Culture & Agriculture*. 31(1) :13-18.

Tilden, J; LP Hanrahan; H Anderson; C Palit; J Olson; W Mackenzie; The Great Lakes Sport Fish Consortium. 1997. "Health advisories for consumers of Great Lakes sportfish: is the message being received?" *Environmental Health Perspectives* 105(12): 1360-1365.

Tooker, Elisabeth

1964 "An ethnography of the Huron Indians, 1615-1649". *Bureau of American Ethnology Bulletin* 190.

1978. "The League of the Iroquois: Its History, Politics, and Ritual." In *Handbook of North American Indians, Northeast,Vol 15*. Bruce G. Trigger, Ed. Washington: Smithsonian Inst. P 418-441.

Trigger, Bruce G. and James F. Pendergast. 1978. "Saint Lawrence Iroquoians". In *Handbook of North American Indians, Northeast, Vol. 15*. Bruce G. Trigger, Ed. Washington: Smithsonian Institution.

Tsukimori K, Tokunaga S, Shibata S, Uchi H, Nakayama D, Ishimaru T, Nakano H, Wake N, Yoshimura T, Furue M.. 2008 "Long-term effects of polychlorinated biphenyls and dioxins on pregnancy outcomes in women affected by the Yusho incident." *Environmental Health Perspective*.116(5):626-30.

United Nations Economic and Social Council's Sub-Commission on the Prevention of Discrimination and Protection of Minorities. 1983. "Working Group on Indigenous Populations". E/CN.4/Sub.2/1983/21/Add.8,para.369.

USDA, National Agricultural Statistics Service. 2009. "2007 Census of Agriculture: American Indian Reservations" Volume 2 • Subject Series • Part 5. Issued June 2009. United States Department of Agriculture, TomVilsack, Secretary; and National Agricultural Statistics Service, Cynthia Z.F. Clark, Administrator. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/American_Indian_Reservations/amind_09.pdf

Vecsey, Christopher. 1987. "Grassy Narrows Reserve: Mercury Pollution, Social Disruption, and Natural Resources: A Question of Autonomy." *American Indian Quarterly* 11(4): 287-314.

Vega WA. 1992. "Theoretical and pragmatic implications of cultural diversity for community research". *American Journal of Community Psychology*. 20:375–91.

Verhovek, Sam Howe.
1990. "Mohawks Ask Cuomo to Join A Peace Effort." *New York Times* April 28 1990.
http://www.nytimes.com/1990/04/28/nyregion/mohawks-ask-cuomo-to-join-a-peace-effort.html?scp=1&sq=%E2%80%9CMohawks%20Ask%20Cuomo%20to%20Join%20A%20Peace%20Effort.%E2%80%9D%20&st=cse
Accessed March 15 2010

1990a. "Whose Law Applies When Lawlessness Rules on Indian Land?" *New York Times* May 6 1990
http://www.nytimes.com/1990/05/06/weekinreview/whose-law-applies-when-lawlessness-rules-on-indian-land.html?scp=1&sq=%22Whose%20Law%20Applies%20When%20Lawlessness%20Rules%20on%20Indian%20Land%22&st=cse
accessed March 15 2010.

Visvanathan, Shiv. 2005. "Knowledge, Justice and Democracy". In *Science and Citizens: Globalization and the Challenge of Engagement*. Melissa Leach, Ian Scoones, and Brian Wynne, eds. Pp. 83–94. London: Zed.

Voget, Fred W. 1984. "Anthropological Theory and Iroquois Ethnography: 1850-1970". *In Extending the Rafters: Interdisciplinary Approaches to Iroquoian Studies*. Michael Foster, Jack Campisi and Marianne Mithun, eds. Eds. Albany: State University of New York Press. P 343-57.

Wallace, APC. 1966. *Religion; an anthropological view*. New York: Random House.

Waugh, FW. 1916. Iroquois Foods and Food Preparation. No 12, Anthropological Series. Memoir 86. Geological Survey. Ottawa: Department of Mines of Canada.

Wessel, Thomas R. 1976. "Agriculture, Indians, and American History." *Agricultural History, Bicentennial Symposium: Two Centuries of American Agriculture* (Jan., 1976), Vol. 50, No. 1pp. 9-20.

White, Brendan; Salli Benedict and Barbara Gray. 2004. "Mohawk Plaintiffs Announce Land Claim Settlement Terms." October 6 2004. http://www.northcountrypublicradio.org/news/newsfacts/settlement.html Accesed March 15, 2010.

White, Rowen M. 2002. "Sustaining Diversity for Culture's Sake; Haudenosaunee Heritage Seed Conservation" Thesis presented to the School of Natural Science, Hampshire college.

WhiteEarth Land Recovery Project Farm to School Program http://nativeharvest.com/node/255

Wickizer, Thomas M; Lawrence B Brilliant; Richard Copeland; and Robert Tilden. 1981. "Polychlorinated Biphenyl Contamination of Nursing Mothers' Milk in Michigan." *American Journal of Public Health*.71(2): 132-137.

Wiedman, Dennis.

1979. "Type II Diabetes Mellius and Oklahoma Native Americans: A Case Sudy of Culture Change in Oklahoma Cherokee", University of Oklahoma.

1987. "Type II Diabetes Mellitus, technological development and the Oklahoma Cherokee. In Encounters in Biomedicine: Case studies in medical Anthropology." Hans Baer, ed. New York: Gordon and Breach.

2006. "Striving for Healthy Lifestyles: Contributions of Anthropologists to the Challenges of Diabetes in Indigenous communities."

Wilk, Richard. 2006 "'But the Young Men Don't Want to Farm Any More': Political Ecology and Consumer Culture in Belize". *Reimagining Political Ecology*. Ed Aletta Biersack and James B Greenberg. Durham& London: Duke University Press.

Wilson, Waziyatawin Angela. 2005 "Decolonizing Indigenous Diets." In For *Indigenous Eyes Only: A Decolonization Handbok.* Ed by Waziyatawin Angela Wilson and Michael Yellow Bird. Santa FE: School of American Research. P67-85.

Wilson, Edmund. 1959. *Apologies to the Iroquois*. New York: Alfred Knopf.

Wing, Steve. 1998. "Whose epidemiology, whose health?" *International Journal of Health Services* 28: 241–252.

Woolfson, P, V Hood, R Secker-Walker and A Macaulay. 1995. "Mohawk English in the Medical Interview." *Medical Anthropology Quarterly* 9(4):503-9.

Winne, Mark. "Food Security - It Takes a Community." In *Thinking outside the Lunchbox* essay series, Center for Ecoliteracy. http://www.ecoliteracy.org/publications/rsl/mark-winne.html

Yobs AR. 1972. "Levels of polychlorinated biphenyls in adipose tissue of the general population of the nation." *Environmental Health Perspectives*, 1:79-80.

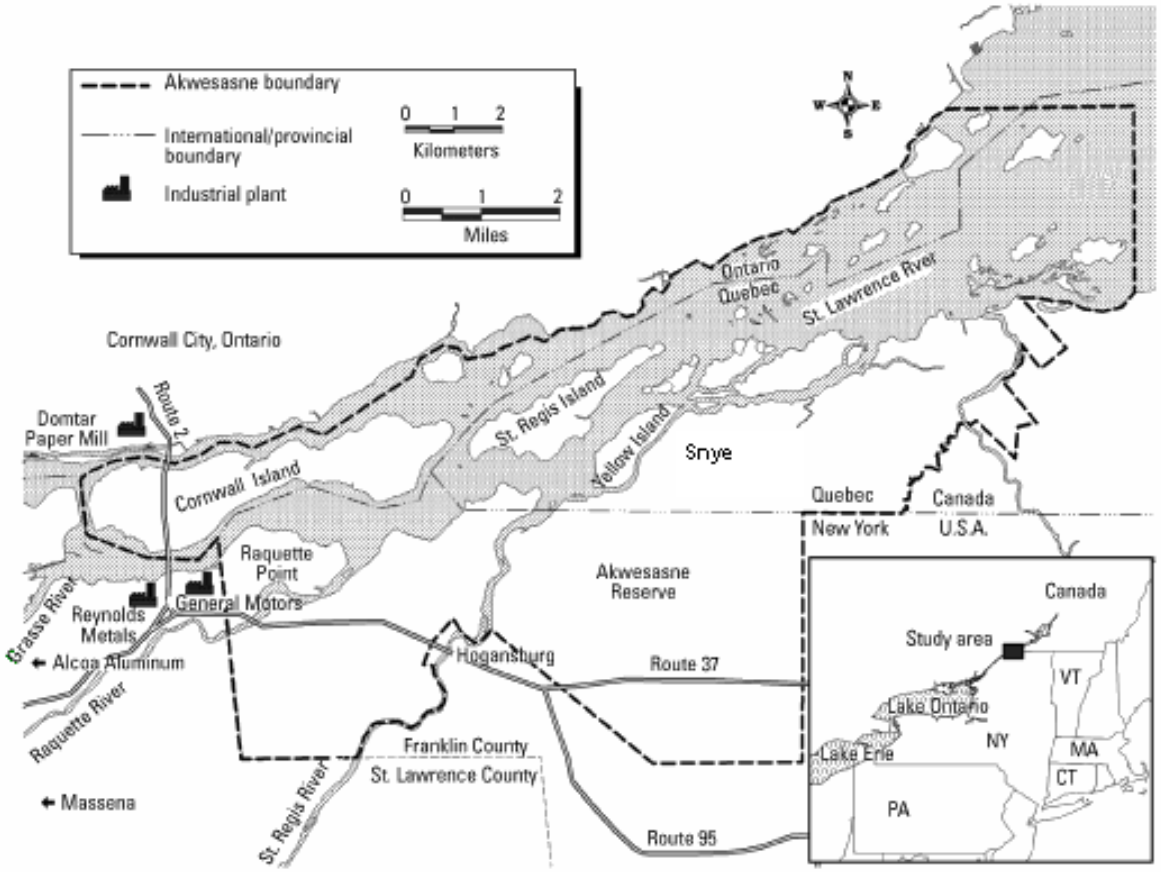


Figure 1. Map of the Mohawk Nation at Akwesasne.

Map published by:

Fitzgerald, EF; Hwang, SA; LAMBERT, G; GOMEZ, M; TARBELL, A. 2005. PCB exposure and in vivo CYP1A2 activity among Native Americans. *Environmental Health Perspectives* 113(3):272-7.

Accessed April 12, 2010 at http://ehp.niehs.nih.gov/members/2004/7370/fig1.gif

Table 2: Interview Questions for residents of Akwesasne

Interviews were based loosely on the questionnaire below.

1) Have you ever taken part in health studies? i.e. did you ever let someone take breast milk or blood samples, or fill out questionnaires?

a) Did you get the results back?

b) How well were the results explained to you?

c) Did you understand what they meant? (i.e. did the numbers mean anything to you?)

d) Do you remember how they made you feel?

e) Did you view yourself differently after hearing the results,

1. After finding out what was in your body that you weren't expecting, or

2. If you were expecting worse, finding out that it wasn't so bad?

3. Did you view your body the same or differently?

f) Did these results, or just the fact that the studies were being done, make you change your behavior in any way?

g) Did you change your diet? How?

h) Did the studies change your perceptions of the river and the land?

2) Do you worry about contamination in your body?

3) Do you think the contamination has affected people's health in Akwesasne? If so, how?

4) Do you think the contamination has affected your body directly?

5) Do you still eat fish? As much as you used to?

a) If you stopped, at what point did you do so, and why?

b) If you reduced your fish eating, at what point did you do so, and why?

c) Were your changes due to advisories or because you noticed changes in the fish?

6) Do members of your family all eat the same amount of fish? (i.e. in some families youth and women of childbearing age won't eat fish, but older people will).

7) If the Environment Division announced tomorrow that the fish were safe to eat, would you go back to eating fish?

8) Who do you rely on for information about the environment? (SRMT Environment Division, NYS DEC, MCA Department of Environment, ATFE, newspaper, radio, word of mouth/family member)

9) Do you think that being labeled a contaminated community has changed residents' feelings about the community or about this land/water?

10) Do you think that if the river and surrounding land hadn't been found to be contaminated that people would still fish and farm as much as they used to?

11) How much do you and your family fish and garden?

a) Has that changed over the years?

b) If you fish and garden less, is that a direct result of contamination, or just easier access to grocery stores?

12) Do you see any solution to dealing with the contamination and getting the community back to a healthier place?

a) What would be the ideal situation?

13) Are there organizations in the community that you know about who are trying to restore traditional practices?

14) The Cultural Impact Assessment completed recently through the Environment Division has noted that Mohawks don't interact with the environment the same as they did 50 years ago, as a result of the contamination. They recommend a program in which money received from the industrial plants would be used to help people get back into farming.

a) Would you be interested in getting back to the land, if programs were developed to help you? (i.e. if you could quit your job tomorrow and live off of just fishing and growing and gathering your own food)

b) Do you think most other people here would be interested in returning to a traditional lifestyle, or have people gotten used to shopping for food and working 9-5 jobs?

15) Do you think people have a fear of the environment now, as a result of the contamination and the warnings put out by the Environment Division?

a) if so, what do you think it would take to overcome that?

16) Do you feel the experience of dealing with the contamination has been different for Akwesasronon on the Canadian side than for Akwesasronon living on the US side?

For members of Kanenhi:io and other residents working on subsistence revival projects.

17) What made you want to join this group?

a) Do you feel your involvement in this group is in any way related to the contamination?

18) Have you read or heard about the Cultural Impact Assessment?

One of the things the assessment was calling for is a sustainable agriculture program. "Agriculture must be restored as a viable economic activity in Akwesasne. The community must be provided with the necessary training, capital and clean land areas so that an agricultural sector can be reestablished and the community can re-achieve self-sufficiency (in conjunction with the revitalization of its fisheries) in its food supply."

a) do you think Kanenhi:io could benefit from this or contribute to this?

19) Some people have said that this generation is not interested in living off the land because they're used to an easier life—playing video games, working sedentary jobs, shopping for food at a store.

a) do you think this is true?

b) Is it possible to get them interested in growing their own food?

c) How?

20) How do you feel about bringing in outside speakers and referring to outside experts and communities to bring back farming to Akwesasne?

21) Are there other organizations in the community that you know about who are trying to restore traditional practices?

Questions for Mohawk staff who worked with researchers on the health studies

1) What was your job specifically in working on the health study?

2) Do you feel you had much input in the way the study was designed and run?

3) How did residents react to you asking questions and requesting samples?

4) What were some of the difficulties in trying to get community members to take part in the study?

a) Was it awkward for you, or easy for you, being a community member?

5) Were you involved in getting information back to study participants?

6) Were you happy with the way in which the study was run? If not, how would you have done things differently?

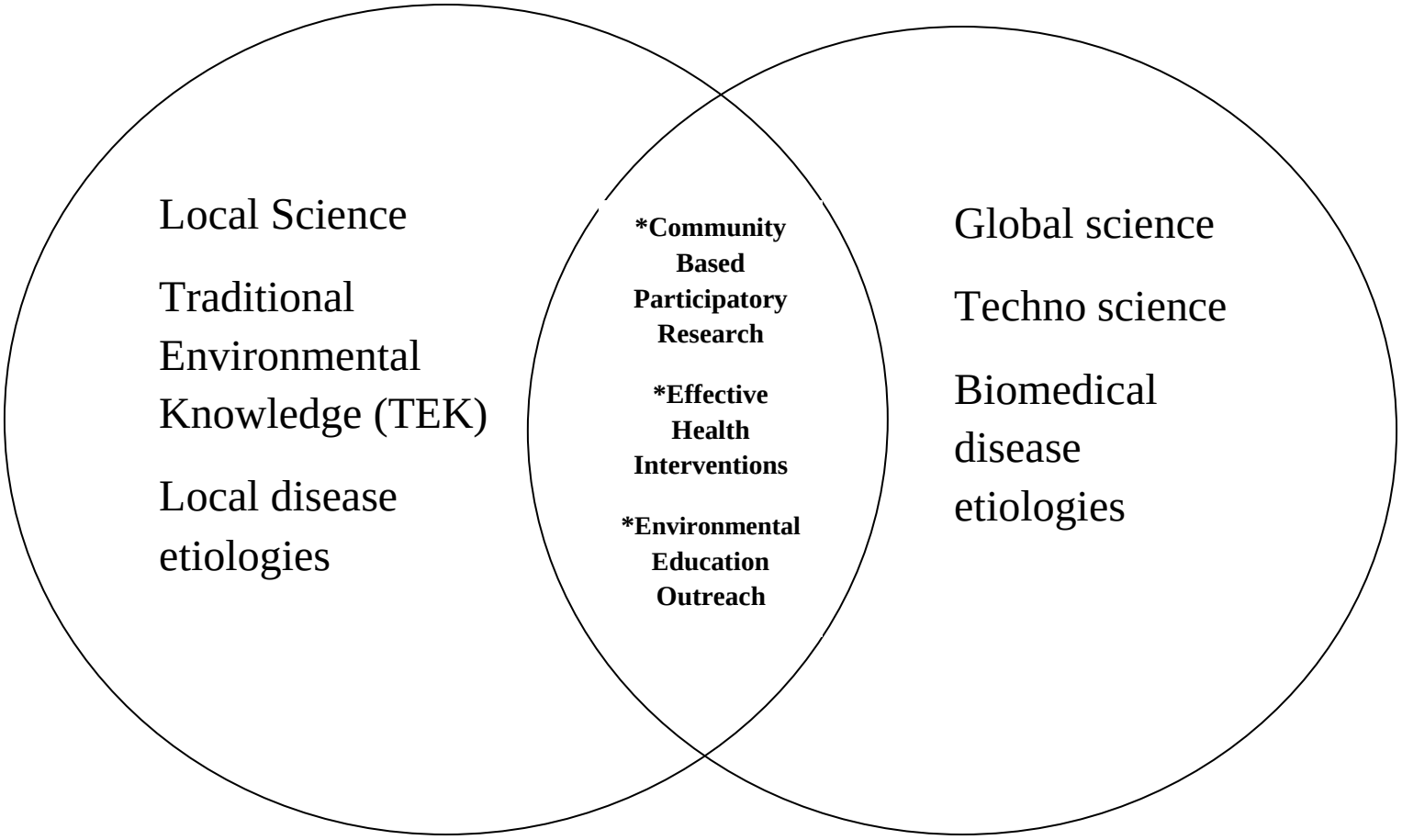
Figure 3: Fish Consumption at Akwesasne, as Measured During SUNY SBRP Health Studies

Paper	Sample population	Fish meals per year over one year prior to pregnancy (or 2+ years before interview for men)	Fish meals per year one year before pregnancy (1-2 years before interview for men)	Fish meals per year during pregnancy (or in the year before the interview for men)	Comments about consumption rates
Fitzgerald et al. 1995a; Hwang et al. 1996	97 Mohawk women 1986-1992	23.5	9.2	3.9	35% of women still ate local fish during pregnancy
Fitzgerald et al. 2004	111 Mohawk women 1992-1995	31.3	11.3	11.7	90% of women surveyed were aware of the fish advisories, 40% changed their rates of local fish consumption. 31% still ate local fish at least once during pregnancy
Fitzgerald et al. 1999	139 Mohawk men 1992-1995	88.6	27.7	21.2	70% ate some local fish in the past year

Figure 4: Illnesses of Concern for Akwesasne Community Members

Illness	Number of people who mentioned it
1. Diabetes	37
2.cancer	34
3. heart disease (including blood pressure)	21
4. respiratory (asthma)	18
5. Thyroid disorders	17
6. Rashes (eczema, photosensitivity rashes, impetigo, unidentified rashes)	12
7. Reproductive issues n=1,miscarriages n=7, problems with ovaries n=2, birth defects n=1	11
7. Cognitive n=2, learning disabilities n=3, ADD n=2, bipolar disorder n=2, Alzheimer's n=1	11
7. Arthritis	11
8. Autoimmune disorders (rheumatoid arthritis, scleroderma)	4
9. Emotional issues	3
10. headaches	2
10. Digestive disorders	2
10. unidentifiable illnesses	2
11. Allergies	1

Figure 5: Local Science, Global science, and CBPR



View of General Motors Central Foundry from Gina’s front yard

Students from the Akwesasne Freedom School husking white corn in the Kanenhiio greenhouse

White corn, braided and hanging to dry

Jean and Henry with their laying hen project

Ionawiienhawi holding Darwin John Calico Corn in the Kanenhi:io community garden