

Environmental Health & Justice Project

**for Saint Lawrence Island
Alaska and Norton Sound**

**Presentation for the National Forum on Tribal
Environmental Science
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Our mission: to assure justice by advocating for environmental and community health.

We believe everyone has a right to clean air, clean water and toxics-free food.

Strategies to address environmental health issues in Alaska

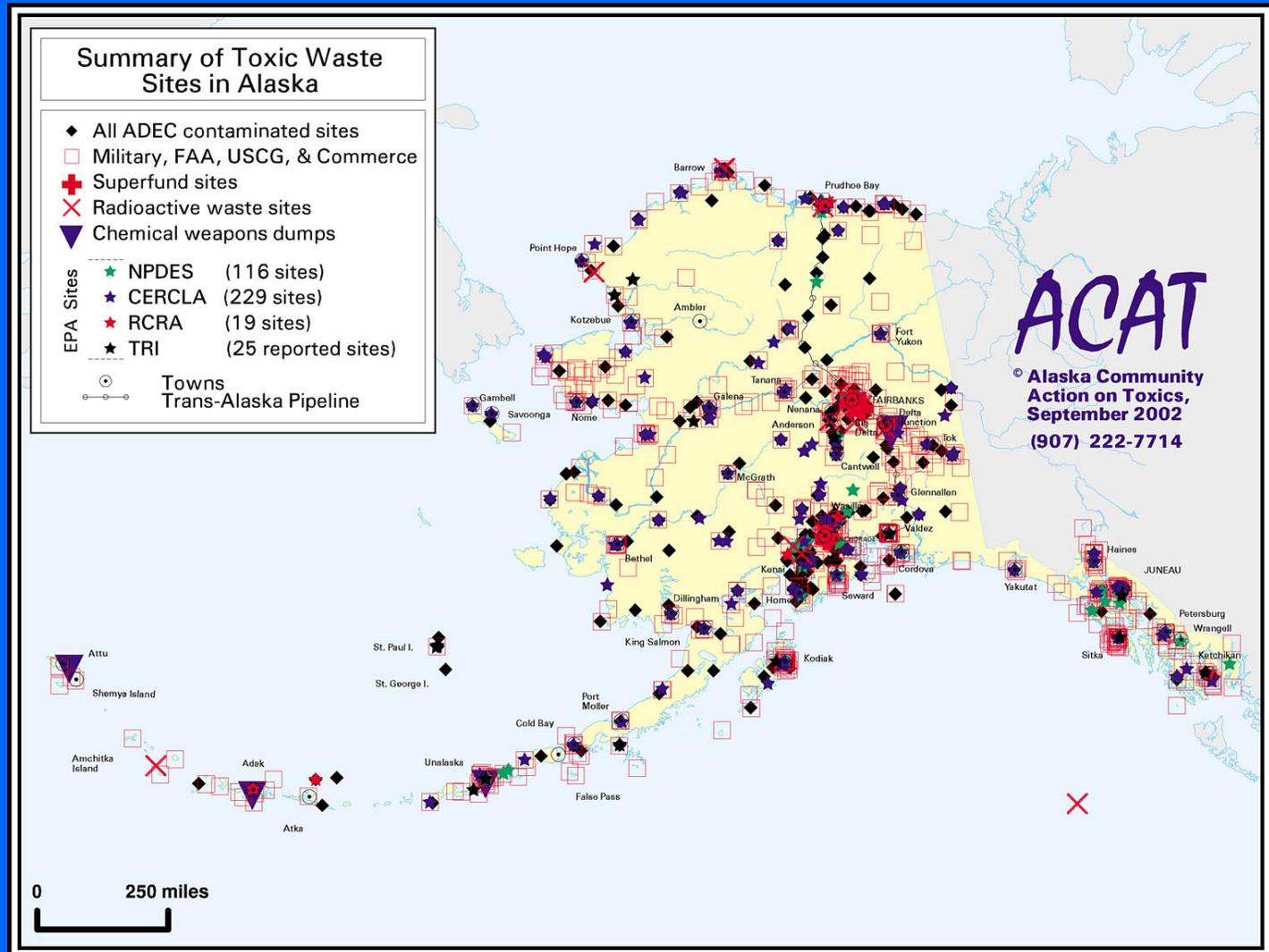
- Respond to community calls for assistance and focus on issues that have an opportunity to catalyze larger policy changes
- Conduct community-based participatory research
- Ensure community right-to-know
- Advocate for health and justice through prompting of protective, precautionary local, state, national and international policy changes

Addressing environmental health and justice issues in Alaska

Core Values.

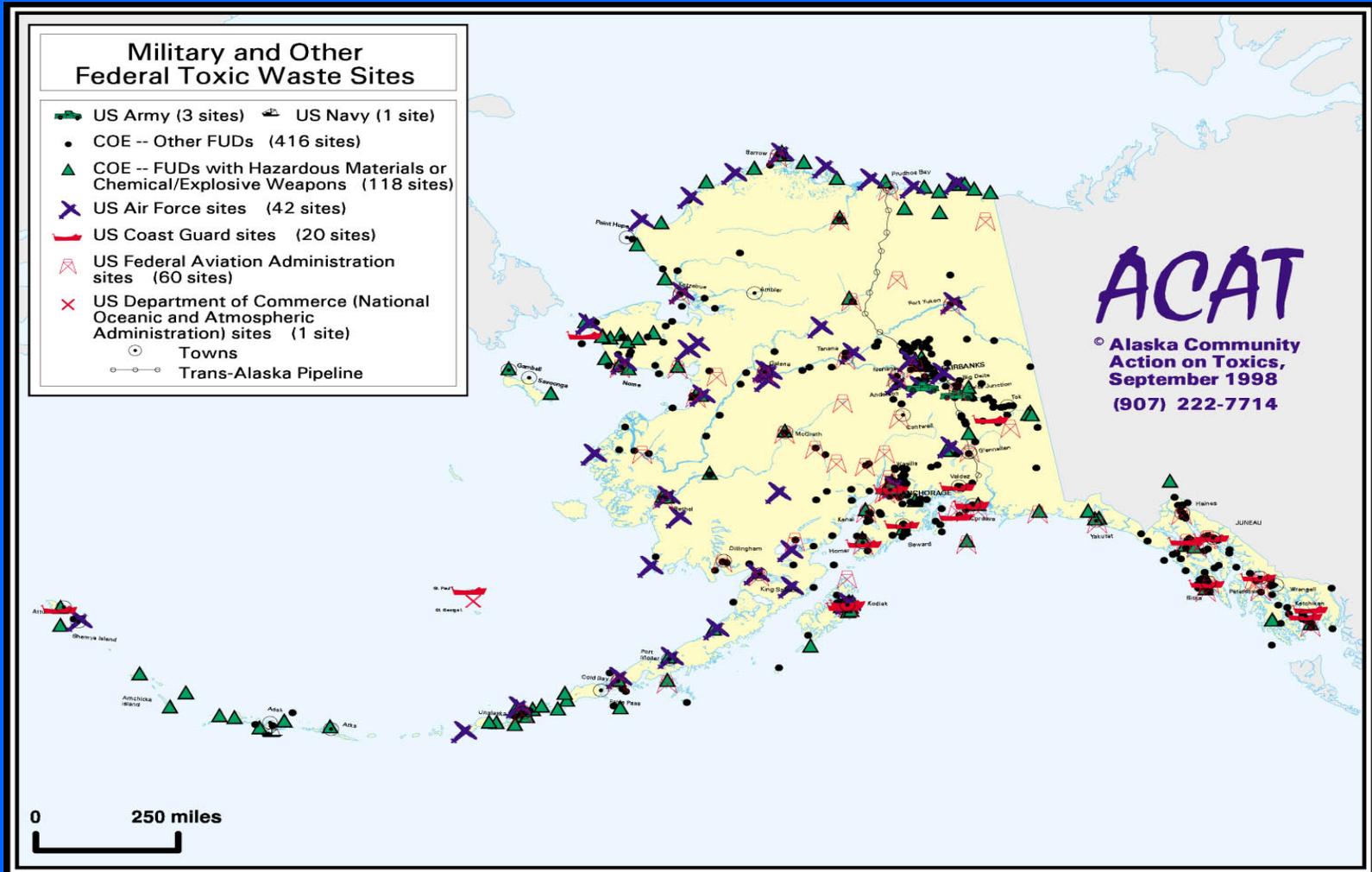
- Community right-to-know
- Environmental justice
- Precautionary principle
- Elimination of the production and release of toxics
- Rights and sovereignty of Indigenous peoples
- Culture of caring and wellness

Summary of Toxic Waste Sites



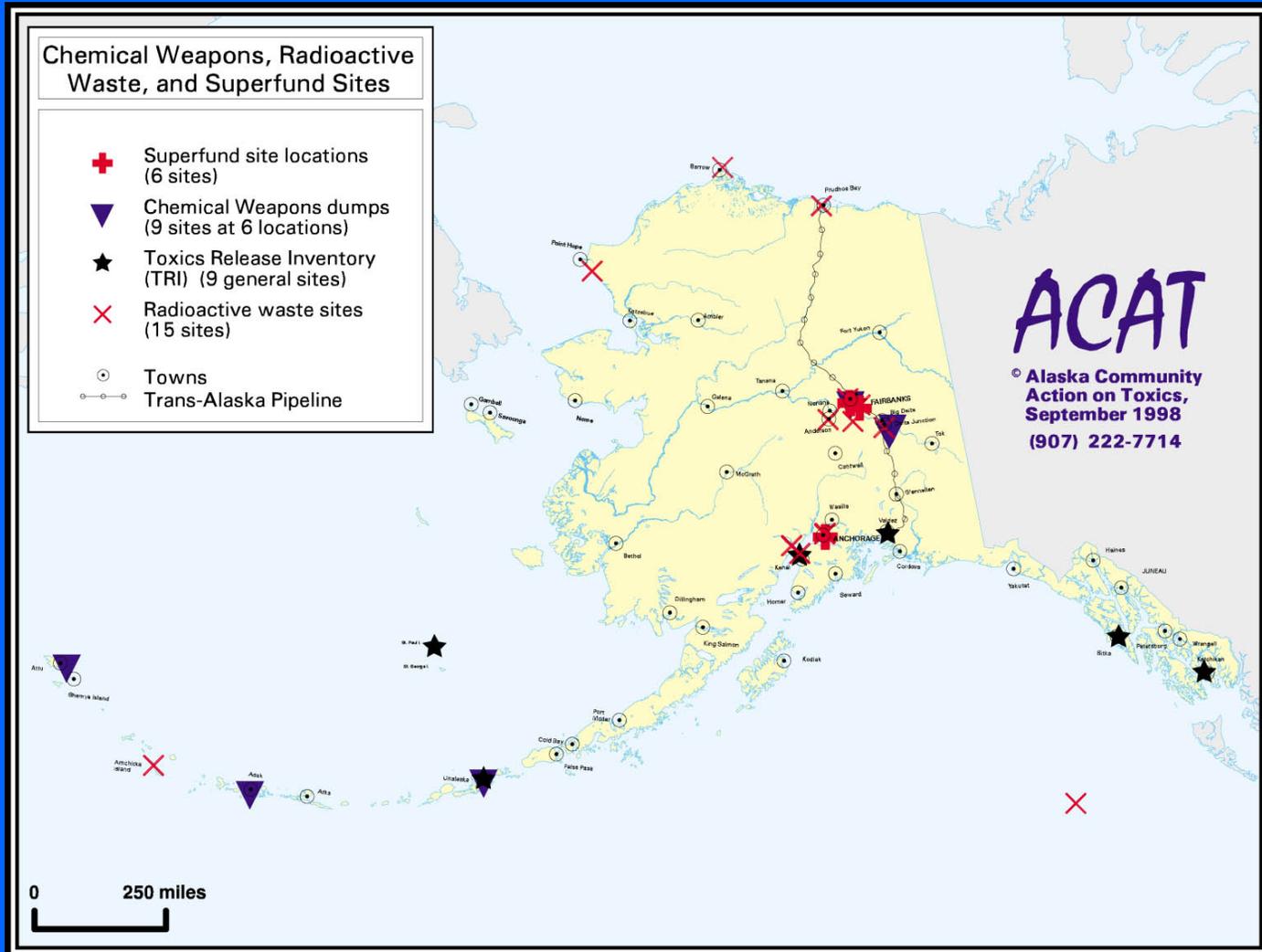


Military & Federal





Chemical Weapons, Radioactive Waste, and Superfund Sites



Contaminants in the Arctic

The Arctic has become a hemispheric sink for pesticides and other industrial chemicals

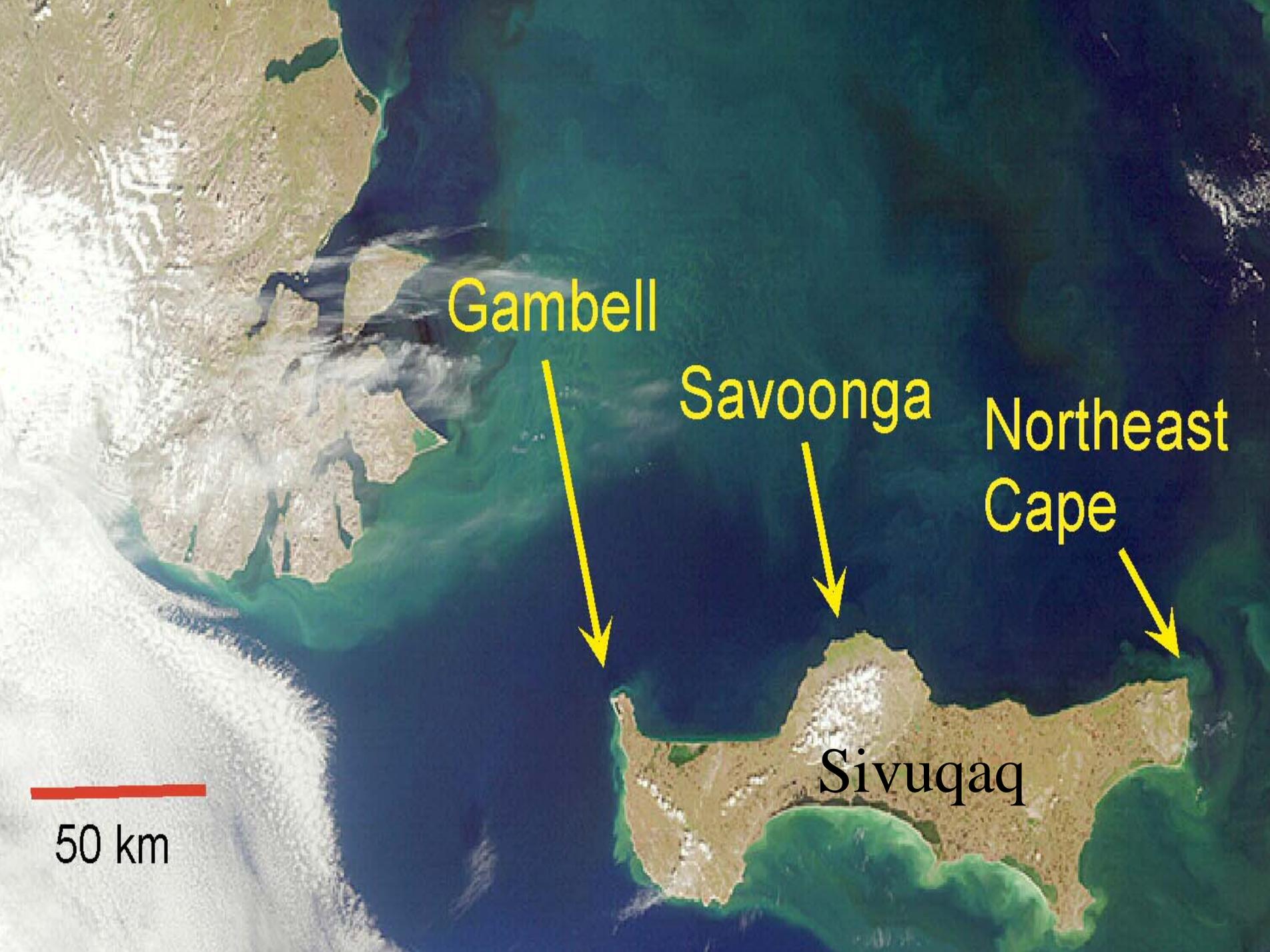
Contaminants pose a threat to the integrity of northern ecosystems, as well as the health of people that rely on traditional diets of fish and marine mammals.



The Arctic marine environment is a hemispheric sink for persistent bioaccumulative toxics

POP Migration processes





Gambell

Savoonga

Northeast
Cape

Sivuuqaa

50 km



Annie Alowa walking through debris
at Northeast Cape

Specific Aims for Saint Lawrence Island (SLI)

- Identify sources of contaminants
- Describe past and current health problems
- Work toward improvement of contaminated sites and prevention of new sources of contaminants



Specific Aims

for Saint Lawrence Island continued

- Create training program
 - For residents, community health specialists, and regional health care providers
 - Addresses the prevention and treatment of environmental health problems in the SLI communities



Specific Aims

for Saint Lawrence Island continued

- Distinguish global sources of contaminants from military sources of contamination.
- The Community decided to determine the level of impact of military contaminants to their health thru blood serum testing.
- Elder and Local Knowledge has guided the process.
- Data and Research have empowered the Community to make informed decisions.

Sampling Conducted at Gambell and Northeast Cape

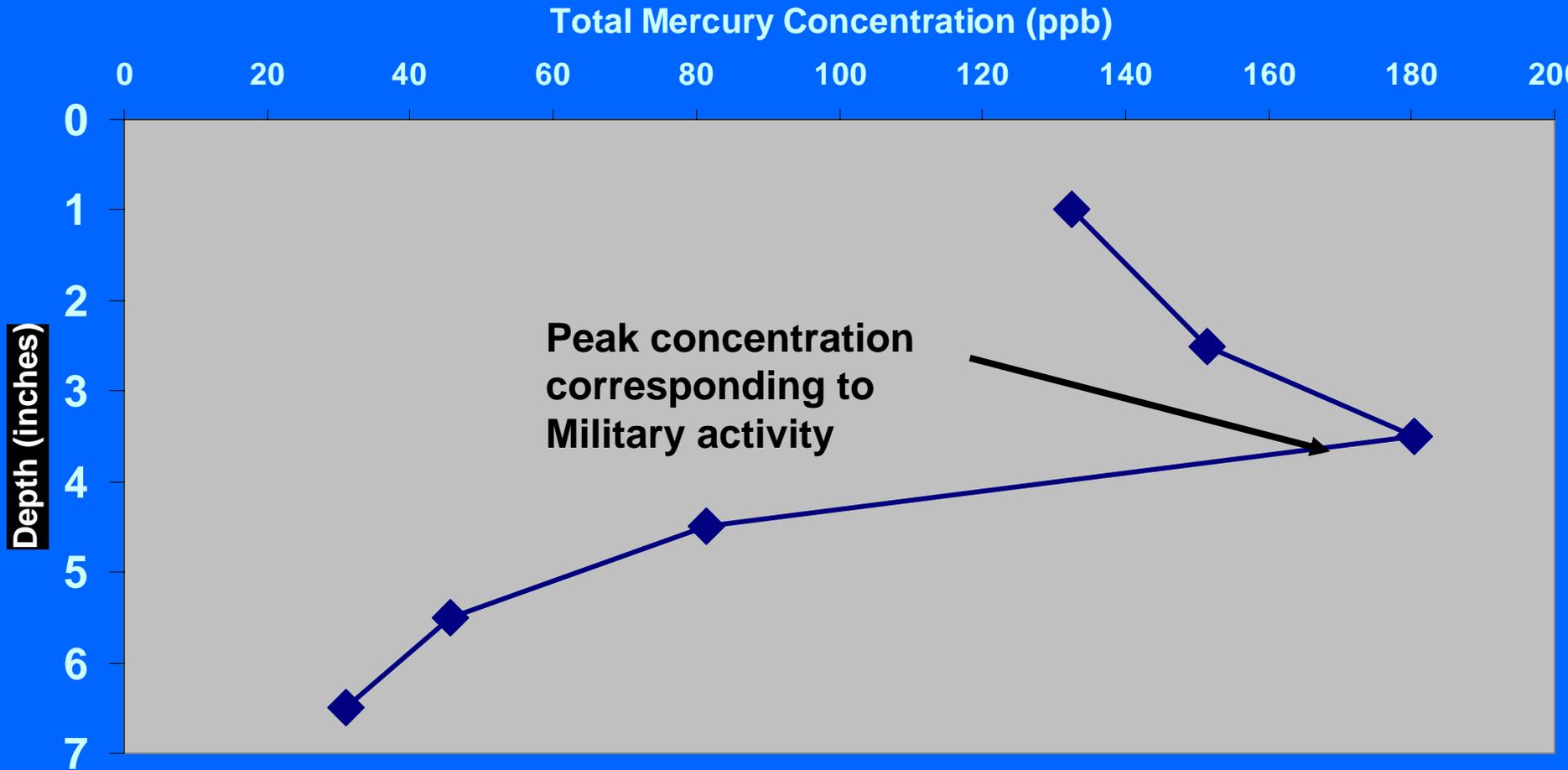
- Bird Eggs (Murre)
- Human Blood (150 samples)
- Air (PCBs, pesticides)
- Groundwater (VOCs)
- Surface Water (PCBs, PAHs, pesticides)
- Edible Plants (PCBs, pesticides)
- Sediment Cores (PCBs, pesticides, trace metals)
- Traditional Food Study (USEPA)
- Community Health Survey (~250 completed)



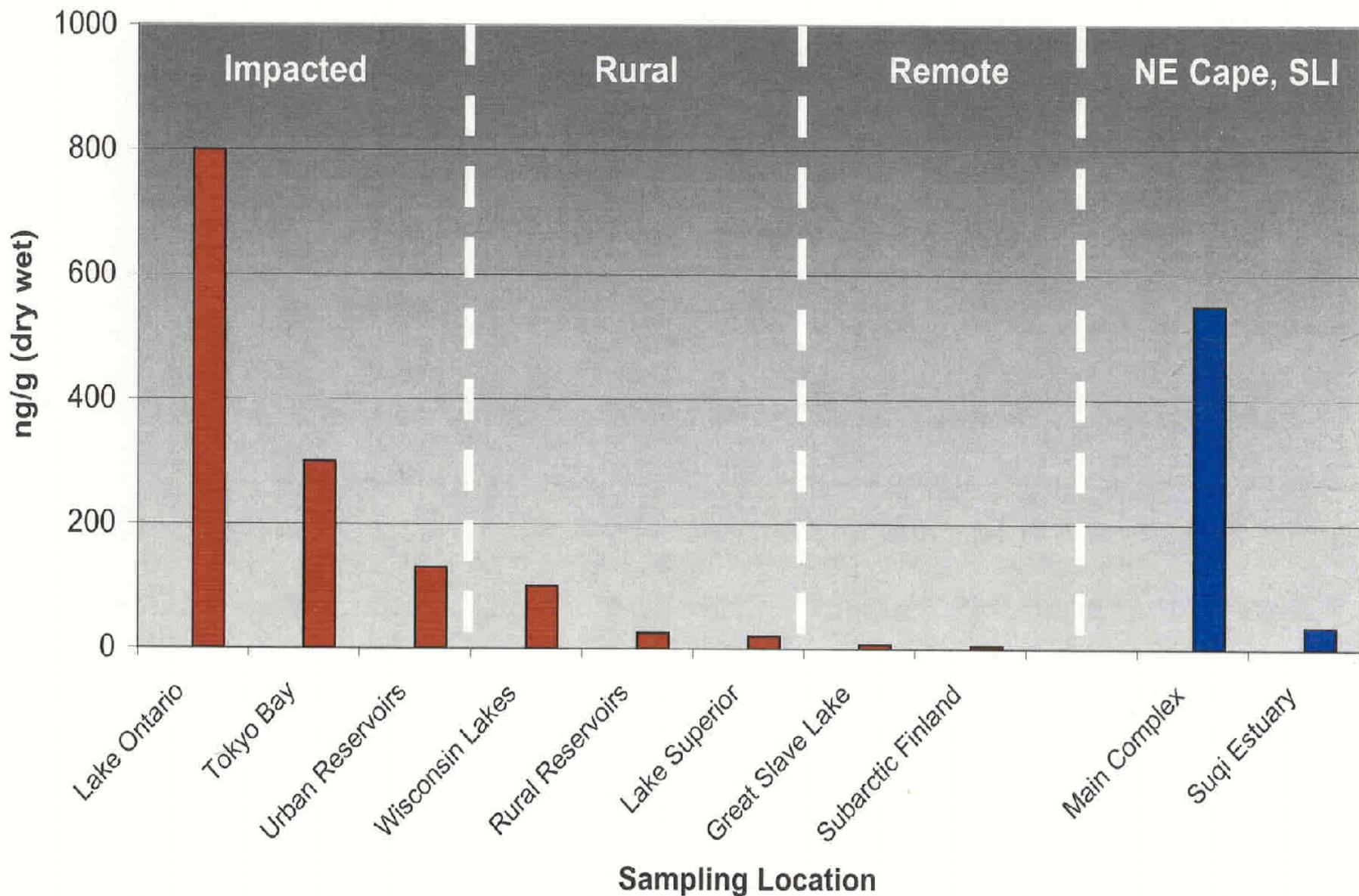
Sampling soil and water, as well as the animals and fish, is an on-going part of the project.



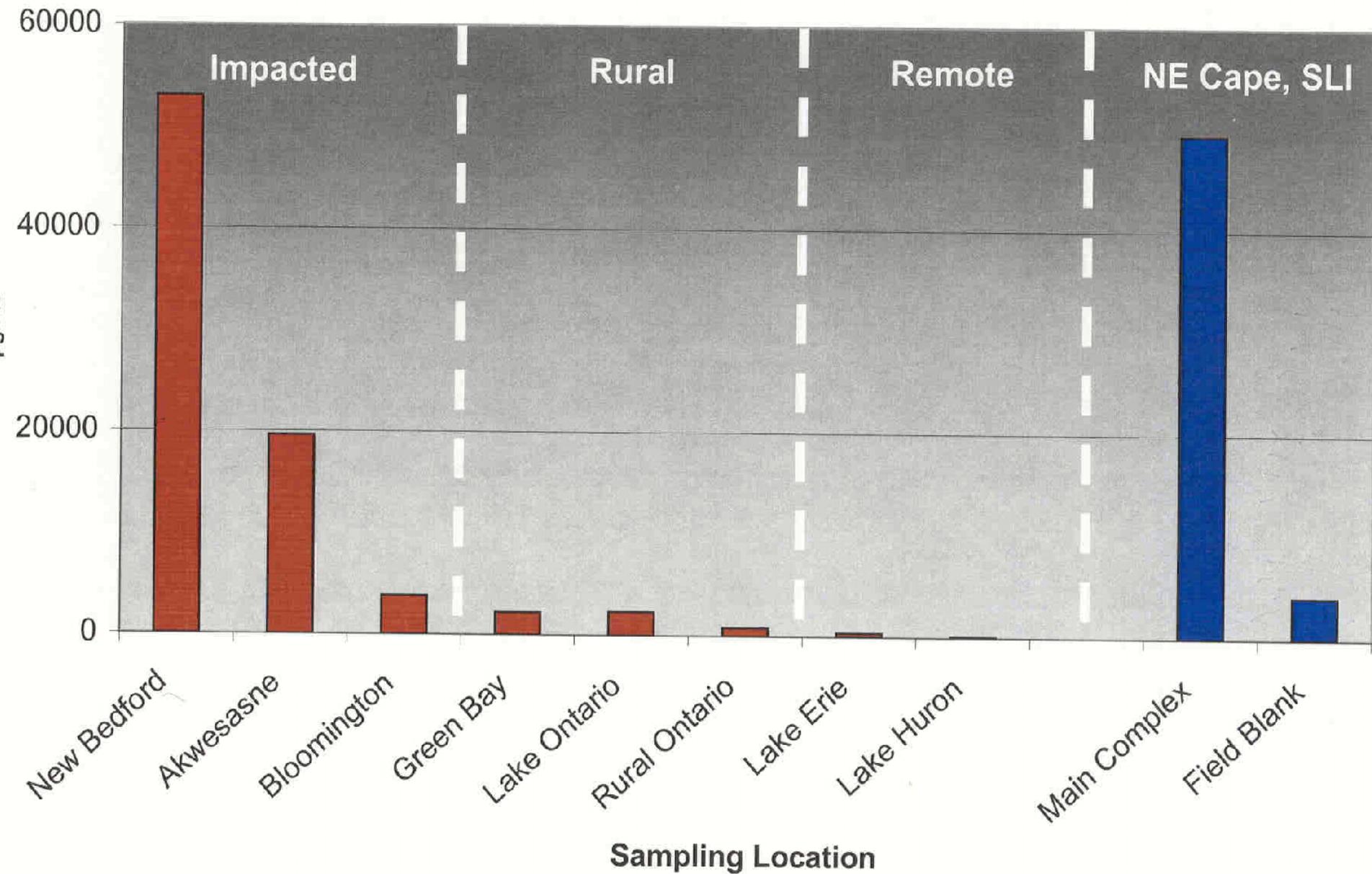
Suqi Drainage Sediment Core Mercury Concentrations



Maximum PCB Concentrations in Sediment Cores



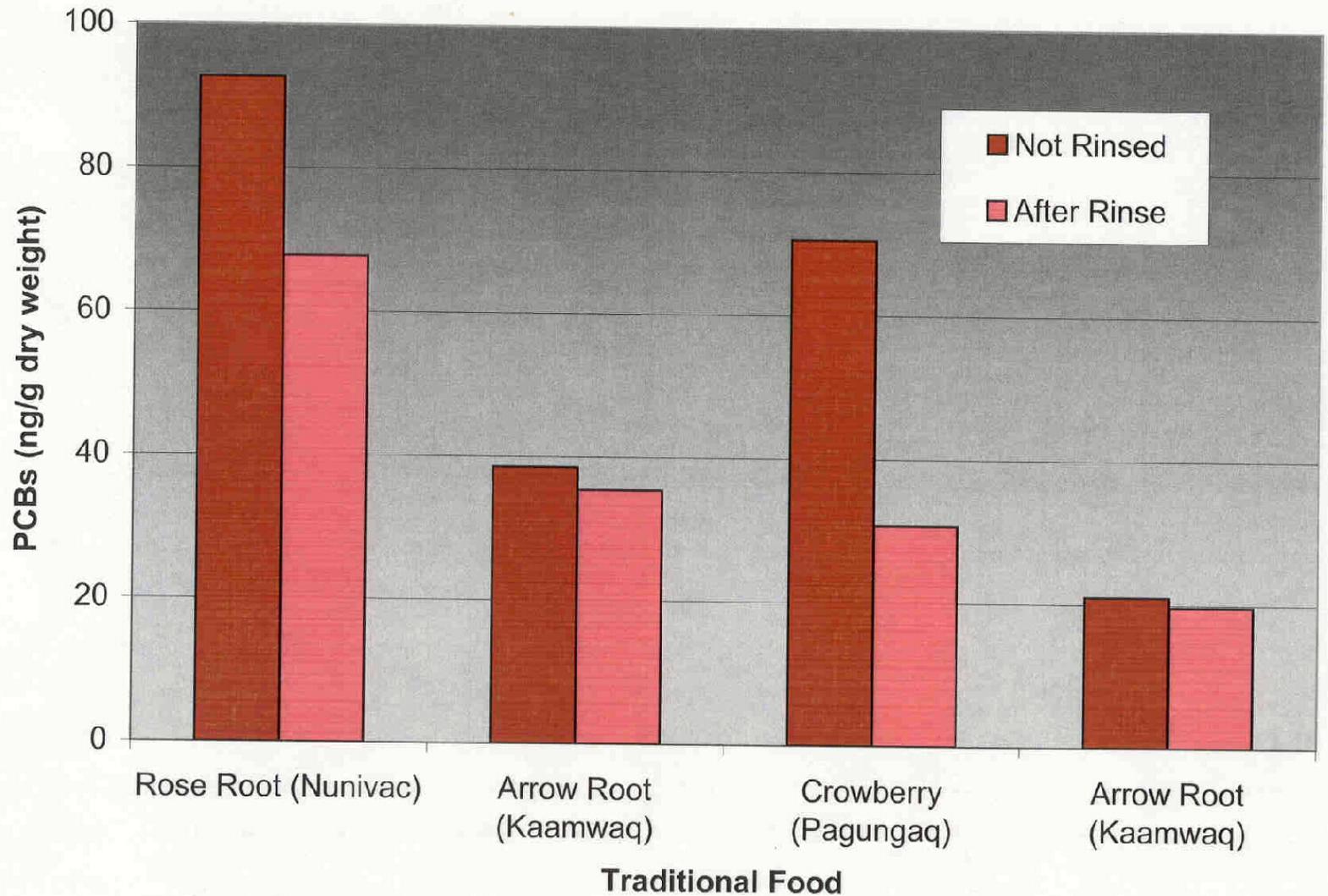
Maximum PCB Concentrations in Air Samples



MIREX

- ❑ Our research identified Mirex which is a pesticide for Fire Ants and is also used as a flame retardant.
- ❑ We believe it is at other Formerly Used Defense Sites (FUDS).

Polychlorinated Biphenyls in Plants



Polychlorinated biphenyls (PCBs):
major contaminants left by the military at the Northeast Cape. They are carcinogenic substances that also cause a variety of other health effects, including reproductive disorders, endocrine disruption, neurobehavioral, immune suppression. However, PCBs also travel to polar regions of the earth via air currents, when they come out of the vapor phase at low temperatures and bioconcentrate in animal fats. Thus, people on St. Lawrence Island may be exposed to PCBs from either the local contamination or from atmospheric sources.

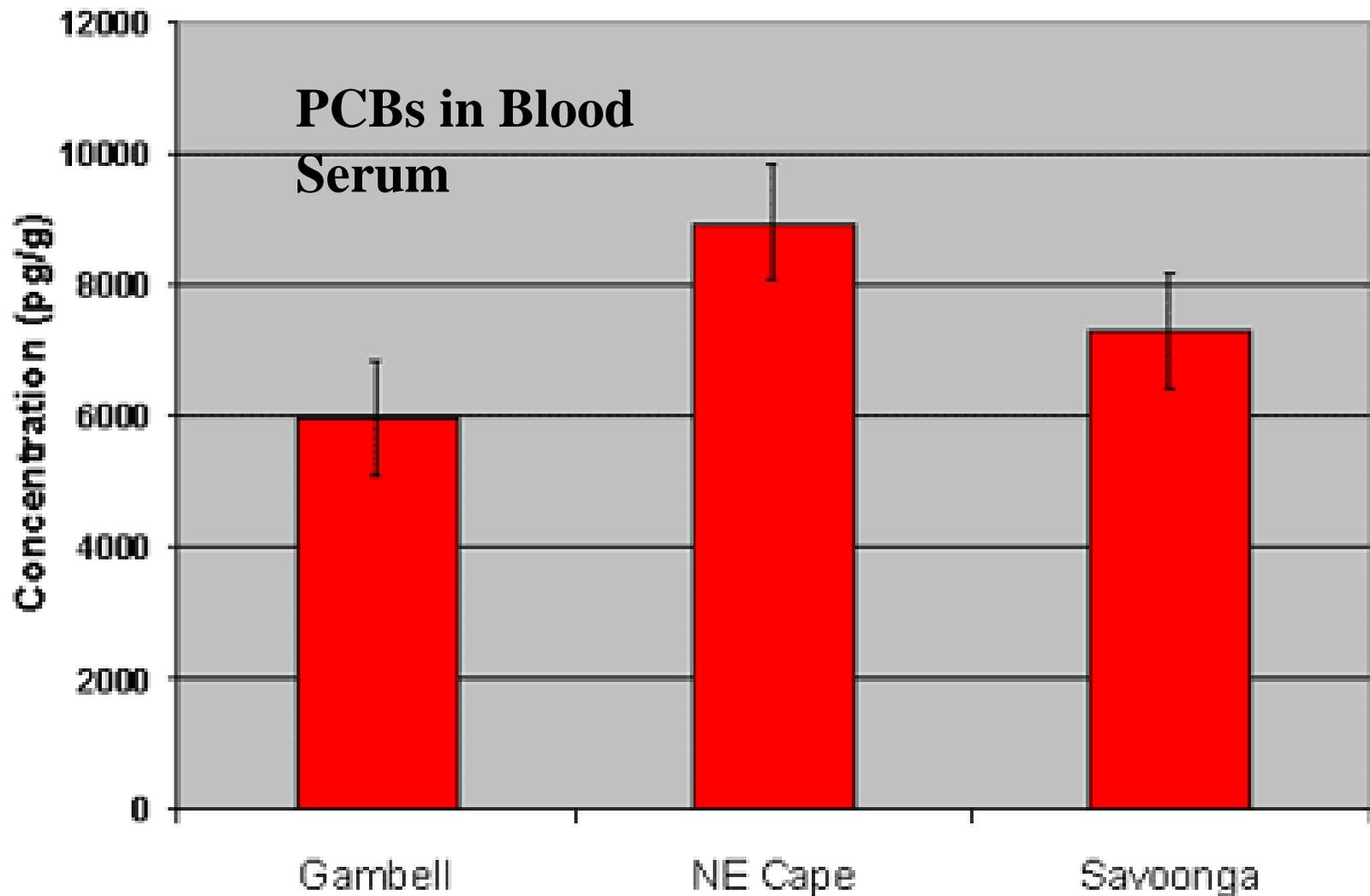
Chlorinated pesticides, such as DDT and chlordane, are also persistent in the environment and in the human body. Some pesticides were almost certainly used at the military sites, but they also travel to polar regions by air currents and bioconcentrate in animal fat. Most of the persistent pesticides also cause cancer and other diseases.

We obtained blood samples from residents of St. Lawrence Island and analyzed them for 101 PCB congeners and 25 chlorinated pesticides.

We compared levels in residents of Gambell, a military site with no known significant PCB contamination; residents of Savoonga with family hunting camps at the Northeast Cape, a military site with significant PCB contamination; and residents of Savoonga with no close connection with the Northeast Cape.

If the PCBs at the Northeast Cape are significant sources of exposure, those individuals who spend significant time there should have higher levels in their blood.

Environmental Health and Environmental Justice on St. Lawrence Island, Alaska



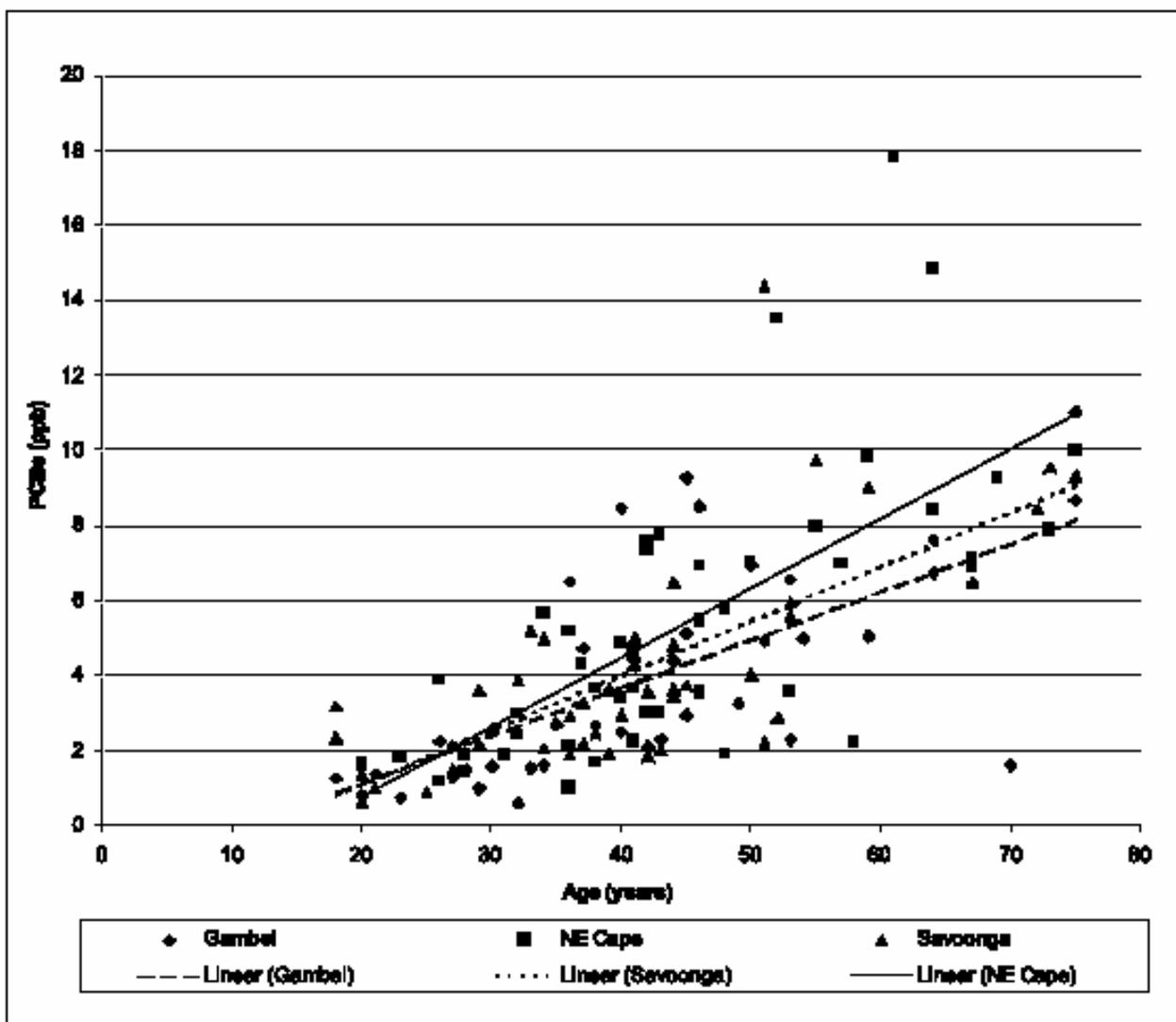


Figure 2. Serum PCB (wet weight) as a function of age for residents of Gambel, Savoonga and those with family camps at the NEC. The data from each individual in the study is plotted, as well as the linear regression best fit for each of the three populations. For Gambel the $R^2 = 0.4696$, for NEC $R^2 = 0.4713$ and for Savoonga $R^2 = 0.5134$.

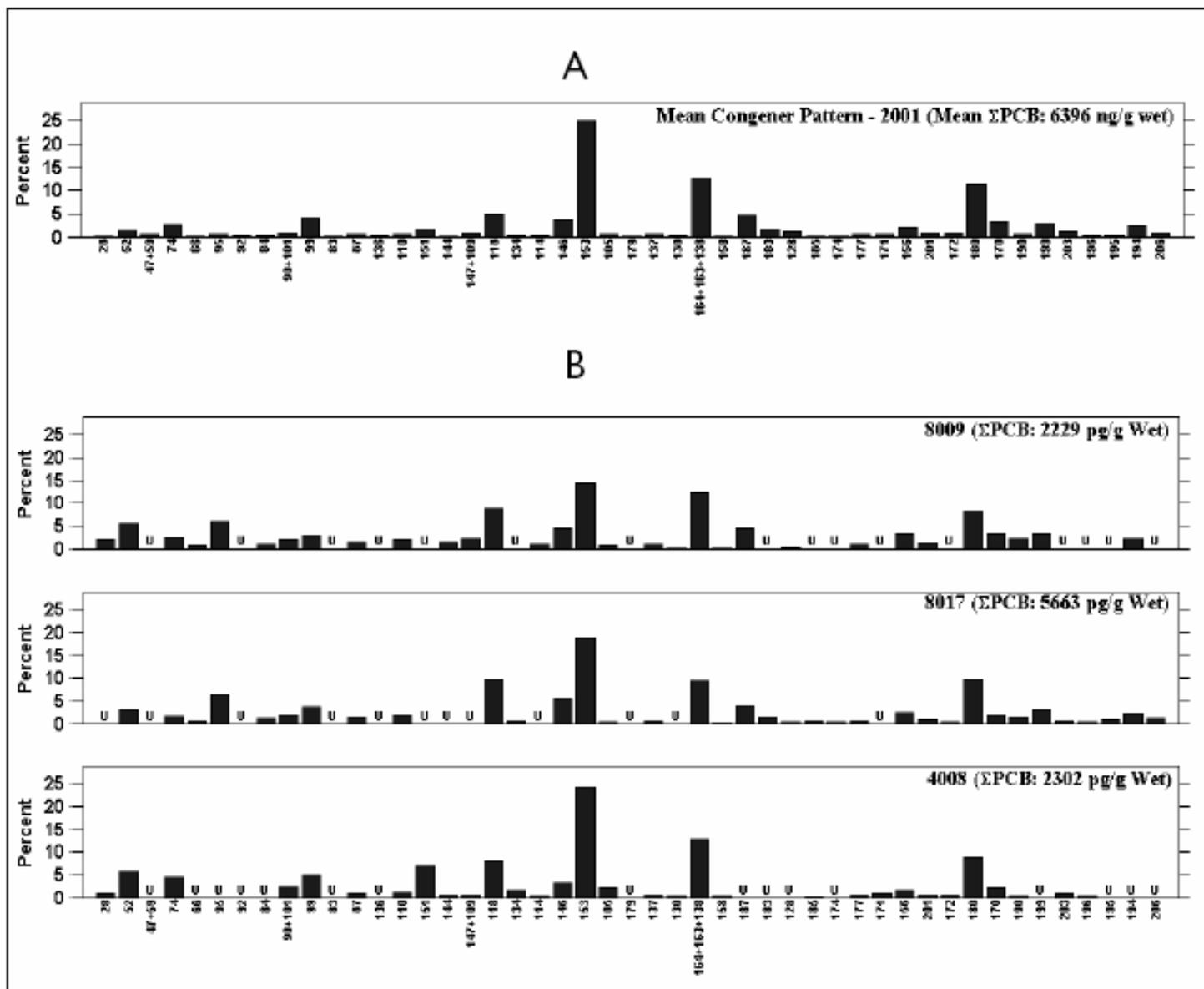


Figure 3. Mean PCB congener pattern in blood from 59 Yupiks aged 35 and over; analyzed in 2001 (A), with data normalized as percentages of total PCBs, and congener patterns from three individuals with elevated levels of transient PCB congeners (B). The mean pattern is very similar to that reported for the average US population (19), but the three individuals shown in B demonstrate the presence of a much higher proportion of lower chlorinated, transient congeners, indicative of recent exposure.

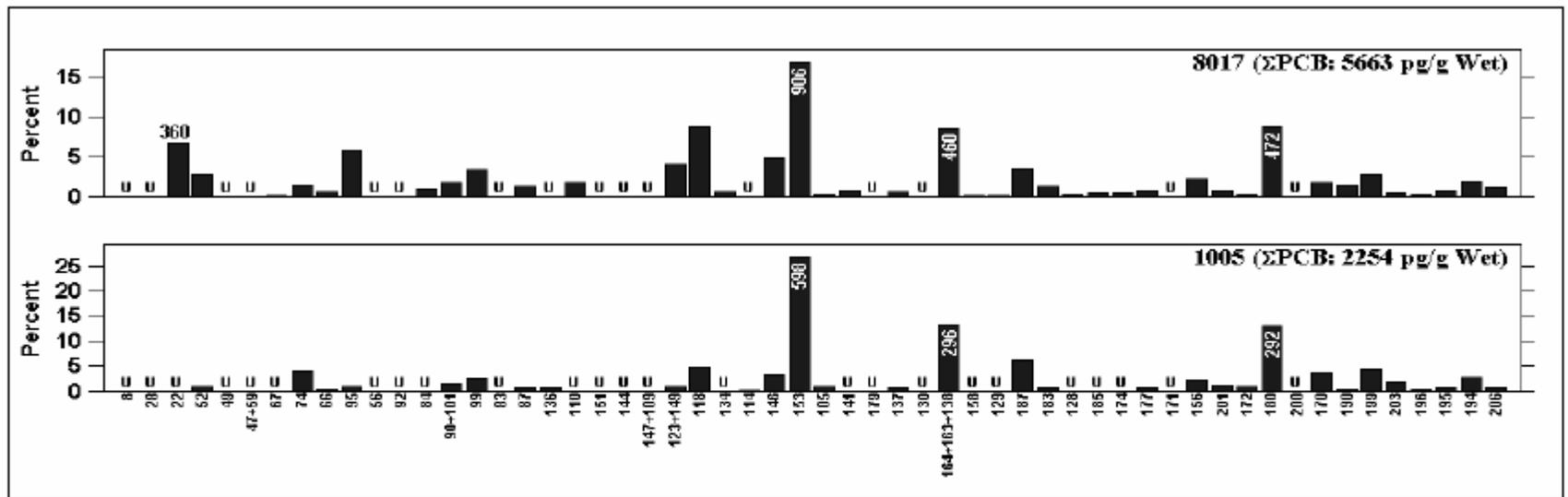
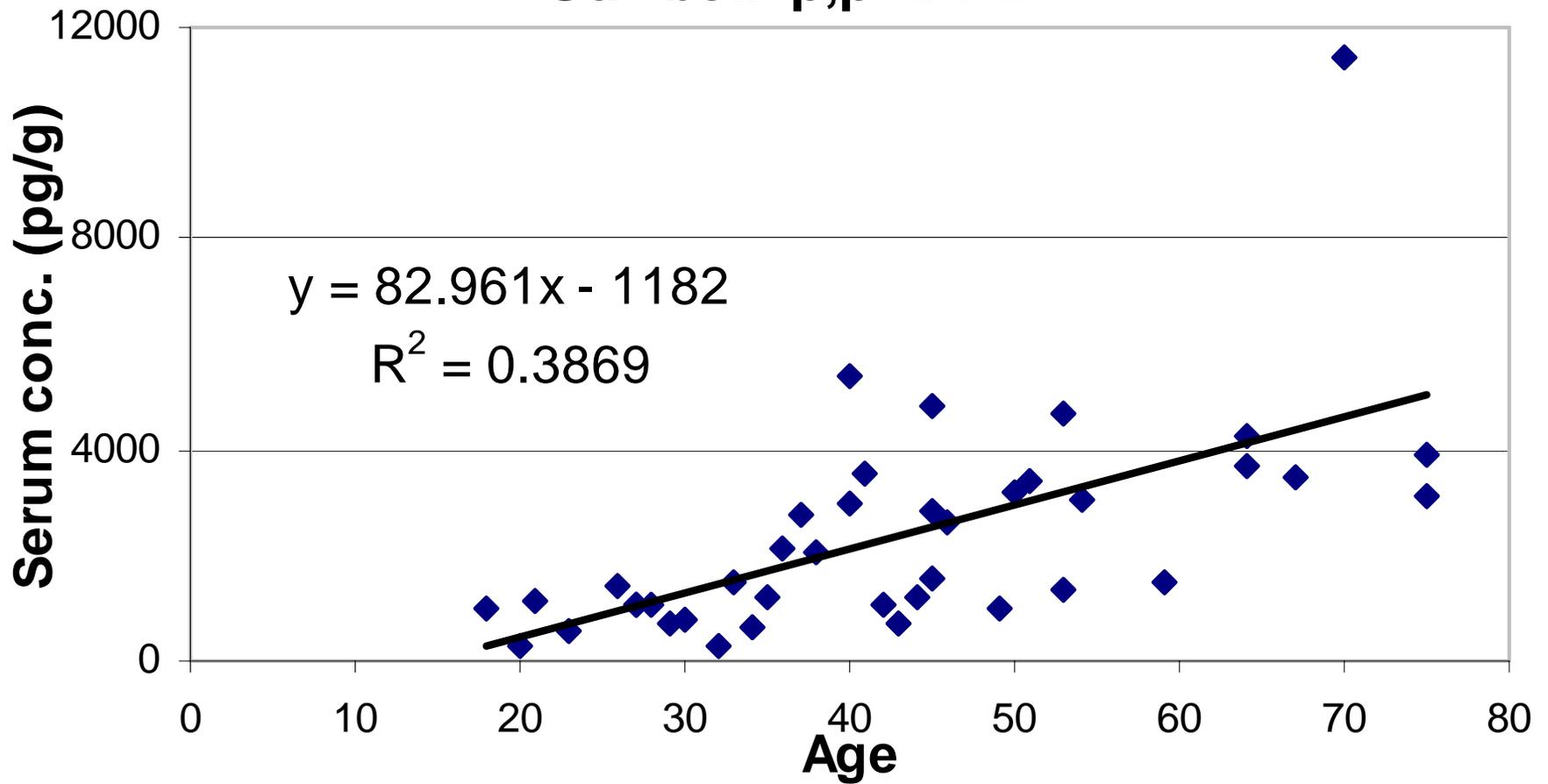


Figure 4. PCB congener pattern in blood taken from one individual (male, age 35, from the NEC group) in 2001 (upper) and from a repeated blood sample in 2003 (lower). Note the decrease in serum levels over time, and the shift in the PCB congener pattern.

Gambell: p,p'-DDE



Sample ID	Average	Max	Min	Positive Results
Alpha-BHC	4	24	0	11
Lindane	35	246	0	6
Delta-BHC	0	21	0	1
Heptachlor	9	35	0	19
Aldrin	6	36	0	5
Heptachlor Epoxide	59	242	0	29
Oxychlorane	425	2121	0	74
Gamma-Chlordane	6	246	0	6
o,p'-DDE	20	106	0	14
Alpha-Chlordane	17	36	0	30
Trans-Nonachlor	291	1052	41	72
Cis-Nonachlor	4	103	0	1
o,p'-DDT	10	31	0	19

Project Summary for New NIEHS Project: Environmental Health and Justice in Norton Sound

- Identify all formerly used and active military sites and build a comprehensive profile for each
- Conduct research to document regional human health impacts of contaminants
- Train and provide support for village environmental health research technicians to collect independent data concerning environmental and health effects of contaminants
- Develop an education program for health care providers to enable them to better identify and treat illnesses that might be linked with exposure to contaminants

Specific Local and Statewide Policy Changes

- Prompt municipal ordinances to ban pesticides.
- Enact statewide citizens' initiative to prevent registration of harmful pesticides.
- Ban aerial applications of pesticides/herbicides.
- Phase-out persistent bioaccumulative chemicals from industrial and military sources.
- Build a people's movement to hold corporations and military polluters accountable – creating Democracy School project Alaska



Importance of the Stockholm Convention

- A groundbreaking international treaty that sets out to eliminate a class of harmful chemicals, starting with 12 of the most hazardous
- Bans 8 pesticides immediately—aldrin, endrin, dieldrin, chlordane, heptachlor, HCB, mirex, toxaphene
- Prohibits production of PCBs immediately and phases out remaining uses
- Limits DDT use to control malaria with long-term goal of phase-out
- Sets goal of elimination of industrial by-products including dioxins and furans
- Uses a science-based approach to take action against additional POPs
- Builds the capacity for all countries to eliminate POPs
- Emphasizes preventative measures to address POPs at their source

Signing and Ratification of Stockholm Convention

- Negotiated by 150 governments in a series of 5 Intergovernmental Negotiating Committee meetings between 1998 and 2000
- Formally signed in Stockholm, Sweden May 21-23, 2001
- At least 127 countries have now ratified the treaty
- United States has not yet ratified the treaty—requires “advice and consent” of two-thirds of the Senate with amendments to FIFRA and TSCA
- By remaining outside this landmark agreement, the U.S. harms its reputation internationally and cannot participate fully

Support for the Stockholm Convention

- Supported through resolutions of many tribes in Alaska and lower-48, Alaska Inter-tribal Council, Alaska Federation of Natives, National Congress of American Indians, Inuit Circumpolar Conference
- More than 350 public interest health and environmental organizations of the International POPs Elimination Network (IPEN) throughout the world

Addition of New Chemicals

First meeting of the POPs Review Committee of scientists/observers in November 2005 to consider 5 new chemicals

- Lindane (Mexico)
- Chlordane (EU)
- Hexabromobiphenyl (EU)
- Pentabromodiphenyl ether (Norway)
- Perfluorooctane sulfonate and 96 precursors (Sweden)

Conclusion: all met criteria for persistence, bioaccumulation, long-range transport, adverse effects

Next steps...

for the health of future generations

Ensure addition of new POPs chemicals, including:

- pentachlorophenol (PCP), endosulfan
- additional brominated flame-retardants
- short-chained chlorinated paraffins (SCCPs), polychlorinated naphthalenes (PCNs),
- unintentionally produced chemicals: octachlorostyrene (OCS), polycyclic aromatic hydrocarbons (PAHs)

Project Staff

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