One Health approach to environmental issues affecting Indigenous Peoples’ health

GIS and CBPR design in Alaska Native communities

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Outline

Contamination Sites in Alaska
  • Location
  • Types

Looking for Links’ to Health Issues
  • Using GIS
  • Comparing available data

One Health Environmental Projects in Alaska

Community-Based Participatory Research:
  • ATCEM Conference
  • Design & Development
  • Tribal & Village Contacts
Contamination Sites in Alaska

WELCOME
The Contaminated Sites Program protects human health and the environment by managing the cleanup of contaminated soil and groundwater in Alaska.

Program Manager: John Halverson
907-269-3094
Contact Information

NEWS AND QUICK LINKS
- Proposed Cleanup Levels for Per- and Polyfluoroalkyl Substances (PFAS)
- Per- and Polyfluoroalkyl Substances (PFAS)
- Aqueous Film Forming Foam (AFFF) Risks
- Approved labs
- Qualify as an Environmental Professional or Sampler

MOST VISITED
- North Pole Refinery
- Fairbanks Area Contaminated Sites

POPULAR CONTENT
- Annual Report
- Contaminated Real Estate

ADDITIONAL RESOURCES
- Vapor Intrusion
- Institutional Controls Information
## Contamination Sites in Alaska

<table>
<thead>
<tr>
<th>Site Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military Installation</td>
<td>627</td>
</tr>
<tr>
<td>Storage/Gas Station</td>
<td>287</td>
</tr>
<tr>
<td>Airport/Airfield</td>
<td>195</td>
</tr>
<tr>
<td>Maintenance Yard/Shop</td>
<td>154</td>
</tr>
<tr>
<td>Oil Exploration/Production</td>
<td>132</td>
</tr>
<tr>
<td>Residence</td>
<td>124</td>
</tr>
<tr>
<td>Commercial/Retail/Office</td>
<td>113</td>
</tr>
<tr>
<td>Waste/Salvage/Disposal</td>
<td>110</td>
</tr>
<tr>
<td>Hospital/Clinic/School/Institution</td>
<td>98</td>
</tr>
<tr>
<td>Mining/Logging Operation</td>
<td>93</td>
</tr>
<tr>
<td>Park/Recreation Area/Firing Range</td>
<td>29</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>21</td>
</tr>
<tr>
<td>Agriculture/Seafood Processing</td>
<td>20</td>
</tr>
<tr>
<td>Laundry/Dry Cleaner</td>
<td>19</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>17</td>
</tr>
<tr>
<td>Railroad Operation</td>
<td>13</td>
</tr>
<tr>
<td>Chemical Manufacturing/Storage</td>
<td>8</td>
</tr>
<tr>
<td>Harbor/Port/Marina</td>
<td>7</td>
</tr>
</tbody>
</table>

- **30%** of active sites are from military installations (627).
- **74%** of all active sites are from release of petroleum products. (DEC, 2018)

**Source:** Alaska DEC, Division of Spill Prevention and Response (SPAR) Annual Report, Fiscal Year 2018
Cumulative Active and Closed Sites, Alaska, DEC, FY 2018

DEC identified more than 7,700 contaminated sites

Since 1990, 5,382 sites have been closed.

Over 2,300 sites remain open (DEC, 2018)
Geochemical analyses of:
• rocks,
• soil samples
• water and stream sediment, collected 1975-1984

Online spatial data:
• Mines
• Prospects
• Occurrences

Other data

National Uranium Resource Evaluation (NURE) Program
Looking for Links to Health Issues

Contaminated sites data

Health registry data

Using GIS to examine data
2003 County-level Medicare Data (65+ age):
Alaska Regions Showed High Prevalence Rate of Parkinson’s Disease

Kodiak Island, Juneau & Wrangell/Petersburg Boroughs: High Parkinson's disease areas in Alaska

From: Willis, A.W. et al, Neuroepidemiology 2010;34:143–151 DOI: 10.1159/000275491 (Figure 1)
Areas with only 10-25% Alaska Native population; (or 75-90% non-Alaska Natives)
A 14-year study of Parkinson’s disease registry that only included the Alaska Native population also found that SE Alaska had the highest rate of Parkinson’s Disease.

*The SE also has the highest incident rates of Lupus & breast cancer.*
Parkinson’s & Lupus

These diseases:

• Have no specific known causes

• Are thought to be associated with environmental contamination or sources

• Lack a totally established tie to genetics
Next: SE Alaska, as example:

Parkinson’s & Lupus: Contamination Sites & GIS
Leaky storage tanks could be examined from the DEC data.
Mining activity past and present could be examined
Geochemical baseline data:

For instance, Lead (Pb) in stream sediments
Manganese (Mn) in water (NURE database)
Fish tissue sample testing for metals, PCBs, PBDEs and pesticides

Using Data from State Veterinarian

https://dec.alaska.gov/eh/vet/
Anadromous fish tissue Sample Sites for Hg.

Map by Anita Moore-Nall. Data source: AK DEC, USGS, and Dept. of Natural Resources.
Links to One Health Issues
Fetal and Neonatal Birth Defects
Fetal and Neonatal Birth Defects

Thought to be Associated with Exposure to *Environmental Contaminants*:

- Cardiovascular ailments
- Orofacial Defects (like Cleft Palate, Cleft lip)
- Neural tube*

*Ward, 2018 indicated: “...evidence continues to accumulate that higher nitrate intake during pregnancy is a risk factor for this group [neural tube] of birth defects.”*
In a 2006, American Journal of Epidemiology article, Gilbreath and Kaas reported on adverse birth outcomes linked with open dumpsites.

Of 199 Alaska Native villages reporting births, there were hazard rankings for 197.

Mothers in villages with high hazard dumpsites:
- 43% more likely to have low birth weight babies
- 45% more likely to give preterm birth

Leading Types of Birth Defects*, Alaska Native Children, Statewide, 2009-2013

- Chromosomal: 3%
- Central Nervous System: 5%
- Musculo-skeletal: 9%
- Genitourinary: 11%
- Orofacial: 15%
- Gastro-intestinal: 3%
- Eye: 2%
- Ear: 1%
- Cardiovascular: 51%

Cardiovascular defects 7% pts. higher than White birth defects

Orofacial defects 6% pts. higher than White birth defects

*FAS or other effects of maternal alcohol use are not included in Alaska Birth Defects Registry

Data Source: State of Alaska, Division of Public Health, Alaska Birth Defects Registry
Problems Linking Birth Defects & Environmental Contaminants

Surveillance (registries), or research; but rarely both

Studies tend to focus on drugs, smoking, alcohol; but not other environmental factors

Difficulties getting approval & funding

Birth defects can be difficult to diagnose at birth or miscoded

...some recent Studies, however are being piloted and planned

“...the West Moberly First Nations, were concerned about the contaminants released by natural-gas sites...”
Related
One Health
Environmental Projects in Alaska
ANTHC: Alaska Native Tribal Health Consortium
Community Environment and Health

Hosts events like ACTEM

One Health Group
And, sponsors programs like this one
What is going on *now* in Alaska Tribal Communities

Alaska Department of Environmental Conservation

**Inspection on Storage Tank Remediation, Village of Kotzebue**
Community-based Approach in Environmental Health in Alaska Native Communities

"CBPR is a collaborative approach...equitably involves partners in the entire research process—from formulation [of] purpose & questions [to] outputs and outcomes"

Env. Health researcher collects Yupik traditional food sample for analysis

In NW Alaska

Mungtak (Bowhead whale).

Photo: Seguinot

Alaska Community Action on Toxics: https://www.akaction.org/tackling_toxics/food/traditional_foods/
Community-Based Participatory Research (CBPR)

- About YOUR community
- By YOUR community
- For YOUR community
Cards distributed at Alaska Tribal Conference on Environmental Management (ATCEM) in Anchorage, Alaska

(Front of Card)

A Look Into Contaminated Sites And Potential Health Effects in Alaska

ATCEM
November 27-30, 2018
Anchorage, Alaska

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llschwarzburg@alaska.edu

(Back of card)

Thanks for attending the ATCEM conference and our 'Looking Into Contamination Sites and Potential Health Effects' Presentation.

If you and your community are interested in becoming involved with us in a Community-based participatory research (CBPR) project about: Contamination Sites & Health Issues in your community,

PLEASE check 'YES' box and fill out this card, including your contact information:

☐ Yes, I'm interested in the possibility of my community participating in a CBPR project on environmental health & justice in our area. Please contact me at:

Community or Village:

Title or affiliation: (Elder, etc.)

Your NAME

Email: _____________________________ phone: _____________________________

(I prefer: [ ] email [ ] phone [ ] either one is OK)

MAIN Env. Health areas of concern:

IMP’T TOPICS you want to share or seek info about:

☐ Not sure right now. Please keep this card to contact us later by emails, listed on front.
Preliminary Steps with these CBPR projects:

#1: Distributed Cards at ATCEM conference

#2: Respond to Requests to establish connection

#3: Work with communities, representative individuals & organizations to
  • establish goals
  • seek appropriate funding
Thank you

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