WEAR Methodology

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ADEC Solid Waste Program
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Project Overview

- Funding through Coastal Impact Assistance (CIAP)
- 4-year project
- Assess, inventory, prioritize landfills, contaminated sites & other environmental concern sites (tank farms, city shops, waste staging areas, etc.)
- Alaska's northern & western coastline, Aleutian Islands & river communities (300 miles from coast)
- Sites ranked on potential erosion & contaminant risks

Inspected 716 sites

in 124 communities

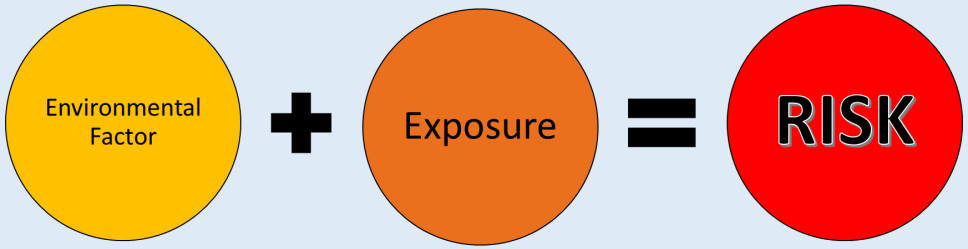
Risk Calculations

Erosion Risk

- *2009 Alaska Baseline Erosion Assessment* USACE, Alaska District
- Desktop assessment
- Field measurements & observations

Contaminant Risk

- Site assessment
- Toxicology
- Exposure pathways
- Human & ecological risk assessment



Data Collected

- Site information
- Size of site
- Years of operation
- Possible contaminants
- Drinking water protection zone
- Distance to critical habitat
- Distance to residences
- Distance to stressed habitat
- Years until erosion
- Erosion type
- Erosion factors
- Erosion symptoms
- Soil Class
- Mitigation efforts

WEAR Project
Site Information Form

Inspectors:_____

Date:_____

Community				
Site name				
Site Type				Landfill, Tank Farm, Drum Dump, Military, Mining
Status				Active/Open, Covered/Closed, Removed/Remediated
Location				
Latitude:		Longitude:		GPS Point ID's:
Description:				
Approx. Size (acres):		Years Operated:		
Possible Contaminants:				Municipal Waste, Fuels, Mining Waste, C&D/Asbestos, Military Waste, Industrial Waste, Other
Distance to (ft):				
Active Erosion:		Closest Water:	Name:	Anadromous water body?
Subsistence Area:		Critical Habitat:		USFW
Residences:		Stressed Habitat:		
Exposure Pathways:				Inhalation, Direct Contact, Wildlife, Other
Erosion:				
Type:				Waves, Currents, Ice, Heat, Wind, Precipitation, Seepage
Factors:				Tides, Storm Surge, Flooding, Permafrost, Human Influenced, Other
Symptoms:				Slides, Undercutting, Scarps, Exposed Permafrost, Root Exposure/Fallen Trees, Waste Exposed, Ice Gouging, Other
NRCS Soil Classification:				
Silt %	Clay %	Cobble %	Organics %	
Sand %	Gravel %	Boulder %	Loam %	
Erosion Rate:		Erosion Rate QA:		Reported, Calculated, BEA Calculated
Current Erosion Mitigation Efforts:				
Drinking Water:				
Is the site in a drinking water protection area? If Yes:				
1° Source Name:		2° Source Name:		
Type:		Type:		Surface Water, Groundwater
Treatment:		Treatment:		Filtration, UV, Chlorination, Reverse Osmosis, Nanofiltration
Well Depth (ft.):		Protection Zone:		Zone A, Zone B, Zone C, Zone E, Zone F
If No:				
Distance to Drinking Water Protection Area:				Upgradient or Downgradient

Scoring

Weighting factors for relative importance

- 1 - important
- 2 – more important
- 3 – most important

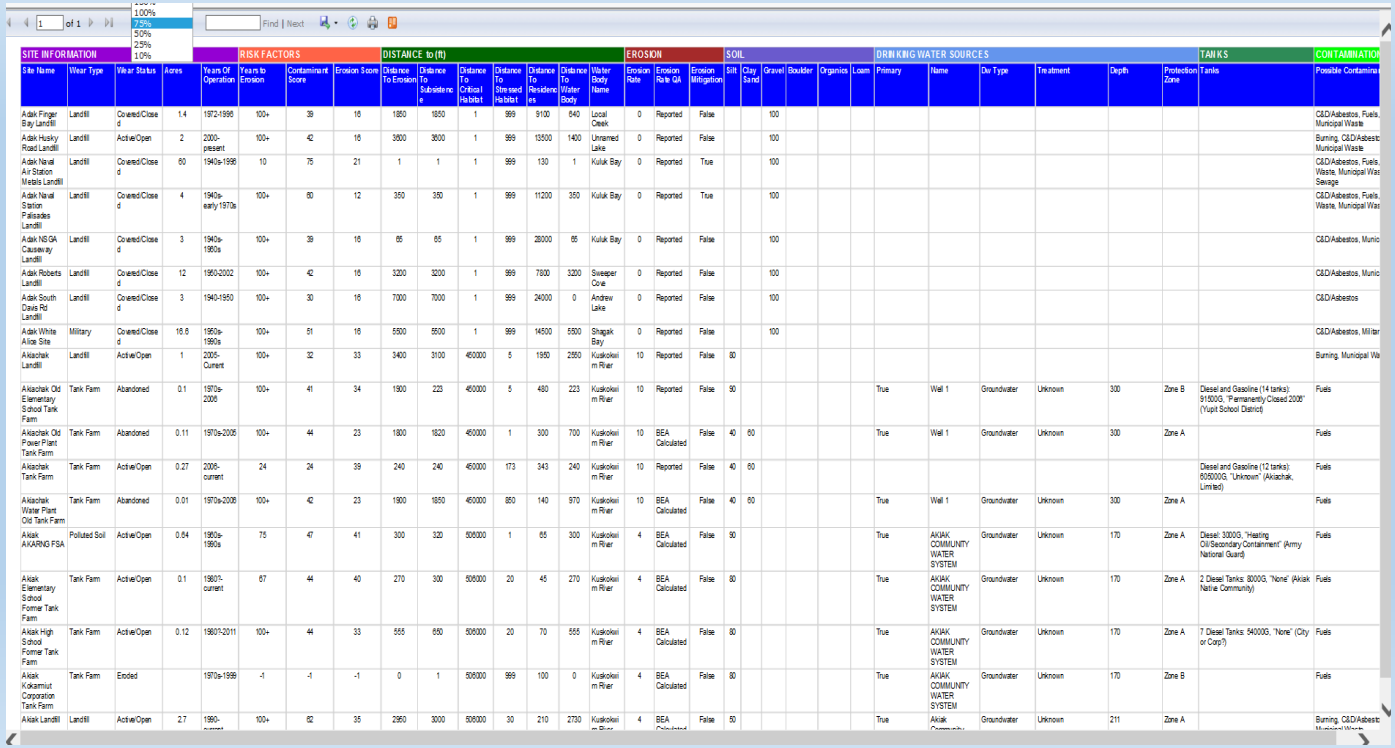
Multipliers corresponding to relative risk

- Higher # = higher potential risk

Weighting Factor x Multiplier = Score

	Weight	Multiplier	Characteristics Considerations & References		
	1-important; 2-more; 3-most	Higher # corresponds to higher risk			Possible Score
WEAR Status	3				
Removed		0	Waste removed		0
Closed/Covered		2	Closed and covered	No longer accumulating waste but all waste remains	6
Inactive		3	left in place; all waste remains; potential responsible party		9
Abandoned		3	Left in place; all waste remains; no responsible party	No longer accumulating waste, no cover, maintenance, etc.	9
Active/open		4	Actively accumulating waste	Increasing waste	12
Size	3				
Small		1	Approximately 0-1 acre	Small, limited waste	3
Med		2	>1 acre, but <5 acres	Minimal waste	6
Possible Contaminants	3				
Burning		1	Burning of waste at any point in time	Air quality issue & formation of hazardous ash	3
Fuels		1	Fuels (gasoline, diesel, heating fuel)	Based upon relative toxicity of suspected contaminants	3
C&D/Asbestos		2	Demolition debris presumably containing asbestos		6
Municipal Waste		3	Household waste		9
Sewage		3	Human waste		9
Mining Waste		4	Metals, acid generating rock (AGR)		12
Industrial Waste		5	Mixed wastes, haz waste, fuels		15
Military Waste		6	Military waste, mixed wastes, haz waste, fuels		18

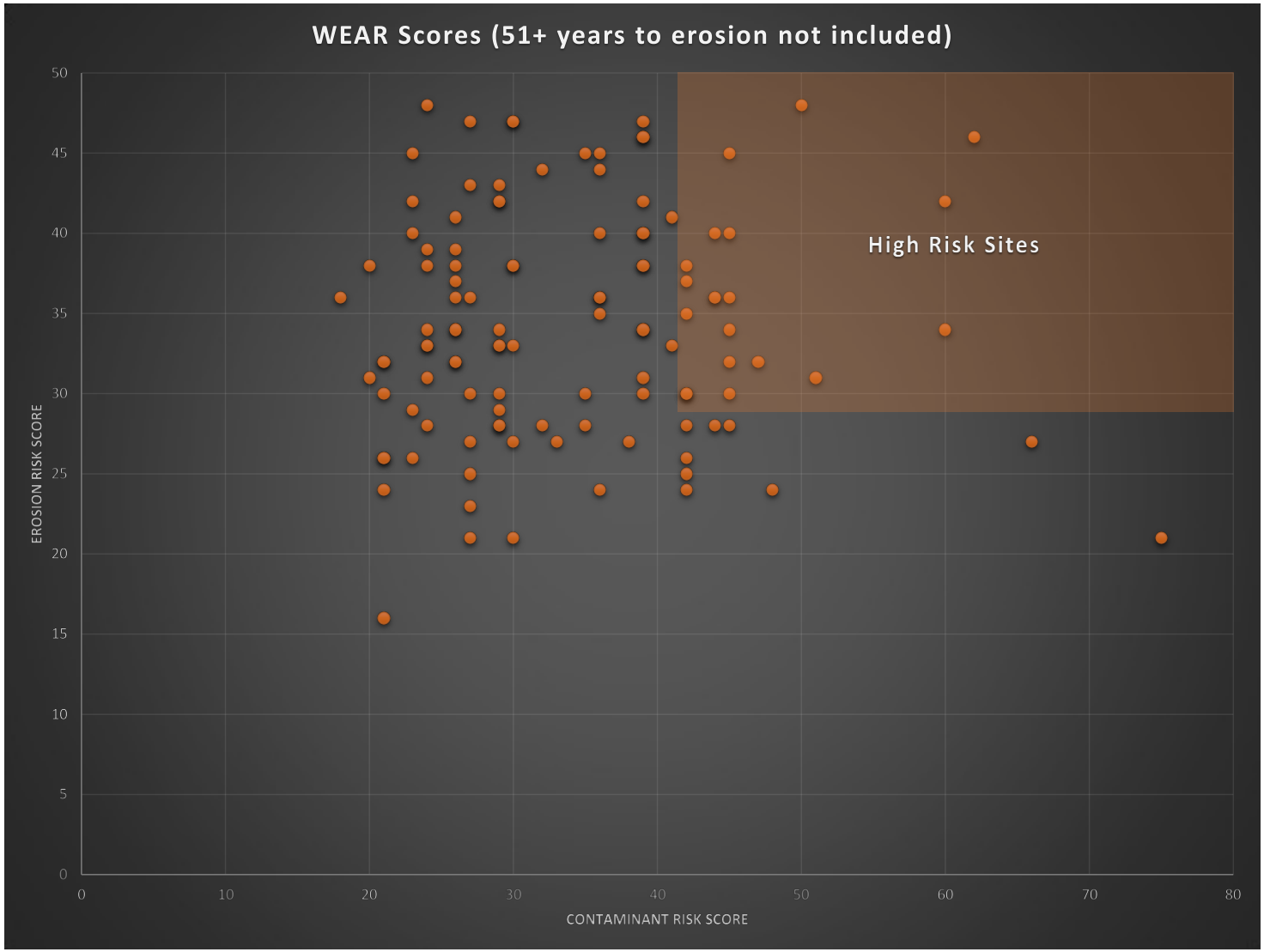
Solid Waste Information System (SWIMS)



SITE INFORMATION					RISK FACTORS			DISTANCE to (ft)						EROSION			SOIL						DRINKING WATER SOURCES						TANKS	CONTAMINATION
Site Name	Wear Type	Wear Status	Acres	Years Of Operation	Years to Erosion	Contaminant Score	Erosion Score	Distance To Erosion	Distance To Subsistence	Distance To Critical Habitat	Distance To Stressed Habitat	Distance To Residences	Distance To Water Body	Water Body Name	Erosion Rate	Erosion Rate QA	Erosion Mitigation	Silt	Clay Sand	Gravel	Boulder	Organics	Loam	Primary	Name	Dw Type	Treatment	Depth	Protection Zone	Tanks	Possible Contaminants
Adak Finger Bay Landfill	Landfill	Covered/Closed	1.4	1972-1996	100+	39	16	1850	1850	1	999	9100	640	Local Creek	0	Reported	False			100											C&D/Asbestos, Fuels, Municipal Waste
Adak Husky Road Landfill	Landfill	Active/Open	2	2000-present	100+	42	16	3600	3600	1	999	13500	1400	Unnamed Lake	0	Reported	False			100											Burning, C&D/Asbestos, Municipal Waste
Adak Naval Air Station Metals Landfill	Landfill	Covered/Closed	60	1940s-1998	10	75	21	1	1	1	999	130	1	Kuluk Bay	0	Reported	True			100											C&D/Asbestos, Fuels, Waste, Municipal Waste, Sewage
Adak Naval Station Palisades Landfill	Landfill	Covered/Closed	4	1940s-early 1970s	100+	60	12	350	350	1	999	11200	350	Kuluk Bay	0	Reported	True			100											C&D/Asbestos, Fuels, Waste, Municipal Waste
Adak NSGA Causeway Landfill	Landfill	Covered/Closed	3	1940s-1960s	100+	39	16	65	65	1	999	28000	65	Kuluk Bay	0	Reported	False			100											C&D/Asbestos, Municipal Waste
Adak Roberts Landfill	Landfill	Covered/Closed	12	1950-2002	100+	42	16	3200	3200	1	999	7800	3200	Sweeper Cove	0	Reported	False			100											C&D/Asbestos, Municipal Waste
Adak South Davis Rd Landfill	Landfill	Covered/Closed	3	1940-1950	100+	30	16	7000	7000	1	999	24000	0	Andrew Lake	0	Reported	False			100											C&D/Asbestos
Adak White Alice Site	Military	Covered/Closed	16.6	1950s-1990s	100+	51	16	5500	5500	1	999	14500	5500	Shagak Bay	0	Reported	False			100											C&D/Asbestos, Military
Akiachak Landfill	Landfill	Active/Open	1	2005-Current	100+	32	33	3400	3100	450000	5	1950	2950	Kuskokwim River	10	Reported	False	80													Burning, Municipal Waste
Akiachak Old Elementary School Tank Farm	Tank Farm	Abandoned	0.1	1970s-2006	100+	41	34	1900	225	450000	5	480	225	Kuskokwim River	10	Reported	False	90						True	Well 1	Groundwater	Unknown	300	Zone B	Diesel and Gasoline (14 tanks): 91500G, "Permanently Closed 2006" (Yupit School District)	Fuels
Akiachak Old Power Plant Tank Farm	Tank Farm	Abandoned	0.11	1970s-2005	100+	44	23	1800	1820	450000	1	300	700	Kuskokwim River	10	BEA Calculated	False	40	60					True	Well 1	Groundwater	Unknown	300	Zone A		Fuels
Akiachak Tank Farm	Tank Farm	Active/Open	0.27	2006-current	24	24	39	240	240	450000	173	343	240	Kuskokwim River	10	Reported	False	40	60											Diesel and Gasoline (12 tanks): 605000G, "Unknown" (Akiachak, Limited)	Fuels
Akiachak Water Plant Old Tank Farm	Tank Farm	Abandoned	0.01	1970s-2006	100+	42	23	1900	1850	450000	850	140	970	Kuskokwim River	10	BEA Calculated	False	40	60					True	Well 1	Groundwater	Unknown	300	Zone A		Fuels
Akiak AKARNG FSA	Polluted Soil	Active/Open	0.64	1960s-1990s	75	47	41	300	320	506000	1	65	300	Kuskokwim River	4	BEA Calculated	False	90						True	AKIAK COMMUNITY WATER SYSTEM	Groundwater	Unknown	170	Zone A	Diesel: 3000G, "Heating Oil/Secondary Containment" (Army National Guard)	Fuels
Akiak Elementary School Former Tank Farm	Tank Farm	Active/Open	0.1	1960?-current	67	44	40	270	300	506000	20	45	270	Kuskokwim River	4	BEA Calculated	False	80						True	AKIAK COMMUNITY WATER SYSTEM	Groundwater	Unknown	170	Zone A	2 Diesel Tanks: 8000G, "None" (Akiak Native Community)	Fuels
Akiak High School Former Tank Farm	Tank Farm	Active/Open	0.12	1960?-2011	100+	44	33	555	650	506000	20	70	555	Kuskokwim River	4	BEA Calculated	False	80						True	AKIAK COMMUNITY WATER SYSTEM	Groundwater	Unknown	170	Zone A	7 Diesel Tanks: 54000G, "None" (City or Corp?)	Fuels
Akiak Kokarmiut Corporation Tank Farm	Tank Farm	Eroded		1970s-1999	-1	-1	-1	0	1	506000	999	100	0	Kuskokwim River	4	BEA Calculated	False	80						True	AKIAK COMMUNITY WATER SYSTEM	Groundwater	Unknown	170	Zone B		Fuels
Akiak Landfill	Landfill	Active/Open	2.7	1990-current	100+	62	35	2950	3000	506000	30	210	2730	Kuskokwim River	4	BEA Calculated	False	50						True	Akiak Community	Groundwater	Unknown	211	Zone A		Burning, C&D/Asbestos, Municipal Waste

Site Rankings

- 716 total sites assessed
- 5 eroded during project timeframe
- 711 sites were scored
- 605 sites excluded likely to erode >50 years
- 106 sites left for final ranking
- 20 sites in upper 25% for both erosion & contaminant risk


WEAR Scores (51+ years to erosion not included)
High Risk Sites
EROSION RISK SCORE
CONTAMINANT RISK SCORE
0
5
10
15
20
25
30
35
40
45
50
0
10
20
30
40
50
60
70
80

High Priority Sites

- Alakanuk Old BIA School
- Alakanuk South Side Dump Site
- Chevak Company Corporation Tank Farm
- Chevak Former AVEC Tank Farm
- Chevak Former City Tank Farm
- Chevak Old River Landfill
- Dillingham IHS Hospital Site
- Emmonak Landfill
- Golovin Fish Processing Plant
- Kalskag Consolidated Tank Farm
- Kotlik Landfill
- Kotlik LYSD Former Tank Farm
- Napakiak Corporation Tank Farm
- Napakiak School Tank Farm
- Nelson Lagoon Landfill
- Newtok Backhaul Staging Area
- Newtok UPC Generator Building
- Nunapitchuk Old Elementary School Tank Farm
- Oscarville School Tank Farm
- Shageluk City Tank Farm

Dillingham IHS Hospital Site

- IHS Kanaknak Hospital, old hospital landfill, and multiple fuel-contaminated sites
- Multiple types of contaminants
- >50 acre site along Nushagak River
- Old landfill waste exposed by erosion
- Seeps & stressed vegetation noted
- Located within critical habitat area
- Silt & clay soils
- Erosion rate of 1ft/year
- Active erosion noted
- No erosion mitigation efforts

Oscarville School Tank Farm

- Store 28,000 gallons heating fuel
- 120ft from school, 165ft from residences, 790ft from subsistence fishing area
- Drinking water protection zone for school's water supply
- Xylenes in drinking water
- Erosion rate of 3ft/year
- Silt riverbank

School Tank Farm (ADEC 2012)

Tuntutuliak - Riverbank Erosion 2012

Nunam Iqua - Shoreline Erosion 2014

Alakanuk - Riverbank Erosion 2014

Wainwright - Shoreline Erosion and Riprap Installation 2013

http://dec.alaska.gov/eh/sw/wear.html