



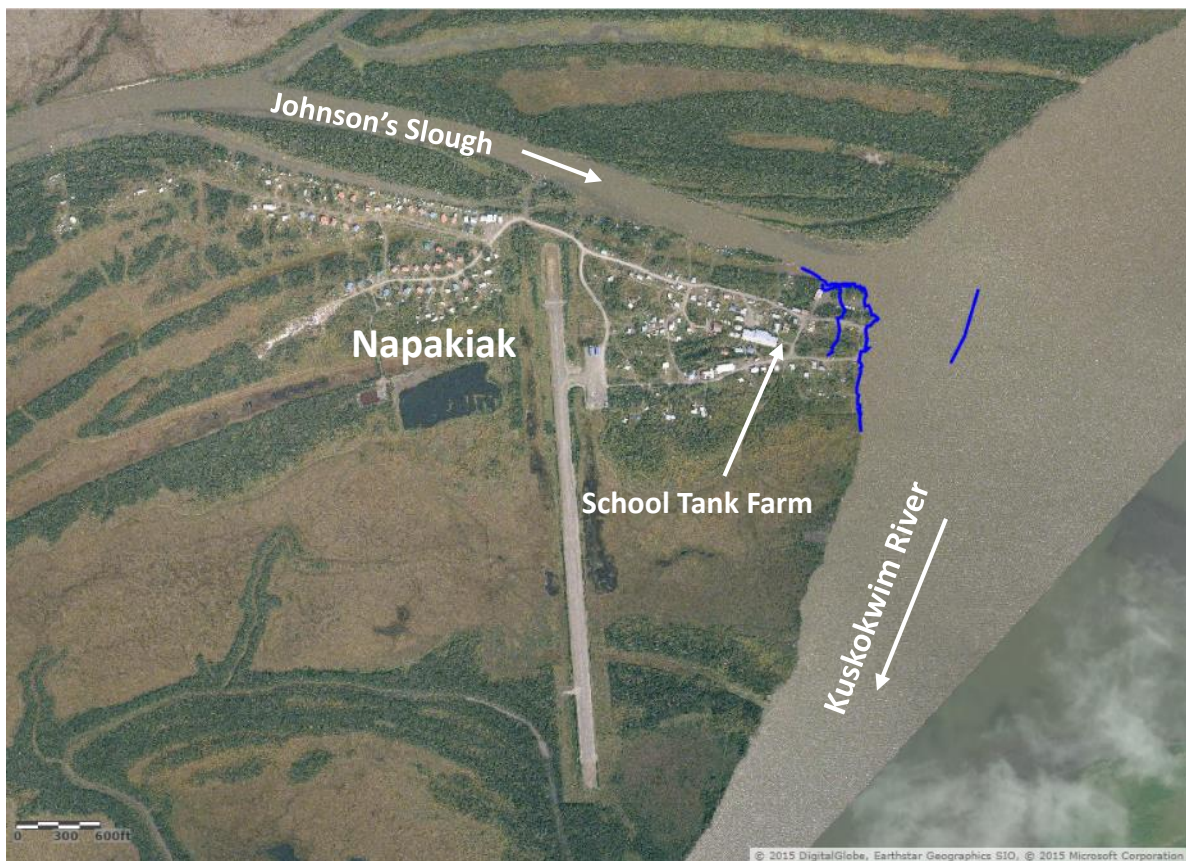
# DETAILED ACTION PLAN

# NAPAKIAK SCHOOL TANK FARM

## WASTE EROSION ASSESSMENT & REVIEW (WEAR)

### MAY 2015

The **Napakiak School Tank Farm** is located on school grounds near the northeast corner of the school at latitude 60.694257 and longitude -161.969985 and was inspected for the Waste Erosion Assessment and Review (WEAR) project on June 21, 2013. The tank farm is owned and operated by the Lower Kuskokwim School District (LKSD), but the landowner is unknown.



Imagery Dated 2007. Note eroding shoreline in blue, from left to right: 2013, 2007, and 1991.

**Community\* – NAPAKIAK** – Napakiak (population 387) is located on the north bank of the Kuskokwim River, 15 miles southwest of Bethel. It is located on an island between the Kuskokwim River and Johnson's Slough. Napakiak is influenced by storms in the Bering Sea and also by inland continental weather. The Kuskokwim River is typically ice-free from June through October. Napakiak is predominantly Yup'ik Eskimos who maintain a fishing and subsistence lifestyle. The city's primary priority in 2009 was to relocate all public facilities and homes to a bluff across Johnson's Slough, as the sandbar on which the city was built is severely eroding.



## CONTAMINANT RISK

The Napakiak School Tank Farm consists of 10 yellow single-walled vertical tanks, owned and operated by the LKSD. It serves as the fuel source for the school and has been in use since the 1970s. The tanks rest on a sturdy timber foundation inside a fenced area and use a lined timber dike impoundment for secondary containment. The total capacity of the tank farm is approximately 140,000 gallons of diesel. The site also contains two disconnected vertical tanks, owned by the Napakiak Corporation. These two tanks have not been in use since the new Corporation Tank Farm was constructed in 2010.

Possible contamination at the School Tank Farm is limited to diesel fuels. Contaminants associated with fuels include volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). These contaminants are known to cause cancer and other chronic diseases. Contamination could have a serious impact on nearby soil, water, and subsistence resources. During the 2013 inspection, no stressed vegetation was found nearby. The nearest residence is located 250 feet away. This site is within the drinking water source protection zones for two community water sources and one transient water source. According to the Alaska Department of Environmental Conservation's (ADEC), Drinking Water Watch database, the community sources are monitored for a group of VOCs related to fuel products. Although no VOCs have been detected over the drinking water standards, chloroform has been consistently detected at concentrations above the detection limit.



School Tank Farm and Napakiak Corp. Tanks (ADEC 2013)



School Tank Farm (ADEC 2013)



Fuel Lines and Timber Supports (ADEC 2013)



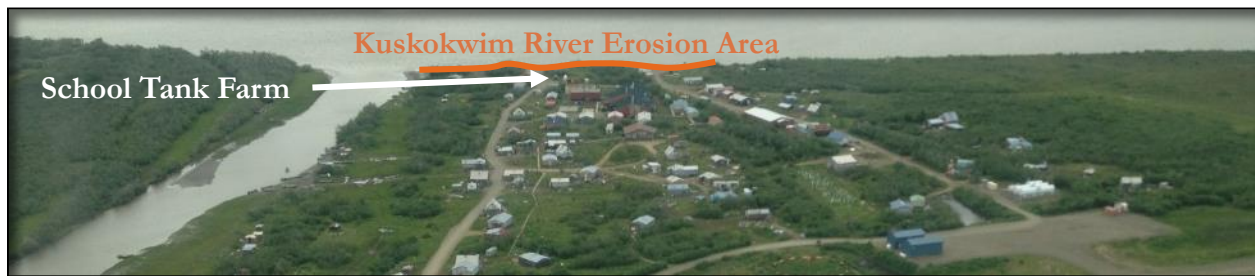
## EROSION RISK

Napakiak is experiencing severe erosion along the western banks of the Kuskokwim River. By comparing the Division of Community and Regional Affairs (DCRA) maps from 1991 and GPS points taken during the 2013 visit, it was found that Napakiak lost over 800 feet of shoreline in that 22-year period. This was consistent with the Army Corps of Engineers' 2009 study, *Alaska Baseline Erosion Assessment (BEA)*, in which the erosion rate was calculated to be 35 feet per year. This extreme rate of erosion is due to several contributing factors. Napakiak is located on a silt-sand bar, a soil type that is very easily eroded by the Kuskokwim's river currents. Ice gouging, floods, and unstable river banks exacerbate the issue.

During the 2013 visit, concern was expressed by residents for the safety of the school, which at that time was only 400 feet away from the active erosion source, the Kuskokwim River. The School Tank Farm was even closer, lying 350 feet away from the Kuskokwim. Using the BEA calculated erosion rate, it is estimated that this site will be impacted by erosion by 2023.



Aerial Photo Looking West (ADEC 2013)



Aerial Photo Looking East (ADEC 2013)



Kuskokwim River Undercutting (ADEC 2013)



Kuskokwim River Erosion (ADEC 2013)

## MITIGATION

According to information in the DCRA community database, as of 2009, the community's priority was relocating Napakiak's public facilities and homes to a nearby, stable bluff where erosion will not be a threat. The 2013 visit found no evidence that relocation has begun.

### Mitigation Options

- A. **No Action** – If no action is taken to control erosion or remove the structures, the eroding shoreline will impact the school tank farm around 2023. The school tank farm is a vital part of Napakiak's infrastructure, providing the sole source of fuel for the school. Additionally, if the site erodes, significant contamination would result from the release of petroleum products into the river. This would have severe consequences, as Napakiak's nearby drinking water source and subsistence areas would be contaminated.
- B. **Remove Site** – Removing or relocating the school tank farm and any associated contaminated soil will mitigate the contaminant risk for the site. As the school's fuel source, this action should be considered in conjunction with removing the school itself. This action will require planning and a significant amount of money.
- C. **Erosion Mitigation** – Currents are the primary cause of erosion on this riverbank. The DCRA handbook, *Understanding and Evaluating Erosion Problems*, suggests the best methods for protecting against erosion caused by currents are spur dikes, revetments, seawalls, vegetation, groins, beach fill, or relocation. The full list of suggested methods is provided in the document in Table 2 which is online at <http://commerce.state.ak.us/dnn/dcra/PlanningLandManagement.aspx>. With the extreme rate of erosion, though, erosion mitigation would be expensive and success would not be guaranteed.

## SUMMARY

The Napakiak School Tank Farm poses a contaminant risk from its potential for fuel contamination, close proximity to residences, and location within drinking water protection zones. The tank farm poses an erosion risk as the Kuskokwim River is actively eroding Napakiak's shoreline, and erosion is estimated to impact the tank farm by 2023. There are no mitigation measures in place.



## RECOMMENDATIONS

As the community is planning to move critical infrastructure and homes to a safer location, it is recommended to monitor erosion rates and distance to the Kuskokwim riverbank until this site and any associated contaminated soil can be removed in conjunction with the community relocation. Continued drinking water monitoring is also recommended.

The School Tank Farm provides essential fuel storage, but it is estimated to be impacted by erosion by 2023. It is necessary to begin planning for and finding ways to fund the removal of the tank farm. The school and other infrastructure are also estimated to be impacted by erosion during this timeframe.



Imagery Dated 2007. WEAR Map at <http://dec.alaska.gov/eh/sw/wear.html>

\*Community Database Online, Division of Community and Regional Affairs, Department of Commerce, Community and Economic Development

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