

EROSION EXPOSURE ASSESSMENT—SCAMMON BAY

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Scammon Bay, Alaska, in 2020. Photo: Coastview, coastview.org/articles/2020/02/19/scammon-bay-kun-river/.



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Report of Investigation 2021-3 Scammon Bay

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EROSION EXPOSURE ASSESSMENT—SCAMMON BAY

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SCAMMON BAY EROSION EXPOSURE ASSESSMENT

This is a summary of results from an erosion forecast near infrastructure at Scammon Bay, Alaska. We conduct a shoreline change analysis, forecast 60 years of erosion, and estimate the replacement cost of infrastructure in the forecast area. Buzard and others (2021) describe the method and guidance for interpreting tables and maps.

Source data for this summary include the following:

- Delineated vegetation lines and change assessment by Buzard and others (2021) following the methods of Overbeck and others (2020).
- Infrastructure AutoCAD outlines and metadata from Division of Community & Regional Affairs (2004) Community Profile Map series.
- Added infrastructure such as roads and out-buildings, delineated if visible in the most up-to-date high resolution (≤ 0.66 ft [20 cm] ground sample distance) aerial orthoimagery (Overbeck and others, 2016).
- Computed infrastructure cost of replacement based on square or linear footage from Buzard and others (2021).

Scammon Bay is located on the south bank of the Kun River on the Yukon-Kuskokwim Delta. Storm surge and ground failure events such as surface water run-off, vegetation disturbance, and subsequent permafrost thaw contribute to erosion (City of Scammon Bay, 2013). From 1951 to



2015, the shoreline remained mostly stable, with erosion rates reaching 1.0 foot per year (Overbeck and others, 2020).

We forecast erosion 60 years from the most recent shoreline (2015) at 20-year intervals to identify the exposure of infrastructure to erosion. The erosion forecast shows the road leading to the barge landing site as well as a minor section of the airport runway are exposed to erosion by 2075 (table 1). The 123 feet of road in the erosion forecast area by 2075 has an estimated replacement cost of \$200 thousand, and the 51 feet of airport runway an estimated \$510 thousand (tables 1 and 2). The total estimated cost of infrastructure exposed to erosion is \$710 thousand (\pm \$210 thousand) by 2075 (table 2; fig. 1).

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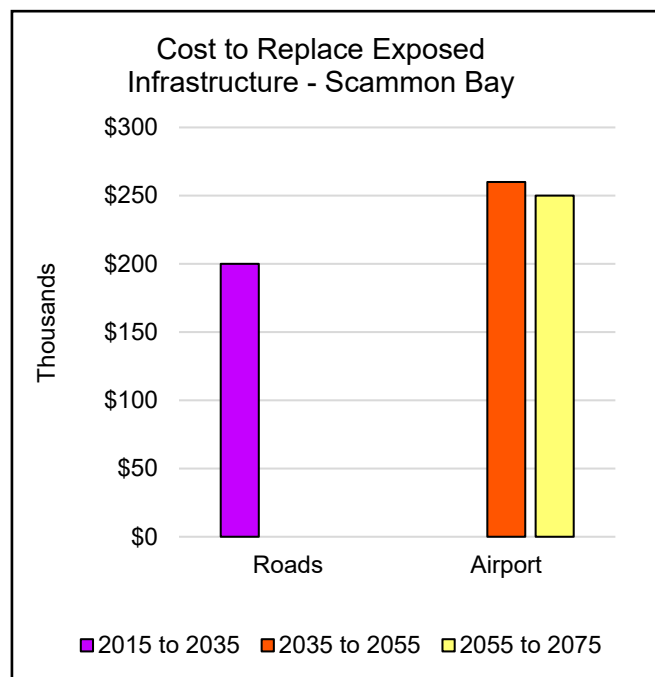
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Table 1. Quantity of infrastructure with estimated erosion exposure by linear footage (LF) or count (n).

Quantity of Exposed Infrastructure						
Erosion Forecast Date Range	Buildings & Tank Facilities (n)	Power Lines (LF)	Fuel Lines (LF)	Water Lines (LF)	Roads (LF)	Airport (LF)
2015 to 2035	0	0	0	0	33	0
2035 to 2055	0	0	0	0	42	26
2055 to 2075	0	0	0	0	48	25
Combined Total	0	0	0	0	123	51

Table 2. Replacement cost of infrastructure exposed to erosion per 20-year interval.

Cost to Replace Exposed Infrastructure							
Erosion Forecast Date Range	Buildings & Tank Facilities	Power Lines	Fuel Lines	Water Lines	Roads	Airport	Sum
2015 to 2035	\$0	\$0	\$0	\$0	\$200,000	\$0	\$200,000
2035 to 2055	\$0	\$0	\$0	\$0	\$0	\$260,000	\$260,000
2055 to 2075	\$0	\$0	\$0	\$0	\$0	\$250,000	\$250,000
Combined Total	\$0	\$0	\$0	\$0	\$200,000	\$510,000	\$710,000

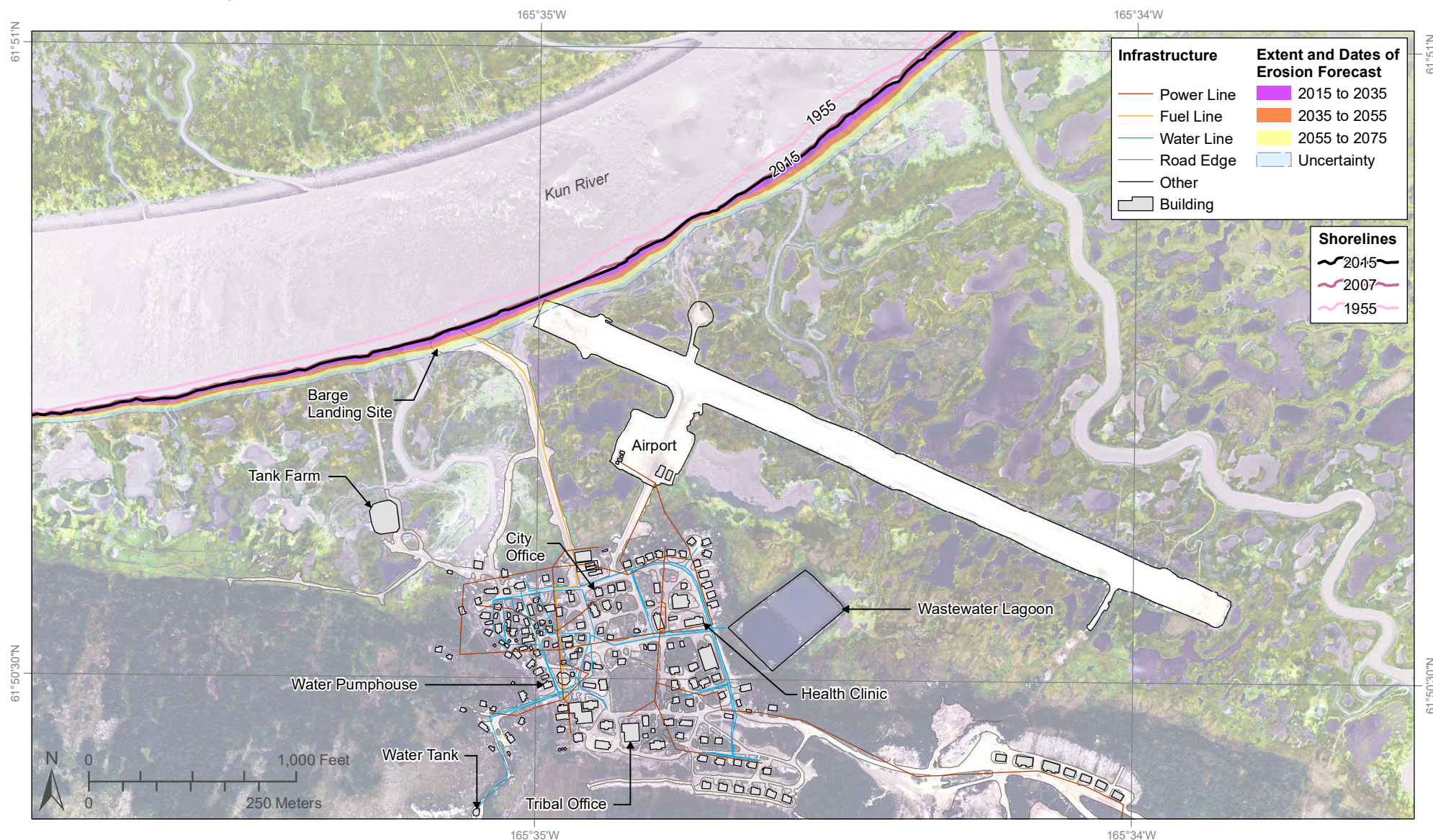
**Figure 1.** This figure summarizes the replacement cost of all infrastructure in the erosion forecast area. Twenty-year intervals are symbolized by color: purple represents the interval 2015 to 2035, orange represents 2035 to 2055, and yellow represents 2055 to 2075. The total cost of infrastructure exposed to erosion by 2075 is \$710 thousand.

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Erosion Forecast Scammon Bay, Alaska

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Buzard and others, 2021
Scammon Bay, Sheet 1 of 1



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Projection: NAD83 UTM Zone 3N. Orthoimagery year: 2015. Orthoimagery available from elevation.alaska.gov

Erosion and accretion of coasts and rivers result in shoreline change. These rates of shoreline change at Alaska communities are calculated from historical and modern shorelines (shorelines shown as lines in pink scale and labeled by year). The long-term (1955 to 2015) shoreline change rate is used to forecast where erosion could impact community infrastructure. Erosion is forecast to reach the colored areas by specified time intervals: 2015 to 2035 (purple), 2035 to 2055 (orange), and 2055 to 2075 (yellow). The area of uncertainty of the 2075 shoreline at a 90 percent confidence interval is light blue. Areas that are not colored by time interval are not forecast to erode by 2075 based on the historical shoreline change rate. For more detailed information about the impacts to infrastructure from erosion at Scammon Bay, refer to the Scammon Bay erosion exposure assessment report.

This work is part of the Coastal Infrastructure Erosion Vulnerability Assessment project funded by the Denali Commission Environmentally Threatened Communities Grant Program. Components of this map were prepared by the Alaska Department of Commerce, Community, and Economic Development (DCCED) using funding from multiple municipal, state, federal, and tribal partners. The original AutoCAD drawing of the infrastructure data layers was converted to ArcGIS.

