EROSION EXPOSURE ASSESSMENT—ELIM

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Suggested citation:
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Richard M. Buzard¹, Mark M. Turner¹, Katie Y. Miller¹, Donald C. Antrobus², and Jacquelyn R. Overbeck¹

ELIM EROSION EXPOSURE ASSESSMENT

This is a summary of results from an erosion forecast near infrastructure at Elim, 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:

- Shoreline change assessment ArcGIS shapefiles from Overbeck and others (2020) updated to the vegetation line if appropriate.
- Infrastructure AutoCAD outlines and metadata from Division of Community & Regional Affairs (2004) Community Profile Map series.
- Added infrastructure such as roads, water and sanitation facilities, and outbuildings, 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).

Elim is located on the northern coast of Norton Sound. The community is built across two rocky sea cliffs that gradually dip to a valley where Elim Creek flows into Norton Sound. The shoreline is effectively stable, eroding and accreting less than 1 foot per year between 1951 and 2015 (Overbeck and others, 2020). Storm surge flooding erodes the beach and areas along the creek, bringing wave-carried debris and resulting in infrastructure damage (U.S. Army Corps of Engineers [USACE], 2008). After the 2005 storm damage, rip rap erosion protection was installed near the river outlet (USACE, 2008).

Due to the relatively stable erosion trends, we cannot forecast erosion at Elim. Erosion hazards are primarily surface sediment scouring during storm surge flood events. Beach erosion can be measured with repeat beach elevation measurements using GPS or digital elevation/surface models. Erosion monitoring and a longer record of beach elevation can help identify whether and when infrastructure may become exposed to erosion.

ACKNOWLEDGMENTS

This work was funded by the Denali Commission Village Infrastructure Protection Program through the project “Systematic Approach to Assessing the Vulnerability of Alaska’s Coastal Infrastructure to Erosion.” The community of Elim was not consulted for this report.

¹ Alaska Division of Geological & Geophysical Surveys, 3354 College Rd., Fairbanks, Alaska 99709-3707
² Alaska Native Tribal Health Consortium, 4000 Ambassador Drive, Anchorage, Alaska 99508
REFERENCES


