Report of Investigation 2021-3 Golovin

EROSION EXPOSURE ASSESSMENT—GOLOVIN

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Golovin, Alaska, in 2012. Photo: ShoreZone, shorezone.org.

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EROSION EXPOSURE ASSESSMENT—GOLOVIN

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GOLOVIN EROSION EXPOSURE ASSESSMENT

This is a summary of results from an erosion forecast near infrastructure at Golovin, 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 (2021a) 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 (2021a) following the methods of Overbeck and others (2020).
- Infrastructure AutoCAD outlines and metadata from Division of Community & Regional Affairs (DCRA, 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 (2021a).

Golovin is located on the south-central coast of the Seward Peninsula. The community is built across a broad spit separating Golovnin Lagoon from Golovnin Bay, which is on the north side of Norton Sound. Erosion is driven by storm surge flooding. Despite many major flood events (Buzard and others, 2021b), most of the shoreline around Golovin remained relatively stable from 1951 to

2015. The beach eroded around the Cheenik Creek outlet (Overbeck and others, 2020), but the bluffs behind the beach had far slower erosion rates. The greatest erosion occurred at an abandoned fish processing plant; the structure is already undercut and flooded regularly (Alaska Department of Environmental Conservation, 2015). The abandoned solid waste landfill is also undergoing erosion (DCRA, 2004).

We forecast erosion 60 years from the most recent shoreline (2015) at 20-year intervals to identify the exposure of infrastructure to erosion. We find no infrastructure within the erosion forecast area that require a replacement cost. Erosion is forecast to continue undercutting the abandoned fish processing plant and landfill. Since these facilities are no longer used, a replacement cost is not computed. Decommission costs are not included in this analysis. Scouring of roadways and flood protection structures during storm surge may incur a cost but cannot be estimated with the methods in this analysis. Repeat elevation profiles and community-based observations and monitoring can help document and understand erosion due to storm surge and waves that could not be assessed using the linear regression forecast. Visit the DGGS Golovin monitoring page for more informationat https://dggs.alaska.gov/hazards/coastal/monitoring-golovin.html.

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Erosion Forecast
Golovin, Alaska

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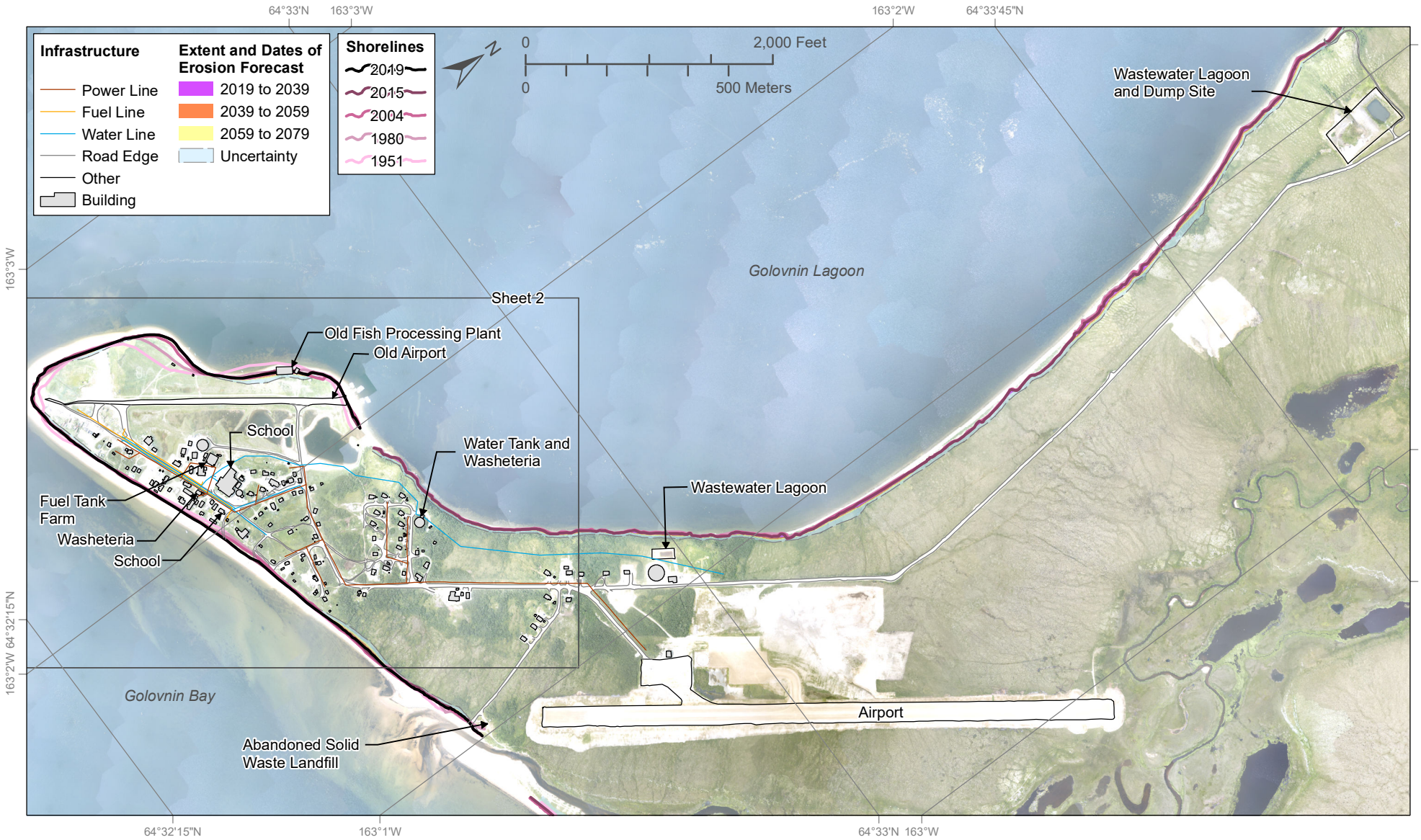
Golovin, Sheet 1 of 2



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Projection: NAD83 UTM Zone 3N. Orthoimagery year: 2019. 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 pinkscale and labeled by year). The long-term (1951 to 2019) 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: 2019 to 2039 (purple), 2039 to 2059 (orange), and 2059 to 2079 (yellow). The area of uncertainty of the 2079 shoreline at a 90 percent confidence interval is light blue. Areas that are not colored by time interval are not forecast to erode by 2079 based on the historical shoreline change rate. For more detailed information about the impacts to infrastructure from erosion at Golovin, refer to the Golovin 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.

Erosion Exposure
Golovin, Alaska

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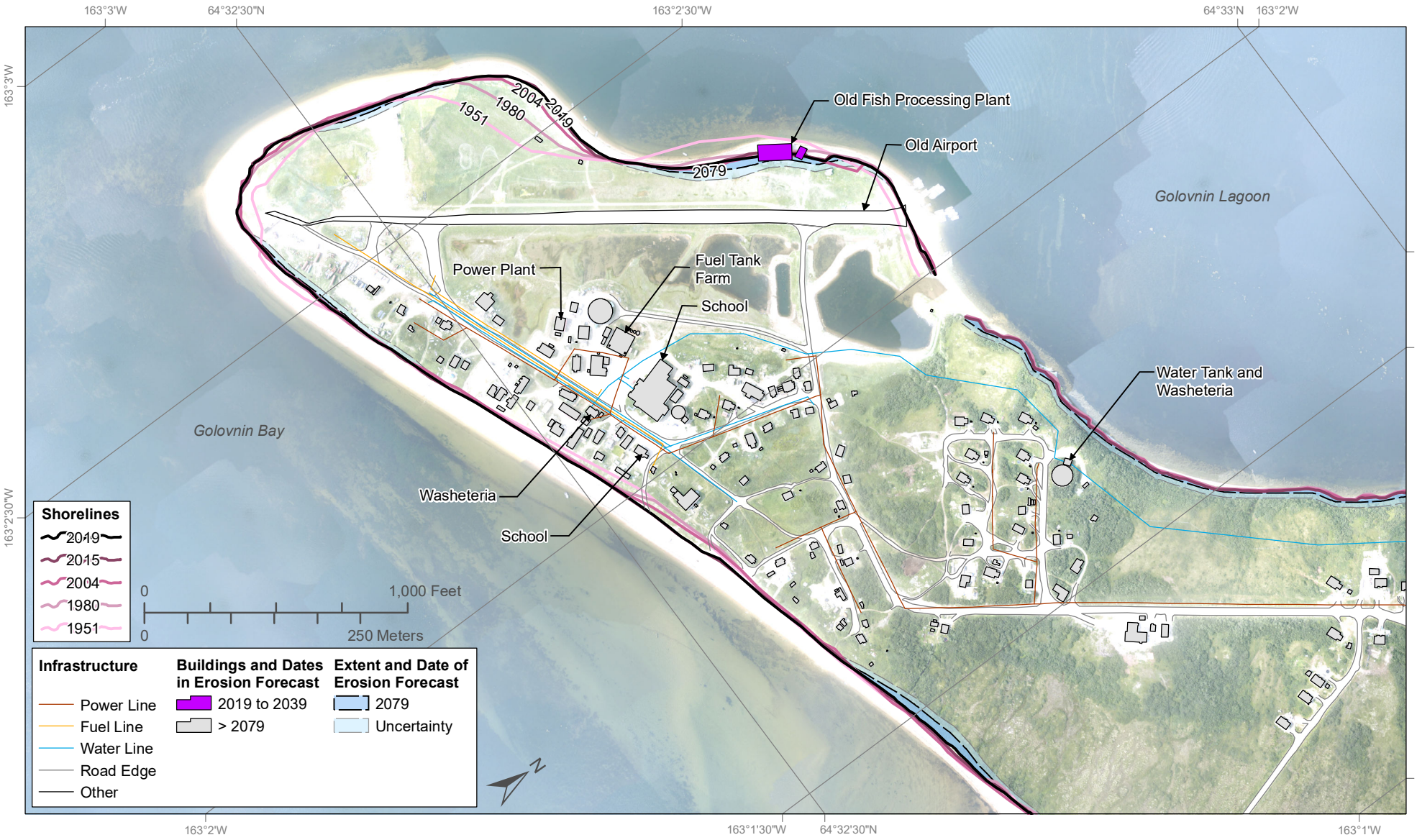

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