



U.S. Army Corps
of Engineers
Alaska District

ALASKA BASELINE EROSION ASSESSMENT

Erosion Information Paper - Homer, Alaska

Current as of August 24, 2007

Community Information

Homer, population 5,454, is located on the north shore of Kachemak Bay on the southwestern edge of the Kenai Peninsula in the Kenai Peninsula Borough. Homer is 227 road miles south of Anchorage at the southern-most point of the Sterling Highway. The OMB Community Erosion Survey was completed by Dotti Harness, planning technician for the City of Homer.

Description of Erosion Problem

The 4.5-mile-long Homer Spit formation is a narrow peninsula that is a terminal moraine formation deposited 14,000 to 15,000 years ago by a glacier that filled and ultimately carved the Kachemak Bay basin. Since its formation, the spit has evolved through geologic and oceanic processes into a narrow landmass having a maximum elevation above mean sea level of only 24 feet. This landform changes throughout the year as sediments are added to and removed from both its west and east sides by ocean currents, tides and storms. The *Homer Spit Storm Damage Reduction Draft Interim Feasibility Report* prepared by the Corps in September 1987, stated both accretion and erosion were occurring during seasonal storms along the Homer Spit. This report also stated that near-shore standing waves in front of the sheet-pile seawall and rubble revetments result from partial reflection of incident wave energy caused by shoreline structures. This condition aggravates the situation of wave overtopping, roadway flooding and local scouring of beach material during storm events. Erosion occurs annually during spring and fall high tides and can be more extreme depending on wind direction.

According to the Homer planner, all areas along the Homer coastal bluffs are subject to erosion. The Kachemak Bay Research Reserve (KBRR) prepared an estimate of coastal bluff erosion based on interpretation of a series of aerial maps (1951, 1961, 1968, 1975, 1996 and 2003). Their report states: "*In general, slightly higher erosion rates were observed west of the spit (~2.6 feet per year) than on the eastern side (~2 feet per year). The western portion of headlands had the highest observed erosion rates (~19.7 feet per year), but the high erosion rates are extremely episodic.*" Also according to the KBRR, the portion of the bluff toe below West Hill Road, approximately 1 mile west of the spit, includes an old slump that has been more susceptible to erosion.

Potential Damages

Homer coastal bluff areas impacted by erosion are occupied primarily by residential structures, with a few commercial structures. Kachemak Drive lots platted at 200-300 feet in length currently have less than one-third of their original platted areas, according to the city planner. Residential owners begin protecting homes generally when the erosion is less than 100 feet away,

and many homes are less than 100 feet, according to the planner. Types of erosion control structures used by residential property owners include: rip rap, gabions, sandbags, articulated concrete mat, driven metal pile, scrap metal and scrap concrete. These structures are constructed at an estimated \$20,000 to \$70,000 per lot; however no long-term city records are available on individual project construction or repair costs. The city estimated \$20,000-\$30,000 for repair per incident, some owners providing maintenance every 3 to 4 years.

The city planner also stated that all structural erosion control measures installed have had failures. Failures have resulted from: (a) overtopping - projects are generally built to elevation 24 feet, however water to elevation 27 feet, plus waves occur; (b) rock displacement - causing failures behind structures and at ends; (c) failure of scrap concrete rubble. The city planner also expressed concern for potential erosion damage to the Sterling Highway, particularly the base of the roadway along West Hill, and the bike path along the spit.

Severe storms accompanied by high water levels and wave action have overtopped and washed out stretches of the spit road, causing the road to be closed for major repairs on several occasions. Structures on the spit that could be threatened include food storage and retail structures, the single 2-lane State highway and bike path, boat storage and repair, elevated boardwalks, hotel/restaurant, condominiums and the boat harbor. All shoreline structures have suffered damage of various degrees, according to the Corps. In the unlikely event the heavily rip rap armored spit road were to fail and the spit became separated from the mainland, this could result in economic loss, water shortages and contamination, communication disruptions, and threats to public health and safety. To protect the state-maintained highway, during the past 20 years the State has spent more than \$6 million on repair and protection measures.

Photos and Diagrams

Photos of erosion provided by community are attached. Also attached are diagrams depicting linear extent of erosion in the community.

References

- Kachemak Bay Research Reserve. 2004.** *Homer Coastal Change Analysis, Kachemak Bay Research Reserve.* <http://planning.ci.homer.ak.us/PLANNINGWEBPAGES/DefaultLinks/Erosion/WebVersion.doc>
- USACE. 1996.** *Homer Spit Repair & Extension Design Memo.* Alaska District, U.S. Army Corps of Engineers.
- USACE. 1987.** *Beach Erosion Control Study Homer Spit, Alaska.* Alaska District, U.S. Army Corps of Engineers.
- USACE. 1987.** *Homer Spit Storm Damage Reduction Draft Interim Feasibility Report Volume II.* Alaska District, U.S. Army Corps of Engineers.
- USACE. 2007.** *Alaska Community Erosion Survey, OMB approved number 07100001, expires September 30, 2009 administered to Dotti Harness, Homer city planner, on July 27, 2007.*

Additional Information

This information paper, as well as those for other communities, can be accessed on the internet at www.alaskaerosion.com. For more information please contact the Corps of Engineers, project manager at (907) 753-5694 or email Alaska.Erosion.POA@usace.army.mil



Photo 1: Homer Bluff Kachemak Drive home site May 2006



Photo 2: Homer Bluff erosion December 2006



Photo 3: Kachemak Drive December 2006



Photo 4: Homer bluff private property riprap project April 2007

Seasonal Accretion & Erosion

Rip Rap Armored

Date of Aerial Photo: 10 Aug 03

NOTE: The extent of erosion shown on this figure is based on interviews with the community. This data has not been field verified. This figure is only intended to show areas of erosion, not rates or severity of erosion



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Linear Extent of Erosion
Part 1



0 750 1,500 3,000 Feet
1 inch equals 1500 feet



Alaska Baseline Erosion
Homer, Alaska



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