

## **Tsunami Action Plan**

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**Purpose:** This plan is intended to give guidance for residents, visitors, and business owners who live and work within the designated inundation areas shown on the attached maps, as well as guide the actions of City officials. These maps are based on wave front predictions established by National Oceanic Atmospheric Association (NOAA) resulting from a significant subduction-zone earthquake off the Washington Coast.

**Notification:** In the event of an offshore earthquake, West Coast/Alaska Tsunami Warning Center in Palmer, Alaska will notify the Washington State Military Department, Division of Emergency Management (E.M.D.) of a potential Tsunami watch or warning. Washington State E.M.D. will then relay Tsunami watch or warning information to local communities that may be impacted. Within Skagit County, this message will be received by Skagit 9-1-1 and Skagit County Emergency Management personnel who will notify local fire and law enforcement agencies.

**Tsunami Watch** - An alert issued to areas outside the warned area. The area included in the watch is based on the magnitude of the earthquake. For earthquakes over magnitude 7.0 Richter, the watch area is 1 hour tsunami travel time outside the warning zone. For all earthquakes over magnitude 7.5 Richter, the watch area is 3 hours tsunami travel time outside the warning zone. The watch will either be upgraded to a warning in subsequent bulletins or will be cancelled depending on the severity of the tsunami.

**Tsunami Warning** - Indicates that a tsunami is imminent and that coastal locations in the warned area should prepare for flooding. The initial warning is typically based on seismic information alone. Earthquakes over magnitude 7.0 Richter trigger a warning covering the coastal regions within 2 hours tsunami travel time from the epicenter. When the magnitude is over 7.5 Richter, the warned area is increased to 3 hours tsunami travel time. As water level data showing the tsunami is recorded, the warning will be cancelled, restricted, expanded incrementally, or expanded in the event of a major tsunami.

**Action Plan:** The City of Anacortes, once notified, will determine the level of risk and type of warning given for their community, and if deemed appropriate, will utilize the Community Alert Network (CAN) system to notify affected residents to seek higher ground. Further, the City's Emergency Operations Center (EOC) will be activated, and the Emergency Broadcast System will be utilized via local radio stations to provide notice to residents. In addition, public safety resources, not already committed, will be deployed to utilize their mobile vehicle loudspeakers to warn affected residents and visitors and direct them to high ground.

**Prediction Model:** The earthquake scenario depicted is a magnitude (Mw) 9.1 Cascadia Subduction Zone event (Priest et al., 1997 and Myers et al. 1999). This event's primary features are a rupture length of approximately 1050 km, average rupture width of 70 km, and slip of 17.5 m. More information is available in Venturato et al., 2004.

The City's inundation map adds a 20% buffer from the predicted boundary of a potential Tsunami wave front. Moreover, the map shows recommended travel routes to high ground for residents to evacuate. In the event of an actual Tsunami and evacuation, public safety resources will be dispatched to high ground to assess the number of evacuees and provide further instructions as to where shelters are established.

**NOAA Technical Memorandum OAR PMEL**  
**NOAA TIME Eastern Strait of Juan de Fuca,**  
**Washington, Mapping Project: Procedures, Data**  
Sources, and Products

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#### **5.4 Anacortes Area**

The maximum amplitudes of the first and second waves approaching Anacortes and western Fidalgo Island are similar, ranging from 1.5 to 1.8 m. Fidalgo Bay and Padilla Bay experience an initial water withdrawal, as the leading depression wave comes in, followed by the tsunami elevation wave with amplitudes from 1 to 1.6 m (Fig. 5). Little to no inundation occurs in downtown Anacortes (Fig. 10).

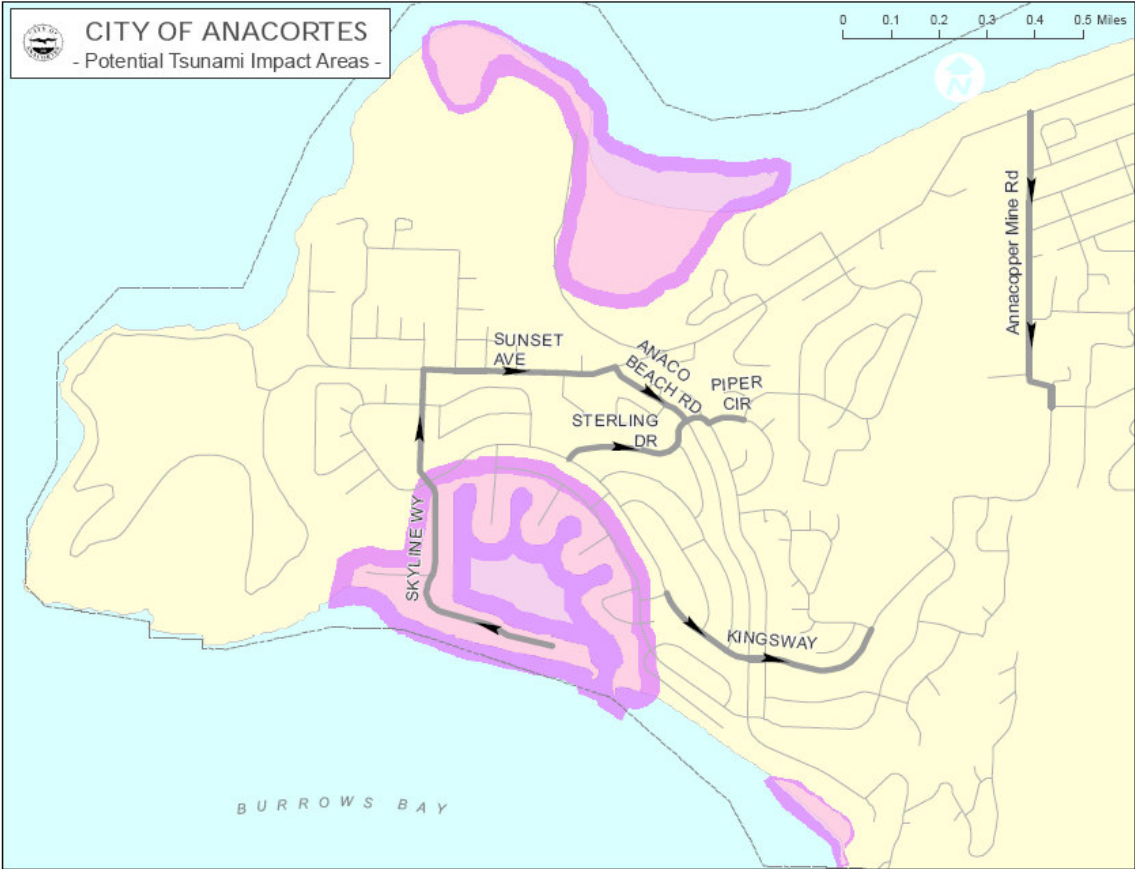
The Skyline Marina at the north end of Burrows Bay experiences higher levels of inundation (above 2 m) and high flow speed magnitudes ( $>1.5$  m/s). High currents also occur around the Anacortes Ferry terminal, Guemes Channel, and Fidalgo Bay (Fig. 11).

Large areas of inundation occur in areas of low topography surrounding Samish Bay, Padilla Bay, and the Swinomish Channel. Though not part of the modeling study, inundation also occurs within the vicinity of Fir Island. The coastal areas of Samish Bay, Padilla Bay, Swinomish Channel, and Fir Island all lie within the historic Skagit River delta region (U.S. Army Corps of Engineers, 2002). This region contains a network of levees and coastal dikes to protect farmland from tidal inundation and river flooding (Fig. 1). These features are not resolved in the model; however, an analysis of coastal dike heights along the shores of Samish Bay, Padilla Bay, Swinomish Channel, and Fir Island suggest that tsunami waves will overtop the dikes and cause inundation as suggested by the model. The average heights of the dikes along the shores of Padilla Bay, Swinomish Channel, and Fir Island range from 1.1 to 1.2 m above Mean High Water (Riggs, personal communication; National Geodetic Survey, 2004). Photos of the Samish Bay coastal dikes suggest a similar height (U.S. Army Corps of Engineers, 2002; Bloch *et al.*, 2002). Maximum wave heights along the coastal dikes range from 1.5 to 1.8 m for Samish Bay, 2.0 to 2.5 m for Padilla Bay, 1.0 to 2.5 m for Swinomish Channel, and 1.0 to 1.5 m for Fir Island.

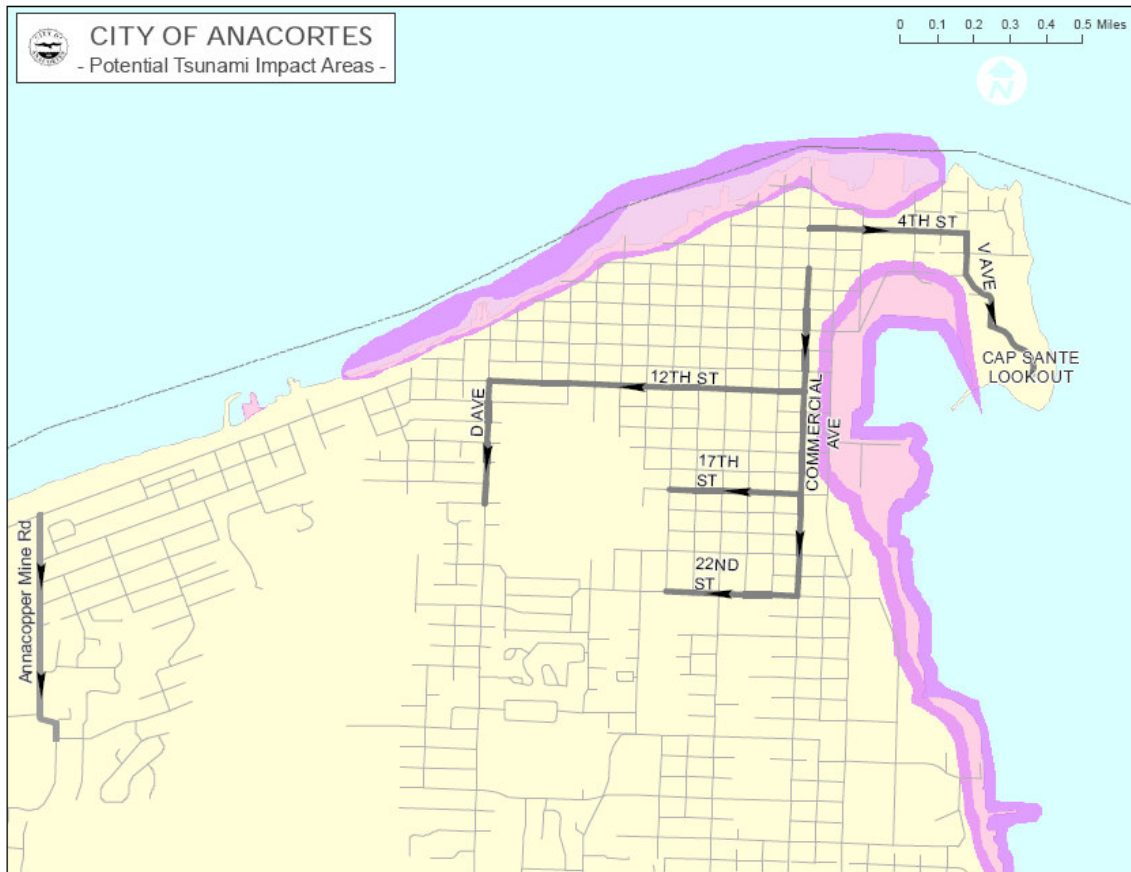
High flow speeds ( $>1.5$  m/s) may also breach many of these coastal dikes and levees. Levees along the Swinomish Channel have not been maintained (U.S. Army Corps of Engineers, 2002), and some of the coastal dikes along Samish Bay are in poor condition (Bloch *et al.*, 2002). Damage of dikes and levees within the Fir Island region have occurred due to flooding in 1990 and 2003 (U.S. Army Corps of Engineers, online source; Washington Military Department Emergency Management Division, 2004).

**APPENDIX B**

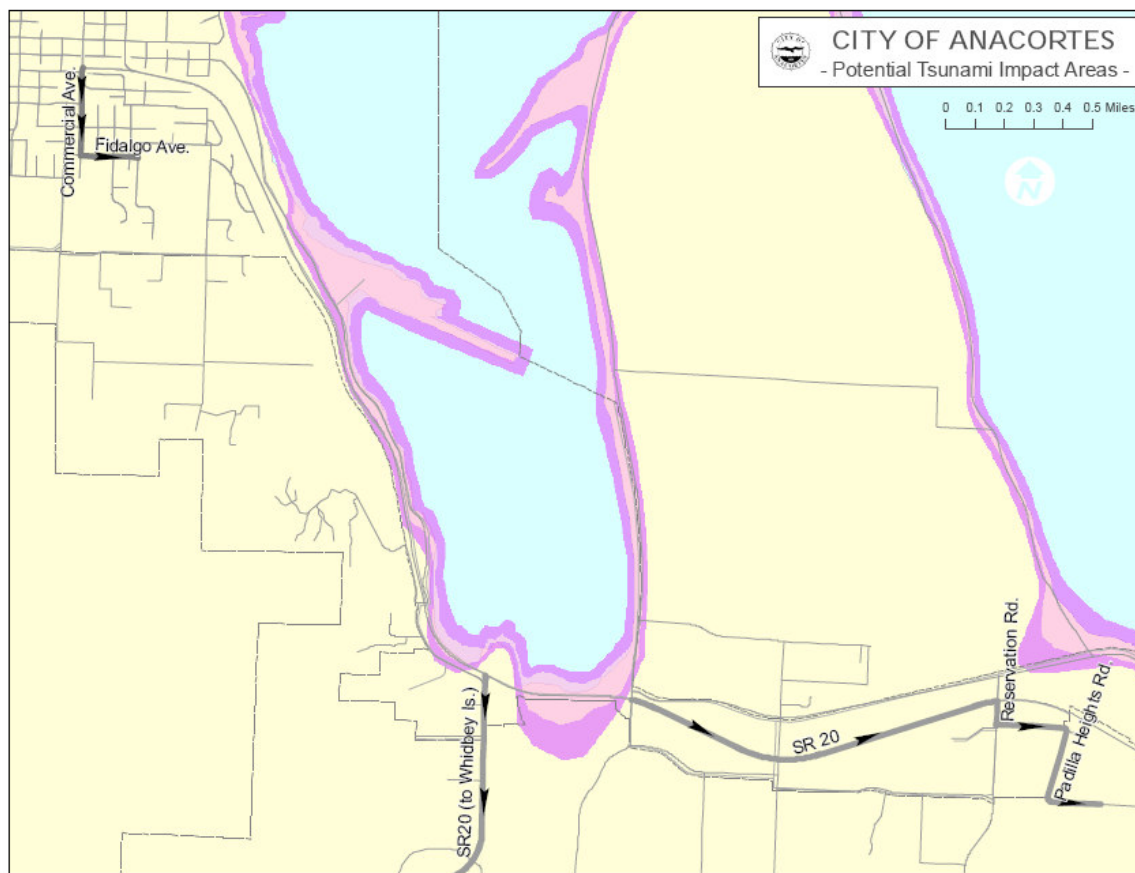
**Map 1 – Skyline Area**



## Map 2 – Downtown Area



### Map 3 – March Point Area



Map 4 – City of Anacortes - Overall

