

4. Environment Element

Introduction

The Environment Element provides the policy basis for the protection and regulation of the critical areas on Guemes Island. The critical areas contain wetlands; aquifer recharge areas; frequently flooded areas; geologically hazardous areas; and fish and wildlife habitat conservation areas. Some of the areas, such as geological hazards, are critical because of the hazard they represent to people. Others, such as fish and wildlife habitats, are critical because of their public value. Air quality, although not identified as critical area under the GMA, is included in this element. The policy recommendations are intended to achieve the following objectives in supplementing the Skagit County Comprehensive Plan (SCCP):

- Preserve the rural character of Guemes Island for future generations
- Protect the environment from adverse effects of development
- Enhance the environmental quality of Critical Areas and wildlife corridors
- Protect the quantity and quality of ground water
- Protect the air quality over Guemes Island

Current Conditions and Issues

Guemes Island's natural features contribute greatly to the well-being and enjoyment of both residents and island visitors. A mixture of woodlands, wetlands, pastures, and open vistas are components of the island's physical environment (Figure 4.1). Responses to the Guemes Island Planning Survey indicate that these features rate very highly. Aspects of the rural character rated as very important are air and water quality; quiet; rural landscape; a sense of privacy; and a comfortable pace of life.

Air Quality. Guemes Island is located down-wind from the March's Point Refineries during the winter months, making air pollution a significant concern during that windy season. Information from the refineries and the Northwest Air Pollution Authority is needed to inform islanders of the levels of air pollution.

Wetlands. A general inventory of the wetlands on Guemes Island is shown on Figures 4.2, 4.3, and 4.4. An extensive wetland complex is found in the valley near the eastern end of Edens Road. It runs from north to south and serves an important function in regulating surface water run-off through Cayou Creek into the Guemes Channel. It may also contribute to the recharge of the groundwater and allow infiltration of potentially contaminated run-off into the underlying aquifer complex. Other wetlands include Veal Pond just north of the western end of Edens Road and the wetland at North Beach. Run-off from these two wetlands flows through drainage channels and tide-gates to the Bellingham Channel and Padilla Bay, respectively.

Aquifer Recharge Areas. The ground-water resource of Guemes Island is the principal source of fresh water used by the permanent and seasonal residents. In 1997 the Environmental Protection Agency (EPA) designated the Guemes Island Aquifer System as a Sole Source Aquifer. The Double Bluff aquifer complex, which generally is located at or below sea level, is the most extensive water-bearing unit and many of the wells are completed in this unit. It underlies all but the rocky eastern part of the island. The Vashon aquifer complex, located above the Double Bluff aquifer, does occur in two separate areas rather than under the entire island and is variable in thickness and productivity (Figure 4.5).

Recharge of fresh water to the ground-water system is primarily from infiltration of precipitation. Most of the recharge occurs in the wet winter months from November through February, when the precipitation greatly exceeds evapo-transpiration. Recharge from septic-fields and irrigation is relatively small. Precipitation recharges through all permeable surfaces on the island except where groundwater is discharging, such as from springs. Some areas contribute more to the recharge than others, depending on the vertical hydraulic conductivity of the underlying geological units (penetration to the lower strata). It is not known what percentage of the recharge water reaches the Double Bluff and Vashon aquifer complexes (USGS report), and therefore it is not known what the carrying capacity is of the groundwater system. Recharge areas are at risk for contamination of the groundwater from the land surface

Seawater Intrusion. The potential for seawater intrusion is great for many of the wells that were drilled in areas near the shore. Seawater intrusion is one important factor that can render groundwater unfit for consumption. A topographical map (Figure 1.1) shows that the Veal Pond and the wetland at North Beach are connected by a low stretch of land, close to sea level. The tip of Guemes Island north of this stretch is the area most susceptible to seawater intrusion. From a combination of water well reports and accurate land elevation measurements for wells that have been completed in the Double Bluff aquifer in this area, it is known that the head of fresh water in the wells is very shallow, between 0.5 and 1 ft above mean sea level. Although some seawater intrusion was found in wells in the Vashon aquifer, it generally is not a problem for wells completed in this unit because most of it is situated above sea level (Figure 4.6).

In 1995 the Skagit County Board of Commissioners/Health adopted an Interim Seawater Intrusion Policy that regulates new wells in coastal locations whenever a landowner requests a building permit or a land division. This policy has not yet been incorporated in the Skagit County Code and thus only has educational value. The Skagit County Health Department Map indicates those areas with seawater intrusion where well drillers need to apply to the Health Department prior to drilling (Figure 4.7).

About twenty public water systems serve local communities on the island. These range from Class B systems with up to 15 connections to the Class A Holiday Hideaway Water Company, which currently has 134 connections and has been approved for a total of 267

connections. This system has wellhead protection areas designated for their two well fields (Figure 4.8).

Due to severe seawater intrusion into its two wells, one West Shore system is now served by a reverse osmosis (R.O.) system, owned and operated by the Skagit Public Utility District. This system uses seawater as its intake and discharges the saline effluent away from the shore into the channel. For seawater, the recovery of potable water may be up to 30 per cent. Several private property owners have installed individual R.O systems, which are not regulated. They use well-water as their source, which has an only slightly higher recovery rate. Therefore, they cause additional stress on the aquifer.

Guemes Island has been designated as a Category I Aquifer Recharge Area. These areas are so designated because of the need to provide special protection due to specific pre-existing land uses, or because the County, State or Federal Government has determined the aquifer needs protection from future land use that poses a risk to the quality or quantity of the aquifer. [SCC 14.24.310 (1) (a)]

Category I includes areas served by groundwater which have been designated as a “Sole Source Aquifer Area” under the Federal Safe Drinking Water Act; areas identified by the County as “Seawater Intrusion Areas”; and areas designated as “Wellhead Protection Areas” pursuant to WAC 246-290-135(4) and the groundwater contribution area in WAC 246-291-100(2)(e). [SCC 14.24.310 (Aquifer recharge area designations)]

Frequently Flooded Areas. The shoreline area west of Veal Pond and the North Beach area northeast of the wetland are susceptible to flooding during winter storm conditions combined with high tides. These two areas are indicated on Figure 4.9, which also shows several smaller areas around the island susceptible to coastal flooding.

During heavy rain, Cayou Creek and its wetland overflows the culvert under Edens Road, ¾ miles east of Guemes Island Road, creating a hazard for motorists during these periods. See also the Transportation Element for other roads prone to flooding. Currently there is no drainage plan for Guemes Island.

Geologically Hazardous Areas. Soil Erosion-Potential Areas are shown on Figure 4.10. The yellow bluff near Kelly’s Point and the shoreline extending north towards Edens Road are feeder bluffs that can slough off substantial material during fierce westerly storms. Likewise, the sheer bluffs along South Shore Road are erosion-prone. Not shown on this map are the high sand bluffs running in a southeasterly direction from North Beach. In addition to the unstable shoreline bluffs, steep slopes are present on the two rocky hills at the eastern part of the island.

Coastal areas are subjective to Tsunami Inundation (Figure 4.9). Major earthquakes with a magnitude of 9 or higher, involving the Cascadian Subduction Zone, have occurred in the Puget Sound Region with an average frequency of about 500 years. Lesser events on the Seattle Fault will also have seismic and tsunami effects on Guemes Island but have not yet been evaluated. The most recent Cascadia Event took place in the year 1700.

When the Cascadia event reoccurs, peak ground accelerations in the Guemes Island area can be expected to be on the order of 15% gravity with a shaking duration of 5 to 6 minutes. The resulting tsunami can be expected to occur within 2½ hours. The height of the tsunami swell as it travels around the island will be 10 to 12 feet. Areas with offshore shallows, such as North Beach, will likely experience higher breaking waves.

The Pacific Tsunami Warning System follows earthquakes magnitude 7 or more with tsunami potential. When necessary, they issue a tsunami warning to the Skagit County Emergency Management and to the Emergency Alert System (EAS). EAS would generate warnings by radio and television. The County Emergency Management would alert the Guemes Island Fire Department that would in turn alert the Community Emergency Response Team (CERT). The island organizations would implement the evacuation of the coastal population. No Tsunami Hazard Zone signs have been posted on Guemes Island. Active geological faults have not been mapped.

Fish and Wildlife Habitat Conservation Areas. The Critical Areas Ordinance (CAO) designates Habitat Conservation Areas (HCA) based on specific criteria that include areas with which endangered, threatened, and sensitive species have a primary association. The county has currently designated all shoreline areas of the island HCA because of their fragile nature and importance in supporting marine-dependent life.

Other areas with a high value for wildlife habitat and plant communities include Square Harbor Wildlife Preserve, owned by the Washington Department of Fish and Wildlife. It was purchased with funds from the Washington Wildlife and Recreation Coalition and thus is protected in perpetuity. It is a haven for raptors and many other bird species. The pileated woodpecker, a State Candidate Species of concern, is frequently seen in the woods. In addition, a small wetland with dead cedar snags is used as a bald eagle night roost, which is an important winter habitat.

The Peach Preserve, also known as the Demopoulos Marsh, is owned by the San Juan Preservation Trust. It also is protected in perpetuity. The preserve features 2,100 ft of shoreline and contains a wetland south of South Shore Drive between the road and the beach. Herons roost in trees north of this wetland. The preserve also includes 19.2 acres of mature secondary forest north of South Shore Road.

Threatened Species. The bald eagle is designated as a State Threatened Species. Since 2001, the Washington Department of Fish and Wildlife (DFW) no longer performs an annual survey of nest sites, but an undated map shows 14 nest sites, some of which are probably alternate nests for one nesting pair. The peregrine falcon is no longer considered endangered or threatened in Washington, but at present has the status of State Sensitive; Guemes Island has been host to a falcon scrape in various locations over the years. According to several local bird watchers, the Brandt's cormorant, the merlin, pileated woodpecker, Vaux's swift, and western grebe are among the State Candidate Species frequenting the island. Federally threatened juvenile Chinook salmon stay in the island's extensive eel grass and kelp beds for protection and rely on the forage fish production for their food supply.

Wildlife. Guemes Island supports many species of wildlife and plants of varied diversity and density. The intrinsic value of these species represents important historic, cultural, recreational and economic resources. These species should be enhanced for the benefit and enjoyment of everyone.

Hunting. Through the years, hunting by off-islanders has frequently led to conflicts between Guemes Islanders and hunters. At times, residents have been at risk of injury from injudicious shots close to residential development. Hunters frequently violate the regulations by trespassing on private land; hunting past the one-half hour after sunset; hunting with artificial lights; and hunting from a motor vehicle or from a public road.

Noxious Species. The following state-designated noxious weeds are of interest on Guemes Island because they have a limited distribution on the island and can still be eradicated: spartina, tansy ragwort, hawkweed, and purple loosestrife. The loosestrife has been successfully limited by biological controls. Spartina was found in one beach location. Other species, such as poison hemlock and Scotch broom, are more widely distributed on the island.

In recent years the Norway rat, also known as sewer rat, and the roof rat, or black rat, have become unwanted inhabitants of the island, causing damage to property and posing a health threat to people and their pets.

Future Conditions and Issues

Population growth on Guemes Island will require careful monitoring to ensure that the island's environmental quality does not suffer deterioration. With the increase in population, residents can expect an increase in noise and light pollution. Areas presently zoned as Rural Intermediate may include lots subject to geologic or flood hazards. The density of development permitted in these areas may result in increased sea-water intrusion and/or contamination of the groundwater system by failing septic systems. Recent legislation (2006, H.B. 1458) requires the local board of health to conduct quality assurance of the on-site sewage certification program and make sure the systems are in compliance with RCW 43.20.050. Septic systems should be repaired and upgraded where necessary to protect surface and groundwater quality.

Much of this development is expected to occur in some of the most fragile environments, including shorelines and wildlife corridors. Protection of these resources and preservation of wildlife, including shoreline, marine and endangered species, is critical to the island's environmental quality. Further discussion of shoreline areas may be found in the Shoreline Master Program.

In case of a Cascadia earthquake, major structural damage will occur to older buildings that have not been adequately constructed and anchored. Properly built wood frame structures should be more resistant. The resulting tsunami will cause extensive damage to buildings and roads in low-lying areas along north and west beaches. The north part of the island will likely be isolated until roads can be cleared and repaired. Ferry service will most likely be disrupted, so Guemes Island residents will probably need to fend for

themselves until regular transportation, power and communication services are restored. Lower magnitude earthquake events will have less severe effects. The Guemes Island Fire Department and CERT should blend into a closer unit so that adequate response time will be available to evacuate low-lying areas.

Increasing development on the island will have other less obvious effects on the environment. These may include loss of trees as lots are cleared, greater prevalence of opportunistic noxious weeds, birds like crows and starlings on cleared land, and more impervious surfaces that increase storm-water runoff and reduce aquifer recharge. The problems with rats in our community will very likely increase unless checked.

Extended ferry hours make it easier for hunters to come across during weekdays and hunting violations will likely increase. With the increase in population, conflicts between islanders and hunters and the risks to the Guemes residents will increase as well unless safe and legal hunting practices are enforced.

With mounting pressure on the refineries across the Guemes Channel to increase production, the risk of residents being exposed to air pollution from that source may also increase. However, with technological improvements at the refineries this risk may actually decrease.

Education

- Guemes Island residents should be strongly encouraged not to water their lawns and gardens with well water. Rainwater catchment systems provide a viable alternative. People shall be encouraged to install water meters in order to track their water usage and detect leaks when the usage rises above the norm.
- Island organizations should cooperate with the County in developing and distributing educational programs to encourage people to minimize destruction of the native vegetation during development of their property and to re-vegetate with native plants that, once established, require a minimum of water and care. [SCCP 13A-2.1]
- The island community should work with existing land trust organizations to assist willing landowners to protect lands, valuable for aquifer recharge areas and wildlife, in perpetuity. [SCC 14.24.180 (1)(b)]

Recommendations: Map Modifications

The County needs to modify the following maps in the Guemes Island Shorezone Map Atlas:

- Wetlands – Figures 4.2 and 4.4.
 - The wetland complex in the valley, intersected by Edens Road, is physically separated from the pond along Seaway Hollow by a ridge, as can be seen on a USGS topographical map (Figure 1.1).
 - The low area between Veal pond and the North Beach wetland should be evaluated to determine whether there is a continuous wetland complex. See USGS topographical map (Figure 1.1).

- Soil Erosion-Potential Areas- Figure 4.10.
 - The partially unconsolidated, partially consolidated sections of shoreline from North Beach in southeasterly direction around the rocky part of the island should be corrected to correspond with Skagit County Potential Landslide and Erosion Areas.
- Tsunami Inundation – Figure 4.9.
 - This map needs to have an overlay with contour lines and parcel lines.

Policy Recommendations

The following recommendations are intended to supplement the policies in the Environment Element of the SCCP.

Air quality

- 4.1** The Northwest Air Pollution Authority (NWAPA) should monitor air quality over the island. (SCCP Introduction)

Aquifer Recharge Areas

- 4.2** Potential prime aquifer recharge areas on the island need to be identified and evaluated. [SCCP 13A-1.2 (b) and SCCP13A-5.1 (g,h)]
- 4.3** The Skagit County Interim Seawater Intrusion Policy, adopted by the Board of Commissioners/Health by Resolution #15570, shall be updated by the Skagit County Department of Health and incorporated in SCC Chapter 12.48. [SCCP 13A-5.1 (i)].
- 4.4** The preliminary groundwater budget, as presented by the USGS in the 1995 report, needs to be further evaluated, and the issue of groundwater availability needs to be addressed. [13A-1.2 (b) and 13A-5.1 (g,h)].

Frequently Flooded Areas

- 4.5** A drainage plan for Guemes Island shall be developed to reduce flood damage and to allow proper conveyance of flood flows. [SCCP 13A-5.1(j)]
- 4.6** Property owners and residents, living on property that is subject to flooding, should be informed of this threat and provided with information on ways to protect their property. These people should be included in the tsunami warning system. [SCCP 13A-5.1(j)]

Geological Hazardous Areas

- 4.7** Removal of vegetation in landslide hazard, erosion hazard and coastal bluff hazard areas, shall be minimized. Replanting should maximize the use of native trees, shrubs, and ground cover that is compatible with the existing surrounding vegetation, meets the objectives of erosion prevention and site stabilization, and does not require permanent irrigation for long-term survival. [SCC 14.24.430 (1) (g)], [G.I. SMP Chap.6 10.c.(1) (b) and (1) (e)]

- 4.8 Low-lying areas within the inundation zones should be posted with Tsunami Hazard Zone signs.
- 4.9 Emergency shelters need to be posted as “EMERGENCY SHELTER” with a list of potential hazards such as: tsunami, earthquake, or storm.
- 4.10 The County shall verify that emergency shelters have adequate seismic resistance.
- 4.11 Emergency shelters need to have the ability to maintain function with loss of grid power and public communication service.

Fish and Wildlife Habitat Conservation Areas

- 4.12 Skagit County should coordinate with the WDOE and WDFW to identify and evaluate potential sites suitable for the Fish and Wildlife Habitat Conservation Area designation.

Noxious Species

- 4.13 The County Noxious Weed Inspector shall provide information to and work with island organizations to control noxious weeds on the island.
- 4.14 The County Health Department should work with island organizations to provide information on methods to minimize impacts from rats.

Protection and Conservation Measures

- 4.15 Seawater Intrusion Mitigation. Mitigation for a single-family residence shall be in conformance with the “Interim Seawater Intrusion Policy” which needs to be updated and incorporated into SCC Chapter 12.48. [SCC 14.24.350 (2)]
- 4.16 Building permits in areas susceptible to seawater intrusion shall be conditional upon the restriction of ground water to use in the home only. [SCC 14.24.350 (5)(iv)]
- 4.17 Water meters shall be required for all new development and encouraged for all existing residences, in order for people to track their water usage and detect leaks. Skagit County shall implement a rebate program for the purchase and installation of individual water meters.
- 4.18 Land elevation shall be determined prior to the drilling of a new water well in order to provide necessary information about the depth to mean sea level.
- 4.19 The County/Health shall evaluate the presence of failing septic systems and the source of nitrate contamination of the groundwater.
- 4.20 Sole Source Aquifer Mitigation. There shall be no density bonus for CaRD developments on Guemes Island, except when the source of water is from a public water system whose source is other than groundwater. [SCC 14.24.350 (3)]
- 4.21 The County shall ensure that open space set aside by CaRD subdivision is permanently protected. [SCCP: 5C-1.2 (a)]
- 4.22 The Planning and Development Services Critical Areas Checklist needs to include the question whether the property is located on a Sole Source Aquifer Area.
- 4.23 The County shall develop requirements for individual reverse osmosis (R.O.) systems that are consistent with requirements for public R.O. systems. Particularly, the water source and effluent discharge need to be addressed. No R.O. systems shall be allowed that use ground water from the aquifer system. A

- public well system or public R.O. system will be preferable over multiple individual R.O. systems [SCC13A-5.3 ©]
- 4.24 The County and island organizations should encourage islanders to use native vegetation on their property by making them easily available. [SCCP 3A-5.1 (q)]
- 4.25 Integrated Vegetation Management (IVM) approaches, with emphasis on mechanical control techniques (mowing and grading), shall be used on the public rights-of-way). All available control actions, such as biological means, shall be considered. Some selective herbicide applications may be used near intersections and traffic signs, where sight distance and visibility is of critical importance, or on areas with isolated populations of noxious weeds. [SCCP 10A-4.1]
- 4.26 Artificial lighting shall use full cut-off fixtures so that direct light from high intensity lamps will not result in glare. Lighting shall be directed away from adjoining properties so that not more than 1-foot candles of illumination leaves the property boundaries. [SCC 14.16.840 (3)].
- 4.27 On-site sound levels are not to exceed levels established by noise control regulations by the Department of Labor and Industries. Maximum permissible environmental noise levels to be emitted to adjacent properties are not to exceed levels of the environmental designations for noise abatement (EDNA) as established by the Washington Department of Ecology. [SCC 14.16.840 (5)]
- 4.28 Waterworks, an island organization, will work towards research and education of the islanders with respect to water use and discharge.

Public Information and Incentives

- 4.29 All public notices affecting Guemes Island shall be posted in the Skagit Valley Herald. Additionally, the County shall notify the Evening Star and or other widely read island media. [CCP13A-1.6]
- 4.30 The County/Health and other departments should cooperate with island organizations to provide islanders with information on the Sole Source Aquifer System; groundwater recharge; and groundwater and surface water quality issues; care of private wells and septic systems; conservation of water usage. Islanders shall be encouraged to be water resource stewards through participation in decision-making, volunteer activities and educational programs. [SCCP 13A-2.1(b)]
- 4.31 The County shall encourage private participation in water conservation, including best management practices and reuse of water by installation of gray water systems, such as bog filtration. [SCCP 13A-3.4(a)]
- 4.32 The County and island organizations should encourage property owners to protect critical areas and open space by participating in incentive programs like the County Open Space Taxation Program. [SCC14.24.180 (1)(a)]
- 4.33 Hunting on Guemes Island should be reviewed regularly by the Washington State Department of Fish and Wildlife in cooperation with island citizens to insure safety of residents and hunters alike. In addition, wildlife populations should be closely monitored and inventoried in the same cooperative manner in order to manage wildlife resources.

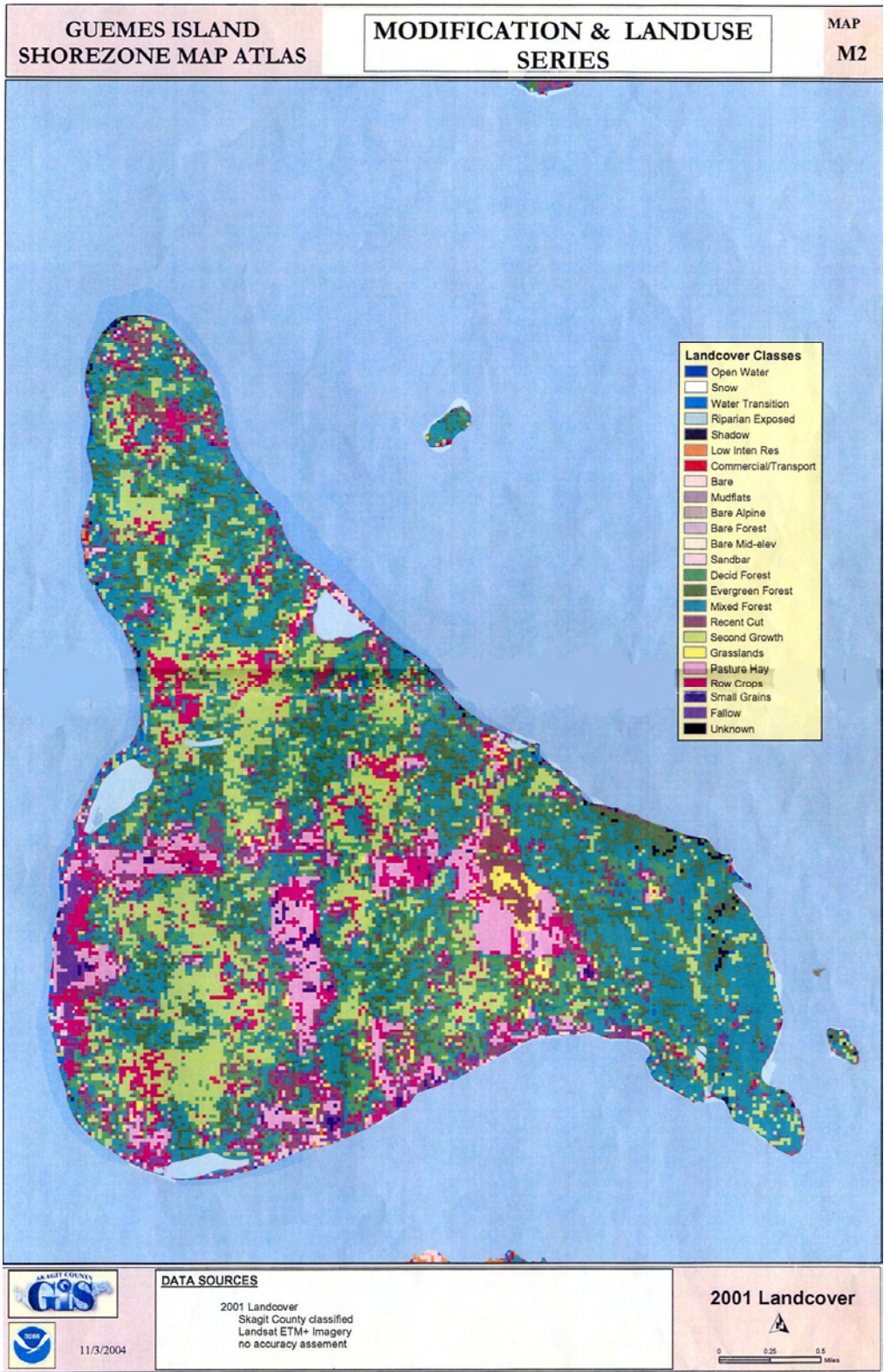


Figure 4.1 Land Cover



Figure 4.2 Wetlands



Figure 4.3 Hydrology

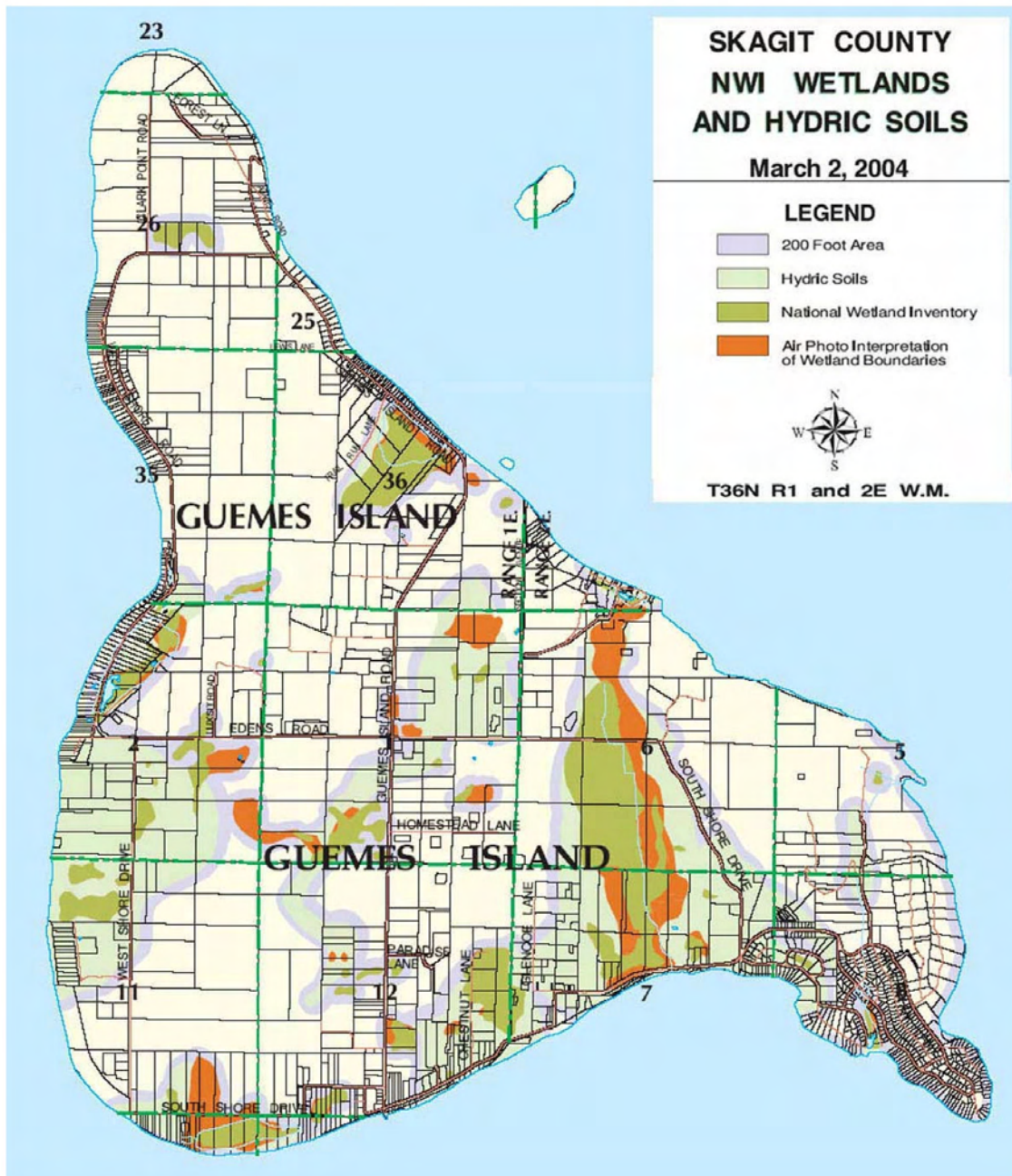


Figure 4.4 NWI Wetlands and Hydric Soils

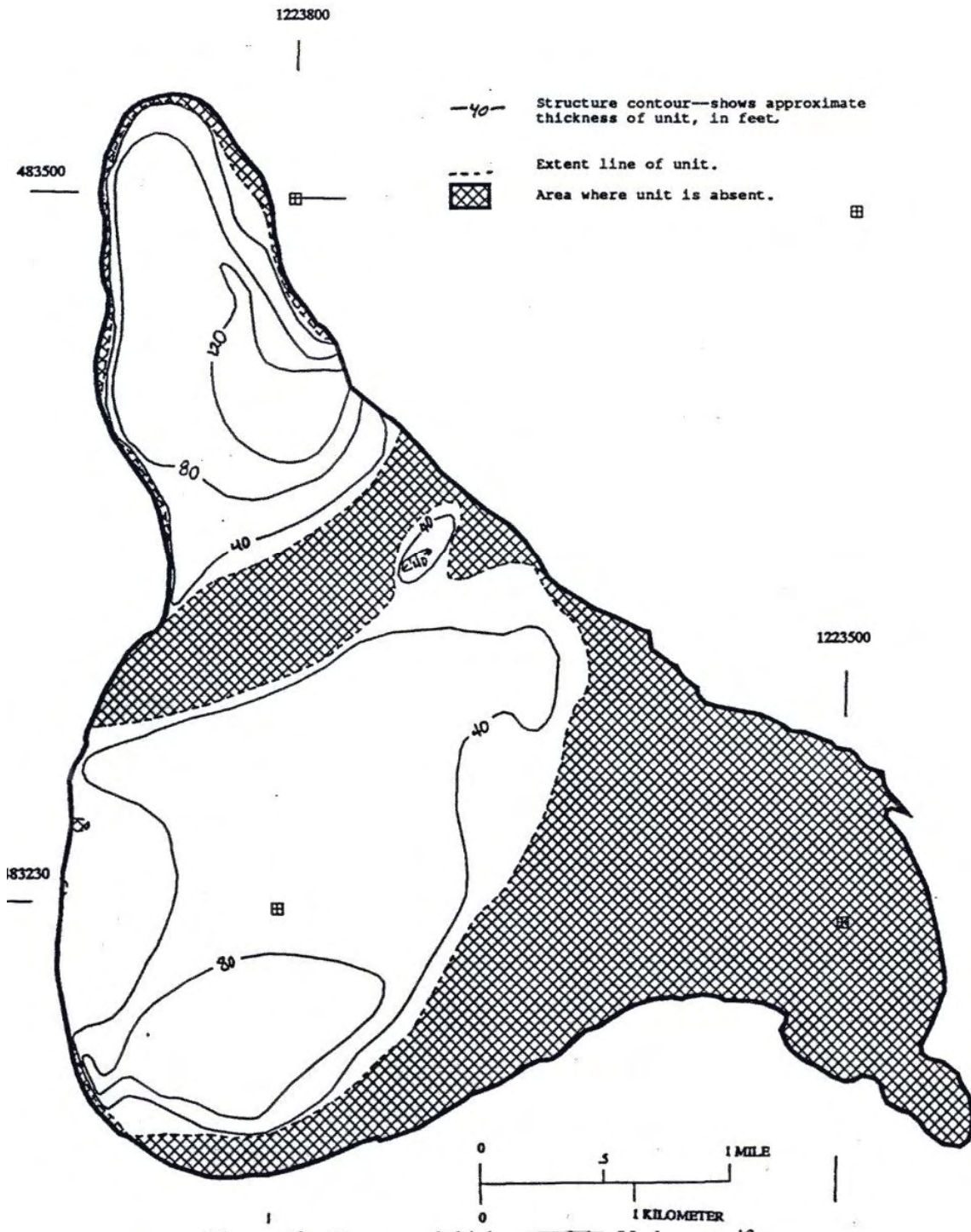


Figure 4.5 Extent and Thickness of the Vashon Aquifer *USGS 1995 Report*

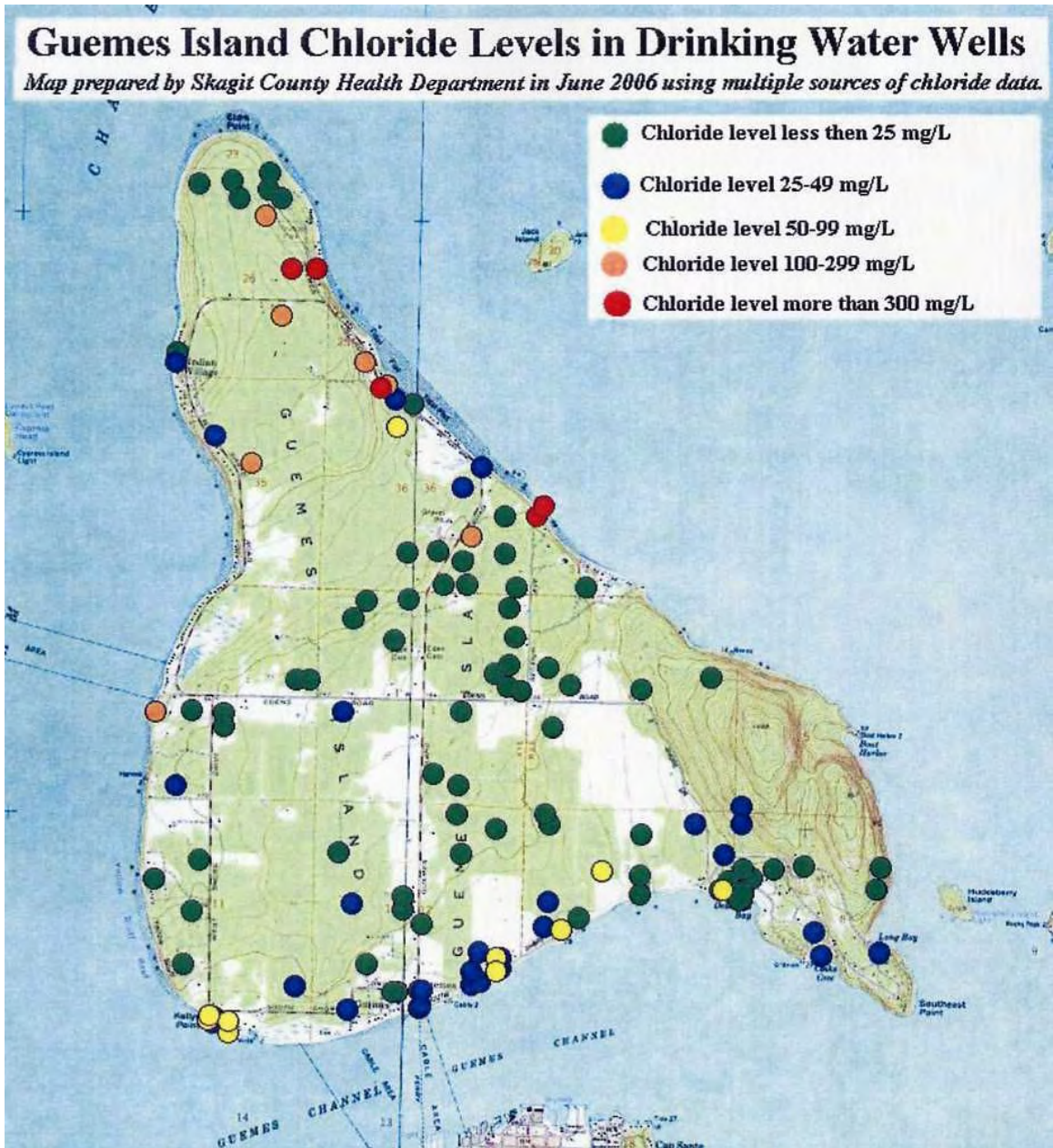
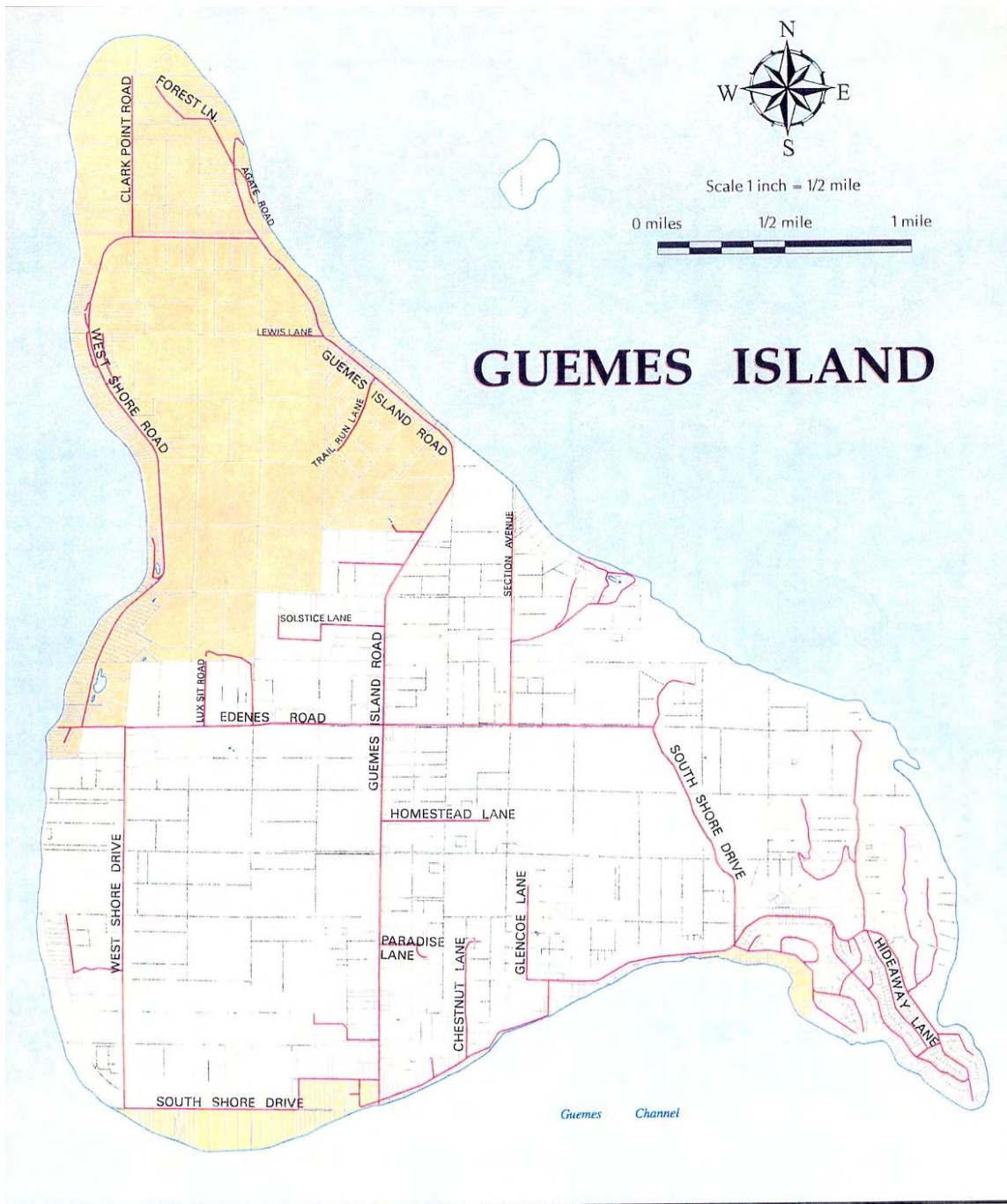


Figure 4.6 Well Chloride Levels



 **Areas Where Well Drillers Apply To The Health Dept. Before Drilling**

Figure 4.7 Well Drilling Permit Areas
Skagit County Interim Seawater Intrusion Policy



Figure 4.8 Public Water Systems

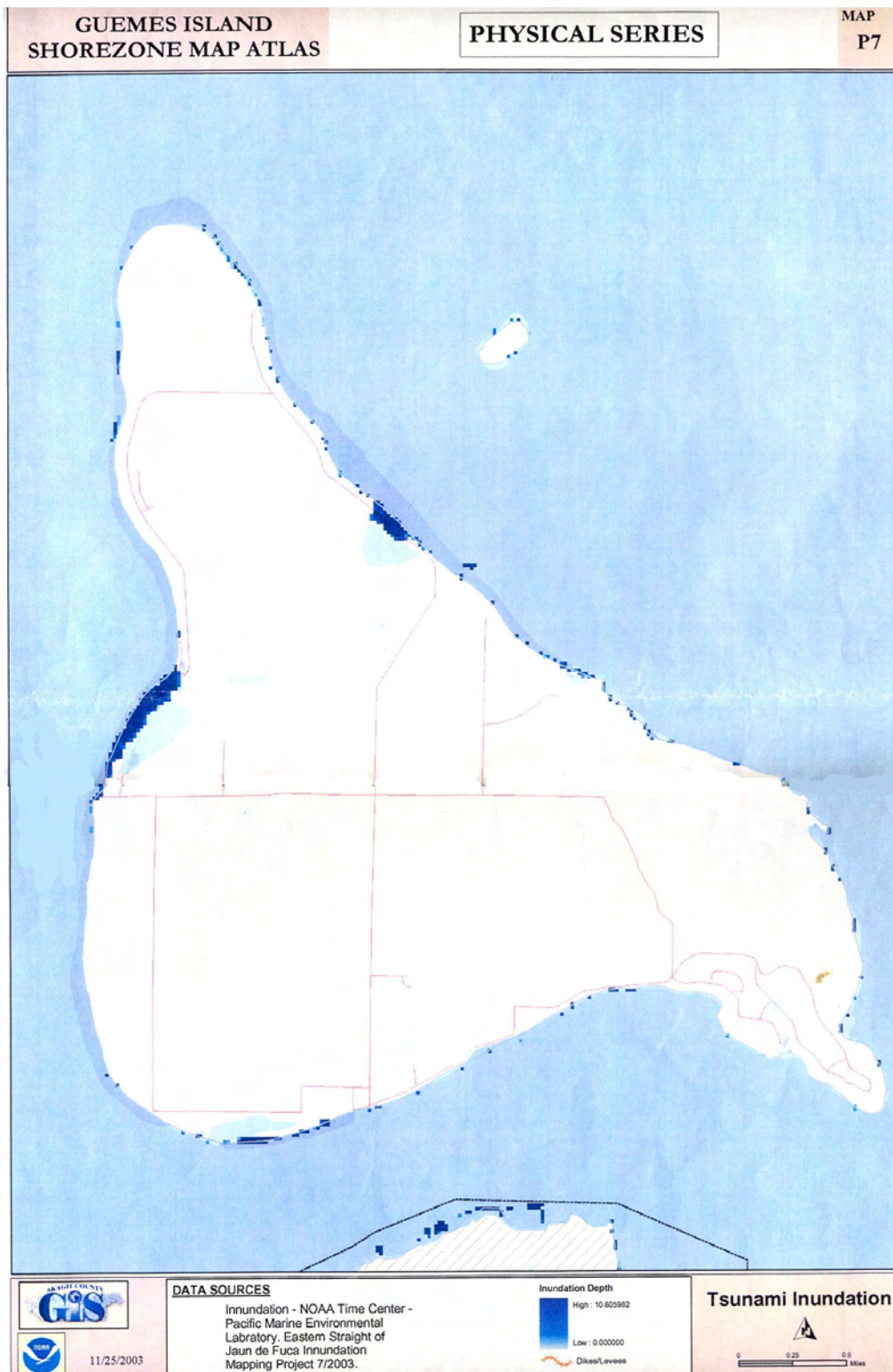


Figure 4.9 Tsunami Inundation Areas



Figure 4.10 Soil Erosion Areas