

APPENDIX G
SHORELINE CHARACTERIZATION,
CITY OF SOAP LAKE

The City of Soap Lake Shoreline Master Program Update Shoreline Inventory, Analysis, and Characterization Report

1 SHORELINE INVENTORY

Appendix G contains the Inventory, Analysis, and Characterization results for the City of Soap Lake (City). This section describes the land use patterns of the City, specifically detailing:

- Existing land use
- Planned land use based on the City's 2009 Comprehensive Plan
- Preferred use for shoreline areas based on the Shoreline Management Act (SMA)
- Existing shoreline environment designations based on the current City Shoreline Master Program (SMP)

Section 2 summarizes the land-capacity analysis results.

Section 3 summarizes the characterization of each shoreline reach within the City of Soap Lake. The following reaches are included:

- Soap Lake

1.1 Land Use Patterns

1.1.1 Existing Land Use

The City of Soap Lake and the Urban Growth Area (UGA) have about 76 acres of land along the Soap Lake shoreline. It is a mix of multiple land use types such as commercial, open space, recreational, residential single-family, residential multifamily, and transportation. The UGA and City limits also include undeveloped land. The City owns park land within the shoreline.

Table 1
Shoreline Existing Land Use

| Existing Land Use | Shoreline Area Acres (City) | % of Land Use (City) | Shoreline Area Acres (UGA) | % of Land Use (UGA) | % of Land Use (Total) |
|---------------------------|------------------------------------|-----------------------------|-----------------------------------|----------------------------|------------------------------|
| Commercial | 1.67 | 3.8 | 0 | 0 | 2 |
| Open Space | 2.34 | 5.3 | 0 | 0 | 3 |
| Recreational | 5.74 | 13 | 2.72 | 8.3 | 11 |
| Residential Multi-family | 1 | 2.3 | 0 | 0 | 1 |
| Residential Single-family | 9.12 | 20.7 | 3.98 | 12.15 | 17 |
| Transportation | 1.51 | 3.4 | 5.99 | 8.28 | 10 |
| Undeveloped | 22.74 | 51.5 | 20.08 | 61.28 | 56 |
| Total | 32.77 | | 44.13 | | 100 |

1.1.2 Planned Land Use

The City's Comprehensive Plan (plan) was adopted in 2009. The plan provides guidance for the City's future development over the 20-year planning period. The City's vision "respects and preserves its natural, historical and cultural resources." It also recognizes the City's unique characteristics and scenic natural features. The City's land use policy encourages new development to provide land for parks, links to parks through the development of trails, and tourist recreational opportunities throughout the City. The residential land use policy intends to allow only residential developments within single family residential districts with the exception of home occupations that are subject to approval process. The City's economic development goal aims to consider strategies to support and expand recreational vehicle and camping facilities.

Soap Lake's land use is implemented through the multiple zoning categories. The predominant zoning/land use in Soap Lake shoreline is R-1 residential. Other uses include R-2 residential and C-1 1st class commercial/central business district. These land uses and their general intents are summarized below.

R-1 Residential

Most of the Soap Lake shoreline has R-1 residential land use and zoning designation. R-1 zoning protects single-family residential districts and allows for single-family residences at a density of one to four dwelling units per acre.

R-2 Residential

The R-2 residential land use is intended to provide for and to protect single-family and two-family residences in specified low density areas and to preserve land for single-family and two-family residential uses. Residential density in this land use and zoning generally ranges from four to eight dwelling units per acre.

C-1 1st Class Commercial/Central Business District

C-1 1st class commercial/central business district zone is intended to provide for a variety of retail business uses and services and to preserve land for such uses. It promotes pedestrian-oriented commercial with major retail, office, entertainment, and arts center for the community. Complementary residential uses are allowed and encouraged in this district.

1.2 SMA Use Preference

The SMA identifies water-oriented uses for shoreline as (173-26-020 WAC), "water-oriented use means a use that is water-dependent, water-related, or water-enjoyment, or a combination of such uses." The SMP guidelines also require that non water-oriented uses be limited to areas where preferred uses are not appropriate or these uses contribute to the goals of the SMA [WAC 173-26-201(2)(d)].

Preferred uses for shoreline areas are listed in WAC 173-26-201(2)(d). The order of preference assigned to these uses is as follows:

- Protection and restoration of ecological function
- Water-dependent uses
- Water-related uses
- Other compatible water enjoyment uses
- Single-family residences

Based on existing land use data, residential use meets the shoreline use criteria and several current uses meet the definitions of water-oriented uses such as:

- Open space
- Recreational
- Commercial

1.3 Existing Shoreline Environment Designations

The City's SMP was adopted in 1974. According to this document, the entire Soap Lake shoreline falls in the urban environment to maintain the economic development and protect public interest of the shoreline.

1.3.1 Urban Environment

The objective of the Urban Environment is to ensure optimum utilization of shorelines within urbanized areas by providing for intensive public use and by managing development so that it enhances and maintains shorelines for a multiplicity of urban uses. The SMP Urban Environment includes high intensity uses such as residential, commercial, and industrial development. The SMP recognizes this environment suitable for areas subjected to extremely intensive use pressure, as well as planned to accommodate expansion.

The SMP emphasizes developments within already developed areas and for water-dependent industrial and commercial uses. It also prioritizes visual and physical public accesses to water. The recreational goal intends to restore areas to a natural useful condition which have been blighted by abandoned or dilapidated structures. The recreational policy prioritizes recreational uses and improvements that facilitate public access to shoreline. The residential policy intends to adequately protect the shoreline aesthetic characteristics and to encourage public access to shoreline within residential subdivisions.

2 LAND CAPACITY ANALYSIS RESULTS

The City of Soap Lake and UGA have development capacity within R-1 and R-2 residential districts. This includes unimproved areas on the northwest bank of the shoreline, vacant and partially utilized parcels along shoreline. These areas have the capacity to add about 49 additional dwelling units. Commercial area on the southeast side is mostly owned by the City and is developed with park and recreation facilities. Some capacity is anticipated in the commercial land. Area within the UGA could add development capacity. No land use designation has been identified in the City's land use map for the UGA areas. State Route (SR) 17 abuts the shoreline in this area. Future developments in the UGA area would occur on the other side of the SR 17, and additional use conflict would be minimal. Generally, residential land uses are not expected to have any major SMA preferred use conflict. However, development at a relatively higher density in this reach might result in the placement of some uses accessory to residential developments within shoreline.

Table 2
Estimated Residential Land Capacity Summary

| Reach | Net Developable Acre | Total Capacity in Residential Units |
|-----------|----------------------|-------------------------------------|
| Soap Lake | 14 | 57 |

3 REACH CHARACTERIZATION TABLE

This section summarizes the characterization of Soap Lake within the City of Soap Lake. The elements described include:

- Existing/physical descriptions
 - Reach location description
 - Reach length
 - Shoreline jurisdiction area
 - Ownership
 - Existing land cover
 - Geomorphic character
 - Flooding and geologic hazards
 - Land use and current SMP designations
 - Habitat types and presence of priority species and habitats
 - Existing public access
 - Vegetation characteristics
 - Major infrastructure
 - Water quality concerns
- Reach characterization and analysis
 - Water quantity
 - Water quality
 - Habitat
- Preliminary reach goals and environment designations
 - Protection goals
 - Restoration goals
 - Public access goals
- Identified development plans
 - Identified restoration measures
 - Identified public access improvements
 - Cumulative impact considerations

| SOAP LAKE | | CITY OF SOAP LAKE |
|---|---|-------------------|
| Soap Lake, 844 acres | Shoreline Jurisdiction: 77 acres | |
|  | | |
| Source: https://fortress.wa.gov/ecy/coastalatlantools/UICoastalAtlas/Tools/ShorePhotos.aspx | | |
| Description: The portion of Soap Lake within the City of Soap Lake and also including the UGA. | | |
| Subreaches (SR), see Figure 1: | | |
| SR A: Begins at the western City limit and extends approximately 2,500 feet to the south | | |
| SR B: Extends approximately 1,400 feet to the southeast | | |
| SR C: Extends around the southern end of the lake approximately 4,600 feet | | |
| SR D: Extends north approximately 7,000 feet | | |
| PHYSICAL CHARACTERISTICS | | |
| Ownership: Private and municipal (City of Soap Lake) | | |
| Existing Land Cover/Development: Undeveloped land, beach campground, and residential development | | |
| Land Use/Current SMP: | | |
| Land use designation: | | |
| <ul style="list-style-type: none"> • Incorporated: R-1 Residential is approximately 70 acres and C-1 Commercial is 7 acres • UGA: Rural residential 1, 18 acres | | |
| Current SMP environment designation: Urban | | |
| Major Infrastructure: Highway 17 along east shore. Wells and pump stations (primarily outside shoreline jurisdiction) in the City operated by Reclamation to control lake levels. | | |

| SOAP LAKE | CITY OF SOAP LAKE |
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| <p>Geomorphic Character: Located within a natural depression within Grand Coulee with steep-sided bedrock walls. The water surface elevation fluctuates seasonally. Banks are primarily bedrock with outburst flood deposits on the west shore and alluvium on the northeast shore.</p> <p>Hardened banks: Bank hardening along portions of the east shore. The total estimated length of this bank hardening is approximately 450 feet.</p> | |
| <p>Flooding and Geological Hazards: Soap Lake is within the FEMA mapped 100-year floodplain; however, the pool elevation and water input is controlled by Reclamation through a series of pump stations within the city.</p> <p>Adjacent soils are designated as slight to moderate erosion potential and generally very low liquefaction susceptibility, except for the alluvial deposits along the south shore which has moderate to high liquefaction potential. Steep slope hazards are present along the east shore where bedrock outcrops and rock talus may be susceptible to mass wasting.</p> | |
| REACH CHARACTERIZATION AND ANALYSIS | |
| <p>Water Quantity and Sediment: Groundwater seepage from Columbia Basin Project facilities and irrigation affect the lake's water level, which is regulated through wells and pump stations operated by the Bureau of Reclamation.</p> <p>Sediment sources to the lake include soil erosion from small drainages to the lake, lake shoreline erosion due to wind and wake driven currents that may be exacerbated by lack of emergent wetland and riparian habitat. Sediment movement along the shoreline is affected by groins associated with private development along Subreach B.</p> | |
| <p>Water Quality: Soap Lake has naturally high concentrations of sodium carbonate and sulfate. Conditions within the lake are stratified between a lower layer, which is hyper-saline, cold, and anaerobic and contains the highest concentration of sulfide recorded in natural water, and the top layer, which is aerobic and brackish (Sorokin et al. 2007).</p> <p>Groundwater seepage from Columbia Basin Project facilities and irrigation, and associated pumping of lake to maintain surface elevation, has diluted the mineral content of the lake (sodium, bicarbonate, sulfate, carbonate, chloride, potassium, and other minerals). Estimates indicate that the mineral content of the lake has been reduced by approximately 50% from the early 1950s to the 1990s. Additional direct pumping from the lake in the late 1990s further reduced mineral content (Coulee Corridor News Summer/Fall 2002).</p> | |
| <p>Habitat Characteristics and PHS Species Presence:</p> <p>The riparian zone has little to no vegetation due to the lake mineral content, dry climate, steep slopes, and urban and recreation development. Where it occurs, vegetation is mostly low-growing grasses and shrubs with a few small patches of trees. Adjacent uplands include shrub-steppe zones. There are no rare plants identified nearby. Urban residential and recreational development occurs along the shoreline on the south end of Soap Lake. SR A is the least developed subreach, it contains a patch of exotic tree species <i>Elaeagnus angustifolia</i> (Russian-olive) at the northern end and some solitary riparian trees further south. The</p> | |

| SOAP LAKE | CITY OF SOAP LAKE |
|---|-------------------|
| <p>vegetation in SR-B and SR-C is very sparse and associated with upland landscaping within residential yards (SR-B) and planting strips within the recreation area of SR-C. Riparian vegetation in SR-D is limited due to armoring along the shoreline and Highway 17, though a moderate-sized patch of upland trees is found within a residential development near the City limits. The lake chemistry limits most aquatic animal and plant life except for algae, bacteria, and tiny crustaceans. Waterfowl and shorebird concentrations exist here, and rare birds occur near the cliffs on the east shore.</p> | |
| ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH) | |
| SUBREACH A | |
| <p>Level of Existing Function: Functioning, though overall function is limited due to lake mineral content as discussed in the Habitat section above</p> <p>Stressors: No existing stressors, though there is residential and public access development potential due to zoning</p> <p>Potential Restoration Opportunities: None</p> <p>Potential Protection Opportunities: Protect unique, fragile, non-renewable, and scenic resources; protect mineral content of lake; protect existing limited wetland and riparian vegetation areas; manage shrub steppe consistent with WDFW Management Recommendations for shrub steppe priority habitat.</p> | |
| SUBREACH B | |
| <p>Level of Existing Function: Impaired, though overall function would be limited due to lake mineral content as discussed in the Habitat section above</p> <p>Stressors: Residential development, groins and armoring</p> <p>Potential Restoration Opportunities: Analyze effectiveness and impact of multiple groins and shoreline hardening, re-establish vegetative strips along shoreline</p> <p>Potential Protection Opportunities: Protect unique, fragile, non-renewable, and scenic resources; protect mineral content of lake. Stormwater controls consistent with Eastern Washington Stormwater manual. Evaluate opportunities to improve riparian vegetation and landscape maintenance practices during redevelopment or through land owner incentive and education programs.</p> | |
| SUBREACH C | |
| <p>Level of Existing Function: Partially functioning, though overall function is limited due to lake mineral content as discussed in the Habitat section above</p> <p>Stressors: Armoring and existing water oriented recreational uses, future recreation development (proposed boat launch)</p> <p>Potential Restoration Opportunities: If public access is redeveloped, consider opportunities to increase aquatic habitat complexity (substrate, organic material, structural elements [e.g., large woody debris], and aquatic and riparian vegetation).</p> <p>Potential Protection Opportunities: Protect unique, fragile, non-renewable, and scenic resources; protect</p> | |

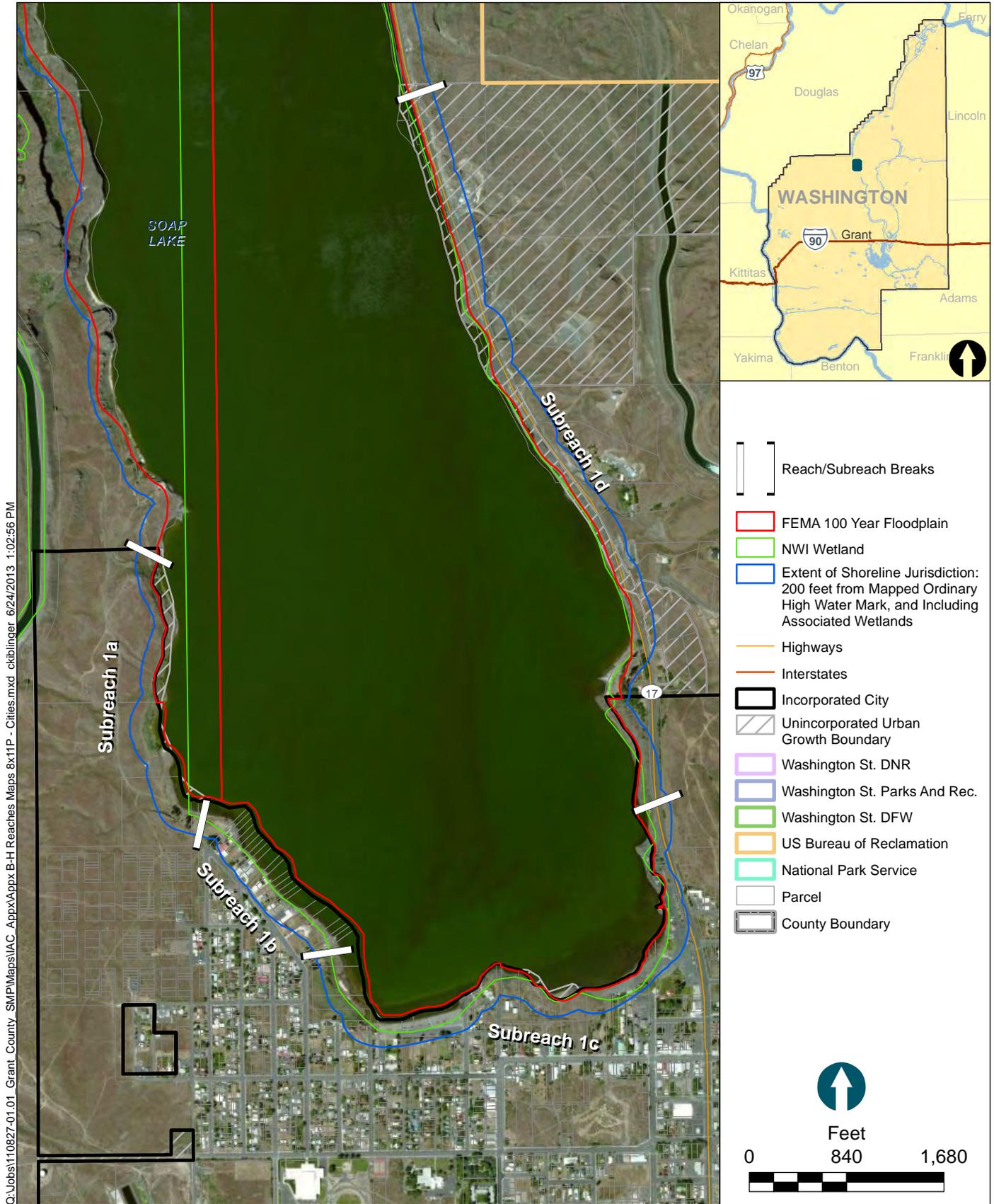
| SOAP LAKE | CITY OF SOAP LAKE |
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| <p>mineral content of lake; protect existing riparian vegetation. Stormwater controls consistent with Eastern Washington Stormwater manual.</p> | |
| <p>SUBREACH D</p> | |
| <p>Level of Existing Function: Partially functioning, though overall function is limited due to lake mineral content as discussed in the Habitat section above</p> <p>Stressors: Armoring including groin; highway within shoreline jurisdiction boundary; limited residential development. Future stressors could include residential development but this will be very limited due to zoning and few buildable areas waterward of the existing highway.</p> <p>Potential Restoration Opportunities: Assess impacts and evaluate potential for armor removal, look at opportunities for soft shoreline/riparian stabilization techniques</p> <p>Potential Protection Opportunities: Protect unique, fragile, non-renewable, and scenic resources; protect mineral content of lake. Manage shrub steppe consistent with WDFW Management Recommendations for shrub steppe priority habitat.</p> | |
| <p>Proposed Shoreline Environment Designation:</p> <p>SR A: Urban conservancy</p> <p>SR B: Shoreline residential</p> <p>SR C: Urban conservancy</p> <p>SR D: Urban conservancy</p> | |
| <p>PUBLIC ACCESS</p> | |
| <p>Existing:</p> <p>The City of Soap Lakes owns about 12% of the total shoreline area, including East Beach and West Beach parks and Smokiam Campground; all provide public access to shoreline. There is also unimproved privately owned shoreline on the northeast and northwest ends of the city limits. The northeast shoreline is leased by the city to provide continued public access. There are two private docks in this management area.</p> | |

| SOAP LAKE | CITY OF SOAP LAKE |
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| <p>Public Access Goals:</p> <p>The City of Soap Lake's Comprehensive Plan shoreline goal states to "ensure that public access to the lake is maintained an encouraged." Its public access policies are as follows:</p> <ul style="list-style-type: none"> • The city should maintain existing ownership and seek opportunities to place additional shoreline areas into public ownership. • The city should adopt into the City Code adequate regulations to insure that all citizens have equal opportunity to enjoy the benefits of Soap Lake. • The city should encourage joint use docks and common access points when the shoreline of Soap Lake is privately owned and developed. <p>The city should encourage community events and public gatherings to utilize the facilities within city parks adjacent to Soap Lake.</p> | |
| <p>Identified Public Access Improvements:</p> <p>According to the Comprehensive Plan, the city is planning to build a boat launch on the lake. The West Beach Park restrooms are identified to be replaced (City of Soap Lake 2009).</p> <p>Although the city owns park land in the shoreline, opportunities exist in this management area to add additional boating and water access facilities.</p> | |
| <p>CUMULATIVE IMPACTS ANALYSIS</p> | |
| <p>Watershed level: The SMP has limited influence on the Columbia Basin Project operations.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Impervious surface increases • Vegetation alterations • Structural effects on habitat from fragmentation by roads and overwater structures • Impacts to existing banks from city-planned recreation improvements, residential dock development, and wave attenuation • Potential water quality effects from future landscape development associated with residential development | |

4 REFERENCES

- Soap Lake, 1974. *City of Soap Lake Shoreline Management Master Program*. Prepared by Grant County Planning Department and Citizens Advisory Committee. January 1974.
- Soap Lake (City of Soap Lake), 2009. City of Soap Lake Municipal Code, Chapter 14.08. Shoreline Management Act.
- Sorokin, D.Y., M. Foti, H.C. Pinkart, H.C., and G. Muyzer, 2007. Sulfur-Oxidizing Bacteria in Soap Lake (Washington State), a Meromictic, Haloalkaline Lake with an Unprecedented High Sulfide Content. *Applied and Environmental Microbiology* pp. 451-455. January 2007.

FIGURES



Appendix G, Figure 1
 Soap Lake - City of Soap Lake
 Shoreline Inventory, Analysis and Characterization Report
 Grant County Shoreline Master Program Update