

CHAPTER 7 FRESHWATER LAKES

Chapter 7 discusses the six freshwater lakes in Island County -Water Resource Inventory Area (WRIA) 6- that are “shorelines of the state” (Table 7-1). Water bodies that have ideal or marine influence are included in the marine reach with which they are associated, even though some of those water bodies are commonly called lakes. Lake shorelines have been identified and lake reaches have been established based upon methods outlined in Chapter 2. Each lake within the County is inventoried as a single “reach” because the lakes are generally small and have a fairly homogenous character throughout.

Table 7-1. Island County Freshwater Lake Shorelines

Reach Label	Reach Description
Whidbey Island Freshwater Lake Shorelines (Section 7.1)	
Cranberry Lake	Located in Deception Pass State Park (West Side), lake reach includes associated freshwater wetlands to the south.
Dugualla Lake	Located in NW Whidbey Island, lake reach extends from dike at west end to just east of SR 20 and includes some associated wetlands
Deer Lake	Located west of Clinton on the south end of Whidbey Island.
Goss Lake	Located on Whidbey Island west of Langley
Lone Lake	Located on Whidbey Island southwest of Langley, reach includes associated wetlands extending south to SR 525
Camano Island Freshwater Lake Shorelines (Section 7.2)	
Kristoferson Lake	Located north of Triangle Cove, lake reach includes extensive associated wetlands

Freshwater lake shorelines in Island County have surface areas ranging from a maximum of 133 acres on Cranberry Lake (Whidbey Island) to a minimum of 28 acres on Kristoferson Lake (Camano Island); as such, there are no freshwater “shorelines of statewide significance”¹. There are no streams within Island County that meet minimum criteria (mean annual flow greater than 20 CFS) to be designated shorelines.

Ecosystem-wide processes that affect lake shorelines include specific actions related to hydrologic processes, sediment delivery, water quality and large woody debris. However, unlike large river systems where water flow is affected by factors across a greater watershed, lakes in Island County are located in either the headwaters or outlets of relatively small drainage

¹ Lakes over 1,000 acres in area are designated as shorelines of statewide significance by RCW 90.58.030(2)(3).

basins and are influenced by a limited area draining to the respective lakes. Lake processes in the small drainage areas are easily altered by nearby land use modifications.

The majority of lakes in Island County formed in shallow depressions remaining from glaciation on an upland plateau. The upland lakes are in the headwaters of their respective small drainage basins; these lakes (including Deer, Lone, Goss, and Kristoferson, which are regulated as shorelines, and several smaller lakes) are important for maintaining stream baseflow for downgradient streams and coastal aquatic habitats like pocket estuaries, lagoons, and salt marshes. However, at present, there are no studies on Island County stream flow relative to lakes in the shoreline jurisdiction, so it is difficult to know the degree of influence that these lakes have on downgradient habitats.

Dugualla and Cranberry Lakes, on the other hand, are adjacent to the marine coastline and historically were brackish features (marshes or coastal lagoons). Historic alteration to lake outlets has modified these two features, removing tidal influence and causing them to become freshwater lakes.

Lakes in Island County do not naturally deliver sediment to downstream waterbodies, but rather serve as “sinks” for sediment from contributing areas (Adamus, 2007). As such Island County lakes are sensitive to development, surrounding land uses, and inputs of sediment in surface water runoff. Sediment storage can protect downstream habitats from delivery of too much sediment input, which can adversely affect habitat. Conversely, increases in sediment delivery to lakes can surpass capacity to assimilate sediment and adversely affect habitat and water quality, both within the lake and downstream.

Data is lacking on actual sediment loading in the lakes and streams feeding the lakes. Based on surrounding land uses, it would be expected that conditions would vary, but that all lakes would have some degree of impact from sedimentation. Excess sedimentation is likely an issue for Dugualla, Lone, Deer, and Kristoferson Lakes. In Dugualla Lake this is likely because of its dike, weir height, and contributions from upstream cleared land and agriculture. Lone Lake has likely been impacted by clearing associated with agriculture, and Deer Lake has likely been impacted to a lesser degree by residential development surrounding the lake. On Kristoferson Lake the mix of agriculture and residential development in the surrounding area has likely contributed additional sediment to the lake. Sediment load alterations have likely been low for Cranberry Lake and Goss Lake because both have more intact forest cover in their contributing drainage areas, although historic logging could have contributed to sediment loads in the past.

In order to classify the water quality of lakes, an assessment of the biological activity in each lake is made. This assessment (i.e. trophic state) is determined by a combination of three indicators namely: 1) clarity (Secchi depth), 2) nutrient levels (total phosphorus) and 3) algae levels (chlorophyll concentrations). Trophic state results are used to classify lake water quality into three categories: oligotrophic (refers to lakes of low productivity), mesotrophic (moderately productive), and eutrophic (highly productive). Although lake productivity is essential to life in a lake, high productivity can be considered undesirable due to the potential for increased algae growth. Rapid changes in a lake's trophic state may also provide an indication of effects resulting from human-induced nutrients or pollutants. Information provided in the reach

assessment for each lake was obtained from Ecology assessment and reporting (Ecology 1996; Ecology 2008).

The inventory refers to data collected from available sources and presented in countywide format in the Map Folio included as Appendix A. In this section, inventory information for each reach is presented as a ‘reach sheet’ where pertinent reach characteristics are detailed and presented with a reach map (2009 aerial photography) and oblique photos (Microsoft Corporation, 2010 - Pictometry Bird’s Eye). Reach-scale inventory information, as defined in WAC 173-26-201, are presented for Island County freshwater lake reaches within two sections, as shown in Table 7-1.). Reach inventory and characterization information is grouped into four broad categories: 1) physical resources; 2) biological resources, including habitats and species; and 3) shoreline use patterns. In addition, key alterations and impairments and identified opportunities (restoration and otherwise) are identified within each reach sheet.

The reach scale assessment establishes a baseline of conditions along the County’s freshwater lake shorelines that will be used to develop shoreline designations, and to revise policies and regulations, with the aim of achieving no net loss of shoreline functions. A summary of key opportunities and management issues for all freshwater lake reaches is included in Section 7.3.

7.1 Whidbey Island Freshwater Lake Shorelines

7.1.1 Physical Characterization

Five freshwater lakes qualifying as regulated shorelines are found in rural areas of Whidbey Island: Cranberry, Deer, Dugualla, Goss, and Lone Lakes. Of these, Cranberry Lake and Dugualla Lake were once brackish or saltwater marshes or coastal lagoons. In the 20th century, the outlets of these lakes were modified to restrict tidal influence and establish the systems as primarily freshwater.

Deer, Goss, and Lone Lakes are not located near marine shorelines, but rather are in or near the headwaters of their respective drainages.

7.1.2 Biological Characterization

Deer, Goss, and Lone Lakes were once surrounded by tall conifer forests and wetlands. Today, the shorelines of Deer and Goss Lakes are largely developed and the shorelines have been partially cleared. The shorelines of Lone, Cranberry and Dugualla Lakes are abutted by wetlands on much or all of the shorelines. In some areas the riparian forests and wetlands abutting portions of these lakes have been cleared for agricultural use.

Three of the five lake systems on Whidbey support salmonid populations (coho, coastal cutthroat and/or chum). Salmonids use Dugualla and Lone Lakes as well as the both upstream areas and the outflows downstream. The Goss Lake basin is also mapped with salmonid use, extending to just below the outlet of the lake. No salmonid use is documented within Cranberry and Deer Lakes.

All lakes on Whidbey Island have waterfowl concentrations, and Kristoferson on Camano Island provide habitat for wood ducks.

7.1.3 Shoreline Use Patterns

The shorelines of Deer and Goss Lakes are largely developed with detached single family residences. Lone, Cranberry and Dugualla Lakes have agricultural uses along portions of their shorelines. All lakes on Whidbey Island have public access of some form. For example, Cranberry Lake is part of Deception Pass State Park; it and other lakes are used for fishing, boating, and swimming.

7.1.4 Reach Analysis

The following reach assessment sheets provide a detailed assessment for each lake on Whidbey Island.

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See Reach Sheets

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See Reach Sheets

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7.2 Camano Island Freshwater Lake Shorelines

Only one freshwater lake qualifying as a regulated shoreline is found in northern Camano Island: Kristofferson Lake. The lake is not located near the marine shoreline and was likely once surrounded by tall conifer forest and wetlands. Today, the shorelines have limited development, with wetlands and intact riparian vegetation occurring around portions of the shoreline. The southern shoreline is largely cleared for agricultural use and does not have public access.

Kristofferson Lake drains to the marine shoreline at Triangle Cove via Kristofferson Creek. The outfall stream and lakes support anadromous salmonid use (coho, coastal cutthroat and chum). The relatively intact connection to the marine shoreline and salmonid use is unique for freshwater lacustrine and wetland habitat on Camano Island, highlighting the role of the lake and outflow system in supporting juvenile salmon populations.

7.2.1 Reach Analysis

The following reach assessment sheet provides a detailed assessment for Kristofferson Lake, the only freshwater lake shoreline on Camano Island.

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See Reach Sheets

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See Reach Sheets

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7.3 Opportunity Areas

Based upon this inventory and characterization, several preliminary management recommendations have been developed for the County's freshwater lake shorelines. These broad recommendations apply to future management decisions for marine shorelines of the state in the County including the development of shoreline environment designations, goals and policies, and shoreline regulations. Management recommendations for freshwater lakes include:

- Assessment and improvement of water quality in the context of surface water runoff and nutrient inputs from contributing basin (all lakes);
- Restoration of associated wetlands, aquatic habitat, and some degraded riparian areas – primary existing uses that have modified riparian, wetland and aquatic habitats include residential (Deer , Goss, and north shore of Kristoferson), agricultural (Dugualla, Lone, and Kristofferson), and public recreational uses (Cranberry Lake).
- Preservation and enhancement of native aquatic vegetation and native woody vegetation in the nearshore environment (all lakes); and
- Assessment and potential restoration of significant system alterations caused by previous shoreline modifications (Cranberry and Dugualla Lakes); focus on existing management approach for lake levels (with dam structure / tide gate / pump facilities), alternative management strategies and potential mitigation. Implications on hydrologic connection with marine shoreline should be considered.