

**Skagit Wildlife Area
Fish Passage and Diversion Screening
Prioritization Inventory**

Habitat Program
Technical Applications Division
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Submitted by

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INTRODUCTION

The Washington State Department of Fish and Wildlife (WDFW) is committed to providing leadership in restoring salmon and trout (salmonid) populations in Washington State.

WDFW conducts Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization projects, which address two factors limiting salmonid populations:

- ?? Human-made barriers to fish passage such as culverts and dams
- ?? Salmonid mortality from unscreened water diversions

When culverts and dams are barriers to fish migration, productive habitat becomes inaccessible. Both adult and juvenile salmonids need to move freely up and downstream to find suitable spawning gravel or disperse from the redd into rearing habitat. Even resident trout need full access to all habitat types to spawn, rear, maximize genetic interchange and survive varying flow conditions.

Juvenile mortality occurs in unscreened or inadequately screened diversions. Water diversion ditches resemble side channels in which juvenile salmonids normally find refuge. When diversion headgates are shut, access back to the main channel is cut off and the channel goes dry. Mortality can also occur with inadequately screened diversions from impingement on the screen, or mutilation in pumps where gaps or oversized screen openings allow juveniles to get into the system.

Inventories of fish passage barriers and water diversions are being conducted on each of the Wildlife Areas owned or managed by WDFW. The inventories and habitat surveys document and prioritize for correction all human-made fish passage barriers and unscreened or inadequately screened diversions to ensure compliance with Washington State laws (RCW 77.55.060, RCW 77.55.040).

For this report, the location of a fish passage or safety structure is referred to as a site. The structure at that site is referred to as a feature.

Features affecting fish passage include:

- ?? Culverts
- ?? Dams
- ?? Fishways
- ?? Others

Features affecting fish safety include:

- ?? Gravity diversions
- ?? Pump diversions
- ?? Others

A site may have one or more features associated with it, such as a gravity diversion with a dam to impound water and direct it to the diversion. A dam may be equipped with a fishway to facilitate fish passage around the dam. An overflow levee or dike with a water control structure is a common site associated with wetland enhancement and is treated as an “other” feature.

This report summarizes the results of the Skagit Wildlife Area inventory.

Relative to fish passage, fish safety and habitat restoration, the 1997 Skagit Wildlife Area Management Plan (working draft summary) identifies three important considerations for improving operations that are still necessary today.

1. The need for cooperation. “There have always been ongoing management concerns and controversy over fish, wildlife, public use and dike maintenance issues with local diking districts.” WDFW recognizes the need to improve the relationship between WDFW and local diking districts, farmers, and landowners, as well as the need to develop cooperative projects that will mutually benefit fish and wildlife and the local citizens.
2. The need for an accurate inventory of all ownership boundaries and keeping the necessary project areas well posted. Poorly defined boundaries have created numerous management problems.
3. The need to improve the riparian shrub/forested areas and drainage channels throughout the wetland and artificial drainage areas of the SWA so juvenile fish stranding is not an issue.

SITE DESCRIPTIONS

The numerous units of the Skagit Wildlife Area (SWA) are located in and around North Puget Sound and the Skagit River basin in western Washington (figure 1). A total of nine units (Fir Island, Leque Island, Telegraph Slough, Goat Island, Guemes Island, Sinclair Island, Samish, Debay Slough, and the Bald Eagle Natural Area) comprise the 15,000+ acre wildlife area.

Units located on or adjacent to the Puget Sound that are associated with estuary habitat include Fir Island, Leque Island, Telegraph Slough, and Samish. Historically, all of these units had estuarine habitat that was utilized by salmonids. Over time, the act of land conversion (constructing dikes and drains) for agricultural, recreational and residential purposes has partially or completely eliminated the natural wetland and flood plain habitat on these units. Currently, the estimated length of dike associated with the SWA is 23,300 meters. Of that, WDFW is responsible for maintaining approximately 18,056 meters.

Bald Eagle Natural Area (1,149 acres)

The Bald Eagle Natural Area is the most inland portion of the Skagit Wildlife Area and includes land holdings owned by the Nature Conservancy. The natural area is located along the south side of the Skagit River near the town of Rockport. Several fish-bearing sloughs and intermittent streams, including the WDFW managed Barnaby-Harrison Slough rearing pond facility, are on this unit.

Debay Slough Unit (250 acres)

Located southwest of Sedro Woolley and west of Clear Lake, the Debay Slough Unit lies along the south bank of the Skagit River. The unit is managed as a reserve for trumpeter

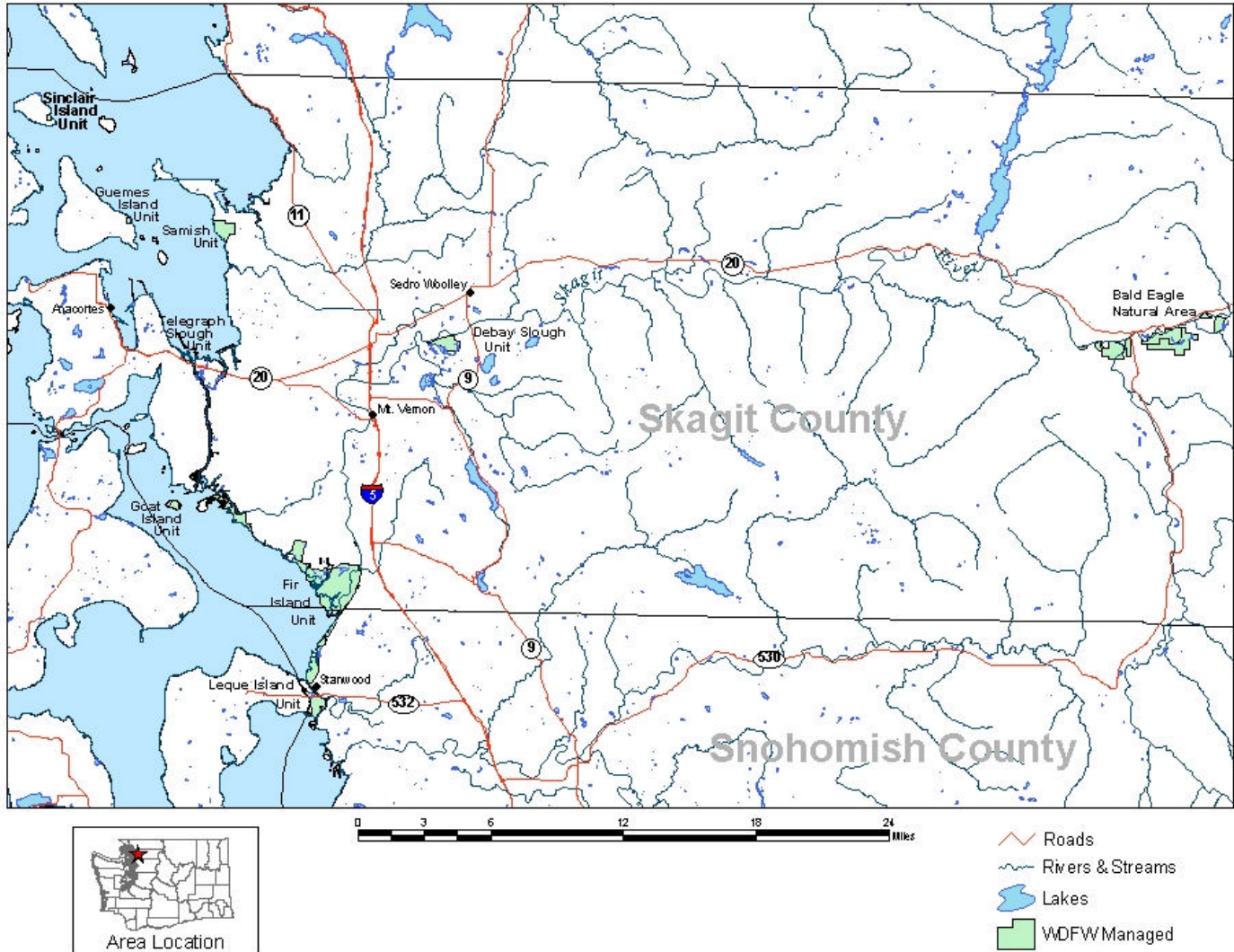


Figure 1. Skagit Wildlife Areas

swans. The farming of corn occurs here and there is an extensive parking lot for visitors. Portions of Debay Slough, an old oxbow channel of the Skagit River, are on the unit. Even though the slough is maintained by a small amount of groundwater and backwater from the tidal influenced Skagit River, the portion of slough on the unit is stagnant and unsuitable habitat for salmonid fish use.

Fir Island Unit (13,000+ acres)

Situated between the North and South Forks of the Skagit River and within the inter-tidal influence of Puget Sound, this unit is the largest parcel of land managed within the SWA. This unit includes a large portion of the Skagit Bay shoreline and second-class tidelands. Fish bearing waters on this unit includes Skagit Bay, several distributary channels of the South Fork Skagit River, sloughs and off-channel areas of inter-tidal marsh.

Almost all of the area has an elevation of less than five feet and the upland [inland] portions of the area are mostly diked segments of the delta. With Skagit Bay being the westerly boundary of most of the unit, the tidal action and the mixing of fresh and salt water creates a rich estuarine environment. The naturally fertile soils in the vicinity have lent themselves to agricultural activities, including farming by department personnel and sharecroppers. Artificial drainage is required to maintain ground water at suitable levels for cultivation. This has been accomplished by constructing a network of dikes, drainage ditches, and the use of drainage gates to prevent or manage back flow of tidewater. The drainage system also serves to enhance waterfowl habitat in the area by creating standing water in portions of the cultivated areas (WDFW 1997).

The estimated length of dikes being maintained on this unit is 16,378 meters. WDFW is responsible for 12,871 meters and Diking District #22 is responsible for 3,507 meters.

Goat Island Unit (92.66 acres)

The Goat Island unit, which includes a majority of the island, lies within Skagit Bay, west of the mouth of the North Fork Skagit River. There are no fish bearing drainages associated with this unit.

Guemes Island Unit (38.7 acres)

The Guemes Island unit is located north of Anacortes, on Guemes Island. The property is situated along the southeastern shoreline near Square Bay and Boat Harbor. This segment has two independent drainages running through the property, neither of which possess fish bearing waters or salmonid habitat.

Leque Island Unit (354 acres)

Located near the town of Stanwood, Washington, this island is bordered by both West Pass and South Pass of the Stillaguamish River, as well as Davis Slough. A flood control dike surrounds the entire island. Cut off from tidal inundation, no natural drainage or salmonid habitat currently

exists on the interior side of the island. Field ditches and the borrow ditch adjacent to the dike drain surface water runoff from the island.

State Route 532 (SR 532) crosses the northern portion of the island west of Stanwood. On the west side of the island and adjacent to the highway is the Davis Slough access area. Currently, two private residences occupy land along the eastern side of the island. In the past, much of the unit has been used for agricultural production, but current farming appears to be limited.

WDFW is responsible for the entire length of dike on this unit, which is approximately 5,185 meters.

Samish Unit (410 acres)

Adjacent to Padilla Bay and south of Samish Island, the Samish unit is predominantly diked agricultural lands. Prior to diking, the habitat in this area was estuarine emergent that was inundated twice daily by the tides. The property is relatively flat and does not have fish bearing waters nor a naturally occurring drainage. Several depression ponds were created to enhance waterfowl habitat. The surface water, generated from rainfall, is controlled and managed as needed for irrigation, cultivation and waterfowl habitat.

The estimated length of dike on this unit is 1,738 meters and Diking District #1 is responsible.

Sinclair Island Unit (35 acres)

The Sinclair Island unit is located on the southeast portion of the island and is associated with the Mary Leach Natural Area. The island is north and west of Guemes Island. As with the other island areas, there is no salmonid habitat associated with this property.

Telegraph Slough Unit (30 acres)

State Route 20 and an active railroad line have bisected Telegraph Slough. The extensive highway road grade and railroad grade has eliminated the natural flow (tidal exchange) between Padilla Bay and the Swinomish Channel, and ultimately with Skagit Bay. As a result, grasses, shrubs and riparian vegetation have claimed much of the historic slough channel south of SR 20. This unit has access area parking located just to the west of the slough on the eastbound side of SR 20.

The slough has been diked to prevent tidal flooding outside the slough and provide agricultural farmland. This dike system is adjacent to the wildlife area and lies parallel to the slough on both sides. These dikes are not associated with the management of the wildlife area.

HABITAT RESTORATION

In response to the Endangered Species Act listing of Puget Sound Chinook (March 1999), feasibility assessments for restoring estuary function to the Skagit and Samish river deltas has and continues to be studied and reported on by numerous resource agencies and public entities. It is estimated that 72% of the historic estuarine delta habitat of the Skagit River is lost today (Washington State Conservation Commission, 2003). With regards to salmonid production (fry to adult survival), it is broadly understood that the loss and degradation of estuary habitat is limiting the resource (Chinook salmon in particular). Restoration efforts have already moved forward in the Fir Island area of the Skagit River delta.

In September of 2000, WDFW, Skagit System Cooperative (SSC) and the U.S. Army Corps of Engineers completed the Deepwater Slough Restoration project, where approximately 230 acres of historic estuarine and riverine habitat on the SWA was restored, while maintaining the productive agriculture (cereal grain) fields and public access. Additional sections of dike not already breached were removed from the Milltown Island portion of the SWA as well. The intentions here are to allow tidal and riverine processes to reclaim the Milltown area (approximately 233 acres of estuary and delta habitat). Restoration of approximately 175 acres in the Wylie Slough area of the SWA is also being considered.

METHODS

Inventory / Feature Evaluation

The inventory of the Skagit Wildlife Area (SWA) was conducted during the fall of 2001 and the summer of 2003. In addition, the Skagit System Cooperative (SSC), in collaboration with WDFW, conducted a comprehensive inventory beginning in 1998, in which they identified over 1750 man-made structures throughout the Skagit Basin. Therefore, many features encountered during SWA inventory had previously been identified by SSC.

All streams or water bodies known to be fish bearing or potentially capable of supporting salmonids (including historic hydrology) were surveyed. All human-made features found in these waters were assigned a Site ID number and their geographical locations were recorded using a global positioning system (GPS) or determined from maps. Each site was evaluated for fish passage (culverts, dams, fishways) or fish safety (surface water diversions). Data collection and evaluation methodologies for all features are described in the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW 2000).

The potential for fish presence is determined based on stream size, gradient, and direct fish observation. Each potentially fish bearing stream or water body having a fish passage barrier was walked to measure and assess the habitat, locate additional features not previously found, and determine the extent of potential fish use. Detailed notes of the habitat (often referenced by hip-chain distance from a known point) are recorded during the habitat survey.

Expected fish species utilization was determined by direct observation and by using resources such as the Washington State Salmon and Steelhead Stock Inventory (WDF et. al. 1992),

Washington State Salmonid Stock Inventory Bull Trout/Dolly Varden Appendix (WDFW 1997), Streamnet, and by personal communication with WDFW regional biologists and wildlife area managers. It is important to note that expected fish species utilization includes potential and historical fish use.

Fish Passage Priority Index

The Fish Passage Priority Index (PI) model consolidates factors which affect a project's potential resource benefit, (species utilization, passage improvement, production potential, habitat gain, project cost, and fish stock mobility and health) resulting in a numeric indicator of relative priority. On streams where fish passage barriers were identified, habitat assessments, data analysis and barrier prioritization were completed per the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW 2000).

Screening Priority Index

The Screening Priority Index (SPI) model consolidates the variables relevant to water diversions, (species utilization, volume of flow, production potential, project cost, and fish stock mobility and health) resulting in a numeric indicator of relative priority. PI and SPI are not comparable, because the PI reflects potential production and the SPI reflects potential mortality. In the SPI, the volume of diverted flow is used to estimate the number of adult equivalent salmonids potentially killed by the unscreened or inadequately screened diversion. The SPI is described in the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW 2000).

Prioritization

The PI and SPI values are intended to be used as a guide to prioritizing projects. Expected species utilization anticipates correction of all downstream human-made barriers preventing anadromous access, but may be refined to reflect the feasibility of restoring anadromous access or habitat. Production values predicted for the PI assume all upstream human-made barriers will be corrected. The PI and SPI values are dynamic, allowing for modification as new information becomes available.

Estuarine Rearing Habitat / Feature Evaluation

The SWA has a substantial amount of estuarine rearing habitat (existing and historic) blocked by dikes and drainage gates. While these structures directly block access to habitat upstream, studies have also shown certain indirect impacts to the habitat caused by dike construction as well. "Dikes impact downstream slough geomorphology by reducing the tidal flushing of the channel. Significant volumes of tidal water no longer flow through cut-off tidal channels because of the lost channel volume cut off behind the dikes as well as lost tidal volume formerly draining off the now isolated marsh surface with each ebb tide.

Reduced tidal flushing allows sediments to be deposited in the downstream portions of the bisected tidal channels, and so they fill in" (Hood, 2002). It is also known that out-migrant juvenile salmonids will seek tributary and blind channel habitat created by a functioning

estuary to avoid predation, acclimate to the salt water and feed to gather strength before continuing their seaward migration (People for Puget Sound, 2000). This channel habitat is also lost or impacted due to dike construction.

Acknowledging that tidal and riverine flooding are physical processes necessary for maintaining healthy estuarine habitats utilized by salmon and other species, the primary approach to restoring estuary habitat would be removing all or considerable portions of the dikes. Although correcting barrier drainage gates for fish passage alone would not provide true restoration of ecological functions, potential correction is still a consideration.

Dike removal is a land management issue, which in recent years is evolving into a policy issue. Due to the nature of differing land management practices and private and public interests, only the area of estuarine rearing habitat blocked and impacted by dikes on the Skagit Wildlife Area will be discussed.

The passage and repair status of features associated with dikes and the interior drainage are subject to potential restoration, which is beyond the scope of this inventory report. Thus, many of the inventoried features will have *unknown* fish passage calls and the repair status for all of these features will be considered *undetermined* (UD). With these unknowns, the prioritization for barrier correction is not applicable. If and when there is a change in how these structures are managed or restoration occurs these features will be reevaluated for fish passage and repair status.

INVENTORY RESULTS

Within the Skagit Wildlife Area owned and/or managed lands, a total of 73 features associated with current or historic fish bearing waters were identified. Many of these features are behind dikes and associated with artificial drainage. The 73 features consist of 61 culverts; five fishways; six 'other' features; and one pump diversion. Evaluations of these features determined nine fish passage barriers and the pump diversion is unscreened (see table 1).

Table 2 lists all of the fish bearing sites within the wildlife area and is sorted by unit and stream. Table 3 lists the unscreened pump diversion on the wildlife area that requires repair. A complete list of all sites identified during the inventory of the Skagit Wildlife Area, including those identified outside the wildlife area, can be found in Appendix A.

Removal of barrier dikes and drainage gates on the SWA could restore inter-tidal and riverine flooding processes (measured as surface area) to approximately 2,882,706 square meters or 706 acres of historic estuary on the Fir Island Unit alone. The amount of estuarine emergent (salt marsh) habitat potentially restored on the Leque Island and Samish Units could conceivably be the entire area of those units. Figures 2-5 show the location of fish bearing features and a general location of the existing dikes on or near each wildlife area unit.

Table 1. Number of fish passage and water diversion features within the Skagit Wildlife Area, listed by unit.

Feature Type	Wildlife Area Units					
	Feature Status	Bald Eagle Natural Area	Fir Island	Leque Island	Samish	Total
Culvert	Fish Bearing	5	27	14	15	61
	Fish Barriers	0	5			5
	Repair Required					
	Repair Status Undetermined		25	14	15	54
Fishway	Fish Bearing	5				5
	Fish Barriers	0				0
	Repair Required					
	Repair Status Undetermined					
Other	Fish Bearing		4		2	6
	Fish Barriers		4			4
	Repair Required		1			1
	Repair Status Undetermined		3		2	5
Pump	Fish Bearing		1			1
	Screened/ Compliant					
	Unscreened/ Non-compliant		1			1
Total Fish Bearing Features						73
Total Barriers						9
Total Unscreened Diversions						1

Table 2. Features located within the Skagit Wildlife Area on fish bearing waters. The codes in the Repair Status column indicate the feature repair status, where RR - repair required; LHG - limited habitat gain; OK - feature is not a barrier or does not pose fish safety issue and does not require repair; UD - status is not determined.

Site ID	Stream	Tributary	WRIA	Fish Species	Feature Type	Owner	Barrier	% Fish Pass	Repair Status
Bald Eagle Natural Area									
IL14	Unnamed	Harrison Sl	04.1340X	CH/CO/PK/SCT/SH/DB/RT	culvert	WDFW	no	100	OK
03.1340B 0.10	Unnamed	Harrison Springs	03.1340B	CH/CO/PK/SCT/SH/DB/RT	fishway	WDFW	no	100	OK
IL13	Harrison Sl	Lucas Sl	04.1340	CH/CO/PK/SCT/SH/DB/RT	culvert	WDFW	no	100	OK
IL17	Barnaby Sl	Skagit R	04.1343	CH/CO/PK/SCT/SH/DB/RT	culvert	WDFW	no	100	OK
IL20	Barnaby Sl	Skagit R	04.1343	CH/CO/PK/SCT/SH/DB/RT	culvert	WDFW	no	100	OK
IL23	Lucas Sl	Skagit R	04.1340	CH/CO/PK/SCT/SH/DB/RT	culvert	WDFW	no	100	OK
03.1343 0.30	Barnaby Sl	Skagit R	03.1343	CH/CO/PK/SCT/SH/DB/RT	fishway	WDFW	no	100	OK
03.1343 0.50	Barnaby Sl	Skagit R	03.1343	CH/CO/PK/SCT/SH/DB/RT	fishway	WDFW	no	100	OK
03.1343 1.00	Barnaby Sl	Skagit R	03.1343	CH/CO/PK/SCT/SH/DB/RT	fishway	WDFW	no	100	OK
03.1340 1.60	Harrison Springs	Skagit R	03.1340	CH/CO/PK/SCT/SH/DB/RT	fishway	WDFW	no	100	OK
Fir Island									
981872	Unnamed	Deepwater Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981873	Unnamed	Deepwater Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981874	Unnamed	Deepwater Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	other	WDFW	yes		UD
981876	Unnamed	Deepwater Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	yes		UD
981875	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	other	WDFW	yes		UD
FI10	Dry Sl	Skagit Bay	03.0220	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	no	100	OK
FI42	Unnamed	Skagit Bay	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
FI43	Unnamed	Skagit Bay	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
FI15	Wylie Sl	Skagit Bay	03.0171	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	yes	33	UD
FI31	Wylie Sl	Skagit Bay	03.0171	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
FI32	Wylie Sl	Skagit Bay	03.0171	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	no	100	OK
981923	Deepwater Sl	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	other	WDFW	yes		RR
981901	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981897	Unnamed	Wylie Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	Unknown	yes	33	UD
981891	Unnamed	Wylie Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
FI19	Unnamed	Wylie Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	other	WDFW	yes	0	UD
FI9	Dry Sl	Skagit Bay	03.0220	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	Dike District #22	yes	33	UD

Site ID	Stream	Tributary	WRIA	Fish Species	Feature Type	Owner	Barrier	% Fish Pass	Repair Status
FI41	Unnamed	Skagit Bay	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	Dike District #22	yes		UD
FI29	Wylie Sl	Skagit Bay	03.0171	CK/CH/CO/PK/SO/SCT/SH/DB	pump	Dike District #22			RR
981924	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981925	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981926	Unnamed	unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981927	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981928	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
981929	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982030	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982031	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982032	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982033	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982034	Unnamed	Old River Sl	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982035	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
982036	Unnamed	Unnamed	03	CK/CH/CO/PK/SO/SCT/SH/DB	culvert	WDFW	unknown		UD
Leque Island									
981916	Unnamed	Davis Sl	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981904	Unnamed	SPass Stillaguamish R	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981902	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981903	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981905	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981906	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981907	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981909	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981910	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981911	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981912	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981913	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981915	Unnamed	Stillaguamish Estuary	05	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981908	Unnamed	WPass Stillaguamish R	03	CK/CH/SO/CO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD

Site ID	Stream	Tributary	WRIA	Fish Species	Feature Type	Owner	Barrier	% Fish Pass	Repair Status
Sammish									
981880	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981881	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981882	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981883	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981884	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981885	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981886	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981887	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981888	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981889	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981890	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981917	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981918	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981919	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981920	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	culvert	WDFW	unknown		UD
981921	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	other	WDFW	unknown		UD
981922	Unnamed	Padilla Bay Estuary	03	CH/CK/CO/SO/PK/SH/SCT/DB	other	WDFW	unknown		UD

Table 3. Unscreened water diversions requiring repair within the Skagit Wildlife Area.

Site ID	WLA Unit	Stream	Tributary	WRIA	Ownership Type	Diversion Type	Flow (gpm)	SPI
FI 29	Fir Island	Wylie Slough	Skagit Bay	03.0171	Private	Pump	7,500	69.62

DISCUSSION

Due to the land management practices and policies associated with the dikes on and off the Skagit Wildlife Area (SWA) and the hydrologic functions (tidal flooding) of the estuary environment, the protocol used to conduct this inventory was applied to the degree of its usefulness. The following guidelines were used to evaluate certain features on the SWA.

- ?? Features with drainage gates through the dikes that are hydraulically connected to fish bearing water and can impede fish passage will be assigned a barrier call of *yes* or *no*.
- ?? Features with drainage gates on the interior side of the dikes that are hydraulically connected to fish bearing water and could impede fish passage will be assigned a barrier call of *yes* or *no*.
- ?? Features without drainage gates on the interior side of the dikes are subject to current management activities and future restoration plans and will be assigned barrier calls of *unknown*.
- ?? All of the features associated with dikes and the drainage behind the dikes are subject to future restoration plans and will be assigned repair status calls of *undetermined (UD)*.
- ?? This inventory report will focus on the problem features and the amount of restorable habitat on the SWA only.

The additional features identified outside the SWA will be documented in Appendix A of the report. This information will be useful should scoping of fish habitat restoration projects occur on those lands.

The following is a brief unit-by-unit discussion of fish passage structures and water diversions identified in fish bearing waters. Figures 6 through 17 referenced in the following discussion can be found at the end of the discussion section.

Bald Eagle Natural Area

The inventory of this area identified five fishways and five culverts (figure 2). The fishways are functional and associated with the Barnaby-Harrison Slough rearing facilities. This area is actively managed by WDFW hatchery operations for juvenile fish production and all of the culvert features in the vicinity are passable as well.

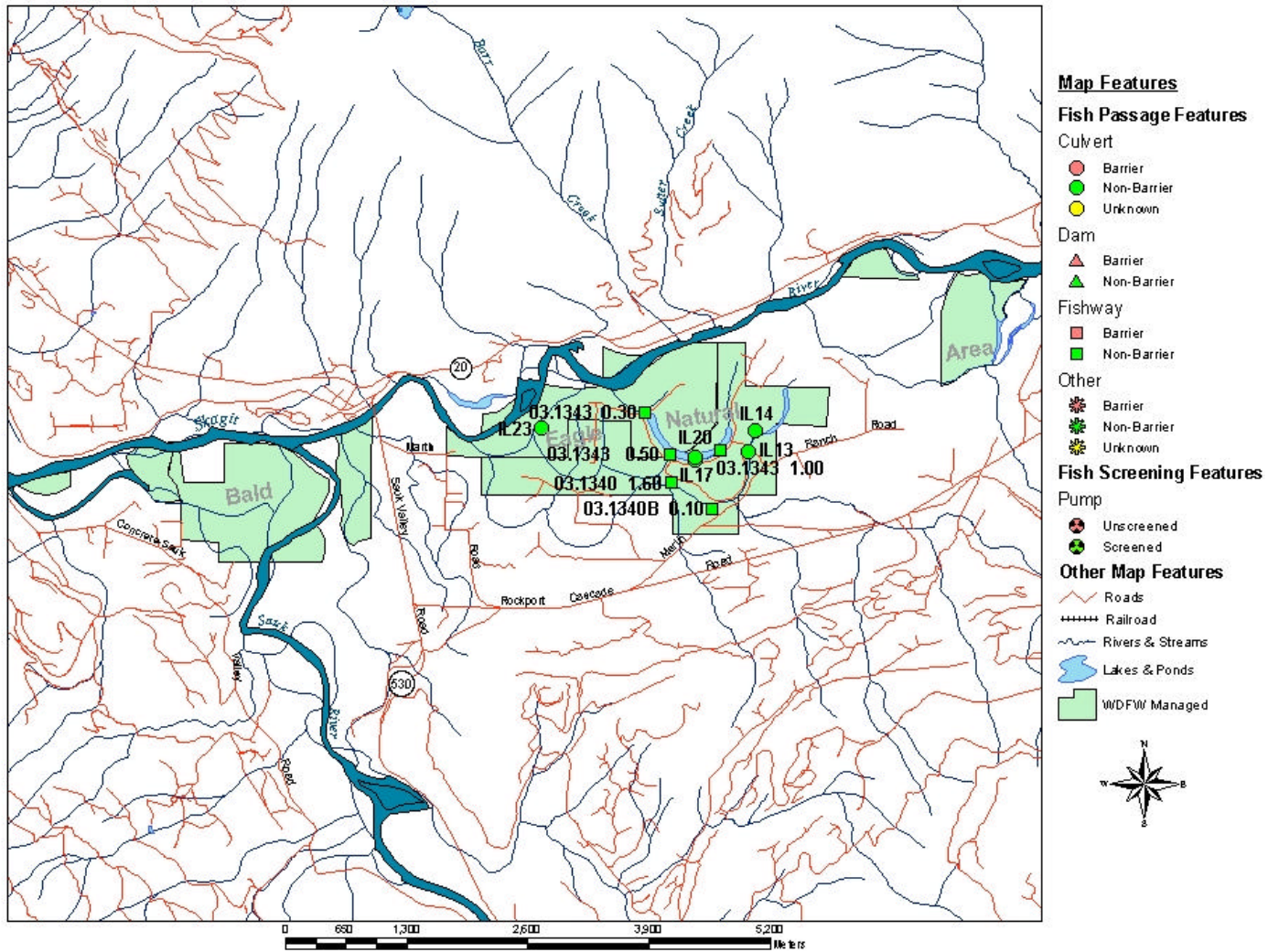


Figure 2. Bald Eagle Natural Area

Debay Slough Unit

Although the old oxbow area (Debay Slough) on this unit is connected to the Skagit River, the inventory efforts revealed that this portion of off-channel habitat does not receive enough hydraulic input (groundwater flow or river flooding) to sustain salmonid habitat. Therefore, fish passage is not an issue.

Fir Island Unit

Fir Island was the only unit with fish passage barriers and fish safety issues associated with **existing** fish bearing waters. Historic conditions of the hydrology in this area indicate the upper extent of tidal influence reached the five-foot elevation contour on U.S. Geological Survey topographic maps (People for the Puget Sound, 2000). A map showing the distribution of Chinook salmon indicates the entire area of this unit being associated with “historic connected habitat” (Washington State Conservation Commission, 2001). These factors indicate that all of the Skagit Wildlife Area - Fir Island Unit was fish habitat at one time.

Wylie Slough – WRIA 03.0171

A total of seven features were evaluated within the Wylie Slough area (figure 3). Site FI 15, the drainage structure of Wylie Slough to Skagit Bay, is a series of six culverts, each with a tide gate at the downstream end, which impede fish passage (fig. 6 and 7). Approximately 1,235 and 1,300 meters upstream are culvert sites FI 32 and FI 31, respectively. While both sites were evaluated as non-barriers, fish passage at Site FI 31 is considered unknown due to collapsing fill and the potential failure of the crossing. The repair of this site is in the permitting stage and will occur in the near future. Approximately 300 meters further upstream and located on the left bank is pump diversion site FI 29. Used for flood control, the pump intake is unscreened and requires correction. Fish can physically reach the site of this pump, which presents a fish safety risk. This site has an SPI of 69.62. Although the only mapped fish use consists of bull trout/dolly varden, the screening priority index must take into account the physical (hydraulic) connection and possibility of restored fish use, which would include all anadromous salmonid species (see table 3.).

Wylie Slough continues off the SWA and flows under three county road crossings (two culverts and one bridge) before becoming ditched. All of the ditch crossings under county roads that are mapped as draining to the slough were inventoried. Dependent upon future fish habitat restoration plans and verified connected hydrology; the passage and repair status calls of those sites would then be assessed or reevaluated.

Approximately 435 meters upstream of FI 15 and located on the left bank is barrier ‘other’ site FI 19 (figure 8). Consisting of a culvert with a flap-style tide gate at the downstream end and a screw gate near the upstream end, this site is for the ditch that drains the upper portion of Teal Slough. When utilized for wetland management this feature becomes impassible. The lower portion of Teal Slough is cut off by dike and no longer drains to Skagit Bay.

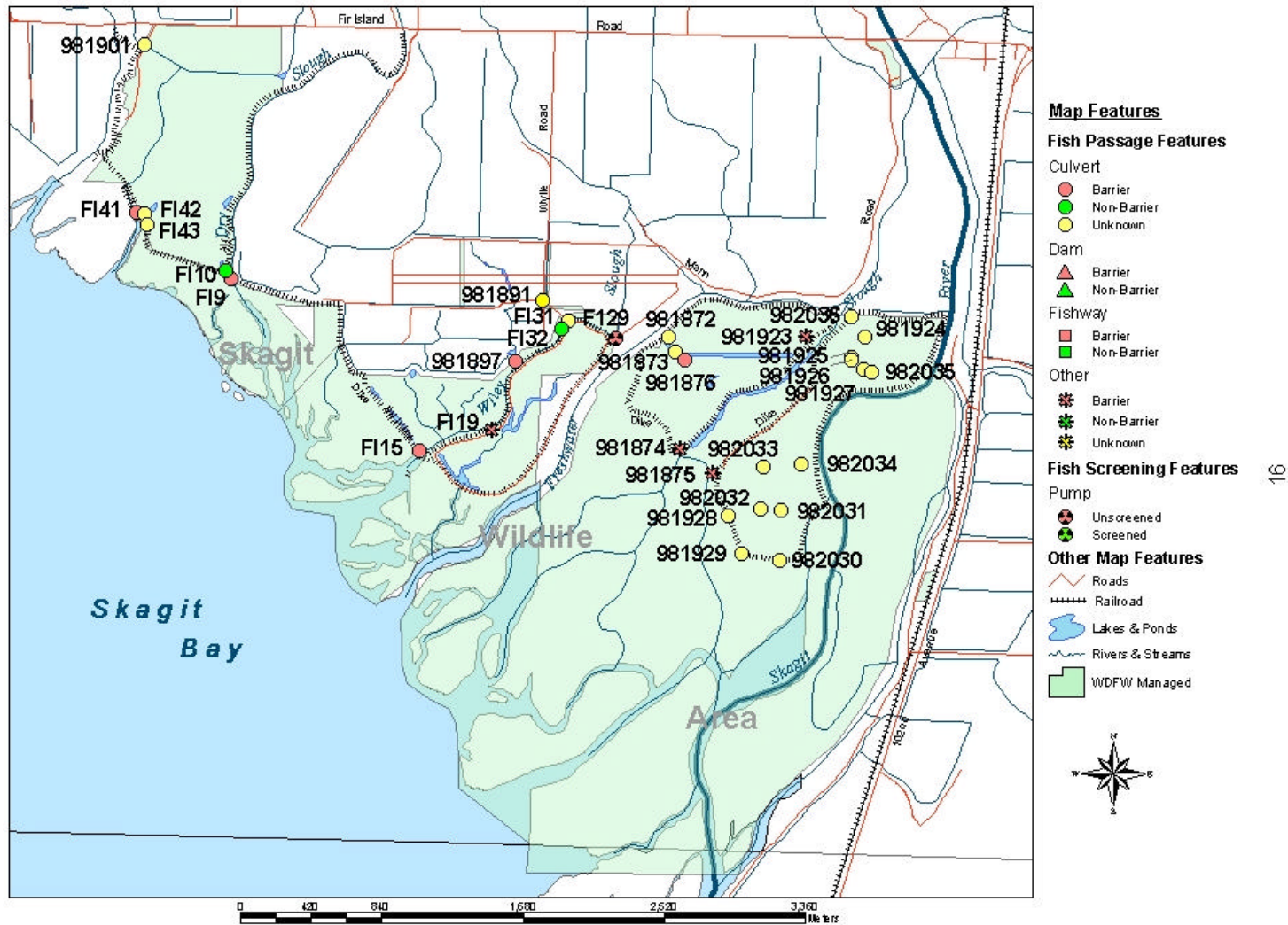


Figure 3. Fir Island Unit

On a small right bank tributary that enters the slough approximately 880 meters upstream of FI 15 is culvert site 981897 (figure 9). The wildlife area property boundary is not clearly known here, but the feature is located about 12 meters above the confluence. The culvert has a flap gate on the downstream end and drains a small pond upstream. This site is a partial barrier. Associated with this drainage further upstream is culvert site 981891. This site is for ditched run-off that passes under the easement road to the SWA. An unidentified fish (30-35mm fry) was observed in the plunge pool of this culvert. This demonstrates that the physical connection of water allows for fish movement into artificial drainage ditches that are often presumed and managed as non-fish bearing.

An analysis of the amount of channel habitat impacted (“destroyed”) by dike construction in the vicinity of Wylie Slough is 16.3 acres of estuarine tidal channels within the dikes and 20.5 acres of tidal channel outside the dikes. This direct and indirect habitat destruction is attributed to sedimentation caused by loss of tidal prism as a consequence of dike construction (Hood, 2001).

WDFW is proposing a restoration project for the Wylie Slough area. Currently in the design phase, this project could potentially restore tidal and riverine processes to approximately 175 acres of former salmonid habitat upstream of FI 15 and inside the dike system. Recovery of the channel loss outside the dike will be habitat gained as well.

Dry Slough – Wria 03.0220

A total of six features were evaluated within the Dry Slough area (figure 3). The dike structure in this area runs the entire length of the property and cuts off three natural drainage channels. Site FI 9, the drainage structure at the mouth of Dry Slough to Skagit Bay, consists of two culverts fitted with flap-style tide gates (figures 10 & 11). This site is a partial barrier to fish passage. Located a short distance to the west is FI 41. Draining an unnamed slough (blind tidal channel) to Skagit Bay, this feature consists of two culverts fitted with flap-style tide gates (figures 12 & 13) and is a partial barrier to fish passage. The third drainage, further to the west, is another blind tidal channel that is completely blocked by the dike. Associated with the interior drainage are WDFW owned culverts FI42, FI 43, FI 10, and 981901. The barrier status of these culverts is unknown and will be reassessed if and when future restoration efforts take place.

Prior to being hydraulically cut off at the northern end, Dry Slough was a major distributary channel from the North Fork Skagit River to Skagit Bay. The inventoried features associated with this drainage can be found in Appendix A.

Restoring tidal action to the mouth of Dry Slough and the public lands in this area would amount to approximately 250 acres of estuary habitat inside the dike. Also, a portion of the approximately 26 acres of channel loss that occurred outside the dike would be recovered as well (Brian Williams, WDFW, personnel communication, July, 2003).

Deepwater Slough

The farmed island segments of the Fir Island Unit are located on the south side of Freshwater Slough (Wria 03.0213) with agricultural fields on both sides of Deepwater Slough. Associated with the dikes and interior drainage are three 'other' features, which are water control structures (WCS) and 16 culverts (figure 3).

Other sites 981874 (figure 14) and 981875 are culverts with combination tide gates used to control the inter-tidal drainage flooding in and ebbing out of the managed wetlands inside the dikes. During the non-migratory season, these features are partially opened to maintain the channel (open water) habitat for resident waterfowl. During the winter waterfowl migration, the features are opened to allow the flooding of the fields for refuge and feeding. Depending on how they are managed, these sites can impede fish movement in or out with the fluctuating tide. This requires them to be considered partial fish passage barriers.

The third WCS, is 'other' site 981923. This feature is a culvert through the dike that is equipped with a screw gate on the upstream (Deepwater Slough) side and a flap-style tide gate on the downstream side. Once used to add water to the interior drainage, this feature is no longer utilized because site 981874 provides the water for the managed wetlands (John Garrett, WDFW, personnel communication, September 2003). Considered functional, the location of 981923 could attract fish into the managed wetlands if it were used. This raises the concern of entrained fish becoming stranded. Fish emigrating from inside the dike would have to negotiate the artificial drainage connection back to Deepwater Slough (approximately 1,390 meters of artificial drainage), which possesses unpredictable flow patterns due to dead-end channels and a potential passage problem at site 981876 when its drainage gate is closed. Site 981876 is a culvert with a screw gate that was fully open during the site visit (figure 15). It is considered a partial barrier based on the drainage gate.

If restoration of this area occurs, fish passage for the 15 culverts inside the dike, identified on map figure 3, would have to be properly considered and evaluated.

Goat, Guemes, and Sinclair Island Units

The inventory of these islands revealed that no fish bearing drainages exist on any of the SWA lands. The Goat Island unit has a small drainage with seasonal flow on the south side, which provides no salmonid habitat. The Guemes Island unit has two seasonal drainages within the property that drain into Boat Harbor. Neither of these drainages possesses fish bearing habitat. The Sinclair Island unit has no salmonid habitat associated with it, but there is a seasonal freshwater pond within the property.

Leque Island Unit

A total of 16 culverts were identified during the inventory of this unit (figure 4). Four culverts are drainage structures through the dike. Located on the northwest side of the island and connected to Davis Slough are sites 981916 (figures 16 and 17) and 981912. Both of these culverts are impaired and the dike at each site is failing. The tide gates are no

longer attached to these culverts and the pipes are intentionally plugged until repairs can occur. Site 981908 has a functioning tide gate that drains into the West Pass of the Stillaguamish River and site 981904 has a functioning tide gate that drains into the South Pass of the Stillaguamish River. The additional 12 culverts are for interior drainage. Two of these culverts are under State Route 532 (figure 4). Considered Washington State Department of Transportation ownership, these features are not include in Table 1, but are in Appendix A.

Historically, the entire area that this unit is on was emergent estuary (Collins, 2000). With tidal flooding and evidence of pre-dike sloughs and blind tidal channels, it is safe to assume salmonids utilized the habitat. Further inspection of this unit revealed the fact that there are no natural drainages or fish bearing waters on the interior side of the dike.

The possibility of restoring the island back to estuary habitat would require the cooperation of the Washington State Department of Transportation, as well as cooperation and compensation of the two private landowners residing on the island. If total restoration were to occur, the existing structures would be removed and the amount of rearing habitat to be gained could be considered the entire 355-acre unit because of total inundation.

Samish Unit

Adjacent to Padilla Bay, the dike that runs the entire length of the unit does not contain any drainage structure. Prior to being diked and converted for agriculture, the land here was estuary emergent habitat (Collins, 2000). Now, only non-fish bearing surface water exists in the drainage ditches. A total of 15 culverts and two water control structures were identified at field crossings during the inventory (figure 5). With no known restoration proposed at this time, all 17 features are unknown barriers with undetermined repair status.

The entire 410-acre unit could be considered restorable habitat due to historic inundation.

Telegraph Slough Unit

The only human-made feature affecting fish habitat on the Telegraph Slough unit is 'other' site PA 107 (figure 5). Consisting of the State Route 20 road fill and a railroad grade, this site disconnects the inter-tidal flow from Padilla Bay to the Swinomish Channel.

The slough area to the north of SR 20 is still influenced by tidal waters of Padilla Bay, but training dikes running parallel to the slough prevent lateral flooding. As a result of the inter-tidal blockage, substantial growth of grasses, shrubs and other vegetation occurs throughout the slough channel on the south side of SR 20. However, tidal backflow from the Swinomish Channel appears to partially flood the south end of Telegraph Slough.

Historically, the entire area surrounding this unit was emergent estuary (Collins, 2000) Corrective action to restore connectivity of the slough and estuary habitat will require the cooperation of the state agencies and possibly private landowners.

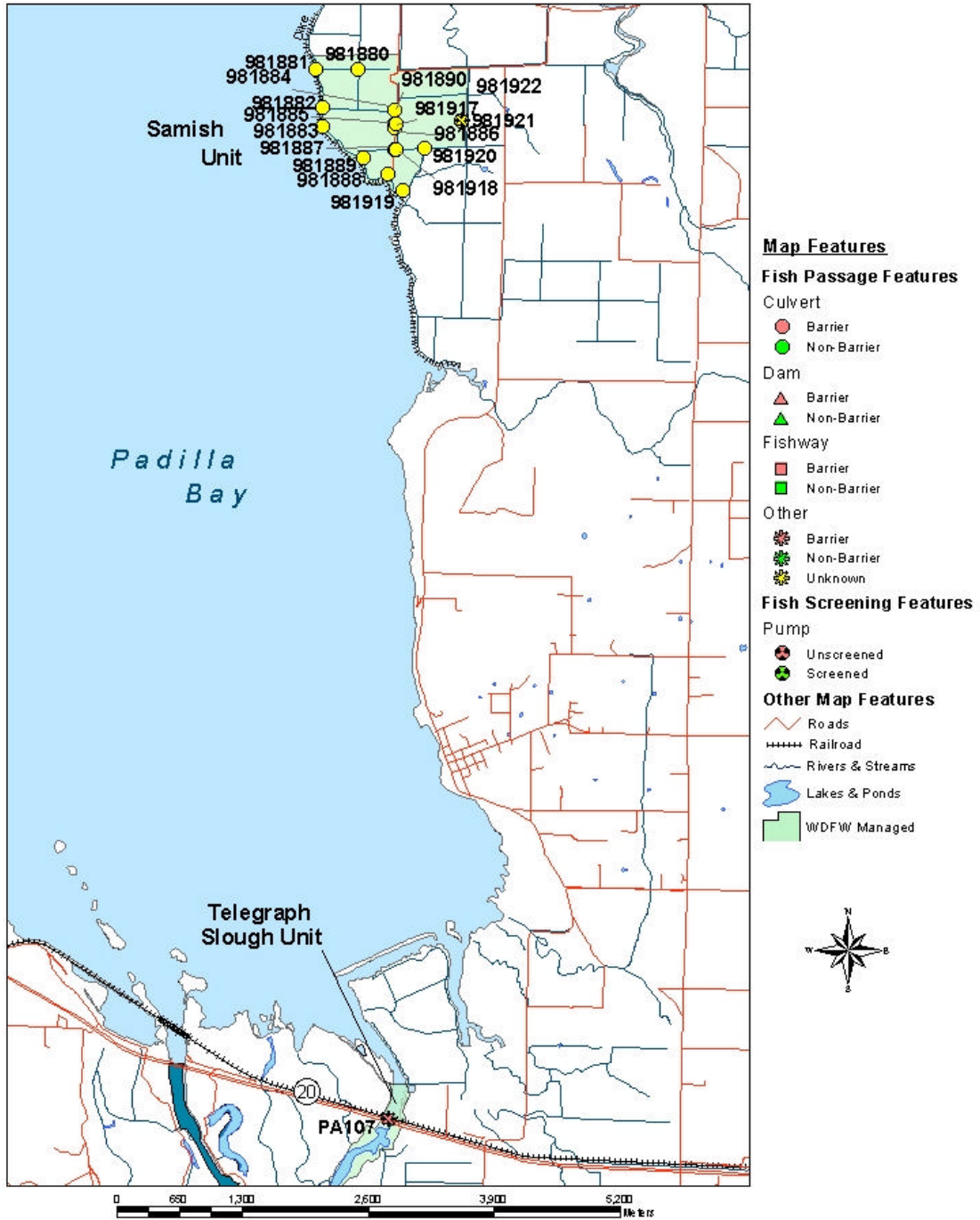


Figure 5. Samish and Telegraph Slough Units

Skagit Wildlife Area / Fir Island Unit / Barrier Features



Figure 6. Site FI 15. Wylie Slough to Skagit Bay. Right bank picture shows 4 of 6 culverts with tide gates. All 6 gates are of the flap style.



Figure 7. Site FI 15 continued. Left bank picture shows 2 of 6 culverts with tide gates. This site is a partial barrier.



Figure 8. Site FI 19. Teal Slough to Wylie Slough. Downstream view of wired open tide gate. Upstream screw gate for wetland enhancement not shown. Currently, several metal fence posts are positioned in the channel at the inlet to prevent beavers from clogging the structure.



Figure 9. Site 981897. Unnamed to Wylie Slough. Located close to the confluence, juvenile fish can negotiate this partial barrier.

Skagit Wildlife Area / Fir Island Unit / Barrier Features



Figure 10. Site FI 9. Dry Slough to Skagit Bay. View of right bank tide gate. This site is a partial barrier.



Figure 11. Site FI 9 continued. View of left bank tide gate.



Figure 12. Site FI 41, Unnamed slough to Skagit Bay. View of partial barrier flap-style tide gates.



Figure 13. Site FI 41 continued. Upstream view shows trash rack structure and stagnant water.

Skagit Wildlife Area / Fir Island Unit / Barrier Features



Figure 14. Site 981874. View of combination drainage and canal gate with platform to access the handwheel for raising the gate to allow backflow. Fish passage is dependent on management activities.



Figure 15. Site 981876, Unnamed to Deepwater Slough. This feature could be shut and potentially strand fish upstream. The artificial drainage upstream is a borrow ditch that follows the perimeter of the dike system. Site 981923, not shown, is upstream of this potential barrier.

Skagit Wildlife Area / Leque Island



Figure 16. Site 981916, Unnamed to Davis Slough. Downstream view of eroding dike and remnant tide gate in the bank.



Figure 17. Site 981916 continued. Upstream view shows the orange tube for the air bladder apparatus used to plug the culvert until repairs can be made.

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APPENDIX A

Features Evaluated during the Skagit Wildlife Area Fish Passage Barrier and Surface Water Diversion Inventory. List sorted by Site ID. Latitude/ Longitude is in decimal degrees (WGS84).

Appendix 1. A comprehensive list of all features associated with the Skagit Wildlife Area inventory. Features are listed by units and tributaries. The codes in the Repair Status column indicate the feature repair status, where RR - repair required; OK - feature is not a barrier or safety issue, no repair required; UD - repair status undetermined.

Site ID	Lat	Long	Stream	Tributary	WRIA	Fish Use	Fish Species	Feature Type	Owner Type	Barrier	% Fish Pass	Repair Status	Screened/Compliant
Bald Eagle Natural Area													
IL14	48.4832	-121.5377	Unnamed	Harrison Sl	04.1340X	yes	CH/CO/PK/SCT/SH/DB/RT	culvert	state	no	100	OK	
03.1340B 0.10	48.4758	-121.5438	Unnamed	Harrison Springs	03.1340B	yes	CH/CO/PK/SCT/SH/DB/RT	fishway	state	no	100	OK	
IL13	48.4813	-121.5387	Harrison Sl	Lucas Sl	04.1340	yes	CH/CO/PK/SCT/SH/DB/RT	culvert	state	no	100	OK	
IL17	48.4804	-121.5465	Barnaby Sl	Skagit R	04.1343	yes	CH/CO/PK/SCT/SH/DB/RT	culvert	state	no	100	OK	
IL20	48.4808	-121.5465	Barnaby Sl	Skagit R	04.1343	yes	CH/CO/PK/SCT/SH/DB/RT	culvert	state	no	100	OK	
IL23	48.4834	-121.5688	Lucas Sl	Skagit R	04.1340	yes	CH/CO/PK/SCT/SH/DB/RT	culvert	state	no	100	OK	
03.1343 0.30	48.4849	-121.5538	Barnaby Sl	Skagit R	03.1343	yes	CH/CO/PK/SCT/SH/DB/RT	fishway	state	no	100	OK	
03.1343 0.50	48.4809	-121.5501	Barnaby Sl	Skagit R	03.1343	yes	CH/CO/PK/SCT/SH/DB/RT	fishway	state	no	100	OK	
03.1343 1.00	48.4814	-121.5428	Barnaby Sl	Skagit R	03.1343	yes	CH/CO/PK/SCT/SH/DB/RT	fishway	state	no	100	OK	
03.1340 1.60	48.4782	-121.5498	Harrison Springs	Skagit R	03.1340	yes	CH/CO/PK/SCT/SH/DB/RT	fishway	state	no	100	OK	
Fir Island													
981872	48.3250	-122.3688	Unnamed	Deepwater Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981873	48.3243	-122.3682	Unnamed	Deepwater Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981874	48.3191	-122.3677	Unnamed	Deepwater Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	yes		UD	
981876	48.3238	-122.3674	Unnamed	Deepwater Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	yes		UD	
981875	48.3177	-122.3651	Unnamed	Old River Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	yes		UD	
FI10	48.3280	-122.4044	Dry Sl	Skagit Bay	03.0220	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	no	100	OK	
FI42	48.3310	-122.4111	Unnamed	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
FI43	48.3304	-122.4109	Unnamed	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
FI15	48.3186	-122.3885	Wylie Sl	Skagit Bay	03.0171	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	yes	33	UD	
FI31	48.3258	-122.3769	Wylie Sl	Skagit Bay	03.0171	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
FI32	48.3253	-122.3774	Wylie Sl	Skagit Bay	03.0171	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	no	100	OK	
981923	48.3252	-122.3578	Deepwater Sl	Unnamed	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	yes	*	RR	
981901	48.3400	-122.4114	Unnamed	Unnamed	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981897	48.3235	-122.3810	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	unknown	yes	33	UD	

Site ID	Lat	Long	Stream	Tributary	WRIA	Fish Use	Fish Species	Feature Type	Owner Type	Barrier	% Fish Pass	Repair Status	Screened/ Compliant
981891	48.3268	-122.3789	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
FI19	48.3198	-122.3828	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	yes	0	UD	
FI9	48.3276	-122.4039	Dry Sl	Skagit Bay	03.0220	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	private	yes	33	UD	
FI41	48.3310	-122.4118	Unnamed	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	private	yes	33	UD	
FI29	48.3249	-122.3731	Wylie Sl	Skagit Bay	03.0171	yes	CK/CH/CO/SO/PK/SH/SCT/DB	pump	private			RR	no
981924	48.3253	-122.3530	Unnamed	Unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981925	48.3242	-122.3541	Unnamed	Unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981926	48.3240	-122.3541	Unnamed	unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981927	48.3236	-122.3531	Unnamed	Unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981928	48.3155	-122.3637	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981929	48.3135	-122.3625	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982030	48.3132	-122.3594	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982031	48.3159	-122.3594	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982032	48.3159	-122.3610	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982033	48.3182	-122.3609	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982034	48.3184	-122.3579	Unnamed	Old River Sl	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982035	48.3234	-122.3524	Unnamed	Unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
982036	48.3263	-122.3541	Unnamed	Unnamed	3	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
Leque Island													
981916	48.2418	-122.3977	Unnamed	Davis Sl	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981904	48.2269	-122.3858	Unnamed	SPass Stillaguamish R	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981902	48.2273	-122.3877	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981903	48.2264	-122.3867	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981905	48.2273	-122.3857	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981906	48.2283	-122.3848	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981907	48.2332	-122.3788	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981909	48.2382	-122.3808	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981910	48.2390	-122.3918	Unnamed	Stillaguamish Estuary	5	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981911	48.2367	-122.3915	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981912	48.2389	-122.3928	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981913	48.2290	-122.3896	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	

Site ID	Lat	Long	Stream	Tributary	WRIA	Fish Use	Fish Species	Feature Type	Owner Type	Barrier	% Fish Pass	Repair Status	Screened/ Compliant
981915	48.2418	-122.3974	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981908	48.2385	-122.3808	Unnamed	WPass Stillaguamish R	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
Sammish													
981880	48.5478	-122.4926	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981881	48.5476	-122.4984	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981882	48.5441	-122.4973	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981883	48.5424	-122.4973	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981884	48.5441	-122.4873	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981885	48.5428	-122.4872	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981886	48.5424	-122.4872	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981887	48.5404	-122.4872	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981888	48.5381	-122.4879	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981889	48.5395	-122.4916	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981890	48.5440	-122.4873	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981917	48.5428	-122.4871	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981918	48.5404	-122.4870	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981919	48.5366	-122.4859	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981920	48.5406	-122.4830	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
981921	48.5432	-122.4779	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	unknown		UD	
981922	48.5456	-122.4771	Unnamed	Padilla Bay Estuary	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	unknown		UD	
Outside of the Skagit Wildlife Area boundary													
FI1	48.3788	-122.3833	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	private	yes		UD	
FI3	48.3656	-122.3829	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	private	unknown		UD	
FI4	48.3620	-122.3858	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	private	unknown		UD	
FI5	48.3582	-122.3902	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	private	unknown		UD	
FI7	48.3497	-122.3855	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	private	unknown		UD	
981892	48.3300	-122.3788	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
981893	48.3301	-122.3856	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
981894	48.3414	-122.3705	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
981898	48.3701	-122.3898	Unnamed	Unnamed	03	unkno wn	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
981899	48.3556	-122.3978	Unnamed	Unnamed	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	

Site ID	Lat	Long	Stream	Tributary	WRIA	Fish Use	Fish Species	Feature Type	Owner Type	Barrier	% Fish Pass	Repair Status	Screened/ Compliant
981900	48.3413	-122.3995	Unnamed	Unnamed	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	no	100	OK	
981877	48.3557	-122.3679	Unnamed	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	no	100	OK	
981878	48.3701	-122.3734	Unnamed (ditch)	Wylie Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	no	100	OK	
981879	48.3755	-122.3787	Unnamed (ditch)	Wylie Sl	03	unkno wn	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
981895	48.3412	-122.3759	Unnamed (ditch)	Wylie Sl	03	unkno wn	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
FI2	48.3701	-122.3807	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
FI33	48.3299	-122.3721	Wylie Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	no	100	OK	
FI34	48.3346	-122.3787	Wylie Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	no	100	OK	
FI40	48.3557	-122.3704	Unnamed	Freshwater Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
FI46	48.3411	-122.4124	Unnamed	Dry Sl	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
FI6	48.3557	-122.3914	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
FI8	48.3412	-122.3907	Dry Sl	Skagit Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	county	unknown		UD	
PA107	48.4502	-122.4847	Telegraph Sl	Padilla Bay	03	yes	CK/CH/CO/SO/PK/SH/SCT/DB	other	state	unknown		UD	
981914	48.2398	-122.3875	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	
991808	48.2398	-122.3883	Unnamed	Stillaguamish Estuary	05	yes	CK/CH/CO/SO/PK/SH/SCT/DB	culvert	state	unknown		UD	