

Sunnyside Wildlife Area Fish Retrofit

Habitat Program
Salmonid Screening, Habitat Enhancement
and Restoration (SSHEAR) Section

Submitted by

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October 2002

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INTRODUCTION

During the past 62 years, the Washington Department of Fish and Wildlife (WDFW) has acquired approximately 808,000 acres of land statewide to benefit fish and wildlife and provide recreational opportunities. Due to the Agency's and the Public's increasing interest in factors affecting fish resources, in October 1997, the Habitat Program initiated an inventory of fish passage and water diversion features on all agency-owned and/or managed lands. WDFW's Salmonid Screening, Habitat Enhancement and Restoration (SSHEAR) Section was assigned this task. The purpose of the inventory is to document and prioritize for correction, all agency-owned fish passage problems including culverts, dams, fishways, lake screens and unscreened or inadequately screened water diversions to ensure compliance with Washington State laws. According to RCW 77.55.060, "All dams or obstructions across or in a stream shall be fitted with a durable and efficient fishway" and RCW 77.55.040 requires that water diversions be fitted with a screen to prevent fish from entering the diversion.

Salmonids of the Pacific Northwest have long been impacted by structures installed in streams incorrectly or with no regard to the salmonid life cycle. Thousands of juvenile salmonids are killed every year when they enter inadequately screened or unscreened water diversions, by mutilation from a pump or being stranded in irrigation canals as the irrigation season comes to a conclusion. Screened water diversions improperly maintained can also impinge salmonids, either killing them directly or carrying them into the diversion system.

Culverts, dams, non-functioning fishways and lake outlet screens also have a very detrimental impact on salmonid populations. When these facilities result in a barrier to fish passage, spawning and rearing habitats become inaccessible. Each year, more of these structures become barriers to fish passage. Watersheds are continually being altered (e.g., development, logging, new roads, etc.), which substantially influences the hydrological dynamics of the watershed. Culverts, fishways, lake outlet screens, and water diversions that were once designed for a defined flow regime, are now incapable of handling the increased flow. Culverts may become velocity barriers and contribute to scouring of huge plunge pools, that in most circumstances result in large outfall drops. Even hydraulic drops less than 0.30 meter (one foot) in height are a potential barrier to adult chum salmon, juvenile salmonids and other fish species. Recent studies have shown that these small hydraulic drops can limit juvenile production by rendering valuable rearing habitat inaccessible.

In cooperation with the Lands Division of the Wildlife Program, SSHEAR staff designed a sampling protocol, database format, and Wildlife Area Scheduling Index for the inventory. To create the scheduling index of Wildlife Areas, a prioritization questionnaire was distributed to Regional Lands Coordinators, Regional Fish Biologists and Wildlife Area Managers. This enabled SSHEAR staff to take advantage of the many years of experience and data accumulated from local and regional WDFW managers.

The questionnaire was designed to prioritize wildlife areas based on four main factors:

- ▼ number of known fish passage problems,
- ▼ stock status,
- ▼ stock mobility, and
- ▼ high profile fish passage and water diversion screening issues of public interest.

This prioritized list was then used to guide, along with other management considerations, the sequence that the wildlife areas would be inventoried. After the index was calculated for each area, they were stratified according to the time of year in which the inventory could be accomplished. Eastern areas will be scheduled in the spring and summer months and the western areas will be inventoried in the fall and winter months. The Sunnyside Wildlife Area is the second inventory conducted in the eastern areas.

SITE DESCRIPTION

The units of the Sunnyside Wildlife Area (SWA) are located within Yakima and Benton Counties in eastern Washington. The Wildlife Area properties lie between Yakima and the Tri-Cities (Pasco, Kennewick and Richland), two major population bases in south-central Washington. These communities, along with several smaller communities in between, directly affect consumptive and non-consumptive use on WDFW-owned lands.

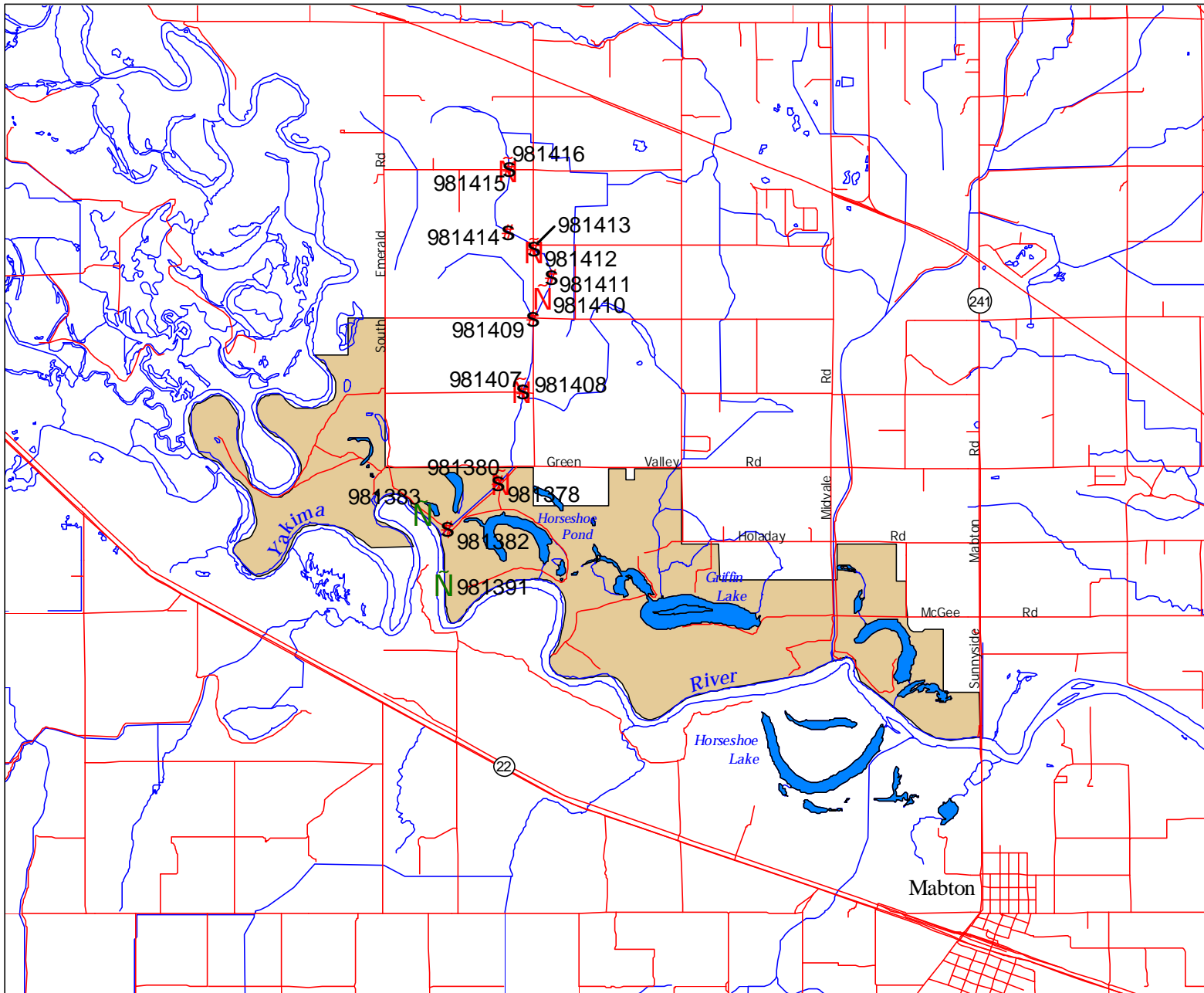
The SWA comprises five different units including the Sunnyside unit (2,786 acres), the Byron unit (1,031 acres), the I-82 unit (980 acres), the Rattlesnake Slope unit (3,661 acres), and the Thornton unit (2,080 acres), totaling 10,538 acres. These units are located along the flood plain of the Yakima River in the lower Yakima Valley (Figure 1). The Yakima River is a tributary to the Columbia River.

The Wildlife Area lands are surrounded primarily by rural agricultural lands, private ranches and private farmlands. The economy of the surrounding communities is based heavily on the agricultural industry. The topography of the Sunnyside, Byron and I-82 units is primarily flat lowland. These units are influenced by the Yakima River which meanders along old oxbows, ponds, and impounded drainages, forming numerous wetlands. The Thornton and Rattlesnake Slope units are moderately sloping upland areas with limited water and natural drainages (WDFW, 1997).

Mitigation History:



The development of the hydro power system in the Columbia River Basin has affected many species of fish and wildlife. Some flood plain and riparian habitats important to fish and wildlife were inundated when reservoirs were filled. Fluctuating water levels caused by dam operations created barren vegetation zones, which has affected suitable spawning and rearing habitat for salmonids. In addition to reservoir-related effects, a number of other activities associated with hydroelectric development have altered land and stream areas in ways that affect fish and

wildlife. These activities include construction of roads and facilities, draining and filling of wetlands, stream channelization and installing riprap along shorelines. In some cases, the





Map Features





Fish Passage Features Culverts

-  Barrier
-  Non Barrier

Fish Screening Features Surface Water Diversions

-  Screened
-  Pump

Other Map Features

-  Roads
-  Rivers/Streams
-  Lakes and Ponds
-  WDFW Managed



2000 0 2000 4000 Meters

construction and maintenance of power transmission corridors has altered vegetation, resulting in increased access to and harassment of fish and wildlife, and increased erosion and sedimentation in the Columbia River and its tributaries.

The Pacific Northwest Electric Power Planning and Conservation Act directs the Bonneville Power Administration (BPA) and United States Department of Energy to protect, mitigate and enhance fish and wildlife affected by the development and operation of federal hydroelectric projects of the Columbia River and its tributaries. As a result, BPA provides funding for planning and implementation of wildlife mitigation projects in Washington.

In 1993, the Department, along with members of the Washington Coalition of Resource Agencies and Tribes, entered into an Interim Washington Wildlife Mitigation Agreement with the BPA. During the term of this agreement, BPA has been funding planning and implementation activities on Sunnyside Wildlife Area lands owned and/or controlled by the Department. These lands are currently being managed by the WDFW, as set forth in the Sunnyside Wildlife Area Mitigation Management Plan (WDFW, 1997).

Unit Descriptions:

Sunnyside Unit

The Sunnyside unit (2,786 acres) is located approximately five miles south of Sunnyside, within notoriously productive farmland. With the Yakima River as its southern boundary, this unit holds the headquarters of the SWA, with a shop, office and manager's residence. The surrounding property is some of the most intensively managed agricultural ground in the nation. Major crops include corn, wheat, barley, alfalfa, asparagus, hops, grapes, apples, pears, peaches, apricots, cherries, mint, numerous seed crops and nursery stock. Several portions of this unit are under lease agreement for sharecropping activities, while the remaining are farmed by the WDFW in 10 to 20 acre food plots dispersed throughout the unit.

There are six ponds (lakes) on the area, varying in size from 100 surface acres to 15 surface acres. These water features offer excellent nesting habitat in the spring and resting areas for migratory waterfowl. They are managed primarily for upland bird and waterfowl habitat. These shallow water bodies support warm water fish species such as carp and largemouth and smallmouth bass. However, with current water and land use practices in the area, they offer no practical salmonid habitat. Specifically, management for waterfowl, agricultural fertilization, irrigation and animal wastes contribute to high summer temperatures, summer drying, and poor water conditions for most of the year.

Giffin Lake, the largest body of water on the unit, is the only one of substantial size within a 50-mile radius. It is important for waterfowl breeding, as well as hunting and fishing. A major watershed and lake cleanup project has been proposed for Giffin Lake to control aquatic weeds and improve waterfowl production and the fishery. This would be a multi-agency cooperative program which involves partial funding from Ducks Unlimited, Pheasants Forever, WDFW Duck Stamp Program and irrigation/water quality districts. The project would include the construction of additional pond area and associated wetlands, which would be managed primarily for waterfowl and other wetland birds.

Additional waters within the Sunnyside unit include approximately five miles of irrigation drainage canals. These “drains” return irrigation water from surrounding agricultural lands to the Yakima River. Due to groundwater filtering and cooling as it returns to these canals, they may provide potential summer off-channel rearing/refuge habitat for salmonids indigenous to the Yakima River. These drains may also provide winter rearing habitats. One particular drain, which flows through the unit, DID #7 (Wendell-Phillips Drain), has the potential for providing such habitats. DID #7 was identified as the single existing potential salmonid habitat on the SWA (WDFW, 1997). Note: DID is an acronym for Drain Irrigation District.

Byron Unit

This unit was the original headquarters of the Wildlife Area, from 1950 to 1975, then it was moved to the Sunnyside Unit. The Byron Unit is primarily lowland area located just west of the Benton/Yakima County line, approximately five miles east of Mabton and five miles south of Grandview. The terrain is a series of depressions and rolling hills. A large drain, carrying groundwater and irrigation water, runs through the area creating a series of ponds extending approximately two miles and around 400 surface acres in size. These ponds produce excellent waterfowl nesting and brooding areas. Unfortunately, the pond areas do not incorporate a natural drainage and are precluded as salmonid habitat due to lethal summer temperatures, poor water quality, and a natural barrier falls approximately 15 meters tall near the confluence with the Yakima River. They do, however, support warm water species.

This area is also bisected by a large irrigation pipeline called the Mabton Siphon. Approximately 500 acres of WDFW land east of the pipeline was made a wildlife reserve in 1948. In 1989, the WDFW entered into an agreement with the City of Grandview and Ducks Unlimited to build a pipeline and allow the city to pump treated sewage water into a series of depressions located inside the Byron Reserve. This project created a lagoon system with 27 surface acres and six miles of riparian shoreline for waterfowl, again unsuitable habitat for salmonids (WDFW, 1997).

I-82 Unit

Seventeen parcels, acquired in 1983 from the Washington State Department of Transportation (WSDOT) when Interstate 82 was constructed, comprise the I-82 units. The properties are dispersed along the Yakima River and I-82, from Union Gap to the Zillah interchange. These areas, located within or near the riparian zone associated with the Yakima River, provide scattered access to the Yakima River and several ponds. Although not located in prime farmlands, the area surrounding the unit is primarily agricultural and livestock land, with small local communities.

The area offers public hunting and fishing with three boat launches and six access parking areas. Seven human-made ponds, created during the highway construction, give anglers opportunities to catch several different species of fish. All of these ponds, which are groundwater fed, are home to carp, largemouth bass, sunfish and bullheads. In addition, the WDFW stocks Pond #3 with brown trout, Pond #4 with brown trout and rainbow trout, and Pond #6 with rainbow trout. Although there is the possibility for interchange between the Yakima River and some ponds during flood events, due to inadequate screening, the ponds are not actively managed as salmonid habitat

beyond the hatchery trout stocking program.

The riparian habitat along the river, sloughs and ponds provide superb nesting, brooding and winter cover for both waterfowl and upland birds. The upland habitat consists of open areas that at one time were agricultural fields and orchards (WDFW, 1997).

Rattlesnake Slope Unit

This unit consists of lands granted to WDFW, in 1973, from the Federal government (Bureau of Reclamation and the Department of Interior). The area is located in Benton County, seven miles north of Benton City, on the lower east slopes of Rattlesnake Peak. Horn Road serves as the east boundary and provides the only public access to the unit. The remainder of the area is bordered by private property and lands owned by the United States Department of Energy (DOE).

The area has large stands of native bunch grasses with smaller patches of sagebrush and cheat grass. There is also historical evidence of some form of intensive land use. Elevations range from 400 feet near Horn Road to 2,000 feet along the crest of the Rattlesnake Hills. Fire has removed large areas of sage that are not likely to return naturally. There are no natural drainages or pond/lake habitats on the unit which would likely support salmonids. As well, both game and non-game wildlife species are limited on this area, due to lack of water.

The unit provides land use for a public shooting range. In 1986, the WDFW and Bureau of Land Management entered into a land use agreement which allowed the Benton County Parks and Recreation Department to develop the shooting range. The shooting range is located along Horn Road, on the northwest corner of the property (WDFW, 1997).

Thornton Unit

This unit is located approximately eight miles northeast of Prosser, amongst the southerly slopes of the Rattlesnake Hills. Elevations on the area range from approximately 1,400 feet near the Sharps Road entrance, at the southeast corner, to around 2,600 feet at the northwest portion, near Rothrock Road. There are several large, gently rolling range areas with abrupt inclines and canyons interspersed throughout. The unit is dominated by grasses and shrub-steppe habitat, and was previously farmed for wheat (WDFW, 1997).

The Snipes Creek drainage runs through the property north to south, but provides no usable salmonid habitat in the upper portion of the watershed. Snipes Creek may support salmonids lower in the drainage, closer to the Yakima River. Within the unit, however, physical characteristics indicate low scour or sustained flow beyond the rainy and/or spring snow melt season. An additional, unnamed drainage passes north to south through the northwest portion of the unit, but again shows no evidence of a sustained flow or usable habitat.

METHODS

Inventory/ Feature Evaluation

The inventory encompassed the Sunnyside Wildlife Area and the Access Areas directly associated with it. SWA staff provided assistance with locating and identifying each culvert, dam, fishway, lake screen and/or water diversion within Department lands known to them.

The SSHEAR field crew then drove all known roads on each unit within the SWA. Areas and roads inaccessible by vehicle were walked by foot where potential fish bearing drainages might exist. The field crew also walked each potential fish bearing drainage on the wildlife area to accurately determine fish use and to locate and evaluate additional features. If a barrier feature was identified on the SWA, then all habitat upstream of that feature was surveyed. If no barrier feature was identified on the SWA, then survey of the drainage stopped at the SWA property boundary. All human-made features associated with fish bearing waters were evaluated for fish passage (culvert, dams, fishways) or fish safety (water diversions). Evaluation methodologies for these features are described in the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (WDFW, 2000). Feature dimensions were measured in metric units, utilizing a Mound City stadia rod (Model 43623). Slope measurements were calculated using a laser from Laser Tech Inc. (Model Impulse 200) mounted on a Bogen Manfrotto monopod (Model 3218). Velocity readings were calculated using the three chip method.

The latitude and longitude of each feature was recorded using a Trimble GeoExplorer II. These positional data were differentially corrected and exported to SSHEAR's Fish Passage and Screening database using Trimble's Pathfinder Office software. Streams were identified by name and/or Water Resource Inventory Area (WRIA) and stream number using U.S.G.S. quadrangle maps (1:24000), Atlas of Washington (DeLorme Mapping 2001), or the Columbia River Basin River Mile Index (WA. Dept. of Ecology, 1972). Fish species presence was determined using the Washington State Salmon and Steelhead Stock Inventory (WDF et. al., 1992), Washington State Salmonid Stock Inventory Bull Trout/Dolly Varden Appendix (WDFW, 1997), the regional Habitat Program staff and the regional Fish Biologist.

Barrier Prioritization

On streams where fish passage barriers were identified within the Sunnyside Wildlife Area, 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). Potential habitat gain was calculated utilizing the reduced sampling full physical survey methodology. Fish passage barriers identified during a physical survey, which have less than 200 meters of useable stream habitat are given a repair status of 'no gain'. Repairing these features for fish passage is not required at this time, but the eventual repair, modification or replacement of these structures will need to meet fish passage requirements per the Hydraulic Project Approval (HPA) permit process.

In watersheds that can provide habitat for anadromous salmonids, potential habitat gain is always calculated from the human-made barrier upstream to the first natural barrier. The net gain is represented by the connection of the smaller (upstream) segment of habitat with the larger (ocean

access downstream). In those portions of a watershed that only support resident salmonids, barrier removal may not result in a net gain of habitat upstream because resident fish populations can exist both up and downstream of a human-made barrier. Resident fish populations and habitat become fragmented and isolated by the human-made barriers because downstream movement is possible, but upstream is not. This reduces genetic interchange and makes the fish susceptible to extinction within isolated reaches. Overall habitat quality for fish is diminished when some habitat components are isolated from segments of the population. In addition, some reaches may not have all the habitat components necessary to sustain independent populations. What is gained by barrier removal is the reconnecting of fragmented fish populations and habitat by re-establishing the ability of fish to migrate upstream.

For the purposes of calculating a Priority Index (PI) value, the benefit to the resident fish population is represented by the habitat segment between the human-made barrier and the closest natural barrier, whether it be upstream or downstream. For example, if an impassable waterfall exists 500 linear meters downstream of a barrier and there is more than 500 linear meters of useable habitat upstream, the downstream habitat would be used to calculate habitat gain as it is the smallest. In this case, the real benefit is to the smaller population segment provided by the access to the larger population/habitat component. Conversely, if there is an impassable cascade eight kilometers downstream of a barrier and there is less than eight kilometers of habitat upstream, the upstream habitat would be used to prioritize for barrier resolution. In this case, the real benefit is to the larger population segment provided by the access to the smaller population/habitat component.

Screen Prioritization

The Screening Priority Index (SPI) model is a modification of the quadratic formula used in prioritizing fish passage barriers. The SPI was created to consolidate the many variables relevant to water diversions into a manageable framework for developing prioritized lists of projects. In the SPI, the habitat value (H) is replaced with flow (Q) as a surrogate to estimate the number of adult 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).

RESULTS

Inventory

A total of 53 sites with human-made features were inventoried during survey work associated with the Sunnyside Wildlife Area (SWA). The total includes WDFW-owned sites (within SWA boundaries) and non-WDFW owned sites (outside SWA boundaries). Of those features, there are 32 culverts, two dams and nine water diversions located within SWA boundaries. An additional six culvert crossings and four water diversions are located outside of SWA property. Fifteen of the inventoried features are associated with potentially fish bearing waters and the Sunnyside Unit. These features are displayed in Table 1 and include: two adequately screened pump diversions; one passable culvert; one barrier dam; six barrier culverts and five inadequately screened pump diversions. The 12 problem features and one passable culvert are all located on Drain Irrigation

District (DID) #7 return canal. The two adequately screened pump diversions draw water directly from the Yakima River.

The inventory and physical habitat survey of DID #7 covered approximately 4,800 lineal meters of habitat. The survey revealed that both the culvert and dam, identified within the unit boundaries, block sufficient habitat to warrant repair. An estimated 5,611.13 square meters of rearing habitat is blocked by fish passage barriers on DID #7. Table 2 lists the site identification number, unit, stream, tributary to, feature type, and repair status of those features inventoried within fish bearing waters.

Prioritization

Table 3 lists all fish passage barriers requiring repair identified during the Sunnyside Wildlife Area inventory (including non-WDFW ownership). Table 4 lists all unscreened water diversions requiring repair, identified during the Sunnyside Wildlife Area inventory.

The PI and SPI values are only intended as a guide to prioritizing projects. Other factors can and need to be considered. For example, the PI values do not reflect the possibility of additional human-made barriers. The true habitat gain can only be realized if all other human-made barriers within the drainage are repaired. The PI and SPI should be regarded as a dynamic index, as it can change as new information becomes available and inputs are refined.

Table 1. Number of fish bearing sites (including non-WDFW ownership) having culvert, dam, water diversion, or other associated feature identified during the inventory of the Sunnyside Wildlife Area.

Feature Type		Sunnyside Unit	Byron Ponds	I-82 Unit	Rattlesnake Slope Unit	Thornton Unit	Total
Culvert	<i>Fish Bearing</i>	7	0	0	0	0	7
	<i>Barriers</i>	6	0	0	0	0	6
Dam	<i>Fish Bearing</i>	1	0	0	0	0	1
	<i>Barriers</i>	1	0	0	0	0	1
Water Diversion	<i>Fish Bearing</i>	7	0	0	0	0	7
	<i>Non-compliant</i>	5	0	0	0	0	5
Others	<i>Fish Bearing</i>	0	0	0	0	0	0
	<i>Barriers</i>	0	0	0	0	0	0

Table 2. Location, type and repair status for features located in fish bearing waters associated with the Sunnyside Wildlife Area (including non-WDFW ownership).

Site ID	WLA Unit	Stream	Tributary To	Feature Type	Repair Status*
WDFW Ownership					
981378	Sunnyside	DID #7	Yakima R	Pump Diversion	Non-compliant
981380	Sunnyside	DID #7	Yakima R	Dam	RR
981382	Sunnyside	DID #7	Yakima R	Culvert	RR
981383	Sunnyside	Yakima R	Columbia R	Pump Diversion	Compliant
981391	Sunnyside	Yakima R	Columbia R	Pump Diversion	Compliant
Non-WDFW Ownership					
981407	Sunnyside	DID #7	Yakima R	Culvert	RR
981408	Sunnyside	DID #7	Yakima R	Pump Diversion	Non-compliant
981409	Sunnyside	DID #7	Yakima R	Culvert	RR
981410	Sunnyside	DID #7	Yakima R	Pump Diversion	Non-compliant
981411	Sunnyside	DID #7	Yakima R	Culvert	RR
981412	Sunnyside	DID #7	Yakima R	Pump Diversion	Non-compliant
981413	Sunnyside	DID #7	Yakima R	Culvert	RR
981414	Sunnyside	DID #7	Yakima R	Culvert	RR
981415	Sunnyside	DID #7	Yakima R	Pump Diversion	Non-compliant
981416	Sunnyside	DID #7	Yakima R	Culvert	NG

* Repair Status indicates whether the site has no significant habitat gain (NG), the site is not a barrier (OK), the site requires repair (RR), or the screening does or does not meet current WDFW and NFS criteria (compliant or non-compliant).

Table 3. Fish passage barriers associated with the Sunnyside Wildlife Area Inventory and requiring repair. Barriers are sorted by unit and Priority Index (PI) Total. Species codes: **CO** = Coho, **CK** = Chinook, **SH** = Steelhead, **RT** = Resident Trout.

Site ID	Stream / Tributary To	Feature Type	% Passability	Additional Barriers		Habitat Gain (m ²)		Priority Index (PI) Values				
				Downstream	Upstream	Spawning Area	Rearing Area	CO	CK	SH	RT	Total PI
Sunnyside Unit: WDFW Ownership												
981382	DID #7 / Yakima R	Culvert	33	0	7	0.00	5611.13	5.68	4.31	3.06	4.61	17.66
981380	DID #7 / Yakima R	Dam	67	1	6	0.00	3676.80	4.28	3.25	2.31	3.48	13.32
Sunnyside Unit: Non-WDFW Ownership												
981407	DID #7 / Yakima R	Culvert	67	2	5	0.00	2236.15	3.78	2.87	2.04	3.07	11.76
981409	DID #7 / Yakima R	Culvert	67	3	4	0.00	1641.64	3.50	2.65	1.89	2.84	10.88
981411	DID #7 / Yakima R	Culvert	67	4	3	0.00	1453.94	3.40	2.57	1.83	2.76	10.56
981413	DID #7 / Yakima R	Culvert	67	5	2	0.00	1192.56	3.23	2.45	1.74	2.62	10.04
981414	DID #7 / Yakima R	Culvert	67	6	1	0.00	992.48	3.09	2.34	1.66	2.51	9.60
Byron Unit:												
No fish bearing waters.												
I-82 Unit:												
No fish bearing waters. Some ponds stocked with trout by WDFW. No resident habitat or anadromous access from/to Yakima River.												
Rattlesnake Slope Unit:												
No fish bearing waters												
No fish bearing waters.												

Table 4. Unscreened water diversions associated with the Sunnyside Wildlife Area Inventory and requiring repair (including non-WDFW ownership). Unscreened diversions are sorted by total Screening Priority Index (SPI). Species codes: **CO** = Coho, **CK** = Chinook, **SH** = Steelhead, **RT** = Resident Trout.

Site ID	Stream/Tributary to	Ownership	Diversion Type	Associated Dam	Intake Specifications	Screening Priority Index				
					Flow (gpm)	CO	CK	SH	RT	Total
Sunnyside Unit: WDFW Ownership										
981378	DID #7 / Yakima R	WDFW	Pump	Yes (981380)	628	3.70	2.79	1.99	2.95	11.43
Sunnyside Unit: Non - WDFW Ownership										
981408	DID #7 / Yakima R	Private	Pump	No	7.5	1.22	0.92	0.66	0.98	3.78
981410	DID #7 / Yakima R	Private	Pump	No	7.5	1.22	0.92	0.66	0.98	3.78
981412	DID #7 / Yakima R	Private	Pump	No	7.5	1.22	0.92	0.66	0.98	3.78
981415	DID #7 / Yakima R	Private	Pump	No	7.5	1.22	0.92	0.66	0.98	3.78

DISCUSSION

Since a majority of lands in the Yakima River valley, including those of the SWA, have been used for agricultural and farming purposes, few natural drainages remain. The Yakima River and its tributaries have been altered over the years to provide irrigation water for nearby communities, to the detriment of native salmonid populations in the Yakima basin.

Currently, the Department does not manage water within the Sunnyside Wildlife Area for salmonid species (except for I-82 Ponds trout stocking). In addition, the naturally dry, arid climate predicates fish habitat in the region is better suited to warm water species. As a result, salmonid habitat preservation and enhancement on the SWA has not been a priority. However, the recognition that irrigation return canals could provide potential habitat is encouraging. The agency simply needs to decide if management priorities on the SWA should include ensuring accessibility to these off-channel canals for salmonids. The following is a discussion of inventoried features, fish passage structures and water diversions associated with each unit.

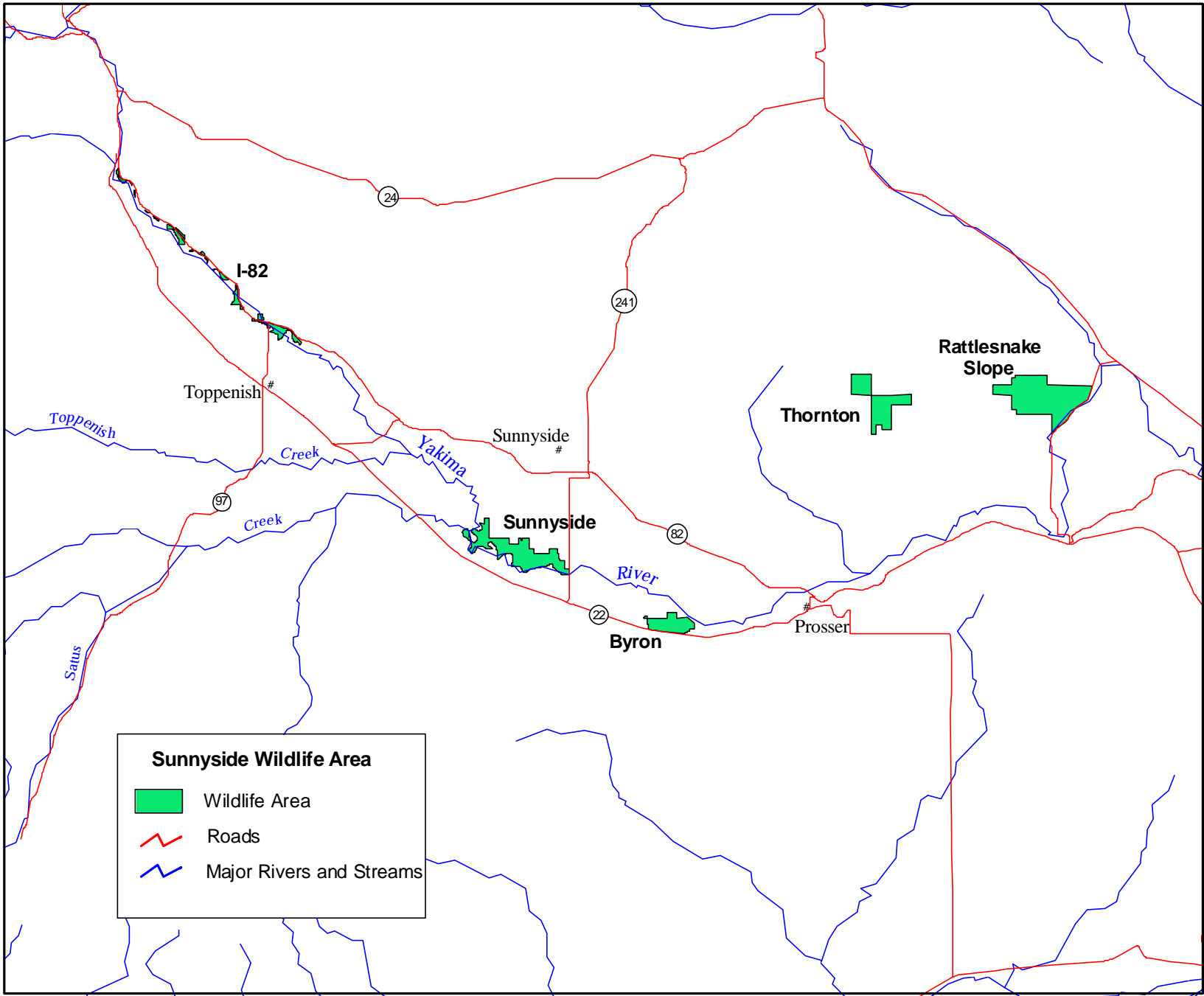
Sunnyside Unit

The Sunnyside Unit (Figure 2) is the only Wildlife Area unit with potential fish use by salmonids. Located at river mile 65.1 on the Yakima is a left bank “drain”, known as DID #7, which flows through the western portion of the unit between Bounds Pond and Horseshoe Pond. This drain could possibly provide off-channel rearing and/or refuge habitat for salmonids. Due to excessive fines and virtually no gravels, it would not likely serve well for spawning. There is no documentation clarifying historical fish use of this drainage, so fish use is based on physical parameters. In addition, one local landowner indicated that trout used to be present. However, there is documented fish use of a similar drainage, the Sulphur Creek Wasteway, another Yakima River tributary located approximately 3.5 river miles downstream.

A total of 13 features (seven culverts, one dam and five pump diversions) were identified during inventory efforts and the physical survey of the DID #7 system. All seven culverts were evaluated as undersized and are partial barriers to fish passages. Two fish passage barriers lie within the unit boundaries. The lowest feature on the drainage is barrier culvert site 981382 (photo #1). The second barrier feature is dam site 981380 (photo #2 & 3), located 726 meters upstream. One additional feature, a newer unscreened pump diversion (Site 981378, photo #4), also lies within the unit boundary approximately 15 meters upstream of 981380.

One thousand meters upstream of Site 981378, a non-fish bearing tributary, contributing approximately 10% flow, enters on the left bank. This tributary enters into a backwater channel area from a visible culvert passing under Wendell-Phillips Road. The tributary exits an irrigation piping system, with no natural drainage east of Wendell-Phillips Road (therefore determining non-fish bearing status). Another 58 meters upstream of the tributary, located underneath a farm road, is an undersized culvert requiring repair (Site 981407). There is an inadequately screened pump diversion (Site 981408) used for irrigation located immediately upstream on the right bank.

The next barrier culvert (Site 981409) is located 821 meters upstream, beneath the intersection of two county roads, Murray Road and Wendell-Phillips Road. This site is unique, having two different inlet culverts which converge beneath the intersection in an unknown configuration.



The right bank culvert inlet, a 0.91 meter diameter corrugated steel round, comes from a non-fish bearing, unnamed irrigation return tributary, contributing less than 5% flow. The main channel lies to the northeast of the intersection and has a 1.22 meter diameter pre-cast concrete round inlet pipe. Both inlets merge at an unknown point beneath the roads and exit through a 1.52 meter diameter corrugated steel pipe. The culvert was evaluated as a partial barrier and is undersized at its outlet end.

Continuing upstream 270 meters, another insufficiently screened pump diversion is located on the right bank (Site 981410). This diversion poses no passage issues, but needs to be screened for fish safety. Another private farm road crossing (Site 981411) exists 254 meters upstream. This culvert was fully submerged during the inventory, but was clearly undersized. The next feature inventoried was another pump diversion (Site 981412) located 521 meters upstream near a farm home. This pump is also inadequately screened. An additional 27 meters upstream is another road crossing (Site 981413) with a corrugated steel squash pipe passing beneath Wendell-Phillips Road. This pipe, although fully back watered and bedloaded, was evaluated as a partial barrier and is undersized in comparison to the ordinary high water width of the DID #7 channel.

The next fish passage structure (Site 981414) is located 316 meters upstream of the Wendell-Phillips Road crossing, beneath another private farm access road connecting two vineyard fields. The culvert here is undersized, but otherwise meets culvert passability criteria. Copious numbers of speckled dace were observed throughout the survey, upstream of Site 981413. The next feature (Site 981415), a pump diversion, is located another 831 meters upstream. This right bank pump, which is not screened, was active during the survey. The intake standpipe for this pump is trapping woody debris. Located one meter upstream of this pump is the upper-most barrier culvert identified during the survey on DID #7 (Site 981416). Because there is less than 200 meters of habitat upstream, site 981416 is considered a 'No Gain'. Therefore, repair is not required at this time.

Correcting all of the fish passage barriers within the DID #7 system would provide anadromous and resident fishes access to approximately 5,611.13 square meters of rearing habitat.

Three additional culverts (Site 981378, Site 981381 and Site 981390) identified along DID #7 warrant discussion. Culverts at Site 981381 and Site 981390 serve as overflow outlets for Horseshoe Pond and Bounds Pond, respectively. These ponds provide seasonal waters suitable for warm water species only. It is not likely that salmonids would survive in these areas. They would more likely become trapped in these areas and eventually die. During the inventory, Horseshoe Pond did have a minimal amount of water, but water level and conditions fluctuate as the areas are managed for waterfowl use. Temperature, poor water quality and water level fluctuations would likely be lethal to salmonids most of the time.

Bounds Pond was dry during inventory and, according to Wildlife Area staff, is usually watered up for waterfowl during fall and winter months. Salmonids access to this area would likely lead to entrapment and death when water levels dissipate and temperatures rise. The culvert at Site 981378, located immediately upstream of Site 981380 on the left bank, provides diversion flow to assist in watering up Horseshoe Pond. Access to the pond via this culvert would also be detrimental for salmonids. The Wildlife Area would need to employ management strategies for salmonid use in order to provide suitable salmonid habitat. This might entail planting of riparian

cover to reduce summer water temperatures, water and soil quality improvements and/or placement of larger woody debris to provide protective cover and shade. At that time, these sites would need to be evaluated for fish passage. Under current management strategies, these sites should be managed to prevent potential salmonid access to the pond areas via appropriate screening.

The following non-fish bearing features were also inventoried within the Sunnyside Unit: Sites 981364 through 981382, Sites 981388 through 981390, Sites 981392 through 981396, and Sites 981403 through 981406. Sites 981383 and 981391 are adequately screened pump diversions associated with the Yakima River.

Byron Unit

Inspection of the Byron unit revealed no suitable salmonid habitat. The area is predominantly lowland terrain and the ponds located here provide ideal waterfowl habitat and support warm water species. However, due to potential predation and warm temperatures throughout the majority of the year, these ponds do not provide habitat conducive to salmonid use. In addition, a barrier falls located just above the outlet channel confluence with the Yakima River prevents movement to and from the ponds by salmonids.

A total of four features were inventoried on the unit (Sites 981384, 981385, 981386, and 981387) prior to final determination of fish utilization. Once potential anadromous access to the ponds was ruled out, by inspection of the natural barrier falls near the mouth of the outlet channel, these sites were confirmed non-fish bearing.

I-82 Unit

As previously mentioned, the I-82 unit includes several parcels of land scattered from Union Gap in the west to the Zillah interchange in the east. There are a series of seven ponds numbered from west to east along I-82. These ponds are man-made, groundwater fed and have no natural drainages associated with them. The Department manages the ponds primarily for warm water species, but does stock a few of the ponds with trout each spring. Specifically, Ponds #3 and #4 are planted with Brown Trout, while Ponds #4 and #6 are planted with Rainbow Trout. Ponds #2, #3, #5 and #6 do have overflow outlet channels which could potentially connect to the Yakima River during extremely wet years or flood events. Therefore, inventory of the unit included verifying that the overflow channels of these ponds do not connect to the Yakima River during typical water level conditions.

One feature (Site 981400) was inventoried between Ponds #1 and #2. This culvert connects the two ponds, draining excess water from Pond #1 into Pond #2, and is managed as an overflow drain only (not intended to pass salmonids). An additional culvert (Site 981401), owned by the Washington State Department of Transportation (WSDOT), was identified where the overflow channel of Pond #2 flows under I-82. A downstream check was completed on this outlet channel to verify connectivity to the Yakima River. Since neither pond is stocked with trout and the downstream survey revealed no connection with the river, these sites were treated as non-fish bearing. A survey of Pond #3 revealed an overflow channel near the east end which has flowing water leaving the pond. Here, another WSDOT-owned culvert (Site 981402) crosses I-82. The outlet channel was surveyed and confirmed there is no connection to the Yakima River.

Ponds #4 and #5 are connected by two culverts at Site 981398. According to Department staff, these culverts serve strictly as overflow pipes to drain excess water from Pond #4 to Pond #5. The pipes were dry during the inventory. Pond #4 is stocked in the spring with rainbow trout and brown trout, which presumably pass to Pond #5 when water levels allow. Pond #5 has an abandoned outlet culvert (Site 981399) at its southeast end which was blocked off with a metal sheet and diked with gabion structures. Water from Pond #5 currently percolates into the local water table, and there is no other outlet feature for these two ponds. Ultimately, there is no anadromous access between these ponds and the Yakima River.

In reviewing the area at Pond #6, locally known as Buena Pond, no outlet structure was identified within the unit boundaries. Water exits the pond on the south side and ties into a wetland system between the pond and I-82 which is outside the unit. One non-fish bearing culvert (Site 981397) was identified at the northwest end of the access area parking lot. The culvert is located in a non-fish bearing irrigation return ditch which dumps into the pond when nearby farms are irrigating.

Inventory of Pond #7, which supports only warm water species, revealed no channelized outlet from the pond to the Yakima River. There is no connection that would allow anadromous access. As well, there were no human-made structures identified on the perimeter of the pond.

Rattlesnake Slope Unit

With few roads and limited access, the Rattlesnake Slope unit is primarily arid, rolling grassland hills. No fish passage features identified. All research indicates there are no drainages or pond/lake habitats capable of supporting salmonids within the unit boundaries. There was no flowing water in any mapped drainages during the survey, indicating these drainages do not provide salmonid habitat.

Thornton Unit

Investigation of the Thornton Unit revealed no fish passage features. This unit has few roads, with Sharps Road being the only mapped road passing through the area. The only mapped drainage, Snipes Creek, does flow through the unit. However, the channel does not provide suitable salmonid habitat and reveals little evidence of flow beyond times of rain or seasonal spring run-off.

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APPENDIX I

Photographs of Barriers and Unscreened Water Diversion
on the Sunnyside Wildlife Area

Sunnyside Wildlife Area / Sunnyside Unit / Site 981382



Photo 1. Lowest barrier culvert on the DID #7 drainage. Although the culvert slope is less than 1%, this culvert is a barrier due to excessive outfall drop and high velocity. It is also undersized.

Sunnyside Wildlife Area / Sunnyside Unit / Site 981380



Photo 2. Upstream end of the diversion dam. Site is a partial barrier due to control structure. With the screw gate partially open and the current flow conditions, the culvert (spillway) was determined to be passable at time of evaluation.



Photo 3. The downstream end of culvert at **Site 981380** better illustrates size of culvert in comparison to channel width. Notice the makeshift flow gauge used to monitor and manipulate water levels.

Sunnyside Wildlife Area / Sunnyside Unit / Site 981378



Photo 4. Example of a “lift” pump diversion configuration. Recently installed on the Sunnyside Unit for controlling water levels of Bos Lake and/or Horseshoe Pond, this pump system has an unscreened intake submerged in DID #7.

APPENDIX II

Complete List of Features Identified During
Inventory of the Sunnyside Wildlife Area

List of features evaluated during the Sunnyside Wildlife Area Fish Passage Barrier and Surface Water Diversion Inventory. List sorted by Site ID. Latitude/ Longitude are in decimal degrees (WGS84). Easting/Northing are in State Plane Coordinates in feet (NAD27, Washington).

Site ID	Geographic Coordinates				WLA Unit	Stream	Trib To	WRI A	Fish Use	Feature Type			Owner Type
	Lat	Long	East	North						Culvert	Dam	Pump Diversion	
981364	46.248970	-120.050640	2113971.826	334290.21	Sunnyside	Giffin Lk	Yakima R	37	no	x			state
981365	46.246190	-120.046530	2115016.961	333280.154	Sunnyside	Giffin Lk	Yakima R	37	no	x			state
981366	46.243990	-120.047570	2114759.859	332476.945	Sunnyside	Giffin Lk	Unnamed	37	no	x			state
981367	46.242720	-120.045380	2115314.948	332017.24	Sunnyside	Giffin Lk	Yakima R	37	no			x	state
981368	46.242890	-120.041690	2116248.902	332084.1	Sunnyside	Giffin Lk	Yakima R	37	no	x			state
981369	46.243000	-120.041550	2116282.81	332126.486	Sunnyside	Giffin Lk	Yakima R	37	no			x	state
981370	46.243000	-120.030640	2119043.125	332141.365	Sunnyside	Giffin Lk	Yakima R	37	no	x			state
981371	46.240700	-120.026320	2120143.312	331307.691	Sunnyside	Unnamed	Yakima R	37	no	x			state
981372	46.243920	-120.016440	2122635.064	332498.956	Sunnyside	Bridgeman Pond	Morgan Lk	37	no	x			state
981373	46.236050	-120.011310	2123949.51	329638.35	Sunnyside	Morgan Lk	Yakima R	37	no	x			state
981374	46.250960	-120.036840	2117459.671	335034.574	Sunnyside	Unnamed	Griffin Lk	37	no			x	state
981375	46.246430	-120.041460	2116300.276	333376.707	Sunnyside	Unnamed	Giffin Lk	37	no	x			state
981376	46.254320	-120.041900	2116172.023	336253.874	Sunnyside	Unnamed	Giffin Lk	37	no			x	state

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Site ID	Geographic Coordinates				WLA Unit	Stream	Trib To	WRI A	Fish Use	Feature Type			Owner Type
	Lat	Long	East	North						Culvert	Dam	Pump Diversion	
981377	46.254140	-120.041760	2116207.812	336188.218	Sunnyside	Unnamed	Giffin Lk	37	no	x			state
981378	46.257110	-120.067030	2109810.345	337235.671	Sunnyside	DID #7	Yakima R	37	no			x	state
981379	46.257020	-120.067030	2109808.767	337199.821	Sunnyside	Unnamed	Horseshoe Pond	37	no	x			state
981380	46.257020	-120.067370	2109723.062	337201.916	Sunnyside	DID #7	Yakima R	37	yes		x		state
981381	46.253480	-120.072700	2108381.537	335904.286	Sunnyside	Horseshoe Pond	DID #7	37	no	x			state
981382	46.252650	-120.074640	2107893.971	335597.611	Sunnyside	DID #7	Yakima R	37	yes	x			state
981383	46.254070	-120.077950	2107051.716	336109.709	Sunnyside	Yakima R	Columbia R	37	yes			x	state
981384	46.192640	-119.884720	2156106.782	314033.169	Byron	Byron Ponds	Yakima R	37	no		x		state
981385	46.194570	-119.894730	2153564.936	314715.509	Byron	Byron Ponds	Yakima R	37	no	x			state
981386	46.196550	-119.892690	2154078.016	315440.228	Byron	Byron Ponds	Yakima R	37	no	x			state
981387	46.197910	-119.907490	2150326.795	315909.912	Byron	Byron Ponds	Yakima R	37	no	x			state
981388	46.250420	-120.044820	2115440.941	334827.665	Sunnyside	DID #12	Giffin Lk	37	no	x			state
981389	46.250500	-120.044910	2115418.793	334856.364	Sunnyside	DID #12	Giffin Lake	37	no			x	state

List of features evaluated during the Sunnyside Wildlife Area Fish Passage Barrier and Surface Water Diversion Inventory. List sorted by Site ID. Latitude/ Longitude are in decimal degrees (WGS84). Easting/Northing are in State Plane Coordinates in feet (NAD27, Washington).

Site ID	Geographic Coordinates				WLA Unit	Stream	Trib To	WRI A	Fish Use	Feature Type			Owner Type
	Lat	Long	East	North						Culvert	Dam	Pump Diversion	
981390	46.253920	-120.073020	2108299.222	336061.431	Sunnyside	Unnamed	DID #7	37	no	x			state
981391	46.247220	-120.075050	2107801.107	333617.732	Sunnyside	Yakima R	Columbia R	37	yes			x	state
981392	46.248510	-120.061380	2111256.169	334104.739	Sunnyside	Horseshoe Pond	Yakima R	37	no	x			state
981393	46.250640	-120.060130	2111566.724	334884.578	Sunnyside	Horseshoe Pond	Yakima R	37	no	x			state
981394	46.254580	-120.066790	2109873.731	336312.542	Sunnyside	Unnamed	Horseshoe Pond	37	no	x			state
981395	46.252600	-120.058980	2111853.274	335599.365	Sunnyside	Bos Lake	Giffin Lk	37	no	x			state
981396	46.251920	-120.053870	2113149.648	335359.56	Sunnyside	Unnamed	Giffin Lake	37	no	x			state
981397	46.421970	-120.323070	2044909.91	397100.33	Sunnyside	Unnamed	Buena Pond	37	no	x			state
981398	46.434820	-120.346450	2039004.527	401773.893	I-82	I-82 Pond # 4	I-82 Pond # 5	37	no	x			state
981399	46.431040	-120.347750	2038679.554	400395.899	I-82	I-84 Pond # 5	Yakima R	37	no	x			state
981400	46.480840	-120.406230	2023913.308	418534.428	I-82	I-82 Pond # 1	I-82 Pond # 2	37	no	x			state
981401	46.475250	-120.401690	2025058.346	416497.094	I-82	I-82 Pond # 2	Yakima R	37	no	x			state
981402	46.464910	-120.381200	2030227.588	412733.85	I-82	I-82 Pond # 3	Yakima R	37	no	x			state

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Site ID	Geographic Coordinates				WLA Unit	Stream	Trib To	WRI A	Fish Use	Feature Type			Owner Type
	Lat	Long	East	North						Culvert	Dam	Pump Diversion	
981403	46.254759	-120.057890	2112125.341	336391.579	Sunnyside	Bos Lk	Giffin Lk	37	no	x			state
981404	46.256570	-120.062309	2111004.398	337044.663	Sunnyside	Unnamed	Bos Lake	37	no	x			private
981405	46.248049	-120.057339	2112277.664	333942.687	Sunnyside	Horseshoe Pond	Giffin Lk	37	no	x			state
981406	46.257260	-120.070809	2108853.129	337284.131	Sunnyside	Unnamed	Bounds Pond	37	no	x			state
981407	46.265979	-120.063879	2110588.294	340473.038	Sunnyside	DID #7	Yakima R	37.0477	yes	x			private
981408	46.266030	-120.063919	2110578.772	340491.717	Sunnyside	DID #7	Yakima R	37.0477	yes			x	private
981409	46.273139	-120.062449	2110935.976	343086.267	Sunnyside	DID #7	Yakima R	37.0477	yes	x			county
981410	46.275210	-120.060869	2111331.574	343841.592	Sunnyside	DID #7	Yakima R	37.0477	yes			x	private
981411	46.277209	-120.059870	2111580.168	344574.517	Sunnyside	DID #7	Yakima R	37.0477	yes	x			private
981412	46.279719	-120.062039	2111026.736	345485.661	Sunnyside	DID #7	Yakima R	37.0477	yes			x	private
981413	46.279980	-120.062209	2110982.124	345581.764	Sunnyside	DID #7	Yakima R	37.0477	yes	x			county
981414	46.281669	-120.065799	2110071.039	346189.933	Sunnyside	DID #7	Yakima R	37.0477	yes	x			private
981415	46.287720	-120.065650	2110097.475	348398.395	Sunnyside	DID #7	Yakima R	37.0477	yes			x	county

List of features evaluated during the Sunnyside Wildlife Area Fish Passage Barrier and Surface Water Diversion Inventory. List sorted by Site ID. Latitude/ Longitude are in decimal degrees (WGS84). Easting/Northing are in State Plane Coordinates in feet (NAD27, Washington).

Site ID	Geographic Coordinates				WLA Unit	Stream	Trib To	WRI A	Fish Use	Feature Type			Owner Type
	Lat	Long	East	North						Culvert	Dam	Pump Diversion	
981416	46.287790	-120.065590	2110111.064	348424.884	Sunnyside	DID #7	Yakima R	37.0477	yes	x			county