

STATE OF WASHINGTON  
WATER RIGHT PERMIT

WR File NR S1-28885  
WR Doc ID: 6802377

<b>PRIORITY DATE</b>	<b>WATER RIGHT NUMBER</b>
8/19/2019	S1-28885

<b>NAME AND MAILING ADDRESS</b>	<b>DIVERSION SITE &amp; RELEASE SITE LOCATIONS</b>
Washington Water Trust 1500 Westlake Ave North Seattle, WA 98109	Seattle City Light facilities: Gorge Dam & Reservoir – Diablo, WA 98283 Gorge Powerhouse Property - Newhalem, WA 98267

<b>Instantaneous Rate and Annual Quantity Authorized for Diversion and Release</b>	
<b>DIVERSION AND RELEASE RATE (cfs)</b>	<b>ANNUAL QUANTITY (ac-ft/yr)</b>
0.5	Approximately 362

cfs = Cubic Feet per Second; ac-ft/yr = Acre-feet per Year

**Attention:** This is a Secondary Use Water Right. The origin of this water is from storage in Seattle City Light's Gorge Reservoir, as authorized under the Primary Use Water Right. This water is going to be diverted from the reservoir and transported via an existing power tunnel to a gate valve and piping (release) system adjacent to Seattle City Light's Gorge Powerhouse. This water will provide continuous additional instantaneous supply into the Skagit River for instream flow augmentation and mitigation purposes. Pursuant to separate agreements with Seattle City Light and Washington Water Trust, the subject water right will be conveyed into the state trust water rights program after one year of continuous release.

<b>Associated Water Right - the Primary Use Water Right</b>			
<b>SURFACE WATER CERTIFICATE NUMBER</b>	<b>INSTANTANEOUS RATE (cfs)</b>	<b>ANNUAL QUANTITY (ac-ft/yr)</b>	<b>REMARKS</b>
8249	Not applicable	Storage of 8350	Gorge Reservoir storage

<b>Purposes for the Secondary Use Water Right</b>			
<b>PURPOSES</b>	<b>DIVERSION AND RELEASE RATE (cfs)</b>	<b>ANNUAL QUANTITY (ac-ft/yr)</b>	<b>PERIOD OF USE</b>
Instream flow augmentation & mitigation	0.5	362	Continuous

<b>Point of Diversion Location</b>			
<b>COUNTY</b>	<b>WATERBODY</b>	<b>TRIBUTARY TO</b>	<b>WATER RESOURCE INVENTORY AREA</b>
Whatcom	Gorge Reservoir	Skagit River	4 – Upper Skagit

<b>SOURCE NAME</b>	<b>PARCEL #</b>	<b>TOWNSHIP</b>	<b>RANGE</b>	<b>SECTION</b>	<b>QQ Q</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
Gorge Reservoir	None	37N	12E	14	NE NW	48.697437	-121.207083

PERMIT



Point of Release Location			
COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Whatcom	Skagit River	Skagit Bay	4

POINT OF RELEASE	PARCEL #	TOWNSHIP	RANGE	SECTION	QQ Q	LATITUDE	LONGITUDE
Newhalem	371221051198	37N	12E	21	NE SE	48.675643	-121.241429

QQ Q = Quarter Quarter

Datum: NAD83/WGS84

Place of Use
DESCRIPTION OF THE AUTHORIZED PLACES OF USE
The mainstem Skagit River from the point of release of instream flow augmentation and mitigation water to the mouth of the river at Skagit Bay.

Proposed Works
Through a Memorandum of Agreement and the related Interagency Agreement No. C1800149 between Seattle City Light and Department of Ecology, Seattle City Light committed to designing, permitting, and constructing new infrastructure necessary for the release of water from Gorge Reservoir through its existing power tunnel, into the Skagit River. The release infrastructure will connect to an existing gate valve within a construction tunnel adit located just up gradient from the Gorge Powerhouse.

Development Schedule		
BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	PUT WATER TO FULL USE BY THIS DATE
Begun	January 1, 2021	December 31, 2021

Attention: Submittal of formal documentation for each stage is required. Extensions may be requested.

Measurement of Water Released	
HOW OFTEN MUST WATER USE BE MEASURED?	Continuously
HOW OFTEN MUST WATER USE DATA BE REPORTED TO ECOLOGY?	Year 1 - quarterly, then annually thereafter
WHAT QUANTITY SHOULD BE REPORTED?	Total annual quantity in acre-feet
WHAT RATE SHOULD BE REPORTED?	Minimum rate of release in cfs

### Provisions

#### Mitigation Uses

This secondary use water right will be used, in part, to offset withdrawals of water by certain existing and new permit-exempt groundwater users affected by the 2013 Washington State Supreme Court decision in *Swinomish Indian Tribal Community v. Department of Ecology*. The use of this water right for mitigation purposes must be as provided in the Skagit River Mitigation Plan, which is included as Attachment 1, including, specifically, the Plan's designation of the two subsets of permit-exempt groundwater users for which the mitigation water will provide offset, and the geographic locations thereof.



**Measurements, Monitoring, Metering, and Reporting**

An approved measuring device must be installed and maintained on the point of release pipeline identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", chapter 173-173 WAC, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Recorded water use data shall be submitted by the applicant or Seattle City Light. To set up an Internet reporting account, contact the Northwest Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Northwest Regional Office for forms to submit your water use data.

**Department of Fish and Wildlife**

Pursuant to Chapter 77.55 RCW, a Hydraulic Project Approval permit may be required from the Washington State Department of Fish and Wildlife prior to beginning construction of the point of release infrastructure.

**Proof of Appropriation**

Consistent with the development schedule given in this permit (unless extended by Ecology), the water right holder must file a Notice of Proof of Appropriation (PA) of Water with Ecology. The PA documents the project is complete and all the water needed has been put to full beneficial use (perfected), which, for this permit means release into the Skagit River of 0.5 cfs continuously for 1 year, totaling approximately 362 AF. In order to verify the extent of water released pursuant to this permit, an inspection, known as a "proof exam", may be required.

**Schedule and Inspections**

Department of Ecology personnel, upon presentation of proper credentials and compliance with applicable health and safety plans, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water released, point of release infrastructure, the measuring device, and associated systems for compliance with water law.

**This Permit Subject to Cancellation**

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Bellevue, Washington this 5 day of February, 2020.

Department of Ecology

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by Ria Berns  
Ria Berns  
Section Manager



## APPENDIX 1

### Skagit River Basin Mitigation Plan

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#### Introduction

This mitigation plan supports the establishment of the Skagit River Basin Mitigation Program (mitigation program), which will be used to offset withdrawals of water by certain existing and new permit-exempt groundwater users affected by the 2013 Washington State Supreme Court decision in *Swinomish Indian Tribal Community v. Department of Ecology*.

The mitigation program will be created from a new secondary use water right (S1-28885), based on a release of water from Seattle City Light's Gorge Reservoir via their hydropower penstock in Newhalem. This release will be a continuous discharge of 0.5 cubic feet per second (cfs), equivalent to approximately 362 acre-feet per year (ac-ft/yr), into the Skagit River. The secondary use permit will authorize beneficial use of the released water for both instream flow augmentation and mitigation purposes.

This mitigation plan describes the water resources management context and drivers for development of the mitigation program and outlines how the program will be designed and operated within the Skagit River Basin.

#### Background

In 2001, the Department of Ecology (Ecology) established an Instream Resources Protection Program (IRPP), under chapter 173-503 WAC, to protect the flows and ecosystem of the Skagit River Basin in Water Resource Inventory Areas (WRIAs) 3 and 4. This administrative rule established minimum instream flow levels for the mainstem Skagit River and certain Cultus Mountain tributaries.

In 2006, the rule was amended by Ecology in response to a lawsuit by Skagit County government claiming the rule did not provide adequate guarantees of future water supplies for Skagit River Basin property owners. The rule amendment established "reservations" of water, not subject to the minimum instream flows, for future out-of-stream uses.<sup>1</sup> The reservations provided uninterrupted (year-round) water supplies for new domestic purposes, among others. The reservations were deemed effective as of the original date of the rule, April 14, 2001.

Ecology consulted with the Washington State Department of Fish and Wildlife, and others, to create reservations that were thought to be protective of fish populations. In *Swinomish Indian*

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<sup>1</sup> A *reservation* of water is a finite amount of water set aside by administrative rule for specific uses. Reservations are a tool for attempting to balance the needs of people and those of the environment.



*Tribal Community v. Department of Ecology*, the Swinomish Tribe challenged the establishment of the reservations. On October 3, 2013, the Washington State Supreme Court agreed with the Tribe and ruled that Ecology cannot set aside new reservations of water through adoption of rule amendments, where water was previously set aside to support stream flows for fish. Therefore, the 2006 rule amendment was determined to be invalid by the court, and the original 2001 rule was reinstated.

The court decision created legal challenges for the owners of Skagit River Basin homes and businesses that were built between April 14, 2001 and October 3, 2013, and are reliant on permit-exempt wells under RCW 90.44.050.<sup>2</sup> In addition, the court decision halted the issuance of new building permits in much of rural Skagit County because mitigation was now required to offset impacts to regulated surface water bodies and any groundwater withdrawals in hydraulic continuity with these surface waters. The subject mitigation program will offer an environmentally- and legally-sound mitigation solution for a significant number of impacted property owners.

On April 30, 2019, Ecology and Seattle City Light (SCL) entered into a Memorandum of Agreement (MOA) “For the Release of Water to the Skagit River for Instream Flow Augmentation and Mitigation Purposes.” This MOA includes the terms and conditions of the water release and key elements of the mitigation program. The Washington Water Trust (WWT) entered into a separate MOA with Ecology to be the holder of the secondary use permit that authorizes the use of water SCL will release from existing storage. After one year of continuous release and “perfection” of the released water, the secondary use permit will be certificated. It then will be donated by the WWT to Ecology for permanent acceptance into the Trust Water Right Program for instream flow augmentation and mitigation purposes.

## **Purpose**

This mitigation program will mitigate for potential impairment to the Skagit River when instream flows drop below the minimum levels established in WAC 173-503. On average, minimum instream flows in the Skagit River have not been met 95 days per year in each of the past 30 years. In practice, the mitigation program will provide mitigation water year-round, both when flows are met and when they are not. This will be a net streamflow benefit to the river.

The mitigation program has goals for two subsets of permit-exempt groundwater users: (1) to provide mitigation for parcels that were issued a county building permit between 2001 and the court’s decision in 2013 on the assumption that water was available<sup>3</sup> and (2) to offer a limited quantity of mitigation water to prospective future users within the “Green Zone” of the “Middle

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<sup>2</sup> Skagit County government does not agree that mitigation is required for landowners that put water to beneficial use prior to October 3, 2013. Thus, Skagit County’s involvement in this mitigation plan is limited to providing assistance to Ecology in the context of potential future users.

<sup>3</sup> After the 2001 rule was adopted, owners of approximately 410 properties, both domestic and commercial, applied for and received county approval to develop new permit-exempt groundwater uses in the Skagit River Basin. When the 2006 rule amendment was overturned, these water users faced uncertainty regarding the availability of a legal water source. Ecology committed to securing a mitigation source for this subset of water users to ensure a legal water supply.



Skagit River Basin” (see Figure 1). These two subsets of users will be referred to as the “Reservation Users” and the “Future Users”, respectively.

### **Mitigation Program Design**

Through a MOA, Ecology purchased water for instream flow augmentation and mitigation purposes from SCL. The agreement requires SCL to maintain 0.5 cfs of flow from Gorge Reservoir storage into the Skagit River on a year-round and continuous basis. This water will be additive to the Skagit River and above and beyond standard SCL operations.

#### **Reservation Users**

##### ***Mitigation Water Availability and Allocation***

Mitigation water will be available first to establish a legal water supply for the approximately 410 Skagit River Basin homes and businesses (the Reservation Users) that were built between April 14, 2001 and October 3, 2013, and do not have a legally uninterruptible groundwater supply. Ecology will allocate a consumptive use amount that is higher than normal to account for these existing connections.

- Ecology will allocate 0.5 ac-ft/yr per connection. In total, this will use approximately 205 ac-ft/yr of the 362 ac-ft/yr purchased. The water allocated for Reservation Users will stay in the Skagit River permanently. The mitigation area is the entire Skagit River Basin (WRIAs 3 & 4).
- Any new large-scale mitigation projects developed in the tributaries by Ecology will be used to provide additional flow enhancement to offset the consumptive use of Reservation Users in that tributary. These Reservation Users will be mitigated for before any new uses are allowed.

#### **Future Users**

##### ***Mitigation Water Availability and Conditions of Use***

Mitigation water will only be available for Future User parcels within the Middle Skagit River Basin, with wells located within the Green Zone. The methodology used to determine the Green Zone is explained in Addendum A.

The following conditions will apply to these Future Users:

- There will be approximately 157 ac-ft/yr available for new permit-exempt groundwater withdrawals by Future Users within the Green Zone.
- No new groundwater withdrawals outside the Green Zone will be approved for mitigation under this mitigation program. Specifically, there will be no mitigation water available for proposed future use in the area downstream of the Skagit County Public Utility District (PUD) pipeline crossing near Sedro Woolley. The Green Zone begins at the PUD



pipeline crossing and ends at a line perpendicular to the Skagit River originating at the confluence with Bacon Creek, which is the extent of privately-held lands.

- The point of withdrawal (a well or wells) for each parcel must be located within the Green Zone. For parcels straddling the boundary of the Green Zone, the point of withdrawal must be located within the Green Zone, then mitigation will apply.
- Future Users will be required to install a remote-read metering system (e.g., radio-read or cellular-based telemetry) and report their water use. This data will be made available, in the aggregate, to requesting parties. Ecology or another agreed upon public entity will collect and manage this metering data.
  - Ecology will provide requesting parties with a summary of aggregated monthly metering use, by tributary, as requested, for a one year period after the mitigation program is established. The frequency of reporting will change to quarterly after a one year period.
  - Ecology may modify the metering component of this plan in consultation with area tribes (Sauk-Suiattle, Swinomish, and Upper Skagit), WDFW, and Skagit County. Any changes to the metering component will be an appealable decision.

#### ***Mitigation Water Allocation and Methodology Used***

Approximately 157 ac-ft/yr is currently available for mitigation for Future Users. This annual volume will be allocated based on reasonable assumptions about average indoor and outdoor use.

#### **Indoor Use**

Indoor water use varies across households based on the number of individuals per residence, water use habits, appliance efficiencies, etc. In addition, the consumptive quantity varies significantly based on whether a residence is connected to a sewer or a septic system. To determine a reasonable average indoor use calculation, Ecology referenced a 2012/2013 metering study (described below). And, Ecology referenced recent comparable examples, the historical per residence allocation in the 2013 Big Lake Water Association (BLWA) reports of examination (ROEs) for acceptance into the Trust Water Rights Program.

In 2012, Skagit County, Ecology, and the City of Anacortes funded an exempt well metering study within the Upper Nookachamps and Fisher-Carpenter subbasins of the Skagit River Basin. The goal of the study was to track indoor and outdoor water use within these subbasins. The study found that average annual daily water use of the 18 volunteer properties was 176 gallons per day (gpd), equivalent to 0.197 ac-ft/yr, which included both indoor and outdoor use. A smaller subset (12) of the volunteers separately tracked indoor and outdoor use. The average annual indoor use for these properties was 131 gpd and 33 gpd for outdoor use (see the Golder Associates October 2013 Technical Memorandum on the Skagit County Exempt Well Metering Program).

The study also evaluated a range of property characteristics among volunteers to determine how representative they were in relation to other properties within the two subbasins. The study



concluded the 18 volunteer parcels were, as a whole, representative of properties within the subbasins that were not monitored.

As another indoor use data point, the BLWA ROEs estimated historical indoor and outdoor use within the association’s former service area. Based on a series of assumptions outlined in the ROEs, indoor use within the BLWA service area was estimated at 198 gpd per household (0.222 ac-ft/yr). These numbers are based on reasonable assumptions on historical use, however, no metering data exist.

Ecology believes that 0.196 ac-ft/yr or an average of approximately 175 gpd per household is a reasonable indoor use allocation that is protective of the water resource and accounts for variability in water use across residences in the Skagit River Basin over time. For the purposes of allocation accounting, the annualized quantity will be rounded up to 0.2 ac-ft/yr. The actual quantity of water that will be debited for indoor use depends on the property’s wastewater disposal system as shown in Table 1.

**Table 1: Indoor Consumptive Use by Method of Disposal**

<b>Metric</b>	<b>Septic<sup>4</sup></b>	<b>Sewer</b>
Pumping Volume	175 gpd	
	63,875 gallons/year	
	~0.2 ac-ft/yr	
Consumptive Portion	10%	100%
Consumptive Use	6,387.5 gallons/year	63,875 gallons/year
	~0.02 ac-ft/yr	~0.2 ac-ft/yr

Outdoor Use

This mitigation plan relies on the U.S. Department of Agriculture’s Natural Resources Conservation Service produced Washington Irrigation Guide (WAIG)<sup>5</sup> to calculate consumptive irrigation use for outdoor irrigation, and relies on the following assumptions:

- The Sedro-Woolley weather station is generally reflective of precipitation and temperatures within the Middle Skagit River Basin.
- The crop irrigation requirements for pasture/turf (11.12 inches) represents the highest likely residential outdoor water use.
- Pop-up impact sprinklers with an average irrigation efficiency of 75 percent are a reasonable proxy for the average residential irrigation system.

<sup>4</sup> For houses on septic systems, Ecology used a 10 percent consumptive rate for indoor use. This is the rate used in the Elwha-Dungeness IRPP (WAC 173-518), the Big Lake Mitigation Plan, and is the standard consumptive use rate used by Ecology. See Culhane and Nazy (2015): <https://fortress.wa.gov/ecy/publications/documents/1511006.pdf>

<sup>5</sup> U.S. Department of Agriculture, Natural Resources Conservation Service Washington Irrigation Guide (updated 1997): [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_035205.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_035205.pdf)



Based on the WAIG variables and calculations, this mitigation plan uses 85 percent as the outdoor use consumptive rate.

Table 2 shows that to meet the requirements for irrigating an average domestic lawn (0.13 acres), as determined in the Big Lake Mitigation Plan, the mitigation program should allocate approximately 0.16 ac-ft/yr (~143 gpd) towards outdoor irrigation. Based on aerial photographs and parcel information for lots in the former BLWA service area, Ecology believes this is a reasonable size estimate and annual allocation volume.

**Table 2. Calculation of Total Irrigation Requirement for Turf near Sedro-Woolley**

Area irrigated	0.13 acres (5,625 ft <sup>2</sup> or ~75' x 75')
Irrigation Application Efficiency	75%
Crop Irrigation Requirement	11.12 in (0.93')
Consumptive Rate	85%
Total Consumptive Use	~0.14 ac-ft/yr
Return Flow Rate	15%
Total Return Flow	~0.02 ac-ft/yr
<b>Total Irrigation Requirement</b>	<b>~0.16 ac-ft/yr (143 gpd)</b>

#### Annual Quantity Allocations and Maximum Connection Limits

Future users will be allocated a flat annual quantity of 0.36 ac-ft/yr (0.2 ac-ft/yr indoor + 0.16 ac-ft/yr outdoor) per connection. This is the estimated total annual quantity pumped (withdrawn) per connection.

#### Yearly Mitigation Quantity Accounting

For the purposes of yearly mitigation quantity accounting, which determines the total number of connections possible, the debited quantity will be based on the water disposal method. The actual consumptive quantity debited from the mitigation program will be the fully consumed portion of indoor use (10 or 100 percent based on septic or sewer) and outdoor use (85 percent, based on the average irrigation efficiency of a pop-up sprinkler system).

- For connections on a septic system, 0.02 ac-ft/yr will be debited for indoor use and 0.14 ac-ft/yr will be debited for outdoor use, for a total of 0.16 ac-ft/yr.
- For connections on a sewer system, 0.2 ac-ft/yr will be debited for indoor use and 0.14 ac-ft/yr debited for outdoor use, for a total of 0.34 ac-ft/yr.

Based solely on septic system usage, a maximum of 981 connections (157 ac-ft/yr of available mitigation water ÷ 0.16 ac-ft/yr per connection) could be offset by the available mitigation water. However, because of the limited areal extent of the Green Zone and the limited number of available buildable lots, the actual number of mitigated connections will be less.



## **All Mitigation Users**

### ***Transferability of Mitigation Credits***

Once issued, mitigation credits are appurtenant to the original property *only* and are *non-transferable*. This applies to mitigation provided to both Reservation Users and Future Users.

### ***Compliance and Enforcement***

Ecology's compliance priority is to balance the mitigation program rather than to enforce at the individual level. If Ecology determines that a water user is willfully and significantly exceeding their allocated quantity, Ecology will pursue escalating levels of enforcement: via (1) technical assistance, (2) warning letter, and (3) compliance order/penalty.

- If metering data shows water use in excess of three times the allocated per-connection quantity, for a period of three consecutive months, Ecology will investigate the use.

### ***Closing the Mitigation Program***

Ecology will track mitigation program activity on its website and publish a quarterly summary as required by RCW 90.42.170. Ecology will also provide notice when the mitigation program is 75, 90, 95, and 100 percent allocated.

- When the mitigation program has reached 95 percent allocation, based on 0.50 ac-ft/yr per connection debit for Reservation Users and accurate Future Users metering data, Ecology will cease allocating mitigation water and will effectively close the mitigation program.
- Ecology will not use metering data to support an increased number of Future User connections due to lower than expected water use.

## **Implementation**

The mitigation program will prioritize mitigation water for Reservation Users. Once these existing users are accounted for, the mitigation program can provide mitigation water to offset development by Future Users within the Green Zone.

### ***Mitigation Costs***

Ecology does not currently have the legal authority in the Skagit River Basin to recover costs for the water purchased from SCL or for the administration of the mitigation program. The mitigation program will operate differently from typical water banks in the state. The Washington State Legislature provided funds aimed at developing water solutions in the Skagit River Basin. These funds have covered some, but not all of the funding necessary to seed, design, and manage the mitigation program.



### ***Reservation Users***

The Reservation Users will be allocated 0.50 ac-ft/yr from the mitigation program. Ecology, in consultation with Skagit and Snohomish Counties, has tracked building permits that were issued between the adoption of the Skagit River IRPP in 2001 and the *Swinomish v. Ecology* decision in 2013. In the Skagit River Basin there are approximately 410 developed parcels eligible for immediate mitigation.<sup>6</sup>

Ecology will issue a “Proof of Mitigated Water Supply” to each Reservation User, and debit the allocation from the mitigation program. However, water will not be considered legally allocated to a reservation parcel until the property owner records a notarized copy of the Proof of Mitigated Water Supply” with their respective county.

### ***Future Users***

Properties within the Green Zone that cannot be reasonably or feasibly served by an existing water purveyor are eligible for mitigation from the mitigation program.<sup>7</sup> These landowners will be given priority for processing their request for a mitigated water supply. Requests for mitigation will be reviewed from all landowners on a first come, first served basis. One “Proof of Mitigated Water Supply” will be issued per connection.

Ecology will coordinate with Skagit County on mitigation program implementation and accounting. As part of the building permit process, Skagit County and Ecology will work together to ensure that mitigation water is available and properly accounted for at the county and state levels. The steps include:

1. For each prospective project, Skagit County will work with Ecology or with Ecology-developed tools to evaluate mitigation suitability for the proposed development within the Green Zone.
2. Skagit County will issue an Ecology-provided “Proof of Mitigated Water Supply”. Skagit County will require the user to record the document on their property title and provide a copy of the recorded document to Skagit County Planning & Development Services before a building permit is issued.
3. Ecology tracks these new uses and issues an annual accounting report (see “Accounting” section below).

The property owner must submit a complete building permit application to the County within one year of recording the Proof of Mitigated Water Supply. A water meter must be installed and inspected as part of the plumbing inspection within one year of the date that the building permit

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<sup>6</sup> Additional parcels in this category may be identified after this document is issued. If a property owner within the approved mitigation area can show, to the satisfaction of Ecology, that they fall into the “Reservation User” category, Ecology will allocate their use from this mitigation program and provide the water user with a “Proof of Mitigated Water Supply.”

<sup>7</sup> Skagit County Code has certain requirements to connect to a public water supply for projects relying on a domestic groundwater system. These specific conditions for Future Users are outlined in Skagit County Code 14.24.340(3).



is issued. If these actions do not occur, Skagit County and Ecology will credit this quantity back to the mitigation program and a document will be recorded on the property owner's title stating that the Proof of Mitigated Water Supply is no longer valid. No extensions or renewals will be granted, but Future Users may reapply.

## **Accounting**

Pursuant to RCW 90.42.170, Ecology will use an online platform that is transparent and enables the public to track the mitigation program accounting. In addition to quarterly website updates, Ecology will issue an annual report that: (1) shows the balance of available mitigation allocation credits, (2) identifies any new water that has been added to the mitigation program, and (3) accounts for any changes in debited consumptive use (e.g., a residence switches from septic to sewer).

Other information about the mitigation program will be available on Ecology's Skagit River water solutions website: <https://ecology.wa.gov/Water-Shorelines/Water-supply/Protecting-stream-flows/Instream-flow-implementation/Skagit-River-basin-projects/Developing-solutions>.

## **Conclusion**

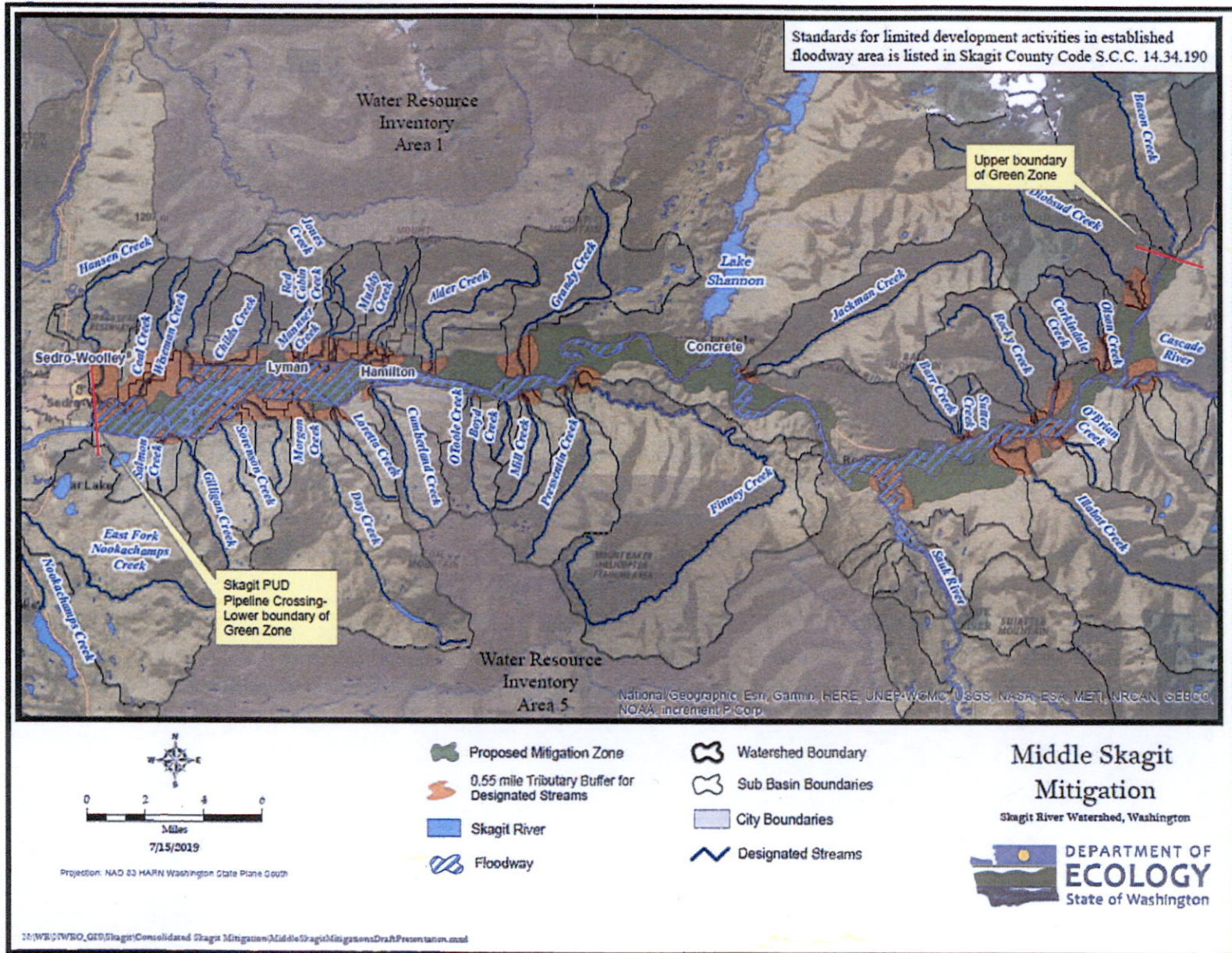
This mitigation plan outlines how the mitigation program will operate and how mitigation credits will be allocated, debited, and processed. In summary:

- 362 ac-ft/yr is available for instream flow augmentation and mitigation purposes.
- Approximately 205 ac-ft/yr is allocated for mitigation for approximately 410 Reservation Users within the Skagit River Basin.
- Approximately 157 ac-ft/yr is allocated for mitigation for a maximum of 981 Future Users. However, because of the limited areal extent of the Green Zone and the limited number of available buildable lots, the actual number of mitigated connections will be less.
- Ecology will track the Future Users per connection estimated mitigation quantity consumed. The debited quantity will be based on the connection's water disposal method.
  - For connections on a septic system, 0.02 ac-ft/yr will be debited for indoor use and 0.14 ac-ft/yr will be debited for outdoor use, for a total of 0.16 ac-ft/yr.
  - For connections on a sewer system, 0.2 ac-ft/yr will be debited for indoor use and 0.14 ac-ft/yr debited for outdoor use, for a total of 0.34 ac-ft/yr.
- Ecology will require all Future Users to install a remote-read metering system and report their water use. Ecology or another agreed upon public entity will collect and manage this metering data. If metering data shows water use in excess of three times the allocated per-connection quantity, for a period of three consecutive months, Ecology will investigate the use.

- When the mitigation program has reached 95 percent allocation, based on 0.50 ac-ft/yr per connection debit for Reservation Users and accurate Future Users metering data, Ecology will cease allocating mitigation water and will effectively close the mitigation program.



Figure 1: Skagit River Mitigation Program Approved Mitigation Area for Future Users (the Green Zone)







## ADDENDUM A

### Skagit River Basin Mitigation Zone Delineation for Future Users

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#### Introduction

Following the 2013 Washington State Supreme Court's invalidation of the 2006 Amendment to the Skagit Instream Flow, the Department of Ecology (Ecology) began to identify and prioritize water acquisition projects to mitigate for permit-exempt well uses in the affected areas of the Skagit Basin. An acquisition of water from Seattle City Light's Skagit River Hydroelectric Project was prioritized due to its location in the upper watershed.

In 2016, Ecology hired HDR Engineering Inc. (HDR) to perform a hydrogeologic evaluation of the middle Skagit River valley to support the future development of a main stem permit-exempt well mitigation program. The specific goal of the evaluation was to determine how groundwater wells within a representative study area would deplete Skagit River flows versus flows in its tributaries.<sup>8</sup> HDR used both a conceptual hydrogeologic model to identify the aquifers with the highest recharge to the Skagit River and a numerical model to quantify the relative impacts of simulated wells within the study area. Ecology built on this information to delineate the mitigation area for future users, as shown in Appendix 1, Figure 1.

#### Summary of HDR Engineering's Middle Skagit Hydrogeologic Evaluation

To determine a study area, HDR first characterized the general hydrogeology of the middle Skagit River using existing well logs and previous hydrogeologic projects, such as the Grandy Creek Hatchery and City of Hamilton groundwater analyses<sup>9</sup>. The study area was selected based on the availability of well logs, presence of tributary creeks, and whether local hydrogeologic conditions were generally representative of the overall watershed. HDR identified a final study area extending from river mile 32 near the confluence of Childs Creek and the Skagit River to river mile 50 on the north side of Cape Horn.

The hydrogeologic assessment of the study area identified aquifers in close proximity to the river, groundwater elevations and flow directions, and aquifer transmissivity. From this information, a 3-layer, steady-state<sup>10</sup> groundwater model was constructed using the Groundwater Vistas interface of MODFLOW<sup>11</sup>. Based on the conceptual model of the hydrogeology, it was

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<sup>8</sup> The decrease in ground water levels from pumping may capture surface water or ground water that would otherwise discharge to surface water. The water captured from surface waters by wells is called streamflow depletion.

<sup>9</sup> For more information see *Middle Skagit Valley Hydrogeologic Assessment*, 2017.

<sup>10</sup> In a steady-state groundwater model the inputs, such as recharge from precipitation, discharge to streams, etc., do not change over time, and therefore do not reflect seasonal changes. A steady-state model is appropriate when modeling long-term groundwater flow.

<sup>11</sup> MODFLOW is the industry standard model developed by the US Geologic Survey that solves the differential groundwater flow equation using a three dimensional grid.



determined that water withdrawals from the distant glacial deposits will have more impact on the nearer tributaries and less effect on the main stem Skagit River. Furthermore, the glacial deposits on the edges of the valley are not generally used for groundwater supply because the topography in these areas are often too steep for development. Therefore, the groundwater model focused on the alluvial deposits adjacent to the main stem and did not include the glacial deposits further away from the Skagit River.

HDR delineated the model grid with cell domain size of 200 ft. by 200 ft. The aquifer transmissivities determined in the hydrogeologic assessment were assigned to each of the aquifer layers. The Skagit River was simulated using the River Boundary Package of MODFLOW and tributaries were modeled using the Stream Package in MODFLOW. With the exception of Childs Creek, all major streams in the study area and along the north side of the Skagit River were modeled by HDR (Grandy, Alder, Muddy, Red Cabin, Mansser, and Jones Creeks, along with one unnamed stream). Day Creek was the only stream that was modeled along the southern side of the Skagit River. Sorenson, Morgan, Loretta, Cumberland, O'Toole, Boyd, Pressentin, Finney, and Mill Creeks were not modeled because these streams do not pass through much alluvium in their lower reaches and have little flow in late summer.

Recharge estimates were based on the percentage of annual precipitation data developed by the United States Geologic Survey<sup>12</sup>. This modeling determined that almost the entire Skagit River is gaining groundwater from the adjacent aquifer. Additionally, the modeled tributary streams were losing groundwater to the adjacent aquifer in their upper reaches, while gaining groundwater from aquifers in their lower reaches closer to the main stem Skagit River. These results confirm that groundwater in the study area moves from the adjacent alluvial aquifer to recharge the main stem Skagit River and lower tributary reaches.

The model was used to simulate the effect of depletion on the Skagit River and its tributaries from groundwater wells pumping in the adjacent alluvial aquifer. A groundwater well pumping at a rate of 25 gallons per minute<sup>13</sup> was modeled in the center of each cell. The results demonstrate that virtually all wells within the study area capture water from both the Skagit River *and* nearby tributary streams to greater or lesser degrees. Furthermore, the model shows that the closer a well is to a surface water source, the greater the percentage impact to that source (see Figure 1A).

HDR performed a partial calibration using limited groundwater level data and streamflow data collected from five of the eight creeks. However, due to scope and budget constraints, this did not equate to a full model calibration. Therefore, model results should only be viewed as providing a general indication of how groundwater pumping may affect surface water in the middle Skagit River. Additional detail about HDR's assessment conclusions can be found in their 2017 report, *Middle Skagit Valley Hydrogeologic Assessment*.

## **Ecology's Mitigation Zone Delineation**

To determine the mitigation zone, Ecology used the groundwater modeling results provided by HDR as ArcGIS geographic information system (GIS) shapefiles. Dots representing each

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<sup>12</sup> See United States Geologic Survey 2009 Scientific Investigations Report 2009-5270.

<sup>13</sup> 25 gallons per minute is the minimum pump rate for a modeled well in MODFLOW.



modeled well location were color coded by Ecology into six categories based on the percentage of streamflow depletion that would occur to the main stem Skagit River. The remaining impacts to streamflow were assumed to affect adjacent tributary streams, consistent with the assumptions used by HDR in their groundwater modeling (see Figure 1A).

A map showing smooth boundaries instead of color coded dots was created using ArcGIS's Spatial Analyst's Inverse Distance Weighted (IDW)<sup>14</sup> interpolation function. This process generated a raster<sup>15</sup> image with calculated borderlines for the six streamflow depletion categories using the model cell values as sample points. The resulting raster was color-coded based on the same six categories of Skagit River depletion (see Figure 2A).

When analyzing depletion to the tributaries versus main stem Skagit River, Ecology looked at two scenarios. These scenarios looked at tradeoffs between protecting tributaries (that are vulnerable to streamflow depletion due to their lower flows when compared to the main stem) and the amount of developable area included in the mitigation zone. The first scenario delineated a mitigation zone where 10% or less of the groundwater withdrawn from simulated wells would deplete tributary streams<sup>16</sup>. However, the resultant mitigation zone consisted of a very limited area immediately adjacent to the river where development would be restricted by the designated special flood hazard areas<sup>17</sup>. The second scenario outlined a mitigation zone where 25% or less of the groundwater withdrawn would deplete tributary streams. This scenario provided a larger mitigation zone with more developable area, while still protecting tributary streamflows. This second scenario mitigation zone was incorporated into the April 2019 Memorandum of Agreement between Seattle City Light and Ecology.

Ecology conducted further analysis of the results to extend the mitigation zone corresponding to a 25% or less impact on tributaries to locations that were not included in the original HDR study area. To start, over 23 measurements determined that a buffer distance of 0.55 miles on either side of a non-modeled stream would closely approximate a 25% depletion zone boundary for the tributary streams. This 0.55 mile buffer zone was applied to all the major upstream and downstream tributaries that were not in the original HDR study area. An arc with an initial 45-degree line on either side of the stream confluence was used to simulate the buffer zone's convergence with the stream at the point of confluence with the Skagit River.

Next the mitigation zone boundary was extended to the areas not originally included in the HDR study area. This extended mitigation zone includes all the alluvium areas mapped by the Department of Natural Resources (and where necessary using LiDAR-based GIS layers), which

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<sup>14</sup> Inverse distance weighted (IDW) interpolation determines cell values using a linearly weighted combination of a set of sample points. The weight is a function of inverse distance.

<sup>15</sup> A raster consists of a matrix of cells (or pixels) organized into rows and columns (or a grid) where each cell contains a value representing information

<sup>16</sup> The corresponding 90% would be depleted from the main stem Skagit River based on the assumptions used in the HDR groundwater modeling.

<sup>17</sup> Skagit County Code SCC 14.34.050. This in turn is based on FEMA National Flood Insurance Program's flood hazard mapping efforts and risk assessment.



roughly follows the river valley floor. The mitigation zone areas were then cropped to exclude the 0.55 mile tributary buffers (see Figure 3A).<sup>18</sup>

Lastly, the upstream and downstream extents of the mitigation zone were identified. Previous work by Ecology determined that there was little or no likely development of permit-exempt wells in close proximity to the river downstream from the Skagit PUD pipeline crossing and upstream of Bacon Creek. All of the land upstream of Bacon Creek is federally designated forest or recreational property. Virtually all of the area downstream of the Skagit PUD pipeline crossing is previously developed farmland or has access to other water sources, such as Skagit Public Utility District water.

The final mitigation zone for the main stem Skagit River is in Appendix 1, Figure 1. This map includes an overlay of the FEMA-established floodway, where new development is limited.

## References

*Middle Skagit Valley Hydrogeologic Assessment: Skagit River Water Rights Mitigation Project:* HDR, Inc. March 31, 2017

USGS Scientific Investigations Report 2009-5270: *Hydrogeologic Framework, Groundwater Movement, and Water Budget in Tributary Subbasins and Vicinity, Lower Skagit River Basin, Skagit and Snohomish Counties Washington.* 2009.

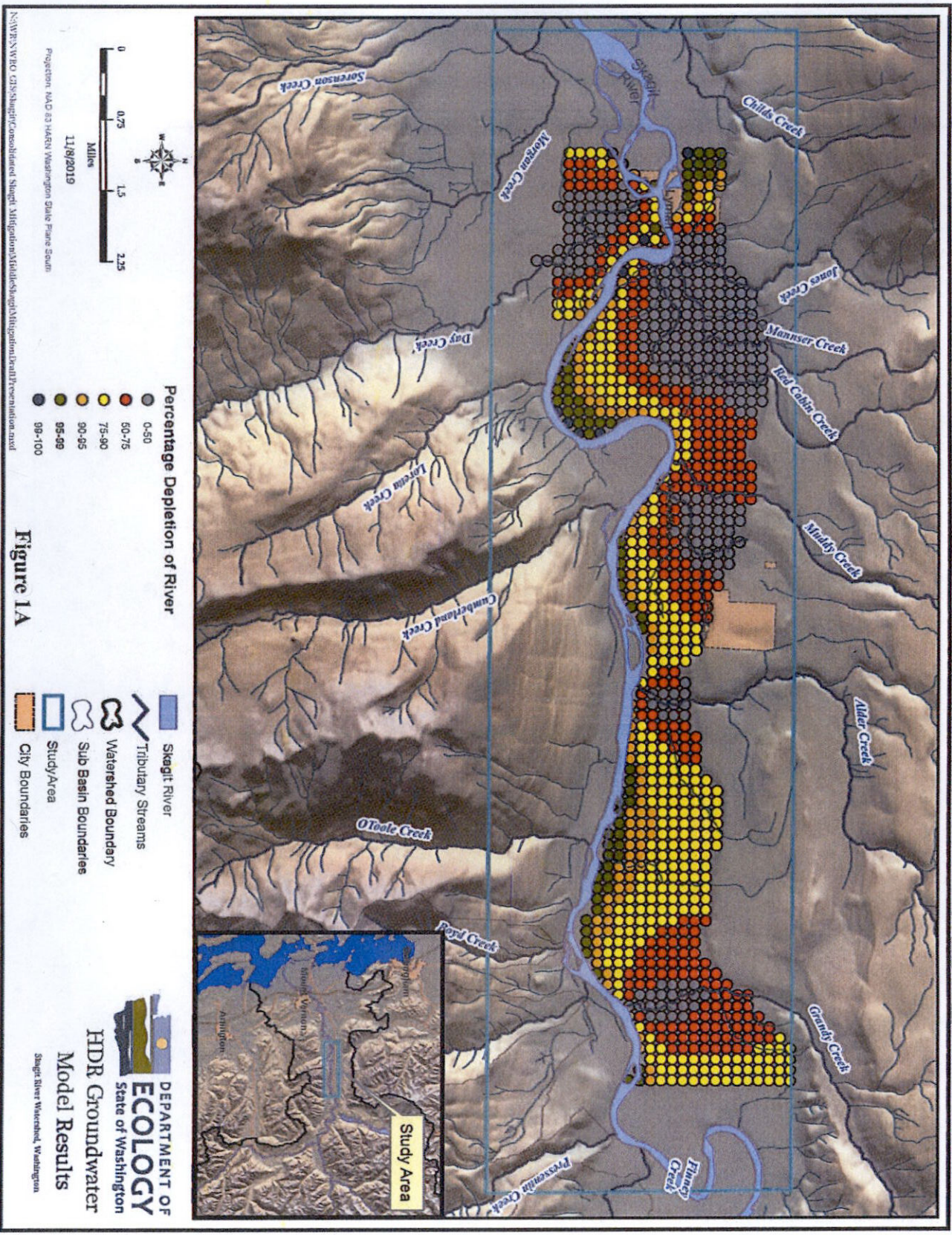
USGS Scientific Investigations Report 2010-5184: *Numerical Simulation of the Groundwater-Flow System in Tributary Subbasins and Vicinity, Lower Skagit River Basin, Skagit and Snohomish Counties, Washington.* 2010

Various WA DNR Geographic Information Systems layers.

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<sup>18</sup> Note that for this initial mapping effort, the cropping was done only on the north side of the river. The buffers were left uncropped on the south side of the river to illustrate what a generated buffer area would look like for a tributary flowing for a longer distance on the valley floor.







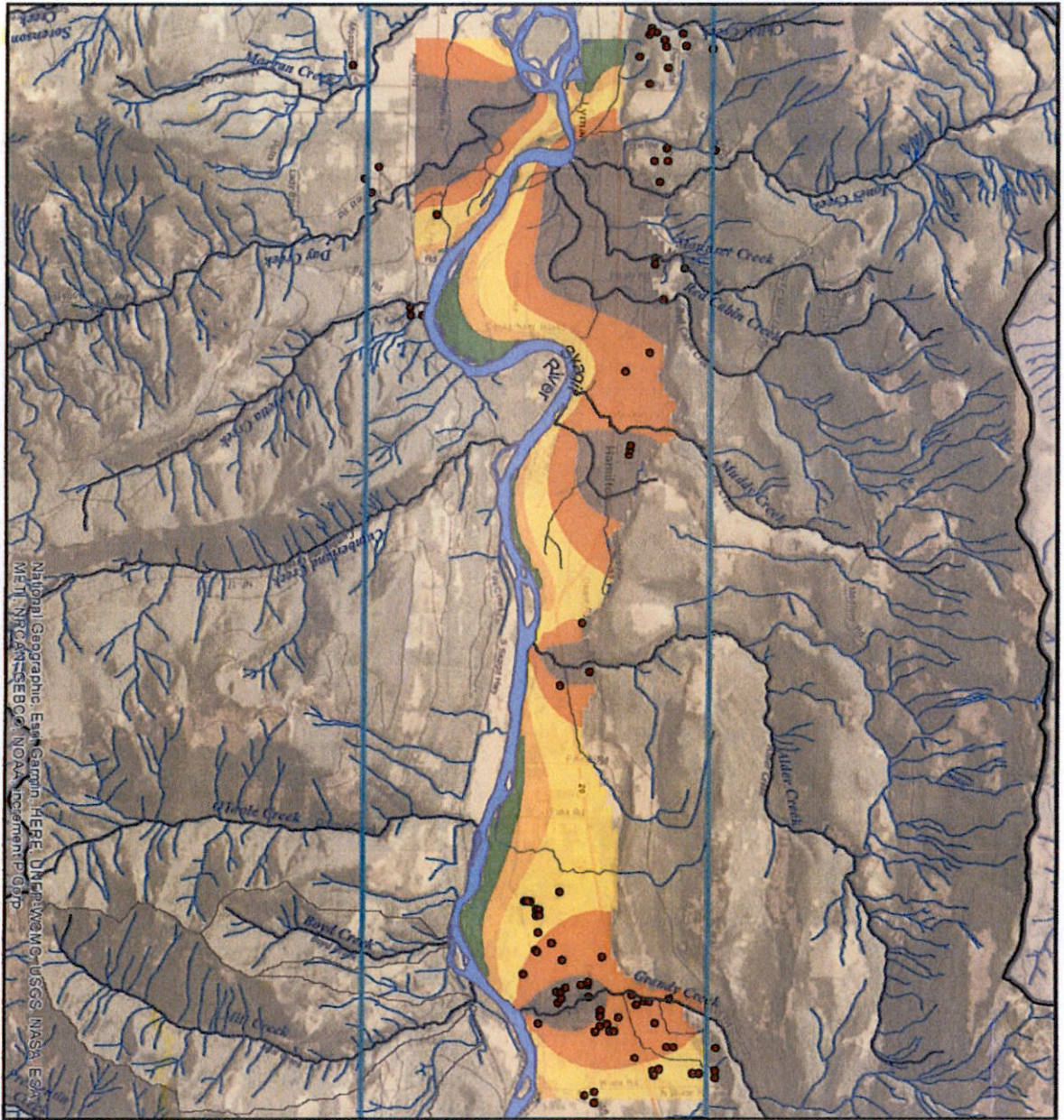


Figure 2A

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# HDR Middle Skagit Basin Hydrogeology Evaluation

Skagit River Watershed, Washington



- Study Area
- Skagit River
- Tributary Streams
- Developed properties without mitigated water source
- Inverse Distance Weighted Percentage Depletion of River**
  - 0 - 50
  - 50 - 75
  - 75 - 90
  - 90 - 95
  - 95 - 99
  - 99 - 100
- Watershed Boundary
- Sub Basin Boundary



11/8/2019

Projection: NAD 83 HARN Washington State Plane South



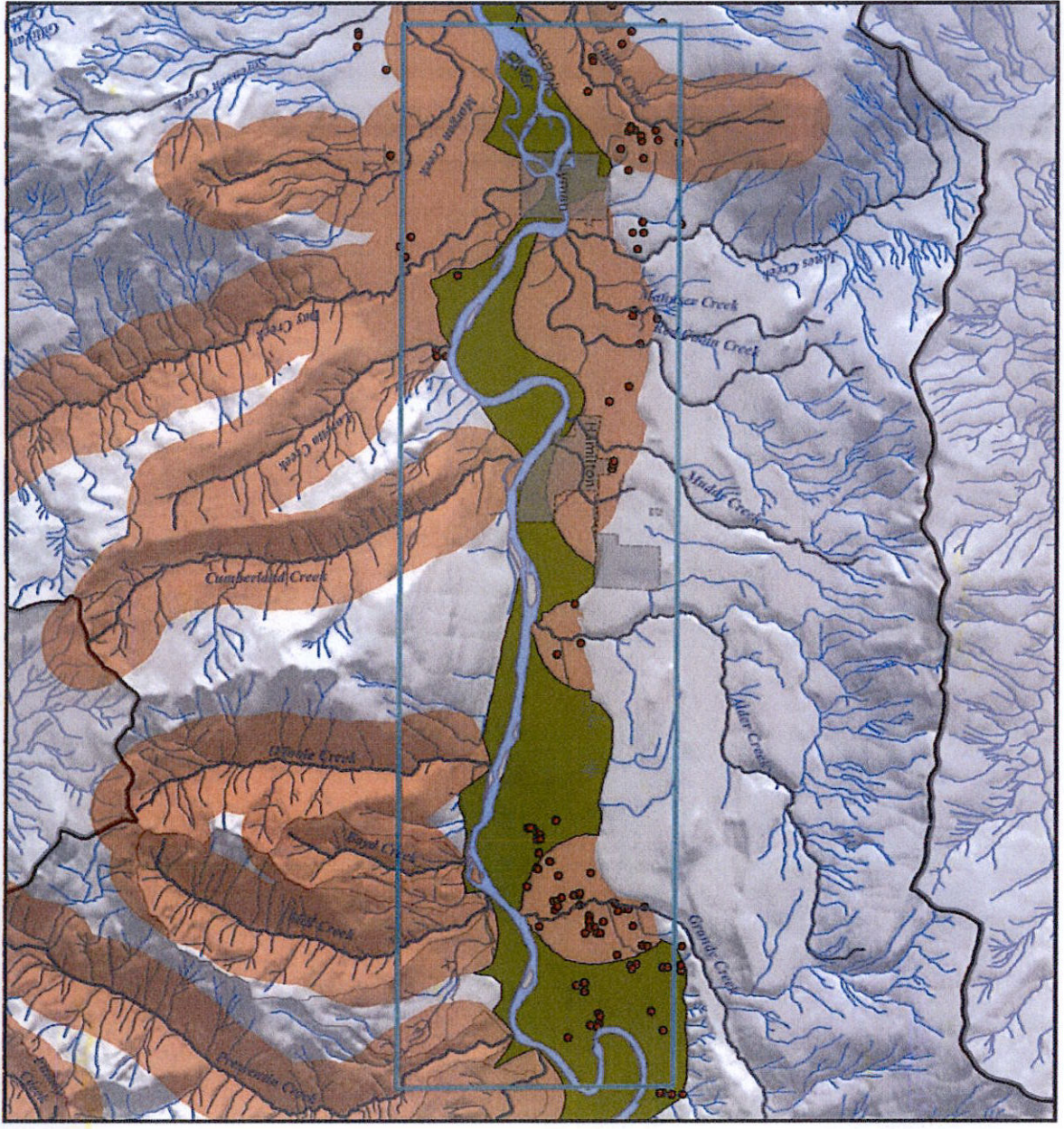


Figure 3A

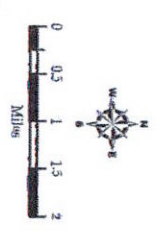
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Proposed Middle Skagit Mitigation  
 Skagit River Watershed, Washington



0.55 mile buffer in red

- Study Area
- Skagit River
- Tributary Streams
- Developed properties without mitigated water source
- Proposed Mitigation Zone
- Tributary Buffer for Designated Streams
- Watershed Boundary
- Sub Basin Boundary
- City Boundaries



11/8/2010

Projection: NAD 83 HARN Washington State Plane South