



# Identification of Freshwater Sites for Aquatic Reserves Lakes and Rivers of Washington State

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Washington State Department of Natural Resources, Aquatic Resources Division

Prepared for the Aquatic Reserves Program

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# 1.0 Freshwater Aquatic Reserve Introduction

The Aquatic Reserve program aims to provide special management for native aquatic habitat and species in the state of Washington. The program was established in 2002 as part of Washington State Department of Natural Resources (DNR) efforts to promote preservation, restoration and enhancement of state owned aquatic lands. Reserves are selected because the aquatic lands are of special environmental importance, scientific value or educational interest (WAC 332-30-151.). Since the foundation of the Aquatic Reserve program, the emphasis has been on reserve selection within Puget Sound with the establishment of seven marine sites. One of the goals of the Aquatic Reserve program is to be inclusive of all aquatic ecosystems, including freshwater systems such as lakes and rivers.

This report identifies freshwater lakes and rivers with high conservation value in Washington State by highlighting their scientific value and environmental importance. The Aquatic Reserve program should use this report to help determine and prioritize lakes and rivers that should be considered for DNR Aquatic Reserve status. Additional aspects of Aquatic Reserve selection and planning should be considered and evaluated by the Aquatic Reserve Program, such as community dynamics, multijurisdictional planning efforts, educational interests, internal agency recommendations, and other identified criteria of importance. All water bodies recommended in this report as potential Aquatic Reserves should be assessed by the Aquatic Reserve program to make sure they meet their established criteria; so they go through the appropriate implementation process; and so expertise and opinion outside of the DNR science and planning unit can be appropriately considered. These dynamics of Aquatic Reserve selection and planning will be discussed in greater detail in Section 5, Recommended Next Steps.

## 2.0 Selecting Priority Areas

The study area includes all of Washington inland freshwater lakes and rivers. Water bodies are reported as western and eastern Washington lakes and rivers, using the Cascade Mountain range as the delineation. This separation is made because the ecosystems are vastly different and water body selection should be compared and evaluated with water bodies providing similar habitat and ecosystem function.

Freshwater aquatic ecosystems such as lakes and rivers are preserved at the local, state and federal level for a variety of reasons. Within the United States they are prioritized for their natural resources such as water supply; recreation use, esthetic value such as wild and scenic, unusual or uncommon features such as geology or high salinity; climate change preparation such as low evaporation rates; part of a larger preservation effort such as a lake within a

terrestrial preservation system; and connectivity such as from headwaters to outlet. WDNR has considered these approaches and selected criteria reflective of agency stewardship values.

## 3.0 Evaluation Process

The following criteria were used by DNR science staff to evaluate and determine the recommended Aquatic Reserve lakes and rivers:

### A. Wildlife Species Concentration

Lakes and rivers were evaluated and considered for selection if they had the highest number of species within a given area compared to other state owned water bodies. The area being the whole water body, or a significant portion of the water body. Species data provided by Washington State Department of Fish and Wildlife (WDFW), Washington Audubon Society, and research/monitoring papers were used to determine species presence. DNR acknowledges that data could be missing from certain locations evaluated in the selection and recommendation process however the best available data was used. Species concentrations considered include the following:

- **Species Concentrations** – Water bodies with a high concentration of one or more state or federally listed and “uncommon” native species were considered for selection. This includes water bodies recommended by species experts.
- **Species Diversity** – Water bodies with the highest diversity of state or federally listed and “uncommon” native species were considered for selection.
- **Uncommon Native Species** – Water bodies with a high concentration of rare or uncommon species were considered for selection. These species include DNR’s Natural Heritage Program listed species with S1 or S2 status; and native freshwater bivalve locations. Species experts were contacted and advice considered.
- **Important Bird Areas** – The Washington Audubon Society has identified Important Bird Areas (IBAs) throughout the state of Washington. These are areas where habitat for a high diversity of bird species or rare and uncommon bird species are present compared to other bird gathering locations in the state. These areas were considered for selection.

### B. Plant Species

Lakes and rivers were evaluated and considered for selection if they had uncommon plants or the highest number of aquatic plant species within a given area compared to other state owned water bodies. The area being the whole water body, or a significant portion of the water body. Species data provided by Washington State Department of Ecology and DNRs Natural Heritage

Program were used to determine plant species presence. DNR acknowledges that data could be missing from certain locations evaluated in the selection and recommendation process however the best available data were used. Plant species concentrations considered include the following:

- **Plant Diversity** – Water bodies with higher plant diversity were considered for selection.
- **Uncommon Plants** – Water bodies with plant species listed with S1 or S2 status by DNRs Natural Heritage Program, or threatened or endangered by state or federal agencies were considered for selection. Aquatic plant experts were contacted and their advice considered.

### **C. Habitat Connectivity**

Lakes and rivers were evaluated and considered for selection if they had habitat connectivity with protected terrestrial, aquatic or wetland areas because connectivity could allow for improved habitat conditions for a given water body and the species that utilize the habitat. DNR's Public and Tribal Lands data layer; the draft MAIDS data layer; and the National Wetlands Inventory by United States Geological Survey (USGS) were used to determine habitat connectivity. Areas included in these criteria include the following:

- **Terrestrial Habitat Connectivity** - Water bodies bordering terrestrial habitat with protection status were considered for selection. This includes DNR managed natural areas.
- **Aquatic Habitat Connectivity/Freshwater Complexes** – Water bodies selected for one of the above listed criteria were assessed for an additional aquatic connection to SOAL such as a river, lake or wetland. Those water bodies where a connection was found were considered for recommendation as a freshwater complex. These water bodies will be recommended as a group as well as separately in the lake or river sections of this document.

### **D. Ecological Parameters**

Other ecological parameters were considered to evaluate and determine recommended Aquatic Reserve lakes and rivers. These include type of land cover including percent development (USGS 2006), percent impermeable surfaces surrounding the lake (USGS 2006), aquatic herbicide treatment (DOE 2012), dam presence (DOE 2011), outfall presence (NPDES/DOE 2012), 303D and 305B listing (DOE 2012), and Water Resource Inventory Area (WRIA) (DOE 2012).

## 4.0 Recommendations

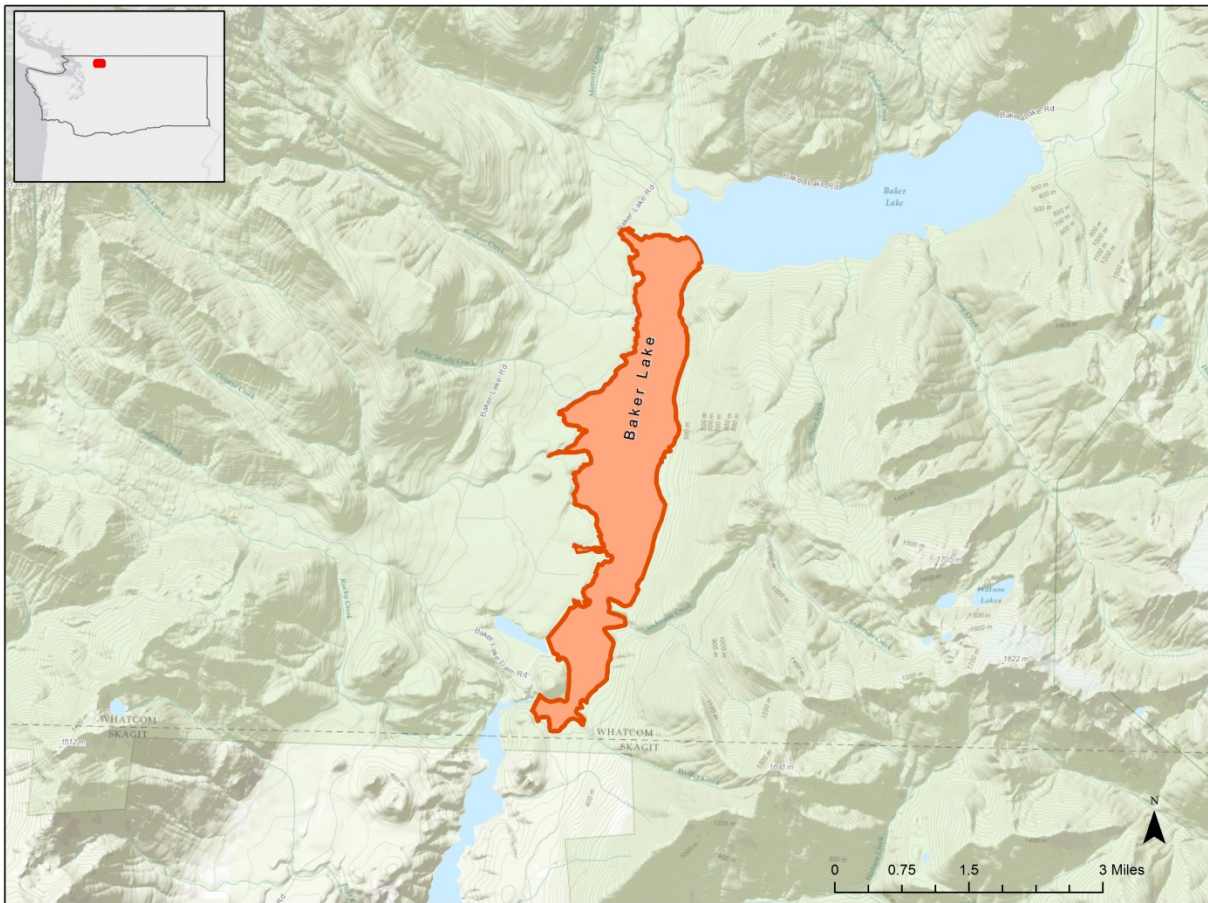
The following are lake and river recommendations using the above described evaluation process. Water bodies are reported as western and eastern lakes and rivers, using the Cascade Mountain range as the delineation.

### Lake Recommendations

The following identifies freshwater lakes with high conservation value to Washington State by highlighting their scientific value and environmental importance. The Aquatic Reserve program should use this list and water body descriptions to help determine and prioritize lakes that should be considered for DNR Aquatic Reserve status (Appendix A and B). Numbers provided on the list are not representative of water body ranking.

	<b><i>Lake</i></b>	<b><i>County</i></b>
<b>1</b>	<i>Baker Lake</i>	<i>Whatcom</i>
<b>2</b>	<i>Calligan Lake</i>	<i>King</i>
<b>3</b>	<i>Bonaparte Lake</i>	<i>Okanogan</i>
<b>4</b>	<i>Lake Wenatchee</i>	<i>Chelan</i>
<b>5</b>	<i>Fish Lake</i>	<i>Chelan</i>
<b>6</b>	<i>Sullivan Lake</i>	<i>Pend Oreille</i>
<b>7</b>	<i>Diamond Lake</i>	<i>Pend Oreille</i>
<b>8</b>	<i>Lake Calispell</i>	<i>Pend Oreille</i>
<b>9</b>	<i>Sprague Lake</i>	<i>Adams/Lincoln</i>
<b>10</b>	<i>Fishtrap Lake</i>	<i>Lincoln</i>

## Western Washington Lakes-----



### **Baker Lake – Whatcom County**

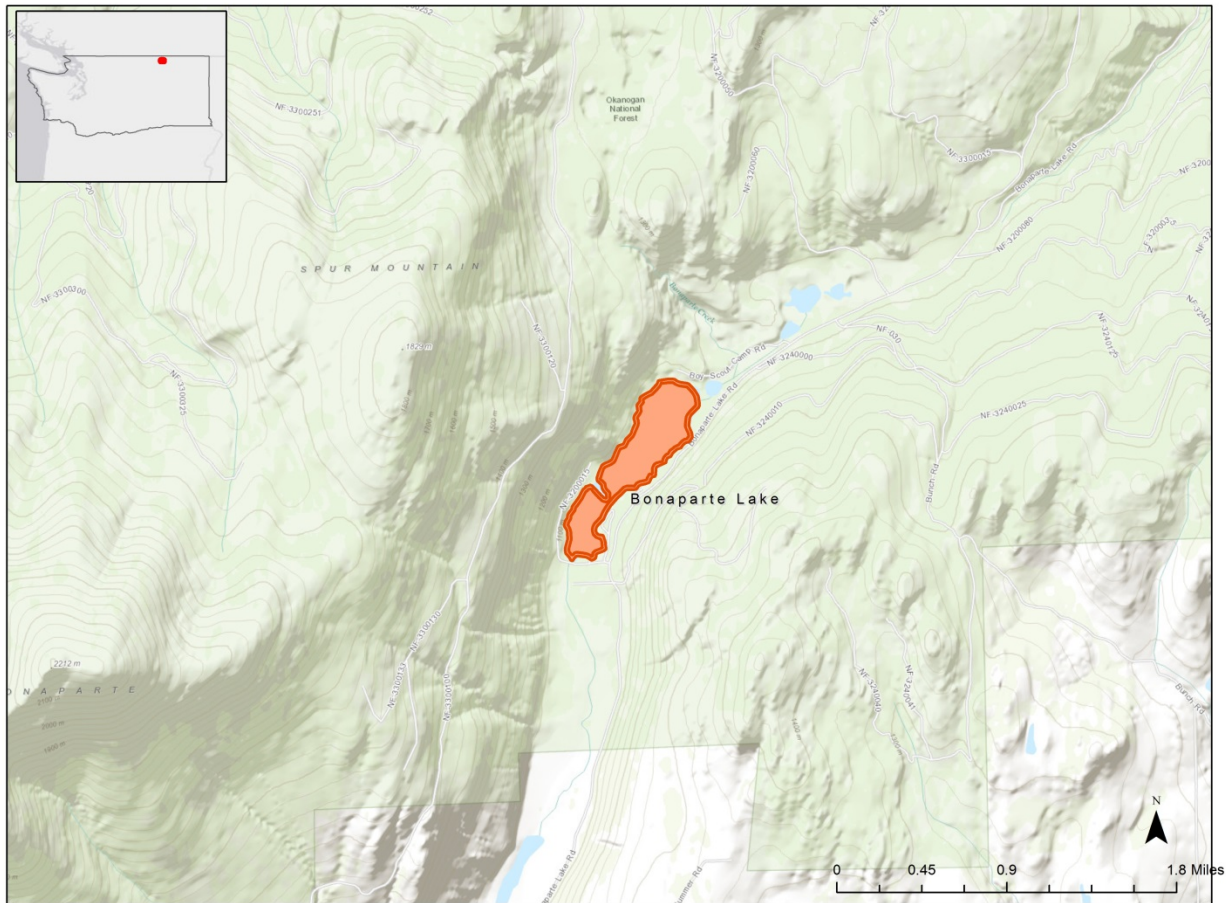
Baker Lake should be considered in the freshwater reserve selection process. Baker Lake is within the Snoqualmie National Forest and flows from Whatcom to Skagit County into the Skagit River system. This state owned water body is valuable because it provides habitat for the Western toad; Common loon use and nesting potential; Marbled murrelet nesting and use; and salmonid rearing and migration. See the Baker Lake information sheet in Appendix C for further details about this ecologically important lake.



### **Calligan Lake - King County**

Calligan Lake should be considered in the freshwater reserve selection process. This state owned water body is valuable because it provides habitat for Common loon nesting. It is one of the two common loon nesting locations on SOAL and there are only 13 known locations in Washington State. It also provides habitat for resident Cutthroat migration. This is a glacial drift plain lake which is a trough-like depression cut into outwash by continental glaciers. The lake depth and shoreline tend to be more irregular than other lake types. This lake type typically has higher flushing rates than other lake types. Lakes with higher flushing rates tend to be less vulnerable to the effects of pollutants. See the Calligan Lake information sheet in Appendix C for further details about this ecologically important lake.

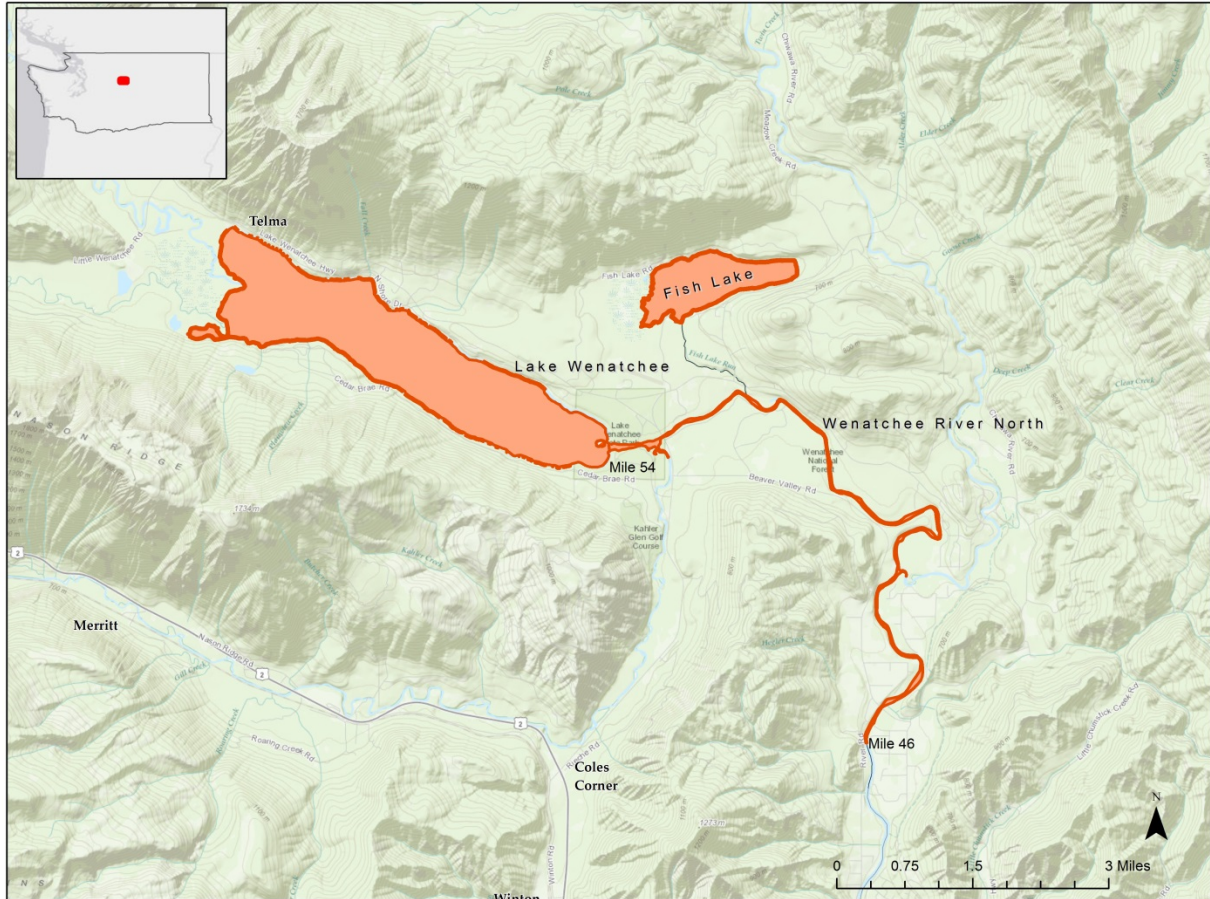
## Eastern Washington Lakes -----



### **Bonaparte Lake – Okanogan County**

Bonaparte Lake should be considered in the freshwater reserve selection process. This state owned water body is valuable because it provides nesting habitat for the Common loon. It is one of the two common loon nesting locations on SOAL and there are only 13 known locations in Washington State. In addition, it is a spawning area for Kokanee, a breeding site for Black tern, and is predominately surrounded by the Okanogan National Forest. See the Bonaparte Lake information sheet in Appendix C for further details about this ecologically important lake.





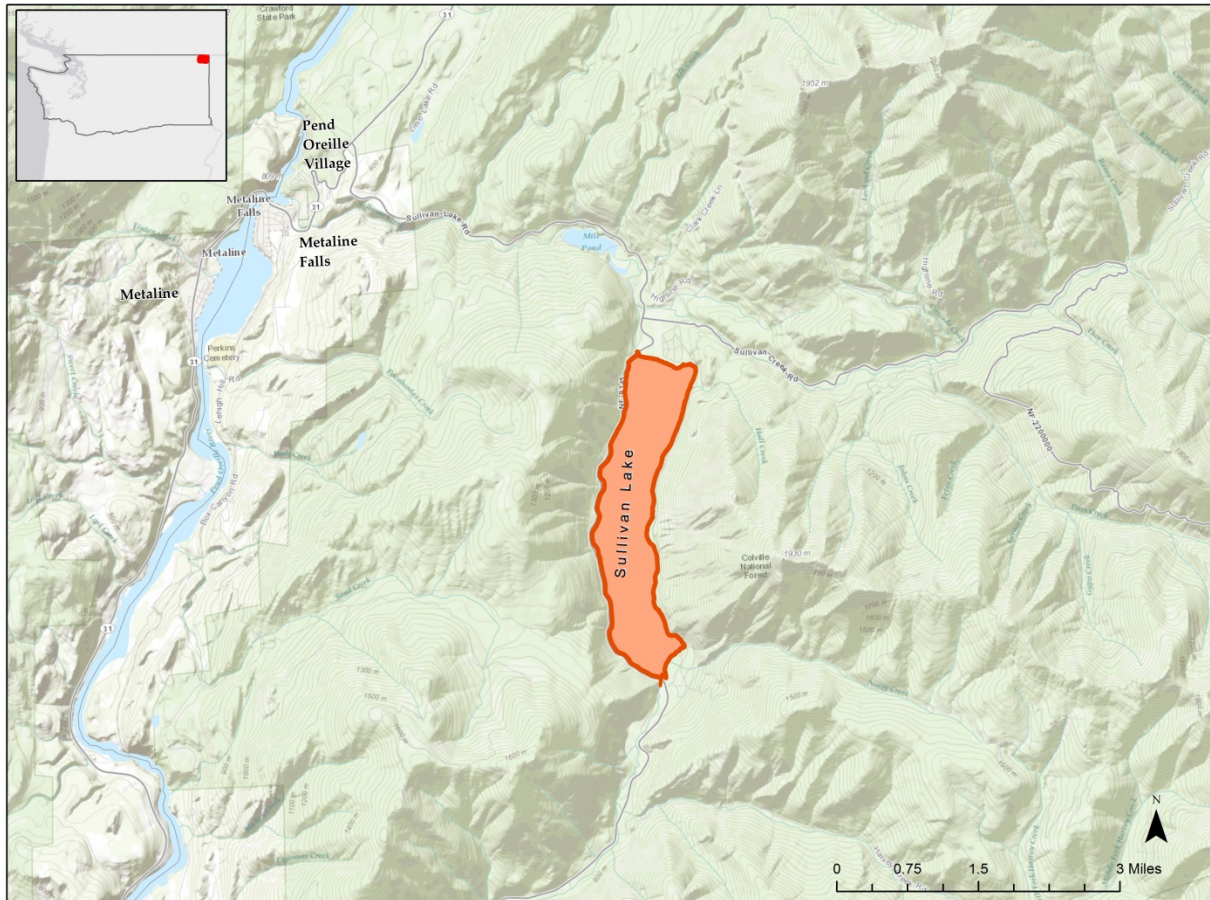
### **Lake Wenatchee – Chelan County**

Lake Wenatchee should be considered in the freshwater reserve selection process. This state owned water body is predominately surrounded by the Wenatchee National Forest and is valuable because it provides habitat for species such as the Western toad, Columbia spotted frog, Common loon and Pacific lamprey. It also provides salmonid rearing habitat for Sockeye, Dolly varden/Bull trout and Steelhead. Lake Wenatchee receives water from the Wenatchee River and is just over 1 mile west of Fish Lake, another lake recommended for reserve selection. Lake Wenatchee, Wenatchee River and Fish Lake should be considered as a freshwater complex reserve (Appendix A). See the Lake Wenatchee information sheet in Appendix C for further details about this ecologically important lake.

### **Fish Lake – Chelan County**

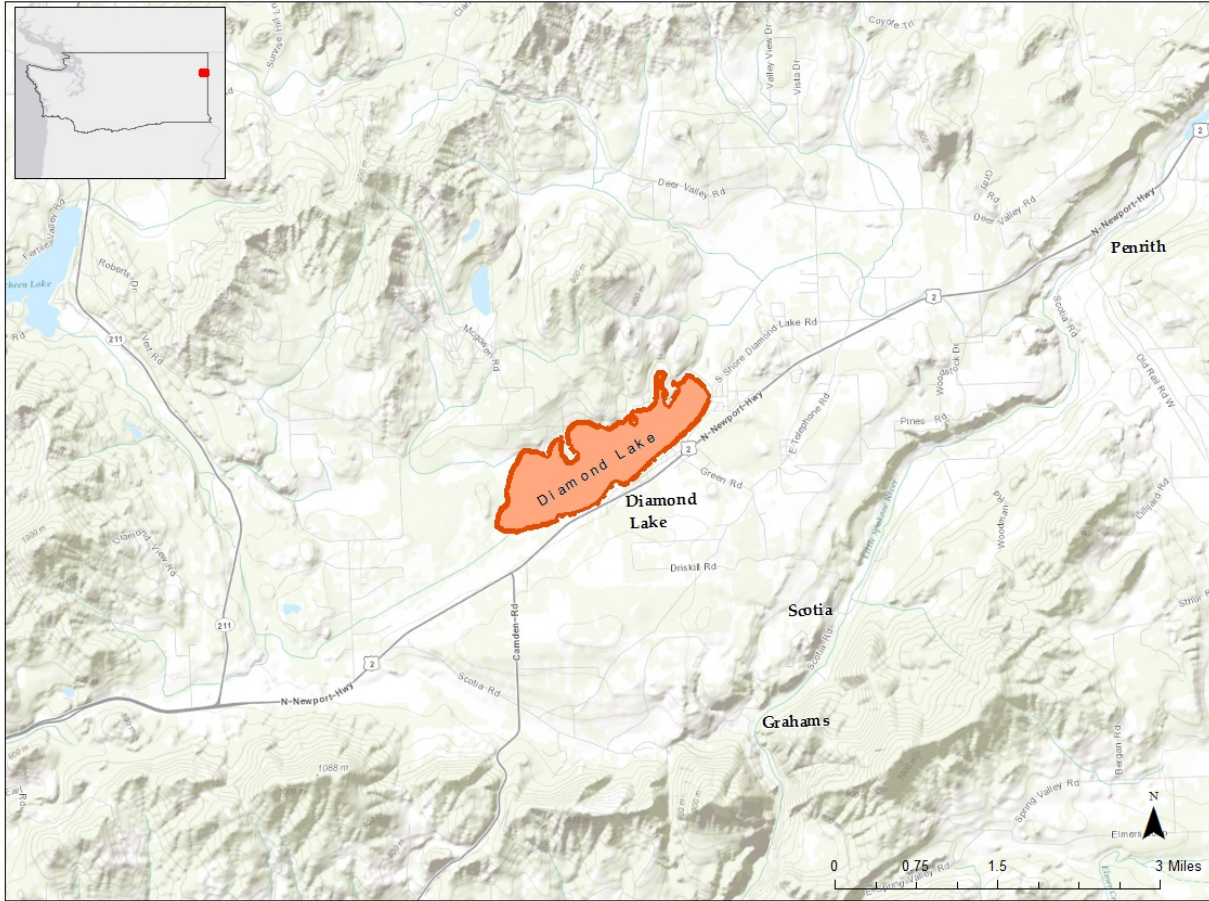
Fish Lake should be considered in the freshwater reserve selection process. This state owned water body is within the Wenatchee National Forest and is valuable because it provides habitat for the western toad and Columbia spotted frog. It is just over one mile east of two other water bodies recommended for reserve selection, Lake Wenatchee and Wenatchee River. These

water bodies should be considered as a freshwater complex reserve, including both lakes and the river system (Appendix A). See the Fish Lake information sheet in Appendix C for further details about this ecologically important lake.



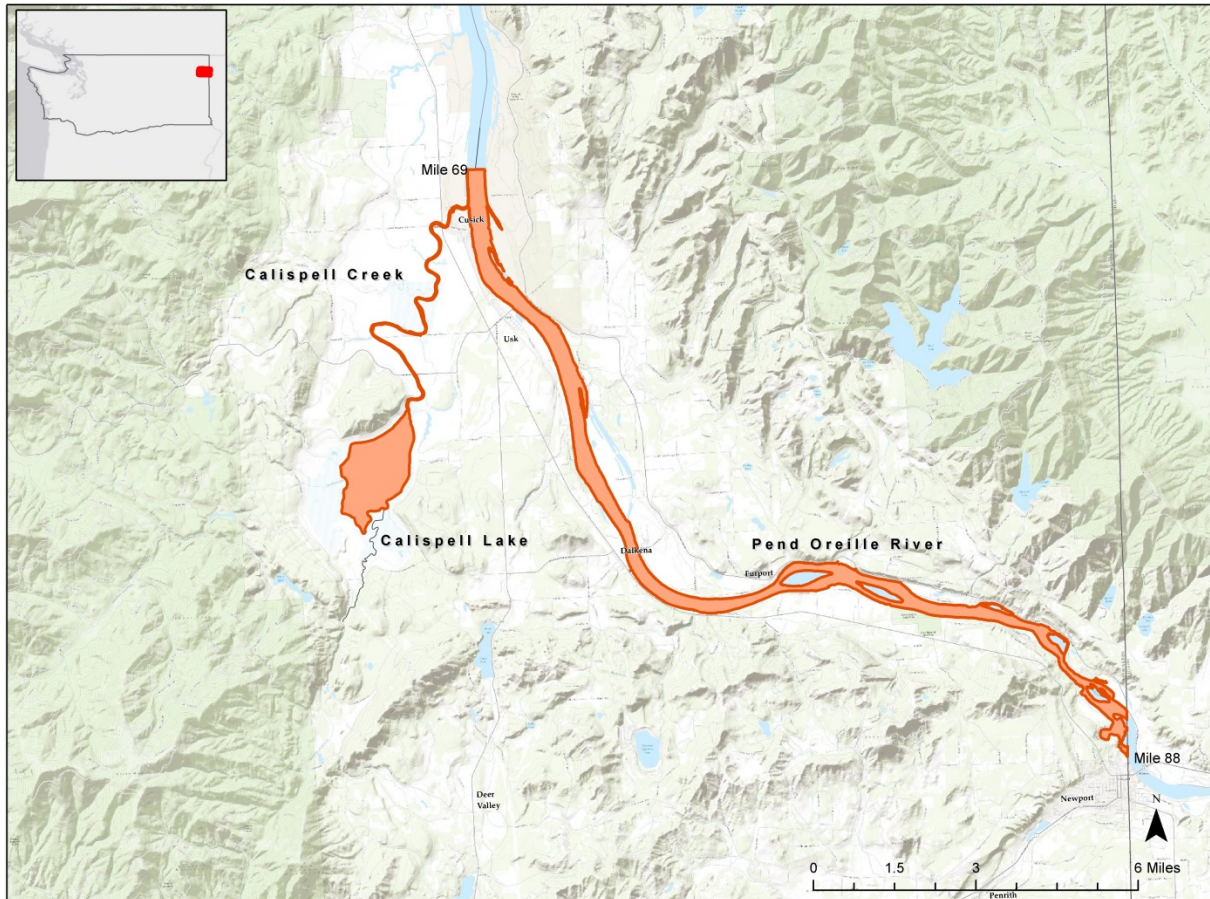
### **Sullivan Lake - Pend Oreille County**

Sullivan Lake should be considered in the freshwater reserve selection process. Sullivan Lake is connected to Sullivan Creek, a tributary of the Pend Oreille River. This state owned water body is valuable because it provides habitat for species such as the Western toad, Columbia spotted frog, Common loon and Harlequin duck. It also provides salmonid migration habitat for Kokanee, Cutthroat trout and Dollyvarden/Bull trout. The entire lake is within the Colville National Forest and surrounded by Western Larch *Larix occidentalis*, the deciduous conifer. This unique conifer bears yellow-green needles in spring, which turn a brilliant yellow in the fall before they drop for the winter. See the Sullivan Lake information sheet in Appendix C for further details about this ecologically important lake.



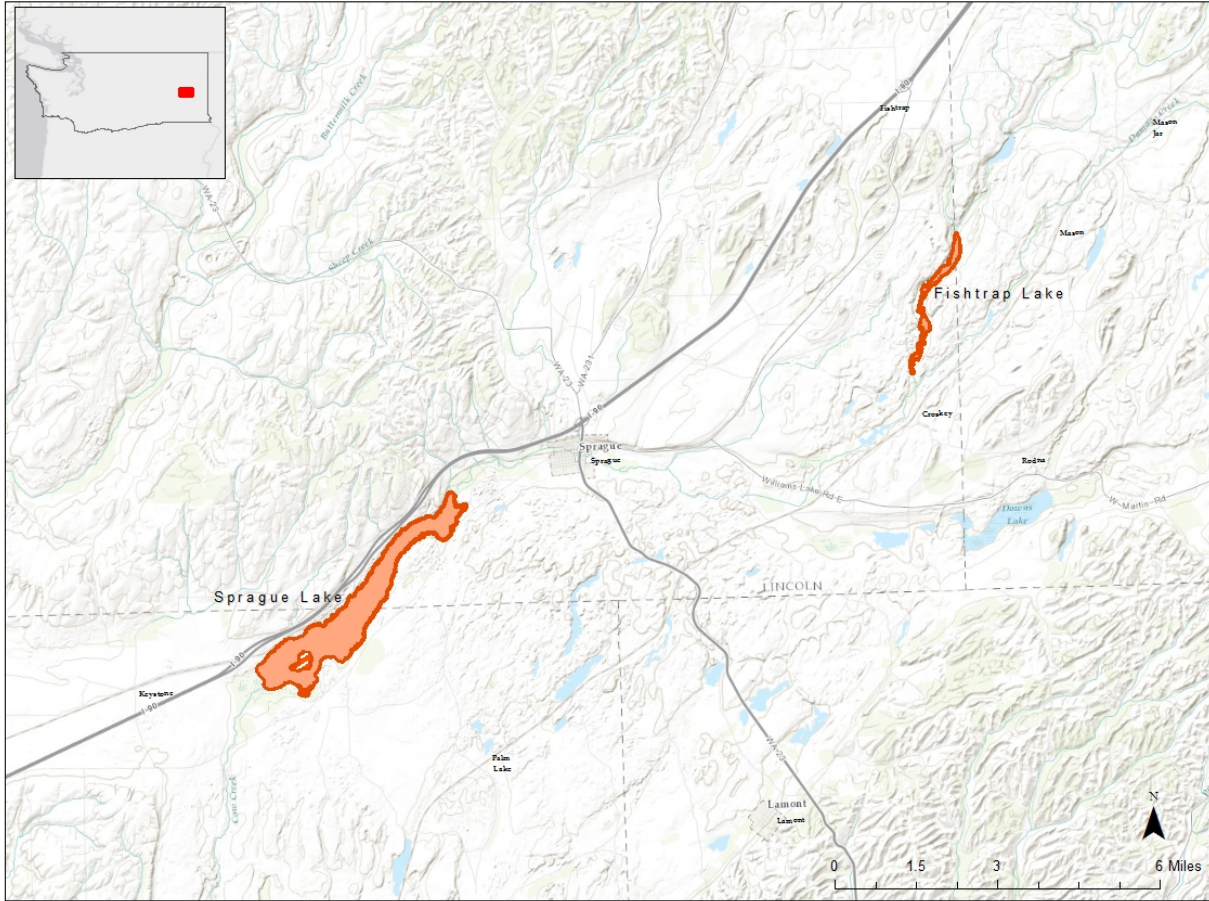
**Diamond Lake - Pend Oreille County**

Diamond Lake should be considered in the freshwater reserve selection process. This state owned water body is valuable because it provides habitat for the Northern leopard frog and Common loon. The southern portion of the lake shoreline consists of the rare wetland habitat low elevation sphagnum bog. There are only 5 locations or less of this habitat type in Washington State. This is a glacial flood scour lake which means it was formed by glaciers eroding away fractured bedrock. This lake type typically has higher flushing and drainage rates which can make it less vulnerable to impacts of runoff inputs. See the Diamond Lake information sheet in Appendix C for further details about this ecologically important lake.



**Calispell Lake – Pend Oreille County**

Calispell Lake should be considered in the freshwater reserve selection process. Calispell Lake receives water from Calispell Creek, a tributary of the Pend Oreille River. This state owned water body is valuable because it provides habitat for the Western toad, Columbia spotted frog, Northern leopard frog, and Common loon and Dolly varden/Bull trout migration. The Washington Audubon Society has designated this area as an Important Bird Area because it provides migration and nesting habitat for many bird species including the state endangered Sandhill crane and White pelican. Calispell Lake receives water from Calispell Creek, a tributary of the Pend Oreille River, both are additional water bodies recommended for reserve selection. These water bodies should be considered as a freshwater complex reserve, including the entire lake, creek and river system (Appendix A). See the Calispell Lake information sheet in Appendix C for further details about this ecologically important lake.



**Sprague Lake – Adams/Lincoln County**

Sprague Lake should be considered in the freshwater reserve selection process. This state owned water body is valuable because it provides 1,840 acres of lake and marsh habitat in the Columbia basin wildlife area for various aquatic and shorebird species. Over 1000 pairs of Ring-billed gulls and 800 pairs of California gulls nest within the lake on Harper’s Island. Other species that utilize this area include; Bonaparte’s gulls, Caspian terns, American white pelicans, Clark’s and Western grebes, Cinnamon teals, Common mergansers, Double-crested cormorants, Osprey and Peregrine falcons. Sprague Lake is part of a unique freshwater emergent wetland complex with a wetland area spanning for 38 miles over multiple county borders with Columbia spotted frog habitat throughout. See the Sprague Lake information sheet in Appendix C for further details about this ecologically important lake.

**Fishtrap Lake – Lincoln County**

Fishtrap Lake should be considered in the freshwater reserve selection process. This state owned water body is valuable because it provides habitat for the Columbia spotted frog and Common loon. It is also a part of a large scale wetland area spanning 38 miles over multiple

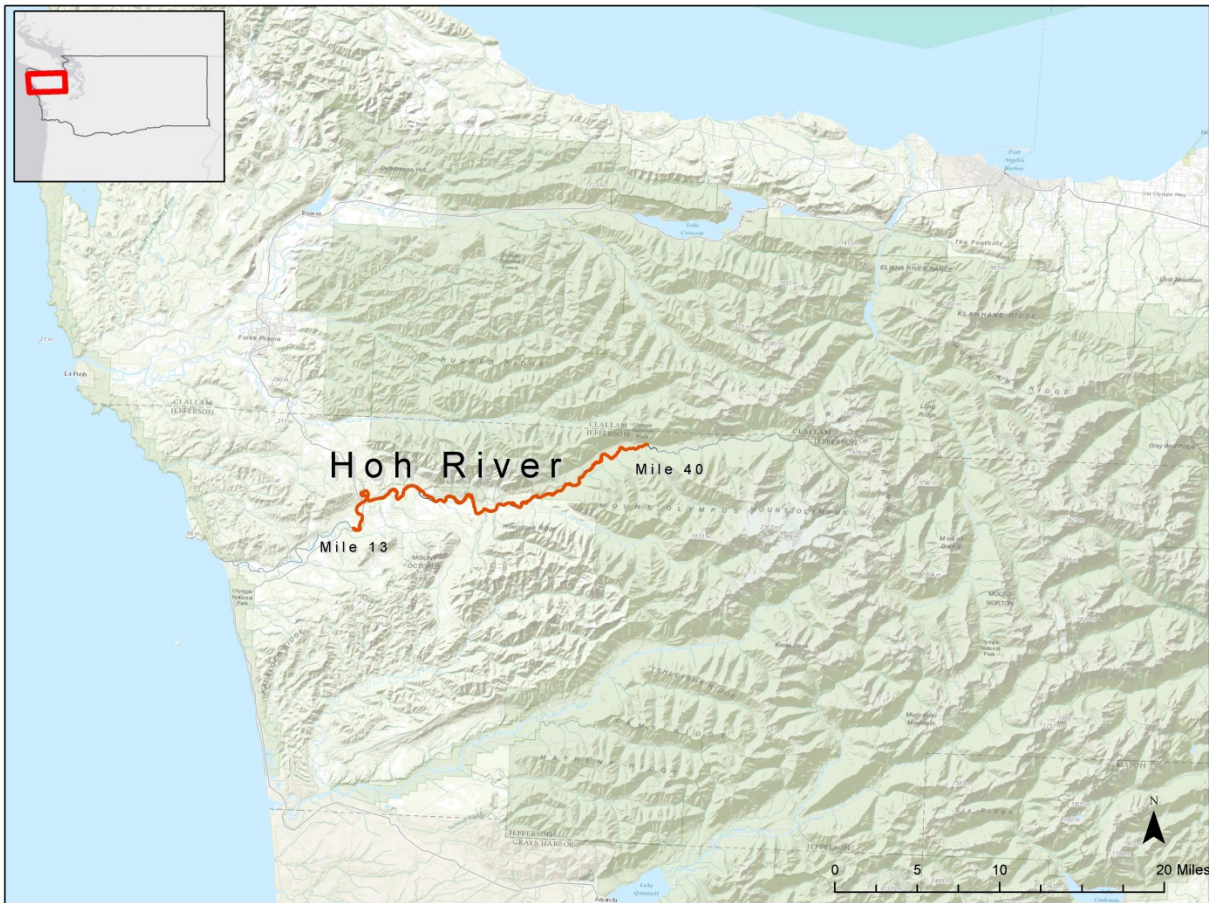
county borders with Columbia spotted frog habitat throughout. See the Fishtrap Lake information sheet in Appendix C for further details about this ecologically important lake.

## River Recommendations

The following identifies freshwater river segments with high conservation value to Washington state by highlighting their scientific value and environmental importance. The Aquatic Reserve program should use this list and water body descriptions to help determine and prioritize river segments that should be considered for DNR Aquatic Reserve status (Appendix A and B). River segments are delineated by river miles since rivers typically span such a long distance. Numbers provided on the list are not representative of water body ranking.

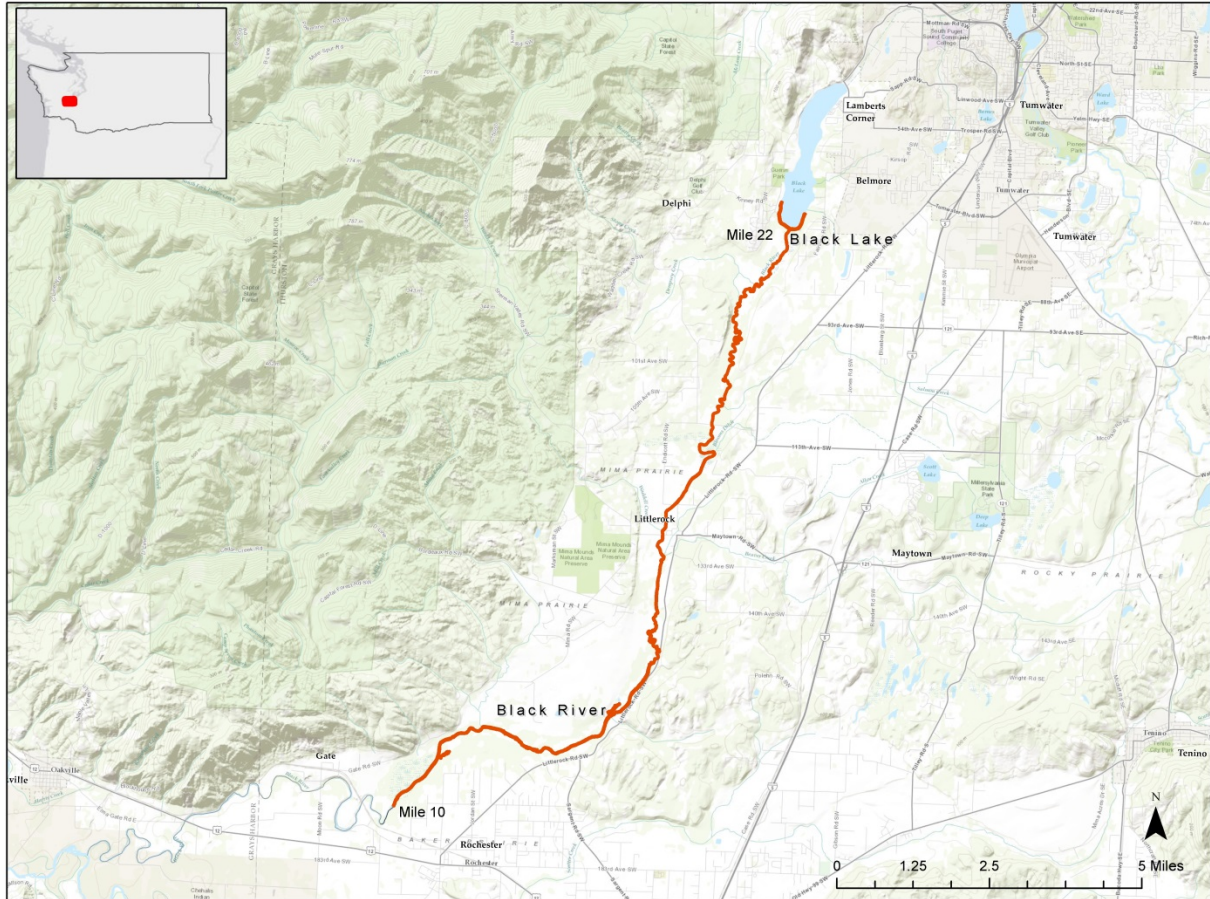
<b>River</b>	<b>County</b>	<b>River Miles</b>
<b>1</b> Hoh River	Jefferson	13-40
<b>2</b> Black River	Thurston	10-22
<b>3</b> Nisqually River	Thurston/Pierce	All of SOAL
<b>4</b> South Fork Nooksack	Whatcom	0-7
<b>5</b> Lewis and Columbia River Confluence	Cowlitz	87-99, 0-4
<b>6</b> Columbia River (Beacon Rock)	Skamania/Klickitat	141-181
<b>7</b> Similkamen River	Okanogan	4-19
<b>8</b> Methow River	Okanogan	38-47
<b>9</b> Pend Oreille River/Calispell Creek	Pend Oreille	69-88
<b>10</b> Wenatchee River (North)	Chelan	46-54
<b>11</b> Wenatchee River/Icicle Creek	Chelan	23-25,0-3
<b>12</b> Yakima River (Columbia River confluence)	Benton	333-336,0-2

## Western Washington Rivers-----



### **Hoh River – Jefferson County**

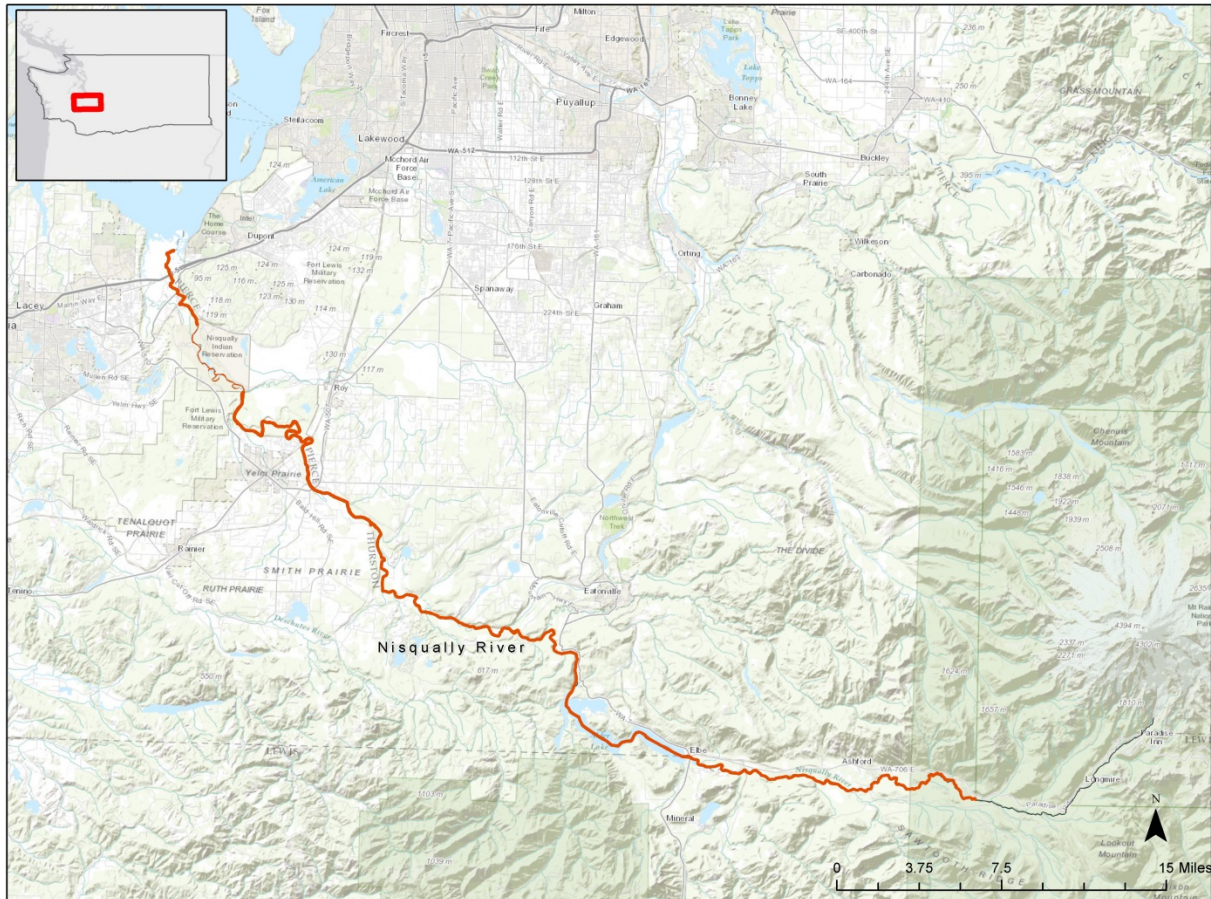
The Hoh River should be considered in the freshwater reserve selection process from river mile 13 to river mile 40. This state owned water body is valuable because it provides habitat for the Harlequin duck, Western toad and salmonid habitat for spawning, rearing and migration. It may also provide habitat for Pacific lamprey spawning. The Hoh River originates at the Hoh Glacier on Mount Olympus and flows west through the Olympic Mountains of Olympic National Park and Olympic National Forest. It empties into the Pacific Ocean at the Hoh Indian Reservation. The river is SOAL throughout this river reach. See the Hoh River information sheet in Appendix D for further details about this ecologically important river segment.



### **Black River – Thurston County**

The Black River should be considered in the freshwater reserve selection process from river mile 10 to river mile 22, where the river meets the southern shore of Black Lake (Appendix A). This state owned water body is valuable because it provides habitat for the largest known concentration of the Oregon spotted frog, a state endangered species. In addition it provides salmonid habitat for spawning, rearing and migration; and it may also provide spawning grounds for the Pacific lamprey. Other rare and uncommon species distributed in the area include the endemic Olympic mudminnow *Novumbra hubbsi* and the native freshwater mussel Western floater *Anodonta kennerlyi*. There are three conservation areas adjacent to this river segment; the Black River Preserve (The Nature Conservancy), the Scatter Creek Wildlife Area (WDFW); and the Black River-Mima Prairie Glacial Heritage Preserve (Thurston County). See the Black River information sheet in Appendix D for further details about this ecologically important river segment.





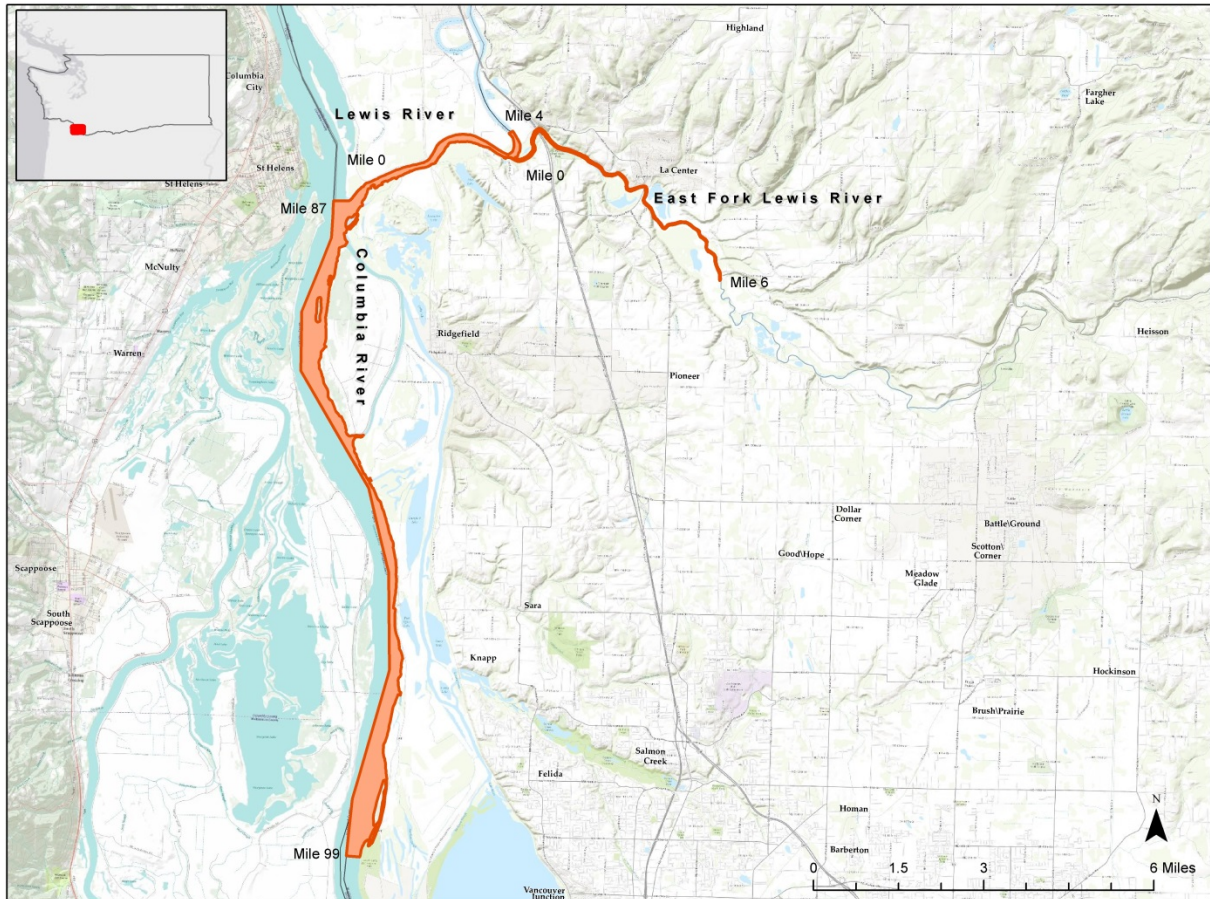
**Nisqually River – Thurston, Pierce and Lewis County**

The entire Nisqually River should be considered in the freshwater reserve selection process from where state ownership begins, near the Mt. Rainer headwaters, to the river mouth at the Nisqually Wildlife Refuge, where the river flows into south Puget Sound. This state owned water body is valuable because it provides habitat for the Western toad, Common loon, Pacific lamprey, and salmonid habitat for spawning, rearing and migration. It is a unique river system because from the headwaters to the river delta, the adjacent lands hold conservation status. See the Nisqually River information sheet in Appendix D for further details about this ecologically important river segment.



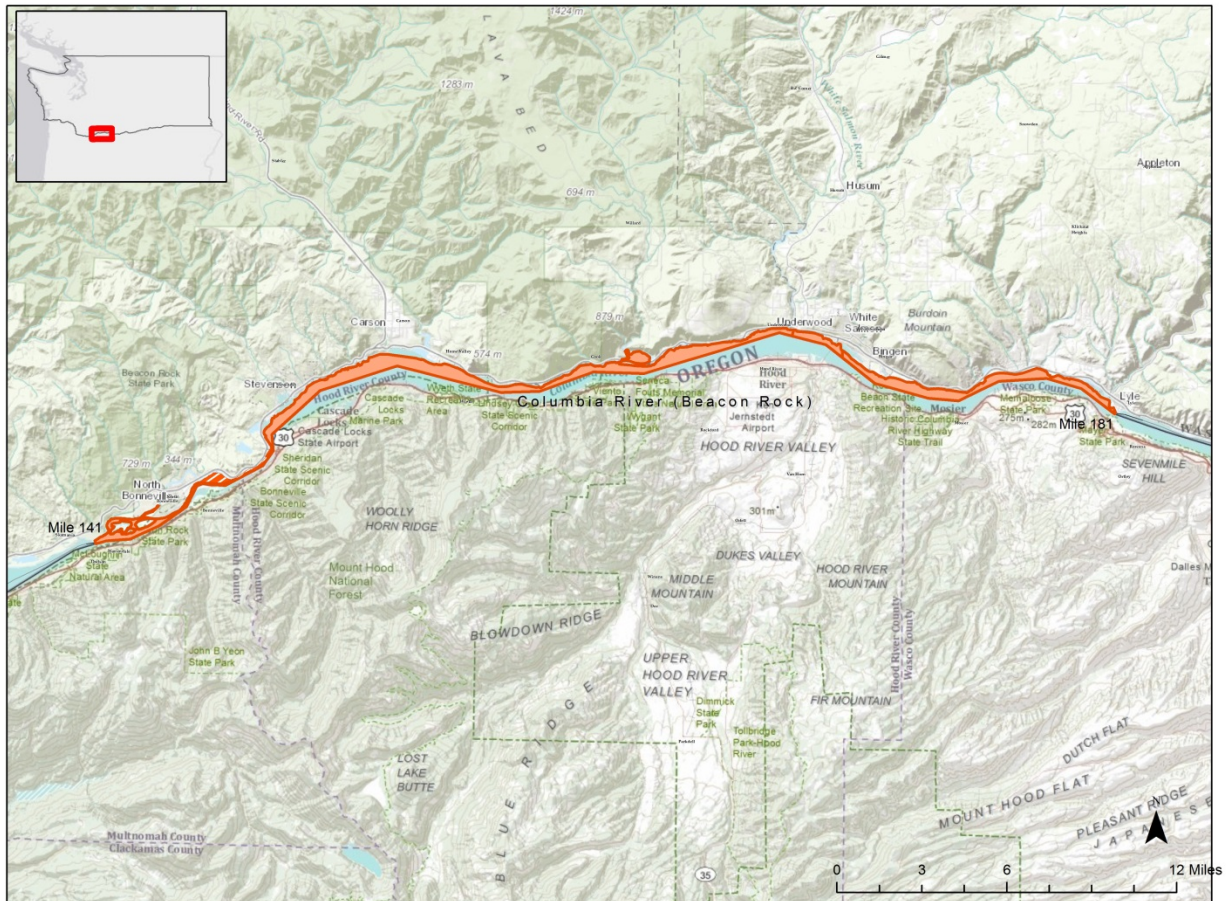
**South Fork Nooksack River – Whatcom County**

The South Fork Nooksack River should be considered in the freshwater reserve selection process from river mile 7 to river mile 0, where the river meets and joins the North Fork Nooksack River, then flows into the mainstem Nooksack River which eventually flows into Bellingham Bay in north Puget Sound. This state owned water body is valuable because it provides habitat for a concentration of the Oregon spotted frog, a state endangered species. In addition it provides salmonid habitat for spawning, rearing and migration. It may also provide spawning grounds for the Pacific lamprey and rare native mussel, the Western pearlshell. See the South Fork Nooksack River information sheet in Appendix D for further details about this ecologically important river segment.



### Lewis and Columbia River Confluence - Cowlitz County

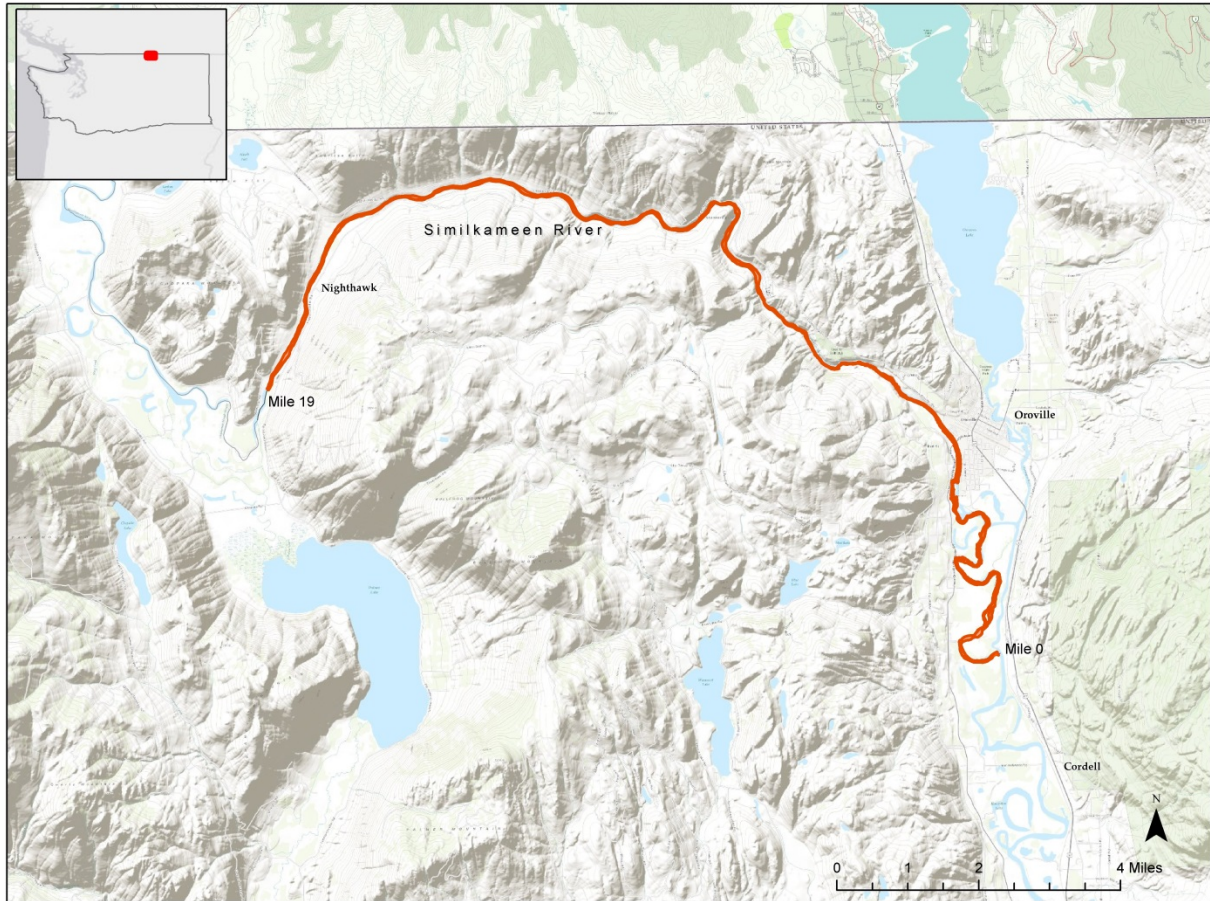
The Lewis and Columbia River confluence, in the Ridgefield National Wildlife Refuge area, should be considered in the freshwater reserve selection process. There are three river segments within this river system: the Columbia River from river mile 99 to river mile 87; a portion of the Lewis River from river mile 0 to river mile 4 meeting with the mouth of the East Fork Lewis River; this fork should also be included until SOAL ends, at river mile 0 to river mile 6 (Appendix A). These state owned water bodies are valuable because they provide habitat for a concentration of birds in the pacific flyway including the the state endangered Sandhill crane, 15,000± Canadian geese; Tundra swans; resident Bald eagles; wintering ducks such as Gadwalls, American widgeons, Northern shovelers, Northern pintails, Ring-necked ducks, Green winged teals, Buffleheads, Lesser scaups; in addition to Green herons, Black crowned night herons, and Great egrets, Black terns and Black-necked stilts. This river segment includes adjacent shoreline land management areas that provide habitat for bird migration populations including Paradise Point State Park, Ridgefield National Wildlife Refuge and Shillapoo Wildlife Area (WDFW). In addition these river segments provide habitat for the Pacific lamprey and Chinook for spawning, rearing and migration. See the Lewis River and Columbia River confluence information sheet in Appendix D for further details about these ecologically important river segments.



**Columbia River (Beacon Rock) - Skamania/Klickitat**

The Columbia River should be considered in the freshwater reserve selection process from river mile 141 to river mile 181, including Draino Lake between river mile 162 and 163. This state owned water body is valuable because it provides habitat for a concentration of the Pacific pond turtle, a state endangered species. In addition it provides habitat for the Western toad and salmonid habitat for spawning, rearing and migration. Harlequin ducks utilize a tributary to this river segment, the Little White Salmon River, which drains into Draino Lake and then the Columbia River. There is the potential is also provides habitat for Pacific lamprey spawning as tributary mouths within the river segment support this species. See the Columbia River (Beacon Rock) information sheet in Appendix D for further details about this ecologically important river segment.

## Eastern Washington Rivers-----



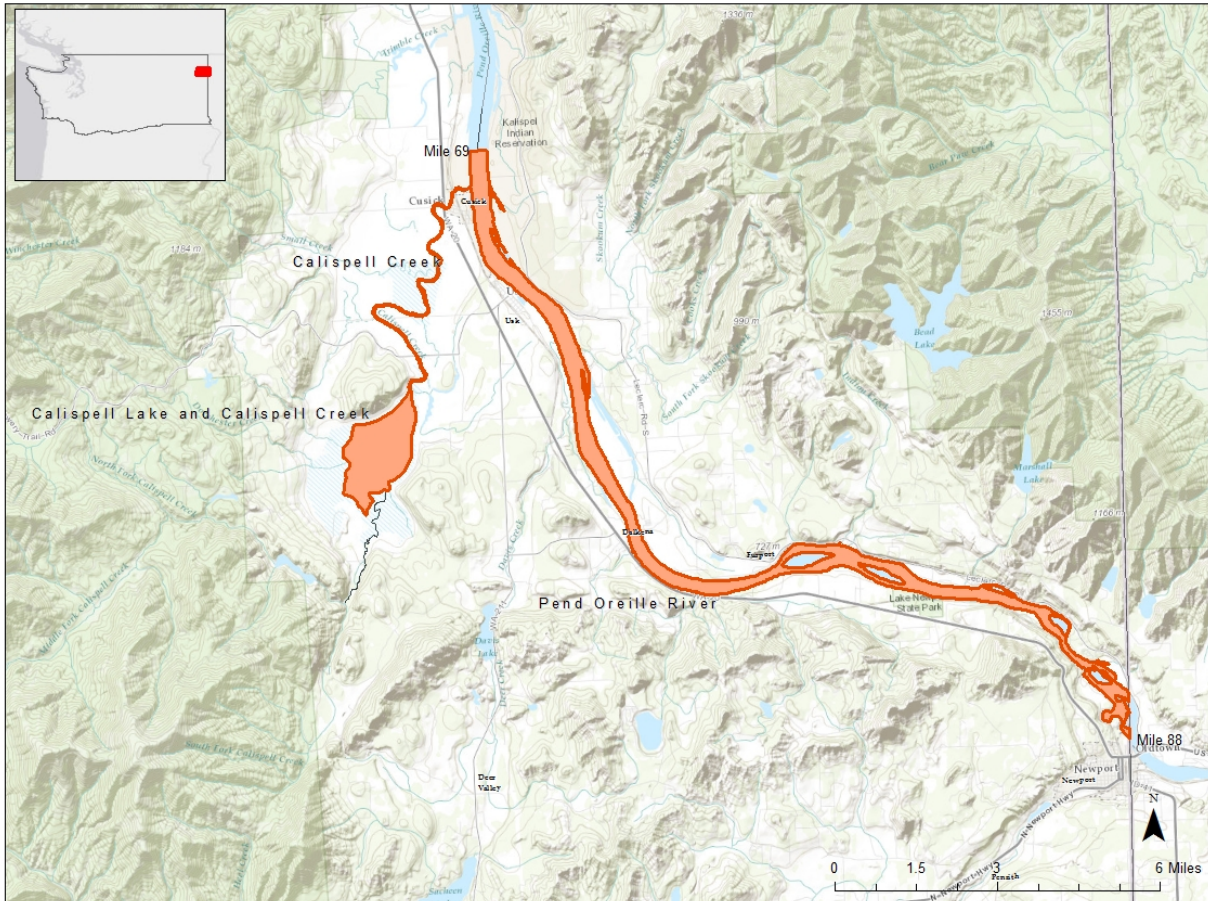
### **Similkameen River - Okanogan County**

The Similkameen River should be considered in the freshwater reserve selection process from river mile 0 to river mile 19. This state owned water body is valuable because there are multiple locations and species of native freshwater mussels, which is a unique feature of this river system and found nowhere else on SOAL. The following species are distributed from river mile 4-19; Western ridgemussel *Gonidea angulate*, California floater *Anodonta californiensis* and Western pearlshell *Margaritifera falcata*. This river segment also provides habitat for the Western toad and salmonid spawning habitat for Chinook and Steehead. See the Similkameen River information sheet in Appendix D for further details about this ecologically important river segment.



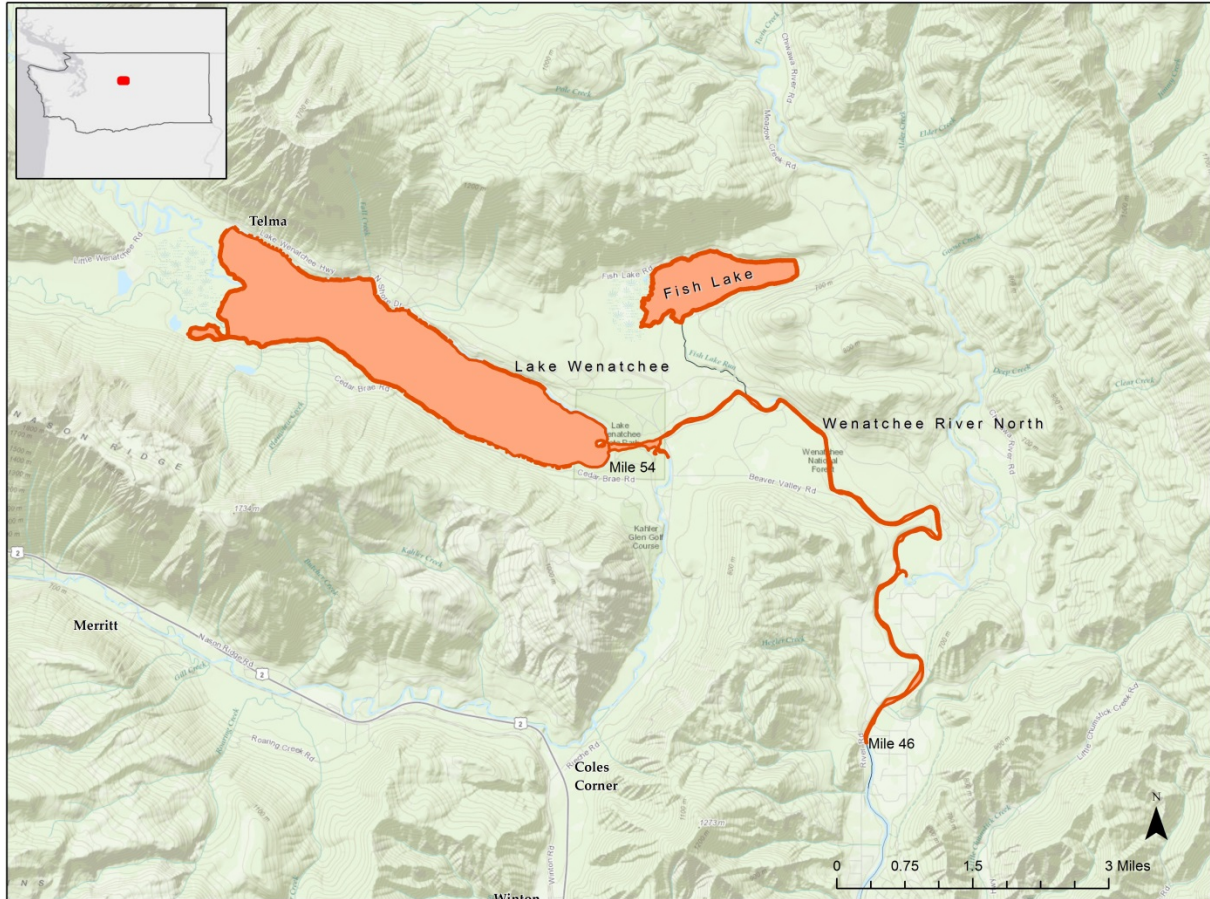
**Methow River – Okanogan County**

The Methow River should be considered in the freshwater reserve selection process from river mile 38 to river mile 47. This state owned water body is valuable because it provides habitat for the Harlequin duck and salmonid habitat for spawning, rearing and migration. The river is a tributary of the Columbia River in north central Washington and originates from a cluster of high mountains and associated tributaries into the Methow Valley. See the Methow River information sheet in Appendix D for further details about this ecologically important river segment.



**Pend Oreille River and Callispell Creek – Pend Oreille County**

The Pend Oreille River and Callispell Creek tributary should be considered in the freshwater reserve selection process from river mile 69 to the Idaho border at river mile 88. Callispell Lake is connected to this river and creek and it should be considered as a freshwater complex (Appendix A). These state owned water bodies are valuable because they provide habitat for the Northern leopard frog, Columbia spotted frog, Western toad, Common loon, the state endangered American white pelican and Sandhill crane; and salmonid migration habitat. The Usk Bridge area, which is within this river segment, has been designated by the Washington Audubon Society as an Important Bird Area. See the Pend Oreille River and Callispell Creek information sheet in Appendix D for further details about these ecologically important river and creek segments.



### **Wenatchee River (North) – Chelan County**

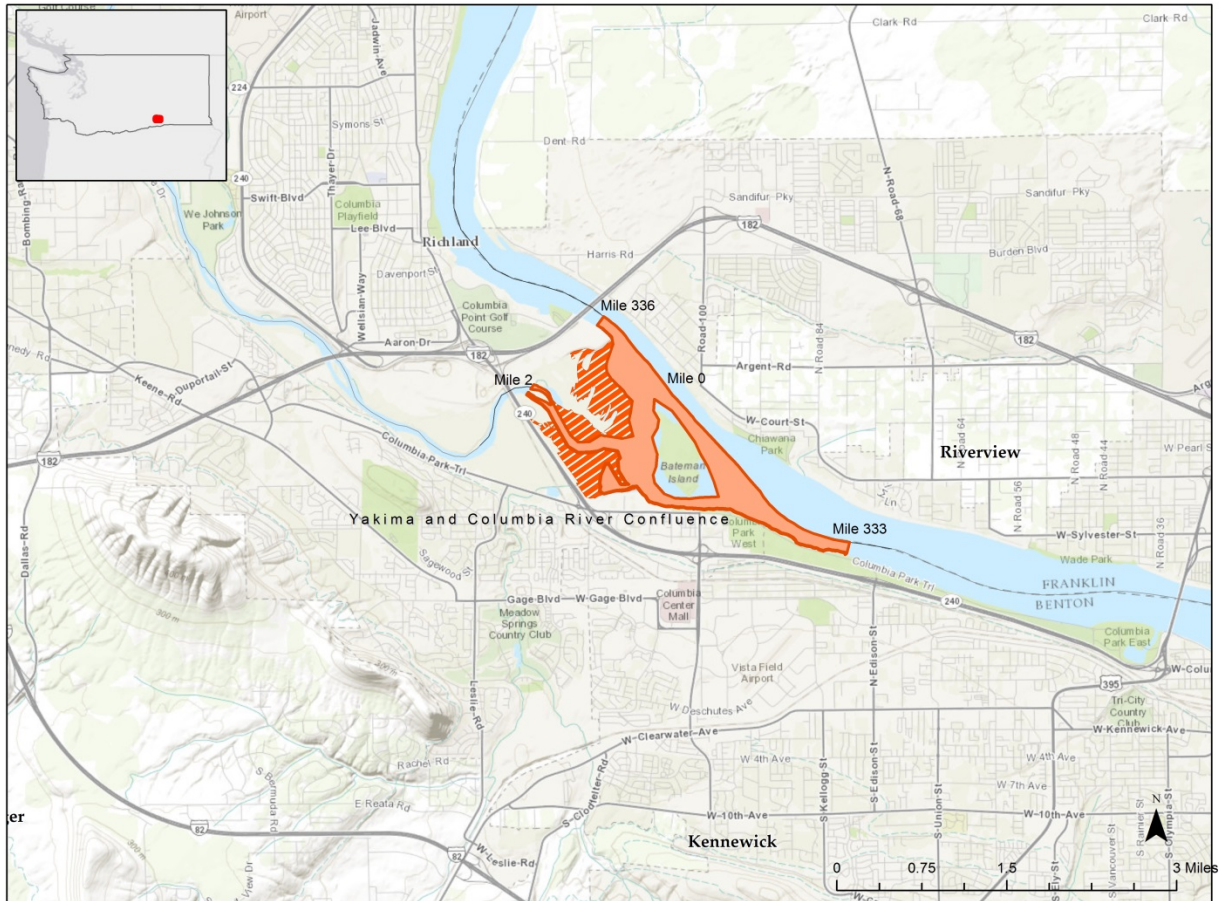
The Wenatchee River should be considered in the freshwater reserve selection process from river mile 46, just south of Beaver Creek, to river mile 54, the south shore of Lake Wenatchee. This state owned water body is predominately within the Wenatchee National forest and is valuable because it provides habitat for the Columbia spotted frog, Western toad and salmonid habitat for spawning, rearing and migration. It may also provide spawning habitat for the Pacific lamprey. River mile 46 was included in the river segment because the tributary, Beaver Creek, supports Steelhead rearing. This river should be considered as a freshwater complex with Lake Wenatchee, the river headwaters, and Fish Lake, just east of Lake Wenatchee, because both lakes are recommended in the lake section of this document (Appendix A). See the Wenatchee River North information sheet in Appendix D for further details about this ecologically important river segment.





**Wenatchee River and Icicle Creek – Chelan County**

The Wenatchee River and Icicle Creek should be considered in the freshwater reserve selection process. The Wenatchee River originates at Lake Wenatchee and flows south east for over 50 miles where it meets the Columbia River. The Wenatchee River should be considered as a freshwater reserve from river mile 23 to river mile 25 where it meets Icicle Creek. The creek should be considered for all of SOAL, from river mile 0 to river mile 3. This state owned water body is valuable because it provides habitat for the Harlequin duck and salmonid habitat for spawning, rearing and migration. Blackbird Island is within this river segment and has been designated by the Washington Audubon Society as an Important Bird Area. This area is heavily used by visitors to Leavenworth, a year round tourist destination. See the Wenatchee River and Icicle Creek information sheet in Appendix D for further details about these ecologically important river and creek segments.



**Yakima River and Columbia River Confluence – Benton County**

The Yakima River and Columbia River confluence should be considered in the freshwater reserve selection process from river mile 0 to river mile 2 in the Yakima River and from river mile 333 to river mile 336 in the Columbia River. This state owned water body is valuable because it has been designated as an Important Bird Area by the Washington Audubon Society providing a refuge for a variety of shorebirds such as Dunlins, Black-necked stilts, American avocets, Greater and Lesser yellow legs, Long billed dowitchers, Spotted sandpipers, American widgeons, Common loons, Pied-billed grebes, Hooded mergansers, Ring-necked ducks, Lesser scaups, and Northern pintails. There are five nature reserves along the river shoreline within this river segment and there is the potential the confluence provides habitat for Pacific lamprey spawning as tributary mouths support this species. See the Yakima River and Columbia River Confluence information sheet in Appendix D for further details about these ecologically important river segments.

## 5.0 Next Steps

This report identifies freshwater lakes and rivers with high conservation value in Washington State by highlighting their scientific value and environmental importance. The Aquatic Reserve program should use this report to help determine and prioritize lakes and rivers that could be considered for DNR Aquatic Reserve status. Additional aspects of Aquatic Reserve selection and planning should be considered and evaluated by the Aquatic Reserve Program. Below are some suggestions that should be evaluated to help determine the next steps in the identification process.

### **Agency Internal Suggestions**

Various water bodies are considered important by DNR internal staff that do not meet the science or environmental criteria used in this report. Land management dynamics suggest that a water body can be important even if not captured in the criteria used but are considered valuable by DNR for other reasons such as unique attributes, lack of infrastructural development, appreciation by the surrounding community, connectivity to DNR Natural Area Preserves and more. A list of these water bodies could be constructed and considered in the freshwater reserve evaluation process. If a list is generated it should include a description of why it is considered valuable. DNR programs that should be consulted with include the Stewardship Section DNR Aquatic Districts and Restoration Program.

### **External Entities**

Various water bodies may be considered important by external entities that do not meet the science or environmental criteria used in this report. Land management and community dynamics suggest that a water body can be important even if not captured in the criteria used but are considered valuable for other reasons such as local interests, on-going continued efforts, funding opportunities, research, education and more. External entities to consult with could include:

- **Washington State Conservation Commission** – Review the Conservation District websites or contact them for further discussion to determine if there are lakes or rivers with ecological, scientific, educational, or another determined value.  
<http://www.scc.wa.gov/contacts/conservation-districts/>
- **Lake Associations** – Determine if there are lake associations or lake associated groups with additional lakes to recommend. Consultation with their local efforts and obtaining available information could be beneficial.
- **Regional Fishery Enhancement Groups** - Consultation with their efforts and obtaining available information could be beneficial. Review the Regional Fishery Enhancement

Groups websites or contact them for further discussion to determine if there are lakes or rivers with ecological, scientific, educational, or other determined value.

<http://wdfw.wa.gov/about/volunteer/rfeg/>

- **Shoreline Management Plans** - Recommendations at the county level with conservation, preservation, restoration or other ecological, scientific or educational designations.  
<http://www.ecy.wa.gov/programs/sea/shorelines/smp/status.html>
- **WRIAs** – Evaluate WRIAs for recommended river segments and determine if there is information available for recommended lakes or rivers that would add to the ecological, scientific, educational, or other determined value.  
<http://www.ecy.wa.gov/apps/watersheds/wriapages/>

### **Further Data Collection**

The findings in this report were determined using various data layers available to DNR. It is recommended that people familiar with the local biology and ecology of a water body are contacted to understand field knowledge. In addition, further research should be completed on each water body to obtain a greater understanding of the lake or river history and current status.

### **Considerations**

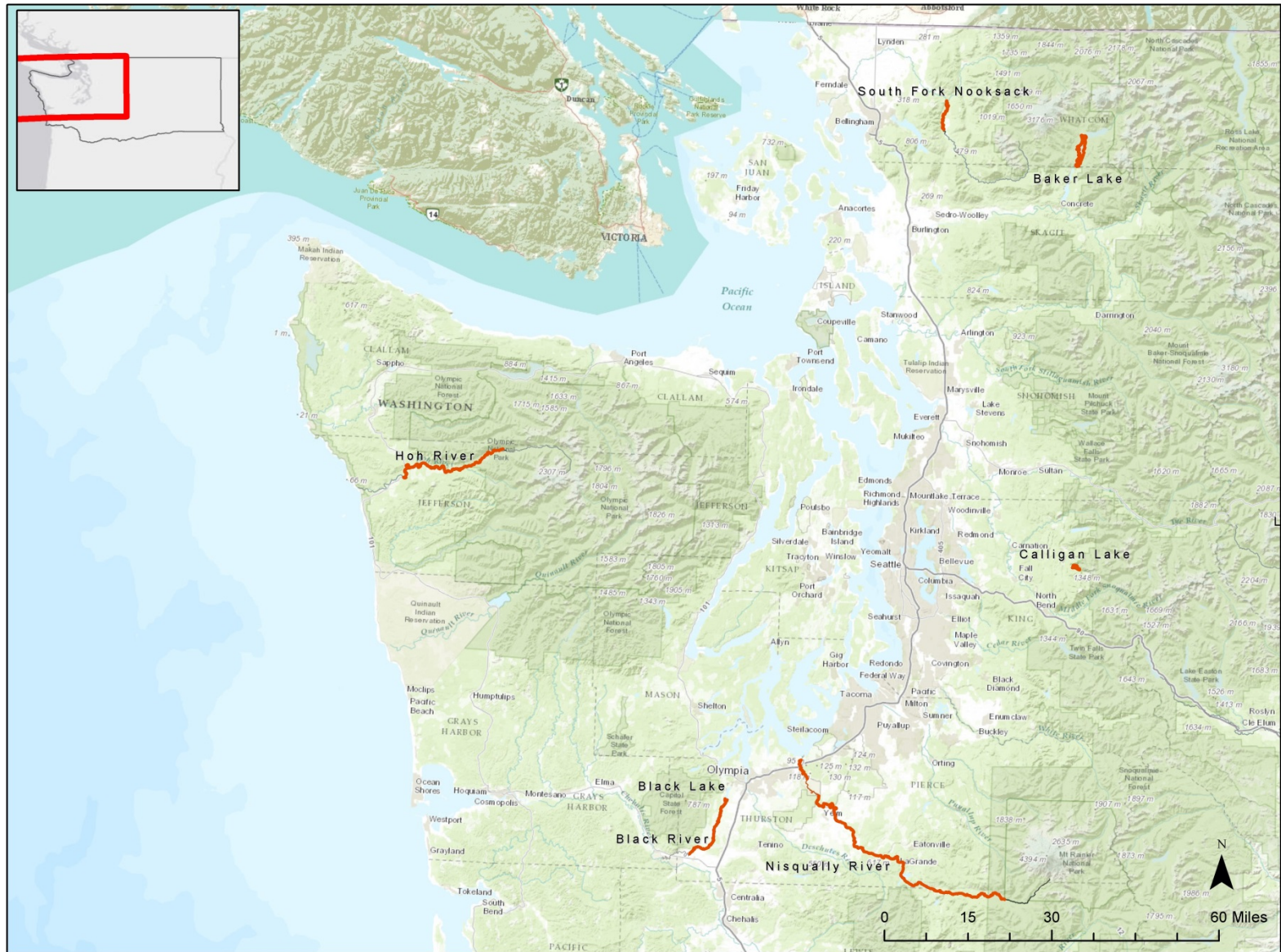
The following entities were contacted in the initial criteria forming process of water body selection. When DNR decides to move forward with the freshwater reserve selection process it could be important to contact the following to determine what level of participation, if any, they could have in the planning process.

- Washington State Lake Protection Association (WALPA)  
<http://www.walpa.org/>
- North American Lake Management Society (NALMS)  
<http://www.nalms.org/>
- Oregon Lakes Association (OLA)  
<http://www.oregonlakes.org/>
- American Rivers, Wild and Scenic: Northwest/Pacific Region  
<http://www.americanrivers.org/region/northwest/>
- River Restoration Northwest  
<http://www.rrnw.org/Home>
- The Nature Conservancy

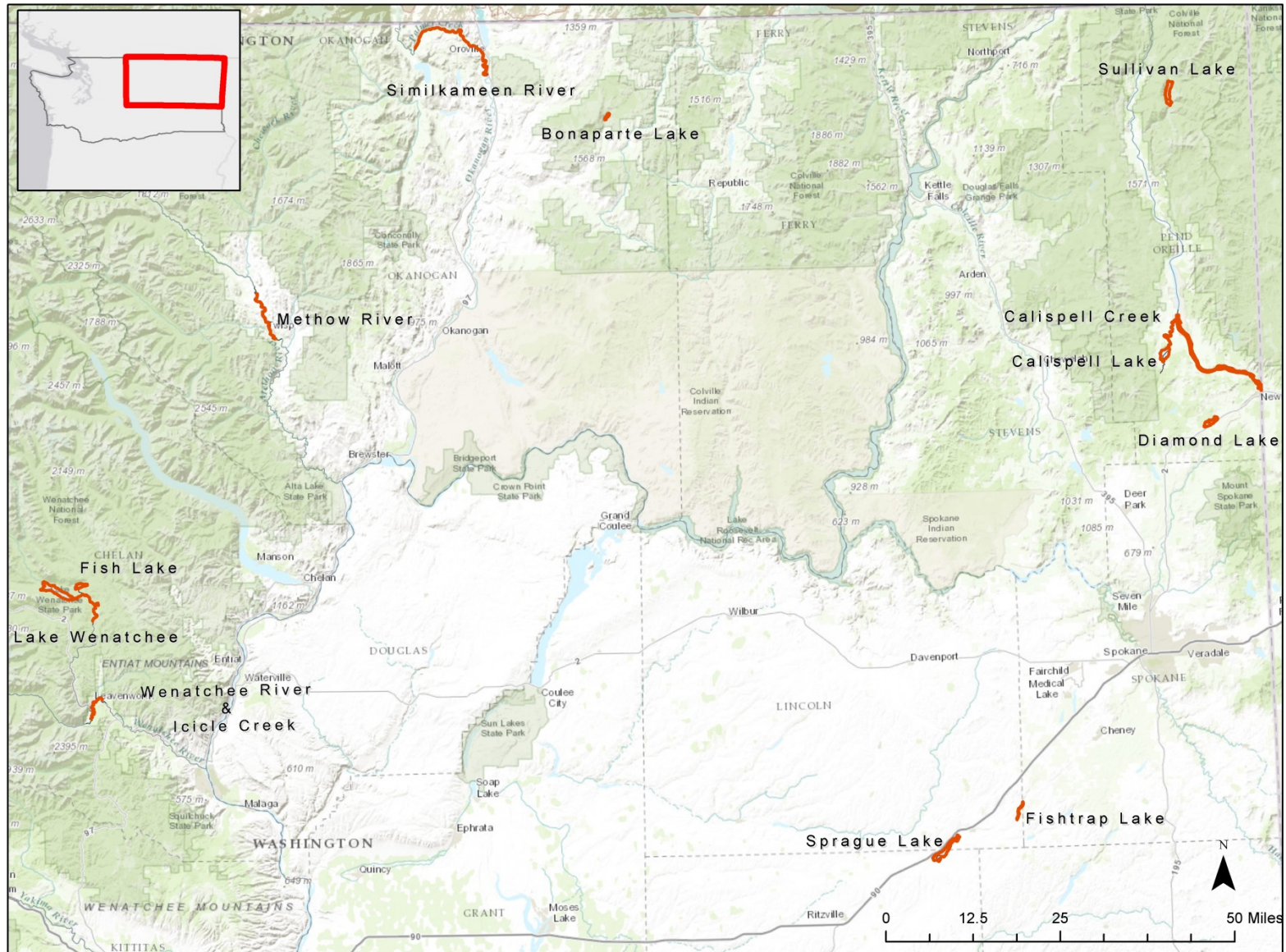
**APPENDIX A**  
**Lakes, Rivers and Freshwater Complex List**

	<b>Lakes</b>	<b>County</b>
<b>1</b>	<i>Baker Lake</i>	<i>Whatcom</i>
<b>2</b>	<i>Calligan Lake</i>	<i>King</i>
<b>3</b>	<i>Bonaparte Lake</i>	<i>Okanogan</i>
<b>4</b>	<i>Lake Wenatchee</i>	<i>Chelan</i>
<b>5</b>	<i>Fish Lake</i>	<i>Chelan</i>
<b>6</b>	<i>Sullivan Lake</i>	<i>Pend Oreille</i>
<b>7</b>	<i>Diamond Lake</i>	<i>Pend Oreille</i>
<b>8</b>	<i>Lake Calispell</i>	<i>Pend Oreille</i>
<b>9</b>	<i>Sprague Lake</i>	<i>Adams/Lincoln</i>
<b>10</b>	<i>Fishtrap Lake</i>	<i>Lincoln</i>
	 <b>Rivers</b>	
<b>1</b>	<i>Hoh River</i>	<i>Jefferson</i>
<b>2</b>	<i>Black River</i>	<i>Thurston</i>
<b>3</b>	<i>Nisqually River</i>	<i>Thurston/Pierce</i>
<b>4</b>	<i>South Fork Nooksack River</i>	<i>Whatcom</i>
<b>5</b>	<i>Lewis and Columbia River Confluence</i>	<i>Cowlitz</i>
<b>6</b>	<i>Columbia River (Beacon Rock)</i>	<i>Skamania/Klickitat</i>
<b>7</b>	<i>Similkamen River</i>	<i>Okanogan</i>
<b>8</b>	<i>Methow River</i>	<i>Okanogan</i>
<b>9</b>	<i>Pend Oreille River and Calispell Creek</i>	<i>Pend Oreille</i>
<b>10</b>	<i>Wenatchee River North</i>	<i>Chelan</i>
<b>11</b>	<i>Wenatchee River and Icicle Creek</i>	<i>Chelan</i>
<b>12</b>	<i>Yakima and Columbia River Confluence</i>	<i>Benton</i>
	 <b>Freshwater Complexes (listed separately above)</b>	
<b>1</b>	<i>Lake Wenatchee, Fish Lake and Wenatchee River</i>	<i>Chelan</i>
<b>2</b>	<i>Black River and south shore of Black Lake</i>	<i>Thurston</i>
<b>3</b>	<i>Lake Calispell, Calispell Creek and Pend Oreille River</i>	<i>Pend Oreille</i>
<b>4</b>	<i>Lewis and Columbia River Confluence and East Fork Lewis River</i>	<i>Cowlitz</i>

APPENDIX B  
Maps of Lakes and Rivers Identified in Washington State  
Quad Zoom Level

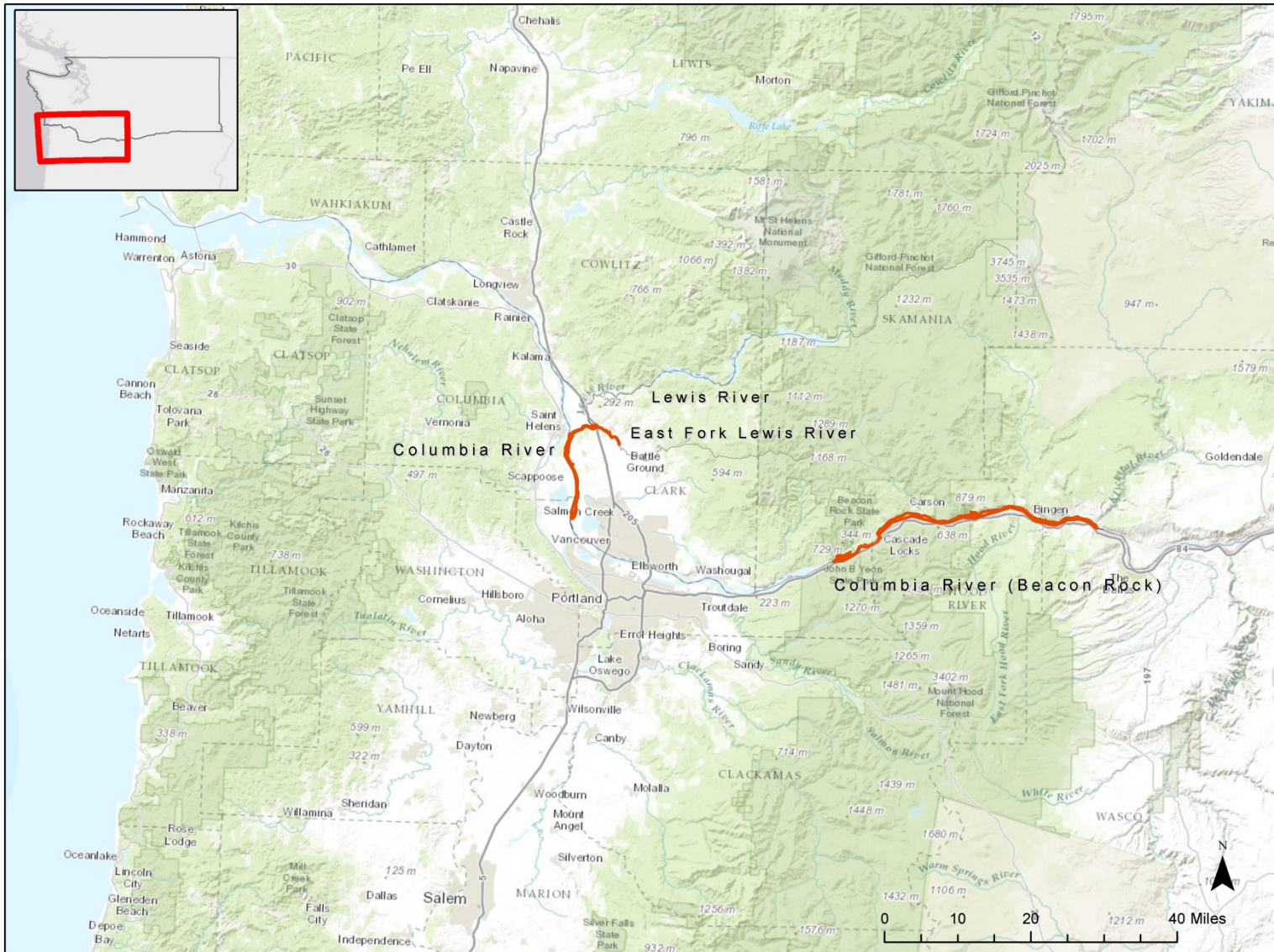


North West Washington – lakes and rivers identified for Aquatic Reserve selection.

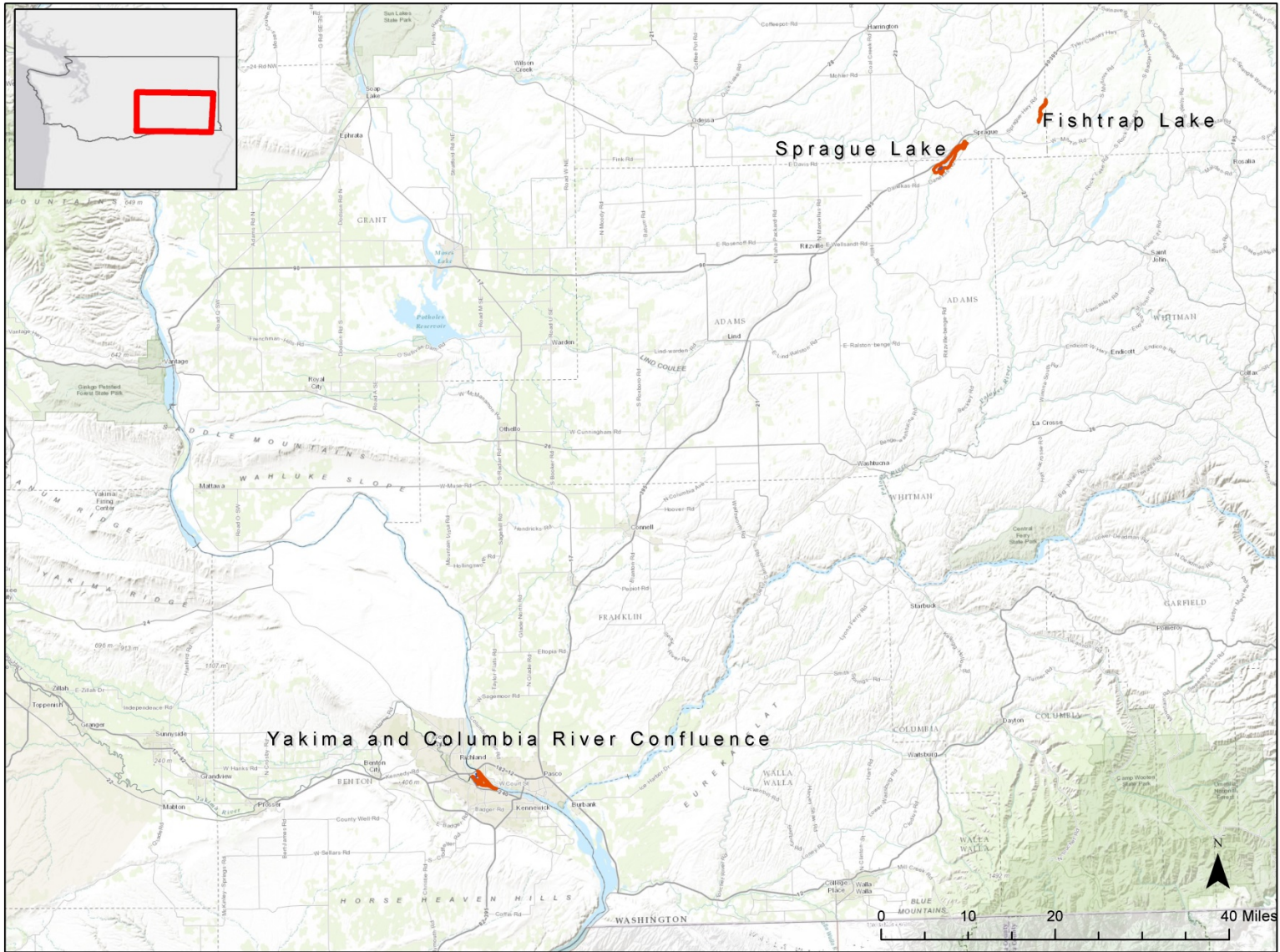


North East Washington – lakes and rivers identified for Aquatic Reserve selection.





South West Washington – lakes and rivers identified for Aquatic Reserve selection.



South East Washington – lakes and rivers identified for Aquatic Reserve selection.

APPENDIX C  
Lake Information Sheets

<b>Baker Lake Whatcom County</b>	
<b>Species Diversity</b>	Western toad Common loon (nesting and use) Marbled murrelet (nesting and use) Salmonid Spawning: tributaries only (Coho, Sockeye, Steelhead and Dolly varden/Bull trout) Salmonid Rearing: Coho, Sockeye, Steelhead and Dolly varden/Bull trout Salmonid Migration: Kokanee, Chinook and Steelhead
<b>Species Concentrations</b>	Common loon , Marbled murrelet, Western toad and salmonid spawning
<b>S1 or S2 Status - Plants</b>	Luminous moss <i>Schistostega pennata</i> (S2), Beard Lichen <i>Usnea longissima</i> (S2)
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	Not surveyed by DOE
<b>Ecoregion</b>	
	North Cascades
<b>Latitude</b>	48.686366
<b>Longitude</b>	-121.669321
<b>Size</b>	4,800 acres
<b>Connectivity to SOAL</b>	
	Lake flows into the Skagit River in Skagit County.
<b>Lake Type</b>	Impoundment
<b>Wetland Connections</b>	Wetlands extend beyond the lake as a wetland complex. To the north east are lakes, freshwater forested/shrub, freshwater emergent and riverine wetlands. To the south west is Lake Shannon.
<b>Terrestrial Connectivity</b>	Mount Baker-Snoqualmie National Forest
<b>Land Cover</b>	Predominantly evergreen forest, mixed forest and shrub scrub surrounds the lake with 0% development.
<b>Percent Impervious Surfaces</b>	The area surrounding the lake is comprised of 0-10% impervious surfaces. There are roads in a couple locations along the western shore.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are predominately SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	Upper Baker Dam (south of lake), West Pass Dike (south west shore)
<b>Outfalls</b>	One outfall on this lake from the Baker River Hatchery (NPDES).
<b>Boat Launches</b>	There are several boat launches on this lake.
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for the western toad and salmonids. A Common loon nest platform was installed in 2009, which should be included. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Mount Baker-Snoqualmie National Forest and Whatcom County Shoreline Master Program. Contact WDFW for potential salmonid surveys. A bird survey schedule should be considered.

<b>Calligan Lake King County</b>	
<b>Species Diversity</b>	Common loon (nesting) Salmonid Migration: Cutthroat
<b>Species Concentrations</b>	One of the two Common loon nesting locations on SOAL, only 13 known locations in Washington State.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	Not surveyed by DOE
<b>Ecoregion</b>	
	North Cascades
<b>Latitude</b>	47.605157
<b>Longitude</b>	-121.669085
<b>Size</b>	251+ acres
<b>Connectivity to SOAL</b>	
	None
<b>Lake Type</b>	Glacial Drift Plain
<b>Wetland Connections</b>	None
<b>Terrestrial Connectivity</b>	Southeast portion of lake borders Snoqualmie National Forest.
<b>Land Cover</b>	Predominately evergreen forest, shrub scrub and herbaceous vegetation surrounds the lake with 0% development.
<b>Percent Impervious Surfaces</b>	The area surrounding the lake is comprised of 0-10% impervious surfaces. There are roads along the north and east shore of the lake.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are predominately SOAL. Approximately 1,465 ft of shoreline are private.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	None
<b>Outfalls</b>	None
<b>Boat Launches</b>	There are no motorized boat launches on this lake
<b>303D</b>	PCB, Alpha-BHC, Dioxin
<b>305B</b>	Heptachlor, Hexachlorocyclopentadiene, Hexachloroethane, Isophorone, Mercury, Nitrobenzene, N-Nitrosodiphenylamine, Phenol, Pyrene, Gamma-bhc (Lindane), Fluorene, Fluoranthene, Endrin, Endosulfan Sulfate, Endosulfan I, Endosulfan II, Dioxin, Dibutyl phthalate, Dimethyl phthalate, Diethyl phthalate, Bis(2-Ethylhexyl) Phthalate, Bis(2-chloroisopropyl)ether, Beta-BHC, Anthracene, Alpha-BHC, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, 2,4-Dinitrophenol, 2,4-Dichlorophenol, PCB, Chlordane, 2,4,6-Trichlorophenol, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene
<b>Potential Management Options</b>	Habitat assessment and/or monitoring with an emphasis on Common loon nesting. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Snoqualmie National Forest and King County Shoreline Master Program. Contact WDFW for potential salmonid surveys. A bird survey schedule should be considered. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas.

<b>Bonaparte Lake Okanogan County</b>	
<b>Species Diversity</b>	Common loon (nesting) Black tern (breeding) Salmonid Spawning: tributary only (Kokanee)
<b>Species Concentrations</b>	One of the two loon nesting locations on SOAL, only 13 known locations in Washington State.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	32 species (invasive species present)
<b>Ecoregion</b>	
<b>Ecoregion</b>	Okanogan
<b>Latitude</b>	48.800596
<b>Longitude</b>	-119.054138
<b>Size</b>	116+ acres
<b>Connectivity to SOAL</b>	
<b>Connectivity to SOAL</b>	None
<b>Lake Type</b>	
<b>Lake Type</b>	Impoundment
<b>Wetland Connections</b>	
<b>Wetland Connections</b>	Wetlands extend beyond the lake in a wetland complex. To the north east is a smaller lake, freshwater emergent wetlands and a freshwater pond. To the south are freshwater emergent wetlands, freshwater forested/shrub wetlands and freshwater ponds.
<b>Terrestrial Connectivity</b>	
<b>Terrestrial Connectivity</b>	Okanogan National Forest surrounds approximately 95% of the lake with approximately 5% bordering DNR surface managed lands.
<b>Land Cover</b>	
<b>Land Cover</b>	Predominately evergreen forest with less than 5% shrub scrub vegetation surrounds the lake with 0% development.
<b>Percent Impervious Surfaces</b>	
<b>Percent Impervious Surfaces</b>	The area surrounding the lake is comprised of 0% impervious surfaces.
<b>Shoreline/Bedland Ownership</b>	
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are entirely SOAL
<b>Herbicide Treatment History</b>	
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	
<b>Dams</b>	One dam on the south portion of the lake, Bonaparte Lake Dam
<b>Outfalls</b>	
<b>Outfalls</b>	None
<b>Boat Launches</b>	
<b>Boat Launches</b>	Two motorized boat launches: Located on the south and south east shoreline
<b>303D</b>	
<b>303D</b>	No
<b>305B</b>	
<b>305B</b>	No
<b>Potential Management Options</b>	
<b>Potential Management Options</b>	Habitat assessment and/or monitoring with an emphasis on common loon nesting and black tern breeding. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Okanogan National Forest and Okanogan County Shoreline Master Program. Contact WDFW for potential Kokanee surveys to determine tributary spawning connection with SOAL. A bird survey schedule should be considered.

<b>Lake Wenatchee Chelan County</b>	
<b>Species Diversity</b>	Western toad Columbia spotted frog (old) Common loon Pacific lamprey (old) Salmonid Rearing: Sockeye, Dolly varden/Bull trout and Steelhead
<b>Species Concentrations</b>	None
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	30 species (invasive species present)
<b>Ecoregion</b>	
<b>Ecoregion</b>	East Cascades
<b>Latitude</b>	47.820874
<b>Longitude</b>	-120.771441
<b>Size</b>	2270+ acres
<b>Connectivity to SOAL</b>	
<b>Connectivity to SOAL</b>	Wenatchee River
<b>Lake Type</b>	Glacial Scour
<b>Wetland Connections</b>	Wetlands extend beyond the lake as a wetland complex. To the north west are freshwater forested/shrub, freshwater emergent and riverine wetlands. To the south east are freshwater forested/shrub and riverine wetlands. Fish Lake is approximately 1 ¼ miles east of Lake Wenatchee and is a recommended lake.
<b>Terrestrial Connectivity</b>	Wenatchee National Forest surrounds 75% of the lake. Lake Wenatchee State Park is located on the southeast shoreline.
<b>Land Cover</b>	Predominately evergreen forest surrounds the lake with the north west portion consisting of woody wetlands. Development at low intensity surrounds the lake which is from roads.
<b>Percent Impervious Surfaces</b>	The area surrounding the lake is comprised of 0-10% impervious surface however roads adjacent to 90% of the lake account for 10-100% impervious surface.
<b>Shoreline/Bedland Ownership</b>	Approximately 50% of the lake shoreline is private
<b>Herbicide Treatment History</b>	
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	None
<b>Outfalls</b>	One outfall exists on this lake
<b>Boat Launches</b>	Two motorized boat launches: The Glacier View Campground boat launch is located on the north west shoreline and Lake Wenatchee State Park boat launch is located on the south east shoreline.
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for the Western toad, Columbia spotted frog, Common loon, Pacific lamprey and salmonids. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider partnerships with Wenatchee National Forest, Lake Wenatchee State Park, and Chelan County Shoreline Master Program. A bird survey schedule should be considered.

<b>Fish Lake Chelan County</b>	
<b>Species Diversity</b>	Western toad Columbia spotted frog
<b>Species Concentrations</b>	None
<b>S1 or S2 Status - Plants</b>	On the south east shoreline: Bristly sedge <i>Carex comosa</i> (S2), Bulb bearing water hemlock <i>Cicuta bulbifera</i> (S2)
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	45 species (invasive species present)
<b>Ecoregion</b>	
	East Cascades
<b>Latitude</b>	
	47.834837
<b>Longitude</b>	
	-120.706095
<b>Size</b>	
	435+ acres
<b>Connectivity to SOAL</b>	
	None
<b>Lake Type</b>	
	Glacial Scour
<b>Wetland Connections</b>	
	Wetlands extend beyond the lake as a wetland complex. To the west are freshwater emergent wetlands. To the south and east are freshwater forested/shrub wetlands. Lake Wenatchee is approximately 1 ¼ miles west of Fish Lake and is a recommended lake.
<b>Terrestrial Connectivity</b>	
	The entire lake is within the Wenatchee National Forest
<b>Land Cover</b>	
	The vegetation is predominately evergreen forest and emergent herbaceous or woody wetlands. Low intensity development surrounds 75% of the lake and appears to be from roads along the north and south shore.
<b>Percent Impervious Surfaces</b>	
	The area surrounding the lake is comprised of 0-10% impervious surfaces.
<b>Shoreline/Bedland Ownership</b>	
	Shoreline/bedlands are entirely SOAL
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	
	None
<b>Outfalls</b>	
	None
<b>Boat Launches</b>	
	Motorized boat launches located on the north west and south west shoreline.
<b>303D</b>	
	No
<b>305B</b>	
	No
<b>Potential Management Options</b>	
	Habitat assessment and/or monitoring for the Western toad and Columbia spotted frog. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Wenatchee National Forest and Chelan County Shoreline Master Program. A bird survey schedule should be considered.



<b>Sullivan Lake Pend Oreille County</b>	
<b>Species Diversity</b>	Western toad Columbia spotted frog (old) Common loon Salmonid Migration: Cutthroat, Kokanee and Dolly varden/Bull trout
<b>Species Concentrations</b>	Common loon and Western toad
<b>S1 or S2 Status – Plants</b>	South portion of shoreline: Crested Shield-fern <i>Cryptotis cristata</i> (S2) and Kidney-leaf White Violet <i>Viola renifolia</i> (S2)
<b>Rare/Uncommon Species (other)</b>	The lake is surrounded by Western Larch <i>Larix occidentalis</i> , the deciduous conifer. This unique conifer bears yellow-green needles in spring, which turn a brilliant yellow in the fall before they drop for the winter.
<b>Plant Diversity</b>	11 species
<b>Ecoregion</b>	
	Canadian Rocky Mountains
<b>Latitude</b>	48.815153
<b>Longitude</b>	-117.292982
<b>Size</b>	1180+ acres
<b>Connectivity to SOAL</b>	
	The lake is connected to Sullivan Creek, a tributary of the Pend Oreille River.
<b>Lake Type</b>	Impoundment
<b>Wetland Connections</b>	At the southern tip of the lake are freshwater emergent, forested/shrub and riverine wetlands.
<b>Terrestrial Connectivity</b>	The entire lake is within the Colville National Forest.
<b>Land Cover</b>	Predominately evergreen forest with 0% development surrounds the lake.
<b>Percent Impervious Surfaces</b>	The area surrounding the lake is comprised of 0-10% impervious surfaces.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are entirely SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	One dam on the north lake shoreline, Sullivan Lake Dam
<b>Outfalls</b>	None
<b>Boat Launches</b>	Two motorized boat launches are located on the lake. East Sullivan Lake Campground on the north shore and Noisy Creek Campground boat launch on the south shore.
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for the Western toad, Columbia spotted frog, Common loon and salmonids. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Colville National Forest and Pend Oreille County Shoreline Master Program. A bird survey schedule should be considered.

<b>Diamond Lake Pend Oreille County</b>	
<b>Species Diversity</b>	Northern leopard frog Common loon
<b>Species Concentrations</b>	None
<b>S1 or S2 Status – Plants</b>	On the south west portion of lake is Swamp Birch <i>Betula nana</i> / Wiregrass Sedge Shrubland <i>Carex lasiocarpa</i> (S2) and Low elevation Sphagnum Bog (S1)
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	54 species (invasive species present)
<b>Ecoregion</b>	
<b>Ecoregion</b>	Canadian Rocky Mountains
<b>Latitude</b>	48.127555
<b>Longitude</b>	-117.19971
<b>Size</b>	672+ acres
<b>Connectivity to SOAL</b>	
<b>Connectivity to SOAL</b>	None
<b>Lake Type</b>	Glacial Flood Scour
<b>Wetland Connections</b>	Wetlands extend beyond the lake as a wetland complex. To the southwest and northeast are freshwater emergent, freshwater forested/shrub and pond wetlands.
<b>Terrestrial Connectivity</b>	None
<b>Land Cover</b>	Approximately 75% of the lake is surrounded by low to medium intensity development with evergreen forest on the periphery. The south west portion of the lake is surrounded by woody and emergent herbaceous wetlands.
<b>Percent Impervious Surfaces</b>	Approximately 75% of the lake is surrounded by 25-75% impervious surface. The south west portion of the lake is surrounded by 0% impervious surface.
<b>Shoreline/Bedland Ownership</b>	Approximately 50% of the shoreline is private.
<b>Herbicide Treatment History</b>	
<b>Herbicide Treatment History</b>	History of herbicide treatment includes: 2, 4-D Amine, 2, 4-D Ester, Diquat dibromide, Glyphosate, Triclopyr TEA, Imazapyr and sodium carbonate peroxide.
<b>Dams</b>	None
<b>Outfalls</b>	None
<b>Boat Launches</b>	One motorized boat launch located on the north east shoreline managed by WDFW.
<b>303D</b>	No
<b>305B</b>	Invasive species
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for northern leopard frog and common loon. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with the Pend Oreille County Shoreline Master Program. A bird survey schedule should be considered. Rare habitat monitoring should be considered by working with the DNR Natural Heritage program. The Total Maximum Daily Load report should be evaluated for water body improvements at 305B listed areas.

<b>Calispell Lake Pend Oreille County</b>	
<b>Species Diversity</b>	Western toad Columbia spotted frog (near/old) Northern leopard frog (near/old) Common loon (river) Salmonid Migration: Dolly varden/Bull trout
<b>Species Concentrations</b>	Audubon IBA: Tundra swans, Greater and Lesser yellowlegs, Black-necked stilts, Wilson's phalaropes, Pied-billed grebes, Gadwalls, American boots, Blue-winged and Cinnamon teals, Northern shovelers, Redheads, Ring-necked and Ruddy ducks, Killdeer, Wilson's snipes, Western bluebirds, Savannah sparrows, Yellow-headed blackbirds, American bittern, Bald eagles, Rough-legged and Red-tailed hawks, Horned larks, Snow bunting, Sandhill crane, White pelican, occasional Golden eagles and Prairie falcons.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	Sandhill crane and white pelican
<b>Plant Diversity</b>	Not surveyed by DOE
<b>Ecoregion</b>	Canadian Rocky Mountains
<b>Latitude</b>	48.273823
<b>Longitude</b>	-117.334614
<b>Size</b>	1124± acres
<b>Connectivity to SOAL</b>	Calispell Creek, a tributary to the Pend Oreille River
<b>Lake Type</b>	Glacial Drift Plain
<b>Wetland Connections</b>	Wetlands extend beyond the lake as a wetland complex. The tributary of the lake, Calispell Creek is connected to the Pend Oreille River and the entire river, creek, lake complex is composed of freshwater emergent wetlands.
<b>Terrestrial Connectivity</b>	None
<b>Land Cover</b>	Emergent herbaceous, woody wetlands, open water and herbaceous vegetation surround the lake with 0% development.
<b>Percent Impervious Surfaces</b>	Predominately 0% impervious surface surrounds the lake.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are entirely SOAL
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	None
<b>Outfalls</b>	None
<b>Boat Launches</b>	None
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring with an emphasis on Columbia spotted frog, Northern leopard frog, Common loon, sandhill crane and white pelican. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Pend Oreille County Shoreline Master Program. Contact WDFW for potential Dolly varden/Bull trout surveys. A bird survey schedule should be considered.

<b>Sprague Lake Adams/Lincoln County</b>	
<b>Species Diversity</b>	None
<b>Species Concentrations</b>	Audubon IBA: Lake and marsh habitat in the Columbia basin wildlife area for 1000+ pairs of ring-billed gulls, 800+ pairs of California gulls nest on Harper's Island on the west end of the lake. Other species include; Bonaparte's gulls and Caspian terns, American white pelicans, Clark's and Western grebes, Cinnamon teal, Common mergansers, Double-crested cormorants, Osprey fish in summer, Peregrine falcons hunt for duck in fall.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	25 species (invasive species present)
<b>Ecoregion</b>	
	Columbia Plateau
<b>Latitude</b>	47.258436
<b>Longitude</b>	-118.064848
<b>Size</b>	1580+ acres
<b>Connectivity to SOAL</b>	
	None
<b>Lake Type</b>	Glacial Flood Scour
<b>Wetland Connections</b>	Unique freshwater emergent wetland as a large scale wetland area spanning for 38 miles over multiple county borders and Columbia Spotted Frog occurrences throughout. Begins in Adams County with Cow Lake, moving diagonally north to north east through Whiteman, Lincoln and Spokane counties to include SOAL; Sprague Lake, Rock Lake, Fishtrap Lake, Williams Lake, Badger Lake, Chapman Lake, Bonnie Lake, Clear Lake, Granite Lake, Meadow Lake, West Medical Lake and Medical Lake.
<b>Terrestrial Connectivity</b>	None
<b>Land Cover</b>	Predominately woody and emergent wetlands surround the lake with the periphery consisting of shrub/scrub and cultivated crops and 0% development.
<b>Percent Impervious Surfaces</b>	Predominately 0% impervious surface surrounds the lake.
<b>Shoreline/Bedland Ownership</b>	Approximately 10-15% of the shoreline is privately owned. The island is not SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	Sprague Lake Dam on Sprague Creek, south of the lake.
<b>Outfalls</b>	None
<b>Boat Launches</b>	There are four motorized boat launches on the lake including: Sprague Lake (south east), Four Seasons Campground (south west), Sprague Lake Resort (north) and Sprague Lake – Lincoln County (north east).
<b>303D</b>	PCB and 2, 3, 7, 8 - TCDD
<b>305B</b>	Four areas including the 303D overlap. Total phosphorus. PCB, Heptachlor, Toxaphene, Chlordane, Mercury, Hexachlorobenzene, Heptachlor Epoxide, Endrin, Endosulfan II, Endosulfan I, Gamma-bhc (Lindane), Beta-BHC, Alpha-BHC, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, and 2,3,7,8-TCDD
<b>Potential Management Options</b>	Habitat assessment and/or monitoring with an emphasis on the Columbia Spotted Frog, Sandhill crane and White pelican. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with Adams/Lincoln County Shoreline Master Program. A bird survey schedule should be considered. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas.

<b>Fishtrap Lake Lincoln County</b>	
<b>Species Diversity</b>	Columbia spotted frog Common loon
<b>Species Concentrations</b>	None
<b>S1 or S2 Status - Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Plant Diversity</b>	12 species (invasive species present)
<b>Ecoregion</b>	
	Columbia Plateau
<b>Latitude</b>	47.340973
<b>Longitude</b>	-117.835724
<b>Size</b>	157+ acres
<b>Connectivity to SOAL</b>	
	None
<b>Lake Type</b>	Impoundment
<b>Wetland Connections</b>	Very unique freshwater emergent wetland complex with a large scale wetland area spanning for 38 miles over multiple county borders and Columbia Spotted Frog occurrences throughout. Begins in Adams County with Cow Lake, moving diagonally north to north east through Whiteman, Lincoln and Spokane counties to include SOAL; Sprague Lake, Rock Lake, Fishtrap Lake, Williams Lake, Badger Lake, Chapman Lake, Bonnie Lake, Clear Lake, Granite Lake, Meadow Lake, West Medical Lake and Medical Lake.
<b>Terrestrial Connectivity</b>	Bureau of Land Management (BLM) entire west and north shore comprising 7000 acres.
<b>Land Cover</b>	Evergreen Forest, woody and emergent herbaceous wetlands, and shrub/scrub surround the lake. With 0% development and no roads along the shoreline.
<b>Percent Impervious Surfaces</b>	Predominately 0% impervious surface surrounds the lake. At the northern most point there is 10-50% impervious surface on the shore but only where a resort is located.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands are entirely SOAL
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	One dam on the lake; Fishtrap Lake dam, south shoreline.
<b>Outfalls</b>	None
<b>Boat Launches</b>	There are two motorized boat launches are on the lake at the north shore Fishtrap Lake (WDFW) and Fishtrap Lake Resort.
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring with an emphasis on the Columbia spotted frog and common loon. Conduct a plant survey and complete an aquatic plant management plan, including invasive removal. Consider consultation with BLM and the Lincoln County Shoreline Master Program. A bird survey schedule should be considered.

APPENDIX D  
River Information Sheets

<b>Hoh River (RM 13-40) Jefferson County</b>	
<b>Species Diversity</b>	Western toad (RM 40-28) Harlequin duck (pairs, chicks use from RM 30-13) Pacific lamprey Salmonid Spawning: Chinook, Steelhead and Coho Salmonid Rearing: Dolly varden/Bull Trout (RM 29-40) Salmonid Migration: Sockeye, Chum, Dolly Varden/Bull Trout and Steelhead
<b>Species Concentrations</b>	None
<b>S1 or S2 Status - Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	
	Northwest Coast
<b>Latitude</b>	
	47.809904
<b>Longitude</b>	
	-124.128526
<b>Connectivity to SOAL</b>	
	The Hoh River originates at the Hoh Glacier on Mount Olympus and flows west through the Olympic Mountains of Olympic National Park and Olympic National Forest. It empties into the Pacific Ocean at the Hoh Indian Reservation. The river is connected to SOAL throughout this river reach.
<b>WRIA</b>	
	Soleduc-Hoh Watershed, 20: This watershed consists of the Soleduck, Hoh, Bogachiel and Calaweh Rivers and many additional tributary creeks and streams. Annual precipitation in the Soleduck-Hoh Watershed ranges from 100 inches per year along the coastal lowlands to 180 inches per year in the Olympic Mountains.
<b>Wetland Connections</b>	
	Predominately freshwater forest/shrub wetland.
<b>Terrestrial Connectivity</b>	
	Some of this river segment borders Clearwater Corridor NRCA, South Nolan NRCA, Olympic National Forest and Olympic National Park.
<b>Land Cover</b>	
	Predominately evergreen forest and shrub scrub.
<b>Percent Impervious Surfaces</b>	
	Predominately 0-10% impervious surface surrounds this river segment.
<b>Shoreline/Bedland Ownership</b>	
	Shoreline/bedlands are predominately SOAL. Due to river and watershed dynamics some areas of the river may not be SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	
	None
<b>Outfalls</b>	
	None
<b>Boat Launches</b>	
	Three motorized boat launches are located on this river segment. Cottonwood (DNR), Hoh Oxbow (DNR) and Hoh River – Morgans Crossing (WDFW).
<b>303D</b>	
	No
<b>305B</b>	
	No
<b>Potential Management Options</b>	
	Habitat assessment and/or monitoring for Harlequin duck, Western toad, Pacific lamprey, and salmonid species. Consider consultation with Jefferson County Shoreline Master Program and the conservation management areas adjacent to this river segment. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.

<b>Black River (RM 10-22) Thurston County</b>	
<b>Species Diversity</b>	Oregon Spotted Frog (recent) Pacific lamprey (presence) Salmonid Spawning: Chinook, Coho and Steelhead Salmonid Rearing: Chinook and Coho Salmonid Migration: Chinook, Coho and Steelhead
<b>Species Concentrations</b>	Oregon Spotted Frog (largest known concentration in WA), RM 10 – 22 to the Black Lake outlet (south shoreline). Recommend 12 miles of river because 2006 wetland data shows wetland habitat presence.
<b>S1 or S2 Status – Plants</b>	Low Elevation Riparian Wetland PTN (S2), <i>Cornus sericea</i> – <i>Salix (hookeriana, sitchensis)</i> Shrubland (Red-osier Dogwood – Hooker’s, Sitka Willow) (S2), <i>Carex comosa</i> (bristly sedge) (S2), <i>Salix (hookeriana, sitchensis)</i> – <i>Spiraea douglasii</i> Shrubland (Hooker’s, Sitka Willow – Douglas’ Spirea)(S2).
<b>Rare/Uncommon Species</b>	Olympic Mudminnow <i>Novumbra hubbsi</i> and Western Floater <i>Anodonta kennerlyi</i> .
<b>Ecoregion</b>	Puget Trough
<b>Latitude</b>	46.890176
<b>Longitude</b>	-123.024987
<b>Connectivity to SOAL</b>	River drains south west from Black Lake. Recommend considering the south shoreline of Black Lake to include in the river reserve because it could be potential frog habitat.
<b>WRIA</b>	Upper Chehalis Watershed, 23: Annual precipitation in the Upper Chehalis Watersheds ranges from 40 inches in the lowland valleys to over 100 inches in the Cascade and Willapa foothills. During the summer, the snowpack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow. (DOE 2012)
<b>Wetland Connections</b>	(NWI-USGS): Freshwater wetland complex is nearly continuous and comprised of freshwater forested/shrub and emergent wetland. Within this river segment there is a 2 mile break in wetland connections according to the 2006 imagery.
<b>Terrestrial Connectivity</b>	The Nature Conservancy–Black River Preserve, Washington Department of Fish and Wildlife–Scatter Creek Wildlife Area/Black River Unit, and Thurston County - Black River–Mima Prairie Glacial Heritage Preserve.
<b>Land Cover</b>	Predominately woody and emergent herbaceous wetlands within a 200-500ft buffer. The area where there is a wetland break, there is low and medium intensity development.
<b>Percent Impervious Surfaces</b>	Predominately 0-10% impervious surface. Only one area, about 1 mile of river, includes 10-100% impervious surfaces according to the 2006 imagery.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	No current history of herbicide treatment via DOE shp.
<b>Dams</b>	None
<b>Outfalls</b>	None (NPDES)
<b>Boat Launches</b>	There are three boat launches on this river segment. Littlerock (WDFW), Black River–Gat–Rochester(WDFW) and Oakville (WDFW).
<b>303D</b>	No
<b>305B</b>	No
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for the Oregon spotted frog, Pacific lamprey and salmonid species. Consider consultation with conservation management areas adjacent to this river segment and Thurston County Shoreline Master Program. Additional habitat assessment and monitoring work should be explored for Olympic Mudminnow and Western Floater. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. This is a good location to consider education, outreach, and volunteer clean up opportunities.



<b>Nisqually River (all) Thurston, Pierce and Lewis County</b>	
<b>Species Diversity</b>	Western toad (throughout) Common loon (use) Pacific lamprey Salmonid Spawning: Chinook, Coho, Chum and Steelhead Salmonid Rearing: Pink Salmonid Migration: Sockeye and Dolly varden/Bull trout
<b>Species Concentrations</b>	None
<b>S1 or S2 Status – Plants</b>	T19R01E, T18R01E and T17R01E: Sandy, Moderate Salinity Low Marsh (S1); Moderate Salinity High Marsh (S2); Silty Moderate Salinity Low Marsh (S2); <i>Salicornia virginica</i> , <i>Distichlis spicata</i> , <i>Triglochin maritime</i> , <i>Jaumea carnosa</i> (S2); Freshwater Tidal Surge Plain Wetland PTN(S1), Low Elevation Riparian Wetland(S2), <i>Populus balsamifera ssp. trichocarpa</i> , <i>Acer macrophyllum</i> , <i>Symphoricarpos albus</i> Forest(S2); <i>Quercus garryana</i> , <i>Symphoricarpos albus</i> , <i>Carex inops</i> Woodland(S1), Oregon goldenaster <i>Heterotheca oregona var. oregona</i> (S1)
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	Puget Trough and West Cascades
<b>Latitude</b>	See Pierce, Thurston and Lewis County borders.
<b>Longitude</b>	See Pierce, Thurston and Lewis County borders.
<b>Connectivity to SOAL</b>	River drains from Mt. Rainer headwaters to Puget Sound. This would be the only headwaters to river mouth reserve in the state and would connect the river system to the Nisqually Aquatic Reserve.
<b>WRIA</b>	Nisqually Watershed, 11: This watershed consists of the Nisqually River and numerous tributary creeks and streams. The annual precipitation in the Nisqually Watershed ranges from 40 inches in the lower Nisqually Watershed to over 120 inches per year in the Cascade Mountains. During the summer, the snowpack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.(DOE 2012)
<b>Wetland Connections</b>	Various throughout river system. Predominately freshwater forested/shrub, freshwater emergent and lake wetlands.
<b>Terrestrial Connectivity</b>	Nisqually Wildlife Refuge, Nisqually Tribe, Fort Lewis Military Base, Nisqually Land Trust, Nisqually- Mashel State Park, Charles L Pack Experimental Forest, Elbe Hills State Forest, Tahoma State Forest, Snoqualmie National Forest and Mt. Rainer National Park.
<b>Land Cover</b>	Difficult to describe at current scale. Appears to be only two areas where low, medium high density developments are present. All other areas are different types of land cover such as evergreen, mixed forest, deciduous forest, hay/pasture, herbaceous and shrub/scrub.
<b>Percent Impervious Surfaces</b>	Difficult to describe at current scale. Appears to be only two areas where impervious surfaces are 10-100% dominate. All other areas are 0-10% impervious surfaces.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands predominately SOAL. Due to river and watershed dynamics some areas of the river may not be SOAL.
<b>Herbicide Treatment History</b>	No current history of herbicide treatment via DOE shp.
<b>Dams</b>	La Grande Dam – Tacoma Public Utilities
<b>Outfalls</b>	Difficult to describe at current scale. Many outfalls throughout.
<b>Boat Launches</b>	Two motorized boat launches are on this river. Alder Lake and Rocky Point Recreation Area.
<b>303D</b>	No
<b>305B</b>	A couple locations near Puget Sound. T18R01E and T19R01E. One other area further upriver in T17R02E.
<b>Potential Management Options</b>	Consult experts and local entities that have already completed habitat and species assessment and monitoring work in this river. Consider an assessment for Oregon white oak presence. There is a strong association with this oak species and the Pacific pond turtle overwintering. Determine if there are other habitat parameters present to support this turtle species. Habitat assessment and/or monitoring for the Pacific lamprey. Consult DNR Natural Heritage Program and determine if monitoring should occur for the known S1 and S2 listed species. Review Pierce, Thurston and Lewis County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. This is a good location to consider education, outreach, and volunteer clean up opportunities.

<b>South Fork Nooksack River (RM 0-7)</b>	
<b>Whatcom County</b>	
<b>Species Diversity</b>	Oregon spotted frog Western toad Pacific lamprey (observed in the Nooksack so potential in NF Nooksack) Salmonid Spawning: Pink, Chinook, Sockeye and Steelhead Salmonid Rearing: Coho and Bull Trout/Dolly Varden Salmonid Migration: Steelhead and Chum
<b>Species Concentrations</b>	Oregon spotted frog concentration is recent, 2011.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	Western Pearlshell (in SF Tributary, east of river between RM 1 and 2, so potential in SF Nooksack.)
<b>Ecoregion</b>	
	North Cascades
<b>Latitude</b>	
	48.774225
<b>Longitude</b>	
	-122.212834
<b>Connectivity to SOAL</b>	
	The river drains into and meets the North Fork Nooksack where it then flows into the main stem Nooksack River. It flows into Bellingham Bay of north Puget Sound.
<b>WRIA</b>	
	Nooksack Watershed, 1: This watershed consists of the Nooksack River and originates in the Cascade Mountains, with its numerous tributaries. It also includes the Sumas River (tributary to the Fraser River), and coastal drainages including the Lummi River, and Dakota, California, Terrell, Squalicum, Whatcom, Padden, and Chuckanut Creeks. Average precipitation varies between 35 and 70 inches per year in the western portion of the watershed, and increases to maximum average of 140 inches at Mt. Baker. During the summer, there is little rain and many streams and rivers are dependent on groundwater inflow.
<b>Wetland Connections</b>	
	Freshwater forested/shrub and freshwater emergent wetlands.
<b>Terrestrial Connectivity</b>	
	None
<b>Land Cover</b>	
	Predominately hay/pasture and mixed forest. Some evergreen, crops and deciduous forest.
<b>Percent Impervious Surfaces</b>	
	Predominately 0-10% impervious surface.
<b>Shoreline/Bedland Ownership</b>	
	Shoreline/bedlands predominately SOAL. Due to river and watershed dynamics some areas of the river may not be SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	
	No
<b>Outfalls</b>	
	Between RM 1 and 2 there are three outfalls all related to the Potter Rd. Nooksack Bridge 148 (surface water – right bank, left bank and slough)
<b>Boat Launches</b>	
	None
<b>303D</b>	
	Entire river segment for temperature.
<b>305B</b>	
	Entire river segment for temperature.
<b>Potential Management Options</b>	
	Habitat assessment and/or monitoring for the Oregon spotted frog, Western toad, Pacific lamprey, and salmonids. Additional habitat assessment and monitoring should be explored for native mussel presence/absence. Consider consultation with Whatcom County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.

<b>Lewis and Columbia River Confluence (RM 0-4)/(RM 87-99) Cowlitz and Clark County</b>	
<b>Species Diversity</b>	Pacific lamprey Salmonid Spawning: Chinook Salmonid Rearing: Steelhead Salmonid Migration: Coho, Chinook, Steelhead, Dolly varden/Bull trout, Chum, Pink and Sockeye.
<b>Species Concentrations</b>	Audubon Society selected Ridgefield National Wildlife Refuge as an Important Bird Area (IBA). It is a refuge to numerous bird species that utilize aquatic habitat including Sandhill cranes; 15,000± Canadian geese; Tundra swans; resident Bald eagles; wintering ducks such as Gadwall, American widgeons, Northern shovelers, Northern pintails, Ring-necked ducks, Green winged teals, Buffleheads, Lesser scaups; Green herons, Black crowned night herons, and Great egrets visit along with white throated sparrows, white breasted nuthatches, black terns and black-necked stilts.
<b>S1 or S2 Status – Plants</b>	Pacific Willow / Columbia River Willow <i>Salix lucida ssp. lasiandra</i> / <i>Salix fluviatilis</i> Woodland (S2)
<b>Rare/Uncommon Species</b>	Sandhill crane migratory concentration area, state endangered species.
<b>Ecoregion</b>	Puget Trough
<b>Latitude</b>	45.807402
<b>Longitude</b>	-122.788612
<b>Connectivity to SOAL</b>	From the Columbia and Lewis River confluence, including the East Fork Lewis River, SOAL connections are various throughout the Columbia River, Lake River and Vancouver Lake.
<b>WRIA</b>	Salmon-Washougal Watershed, 28, and Lewis, 27: The Salmon-Washougal and Lewis Watershed are located in southwest Washington and includes Salmon Creek, Washougal River, Lewis River and numerous tributaries and streams. Annual precipitation in the watershed ranges from 40 to 150 inches. Most of this precipitation arrives during the winter months. During the summer when there is little rain low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	Mostly freshwater emergent and freshwater forested/shrub wetlands.
<b>Terrestrial Connectivity</b>	Paradise Point State Park, Ridgefield National Wildlife Refuge and Shillapoo Wildlife Refuge (WDFW) are recognized valuable wetland buffers between terrestrial and shoreline areas.
<b>Land Cover</b>	Predominately hay/pasture, cultivate crops, woody wetlands, emergent herbaceous wetlands, open water, and some deciduous and evergreen forest.
<b>Percent Impervious Surfaces</b>	Predominately 0-10% impervious surface for these river segments. At the city of La Center, along the North Fork Lewis River, there is 10-100% impervious surface.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	Various dams. The Columbia River, and many associated tributaries are controlled.
<b>Outfalls</b>	Approximately 6 in the proposed river segments.
<b>Boat Launches</b>	There are three motorized boat launches along this river segment.
<b>303D</b>	Yes – Various locations throughout river segments for temperature, DO and bacteria.
<b>305B</b>	Yes – Various locations throughout river segments for temperature, DO bacteria and invasive species.
<b>Potential Management Options</b>	Contact experts and local entities that have already completed habitat and species assessment and/or monitoring work in these river segments. Pacific lamprey and salmonid habitat assessment and/or monitoring should be explored. Determine if there are shoreline enhancement efforts ongoing in the various wildlife refuges. Consider consultation with the Cowlitz County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.

<b>Columbia River – Beacon Rock (RM 141-181) Skamania/Klickitat County</b>	
<b>Species Diversity</b>	Pacific pond turtle Western toad Pacific lamprey Salmonid Spawning: Most tributaries along this river segment. Includes spawning habitat for Chum, Steelhead, Chinook and Coho. Salmonid Rearing: Most tributaries along this river segment. Includes rearing habitat for Chum, Steelhead and Chinook. Salmonid Migration: Includes migration habitat for Coho, Pink, Steelhead, Sockeye, Chum and Chinook.
<b>Species Concentrations</b>	Pacific pond turtle
<b>S1 or S2 Status – Plants</b>	Persistentsepal Yellowcress <i>Rorippa columbiae</i> (S1), Oregon ash (Black Cottonwood)/Red-osier Dogwood <i>Fraxinus latifolia</i> – ( <i>Populus balsamifera</i> ssp. <i>Trichocarpa</i> )/ <i>Cornus sericea</i> Forest (S2), Western ladies' Tresses <i>Spiranthes porrifolia</i> (S2), White Oak <i>Quercus garryana</i> /Symphoricarpos <i>albus</i> Woodland (S2); Diffuse stickseed <i>Hackelia diffusa</i> var. <i>diffusa</i> (S2)
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	
	West Cascades/East Cascades
<b>Latitude</b>	45.698207
<b>Longitude</b>	-121.72401
<b>Connectivity to SOAL</b>	
	Various water bodies through the Columbia River, including Draino Lake.
<b>WRIA</b>	Wind-White Salmon Watershed, 29: Annual precipitation ranges from 20 inches per year along the Columbia River in southeast Skamania County to 140 inches per year in the Cascade Mountains. Most of this precipitation arrives during the winter months. During the summer, snow pack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	Mostly riverine throughout this river segment.
<b>Terrestrial Connectivity</b>	Beacon Rock State Park, Pierce National Wildlife Refuge and Gifford Pinchot National Forest.
<b>Land Cover</b>	Low, medium and high density development are present. All other areas are different types of land cover which include evergreen forest, shrub/scrub and herbaceous.
<b>Percent Impervious Surfaces</b>	Appears to be 10-100% impervious surfaces along the entire river stretch due to the highway and associated towns.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedland ownership varies throughout this river segment.
<b>Herbicide Treatment History</b>	
	In Draino Lake with Diquat dibromide, Triclopyr TEA and 2,4-D Amine.
<b>Dams</b>	Various dams. The Columbia River, and many associated tributaries.
<b>Outfalls</b>	Difficult to describe at current scale. Many outfalls throughout.
<b>Boat Launches</b>	There are several motorized boat launches along this river segment.
<b>303D</b>	Various locations throughout river segment for temperature, DO and pH.
<b>305B</b>	Various locations throughout river segment for temperature, dissolved gas, dioxin, pH, DO. One location near pacific pond turtle concentration has several toxins associated with the site.
<b>Potential Management Options</b>	This river segment is a WDFW release area for the pacific pond turtle. DNR should contact experts involved in these efforts and evaluate if the agency can partner. Pacific lamprey and salmonid habitat assessment and/or monitoring should be explored. Consider consultation with the Skamania and Klickitat County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.

<b>Similkameen River (RM 0-19) Okanogan County</b>	
<b>Species Diversity</b>	Western toad (RM 0-3) Salmonid Spawning: Chinook and Steelhead (RM 3-9)
<b>Species Concentrations</b>	There are multiple locations and species of native freshwater mussels. This is a unique feature of this river system and found nowhere else on SOAL. Western ridgemussel <i>Gonidea angulate</i> , California floater <i>Anodonta californiensis</i> and Western pearlshell <i>Margaritifera falcata</i> are distributed in this river segment (RM 4-19).
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	Western ridgemussel <i>Gonidea angulate</i> , California floater <i>Anodonta californiensis</i> and Western pearlshell <i>Margaritifera falcata</i> (RM 4-19).
<b>Ecoregion</b>	
<b>Ecoregion</b>	Okanogan
<b>Latitude</b>	48.980649
<b>Longitude</b>	-119.540469
<b>Connectivity to SOAL</b>	
<b>Connectivity to SOAL</b>	River drains south east from southern British Columbia Canada into Osoyoos River near Oroville, Washington.
<b>WRIA</b>	Okanogan Watershed, 49: This area is arid, receiving less than 20 inches of rain annually. During the summer, the snowpack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	None within the recommended river mile area however wetland connections are present at both river tributary ending points and onward in those systems. To the west, at RM 19, the river connects to Palmer Creek, Champneys Slough and then Palmer Lake where freshwater emergent wetland, forested/shrub and pond wetlands are present. To the east, at RM 4, the river connects to Osoyoos River which consists of freshwater emergent, forested/shrub and ponds wetlands.
<b>Terrestrial Connectivity</b>	US Federal Government and US Bureau of Land Management comprise approximately half of the surrounding area.
<b>Land Cover</b>	Predominately shrub scrub. Areas of hay/pasture and open space development border different portions of the river.
<b>Percent Impervious Surfaces</b>	Predominately 0-10% impervious surface. Only one area, located at RM 4-6, includes 10-100% impervious surfaces.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	No dams exist on this river. Proposal for development in BC Canada.
<b>Outfalls</b>	There are 3 outfalls between RM 4-6. One outfall is for surface water for the City of Oroville, pedestrian project; one outfall is for surface water for the Oroville POTW; and one outfall is for surface water for the Similkameen Hatchery (WDFW).
<b>Boat Launches</b>	None
<b>303D</b>	RM 4-6 for temperature
<b>305B</b>	Four locations; temperature, Arsenic, Ammonia-N, Bacteria, pH, Aldrin, Dieldrin, Heptachlor Epoxide, Heptachlor; 4,4'-DDD; 4,4'-DDE; DDT and DO
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for native freshwater mussels, Western toad and salmonids. Consider consultation with the Okanogan County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.

<b>Methow River (RM 38-47) Okanogan County</b>	
<b>Species Diversity</b>	Harlequin duck (use at RM 38-39) Salmonid Spawning: Chinook, Sockeye and Steelhead Salmonid Rearing: Chinook
<b>Species Concentrations</b>	Chinook, Sockeye and Steelhead spawning
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	
	Okanogan
<b>Latitude</b>	
	48.368053
<b>Longitude</b>	
	-120.118832
<b>Connectivity to SOAL</b>	
	Not within the recommended area for reserve selection.
<b>WRIA</b>	
	Methow Watershed, 48: This area is arid, receiving less than 20 inches of rain annually. Most of the precipitation arrives during the winter months when water demands are the lowest. During the summer, the snowpack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	
	Riverine, freshwater forested/shrub and freshwater emergent wetland.
<b>Terrestrial Connectivity</b>	
	None
<b>Land Cover</b>	
	Shrub/scrub, herbaceous and high to low intensity development along the river mile stretch. Further upriver, less development.
<b>Percent Impervious Surfaces</b>	
	Due to the road being near and far from the road, 0-100% impervious surface is present the entire river stretch.
<b>Shoreline/Bedland Ownership</b>	
	Shoreline/bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	
	None
<b>Outfalls</b>	
	One outfall within recommended area – Surface Water, Twisp POTW, Waste. (RM38-39)
<b>Boat Launches</b>	
	None
<b>303D</b>	
	No
<b>305B</b>	
	At RM 38–39, Ammonia – N, Arsenic, Bacteria, pH (Just south of the outfall). Twisp River tributary – temperature (RM 40-41).
<b>Potential Management Options</b>	
	Habitat assessment and/or monitoring for Harlequin duck and salmonids. Consider consultation with the Okanogan County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. DOE has a report on arsenic levels being naturally derived. Should research further.

<b>Pend Oreille River and Calispell Creek (RM 69-88)/(all)</b>	
<b>Pend Oreille County</b>	
<b>Species Diversity</b>	Northern leopard frog (1958 use at RM 71-72) Columbia spotted frog (1998 use at RM 72 - 86) Western toad (2000 use at creek and lake) Common loon (use) Salmonid Migration: Bull trout and Steelhead
<b>Species Concentrations</b>	The Usk Bridge area has been designated by the Audubon Society as an Important Bird Area (IBA). Cliff swallows glue mud nests to the bottom of the bridge. In trees are Red-eyed vireos, Bullock's orioles, American goldfinches, and nesting American redstarts and Black-headed grosbeaks. Ospreys fish in the river; Double crested cormorants perch on pilings, and Tundra swans visit in march.
<b>S1 or S2 Status - Plants</b>	Prarie Cordgrass <i>Spartina pectinata</i> (S2), Canadian St. John's-wort <i>Hypericum majus</i> (S2)
<b>Rare/Uncommon Species</b>	American white pelican, Sandhill crane and Western pearlshell
<b>Ecoregion</b>	Canadian Rocky Mountain
<b>Latitude</b>	48.343421
<b>Longitude</b>	-117.28994
<b>Connectivity to SOAL</b>	The Pend Oreille River, Calispell Creek tributary and Calispell Lake.
<b>WRIA</b>	Pend Oreille Watershed, 62: Located in northeastern Washington includes a portion of the Pend Oreille River and numerous tributary creeks and streams lying between the Canadian Border and the Idaho border beginning in the mountains of Idaho, Montana and Canada. The annual precipitation ranges from 26 inches per year in the town of Newport to 55+ inches in the higher elevation mountainous area. During the summer, the snowpack is gone, there is little rain, and naturally, low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	Freshwater emergent and some freshwater forested shrub wetlands.
<b>Terrestrial Connectivity</b>	Kalispel Indian Reservation, DNR managed surface, US Federal government and State Park.
<b>Land Cover</b>	Predominately evergreen forest, herbaceous and shrub/scrub. Some cultivated crops.
<b>Percent Impervious Surfaces</b>	Predominantly 0-10% impervious surface, 10-100% borders the river and appears to be from a road.
<b>Shoreline/Bedland Ownership</b>	Most of the shoreline/bedland is SOAL. Some islands within the river system are not SOAL. A portion of Calispell Creek shorelines are not SOAL.
<b>Herbicide Treatment History</b>	History of herbicide treatment including: 2, 4-D Ester, Diquat dibromide, Glyphosate, Sodium carbonate peroxyhydrate, Triclopyr TEA, 2, 4-D Amine and Imazapyr.
<b>Dams</b>	None
<b>Outfalls</b>	Three outfalls just south of the W 5 <sup>th</sup> Street bridge. Ponderay Newsprint Company for process waste water; Skookum Rendezvous RV Resort surface water outfall; and Cusick WTP water treatment group surface water.
<b>Boat Launches</b>	There are six motorized boat launches in this river stretch.
<b>303D</b>	DO, pH, temperature, PCB
<b>305B</b>	DO, pH, temperature, PCB, Aldrin, Bacteria, Ammonia-N, Total Dissolved Gas, Phenol, Fluoranthene, Mercury, 4,4'-DDT, Dimethyl phthalate, 1,4-Dichlorobenzene, Chlordane, Hexachlorocyclopentadiene, 4,4'-DDE, N-Nitrosodiphenylamine, Gamma-bhc (Lindane), Beta-BHC, Dioxin, 2,4-Dichlorophenol, Isophorone, 1,3-Dichlorobenzene, Endrin, Diethyl phthalate, Endosulfan II; 4,4'-DDD; Bis(2-Ethylhexyl) Phthalate, Pyrene, Nitrobenzene, Dibutyl phthalate, Fluorene, Anthracene; 2,4,6-Trichlorophenol; Hexachloroethane, 1,2-Dichlorobenzene; Endosulfan Sulfate, Heptachlor, Bis(2-chloroisopropyl)ether, Endosulfan I, 2,4-Dinitrophenol
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for Northern leopard frog, Columbia spotted frog, Western toad, Common loon and native mussels. Consider consultation with the Pend Oreille County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. Consider island management options and potential partnerships with Idaho.

<b>Wenatchee River North (RM 46-54) Chelan County</b>	
<b>Species Diversity</b>	Columbia spotted frog (old) Western toad (RM 55-48) Pacific lamprey Salmonid Spawning: Steelhead, Chinook and Dolly varden/Bull trout Salmonid Rearing: Sockeye and Dolly varden/Bull trout Salmonid Migration: Kokanee and Chinook
<b>Species Concentrations</b>	Salmonid spawning and rearing. (need field confirmation by WDFW)
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	
	East Cascades
<b>Latitude</b>	
	47.80825
<b>Longitude</b>	
	-120.725597
<b>Connectivity to SOAL</b>	
	Lake Wenatchee
<b>WRIA</b>	
	Wenatchee Watershed, 45: This area is arid, receiving less than 20 inches of rain annually. Most of the precipitation arrives during the winter months when water demands are the lowest. During the summer, the snow pack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	
	Freshwater forested/shrub wetlands throughout
<b>Terrestrial Connectivity</b>	
	Wenatchee National Forest (RM 48 – 54)
<b>Land Cover</b>	
	Predominately evergreen forest and woody wetlands. Some hay/pasture, shrub/scrub, herbaceous and low to medium intensity development.
<b>Percent Impervious Surfaces</b>	
	Predominately 0-10% impervious. Only a couple areas near the river where 10-100% impermeability is present.
<b>Shoreline/Bedland Ownership</b>	
	Shoreline appears to be publicly owned by state parks by commissioner order. Bedlands are SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	
	Tumwater Canyon Dam, Chelan PUD No1, approximately 15 miles south of this river segment.
<b>Outfalls</b>	
	One outfall between river mile 48 and 49.
<b>Boat Launches</b>	
	None
<b>303D</b>	
	No
<b>305B</b>	
	Temperature and DO in various segments. Arsenic, Ammonia-N, Bacteria and pH in the southern river segment.
<b>Potential Management Options</b>	
	Habitat assessment and/or monitoring for the Columbia spotted frog, Western toad, Pacific lamprey, and salmonids. Consider consultation with the Chelan County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered.



<b>Wenatchee River and Icicle Creek (RM 23-25)/(RM 0-3) Chelan County</b>	
<b>Species Diversity</b>	Harlequin duck (loafing, swimming, pairing) – Icicle Creek Pacific lamprey (spawning) – Wenatchee River Salmonid Spawning: Steelhead and Sockeye (Icicle Creek) and Steelhead and Chinook (Wenatchee River) Salmonid Rearing: Dolly varden/Bull trout (Icicle Creek) and Chinook, Sockeye, Dolly varden/bull trout (Wenatchee River)
<b>Species Concentrations</b>	Audubon Society selected Blackbird Island as an Important Bird Area (IBA). Woodland dwellers abound in the deciduous pine forest: Red-breasted nuthatches, Downy woodpeckers, Veeries, Red-eyed vireos, Swainson’s thrushes, Bullock’s orioles. Western tanagers, Yellow warblers, Cedar waxwings, Gray catbirds, Rufous and Calliope hummingbirds utilize island habitat. On the river wood ducks arrive in spring, Ospreys fish on summer evenings and bald eagles feast on salmon in fall.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	East Cascade
<b>Latitude</b>	47.579999
<b>Longitude</b>	-120.667316
<b>Connectivity to SOAL</b>	Icicle Creek and Wenatchee River
<b>WRIA</b>	Wenatchee Watershed, 45: This area is arid, receiving less than 20 inches of rain annually. Most of the precipitation arrives during the winter months. During the summer, the snow pack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	Predominately riverine. Minor freshwater forested/shrub and emergent wetland.
<b>Terrestrial Connectivity</b>	None
<b>Land Cover</b>	Predominately low, medium to high intensity development. Multiple other land types such as cultivated crops, hay/pasture, mixed forest, evergreen, woody wetlands, and herbaceous.
<b>Percent Impervious Surfaces</b>	Predominately 25-100% impervious surface. Some areas with 0-10% impervious surface.
<b>Shoreline/Bedland Ownership</b>	Shoreline/Bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	None
<b>Dams</b>	None
<b>Outfalls</b>	4 outfalls include: Posthotel and Spa – Surface water; Cascade Medical Center Improvements – surface water; Icicle Brewing Co. – Treatment Wo.; and Leavenworth POTOW – Waste Water Wenatchee
<b>Boat Launches</b>	Wenatchee River – Leavenworth public boat launch (WDFW)
<b>303D</b>	Wenatchee River: PCB, 4,4-DDE Icicle Creek: PCBs
<b>305B</b>	Wenatchee River: Toxaphene, Endosulfan I, Total Chlordane, PCBs, Endosulfan sulfate, mercury, Hexachlorobenzene, Alpha – BHC, 4, 4-DDE, Dieldrin, Heptachlor; 2,3,7,8-TCDD TEQ; Endosulfan II, Endrin, Beta-BHC; 4,4-DDT; Aldrin; Heptachlor Epoxide; 4,4-DDD; Endrin Aldehyde; Gamma-bhc (Lindane) Icicle Creek: Temperature, bacteria and pH
<b>Potential Management Options</b>	Habitat assessment and/or monitoring for the Harlequin duck, Pacific lamprey, and salmonids. Consider consultation with the Chelan County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. Consider outreach and education opportunities due to this highly developed and tourist travel destination area.

<b>Yakima and Columbia River Confluence (RM 0-2)/(RM 333-336)</b>	
<b>Benton County</b>	
<b>Species Diversity</b>	Pacific lamprey
<b>Species Concentrations</b>	Audubon Society selected Ridgefield National Wildlife Refuge as an Important Bird Area (IBA). It is a refuge for shorebirds such as Dunlins, Black-necked stilts, American avocets, Greater and Lesser yellow legs, Long billed dowitchers, Spotted sandpipers, American widgeons, Common loons, Pied-billed grebes, Hooded mergansers, Ring-necked ducks, Lesser scaups, Northern pintails and Great horned owls.
<b>S1 or S2 Status – Plants</b>	None
<b>Rare/Uncommon Species</b>	None
<b>Ecoregion</b>	
	Columbia Plateau
<b>Latitude</b>	46.249193
<b>Longitude</b>	-119.247417
<b>Connectivity to SOAL</b>	
	Various water bodies throughout the Columbia River
<b>WRIA</b>	Lower Yakima Watershed, 37: This area is arid, receiving less than 20 inches of rain annually. Most of the precipitation arrives during the winter months. During the summer, the snow pack is gone, there is little rain, and naturally low stream flows are dependent on groundwater inflow.
<b>Wetland Connections</b>	Freshwater forested/shrub, freshwater emergent, ponds and lake wetlands.
<b>Terrestrial Connectivity</b>	Bateman Island, Columbia Park, Chiawana Park, Yakima Delta Wildlife Nature Area and Riverview Natural Preserve
<b>Land Cover</b>	This is a high density developed area. Other types of land cover include shrub/scrub, cultivated crops and hay pasture.
<b>Percent Impervious Surfaces</b>	Highly Impervious surfaces surround these river segments.
<b>Shoreline/Bedland Ownership</b>	Shoreline/bedlands predominately SOAL.
<b>Herbicide Treatment History</b>	
	None
<b>Dams</b>	Various dams. The Columbia River, and many associated tributaries are very controlled.
<b>Outfalls</b>	Difficult to describe at current scale. Many outfalls throughout. Would need to determine area and then identify.
<b>Boat Launches</b>	Various motorized boat launches are on this river segment (4-6)
<b>303D</b>	4,4-DDT, 4,4-DDE
<b>305B</b>	One area of PCBs, chlordane, 4,4-DDT, 4,4-DDE
<b>Potential Management Options</b>	Contact experts and local entities that have already completed habitat and species assessment and/or monitoring work in these river segments. Habitat assessment and/or monitoring for the Pacific lamprey and northern leopard frog should be considered. Consider consultation with the Benton and Franklin County Shoreline Master Program. The Total Maximum Daily Load report should be evaluated for water body improvements at 303D and 305B listed areas. Conduct a shoreline plant survey and complete an aquatic plant management plan, including invasive and debris removal. A bird survey schedule should be considered. Consider outreach and education opportunities due to this highly developed recreational use area.