



US Army Corps  
of Engineers ®  
Seattle District

**BIOLOGICAL EVALUATION  
FOR INFORMAL ESA CONSULTATION**  
**For: Diablo Lake New Tour Dock (NWS-)**  
**Version: May 2012**



**\*\* This form is for projects that have insignificant or discountable impacts on listed species. It contains all the information required for a biological evaluation, but in abbreviated form and with minimal instructions on how to fill it out. For more detailed instructions, a format for development of a biological assessment or biological evaluation can be found on the Seattle District Corps website ([www.nws.usace.army.mil](http://www.nws.usace.army.mil) – click on regulatory and then on endangered species, BA Template). You may also contact the Corps at 206-764-3495 for further information.**

**Drawings and Photographs - Drawings and photographs must be submitted.** Photographs must be submitted showing local area, shoreline conditions, existing overwater structures, and location of the proposed project. Drawings must include a vicinity map; plan, profile, and cross-section drawings of the proposed structures; and over- and in-water structures on adjacent properties. (For assistance with the preparation of the drawings, please refer to our *Drawing Checklist* located on our website at [www.nws.usace.army.mil](http://www.nws.usace.army.mil) Select Regulatory – Regulatory/Permits – Forms.) Submit the information to: U.S. Army Corps of Engineers, Regulatory Branch, P.O. Box 3755, Seattle, Washington 98124-3755.

**Date: February 1, 2018**

<b>SECTION A - General Information</b>			
1. <b>Applicant name:</b> Shelly Adams, Sr. Environmental Analyst, Seattle City Light			
Mailing address: P.O. Box 34023, Seattle, WA 98124-4023			
Work phone: (206) 684-3117	Cell phone: (425) 891-1765	Email: Shelly.adams@Seattle.gov	Fax:
2. <b>Joint-use applicant name (if applicable):</b> Elly Boerke, North Cascades National Park			
Mailing address: 810 Highway 20, Sedro-Woolley, WA 98284			
Work phone: 360-854-7328	Home phone:	Email: elly_boerke@nps.gov	Fax:
3. <b>Authorized agent name:</b> N/A			
Mailing address:			
Work phone:	Home phone:	Email:	Fax:
4. <b>Location where proposed work will occur</b>			
Address (street address, city, county): Diablo Dam Access Road, Diablo Lake, Skagit River Hydroelectric Project			
Location of joint-use property (street address, city, county):			
Waterbody: Diablo Lake			
¼ Section: NWSE	Section: 4	Township: 37 North	Range: 13 East
Latitude: 48.717677°		Longitude: -121.119063°	

## 5. Description of Work

*Include project drawings and site photographs.*

City Light proposes to construct a new tour dock to replace the existing tour dock on Diablo Lake. The proposed tour dock would be in a new location, approximately 3,000 feet northeast of the existing location. The new location is near the Environmental Learning Center (ELC), on the southwest side of Diablo Lake in Whatcom County, Washington (Figures 1 and 2).

Diablo Lake is a component of the Skagit River Hydroelectric Project, licensed by the Federal Energy Regulatory Commission (FERC, Project Number 553). The Skagit River Hydroelectric Project is composed of a series of three dams on the Skagit River that, from downstream to upstream, include Gorge Dam, Diablo Dam, and Ross Dam. Each dam has an associated powerhouse immediately downstream and an associated reservoir immediately upstream. This hydroelectric infrastructure lies within the Ross Lake National Recreation Area (RLNRA), in which the RLNRA is administered by the National Park Service (NPS, Figure 1). The Enabling Legislation for the RLNRA, as amended by the Washington Parks Wilderness Act of 1988, provides for Skagit River Hydroelectric Project operations and maintenance activities within the RLNRA.

The Skagit Tours are a requirement of the Recreation and Aesthetics Settlement Agreement that are part of the current FERC license. One of the most popular of these tours, the Diablo Lake Boat Tours, formerly began at the existing tour dock located on the north side of Diablo Dam, approximately 600 feet upstream from the right abutment (Figure 3). The boat tour continued east across Diablo Lake to the Ross Dam and Powerhouse. Parking was very limited near the tour dock facility, so tour participants were directed to park and check in at the ELC approximately ½ mile down Diablo Dam Access Road. From this point, participants walked back along the narrow road, without a sidewalk or shoulder, to the tour dock. Likewise, at the conclusion of the tour, participants made the same trek back to the ELC for lunch and to access their vehicles.

In 2014, City Light removed the tour boat (Alice Ross III) from service due to American Disabilities Act (ADA) inaccessibility, lack of climate control, non-compliant diesel emissions, and moisture intrusion. An existing ferry boat was used until a new boat could be purchased. During that period, boat access was moved from the existing tour dock to the Diablo Boathouse because of the height differential between the ferry boat and the tour dock. City Light has since purchased a new boat to accommodate the Skagit Tours, but it sits even higher in the water, so neither the existing tour dock or the Diablo Boathouse are adequate loading locations. Because there are no shoulders along the Diablo Dam Access Road, the long walk visitors must make between the ELC and the existing tour dock location and/or boathouse is unsafe and does not provide a positive visitor experience. Thus, a new tour dock is necessary to improve the safety, accessibility, and overall experience for tour participants.

The new tour dock would be located near the ELC dining hall along the “peninsula trail” (Figure 2 and Drawing C-4) and would be ADA accessible. The new tour dock would be composed of a dock, gangway and pier (also referred to as a “deck” in the drawings). The dock structure would be 50’ long x 25’ wide x 5’ high and constructed of steel pontoons, Alaskan cedar walers, and a partial grating surface (30%) to allow light penetration. The pier would consist of two nonlinear sections, each of which are approximately 36’ long x 20’ wide and 19’ long x 10.5’ wide. The pier would be composed of structural members treated with water-based wax emulsion sealer, and would be fitted with molded fiberglass grating to allow light penetration. The gangway would be approximately 40’ long by 5’ wide, and would

connect the pier to the dock. The gangway would be constructed of composite grating and aluminum members (Drawing C-4).

The new tour dock would be transported to Diablo Lake in two pieces, fashioned together in the Diablo Boathouse parking lot, and launched from one of the barge landings. The dock would then be floated to the project site and anchored to the shoreline structures. The tour dock would float on metal pontoons, and would be attached to the shoreline with two steel stiff arms, each approximately 20 feet long and each connected to a main concrete anchor block. The two main anchor blocks would be 12 feet by 6.5 feet by 4 feet, and would be secured in place with six rock bolts drilled into bedrock to an estimated depth of 6 feet. A steel beam would join each main anchor block to a concrete, deadman anchor that would be 8 feet by 2 feet by 5 feet. In the instance that bedrock is shallow and soil depths do not allow construction, the deadman anchors and steel beams would be eliminated, and the main concrete anchors would be horizontally attached to bedrock with rock bolts. A continuous anchor block (50 feet long, 2 feet wide, and 2 feet deep) would run along the underside of the northeast edge of the pier. Four concrete pier supports (each 2 feet long, 2 feet high, and 2 feet deep) would anchor the opposite side of the pier. (Drawing C-4).

*Note: In the instance that bedrock is shallow and soil depths do not allow construction per Drawing S-1, the deadman anchors and steel beams would be eliminated, and the main concrete anchors would be horizontally attached to bedrock with rock bolts.*

Work would be conducted with an excavator from a barge to dig the trench for the deadman anchor. All soil removed from the trench would not be sidecast, but temporarily stockpiled on the barge. After installing the deadman anchor and steel beam, the trench would be backfilled with the stockpiled native soil. All concrete would be poured from a concrete mixer truck and pumper truck on the barge. A pneumatic drill mounted on tracks would be used to install the rock bolts. City Light would use a dump truck on a barge for importing and exporting materials. A pneumatic jackhammer would prepare the bedrock surfaces. In addition, a chainsaw, a small vibratory compactor, and other miscellaneous hand tools may be used.

An approximately 305-foot-long section of the existing Peninsula Trail would be improved to comply with ADA recommendations (Drawing C-5). Approximately 115 feet of new trail would be built to connect the improved section of the Peninsula Trail to the new pier (Drawing C-4). Overall, the walk from the ELC dining hall (where tourists must check in regardless of the alternative) to the new tour dock would be approximately 420 feet. As shown in the project plans, trail improvements would include:

- Minor regrading for 305 feet
- Where necessary, widening to provide a 3 foot-wide trail over the 305 foot section
- Resurfacing with 4 inches of 3/4 inch gravel (15 cubic yards)
- Adding one turnout that is 6 feet long and 3 feet wide
- Installing new rockery and/or replacing existing rockery in several locations for a total length of approximately 400 feet (7.3 cubic yards)

Construction of the new trail section would include:

- Clearing and grading along the length of new trail, approximately 115 feet long by 3 feet wide
- Adding approximately 10 inches of aggregate along the new trail (approximately 10.6 cubic yards)

- Removing five trees within the proposed trail alignment
- Constructing one turnout that is 6 feet long and 3 feet wide
- Installing approximately 20 feet of new rockery along the trail (2.2 cubic yards)

Equipment used for trail improvements and construction may include a mini excavator, motorized wheelbarrow, and various hand tools.

Construction would require a 6-week period between April and June 2018 (excluding Memorial Weekend) or October through November 2018. All land disturbing activities would be conducted in the dry. Thus, during construction, Diablo Lake would be drawn down to an elevation of 1,202 feet (NAVD 88), approximately 9 feet below the lake's ordinary high water mark (OHWM). Elevation 1,202 is 4 to 6 feet below normal operating levels.

The existing tour dock would be turned over to the NPS. The NPS would obtain permits as appropriate, as a separate project.

#### **For projects that include pile driving**

*If steel or concrete piles are being installed with an impact hammer pile driver, marbled murrelets may be adversely impacted. For installation of any type of pile with a vibratory pile driver, marine mammals may be adversely impacted. A monitoring plan may be required to ensure protection of these species.*

Not Applicable

#### **6. Construction Techniques:**

*Describe methods and timing of construction to be employed in building the project and any associated features. Identify actions that could affect listed / proposed species or designated / proposed critical habitat and describe in sufficient detail to allow an assessment of potential impacts. Consider actions such as vegetation removal, temporary or permanent elevations in noise level, channel modifications, hydrological or hydraulic alterations, access roads, power lines etc. Also discuss construction techniques associated with any interdependent or interrelated projects.*

*Address the following:*

During construction, Diablo Lake would be drawn down to elevation 1202 (NAVD 88), approximately 9 feet below the OHWM (4 to 6 feet below normal operating levels). Thus, the project would be constructed in the dry.

##### A. Construction sequencing and timing of each stage (duration and dates):

Construction is scheduled to occur from either April through June 2018 or October through November 2018. Construction would take approximately six weeks.

##### B. Site preparation:

Before any grading begins, the construction limits would be established using fencing or flagging. Trees within the construction limits would be flagged either for removal or for protection. Fencing would be provided for trees that could be damaged by construction activities, and compost socks would be installed around the downslope perimeter of the project area. The lake level would be slowly lowered to 1202 feet NAVD 88. Once the water level has been drawn down, work below the OHWM would begin.

##### C. Equipment to be used:

An excavator, located on a barge, would be used to dig the trench for the deadman anchor. All concrete would be poured utilizing a concrete mixer truck and pumper truck from a barge. A pneumatic drill mounted on tracks would be used to install the rock bolts. City Light would use a dump truck for importing and exporting materials (from a barge only), as well as a pneumatic jackhammer to prepare bedrock surfaces. A chainsaw, a small vibratory compactor, and other miscellaneous hand tools may also be used. Equipment used for existing trail improvements and new trail construction may include a mini excavator, motorized wheelbarrow, and various hand tools.

D. Construction materials to be used:

The proposed project would primarily balance cut and fill. The only imported fill necessary for construction would be aggregate for trail resurfacing, rockery for landscaping, and concrete for the anchor blocks and deck foundation. Aggregate for trail resurfacing would consist of approximately 25.6 cubic yards (CY) of 5/8" (-) permeable top course sourced from Casey's Pit in Marblemount, WA. The rockery walls would consist of approximately 7.5 CY of 18-36" rock obtained locally from within the Skagit River Hydroelectric Project boundaries. Concrete would consist of approximately 36.5 CY of 4,000 PSI concrete sourced from Skagit Ready Mix in Mount Vernon (24.4 CY of this would be placed below the OHWM). Approximately 19 CY of topsoil from Cedar Grove may be brought in for planting.

E. Work corridor:

The work area, including all areas of ground disturbance, would be approximately 6,702 square feet (sf).

F. Staging areas and equipment wash outs:

The only equipment that may be staged on site would be the motorized wheelbarrow, mini excavator, or rock drill. All other equipment would be staged offsite in an upland location. Equipment and hand tools that would come into contact with concrete would be washed offsite in an upland location.

G. Stockpiling areas:

All soil removed from below the OHWM would not be sidecast, but temporarily stockpiled on the barge. Soil would be placed on the barge carefully to avoid a discharge into the lake. After installing the deadman anchor and steel beam, the trench would be backfilled with the native soil. Soil removed from other areas above the OHWM would be sidecast temporarily adjacent to the excavated area. Any sidecast soil left overnight would be covered with mulch or plastic and surrounded with sediment wattles.

H. Running of equipment during construction:

To minimize emissions of greenhouse gases and noise, equipment would not be left idling for more than a few minutes at a time when not in active use.

I. Soil stabilization needs / techniques:

The project area would be contained along the downslope perimeter by a compost sock that would filter any sediment prior to entering the reservoir. Following ground disturbance, exposed soils would be stabilized immediately with mulch. In the fall, disturbed areas would be replanted with native vegetation in accordance with the NPS.

J. Clean-up and re-vegetation:

The site would be recontoured to blend with surrounding terrain. A native plant seed mix collected by the NPS would be sown into the upland area. The mix is expected to be composed of a mixture of grasses, forbs, and pioneer shrubs and trees found at the site and similar areas in the vicinity.

**K. Storm water controls / management:**

The only impervious surfaces in the project area include the gravel trail, which runs perpendicular to the slope; thus, City Light does not anticipate much run-off, and any run-off that does accumulate would quickly infiltrate into the ground. The amount of ground disturbance is relatively small (0.15 acres). To the extent possible City Light has minimized the number of trees proposed for removal, and would be using tunneling or hydro-excavation through the drip zones of preserved trees. Trees that may be impacted would be protected with high-visible fencing to the extent possible. A compost sock would be employed along the downslope perimeter of the project to filter any sediment. Mulch would be applied following grading activities. The project area would be contained along the downslope perimeter by a compost sock that would filter any sediment prior to entering the reservoir.

**L. Source location of any fill used:**

The proposed project would primarily balance cut and fill. The only imported fill necessary for construction would be aggregate for trail resurfacing, rockery for landscaping, and concrete for the anchor blocks and deck foundation. Aggregate for trail resurfacing would consist of approximately 25.6 CY of 5/8" (-) permeable top course sourced from Casey's Pit in Marblemount, WA. The rockery walls would consist of approximately 7.5 CY of 18-36" rock obtained locally from within the Skagit River Hydroelectric Project boundaries. Concrete would consist of approximately 36.5 CY of 4,000 PSI concrete sourced from Skagit Ready Mix in Mount Vernon (24.4 CY of this would be placed below the OHWM). Approximately 19 CY of topsoil from Cedar Grove may be brought in for planting.

**M. Location of any spoil disposal:**

There is no spoil disposal proposed for this project.

**7. Action Area**

*Please describe the action area. The action area means all areas to be affected directly (e.g., earth moving, vegetation removal, construction noise, placement of fill, release of environmental contaminants) and indirectly by the proposed action. (Example: as a direct effect, the action area for pile driving would include the area out to where the noise from the pile driving falls below the level of harm or disturbance for listed species. For vibratory hammer pile driving impacts to killer whales, this level is 120 dB. Action area will include any area where the underwater noise level may exceed 120 dB).*

The action area comprises the approximate 0.15-acre upland site (including the existing and new trail, pier, and concrete supports), and the overwater area where the dock and gangway is proposed (the barge would be situated in this same location while conducting excavation activities). Construction noise would attenuate to the background level (46 dBA) at 9,045 feet from the tour dock site over water, and noise over land would attenuate at 3,200 feet from the construction area. Thus, the action area would also include these noise buffers. There would be no work conducted underwater (the lake would be drawn down for all construction activities, including rock drilling), so sound transmission would include the air only.

**8. Species Information:**

*Identify each listed or proposed species, including terrestrial species, as well as designated or proposed critical habitat in the action area. Please include information on which listed species use are expected to be found in the action area and the potential for them to be there during project activities.*

Bull trout (*Salvelinus confluentus*), a threatened species that is protected under the Endangered Species Act (ESA) occurs in the action area. Bull trout were listed as a threatened species by the U.S. Fish and Wildlife Service (USFWS) on June 10, 1998. Bull trout in Diablo Lake are part of the Upper Skagit Core

Area, which is located within the Coastal Recovery Unit (RU) that includes western Washington and western Oregon (USFWS 2015). Diablo Lake is also designated as critical habitat for bull trout (50 CFR 17:63898-64068). Diablo Lake primarily provides foraging, migration, and overwintering (FMO) habitat for subadult and adult bull trout, though there is likely limited use of this reservoir by juvenile fish (SCL 2012).

Based upon USFWS consultation guidance for previous projects (Teachout 2015), breeding pairs of western yellow-billed cuckoo (*Coccyzus americanus*) in Washington are possible but there are no past or current confirmed records of this species in or near the action area. Suitable breeding habitat is defined as patches of mature willow and cottonwood riparian vegetation that are >50 acres in size—habitat that is lacking in the action area. Furthermore, this previous interim consultation guidance indicated that since 1990 there have been only 13 yellow-billed cuckoo sightings in Washington and almost all of these have been in eastern Washington.

The only other ESA-listed species in which there would be possible occurrence based on current range and distribution would be the northern spotted owl (*Strix occidentalis caurina*). Habitat for this species is characterized by mature and old-growth trees with dense canopy closure, abundant logs, standing snags, and live trees with broken tops. Habitat such as this does not occur in the action area. The nearest northern spotted owl designated critical habitat is approximately 20 miles away.

## 9. Existing Environmental Conditions:

*Describe existing environmental conditions for the following:*

### A. Shoreline riparian vegetation and habitat features

Diablo Lake is the middle of the three reservoirs that comprise the Skagit River Hydroelectric Project. The water levels in the lake are managed in accordance with the terms of the hydroelectric license issued by the FERC in May 1995 to City Light. The reservoir has a surface area of 770 acres and is used primarily for daily and weekly re-regulation of the discharge from Ross powerhouse. Under normal operations the water surface elevation of Diablo Lake fluctuates between 1,201.5 and 1,205 feet.

The immediate project area occurs along an undeveloped portion of the shoreline on Diablo Lake, approximately 200 feet south of the ELC (the shoreline is relatively developed in the project vicinity though, see Figure 3). The “peninsula trail” begins at the ELC and traverses the shoreline, passing just by the proposed tour dock location. Low rock walls occur along the length of the peninsula trail. 240 kV transmission lines occur almost immediately overhead.

The land moderately slopes on all sides of the peninsula towards the water. Soils are shallow and rocky with underlying bedrock near the surface. The proposed tour dock would extend into the water over a smooth rock ledge that drops precipitously into the water to a depth of approximately 35 feet deep. The water is relatively deep along the shoreline in this area, with the substrate consisting of bedrock.

The project area is consistent with the North Pacific Maritime Dry-Mesic Douglas-Fir Western Hemlock Ecological System, as defined by the Washington Natural Heritage Program (WNHP; Rocchio and Crawford, 2009). Vegetation in the project area is dominated by mature Douglas-fir (*Pseudotsuga douglasii*) with western hemlock (*Tsuga heterophylla*) co-dominant or occasional in the canopy. The understory is sparse due to the shallow soils, consisting primarily of sword

fern (*Polystichum munitum*), salal (*Gaultheria shallon*) and kinnikinnick (*Arctostaphylos uva-ursi*).

B. Aquatic substrate and vegetation (include information on the amount and type of eelgrass or macroalgae present at the site)

The shoreline area is composed primarily of large cobbles, boulders, and bedrock. The shoreline is relatively steep within the project area, with the reservoir becoming about 60 feet deep within 100 feet of the shoreline. There is no submerged aquatic vegetation in the project vicinity.

C. Surrounding land/water uses

The west end of Diablo Lake, where the project occurs, is relatively developed because this is where the only road access exists (Figure 3). The Diablo Dam Access Road crosses over Diablo Dam, ending at the ELC parking lot in approximately 0.7 miles. Between the dam and the ELC and along this road, lies various City Light marine facilities including the existing tour dock, the West Ferry Landing, the Diablo Boathouse, a marine fueling station, and several barge landings (Figure 3). These marine facilities provide access to the east side of Diablo Lake, where Ross Powerhouse, Ross Dam, and access to Ross Lake occur. In addition, a dry dock facility is located approximately 400 feet northeast, on the opposite side of the peninsula. The dry dock structure consists of a large building and marine rails that extend several hundred feet into the water. The dry dock was constructed in the 1930's for the purpose of servicing and maintaining City Light vessels.

The project is located within the RLNRA, a part of the North Cascades National Park Complex. The RLNRA is managed by the NPS for resource protection and preservation, education and interpretation, and visitor use. Visitors may be using the lake or shoreline for recreational activities, such as fishing, kayaking, swimming, hiking, or canoeing.

Approximately 200 feet north and west of the proposed tour dock lies the ELC campus. The North Cascades Institute operates the ELC under a lease agreement with City Light and provides educational programs on a daily and semester basis. The ELC campus includes dining, lodging, and various support and recreational facilities such as those for kayaking and canoeing. Various trails and a right-of-way access roads extend east from the ELC.

D. Level of development

The level of development is low in the immediate project area but moderately developed in the vicinity (Figure 3). The west end of Diablo Lake where the project is located, is relatively developed because the sole road access to the lake occurs here. From Diablo Dam, the Diablo Dam Access Road continues approximately 0.7 miles, ending at the ELC parking lot. Various City Light marine facilities occur along this stretch of road including the existing tour dock, the West Ferry Landing, the Diablo Boathouse, a marine fueling station, and several barge landings. These marine facilities provide access to the east side of Diablo Lake, where Ross Powerhouse, Ross Dam, and Ross Lake access occur. In addition, a dry dock facility is situated approximately 400 feet northeast, on the opposite side of the peninsula. The dry dock structure consists of a large building and marine rails that extend several hundred feet into the water.

Approximately 200 feet north and west of the proposed tour dock lies the ELC campus. The North Cascades Institute operates the ELC under a lease agreement with City Light and provides educational programs on a daily and semester basis. The ELC campus includes dining, lodging,



and various support and recreational facilities. The shoreline near the ELC, approximately 400 feet north, is used as a kayak and canoe launch.

#### E. Water quality

Water quality conditions in Diablo Lake are excellent. Diablo Lake is designated as a Category 1 water body by the Washington Department of Ecology, which means there are no documented water quality impairments (Washington State Water Quality Atlas 2017). Diablo Lake is an oligotrophic lake that drains a pristine drainage, and is located within the boundaries of North Cascades National Park.

#### F. Describe use of the action area by listed salmonid fish species.

Diablo Lake is used as FMO habitat by bull trout. The majority of bull trout in the Upper Skagit Core Area live in Ross Lake (SCL 2012; USFWS 2013). Recent genetic testing completed by the Washington Department of Fish and Wildlife (WDFW) Molecular Genetics Laboratory found that a large percentage of the native char present in Diablo Lake are Dolly Varden. This is a native char species that closely resemble bull trout, but is much smaller in size than the bull trout found in this reservoir. Adult bull trout are large adfluvial (lake-dwelling) fish that are typically larger than 400 mm total length (TL), with the largest individuals exceeding 700 mm TL. In comparison, adult Dolly Varden are less than 300 mm TL.

City Light fish biologists estimated the abundance of bull trout in Diablo Lake at 370 by downscaling the estimated number in Ross Lake based upon the surface area of Diablo Lake (City Light 2012). The USFWS (2013) suggested that the actual number of bull trout may be lower than this estimate due to poor spawning habitat conditions in Thunder Creek, which is the only major stream drainage where bull trout can spawn in this reservoir system. Based upon the results of tangle net sampling conducted in Diablo Lake by NPS and City Light biologists in 2010, 79 percent of native char in the reservoir are Dolly Varden, while 21 percent of the native char are bull trout (City Light 2012). Dolly Varden are likely the dominant char species in this reservoir due to the extremely cold and turbid water quality conditions found in Thunder Creek, which drains one of the largest glacier systems in the state.

Based upon the results of tangle net sampling conducted by WDFW in 2005 and NPS in 2010, Diablo Lake is used mainly by subadult and adult bull trout (i.e., age 3 and older fish). No juvenile bull trout have been captured in the experimental gill nets used in this sampling, which are capable of capturing fish less than 100 mm TL. This is consistent with the life history of bull trout, which typically spend the first 2 to 3 years of life in their natal tributaries (USFWS 2015).

Bull trout have been observed throughout the reservoir, and observations of acoustically tagged fish have found that they can move between different areas of the reservoir (including the proposed dock area) within a single day (Connor 2017). The results of three years of migration data obtained from adult bull trout implanted with acoustic tags suggest that bull trout strongly prefer the Thunder Arm area of the reservoir (outlet of Thunder Creek), and the narrow and deep canyon area of the reservoir downstream of Ross Powerhouse. Bull trout likely prefer these areas because of the relatively high concentrations of forage fish (including reidside shiners and juvenile rainbow trout) at these locations. Bull trout typically congregate at the mouths of major tributaries in Ross and Diablo reservoirs to feed on small fish migrating out of the tributaries.

Diablo Lake becomes thermally stratified in the summer, with temperatures ranging between 14 and 16 C in the epilimnion of the reservoir (shallower than 25 feet), and between 5 and 10 C in the hypolimnion of the reservoir (deeper than 85 feet, City Light data for 2015 and 2016). Research on the vertical migration patterns of bull trout in Ross Lake found that bull trout move into the shallow and warmer waters on a daily basis to forage on small fish, especially redbside shiners (Eckmann et al. 2016). Bull trout then migrate into the deeper areas of the reservoir where temperatures are less than 10 C during the remainder of the day. The diel vertical migration of bull trout in the reservoirs is thought was suggested to be a way to optimize food intake (small forage fish are concentrated in the warmer surface waters), as well as to improve gamete production (the survival of developing bull trout eggs is enhanced at temperatures less than 10 C). Based upon these research findings, most adult bull trout in Diablo Lake would be expected to make regular daily migrations between shallower and warmer feeding areas of the reservoir, and the deep and cold “resting” areas located in the hypolimnion of the reservoir.

Acoustic monitoring data for six, tagged, adult bull trout in 2014 (Connor 2015) found that fish were most often detected in the lake (61%) immediately downstream of the Ross Powerhouse tailrace and in the Thunder Arm areas (26%). There were few observations of fish in the forebay area of Diablo Dam (~1%). The remainder of detections of tagged fish were elsewhere around Diablo Lake between the Ross Powerhouse tailrace, Thunder Arm, and the Diablo Dam forebay area. Acoustic monitoring data obtained from 11 tagged adult bull trout in Diablo Lake in 2015 again found that bull trout spend most of their time in the areas of the Ross Powerhouse tailrace, and within the Thunder Arm area of the reservoirs (Connor 2016). The number of bull trout detections within the northern portion of the reservoir in the vicinity of the proposed tour dock was relatively small, accounting for only 4 percent of all observations (228,000 detections) recorded in Diablo Lake in 2015 (City Light bull trout acoustic telemetry database 2015). These data indicate that the proposed boat dock construction site is a low-use habitat area for bull trout in the reservoir.

G. Is the project located within designated / proposed bull trout or Pacific salmon critical habitat? If so, please address the proposed projects’ potential direct and indirect effect to primary constituent elements (Critical habitat templates can be found on the Corps website at: [http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=Primary\\_Const\\_Elem](http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=Primary_Const_Elem)).

Diablo Lake was designated as critical habitat for bull trout by the USFWS in the final rule published on Oct. 18, 2010 (75 FR 63898). Diablo Lake has a surface area of 770 acres and volume of 89,000 acre-feet at full operating pool. The reservoir has an average depth of 98 feet and maximum depth of 240 feet at full pool. Diablo Lake is located within Core Area 3, Upper Skagit River, which is one of 21 designated core unit areas within the Coastal Recovery Unit (USFWS 2015a). The recovery plan also states that the Upper Skagit core area is one of four that have been identified as “population strongholds” in the Puget Sound (USFWS 2015b). Populations of bull trout in the Upper Skagit core area are among the most abundant and stable in the Coastal Recovery Unit (USFWS 2015b).

The tour dock and gangway would have a combined surface area of approximately 1,450 sf. This dock and gangway would cover 0.004 percent of the surface area of the reservoir, so impacts to critical habitat in the reservoir would be very small. Construction of the concrete footings and anchor blocks for the tour dock and ramp would impact approximately 60 feet of the shoreline of

the reservoir below the OHWM. The impacted area of the shoreline is extremely small relative to the 74,600 feet shoreline length of the reservoir.

There are 9 primary constituent elements (PCE) determined to be essential for bull trout conservation, according to 50 CFR Part 17 and 70 FR 562212 et seq.:

- 1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

*Existing Conditions:* There are no springs or seeps in the project area. The tour dock anchor footings would be primarily constructed upon hard surface rock and bedrock.

*Effects to PCE:* The project would not have any impact on water connectivity since the anchor footings for the tour dock will be constructed on hard rock and bedrock which has almost zero permeability.

- 2) Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including, but not limited to permanent, partial, intermittent or seasonal barriers.

*Existing Conditions:* The project site is currently used as foraging habitat for subadult and adult bull trout which reside in the reservoir on a year-round basis (SCL 2012). The project would have very little impact on the spawning migration of bull trout, or on juvenile fish, since the only spawning and juvenile rearing area in the Diablo Lake drainage is located within Thunder Creek which is located on the opposite (South) side of the reservoir from the project site.

*Effects to PCE:* Migration between foraging, spawning, rearing, and overwintering habitats would not be affected by the project. Project activities will not form any permanent, partial, intermittent or seasonal barriers to migration between habitats used by bull trout in Diablo Lake.

- 3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

*Existing Conditions:* The tour dock would be located along a relatively steep section of the reservoir shoreline which is composed mainly of large cobbles, boulders, and bedrock. Trees and bushes situated along the shoreline in the project area provide a source of terrestrial organisms and limited overhanging vegetation cover to fish in the reservoir.

*Effects to PCE:* The construction of the access trail to the dock would result in the removal of one mature tree that provides overhanging cover and a potential source of invertebrates for foraging fish in the reservoir. This alteration in vegetation would have no measurable impact on the bull trout forage base in the reservoir, especially since subadult and adult bull trout feed primarily on small fish. Based upon observations conducted over several years in Ross Lake by City

Light and NPS fish biologists, overwater structures including boat docks and boat houses are a major attractant to redbase shiners. This introduced minnow species was introduced into Ross Lake in the early 2000s, and is now found in abundant numbers in both Ross and Diablo Lakes. The new tour dock would be expected to result in a local concentration of redbase shiners, which would improve the food base of bull trout in the project area. The results of acoustic monitoring of bull trout suggest that individual fish reside under overwater structures in the reservoirs for extended periods of time (several weeks to several months). These observations indicate that bull trout will establish foraging territories under these structures. Due to the lack of natural habitat cover such as that provided by floating logs in this vicinity of the reservoir, the tour dock would be expected to result in an improvement to the food base and foraging habitat for bull trout.

- 4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

*Existing Conditions:* The project site is located along a relatively steep shoreline area of the reservoir. Due to the rocky nature of the shoreline, this area of the reservoir contains very little natural cover including large wood. Overhanging vegetation provides very little habitat cover in this area of the reservoir.

*Effects to PCE:* The tour dock and ramp would provide 1,250 square feet of habitat cover for bull trout in an area of the reservoir that contains very little natural shoreline cover. The depth of the reservoir under the tour dock would be approximately 35 feet at full operating pool, and approximately 24 feet at the minimum operating pool. Based upon observations in Ross and Diablo Lakes, overwater structures located over deep water are commonly used for cover by bull trout. Adult bull trout may use these areas as habitat cover for extended periods, and may establish foraging territories at these locations. The grated partial grating that will be used at the tour dock, as well as the frequent use of the dock by people, will likely reduce the attraction of the dock as a cover refuge for bull trout. Nevertheless, the bull trout would be expected to migrate into this area from surrounding deeper areas of the reservoir to forage on redbase shiners and small rainbow trout that are attracted to the dock. Thus, the dock would be expected to provide a small increase to bull trout foraging habitat in the project area.

- 5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.

*Existing Conditions:* Water temperatures in most areas of Diablo Lake are within the preferred temperature range for bull trout throughout the year. Water temperatures near the surface of the reservoir (i.e., shallower than 5 feet) can warm up to 17 °C during the summer months. However, bull trout will still

forage in these warmer waters given that an abundant supply of forage fish (reidside shiners and small rainbow trout) is present, and given that the bull trout have the ability to migrate to colder areas of the reservoir during periods of the day (Eckmann et al. 2016).

*Effects to PCE:* Water temperatures under the tour dock would be in the 12 to 14 C range during the summer at depths greater than 25 feet, which means that there is suitable cold water refuge habitat for bull trout in the immediate vicinity of the dock throughout the year. Bull trout would access deeper water in the reservoir having temperatures less than 10 C during the summer in the immediate vicinity of the project site. Thus, the tour dock and vicinity could be used by bull trout as foraging habitat throughout the entire year, and foraging in this area would not be expected to be constrained by water temperatures. The tour dock would not have any effects on water temperatures in the reservoirs due to its very small size.

- 6) Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.

*Existing Conditions:* As mentioned previously, the project site would be used as FMO habitat by subadult and adult bull trout. There is no spawning and early juvenile rearing habitat within the vicinity of the project area. The spawning and early juvenile rearing habitat areas for bull trout in Diablo Lake are located within the Thunder Creek drainage, which is found on the opposite side of the reservoir.

*Effects to PCE:* Spawning and early rearing habitat for bull trout will not be affected by the project.

- 7) A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.

*Existing Conditions:* The project site is located entirely within a reservoir with a mean hydraulic residency time of 9.4 days. Consequently, Diablo Lake should be considered a lake (and not a river) in terms of hydrological effects of the project on bull trout. The primary process influencing the water surface elevations in Diablo Lake is Skagit River Hydroelectric Project operations, which result in daily water level fluctuations of 1 to 5 feet. Larger drawdowns of up to 11 feet occur infrequently.

*Effects to PCE:* The project will not have any effect on the hydrology of the reservoir.

- 8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

*Existing Conditions:* Diablo Lake possesses cold and clean waters that support the normal reproduction, growth, and survival of bull trout. The Diablo Lake drainage is located within the boundaries of North Cascades National Park and the Ross Lake National Recreation Area. Diablo Lake is designated as a Class 1 water body by the Washington Department of Ecology, meaning that it has no documented water quality impairments. This reservoir supports one of the largest populations of Dolly Varden in the Washington State, which is a native char species that requires even colder and cleaner water quality conditions that bull trout.

*Effects to PCE:* The project will have no effect on water quality and quantity, and thus have no effect on normal reproduction, growth or survival of bull trout.

- 9) Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.

*Existing Conditions:* There are few non-native predatory fish present in Diablo Lake. The non-native fish species in Diablo Lake that is of most concern is brook trout, which can compete with bull trout for foraging, spawning, and early juvenile rearing habitat. Brook trout can also interbreed with bull trout, which can result in reduced reproductive productivity. Genetic studies have shown bull trout-brook trout hybrids are present in Diablo Lake (Smith and Naish 2010; City Light 2012). Brook trout are found in relatively low numbers in Diablo Lake, which is likely a result of the cold water temperature regimes in this reservoir that favor bull trout and Dolly Varden.

*Effects to PCE:* The tour dock would provide a relatively small area of overwater habitat cover that could be an attractant to brook trout. Partial grating of the dock would allow light penetration, which would reduce the attraction of this structure to brook trout. Because of the cold temperature regime and steep shoreline of the reservoir at the project site, native bull trout and Dolly Varden are more likely to use the tour dock as habitat than nonnative brook trout. The project would be expected to have no effect on the abundance of brook trout in Diablo Lake.

H. Describe use of the action area by other listed fish species (*green sturgeon, eulachon, bocaccio, canary rockfish and yelloweye rockfish*).

There are no other listed fish species known or likely to occur in the action area.

I. Is the project located within designated/proposed critical habitat for any of the species listed below? If so please address the proposed projects' potential direct and indirect effect to primary constituent elements. Please see the NOAA-Fisheries and US Fish and Wildlife websites ([www.nwr.noaa.gov](http://www.nwr.noaa.gov) and [www.fws.gov/pacific](http://www.fws.gov/pacific) respectively) for further information.

<i>Southern resident killer whale</i>	<i>Marbled murrelet</i>
<i>Northern spotted owl</i>	<i>Western snowy plover</i>
<i>Green sturgeon</i>	<i>Eulachon</i>

No, the project is not located within designated critical habitat for the species listed in this subsection.

- J. Describe use of action area by marbled murrelets. How far to the nearest marbled murrelet nest site or critical habitat? Some information is available on the Fish and Wildlife Service website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?sPCODE=B08C>. The “Marbled Murrelet Effectiveness Monitoring Plan for the Northwest Forest Plan” (Madsen et al. 1999) considers the primary nesting range of the species to extend inland 40 miles (24 km) in Washington. The action area is about 65 straight line miles from the nearest coastal saltwater; flight distance up the Skagit River is about 88 miles. Although marbled murrelets have been recorded flying up the Thornton Creek drainage, about 10 miles west of the action area, there are no records of nesting marbled murrelets in the RLNRA or North Cascades National Park.
- K. Describe use of action area by the spotted owl. How far to the nearest spotted owl nest site or critical habitat? Some information is available on the Fish and Wildlife Service website: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?sPCODE=B08B>. The nearest northern spotted owl designated critical habitat is about 20 miles away (USFWS, Jim Muck, personal communication); the closest nest territory is over a mile to the southeast on Ruby Mountain and was last known to be occupied in 1987.
- L. **For marine areas only:** Describe use of action area by Southern Resident killer whales. How often have they been seen in the area and during what months of the year? For information on noise impacts on killer whales and other marine mammals, please see the National Marine Fisheries website: <http://www.nwr.noaa.gov/Marine-Mammals/MM-consults.cfm>.  
Not applicable.
- M. **For marine areas and Columbia River:** How far is the nearest steller sea lion haulout site from the action area? Describe their use of the action area. See the National Marine Fisheries website: <http://www.nwr.noaa.gov/Marine-Mammals/MM-consults.cfm> for information on the steller sea lion and location of their haulout sites.  
Not applicable.
- N. **For marine areas only: Forage Fish Habitat** – only complete this section if the project is in tidal waters.

Check box if WDFW documented habitat is present. Go to the WDFW website for this information: <http://wdfw.wa.gov/fish/forage/forage.htm>, then search for each species under the link to Biology, then the link to Documented Spawning Grounds (if available, please attach a copy of the Hydraulic Project Approval from WDFW):

**Surf Smelt:** ☐      **Pacific Herring:** ☐      **Sand Lance:** ☐

Check box if the proposed action will occur in potentially suitable forage fish spawning habitat:

**Surf Smelt:** ☐      **Pacific Herring:** ☐      **Sand Lance:** ☐

If no boxes are checked, please explain why site is not suitable as forage fish spawning habitat.

Please describe the type of substrate and elevation and presence of aquatic vegetation at the project area. For example:

At +10 to +5 feet above MLLW, there is no aquatic vegetation, the substrate consists of large cobbles.

At +5 to +1 foot above MLLW, there is eelgrass and the substrate consists of fine sand.

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## 10. Effects Analysis

*Describe the direct and indirect effects of the action on the proposed and listed species as well as designated and proposed critical habitat within the action area. Consider the impact to both individuals and the population.*

*Discuss the short-term, construction-related, impacts as well as the long-term and permanent effects.*

**Direct Impacts:** The project would include the construction of a dock, gangway, and pier supported by a concrete foundation wall and concrete anchor blocks along a 60 feet section of the shoreline. Some of the concrete structures would be installed below the OHWM. All construction would be conducted in the “dry” by drawing down the reservoir during the construction period. The new dock would be barged to the project site, and anchored to the shoreline structures. The dock would float on metal pontoons, and along with the gangway, would have a surface of area 1,450 sf. Partial grating (30%) of the decking would allow partial light penetration to water under the dock.

Construction of the dock anchor wall and anchor blocks would result in short-term above-water visual disturbance to any bull trout residing in this area. Disturbance to bull trout by noise and ground vibrations would be minimal because construction would occur out of the water. Based upon acoustic tracking data collected from tagged bull trout in Diablo Lake, the project area is considered a low-use habitat area by this species. Consequently, construction activities along the shore may result in some short-term avoidance behavior by bull trout within the project area, though this altered behavior would not be expected to impact foraging ability, growth, or survival.

The project would also include improvements to 300 feet of an existing access trail, and the construction of 100 feet of additional trail to provide public access to the tour dock. Construction of the trail will result in the removal of five (5) trees. A sediment and erosion control plan would be implemented to minimize sediment inputs from the construction area into Diablo Lake. Sediment inputs from construction of either the dock anchor footing or trail would not exceed DOE turbidity standards, and would therefore not be expected to impact bull trout.

The proposed project would result in the installation of a permanent dock that would provide some habitat cover to bull trout in an area lacking natural overwater cover (e.g., floating logs). The use of this habitat by bull trout for cover purposes would be limited due to the light penetration provided by the grated deck surface of the dock, and by frequent use of the dock by City Light’s boat operators and tour groups. However, the new boat dock would be expected to attract reddsides and small rainbow trout to this area of the reservoir, thus improving the local forage base for bull trout over the long-term.



**Indirect Impacts:** No indirect impacts are anticipated. The Skagit River Hydroelectric Project would continue to operate per the existing FERC license, and under the Biological Opinion and Incidental Take Statement issued in 2013 by the USFWS for bull trout.

#### **11. Conservation measures:**

*Conservation measures are measures that would reduce or eliminate adverse impacts of the proposed activity (examples: work done during the recommended work window (to avoid times when species are most likely to be in the area), silt curtain, erosion control best management practices, percent grating on a pier to reduce shading impacts).*

**Proposed work window:** The proposed work window would not affect the spawning migration of bull trout, since migratory routes and spawning habitats are found on the opposite side of the reservoir (i.e., Thunder Arm area of reservoir and Thunder Creek drainage).

#### **Other conservation measures:**

- The reservoir elevation would be lowered approximately 11 feet from the normal operating pool level to conduct tour boat dock construction in the dry.
- The surface of the dock structure would have partial grating (30 percent) and the pier surface would be constructed of molded fiberglass grating to allow light penetration.
- Soil would be stockpiled on the barge rather than on land.
- Compost socks would be installed around the perimeter of construction to prevent or minimize erosion and sedimentation during construction.
- Mulch would be applied to all disturbed areas immediately following construction.
- Turbidity in the lake would be monitored during construction out to approximately 300 feet.
- State water quality standard for turbidity would be met; which is no more than 5 nephelometric turbidity units (NTUs) above background levels when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background is more than 50 NTU.
- A concrete wash-out area would be created for use during construction.
- The contractor would ensure that wash water does not enter the lake and would have spill response equipment on site throughout the duration of construction.
- The proposed trail alignment was selected to minimize tree removal; only five trees would be removed.
- Trees to be removed would be flagged prior to construction.
- Tunneling or hydro-excavation would be utilized through the drip zones of preserved trees to prevent damage.
- City Light would prepare a revegetation plan in consultation with the NPS botanist for shoreline areas disturbed by construction of the trail improvements and new trail section.

#### **12. Determination of Effect:**

*Provide a summary of impacts concluding with statement(s) of effect, by species. Even projects that are intended to benefit the species might have short-term adverse impacts and those must be addressed. Only the following determinations are valid for listed species or designated critical habitat:*

**No effect.** *Literally no effect. No probability of any effect. The action is determined to have 'no effect' if there are no proposed or listed salmon and no proposed or designated critical habitat in the action area or downstream from it. This effects determination is the responsibility of the action agency to make and does not require NMFS review.*

***May Affect, Not Likely to Adversely Affect (NLAA)*** – Insignificant, discountable, or beneficial effects. The effect level is determined to be ‘may affect, not likely to adversely affect’ if the proposed action does not have the potential to hinder attainment of relevant properly functioning indicators and has a negligible (extremely low) probability of taking proposed or listed salmon or resulting in the destruction or adverse modification of their habitat. An insignificant effect relates to the size of the impact and should never reach the scale where take occurs. A ‘discountable effect’ is defined as being so extremely unlikely to occur that a reasonable person cannot detect, measure, or evaluate it. This level of effect requires informal consultation, which consists of NMFS and/or USFWS concurrence with the action agency’s determination.

***May Affect, Likely to Adversely Affect (LAA)*** This form is not appropriate for use with a project that is LAA listed species. Please see the Biological Assessment (BA) template on the Corps website: [http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage\\_ESA](http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_ESA)

***Northern Spotted Owl*** – There is no critical or suitable habitat within the action area. Therefore, the project would have No Effect on this species.

***Western Yellow-billed Cuckoo*** – There is no critical habitat or suitable habitat within the action area. Therefore, the project would have No Effect on this species.

***Bull Trout*** – There would be minor but insignificant direct effects on some critical habitat and PCE’s. Therefore, the project May Affect, but is Not Likely to Adversely Affect (NLAA) bull trout in Diablo Lake.

### **13. EFH Analysis**

Not Applicable. There is no EFH in the action area.

### **14. References:**

- Connor, E. 2015. Annual Incidental Take Report for 2014 – Bull Trout, Skagit Hydroelectric Project (FERC 553). Seattle City Light, City of Seattle, Seattle WA.
- Connor, E. 2016. Annual Incidental Take Report for 2015 – Bull Trout, Skagit Hydroelectric Project (FERC 553). Seattle City Light, City of Seattle, Seattle WA.
- Connor, E., F. Goetz, D. Pflug, and E. Jeanes. 2009. Migration Studies of Bull Trout and Steelhead in the Skagit River, Washington. Presentation to the Pacific Ocean Shelf Tracking (POST) Project Science Forum. June 18, 2009.
- Downen, M. 2006. Skagit Bull Trout Monitoring Program: 2002-2005 report. Report prepared for Seattle City Light. Washington Department of Fish and Wildlife, La Conner, Washington.
- Eckmann, M., J. Dunham, E. Connor, and C. Welch. 2016. Bioenergetic evaluation of diel vertical migration of bull trout (*Salvelinus confluentus*) in a thermally stratified reservoir. Ecology of Freshwater Fish 2016: 1-14.
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- Madsen, S., D. Evans, T. Hamer, P. Henson, S. Miller, S.K. Nelson, D. Roby, and M. Stapanian. 1999. Marbled murrelet effectiveness monitoring plan for the Northwest Forest Plan. USDA, U.S. Forest Service. PNW-GTR-439. 51 pp.

- Smith, M.J. and K. Naish. 2010. Population Structure and Genetic Assignment of Bull Trout (*Salvelinus confluentus*) in the Skagit River Basin. Draft Report to Seattle City Light, Seattle, Washington.
- Teachout, E. 2015. Interim consultation guidance for western yellow-billed cuckoo (*Coccyzus americanus*). Washington Fish and Wildlife office, U.S. Fish and Wildlife Service, Lacey, WA.
- U.S. Fish and Wildlife Service (USFWS). 2015a. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Pacific Region, Portland, OR.
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- U.S. Fish and Wildlife Service (USFWS). 2013. Biological Opinion for the Seattle City Light Skagit River Hydroelectric Project, Federal Energy Regulatory Commission Number 553-221 in Skagit and Whatcom Counties, Washington. Washington Fish and Wildlife Office, Lacey, WA.