Wells Project Resident Fish and Aquatic Habitat Chronology (1965-2007)

Date	Description
Resident Fish Inventories and Studies	
1974	*Occurrence of Gas Bubble Disease Symptoms on Fish in Mid-Columbia Reservoirs.* Dell et al. (Dell, M., Erho, M. & Leman, B.) addressed the occurrence of gas bubble trauma on juvenile salmonids and resident fish. Fish were collected with beach seines, Lake Merwin traps, Pennsylvania traps and angling throughout the Mid-Columbia reservoirs and included extensive sampling in the Wells Reservoir. Presence of various resident fish species was documented during this survey in addition to monitoring for signs of gas bubble disease.
1979	*Fisheries Survey of Wells Reservoir*. J.A. McGee. Douglas PUD conducted a survey to document the abundance and distribution of resident fish species present in the Wells Project Reservoir (RM 515.6 to RM 538.0). Trap nets, beach seines, and angling were used to collect a total of 2,480 fish. Twenty of the 27 known species previously trapped in the Mid-Columbia reservoirs (Dell et al. 1974) were identified during the 1979 inventory.
1983	*Resident Fisheries of the Wells Pool (A Review).* William Zook. Zook conducted a historical review of resident fish in the Wells Reservoir that included an assessment of origin, general biology, abundance, habitat use, and distribution.
1994	*Significance of Predation in the Columbia River from Priest Rapids Dam to Chief Joseph Dam.* Craig Burley and Thomas Poe. A one-year study that determined the relative abundance and rates of predation for several predatory species of fish. The study documented the rates of predation by northern pikeminnow (*Ptychocheilus oregonensis*), smallmouth bass (*Micropterus dolomieui Lacepede*) and walleye (*Stizostedion vitreum vitreum*) on outmigrating juvenile salmonids. Results of the study showed that northern pikeminnow were by far the most abundant predator collected and that abundance index values were highest in mid-reservoir areas while consumption index values were highest near the boat restricted zone of project tailraces.
1999	*Assessment of Resident Fish in Lake Pateros, Washington.* Beak Consultants and Rensel Associates. An updated inventory of the resident fish species composition of the Wells Reservoir. Sampling gear used during this study included scuba, snorkeling and beach seining and was designed to be consistent with past inventories. The primary goal of the study was to characterize species composition and distribution within the Wells Reservoir and to document changes from past resident fish inventories.

Bull Trout (*Salvelinus confluentus*)	
2000-present	During the fish migration season (May 1 to November 15), 24-hour bull trout counts have been conducted at both the east and west fish ladders at Wells Dam since 2000.
2000-2003	From 2000 to 2003, Douglas PUD conducted video counts for bull trout of at least 1 adult fishway for 28% (2 days a week) of the off-season period (November 16 to April 30). During this period, no adult or juvenile bull trout have been observed using the adult fishways.
2004-2006	Beginning in the winter of 2004, Douglas PUD initiated winter video counts in operating fishways at Wells Dam. The intent of these counts was to determine the use of the fishways by bull trout during the entire off-season (winter) period. These experimental counts have determined that no adult or juvenile bull trout utilized the fishways at Wells Dam during the winter of 2004-2005 and 2005-2006. Winter counts for bull trout will also take place during the winter of 2006-2007.
2001-2004	*Movement of Bull Trout within the Mid-Columbia River and Tributaries.* BioAnalyst, Inc. The objectives of this 3-year telemetry study were to describe the movements of migratory sized bull trout in the Mid-Columbia River and to assess the effects of hydroelectric operations on the migration patterns of these fish. This study was a collaborative effort between Douglas and Chelan PUD and examined movements within the Rock Island, Rocky Reach, and Wells Project areas. Although not a stated goal of the study, movements and behavior patterns within the major tributary streams were also documented during this study. Drainages surveyed include the Methow, Wenatchee and Entiat rivers.
2005-2008	*Bull Trout Radio-telemetry Study.* LGL Limited. As part of the Wells Bull Trout Monitoring and Management Plan, Douglas PUD is implementing another 3-year radio-telemetry study to assess incidental take associated with bull trout passage through Wells Dam. In addition, this study will also provide more refined passage metrics for bull trout. Douglas PUD will also PIT tag and collect genetic samples from juvenile and adult bull trout when encountered during either smolt trapping in the Methow, brood collection at Wells Dam or during radio-tagging associated with this study. The collection of genetic information is intended to assist the USFWS in developing a genetic database for each of the Bull Trout Populations in the Upper Columbia River.
Pacific Lamprey (*Lampetra tridentata*)	
1995-Present	Since 1995, Adult Pacific lamprey have been counted at both the east and west fish ladders at Wells Dam during the fish migration season (May 1 to November 15).
2004	*Assessment of Adult Pacific Lamprey Migratory Behavior at Wells Dam Using Radio-telemetry Techniques, 2004.* LGL Limited. In 2004, Chelan PUD captured, tagged, and released 150 lamprey in the Rocky Reach Project area. At Wells Dam tailrace, 18 of these tagged fish were detected. A proportion of these fish entered the fishway and passed the project. Although sample sizes of this baseline study were relatively small, data collected provided information regarding passage metrics, migratory behavior, and potential impediments within the Wells fish ladders.

White Sturgeon (*Acipenser transmontanus*)	
2001-2003	*White Sturgeon Population Assessment and Behavior Study.* Starting in the spring of 2001, Central Washington University in cooperation with Douglas PUD initiated an inventory of the sturgeon population living in the Wells Reservoir. During this study, long-line gear was deployed during two summers in an effort to collect, PIT-tag and radio-tag individual sturgeon. The study segmented the Wells Reservoir into five discrete sampling zones and attempted to uniformly spread effort across these zones. Mark-recapture was used to estimate population. Locations of captured sturgeon were documented and radio-tags were used to determine habitat preferences over a two year period. Length-at-age metrics were developed based upon the samples collected during the study. The final Master's Thesis for this study is expected to be available in early 2007.
Aquatic Habitat	
1965-Present	Douglas PUD owns approximately 89 miles of Wells Project shoreline in fee title and through the implementation of its land use policy, addresses shoreline management issues and maintains an approval process for land use activities below Wells Project Boundary. Applications for activities such as construction of boat docks and piers are reviewed and considered for approval by Douglas PUD only after the project sponsors have already received the applicable construction permits from the appropriate state and federal agencies. Although many of the shoreline management activities conducted on Project lands are conducted to directly benefit terrestrial species of plants and wildlife, these management efforts may also indirectly benefit resident fish, juvenile anadromous fish, and aquatic invertebrates and plants by minimizing impact in littoral areas of the Wells Project.
2004	Wells HCP Approved by FERC. The HCP requires Douglas PUD treat project lands as habitat for anadromous salmonids. The District further agrees to notify and consider comments received from HCP parties regarding any land use permit applications associated with Project owned lands.
2005	*Macrophyte Identification and Mapping of the Wells Project.* Douglas PUD. In August and September of 2005, Douglas PUD conducted an assessment of the aquatic macrophyte communities found in Wells Project water bodies. The study approach consisted of using high resolution orthophotography and detailed bathymetry to estimate probable locations of macrophyte beds throughout the Wells Reservoir. Estimates were made based on trends observed in similar studies at the Rocky Reach, Wanapum, and Priest Rapids reservoirs. Macrophyte locations were estimated and mapped based on depth using a Geographic Information System (GIS). The estimated locations were then field verified through a comprehensive survey of the reservoir to determine presence or absence of macrophyte beds in the estimated locations. Species composition data was categorized into pre-determined aquatic plant community types which were integrated into a final continuous macrophyte map layer in the GIS.
2005	A detailed bathymetric survey was conducted for the Wells Reservoir and portions of the Okanogan and Methow rivers that are within the FERC Project boundary. The final product includes a digital elevation model and one-foot contours in GIS format for the entire Wells Reservoir and Tailrace.

Aquatic Ecosystem	
2006	*Effects of Water Level Fluctuations on Natural Resources within the Wells Project: A Review of Existing Information.* In 2006, Douglas PUD completed a comprehensive analysis of potential impacts resulting from reservoir fluctuations. The objectives of the study were to describe the effects of water level fluctuations on aquatic resources, with an emphasis on salmonids, bull trout and Pacific lamprey; terrestrial resources, with emphasis on waterfowl, amphibians, wetland and riparian habitat; and erosion

Agreements	
1970	Agreement between Douglas PUD and the Confederated Tribes of the Colville Reservation for fish and wildlife impacts upon the Colville Indian Reservation and the Columbia and Okanogan Rivers adjacent thereto as a result of the development of the Wells Hydroelectric Project.
1972	Agreement between Douglas PUD and the Washington State Department of Game for Mitigation of Gamefish Losses in Connection with the Wells Project.
1972-2003	Correspondence between Douglas PUD and the Washington Department of Game for resident trout mitigation. Memorandums document the progression of this agreement to the present day mitigation program of 20,000 pounds of resident rainbow trout to be planted in lakes in Okanogan and Douglas counties.