

**Endangered Species Act Section 7(a)(2) Consultation
Biological Opinion And Magnuson-Stevens
Fishery Conservation and Management Act Essential
Fish Habitat Consultation**

**Consultation on Treaty Indian and Non-Indian Fisheries in the
Columbia River Basin Subject To the 2008-2017 *US v. Oregon*
Management Agreement**

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Northwest Region

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Terms and Definitions

Abundance	In the context of salmon recovery, abundance refers to the number of adult fish returning to spawn.
Acre-feet	A common measure of the volume of water in the river system. It is the amount of water it takes to cover one acre (43,560 square feet) to a depth of one foot.
Adaptive Management	The process of adjusting management actions and/or directions based on new information.
Anadromous Fish	Species that are hatched in freshwater, migrate to and mature in salt water, and return to freshwater to spawn.
Baseline Monitoring	In the context of recovery planning, baseline monitoring is done before implementation, in order to establish historical and/or current conditions against which progress (or lack of progress) can be measured.
Beverton-Holt Function	This function predicts the number of progeny that will return to spawn from a given number of parental spawners.
Biogeographical Region	An area defined in terms of physical and habitat features, including topography and ecological variations, where groups of organisms have evolved in common.
Broad-Sense Recovery Goals	Goals defined in the recovery planning process, generally by local recovery planning groups, that go beyond the requirements for delisting, to address, for example, other legislative mandates or social, economic, and ecological values.
Compensatory Mortality	Refers to mortality that would have occurred for another reason.
Compliance Monitoring	Monitoring to determine whether a specific performance standard, environmental standard, regulation, or law is met.
Delisting Criteria	Criteria incorporated into ESA recovery plans that define both biological viability (biological criteria) and alleviation of the causes for decline (threats criteria based on the five listing factors in ESA section 4[a][1]), and that, when met, would result in a determination that a species is no longer threatened or endangered and can be proposed for removal from the Federal list of threatened and endangered species.
Demand	The amount of power being used at any given time. Demand in the Northwest is seasonal; with the highest use in the winter for heating and the lowest in the summer.
Density-Independent Survival	A change in survival that is not influenced by the number of fish in the population. Generally speaking, most factors influencing survival after the smolt stage are assumed to be density independent. During the egg-to-smolt stage, the density of adults and juveniles can influence survival as a result of competition for

limited habitat or other factors. For evaluation of survival gaps, estimates of survival changes resulting from actions affecting early life stages of salmon and steelhead are made under the assumption of low density.

Dissolved Gas Level

As falling water hits the river surface, it drags in air as it plunges. With increasing water pressure, the air dissolves into the water and increases the levels of pre-existing dissolved gases.

Distinct population segment (DPS)

A listable entity under the ESA that meets tests of discreteness and significance according to USFWS and NOAA Fisheries policy. A population is considered distinct (and hence a “species” for purposes of conservation under the ESA) if it is discrete from and significant to the remainder of its species based on factors such as physical, behavioral, or genetic characteristics, it occupies an unusual or unique ecological setting, or its loss would represent a significant gap in the species’ range.

Diversions

Refers to taking water out of the river channel for municipal, industrial, or agricultural use. Water is diverted by pumping directly from the river or by filling canals.

Diversity

All the genetic and phenotypic (life history, behavioral, and morphological) variation within a population. Variations could include anadromy vs. lifelong residence in freshwater, fecundity, run timing, spawn timing, juvenile behavior, age at smolting, age at maturity, egg size, developmental rate, ocean distribution patterns, male and female spawning behavior, physiology, molecular genetic characteristics, etc.

Draft Limit

The lowest level to which a reservoir can be drawn down. The limit is based on rule curves that are calculated on both historic and current streamflow data.

Drafting

The process of releasing water from storage in a reservoir. Operators begin drafting reservoirs—through turbines or over the spillway of a dam—to lower the level for a number of reasons, including flood control or downstream flows for fish or power generation.

Dredging

The act of removing sediment from the river bottom to keep the channel at the proper depth for navigation. The continual moving and shifting of sediment makes dredging an ongoing activity.

Effectiveness Monitoring

Monitoring set up to test cause-and-effect hypotheses about recovery actions: Did the management actions achieve their direct effect or goal? For example, did fencing a riparian area to exclude livestock result in recovery of riparian vegetation?

ESA Recovery Plan

A plan to recover a species listed as threatened or endangered under the U.S. Endangered Species Act (ESA). The ESA requires that recovery plans, to the extent practicable, incorporate (1)

	<p>objective, measurable criteria that, when met, would result in a determination that the species is no longer threatened or endangered; (2) site-specific management actions that may be necessary to achieve the plan's goals; and (3) estimates of the time required and costs to implement recovery actions.</p>
Evolutionarily significant unit (ESU)	<p>A group of Pacific salmon or steelhead trout that is (1) substantially reproductively isolated from other conspecific units and (2) represents an important component of the evolutionary legacy of the species.</p>
Factors For Decline	<p>Five general categories of causes for decline of a species, listed in the Endangered Species Act section 4(a)(1)(b): (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.</p>
Fall Chinook Salmon	<p>This salmon stock returns from the ocean in late summer and early fall to head upriver to its spawning grounds, distinguishing it from other stocks which migrate in different seasons.</p>
Fish Guidance Efficiency	<p>Number of fish guided into the bypass system divided by total number passing via the powerhouse (i.e., the combined total for bypass system and turbine passage).</p>
Fish Ladder	<p>A series of stair-step pools that enables salmon to get past the dams. Swimming from pool to pool, salmon work their way up the ladder to the top where they continue upriver.</p>
Fish Passage Efficiency	<p>Number of fish passing the dam via non-turbine routes divided by total number passing the dam by all routes.</p>
Flip Lips	<p>A structural device that redirects water as it comes over the spillway of a dam. Flip lips reduce deep plunging of water into the pool below; keeping the water from becoming supersaturated with nitrogen. Fish are naturally attracted to the rapidly moving water at the base of the dam but can suffer from gas bubble disease when the water is supersaturated with gas.</p>
Flood Control	<p>Streamflows in the Columbia River Basin can be managed to keep water below damaging flood levels in most years. This level of flood control is possible because storage reservoirs on the river can capture and store heavy runoff as it occurs.</p>
Flood Control Rule Curve	<p>The curve is also called the upper rule curve. It establishes the amount of storage space that must be maintained in a reservoir to reduce damaging flood conditions downriver.</p>
Flood Control Storage Space	<p>The space that is provided in a storage reservoir to allow for the capture of runoff that could otherwise cause flood damage.</p>

Flow Augmentation	Water released from system storage at targeted times and places to increase streamflows to benefit migrating salmon and steelhead
Freshet	The heavy runoff that occurs in the river when streams are at their peak flows with spring snowmelt. Before the dams were built, these freshets moved spring juvenile salmon quickly downriver
Functionally Extirpated	Describes a species that has been extirpated from an area; although a few individuals may occasionally be found, they are not thought to constitute a population.
Hyporheic Zone	Area of saturated sediment and gravel beneath and beside streams and rivers where groundwater and surface water mix.
Implementation monitoring	Monitoring to determine whether an activity was performed and/or completed as planned.
Independent population	Any collection of one or more local breeding units whose population dynamics or extinction risk over a 100-year time period is not substantially altered by exchanges of individuals with other populations.
Indicator	A variable used to forecast the value or change in the value of another variable.
Interim regional Recovery plan	A recovery plan that is intended to lead to an ESA recovery plan but that is not yet complete. These plans might address only a portion of an ESU or lack other key components of an ESA recovery plan.
International Joint Commission	Six-person Canada-U.S. board created by the 1909 Boundary Water Treaty to resolve disputes on waters shared by the two nations.
Intrinsic Productivity	The average of adjusted recruits per spawner estimates for only those brood years with the lowest spawner abundance levels.
Kelts	Steelhead that have spawned but may survive to spawn again, unlike most other anadromous fish.
Lambda	Also known as Population growth rate, or the rate at which the number of fish in a population increases or decreases.
Large woody debris (LWD)	A general term for wood naturally occurring or artificially placed in streams, including branches, stumps, logs, and logjams. Streams with adequate LWD tend to have greater habitat diversity, a natural meandering shape, and greater resistance to flooding.
Legacy Effects	Impacts from past activities (usually a land use) that continue to affect a stream or watershed in the present day.

Levees, Flood Walls, & Bank Protection	A levee is a raised embankment built to keep out flood waters. Flood walls, such as the concrete seawall along the Willamette River in downtown Portland, are barriers constructed to hold out high water. The soil on river banks is protected from erosion in a variety of ways. River grasses and trees are cultivated in some areas, and fine mesh screens are laid on banks in other areas to keep soil in place. Rip-rap is also used to protect against fast moving streams or vigorous wave action.
Limiting Factor	Physical, biological, or chemical features (e.g., inadequate spawning habitat, high water temperature, insufficient prey resources) experienced by the fish at the population, intermediate (e.g., stratum or major population grouping), or ESU levels that result in reductions in viable salmonid population (VSP) parameters (abundance, productivity, spatial structure, and diversity). Key limiting factors are those with the greatest impacts on a population's ability to reach its desired status.
Locally developed recovery plan	A plan developed by state, tribal, regional, or local planning entities to address recovery of a species. These plans are being developed by a number of entities throughout the region to address ESA as well as state, tribal, and local mandates and recovery needs.
Locks	The key to inland navigation on the Columbia-Snake River Waterway, locks raise and lower ships between pools on the river, i.e., from below a dam to the pool above it. On the trip from the ocean to Lewiston, Idaho, vessels travel from sea level through eight locks to an elevation of over 700 feet.
Major dams	Large hydro-electric projects developed by Federal agencies within the Pacific Northwest. Twenty-nine major dams are in the Columbia River Basin. Two dams are in the Rogue River Basin. A total of 31 dams comprise the Federal Power System.
Management unit	A geographic area defined for recovery planning purposes on the basis of state, tribal or local jurisdictional boundaries that encompass all or a portion of the range of a listed species, ESU, or DPS.
Major population group (MPG)	A group of salmonid populations that are geographically and genetically cohesive. The MPG is a level of organization between demographically independent populations and the ESU.
Megawatts	A measure of electrical power equal to one million watts. Megawatts delivered over an hour are measured in megawatt-hours.
Morphology	The form and structure of an organism, with special emphasis on external features.

Multipurpose Facilities	The Columbia River and the reservoir system are used for many purposes or uses. Projects that were authorized to serve a variety of purposes are referred to as “multipurpose.”
Northern Pikeminnow	A giant member of the minnow family, the Northern Pikeminnow (formerly known as Squawfish) is native to the Columbia River and its tributaries. Studies show a Northern Pikeminnow can eat up to 15 young salmon a day.
Quasi-Extinction Threshold (QET)	This is the point at which a population has become too small to reliably reproduce itself, even though there may be a few fish remaining. Since there is debate about the exact population level at which this condition occurs, several possible levels (50, 30, 10, 1) are considered. Results from short-term quasi-extinction probability modeling are used to help assess near-term (24-year) extinction risk.
Operating Requirements	These are the limits within which a reservoir or dam must be operated. Some requirements are established by Congress when a project is authorized; others evolve with operating experience.
Operating Year	Detailed operations planned over a 12-month period. The operating year begins on August 1 and ends on July 31.
Parr	The stage in anadromous salmonid development between absorption of the yolk sac and transformation to smolt before migration seaward.
Peak Flow	The maximum rate of flow occurring during a specified time period at a particular location on a stream or river.
Phenotype	The external appearance of an organism resulting from the interaction of its genetic makeup and the environment.
Piscivorous	Describes fish that prey on other fish for food.
Population bottlenecks	The most significant limiting factors currently impeding a population from reaching its desired status. Bottlenecks result in the greatest relative reductions in abundance, productivity, spatial distribution, or diversity and are defined by considering viability impairment across limiting life stages and limiting factors.
Productivity	A measure of a population’s ability to sustain itself or its ability to rebound from low numbers. The terms “population growth rate” and “population productivity” are interchangeable when referring to measures of population production over an entire life cycle. Can be expressed as the number of recruits (adults) per spawner or the number of smolts per spawner.
Proposed Action	A proposed action or set of actions
Prospective Actions	Actions from both the FCRPS Biological Assessment and Upper Snake Biological Assessment, August 2007

Reasonable and Prudent Alternative (RPA)	Recommended alternative actions identified during formal consultation that can be implemented in a manner consistent with the purposes of the action, that can be implemented consistent with the scope of the Federal agency’s legal authority and jurisdiction, that are economically and technologically feasible, and that the Service believes would avoid the likelihood of jeopardizing the continued existence of the listed species or the destruction or adverse modification of designated critical habitat.
Recovery domain	An administrative unit for recovery planning defined by NOAA Fisheries based on ESU boundaries, ecosystem boundaries, and existing local planning processes. Recovery domains may contain one or more listed ESUs.
Recovery goals	Goals incorporated into a locally developed recovery plan. These goals may go beyond the requirements of ESA de-listing by including other legislative mandates or social values.
Recovery plan supplement	A NOAA Fisheries supplement to a locally developed recovery plan that describes how the plan addresses ESA requirements for recovery plans. The supplement also proposes ESA de-listing criteria for the ESUs addressed by the plan, since a determination of these criteria is a NOAA Fisheries’ decision.
Recovery scenarios	Scenarios that describe a target status for each population within an ESU, generally consistent with TRT recommendations for ESU viability.
Recovery strategy	A statement that identifies the assumptions and logic—the rationale—for the species’ recovery program.
Recruits per spawner	Generally, a population would be deemed to be “trending toward recovery” if average population growth rates (or productivities) are expected to be greater than 1.0.
Redd	A nest constructed by female salmonids in streambed gravels where eggs are deposited and fertilization occurs.
Reservoir Drawdown	The water levels in a reservoir can be lowered, or drawn down, by releases from the dam. These drawdowns have the effect of speeding up the water through a reservoir by decreasing its cross-sectional area.
Resident Fish	Fish that are permanent inhabitants of a water body. Resident fish include trout, bass, and perch.
Riparian area	Area with distinctive soils and vegetation between a stream or other body of water and the adjacent upland. It includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.
River Reach	A general term used to refer to lengths along the river from one point to another, as in the reach from the John Day Dam to the McNary Dam.

Rule Curve	Water levels, represented graphically as curves, that guide reservoir operations.
Runoff	Precipitation, snowmelt, or irrigation water that runs off the land into streams or other surface water.
Salmonid	Fish of the family <i>Salmonidae</i> , including salmon, trout, chars, grayling, and whitefish. In general usage, the term usually refers to salmon, trout, and chars.
Smolt	A juvenile salmon or steelhead migrating to the ocean and undergoing physiological changes to adapt from freshwater to a saltwater environment.
Snowpack	The accumulation of snow in the mountains that occurs during the late fall and winter.
Sound	In order to pass via the spillway of a dam, smolts must dive to locate spillway entrances.
Spatial structure	The geographic distribution of a population or the populations in an ESU.
Spill	Water released from a dam over the spillway instead of being directed through the turbines.
Spill Effectiveness	The proportion of fish passing the spillway divided by the proportion of water spilled.
Spill Efficiency	The total number of fish passing the spillway divided by the total number passing the dam.
Stakeholders	Agencies, groups, or private citizens with an interest in recovery planning, or who will be affected by recovery planning and actions
Stratum/major population group	An aggregate of independent populations within an ESU that share similar genetic and spatial characteristics.
Streamflow	Streamflow refers to the rate and volume of water flowing in various sections of the river. Streamflow records are compiled from measurements taken at particular points on the river, such as The Dalles, Oregon.
Streamflow Records	For over 100 years, water resource managers in the Northwest have maintained records on the seasonal volume and rate of flow in the Columbia River. These historical records are of profound importance to planning system operations each year.
Technical Recovery Team (TRT)	Teams convened by NOAA Fisheries to develop technical products related to recovery planning. TRTs are complemented by planning forums unique to specific states, tribes, or regions, which use TRT and other technical products to identify recovery actions. See SCA Section 7.3 for a discussion of how TRT information is considered in these Biological Opinions.
Temperature Control	By drawing water from different elevations within a reservoir, water temperature can be regulated. This temperature regulation

	results in the ability to control the water temperature released from the reservoirs, and the subsequent water temperature downstream.
Threats	Human activities or natural events (e.g., road building, floodplain development, fish harvest, hatchery influences, volcanoes) that cause or contribute to limiting factors. Threats may exist in the present or be likely to occur in the future.
Transmission Grid	The network of high-voltage transmission lines serving the region, carrying power from generating plant to cities.
Turbine	An enclosed rotary type of prime mover that drives an electric generator to produce power.
Viability criteria	Criteria defined by NOAA Fisheries-appointed Technical Recovery Teams based on the biological parameters of abundance, productivity, spatial structure, and diversity, which describe a viable salmonid population (VSP) (an independent population with a negligible risk of extinction over a 100-year time frame) and which describe a general framework for how many and which populations within an ESU should be at a particular status for the ESU to have an acceptably low risk of extinction. See SCA Section 7.3 for a discussion of how TRT information is considered in these Biological Opinions.
Viable salmonid population (VSP)	An independent population of Pacific salmon or steelhead trout that has a negligible risk of extinction over a 100-year time frame. Viability at the independent population scale is evaluated based on the parameters of abundance, productivity, spatial structure, and diversity.
VSP Parameters	Abundance, productivity, spatial structure, and diversity. These describe characteristics of salmonid populations that are useful in evaluating population viability. See NOAA Technical Memorandum NMFS-NWFSC-42, "Viable salmonid populations and the recovery of evolutionarily significant units," McElhany et al., June 2000.

Acronyms and Abbreviations

Action Agencies	U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, and the Bonneville Power Administration
AFF	anadromous fish evaluation program
amsl	above mean sea level
B.C.	British Columbia
BIA	Bureau of Indian Affairs
BiOp	Biological Opinion
BLM	Bureau of Land Management
BMPs	Best Management Practices
BON	Bonneville Dam
BPA	Bonneville Power Administration
BRT	Biological Review Team (NOAA Fisheries)
BY	brood years
CBFWA	Columbia Basin Fish and Wildlife Authority
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHARTs	critical habitat analytical review teams
CI	confidence interval
Comanagers	States and Tribes of the Columbia River Basin
COMPASS	Comprehensive Fish Passage
Corps	U.S. Army Corps of Engineers
CR	Columbia River
CRB	Columbia River Basin
CREP	Conservation Reserve Enhancement Program
CRFMP	Columbia River Fishery Management Plan
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
CTWS	Confederated Tribes of the Warm Springs
CWA	Clean Water Act
CWMS	Corps Water Management System (database)
CWT	coded-wire tag
D	differential delayed survival of transported fish

DART	Data Access in Real Time (University of Washington Program)
DDT	dichlorodiphenyltrichloroethane
DIP	demographically independent population
DNR	see WA DNR
DPS	Distinct Population Segment
EDT	ecosystem diagnosis and treatment
EEZ	Exclusive Economic Zone
EF	east fork
EFH	essential fish habitat
EIP	Ecological Improvement Potential
EIS	environmental impact statement
ENSO	El Niño Southern Oscillation
ESA	Endangered Species Act
ESBS	extended-length submersible bar screen
EST	Columbia River estuary
ESU	evolutionary significant unit
FCRPS	Federal Columbia River Power System
FFDRWG	Fish Facility Design Review Work Group
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FGE	fish guidance efficiency
FMEP	Fisheries Management and Evaluation Plan
FPE	fish passage efficiency
FPOM	Fish Passage Operations and Maintenance Coordination Team
FR	Federal Regulation
FRN	Federal Regulation Notice
FS	Forest Service
GBT	gas bubble trauma
GDU	genetic diversity unit
H	High
HCD	Habitat Conservation Diversion
HCP	Habitat Conservation Plan
HCY	Hell's Canyon
HGMP	hatchery and genetic management plan

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HIP	Habitat Improvement Program
HOF	hatchery-origin fish
HSRG	Hatchery Scientific Review Group
HUC	Hydrological Unit Code
HYDROSIM	Hydro Simulation Program
I-205	Interstate Highway 205
I-5	Interstate Highway 5
ICB-TRT	Interior Columbia Basin Technical Recovery Team
ICTRT	Interior Columbia Basin Technical Recovery Team
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IHR	Ice Harbor Dam
IPER	Implementation Plan Evaluation Report
ISAB	Independent Scientific Advisory Board
ISRP	Independent Scientific Review Panel
ISS	Idaho Supplementation Studies
JDA	John Day Dam
kcfs	thousand cubic feet per second
km²	square kilometers
ksfd	Thousand cubic feet per second days
L	Low
LCFRB	Lower Columbia Fish Recovery Board of the NWPCC
LCR	Lower Columbia River
LGO	Little Goose Dam
LGR	Lower Granite Dam
L-M	Low to Medium
LMN	Lower Monumental Dam
LSRCP	Lower Snake River Compensation Plan
LWD	large woody debris
MAF	million acre-feet
MaSA	major spawning areas
MCN	McNary Dam
MCR	Mid-Columbia River
MFJD	Middle Fork John Day
MHHW	mean higher high water level

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mi/mi²	miles per square mile
MIP	minimum irrigation pool
MiSA	minor spawning areas
MMPA	Marine Mammal Protection Act
MOP	minimum operating pool
MPG	major population group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NF	north fork
NFH	National Fish Hatcheries
NFJDR	North Fork John Day River
ng/g	nanograms per gram
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOF	natural-origin fish
NPMP	Northern Pikeminnow Management Program
NRC	National Research Council
NWF	National Wildlife Federation
NWPCC	Northwest Power and Conservation Council
NWPPC	Northwest Power Planning Council
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OWRD	Oregon Water Resources Department
PA	Proposed Action
PAH	polyaromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCE	primary constituent element
PCSRF	Pacific Coast Salmon Recovery Fund
PCTS	Public Consultation Tracking System (database)
PDO	Pacific Decadal Oscillation
PECE	“Policy for Evaluation of Conservation Efforts When Making Listing Decisions”
PFMC	Pacific Fishery Management Council
PGE	Portland General Electric

PIT	passive integrated transponder
POD	point of diversion
ppt	Parts per thousand
PUD	Public Utility District
QET	quasi-extinction threshold
R/S	returns-per-spawner
RFT	reproductive failure threshold
RHCA	riparian habitat conservation area
Rkm	river kilometer
RM	river mile
RM&E	Research, Monitoring, and Evaluation
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
RPMs	reasonable and prudent measures
R/S	recruits per spawner
RSW	removable spillway weir
SAR	smolt-to-adult return rate
SASSI	Salmon and Steelhead Stock Inventory
SbyC	separated-by-code
SCA	Supplemental Comprehensive Analysis
SCT	System Configuration Team
SEF	East Fork Salmon River
SF	south fork
SFJD	South Fork John Day
SIMPAS	simulated passage (model)
SR	Snake River
SRPAH	Pahsimeroi River
SRS	sediment retention structure
SRUMA	Salmon River-Upper Mainstem
SRWG	Studies Review Workgroup
SRYFS	Salmon River-Yankee Fork
STS	submersible traveling screen
SWHA	shallow water habitat area
SWCD	Soil and Water Conservation District
SYSTDG	System Total Dissolved Gas (TDG) Model

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T&C	terms and conditions
TDA	The Dalles Dam
TDG	total dissolved gas
TERP	Tower Ecosystem Restoration Projects
TMDL	total maximum daily load
TMT	Technical Management Team
TRT	Technical Recovery Team
TSW	temporary spillway weir
UCM	Unit Characteristic Method
UCR	Upper Columbia River
UCUT	Upper Columbia United Tribes
UNF	Umatilla National Forest
UPA	Updated Proposed Action
URC	upper rule curve
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USRC	Upper Salmon River at Challis Project
USRITAT	Upper Salmon River Interagency Technical Advisory Team
UWR	Upper Willamette River
VARQ	variable (VAR) outflow (Q)
VH	Very High
VL	Very Low
VSP	viable salmonid population
W/LC TRT	Willamette/Lower Columbia TRT
WA DNR	Washington Department of Natural Resources
WCS BRT	West Coast Salmon Biological Review Team
WDF	Washington Department of Fisheries
WDFW	Washington Department of Fish and Wildlife
WF	west fork
WNFH	Winthrop National Fish Hatchery
WQT	Water Quality Team

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WRIA water resource inventory area
YN Yakima Nation

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Chapter 1

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Chapter 1

Background & Consultation History

The Endangered Species Act (ESA) calls for determinations and actions to conserve wildlife species from the risk of extinction. In particular, ESA Section 7(a)(2), 16 U.S.C.A. § 1536(a)(2), requires Federal agencies insure that their actions meet certain standards when they affect species determined to be “endangered” or “threatened” as those terms are defined by the ESA. Federal agencies must insure that their actions are not likely to jeopardize their continued existence or result in the destruction or adverse modification of their critical habitat (as further articulated and defined in the statute and implementing regulations).

1.1 Objective

The objective of this Biological Opinion is to apply these standards to the effects of fisheries that are proposed pursuant to the 2008-2017 *United States v. Oregon Management Agreement* (hereafter 2008 *U.S. v. Oregon Agreement*). A secondary objective is to identify, in a written statement, the incidental “take,” as that term is defined, expected from actions meeting the standards, including terms and conditions to minimize such take.

The Federal action considered in this Biological Opinion is an agreement among the *U.S. v. Oregon* parties to implement fisheries in the mainstem Columbia River and adjacent areas for the next ten years, beginning in 2008. The proposed action is described in further detail in Chapter 2 of this document. The Parties to the 2008 Agreement are: the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation (collectively, the Columbia River Treaty Tribes); the Shoshone-Bannock Tribes; the States of Oregon, Washington and Idaho; and the United States (as represented by the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service and NOAA Fisheries). The Parties have tentatively concluded the 2008 Agreement. However, NOAA Fisheries’ final approval requires the completion of a Section 7 consultation, as required by the Endangered Species Act (ESA), on the proposed agreement and a conclusion that the proposed action is not likely to jeopardize any ESA-listed species nor result in the destruction or adverse modification of their critical habitat. Separately, NOAA Fisheries must also satisfy the requirements of the National Environmental Protection Act (NEPA). Once the ESA and NEPA requirements have been satisfied and the Agreement is finalized, the parties intend to request the Court enter it as a court order in the *U.S. v. Oregon* court case, Civ. No. 68-513 (D. OR).

1.2 Consultation History

Fisheries in the Columbia River basin were managed subject to provisions of the Columbia River Fish Management Plan (CRFMP) from 1988 through 1998. The CRFMP was a stipulated agreement adopted by the Federal Court under the continuing jurisdiction of *U.S. v. Oregon* (Civ. No. 68-513 (D.

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Or.)). Following 1998, fisheries were managed subject to provisions of a series of short term agreements among the Parties, the durations of which ranged from several months, covering a single fishing season, to five years.

NOAA Fisheries has consulted under Section 7 of the ESA on proposed fisheries in the Columbia basin since 1992. The commencement of these consultations immediately followed the first listings of salmonids. After the initial consultation, NOAA Fisheries conducted a series of consultations to consider the effects of proposed fisheries as additional species were listed, as new information became available, and as fishery management provisions evolved to address the needs of ESA listed species. The sequence of prior biological opinions related to mainstem fisheries in the Columbia River is shown in Table 1-1. More detailed descriptions of the consultation history are described in the 2001 and 2005 biological opinions (NMFS 2001b, NMFS 2005c).

Most recently, the *U.S. v. Oregon* fisheries have been managed subject to the 2005-2007 Interim Management Agreement (2005 Agreement) (U.S. District Court 2005). The 2005 Agreement applied to winter, spring, summer, and fall season fisheries. NOAA Fisheries completed a biological opinion on the 2005 Agreement on May 9, 2005. The opinion concluded that fisheries management subject to the proposed agreement was not likely to jeopardize any of the affected ESA listed species. NOAA Fisheries subsequently completed three supplements to the 2005 biological opinion dated March 2, 2006, October 11, 2006, and September 11, 2007. These supplements considered additional information related to the management of winter steelhead populations from several of the listed steelhead Distinct Population Segments (DPS), Lower Columbia River Chinook, Lower Columbia River coho, and Green Sturgeon, and for the first time, the effects of proposed fisheries on ESA-listed Southern Resident killer whales. The 2005 biological opinion, and associated supplements, provided the necessary ESA Section 9 take exemptions for the 2005 Agreement.

The 2005 Agreement and associated harvest provisions were the result of ongoing negotiations in *U.S. v. Oregon* and the sequential evolution and development of fishery management since the initial salmon listings in 1992. These negotiations have been under the continuous supervision of the Federal Court with jurisdiction over *U.S. v. Oregon*. The most recent iteration of the negotiations began with completion of the Interim Agreement in 2005. The 2005 Agreement served as the model for the successor 2008 Agreement being considered in this Opinion.

The *U.S. v. Oregon* negotiations were closely supervised by the Federal Court. Negotiating sessions were held monthly with status reports to the Court made after each session. At the same time there were ongoing discussions and consultations regarding operation of the Federal Columbia River Power System (FCRSP) and Bureau of Reclamation irrigation projects in Idaho. These discussions were also proceeding under the close supervision of the Federal Court in a separate case. Most of the *U.S. v. Oregon* parties were involved with the litigation and negotiations related to the FCRPS and Bureau of Reclamation projects so there was a close association, both in time and substance, between the developing *U.S. v. Oregon* agreement and hydro actions. The relationship between the *U.S. v. Oregon* and hydro actions are discussed in more detail in section 1.5 of this opinion.

Because the 2008 Agreement developed using the 2005 Agreement as the starting point, management provisions of the 2008 Agreement are, in most respects, similar to those in the 2005 Agreement. This is true in particular for the winter, spring, and summer season fisheries. There are, however, two notable changes in management of fall season fisheries. Under the 2005 Agreement, fall season fisheries were subject to fixed harvest rate constraints of 31.3% for Snake River fall Chinook and 17.0% for B-run steelhead. However, the 2008 Agreement includes abundance based harvest rate schedules that allow the harvest rates to vary up or down from the status quo rates depending on the overall abundance of SR fall Chinook and B-run steelhead. The use of abundance based harvest rate schedules generally is more responsive to overall stock status. Abundance based harvest rate schedules previously were developed for other stocks including upriver spring Chinook, sockeye, and upper Columbia River summer Chinook. These were incorporated into the 2005 Agreement and directly carried over into the 2008 Agreement. Development of abundance based harvest rate schedules for SR fall Chinook and B-run steelhead for use in the 2008 Agreement applies the benefits of abundance based management to these two additional stocks. Because of the close association between the 2005 Agreement and the 2008 Agreement being considered here, prior biological opinions provide pertinent background information that give context and elucidate the evolution of thought and considerations for the proposed harvest provisions, including the merits of abundance-based harvest rate schedules.

1.3 Fishery Management & Evaluation Plans for Upper Willamette River Spring Chinook & Steelhead

NOAA Fisheries previously determined that Section 9 take prohibitions under the ESA for Upper Willamette River (UWR) Chinook and steelhead do not apply to freshwater fishery activities, including those considered in this Biological Opinion. The Oregon Department of Fish and Wildlife (ODFW) submitted Fishery Evaluation and Management Plans (FMEP) pursuant to limit 4 of the ESA Section 4(d) rule (NMFS 2000c). The UWR Chinook and UWR steelhead FMEPs were dated February 7, 2001 and June 8, 2001, respectively (ODFW 2001a, b). NOAA Fisheries reviewed the proposed Plans and determined that they adequately addressed the requirements of the 4(d) rule (Kruzic 2001a, b). The respective Plans are subject to regular reporting requirements and periodic review, but have no specified expiration date and are therefore still in effect. The Plans considered all fishing in the Willamette and Lower Columbia rivers that may affect either of the listed species. The effect of fisheries being considered under the proposed 2008 Agreement on UWR Chinook and steelhead were therefore already addressed by the FMEPs. Because NOAA Fisheries has previously determined that Section 9 take prohibitions do not apply to the proposed fisheries, the effects of the fishing activities under the 2008 Agreement on UWR Chinook and steelhead are not considered further in this Biological Opinion.

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Table 1-1. Key Biological Opinions Related to Proposed Mainstem Fisheries Managed Subject to Agreement Under *US. v. Oregon.*

Biological Opinion	Date signed	Time Frame Considered	ESU/DPSs Considered
Informal Consultation	02/21/92	Winter 1992	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Informal Consultation and Conference Opinion	04/03/92	Spring 1992	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1992 Summer and Fall Season Fisheries	06/12/92	Summer-fall 1992	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Addendum to the June 12, 1992 opinion	06/30/92	Summer-fall 1992	SR Sockeye
Biological Opinion – 1993 Winter, spring and summer Season Fisheries	03/01/93	Winter, spring & summer 1993	SR Sockeye SR Spring/Summer Chinook
Biological Opinion – Fall Season Fisheries and IDFG section 10(a)(1)(b) Permit.	05/28/93	Fall 1993	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Addendum to the March 1, 1993 Biological Opinion	06/24/93	Winter, spring & summer 1993	SR Sockeye SR Spring/Summer Chinook
Second addendum to the March 1, 1993 Biological Opinion	07/09/93	Winter, spring & summer 1993	SR Sockeye SR Spring/Summer Chinook
Reinitiation of the March 1, 1993 Biological Opinion	07/13/93	Winter, spring & summer 1993	SR Sockeye
Biological Opinion – 1994 Winter, spring and summer	2/11/94	Winter, spring & summer 1994	SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1994 Fall Non-Treaty Fisheries	8/10/94	Fall 1994	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1994 Fall Treaty Fisheries	8/26/94	Fall 2004	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1995 Winter, spring and summer	4/5/95	Winter, spring & summer 1995	SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1996-1998 Winter, spring and summer seasons	2/16/96	Winter, spring & summer seasons 1996-1998	SR Sockeye SR Spring/Summer Chinook
Biological Opinion – 1996-1998 - FALL	7/31/96	1996-1998	SR Fall Chinook
1996-1998 – Fall - Addendum	9/23/96	1996-1998	SR Fall Chinook

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Biological Opinion	Date signed	Time Frame Considered	ESU/DPSs Considered
Biological Opinion – 1997 CR Late fall season steelhead	11/20/97	Late fall 1997	SR Fall Chinook SR steelhead UCR steelhead
Reinitiation fall opinion (9/23/96) – 1998	9/10/98	Fall 1998	LCR steelhead SR steelhead UCR steelhead
Biological Opinion and Conference – 1999 Winter, spring and summer	1/25/99	Winter, spring & summer 1999	SR Fall Chinook SR Sockeye SR Spring/Summer Chinook LCR steelhead SR steelhead UCR steelhead UWR steelhead MCR steelhead UWR Chinook LCR Chinook UCR Chinook CR Chum
Biological Opinion – 1999 Fall	7/30/99	Fall 1999	SR Fall Chinook LCR steelhead SR steelhead UCR steelhead MCR steelhead LCR Chinook CR Chum
Biological Opinion – 2000 Winter, spring and summer	2/29/2000	Winter, spring & summer 2000	SR Sockeye LCR steelhead SR steelhead UCR steelhead UWR steelhead MCR steelhead SR Spring/Summer Chinook UWR Chinook LCR Chinook UCR Chinook
Biological Opinion – 2000 Fall	7/31/00	Fall 2000	SR Fall Chinook LCR steelhead SR steelhead UCR steelhead MCR steelhead LCR Chinook CR Chum
Biological Opinion 2001-05 – Winter, spring and summer Management Agreement	3/21/01	Winter, spring & summer 2001-05	LCR steelhead SR steelhead UCR steelhead UWR steelhead MCR steelhead SR Spring/Summer Chinook

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Biological Opinion	Date signed	Time Frame Considered	ESU/DPSs Considered
			UWR Chinook LCR Chinook UCR Chinook CR chum
Biological Opinion –2001 Fall	8/10/01	Fall 2001	LCR steelhead SR steelhead UCR steelhead MCR steelhead LCR Chinook SR fall Chinook CR chum
Biological Opinion –2002 Fall	8/15/02	Fall 2002	LCR steelhead SR steelhead UCR steelhead MCR steelhead LCR Chinook SR fall Chinook CR chum
Supplement to the 3-21-01 Biological Opinion – Winter, spring and summer	7/11/03	Winter, spring & summer 2003-2005	SR Sockeye LCR steelhead SR steelhead UCR steelhead UWR steelhead MCR steelhead SR Spring/Summer Chinook LCR Chinook UWR Chinook UCR Chinook
Biological Opinion – 2003 Fall	7/30/03	Fall 2003	SR Spring/Summer Chinook LCR Chinook LCR steelhead SR steelhead UCR steelhead MCR steelhead CR chum
Biological Opinion – 2004 Fall	8/6/04	Fall 2004	LCR steelhead SR steelhead UCR steelhead MCR steelhead LCR Chinook SR fall Chinook CR chum LCR coho
Supplement to the 3-21-01 Biological Opinion - 2005 Winter, spring and summer	1/6/05	Winter, spring & summer 2005	LCR steelhead UWR steelhead MCR steelhead
2005-2007 agreement Biological Opinion	5/09/05	2005-2007	All

Biological Opinion	Date signed	Time Frame Considered	ESU/DPSs Considered
Addendum to the 5/09/05 Biological Opinion	9/15/05	2005-2007	Same
Supplement to the 5/09/05 Biological Opinion	3/2/06	2006-2007	LCR steelhead UWR steelhead MCR steelhead
Supplement to the 5/09/05 Biological Opinion	10/11/06	2006-2007	LCR coho Southern green sturgeon DPS
Supplement to the 5/09/05 Biological Opinion	9/11/07	2007	LCR coho LCR Chinook Killer whales

1.4 Relationship to Consultations on the FCRPS and Reclamation Actions

This Biological Opinion is being issued in conjunction with biological opinions for the Federal Columbia River Power System (FCRPS) and for the Bureau of Reclamation irrigation projects in Idaho in the Snake River Basin above Brownlee Reservoir (Upper Snake Projects). NOAA Fisheries has completed Section 7 consultation analysis, entitled the Supplemental Comprehensive Analysis (SCA), that considers the effects of operations of the FCRPS and Upper Snake Projects, together with the harvest actions that are the subject of this Biological Opinion (NMFS 2008a, 2008b, and 2008f). The FCRPS and Reclamation Actions, along with the fishery Actions being considered in this Biological Opinion, are largely coincident both in time and place. The actions would all occur over the next ten years beginning in 2008, and affect listed species by their actions in significant portions of the Columbia River basin. Understanding the relationship between the FCRPS and Reclamation Actions, and fisheries considered under the proposed 2008 Agreement, provides necessary context for this consultation. Background related to the FCRPS and Reclamation Actions and consultations is discussed in more detail in the SCA and FCRPS and Upper Snake Biological Opinions (NMFS 2008a, 2008b, and 2008f).

1.5 Comprehensive Analysis

This Biological Opinion on the proposed 2008 Agreement relies on the Comprehensive Analysis (CA) and NOAA Fisheries' SCA, which provided an analysis for the purposes of ESA §7(a)(2) on the aggregate effect from FCRPS, Reclamation Actions (including the Upper Snake Projects) and the 2008 Agreement for Columbia River harvest considered together as the Prospective Actions. This coordination of consultations insures that the best available information, reflected by the CA and SCA, was used consistently. The simultaneous treatment of consultations provided the necessary assurance that the FCRPS and Reclamation Actions were completely analyzed for ESA §7(a)(2) purposes, and therefore were properly considered as part of the Environmental Baseline in this consultation on the proposed 2008 Agreement.

The close relationship between the remand process, the consultation on the FCRPS and Reclamation Actions, and consultation on the 2008 Agreement is worth noting. All of the state and Tribal parties to *U.S v. Oregon* were directly involved in the FCRPS litigation and associated remand process. Past and present harvest that occurred under the past *U.S. v. Oregon* agreements was included in the environmental baseline and therefore analyzed in the comprehensive and supplemental comprehensive analyses. Future fisheries anticipated under the 2008 Agreement were also considered in the CA and SCA. Inclusion of these fisheries in the analysis stems from the Federal government's view that the tribes have a treaty fishing right that continues to exist and must be accounted for in the environmental baseline (for a comprehensive evaluation of the environmental baseline, please see Chapter 5 of this document as well as the SCA). A consequence is that the analysis and related conclusions developed in the CA and SCA provide the best available science and analysis that support the ESA §7(a)(2) conclusions reached in this Biological Opinion for the fisheries proposed under the 2008 Agreement.

Chapter 2

Proposed Actions

- 2.1 Seasonal Fisheries**
- 2.2 Treaty Indian Fisheries**
- 2.3 Non-Treaty Fisheries**

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Chapter 2

Proposed Actions

The Federal action considered in this Biological Opinion is NOAA Fisheries signing of the 2008-2017 *United States v. Oregon* Management Agreement and issuance of the associated Incidental Take Statement. The proposed non-Treaty and treaty Indian fisheries extend from May 5, 2008 to December 31, 2017, and operate primarily in the mainstem Columbia River from its mouth upstream to the Wanapum Dam and in the Snake River up to Lower Granite Dam. Fisheries that are included in the proposed action are described in detail in the biological assessment (TAC 2008), but are summarized below.

2.1 Seasonal Fisheries

Fisheries in the Columbia River basin are generally managed within the winter/spring, summer, and fall seasons. Treaty Indian and non-Treaty fisheries (discussed in more detail below) are managed subject to state and tribal regulation, consistent with provisions of the *U.S. v. Oregon* agreement and associated biological opinions. Seasonal fisheries target particular stocks of fish, and incidentally catch ESA listed species. The winter/spring season extends from the beginning of the year to June 15. Commercial, recreational, and ceremonial and subsistence (C&S) fisheries target primarily upriver spring Chinook stocks and spring Chinook that return to the Willamette and lower Columbia River tributaries. Some steelhead are also caught incidentally in these fisheries, particularly winter run populations from the Upper Willamette River (UWR), Lower Columbia River (LCR), and Middle Columbia River (MCR) Distinct Populations Segments (DPS). The winter/spring season fisheries are managed under the 2008 Agreement subject to specific ESA related harvest rate limits for Upper Columbia River (UCR) spring Chinook, Snake River (SR) spring/summer Chinook, and steelhead. As noted above, NOAA Fisheries previously determined, pursuant to the ESA Section 4(d) rule, that Section 9 take prohibitions are not required for threatened ESUs of UWR Chinook and steelhead for fishing activities in the Willamette River and lower Columbia River. The effects of the proposed 2008 Agreement on UWR Chinook and steelhead ESUs are therefore not considered further in this biological opinion.

The summer season extends from June 16 to July 31. Commercial, recreational, and C&S fisheries are managed primarily to provide harvest opportunity directed at unlisted UCR summer Chinook. An abundance based harvest rate schedule defines the allowable harvest in any particular year for non-Treaty and treaty Indian fisheries. Summer fisheries are constrained primarily by the available opportunity for UCR summer Chinook, and by specific harvest rate limits for SR sockeye salmon and harvest rate limits on steelhead in non-Treaty fisheries.

Fall season fisheries begin on August 1 and extend to the end of the year. Commercial, recreational, and C&S fall season fisheries target primarily harvestable hatchery and natural

origin fall Chinook and coho salmon. Fall season fisheries are constrained by specific ESA related harvest rate limits for listed SR fall Chinook, and both A-run and B-run components of the listed Snake River steelhead ESU (A-run and B-run steelhead are stock designations that refer to components of the summer run steelhead DPSs, that have particular life history characteristics). As discussed in more detail below, non-Treaty fisheries below Bonneville Dam are also subject to harvest rate constraints for lower river stocks including Lower Columbia River Chinook, coho, steelhead, and chum.

2.2 Treaty Indian Fisheries

Treaty Indian fisheries considered in the proposed 2008 *U.S. v. Oregon* Agreement are managed subject to the regulation of the Columbia River Treaty Tribes. Proposed treaty Indian fisheries are listed in Table 2-1 and arranged by season. Generally, they include all mainstem Columbia River fisheries between Bonneville Dam and McNary Dam, commonly known as Zone 6 (Figure 2-1), and any fishery impacts from tribal fishing that occurs below Bonneville Dam. Additionally tribal fisheries within specified tributaries to the Columbia River are included. These tributaries include: the Willamette River at Willamette Falls (lamprey fishing only), the Cowlitz and Sandy rivers (smelt fishing only), the Wind River, Little White Salmon River, Big White Salmon River, Hood River, Klickitat River, Deschutes River, John Day River, Umatilla River, Walla Walla River, Yakima River, and Icicle Creek (Wenatchee River).

2.3 Non-Treaty Fisheries

Non-Treaty fisheries considered in the 2008 *U.S. v. Oregon* Agreement are managed under the jurisdiction of the states of Oregon and Washington. Proposed non-Treaty fisheries are listed in Table 2-1 and arranged by season. Generally, these include mainstem Columbia River commercial and recreational salmonid fisheries between Buoy 10 at the river mouth and Bonneville Dam (commonly known as Zones 1-5), designated off channel Select Area fisheries (SAFE), mainstem recreational fisheries between Bonneville Dam and McNary Dam (commonly known as Zone 6), recreational fisheries between McNary Dam and Highway 305 Bridge in Pasco, Washington, recreational and Wanapum tribal spring Chinook fisheries from McNary Dam to Priest Rapids Dam, and recreational spring Chinook fisheries in the Snake River upstream to Lower Granite Dam. (See Table 2-1 and Figure 2-1).

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Table 2-1 Proposed non-Treaty and Treaty Indian fisheries by season, jurisdiction and target species.

Fishery Management Period	Jurisdiction	Fishery Description by Target species/Area
All year	Non-Treaty	Commercial anchovy/herring/sardine
		Commercial carp
		Recreational steelhead (mouth to Hwy 395 Bridge)
		Recreational warm water species
		Recreational sturgeon (below Bonneville Dam)
		Recreational sturgeon (above Bonneville Dam)
		Commercial sturgeon
		Recreational fisheries in Select Areas
		Commercial fisheries in Select Areas
		Sturgeon research, monitoring and evaluation
		Test fishing
		Stock assessment at dams
Winter / Spring season January 1 through June 15	Non- Treaty	Commercial sturgeon
		Commercial spring Chinook
		Commercial smelt (mainstem and tributaries)
		Commercial shad (mainstem and Washougal Reef)
		Recreational spring Chinook – below Bonneville Dam
		Recreational spring Chinook – above Bonneville Dam
		Recreational spring Chinook – Snake River
		Recreational spring Chinook – Ringold
		Recreational smelt (mainstem and tributaries)
		Wanapum tribal spring Chinook
		Commercial shad
		Treaty Indian
	Sturgeon gill net	
	Winter/spring season salmon	
	Spring Chinook C&S	
	Spring tributary fisheries	
	Recreational salmon – mouth to Hwy 395 Bridge	

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Fishery Management Period	Jurisdiction	Fishery Description by Target species/Area
		Commercial salmon
		Commercial shad
	Treaty Indian	Summer Chinook with incidental steelhead
		Sockeye
		Sturgeon set line
		Summer tributary fisheries
		Shad
		Lamprey
Fall season August 1 through December 31	Non- Treaty	Commercial salmon
		Recreational Buoy 10
		Recreational salmon - mouth to Hwy 395 Bridge
		Recreational steelhead (tributary dip-ins)
		Commercial smelt (mainstem and tributaries)
		Recreational smelt (mainstem and tributaries)
	Treaty Indian	Fall Chinook with incidental coho and steelhead
		Sturgeon gill net
		Sturgeon set line
		Fall tributary fisheries
		Yellow perch

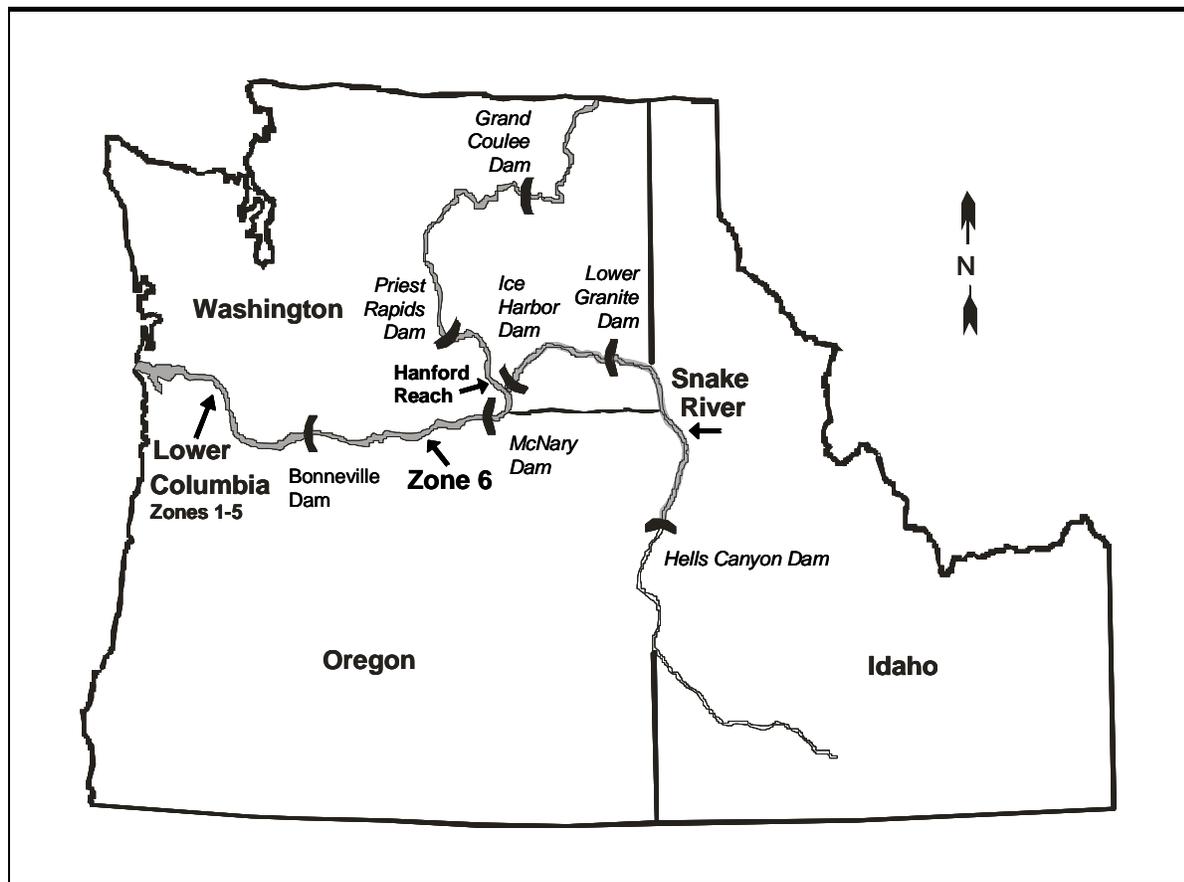


Figure 2-1. Map of the Columbia Basin in Oregon, Washington and Idaho showing the general area where non-Treaty and Treaty Indian Columbia River fisheries included in this proposed action would occur.

Other non-Treaty fisheries included those directed at sturgeon and shad, warm water species from the Columbia mouth to Priest Rapids Dam, salmonids in the Ringold sport fishery, and carp above Bonneville Dam. Various fishery-monitoring activities are also included.

Harvest provisions of the 2008 Agreement focus on the management of upriver stocks that return to areas above Bonneville Dam. Recall that the primary purpose of *U.S. v. Oregon* is to insure the conservation and appropriate allocation of upriver stocks that the tribes access as part of their treaty right. Lower river stocks that return to areas below Bonneville Dam are nonetheless affected by fisheries considered in the proposed 2008 Agreement, particularly non-Treaty fisheries that occur below Bonneville. These lower river stocks include Lower Columbia River (LCR) Chinook, coho, steelhead, and chum, and UWR Chinook and steelhead. The 2008 Agreement does not set harvest rate constraints that are specific to these species, but the biological assessment does propose harvest rate limits for each of the lower river species that are part of the proposed action subject to this consultation (TAC 2008).

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Unlike the other lower river species, LCR Chinook and coho are caught in both ocean and in river fisheries. As explained in more detail in sections 8.10 and 8.11 of this Biological Opinion, both are managed subject to total exploitation rate limits for the combined ocean and inriver fisheries that must be shared between ocean and inriver fisheries. The necessary sharing is implemented by coordination and the close association of related biological opinions on Pacific Fisheries Management Council fisheries and the 2008 Agreement

Chapter 3

Action Area

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Chapter 3 Action Area

The action area for an ESA consultation is described by NOAA Fisheries and U.S. Fish and Wildlife Services' joint implementing regulations (50 CFR §402.02) to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area is not delineated by the migratory range of the species affected by the project unless that area is also directly or indirectly affected by the proposed actions.

For purposes of this Biological Opinion, the action area includes the foot print of the proposed fisheries, and accessible salmon spawning and rearing areas in the Columbia River basin. Proposed fisheries may occur from the Columbia River mouth upstream to the Wanapum Dam, in adjacent off channel areas, in specified tributaries between Bonneville and McNary Dam, and in the Snake River upstream to Lower Granite Dam. Fisheries will also occur in the Walla Walla River, the Yakima River, and in Icicle Creek (Wenatchee River). As described in the biological assessment (TAC 2008) proposed fisheries may also have an indirect effect on the amount of marine derived nutrients returning to spawning and rearing areas due to a reduction in the number of adult fish that would otherwise return to spawn and die. The action area therefore extends from the fishery footprint upstream to include all accessible salmon spawning and rearing areas in the Columbia River basin. Thus, it includes portions of the states of Washington, Oregon, and Idaho. NOAA Fisheries is also considering the effects of the 2008 Agreement on Southern resident killer whales in this biological opinion. Southern resident killer whales do not occur in the Columbia River, but there may be indirect effects of Columbia River fisheries on prey availability in the ocean. The action area therefore includes areas off the Pacific Coast where salmonid species from the Columbia River, which are affected by the action, are available as prey for listed Southern resident killer whales; generally within 50 km of the coast from the river's mouth and plume south to southern Oregon and north to the Queen Charlotte Islands.

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Chapter 4

Species & Critical Habitat Affected

- 4.1 Species Affected by the RPA
& their Rangewide Status**
- 4.2 Rangewide Status of Designated
Critical Habitat**

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Chapter 4

Species & Critical Habitat Affected

4.1 Species Affected by the RPA & their Rangewide Status

This consultation considers whether the proposed action is likely to jeopardize the continued existence of 13 listed species of Columbia basin salmonids or cause the destruction or adverse modification of their designated critical habitat. The 13 species are:

Chinook Salmon (*Oncorhynchus tshawytscha*)

ESU	ESA Listing Status	ESA Critical Habitat
Snake River (SR) spring/summer Chinook salmon	Listed as threatened on June 28, 2005 [NMFS 2005a]	Critical habitat designated on October 25, 1999 [NMFS 1999a]
Snake River (SR) fall Chinook salmon	Listed as threatened on June 28, 2005 [NMFS 2005a]	Critical habitat designated on December 28, 1993 [NMFS 1993]
Upper Columbia River (UCR) spring Chinook salmon	Listed as endangered on June 28, 2005 [NMFS 2005a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]
Upper Willamette River (UWR) Chinook salmon	Listed as threatened on June 28, 2005 [NMFS 2005a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]
Lower Columbia River (LCR) Chinook salmon	Listed as threatened on June 28, 2005 [NMFS 2005a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]

Steelhead (*Oncorhynchus mykiss*)

DPS	ESA Listing Status	ESA Critical Habitat
Snake River (SR) steelhead	Listed as threatened on January 5, 2006 [NMFS 2006a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]
Upper Columbia River (UCR) steelhead	Listed as endangered on June 13, 2007 [Court decision]	Critical habitat designated on September 2, 2005 [NMFS 2005b]
Middle Columbia River (MCR) steelhead	Listed as threatened on January 5, 2006 [NMFS 2006a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]

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Steelhead (*Oncorhynchus mykiss*)

ESU	ESA Listing Status	ESA Critical Habitat
Upper Willamette River (UWR) steelhead	Listed as threatened on January 5, 2006 [NMFS 2006a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]
Lower Columbia River (LCR) steelhead	Listed as threatened on January 5, 2006 [NMFS 2006a]	Critical habitat designated on September 2, 2005 [NMFS 2005b]

Chum Salmon (*Oncorhynchus keta*)

ESU	ESA Listing Status	ESA Critical Habitat
Columbia River (CR) chum salmon	Listed as threatened on June 28, 2005 [NMFS 2005a]	Habitat designated on September 2, 2005 [NMFS 2005b]

Sockeye Salmon (*Oncorhynchus nerka*)

ESU	ESA Listing Status	ESA Critical Habitat
Snake River (SR) sockeye salmon	Listed as endangered on June 28, 2005 [NMFS 2005a]	Critical habitat designated on December 28, 1993 [NMFS 1993]

Coho Salmon (*Oncorhynchus kisutch*)

ESU	ESA Listing Status	ESA Critical Habitat
Lower Columbia River coho salmon	Listed as threatened on June 28, 2005 [NMFS 2005 a]	Critical habitat designation under development

Killer Whales (*Orcinus orca*)

ESU	ESA Listing Status	ESA Critical Habitat
Southern Resident DPS Killer Whales	Listed as endangered on November 18, 2005 [NMFS 2005d]	Critical habitat designation on November 29, 2006 [NMFS 2006c]

Green Sturgeon (*A. medirostris*)

ESU	ESA Listing Status	ESA Critical Habitat
Southern DPS of Green Sturgeon	Listed as endangered on April 7, 2006 [NMFS 2006d]	Critical habitat designation under development

4.2 Rangewide Status of Designated Critical Habitat

NOAA Fisheries has designated critical habitat for 12 of the 13 salmon and steelhead species that would be affected by the proposed action.¹ Critical habitat includes the stream channel within each designated stream reach with the lateral extent defined by the ordinary high-water line. Within these areas, the primary constituent elements (PCEs) essential for the conservation of the listed species are those sites and habitat components that support one or more life stages. The PCEs for three species of SR salmon are shown in Table 4.2-1, below. The PCEs for nine other species of Columbia basin salmon and steelhead are described in the paragraphs following Table 4.2-1.

Table 4.2-1. PCEs identified for SR Sockeye, spring/summer Chinook, and fall Chinook Salmon (NMFS 1993).

Habitat Component	Sockeye	Spring/Summer Chinook	Fall Chinook
Spawning & juvenile rearing areas	1) spawning gravel 2) water quality 3) water quantity 4) water temp. 5) food 6) riparian veg. 7) access	1) spawning gravel 2) water quality 3) water quantity 4) cover/shelter 5) food 6) riparian veg. 7) space	Same as spr/sum Chinook
Juvenile migration corridors	1) substrate 2) water quality 3) water quantity 4) water temp. 5) water velocity 6) cover/shelter 7) food 8) riparian veg. 9) space 10) safe passage	Same as sockeye	Same as sockeye
Areas for growth & development to adulthood	Ocean areas – not identified	Same as sockeye	Same as sockeye
Adult migration corridors	1) substrate 2) water quality 3) water quantity	Same as sockeye	Same as sockeye

¹ NOAA Fisheries has not yet developed a critical habitat designation for LCR coho salmon.

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Habitat Component	Sockeye	Spring/Summer Chinook	Fall Chinook
	4) water temp. 5) water velocity 6) cover/shelter 7) riparian veg. 8) space 9) safe passage		

NOAA Fisheries (NMFS 2005b) has identified the following PCEs for the nine other species of Columbia basin salmonids.²

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them, juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.
4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting

² A fifth category in NMFS (2005b), “nearshore marine areas,” refers to areas designated in Puget Sound (i.e., is not applicable to Columbia basin salmonids).

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growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.

At the time of the critical habitat designations that became final in September of 2005, NOAA Fisheries' Critical Habitat Analytical Review Teams (CHARTs) rated 525 occupied watersheds in the Columbia River basin. The CHARTs gave each of these occupied watersheds a high, medium, or low rating. High-value watersheds are those with a high likelihood of promoting conservation, while low value watersheds are expected to contribute relatively little. Conservation value was determined by considering the factors listed in Table 4.2-2 below.

Table 4.2-2. Factors considered by Columbia Basin CHARTs to determine the conservation value of occupied HUC-5s.

Factors	Considerations
PCE quantity	Total stream area or number of reaches in the HUC-5 where PCEs are found; compares to both distribution in other HUC-5s and to probable historical quantity within the HUC-5
PCE quality – current condition	Existing condition of the quality of PCEs in the HUC-5
PCE quality - potential condition	Likelihood of achieving PCE potential in the HUC-5, either naturally or through active conservation/restoration, given known limiting factors, likely biophysical responses, and feasibility
PCE quality - support of rarity/importance	Support of rare genetic or life history characteristics or rare/important types in the HUC-5
PCE quantity - support of abundant populations	Support of variable-sized populations relative to other HUC-5s and the probably historical levels in the HUC-5
PCE quality - support of spawning/rearing	Support of spawning or rearing of varying numbers of populations (i.e., different run-timing or life history types within a single ESU and or different ESUs)

Of the 525 watersheds evaluated, 382 were assigned a high rating, 93 a medium rating, and 50 a low rating. The CHART ratings do not address SR spring/summer Chinook salmon, SR fall Chinook salmon, or SR sockeye salmon because critical habitat was designated for these ESUs in 1993. Ratings for the LCR coho salmon ESU are under development.

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Many factors, both human-caused and natural, have contributed to the decline of salmon over the past century. Salmon habitat has been altered through activities such as urban development, logging, grazing, power generation, and agriculture. These habitat alterations have resulted in the loss of important spawning and rearing habitat and the loss or degradation of migration corridors. Thus, critical habitat is not able to serve its conservation role in its current condition in many of the designated watersheds. Factors limiting the functioning of PCEs and thus the conservation value of critical habitat are discussed for each species in Chapter 8 of the Supplemental Comprehensive Analysis.

Chapter 5

Environmental Baseline

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Chapter 5 Environmental Baseline

The Environmental Baseline is discussed in detail in Chapter 5 of the Supplemental Comprehensive Analysis, which NOAA Fisheries hereby incorporates by reference.

This section provides an analysis of the effects of past and ongoing human and natural factors on the current status of the species, their habitats and ecosystems, within the action area. In addition, this analysis evaluates the effects on designated critical habitat. The environmental baseline includes: “the past and present impacts of all Federal, state, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone Section 7 Consultation and the impacts of state and private actions that are contemporaneous with the consultation in progress” (50 C.F.R §402.02, ‘effects of the action’). Thus, the environmental baseline for this Opinion includes the anticipated future effects of the FCRPS and Reclamation Actions.

In keeping with the effort to explicitly aggregate the effects of the FCRPS and Reclamation Actions, and those associated with the proposed 2008 Agreement in rendering its biological opinions on these actions, NOAA Fisheries includes an extensive discussion of the environmental baseline, applicable to all three consultations, in the Supplemental Comprehensive Analysis for these consultations (NMFS 2008f, Chapter 5).

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Chapter 6

Cumulative Effects

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Chapter 6 Cumulative Effects

As part of the Biological Opinion Collaboration process, the states of Oregon, Washington, and Idaho provided information on various ongoing and future or expected projects that are reasonably certain to occur and will affect recovery efforts in the Interior Columbia Basin (Chapter 17 in Corps et al. 2007a). A number of these projects were described as having a positive effect on the status of Columbia Basin salmonids. All of these actions are either completed, ongoing, or planned with a high likelihood of implementation. They address protection and/or restoration of existing or degraded fish habitat, instream flows, water quality, fish passage and access, and watershed or floodplain conditions that affect stream habitat. Significant actions and programs include growth management programs (planning and regulation), a variety of stream and riparian habitat projects, watershed planning and implementation, acquisition of water rights and sensitive areas, instream flow rules, stormwater and discharge regulation, Total Maximum Daily Load (TMDL) implementation, and hydraulic project permitting. Responsible entities include cities, counties, and various state agencies. For a comprehensive evaluation of cumulative effects please see Chapter 6 of the SCA (NMFS 2008f Chapter 6).

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Chapter 7

Analytical Methods for Salmonids

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Chapter 7

Analytical Methods for Salmonids

The analytical methods used for assessing jeopardy are discussed in detail in Chapter 7 of the Supplemental Comprehensive Analysis, which NOAA Fisheries hereby incorporates by reference.

The chapter describes:

- Methods for evaluating life-cycle effects at the population level that are applicable to the jeopardy standard (Section 7.1);
- Methods to evaluate action-specific and life-stage-specific effects that contribute to the life-cycle jeopardy analysis (Section 7.2);
- The method for evaluating effects at the MPG and species level (Section 7.3);
- Methods for evaluating effects on critical habitat for the adverse modification analysis (Section 7.4).

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