2020 JOINT STAFF REPORT CONCERNING STOCK STATUS AND FISHERIES FOR STURGEON AND SMELT

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INTRODUCTION

This report describes sturgeon and smelt populations in the mainstem Columbia River and includes a review of fisheries, current management plans and guidelines, and past management actions and strategies. This report is part of an annual series produced by the Joint Columbia River Management Staff of the Oregon Department of Fish & Wildlife (ODFW) and Washington Department of Fish & Wildlife (WDFW). Members of the *U.S. v Oregon* Technical Advisory Committee (TAC) have reviewed this report.

THE COMPACT

The Columbia River Compact is charged by congressional and statutory authority to adopt seasons and rules for Columbia River commercial fisheries. In recent years, the Compact has consisted of delegates for the Oregon and Washington agency directors, acting on behalf of the Oregon Fish and Wildlife Commission (OFWC) and the Washington Fish and Wildlife Commission (WFWC). In addition, the Columbia River treaty tribes have authority to regulate treaty fisheries.

When addressing commercial seasons for Columbia River fisheries, the Compact must consider the effect of the commercial fishery on escapement, treaty rights, and the impact on species listed under the Endangered Species Act (ESA). Working together under the Compact, the states have the responsibility to address the allocation of limited resources between recreational, commercial and treaty fishers. This responsibility has become increasingly demanding in recent years. The states maintain a conservative management approach when considering Columbia River fisheries that will affect species listed under the ESA.

SEASONS CONSIDERED

Recreational and non-treaty commercial fisheries for white sturgeon in the Columbia River and tributaries downstream of Bonneville Dam during 2020 will be likely be addressed after updated stock status information and additional Commission guidance is available. Retention fisheries in the pools between Bonneville Dam and McNary Dam (Zone 6) open January 1 under permanent rules. The Sturgeon Management Task Force (SMTF) will meet in January 2020 to review results of the 2019 stock assessment in John Day Pool and to discuss management options for 2020, including harvest guidelines for Zone 6 sturgeon fisheries.

As a result of the 2010 ESA listing of Eulachon (referred to locally as Columbia River smelt), all Eulachon-directed fisheries in the Columbia River closed as of January 2011. In 2014–2018, the states worked closely with the National Marine Fisheries Service (NMFS) to conduct limited Eulachon research fisheries to gather biological data and adult catch-per-unit-effort data for monitoring the status of the population. Due to projected poor returns in 2019, no Eulachon fisheries were considered or conducted. Inter-agency discussions continue regarding the potential for 2020 Eulachon fisheries.

ENDANGERED SPECIES ACT (ESA)

Salmon and Steelhead

The majority of Columbia Basin salmon and steelhead stocks are listed under the ESA as shown in the table below. The *U.S. v Oregon* TAC has prepared Biological Assessments (BAs) for combined fisheries based on relevant *U.S. v Oregon* management plans and agreements since 1992.

Federally-listed Species Found in Columbia River Fishery Management Areas			
Species – *ESU/DPS*	Current Designation	Listing Date	Effective Date
Chinook			
Snake River Fall	Threatened	April 22, 1992	May 22, 1992
Snake River Spring/Summer	Threatened	April 22, 1992	May 22, 1992
Upper Columbia Spring	Endangered	March 24, 1999	May 24, 1999
Upper Columbia Summer/Fall	Not warranted	--	--
Middle Columbia Spring	Not warranted	--	--
Lower Columbia River Spring/Fall	Threatened	March 24, 1999	May 24, 1999
Upper Willamette Spring	Threatened	March 24, 1999	May 24, 1999
Deschutes River Summer/Fall	Not warranted	--	--
Steelhead			
Snake River Basin	Threatened	August 18, 1997	October 17, 1997
Upper Columbia River[1]	Threatened	August 18, 1997	October 17, 1997
Lower Columbia River	Threatened	March 19, 1998	May 18, 1998
Middle Columbia River	Threatened	March 25, 1999	May 24, 1999
Southwest Washington	Not warranted	--	--
Upper Willamette	Threatened	March 25, 1999	May 24, 1999
Sockeye			
Snake River	Endangered	November 20, 1991	Dec. 20, 1991
Okanogan River	Not warranted	--	--
Lake Wenatchee	Not warranted	--	--
Chum – Columbia River	Threatened	March 25, 1999	May 24, 1999
Coho – Columbia River	Threatened	June 28, 2005	August 26, 2005
Green Sturgeon- Southern DPS	Threatened	April 7, 2006	July 7, 2006
Eulachon - Southern DPS	Threatened	March 18, 2010	May 17, 2010

1. *Status downgraded to threatened per U.S. District Court order in June 2009.*

The current BA addresses Columbia River treaty and non-treaty fisheries for upriver Chinook, upriver Coho, sockeye, steelhead, and white sturgeon, as described in the *2018–2027 U.S. v Oregon Management Agreement* (2018–2027 MA). The BA was submitted in June 2017, and a Biological Opinion (BO) was subsequently issued by the NMFS in February 2018. Impacts to listed salmonid species from Eulachon and sturgeon fisheries described in this report are expected to be zero and low, respectively.

Eulachon

In March 2010, the NMFS published a rule (75 FR 13012) to list the Southern Distinct Population Segment (DPS) of Eulachon as threatened under the ESA, which became effective May 17, 2010. This DPS encompasses all populations within the states of Washington, Oregon, and California and extends from the Skeena River in British Columbia (inclusive) south to the Mad River in Northern California (inclusive). As a result of this listing, the *U.S. v Oregon* TAC submitted to NMFS an addendum to the 2008–2017 BA, which covered Columbia River Eulachon fisheries through 2017. The 2018–2027 BA addresses the incidental take of ESA-listed Eulachon in 2018–2027 Columbia River fisheries.

Green Sturgeon

In April 2006, the NMFS published a rule (71 FR 17757) to list the Southern DPS of the North American green sturgeon (those spawning in the Sacramento River, California) as threatened on April 7, 2006, which became effective July 6, 2006. Effective November 9, 2009, the Columbia River below River Mile 46 was designated as critical habitat of the Southern DPS (74 FR 52300). The BO covering non-treaty fisheries described in the 2018–2027 MA also addresses impacts to green sturgeon. Given that (1) the sale of green sturgeon from Columbia River commercial fisheries was prohibited effective July 6, 2006, and (2) the retention of green sturgeon in Columbia River recreational fisheries was prohibited effective January 1, 2007, impacts to green sturgeon from fisheries described in this report are expected to be very low.

Marbled Murrelet

The threatened status of the marbled murrelet has not changed since initially listed October 1, 1992 (57 Fed. Reg. 45328, October 1, 1992). On September 24, 1997, the U.S. Fish and Wildlife Service released a recovery plan for the threatened marbled murrelet for the states of Washington, Oregon, and California (USFWS 1997). On June 12, 2009, the United States Fish and Wildlife Service concluded a five-year review of the status of the marbled murrelet and determined that no change in the bird's threatened status was warranted (USFWS 2009). On October 4, 2011, critical habitat was designated for the marbled murrelet (61 Fed. Reg. 26256). Fisheries described in this report are not likely to adversely affect this species.

STURGEON MANAGEMENT AND FISHERIES DOWNSTREAM OF BONNEVILLE DAM

Stock Status

Sturgeon abundance in the lower Columbia River (LCR) collapsed at the end of the 19th century due to overfishing and remained depressed through the first half of the 20th century. The population began to rebound only after the adoption of management actions aimed at reducing overall harvest and protecting broodstock, particularly the 6-foot maximum size limit regulation enacted in 1950. White sturgeon abundance subsequently increased significantly through the 1990s and supported robust recreational and commercial fisheries. Abundance of sub-adult fish began declining in the mid-2000s, prompting changes in harvest quotas and retention seasons.

Joint state tagging and recovery programs were initiated in 1986 to provide data necessary to estimate the annual abundance of white sturgeon inhabiting the LCR. Abundance estimates, based on tagging conducted in one year and mark sampling extending into the following year, were produced from 1987 through 2012 with the exception of 1994 and 2004 (the estimates refer to the year of tagging, although final estimates required recoveries through the following year). Abundance estimates for harvestable size fish [42–60 inches total length (TL) or 38–54 inches fork length (FL)] were generally low during 1988–1992, averaging 55,600 fish, but improved significantly during 1993–1997 when average legal abundance was 169,200 fish. The estimates from 1998 through 2007 were lower (131,400 average) but more stable, ranging between 121,600–140,700 fish (Table 1). Legal abundance estimates declined steeply beginning in 2008, reaching a low of 65,300 fish in 2010 before increasing to 72,800 fish in 2011 and to 83,400 fish in 2012.

In 2011, ODFW finalized the Oregon Lower Columbia River and Oregon Coast White Sturgeon Conservation Plan (WCP). In response to uncertainties identified in the WCP, ODFW initiated an additional survey in 2010 using research setlines during July, August, and September to recover white sturgeon tagged in May and June. This "in-year" approach allows researchers to estimate current abundance and to project an estimate of the next year's abundance.

Concurrent abundance estimates for 38–54 inch FL sturgeon resulting from the "traditional" approach using mark-recoveries through fishery sampling and the new approach using mark-recoveries from setline sampling are available for 2010–2012, and produced fairly similar results (Table 1). Since 2013, the setline-only approach produced progressively increasing population estimates from 2013 through 2016, followed by declines in 2017 and 2018. The 2016 estimate of 224,000 legal-size fish represented an increase of 56% from 2015, raising concern about the accuracy of the estimate since it was not fully supported by catch rates in 2016 gillnet or setline tagging efforts. Since the mark-recapture survey is susceptible to positive bias if marked fish do not mix adequately prior to the subsequent setline recovery effort, a more conservative legal abundance estimate of 165,600 was used for management purposes in 2017, rather than the projected abundance of 237,900. This conservative estimate represented the projected abundance of 38–54 inch FL fish in 2017 based on the 2010–2016 relationship between research setline catch rates and mark-recapture abundance estimates. The actual estimate for 2017 of 199,800 came in mid-way between the two projections for 2017, but still maintained the general trend of increasing abundance of 38–54 inch FL fish since 2012. The 2018 and 2019 abundance estimates of 162,200 and 168,200 indicate growth of this population segment may have peaked in 2016–2017.

Reduced recruitment to the lower end of the legal slot drove the past decline, with abundance of 42–48 inch TL white sturgeon averaging 126,900 fish for 1996–2000, and 95,200 fish for 2001–2007, before reaching a low of 39,100 fish in 2010 (Table 1). The estimated number of fish in this size class has generally increased since 2010, but as a percentage, has declined to less than 50% of the overall 42–60 inch TL fish abundance since 2016, down from 70–90%. Conversely, the percentage of fish between 48 and 60 inches TL has increased over time, averaging 24% during 1987-2003, 31% during 2004-2012, and 53% during 2014-2019. This obvious shift in the composition of legal-size fish from predominately 42–48 inch TL fish to a majority now represented in the 48–60 inch size group, may be a consequence of chronic poor recruitment in recent years.

Catch per angler trip (CPUE) of sublegal (<38 inches FL, <42 inches TL,) white sturgeon decreased annually from 2004 through 2009 following eight years of mostly steady increases. By 2008, CPUE of sublegal-size fish had dropped by almost 40% of the 1996–2006 average. This declining trend slowed in 2009, then remained relatively stable through 2012 before increasing by 6% in 2013. Angling effort for sturgeon dropped by about 90% beginning in 2014 following the retention prohibition, so comparable data on catch per trip of sublegal fish is not available for 2014–2016. For 2017–2019, limited retention fisheries were re-instated with a narrower legal-size slot (expanded sub-legal range), yet the sublegal CPUEs in the LCR were the lowest observed since 1982.

The abundance of spawner-size adult (≥167-cm FL) white sturgeon was depressed during 2011–2015, averaging about 3,050 fish (Figure 1). However, abundance estimates since 2016 have shown an increasing trajectory. The 2017–2019 running average is nearly 9,500 fish, which is now above the desired status threshold of 9,250 adult fish identified in the WCP. However, the confidence intervals for the spawner-size abundance estimates have considerable overlap, making it difficult to discern a clear trend in abundance between years.

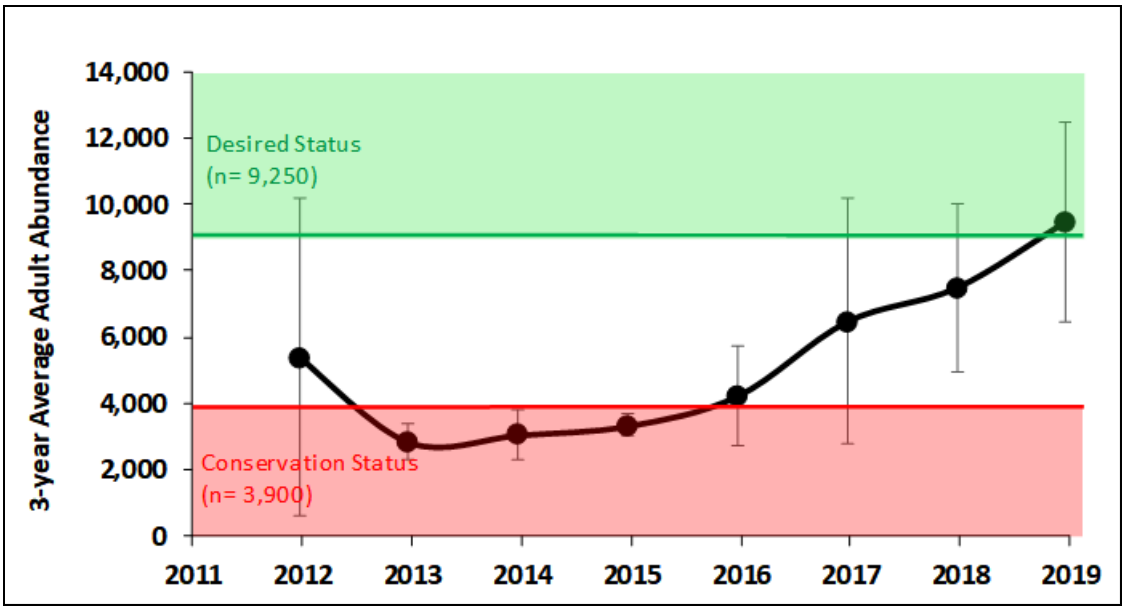

Figure 1. Three-year running average estimated abundance for white sturgeon ≥167 cm FL from the lower Columbia River, 2012–2019. Less than three years of data were available prior to 2012 so averages are not available. Error bars represent one standard deviation.

Since 2004, annual monitoring of young-of-year (YOY) white sturgeon recruitment in the LCR has been conducted in the late fall targeting juvenile sturgeon that were spawned earlier the same year. Staff deploy small-mesh gillnets at standard index sites throughout the lower Columbia and Willamette rivers. The catch per set of YOY sturgeon and proportion of sets capturing at least one YOY sturgeon (Ep) are used as indices to monitor trends in recruitment (Table 3). Sampling results during 2010–2016 indicated relatively low production in the LCR and generally better rates in the lower Willamette River (LWR). High flows in 2017 resulted in a marked improvement in juvenile production with YOY catch rates increasing to the highest levels observed since 2009 for the LCR and the highest ever (since 2010) for the LWR. Sampling in 2018 showed mixed results; both indices were the fifth lowest for the mainstem Columbia River

but record high for the LWR, essentially doubling 2017 results. Juvenile production in 2019 was below average in the LCR and similar to the recent 5-year average in the LWR. Additional years of paired recruitment and detailed stock assessment data are needed to infer absolute levels of recruitment from these data. However, the relatively low proportion of juvenile and sub-legal sturgeon in recent years is indicative of productivity issues.

Predation by sea lions has created a substantial threat to the white sturgeon population, especially for adult-size fish taken by Steller sea lions (SSL). Observers for the U.S. Army Corps of Engineers (USACE) documented a steady annual increase in the number of individual SSL at Bonneville Dam (RM 145), from zero animals in 2002 to 89 individual animals in 2011. From 2012–2019, annual observations of individual animals ranged from 39-80 during spring monitoring.

Predation of adult-size fish observed by WDFW and ODFW employees in the vicinity of Beacon Rock (~RM 141) peaked during December 2005 through March 2006, with over 50 kills reported. Activity then declined following initiation of a state and tribal hazing program in March 2006 that successfully moved the SSL out of the area by early April. Hazing activity was conducted again in February 2007, December 2007 through May 2008, and from February through May in 2009 and 2010; however, these efforts grew steadily less effective each year. Crews were often able to distract individuals from feeding, but were not successful in driving them out of the area (the Columbia River Gorge). In 2011, WDFW and ODFW staff expanded the area of observation from Tanner Creek (~RM 144; lower boundary of USACE observation area) downstream to Rooster Rock State Park (~RM 129), to document rates of predation in this area. Results of this work, combined with USACE observations, indicate significant predation of white sturgeon occurs throughout the 16-mile stretch immediately downstream of Bonneville Dam, with most activity confined to the upper 10 miles. The WDFW and ODFW observations near Beacon Rock suggest SSL diet in this downstream location is comprised of a higher proportion of adult-size white sturgeon than has been documented by the USACE observation program.

The spring USACE observation program at Bonneville Dam (primarily January–May) documented a steady increase in total predation of all sizes of white sturgeon through 2011. Even though California sea lions (CSL) are also present in high numbers, most of the observed take of sturgeon is by SSL, with very few incidences of sturgeon predation attributed to CSL. Estimated consumption of white sturgeon in this small area increased from an observed take of just one white sturgeon in 2005 to 3,003 fish in 2011, and has since declined (Table 2). In 2017, the USACE expanded the observer program to include the late fall and winter (mid-August through December) which estimated an additional 238 white sturgeon consumed. Results for fall 2018 and 2019 are not currently available. It is unlikely that sea lion feeding preference has changed so the reduced predation observed in the Bonneville Dam tailrace is likely the result of white sturgeon avoiding this area in winter and spring and instead seeking out other areas of the Columbia River and tributaries with less predation potential.

Predation on smaller white sturgeon throughout the river continues based on observations by staff and reports from anglers and commercial fishers. Predation on larger sturgeon also appears to be increasing in other parts of the LCR and LWR as well. In 2009, ODFW generated estimates of total annual predation impacts on sturgeon by SSL and CSL in the LCR and LWR as an element of a population viability model. The modeled losses increased from 6,700 fish in 2009 to a presumed maximum of 10,600 fish by 2014. Loss of juvenile fish to predation may be

impacting sublegal abundance and recruitment to fisheries. Loss of adult fish is contributing to lower population productivity and reduced recruitment to fisheries.

Monitoring of pinniped predation at Willamette Falls by ODFW and cooperators in recent years indicates additional white sturgeon losses are occurring in this area, primarily by SSL. During the 2018 observation program (January 8–June 3), 79 white sturgeon were observed consumed by SSL. For 2019, 98 white sturgeon predation events were observed (January 7–June 2) by SSL. In addition, anecdotal reports of sea lion predation on white sturgeon for areas downstream of Willamette Falls continue to increase.

Fishery Management Actions

Sturgeon fishery management focused on the commercial fishery during the early 1900s and expanded to encompass recreational fisheries beginning in 1940. Regulations for recreational and commercial fisheries became increasingly restrictive and complex as the popularity and importance of sturgeon as a target species increased for both fisheries.

Past Management Actions

Sturgeon management actions were initiated in 1897 with the adoption of a November-February season and a 4-foot TL minimum size limit for commercially-landed sturgeon in Washington. Oregon adopted these same rules in 1899 along with a ban on Chinese-type long lines. During 1899–1908, commercial sale of sturgeon was generally prohibited. Beginning in 1909, commercial sturgeon sales were allowed during salmon seasons only. Between 1940 and 1989, fishery management actions primarily consisted of modifying catch limits for the recreational fishery and size restrictions for recreational and commercial fisheries. Most significant was the adoption of a 6-foot TL maximum size limit regulation for all fisheries in 1950 to protect broodstock and aid rebuilding of the Columbia River white sturgeon population. Additionally, commercial sturgeon setline seasons initiated in 1975 were phased out during 1983-1985.

During 1989–2013, the management strategy for LCR white sturgeon fisheries was to optimize harvest while allowing for the continued rebuilding of the population. Significant management actions taken during 1985–1996 to restrict catches to sustainable levels included: (1) increasing the minimum size limit in recreational fisheries; (2) reducing the maximum size limit in all fisheries; (3) reducing daily and annual catch limits for recreational fisheries; and (4) adopting annual catch guidelines for commercial fisheries.

Primarily due to angling regulation changes, recreational catch dropped from a peak of 62,400 fish in 1987 to a low of 17,300 fish in 1990. Commercial catch also dropped from a peak of 11,600 fish in 1986 to a low of 3,800 fish in 1991, due to reductions in fishing opportunities. In 1986, the daily bag limit for legal-sized fish (36-72 inches TL) was reduced from three to two and an annual bag limit of 30 fish was adopted in Oregon. The maximum size limit for all white sturgeon fisheries was reduced from 72 inches to 66 inches TL in 1994. In 1990, the annual bag limit was reduced to 15 fish annually. The daily bag limit was modified in 1991 to only allow one 40-48 inch fish and one 48-72 inch fish per day. In 1996, recreational regulations were further restricted with a daily catch limit of one fish between 42 inches TL (equivalent to 38 inch FL) and 66 inches TL and a ten fish annual catch limit. The maximum size limit for both fisheries was reduced from 66 inches TL to 60 inches TL (equivalent to 54 inch FL) in 1997. These regulation changes culminated in adoption of WFWC policy C-3001 on Lower Columbia

Sturgeon Management and in a series of one to three year, Joint State Management Agreements (Accords) between Washington and Oregon that guided Columbia River sturgeon management during 1997–2013.

In 2017, following a three-year period without retention fisheries, the legal size slot for both recreational and commercial retention fisheries was narrowed to 44–50 inches FL, and remains in effect. See Table 8 for an annual summary of seasons and regulations for commercial fisheries. Table 9 summarizes annual regulations for LCR recreational fisheries.

Joint State White Sturgeon Management Agreements

The 1997–2013 Accords contained a variety of fishery regulations including: (1) size limits for recreational and commercial fisheries, (2) daily and annual catch limits for recreational anglers, (3) gear restrictions for recreational and commercial fisheries, (4) the allowance of target sturgeon seasons in the commercial fishery, and (5) protective measures for adult-size sturgeon.

One key aspect of most of the agreements through 2009 was the adoption of a three-year average harvestable number of sturgeon designed to reduce the risk of exceeding what was deemed sustainable. The total harvestable number has been allocated 80% for recreational fisheries and 20% for commercial fisheries since implementation of the first Accord in 1997.

The tenets of the Accords also allowed for modifications if new information suggested that a change was warranted. Since adoption of the first Accord, additional management actions have been necessary. Abundance of legal-size fish did not increase as expected during the initial two years of the first Accord, and based on that new information, the annual harvestable number was reduced from 67,300 to 50,000 fish for 1999 fisheries.

In December 2002, the WFWC and OFWC (Commissions) established sturgeon management protocol to help guide the development of recreational and commercial fisheries during 2003–2005. Due to the declining trend in abundance, the Commissions adopted a reduction in the annual harvestable number from 50,000 fish to 40,000 fish per year for 2003–2005. This reduction generated a conflict in season-shaping preferences among competing recreational interests for the areas downstream (estuary) and upstream (non-estuary) of the Wauna powerline crossing at river mile (RM) 40. After much debate, the Commissions allotted 60% of the recreational share to the estuary fishery and 40% to the non-estuary (above Wauna) fishery.

By 2004, work with the Columbia River Recreational Fishery Advisory Group (CRRAG) had established that fishery goals differed for those who participated in the estuary fishery compared to those who participated in the non-estuary fishery. For the area upstream of the Wauna powerlines, anglers preferred retention opportunity throughout as much of the year as possible, especially during the spring and fall timeframes. A days-per-week approach was adopted to achieve this, with retention allowed on Thursdays, Fridays, and Saturdays, and catch-and-release allowed on non-retention days. Retention was prohibited during August and September to help ensure that the annual harvest guideline lasted through the fall timeframe. For the estuary fishery, anglers preferred retention opportunity seven days per week, and a retention season that lasted at least through July 4. To achieve this, beginning in 2004 the minimum size limit for this area increased in May annually to 45-inches TL (41-inch FL equivalent since 2009) to slow catch rates and prolong the retention season. This modification required the annual guideline for the estuary be reduced by 17% (from 19,200 fish to 16,000 fish) to maintain a comparable overall harvest rate. These basic season structures continued in subsequent Accords. Other

changes to recreational fishery regulations enacted during 2004–2005 included reducing the annual limit from ten fish to five fish and requiring anglers to use one single-point barbless hook.

The fourth Joint State Accord covered the three-year period from 2006–2008. The major tenets from the prior Accord remained intact, including the 40,000 fish annual harvestable number (36,800 fish actual with adjustments to the estuary guidelines), the 80% recreational and 20% commercial allocation, and the 60% estuary and 40% non-estuary recreational sub-allocation. The agreement also called for basic monitoring of marine mammal predation of white sturgeon.

The maximum size limit for green sturgeon in the commercial fishery was lowered from 66 inches TL to 60 inches TL for 2006–2008 to provide additional protection. However, when green sturgeon were ESA-listed as threatened (effective July 6, 2006) the states subsequently prohibited sales (and therefore retention) of green sturgeon from Columbia River commercial fisheries effective July 6, 2006 and retention of green sturgeon in Columbia River recreational fisheries effective January 1, 2007.

The 2006–2008 Joint State Accord for Columbia River sturgeon management was renewed for 2009 to allow for development of the Oregon WCP and refine a strategy for long-term LCR white sturgeon management. Also in 2009, Oregon and Washington converted from a TL to a FL measurement standard in all fisheries. The conversions for slot measurements were as follows: 42-inch TL = 38-inch FL, 45-inch TL = 41-inch FL, 48-inch TL = 43-inch FL, 60-inch TL = 54-inch FL.

Due in part to the quickly changing status of the population, the Joint State Accord was again renewed for just one year in 2010. The updated WFWC policy C-3001 called for a reduction in harvest of no less than 45% from the previous level, to address the declines in abundance and uncertainties surrounding the impact of predation. Negotiations between the Directors of the ODFW and WDFW resulted in a 2010 Accord that set the harvestable number at 24,000 fish for 2010, a 40% reduction from the previous guideline.

Prior to implementation of the first Accord, the agencies in 1996 adopted a no-sturgeon-angling sanctuary just downstream from Bonneville Dam to protect spawning white sturgeon. A boat-based catch-and-release fishery targeting sturgeon larger than the legal-size limit (oversize) had been intensifying in this area since 1990. Angling for sturgeon from boats was prohibited during May and June within this sanctuary, which extended 4.5 miles downstream to Beacon Rock. In 2000, this closure was extended through mid-July to provide additional protection to the adult population.

In 2004, the duration of the sturgeon-angling prohibition within the spawning sanctuary was extended through July and the bank fishery was incorporated into the closure. Washington adopted a regulation extending the sanctuary boundary an additional 1.6 miles further downstream to U.S Coast Guard (USCG) Navigation Marker 85. Oregon did not adopt this change and Washington rescinded the regulation in order to maintain concurrence with Oregon. Instead, the Joint State Accord was modified to include a “Best Fishing Practices” program that identified angling practices designed to maximize post-release survival rates in the oversize catch-and-release fishery. The spawning sanctuary boundary was eventually extended to USCG Navigation Marker 85 with adoption of the 2006–2008 Accord.

In 2010, the Directors agreed to move the downstream sanctuary boundary to USCG Navigation Marker 82, adjacent to the upper end of Skamania Island, closing about nine miles of river to

sturgeon angling. The closure period was extended an additional month, covering May through August. Also in 2010, the state of Oregon established a 1-mile spawning sanctuary in the LWR from the I-205 Bridge upstream to Willamette Falls during May 1–August 31 following documentation of successful white sturgeon spawning in this area. In 2013, the Willamette River sanctuary was expanded an additional 5.3 miles downstream to the Lake Oswego-Oak Grove Railroad Bridge.

A new three-year Accord was adopted by the Commissions in February of 2011 for 2011–2013. No changes were made to allocations among fisheries or areas, and spawning sanctuaries remained as adopted in 2010. However, harvest guidelines during the period were established as a 22.5% annual harvest rate or a cap of 17,000 total harvested fish, whichever was lower. This harvest level was to be derived annually from projected abundance in the coming year, based on in-year stock assessment abundance estimates. This resulted in a guideline for 2011 that was 29% below the 2010 level.

The 2011–2013 Accord was amended for 2012 to reflect revised policy guidance based on continued concern for the status of the population. The 2012 Amendment specified that the 2012 harvest guideline be based on a 16% harvest rate of the legal-size segment of the population, or 10,400 white sturgeon. Harvest sharing remained at 80/20 sport/commercial. The Amendment resulted in a 39% reduction in the guideline, which was allocated as follows for 2012: 2,080 commercial, 4,992 below Wauna (adjusted to 4,160 to reflect the change in the minimum size limit during the summer season), 2,080 mainstem above Wauna, and 1,248 for the LWR. Since the 2012 Amendment, no modifications or new Accords have been adopted.

The WCP was developed during 2008–2011 and adopted by the OFWC in August 2011. WDFW staff was integrally involved in development of the Oregon WCP and the completed plan has since been endorsed by WDFW. The Oregon WCP examines factors and threats that may be limiting the abundance and productivity of LCR white sturgeon, and identified critical unknowns and data gaps pursuant to these factors and threats. Population goals and objectives were developed and strategies and actions identified to address the limiting factors and threats. Additional guidance was provided by the Commissions for 2013. A Columbia River Fishery Management Workgroup, formed in 2012 to develop strategies and recommendations for restructuring Columbia River fisheries, developed two specific recommendations for LCR sturgeon fisheries. The first was to allocate only 90% of the harvest guideline derived from the 16% harvest rate, holding 10% in reserve as a conservation buffer.

In response to the reduced 2013 guideline, each Commission adopted reduced statewide annual recreational bag limits, from five fish to two fish, effective April 2013. In addition, the Directors negotiated a 15% hold-back in the harvest guideline for 2013 fisheries. Harvest sharing remained at 80/20 sport/commercial. The 16% allowable harvest rate was reduced to 13.6%, resulting in a 10,105 fish guideline allocated as follows for 2013: 2,021 commercial, 4,850 below Wauna (adjusted to 4,042 to reflect the change in the summer season size slot), 2,021 mainstem above Wauna, and 1,213 for the LWR (1,733 with 520 fish baseline added in).

The second recommendation by the Columbia River Fishery Management Workgroup to the Commissions was to consider implementing rules prohibiting retention of LCR origin white sturgeon if a decline in legal-size abundance forecast for 2012 held true, which turned out to be the case. In response, the OFWC adopted rules prohibiting retention of white sturgeon in the LCR, LWR, and Oregon coast effective January 1, 2014. The WFWC adopted similar rules,

prohibiting white sturgeon retention effective January 1, 2014 in the LCR, Washington coast, Puget Sound, and their tributaries. Retention of white sturgeon remained prohibited during 2014–2016.

Adjustments for Harvest outside the Mainstem Columbia River

Past harvest guidelines and allocations identified in the Joint State management agreements pertained specifically to harvest in the mainstem Columbia River (and Select Areas) downstream of Bonneville Dam. However, white sturgeon from the LCR migrate into and can be harvested in various Columbia River tributaries and coastal estuaries. Harvest outside the Columbia was generally low, averaging 2.6% of the legal abundance based on 1996–2007 tag recovery data but can be higher, as observed in 1996 when tag recoveries from outside the Columbia River increased to 5.3%. During that year, harvest of white sturgeon along the coast correspondingly peaked at a level more than double the average harvest for the previous decade. This phenomenon was recognized as a concern, so the Columbia River harvest guideline identified in the original 1997–1999 Joint State Management Agreement was adopted with the contingency that it could change with a substantial increase in harvest outside the Columbia system. To assure that future harvest guidelines and allocations remained equitable, the Commissions adopted policy in the 2000–2002 and subsequent Joint State agreements, calling for management of sturgeon harvest outside the mainstem Columbia River to be consistent with Columbia River conservation and management needs.

The 2000 Willapa Bay Fishery Management Framework was developed to address the Joint State agreement policy. The Willapa Framework incorporated white sturgeon harvest guidelines for commercial and recreational fisheries based on the historic relationship between Willapa Bay and Columbia River harvest levels. The Willapa Bay guideline was adjusted by the same (20%) reduction made to the Columbia River guideline in 2003, resulting in a 1,769 fish guideline. Following adoption of the plan, non-treaty commercial harvest in Willapa Bay declined; however, treaty harvest in Grays Harbor and tributaries generally increased. Collectively, the combined harvest remained fairly consistent from 1997–2013. The Willapa guideline was adjusted downward by 40% in 2010, by 29% in 2011, and by 39% in 2012 to keep in step with the reductions adopted for the LCR. Also in 2012, Washington implemented restrictions to Puget Sound recreational sturgeon fisheries. The year-round retention season was reduced to two retention periods, June 1–30 and September 1 through October 15. Effective January 1, 2014, retention of white sturgeon was prohibited along the Washington coast, including Puget Sound, and all coastal bays and tributaries.

During 2004–2012, there was a significant shift in the winter and early spring recreational sturgeon harvest from the mainstem Columbia River into the Willamette River. This shift may have been due to warmer winter water temperatures (2–5°F higher) in the Willamette and generally poor Eulachon returns to the Columbia River through 2012 that appeared to attract more sturgeon (and recreational fishers) to the Willamette River during January–May. Because of this increasing trend, staff re-calculated harvest estimates (and adjusted guidelines) for the Willamette recreational fishery to account for harvest in excess of the 1986–1996 baseline level (or adjusted baseline in more recent years). The adjusted estimates for the Willamette River were added to harvest estimates for the fishery above Wauna to more accurately reflect the total recreational harvest for this river section.

The harvest adjustments (increases) for the Willamette were based on information available from the ODFW creel survey and angler catch record card data during 2004–2009 (Table 5). Prior to 2009, the Willamette River creel program had been focused on estimating harvest of spring Chinook salmon. Accordingly, the program typically only operated from March through June of each year. In order to derive full-year catch estimates, including timeframes not included during creel surveys, staff used adjusted catch record card estimates. Catch estimates from catch record cards for the time period in which creel surveys were conducted were compared with catch estimates from creel surveys to derive a ratio of creel and catch record derived harvest. This ratio was then applied to catch record card harvest estimates for time periods outside the creel survey period.

In 2009, the Willamette creel program was expanded to include the January–February timeframe, but catches in the remainder of the open season were still generated by the catch card/creel survey ratio method. During 2010–2013, the creel survey was conducted during all timeframes in which sturgeon retention was allowed, and no expansions for non-sampled periods were attempted. Based on the above methods, annual white sturgeon harvest in the LWR averaged 1,531 fish (range 989–2,206) during 1986–1996, 1,871 fish (range 1,263–2,811) during 1997–2003, and 5,193 fish (range 2,327–9,148) during 2004–2010. During 2010–2014, the LWR recreational sturgeon fishery was managed under a separate harvest guideline. The Amendment to the Accord specified a 1,768 fish guideline for the Willamette River in 2012, including the baseline of 520 sturgeon. The guideline for 2013, including the 520 fish baseline, was 1,733 fish. When retention fisheries were reinstated in 2017, the baseline for the Willamette River was eliminated to improve harvest rate accounting.

2019 Management Actions

The management approach for 2019 LCR sturgeon fisheries paralleled the process used for prosecuting conservative fisheries in 2017 and 2018. ODFW and WDFW staff met with the Columbia River Recreational Advisory Group (CRRAG) in January 2019 to provide an update on the population status of LCR white sturgeon based on the 2018 stock assessment. A meeting with the Columbia River Commercial Advisory Group (CRCAG) was planned for January but did not occur. Several indicators were stable (YOY production, adult abundance, and proportion juveniles) compared to 2017. However, the legal abundance estimate declined by 19% from 2017.

Based on this information and staff's intention to mimic the 2017–2018 fishery approach, the CRRAG was generally supportive of conservative retention opportunity in 2019. In February 2019, staff presented an update on the status of the LCR white sturgeon population to their respective Commissions. Both Commissions supported implementing sturgeon retention fisheries in 2019 similar to what occurred in 2017–2018.

Given the general desire to continue conservative retention fisheries, staff evaluated season options with an initial focus on the estuary recreational fishery. Staff used a conservative approach when designing 2019 fisheries that included:

- Maintaining the 44–50 inch FL legal slot for all LCR fisheries to facilitate management and provide immediate escapement of larger-size white sturgeon (50–54 inch FL) by excluding them from harvest.

- Modeled the harvest for all fisheries combined to not exceed a conservative 3.8% harvest rate on 44–50 inch FL fish (equivalent impact to broodstock escapement of a 4.6% harvest rate on the traditional 38–54 inch FL size slot).
- Delaying white sturgeon retention fisheries outside the Columbia Basin until annual creel programs are available to monitor the retained catch.

Based on this approach, a total of 6,160 white sturgeon were available for harvest downstream of Bonneville Dam in 2019. Existing policies in both states allocate 80%, or 4,930 of the harvestable white sturgeon to recreational fisheries. Recreational sub-allocations in place prior to 2014 and in 2017–2018 were applied to 2019 fisheries resulting in 2,960 fish (48%) for the estuary, 1,230 fish (20%) for the mainstem Columbia above Wauna, and 740 fish (12%) for the LWR. The commercial share of 20% of the harvestable stock, or 1,230 fish for 2019 was not subject to any additional policy guidance.

Sturgeon Fisheries

Reduced salmon fishing opportunities during the mid-1970s through the late 1990s greatly increased the popularity and importance of sturgeon for both commercial and recreational fisheries. The healthy white sturgeon population allowed the commercial industry to develop stable fisheries in a time when commercial salmon fishing opportunities had been drastically reduced. A similar lack of stable recreational salmon fisheries and recognition of white sturgeon as a sport fish resulted in increased popularity of sturgeon angling since the mid-1980s. Over time, reduced white sturgeon catch guidelines impacted the stability of all Columbia River sturgeon fisheries. Based on Commission guidance, retention of white sturgeon in Columbia River commercial and recreational fisheries was prohibited during 2014–2016.

Past Commercial Sturgeon Fisheries

Since the late 19th century, commercial catch of sturgeon remained very low until the mid-1940s. Through 1968, annual landings only exceeded 5,000 fish occasionally. During 1969–2009, landings exceeded 5,000 fish annually except in 1991. Since 2010, landings have been less than 4,400 fish annually. Catches peaked in the late 1970s and early 1980s with annual landings ranging from 9,400 to 22,800 fish. During the 1990s, catches ranged from a low of 3,800 fish in 1991 to a high of 13,900 fish in 1998 (Tables 6 and 10). During 1997–2013, commercial sturgeon fisheries were managed to remain within catch guidelines while maximizing economic benefit and achieving conservation objectives for other species. Plans for distribution of the commercial harvest allocation were developed annually with input from the CRCAG, to provide fishing opportunities throughout the year while maintaining optimum market value. Weekly landing limits remained a valuable tool in maintaining consistent commercial fisheries since first adopted in 2002. During 2003–2013, harvest guidelines for commercial fisheries included fish caught in both mainstem and Select Area commercial fisheries. The retention of green sturgeon has been prohibited in commercial fisheries since July 2006. Based on Commission guidance, white sturgeon retention and sales in LCR commercial fisheries was prohibited from January 2014 through May 2017. Retention fisheries were reinstated in 2017 with annual guidelines of less than 1,245 fish. Season summaries are described in Table 8. Harvest guidelines and catch data are provided in Tables 6, 7, 10 and 11.

2019 Commercial Fishery

Commercial white sturgeon fisheries in 2019 were managed based on a 1,230 fish allocation (Tables 6 and 7). Consistent with the recreational fishery, the legal slot length was maintained at 44–50 inches FL. Staff's preseason expectation for sharing of the commercial allocation between Select Area and fall mainstem fisheries was 50% each, 615 fish for Select Area fisheries and 615 fish for fall mainstem fisheries.

Commercial retention of white sturgeon in 2019 started April 1 in the Blind/Knappa Slough, Tongue Point/South Channel, and Youngs Bay Select Area fisheries. A landing limit of four fish per vessel per week was in effect throughout spring and summer Select Area fisheries which continued through July 31 in Youngs Bay and through June 28 in other Oregon Select Area sites. White sturgeon landings included 20 fish during the winter season, 381 during the spring season, and 78 during the summer season (479 total), leaving 751 fish on the overall commercial allocation.

Commercial white sturgeon retention continued into the fall season for both mainstem and Select Area fisheries. The early fall mainstem fishery consisted of four, 9-hour fishing periods (August 14–27) in Zones 4–5. The weekly white sturgeon landing limit was seven fish per vessel. Mesh size was restricted to a 9-inch minimum for all four periods. A total of 509 white sturgeon were landed, leaving a balance on the overall commercial allocation of 242 fish.

In fall Select Area fisheries, a weekly landing limit of three fish was adopted to manage harvest within the guideline balance. By late September, when late fall mainstem fisheries were being considered, approximately 97% (1,188 sturgeon) of the commercial 1,230 white sturgeon allocation had been landed. Given the small remaining balance, staff elected to maintain sturgeon retention in the Select Area fisheries where catches had slowed instead of allowing retention in late-fall mainstem commercial fisheries. White sturgeon retention and sales ended effective October 6 in all fall Select Area fisheries with an estimated 212 white sturgeon landed.

Preliminary 2019 white sturgeon landings in all commercial fisheries (Tables 6, 7 and 11) total 1,200 fish with 42% (509) landed in mainstem fisheries and 58% (691) landed in Select Area fisheries. Total catch represented 98% of the 2019 commercial guideline of 1,230 white sturgeon.

Past Recreational Sturgeon Fisheries

Recreational harvest guidelines for white sturgeon decreased steadily from 54,000 fish in 1997 to 8,100 fish in 2013 in response to declining abundance. During this time, sturgeon angler trips declined from over 200,000 trips per year to just over 33,000 trips in 2013. Based on guidance from the OFWC and WFWC in December 2013, LCR recreational sturgeon fisheries closed to retention effective January 1, 2014. Sturgeon retention remained prohibited for the duration of 2014, 2015, and 2016 downstream of Bonneville Dam and in the LWR below Willamette Falls. Catch-and-release angling remained open during the retention closure; however, sturgeon angler trips in each of those years decreased by about 90% from 2013 levels.

During the retention closure, the abundance of legal and over-legal white sturgeon increased, and the Commissions approved the resumption of limited retention fisheries for white sturgeon in the LCR and LWR beginning in 2017. The Commissions approved an overall recreational catch guideline of 4,990 white sturgeon based on a 3.8% harvest rate on the number of 44–50 inch fish in the legal size population and allocated the catch to the Columbia River estuary (60%),

Columbia River between Wauna and Bonneville (25%), and lower Willamette River (15%). Despite the conservative catch guidelines and restrictive daily and annual bag limits, the 2017 retention fisheries were very popular and produced a total catch of 3,665 legal size white sturgeon from 23,700 angler trips. Anglers in the estuary made 13,700 trips and kept 3,235 legal size sturgeon during five retention days in June 2017, and anglers in the Columbia upstream of Wauna made 10,000 trips and kept 430 legal size sturgeon during three days in October. ODFW did not recommend a retention fishery in the lower Willamette River in 2017 based on the potential of exceeding the 700 fish guideline in a one-day fishery.

The Commissions approved similar sturgeon fisheries for the Columbia River in 2018. Based on input from the CRRAG, the estuary fishery started in mid-May, when catch rates were expected to be lower, in order to maximize retention days, and the fishery above Wauna started in mid-September, when catch rates would be higher, to increase the likelihood of achieving the quota for that area. Anglers in the estuary made 18,300 trips during an 11-day season from mid-May through early June and kept 2,412 legal size sturgeon, and anglers in the Columbia upstream of Wauna made 11,000 trips an two days during September and kept 1,049 legal size fish. No fishery occurred in the LWR in 2018. Table 8 summarizes annual recreational regulations, and Tables 3, 4, 6, 9 and 10 display harvest guidelines and catch data.

2019 Recreational Sturgeon Fishery

Staff met with their respective Commissions in February 2019. Both Commissions favored maintaining limited retention fisheries for white sturgeon in 2019, similar to opportunities provided in 2017 and 2018. Based on updated population information and a conservative harvest rate of 3.8% on the 44–50 inch segment of the sturgeon population, the states established guidelines of 2,960 and 1,230 white sturgeon for 2019 recreational fisheries in the estuary and above Wauna, respectively.

Below Wauna (Estuary)

Staff developed options for the 2019 estuary fishery using effort and CPUE data from the 2017 and 2018 fisheries. The states modeled an 11-day fishery beginning Monday May 13 through Wednesday June 5 on Mondays, Wednesdays, and Saturdays. The days-per-week structure would reduce the chance of exceeding the catch guideline by a large margin, even though catch rates and effort could change considerably from one opening to the next. Staff expected catch rates to start low at about 0.08 fish kept per angler in May, increase gradually to about 0.20 retained fish per angler in early June, and average 0.12 fish kept per angler for the season.

The states held a hearing March 28, 2019 and adopted the retention fishery in the estuary for Mondays, Wednesdays and Saturdays during May 13–June 5. The regulations included a daily bag limit of one white sturgeon with a 44-inch minimum FL and a 50-inch maximum FL, and an annual bag limit of two white sturgeon including any fish harvested prior to the estuary fishery. An additional regulation prohibited angling for sturgeon after 2 p.m. daily on days open for retention, including catch-and-release angling, to reduce fishing opportunity and discourage guides and charters from running double trips. The states planned to consider fishing opportunity in the mainstem Columbia River upstream of Wauna power lines during the early fall timeframe.

Columbia River flows were moderately high and cool during mid-May through early June, averaging 313 kcfs and 57.1°F. Flows were much lower than in 2018; however, the temperature

increased gradually to 60°F by June 5. Effort was moderate with 322 private boats, five charters, and 86 bank anglers observed on Wednesday May 15. Catch rates started out at 0.08 retained fish per angler, which matched expectations. Early in the fishery, catch rates were best near the upstream angling boundary at Wauna down to the islands around Tongue Point; very few fish were caught downstream of the Astoria Bridge. Both effort and CPUE remained relatively stable during May, with 300–400 boats per weekday just over 600 boats per weekend day. Catch rates improved slightly throughout the month to 0.11 fish per angler and averaged 0.09 retained fish per angler for the month, which was similar to expectations. The catch during the first eight fishing days in May was 1,265 white sturgeon, or 43% of the guideline, which was similar to the expected catch of 1,200 fish.

By June, fish had spread downriver and catch rates improved in the area around the Astoria-Megler Bridge. Effort during June 1, 3, and 5 was slightly higher than expected averaging about 584 private boats, 10 charters and 75 bank anglers. Catch rates during those days averaged 0.22 fish kept per angler, which was similar to expectations. The total catch for June 1, 3 and 5 was 1,573 white sturgeon from 7,248 angler trips, which brought the total catch to 2,838 white sturgeon, or 96% of the guideline, from 22,012 angler trips when the fishery closed. In addition to the 2,838 white sturgeon kept, anglers released 5,388 sublegal, 25 legal, and 5,015 over-legal white sturgeon and 20 green sturgeon during the 11-day fishery.

Staff from both states intensively monitored the estuary fishery. Sampling crews observed 1,619 kept white sturgeon, or 57% of the total catch, and scanned 1,528 fish for tags. In addition to eight samplers from the Astoria, Clackamas, and Vancouver offices, samplers from the ocean salmon monitoring programs at the ports of Hammond and Ilwaco assisted in the monitoring and sampling of this fishery. The 2 p.m. curfew regulation also facilitated sampling of the catch, since most anglers quit before or right at 2 p.m. Staff conducted aerial counts on five of the 11 open fishing days and conducted trailer counts daily.

Above Wauna (non-Estuary)

In late winter, staff met with the CRRAG to solicit input for the sturgeon fishery above Wauna in 2019. While some of the advisors preferred to start later in the fall to allow more retention days, most of the advisors favored a season above Wauna similar to the 2018 fishery, which opened for two Saturdays in September and produced a catch of 1,049 white sturgeon, or 85% of the guideline from 11,031 angler trips. Staff thought two Saturdays in September would be a reasonable starting point to establish a season with little risk of exceeding the 1,230 fish guideline. In addition, this season structure would allow the states to postpone or cancel the second Saturday if anglers caught more than half the guideline on the first day.

The states held a Joint State hearing on September 5, 2019 to adopt recreational white sturgeon fishing regulations in the Columbia River above Wauna. The states adopted a two-day fishery on September 21 and 28 (both Saturdays) in the Columbia River from the permanent angling deadline at Bonneville Dam downstream to Wauna power lines and in the Cowlitz River in Washington. The daily bag limit on retention days was one white sturgeon with a 44-inch minimum FL and a 50-inch maximum FL, and the annual limit was two fish including any sturgeon harvested previously during the year.

Effort was high on Saturday September 21, with 1,374 boats and 617 bank anglers observed on the flight. The weather was nearly perfect, and Chinook salmon seasons had closed entirely in the Columbia River effective September 6. Catch rates were slightly below expectations at 0.10

fish kept per angler, with higher catch rates for boat anglers in the area from Kelley Point downstream to Kalama. Catch rates for bank anglers were generally poor. Overall catches were similar to expectations, with 524 legal white sturgeon retained, or 43% of the guideline, from 5,060 angler trips. The states opted not to modify the fishery above Wauna prior to the September 28 opener, because the chance of exceeding the overall recreational guideline by a significant margin was unlikely.

Angler participation remained high on Saturday September 28 with 1,147 boats and 552 bank anglers counted on the flight; however, catch rates dropped to about 0.03 fish kept per angler. The final catch for Saturday September 28 was 119 fish kept from 4,447 angler trips, which brought the total catch for the two-day fishery to 643 white sturgeon, or 52% of the guideline from 9,507 angler trips.

The states held a hearing on October 7 and adopted another retention day on Saturday October 12. Although it was unlikely that anglers could access the remainder of the guideline in one additional day, the states were reluctant to set more than one day at a time. Effort on October 12 was much less than what occurred in September, with 432 boats and 217 bank anglers participating. Catch rates also declined to 0.02 fish kept per angler, and the total catch was 29 white sturgeon kept from 1,544 angler trips.

The states held another hearing on October 16 and adopted two more days of sturgeon retention for Saturday October 19 and Thursday October 24. The catch expectation was 50 fish total for both days, but the states wanted to provide additional opportunity for sturgeon retention because angler interest and participation remained high in the most recent fishery. The states also wanted to provide a weekday angling opportunity for people who were unable to fish on the open Saturdays. Weather conditions were windy and rainy on Saturday October 19, and effort dropped to 331 angler trips; however, weather conditions were ideal on Thursday October 24, and sturgeon anglers made 822 trips that day. Catch rates were poor on both days, as expected, with an average of 0.01 fish kept per angler trip. The total catch for the final two days was 13 white sturgeon kept from 1,213 trips, which brought the total retained catch for the fall retention fishery above Wauna to 685 fish, or 56% of the guideline, from 12,063 angler trips. WDFW also estimated that anglers caught and kept 50 fish in the Cowlitz River in 2019. During the 2019 retention fishery above Wauna, anglers released 2,315 sublegal, 20 legal, and 646 over-legal white sturgeon and two green sturgeon.

Staff from both states intensively monitored the recreational fishery above Wauna. Staff conducted effort counts on all five days of the fishery including flights on two days, and samplers observed 263 legal white sturgeon, or 38% of the total catch, and scanned 259 of them for tags.

Summary of 2019 Recreational Harvest

Sturgeon anglers made 37,703 total trips on the LCR in 2019, including trips for catch and release angling, which was highest angler trip total for sturgeon since 2012. Anglers in the estuary retention fishery made 22,012 trips and kept 2,838 sturgeon during an 11-day season in May and June, while anglers above Wauna made 12,063 during a five-day retention season in September and October and kept 685 white sturgeon. A retention fishery did not occur in the lower Willamette River in 2019. The combined harvest on the lower Columbia was 3,523 white sturgeon, or 84% of the 4,190 fish guideline. Anglers made an additional 3,600 sturgeon trips for catch and release fishing. In addition to the 3,523 white sturgeon kept in 2019, anglers

released 10,230 sublegal, 791 legal, and 7,067 over-legal white sturgeon and 22 green sturgeon.

Expectations for 2020 Lower Columbia River Sturgeon Fisheries

Staff intend to provide briefings on the stock status of the LCR sturgeon population at the February Commission meetings and anticipate additional guidance regarding 2020 retention fisheries downstream of Bonneville Dam. Per permanent regulations, recreational sturgeon fisheries are restricted to catch-and-release only in the LCR and LWR, unless retention seasons are approved. The Willamette River upstream of Willamette Falls is open to retention all year under permanent rules.

STURGEON MANAGEMENT AND FISHERIES UPSTREAM OF BONNEVILLE DAM

Stock Status

The LCR white sturgeon population historically ranged into areas upstream of the current location of Bonneville Dam; however, with the construction of Bonneville Dam in 1938, the population became segregated and fish residing upstream could no longer migrate freely between freshwater and marine environments. The population was further segregated with the completion of McNary Dam in 1953, The Dalles Dam in 1957, and John Day Dam in 1968, resulting in functionally separate populations in Bonneville, The Dalles, John Day, and McNary pools. Today, a total of 12 dams on the mainstem Columbia River, from Grand Coulee to Bonneville, and five on the lower Snake River, from Hells Canyon Dam to Ice Harbor Dam, fragment white sturgeon populations throughout the basin. Inaccessibility to the marine environment and habitat alterations, primarily due to hydroelectric development, has rendered these populations less productive than those residing below Bonneville Dam.

The Sturgeon Management Task Force (SMTF), defined within the framework of the *U.S. v Oregon* Management Agreement, consists of representatives from Oregon, Washington, and the Columbia River treaty Indian tribes (Nez Perce, Umatilla, Warm Springs, and Yakama). The purpose of the SMTF is to review sturgeon management issues and set harvest management guidelines for the upcoming year in reservoirs between Bonneville and McNary Dam, hereafter referred to as the Zone 6 management area.

Since 1994, sturgeon fisheries occurring in Zone 6 are managed separately in accordance with reservoir-specific harvest guidelines set forth by the SMTF (Table 12). Abundance of sturgeon populations in each of the three Zone 6 pools is estimated every three years to monitor the effects of hydro-system operations and fishery management strategies. Mark-recapture population estimates are derived using directed sampling with gillnets and setlines. Significant harvest reductions were enacted beginning in 1988 and populations in all three pools increased as a result of reduced catch and other mitigation efforts. Additionally, trends in cohort strength have varied cyclically in correlation with water year types (e.g., high flow years versus low flow years). High flow years generally yield more recruits and subsequent increased harvest guidelines as these relatively larger cohorts move into the legal size class, whereas low flow years generally yield the opposite effect. The most recent estimates of legal-size abundance are 8,222 38–54 inch FL fish in Bonneville Pool (2018), 3,664 43–54 inch FL fish in The Dalles

Pool (2017), and 6,443 43–54 inch FL fish in John Day Pool (2019 preliminary estimate). Prior estimates back to 1976 of 33–65 inch FL (36–72 inch TL) fish are presented in Table 13. Overall, abundance estimates for The Dalles and Bonneville reservoirs increased in 2017 and 2018, respectively, and guidelines were increased. The 2019 abundance estimate for John Day Reservoir increased slightly from the previous 2016 estimate, which is largely attributed to hatchery supplementation in 2016 rather than additional natural-origin recruitment. The John Day Pool harvest guideline will be re-evaluated in early 2020.

Sturgeon Fisheries

Sturgeon fisheries in Zone 6 consist of treaty commercial and subsistence fisheries and non-treaty recreational fisheries. Non-treaty fishing is restricted to hook-and-line recreational fishing only, while treaty Indian commercial fishing is conducted with three main types of gear: hook-and-line, setlines, and gillnets, although small numbers of legal-sized sturgeon are caught in hoop-nets.

Pool-specific harvest guidelines are shaped to meet fishery demands and harvest allocations are split between treaty commercial and non-treaty recreational fisheries. Within Zone 6, the 2019 overall harvest allocation was split with approximately 60% allocated to treaty commercial fisheries and 40% allocated to non-treaty recreational fisheries. Within each pool, the harvest allocations vary with equal harvest shares allocated to recreational and treaty commercial fisheries in Bonneville Pool, and a larger allocation for treaty commercial fisheries in The Dalles and John Day pools. Treaty fishers also take sturgeon for subsistence purposes separate from commercial sturgeon seasons, and this catch is not included in the commercial catch guidelines. Subsistence catch is estimated through a creel monitoring program conducted by the tribes and reported to the SMTF.

Recreational fisheries upstream of McNary Dam, in the McNary Pool/Hanford Reach, and in the lower Snake River (below Ice Harbor Dam) have been open to retention from February 1 through July 31 annually, per permanent regulations. Due to continued poor annual production of sturgeon in the Snake River upstream of Ice Harbor Dam, the WFWC adopted permanent rules prohibiting retention of sturgeon in this area effective July 1, 2015. Catch and release continues to be allowed year-round.

2019 Treaty Fisheries

In 2019, the slot limit sizes for sturgeon retention were 43–54 inches fork length in The Dalles and John Day pools and 38–54 inches fork length in the Bonneville Pool. Seasons consisted of a January setline fishery, a winter gillnet fishery beginning in February, and a summer setline fishery in late July and early August.

During the January fishery, 43 sturgeon were harvested from Bonneville Pool, 19 from The Dalles Pool, and 12 from John Day Pool. Most of the Zone 6 commercial treaty guideline was harvested during the winter gillnet and fall setline fisheries (Table 17). The winter gillnet fishery occurred in The Dalles Pool from February 1–19, and in John Day Pool from February 1–27. The gillnet fishery in the Bonneville Pool ran from March 1–23. During the winter gillnet fishery, landings totaled 1,051 fish, which included 57 sturgeon in John Day Pool, 407 in The Dalles Pool, and 587 in Bonneville Pool. A late summer and early fall setline fishery was

opened in the John Day Pool from July 26 through August 8, during which 118 fish were harvested. There were no late fall setline fisheries in 2019.

Commercial season totals through October 31 were 126%, 103%, and 107% of the respective harvest guidelines for Bonneville, The Dalles, and John Day pools (Table 17). Treaty subsistence sturgeon fishing is open year-round and normally involves the retention of legal-sized sturgeon caught in association with other commercial and subsistence fishing activity. The subsistence catch in 2019 (as of October 31) is estimated to be 140 fish, or 86% of the previous 5-year average of 162 sturgeon (Table 15).

2019 Non-Treaty Recreational Fisheries

Recreational fisheries typically begin on January 1 in the Zone 6 reservoirs and continue until the reservoir-specific guideline is met (Table 16). After guidelines are met and retention is closed for the season, catch-and-release recreational fishing is allowed. From 2011 to 2018, managers altered the management structure in Bonneville Pool to allow for a summer season beginning in late June. To accomplish this, the winter season retention period in Bonneville Pool closed when approximately 50% of the harvest guideline was attained, and the remaining guideline was left for a short summer retention period. However, after a single-day opener in June 2018 where recreational anglers harvested almost double the expected take, managers determined that harvest guidelines were too small to split between seasons and remain within the set guidelines. Therefore in 2019, Bonneville Pool was managed only for the winter fishery and closed when the guideline was met.

In 2018, the sport retention guidelines in both Bonneville and The Dalles pools were exceeded, leading to a more conservative approach to management in 2019. A few warm days following the New Year holiday led to high harvest rates during the first week of 2019. As a result, The Dalles Pool closed to retention on January 7, with 79 sturgeon harvested (59% of the harvest guideline). A winter storm hit in early February and harvest slowed until late March, when harvest rates picked up in both Bonneville and John Day pools. As a result, Bonneville Pool closed to retention on April 13 with 448 sturgeon harvested (90% of the harvest guideline) and John Day Pool closed to retention on April 3, with 129 sturgeon harvested (123% of the harvest guideline; Tables 12 and 16).

The retention season for McNary Pool/Hanford Reach and the Snake River below Ice Harbor Dam was open from February 1 through July 31, per permanent regulation. In this section of river, there is no regular creel survey to monitor catch. Due to normal delays in angler catch record card reporting, a 2019 recreational harvest estimate for McNary Pool/Hanford Reach is not available. The 2018 estimate of white sturgeon harvest by Washington anglers for McNary Pool/Hanford Reach and the Snake River downstream from Ice Harbor Dam is 132 fish.

Expectations for 2020 Above Bonneville Sturgeon Fisheries

As per permanent regulations, treaty Indian winter commercial seasons include a setline season scheduled for January 1–31, 2020. A gillnet fishery is typically scheduled annually to begin on February 1.

Zone 6 recreational seasons will begin January 1, 2020 per permanent regulations, and continue until the reservoir-specific guidelines are met. Due to the lack of in-season catch monitoring

data, the recreational sturgeon fishery in McNary Pool/Hanford Reach and the lower Snake River (below Ice Harbor Dam), will close to retention year-round beginning in 2020. Catch and release will be permitted year-round.

SMELT MANAGEMENT AND FISHERIES

Stock Status

Of the numerous streams and rivers occupied by Southern DPS Eulachon, the Columbia River has historically supported the largest spawning run. Eulachon return to the Columbia River to spawn when they are between two to seven years old, with a majority returning at ages three and four. The fish may begin to enter the Columbia River in November to December, and typically reach peak spawner abundance in February. Depending on environmental conditions and subsequent run timing, the presence of adult fish and larvae have been documented in the Columbia River through April and into May. Eulachon typically spawn in the mainstem Columbia River downstream of Bonneville Dam and in the Cowlitz River, with inconsistent runs and spawning events also occurring in the Grays, Skamokawa, Elochoman, Lewis, Kalama, and Sandy rivers.

Eulachon run sizes to the Columbia River during the past two decades have varied, with two noticeable peaks in 2001–2003 and in 2013–2016. Run size is the estimate of fish that spawn plus fish caught in fisheries. The larvae produced in any given year is a factor in determining how many fish will return from that brood year; however, high larval production does not always equate to strong adult returns, indicating a bottleneck occurs post-hatch.

Adult Returns and Larval Recruitment

Historically, commercial landings were used to estimate the size of the Eulachon spawning run within the Columbia River basin; however, the documentation of effort, which would have provided the context necessary to evaluate the bias of market demand, does not exist. In modern Eulachon fisheries, catch per unit of effort is defined as the total weight (pounds) of Eulachon caught per landing, providing the context necessary to estimate run size (Tables 18, 19, and 20).

Since 2011, Eulachon larval density data collected during the winter and spring, has been combined with information on daily river flow and adult fecundity and sex ratios to derive an annual estimate of spawning stock biomass (SSB; expressed in pounds or metric tons) for spawning areas upstream of the standard mainstem Columbia River sample site (river mile 34; Clifton Channel-Price Island transect). The SSB is a conservative estimate of the minimum number of spawning adults needed to have produced the Eulachon larval outflow observed, and assumes an equal male-to-female ratio on the spawning grounds. The actual number of spawning adults is likely greater than the SSB estimate, when accounting for egg and larvae mortalities upstream of the sampling site, spawning activities that occur downstream of the sampling site, and immeasurable predation. The total number of spawning adult fish is estimated using an average of 11.16 adult Eulachon per pound. The SSB for the Columbia River increased annually from 2012 through 2014, peaking at an estimated 16,400,000 pounds, and then declined to an estimated 370,000 pounds in 2018, the lowest run-size estimate since SSB was first

calculated in 2010. The estimated 2019 return of 4,205,000 pounds was the highest since 2016 and 66% of the 2011–2018 average (Figure 2; Table 20).

The total annual run size includes harvest (commercial, recreational, and tribal) along with the SSB estimate, to account for fish removed before spawning occurred (Table 20). These run size numbers (and SSB estimates) indicate moderate to high levels of larval outflow in 2015–2016 and low levels of larval outflow 2017–2018. However, high larval densities are not necessarily correlated with a strong cohort and subsequently provide little information as to the strength of the returning year class.

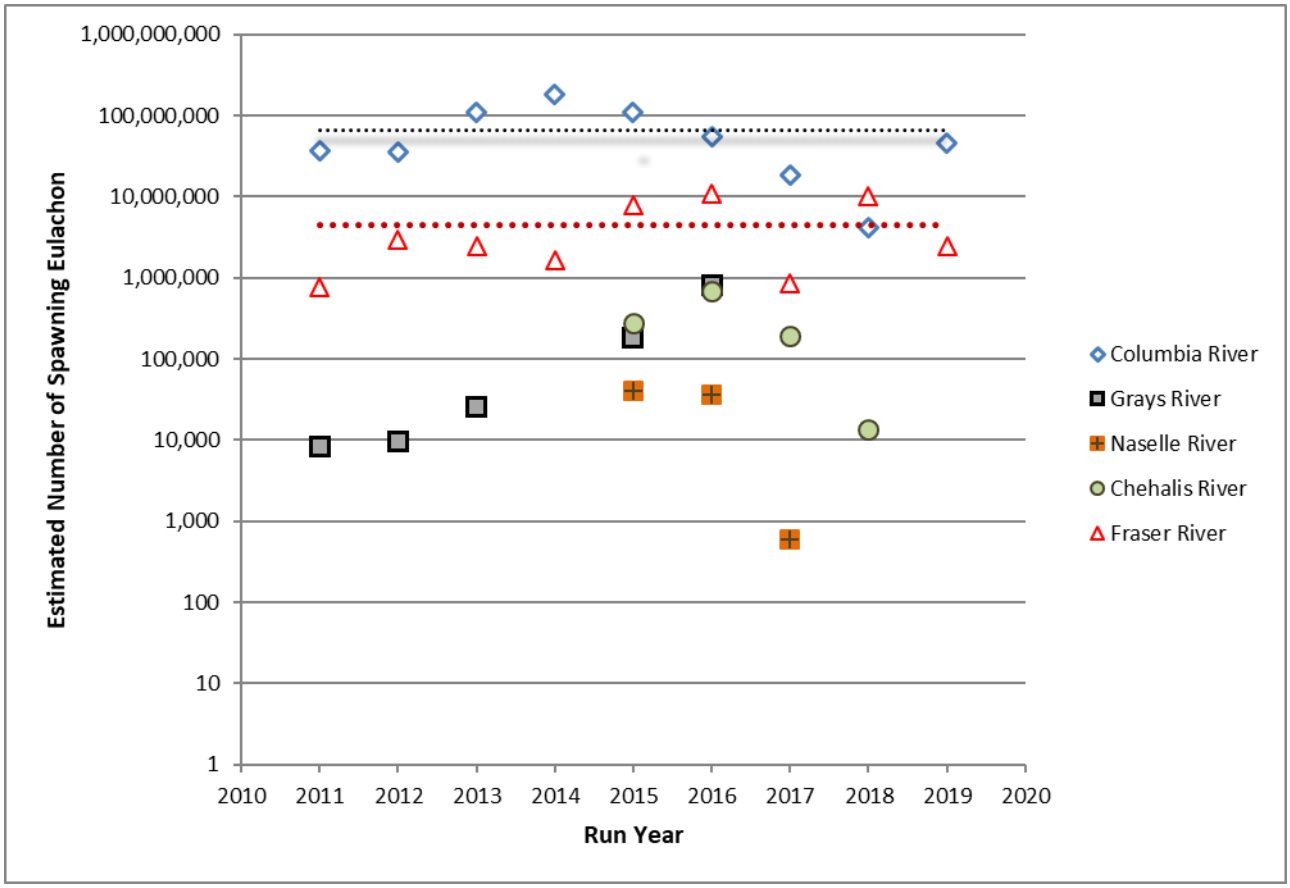

Figure 2. The estimated number of Eulachon spawning in the Columbia, Fraser, Chehalis, Naselle, and Grays rivers in 2010–2019. Estimates are calculated by multiplying the annual Spawning Stock Biomass (SSB) total weight by a standard 11.16 fish per pound. Estimates for the Fraser River derived from data provided by the Canadian Department of Fisheries and Oceans (DFO). The Fraser River estimate for 2019 was not finalized at the time of this publication. Dotted lines indicate mean SSB for the Columba and Fraser rivers.

In 2005, Columbia River average larval densities reached the lowest recorded levels since the inception of the larval sampling program and remained depressed for at least six years, or longer than the average generation cycle for the species (Figure 3 and Table 21). Despite several low adult runs in preceding years, the larval densities rose during 2011, and reached a record level in 2014, indicating the relatively high survival of a fewer number of larvae. Prior to 2011, annual Eulachon larval densities for the mainstem Columbia River site aligned well with the adult CPUE trend from commercial mainstem fisheries (Figure 3). Commercial CPUE data shows that a similar trend occurred after the initial population crash in the mid-1990s—i.e., low larval production in 1994–2000 (7 years) followed by a spike in adult returns and larval densities in 2001. Strict restrictions imposed on fishing periods during the 2014–2018 commercial fishery altered the fishing effort around the tidal cycle and lessened the relationship between larval density and CPUE.

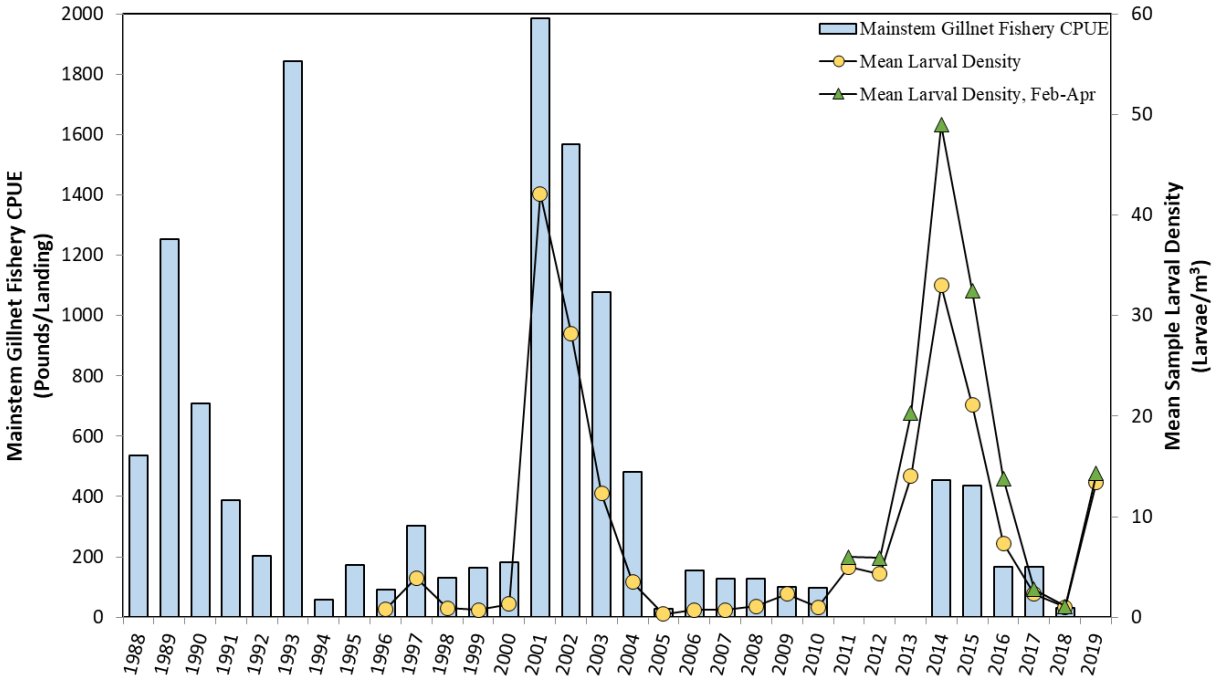

Figure 3. Comparison of adult Eulachon catch per unit effort (CPUE) in terms of total pounds per landing in the mainstem Columbia River commercial gillnet fishery and mean larval densities captured at mainstem Columbia index sites using plankton tow nets, 1988–2019. Commercial fisheries CPUE data is not available for 2011–2013 or 2019 due to no fisheries occurring in those years.

Based on the similarity in trends between landings data and the larval densities observed, the older brood years (2015 and 2016) produced relatively large numbers of larvae in comparison to recent brood years (2017 and 2018). For example, the 2017 larval density was very low, and the 2018 estimate was only 1.1 larvae per cubic meter, the lowest since 2010. However, in 2019, it was the younger 2017 and 2018 brood years that contributed the most to the spawning run (a majority of fish returned at Age-2 and Age-3 in 2019). Although larval densities will continue to be considered in forecasting run-size estimates, the data here indicates a bottleneck in survival

occurs either during the larvae's transition from freshwater to saltwater, or during juvenile rearing in the ocean, prior to their run back to freshwater.

Freshwater to Saltwater Transition

Environmental conditions in freshwater effect the incubation time (the period of time from egg fertilization to hatching), timing and duration of the larval out-migration, nearshore ocean distribution of larvae, and overall larval survival during the transition from freshwater to saltwater. Specifically, the timing and availability of adequate water temperatures and flow volume may impact where larvae are located (i.e., within the estuary or into marine waters) when transitioning from endogenous yolk-larvae to exogenously-feeding larvae. Eulachon larvae have fully developed sensory systems, mouths, and digestive tracts at the time of yolk sac absorption, indicating that prey availability at the transition to first-feeding is critical to survival.

During the winter and spring of 2015 and 2016, Columbia River water temperatures were warm and flows were below normal, which may have increased development time and decreased their transit time downstream. If larvae transitioned to first-feeding before reaching the estuary, adequate or appropriate prey may not have been available and decreased the survival of the cohort. The water particle residence time in the estuary was above normal during the spring, which means that larvae that did enter the estuary would have remained there longer than typical. Additionally, the 2015 Columbia River plume volume was at or near record low for March through June and the 2016 plume volume was above normal early in the season but declined to low levels in May and June, suggesting a very poor dispersal of Eulachon larvae into the nutrient-rich marine waters. Therefore, the data suggests that poor freshwater environmental conditions were not conducive to early life-stage survival for brood years 2015 and 2016 fish (those returning as Age-5 and Age-4 during 2020).

Columbia River water temperatures during the winter and spring of 2017 were cold and flows were above normal. The winter/spring 2018 Columbia River water temperatures were warmer with flows above normal. This suggests that 2017 and 2018 larvae were transported downstream at a quicker rate and likely made it further while still feeding on their yolk reserves. The 2017 and 2018 water particle residence times in the estuary were short, which means that larvae likely moved through the estuary quickly. Finally, the 2017 Columbia River plume volume was at record levels during April–June, suggesting very wide dispersal of Eulachon larvae into nutrient rich marine waters. The 2018 Columbia River plume volume was mostly above average, which suggest normal to wide dispersal of larvae into marine waters. Therefore, the data suggests that water conditions were highly conducive to early life-stage survival for brood years 2017 and 2018 fish (those returning as Age-3 and Age-2 during 2020.

Ocean Phase

All Southern DPS Eulachon stock groups have remained depressed since the coast-wide collapse, suggesting that protracted poor ocean conditions are prevalent off the Pacific Coast. Various indices of oceanic environmental conditions, including the Pacific Decadal Oscillation Index (PDO; https://www.ncdc.noaa.gov/teleconnections/pdo/) and the Southern Oscillation Index (SOI; https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/), may serve as indicators to estimate smelt survival during the ocean-phase. For example, warm PDO phases coincide with enhanced coastal ocean biological productivity in Alaska and inhibited productivity off the west coast of the contiguous United States. From 2014 through 2016, PDO was trending in a warm

phase, which signifies unfavorable ocean conditions for early Eulachon survival. Cohorts that were produced from the strong adult runs in 2014–2016, did not materialize as strong adult runs in the following years. However, in 2017 and 2018, there was a decrease in the PDO values which may have led to improved ocean conditions for recent cohorts. Other indices of ocean environmental condition (SOI, etc.) likewise show that conditions in the ocean have improved but not to the point of being particularly favorable for Eulachon survival.

The productivity of copepods, a primary prey base for Eulachon off the Pacific Northwest coast, is highly affected by coastal upwelling; however, upwelling alone cannot predict copepod composition. Strong upwelling is a positive indicator for ocean survival of Eulachon, but only if the deep source waters are cold and nutrient rich. Copepods sampled off Newport, Oregon from late 2010 through early 2014 were comprised primarily of nutritionally rich, cold-water northern species, though upwelling had been weak during 2014. Upwelling improved in 2015, but due to the extended period of warm water conditions, the seasonal shift from a warm winter copepod community to a cold summer community did not occur, thereby limiting the availability of nutrient rich prey. The upwelling in 2016 and 2017 were extremely weak and because of continued warm water conditions, the Eulachon food base remained dominated by the nutrient poor warm-water species. In 2018 and 2019, upwelling improved and the copepod community transitioned back to the northern cold-water species indicating that the marine ecosystem may be returning to normal.

During the months of May through September, it is not unusual for small portions of the continental shelf (out beyond the 30 m depth contour) to become hypoxic (dissolved oxygen levels less than 1.4 ml/L) in the lower 10–30 m of the water column. The presence of hypoxic waters may be lethal to Eulachon and the plankton they feed upon. NMFS's Northwest Fisheries Science Center has reported in recent years that broad areas of the shelf north of Newport, Oregon, have been hypoxic. It is estimated that 28–40% of the total shelf area experienced hypoxia in 2012–2014. This condition improved in 2015–2017 when the area affected decreased to approximately 3–10% annually; however, during June of 2018 up to 58% of the shelf area experienced hypoxia. While data has not been published yet for 2019, news media have reported about the return and subsequent dissipation of another "Blob", a large mass of unusually warm nutrient and oxygen poor water in the Pacific Ocean. The recent upswing in hypoxia events may be detrimental to all returning brood years. The actual location of the smelt or their preferred food source relative to the hypoxic zones, and the ability of them to avoid or escape from these zones is not known. We assume that when 25% or more of the shelf area experiences hypoxia, it is more likely that the Eulachon will be negatively affected.

Fishery Management Actions

In 2001, WDFW, with input from ODFW, finalized the Washington and Oregon Eulachon Management Plan (WOEMP) which contains recommended policies concerning Eulachon fishery management. These policies are considered 'wise-use' management precepts consistent with an ecosystem approach in making resource decisions. In the plan, fishery recommendations have been categorized into three levels, depending on run size expectations based on (1) parental run strength as indexed by fishery landings, (2) juvenile production as indicated by larval sampling, and (3) estimates of ocean productivity. Columbia River Eulachon fishing seasons were regulated in accordance with the WOEMP from 2001 through March 2010 prior to closure of all Columbia River Eulachon fisheries. When fisheries resumed in 2014, they were set at

levels lower than that prescribed in the WOEMP. These very limited opportunities allowed managers to gather biological data on adult Eulachon returns and maintain a connection between the public and this resource.

Eulachon Fisheries

Past Commercial, Recreational, and Tribal Fisheries

Smelt fisheries historically occurred in the mainstem Columbia River and tributaries, primarily the Cowlitz River. Mainstem fisheries primarily consisted of the commercial fishery using gillnets, a smaller commercial fishery using small trawls, and a minimal recreational fishery. The Cowlitz River provided the most consistent recreational and commercial fishing opportunities of the Columbia tributaries; however, smaller fisheries also existed in the Grays, Kalama, Lewis, and Sandy rivers. Columbia River tributary commercial and recreational fisheries used dip nets to capture smelt; most recreational anglers targeted Eulachon from the bank whereas most commercial fishers targeted Eulachon by boat. Additionally, local tribes have harvested Eulachon for ceremonial and subsistence purposes.

As Columbia River Eulachon abundance began to decline during the early 1990s, fishery managers restricted fisheries to increase escapement to spawning areas (Tables 22–24). Beginning in 1995, Columbia River mainstem and tributary commercial fisheries were greatly reduced in response to exceptionally poor landings. In 1997–2000, commercial fisheries were further restricted to test fisheries with limited days per week and a short season. These test fisheries were intended to allow minimal Eulachon catch and collection of biological data to provide fishery managers with data necessary to assess the annual run strength. Starting in 2001, commercial fisheries were managed according to the WOEMP.

In response to the ESA listing in 2010, the states prohibited commercial sales of Eulachon from Columbia River and tributary fisheries effective December 10, 2010 and closed all recreational Eulachon fisheries effective January 1, 2011. In 2014–2018, the states worked closely with NMFS to adopt limited, conservation-minded commercial and recreational Eulachon seasons. These seasons were research-based, closely monitored, and provided the opportunity to collect biological data to evaluate the run size and age structure of the Columbia River sub-population. Fishery assessment data allows for a better understanding and calibration of the SSB estimation calculations and help state agencies provide NMFS with improved data for a viability assessment as part of a Eulachon recovery plan.

2019 Commercial, Recreational, and Tribal Fisheries

No commercial or recreational fishery occurred in 2019 due to a low run prediction (Tables 20, 22, 23, and 24). Late in the run, managers noted that it was possibly larger than projected, but took a conservative stance and maintained the commercial and recreational fishery closures. Tribal ceremonial and subsistence fisheries took a total 23,660 pounds of Eulachon from the Cowlitz River (Table 20). Tribal landings included 21,710 pounds for the Yakima Tribes, 1,315 pounds for the Warm Spring Tribes, 435 pounds for the Umatilla Tribes, and 200 pounds for the Cowlitz Tribe.

Expectations for 2020 Eulachon Fisheries

Each brood year that composes the 2020 run has a different recruitment and survival profile. Since returns of Age-6 and Age-7 fish are typically minor, the 2020 forecast is based on brood years 2015–2018 that represent adult returns at ages 5, 4, 3, and 2 respectively (see table below). The 2020 run should primarily be comprised of returns from 2016–2017 brood years (Age-3 and Age-4 returns) with minimal contribution from the 2015 brood (Age-5). Although Age-2 fish typically do not contribute substantially to adult returns, environmental conditions have been favorable for the 2018 brood year and could result in some representation in the 2020 run.

Factors determining the return of Eulachon to the Columbia River in 2020.

		Cohort Survival Factors			
Brood Year	Age at Spawn	Larval Recruitment	Freshwater Phase	Ocean Phase	Forecasted Contribution
2015	5	+	-	-	-
2016	4	0	-	-	-
2017	3	0	+	0	+
2018	2	-	+	+	+

Overall, the 2020 run is expected to be moderate in size and likely similar to the 2019 return in magnitude. This run prediction could provide for limited Eulachon fisheries in the Columbia River estuary and Cowlitz River during 2020. Additionally, the states have discussed with other members of the Eulachon Technical Recovery and Implementation Team (ETRIT) the possibility of gathering biological data to expand our understanding of the species life history.

Table 1. Estimated and projected abundance of 42–60 inch total length (38–54 inch fork length) white sturgeon in the lower Columbia River, 1987–2020.

		Setline (S)			Estimation Method (H/S) and Number (%) by size class	
Year	Historic (H)	Actual	Projected [1]		42-48 TL	48-60 TL
1987	104,000			H	75,900 (73%)	28,100 (29%)
1988	68,100			H	34,400 (51%)	33,700 (49%)
1989	48,700			H	31,900 (66%)	16,800 (34%)
1990	37,800			H	25,800 (68%)	12,000 (32%)
1991	44,200			H	32,500 (74%)	11,700 (26%)
1992	79,100			H	70,400 (89%)	8,700 (11%)
1993	129,700			H	115,500 (89%)	14,200 (11%)
1994 [2]	N/A			H	N/A	N/A
1995	202,200			H	143,200 (71%)	59,000 (29%)
1996	170,600			H	137,100 (80%)	33,500 (20%)
1997	174,300			H	146,600 (84%)	27,700 (16%)
1998	140,700			H	116,800 (83%)	23,900 (17%)
1999	134,500			H	116,800 (87%)	17,700 (13%)
2000	134,700			H	117,300 (87%)	17,400 (13%)
2001	127,500			H	102,200 (80%)	25,300 (20%)
2002	121,600			H	87,400 (72%)	34,200 (28%)
2003	131,200			H	85,000 (65%)	46,200 (35%)
2004 [2]	N/A			H	N/A	N/A
2005	136,900			H	106,900 (78%)	30,000 (22%)
2006	123,400			H	88,100 (71%)	35,300 (29%)
2007	131,700			H	101,800 (77%)	29,900 (23%)
2008	101,200			H	69,800 (69%)	31,400 (31%)
2009	95,000			H	65,000 (68%)	30,000 (32%)
2010	65,300	100,200		H	39,100 (60%)	26,200 (40%)
2011	72,800	80,500	77,000	H	46,300 (64%)	26,500 (36%)
2012	83,400	72,700	65,000	H	52,600 (63%)	30,800 (37%)
2013 [3]	N/A	114,200	74,300	-	N/A	N/A
2014	N/A	131,000	131,700	S	76,200 (55%)	54,800 (45%)
2015	N/A	143,900	138,200	S	74,100 (51%)	69,700 (49%)
2016	N/A	224,000	147,100	S	104,100 (46%)	119,900 (54%)
2017	N/A	199,800	237,900	S	86,300 (43%)	113,500 (57%)
2018	N/A	162,200	198,300	S	70,300 (43%)	91,900 (57%)
2019 [4]	N/A	168,200	164,100	S	76,855 (46%)	91,349 (54%)
2020 [4]			148,800	S		

[1] *Projected abundance based on the previous year's setline estimate. Projections do not include harvest.*

[2] *Abundance estimates were not developed in 1994 and in 2004.*

[3] *Since 2013, abundance estimates have been developed using the setline method rather than the historic approach.*

[4] *The 2019 setline-based estimate and 2020 setline-based projection are preliminary.*

Table 2. Estimated consumption of white sturgeon by pinnipeds at Bonneville Dam tailrace, 2005-2018.

Year	Total hours observed	Observed sturgeon catch	Sturgeon catch per hour observed	Adjusted sturgeonn catch estimate
2005	1,109	1	0.001	--
2006	3,650	265	0.073	413
2007	4,433	360	0.081	664
2008	5,131	606	0.118	1,139
2009	3,455	758	0.219	1,710
2010	3,609	1,100	0.305	2,172
2011	3,315	1,353	0.408	3,003
2012	3,404	1,342	0.394	2,498
2013	3,247	314	0.097	635
2014	2,947	79	0.027	146
2015	2,995	24	0.008	44
2016	1,974	30	0.015	90
2017	1,142	6	0.005	24
2018	1,410	46	0.033	148

[1] *Data from U.S. Army Corps of Engineers observation program.*

[2] *Spring (January-July) timeframe. Data for 2019 not yet available.*

Table 3. Catch per set (CPUE) and proportion of positive sets (Ep) for young-of-year white sturgeon in the lower Columbia and Willamette rivers, 2004–2019.

	Lower Columbia River		Willamette River	
Year	CPUE	Ep	CPUE	Ep
2004	1.29	0.44	--	--
2005	1.74	0.49	--	--
2006	1.88	0.52	--	--
2007 [1]	--	--	--	--
2008	1.23	0.45	--	--
2009	5.66	0.78	--	--
2010	0.19	0.18	0.43	0.24
2011	0.58	0.34	0.06	0.06
2012	0.77	0.35	0.25	0.22
2013 [2]	0.21	0.12	--	--
2014	0.56	0.31	1.38	0.38
2015	0.06	0.05	0.58	0.26
2016	0.20	0.14	0.75	0.50
2017	1.64	0.58	1.75	0.46
2018	0.43	0.27	3.96	0.83
2019 [3]	0.33	0.21	1.42	0.67

[1] *No sampling conducted.*

[2] *Incomplete sampling in Willamette River.*

[3] *Preliminary.*

Table 4. Annual recreational white sturgeon catch and harvest guidelines in the lower Columbia River, 1994–2019.

	Below Wauna [1]		Above Wauna		Combined	
Year	Catch	Guideline [2]	Catch	Guideline [3]	Catch	Guideline
1994	15,578	N/A	17,893	N/A	33,471	
1995	29,714	N/A	15,423	N/A	45,137	
1996	27,694	N/A	15,068	N/A	42,762	
1997	24,511	N/A	13,646	N/A	38,157	53,840
1998	30,303	N/A	11,293	N/A	41,596	53,840
1999	29,238	N/A	10,561	N/A	39,799	40,000
2000	24,267	N/A	16,238	N/A	40,505	40,000
2001	21,619	N/A	19,597	N/A	41,216	39,500
2002	26,234	N/A	12,045	N/A	38,279	38,300
2003	18,367	19,200	13,565	12,800	31,932	32,000
2004	15,050	16,000	10,519	12,800	25,569	28,800
2005	17,911	17,783	11,891	11,560	29,802	29,343
2006	15,726	16,000	8,545	12,800	24,271	28,800
2007	19,131	16,274	10,675	13,852	29,806	30,126
2008	13,614	13,143	7,959	12,387	21,573	25,530
2009	13,109	15,529	4,599	11,430	17,708	26,959
2010	6,491	9,600	4,831	4,835	11,322	14,435
2011	6,117	6,800	2,908	3,410	9,025	10,210
2012	4,466	4,160	1,859	2,080	6,325	6,240
2013	4,559	4,042	1,942	2,021	6,501	6,063
2014 [4]	0	0	0	0	0	0
2015 [4]	0	0	0	0	0	0
2016 [4]	0	0	0	0	0	0
2017	3,235	3,000	430	1,245	3,665	4,245
2018	2,412	2,960	1,049	1,230	3,461	4,190
2019 [5]	2,838	2,960	685	1,230	3,523	4,190

[1] *Recreational catch estimates for 1993-2002 are above and below the western tip of Puget Island (RM 38).*

[2] *The switch to a 45-inch min. (TL) size limit in 2004 required a 17% reduction in the base guideline.*

[3] *Actual in-season guidelines were different than represented here. Beginning in 2010, the guideline for the area above Wauna does not include the Willamette guideline.*

[4] *No sturgeon retention allowed during 2014-2016.*

[5] *Preliminary.*

Table 5. Annual recreational white sturgeon catch and harvest guidelines in the lower Willamette River, 2004–2019.

Year	Catch [1]	Catch in Excess of Baseline [2]	Catch in Excess of Baseline [3]	Guideline [3]	% of Guideline
2004	4,099	1,225	2,874	Na	
2005	2,327	1,225	1,102	Na	
2006	3,348	1,225	2,123	Na	
2007	6,555	1,225	5,330	Na	
2008	9,148	1,225	7,923	Na	
2009	7,346	1,225	6,121	Na	
2010	3,529	735	2,794	2,865	98%
2011	2,690	520	2,170	2,030	107%
2012	1,535	520	1,015	1,248	81%
2013	1,410	520	890	1,213	73%
2014 [4]	0	0	0	0	NA
2015 [4]	0	0	0	0	NA
2016 [4]	0	0	0	0	NA
2017 [5]	0	0	0	750	0%
2018 [5]	0	0	0	740	0%
2019 [5]	0	0	0	740	0%

[1] *Harvest estimates revised November 2011 based on updated punch card and existing creel information.*

[2] *Baseline harvest levels for the lower Willamette River were based on average harvest during 1986-1996 (1,225 fish). The lower Willamette River baseline decreased to 735 fish in 2010 and 520 fish in 2011 consistent with declining llegal abundance estimates. The baseline was eliminated in 2017.*

[3] *During 2003-2009, harvest in excess of the baseline was applied to the above Wauna recreational harvest guideline. Beginning in 2010, a separate harvest guideline was established for the lower Willamette River.*

[4] *No sturgeon retention allowed during 2014-2016.*

[5] *The 2017-2019 allocations were 750, 740, and 740 fish respectively, but no retention fisheries occurred.*

Table 6. Annual commercial white sturgeon landings and harvest guidelines in the lower Columbia River, 1993–2019.

	Mainstem							Select Area				
Year	Winter Sturgeon [1]	Winter Salmon	Summer	Early August	Late August	Late Fall	Total	Spring/ Summer	Fall	Total	Grand Total	Guideline
1993	990			0	0	7,010	8,000	30	20	50	8,050	6,000
1994	2,990			0	0	3,380	6,370	30	0	30	6,400	6,000
1995	0			0	0	5,980	5,980	110	70	180	6,160	8,000
1996	800			0	330	6,580	7,710	580	110	690	8,400	8,000
1997	2,710			1,740	140	7,790	12,380	350	100	450	12,830	13,460
1998	2,680			2,540	90	8,060	13,370	360	170	530	13,900	13,460
1999	1,780			2,770	60	4,180	8,790	520	190	710	9,500	10,000
2000	2,260			2,490	300	5,130	10,180	540	160	700	10,880	10,000
2001	3,060			4,720	1,020	0	8,800	490	20	510	9,310	9,100
2002	2,720			1,340	380	4,200	8,640	650	330	980	9,620	9,800
2003	1,490	27		2,170	410	3,430	7,527	250	170	420	7,947	8,000
2004	1,696	174	9	1,550	917	3,219	7,565	184	117	301	7,866	8,000
2005	473	70	1,369	1,129	965	3,793	7,799	279	74	353	8,152	8,200
2006	288	1,651	544	1,548	363	3,492	7,886	317	109	426	8,312	8,000
2007	1,424	47	414	2,646	91	2,734	7,356	257	148	405	7,761	7,850
2008	869	17	523	2,706	103	3,170	7,388	337	134	471	7,859	7,927
2009	1,697	21	624	2,213	756	2,001	7,312	311	114	425	7,737	8,000
2010	518	28	289	1,578	297	1,348	4,058	211	116	327	4,385	4,800
2011	50	125	504	967	353	1,187	3,186	201	0	201	3,387	3,400
2012	40	14	281	585	409	368	1,697	225	0	225	1,922	2,080
2013	15	274	326	0	719	324	1,658	254	100	354	2,012	2,021
2014 [2]	0	0	0	0	0	0	0	0	0	0	0	0
2015 [2]	0	0	0	0	0	0	0	0	0	0	0	0
2016 [2]	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	485	239	724	266	237	503	1,227	1,245
2018	0	0	0	0	413	0	413	296	117	413	826	1,230
2019	0	0	0	0	509	0	509	479	212	691	1,200	1,230

[1] *Prior to 2003, values reflect all winter fisheries.*

[2] *No sturgeon retention allowed during 2014-2016.*

Table 7. Recreational and commercial white sturgeon catch and harvest guidelines in the lower Columbia River, 1997–2019.

	Recreational		Commercial		Combined	
Year	Catch	Guideline [1]	Catch	Guideline	Catch	Guideline [1]
1997	38,157	53,840	12,830	13,460	50,987	67,300
1998	41,596	53,840	13,900	13,460	55,496	67,300
1999	39,799	40,000	9,500	10,000	49,299	50,000
2000	40,505	40,000	10,880	10,000	51,385	50,000
2001	41,216	40,000	9,310	9,100	50,526	49,100
2002	38,279	38,500	9,620	9,700	47,899	48,200
2003	31,932 [2]	32,000	7,947	8,000	39,879 [2]	40,000
2004	28,443 [2]	28,800	7,866	8,000	36,309 [2]	36,800
2005	30,904 [2]	29,343	8,152	8,200	39,056 [2]	37,543
2006	26,394 [2]	28,800	8,312	8,000	34,706 [2]	36,800
2007	35,136 [2]	30,126	7,761	7,850	42,897 [2]	37,976
2008	29,496 [2]	25,530	7,859	7,927	37,355 [2]	33,457
2009	23,829 [2]	26,959	7,737	8,000	31,566 [2]	34,959
2010	14,116 [2]	17,300	4,385	4,800	18,501 [2]	22,100
2011	11,195 [2]	12,240	3,387	3,400	14,582 [2]	15,640
2012	7,340 [2]	7,488	1,922	2,080	9,262 [2]	9,568
2013	7,391 [2]	7,276	2,012	2,021	9,403 [2]	9,297
2014 [3]	0	0	0	0	0	0
2015 [3]	0	0	0	0	0	0
2016 [3]	0	0	0	0	0	0
2017	3,665	4,245	1,227	1,245	4,892	5,490
2018	3,461	4,190	826	1,230	4,287	5,420
2019 [4]	3,520	4,190	1,200	1,230	4,720	5,420

[1] *Actual guidelines used in-season may have been different than shown here.*

[2] *Includes estimated Willamette River recreational harvest in excess of the adjusted 1986-1996 baseline harvest.*

[3] *No sturgeon retention allowed during 2014-2016.*

[4] *Preliminary.*

Table 8. Summary of mainstem commercial seasons and sturgeon regulations in the lower Columbia River, 1997–2019.

Winter
1997-2002: Two 30-hr fishing periods per week from the 2nd week of January through mid-February (Zones 1-5).
2003: Three 30-hour fishing periods (one per week) followed by one 12-hour period. January only (Zones 1-5).
2004: Five 24-hour fishing periods from mid-January through mid-February (Zones 1-5).
2005: Seven 24-hour fishing periods from January through late February (Zones 1-5).
2006: Ten fishing periods from January-February (Zones 1-5). Seven were 24 hours and three were 12 hours.
2007: Nine fishing periods from January-February. Seven were 24 hours and two were 18 hours (Zones 1-5).
2008: Eleven fishing periods from January - February. Six were 24 hours and five were 18 hours. Three openers were restricted to portions of Zones 4-5 and the remainder occurred in Zones 1-5.
2009: Eight fishing periods from January – February (Zones 1-5). Six were 24 hours and 2 were 18 hours. Landing limit of 12 during the last four periods.
2010: Five 24-hour fishing periods during January-February (Zones 1-5) with a 15 fish landing limit in effect.
Sturgeon catch also occurs in spring Chinook fisheries. Annual protocol adopted for the Winter/Spring season typically includes 200 sturgeon be set aside for Chinook-directed fisheries. Catches of sturgeon in these fisheries is typically low; therefore, weekly landing limits for sturgeon are generally not utilized in winter/spring salmon-directed fisheries.
2011: Four 24-hour fishing periods took place in late-January to early-February (Zones 1-5) with a 10 white sturgeon/vessel/week landing limit in effect. Some sturgeon harvest also occurs during the spring Chinook fishery. Protocol adopted for the winter/spring timeframe was 800 total (400 for set aside for winter sturgeon, and 400 for winter/spring salmon). Catches of sturgeon in winter/spring salmon directed fisheries is typically low; therefore, weekly landing limits for sturgeon are generally not utilized.
2012: Three 24-hour fishing periods took place during January 30-February 7 in Zones 1-5 with a 10 white sturgeon/vessel/week landing limit in effect. Some sturgeon harvest also occurs during the spring Chinook fishery; there were two fishing periods in early April (April 3 & 10) with six white sturgeon/vessel/week allowed.
2013: Three 24-hour fishing periods took place during January 31-February 7 in Zone 1-5 with a 10 white sturgeon/vessel/week landing limit in effect. Some sturgeon harvest also occurs during the spring Chinook fishery; there was one 9-hour fishing period on April 9th in Zones 1-5 with no landing limit for white sturgeon, and three fishing periods during May in Zones 1-5 with landing limits (May 15, 14-hours with a **five** white sturgeon/vessel/weekly limit; May 22-23, a 12-hour fishing period also with a **five** white sturgeon/vessel/weekly limit, and May 29-30, a 12 hour fishing period with a **three** white sturgeon/vessel/weekly limit).
2014-2016: No winter sturgeon seasons. Sturgeon retention was not allowed during 2014, 2015, and 2016.
2017: No mainstem commercial winter or spring seasons.
2018: No mainstem commercial winter or spring seasons.
2019: No mainstem commercial winter or spring seasons.
Summer
2004: Two 12-hour fishing periods during late June and early July targeting sockeye and summer Chinook.
2005: Six 10-hour fishing periods during late June through late July targeting summer Chinook.
2006: Three 10-hour and ten 12-hour fishing periods from late June through July 31 targeting summer Chinook. Retention of green sturgeon in commercial fisheries was prohibited effective July 6, 2006.
2007: Two 10-hour fishing periods in late June and early July targeting summer Chinook. Weekly limit 5 white sturgeon per vessel.
2008: Three 10-hour fishing periods in late June and early July targeting summer Chinook. A 6-hour target sockeye fishery also occurred in Area 2S on June 30, 2008. Weekly limit 5 white sturgeon per vessel.
2009: One 12-hour fishing period on June 18 and two 10-hour fishing periods on June 24 and 30 targeting summer Chinook. Weekly limit 5 white sturgeon per vessel**.**
2010: Two 10-hour fishing periods on June 17 and 22 targeting summer Chinook. Weekly limit of 3 white sturgeon per vessel.
2011: Two 8-hour fishing periods, one on June 16-17 and another on June 22 -23. The weekly limit was 5 white sturgeon per vessel.
2012: One 8-hour fishing period took place on June 17-18. The weekly limit was 5 white sturgeon per vessel.
2013: Two 8-hour fishing periods took place on June 16-17, and July 15-16. The weekly limit was **five** white sturgeon per vessel during the first fishing period, and **two** white sturgeon per vessel during the second period.
2014-2016: No sturgeon allowed retention during 2014, 2015, and 2016.
2017: No mainstem commercial summer season.
2018: No mainstem commercial summer season.
2019: No mainstem commercial summer season.

Table 8 (continued). Summary of mainstem commercial seasons and sturgeon regulations in the lower Columbia River, 1997–2019.

Early August
1998-2001: One 12-hour fishing period below Longview Bridge targeting sturgeon during the 1st week of August.
2002: Three fishing periods with a five white sturgeon per vessel per day limit. Possession and sales prohibited during the final two fishing periods.
2003-2005: Four 12-hour Chinook fishing periods each year in Zones 1-5.
2006: Six fishing periods in all or portions of Zones 1-5. Weekly landing limits ranged from five to seven white sturgeon per vessel.
2007: Three early August periods of 12 hours each in Zones 1-5. Weekly landing limits = 12 white sturgeon per vessel.
2008: Five fishing periods (four in Zones 1-5 and one in Zones 2-5). Weekly landing limits = 10 white sturgeon per vessel per week.
2009: Three 12-hour fishing periods (two in Zones 1-5 and one in Zones 2-5).
2010: Four 12-hour fishing periods (three in Zones 1-5 and one in Zones 2-5).
2011: One 9-hour fishing period in Zones 1-5 with a weekly landing limit of 10 white sturgeon per vessel.
2012: One 9-hour fishing period in Zones 1-5 (August 5-6) with a weekly landing limit of seven white sturgeon per vessel.
2013: There were no early-August seasons in Zones 1-5 during 2013.
2014-2016: No sturgeon retention during 2014, 2015, and 2016.
2017: No mainstem commercial early August season.
2018: No mainstem commercial early August season.
2019: No mainstem commercial early August season.
Late August
1997-2003: Target Chinook seasons in Area 2S or expanded Area 2S during late August.
2004-2005: Four fishing periods during mid to late-August with varying area and possession limit restrictions.
2006: One fishing period in Zones 3-5 and one in Zones 4-5 (upstream of the I-205 Bridge),with a weekly landing limit of seven white sturgeon.
2007: One 11-hour fishery in Zones 4-5 with a three white sturgeon per vessel weekly landing limit.
2008: Two fishing periods in Zones 4-5, with a weekly landing limit of three white sturgeon.
2009: Two 10-hour fishing periods in Zones 3-5 (upstream of Kalama River) with a weekly landing limit of nine white sturgeon and one 10-hour period in Zone 5 only with a weekly landing limit of three white sturgeon.
2010: One 10-hour and two 9-hour fishing periods in Zones 4-5, with a weekly landing limit of four white sturgeon.
2011: Seven 9-hour fishing periods in Zones 4-5 with weekly landing limits of 10 white sturgeon per vessel.
2012: Eight 9-hour fishing periods in Zones 4-5 with weekly landing limits: of three white sturgeon per vessel during August 12 through August 24; and five white sturgeon per vessel during August 26 through August 29.
2013: Eight 9-hour fishing periods in Zones 4-5 with weekly landing limits of **four** white sturgeon per vessel during August 11 through August 29.
2014-2016: No sturgeon allowed retention during 2014, 2015, and 2016.
2017: Five 9-hour fishing periods in Zones 4-5 with weekly landing limits: of six white sturgeon per vessel during August 22 through September 1.
2018: Three 9-hour fishing periods and one 7 hour fishing period in Zones 4-5 with weekly landing limits: of six white sturgeon per vessel during August 21 through August 27 and seven white sturgeon per vessel during August 29 through August
2019: Four 9-hour fishing periods in Zones 4-5 with weekly landing limits: of seven white sturgeon per vessel during August 14 through August 27.

Table 8 (continued). Summary of mainstem commercial seasons and sturgeon regulations in the lower Columbia River, 1997–2019.

Late Fall
Fisheries occur during mid-September through the end of October and include both salmon- and sturgeon-directed fisheries. Salmon seasons vary depending on run sizes and available impacts for listed species. Target Chinook and/or coho fisheries occur throughout the late fall timeframe while target sturgeon seasons most often occur during October, if sturgeon remain available on the quota.
1997-2000: Target fall sturgeon seasons occurred.
2001: Sturgeon sales prohibited in late-fall due to high landings earlier in the year.
2002: A five white sturgeon per day per vessel possession and sales limit was in effect for nearly the entire late fall season except for the final 3-day fishing period when sturgeon possession and sales were prohibited.
2003: Sturgeon possession and sales limits ranged from three to nine per vessel per week.
2004: Sturgeon possession and sales limit of five white sturgeon per vessel per week was in place for most of the late fall period, but was increased to ten fish during the final three fishing periods.
2005: Sturgeon possession and sales limits ranged from three to 15 fish per vessel.
2006: White sturgeon possession and sales limits were maintained at eight white sturgeon per week per vessel when retention was allowed.
2007: White sturgeon possession and sales limits ranged from 7-12 white sturgeon per vessel through October 5 after which white sturgeon sales in the mainstem were prohibited.
2008: Most fishing periods occurred in Zones 4-5, however, some fishing did occur in all or portions of Zones 1-3. Sturgeon sales were allowed in all periods, with weekly landing limits of 10 fish per vessel through October 3, followed by three fish landing limits thereafter.
2009: Most fishing periods occurred in Zones 4-5, however, some fishing did occur in all or portions of Zones 1-3. Sturgeon sales were allowed through October 23, with weekly landing limits ranging from 5-8 fish per vessel. Sales were prohibited after October 23.
2010: Eleven fishing periods during September 22-October 22 with weekly landing limits of 5-8 fish per vessel.
2011: Ten fishing periods during September 18 – October 20 with weekly landing limits of 2 -7 white sturgeon per vessel.
2012: Sturgeon retention allowed in five (September 19-28 and October 4-5) of 15 late fall fishing periods. The landing limit for the first four fishing periods (three in Zones 4 – 5, and the fourth in Zones 1 – 5) was five white sturgeon per vessel. On October 4 – 5, (one period in Zones 1 – 5), the vessel limit was two white sturgeon.
2013: Sturgeon retention was allowed for the first seven of 34 late fall fishing periods (during September 15-30). The landing limit was **two** white sturgeon per vessel during each week sturgeon were allowed. Sturgeon retention was not allowed from October 1-November 1.
2014-2016: No sturgeon allowed retention during 2014, 2015, and 2016.
2017: Two 10-hour fishing periods in Zones 4-5 with weekly landing limits: of five white sturgeon per vessel during September 17 through September 20.
2018: No mainstem commercial late fall season.
2019: No mainstem commercial late fall season.

Table 9. History of sturgeon regulations for the lower Columbia River recreational fishery.

Year	Daily Bag Limit	Annual Bag Limit	Size Restrictions	Other Regulations
Pre-1940	None	None	None	None
1940	Only 3 < 4'	"	"	"
1942	Five (3 < 4' and 2 ≥ 4')	"	"	"
1950	"	"	30" min.-72" max.	"
1951	3 Fish	"	"	"
1957	"	"	"	Cannot remove head or tail in the field.
1958	"	"	36" min.-72" max.	
1986	2 Fish	OR-30	"	OR--required sturgeon tag: WA--no gaffing.
1989	"	OR-30, WA-15	40" min.-72" max.	WA--required sturgeon tag. New minimum size limit effective April 1.
1990	"	15	"	Single-point barbless hooks required. OR--no gaffing.
1991	"1 and 1" slot limit	"	"	Daily limit changed to one fish 40-<48" and one fish 48-72".
1992	"	"	"	WA--60" max. length effective April 16, 1992-April 15, 1993. WA--Beacon Rock to Bonneville Dam sturgeon spawning sanctuary (boat and bank) April 16 - June 15, 1992.
1994	"	10	42" min.-66" max.	Daily limit changed to one fish 42-<48" and one fish 48-66".
1995	"	"	"	LCR closed to retention September 1-December 31.
1996	1 Fish	"	"	One 42-66" fish daily bag limit effective April 1. Closed to boat angling from Beacon Rock to Bonneville Dam May 1-June 30.
1997	"	"	42" min.-60" max.	80% allocation of 67,300 annual harvest guideline to sport fishery (53,840).
1999	"	"	"	Harvest guideline adjusted to 50,000 in-season (40,000 sport). U.S. Army Corps implements Bonneville Boat Restricted Zone from Robins Is. to Hamilton Is. boat ramp.
2000	"	"	"	Retention disallowed below Wauna powerlines April 1-30. Beacon Rock-Bonneville boat angling closure extended through 7/15. Annual limit 10 fish even if licensed in both states.
2001	"	"	"	LCR closed to retention August 1-September 30.
2002	"	"	"	LCR closed to retention on Sundays and Mondays during March 3-May 13 and seven days per week during July 25-November 22.
2003	"	"	"	32,000 annual harvest guideline split 40% above Wauna and 60% below Wauna. Retention allowed above Wauna January 1-March 23 and July 1-October 31 and below Wauna January 1-June 27.
2004	"	5	42" min.-60" max. 45" min. below Wauna during May 15-July 3	28,800 annual harvest guideline split 12,800 above Wauna and 16,000 below Wauna. Retention allowed above Wauna January 1-31, then three days per week (Thur.-Sat.) during February 1-July 31 and October 1-December 31. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 15-July 3 with a 45" minimum size limit. Closed to boat and bank angling from Beacon Rock to Bonneville Dam May 1-July 31. Annual limit reduced to five sturgeon.
2005	"	"	42" min.-60" max. 45" min. below Wauna during May 14-July 10 and July 15-August 15	29,343 annual harvest guideline split 11,560 above Wauna and 17,783 below Wauna. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-July 31 and October 1-December 31. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 14-July 10 and July 15-August 15 with a 45" minimum size limit.
2006	"	"	42" min.-60" max. 45" min. below Wauna during May 13-July 4	28,800 annual harvest guideline split 12,800 above Wauna and 16,000 below Wauna. Retention allowed above Wauna three days per week (Thur.-Sat.) during January 1-July 31 and October 1-December 31. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 13-July 4 with a 45" minimum size limit. Closed to boat and bank angling from Navigation Marker 85 to Bonneville Dam May 1-July 31.

Table 9 (continued). History of sturgeon regulations for the lower Columbia River recreational fishery.

Year	Daily Bag Limit	Annual Bag Limit	Size Restrictions	Other Regulations
2007	“	“	42" min.-60" max. 45" min. below Wauna during May 12-July 4	30,126 harvest guideline split 13,852 above Wauna and 16,274 below Wauna. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-31 and four days per week (Thur-Sun.) February 1-July 31 and seven days per week August 18-December 31. Sturgeon retention allowed below Wauna January 1-April 30 under permanent rules then May 12-July 4 with a 45” minimum size limit. Retention of green sturgeon prohibited.
2008	“	“	42" min.-60" max. 45" min. below Wauna during May 10-July 26	25,530 harvest guideline split 12,387 above Wauna and 13,143 below Wauna. Retention allowed above Wauna four days per week (Thur-Sun.) January 1-December 31. Sturgeon retention allowed below Wauna January 1-April 30 under permanent rules then May 10-June 24, July 10-12, July 17-19, and July 26 with a 45” minimum size limit.
2009	“	“	38" min. FL-54" max. FL 41" min. FL below Wauna during May 9-July 25	Fork length measurement. 26,959 harvest guideline split 11,430 above Wauna and 15,529 below Wauna. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-July 31 and October 1-December 31. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 9-June 28, July 2-5, 10-12, 17-19 and 24-26 with a 41” minimum size (FL) limit.
2010	“	“	38" min. FL-54" max. FL 41" min. FL below Wauna during May 22-August 1	17,300 annual harvest guideline split 7,700 above Wauna (including a sub-allocation for the Willamette River of 2,865) and 9,600 for the estuary. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-July 31 and October 1-December 31, except closed inside Sand Island (near Rooster Rock) April 29-July 31. Closed to all sturgeon angling during May 1-August 31 from Skamania Island upstream to Bonneville Dam. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 22-July 11 and July 15-August 1 with a 41” minimum size (FL) limit.
2011	1	5	38" min. FL-54" max. FL 41" min. FL below Wauna during May 14-July 31	12,240 annual harvest guideline split 5,440 above Wauna (including a sub-allocation for the Willamette River of 2,030) and 6,800 for the estuary. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-July 31 and October 1-December 31, except closed inside Sand Island (near Rooster Rock) January 1-April 30. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 14-July 31 with a 41” minimum size (FL) limit.
2012	“	“	38" min. FL-54" max. FL 41" min. FL below Wauna during May 12-July 4	7,488 annual harvest guideline split 3,328 above Wauna (including a sub-allocation of 1,248 for the Willamette), and 4,160 for the estuary. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-July 31. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 12-July 4 with a 41” minimum size (FL) limit.
2013	“	2	38" min. FL-54" max. FL 41" min. FL below Wauna during May 11-June 20	7,276 annual harvest guideline split 3,234 above Wauna (including a sub-allocation of 1,213 for the Willamette), and 4,042 for the estuary. Retention allowed above Wauna three days per week (Thur.-Sat.) January 1-June 15. Retention allowed below Wauna January 1-April 30 under permanent rules, then May 11-June 20 with a 41” minimum size (FL) limit.
2014	0	0	No retention.	Catch and release only.
2015	0	0	No retention.	Catch and release only.
2016	0	0	No retention.	Catch and release only.
2017	1	2	44" min. FL-50" max. FL	4,245 annual harvest guideline split 1,245 above Wauna and 3,000 for the estuary. Retention allowed in the estuary June 5, 7, 10, 12, and 14 with no angling allowed after 2 pm. Retention allowed above Wauna October 21, 26, and 28.
2018	"	"	"	4,190 annual harvest guideline split 1,230 above Wauna and 2,960 for the estuary. Retention allowed in the estuary May 14, 16, 19, 21, 23, 26, 28, 30 and June 2, 4 and 9 with no angling allowed after 2 pm. Retention allowed above Wauna September 15 and 22.
2019	"	"	"	4,190 annual harvest guideline split 1,230 above Wauna and 2,960 for the estuary. Retention allowed in the estuary May 13, 15, 18, 20, 22, 25, 27, 29 and June 1, 3 and 5 with no angling allowed after 2 pm. Retention allowed above Wauna September 21 and 28 and October 12, 19 and 24.

Table 10. Estimated catch of white sturgeon (in 1,000's) in 1-ft legal (total) length groups in mainstem lower Columbia River commercial and recreational fisheries, 1977–2019. [1]

	Recreational Fisheries [2]							Commercial Fisheries [3]				
	3-4 Ft		4-5 Ft		5-6 Ft			4-5 Ft		5-6 Ft		
Year	No.	%	No.	%	No.	%	Total	No.	%	No.	%	Total
1977-79 Ave	22.2	76	5.4	18	1.6	5	29.2	12.5	94	0.8	6	13.3
1980-84 Ave	24.5	78	5.3	15	1.6	5	31.4	12.3	93	0.9	7	13.2
1985-89 Ave	38.5	86	5.0	11	1.4	3	44.9	7.5	90	0.8	10	8.3
1990-94 Ave	25.6	84	4.0	13	0.7	2	30.3	5.6	93	0.3	5	5.9
1995	35.9	80	8.9	20	0.3	1	45.1	6.1	98	0.1	2	6.2
1996	30.7	72	11.4	27	0.6	1	42.7	8.3	99	0.1	1	8.4
1997	29.0	76	9.1	24	<0.1	<1	38.1	12.8	100	0.0	0	12.8
1998	32.1	77	9.4	23	0.1	<1	41.6	13.9	100	0.0	0	13.9
1999	31.8	80	7.9	20	<0.1	<1	39.7	9.5	100	0.0	0	9.5
1995-99 Ave	31.9	77	9.3	22	0.2	<1	41.4	10.1	99	<0.1	<1	10.1
2000	33.3	82	7.2	18	<0.1	<1	40.5	10.9	100	0.0	0	10.9
2001	31.4	76	9.8	24	<0.1	<1	41.2	9.3	100	0.0	0	9.3
2002	28.0	73	10.3	27	<0.1	<1	38.3	9.8	100	0.0	0	9.8
2003	20.9	66	11.0	34	<0.1	<1	31.9	8.0	100	0.0	0	8.0
2004	13.8	54	11.8	46	<0.1	<1	25.6	7.9	100	0.0	0	7.9
2000-04 Ave	25.5	72	10.0	28	<0.1	<1	35.5	9.2	100	0.0	0	9.2
2005	17.2	58	12.6	42	0.1	<1	29.9	8.2	100	0.0	0	8.2
2006	13.8	57	10.4	43	0.1	<1	24.3	8.3	100	0.0	0	8.3
2007	16.6	56	13.1	44	0.1	<1	29.8	7.8	100	0.0	0	7.8
2008	10.7	49	10.9	50	<0.1	<1	21.6	7.9	100	0.0	0	7.9
2009 [4]	6.7	38	11.0	62	0.1	<1	17.8	7.7	100	0.0	0	7.7
2005-09 Ave	13.0	53	11.6	47	<0.1	<1	24.6	8.0	100	0.0	0	8.0
2010 [4]	4.9	44	6.3	56	<0.1	<1	11.2	4.4	100	0.0	0	4.4
2011 [4]	3.8	42	5.2	58	<0.1	<1	9.0	3.4	100	0.0	0	3.4
2012 [4]	2.5	40	3.8	60	<0.1	<1	6.3	1.9	100	0.0	0	1.9
2013 [4]	2.4	37	4.1	62	<0.1	<1	6.5	2.0	100	0.0	0	2.0
2014 [5]	0.0	0	0.0	0	0.0	0	0.0	0.0	0	0.0	0	0.0
2010-14 Ave	2.7	41	3.9	58	<0.1	<1	6.6	2.3	100	0.0	0	2.3
2015 [5]	0.0	0	0.0	0	0.0	0	0.0	0.0	0	0.0	0	0.0
2016 [5]	0.0	0	0.0	0	0.0	0	0.0	0.0	0	0.0	0	0.0
2017 [4]	0.0	0	3.7	100	0.0	0	3.7	1.2	100	0.0	0	1.2
2018 [4]	0.0	0	3.5	100	0.0	0	3.5	0.8	100	0.0	0	0.8
2019 [4]	0.0	0	3.5	100	0.0	0	3.5	1.2	100	0.0	0	1.2

[1] *Sum of individual columns may not equal total due to rounding errors. Recreational harvest in the Willamette River not included.*

[2] *White sturgeon legal size limits were 36"-72" total length (TL) during 1977-1988, 40"-72" TL during 1989-1993, 42"-66" TL during 1994-1996, 42"-60" TL during 1997-2008, 38"-54" fork length (FL) during 2009-2013, and 44"-50" FL in 2017-2019.*

[3] *White sturgeon legal size limits were 48"-72" TL during 1977-1992, 48"-66" TL during 1993-1996, 48"-60" TL during 1997-2008, 43" -54" FL during 2009-2013, and 44"-50" FL in 2017-2019.*

[4] *Converted from current regulation fork length measurements to total length equivalent measurements.*

[5] *No sturgeon retention allowed during 2014-2016.*

Table 11. Recreational and commercial sturgeon catch (in 1,000's) and white sturgeon catch sharing percentages in the lower Columbia River, 1977–2019.

	White Sturgeon					Green Sturgeon		
	Recreational [1]		Commercial [2]		Total	Recreational	Commercial	Total
Year	Catch	%	Catch	%	Catch	Catch	Catch [2]	Catch
1977-79 Ave	29.2	70	13.3	30	42.5	0.0	1.2	1.2
1980-84 Ave	31.5	70	13.2	30	44.7	<0.1	1.2	1.3
1985-89 Ave	44.9	84	8.3	16	53.2	<0.1	3.5	3.8
1990	17.3	77	5.3	23	22.6	0.1	2.2	2.3
1991	22.7	86	3.8	14	26.5	<0.1	3.2	3.2
1992	40.1	87	6.2	13	46.3	0.1	2.2	2.3
1993	37.9	82	8.1	18	46.0	<0.1	2.2	2.2
1994	33.5	84	6.4	16	39.9	0.1	0.2	0.3
1990-94 Ave	30.3	83	6.0	17	36.3	0.1	2.0	2.1
1995	45.1	88	6.2	12	51.3	<0.1	0.4	0.4
1996	42.8	84	8.4	16	51.2	0.1	0.6	0.7
1997	38.2	75	12.8	25	51.0	<0.1	1.6	1.6
1998	41.6	75	13.9	25	55.5	0.1	0.7	0.8
1999	39.8	80	9.5	20	49.3	0.1	0.8	0.9
1995-99 Ave	41.5	80	10.2	20	51.7	0.1	0.8	0.9
2000	40.5	79	10.9	21	51.4	<0.1	1.2	1.3
2001	41.2	82	9.3	18	50.5	0.1	0.3	0.4
2002	38.3	80	9.6	20	47.9	0.1	0.2	0.2
2003	31.9	80	8.0	20	39.9	0.1	<0.1	0.1
2004	28.4	78	7.9	22	36.3	<0.1	0.1	0.1
2000-04 Ave	36.0	80	9.1	20	45.1	<0.1	0.4	0.4
2005	30.9	79	8.2	21	39.1	0.1	0.1	0.2
2006	26.4	76	8.3	24	34.7	0.1	<0.1	0.1
2007	35.1	82	7.8	18	42.9	<0.1	0.0	<0.1
2008	29.5	79	7.9	21	37.4	0.0	0.0	0.0
2009	23.8	76	7.7	21	31.5	<0.1	0.0	<0.1
2005-09 Ave	29.1	78	8.0	22	37.1	<0.1	0.0	<0.1
2010	14.1	76	4.4	24	18.5	<0.1	0.0	<0.1
2011	11.2	77	3.4	23	14.6	<0.1	0.0	<0.1
2012	7.3	79	1.9	21	9.2	<0.1	0.0	<0.1
2013	7.4	79	2.0	21	9.4	0.0	0.0	0.0
2014 [3]	0.0	0	0.0	0	0.0	0.0	0.0	0.0
2010-14 Ave	8.0	78	2.9	22	10.9	<0.1	0.0	<0.1
2015 [3]	0.0	0	0.0	0	0.0	0.0	0.0	0.0
2016 [3]	0.0	0	0.0	0	0.0	0.0	0.0	0.0
2017	3.7	75	1.2	25	4.9	0.0	0.0	0.0
2018	3.5	81	0.8	19	4.3	0.0	0.0	0.0
2019 [4]	3.5	75	1.2	25	4.7	0.0	0.0	0.0

[1] *Includes Willamette River harvest in excess of the adjusted 1986-1996 baseline.*

[2] *Includes Youngs Bay (1979-present) and other Select Area landings (1998-present).*

[3] *No sturgeon retention allowed during 2014-2016.*

[4] *Preliminary.*

Table 12. Annual treaty and recreational white sturgeon catch and harvest guidelines by pool in Zone 6, 2010–2019. [1]

	Bonneville Pool		The Dalles Pool		John Day Pool	
Year	Catch	Guideline	Catch	Guideline	Catch	Guideline
			Treaty Commercial Fisheries			
2010	1,540	1,400	1,184	1,000	302	335
2011	2,089	2,000	604	"	1,208	1,000
2012	2,203	"	996	"	1,347	"
2013	1,274	1,100	669	"	1,042	"
2014	706	"	496	"	1,267	"
2015	445	"	258	325	884	"
2016	224	325	260	"	809	"
2017	368	"	326	"	209	295
2018	406	"	415	415	166	210
2019 [2]	630	500	426	"	187	175
			Non-Treaty Recreational Fisheries			
2010	1,451	1,400	336	300	159	165
2011	2,334	2,000	220	"	533	500
2012	1,796	"	279	"	473	"
2013	1,022	1,100	314	"	509	"
2014	877	"	121	"	492	"
2015	874	"	115	100	532	"
2016	349	325	96	"	520	"
2017	276	"	84	"	126	105
2018	452	"	180	135	81	"
2019 [2]	448	500	79	"	129	"

[1] *Harvest estimates prior to 2010 are available in previous Winter Joint Staff Reports.*

[2] *Preliminary.*

Table 13. Annual 33–65 inch fork length (36–72 inch total length) and legal slot size abundance estimates by pool in Zone 6, 1976–2019.[1]

Year	Bonneville Pool		The Dalles Pool		John Day Pool	
	33-65 inch	Legal slot [2]	33-65 inch	Legal slot [2]	33-65 inch	Legal slot [2]
1976-1978	5,400	--	--	--	--	--
1987	--	--	18,900	--	--	--
1988	--	--	6,300	--	--	--
1989	17,900	--	--	--	--	--
1990	--	--	--	--	2,200	--
1991	--	--	--	--	--	--
1992	--	--	--	--	--	--
1993	--	--	--	--	--	--
1994	19,800	--	6,500	--	--	--
1995	--	--	--	--	--	--
1996	--	--	--	--	24,100	4,050
1997	--	--	46,800	8,163	--	--
1998	--	--	--	--	--	--
1999	45,600	--	14.,735	--	--	--
2000	--	--	--	--	--	--
2001	--	--	--	--	14,200	1,074
2002	--	--	20,600	5,997	--	--
2003	34,220	6,880	--	--	--	--
2004	--	--	--	--	12,800	1,094
2005	--	--	11,800	1,149	--	--
2006	42,100	6,240	--	--	--	--
2007	--	--	--	--	26,600	1,587
2008	--	--	76,800	1,680	--	--
2009	117,600	29,641	--	--	--	--
2010	--	--	--	--	33,800	4,350
2011	--	--	54,900	2,730	--	--
2012	72,000	14,212	--	--	--	--
2013	--	--	--	--	24,400	9,620
2014	--	--	34,600	1,854	--	--
2015	35,000	5,890	--	--	--	--
2016	--	--	--	--	14,000	5,177
2017	--	--	35,200	3,664	--	--
2018	37,000	8,222	--	--	--	--
2019 [3]	--	--	--	--	20,200	6,443

[1] *Data compiled from annual reports for BPA Project 1986-050-00 and from Sturgeon Management Management Task Force summaries.*

[2] *Prior to 1994, the legal size slot varied and was not always consistent between Oregon and Washington. From 1994-1996, legal size was 42–66 inches in Bonneville Pool, and 48–66 inches in The Dalles and John Day pools. In 1997, the legal maximum was changed to 60 inches. In 2009 measurements changed from total length to fork length (38–54 inches in Bonneville Pool, and 43–54 inches in The Dalles and John Day pools).*

[3] *Preliminary.*

Table 14. Treaty commercial white sturgeon seasons and catch in Zone 6, 2015–2019.

Fishery	Dates	Open Pools [1]	Length (days)	Mesh Size Restriction	Catch [2]
	2015				
Winter	January 1-31	All	30	Setline	82
"	February 2-24	TD, JD	22.5	None	896
"	February 23-March 21	BO	26.5	none	377
Spring	Closed Season	All	--	--	--
Summer	Closed Season	All	--	--	--
Fall	October 19-30	TD	11.5	Setline	0
Fall	November 2-13	BO	11.5	Setline	0
Fall	November 16-25	TD	9.5	Setline	165
Fall	November 27-December 31	BO	34.5	Setline	67
				Total	**1,587**
	2016				
Winter	January 1-31	All	30.5	Setline	58
"	February 1-March 5	TD	33.5	None	254
"	February 1-March 12	JD	40.5	None	703
"	March 14- March 21	BO	7.5	None	21
Spring	Closed Season	All	--	--	--
Summer	Closed Season	All	--	--	--
Fall	August 1-13	BO	12.5	Setline	57
Fall	October 24-November 5	JD	12.5	Setline	48
Fall	November 7-12	TD	5.5	Setline	6
Fall	November 14-26	BO	12.5	Setline	146
				Total	**1,293**
	2017				
Winter	January 1-31	All	31	Setline	0
"	February 1-March 4	TD, JD	31.5	None	489
"	March 6-March 17	BO	11.5	None	368
Spring	Closed Season	All	--	--	--
Summer	Closed Season	All	--	--	--
Fall	August 1-12	JD	11.5	Setline	46
Fall	December 11-30	JD	19.5	Setline	0
				Total	**903**
	2018				
Winter	January 1-31	All	31	Setline	89
"	February 1-16; February 22-March 3; March 15-19	TD	31	None	352
"	February 1-March 3; March 15-24	JD	41	None	140
"	March 5-14	BP	10	None	64
Spring	Closed Season				
Summer	June 6-15	JD	10	None	7
Summer	July 27-August 4	JD	9	None	10
Fall	August 6-25	BP	20	None	114
Fall	October 17-31	BP	15	None	211
				Total	**987**
	2019 [3]				
Winter	January 1-31	All	31	Setline	74
"	February 1-19	TD	19	None	407
"	February 1-27	JD	27	None	57
"	March 1-23	BP	23	None	587
Summer	July 26-August 8	JD	14	Setline	118
				Total	**1,243**

[1] *BO = Bonneville Pool, TD = The Dalles Pool, JD = John Day Pool.*

[2] *Legal-sizes of 38-54 inches FL in Bonneville Pool and 43-54 inches FL adopted January 29, 2009.*

[3] *Harvest estimates are preliminary, through October 23, 2019.*

Table 15. White sturgeon catch in treaty commercial, subsistence, and recreational fisheries in Zone 6, 2010–2019. [1]

Year	Treaty Commercial			Treaty Subsistence	Non-Treaty Recreational
	Gill Net	Setline	Total		
2010 [1]	2,889	137	3,026	616	1,946
2011	2,799	1,102	3,901	652	3,087
2012	4,153	393	4,546	447	2,548
2013	2,917	68	2,985	366	1,845
2014	2,362	107	2,469	270	1,490
2015	1,273	314	1,587	208	1,521
2016	978	315	1,293	144	965
2017	857	46	903	103	486
2018	556	431	993	84	713
2019 [2]	1,144	239	1,243	140	656

[1] *Harvest estimates prior to 2010 are available in previous Winter Joint Staff Reports.*

[2] *Preliminary estimates as of August 14, 2019.*

Table 16. Recreational white sturgeon retention seasons in Zone 6, 2009–2019. [1]

Year	Bonneville Pool	The Dalles Pool	John Day Pool
2009	January 1-June 5	January 1-April 18	January 1-April 12
2010	January 1-February 20	January 1-May 5	January 1-February 28
2011	Jan 1-Feb 18, Jun 30-Jul 2, Jul 7-8	January 1-July 29	January 1-April 9
2012	Jan 1-Feb 17, Jun 15-16, Jun 22-23	January 1-November 3	January 1-May 20
2013	Jan 1-Feb 10, Jun 14-15, Jun 21	January 1-November 11	January 1- June 28
2014	Jan 1-Feb 17, Feb 24-Mar 9, Jun 13-14, Jun 20-21, Jul 11-12, Jul 18-19	January 1- July 31	January 1-June 13
2015	Jan 1-Mar 1, Jun 19-21, Jun 26-28, Jul 3-5	January 1- May13	January 1-June 2
2016	Jan 1-Feb 7, Jun 18	January 1-Apr 29	January 1-May 28
2017	Jan 1-Mar 24, Jun 10, Jun 23	January 1-March 24	January 1-March 29
2018	Jan 1-Feb 3; June 15	January 1-19; June 15	January 1-February 11
2019	Jan 1-April 12	January 1-6	January 1-April 2

[1] *Retention dates prior to 2009 are available in previous Winter Joint Staff Reports.*

Table 17. Preliminary Zone 6 treaty commercial catch by season and pool, with catch guidelines, 2019.

Reservoir	January Setline	Winter Gill Net	Summer Setline	Late Fall Setline	Commercial + OTB Total	Guideline
Bonneville	43	587	0	--	630	500
The Dalles	19	407	0	--	426	415
John Day	12	57	118	--	187	175
Total	74	1,051	118	0	1,243	1,090

"--" indicates no fishery during this timeframe.

Table 18. Columbia River and tributary commercial Eulachon landings (in thousands of pounds), 1938–2019.

Year (s)		Columbia River [1]	Grays River	Cowlitz River	Kalama River	Lewis River	Sandy River	Total
1938-1949	Range	200-1,000	0-59	1-3,000	0-77	0-2,000	0-1,400	1,000-5,700
	Average	610	18	1,400	13	300	300	3,000
1950-1959	Range	400-1,300	0-16	0-2,000	0-44	0-900	0-500	1,300-2,600
	Average	800	3	700	11	200	100	1,800
1960-1969	Range	100-800	0-53	1,000	0-0	0-82	0-0	800-1,500
	Average	700	10	600	0	8	0	1,100
1970-1979	Range	900	0-6	100	0-300	0-900	0-800	500-3,200
	Average	300	1	1,400	4	100	100	2,000
1980-1989	Range	53-500	0-35	100-3,700	0-8	0-2,700	0-300	500-3,800
	Average	200	4	2,500	1	600	59	2,400
1990-1999	Range	0.2-37	0.0	0-3,673	0-67	0-22	0.0	9-3,674
	Average	13	0.0	1,029	7	2	0.0	1,051
2000-2009	Range	0.1-159	0.0	0-464	0.0	0-529	0-23	0.2-1083
	Average	37	0	102	0	102	2	244
2010 [2]		3.6	0.0	0.0	0.0	0.0	0.0	3.6
2011-2013 [2]		--	--	--	--	--	--	--
2014 [2] [3]		0.0	0.0	0.0	0.0	0.0	0.0	0.0
2015 [3]		0.0	0.0	0.0	0.0	0.0	0.0	0.0
2016 [3]		4.8	0.0	0.0	0.0	0.0	0.0	4.8
2017 [3]		5.0	0.0	0.0	0.0	0.0	0.0	5.0
2018 [2] [3]		0.1	0.0	0.0	0.0	0.0	0.0	0.1
2019 [2]		--	--	--	--	--	--	--

[1] *Season totals may contain landings from previous December.*

[2] *Commercial fisheries were closed effective December 2010 through January 2014 and March 2018 through present.*

[3] *Minor research fisheries conducted in February 2014-2018.*

Table 19. Eulachon CPUE's and landings in Columbia River commercial fisheries, 1990–2019. [1]

	CPUE's by Calendar Week						Season Totals	
Year	5	6	7	8	9	10	CPUE	Pounds [2]
1990	0	0	0	0	0	0	709	6,381
1991	0	107	685	0	0	940	389	5,841
1992	344	232	290	0	0	50	203	2,644
1993	18	0	224	1,731	2,274	3,100	1,843	33,172
1994	0	0	0	0	35	109	59	235
1995	216	250	67	0	137	35	180	7,612
1996	122	0	445	59	150	20	95	7,208
1997	161	216	672	214	0	0	304	37,069
1998	94	30	17	0	0	0	134	11,866
1999	143	183	297	110	0	0	172	20,834
2000	371	123	330	241	37	0	211	31,042
2001	0	520	1,604	2,322	3,875	2,194	2,033	158,809
2002	1,401	2,014	106	0	2,057	7,320	1,920	57,980
2003	445	581	778	4,350	2,216	2,486	1,132	66,875
2004	34	693	368	47	21	153	548	15,431
2005	25	28	0	0	0	0	27	108
2006	194	209	14	0	0	0	157	13,099
2007	0	0	0	209	163	39	153	8,702
2008	0	63	210	58	1	0	133	11,381
2009	34	3	65	50	45	47	101	5,539
2010 [3]	43	22	7	3	0	0	96	3,539
2011-13 [3]	--	--	--	--	--	--	--	--
2014 [3,4]	--	--	0	32	631	200	453	18,558
2015 [4]	--	76	534	469	61	--	435	16,546
2016 [4]	--	146	225	148	36	--	166	4,822
2017 [4]	1	0	258	121	53	--	167	5,019
2018 [4]	51	8	0	0	0	--	37	110
2019 [4]	--	--	--	--	--	--	--	--

[1] *CPUE = pounds per delivery.*

[2] *May include landings from previous December.*

[3] *Commercial fisheries were closed effective December 2010 through January 2014 and March 2018 through present*

[4] *Minor research fisheries conducted in 2014-2018.*

Table 20. Eulachon run size and estimated harvest in Columbia River commercial, sport, and tribal fisheries, 2011–2019.

Year	Weeks sampled for SSB	Run size (SSB plus harvest in pounds) [1]	Harvest (pounds)				
			Commercial				
			Mainstem	Tributary	Sport	Tribal	Combined
2011	19	3,300,000	0 [2]	0 [2]	0 [2]	N/A	0
2012	25	3,200,000	0 [2]	0 [2]	0 [2]	N/A	0
2013	29	9,600,000	0 [2]	0 [2]	0 [2]	7,470	7,470
2014	22	16,600,000	18,560	0 [2]	203,880	6,970	229,410
2015	33	11,400,000	16,550	0 [2]	290,770	10,400	317,720
2016	25	5,100,000	4,820	0 [2]	141,050	8,560 [3]	154,430
2017	18	1,600,000	5,019	0 [2]	541	1,900	7,531
2018	13	400,000	110	0 [2]	0 [2]	0	110
2019	16	4,205,000	0 [2]	0 [2]	0 [2]	23,660	23,660

[1] *Rounded to the nearest 100,000 pounds.*

[2] *Closed to fishing.*

[3] *Includes 200 pounds landed by the Cowlitz Tribe.*

Table 21. Eulachon larval sampling densities in the lower Columbia River and select tributaries, 1999–2019. [1]

	Catch (larvae per cubic meter) [2]						
Year	Mainstem Columbia	Cowlitz River	Grays River	Elochoman River	Kalama River	Lewis River	Sandy River
1999	0.7	0.2	0.6	0.8	0.4	0.0	0.1
2000	1.3	41.6	25.7	3.5	0.1	0.2	0.1
2001	42.1	192.0	24.4	0.0	5.5	17.6	N/S
2002	28.2	283.0	N/S	N/S	0.5	0.6	N/S
2003	12.3	1.4	N/S	24.5	N/S	36.2	0.1
2004	3.5	0.9	20.4	N/S	N/S	N/S	N/S
2005	0.3	N/S	0.6	N/S	N/S	N/S	N/S
2006	0.7	0.1	0.0	N/S	N/S	N/S	N/S
2007	0.7	2.8	N/S	N/S	N/S	0.3	N/S
2008	1.1	6.2	44.0	3.3	N/S	<0.1	N/S
2009	2.3	0.1	0.2	N/S	N/S	0.5	N/S
2010	1.0	4.2	178.9	N/S	N/S	0.9	N/S
2011	6.0	29.1	0.2	2.0	0.4	<0.1 [3]	N/C
2012	5.9	N/C [4]	1.6	N/S	N/S	N/S	N/S
2013	20.3	N/C [4]	1.4	N/S	N/S	N/S	N/S
2014	49.0	N/C [4]	N/S	N/S	N/S	N/S	N/S
2015	32.5	N/C [4]	13.4	N/S	N/S	N/S	N/S
2016	13.8	N/C [4]	48.7	N/S	N/S	N/S	N/S
2017	2.8	N/C [4]	N/S	N/S	N/S	N/S	N/S
2018	1.1	N/C [4]	N/S	N/S	N/S	N/S	N/S
2019	14.3	N/C [4]	N/S	N/S	N/S	N/S	N/S

[1] *Inter-annual comparisons of abundance are tentative as sampling has not been systematic from year to year. Mainstem Columbia R. data since 2003 includes multiple collections at Price Island and Clifton Channel sites.*

[2] *N/S = not sampled. N/C = larval density not calculated, but some larvae collected.*

[3] *Average density observed by the Cowlitz Tribe Natural Resources staff was 28 larvae per cubic meter.*

4 Average density observed by the Cowlitz Tribe Natural Resources staff, but unavailable.

Table 22. Mainstem Columbia River commercial smelt seasons, 1985–2019.

Year	Season	Fishery Level [1]	Weekly Period	Days Open
1985	Jan. 1 - Dec. 31	--	7 d/wk (upstream of Cowlitz R. 2/22-3/1)	365
1986-1994	Dec. 1 – Mar. 31	--	7 days/week	121
1994/1995	Dec. 7 – Jan. 7	--	7 days/week	38
	Jan. 7 – Mar. 31	--	8 PM Sat – 8 AM Wed	48
1995/1996	Dec. 1 – Feb. 2	--	7 days/week	64
	Feb. 3 – Mar. 31	--	Noon Mon – 6 PM Fri	32
1996/1997	Dec. 1 – Jan. 27	--	7 days/week	58
	Jan. 30 – Feb. 21	--	6 AM Thu – 6 PM Fri	8
1997/1998	Dec. 1 – Dec. 31	--	7 days/week	31
	Jan. 2 – Feb. 13	--	6 AM – 6 PM Mon & Fri	13
1998/1999	Dec. 1 - Dec. 23	--	7 days/week	23
	Dec. 30 - Feb. 10 [2]	--	7 AM - 7 PM Wed	7
1999/2000	Dec 1 - Dec 26	--	7 days/week	26
	Dec. 29 Feb. 23	--	7 AM - 7 PM Wed	9
2000/2001	Dec 1 - Dec 31	-- [3]	7 days/week	31
	Jan. 3 - Mar. 7	One	3 AM - 9 PM Wed	10
	Mar. 12 - Mar. 31	Two (3/06)	3 AM - 9 PM Mon & Wed	6
2001/2002	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 2 - Jan. 31	Two	3 AM - 9 PM Sun & Wed	9
	Feb. 1 - Mar. 31	Two (1/31)	3 AM - 9 PM Sun, Wed & Fri	26
2002/2003	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1- Mar. 31	Three	3 AM - 9 PM Sun, Tues, Thurs, & Fri	51
2003/2004	Dec. 1- Dec. 31	-- [3]	7 days/week	31
	Jan. 1 - Mar. 21	Three	3 AM – 9PM Sun, Tues, Thurs, & Fri	34
	Mar. 22- Mar. 31	Two (3/18)	3 AM – 9 PM Fri, & Sun	2
2004/2005	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1- Feb. 23	Two	3 AM - 9 PM Mon, & Thurs	15
	Feb. 24 – Mar. 31	One (2/23)	3 AM – 9 PM Thurs	6
2005/2006	Dec. 1 – Dec. 31	-- [3]	7 days/week	31
	Jan. 1 – Mar. 2	One	7 AM - 4 PM Mon, & Thurs	20
	Mar. 7	One (3/08)	7 AM - 4 PM Mon	1
	Mar. 13 – Mar. 31	One (3/08)	7 AM - 4 PM Mon & Thurs	6
2006/2007	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1 - Mar. 31	One	7 AM - 4 PM Mon,& Thurs	20
	Mar. 11	One (3/05)	7 AM - 4 PM Sun	1
	Mar. 15- Mar. 31	One (3/05)	7 AM - 4 PM Mon & Thurs	5
2007/2008	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1 - Mar. 31	One	7 AM - 4 PM Mon & Thurs	26
2008/2009	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1 - Mar. 31	One	7 AM - 2 PM Mon & Thurs	26
2009/2010 [4]	Dec. 1 - Dec. 31	-- [3]	7 days/week	31
	Jan. 1 - Mar. 31	One	7 AM - 2 PM Mon & Thurs	25
2011-2013 [4]	Closed	--	--	0
2014 [5]	Feb. 10-Mar. 6	< One	7 AM - 2 PM Mon & Thurs	8
2015 [5]	Feb. 2-Feb. 26	< One	7 AM - 2 PM Mon & Thurs	8
2016 [5]	Feb. 1-Feb. 25	< One	7 AM - 2 PM Mon & Thurs	8
2017 [5]	Feb. 2-Feb. 27	< One	7 AM - 2 PM Mon & Thurs	8
2018 [5]	Feb.1-Feb. 26	< One	7 AM - 2 PM Mon & Thurs	8
2019 [4]	Closed	--	--	0

[1] *Fishery levels are described in the Joint State Eulachon Management Plan.*

[2] *An additional test fishery (1-3 boats) occurred on January 31, February 7, and February 18, 1999.*

[3] *Under permanent rules (prior to December 2010), December 1-31 was open 7 days/week, 24 hours.*

[4] *Commercial fisheries were closed effective December 2010 through January 2014 and March 2018 to present.*

[5] *Minor research fishery*

Table 23. Washington and Oregon tributary commercial smelt seasons, 2002–2019. [1]

Year	Cowlitz River [2]	Kalama River [3]	Lewis River [4]	Oregon Rivers
2002	***1/02-1/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Wed – 6 AM Thu ***2/01-2//25:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu ***2/26-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu, and 6 PM Thu – 6 AM Fri	***2/05-2/25:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu ***2/26-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu, and 6 PM Thu – 6 AM Fri	***2/05-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu ***2/26-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and Wed – 6 AM Thu, and 6 PM Thu – 6 AM Fri	24-hours daily
2003	***1/01-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and 6 PM Wed – 6 AM Thu	***1/01-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and 6 PM Wed – 6 AM Thu	***1/01-3/31:*** 6 PM Sun – 6 AM Mon, and 6 PM Tue – 6 AM Wed, and 6 PM Wed – 6 AM Thu	24-hours daily
2004	***1/01-3/17:*** 6 PM Sun – 6 PM Tue and 6 PM Wed - 6 PM Fri ***3/18-3/31:*** 6 PM Sun – 6 AM Mon and 6 PM Wed – 6 AM Thu	***1/01-3/17:*** 6 PM Sun – 6 PM Tue and 6 PM Wed - 6 PM Fri ***3/18-3/31:*** 6 PM Sun – 6 AM Mon and 6 PM Wed – 6 AM Thu	***1/01-3/17:*** 6 PM Sun – 6 PM Tue and 6 PM Wed 6 PM Fri ***3/18-3/31:*** 6 PM Sun – 6 AM Mon and 6 PM Wed – 6 AM Thu	24-hours daily
2005	***1/01-2/22:*** 6 PM Sun – 6 AM Mon and 6 PM Wed – 6 AM Thu ***2/23-3/31:*** 6 PM Wed- 6 AM Thu	Closed	***1/01-2/22*** 6 PM Sun – 6 AM Mon and 6 PM Wed – 6 AM Thu ***2/23-3/31:*** 6 PM Wed- 6 AM Thu	24-hours daily
2006	***1/01-3/31:*** 6 PM-11:59 PM Sun and Wed	Closed	Closed	24-hours daily
2007	***1/01-3/31:*** 6 PM-11:59 PM, Sun and Wed	Closed	Closed	24-hours daily
2009	***1/01-3/31*** 6AM – 10:PM, Saturdays:	Closed	Closed	24-hours daily
2010 [5]	***2/03-2/28*** 7 PM–10 PM Sun and Wed	Closed	Closed	24-hours daily through November
2011-2019 [5]	Closed	Closed	Closed	Closed

[1] *Washington tributaries not listed were closed by emergency regulation during this period. All tributary commercial fisheries are restricted to dip net gear.*

[2] *Area restricted to downstream of Peterson's Eddy (approximately River Mile [RM] 8.0).*

[3] *Area restricted to downstream of Modrow Bridge (RM 2.9).*

[4] *Area restricted to the mainstem and North Fork downstream from the overhead powerlines near Eagle Island (approximately RM 11.5).*

[5] *Tributary commercial fisheries were closed effective December 2010 due to ESA listing.*

Table 24. Lower Columbia River mainstem and tributary recreational smelt seasons, 2002–2019.

Year	Season Structure
2002	The Columbia River and Oregon tributaries open 7 days per week the entire year. Washington tributaries open Saturdays, Sundays, and Wednesday from 6 AM to 10 PM during January 1-February 25, 2002. Washington tributaries open 7 days per week from 6 AM to 10 PM during February 26-March 31, 2002.
2003	The Columbia River and Oregon tributaries open 7 days per week the entire year. Washington tributaries open 7 days per week from 6 AM to 10 PM during January 1-March 31, 2003.
2004	The Oregon portion of the Columbia River and Oregon tributaries open seven days per week the entire year (25-lbs. daily limit), and the Washington portion of the Columbia River was open 7 days per week during January 1- March 31, 2004 (20-lbs. daily limit). Washington tributaries were open 7 days per week from 6 AM to 10 PM during January 1 – March 19, 2004, and on Wednesdays and Saturdays from 6 AM to 10 PM during March 19-31, 2004 (20-lbs. daily limit).
2005	The Oregon portion of the Columbia River and Oregon tributaries open seven days per week the entire year (25-lbs. daily limit), and the Washington portion of the Columbia River was open 7 days per week during January 1- March 31, 2005 (25-lbs. daily limit). Washington tributaries (Grays River, Cowlitz River, Kalama River, and Lewis River) were open on Tuesdays and Saturdays from 6 AM to 10 PM during January 1 – February 23, 2005 (10-lbs. daily limit), and in the Cowlitz River only, on Saturdays from 6 AM to 10 PM during February 26 – March 31, 2005 (10-lbs. daily limit).
2006-2007	The Oregon portion of the Columbia River and Oregon tributaries open seven days per week the entire year (25-lbs. daily limit), and the Washington portion of the Columbia River was open 7 days per week during January 1- March 31 (25-lbs. daily limit). Washington tributaries were closed with the exception of the Cowlitz River, which was open on Saturdays only, from 6 AM to 10 PM, during January 1 – March 31 (10-lbs. daily limit).
2007-2009	The Oregon portion of the Columbia River and Oregon tributaries open seven days per week the entire year (25-lbs. daily limit), and the Washington portion of the Columbia River was open 7 days per week during January 1- March 31 (25-lbs. daily limit). Washington tributaries were closed with the exception of the Cowlitz River, which was open on Saturdays only, from 6 AM to 10 PM, during January 1 – March 31 (10-lbs. daily limit).
2009-2010 [1]	The Oregon portion of the Columbia River and Oregon tributaries open seven days per week the entire year (10-lbs. daily limit), and the Washington portion of the Columbia River was open 7 days per week during January 1-March 31 (10-lbs. daily limit). Washington tributaries were closed with the exception of the Cowlitz River, which was open on Saturdays only from 7 AM to 3 PM, during February (10-lbs. daily limit).
2011-2013	Closed
2014 [2]	Columbia River closed. All tributaries closed except the Cowlitz River on the Washington shore, which was open on Saturdays (6 AM-noon) during February 8 - March 8 (10-lbs. daily limit) and the Sandy River on the Oregon shore, which was open on Saturdays (6 AM-noon) during March 1-22 (10-lbs. daily limit).
2015 [2]	Columbia River closed. All tributaries closed except the Cowlitz River on the Washington shore, which was open 6 AM-noon on Saturday February 7 and 14 (10-lbs. daily limit) and the Sandy River on the Oregon shore, which was open 6 AM-noon on Saturday March 7 and Sunday March 15 (10-lbs. daily limit).
2016 [2]	Columbia River closed. All tributaries closed except the Cowlitz River on the Washington shore, which was open 7 AM-1PM on Saturday February 6 (10-lbs. daily limit).
2017 [2]	Columbia River closed. All tributaries closed except the Cowlitz River on the Washington shore, which was open 8 AM-1 PM on Saturday February 25 (10-lbs. daily limit).
2018-2019	Closed

[1] *Recreational fisheries were closed effective December 2010 due to ESA listing.*

[2] *Minor research fishery.*