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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF OREGON

DESCHUTES RIVER ALLIANCE, an Oregon nonprofit corporation, Plaintiff, v. PORTLAND GENERAL ELECTRIC COMPANY, an Oregon corporation, Defendant.	Case No. 3:16-cv-01644-SI DECLARATION OF ROD FRENCH

I, Rod French, declare:

Qualifications

1. I am the Mid-Columbia District Fisheries Biologist for the Oregon Department of Fish and Wildlife (ODFW) in The Dalles, Oregon. I have served as the Mid-Columbia District Fisheries Biologist since 2002. In this role I am responsible for directing, and implementation of the ODFW fisheries program for the Mid-Columbia Fisheries District, an area that encompasses

four counties in North Central Oregon, including the Hood River, and Lower Deschutes River Watersheds. I have a Bachelor's Degree in Fisheries Science from Oregon State University. I have been employed by the Oregon Department of Fish and Wildlife ("ODFW") for over 29 years. During this period, I have served in a variety of positions ranging from entry level positions early in my career to my current position. I have conducted extensive fisheries research on salmon, steelhead, and resident trout throughout the state of Oregon, along with managing fisheries in ODFW's East Region.

2. I provide this declaration to explain the importance of the adaptive management programs at the Pelton Round Butte Dam Project ("the Project") to the preservation and reintroduction of anadromous fish species in the area, and the attempted restoration of the Deschutes River to pre-dam natural conditions instead of the artificial conditions that prevailed from 1958 to the implementation of the current adaptive management program in 2010. I also set forth the evidence that the Selective Water Withdrawal ("SWW") adaptive management regime at the Project has not adversely impacted fisheries resources of the river, for example, redband trout.

Deschutes River Fisheries Background

3. The Deschutes River supports extremely popular sport and important tribal fisheries for resident (redband) trout, summer steelhead, along with fall and spring Chinook salmon. Fish from the Deschutes additionally support domestic and international ocean fisheries, along with Columbia River fisheries. Due to the premier nature of the Deschutes River in supporting fisheries, it has been a focal point for the ODFW in developing monitoring and research activities that guide management to support fisheries. Because of the importance of the Deschutes River fisheries resources and the desire to further understand species and guide fisheries management, ODFW initiated comprehensive long-term studies on the primary gamefish species in the Deschutes in late 1970s culminating with final reports of findings in the late 1980s (Schroeder and Smith, 1989; Lindsay, Jonasson, and Schroeder, 1989, Jonasson and

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Lindsay 1988). These reports establish baseline conditions and have provided much of the foundation for monitoring. The Deschutes River supports a diverse and rich assemblage of fish, which can likely be attributed to its high productivity. In addition, to the important native gamefish (redband trout, summer steelhead, fall and spring Chinook, bull trout, sockeye), it also supports large endemic populations of mountain whitefish, several species of suckers and sculpins, and pacific lamprey. The presence and abundance of these native non-gamefish serves to the uniqueness of the Deschutes. ODFW's population studies suggest their abundance is significant, and they undoubtable play an important role in the health and ecosystem of the river. For instance, researchers conducting population estimates on the Deschutes in 1975 found mountain whitefish were three times more abundant than rainbow trout, and suckers were more than five as abundant as rainbow trout (Schroeder and Smith, 1989).

Pre-Dam Fish Abundance

4. Historically the Deschutes River had more uniform flow than any other river in the United States (Nehlsen 1995) due to its large groundwater influence. Native Americans have fished the Deschutes since time immemorial. Anthropogenic factors (*e.g.* agriculture, water withdrawals, grazing, etc.) began impacting flows, fish, and habitat in the Deschutes as early as the late Nineteenth Century. The completion of construction of the dams associated with the Project in 1956-1958 had profound effects on fisheries in the Deschutes River, primarily by blocking habitat, but the dams also contributed to alterations in water quality, including but not limited to impacts on downstream flows and temperatures. Available Lower Deschutes fish population data prior to construction of the Project is inconsistent, although reports of fishing and fish distribution are readily available. Upstream Project fish trapping facilities became operational in 1956, and since that time some fish abundance data has been relatively available.

Fall Chinook

5. The Oregon Department of Fish and Wildlife has been monitoring wild fall Chinook in the lower 100 miles of the Deschutes River below the Project since the 1970s. The

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U.S. section of the Chinook Technical Committee for the Pacific Salmon Treaty in 1999 identified the fall Chinook in the Deschutes as an Indicator Stock of upriver bright[1] fall Chinook. An escapement goal, a goal for the number of fish returning to their natal stream to allow for a stable population, for wild adult fall Chinook in the lower Deschutes River was determined to be 4,532 (Sharma *et al.* 2013). The number of returning adults has been collected consistently since 1977. This is one of the longest data sets for upriver bright fall Chinook stocks in the Columbia River Basin.

6. Wild adult fall Chinook runs in the Deschutes River have been very abundant in recent return years. Since 2011, we have observed some of the highest returns on record with an average estimate of 14,921 adults (Table 1). From 2004 to 2010, run size estimates averaged 9,737 adults. Fall Chinook abundance in the Deschutes had been steadily increasing since 1977. We hypothesize the substantial riparian recovery[2] during the 1980s and 1990s has largely contributed to this increased population size. Other factors such as reduction in out-of-basin harvest, improved passage conditions on the Columbia River associated with court ordered spill, and favorable ocean conditions may have also contributed.

7. Since the inception of the SWW adaptive management program at the Project in the winter of 2010, the change from an unnatural to a more natural temperature regime in the Deschutes has likely had a positive influence on the fresh water success of fall Chinook. High quality habitat and water conditions in the mainstem of the Deschutes River are critical to the success of fall Chinook due to their life-history. Unlike other Deschutes salmonids, fall Chinook are mainstem spawners, meaning adults return from the ocean and only spawn in the main channel of the Deschutes, not in tributaries. Spawning is distributed throughout the lower 100 miles of the river and occurs from October to February. Incubation of the eggs occurs during the

[1] Bright refers to a stock or population of Chinook. Upriver Bright stock fall Chinook are late maturing (maintaining color and flesh quality longer into fall, and are highly prized for their high quality by tribal and non-tribal fishers); they made up of fish from the Deschutes, Snake River, Hanford Reach of Columbia River

[2] Riparian refers to the vegetation along the margin of the stream.

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winter, and larva begin to hatch out of the gravel in late winter/early spring. Juveniles rear on the margins of the river in the spring and begin out-migration to the ocean in late spring and continue to mid-summer. Prior to 2010, the Project contributed to unnaturally cold temperatures in the spring as a result of the artificial temperature conditions created by the dams. The existing temperature releases from the SWW allow for warmer water during the critical spring period after juveniles emerge from the gravel and preserve colder water to be released in late summer and fall when necessary to initiate spawning. This creates juvenile rearing conditions within the optimum metabolic temperature range for feeding and growth. This enables fish to potentially migrate earlier when Columbia River temperatures are more favorable, and potentially at a larger size at the time of migration. Studies of hatchery juvenile spring Chinook in the Pelton Fish Ladder have emphasized the importance of a restoring the natural, i.e., pre-dam temperature regime on growth, size, and smolting in Chinook (Spangenberg *et al.* 2014, Beckman *et al.* 2017) instead of the artificial conditions caused by the Project dams beginning in the late 1950s.

8. There is no hatchery augmentation on Deschutes fall Chinook. Deschutes fall Chinook are widely considered as one of the healthiest populations of wild Chinook in the entire Columbia Basin.

Estimated escapement, harvest, and total run of adult fall Chinook salmon in the Deschutes River, by year.

	Adult		
	Escapement	Harvest	Run to River
1977	7,903	1,861	9,764
1978	5,393	1,971	7,364
1979	5,126	1,592	6,718
1980	4,106	1,951	6,057
1981	6,070	1,837	7,907
1982	5,513	2,016	7,529
1983	5,491	1,496	6,987
1984	2,779	970	3,749
1985	7,902	807	8,709
1986	7,467	1,153	8,620
1987	9,187	2,057	11,244
1988	9,548	2,391	11,939
1989	6,338	1,730	8,144

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1990	2,864	970	3,887
1991	5,373	154	5,561
1992	3,668	37	3,698
1993	8,809	11	8,817
1994	9,556	69	9,598
1995	9,304	36	9,338
1996	10,233	78	10,308
1997	20,208	133	20,337
1998	15,907	507	16,383
1999	7,389	373	7,707
2000	4,985	407	5,321
2001	12,817	334	13,033
2002	11,907	992	12,727
2003	13,413	1,078	14,384
2004	13,297	1,224	14,521
2005	14,936	835	15,735
2006	10,955	785	11,659
2007	6,361	1,247	7,608
2008	6,908	706	7,614
2009	6,429	687	7,116
2010	9,275	791	10,066
2011	17,117	1,051	18,168
2012	17,624	1,161	18,785
2013	18,068	2,237	20,305
2014	17,993	1,439	19,432
2015	17,074	1,120	18,194
2016	11,628	762	12,390
2017	4,942	989	5,931[3]

Spring Chinook

9. Historically spring Chinook salmon primarily spawned in the Upper Deschutes River above the Project, and in the Warm Springs River. Following construction of the Project, natural spawning was limited to the Warm Springs River, with some limited use in Shitike Creek. No spawning of spring Chinook occurs in the Lower Deschutes itself. Juvenile spring Chinook generally spend one year rearing in the tributary of their origin, then migrate to the ocean in the spring. It is believed that a small percentage, however, migrate out of the tributary of origin in their first year of life, and complete rearing in the Lower Deschutes before migrating

[3] The 2016-2017 decline is likely related to poor in-river outmigration conditions associated with drought, low streamflows and high temperatures combined with poor ocean conditions both at ocean entry and during rearing. Declines were observed region-wide.

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to the ocean. In addition to the wild population there are two hatchery populations in the Deschutes River. Round Butte Fish Hatchery was constructed in 1972, at the base of Round Butte Dam with its primary purpose of providing hatchery spring Chinook mitigation for lost production above the dam complex. Warm Springs National Fish Hatchery was constructed in 1978, on the Lower Warm Springs River by the U.S. Fish and Wildlife Service at the request of the Warm Springs Tribes to increase spring Chinook production. Wild spring Chinook are counted at a weir at Warm Springs National Fish Hatchery. Wild adult return numbers have generally declined since the early 2000's but the cause of the current decline is unknown, as the population doesn't track other Columbia Basin spring Chinook populations.

Wild Adult Spring Chinook Returns to the Deschutes River

Run Year	Adults
1982	1,317
1983	1,081
1984	803
1985	777
1986	1,186
1987	1,550
1988	1,259
1989	1,254
1990	1,701
1991	772
1992	953
1993	524
1994	425
1995	160
1996	1,222
1997	858
1998	248
1999	366
2000	2,551
2001	2,096
2002	1,290
2003	1,244
2004	2,234
2005	656
2006	1013
2007	361
2008	527
2009	412

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2010	1,487
2011	693
2012	347
2013	311
2014	665
2015	1,323
2016	365
2017	179[4]

Summer Steelhead

10. Adult return estimates of summer steelhead upstream of Sherars Falls (river mile 43) have been conducted annually since 1977. Deschutes River steelhead are part of the Middle Columbia Distinct Population Segment, listed as threatened under the Endangered Species Act in 1998. Steelhead have the most complex life-history of any of salmonids in the Lower Deschutes River. They generally rear in freshwater from one to four years, before migrating to the ocean, where they typically spend another one to two years, before returning to spawn. Deschutes steelhead spawn in both the mainstem river and tributaries, and can rear in either location. Distribution of spawning in the Deschutes is variable, likely dependent on how much water run-off is present in tributaries during the spring. On good water years, steelhead will enter tributaries at higher rates to spawn while low water years might leave tributaries dry, or with very low flow, such that more spawning will occur in the main stem Deschutes. Juvenile success is also variable depending on water conditions in many tributaries. Thus, juvenile steelhead success has annual variability that may or may not be related to conditions in the main stem Deschutes.

11. Adult wild steelhead most certainly spawn in the mainstem Deschutes and produce offspring that rear in the main channel, but we do not have a good measure of how many or how successful. This is primarily due to the low probability of redd detection and challenges associated with surveys in the spring when flows are high. Deschutes mainstem and tributary reared fish are mixed as smolts, as they migrate out of the river.

[4] *See* footnote 3 for some of the probable reasons for this recent decline.

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12. To monitor the population, wild adult steelhead are initially marked at the Sherars Falls Adult Salmon and Steelhead Trap and subsequently captured at the Pelton Trap and Warm Springs National Fish Hatchery. Therefore, estimates of abundance are only above Sherars Falls (river mile 43). Due to their complex life history, and the fact that many out of basin factors (ocean conditions, environmental conditions, Columbia River passage, fisheries, etc.) affect number of adult returns, returns of steelhead in the Deschutes are likely impossible to correlate to the effects of SWW at the Project either positively or negatively. It should be noted that adult Deschutes steelhead returns generally trend with other Columbia Basin populations, indicating that out-of-basin effects such as ocean conditions affect all of their survivals similarly.

13. Hatchery production of steelhead occurs at the Round Butte Fish Hatchery, as part of mitigation for lost production above the dam complex. It is believed that the large influx of stray hatchery steelhead (e.g., hatchery origin fish from outside of the Deschutes Basin) in recent years may have had a substantial detrimental effect on the fitness of wild Deschutes steelhead. It should be noted, however, that with the current de-emphasis on transportation of steelhead smolts from up-river locations, the incidence of hatchery steelhead straying into the Deschutes has dramatically declined.

Estimated number of wild steelhead that migrated upstream of Sherars Falls on the Deschutes River, by run year.

Run Year	Wild
1977-78	6,600
1978-79	2,800
1979-80	4,200
1980-81	4,100
1981-82	6,900
1982-83	6,567
1983-84	8,228
1984-85	7,721
1985-86	9,624
1986-87	6,207
1987-88	5,367
1988-89	3,546
1989-90	4,278
1990-91	3,653
1991-92	4,826
1992-93	904
1993-94	1,487

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1994-95	482
1995-96	1,662
1996-97	3,458
1997-98	1,820
1998-99	3,800
1999-00	4,790
2000-01	8,985
2001-02	8,749
2002-03	9,363
2003-04	5,524
2004-05	3,161
2005-06	3,432
2006-07	3,986
2007-08	3,482
2008-09	4,048
2009-10	4,236
2010-11	7,257
2011-12	5,450
2012-13	3,749
2013-14	3,677
2014-15	5,358
2015-16	2,457
2016-17	1,196[5]

Redband Trout

14. Redband trout are found throughout the Lower Deschutes River and are the resident version of anadromous steelhead. Like steelhead redband trout are found in the mainstem river, and in tributaries, and they use both for spawning and rearing. Because they are the same species as steelhead, redband trout can, and frequently do, spawn with steelhead. Progeny from the spawning can be either a resident trout or an anadromous steelhead. Redband trout in the Lower Deschutes have rapid growth rates, mature early, and are relatively short lived compared to many other Oregon redband trout populations.

15. ODFW designed and implemented a study of redband trout to determine if there was detectible change in trout post-construction of the SWW at the Project. The study was developed to evaluate the relative health of redband trout in portions of Deschutes downstream of the Project. The study area and methods were chosen to replicate and compare the existing health of rainbow trout to that reported in Schroeder (1989). This study was conducted to

[5] *See* footnote 3 for some of the likely reasons for this recent decline.

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investigate the existing key parameters of redband trout population health in the Deschutes River (growth, age structure, food consumption, condition, and disease), compare results to historical data, and establish a baseline data set for future monitoring. We have not observed substantial differences in any of the parameters we examined, which *indicates the relative health of the population is not declining as a result of the SWW or otherwise.*

16. ODFW has observed from recent studies (2014-2017) very similar growth in trout to the 1970's and 1980's studies. While we have not tested the statistical significance in growth, it appeared growth was similar from 2014-2017 as compared to the previous studies. These results suggest there was not a period of population stress after 2010 when the SWW was constructed and adaptive management commenced. We believe if there was a period of stress due to changes in water management, there would have been a negative response in growth, which is not evident in the data. Thus, the anecdotal reports relied upon in some of the declarations filed by plaintiffs in this action does not appear to be supported by the scientific evidence.

Back-calculated growth (cm/year) at age of redband trout in the Deschutes River, by study period.

		Age					
Section	Year(s)	1	2	3	4	5	6
Trout Creek	1972-75	117	109	73	58	42	
	2014-2016	126	120	77	31	20	
North Junction	1972-75	96	115	86	62	32	
	1983-86	108	119	77	32	28	11
	2014-2016	132	117	65	32	29	
Nena Creek	1972-75, 1979	100	110	93	80	17	
	1983-86	111	107	66	29	28	13
	2014-2016	129	110	66	30	31	

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Jones Canyon	1986	110	111	70	31	30	21
	2014, 2016	137	104	46	29	47	

17. The physical condition of trout sampled from 2014 to 2017 was good, and was very similar to historical data. We were able to determine a Fulton-type condition factor (K), which is essentially a measure of fish girth (*see* Froese 2006). The mean condition factor of all trout sampled (mature and immature) was 1.21 in 2014, 1.21 in 2015, 1.22 in 2016, and 1.18 in 2017. Schroeder (1989) reported mean condition factors in immature fish in three of the study areas of the Deschutes ranging from 1.23 to 1.25 while mature fish ranged from a mean of 1.07 to 1.27. Future monitoring should continue to refine the current condition estimates of mature and immature fish.

18. ODFW has observed a possible shift in spawn timing of trout in the Deschutes from our recent studies. Schroeder 1989 reported peak spawning shifted from March-May (pre-dam) to late April-June (post-dam). We have observed abundant spawning activity from fish sampled in February-March, possibly indicating a shift to a more natural spawn timing starting in mid-February. Numerous trout were lethally sampled as spawned-out in late February. More investigation is needed to determine with certainty if spawn timing has changed, but these changes are a promising sign that the SWW is helping to return the river to pre-Dam natural conditions.

19. Additional support for the conclusion that the SWW has not adversely impacted trout abundance may be found in angler catch rates. Trout abundance data is very difficult to obtain in the Lower Deschutes, primarily due to the low sampling efficiency relating to the large size of the river and high natural variation. Trout abundance estimates from the Deschutes generally can be described as having high sampling bias with significant variation. Nonetheless, we have examined trout angler catch rates, in various reaches in the Lower Deschutes. Catch rates, which measure the rate anglers catch fish (i.e. number of fish caught per hour), can be used as a relative measure of fish abundance. While sampling catch can also have significant biases, it can help determine trends in fish populations. Examining recent angler trout catch rates,

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shows that the rates compare favorably with previous data (and other blue ribbon trout streams) and do not evidence a declining trend.

Smallmouth Bass/Walleye

20. Smallmouth bass are not a native fish species in Oregon, but have widely been introduced as a gamefish. Smallmouth bass can compete with, and prey upon, native salmonids where they coexist. They were not, historically speaking, commonly found in the Lower Deschutes River, however, they are abundant in the Columbia River, in reservoirs upstream of the Lower Deschutes, and generally found throughout the Deschutes Basin in many lakes and ponds. Typically during peak summer fishing season, it was common to receive sporadic reports of anglers catching a smallmouth throughout the Lower Deschutes, but most commonly from the lowest reaches of the river. There were reports of smallmouth being caught relatively frequently one year in the early 1990s, but records were documented poorly, and they seemed to only be present one year. The exact mechanisms that have prevented smallmouth from invading the Lower Deschutes are poorly understood, but it is widely believed that the Lower Deschutes was too cool, and the gradient too high for successful smallmouth occupation. Smallmouth bass typically occupy habitats with less stream gradient, velocity, and warmer temperatures than that present in the Lower Deschutes. Smallmouth bass are abundant throughout the John Day River, and many other Columbia River tributaries.

21. Beginning in the summer of 2010, following completion of the SWW, ODFW district staff began conducting summer surveys in the Lower Deschutes to investigate bass encroachment into the river. The annual surveys did not identify any bass for six years. In the summer of 2016, prior to our annual survey, we began receiving reports of smallmouth bass being caught in the lower reaches of the river by anglers. Subsequent surveys identified the presence of adult smallmouth bass in approximately the lowest 15 miles of the river. We identified increasing densities as we approached the mouth. We did not identify any young of the year smallmouth bass, indicating successful reproduction had not occurred. We conducted

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several sampling trips during the summer of 2016, where we sampled stomachs of smallmouth bass. These sample sizes were relatively small, but the bulk of the diet consisted of crayfish, and sculpin; no salmonids were identified in the stomachs. Very few juvenile salmonids are present in the lower river during the summer, as most juvenile salmonids have migrated from the river by then. By late September of 2016, angler reports of smallmouth subsided, and we were no longer able to capture smallmouth bass using the exact sampling techniques as earlier in the summer, likely indicating smallmouth had left the river. Sampling in early summer of 2017 also identified the presence of smallmouth bass in the lower reaches of the river. As in 2016, all bass sampled were adults, were found predominately in the lower 12 miles of the river, and no reproduction was evident. Additionally, we PIT tagged[6] several hundred smallmouth in 2017, and observed tags leaving the river predominately in September at a detection site near the river mouth, and at sites in the Columbia River near John Day Dam. Two ODFW warm water biologists have examined smallmouth bass habitat in the Lower Deschutes, and both have expressed their professional opinions that suitable habitat is lacking, and that bass may just be making temporary foraging runs into the river to feed when temperatures warm.

22. A few reports of walleye being caught in the very lowest reaches of the Lower Deschutes were received in 2017. These reports were located in the lower mile of the river, as walleye do not typically occupy stream habitats with gradients, or velocities, like those found in the Lower Deschutes. It should also be noted that an exceptionally large cohort of walleye was from the 2015 year class was present in the Columbia River in 2017, and likely due to their large numbers fish moved into less typical areas such as the Lower Deschutes.

23. In summary, it is not possible to correlate the SWW adaptive management program with increased numbers of smallmouth bass or walleye in the Lower Deschutes.

[6] Passive Integrated Transponder (PIT) tagging uses a small radio transponder that contains a specific code, which allows individual fish to be assigned a unique 10 or 15 digit alphanumeric identification number for tracking.

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Disease

24. Similarly, it is not possible to correlate the incidence of fish diseases such as *Ceratonova shasta* and Neascus, or black spot, with the initiation of the SWW adaptive management program. *Ceratonova shasta* is a fish parasite in salmon and trout. There is no empirical evidence that *Ceratonova shasta* prevalence has increased in juvenile Chinook salmon in the Deschutes River since SWW operation began at the Project. More effort has recently been made to discover why spring Chinook adult returns have been low and some of that focus has been on the potential of *C. shasta* infections to lower outmigrating juvenile survival. However, *C. shasta* has been a known significant pathogen since the early 1970s in the Deschutes. Experimentally exposed groups of rainbow trout in 1979 had as high as 80% *C. shasta* prevalence in the Crooked River above the dam complex. Rainbow trout exposed to Reregulation Dam tailrace river water (at the Pelton trap) in November 1975 experiments had a minimum of 42% confirmed *C. shasta* prevalence and 50% more showing clinical signs of infection. Exposures of juvenile spring Chinook in 2015 at the same Pelton trap location as in 1975 had *C. shasta* prevalence rates of 7.7% in April and 28.6% in May. No experiments of the same stock of fish at the same time of the year, before and after SWW operation, have been conducted so we have no objective comparison of infection rates. The science to detect *C. shasta* has also changed considerably since the 1970s and is now able to detect infections that show no clinical signs or that can be seen microscopically. The life cycle of *C. shasta* is intricately linked to water temperature and studies have shown that temperatures above 15°C increase the actinospore (infective stage to salmonids) productivity in the host polychaetes. Average daily water temperature data from the USGS Madras water station just below the Reregulation Dam from October 2007 through March 2018 has only exceeded 15°C twice: July 2010 and July 2015. It is unlikely that the SWW operation has increased water temperatures enough to increase *C. shasta* prevalence in the Deschutes River.

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25. ODFW does have evidence that the parasite Neascus, or black spot, infestations have increased in Trout Creek, which is a tributary to the Lower Deschutes. Outmigrating smolts from Trout Creek have been monitored since 1999. While 2013 and 2014 had higher percentages of prevalence than any previous year, 2015 was the third *lowest* prevalence recorded. The infestation trend is very cyclical with a high year followed by decreases in prevalence to a low and then a subsequent increase back to another high over 6-7 years. Between 2004 and 2016, the juvenile Chinook and steelhead monitored in the John Day River have had similar cyclical increases in black spot prevalence, with no SWW operation to attribute the increase to. Despite the increase in this surficial parasite, no difference has been found in the general health of any fish population in the Deschutes River. Redband trout data from 2018 show that there is no difference in condition factor between infected and noninfected fish. In the lower Deschutes, the frequency of black spot infected redband trout appears to be increasing (ODFW unpublished data). Therefore, the department decided to test the hypothesis that black spot may affect fish condition directly. We tested this hypothesis by modeling the effect of infection on the weight-length relationship and condition factors of trout collected from the Deshutes in 2018. None of our results indicate there is a difference in the condition of fish infected versus uninfected. There have been no observed increases in any other parasite or pathogen that is monitored in the Deschutes River or tributaries since the SWW became operational.

Algae

26. ODFW does not collect data on algae. We have heard reports from anglers that in some areas wading has become more difficult due to rocks being slick with algae following the implementation of the SWW, however, we have no data available to corroborate these anecdotal reports. However, in the summer of 2017, I worked with Dr. Max Bothwell to sample algae in certain selected reaches along the Deschutes. Dr. Bothwell of Environment Canada is an adjunct professor at the University of Victoria and University of Alberta, and one of the world's

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foremost experts on algal communities and their relationship to nutrients in rivers. He has published many papers on the subject.[7] He found that nitrate levels are very low, and phosphorous levels are very high in the Deschutes. When nitrate levels appear low, slight increases can have significant increases in algal growth. He indicated that increases in algae often leads to increases in macroinvertebrates and can lead to increases in fish productivity. In the sampling we conducted, Dr. Bothwell observed nothing unusual, or unexpected, and concluded that algae was relatively scarce to what he might have expected. Dr. Bothwell noted lack of large floods, or flushing flows, recently can, and likely are increasing algae buildup. In short, one cannot conclude either than the SWW is increasing the prevalence of algae in the Lower Deschutes or that any such increase is negatively impacting fish species.

Aquatic Macroinvertebrates

27. We have little to no data on macroinvertebrates.[8] However, my observations of their prevalence include my many days working on the river throughout the year, along with time spent recreating on the river. It has been my observation that there have been some subtle changes in adult emergence timing, particular with the well-known salmonfly hatch occurring somewhat earlier since the SWW went into operation. In my opinion this probably is occurring because of the river's return to the more natural seasonal thermal pattern that existed before the construction of Project dams. While I may have observed a slight decline in the number of caddisflies, much of our fish sampling takes place along the bank of the river, where caddisflies appeared quite abundant last summer. Additionally, we operate a fish trap at the Sherars Falls during the summer. The trap is situated so it hangs out over the river along the west bank, just upstream from the falls. Because the trap is operated at night, artificial light is needed for its operation. Due to the location over the river aquatic insects swarm to the light source at the trap. The trap has been in operation since the 1970s, and aquatic insects have continually been a

[7] *See https://scholar.google.ca/citations?user=nWlbS74AAAAJ&hl=en.*

[8] Macroinvertebrates are animals without a backbone that can be seen with the naked eye (for example, aquatic insects, snails, worms).

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nuisance at the trap. We have not observed a decline in the numbers, or swarms of insects observed at the trap since the inception of the SWW.

28. Macroinvertebrates are an important food source for fish in the Deschutes. In addition to my anecdotal observations, the evidence does not show that the operation of the SWW has impacted the availability of macroinvertebrates for fish in any significant way. ODFW examined food items found in trout stomachs as part of research work conducted on the Deschutes in the 1970s. Schroeder and Smith (1989) examined the weight of the food items in the stomach contents from trout greater than 25 cm by the percent composition. That study found that aquatic insects were the primary food items found, with crayfish, snails, and other fish making out the bulk of the food consumed. Of the total food items they found in stomachs by percentage were Plecotera (Stoneflies) 50%, Ephemeroptera (Mayflies) 20%. However, the Trichoptera (caddisflies) identified by plaintiffs represented less than 10% (Schroeder and Smith 1989). Stomach samples collected in the spring from rainbow trout from over 25 cm in selected reaches of the Deschutes in 2014-2017, show a similar preference for aquatic insects (*see* table below). Recent work and that of Shroeder, found redband trout to not significantly feed on diptera (trueflies). Caneflies belong to the order diptera.

Percentage of aquatic insects found in redband trout stomachs by weight.

	Food Item			
	Ephemeroptera	Plecoptera	Tricoptera	Diptera
2014	0.03	0.94	0.04	0.00
2015	0.11	0.73	0.15	0.01
2016	0.08	0.75	0.16	0.00
2017	0.07	0.85	0.08	0.00

River Turbidity, Water Quality

29. We have no objective data on turbidity resulting from the operations of the SWW. However, any increase in turbidity appears to reflect a return to natural conditions before the construction of Project dams, which may be beneficial to existing fish species in the Lower Deschutes. It is true that turbidity is a common concern in the Deschutes downstream from the

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White River, as it can negatively affect fishing and to lesser extent fisheries. However, the White River is influenced by glaciers on Mt. Hood, and is not related to the SWW. It has been my observation, however, that river above White River has been slightly more off color in the spring, early in summer than it was prior to the operation of the SWW. This color change appears to be related to the return of more natural, pre-Dam runoff flows, has limited duration, and likely has little or no effect on fisheries. In the 1950s, prior to construction of the Project, the Crooked River was considered the principal source of turbidity in the Deschutes. Oregon State Game Commission biologists identified April through early June as the period of greatest turbidity in Deschutes (Nehlsen 1995). Dams, and improved land management in the Crooked River Basin, have undoubtedly improved water quality, and reduced turbidity since the 1950s. Changes resulting from the SWW have moved the river back to this natural turbidity during spring runoff, as turbid water from the Crooked River, or others sources does not settle out before released downstream. Some turbidity in the spring may be beneficial to fish, as the more turbid waters provide cover as fish (juvenile salmon and steelhead) from predators as they are migrating out of the Deschutes. Neither I nor any of my staff have noticed any odors, nor have we received any complaints from anglers, or other members of the public on river odor.

Birds/Bats

30. I, my staff, and our ODFW district wildlife staff based out of The Dalles District all spend considerable amount time working on, or in, the Deschutes River corridor. We have not observed specific declines in birds, or bats, as described plaintiffs, and we certainly cannot correlate any such decline to SWW operations. Many of the bird species observed to be in decline, are highly migratory, have complex life histories, and it would be difficult, if not impossible, to correlate a potential change in numbers associated with a change in operation of the SWW. As mentioned earlier, the Deschutes is a highly productive river, that supports a tremendous abundance of macroinvertebrates, and a diverse abundant biomass of fish, it would seem unlikely that the lack of macroinvertebrates or fish could limit birds in the magnitude

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described. Bat numbers are in decline regionally, and identifying a localized decline in the population would be difficult.

Fish Committee

31. The Project Fish Committee is composed of the primary licensee signatory agencies along with one non-governmental organization ("NGO") representative. The Committee conducts monthly meetings where fisheries and water quality operational management conditions are discussed to ensure they meet licensee objectives and goals. ODFW representatives at the meeting include the Upper Deschutes District Biologist, ODFW PGE Mitigation Coordinator, and the ODFW Eastern Region Hydroelectric Coordinator. It is my understanding that potential issues are handled in an open and transparent manner, and decisions are based on a consensus approach. It is my understanding the Committee has been effective at reviewing available information and science, and applying adaptive management to further refine and meet fisheries and water quality goals.

Success of SWW at Providing Passage

32. One of the goals of the SWW is to return anadromous fish into historic habitats above the dams. Downstream fish passage survival rates to and through the SWW have increased through implementation of adaptive management measures, such as fish stock origination, changes in life stage releases, changes in power generation, along with other measures. It is important to understand, however, the facility has only been in operation for a relatively short period of time. This is particularly true when you compare this limited time period to the prior 50 years of artificial conditions from the late 1950s until 2010. Moreover, considerable adaptive learning has taken place, and additional learning will likely be needed to refine operations to increase fish survival through the facility. Reservoir currents bringing fish to the SWW are still not completely understood, and continual adaptive learning will be required to improve success.

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33. Project adult return rates have generally been below established goals in the Settlement Agreement, but as with the downstream passage, a significant amount of adaptive management has occurred and returns have been showing some signs of improvement. While recent returns have been below stated goals, it should be noted that adult returns are affected by a number of outside factors, such as, ocean conditions, environmental conditions, Columbia River passage, fisheries, along with many others factors outside of the basin that all effect adult returns.[9] Because of the complex factors outside of the basin, seeing substantial gains in adult return rates needs to be considered a long term process. For instance, the generation time of some species can be as long as seven years, so success can and will take a substantial amount of time to evaluate. Restoring fish to their historic habitat is an important part of restoring ecosystem function. It is also important to consider, however, that returning steelhead back into the historical habitat, and reestablishing a self-sustaining population will be important to achieving recovery of Deschutes River ESA listed Middle Columbia River steelhead in addition to its importance to tribal peoples.

34. The reintroduction of anadromous fish into their historic habitats in the upper Deschutes River subbasin is a significant and groundbreaking effort to restore the historic fish assemblage which was disrupted by initial Project construction and operation. Further, these changes return the river to its natural conditions instead of perpetuating the artificial conditions that prevailed from the late 1950s until 2010. It is my opinion that it would be more beneficial to protected fish species to allow these efforts to continue through the SWW rather than by court order returning to the artificial conditions that existed from the late 1950s until 2010.

I declare under penalty of perjury that the foregoing is true and correct.

EXECUTED on April 12, 2018.

ROD FRENCH

[9] *See* footnote 3.

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