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IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF CALIFORNIA

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY and WESTLANDS WATER DISTRICT, Plaintiffs, vs. SALLY JEWELL, as Secretary of the U.S. Department of the Interior; U.S. DEPARTMENT OF THE INTERIOR; U.S. BUREAU OF RECLAMATION; MICHAEL L. CONNOR, as Commissioner, Bureau of Reclamation, U.S. Department of the Interior; and DAVID MURILLO, as Regional Director, Mid-Pacific Region, Bureau of Reclamation, U.S. Department of the Interior, Defendants,	Case No.: 13-cv-01232-LJO-GSA **DECLARATION OF MICHAEL BELCHIK**

I, Michael Belchik, declare as follows:

1. I make this declaration based on my personal knowledge of the facts set forth herein. I am willing and able to testify under oath if called as a witness before the Court.

2. I am employed by the Yurok Tribe as a Senior Fisheries Biologist in the Yurok Tribal Fisheries Program (YTFP). I have been employed in that position since July 14, 1995. The YTFP employs approximately 50 people to manage, conserve, and restore Yurok's fishery resources. Of these, 16 are biologists and approximately 35 are technicians, depending on the season. YTFP also contracts with numerous experts in various disciplines, including hydrology,

geology, pathology, and biology, to assist with protecting Yurok's fishery resource and associated habitat.

3. I have two Bachelor of Science degrees, one in Fisheries Biology and one in Oceanography, both from Humboldt State University.

4. From 1995 through 2000, I was the technical lead on the EIS team for the Trinity River Record of Decision (ROD) for the Yurok Tribe. Because of this, I am very familiar and knowledgeable with the upper Trinity River and with the studies that were carried out prior to the ROD. I have first-hand knowledge of the Trinity and Klamath Rivers that informs my conclusions set forth below.

5. I have conducted numerous studies on anadromous fish in the Klamath River including Chinook and coho salmon, steelhead, sturgeon, eulachon, and lamprey. The studies I have been involved with include flow studies, studies on fish disease, real-time monitoring of fish health and condition, and spawning enumeration studies as well as other studies. I have published papers in peer-reviewed journals on these subjects. I have been responsible for the preparation of many technical papers, technical memos, progress and final reports regarding these studies. I have provided declarations in legal proceedings, been deposed, and have presented live expert witness testimony.

6. In the course of my duties working for the Yurok Tribal Fisheries Program, I have acquired intimate and detailed knowledge of flow management on both the Klamath and Trinity Rivers, and how that flow management affects anadromous fish and other aquatic species in the Klamath and Trinity Rivers. I regularly monitor river flow predictions, hydrological conditions, and weather and climate predictions insofar as they relate to anadromous fish in the Klamath River Basin.

7. In the course of my duties I have acquired knowledge and familiarity with the Yurok Tribal fishery. Yurok and the Hoopa Valley Tribe are annually allocated 50% of the harvestable surplus of Klamath Basin anadromous fish. Of this Tribal allocation, 80% is dedicated to Yurok and 20% to the Hoopa Valley Tribe. On average, calculated post-season, Yurok harvests approximately 86% of the Klamath River Indian fishery harvest. The 2013 fall

Chinook salmon allocation for the Yurok Tribe is 91,862 fish. Management and restoration decisions by the Yurok Tribe regarding Yurok trust species such as coho and Chinook salmon and steelhead trout and the various seasonal races is based on best available science.

8. Klamath and Trinity anadromous species, but especially Chinook salmon, are vitally important to the Yurok Tribe and its members for sustenance, cultural values, and economic opportunities. The Klamath River and the fishery resource it supports are an integral component of the Yurok way of life. Yurok people depend upon various species/races of anadromous fish that migrate through the reservation throughout the year, such as spring and fall Chinook salmon, coho salmon, steelhead, green sturgeon, lamprey and eulachon. All these runs are of utmost importance to Yurok people, however the only run that has been robust enough to support occasional commercial opportunities during recent decades has been the fall Chinook run. This fall Chinook run was most impacted by the 2002 fish kill.

9. Due to the immense importance of the Klamath and Trinity River fisheries to the Yurok Tribe, one of my primary duties since the 2002 fish kill has been to thoroughly investigate the cause of the fish kill and work to develop scientific information that can be used to guide management actions intended to reduce the chances of another fish kill happening. The Tribe has made this a priority for their staff, myself included, because the fish kill caused disruption to the Yurok fishing, and impacted future runs by significantly reducing the number of spawning fish in 2002. This likely resulted in substantial effects on the survival of eggs from fish that survived to spawn thus lowering the production of juvenile fish in subsequent years. To that end, I have been involved in the preparation of several pieces of scientific evidence regarding flow management on the Klamath and Trinity Rivers as it relates to the catastrophic fish kill of 2002.

10. This year, as in previous years, I have made numerous visits and snorkel observations on the lower Klamath River to check river conditions and observe fish health conditions first hand.

2002 Fish Kill and Research of Causes

11. In 2002, over 34,000 adult salmon died due to a massive disease outbreak of Ich, with a secondary infection of columnaris. This fish kill happened entirely within the Yurok Reservation. During this catastrophic fish kill event, I visited the fish kill area on multiple days, collecting data, making observations as to the cause of the fish kill event, and photographing the devastation.

12. During my site visits, I observed tens of thousands of adult dead Chinook salmon, steelhead trout and coho salmon, ranging in size from approximately 5 to 40 pounds. The number of dead Chinook was conservatively estimated at over 33,000, but was likely higher.

13. During my site visits in 2002, I saw numerous dead adult Southern Oregon/Northern California Coastal (SONCC) coho salmon in and near the mouth of Blue Creek. SONCC coho salmon are listed as "threatened" under the Endangered Species Act, with returns very low when compared to historic abundance, and are protected under the federal Endangered Species Act and other laws. Studies estimated around 350 coho died during the fish kill event of 2002. Although this is a much smaller number than the number of dead adult Chinook, it is important because coho populations are so imperiled to begin with. Because I witnessed mortality of coho salmon in the fish kill of 2002, it is clear that coho are at risk from a fish kill. Augmented flows proposed for the Trinity River that reduce the risk to Chinook salmon will lessen the likelihood of mortality for this listed species as well as for Chinook salmon.

14. I have read all studies evaluating the causes of the 2002 fish kill event, and co-authored one of the reports. There is a general consensus in these studies that the cause of death of the fish in 2002 was a massive epidemic of *Ichthyophthirius multifiliis* ("ich"), which is a single-celled protozoan parasite that passes from fish to fish in crowded, low flow, poor water quality conditions. A secondary infection of columnaris (a bacterial infection) was also implicated.

15. Available information, including reports from the US Fish and Wildlife Service, the California Department of Fish and Wildlife, and the Yurok Tribe, show that low flows, marginal (but not unusual) water quality conditions, and a large run size were the primary factors

in causing the outbreak of ich. Of these conditions, flow is the only one that can be affected by management actions. Although no single factor was cited as the direct cause of the fish kill, all three reports linked the combination of low flows and a relatively large run size to the disease outbreak and subsequent death of tens of thousands of fish.

16. It is the combination of low flows and high run size that significantly increases the risk of a catastrophic fish kill because it creates a potential situation of many infected fish in a small area that easily pass the disease organism to each other. Ich during its free swimming infectious stage, known as a theront, does not distinguish between Chinook and coho salmon or between adults and juveniles. It can be transmitted freely between these fishes due to its presence in the water column. Furthermore, high water temperatures shorten the life cycle of the ich pathogen which increases transmission rates and increases the chances of a deadly epidemic.

17. Although other years have had above-average run sizes and low flow conditions, 2002 was unique in that it had a large run size combined with extremely low flows. The only other year that was similar to 2002 in having an above average run size combined with low flows was 1988. However, the 2013 run is projected to be approximately 1.4 times the size of the 1988 run. It is the combination of large run size and low flows that was unique, rather than the presence of either a large run or low flows in and of themselves.

Augmented Flows Needed to Significantly Reduce the Risk of a Fish Kill in 2013

18. In 2002, the year most comparable to 2013 in terms of low flows in combination with a large projected run size, the fall Chinook salmon run was only 58.9% of that projected for 2013. The 2013 fall Chinook salmon run is approximately 1.7 times the run size of 2002. Flows are projected to be similar in 2013 to those that occurred in 2002, which involved a significantly smaller run size. In fact, the flow at the mouth of the Klamath on August 17, 2013, was nearly exactly what it was in August 2002, a few weeks before the start of the fish kill. Based on my experience and research of the 2002 fish kill, I have concluded that the combination of these conditions (large run size and low flows) makes the risk of a fish kill this year more probable than not unless lower Klamath River flows are augmented to lessen the risk.

19. I have been an active member of the Klamath Fish Health Action Team (KFHAT) since 2003, which is a group that shares real-time information regarding fish health and conditions on the Klamath River. Members of KFHAT represent a broad spectrum of Tribal, Federal, State and local fisheries co-managers including: California Department of Fish and Wildlife, Hoopa Valley Tribe, Humboldt Watershed Council, Karuk Tribe, Klamath Salmon Anglers and Guides Association, NOAA Fisheries, North Coast Regional Water Quality Control Board, PacifiCorp, Quartz Valley Tribe, Salmon River Restoration Council, Shasta Valley Resource Conservation District, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Forest Service, and the Yurok Tribe. KFHAT has color coded alert levels from green (low chance of fish kill event) to red (fish kill occurring). The current level is yellow, indicating a significant risk of a fish kill occurring. The reason for the yellow alert is dry hydrologic conditions in the basin and an above average predicted fall Chinook salmon run size (predicted = 272,000 fish; average = 121,000 fish).

20. Since records were initially kept in 1978, the projected run size in 2013 is second only to the run that returned during 2012, when supplemental fall flows were used to minimize the risk of a fish kill. This large run in 2012 was primarily comprised of the same brood (2009) that is anticipated to return in 2013. However last year the run was primarily composed of age-3 fish and this year they are expected to be larger age-4 fish.

21. There is broad scientific consensus among fisheries managers in the Klamath that higher flows have the capability to significantly reduce the chances of an epidemic outbreak of ich by 1) by increasing water velocities and 2) by causing higher turnover rates of water in holding areas, which reduces the ability of ich to find and attach to a host fish during its free swimming infectious stage as a theront.

22. Sufficiently high water velocities and turnover rates need to be maintained before and throughout the primary fall Chinook salmon migration season in order to reduce the probability of an ich outbreak. In addition, higher base flows help to reduce the overall density of adult fall-run Chinook salmon, and thereby reduce the probability that the theronts would be

successful in finding a host. Finally, increased flows reduce the risk to coho salmon that may be in the system or that migrate into the system after the disease has already been established.

23. It is clear from the research that my crew and I have done regarding ich that flow increases must happen before an epidemic becomes apparent. By the time fish are actually dying from ich and becoming visible as carcasses, it is too late to increase flows and stop the epidemic. At that point, emergency flow increases can only lessen the severity of a fish kill, rather than prevent it. In addition, any response to an epidemic is necessarily delayed by at least two days due to the travel time from Lewiston Dam to the lower Klamath River.

24. As part of our regular duties, my crew of qualified biologists and technicians regularly enumerate fish that congregate at areas of colder water (known as "thermal refugia") in and near the place where the catastrophic fish kill event occurred in 2002. This year, we have seen between 2 and 10 times more juvenile fish at these creek mouths than ever before, which I attribute to a combination of abundant juveniles and warm river temperatures. This occurrence has led to an even greater risk of a fish kill because juvenile fish as well as adult fish are capable of developing and passing along ich. Although our concern about juvenile fish starting an epidemic has lowered because 1) the majority of juvenile fish appear to have emigrated from the river and 2) no ich infections in juveniles were found by the CA/NV fish health center on July 29, 2013 when they sampled approximately 50 juvenile Chinook salmon at Blue Creek, a primary thermal refugia location within the Lower Klamath. However, our concern about the risk of a fish kill in the adult run remains high based on the large run size and dry conditions and the possibility that the epidemic can start with adult fish from the early part of the run rather than juveniles.

2013 Real-time Monitoring and Overestimation of Augmented Flow Releases

25. I have reviewed the Bureau of Reclamation's Environmental Assessment for the 2013 Lower Klamath River Late Summer Flow Augmentation from Lewiston Dam, as well as Charles Hanson's declaration. Mr. Hanson's declaration states that "up to 62,000 acre-feet (AF), and potentially up to 109,000 AF" will be released. I have analyzed river flow predictions from the California-Nevada River Forecast Center (CNRFC) and have found this estimated volume of

water to be in error. The error is due to several factors: 1) because of the TRO, the releases are highly unlikely to start before August 23; 2) the river flow forecasts have changed since the EA was published, meaning less flow augmentation will be required in order to reach the target of 2800 cfs at the KNK gage; and 3) the CNRFC forecasts are over 250 cfs low at this time for the lower Klamath River, which has caused the estimates of the water needed to reach the proposed flow target of 2800 cfs to be too high. These second two factors are explained more fully below.

26. The predicted flow at the KNK gage for August 19 was projected as of August 19 to be 2147 cfs. On August 19th, 2013, the actual flow was 2390 cfs. Thus, the flow at the KNK gage on August 19th, 2013, was 243 cfs higher than projected, requiring that less water be released to meet the targeted flow of 2800 cfs at the KNK gage.

27. The CNRFC forecasts are currently underestimating the amount of flow for the lower Klamath River. For example, on August 19th, 2013, the CNRFC predicted 2147 cfs at the mouth of the Klamath River (797 cfs prediction for flow without reservoir releases, plus 450 cfs from Lewiston Dam and 900 cfs from Iron Gate Dam). The actual flow as of 8:00 am August 19, 2013, was 2390 cfs. This is an under estimation of 243 cfs. In addition, BOR is currently scheduled to release 11,000 af of water beginning on August 24, 2013, for the Hoopa Boat Dance ceremony.

28. Based on real-time conditions and the currently planned release for the Hoopa Boat Dance ceremony, only 20,732 acre-ft of water will be needed to reach the 2800 cfs target at the mouth of the Klamath if supplemental flows are initiated on August 23 and continue through September 21. I have prepared a technical memo that discusses how these calculations were made.

Minimal Risks To Non-Targeted Species From Augmented Flows

29. In 2012, I participated in the Trinity River Fall Flows Workgroup which was convened by the Trinity River Restoration Program and overseen by the Bureau of Reclamation, to analyze whether flow augmentation was a prudent management action to lessen the risk of a fish kill in the lower Klamath River and if so, how it should be implemented. Based in part on the Yurok Tribe's research, the Trinity River Fall Flows Workgroup in 2012 recommended that a

base flow of 3200 cfs be maintained in the lower Klamath during the period of adult fall-run Chinook salmon migration beginning on August 15, 2012, and continuing through September 23, 2012, with the possibility of extending the flows later if water temperatures were above a certain threshold. Although the group specifically noted and discussed potential downsides to increasing flows, there was unanimity among the scientists that the benefits (possible prevention of a fish kill event) outweighed impacts to other species such as juvenile lamprey, pond turtles, yellow-legged frogs and other salmonids. Many of these species, including the steelhead and lamprey eels are important to the tribe, so risks to these species were carefully considered by Tribal and other biologists. The fact that the benefits outweighed the risks was evident in the fact that the group forwarded the recommendation for increased flows to the BOR Northern California Area Manager.

30. I have reviewed the declaration of Charles Hanson, and specifically his assertion that increased fall flows from Lewiston Dam followed by a reduction back to 450 cfs would cause an increased risk of redd dewatering. The Trinity River Fall Flows Workgroup did express a concern about dewatering of redds, but subsequent direct observations by USFWS indicated that no redds were in fact dewatered after the 2012 Trinity River flow augmentation. Redd dewatering is not a significant or even meaningful risk. I base this conclusion on the fact that flows were actually increased in 2012 without any redd dewatering occurring when flows dropped back down from approximately 950 cfs to 450 cfs on September 18 and 19th, 2012.

Significant Risk of a Massive Fish Kill in 2013 without Augmented Flows

31. I have great concern about a fish kill this year due to the very large run size predicted to return to the Klamath River combined with the very dry conditions that are causing low river flows. The 2013 flows are projected to be nearly identical to those in 2002 if augmented flows are not provided. The fall adult Chinook salmon run size is predicted to be 170% greater this year than the 2002 run. The combination of these two factors this year is more extreme than the conditions experienced in 2002 immediately prior to that fish kill event. Because the consequences of a fish kill are so catastrophic to the Tribe, the Tribe has placed

great emphasis on prevention of a fish kill this year. This was evident in the Tribe's April 25, 2013, letter to the Secretary of the Interior requesting augmented flows.

32. While less than recommended by the Trinity River Fall Flows Workgroup, a base flow of 2800 cfs between August 15 and September 15, 2013, would be significantly more protective against the risk of a fish kill for this year than the "no action" alternative. A fish kill is significantly more probable if these additional flows are not released. For each day that increased flows are delayed, the risk of a significant fish kill that cannot be stopped increases.

33. While definitive cause and effect relationships between flow, fish density and water quality are not available, and likely will never be available given the complexity of the system and the large number of variables, the existing scientific evidence strongly supports increased flows in situations such as 2013 where a very large run of fish is expected during low and warm water conditions. In my opinion, which is shared by every single fisheries manager with experience in the Klamath with whom I interact, a failure to implement augmented flows in the immediate future will significantly increase the risk of another fish kill event.

I declare under penalty of perjury under the laws of the State of California and the United States that the foregoing is true and correct.

Executed this 19th day of August, 2013, at Weitchpec, California.

/s/ Michael Belchik (as authorized on 8/19/13)

Michael Belchik