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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 2014 fall

Chinook salmon allocation for the Yurok Tribe is 21,840 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 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 fish densities (caused either by high run size, fish holding in pools, or adult fish trapped at thermal refuge areas) that significantly increases the risk of a catastrophic fish kill because it creates a potential situation of many 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 quicken the life cycle of the ich pathogen, which increases transmission rates and increases the chances of a deadly epidemic.

Augmented Flows Needed to Significantly Reduce the Risk of a Fish Kill in 2014

17. The flows in 2014 have been at or near record lows throughout the Klamath/Trinity Basin. In late July and early August of 2014, the flows at the Klamath River near Klamath (KNK) gage were significantly lower than they were in 2002 or in 2013, and projected to fall even further. Contributions from tributaries such as the Shasta, Scott, Salmon, and South Fork Trinity River were also at or near record low.

18. In my declaration in 2013, I talked at length about the relationship between run size and low flows, and how that increased the risk. Exhibit 1 at ¶¶ 15-18. Large run size is assumed to lead toward higher fish densities, which when combined with low flows in 2013 was determined to lead to a higher risk of a fish kill. However, in addition to large run size, fish behavior and the presence of other salmonids can cause large numbers of fish to congregate in high densities for extended periods of time. For example, if a large run of spring Chinook and steelhead trout enter the river, and river temperatures rise sharply to a level that induces extended residence at thermal refuge areas, fish will be trapped at thermal refuge sites for extended periods of time in high densities. This exact set of circumstances occurred this year and in 2002. The Yurok Tribal Fisheries Program has direct observations of high numbers of fish at Blue Creek

thermal refuge site in numbers that have not been seen since 2002, the year of the fish kill (high numbers of adults at this thermal refuge site were observed in 2003 and 2004, but preventative flows were provided in those years). This has greatly increased my level of concern for the occurrence of a fish kill in 2014 if emergency protective flows are not provided.

19. 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 a very high number of adult salmonids holding at various thermal refugia in the lower Klamath River. A review of our thermal refuge observational data shows that the last time this occurred was in 2002. Fish use thermal refugia every year when water temperatures are high, however, since 2002, we have not had adult fish holding in thermal refugia in the lower Klamath River in such unusually high numbers for an extended period of time (See Exhibit 2, Technical Memoranda describing observations at Blue Creek since 2002; Exhibit 3, PowerPoint presentation given to Bureau of Reclamation by the Yurok Tribe on August 6, 2014, see also youtube videos https://www.youtube.com/watch?v=44kyN1bz_jc&list=UUcxFgOcHoQXYaoS1u2rPAYw and https://www.youtube.com/watch?v=jpX6ICJZeuA&list=UUcxFgOcHoQXYaoS1u2rPAYw&index=2 that show footage of high numbers of adults in the refuge filmed by the Yurok Fisheries Program in 2014. This occurrence (high numbers of adult salmon holding for extended periods of time) has led to an even greater risk of a fish kill because adult fish holding in refugee are at risk of developing and passing along ich and potentially seeding the river with ich prior to the arrival of the larger fall Chinook runs.

20. Starting in July of 2014, our observations at Blue Creek, located approximately 15 river miles upstream of the mouth of the Klamath showed a very large number of adult salmonids (steelhead and Chinook salmon) holding at or near the mouth of Blue Creek. The last time this had occurred and proactive or emergency flows were not provided was in 2002 in the months preceding the fish kill (Exhibit 3).

21. 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 Orange as upgraded on August 1st 2014, indicating that "A die-off is imminent and management levels in agencies need to be alerted". The reason for the orange alert is "high temperatures, critically dry water year designation, increased mortality." (http://www.kbmp.net/collaboration/kfhat)

22. Another reason I have become very concerned about a fish kill this year despite below average predicted escapement is the on-going low level mortality that has been observed throughout the summer of 2014 throughout the Klamath basin. Dead adult salmonids have been observed in the Klamath River mainstem below the Trinity River confluence, in the lower Trinity River mainstem, and in the Salmon River.

23. 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 which can directly wash the trophont life stage out of the system before it can hatch and release theronts that infect new fish, and 2) by causing velocities and higher turnover rates of water in holding areas, which reduces the ability of the free swimming infectious theront stage of ich to find and attach to a host fish. Whatever the water velocities and turnover rates were in 2002 at flows of approximately 2,000 cfs, they were sufficiently low to allow a massive and rapid outbreak of ich.

24. 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. If emergency protective flows are stopped during the time of fall migration, the disease can reach epidemic proportions quickly if fish are congregating in a certain location, such as Blue Creek refugia as has been directly observed this year. 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.

25. 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 fully 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 four days due to the time needed for Bureau of Reclamation to respond and the travel time from Lewiston Dam to the lower Klamath River.

Minimal Risks To Non-Targeted Species From Augmented Flows

26. In 2012, and again in 2013, 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.

27. 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. I therefore conclude that 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 2014 without Augmented Flows

28. The source of my concern regarding a fish kill in 2014 is the direct observations of adult holding in various thermal refuge areas in the lower Klamath River, but primarily at the Blue Creek refuge. There have been large numbers of adults holding at these locations since early August due to high water temperatures, and thus have been holding in close proximity to each other for over a month. The 2014 flows are projected to be significantly lower than in 2002 if augmented flows are not provided. 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 letters to the Secretary of the Interior requesting augmented flows. Exhibit 4, and 5.

29. While less than recommended by the Trinity River Fall Flows Workgroup in 2012, the 2014 supplemental flow releases that are being released on an emergency basis will significantly lower the risk of a fish kill for this year compared to maintaining releases at the status quo. In other words, a fish kill is significantly more probable if these additional flows are not fully released.

30. While quantified 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 during low flow years and especially in situations such as 2014 where adult fish have been holding in close quarters for many weeks in a row. 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 2014 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 26th day of August, 2014, at Weitchpec, California.

/s/ Michael Belchik (as authorized on 8/26/14)

Michael Belchik