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Hearing on The Endangered Species Act 30 Years Later: The Klamath Project
Statement of

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and

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Good morning, Mr. Chairman and members of the Committee. My name is William Lewis, Jr. I am professor of Environmental Science and Director of the Center for Limnology at the University of Colorado's Cooperative Institute for Research in

Environmental Sciences. I recently served as chair of the National Research Council's Committee on Endangered and Threatened Fishes in the Klamath River Basin. The National Research Council (NRC) is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine; it was chartered by Congress in 1863 to advise the government on matters of science and technology.

The Lost River sucker and shortnose sucker of the Klamath River basin were listed as endangered by the U.S. Fish and Wildlife Service under the federal Endangered Species Act in 1988. These two fish species, which are restricted in their distribution to the Klamath River basin, were so abundant a century ago that they served as a major food source for American Indians and supported a commercial fishery. Both species are large, have a long life span, and can tolerate a number of kinds of environmental extremes that many other fishes cannot. The two species originally occupied much of the upper half of the Klamath River basin. Their distribution and abundance are now much reduced, and most of the present subpopulations are not self-sustaining.

In listing the two endangered sucker species, the U.S. Fish and Wildlife Service cited overfishing as one cause of decline. Other causes are also important, however, as indicated by the failure of these species to recover after a ban on fishing in 1987. The U.S. Fish and Wildlife Service identified water management practices (including water-level manipulation and entrainment of fish through irrigation structures), adverse water quality, introduction of competitive or predatory fishes not native to the Klamath basin, physical alteration of habitat such as marshes and spawning areas, blockage of migration pathways, and genetic isolation of subpopulations. These factors are related to a number of human activities, including irrigated agriculture, power production, and livestock management.

The coho salmon, a migratory species that spends approximately half of its life in streams and the other half

in the ocean, is distributed from California to the Aleutian Islands. It is divided into distinctive genetic subgroups that are termed "evolutionarily significant units." One of these evolutionarily significant units spawns and develops through its early life stages in waters of the Klamath River basin and nearby drainages. Although once abundant in the Klamath River basin, it has declined notably over the last 80-90 years. As a result of its decline, it was listed in 1997 by the National Marine Fisheries Service as threatened under the federal Endangered Species Act. In evaluating the decline, the NMFS listed overfishing as one initial cause. Prohibition of fishing for wild coho (as distinguished from hatchery fish, which bear hatchery markers) has not led to recovery, however. In attempting to identify other factors that may be suppressing coho, the NMFS has listed irrigation-related flow manipulation of the Klamath River, physical blockage of migration pathways by dams or irrigation structures, high temperature or other poor water-quality conditions related in part to flow manipulation, and physical habitat impairment. Coho presently occupy only the lower portion of the Klamath River basin, below Iron Gate Dam. Their previous distribution, prior to the installation of mainstem dams, extended upstream. Coho mature almost exclusively in tributary waters, and migrate to the ocean during spring to complete the second half of their life cycle prior to their return for spawning, after which they die.

As required by the Endangered Species Act (ESA), the two listing agencies responsible for ESA actions on behalf of the listed suckers and coho salmon have conducted formal consultations with the U.S. Bureau of Reclamation, which manages water in parts of the upper portion of the Klamath River basin through its Klamath Project, which serves 220,000 acres of private, irrigated agricultural lands. Because water management is a potential direct or indirect factor affecting the listed species, the consultations were intended to produce documentation of the operational effects of the Klamath Project on the listed species, and to elicit proposals from USBR for avoidance of jeopardy to these species through future operations of the Klamath Project. The listing agencies have engaged in numerous rounds of consultation with the USBR. The consultations have culminated in the production of biological assessments by the USBR and biological opinions by the listing agencies. In its biological assessments, the USBR has proposed changes in water management and screening of its main water intake as well as some other measures intended to benefit the fish. In all cases, however, the listing agencies have found the USBR proposals inadequate and have required more extensive changes in water management and some greater commitments to other actions as well.

The agencies released assessments and opinions during early 2001, as they had in previous years. The biological opinions of the two listing agencies for 2001 required substantially increased stringency in management of water by the Klamath Project. Specifically, the USFWS required that annual minimum water levels in Upper Klamath Lake, which is home to an impaired population of endangered suckers, be less extreme than in previous years, which in effect eliminated part of the storage value of the lake for the Klamath Project. In addition, the NMFS required higher minimum flows downstream of Iron Gate Dam. The effect of this requirement was to reduce further the ability of the USBR to store water in Upper Klamath Lake for use in irrigation. Thus, the total amount of water available to the USBR for use by the Klamath Project in dry years was significantly reduced as a result of the 2001 biological opinions.

After release of the 2001 biological opinions by the listing agencies, it became clear that 2001 would be a year of extreme drought. Whereas similar extremes of drought in recent years (1992, 1994) had led to water restrictions for the Klamath Project, they had not eliminated irrigation on the private lands irrigated by the Klamath Project. The new restrictions for water level in Upper Klamath Lake and flows in the mainstem Klamath could not be met, however, without cessation of irrigation on the lands served by the Klamath Project. While a small amount of water was made available late in the season, there was virtually no irrigation through the Klamath Project during the growing season of 2001. Thus, the coincidence of an extreme drought with new restrictions on water management combined to make disastrous consequences for Klamath Project irrigators and their economic dependents. Had 2001 been a normal or wet year, the restrictions no doubt would have generated much controversy, given that the implications for drought years of the future would have been evident through calculations of water shortfalls in dry years. The events combined, however, to force the controversy to a crisis over a period of just a few weeks, during which water users and their supporters criticized the decisions of the listing agencies, while parties with economic or other interests in fish applauded the ESA-based water restrictions as a step toward restoration of the three listed fishes.

The economic hardship brought on by the combination of drought and the new water restrictions focused much attention on the scientific basis for judgments that were made by the listing agencies. Therefore, the U.S. Department of the Interior and the Department of Commerce asked the National Academy of Sciences

(NAS) to form, through the National Research Council (NRC), a committee (the NRC Committee on Endangered and Threatened Fishes in the Klamath River Basin) that would be capable of assessing the scientific and technical issues surrounding the water restrictions. The committee's charge, which was written by the U.S. Department of the Interior and Department of Commerce in consultation with NRC staff, called for the committee to produce an interim report focusing on the strength of scientific support for the biological assessments and biological opinions of 2001. In a second phase, leading to a final report, the committee was charged with a broader overview of the requirements of the listed species for recovery in the future. The committee released its interim report in February 2002 and its final report in October 2003. As is the case with all NRC reports, these two reports were rigorously reviewed externally and were revised by the committee in response to review under supervision of the NRC and the NAS.

In its interim report, the NRC committee found that proposals by the USBR for water management in the future left open the possibility of establishing lower mean water levels in Upper Klamath Lake and lower mean flows in the Klamath River main stem than had been the case over the past decade. Although it was not clear whether changes of this type were actually the intent of the USBR proposals, the committee found the proposals unjustified on grounds that lower mean operating levels and flows were unknown and were not analyzed scientifically by the USBR for its assessments.

In analyzing the USFWS's biological opinion of 2001, the NRC committee found considerable scientific support for a number of requirements specified by the USFWS. For example, installation of a fish screen to prevent outright mortality of multiple age classes of endangered suckers entering the Klamath Project's main irrigation canal near the outlet of Upper Klamath Lake was proposed by the USFWS, and the committee found this recommendation highly supportable. In examining the scientific basis for a USFWS requirement that water levels in Upper Klamath Lake be held higher than they had been in the recent past, however, the committee found considerable data, collected primarily with federal support during the 1990s, that the projections of benefit to the fish from this change in management were contradicted by evidence. Specifically, extremes of water quality impairment producing mortality of suckers in Upper Klamath Lake did not coincide with years of low water level. Also, proposed benefits sought through expansion of habitat associated with higher water levels did not appear in the form of a higher output of young fish, as determined by sampling of fish during the 1990s. Thus, the committee found the scientific basis for the requirement for stricter regulation of water levels in Upper Klamath Lake to be unsupported scientifically, but also noted that this conclusion would not be a valid argument for expanded water-level manipulation.

For evaluation of the needs of coho salmon, the National Marine Fisheries Service relied heavily on habitat modelling, which is common practice for predicting the benefits to fish of higher flows in streams or rivers. The modelling results were not available in final form to the NMFS when it wrote its 2001 opinion, and were not available to the NRC committee during its deliberations. Thus, the NMFS decisions in 2001 based on incomplete modelling could not be considered well supported. More importantly, an underlying assumption of the modelling was that habitat requirements of coho salmon could be equated with habitat requirements of Chinook salmon, which also occupy the Klamath basin. The committee noted that coho salmon are much more strongly dependent on tributaries than Chinook salmon, and therefore are less sensitive to mainstem conditions during the rearing phase than Chinook salmon. Thus, the overall approach of the NMFS, in the opinion of the committee, was scientifically weak. The strongest point brought forward by NMFS had to do with possible benefits of an April flow pulse that would assist the young fish in migrating to the ocean. While this benefit had not been quantified or evaluated empirically, it at least had some potential to be valid.

While the NRC committee found strong scientific support for a number of requirements given by the listing agencies in 2001, the requirements related to water levels in Upper Klamath Lake and water flow in the Klamath main stem had no substantial scientific basis, in the opinion of the committee. This conclusion, as given in the interim report, generated much positive reaction from the community of irrigators and their economic dependents and much criticism from environmentally oriented observers. It seemed to many that the committee had sided with the irrigators and against environmental interests. The committee, however, was merely responding to its charge, and was not aligning itself with one set of interests or the other.

Following the issuance of the interim report, the agencies were required to go through yet another round of consultations and produce assessments and opinions, as before, because of the expiration of the 2001 documents after one year. While the NRC report was not binding on the agencies, it stimulated some changes in the ESA consultations of 2002. In general, the agencies were more energetic and innovative in their consultations than they had been in previous rounds, and were able to produce a ten-year plans rather than one-year plans. Although the ten-year plans can be reopened at any time by the listing agencies, they

provide a degree of stability that favors both water management and recovery actions. The USBR, recognizing that use of water on behalf of fish would be a constant feature of future water management, offered increased concessions that it considered to be useful but still consistent with future delivery of meaningful amounts of water through the Klamath project over a wide range of water-year types. It proposed development of a water bank, which might include conditional water rights to be obtained by lease or purchase and to be used to reduce pressure on the irrigation water source during years of drought. The USBR also offered an April flow pulse below Iron Gate Dam to benefit coho during their migration and made several other kinds of concessions related to coho.

The two listing agencies found the proposals of USBR to be useful but insufficient. Thus, they found that the USBR's proposed operations as outlined in the biological assessment of 2002 would leave the three species in jeopardy, and they issued "reasonable and prudent alternatives," as required by the ESA. The reasonable and prudent alternatives placed deadlines on a number of the proposals made by USBR and also put a volumetric requirement on the water bank. The USFWS, while continuing to back the concept of benefit to the endangered suckers from reduced water-level fluctuations in Upper Klamath Lake, moderated its water-level requirements so as to be more consistent with the data collected on the suckers during the 1990s. Fish screening continued to be an issue; screening of the main canal supplying the Klamath Project was required by USFWS and was accomplished during 2004. The USFWS made several other requirements as well.

The NMFS continued to endorse its habitat-based flow modelling leading to requirements for higher flows in the Klamath main stem, on grounds that expanded habitat in the main stem would benefit coho. The NMFS moderated the effect of these requirements on the Klamath Project, however, by recognizing that the USBR accounts for only approximately half (57%) of total irrigation water use above Iron Gate Dam. Thus, the NMFS apportioned to USBR 57%, rather than 100%, of the quantitative requirement for water needed to meet its prescribed flows at Iron Gate Dam. It also required, however, that USBR participate in actions required to make up the balance (43%) of the water required to provide minimum flows, and it endorsed the water-bank concept.

In its final report, the NRC committee gave several major conclusions relevant to the long-term recovery of endangered and threatened species in the Klamath River basin. First, the committee noted that none of the three species could be expected to recover through any program that is primarily or solely based on consultations with the USBR related to operations of its Klamath Project. While the Klamath Project consultations are mandatory, factors suppressing the species extend well beyond the Klamath Project. For suckers, blockage of a large amount of potential spawning habitat by Chiloquin Dam and by numerous small, privately managed tributary dams and diversions constitutes "take" (mortality or life-cycle impairment) and must be eliminated or circumvented. Restoration of habitat in tributary spawning areas for the suckers above Upper Klamath Lake also is critical, and expansion of resting areas for larval fish at tributary mouths for Upper Klamath Lake is important. The committee viewed the feasibility of reversing poor water-quality conditions in Upper Klamath Lake as low for the near future, and therefore recommended strong emphasis on stimulation of the production of young fish for Upper Klamath Lake to offset adult mortality and expansion or introduction of subpopulations at other locations where manipulation of environmental conditions might be more feasible. For example, the committee recommended establishment of a subpopulation in Lake of the Woods, where suckers were poisoned decades ago in order to make way for game fish.

For coho, the committee recommended much more emphasis on tributaries, where young coho either succeed or fail in reaching the smolt stage for migration to the ocean. The tributaries are plagued by a variety of problems, including excessive drawdown in summer, numerous blockages and diversions that affect the movement of salmon, high temperatures caused by loss of riparian vegetation and excessively low flows during summer, diversion of cold spring flows that originally provided year-round benefit to salmon, degradation of physical habitat by dams, inadequate control of erosion, and effects of livestock on stream banks and stream channels. In addition, mainstem dams block access of coho to tributary habitat, and introduction of large numbers of competitive hatchery-reared fish (mostly steelhead and Chinook) may reduce the success of young, wild coho during their downstream migration; both types of impairment should be considered for possible action. Correction of problems affecting coho obviously must extend far beyond the boundaries of the USBR's Klamath Project.

The NRC committee also diagnosed some procedural and organizational problems with the recovery efforts in the basin. There are no adequate ESA recovery plans for any of the three species. Funding for recovery programs has been inadequate, and would not have supported actions of the scope necessary to produce recovery. Because of intense partisan feelings within the basin about recovery strategies, the agencies must

find ways of fostering collaboration through a diverse committee of cooperators who are fully informed on recovery plans and proposals, and who have the opportunity to debate and contribute to them. Guidance for well-meaning landowners who attempt to improve the environment would be very useful in maximizing the beneficial effects of private money directed toward remediation.

The listing agencies in the Klamath basin have been strongly criticized for using judgment not supported by bedrock scientific information. The NRC committee, as expressed in its reports, did not agree with the notion that professional judgment is a useless or inappropriate tool to be used in environmental actions such as those required by the Endangered Species Act. Professional judgment, which involves application of knowledge about the basic requirements of a listed species, is mandatory for agencies that implement the Endangered Species Act. The NRC committee did note, however, that the use of judgment is much more defensible when data are not available, or when judgment is confirmed by at least some data, than when it proves to be inconsistent with accumulating data. In the latter instance, the listing agencies would more likely be effective if they were to modify their judgments, and should not be criticized for doing so, given that modification of initial judgments in response to observations or data is a constant feature in all fields of applied science.

The committee concluded that there is much untapped potential for recovery of the three listed species in the Klamath River basin. Recovery efforts must extend beyond the Klamath Project and its operations to embrace all major factors known to cause mortality or impairment of the endangered fishes. If efforts of this scope can be designed, and are supported by steady funding from the federal government, implementation of the Endangered Species Act in the Klamath River basin could be an inspirational example, especially for the western states.

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