

Testimony of William Lewis  
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Subcommittee on Water and Power  
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My name is William Lewis. I am employed by the University of Colorado at Boulder, where I am Professor of Biology and Director of the Center for Limnology within the Cooperative Institute for Research in Environmental Sciences. My field of specialization is inland waters, including lakes, streams, rivers, and wetlands.

The National Research Council (NRC) is the operating arm of the National Academy of Sciences (NAS) and the National Academy of Engineering (NAE). The NRC forms and manages committees under policies and guidelines set by NAS. Between the 1970s and the present, I have been a member or chair of several NRC committees. Between 2002 and 2004, I was chair of the Committee on Endangered and Threatened Fishes in the Klamath River Basin ("Klamath Committee"). The work of the committee, as defined by its statement of task, was to review documents prepared by agencies of the federal government regarding effects of the U.S. Bureau of Reclamation's Klamath Project, which manages water for irrigation, on three fish species in the Klamath River Basin that are listed as threatened (coho salmon) or endangered (shortnose sucker, Lost River sucker) under the Endangered Species Act. The committee's study was sharply focused on the scientific basis of agency decisions through which the Endangered Species Act was being implemented in the Klamath Basin. The work of the committee is described in its final report, which was published by NAS in 2004.

The Klamath Committee considered the possibility, as proposed by the US Fish and Wildlife Service and National Marine Fisheries Service, that new restrictions on operations of the USBR's Klamath Project could offer significant benefits both to the endangered suckers and threatened coho salmon. After studying valuable information collected by federal agencies and others, the committee concluded that stricter operating requirements for the Klamath Project, as proposed by the ESA implementation agencies (USFWS, NMFS), would be unlikely to benefit the ESA-listed species. This conclusion was reached by the committee on a scientific basis, without any consideration of economic or political factors, as directed by the committee's scope of work. The incidental effect of the conclusion, however, was to call into question a tightening of water management for the Klamath Project that would have caused significant and frequent shortfalls of water delivery to agricultural water users.

In considering documents prepared by the federal agencies and others, the committee also concluded that a proposal prepared by the USBR, if approved, would have left operations of the Klamath Project open to a wider range of water use than had been the case in the recent historical past. The committee noted that intensifying water management in this way could not be supported scientifically because more intensive water management had not been studied environmentally. Therefore, while the committee could not find reasons for new restrictions on water management, it also could

not find a scientific basis for a greater latitude of water management than had been in place for the preceding decade.

Because the biological opinions issued by the ESA implementation agencies made reference to numerous factors other than water management that might be affecting the listed species, the committee considered all other possible causes for failure of the listed species to recover. For each of the species, the committee found compelling arguments for numerous kinds of remediation that could be effective in improving the likelihood of recovery for the species. Options identified by the committee include removal of small dams, restoration of cool water to tributaries, experimental elimination of heavy stocking of non-endangered species, restoration of streamside vegetation and woody debris, and numerous others. Some of these measures have been undertaken since the committee finished its work.

Circumstances leading to the creation of the Klamath Committee followed a pattern that is typical for NRC committees formed under direction of the NAS. Within the Klamath Basin, the US Bureau of Reclamation is responsible for operating the Klamath Project for the benefit of private irrigators, and the US Fish and Wildlife Service has the responsibility of implementing the requirements of the ESA for non-migratory fish species. Both of these agencies are administered by the Department of the Interior. Over years of study and debate leading to increasing degrees of restriction on the USBR's water management practices for the benefit of endangered suckers, the two agencies had reached a critical point at which the USBR strenuously objected on technical and scientific grounds to further restrictions on its management of the Klamath Project. Furthermore, the National Marine Fisheries Service of the Commerce Department, which administers ESA requirements for anadromous migratory fishes, including coho salmon, was also calling for increased stringency of water management based on welfare of coho, again in opposition to the USBR's analysis of the probable benefits of increased restrictions. Thus, three agencies of the federal government were involved in a scientific and technical dispute with substantial potential consequences both for endangered species and for agricultural water use and its economic derivatives. Assistance in resolution of this problem by nonpolitical means is exactly the type of task for which the National Academy of Sciences, which is not a government agency, was created. The Academy has been a consistent source of independent analysis and review on scientific and technical matters of importance to the federal government for over a century. In other words, the formation of an NRC committee to examine the scientific and technical issues related to endangered fishes in the Klamath Basin was well justified and timely, with no detectable overtones of partisan political motivation.

Over the many decades that have elapsed since its formation by Congressional Charter in 1863, the National Academy has developed procedures insuring that the work of its committees will not be influenced politically or by any other means not related to an independent and factual examination of scientific and technical information. The safeguards are numerous and have proven highly effective. They include the following: 1) NAS does not accept a committee charge that directs the committee to reach specific conclusion or type of conclusion, 2) NAS populates its committees with individuals who come from varied backgrounds, have varied expertise relevant to the problem at hand, and have established national and international reputations as experts in their fields, 3) while the committee collects evidence and opinions in open meetings, it is insulated from

external pressure during its deliberations, 4) NRC committees are directed to prepare a report containing conclusions that can be approved by all committee members, and not just a majority of members, 5) NRC committee reports are reviewed anonymously by as many as 10-15 experts who give anonymous opinions that must be considered by the committee and either rebutted effectively or reflected in revisions of the report, 6) the report and revisions to NRC reports are overseen in detail by two officials representing the interest of the NAS in the integrity of the report, 7) final reports must be approved by the chair of the NAS Report Review Committee, 8) members of NRC committees formed by the NAS are not compensated, 9) committees are dissolved when their task is completed; they do not have lasting influence except through their final report, 10) committee members are rigorously screened for conflict of interest and bias.

During 2002, while the committee was conducting its work, the Klamath Basin was experiencing a severe drought, and in early fall there was a mass mortality of adult salmon at the mouth of the Klamath River. The federal agencies sponsoring the NRC Klamath study requested specifically that this incident of mortality be addressed by the committee as an addendum to its statement of task. Mass mortality of salmon at the mouth of the Klamath attracted much attention to the work of the Klamath Committee.

The mass mortality of 2002 involved the death of a conservatively estimated 32,897 salmon. Three hundred forty-four (1%) were coho; 32,553 (99%) were fall-run Chinook salmon out of a run of approximately 170,000 fall-run Chinook. Coho salmon in the Klamath are listed under the ESA, and the NMFS is charged to protect them from any unnatural mortality.

The immediate cause of death of the salmon was massive infection by bacterial and protozoan disease agents. These disease agents are common and cause mortality of fish that are stressed or crowded.

The salmon that died in 2002 were gathered in a dense mass at the mouth of the Klamath in preparation for group migration up the main stem of the Klamath. This is an annual phenomenon and would not be considered unusual. The salmon await favorable conditions for migration. A typical trigger for upstream migration is a cool pulse in flow, the natural cause of which would be precipitation in the lower part of the basin. Because the weather was extraordinarily dry, it appears that this pulse did not come, and the prolonged crowding of the salmon led to the mass mortality.

An important question considered by the committee and many others is whether management of water by the Klamath Project was responsible for withholding the pulse of flow that would have allowed the salmon to migrate. The NRC committee concluded that this is very unlikely. The Klamath Project is located over 150 miles upstream from the mouth, and water flowing through the Klamath Project accounts for only 10% of the total flow at the mouth; large tributaries entering the river below the Klamath Project contribute most of the flow at the mouth. Furthermore, the Klamath Project releases water that is warm because it comes from storage lakes rather than reaching the stream through groundwater or surface runoff. The committee concluded that a relatively small amount of warm water propagated over a distance of 150 miles would not have made a critical difference to the salmon that were staging for migration at the mouth of the river.

The committee also examined previous conditions and found that low flows similar to those of 2002 had occurred in several years within the period of record without any accompanying salmon mortality. The committee therefore concluded that mortality

was the result of an unusual combination of conditions, probably including unusually low flow plus the absence of a cool pulse of flow that even a brief precipitation event might have provided.

In summary, formation of the Klamath Committee in 2002 followed a series of events that is typical for formation of NRC committees by the NAS: conflict over technical or scientific issues within agencies of the federal government leading to a need for opinions from an independent body, which often is the NAS. Once formed through the NRC by NAS, committees are managed so that their findings cannot be manipulated politically, nor would committee members continue to serve in the face of manipulation.