California's salmon crisis

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Assembly Committee on Water, Parks, and Wildlife
Jared Huffman, Chair.

Informational Hearing on *California's salmon crisis: understanding the severity of the crisis and the state's role in recovery*

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Mr. Huffman, members of the Assembly Committee, and colleagues in the world of salmon conservation,

Thank you for inviting me to participate in this hearing on California's salmon crisis. The hearing is very timely because there is an unprecedented crisis with the state of California's salmon. But the crisis goes far beyond salmon: it also applies to our steelhead and trout, and beyond that to most of our cold water and sea-run fishes, and beyond *that* even to our native freshwater fishes in general.

But there is enough to talk about with just our salmon, steelhead, and trout populations, California's salmonid fishes. I can talk about the statewide status of these species because I spent over a year, along with postdoctoral scholar Joshua Israel and graduate student Sabra Purdy, completing an exhaustive study of their status, using objective criteria for making a final status determination for each species. The report was completed last fall, including expert review, and is now posted on the California Trout website. CalTrout, a conservation-oriented organization of anglers, commissioned the report and beautifully produced their own summary of it. The pictures in their report are spectacular, demonstrating both beauty of the fish and of the habitats in which they live. For me personally the report has been a culmination of nearly 40 years of working with these fish. My very first paper on California fish was a report on the spawning of Chinook salmon in the San Joaquin and Kings Rivers during 1969, a wet year, the first such record in over twenty years. And I think the last.

Reality

Here are some of the basic facts from the report:

- There are 31 distinct kinds of salmon, steelhead, trout, and whitefish in California. There were 32, but bull trout became extinct in the 1970s.
- Of the 31 kinds, 12 are varieties of salmon, 8 are varieties of steelhead, 10 are trout, and one is the mountain whitefish. The salmon and steelhead are genetically or ecologically distinct entities recognized by agencies for management. They range from the Sacramento winter-run Chinook salmon to the California golden trout.

- 65% of these salmonids are found ONLY in California, while another 16% are shared just with Oregon. This gives us a special obligation to protect a unique part of California's heritage.
- California contains the southern-most populations of salmon and steelhead. They are thus among the most adaptable members of their species, historically thriving in a climate where droughts and floods are common.
- In our judgment, 65% (20 kinds) of California's salmonids are at high risk of extinction in before the end of this century. Some may not make it through the next ten years without a more intensive level of intervention, pink salmon, chum salmon, and the central California coast coho salmon, the southernmost populations of their species.
- Not surprisingly, salmon and steelhead fisheries have collapsed statewide.

Evaluating salmonid status

How did we develop our evaluations of the status of the salmon, steelhead, and trout of California?

First, we reviewed and compiled the literature, including unpublished reports, on each species.

Then, using that information, we scored each species on six metrics (1) number of watersheds occupied, (2) breeding population size, (3) intervention needs to sustain populations, (4) tolerance of environmental conditions likely to be encountered, (5) genetic risks, and (6) climate change. Using objective criteria, each was scored on a 1 to 5 scale, where '1' represented a worst score and '5' represented the best score. The scoring methods are presented in detail in the two reports. We then averaged these scores to come up with an overall status score for each species, where a score of 1 indicated the species was at immediate risk of extinction, a score of '2' indicated high risk of extinction (within 50-100 years), a score of '3' indicted the species was declining but at low risk of extinction, '4' indicated no risk of extinction and '5' a large and expanding population. Our methods are robust and should be repeatable, so I invite others to try them out and see if they come up with the same results.

Each account, with the scores, was then sent to expert reviewers for comment. I should also note here that we scored each evaluation on its reliability based on how good we thought the information was. Information for most species had high reliability scores but some, such as coastal cutthroat trout, scored low on reliability because there is very little published research or monitoring information on these fish in California.

Our results show that three types of salmon are at immediate risk of extinction (within the next 10-50 years without serious intervention), 17 kinds of salmonids are at high risk of extinction, and six are declining, even if not in immediate danger of extinction. The fish in the first two categories represent 65% of the salmon, steelhead, and trout in California; 75% of these threatened species are found ONLY in California.

While our judgments of status were made independently for each kind of salmonid, they should come as no surprise. 14 of the species are already listed by either the state or federal governments as threatened or endangered. Our analysis indicates that a good case can be made for listing at least nine more species with high risk of extinction, at least at the state level.

To me extinction is not an abstract concept. In the 1970s, I lead an intensive effort to find bull trout in the McCloud River, where it had once supported an important sport fishery. After two summers of looking, one of my graduate students finally caught one, which he tagged and released. That was the last bull trout seen in California. The cause of their extinction was a combination of several of the usual suspects: the alteration of the river and its fish populations by dams, including blocking of salmon runs, combined with the invasion of non-native brown trout. I would hate to witness another such extinction.

Examples

Let me now give you a few examples of what we are facing, focusing on salmon and steelhead.

California Central Coast coho salmon once occupied most coastal streams from Santa Cruz north to Punta Gorda, with records from 330 streams. These are the southernmost populations of the species. Today, they are barely holding on in a handful of streams. Lagunitas Creek in Marin County supported one of the largest remaining populations, of a few hundred fish. Last year, however, less than 50 spawned in the creek. They are listed as an endangered species and NMFS considers the recovery plan they are developing as an "extinction prevention plan."

Southern Oregon/Northern California coast coho salmon were once the most abundant salmon in the smaller coastal streams of northern California and southern Oregon, with spawners numbering in the hundreds of thousands. Thanks to the severe alteration of their streams, resulting in the loss of the cold water they need, annual returns of wild fish are only a few thousand a year and declining. They are listed as a threatened species. One bit of good news for this species is that The Nature Conservancy has recently acquired Big Springs Creek, a major coho spawning and rearing tributary to the Shasta River, which had been devastated by poor ranching practices. Restoration of this stream may significantly increase the total abundance of wild coho salmon in the Klamath River basin, yet more habitat restoration and protection of coldwater throughout the Klamath is necessary.

Central Valley spring Chinook salmon were scored a '2' even though their numbers are small and they are listed as a threatened species. This is because of the restoration efforts being undertaken on their behalf, including eventually restoring populations to the San Joaquin River. They are particularly important today as an example of life history diversity that we need to protect to maintain both the fish and fisheries. Spring Chinook, despite their low numbers, did not suffer the crash that the fall Chinook salmon did.

Central Valley fall Chinook salmon are the most abundant run in the Central Valley and the main support of the California salmon fishery. Recent studies suggest that 90% of these salmon are now of hatchery origin and fairly uniform in their characteristics, including behavior. Despite hatcheries cranking out millions of

young, their populations collapsed and in the last couple of years the population has hovered around 60,000 fish. Both the sport and commercial fishery, of course, were shut down. The causes of this collapse are multiple and complex, but, in my view, boil down to three interacting causes

1. Reliance on hatchery production to maintain the populations. These fish have low diversity in life history and behavior so respond in a uniform manner to bad, as well as good, environmental conditions.
2. Consistently unfavorable conditions for survival in fresh water: inadequate stream flows, lack of floodplains, poor water quality, pumping from the Delta and elsewhere, and heavily channelized rivers and Delta.
3. Periodic unfavorable ocean conditions , such as occurred in 2005, when warm water and low food devastated the hatchery Chinook that managed to make it to the ocean, perhaps assisted by a pod of 80 hungry orcas.

Hatchery fish so dominate the population today that it is possible to argue that wild Central Valley fall Chinook merit threatened species status. If about 66,000 adult Chinook returned in 2008, as estimated by the AFRP, and hatchery fish contribute to 90% of the ocean fishery, as recent studies suggest, then only about 6-7,000 of them would have been of wild origin. This is fewer fish than exist in the population of spring Chinook salmon, which is listed as a threatened species.

Southern California steelhead continue to amaze me because they are managing to hang on in streams as far south as in San Diego County. It is a tribute to their resiliency that they have managed to survive in some of the most abused streams in the state, streams that have been dammed, diverted, dried up, polluted, and otherwise misused. Even these fish have their limits, however, and most, if not all, of the remaining populations are likely to disappear soon without actions to assist their migrations past dams, both upstream and downstream, and their rearing in both streams and coastal lagoons. I am sure most southern Californians are totally unaware of this astonishing fish, even though it is one of the few remaining bits of their natural heritage that still persists. It is listed as an endangered species.

Causes

So why are so many species in trouble in the state? The root causes are easy to understand: California is a huge state with fragile landscapes on which we have imposed, in just over 150 years, a large human population with ever-growing demands for resources. The climate of the state results in huge disparities in the geographic and seasonal distribution of the water, resulting in development of massive water distribution systems, involving dams, diversions, ditches, aqueducts, and pumps. We modified the landscape with great efficiency, cutting down forests, clearing deserts and swamps for farming, building cities on floodplains, stripping away the landscape for minerals, lining the rivers with levees, and dumping our wastes into the water. For most of the last 150 years we have largely ignored the needs of our salmonid fishes, relying on their natural resilience to keep fisheries going. For a few salmon and trout, we have built hatcheries to maintain fisheries, as mitigation for the damages caused by dams and water diversions . Hatcheries have maintained fisheries in short run but have just slowed declines of the cultured species, while making recovery of locally adapted wild populations even more

difficult. We are much more conscious of the damage done to our fish and fisheries today than we were in the past, resulting in the listing of species under the ESAs, continual conflicts over water and land use, and, on the positive side, a growing number of Californians who are willing to devote their time and resources to fish conservation. But these efforts are not enough to overcome the effects of our long legacy of damage to the fish and the landscapes in which they live.

Conclusions

The fact that 65% of California's salmon, steelhead, and trout species are on a trajectory to extinction within this century and that major fisheries have collapsed or disappeared, indicates a failure of management of fish and watersheds on a large scale. Salmon and steelhead runs in virtually all coastal watersheds of the state are in decline, including the Sacramento, San Joaquin, Eel, and Klamath rivers. In most instances, population numbers have been depressed for so long that we have come to accept small populations as 'natural.' We need to shake off this acceptance and set new goals of having spectacular runs of large fish in as many streams as possible. This will mean paying off debts we have owed to the environment for long time. This will not be easy because each species and each population faces its own unique problems, as well as the broader problems that all salmonids have in common. And climate change is adding to the difficulty of recovering species, or of even just maintaining many of them in small numbers.

You will be hearing of many ways to pay off this environmental debt and reasons to do so from the following speakers. But the basic strategy will have to include:

- Providing clear, cold water in streams
- Recreating healthy watersheds in sustainably managed landscapes
- Actively managing species and populations supporting major fisheries through hatchery reform,and precautionary harvest regulation
- Actively managing threatened and endangered species and populations, using a unique strategy for each one, including habitat expansion and improvement programs, captive rearing, and assisted migration.
- Creating a management structure that creates a REAL mandate for restoration, including high profile, independent agencies with the will, authority, and funds to promote conservation on a large scale.
- Integrating conservation into our educational systems, from kindergarten through college, to create a populace that understands that conservation matters.

The report that Josh, Sabra, and I produced is subtitled "status of an emblematic fauna." That title reflects some wishful thinking on our parts, given the level of awareness of the environmental crisis the state of the salmonids reflects. But recovery of California's amazing salmon, steelhead, and trout populations *should* be emblematic of recovery of a land and waterscape that is also a better place for humans.

Thank you.