



Home
 Current Issue
 Archive
 Forum
 Site Guide
 Feedback
 Subscribe
 Search

Browse >>
 Books & Critics
 Fiction
 Food
 Foreign Affairs
 Language
 Poetry Pages
 Politics & Society
 Science & Technology
 Travel & Pursuits

Send this page to a friend

Go to this issue's Table of Contents.

OCTOBER 2000

(The online version of this article appears in two parts. Click here to go to [part one](#).)

The usual argument in favor of this fine-grained approach to preservation is that it maximizes the genetic diversity of the entire salmon population: Chinook that spawn in June in the Columbia River are different from Chinook that spawn in September in the Snake River. The usual counterargument is that any population of salmon, with their tremendous fecundity, contains enormous genetic potential, and salmon have proved themselves highly adaptable, rather than fragile, in the past. A small proportion of salmon seem predisposed to return to a different stream from the one where they were spawned, promoting spread of the species. A hundred years ago, for example, there were no native Chinook populations in the rivers of New Zealand. Several loads of Chinook eggs from a single run on the Sacramento River were shipped there, and now at least five of New Zealand's river systems have established "self-sustaining" runs, with different spawning schedules and visible differences among fish that all descended from the same stock. Moreover, because hatcheries have been running full tilt in the Pacific Northwest for more than a century,

it is difficult to imagine that many "pure" wild runs, with no hatchery genetic material in their lineage, remain. Nonetheless, the unit interpretation prevails, with the Twilight Zone implication that special listed fish swim in the ocean and in the rivers among their more numerous unprotected fellows, and it's often impossible to tell the two apart. Some, but not all, hatchery fish have their fins clipped in a way that identifies them after they've been caught. So an oceangoing trawler that hauls up a fish with unclipped fins may have caught a wild Chinook -- or it may have snared just another hatchery fish. No one can tell, and in either case the fish is dead.

If the objective really were to do whatever is necessary -- but only what is necessary -- to ensure the survival of each salmon run, then the logical path would be clear. Some important variables that affect the salmon's welfare are beyond direct human control. There is increasing evidence that changes in ocean conditions, especially fluctuations in ocean temperature through roughly twenty-year cycles, have an enormous impact on salmon stocks. When the northern Pacific gets warmer, as it has for most of the past decade, salmon runs generally get smaller and the fish move northward, toward Alaskan rivers. When the Pacific gets cooler, as it seems to have done in the past year, stocks recover and the fish move south. As of this writing, Alaskan rivers have had smaller runs this year than in any other year of the past decade; more Chinook

returned this spring to the Columbia River, between Oregon and Washington, than have done so since 1938.

Among the variables people can directly control, the most obvious is the rate at which salmon are fished. Step one in a campaign to preserve most other endangered wildlife is to stop destroying it on purpose. This has proved crucial for fish: many major stocks have been fished to the point of exhaustion and have then begun to recover after fishing limits or moratoriums were slapped on. Cod, herring, shad, swordfish, striped bass, various crabs and clams, and many other forms of marine life have been through the depletion part of the cycle; shad and striped bass have begun to rebound.

Northwest salmon populations have been through the cycle several times in the past century. Industrial-scale fishing boomed 150 years ago, when advances in canning technology made it feasible to ship Pacific salmon around the world. By the end of the nineteenth century, salmon runs were collapsing throughout the Northwest. From then on, hatcheries propped up the salmon populations. Through the past century salmon runs on rivers from Oregon to Alaska have risen and fallen largely in response to changes in fishing technology and other aspects of "harvest pressure." A chart of salmon runs in rivers along the Pacific coast over the past century would show curves mainly rising and falling in

sync. "Mainstem coho," which spawn in the downstream reaches of the Columbia and do not encounter even one dam, follow these patterns.

All of this suggests that factors affecting the salmon population as a whole, such as changes in sea conditions and advances in fishing technology, are at least as urgent as stream-by-stream changes and the impact of dams. This is a conclusion that anti-dam groups vehemently dispute. "To say that the problem is not the dams just because there are problems in undammed rivers is to deal with the subject at such a simplistic level that it makes all argument moot," Rob Masonis, of American Rivers, told me. "You have to look habitat by habitat and stock by stock."

Still, emergency steps for any other endangered species probably start with controls on commercial harvesting -- think of the crackdown on traffic in rhino horns and ocelot hides. Harvest limits have been the first step for other fish. A separate topic of debate centers on pressure on salmon from other species: seals and sea lions, which though now abundant are still legally protected, may well eat as many salmon as fishermen take. The world's largest colony of Caspian terns, which established itself in the 1980s on a man-made island in the Columbia estuary, also eats significant quantities of young fish. When pressed, anti-dam advocates will agree that controls on fishing, or even management of predator

species, could be involved in an action agenda. Indeed, all parties to the dispute agree that any recovery scheme must include the "4 Hs": improving *habitat*, so that the adult fish have places to lay their eggs; managing *hatcheries*, so that their progeny don't crowd out vulnerable wild fish; monitoring the impact of *hydropower*, which means the dams; and limiting *harvest*.

The difference is priority and emphasis. In their press releases, working papers, and even off-the-cuff comments, representatives of the anti-dam groups say, with consistency and a tone of utter certainty, "the science is telling us" and "the scientists say" that the dams are so overwhelmingly at fault that talking about anything else is a waste of time. Even a few months' immersion in the issue, however, makes plain that "the science" is quite a bit sketchier and more contradictory than that.

Because the science is disputed, a strategy truly aimed at saving fish would try the fastest, cheapest, and most easily reversible remedies first. By anyone's reckoning, removing dams would come near the bottom of the list. The breaching process would be slow,

**AUTHOR'S NOTE
(Web-only)**

For those interested in looking further, the best compendium of scientific studies is at [Columbia Basin Research](#).

Arguments against the dams can be found at [Columbia & Snake Rivers Campaign and American Rivers](#);

expensive, riddled with side effects, and essentially irreversible. The anti-dam groups partly accept this logic, in that they talk about removing the four smallest and least economically valuable dams on the Columbia-Snake river system -- but not four big dams on the lower Columbia, through which the salmon must also pass, or the gargantuan Grand Coulee, on the upper Columbia, which totally blocks upstream salmon passage but which also is one of the three largest power-generating facilities in the world. Yet despite their acceptance of cost-benefit logic in regard to these more imposing dams, the anti-dam groups are absolutist about the four dams they think they have a chance to remove.

[arguments on the other side, at Northwest Power Planning Council and Buchal.com.](#)

THE real agenda underlying the salmon debate becomes clear only in light of unresolved questions about development and preservation in the high-tech Northwest. The Endangered Species Act is concerned with protecting the fish and nothing more, but for most people in the region, the ideal is to eat the fish and have them, too. An important part of the region's self-image is tied up not just with eating salmon but with the idea that they're waiting to be caught. It is a land of limitless abundance that everyone fears is being lost.

An episode on the Fourth of July illustrated this attitude. The house where my wife and I lived in Seattle had a dramatic view of Lake Washington. On the Fourth we awoke to see it covered with hundreds of small craft. The front page of *The Seattle Times* carried the explanation: for the first time in four years a sockeye-fishing season had just been opened on the lake.

The background of the story was testament to the adaptive vigor of salmon, and implicitly another strike against the idea that dams are the real problem. Before Seattle was heavily developed, Lake Washington supported a large population of lake-spawning "kokanee" salmon, and perhaps a smaller population of sockeye salmon, which unlike the kokanee must make their way to the ocean to mature. Around the time of World War I locks and other construction projects, which lowered the lake's level, blocked access to the sea for whatever sockeye were then in the lake. In the 1930s sockeye eggs were transplanted into the lake, and the salmon established a run that made its way to and from the sea via the Ballard Locks. The size of the run rose and fell, apparently for natural reasons, but in 1988 a local fishing writer named Brad O'Connor discovered that sockeye would bite a bare, unbaited hook. The daily limits at the time were as high as six fish a day per angler. Fishing increased; the sockeye population went down. In most years fishing was banned, and the population recovered, to this year's

robust level. All this occurred with no change in locks, dams, or habitat.

The opening of this summer's season was greeted with V-J Day-style glee in the local press; this was the Northwest lifestyle everyone wanted to bring back. Yet there was, so to speak, a catch. A spokesman for the National Marine Fisheries Service was quoted in the paper as saying that a number of "listed" Chinook salmon were out in the lake with the sockeye, and anglers "may in fact catch some"; if they did, they would just "have to release them safely back into the water." Anyone who has seen this done knows how euphemistic that "safely" is. If the goal really were only species preservation, no fishing that might accidentally harm an endangered fish would be allowed. But if the goal -- or at least an additional goal -- is preserving the fishing lifestyle, then the effect on the Chinook is an acceptable cost. The surest route to "paving the river with salmon," in a favored regional phrase, would be to maximize hatchery operations, use technical means to increase the survival of young salmon en route to the sea (for instance, putting them in tanks and sending the tanks downriver by barge), shoo off the Caspian terns and sea lions, and not worry so much about what happens to the endangered runs.

Pursuit of this vision is complicated by the ESA and also by the debate's underlying -- and usually unspoken -- agenda. That is the desire to limit the development of pristine

territory, and to return rivers where possible to their unspoiled, pre-dammed condition -- not necessarily for the sake of the salmon. Arguments about dams increasingly turn on the phrase "normative river," which means a river in as close to its original condition as possible. Couching the argument like this is a way of obviating scientific disagreements over what approach will produce the most salmon. Dams are the antithesis of normative rivers, and therefore must go.

If you've seen the difference between dammed and undammed rivers, it's hard to dismiss the normative-rivers plea. In late June I spent a day flying over the eight dams that lower Snake River salmon must traverse -- the four big ones on the Columbia and the four objects of controversy on the lower Snake -- and then circled up to central Washington to view the Grand Coulee. I spent half the time marveling at the ambition that created the structures, and the other half appalled at how radically the natural landscape had been transformed. The debate about whether this transformation should be undone is worth carrying out on its own terms -- not on the backs of the fish.

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Illustration by Adrian Chesterman.

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The Atlantic Monthly; October 2000; *Saving Salmon, or Seattle? - 00.10 (Part Two)*; Volume 286, No. 4; page 20-26.

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