As any reader who wet a line in 1995 already knows, steelhead have been extremely scarce from northern British Columbia to California. On the Skeena system, the 1995 run appears to be on a par with 1993, about the worst year on record. South of the border, the U.S. National Marine Fisheries Service (prodded by a threatened lawsuit) will announce, probably in February, their findings on a comprehensive, coast-wide review of wild steelhead stocks. The Steelhead Committee expects many runs to be listed as threatened or endangered under the Endangered Species Act.

How bad is bad? In Washington and Oregon, some rivers are without anglers or steelhead. Wild steelhead populations in the Snake River watershed and California are in even worse shape than those in coastal areas of Washington and Oregon. Indeed, in my opinion, as unimaginable as it might seem, most Snake River wild steelhead stocks will become extinct within the next decade or so. Illustrative of the emergency, anglers at one well-known steelhead lodge on the Grande Ronde River caught TWO steelhead all season last year.

The sad reality is that over the past fifty years, we have lost more angling opportunity than the aggregate of what remains. All the while, we anglers have meekly accepted this steady erosion of wild steelhead and salmon populations and angling opportunities. Perhaps we have been so acquiescent because our sport is a contemplative one. Our richest moments and sweetest pleasures are often found in lonely places. We have failed to make our numbers count, perhaps because angling, by its nature, is an uncertain thing. We all draw blanks much of the time, only to be rewarded with a good day. Salmon and steelhead declines have occurred over a long period and have been off-set with occasional glimpses of the productive past giving hope to rebounding populations. Always these hopes have gone a-glimmering.

The magnitude of steelhead declines is apparent only on reflection. When we compare historic levels of abundance to present populations, we are shocked. For example, as recently as the 1950’s, California’s Eel River produced tens of thousands of wild steelhead. Half a lifetime later, only a few hundred ghostly remnants return to a river ravaged by loggers, diverted by water brokers and abandoned by anglers.

Last summer I attended a steelhead briefing by the Washington Department of Fish and Wildlife arranged by the Fish and Wildlife Commission. It was both appalling and illuminating. Four hours into the briefing, the audience had yet to meet a steelhead, a description of the problem, the Columbia river, or linkages between habitat and wild steelhead. With two notable exceptions, none of the briefers:

- conveyed any sense of alarm or responsibility for the desperate status of many (probably most) of Washington’s wild steelhead runs;
- provided any analysis of how we arrived at this sorry condition; no description of alternatives faced or choices made that landed us (and especially wild steelhead) in this mess;
- offered a vision of how to get out of the briar patch other than arguing that listing steelhead under the Endangered Species Act was neither necessary nor desirable.

During the past two years, as co-director of the joint Russian-American Kamchatka Steelhead Project (see up-date elsewhere in this issue), I have been able to see steelhead country the way it once was—wild, beautiful, productive. On one remote Kamchatkan river, I met a native woman, the wife of the only family in the entire watershed. In response to my queries about the steelhead populations in her river she told me, “In the beginning, our river was good. It is still good. It is as good as it was in the beginning.”
THINKING ABOUT SALMON LANDSCAPES

James R. Karr

Dr. James R. Karr, a fish and wildlife biologist, is Professor of Fisheries, Public Affairs, and Zoology, and Adjunct Professor of Environmental Health at the University of Washington. Since 1972 he has served on the faculties of Purdue, Illinois, and Virginia State universities and Virginia Polytechnic Institute and as acting director of the Smithsonian Tropical Research Institute in Balboa, Panama. From 1991-95 he was director of the U-Washington’s Institute for Environmental Studies. His research has included, inter alia, stream ecology, watershed management, ecological integrity and health, environmental risk and policy. Karr’s Index of Biotic Integrity (IBI) was originally developed for use with fish communities in the Midwest and is now used on six continents and has been modified for use with benthic invertebrate communities.

Jim Karr also is a steelhead flyfisher whose love of the sport is reflected in his passionate prose in support of smarter partnerships between scientists, fisheries managers and public policy makers. Jim can be found, when he has the time, in his favorite runs on the Skykomish River.

This article is the text of the keynote address at the 1994 Northeast Pacific Chinook and Coho Salmon Workshop, held at Eugene, OR, November 7 - 10, and was published by the Oregon Chapter of the American Fisheries Society in Salmon Ecosystem Restoration: Myth and Reality, edited by Mary Louise Keefe. It is reprinted here with permission.

As a newcomer to the Pacific Northwest, I am overwhelmed by the region’s beauty and, at the same time, saddened by environmental declines. Most of all, I am appalled by our inability to make the decisions required to halt, let alone reverse, the downward trend. Future generations will never forgive our squandering of vast regional resources in little more than a century.

Salmon are the Northwest’s cultural icon, and because they depend on the entire landscape—terrestrial, aquatic, and marine—their decline signals an ecological health crisis and speaks volumes about the quality of our stewardship of this place. Salmon are the Northwest’s canary in the coal mine, and the canary is dying.

The question is: Will this conference help us make the right choices, or will we simply repeat the words and deeds of the past and perpetuate the decline?

I am not optimistic because I am not confident that we can muster the vision to formulate comprehensive solutions. Even if we do develop visionary solutions, will we forcefully articulate them to a society tired of inadequate prescriptions? Even more tenuous, will political leaders implement any solutions we manage to articulate? Is society prepared for the sweeping change that will be required to save salmon and, I would argue, ourselves as well?

The Problem of Legacies

Legacies—defined as anything handed down by a predecessor—can be powerful positive forces. A successful industrialist can leave a legacy of wealth to a philanthropic cause. A fallen old-growth forest giant on the Olympic Peninsula furnishes a centuries-accumulated store of nutrients to another generation of trees whose seeds have germinated atop the fallen trunk.

But legacies can also hand-cuff society. Law, science, and public policy based on outdated knowledge and values, and developed to fill nineteenth-century needs, cannot meet present challenges. These legacies constrain, even prevent, creative solutions because they perpetuate the status quo (Johnson and Paschal 1995, Karr 1995a, Rolston 1995).
For example, EPA focuses on water chemistry because of the narrow vision of water resource problems left over from the Water Pollution Control Administration in 1970. The Army Corps of Engineers' responsibility for wetlands is a legacy from the Rivers and Harbors (or Refuse) Act of 1899, a bill designed to stop organic contamination from human wastes and oil pollution in navigable waters. Because it was responsible for dredging navigable waterways, the Corps found itself the federal agency in charge of protecting adjacent, and now all, wetlands. Every government agency must contend with the legislative legacies that created them and still, too often, constrain their goals or mandates and, inevitably, their vision.

Past decisions and past training also constrain us as individuals. Academic training divides learning into disciplinary boxes (schools, colleges, departments, and “degree options”). When individuals (including ecologists) are trained within these disciplinary boxes, they see problems from within a boxed perspective and develop narrow solutions. Fifteen years ago, I was asked by the Organization of American States to aid in a water resource evaluation in Venezuela, where it rains heavily for most of the year and is dry for three months. Several years earlier, consultants had recommended an irrigation system for that region, even though the area has standing water in extensive wetlands for most of the year. The consultants came from a university in the northwestern United States and were trained to think about irrigation. So they thought about irrigation “solutions” even in the wet tropics. The irrigation system was installed at great expense to international development agencies and was then quickly abandoned by local officials.

It is precisely this kind of training that adds fish ladders to dams to help adults get upstream while ignoring the need for young fish to swim downstream. It is precisely this training that ignores habitat loss caused by dam construction and the flooding that creates a reservoir or destruction of riparian corridors by livestock. It is this training that encourages hatcheries that produce fish that do well in hatcheries but survive poorly in streams. It is this training that motivates regulators implementing the Clean Water Act to focus on water chemistry and toxicology and causes fish biologists to add woody debris in an effort to “restore” salmon habitat. Each of these “solutions” blinds us to the real problem: the need to maintain the quality of the whole stream environment.

Few see salmon and the landscapes they depend on in the integrative fashion required to maintain salmon populations. All conceive the situation as narrowly as H. A. Einstein (1972), who said, “The various forms of life in a river are purely incidental, compared with the main task of the river, which is to conduct water runoff from an area toward the oceans.” The legacy of his training as a hydrologist prevented Albert Einstein’s son from understanding the importance of life and living systems.

These and other legacies give us a conceptual framework and a set of tools that have not saved salmon—and are not likely to. Past efforts have failed to protect salmon because we have neither seen the problem at the proper scale nor developed solutions appropriate to that scale.

In short, our error is to ask, How can we make more salmon? when we should be asking, How can we improve the regional life-support systems that maintain healthy salmon populations? Our answers—build more hatcheries, install fish ladders, build wastewater treatments plants—reflect the narrowness of the question.

These answers do not acknowledge the real problem—massive changes in the landscapes and the rivers draining those landscapes. The result: a region nearly uninhabitable by healthy stocks of wild salmon because spawning and nursery areas as well as migratory pathways have been damaged or destroyed.

Another legacy is hubris: the arrogance that assumes we understand the problems and have the solutions to fix them. As a result, we almost never monitor management actions to see if they really work. As one EPA official told me more than 20 years ago when I asked if “best management practices” for controlling soil erosion actually improved water quality (Karr 1995b), “We are not interested in the effects of our actions, only that the actions are taken.” But, I argue, until we routinely monitor and evaluate our restoration efforts (Karr et al. 1991), we will not protect existing resources or restore degraded ones.

Seeking Solutions

We must replace narrow mitigation and management with conceptually broad analysis and synthesis. Twenty years ago, I participated in a study of agriculture and water quality in the Midwest. My colleagues—agronomists, agricultural engineers, and soil conservationists—saw water quality as a pollution or chemical contamination issue. Because small streams were neither fishable nor swimmable, they regarded the aquatic biota as unimportant.

During that project, we showed that paying attention only to water chemistry would not protect water quality as defined in the Clean Water Act (Karr and Dudley 1981, Karr 1991). We showed that the biotic integrity of a stream is degraded by human activity via five primary sets of variables:

- **Water quality.** Excessive nutrients, suspended solids, organic and inorganic materials, heavy metals, or other toxic materials from point and nonpoint sources degrade water quality and biological integrity.

- **Habitat structure.** The physical structure of the stream channel and the near-channel environment influence biotic integrity. This fact may be self-evident to biologists, but it is not evident to many individuals responsible for protecting water resources (see, for example, Angermeier and Karr 1984).

- **Flow regime.** Activities like irrigation or channelization, which may remove all water from a stream, clearly degrade biological integrity. But subtle shifts in flow during one season or more can also decimate important components of regional aquatic biotas.

- **Energy source.** All living organisms require energy and nutrients. Human activities often shift the source of energy in streams. In fact, a primary impetus for the Rivers and Harbors Act of 1899 was concern about massive inputs of organic material (largely human waste), which depleted oxygen supplies, killed fish, and smelled bad. Yet in small streams, material in the form of leaves can be essential to maintain biotic integrity.

- **Biotic interactions.** Competition, predation, and mutualisms have major influence on the species composition and relative abundance of stream organisms. Exotics or overharvest by sport and commercial fishers alter these interactions, with potentially catastrophic effects on stream quality.
communities. The introduction of exotic species can actually have far more devastating effects than conventional pollutants, yet managing exotic species has been given relatively little attention.

When biologists do not communicate these simple facts in their entirety to citizens and to policymakers, we are not doing our job.

In the Pacific Northwest, we see human effects on these variables in many ways (Table 1).

Because human influence on aquatic systems is complex, neither simple analyses (e.g., one special-interest group blaming another) nor simple solutions (e.g., hatcheries, barging young fish) are likely to reverse the salmon decline. Everyone is responsible for losing salmon because the activities of each individual or special-interest group affects one or more of the five sets of variables.

Consider the energy and resources put into artificial propagation during the past century—a prime example of a simple solution that became part of the problem. Hatchery propagation of fish that are then released into streams (supplementation) is seen by many as the way to mitigate losses of fish caused by habitat destruction, dams, and other human actions. Hundreds of hatcheries operate in the Northwest; state fishery budgets are dominated by salmon culture (35 percent for Washington, 42.5 percent for Oregon). In contrast, only three percent of the Oregon budget goes to manage natural production (White et al. 1995). This spending pattern continues despite a century of problems with hatchery ineffectiveness. Indeed, we are still denying the evidence that hatchery operations often damage wild populations and squander limited resources.

Hatchery fish exhibit poor survival and reproduction after release because they have morphological, physiological, and behavioral anomalies. They affect wild fish adversely: They may prey on wild fish or compete with them for limited natural foods; they stimulate abnormal behavior and otherwise disrupt social systems. They may attract other predators; transmit diseases; or, when exotic species or stocks are raised in hatcheries for release, contaminate the regional biota.

The effects of hatcheries can also be detrimental when their effluent contaminates streams, when water withdrawal for hatchery operations reduces streamflows, or when hatchery facilities block upstream migration of wild fish. Hatchery operations are expensive; they divert resources that could, and should, be used to protect and enhance wild populations.

The effects of hatcheries are most insidious when they give a false sense of security that we are resolving serious problems by artificial propagation. It's as if we were treating vitamin C deficiency in a starving child by prescribing vitamin C supplements instead of feeding her healthy foods. Instead of seeing the problem as shrunked salmon populations, we should see the problem as aquatic ecosystems that have collapsed because of human actions.

What Is the Proper Scale?

Salmon are virtually uninvolved in the geographic extent and variety of environments they occupy during their life history. As a group, they depend on nearly all aquatic habitats from the open ocean to the smallest headwater streams. Salmon are also unrivaled in the diversity of their life histories, an evolutionary result of their survival as spawners in places from tiny coastal streams to the Columbia River. Our efforts in restoring salmon should be measured by whether such diversity persists. It simply is not enough to say we have saved a few stocks of each species of salmon. Without life-history diversity, salmon will not be able to survive climatic and other natural disturbances, let alone the disturbances created by humans.

Because the environments that salmon occupy are so diverse, no single scale of study, analysis, or management is appropriate. Salmon biology is clearly affected by phenomena operating at the microsite level occupied by benthic invertebrates to the landscape from the North Pacific to Snake River headwaters. Management programs must keep that full range in view.

Single management actions are likely to fail unless they are integrated into a suite of actions comprising all the relevant spatial and temporal scales. Defining the many scales contained in the salmon landscape is thus critical. But another critical landscape demands our attention as well. Development of a societal policy to protect salmon also requires integration across administrative, cultural, and political scales. Failure to understand any of these dimensions and their influence on salmon is likely to limit the success of all salmon conservation efforts.

Defining the Proper Goals

Without clearly defined societal goals, or with poorly conceived goals, the complete loss of salmon seems inevitable. One especially prevalent yet inappropriate goal is the maximization of salmon populations. The correct goal must be to provide regional landscapes capable of supporting salmon. That is, we need to fix the landscapes, and salmon will take care of themselves.

Policymakers and bureaucrats prefer simple, cookbook approaches to management, but it is important for biologists to resist oversimplification. We can no more derive a generic treatment plan to save salmon than we would want our doctor to treat us for “the average” disease. Doctors should prescribe treatment only after an analysis of the patient’s symptoms, but the prescription should treat the disease, not just the symptoms.

| Table 1. Examples of the effects of human actions in Northwest watersheds. |
|-----------------------------|-----------------------------------------------|
| **Water quality**            | Increased temperatures, oxygen depletion, chemical contamination. |
| **Habitat structure**        | Sedimentation and loss of spawning gravel, lack of coarse woody debris, loss of deep pools, destruction of riparian environment. |
| **Flow regime**              | Altered flows that reduce hatching rates or migration time for anadromous fish or alter benthic invertebrate communities. |
| **Energy sources**           | Altered supply of riparian organic material, fewer nutrients from salmon carcasses. |
| **Biotic interactions**      | Increased predation on young by exotic species, overharvest by sport and commercial fishers. |
Prescriptions to save salmon should be grounded in knowledge of local conditions (symptoms), but the treatment should be directed at saving salmon landscapes, not just increasing numbers of salmon. The idiosyncratic treatments for local places must then be integrated with large-scale concerns: it wastes resources to create local biological conditions that support salmon without ensuring that regional landscapes will in turn support that local population.

**Ecosystem Management and Watershed Analysis**

Calls for ecosystem management and watershed analysis have seduced many into believing that we are already implementing the kind of integrative approach I am advocating. But I am not prepared to endorse "ecosystem management" or "watershed analysis" as panaceas to resolve natural resource crises.

Why have these words so rapidly become the mantras of just about everyone with an interest in resources? I suggest two reasons: (1) new terms make us feel we have a new approach, and (2) these words mean just about anything, so they can make almost everybody happy without any change in the status quo.

Here are a few definitions for "ecosystem management": a science-based management approach; a rational alternative of species-by-species management; a warm fuzzy feeling; Aldo Leopold vindicated; Gifford Pinchot regrouping; catering to the demands of rural communities in the name of public participation and involvement; and opportunity to replace the largely unsuccessful fishery harvest models with largely untested ecosystem models as a way to manage resources.

Similar problems exist with "watershed management." Some Forest Service employees, for example, have told me that they want watershed management to be based on existing information. But existing information consists largely of hydrological and geomorphological data, often ignoring the biology of watersheds. Dependence on existing data sanctions the continued neglect of many biological dimensions of watershed condition. I prefer to think in terms of landscape analysis and management, an approach that extends beyond the largely hydrological focus of watershed analysis.

In most watershed analysis, we assume we know what the fish and other components of the biota need: some optimal habitat condition. But fish, insects, and other organisms often do not survive well in this optimal habitat, perhaps because they don't agree with our decisions about "optimal," perhaps because the spatial and temporal dynamics they need are not maintained when we select a static condition as a management target.

Rather than fixating on some optimal physical habitat, we should add biological goals and benchmarks (Davis and Simons 1995). Until we incorporate biological evaluations into watershed analysis, we will have more of the same under a new name.

The following biological goals should be explicit in landscape management (in part from Grumbine 1994): maintain healthy individuals, both human and nonhuman; protect viable populations of all native species; maintain the full array of biological interactions; protect the communities or assemblages of species that characterize the region; protect and preserve ecological and evolutionary processes; encourage the flow of goods and services to human society within the constraint imposed by those ecological and evolutionary processes; and accomplish this over multiple spatial and temporal scales. Biological goals are essential.

Ecosystem management and watershed analysis are simply methods: nothing more, nothing less. Like binoculars, they can be used for several purposes. Ecosystem management and watershed analysis can yield improved public policy for salmon if and only if they are used in the context of carefully and clearly defined societal goals.

Given our record of natural resources management, I hope we will define the goals more effectively than we have in the past. I would like to see us protect Earth's living systems, Earth's biological integrity. In my view, we should always seek to protect the products of hundreds of millions of years of evolutionary and biogeographic processes.

Those systems operate on a diversity of spatial and temporal scales and they are maintained by a natural disturbance regime which is fundamental and integral to that integrity. The goal is not to manage the resource, but to manage damage done to biological integrity by the actions of humans.

**Managing the Salmon Landscape**

Over the past two centuries, our management attitudes toward salmon have changed fast, passing through some five overlapping stages.

- **No management.** For decades, many felt salmon needed no management because there were so many fish that it was inconceivable that humans could ever influence their numbers.

- **Need management.** When it became apparent, as early as the mid-nineteenth century, that salmon numbers were declining, half-hearted management began. Traps and nets blocking entire tributary streams were regulated or banned. Fish wheels that used the Columbia River's own energy to turn and scoop salmon out of the water for canning came and went within a half-century. But massive salmon depletion in rivers and ocean continued as harvest technology became more efficient and habitat destruction more widespread.

- **Techno-fixes.** The era of techno-fixes began more than a hundred years ago with hatcheries; it expanded to include fish ladders, and continues today with barging of young, reservoir drawdowns, spawning channels, fish screens, and innumerable "compensatory mitigations." None are integrated in time or place, and all have failed.

- **Watershed analysis and ecosystem management.** If clear biological goals are not defined and incorporated, these latest methods will become mere conceptual techno-fixes.

- **Seeing the salmon landscape.** Will we reach this stage before the salmon are gone? Will we ever integrate the treatment of symptoms with the treatment of the disease ailing salmon? Will societal values ever recognize the importance of healthy salmon landscapes to both salmon and humans?

Scientists have confidence that solutions to management problems will follow from the rational examination of scientific facts. Consider the impact of Rachel Carson's (1962) *Silent Spring* on public awareness of the consequences of pesticide use. Yet despite the weight of scientific evidence and Carson's eloquence, modern society 33 years later is still on a pesticide treadmill. Compelling scientific evidence has not overcome the economic, political, and social pressures to continue using existing compounds; to develop new generations of toxic chemicals to control crop.
livestock, and human pests; or to continue production and export of chemicals like DDT, whose use in the US has been banned.

We will be no more successful than Rachel Carson if we keep our focus narrow and deal only with spawning channels, drawdowns, and hatcheries. Until we bring together information on biological status and trends with understanding of sociopolitical, economic, and ethical constraints, we are not likely to resolve conservation and management challenges.

**Four principles**, each of which involves changes in the way we conceive and execute natural resource policy, seem critical to success:

1. Solutions will not come from defining and correcting the factor responsible for the decline in salmon because no single factor is responsible.

2. Because natural conditions and the types of human activities vary among regions, no general prescription is likely to yield an effective solution for all watersheds.

3. Idiosyncratic analysis is required for each area to identify the primary factors responsible for decline in biological integrity (Andermarcher and Karr 1994), including loss of salmon populations. Those factors must be treated together, not in sequence.

4. Sophisticated monitoring programs should be implemented to determine the effectiveness of management plans.

But accomplishing these tasks is daunting; society resists change. According to Heifitz (ms. cited by Van Tilburg 1994), societies fail to adapt for three reasons: They do not see, understand, or fully grasp the significance of the threat before them and therefore cannot see its ramifications. Second, they may understand the challenge but do not know enough to define the proper solution. The solution cannot be known until all options have been tried and failed. And third, the anxiety or conflict involved in finding a solution may be too stressful.

When it comes to salmon, I think the first reason does not apply; we know what the threat is. We do seem to be having trouble with knowing how to find solutions, especially if we fail to focus on the broader question of restoring salmon landscapes. The third reason may hamstring us permanently. If we cannot overcome our discomfort to save salmon, our inertia sends an ominous message about our ability to deal with a broader range of environmental challenges.

**Asking Questions**

The most important questions policymakers can ask scientists are: What will natural systems allow? What are the consequences of pushing systems beyond that point? Instead, policymakers now poll the public about “values” and claim to define goals based on those values, as if any value system were equivalent to any other. In my view, this behavior abdicates leadership responsibility. All values are not equal; values derived from flat-earth theory, for example, do not belong on a level playing field with values grounded in modern astronomy.

Historically, ecologists were reluctant to enter the arena of management and public policy. I propose six questions to help us focus our research on the need to integrate science and policy in the diverse landscapes occupied by salmon and scientists.

1. What is the contribution of this research to science? How will the understanding of behavior, ecology, or evolution of salmon be advanced by this research?

2. What is the contribution of this research to management and, ultimately, to conservation? Does the knowledge clarify or inform management activity? Advance in knowledge does not always ensure the maintenance of salmon populations, the protection of natural resources, or ecological health.

3. What role will research play in guiding policy? How will this knowledge direct or improve public policy toward salmon or their landscapes?

4. What public policy incentives will help manage or conserve salmon?

5. How can we help society track the success of these policy incentives?

6. Is enough done to manage people—the ultimate need to protect salmon from excessive human disturbance?

These questions are concerned with (1) collecting information, (2) interpreting it, (3) communicating it, (4) using it to define and implement societal policies to protect salmon and salmon landscapes, (5) evaluating program success, and (6) controlling the negative influence that people have on the environment of all living things.

Biologists must first do good biology. But each of us must consider the importance of doing more than that. We should explore how we can go beyond the “ecobabble” that we use to communicate among ourselves. As ecologists and fish biologists, we may find fascinating the relative influence of predation, competition, or food supply, or the subtle differences in habitat on the distribution and abundance of salmon. But those ecotones rarely hold as much interest for citizens. We must improve our ability to communicate with the public, policymakers, and political leaders. We must lead them to understand why knowledge about anadromous fish and protecting those fish protects biological integrity at the same time and, thus, our long-term interests.

In closing, we must shift from a largely engineering mentality about fixing things to an approach that prevents us from breaking them in the first place. Ultimately, what we must manage is not salmon but people, beginning, as biologists, by understanding and leading others to understand that we are all citizens in a biotic community (Orr 1994). If we ever succeed in managing people and landscapes for salmon, we will manage landscapes for ourselves as well.▲
CONSERVATION STRATEGIES FOR ANADROMOUS FISH

Bill Bakke is no stranger to those readers of The Osprey who have been with us for some time. He contributed in our early years (issues 4 and 5, 1988-89) and his lead article in issue 10 (September 1990), What Does Extinction Look Like?, has become an accurate forecast of Big Trouble for Snake River salmonids. For 10 years the Executive Director of Oregon Trout, Bill now heads up the Native Fish Society, an organization dedicated to the development of conservation policies founded on good science rather than on the data-deficient and business-as-usual inertia so common to regional and state bureaucracies. Bill is a many-years-experienced and trained biologist who has worked tirelessly, but outside the bureaucracies, for the preservation of wild steelhead and salmon. His independence and integrity make him a worthy spokesman to whom we should all pay close attention.

Anadromous salmon and trout have been managed on the west coast of North America for over 140 years. This management has been ineffective, resulting in a loss of biological diversity, extinction, ESA listings, and reduced productivity of native fish fauna. The strong commitment to commodity production of salmonids among fish management institutions has eclipsed their conservation mission. As a result, fish management agencies have contributed as much or more to the decline of native salmonids as have other development interests. Because the people of the Northwest and the nation are being held accountable for the protection and recovery of native fish fauna through the Endangered Species Act, a new fish management institution must be formed. This article recommends management reform measures by discussing specific goals and then identifying current problems related to each.

Identify Conservation Management Units

The conservation management unit is the fundamental element in developing a conservation management plan. What is it we are trying to manage and protect? Currently, the fish management agencies and tribes do not have a definition of what it is they are trying to manage and have developed very few, if any, specific biological objectives to define their management programs. Define the management unit. This ought to be the stock and the substock structure. Use Ricker’s definition of a stock. This would mean that each river has a distinct stock until proven otherwise. Within each river basin there may be a substock structure that can be identified by research as was done on the Yakima River where three spring chinook substocks were identified based on genetic and life history characteristics. A management program would then be developed to maintain this substock structure and thereby the identity, productive capacity and evolutionary potential of the stock being managed.

The Problems. At present, the fish management agencies aggregate wild stocks—from many river systems—and hatchery-produced fish into one or more harvest management units. For example, there are 96 Oregon coastal coho salmon stocks which have been combined into one stock for harvest management purposes. This stock is called Oregon Coastal Natural (OCN) Coho. Rather than having an escapement goal for each of the 96 coho stocks, the state has set a coastwide escapement goal of 200,000, which breaks down to about 42 spawners per mile. This gross treatment has been one of the reasons the coho runs collapsed and have been proposed for listing under the ESA. Small, less productive stocks will be lost under this kind of management. For example, Cummins Creek on the central Oregon Coast is a hydrologic wilderness area but coho seeding is only 11 percent of capacity, suggesting that there are too few spawners escaping the fishery to maintain the reproduction potential of this stock. This commodity driven management program is similar for other species and stocks throughout Oregon and other west coast states.

Another problem is that the stock structure is not defined. This means that a river may have more than one stock of salmon or trout. Large river systems may have a number of substocks. When biologists take a close look at the genetic and life history characteristics of a river stock they often find a diversified stock structure. This is caused by adaptation within the stock to variable environments within a watershed. For example, in the Yakima subbasin of the Columbia River three substocks of spring chinook were identified. In the Grande Ronde River six substocks of spring chinook were found. These fish are distinct in terms of genetic and life history characteristics, meaning that they are diverging from an ancestral spring chinook stock as they adapt over time to the environmental conditions of their breeding streams. Similar substock structures have been found from California to Alaska.

The fact is that not much time or money has been spent inventorying the biological diversity of salmonids over their range. A management program, to be successful in maintaining the genetic identity and the reproductive capacity of stocks, must make sure each stock or substock has enough adult spawners, over the entire spectrum of the spawning migration, to exceed the carrying capacity of its habitat.

Exceeding the carrying capacity maximizes the exchange of genetic information, allowing the stock to cope with environmental variability through natural selection. But harvest management is not organized to conserve stocks let alone the substock structure of salmon and trout on the west coast. However, effective conservation management of salmon and trout requires that this biological diversity be maintained.

Inventory The Biological Diversity Of Salmonids

Once the conservation management unit is identified then a complete inventory of the biological diversity of salmonids must be undertaken, over the whole range, to determine the genetic and life history attributes of each stock. This may result in identification of substock structure. A conservation management plan would then be developed for each stock based on this benchmark information. Management ought to be treated as an experiment and evaluated against this benchmark data. This would cause management to be data driven. Also, management would be driven by the

Bill M. Bakke
natural production requirements of native salmonids. A management program evaluated against this biological diversity baseline would allow the management agencies to identify measurable biological objectives; and to effectively use adaptive management (learn by doing), because changes in the baseline would trigger a review of, and changes in, the management program to make it conform to the baseline. This is fundamental to conservation management for native salmonids. Failure to act on data that indicates a loss of biological diversity would be identified in an annual conservation audit.

The Problems. At the present time there is very little information on the biological diversity of native salmonids in Oregon or the west coast. This work has not been funded, even though policy has been adopted by some agencies to collect this information. The most striking example of this failure to implement a biological diversity inventory is in the Columbia River Basin where fish agencies and tribes have refused to complete a plan for conserving genetic diversity and improving conservation of biological diversity since 1991 (Section 6.2A Strategy For Salmon, N.W. Power Planning Council).

An inventory of biological diversity is necessary in order to provide the fundamental data on stocks and stock structure so that conservation management can be implemented. The agencies have refused to develop this information fearing that it will be used against them. For example, a mixed stock harvest program could not be justified unless it was conducted to maintain the biological diversity of the various species. It is unlikely that mixed stock ocean or river harvest programs could be maintained if this information were available and a monitoring program were in place to measure the effects of harvest on biological diversity.

If for political reasons, the fish agencies and tribes are unwilling to collect this information, then an independent party should be contracted to do the work.

Monitoring And Evaluation

Once the management units are defined and their genetic and life history attributes identified (biological diversity), and measurable biological objectives are established, management is evaluated to determine whether these management units or stocks are functioning above the replacement line and whether the biological organization of the stocks is being maintained. Results from this monitoring and evaluation effort would be reported to the relevant management agencies so that management changes can be implemented. This monitoring and evaluation function must be conducted by an independent scientific group. A report on the findings of the monitoring and evaluation program would be available to the public.

The Problems. At present there is no monitoring of the fish management programs to determine whether objectives for conserving biological diversity are being met annually. Typically, monitoring and evaluation programs, if they exist at all, are poorly funded. At this time it is impossible to know what biological changes management is forcing on a stock or how to change management to provide enough relief for the stock to recover. Without biological objectives, monitoring and evaluation efforts are ineffective and conservation management by biological objective is impossible. Even though most fish agencies are bound by law to conserve the resource, there is no effective way for the agency to assess its management program owing to the lack of data on biological diversity, the lack of biological objectives for management, and the lack of monitoring. In addition, without this information, the public does not have the ability to advocate effective conservation management programs. Management and management reform should be data driven, but the absence of data makes adaptive management and management reform impossible. The fish management agencies have perfected the principle of “No data, No problem.”

Independent Conservation Audit

An independent conservation audit must be created because resource management agencies have an unworkable dual function. Commodity production has eclipsed the conservation obligations of natural resource management agencies such that anadromous salmon runs continue to decline, are listed for protection under the ESA, or are going extinct. The conservation audit should be performed by a separate agency that would monitor and evaluate the annual salmonid management program. It would probably be a federal agency with an explicit mandate to conserve native stocks and the enforcement ability to preempt state, federal, and tribal management actions. The conservation audit would function as described above.

The responsibility of the federal conservation audit program would be to monitor the compliance of fish management and habitat management programs to determine whether they are contributing to the long-term health of native salmonid resources in the region. In this way fish and habitat management programs would not only be evaluated, they would have the benefit of scientific peer review. Based on the conservation audit, the management agencies would be expected to change operations to meet the standards for native salmonid protection and conservation. The conservation audit should be applied to all agencies that have an effect on native salmonids and their habitats.

Consequently, there would be an annual audit to determine whether forestry operations, hydro dam operations, mining and grazing and agriculture were protecting the biological diversity of native salmonids. This would require the setting of objectives by stock for each of these agencies. It is unreasonable to believe that improved conservation management by the fish agencies and tribes would be able to provide the protection needed for each stock without compliance by land and water management agencies with specific, measurable conservation objectives.

The Problems. At the present time there is no conservation audit program within state, federal or tribal agencies. Since these agencies have a built-in conflict of interest and have a history of failing to meet conservation objectives, an independent conservation audit is necessary.
Moratorium On New Hatchery Development And Reform Of Existing Hatcheries

No new hatcheries should be constructed, and existing hatchery operations should be reformed, in order to protect native salmonids. Until the cumulative effects of the current hatchery programs on native salmonids can be determined, no new hatcheries should be constructed. All new federal hatcheries or federally funded hatcheries should be subject to NEPA review. Existing hatcheries must be reformed to meet biological objectives for native salmonids. Gene conservation protocols must be developed for each hatchery. Mitigation for hydro dams should be restructured to provide funding to restore natural production areas rather than replacing wild salmonids with hatchery fish.

This can be accomplished through new hydro dam licenses and relicensing. Hatchery operations that rely on the transfer of stocks between basins must be terminated in order to protect the integrity of native stocks. Biological objectives must be set for each hatchery and for hatcheries in combination to maintain conservation management of native stocks exposed to hatchery stocks or harvest of hatchery fish. Production and contribution standards should be established for each hatchery and the cost per returning adult should not exceed the value of that fish to the fishery.

All hatcheries should be licensed so that there is periodic public review, providing a process to reform or terminate hatchery operations based on new information. A ten year license is recommended.

The Problems. The effect of the hatchery program on native salmonids has not been fully evaluated, but there is enough scientific information to conclude that hatcheries are having a detrimental effect on native salmonids. Hatcheries can cause the extinction of native stocks, degradation of their reproductive capacity through genetic and ecological interactions, and lead to overharvest of native stocks in mixed hatchery/wild stock fisheries. Hatcheries can also be a source of water quality pollution, spread disease, and consume dollars needed to improve the management of native stocks. All of these negative effects of the existing hatchery program must be controlled if hatcheries are to add to the abundance of salmonids rather than serve as a replacement of natural production.

State And Federal Policy And Program Development

It is critical that a coordinated state and federal policy be developed to perpetuate the biological diversity and productive capacity of native salmonids and their habitats. This would mean that each relevant fish, land and water management agency be involved. At this time state and federal agencies have conflicting missions regarding salmon habitat and management. Until this problem is addressed and resolved, a coherent salmon management and recovery mission cannot be developed and successfully implemented on the west coast.

Some priority policies and programs that must be developed to implement conservation management by the state and federal fish agencies are the following:

1. Institutionalize a native salmon management program with biological objectives that is binding on each fish management and funding agency.
2. Adopt a gene conservation policy with protocols to be applied through various fish habitat management programs.
3. Establish an independent scientific audit agency to evaluate annually the management program against biological baseline objectives by stock.
4. Fund an inventory of salmonid biological diversity to establish a conservation baseline that can be used to evaluate whether management is achieving its biological objectives.
5. Establish a, coast wide information exchange on native salmon conservation and research.
6. Develop biological objectives for hatcheries, standards for operation and contribution, gene conservation protocols, and evaluate the cumulative effects of the hatchery program on native stocks.
7. Develop biological objectives for each land, water and energy management agency to bring those agencies into compliance with native salmonid conservation objectives.

Dear Editor,

On a recent trip to the Kamchatka Peninsula in Russia, our group became aware of a very depressing situation. A well-known American writer (and a reputed conservationist) was breaking Russian law, apparently an unwitting accomplice of a commercial sportfishing group which was targeting protected Russian steelhead.

Everyone operating in Kamchatka knows that the steelhead is listed as endangered in the Russian Red Book and that fishing for them is closely controlled by the Russian government. Yet here were two Americans operating without permission. They had to be waved off by one of the Russian scientists in charge of the steelhead recovery program.

The last thing we steelheaders need is an “ugly American” reputation among those Russians who are working hard to save steelhead.

Howard Johnson, Enumclaw, WA

Dear Editor,

Each year our club earmarks a portion of our resources to the support of fishery conservation. Obviously, much of this support is directed to local programs which promote conservation, fly fishing and fly tying. However, we recognize the need to support national and international programs which promote fishery conservation thereby providing everyone with a better environment in which to live.

Again this year, as partial fulfillment of these objectives we, the Smoky Mountain Fly Fishers, are making this $100 donation to The Osprey newsletter. We feel that The Osprey is a prime example of what can be accomplished by dedicated people who have the courage to make a positive difference.

Best regards, Bruce E. Harang, president (Asheville, NC)

Dear Editor,

This letter concerns the political orientation of your October 1995 edition. At three points in the newsletter you urge Washington voters to vote Yes on Referendum 45, yet the newsletter is silent on Referendum 48.
For the preservation of wild steelhead, Referendum 45 is a "small-potatoes" issue. It provides that the Fish and Wildlife Commission appoint the agency director rather than the governor. In this complex world of multiple competing interests, so what?

Referendum 48, on the other hand, is a direct attack on the most vital element of steelhead preservation, the protection of freshwater fisheries habitat. It would require, among other things, that the landowners be compensated for any regulations that limited land use in any way. This approach would have the taxpayers pay riparian property owners not to destroy steelhead habitat.

Would you please explain to your readers why you have ignored this threat to steelhead preservation in your pre-election issue?

Sincerely, David A. Troutt, Natural Resources Director, Nisqually Indian Tribe (Olympia, WA)

Eds comment:

We would be happy to explain:

1. It has never been editorial policy of the newsletter to involve itself aggressively in electoral politics, but in the case of R-45 we made an exception by inserting three "blockads," as Troutt has noted. We passionately disagree that R-45 was a "small potatoes" issue. The Steelhead Committee has championed a strong and authoritative commission for years; if R-45 had failed, the commission would have been eviscerated. (And, worth noting it is apparent to commission supporters that tribal representatives rarely engage the commission in substantive issues because they have their own, federally mandated contacts with state managers. This may explain Troutt's assessment of R-45: the commission isn't as important to the tribes as it is to others.)

2. As to Referendum-48, we couldn't agree more with Troutt's assessment of its potential threat to steelhead conservation. In truth, the editorial committee gave R-48 about as much chance of passage as the proverbial snowball and so paid it little heed when it came to press time. As it turned out, we were right. Committee members aggressively supported R-45, albeit behind the scenes; it passed. We ignored R-48; it failed. We recognize and appreciate the hard work, Troutt's included, that went into its defeat, but the committee had to put its meager resources where it believed they would have the most impact.

Dear Editor,

I have read *The Osprey* for a few years now and have come to some conclusions about it. I must say it is very informative and well put together with respect to steelhead and salmon issues. However, several past articles, although informative, deal with the premise of promoting "redd" fly fishing during the spring here in Washington.

Suggestion: If *The Osprey* is truly committed to the "preservation" of wild steelhead during this time frame, then it should reflect that philosophy at all times, especially after an article (regardless of author) which has evoked a constant "spring" steelhead fishery. Such articles, like some of the previously published Skagit stories, do not really fulfill a preservationist ideal. Nor does it promote a feeling of enhancing wild stocks simply by releasing one after the other. In fact, most of us who enjoy the sport of steelhead fly fishing to conserve steelhead, do not partake in "late spring" fishing when steelhead are over their redds. A conscious effort must be made here, as to when one hangs up his or her fly rod. In essence, one should not abuse his fly fishing integrity by pounding them during the spring. His rod should rest during the redds.

I would challenge the Osprey staff and all its readers not to betray the resource which you love so dearly, especially during the spring. In so doing, you most certainly will be stealing from our children's children enjoyment.

Also, the newsletter's continuous anti-hatchery stance seems rather short-sided, and more or less a personal vendetta, rather than a sound philosophical approach to steelhead management. Your Washington streams did not contain any hatchery steelhead, like the beautiful 9 lb North Fork Slilley buck I caught recently, perhaps we fly fishermen would only be casting our flies into the wind. Food for thought.

Sincerely, Dr. Phillip T. Answorth, Snohomish, WA

Eds comment:

Dr. Answorth's concern about "redd fishing" has been around for some time. Unfortunately for his argument, the data (limited) and the experiences (not so limited) of most fishermen don't support the claim that fishing during the late spring season hurts the fish. And it is a cardinal position of the Steelhead Committee that we should promote maximum recreational opportunity so long as our wild stocks are not adversely impacted. Further, *The Osprey* does not and has never promoted or endorsed fishing on or over redds.

As to our views on hatcheries, these are hardly "personal," or "short-sided," as witness the publicly stated concerns of many scientists and others, including, as it happens, views expressed in at least three of the articles on this issue. It is certainly true that a few hatcheries provide otherwise unavailable sport in some rivers at some times. It is the harm—now widely understood— caused by Northwest hatchery programs that we object to and will continue to resist.

Dear Editor,

Some years ago when I first signed a contract to do work for the Bonneville Power Administration, I thought I had died and gone to heaven. I was working for a large, stable organization that paid its bills on time. The people I worked with were bright and energetic.

Now, of course, BPA is smaller, less stable, and accused of all the ethical lapses of the private sector...

Do I think that BPA is right in everything it has done? No. In my humble opinion, when BPA was fat and happy before the competitive crunch hit, it too easily gave into pressure applied by the tribes and states through the Northwest Power Planning Council and gave hatcheries to every group that wanted one... Worst of all lately, BPA has projected the attitude that fish are causing all its financial problems...

The positive role the environmental community can play is to create counter pressures. But it isn't going to happen when the positions taken are full of inaccuracies. Pieces such as your two-part analysis of the salmon problems on the Columbia and Snake rivers may work to build outrage in the already converted or the uninformed, but they are not going to convince any objective or knowledgeable observer because they contain some unfortunate errors...

One of the more interesting claims in the series is that BPA cooks the books. Mr. Redman is on decent ground when he says that accepting foregone revenues and power purchases as fish expenses can be challenged philosophically. But he is wrong when he says this questionable accounting—BPA's financial statements are audited and have been found to be in accordance with generally accepted accounting principles...
Mr. Redman attacks BPA for not taking into account water used for irrigation, transportation, and the like. BPA has no power to do so except at the dams. And it is charging. Under the 1980 Power Act, BPA can charge for the portion of the dam maintenance and operation costs that are assigned to uses other than power generation. As I recall, that is 27 percent. This is not popular with the affected parties, but BPA will be reimbursed for the operations and maintenance expenses for irrigation, transportation, recreation, and such uses of the dams.

Ah, yes. And the famous aluminum subsidies. By legislation, BPA’s rates have been cost based. The reason rates for the direct-services industries appear to be lower than those for other users is that it costs less to supply power to them. Basically, BPA can string a line to an aluminum plant, turn on the juice, and go home. The same amount of power flows day and night every day all year. This is not the case with other users. Loads fluctuate by day and by season, even hourly in places. This is a lot more expensive than supplying power to the level load at the aluminum plants.

Mr. Redman may be right when he says that the Northwest is switching from being a net power exporter to a net power importer. But the second half of his analysis is dead wrong. The problem is that the imported power is cheaper than BPA’s hydro-based power. This is why BPA is so concerned about the escalating salmon recovery costs—along with other costs it cannot control.

The defense and aerospace industries in California shrank drastically at the same time that massive amounts of cheap natural gas have been pouring south out of Alberta. California has a lot of old, polluting natural-gas-powered generating plants that were going to be shut down. But, with the new rules on competition and the amazing low price of natural gas, the operators of those plants saw an opportunity to pump out cheap electricity and send it to the Northwest.

One assumes that this is a temporary phenomenon and that natural gas prices will go up and the plants in California will close as they were supposed to. In the meantime BPA is in a bind.

If you don’t like how BPA funds fish recovery, you might consider the options under Puget Power or Portland General Electric.

I confess that I have become an agnostic when it comes to saving salmon and steelhead runs. I no longer automatically believe what I am told by the feds, the environmental movement, the states, the tribes, or industry. The dueling biologists have worn me out. The barge issue is a perfect example. My instincts say that bargeing is unnatural and, therefore, wrong. Numerous groups have pointed out that runs have declined while bargeing has been in use. But instincts are often wrong and the correlation between bargeing and declining runs is only one— a correlation. No causation has been established. The recent National Research Council report seems to provide a balanced view of bargeing—use it until a better method of getting smolts down the river is devised. Keep experimenting and learning.

If the salmon and steelhead on the Columbia and Snake Rivers are to be saved, it will take concerted and enlightened action on the part of all groups. This is certainly a difficult and uncertain task. I understand your frustration over the status quo but ranting and raving and making erroneous claims will not help.

Cordially, Ian Templeton, Portland OR

The ranting and raving Mr. Redman responds:

By my count Ian Templeton disagrees with my two articles on the Columbia/Snake situation. Let’s take them in turn.

1. On BPA’s accounting for Fish and Wildlife expenses, this is not a question of whether accountants have audited the work of other accountants. It is an issue of top management financial policy, and whether the fish are treated equally with other users of water river. Box 9-1 of the National Research Council report UPSTREAM discusses the “Annual Costs of Fish and Wildlife Investments,” and is quoted in part here to provide a better response to this question than I can.

“The largest annual cost for salmon restoration in the Columbia River is in water. An implicit assumption in design of the system of dams was that there would always be water for fish. Water, however, is not available in the right places, in adequate quantities, or at the right times to meet the requirements of migrating salmon. Fish have no rights to Columbia River water. To implement restoration goals, water has to be purchased from those who control it.

“A second assumption in design of the Columbia River system was that substitutions such as artificial propagation and artificial ways of getting up and down river could replace natural production. The second largest annual cost is in bypass facilities and the purchase of hatchery salmon to replace natural runs of salmon adversely affected by dams.

“The annual cost of fish and wildlife investments is not a precise or simple number. Costs vary according to rainfall in the region, power markets, water storage from the previous year, the allocation of responsibility for fixed costs, and what gets included as a fish and wildlife expense.

“Total FY 1994 costs for fish and wildlife for both the NPWC and ESA programs and operating expenses, flow revenue impacts and power purchases, interagency transfers for associated projects, related fixed expenses, and foregone revenues. Of the total costs, BPA administrators actually control a relatively small portion.

“In assigning costs, BPA makes assumptions about future years with respect to flows, power markets, and other factors. BPA planning does not budget to save money from good market and flow years for helping in hard years. Thus, the drought of the late 1980s and early 1990s has put severe upward pressure on BPA electricity rates.

“The biggest salmon restoration expense comes from the revenue impacts and purchase of power lost because of altered flows for migration. This category has increased by 300 percent since FY 1991 and is $150-200 million for FY 1994. Low flows due to drought and poor power markets substantially increase this cost.

“The actual direct FY94 BPA expenses for salmon, resident fish, and wildlife measures amounted to $54 million. This was up one-third from FY91. The salmon portion was 72 percent of the total. It has increased 17 percent since FY91.

“The total of all these costs was on the order of $350 million, which was about 1 percent of BPA revenues. The total costs were

The Osprey, No. 26, January 1996, page 11
more than twice what they were in FY91. While it is worthwhile knowing the relative costs of actions to protect salmon, NPPC fish and wildlife program and ESA biological opinion are held out as the major factor affecting ‘Pacific Northwest electric utility ratepayers’ (BPA 1994). The impact of the drought and power markets are seldom mentioned in conjunction with the fish and wildlife costs. The costs in lost power to provide water for irrigation, transportation, recreation, and flood control are not calculated. The primary purpose of the Columbia River system is assumed to be mainly hydropower production and related functions. Fish and wildlife requirements are judged from this perspective.

"Cost estimates come from models that simulate operation of the system. The costs allocated to the fish and wildlife program depend on how one sets priorities for water use. Should hatcheries, for example, be charged to the fish and wildlife program or to irrigation or to hydropower? Why should salmon be charged for flaws in the design of the hydropower system? If water flows for fish were given the highest priority, then hydropower generation would have to buy water allocated to fish rather than the reverse. How is the amount of power purchased for fish enhancement known? The selection of interest, amortization, and depreciation rates greatly affects cost estimates. What replacement rates should be used to calculate the forgone revenues? These and many other assumptions and estimated allocations make the costs frequently quoted highly subject to debate for the values implied in their calculation." (Emphasized added.)

2. Mr. Templeton is correct in his observation that it costs BPA less per kWh to deliver a constant flow of power to the aluminum plants than a variable flow to other end users, and that there is value to BPA in the interruptible clause in the aluminum plants' contracts (although rarely used). But the issue isn't whether the aluminum plants should get lower rates than other end users; it's how much lower. Too much lower by tens of millions of dollars per year, possibly over $100 million, according to the House of Representatives Committee report, "BPA at a Crossroads," mentioned in my article in the October Issue (No. 25) of The Osprey.

3. Mr. Templeton's claim that natural gas based power may be competitive with and sometimes cheaper than BPA's hydro based power is partly right. Unencumbered...

... letters, cont. to page 20

UPSTREAM: THE NRC REPORT

In this article Bill Redman (whom readers may in our two most recent issues) has again done yeoman duty by carefully studying and here helping to explain the recent National Research Committee report on the condition of west coast salmonids. The 388-page report may become immensely important to the future of these many stocks, yet the national media focused on it only briefly and narrowly. Bill's summary and concluding recommendations for "next steps" are a useful contribution to the debate and should be considered carefully by interested readers who may have influence or authority in the matter.

The report “UPSTREAM, Salmon and Society in the Pacific Northwest” was released by the National Research Council in mid-November amid a flurry of media attention centered primarily on the report’s positions regarding alternatives for getting salmon and steelhead smolts downstream through the Columbia/Snake hydro system.

Before dealing with this issue, it is important to understand some of the background and scope of the report and what it has to say about the whole sweep of the salmon situation. The report was done at the request of Congress by a panel of 15 scientists selected by the National Research Council for their qualifications and varied backgrounds and views. Eleven of the 15 are university faculty people, a few have done work for industry, and one is a fish and wildlife agency professional. Indeed their credentials are impressive.

The National Research Council, in turn, is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering for providing services to the government, the public, and the scientific and engineering communities.

The committee reviewed the status of stocks of the seven species of the genus Oncorhynchus (steelhead, sea-run cutthroat, and the five Pacific salmon) in Washington, Oregon, Idaho, and California, and analyzed the causes of decline and options for intervention. Supported by a staff of three, the committee met periodically over a three year period and made what appears to be a comprehensive review of a wide variety of scientific studies.

As to the debate between transportation and drawdown, readers need to know that the report is 388 pages long, only 12 of which deal with the controversial questions surrounding the alternatives for getting Columbia/Snake smolts downstream through the hydro system.

The rest of the report should only draw support from fish advocates. In general it says that salmon have great importance in the Pacific Northwest, that their decline is widespread and dramatic, that the declines are largely due to human impacts, and that there is no single "magic bullet" that will bring recovery. It says: "Any solution to the salmon problem must take the effects of growth in human population and economic activity into account."

A brief rundown of a few of the highlights in each area of the report will provide a flavor.

On Genetic Diversity:

"A crucial aspect of the recommendations is the overriding need to focus management goals primarily on genetic diversity rather than on biomass production. Sustained productivity of anadromous salmon in the Pacific Northwest is possible only if the genetic resources that are the basis of such productivity are maintained. Salmon management should be based on the premise that local reproductive populations are genetically different from each other, and valuable to the production of salmon."

The report blames hatchery operations and extirpation of natural local populations for much of the shrinkage in genetic diversity.

On Hatcheries:

"The management of hatcheries has had adverse effects on natural salmon populations. Hatcheries can be useful as part of an integrated, comprehensive approach..."
to restoring sustainable runs of salmon, but by themselves they are not an effective technical solution to the salmon problem. ... The intent of hatchery operations should be viewed instead as part of a bioregional plan for protecting or rebuilding salmon populations and should be used only when they will not cause harm to natural populations. ... All hatchery programs should adopt a genetic-conservation goal."

The report calls for a change in hatchery focus from fish factories to learning laboratories, close monitoring of all hatchery programs, and marking of all hatchery fish.

On Habitat:

"Many human activities — notably forestry, agriculture and grazing, hydropower, and commercial, residential, and recreational development — have contributed to the degradation of the riverine and adjacent riparian and near-river habitat and caused loss of habitat of spawning adults and young salmon, and loss of associated components of the ecosystem. ... Riverine-riparian ecosystems and biophysical watershed processes that support aquatic productivity should have increased protection."

On Harvest:

Not enough fish are being allowed to return to spawn. ... Escapements should be increased." The report urges a change in focus from catch to escapement. It recognizes that, while fishing is not generally the largest cause of mortality, it is the easiest factor to control and must be used. It says fishing should generally be done only when the source of the fish is known and by methods which ensure minimal mortality in depleted runs. Live catch terminal fishing is named as the preferred method.

On Institutional Change:

"Our limited understanding of salmon and the ecosystems they inhabit requires adaptive management if rehabilitation is to have a chance. Systematic, experimental learning is faster and less expensive than trial and error learning, which has proved to be ineffective ... This means close monitoring and record keeping of results and long time cycles."

The report points out that this approach requires the kind of institutional stability that does not exist today, with political changes hindering the long term view. It calls for

formation of a standing scientific advisory board, which apparently is in the process of being formed. Obviously, the composition and influence of this board will be critical. The report says that the marketplace does not account for the full range of salmon costs and benefits, with non-market values underrepresented and usually not easy to measure.

Significantly, the report recommends: "Hydropower prices, which internalize the full costs of growth, should be used to provide funding for rehabilitation of salmon and their ecosystems, especially in areas that are affected by hydropower projects." The report also calls for the formulation of preemptive salmon recovery plans in advance of listing under the Endangered Species Act.

On Dams, In General:

The report says dams have greatly reduced wild runs.

On Columbia/Snake Dams Specifically:

"The many dams on the Columbia River and its tributaries cumulatively have had large effects on salmon survival.... Although as many as 90 percent of young salmon might survive passage over, around, and through any individual major hydropower project on the Columbia-Snake river mainstem, the cumulative reduction in survival caused by passing many projects has adversely affected salmon populations.... Of the various human-caused changes in the region, particularly the Columbia River basin, perhaps none has had greater impact than dams ... there is a consensus that migration hazards... associated with mainstem dams are a leading factor in the mortality of smolts migrating downstream."

Recommendation: Improve salmon survival rates associated with passing hydropower projects in the Columbia and Snake Rivers. "Serious consideration needs to be given to all available alternatives for doing so; even a small improvement in survival would be helpful if it were repeated at many dams." The committee strongly supports acquisition of additional reach specific survival information at Snake and Columbia river projects.

It says specifically that damming of Hanford Reach of the Columbia would make the situation worse and that existing dams should have adequate fish passage facilities where feasible and appropriate before relicensing.

So far so good. Any and all of these recommendations would help it acted on by the policy makers. Our challenge is to inform the policy makers and insist on their action.

Now to the questions about how to get the smolts downstream through the hydro system.

The report states: "Despite the paucity of information, it is clear that no single approach would eliminate the adverse effects of dams on salmon." The report reviews seven measures proposed or in use to assist downstream migration:

1. It generally endorses installation of juvenile fish passage facilities, such as deflection screens from turbines, in dams that don't have them, and refinement of them in dams that do have them.
2. It acknowledges heavy squawfish predation on smolts, without much comment on the effectiveness of efforts to control squawfish populations.
3. It endorses spilling water over dam spillways as an effective means of reducing smolt mortality as they migrate across the dams, but says spill has no effect on reservoir mortality. It also cautions that spill must be done with close attention to the dangers of gas supersaturation.
4. Flow augmentation (releasing water stored in upstream reservoirs) during the spring migration season is found in the report to have little positive effect on reservoir water flow rates and smolt travel times, but it is acknowledged to be a likely source of water for spill.
5. Dam removal is acknowledged to be an obvious alternative to improve migration, but at high economic and environmental cost.
6. The controversy has come primarily from the report's comments on the relative merits of...
(7) spring reservoir drawdowns. Typical is the following: "The committee is unaware of any scientific data that unequivocally support drawdown to a level above river grade as the best available dam-mitigation option for the Columbia River or Snake River. Based on limited information, transportation appears to be the most biologically effective and cost effective approach for moving smolts downstream. It should be continued on an adaptive basis (i.e., in such a way that additional information can be obtained about its effectiveness.) Additional information is needed on effects of transportation on survival to the adult return stage, on homing, on success of natural spawning, and on genetic diversity of returning adults. Because any action that could jeopardize all of the fish in a stream must be avoided, not all of the fish in any stream should be transported."

The report acknowledges that the state agencies and tribes oppose barging and trucking and support seasonal drawdowns, and that the runs have continued to decline while fish have been barged. But it refers to modeling done by the 1993 Snake River Salmon Recovery Team and quotes a "transportation-benefit ratio" of 2:1 compared to current in-river migration. The report says: "Only drawdown of the Snake River reservoirs to river-grade, which would take years to design and build, potentially offers higher survival than transportation... Most of the studies... that have considered a drawdown option have concluded that drawdown to any level greater than natural river level is not likely to have biologically significant benefits, in comparison with other alternatives... the natural river drawdown option produces a range of survival... in the Snake River basin. This option also should have the potential to increase survival over that predicted for transportation."

However, the (Recovery) team added that the drawdown alternatives are highly uncertain, and even the most optimistic juvenile passage assumptions associated with a four pool drawdown fail to improve survival values. "... beyond what is achievable with juvenile transportation."

---

The committee's support for these conclusions may come at least in part from its findings that the data suggest greater mortality at the dams than in the reservoirs; i.e., higher priority to getting the fish past the dams than through the reservoirs.

**What To Do?**

These opinions pose some interesting challenges to those of us who have come down firmly in support of spring migration season drawdowns: "There is less scientific consensus in support of drawdowns than there was even a year ago. So what to do? Cries of outrage won't help; nor will claims of environmental purity in support of drawdowns over transportation. Rather, a good approach is to pose a series of thoughtful questions based in common sense rather than any claim to greater scientific knowledge; then seek out the answers and go from there. Here is a starting list of questions.

1. Committee Chairman John Magnuson said: "If we continue business the way we have in the past, salmon will continue to decline." Given that the Snake River runs have continued to decline while transportation of smolts has been increasingly "business the way we have," what hope can be offered that continued transportation will contribute to a turnaround leading to recovery of the runs?

2. Do the data offered in the report on "transportation-benefit ratios" measure success as smolts delivered below Bonneville, or returning adults?

3. Has the committee seen the Idaho Department of Fish and Game data showing a close inverse relationship between number of Snake River salmon smolts barged and number of returning adults, and if so, what interpretation does it offer, and how can such a consistent pattern be ignored?

4. What happens next if further experimentation and measurement show that transportation simply isn't working?

5. Where in the committee's report is the time urgency demanded by the perilous state of the Snake River chinook and sockeye runs?

6. With the need for adaptive management being one of the overriding themes of the report, shouldn't several different approaches to improving Columbia/Snake downstream migration be tested concurrently, especially considering the long time required to fully understand the results and the time urgency of the situation?

7. Given that there is a good deal of support for drawdowns in the scientific community, shouldn't that be one of the options tested soon?

8. In making judgments about the cost effectiveness of various alternatives, are the scientists stepping outside their areas of expertise into policy making, especially considering that the majority of residents of the Pacific Northwest have indicated through polls that they are willing to pay a modest amount more for electricity to save the salmon?

---

Considering our current level of understanding of these questions many of us are too uncomfortable with the likely answers to rest easy with this section of the NRC report. ▲
KAMCHATKA STEELHEAD:
PROJECT UPDATE

This past fall, I spent two months in Kamchatka co-directing a joint Russian-American scientific project. We were there to study steelhead populations and genetics on the Kamchatka Peninsula in the Russian Far East. The Kamchatka Steelhead Project is a twenty year program combining scientific resources of Moscow State, Washington and Washington State universities, the U.S. National Marine Fisheries Service, the B.C. Ministry of Environment, the Russian Ministry of Environment and Russian Academy of Sciences. Scientists from Moscow State University and the U.S. National Marine Fisheries Service participated in field activities along with Russian conservation officers.

The project is supported by the Federation of Fly Fishers and funded through a combination of grants from the U.S. and Russian governments (20 percent), American private charitable trusts (five percent) and individual participating sponsors who accompany the expeditions as volunteers (75 percent).

Russian steelhead are listed as an endangered species in the Russian "Red Book of Rare and Disappearing Species." To protect steelhead, all fishing for them, both commercial and recreational, is prohibited throughout Russia. In support of the joint Russian-American scientific study of Kamchatka steelhead populations, the Russian Ministry of Environment issued special permits to the Kamchatka Steelhead Project to collect biological specimens from 200 steelhead in 1995:

- 50 specimens to be collected by Moscow State University. These specimens were to be collected lethally (by gill net) to permit detailed biological and genetic examination;

- 150 specimens to be collected by catch and release fly fishing by individually named participants (i.e., the Ministry issued a license to each participant granting an exemption to the Red Book prohibition on fishing for steelhead). The expedition collected scale samples, physical measurements and a small, non-lethal biological sample (1 cm x 1 cm fin clip) from each steelhead.

Except for these special permits issued to the Kamchatka Steelhead Project, no other fishing for steelhead is allowed in Russia.

Building upon the 1994 expedition experience, the KSP mounted an expanded program in 1995. The 1995 expeditions were very successful and rewarding. We gathered voluminous scientific data from one of the most remote and beautiful regions left on the planet. The expeditions were accomplished on a modest budget directed by the Wild Salmon Center with unpaid volunteers. Altogether, we collected data on 193 steelhead and 25 large resident trout (3-10 pounds) from four Kamchatka wilderness rivers. In the next issue of The Flyfisher, I will report preliminary findings based upon the scientific data collected.

Confirmed by ten weeks of expedition experience, we know that fly fishing is an effective, non-lethal data collection method which is especially valuable when studying depressed, threatened or endangered steelhead and trout populations such as Kamchatka endangered steelhead.

One event underscored a depressingly real reality: Where there are steelhead, there may be those who are prepared to fish with or without the required permits. This fall, employees of a prominent American outfitting firm, and a well known American fishing author, were fishing illegally for steelhead within a mile of our expedition camp. They had arrived by a helicopter chartered by a commercial fishing company and established an unauthorized camp in a nature reserve. The Russians were stunned.

When confronted by scientists from Moscow State University and a Russian conservation officer, the Americans claimed that they had the necessary permits although the Ministry of Environment had issued no such permits. Further, I had previously provided the American outfitter, at his request, written confirmation of the steelhead’s endangered status, a detailed explanation of the Russian permitting process and a translated letter from the Russian Academy of Sciences faculty director responsible for monitoring the status of endangered steelhead which further explained the angling prohibitions. The outfitter simply fished without the requisite permits.

I have spent approximately ten weeks in Kamchatka studying steelhead. The expeditions have found significant steelhead populations in three rivers. Collecting specimens from Kamchatka steelhead, like steelhead fishing everywhere, is not easy. You fish for a bite or two a day and land about half of what you hook. But, in Kamchatka, what a bite! Based upon our experience, steelhead in the Kamchatka rivers studied appear to be the largest steelhead in the world. This year, the majority of steelhead were in the 16-18 pound range and a high proportion of the steelhead were over twenty pounds. I personally landed three steelhead in the 25-28 pound range. The largest steelhead taken by Moscow State University scientists weighed 19 kilograms (41.8 pounds).

As previously reported, a high percentage of Kamchatka steelhead are repeat spawners—comprising, perhaps, as many as 75 percent of the run. Quite astonishingly, one fish caught steelhead captured in 1995 had been caught and tagged during the 1994 expedition in a completely different watershed. The two rivers enter the sea more than 100 miles apart. While this fish is but a single sample, its life history raises intriguing issues which challenge much of the conventional wisdom about steelhead migration, straying and homing.

Surprisingly, this very high incidence of repeat spawning may have important implications for human health. At the beginning of spawning migrations, steelhead develop arteriosclerosis—a non-reversible arterial disease often fatal to humans. Steelhead which survive spawning and return to the sea are the only species known where arteriosclerosis is a reversible process. Dr. Robert Van Citters, Dean Emeritus of the University of Washington Medical School, directs a research project to investigate this phenomenon and its potential application for human health care. The Kamchatka Steelhead Project cooperates in this project by providing steelhead hearts from the lethally collected specimens.

In one river, we found substantial numbers of co-existing large, resident trout which appear to be taxonomically different from rainbow. The genetic relationship between these trout and steelhead and rainbow trout is an area of great scientific interest.

The Kamchatka Steelhead Project will mount at least two scientific expeditions in the fall of 1996 (September/October). Many of the 1994 and 1995 participants plan to return. If you are interested in the details of the 1996 program and how you can participate as an expedition sponsor, please contact me directly at 206 742 4651. Or write to the Wild Salmon Center which directs the Kamchatka Steelhead Project:

The Wild Salmon Center
16430 72nd Avenue West
Edmonds, Washington 98026
206 745 9478 (fax)
1995 HONOR ROLE OF CONTRIBUTORS

|$500 AND UP
OVERLAKE FLY FISHING CLUB
$100 TO $499
FRANK AMATO
BILL BARNETT
JAY COULTER
JIM HUBBARD
JERRY L. MYERS
OREGON COUNCIL, FFF
SMOKY MOUNTAINS FLY FISHERS
THE STEAMBOATERS
|$25 TO $49
JAMES R. ADAMS
BRUCE BAKER
WILLIAM K. DOWNING
ALICE J. ELLIOTT
CRANDALL ERDMAN
SERGE KARPOVIC
DAVID LLEWELLYN
WILLIAM E. LOMBARD
JON B. LUND
BOB MCLAUGHLIN
WILLIAM A. MCMANUS
JIM PAUTZKE
LEO J. PROBY
JERRY ROGERS
MICHAEL P. ROGERS
JOE SHELDBO
JAMES L. SHIVELY
RICHARD V. SMITH
RICHARD W. SMITH
LEE STRAIGHT
GEORGE A. VEITH
STEPHENV L. WARREN
RICHARD W. WATTS
DAVID B. WOOD


The FFF Steelhead Committee lost a strong member and devoted co-worker on November 25 when Bill Barnett succumbed to cancer.

Among fly fishers, Bill was “Mr. Wenatchee River,” and it would be hard to find a Wenatchee River steelheader who has not run into him on the river or who isn’t aware of his many-years efforts to improve the wild steelhead and trout populations in his home stream. Bill lived on the river and knew and understood it as well as anyone. Probably his proudest achievement was the elimination of hatchery rainbows from Tumwater Canyon.

Bill served on the Washington wildlife department’s fisheries policy task force for three years, exercising his quiet but authoritative influence where it made the most impact. He was somewhat of an anomaly in this setting—quiet, gracious, always listening carefully; he saved his speech for important issues and he was always right.

Bill was among the most generous supporters of The Osprey, not just with his checkbook, but always with his counsel. He had the wisdom of the old pro and he dispensed it with the heart and soul of a concerned grandfather.

The Wenatchee and rivers everywhere have lost a dear and valuable friend.

IS YOUR NAME HERE?

Long-time readers of The Osprey need no reminding that our ability to write and publish this newsletter depends on voluntary financial contributions. In January, each year, we like to try to remind everyone about this necessary, if awkward, subject. We now mail out about 1400 copies of each issue; sadly, though, our financial support “team,” readers who contribute more or less regularly, is very narrow, only a few hundred contributors.

Fact is, in early 1996 our treasury is as low as it has ever been, owing mainly to a drop off in reader contributions. In order to fix this we have no choice but to take drastic action:

This will be the last issue of The Osprey sent “free” to more than 400 on our mailing list who have never contributed, save for those institutions and professionals whose readership we particularly value. Most of those affected will be people we have met along the riverbank and others who have expressed interest, however vague, but who have never acknowledged even receiving the newsletter. Naturally, a contribution will put any reader back on our mailing list.

Is The Osprey a good investment? Are we succeeding? (Clearly, we’re not, financially.) But, without bragging, we can assure readers that The Osprey does have impact among fisheries policy-setters who make a difference. Much of our material and focus is provided or influenced by leading steelhead authorities, scientists and others.

We hear kind words from resource managers and politicians often enough to know that we are listened to. And our readers tell us that the newsletter provides information and food for thought not found elsewhere.

How much is “enough?” This year’s Honor Roll identifies readers who have contributed $25 or more during 1995. Some of you have contributed less, usually ten bucks, and these smaller donations are much appreciated. Any decent magazine these days costs around $3.00 a copy at the newstand. Our newsletter shows up in your mailbox three times a year. So you be the judge.

If you think The Osprey makes a difference, please send a check. I have. So has every member of our editorial team — already volunteering time and energy for steelhead conservation. How about it? PS
The following dispatch from the San Francisco Chronicle, dated October 19, 1995, and written by staff writer Glen Martin, was called to our attention by occasional Osprey contributor H.L. Joseph, who probably is Vallejo, CA’s most effective steelhead enthusiast. This is a real-life account of what can go very wrong in the hatchery industry. Just as important, it reminds of the ingrained habit of hatchery managers, who by now should know better, to downplay the importance of genetic integrity. Eds.)

The California Department of Fish and Game has become a victim of its own success on the Klamath River, where the return of artificially propagated Chinook salmon has been so great that it has overwhelmed the state’s hatchery at Iron Gate Dam.

“The Iron Gate Hatchery, located near the Oregon border in Siskiyou County, tries to process about 8,000 returning salmon spawners to meet its annual quota of 10 million fertilized eggs. But for the past two years, hatchery supervisor Bob Corn said, thousands more salmon than anticipated have returned for spawning.

“‘There are probably 20,000 to 30,000 fish at Iron Gate right now,’ Corn said, ‘and we don’t have the personnel or the space to deal with them at all. So those we don’t use must be returned to the river.’

“Prevented from spawning at their native hatchery, the fish head back downriver. Most ultimately attempt to lay their eggs in the gravel of the Klamath’s tributaries, prime spawning grounds for native salmon.

“Some biologists worry that the situation will cause interbreeding of hatchery and wild salmon, thus threatening to dilute and ultimately destroy the stocks of purely native Chinooks.

“Because hatchery fish have less genetic diversity than wild fish, they are more susceptible to disease and less flexible in adapting to changing environmental conditions.

“Of all the Klamath’s tributaries, the Shasta River is the most significant to salmon. It harbors a wild strain of Chinook salmon that is one of the most robust in the Klamath River Basin, which stretches about 200 miles from the ocean to Iron Gate Reservoir.

“Biologists say the interloping hatchery fish threaten the integrity of the Shasta’s wild Chinook run.

“‘The hatchery fish are competing with the wild fish for what spawning habitat exists, they are threatening the genetic base of the wild fish by interbreeding with them, and they are endangering the wild fish directly by exposing them to hatchery-borne diseases,’ said Roger Barnhardt, president of the Humboldt County chapter of the American Fisheries Society.

“‘These wild strains of salmon are extremely important,’ said Barnhardt. ‘The hatchery should be operated in concert with the (Klamath’s multiagency) basin-wide recovery plan for wild fish, and that’s not being done.’

“Jack Shaw, president of Shasta River Audubon Society, said it is ‘bad biology to let the hatchery fish supplant wild salmon on the Shasta and other drainages. I can’t understand it.’

“Hatchery supervisor Corn said he simply does not have the people or the financing to handle all the excess fish.

“‘We try to fin-clip all the ones we return, so they can be identified and removed at the Fish and Game counting racks on the Shasta River,’ said Corn. ‘Unfortunately, they’re in the same boat on the Shasta as we are — not enough staff.’

“Kim Rushton, the assistant hatchery manager, said the same shortage in staff and facilities prevents Fish and Game from culling the surplus salmon for other uses, such as donating them to community charities.

“Opponents to Fish and Game’s policy say California should follow the lead of Oregon and Washington, which allow all artificially propagated salmon to return to their hatcheries, then sell the excess to commercial interests to help cover operating costs.

“The problem also emphasizes the growing conflict between hatchery managers and proponents of wild fish. Rather than operate hatcheries, say wild-salmon advocates, fisheries managers should improve river habitats so that salmon can be self-sustaining.

“Hatchery operators counter that their facilities provide a reliable source of salmon despite degraded environmental conditions in the rivers.

“‘Genetic interchange has already been occurring between hatchery and wild fish on the tributaries for some time,’ said Corn. ‘It’s true that hatchery fish support a narrower genetic base than wild fish, but that doesn’t mean they are very different genetically. Our hatchery fish are drawn from wild strains. The genetic difference isn’t that great.’

“Much of the problem, said Corn, may be attributed to oceanic fishing closures for Klamath River salmon aimed at protecting the basin’s stock of native fish.

“‘They protected the wild fish all right, but then we had all these hatchery fish returning,’ said Corn. ‘Nobody derived any benefit from them, and they ended up straining the system.’
WILD SALMON CENTER'S
INTERNATIONAL STEELHEAD PROJECT
1996 WILDERNESS EXPEDITIONS

SPONSORSHIP:

$5,500

SPACE IS LIMITED.
ITINERARIES SUBJECT TO CHANGE.

MAKE APPLICATION TO:
THE WILD SALMON CENTER
206-742-4651
206-745-9478 FAX
E-MAIL: soverel@u.washington.edu
REPORTS ON THE 1994 AND 1995 EXPEDITIONS AVAILABLE.

KAMCHATKA & SOUTH AMERICA

KAMCHATKA, RUSSIA

EXCEPTIONALLY LARGE STEELHEAD — average 15-16 lbs.; many 20-28 lbs.

Expeditions: Sept. 7-22; Sept. 21-Oct 6, Oct 5-20.

SOUTH AMERICA
Investigation of areas where introduced steelhead have established self-sustaining wild populations is of great scientific significance.

Join scientific expeditions to river systems thought to contain steelhead and sea-trout populations in coastal Chile and western Argentina: June 15-30; June 29-July 14; Oct. 12-27; Oct. 26-Nov. 10.

Comfortable camps/lodging. Experienced staff.

WORLD-CLASS STEELHEAD EXPEDITIONS SPONSOR AND JOIN...

International Steelhead Scientific Expeditions for two weeks of field work collecting biological samples and other scientific information on steelhead populations in Kamchatka and South America.

WSC expeditions are sanctioned by host country governments and include field participation of leading scientific authorities. Sponsoring anglers are critical to the success of all expeditions. Catch and release fly fishing provides a statistically significant, NON-LETHAL data collection method which is extremely important when studying endangered or depressed stocks. The Spring 1995 issue of Wild Steelhead & Atlantic Salmon magazine contains an in-depth article about the 1994 expeditions.
REMINISCENCE

Joe has spent a lifetime learning the secrets of that most challenging of steelhead rivers, the North Umpqua. He is a master fly tier and guide and the proprietor of The Blue Heron fly shop in Idleyld Park along the river.

I remember when...

The Osprey invited me, as an “old timer,” to submit an article that portrayed what fishing was like way back when. Well, at 49 years of age I am not exactly sure that I qualify as an old timer, but I am happy to relate some of my early experiences along the North Umpqua.

The fish are the primary reason that we do what we do, but it is also the other things, the river’s sights, sounds, smells, plus the people we meet and experiences shared, as well as lone encounters.

I have trout fished the river since I was eight years old. I was thirteen when I saw my first steelhead, and it wasn’t even on the end of my line!

Mid afternoon on a day in 1960 found me sitting wet in blue jeans and tennis shoes on the partially submerged lodge of the Station Pool. I had waded, slipped, and swam to the lodge from the road side of the pool. The water was cold in the hot August sun, but not uncomfortable. I fished a seven dollar fly rod, Shakespeare “Russell” reel, Gladding HCH line tipped off with a Berkeley “state-of-the-art” knotless tapered leader. A plastic box crammed full of my own home tied flies completed my gear. It was heaven on earth. I was without a care in the world. That is, until that day when I became aware of just how big and beautiful a steelhead is!

A man began wading from the trail side until he was directly across from me, and at once began casting, his fly landing just a few feet downstream. Now back then I didn’t know there was such a thing as fishing etiquette. I reeled in so that I could watch a real pro in action. He was outfitted with canvass-looking waders, hob-nailed boots, and a “real fly vest” (something I had really wanted but couldn’t afford back then). Some sort of silly looking hat that seemed out of place sat on his head. Anyway, his casts were smooth and beautiful. Suddenly, after only five or six casts, he was fast to a steelhead that catapulted so high in the air that it looked like a bright shiny slice of silver moon against the blue of the sky. As I sat on that ledge and watched that fish jump less than fifteen feet away, all I could do was look up and gasp! “Oh, no!” the man said. “He broke off!”

The man, whom I only knew as “Mister” was just as excited as I was. “Hey, Mister... how big?” I asked as he reeled in his slack line.

“Ten or eleven pounds,” he hollered back. A slight pause on my part, then the inevitable question. “Hey, Mister... what fly?” “Skunk fly, number four,” he yelled.

Well, to make a long story short, I was the one who was hooked and landed that day!

The next couple of summers I fished the North Umpqua every chances I could, which was never enough. I bounced back and forth between fishing for trout and for steelhead. Many trout were taken, but only a few steelhead were even hooked. Those that were hooked solidly lasted but a few seconds, as I usually clamped down on the reel handle and immediately went into “winch mode.” Banged up knuckles and broken leader tippets were the result. But, boy! I was so excited that my heart would jump to my throat and I’d get kind of shaky all over. Then the fish would be gone, but I’ll never forget that adrenaline rush!

Back then an OX Berkeley leader tested at five or six pounds. Gladding and Stren weren’t much better. I would eventually catch steelhead on four pound Stren, but lost a whole lot more. All in all it was a great learning experience. It taught me to let them run and only apply pressure when they stop.

Everything had to be learned by trial and error. The few steelheaders around at that time usually would not give a kid the time of day. The only books available to me then were Claude Kreikler’s “Steelhead,” Van Fleet’s “Steelhead to a Fly,” and a chapter in Ray Bergman’s “Trout” about the N. Umpqua.

There was one old timer who spurred my interest in steelhead on two different occasions. Once I saw him at the Boat Pool and sat down to watch him cast. After a few moments he motioned me over. I couldn’t believe my luck. The casting lesson lasted all of eight or ten minutes, but I got to use a real “bamboo” rod for the first time. The Golden Ashway line shot through the guides with ease. A Pfueger Medalist 1459 1/2 reel completed his outfit.

On another day at Mott Bridge he pulled a small plastic fly box from his vest. When opened to the sunlight the flies sparkled like jewels. There were Skunks, Black Gordons, Cumming, Umpqua Specials, and a pattern that was new to me... a blue-winged Jack Scott. It was tied with a blue bucktail wing tipped with a peacock sword, and Jungle Cock checks. They were the most beautiful flies I had ever seen, and certainly my first introduction to Jungle Cock. Well, I just had to have some of those little feathers. In the early 1960s a triple-A grade cape could be mail-ordered from Herter’s, Inc. I paid $7.50 for my first Jungle Cock cape. Almost every steelhead fly I tied that next year sported wings dressed with Jungle Cock.

The next couple of years I fished when I could, but it wasn’t until I was old enough to drive that my steelhead education really began.

The lure of the river was like magic. Pools and runs had intriguing names like Rattlesnake, Rip-Rap, Split Rock, Clay Creek, Archie and The Kitchen, to name a few. I eagerly sought out new pools as soon I heard of them, pestered other fishermen for information on flies and the names of pools, and even down right “spied” on people like Frank Moore and Frank Bergh. Frank Bergh is gone now, but what a gentleman he was! Always free with his information. He occasionally would stop and chat for awhile. He had a polite way of pointing out my errors, helping me to improve my skills. Little things like, “Do you always mend so much?” or “You know, I’ve had better luck at pool such and such,” or “Not many fish holding here this year, you might try Clay Creek or Famous.” Then he would usually just grin and say “Well, gotta go!” I still bump into Frank Moore once in a while along the river.

Of the steelhead that I’ve hooked, lost and landed over the years, there have been some wonderful fighting fish as well as some real “dogs.” My first fish is one of my most memorable. It wasn’t the largest or most active, but it was the first fly-caught steelhead that I had hooked. I was fishing with Dale Greenley and without his help I might have lost yet another steelhead. The hooked fish zig-zagged from one side of the river to the other for several minutes, then shot into the air with a splashy end-over-end jump. Then to my horror it headed out of the pool and down the rapids into a jumble of rocks and white water. This is where Dale saved the day. The fish was clearly tired by now, lying on its side in a small pocket of water next to the foaming rush of rapids. Dale managed to lie down on his stomach on a ledge rock and after a couple of grizzly bear-like swoops, sat up holding the hard-earned prize in one hand. I don’t know who was more pleased, Dale or me. We were both grinning from ear-to-ear!

Reminiscence, cont. to pg. 20...
by WPPSS nuclear debt and indirect expenses including fish and wildlife, hydro power is still considerably cheaper than natural gas fired turbines. With these expenses added to hydro power costs, excess power produced from natural gas can become competitive with hydro. So yes, Bonneville’s financial problems are real. But that brings us right back to the central issues of this discussion. Does BPA’s methodology for determining fish and wildlife expenses give the fish an even shake compared to other river users? And is BPA management placing the blame for its problems disproportionately on the fish? The answers are resoundingly — no and yes!

4. I have dealt with the issue of the effectiveness of barge smolts downstream through the hydro system in my comments on the NRC report published elsewhere in this issue. Other than that, Ian Templeton and I find a lot to agree on.

(Eds’ note: Both Templeton’s letter and Redman’s response were edited for brevity but we have preserved the tone and substance of their discussion.)

---

**IN THIS ISSUE**

How Bad is Bad? 1  
Salmon Landscapes 2  
Conservation Strategies 7  
Letters 9  
Upstream: The NRC Report 12  
Kamchatka Update 15  
Appeal/Honor Roll 16  
From The Wire 17  
Reminiscence 19

Issue No. 26  
January 1996  
Linda Hanlon, Editor

Copyright 1996, The Osprey®

---

... Reminiscence, cont. from page 19

“Finally... finally!” he said. “It sure took us long enough!” We both had fished many hours for this moment. To us the roughly five pound hatchery hen was a quite a prize.

Dale and I have fished for steelhead together now for about thirty-three years. As time permits on our schedules, we still manage a few outings each year to search out the Umpqua steelhead.

My first steelhead was taken on a #4 Black Prince tied by Cal Bird. Frank Moore owned Steamboat Inn at that time. A steelhead fly cost an average of 50 cents each in the early 1960s. Frank also had a few other specially tied flies by Cal Bird. They were a little more, priced at 75 cents each. It was really my first introduction to seeing a well-proportioned fly. Since the flies were so “expensive,” I wasn’t in the habit of buying them, but these were beautiful, graceful flies tied on the best Alcock hooks available. The purchase brought me luck because with it I beached my first steelhead.

Even though I had a little help from Dale, this is the way it happened... give or take a lie or two. ▲