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# SALMON RECOVERY:

## *As Viewed by Two Economists*

➤ The value society places on salmon has changed over time. Values of salmon were quite low relative to other uses during the period of irrigation, hydropower and navigation development. This short sighted view of resource values leaves a dwindling number of salmon and a legacy of property rights which are difficult to change even though they may be viewed as inappropriate for the future. Recently, the Endangered Species Act (ESA) has been involved to halt the population decline. However, the ESA is a narrow and inflexible tool to apply to complicated biological and

by Norman K. Whittlesey and Philip R. Wandschneider

**M**ajor changes in the Columbia River's ecosystem has caused a decline in the river from as many as 16 million fish to less than 2½ million—one-half million wild stock salmon, plus two million of hatchery origin. Many of the original salmon species are now extinct and numerous others are rapidly approaching the threatened or endangered level due to alteration of the salmon's habitat. Forestry, grazing and other land uses altered the upstream habitat, water quality, and stream flow. Eight million acres of irrigation controls and diverts a major portion of available stream flows, particularly in the Snake River portion of the Columbia River basin. Hydropower development completely eliminated one-third of original salmon habitat and inhibits passage of smelts (juveniles) and adult fish in the remaining portions of the river basin. Navigation and flood control management compete with the fish for use of the river system. River, estuary, and ocean harvests further reduce the numbers of wild salmon. In addition, fish hatcheries designed to mitigate some of these effects have introduced problems of disease and genetic dilution.

In this setting the Snake River sockeye salmon has recently been listed as an endangered species. In addition, Snake River spring-summer chinook and Snake River fall chinook are also likely to be listed as threatened or endangered under the Endangered Species Act (ESA) by mid-summer. These listings add new fuel to hot debates generated by the spotted owl in the same region. While the ESA focuses narrowly on the target species, many considerations will impinge on all public and private decisions related to this salmon crisis. Economics can assist in understanding how such crises arise and economic analysis might aid in managing economic development and applying and reinterpreting the Endangered Species Act.

Resource management is fundamentally affected by the economic value of the resource. Three major features affect the eco-

nomic value of a resource like salmon:

- Changes in the population of the species;
- Property rights and laws developed over time; and,
- The relationship of the resources to other features of the ecosystem and its definition as a "commodity." In the case of salmon, as its populations declined its (marginal) economic value has increased. This phenomena molds the political debate and sets the stage for recovery planning.

### Stock Size and Fish Values

It is useful to think in terms of three levels of fish populations. An "endangered" population—one which will soon be extinct unless major steps are taken to increase population numbers. A "threatened" population—one not in imminent danger of extinction, but its numbers are insufficient to allow any use of the resource except for propagation of the species. A "harvestable" fish population—one sufficient to permit use of the resource for sport, commercial, or Indian treaty fishing. These three levels are practical distinctions related to key legal and economic issues.

### Importance of "Commodity"

To a large extent the argument over whether some salmon should be listed under the ESA has been one of "defining the commodity." At one extreme, a salmon is a salmon. To people who hold this view, the extinction of the wild Snake River salmon would not be important. At the other extreme—a reproductively isolated population such as the Snake River Sockeye salmon, is unique and irreplaceable and should be considered as a valuable social commodity. Generally, one more or less of an abundant population will have different use and value than one more or less of a relatively small population. At threatened or endangered population levels the fish have value as an investment good because they have a significant effect on the population levels in future years. In contrast, at substantially larger population level,

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Indian fishing before Bonneville Dam

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one extra fish contributes little to increasing future population size and its social value is primarily determined by its contribution to current recreation and consumption.

An understanding of property rights is critical to an understanding of salmon issues.

## Property Rights and Changing Fishery Habitat

The Columbia-Snake River region extends over most of three states and straddles two countries. Over time a complex system of agencies, governments, laws, treaties, compacts, and institutions managing the river resources has been developed. In turn, a set of property rights fostered by this system govern economic and political decision-making over the resources, including salmon, in the region.

It is useful to identify three levels of entitlement to resources. Ownership under a *property rule* means that any non-owner must ask permission to use the resource and the owner sets the price for its use or its transfer. In contrast, property owned under an *inalienability rule* cannot be infringed upon by others nor lost—but neither can it be sold or its use rented to others? Protection by a *liability rule* permits other parties to use, take or destroy the property without the “owners” consent, but requires compensation for damages.

Property rights for the fish and their habitat have changed over time with significant effects and changes on fish populations. In the beginning, the property rights of the indigenous Native Americans to the fish and their habitat were unchallenged common property rights. The fish were abundant, and harvest was consistent with a viable fishery. With settlement of the West, however, these Native American community property rights for fish habitat were challenged by the settlers: they successfully obtained property rights to water for the development of irrigation and mining under the legal structure of the “appropriation doctrine” which gave little protection to instream water uses such as for fish habitat. The water “commons” was fenced, leaving the fish out. The adverse environmental effects of these changes in property rules was initially small but compounded over time. The major ocean and river salmon harvests peaked in the late 1800s due to the effectiveness of harvesting technology, for instance “fish wheels” and high economic demands.

Property rights were changed in major ways from the early

1930s to the mid-1970s. This new phase began with construction of large dams for navigation, power production, and major irrigation projects. During these years a weak liability rule prevailed for fish and their habitat: developers had some liability for damage to salmon production (e.g., the Mitchell Act, the Bonneville Project Act). Mitigation of the damages, mostly hatchery construction, turned out to be quite modest compared to the major damages imposed on the ecosystem—and the adverse effects on wild salmon populations.

Then during the 1970s and 1980s, social values shifted toward greater environmental concerns. However, even though major legal and political decisions to protect and enhance the fish were undertaken, fish populations continued to decline due to the continued effects of habitat changes and fish harvests.

## Fish Recovery and the Rights of Affected Parties

Now we contemplate the ESA listing which will strengthen the property rights held by the tribes and the state and federal management agencies for fish habitat for the purpose of increasing fish numbers to a more acceptable level.

An ESA listing bestows an inalienable property rights: strong but inflexible. Enhancing the status of salmon through ESA listing will result in related losses for other users of the river resources. Decreases in the use of riparian habitat, hydropower production, irrigation, navigation, and fish harvest are major examples. Current owners inherited, bought or developed investments around these uses with the expectation that they were legal and proper. Some of these rights have a strong legal status but others are not so clearly protected. Irrigation rights protected by state laws of the appropriation doctrine will be difficult to modify for the purpose of salmon recovery. The rights of navigation, hydropower, and recreation to instream uses of water are traditional since they were “obtained” by settlers and developers, but, they have only weak protection under federal and state laws. These users are more likely to rely upon political action rather than the courts to protect their claims or obtain compensation for losses due to salmon recovery actions.

## Rights, Values and History

Value as determined by property rights has another dimension. Property rights establish whether one must pay for the use of an item by another. However, the amount one is willing to pay (WTP) for something may be less than the amount that the same person would accept (WTA) for it if they were the owner. This is the case for at least three reasons: the income effect, uniqueness of the good, and whether the trade for which the commodity is being valued is voluntary or coerced.

For example, in early years of this country, salmon populations were unimaginably large and marginal values for salmon were very low, driven largely by commercial food values. The rights of the Native Americans to fish habitat were weak relative to the claims of the settlers and compensation payments to the Native Americans were very low. As some fish populations entered the threatened and endangered range, they were protected only by a liability rule and the trustees of the salmon could not stop the actions of the irrigators, power companies and others that were causing the losses. Decision makers did not publicly recognize that lower fish populations would lead to increased marginal values and challenges to the property rights being expanded by their decisions.

Had the increasing marginal value of scarce salmon been antici-

pated, and, had rights to fish habitat been stronger, the development of water control facilities on the Columbia-Snake River system might have been much different. Salmon losses would have been valued as a greater cost to hydropower, navigation, and irrigation development. Some projects might not have passed benefit-cost tests, while standards for mitigation and compensation would have been set much higher for others.

Now ESA listing for the threatened and endangered fish implicitly moves valuation of salmon to a very high marginal value. The rights of fish are changed by the ESA status from a liability rule to an inalienable rule and consequently other user rights must be modified. At a minimum, trustees for the property rights of fish are moved from a position of setting fish habitat value as a WTP scale to that of a WTA scale. As a recovery plan takes effect, values will be kept high at least until population levels are beyond the threatened stage. Then marginal values will fall and property rights associated with salmon will no longer be provided the inalienable rule of protection.

## Economic Choices

In the complex economic setting of the Columbia River system every possible change in river management impinges on many interest groups, each anticipating the worst possible scenario. This stirs much debate in an election year and when the ESA must also be reauthorized by Congress. While most current river uses were encouraged and enhanced by government subsidies, these uses now involve real property rights held by individuals and institutions. Which of these property rights can be taken from their present owners? Which ones must be compensated, and which must remain unchanged? To save these salmon species requires restorations of a large and complex ecosystem now governed by a wide array of laws and institutions, the ESA provides no guidance on these questions.

The political debate centers on the perceived value of the fish relative to the expected cost of recovery actions. However, the recovery planning can be totally cost-oblivious as some would interpret the ESA to require. Or it can employ economic analyses ranging from simple cost sensitivity to complex cost effective planning. But it is difficult to determine the value of the marginal fish in an endangered population eliminating the possibility of full blown cost-benefit analysis. Consequently, to achieve a successful recovery plan that is most cost effective is probably the best to expect.

In fact, in our society, issues such as endangered species are often decided with valuations inconsistent with the calculus of tradeoffs that economists employ. Fair treatment and moral obligation cannot be incorporated into the economic analyses. This sug-



Early century Columbia River


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gests the need for flexibility. There are circumstances under which it is appropriate to use monetary values. There are other circumstances under which it is neither appropriate nor informative to use monetary values. But the alternatives are not simply to avoid economics altogether or to depend entirely on economic analysis.

Admittedly, the salmon listing process is strictly a biological decision. However, any subsequent development of a recovery plan is expected to be sensitive to economic costs, current property rights, and the economic and political power of those that hold them. The political process will require that jobs and economic effects be considered. Hydropower dams will not be removed or rendered ineffective, irrigation will not be shut down, and navigation will continue to exist on the river system, although each may have to accept changes from the status quo.

## ESA Limitations

The current problems related to these salmon stocks contain important lessons. One initial error was to underappreciate the significance of genetic diversity in the salmon. Choices for resource allocations frequently have insidious and long term effects that are both undesirable and unforeseen. Today it may be that the general condition of the ecosystem is still underappreciated with even greater problems looming ahead. The problem of endangered salmon species in the Columbia River system is really an illustration of a general ecosystem degradation—degradation so severe that the salmon may no longer be able to survive. Some salmon species have already reached extinction and, unless major changes are made with a recovery plan, others will follow. Now, however, the entire management problem is focusing on the perceived value of a single (or few) salmon species, probably an unfair burden for protectorates of these salmon.

The ESA was never intended as a tool for addressing such complex and far reaching issues as the Columbia-Snake River salmon fishery. The realignment of property rights required to solve this problem is a task not envisioned by the developers of the ESA. The ESA contemplates a single isolated species rather than a continuum of related, but distinct populations comprising a diverse family. It does not address issues of entire ecosystems. To continue on the present path could lead to the demise or weakening of the ESA without establishing an acceptable replacement for protecting endangered species or managing complex ecosystems. Society must devise better means for reallocating property rights and related resources in addressing general ecosystem or environmental problems. 

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