

Economic and Social Change in the Fishery

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Abstract: A great deal is known about economic and social adjustments in modern societies, but the two are not well integrated in social science literature. The unique biological conditions in the fishery further complicate decision making at both the micro and macro levels. An assessment is made of how well current private and public sector decision-making in the United States utilizes knowledge from the social and biological sciences in management of the Columbia River fishery. The interdisciplinary concept of social capital is used to integrate knowledge from fishery biology, resource economics, and systems science. Recommendations are made for reform of public sector management of the Columbia River Fishery.

Fishery Management in Complex Human Societies

Reference is made at the outset to the Figure to obtain an overview of the problem to be addressed in this paper. Consider column 1, which pertains to the private sector portion of a nation state. At the micro level, the fishing industry is composed of individuals and firms that provide fishery related commodities to the larger economy. Commodities used in consumption and production move in the opposite direction. In a progressive enterprise economy, incentives will exist for the fishery to become increasingly productive, a process referred to as induced innovation. These improved practices will make it possible to harvest more fish with less labor, assuming fish stocks remain stable. It has long been known fish stocks may not remain stable because improved technology may result in greater fishing effort and stocks may become depleted. This is because entry into the fishery may be relatively open, given the difficulty of assigning fishing rights among those who may wish to fish. In summary, technical change may result in exploitation of the fishery unless access to the fishery is controlled in some way. If access is controlled, excess labor may need to leave the industry unless incomes are to become depressed.

Column 2 depicts the public sector. The assumption is made here that a stable government is needed for the proper functioning of the private sector. Obviously general agreement does not exist among economists regarding the most desirable mix of public and private sector activities.

Experience has demonstrated the necessity of public sector activity in fishery management at micro and macro levels in complex modern societies. A constraint on fishing levels may well require some type of public sector activity. If there is a common fishery and the fishing effort is dispersed geographically, public sector involvement may be necessary at both the micro and macro levels. Regional governance may be needed for some problems as well.

Economic models pertaining to private and public interactions generally neglect local and regional public sector decisions. Such models typically are designed to demonstrate how individual and firm decisions at the micro level are influenced by public sector actions and private sector macro performance is predicted accordingly. Such simplification is not justified for the fishery.

Rural studies research has demonstrated rural people consistently have turned to group activity when addressing a wide range of the problems they face. Local units of government units of government usually exist for recurring and predictable issues. In addition, rural people participate in many formal and informal non-governmental organizations and networks when responding to particular challenges. No single academic discipline captures the complexity of these interactions and decisions. Yet several disciplines have unique contributions to make to such an understanding. Anthropology, economics, political science, and sociology provide examples. The interdisciplinary concept of social capital has been of value in this respect. This concept permits a complete accounting of the assets available to local people as they address problems. It permits the rural capital stock to be classified as natural, man-made, human, and social. The formation and existence of social capital in the fishery will be discussed later in this paper (Castle).

The fishery is commonly referred to as a traditional, or primary, industry. It is not uncommon to associate such industries with stability, or refer to them as unprogressive. Yet changes in the availability and adoption of new technology, and the level and nature of consumer demand, require that such industries continuously reorganize themselves. Such reorganizations affect how natural resources are managed, and the welfare of the people who depend upon these industries for their livelihood. Disequilibrium is the rule, not the exception.

Local communities are an integral part of the traditional fishery. Social arrangements arise at the local level to permit individuals involved to better address problems they share with others. To qualify as “social capital” these group arrangements must be characterized by information exchange, mutual trust, and the expectation of reciprocity (Coleman). In addition, such arrangements must permit groups to achieve particular objectives better than those objectives can be achieved in its absence. Some problems that require group action for solution are highly predictable. Formal organizations with specific objectives may be the most effective way of addressing such problems. General-purpose associations, such as the family or the local community groupings, may be most effective in at least recognizing, if not addressing, highly unpredictable, and uniquely local need.

The social capital concept is useful in relating economic and social issues. It is, by definition, an interdisciplinary construct. The noun, “capital” is a term defined in economics, whereas the adjective “social” modifies “capital” and derives meaning from sociology and anthropology. The “social capital” term has been criticized because it has been applied so broadly that it lacks specificity in discussions where precision is required. The position taken here is that if the content of both the noun and the adjective are understood and observed, precision in the use of the term “social capital” necessarily will follow.

Consider first the meaning of the noun, capital. To be considered capital, an item must carry the expectation that it will be useful in production or consumption at some time in the future. Capital may be classified in various ways. Natural (land), man-made, and human capital are well developed in the economics literature. An economist, Loury, was one of the first to make use of the term “social capital” in an attempt to provide a more complete accounting of the factors that contribute to economic outcomes.

In a major article published in 1998, Woolcock set forth the principal characteristics of social capital in economic development. He accepts, and restates, that social capital consists of the information exchange, trust, and norms of reciprocity inhering in a social network. He then provides a framework for the evaluation of social capital under different conditions of development. He notes that social capital considerations vary from micro to macro levels in society. Typically the family and local community are primary forms of social capital at the micro level. Woolcock says they provide for integration at that level because of certain embedded values or norms. Yet the conditions that make social capital formation possible (information exchange, trust, and expectations of reciprocity) may be difficult to establish at the macro

level. At this level a common ethnic background or strong family ties may not exist. At the macro level the need is to provide for social arrangements that will create an atmosphere of trust among what Woolcock calls “extra-community networks”. Social relationships need to be structured so that impersonal and autonomous actions will be conducted in an atmosphere of integrity. That is, if one plays by a commonly understood set of rules, it is expected that others will play by that same set of rules.

Let us now return to the Figure. The third column includes non-governmental organizations and social networks that people use at various decision levels. Just as the public sector is necessary for the proper functioning of the private sector, so too, are the third column groups necessary for both the private and public sectors. That is, complex modern societies are dependent for their functioning upon the conditions of trust, reciprocity, and information at all levels. As noted earlier, these conditions, standing alone, do not constitute social capital. They must be viewed as necessary, but not sufficient, conditions.

The Columbia River Anadromous Fishery Resource

The concepts developed to this point are now applied to an important contemporary problem. Fish runs have been declining in the Columbia River for the past several decades. It is convenient to consider the (1) out-of-stream habitat, (2) in-stream conditions, and (3) the ocean environment when identifying reasons for the decline. All three components of the natural environment have been modified since fish runs began to decline. For examples: the out-of-stream habitat has been changed by agricultural and forestry practices that affect spawning beds and water quality; dams on the main stream of the Columbia have affected fish migration and water temperatures; fishing effort and natural predators have not remained constant on the high seas. Data are not adequate to permit quantitative assessments of the amount of the decline caused by change in each of the three components. A group of biologists have issued a report entitled *Return to the River* in which they maintain an improvement in fish runs will be dependent on moving toward predevelopment conditions in each of the three components.

A movement toward predevelopment conditions for any of the components would impose costs on some segment of the economy of the Pacific Northwest (PNW). These costs would not be borne equally across all components. The result is that incentive exists to do nothing, but if something is to be done there is also incentive to blame declining runs on a particular component rather than the entire system. Thus, those who benefit from dams have incentive to direct attention to deplorable ocean conditions and so forth.

The reader's attention is now directed to column 2 of the Figure. The public sector is heavily involved in resource management on the Columbia. Federal, state, and local agencies operate under a complex thicket of legislation; the endangered species act provides one example. It is instructive to classify all government agencies in a three by three matrix with federal, state, and local agencies placed in (say) rows and with the executive, legislative, and judicial branches of government placed in (say) the columns. There will be at least one entry in every box in the matrix. A complete enumeration of agencies involved with the Columbia fishery would yield well over one hundred entries. This complex public sector has little relationship to the biological realities of the anadromous fishery with its considerable space and time requirements. There are those, including this author, who believes the decision structure for the Columbia River fishery is one of the major contributors to the problem for which a solution is being sought. Why is this? How did it happen that our social structure evolved in this way? What would be required to bring about congruence between biological realities and social decision-making?

It will be helpful to return to the Figure in addressing this question. Attention is directed to the first column of the figure, specifically the private sector. The economy of the Columbia River is natural resource related to be sure, but many natural resource uses are involved in addition to the fishery. For example, power, navigation, and irrigation are resource related but non-fishery uses. The private sector has little meaning, however, if considered in isolation from column 2, the public sector. Public sector activity made possible many of the private sector river uses in existence. These private sector uses reflect past public and private investment, current public subsidies, and on-going public sector activity of particular agencies. The primary focus of these private and public sector interests is not to provide for the comprehensive needs of the anadromous fishery. Their contribution to the fishery often comes about because of requirements and constraints imposed on their operations or as a by-product of other activities. The Clean Water Act and The Endangered Species Act provide conspicuous examples. The Northwest Power Planning Council was created specifically to give attention to the adverse effects of power uses on the river on the fishery. The Council has provided considerable leadership in providing protection for the fishery. It is limited in what it can accomplish by lack of power over other agencies and by up-stream down-stream conflicts within the Council itself. Council membership results from appointments of the Governors of the various states.

Attention is now directed to column three of the Figure. Are there non-governmental organizations or informal networks that are consistent with the needs of the

Columbia River anadromous fishery? No doubt some would testify to such a commitment, yet many have other items on their agendas. Organizations representing the Native Americans might be expected to have a major commitment to fish, yet their support of hatcheries puts them at odds with many who believe hatchery releases pose a major threat to native or wild fish.

At this point it is helpful to consider the right side of the Figure. Do conditions exist that might give rise to forms of social capital useful in re-establishing declining fish runs? To address this question it is important to be clear on some fundamentals of the social capital concept. As noted earlier, capital is an economic concept. It is created in one time period for use in another and is a stock rather than a flow concept. To qualify as capital, an entity must make humans better able to achieve their objectives than would be possible in its absence. Capital, then, has meaning only in the context provided by some objective. Thus, an item may be capital in one situation but not in another; the tools of the ditch digger are likely to be of little value to the watchmaker. These requirements of capital do not change by modifying it with the adjective "social".

Therefore, as the right side of the Figure is considered, the question to be asked is whether there are social groups held together by trust, an expectation of reciprocity, and information exchange that also have the diminution of fish runs as an objective? If such groups do not exist might "extra-community" groups be brought into existence? Woolcott has established the requirements that must be met if such groups are to be effective. Clearly, social objectives must be explicit if the productivity of specific forms of social capital is to be assessed.

To this point the objective for the Columbia anadromous fishery has been stated in general terms such as "the re-establishment of fish runs". Such a general objective does not give a reference point in time, it does tell what species are to be restored, and neither is it specific with respect to where the restored species are to be found. I have yet to discover a close observer of the problem situation who believes such a general objective is realistic. Fish, in common with all biological organisms, adapt to and reflect their environment. Even if all dams were breached, all water withdrawals stopped, no fish harvested by humans, and water quality improved dramatically, anadromous fish runs would not be restored to what they were at some "pre-development" point in time. A more operative objective would be a return to more "natural" river conditions in the belief that increased fish runs would result. Such fish runs would reflect a fishery consistent with the contemporary environment rather than "pre-development" conditions never again to be attained. Biological science is not capable of predicting accurately the precise composition and level of species that will

result from a given environmental situation. And any result at a given point in time will be an unstable one.

The problem of ambiguous objectives is not trivial. For example, numerous studies have been made of fishery management on the Columbia. Attempts have been made to compare the results of such studies. This has proved very difficult to do because the management objective assumed varied from study to study. As a consequence, measures made by the various studies were not comparable. The great contribution of the publication entitled *Return to the River* was that it stated an understandable objective even though based upon ideal situation unlikely to ever occur. The authors recognized the ideal situation they described probably could not be achieved, but they knew the concept they advanced would contribute to greater clarity than would otherwise be possible. The concept provided criteria for judging the desirability of particular actions with "desirability" being based upon direction taken rather than the achievement of a particular objective.

Human actions, of course, may reverse past declines in fish runs in particular locations for some species. This has happened for some species in coastal streams for one or two years. This experience suggests it may be necessary to focus on some segment of the fishery rather than all fish runs for the entire Columbia River. The logic of the Endangered Species Act is that no species should become extinct. Another version of this logic is captured in the phrase "deal with the worst first". This is the appropriate procedure only if all species are to be saved and if the resources to be devoted to correcting the difficulty are unlimited. Neither is likely to be the case on the Columbia.

To summarize, it can be said the present approach to the Columbia River Fishery is unlikely to lead to the desired result for three reasons:

1. The implicit objective is unworkable. There is a fundamental mismatch between the biological reality of restoring the entire fishery to some arbitrary previous level and the decision-making framework being relied upon to bring this about.
2. The objective is not in accord with reality. Few, if any, competent observers believe all species will be restored to previous levels.
3. Resources are limited. There is no evidence those who will bear the costs are willing to invest unlimited resources in the approach being followed.

In order to mount a credible effort on such a large problem, it will be necessary to change the decision-making structure now in place in a fundamental way. It is highly unlikely our society will be willing to reorganize the public sector and bring about significant private sector changes to address this poorly defined, highly uncertain,

biological objective. To do so would mean it would be necessary either to change our form of governance, or make an exception for this particular resource.

The problem basically not one of balancing a trade-off between economic development on the one hand, and environmental restoration on the other. At any given point in time, the existing level of economic development reflects adjustments the economy has made, and expects to make, to its historical, current, and anticipated environment. If society decides to impose constraints on an economy to achieve an environmental objective, the economy will be placed on a different trajectory than would exist in the absence of those constraints. The economic output from the changed economy will need to be anticipated in order to evaluate the economic consequences of the environmental constraint. There will also be changes in the incidence of costs and returns within the economy. Nevertheless, economic systems do adapt and change in response to the environment in which they operate. On the other side of the coin, biological systems also adapt to different social and economic systems. Just as is the case with economic systems, new constraints will place biological systems on different trajectories. Our ability to predict the path of different biological trajectories may be no better than it is for different economic trajectories. Rather than emphasizing a trade-off between the two, it is preferable to isolate socially desirable joint trajectories. Our decision-making framework is not so oriented. Current policy-making is now oriented to demonstrate additional economic development will not diminish the natural environment. In an earlier era, the burden of proof was placed on environmental interests to demonstrate environmental protection would not cause a sacrifice in economic development. The suggestion here is that neither approach is consistent with contemporary needs on the Columbia.

The possibility of selecting a trajectory that will incrementally improve the fishery suggests a different approach to managing the Columbia River anadromous fishery. First, the objective of restoring fish runs of all species to some historical level would be abandoned. Instead a more modest, but potentially achievable, biological objectives would be identified. Any biological objective selected would be consistent with the principles set forth in *Return to the River*, and, if achieved, would be recognized generally as an improvement in the Columbia River Fishery. The other condition would be that the probable economic adjustments be made explicit. It is not suggested that the resulting economic activity be "sustainable" in every respect. A hallmark of modern systems is their ability to adjust to changing environments. In this case the suggested strategy is to select a biological trajectory that will result in incremental improvement as described. This will become a part of the

general environment to which the economic system will be expected to conform.

Adoption of this approach would require significant change in the decision framework for managing the fishery. As noted earlier, the existing decision-making framework stems from the particular form of democratic government in the United States. As much as the fishery is valued in the United States, to my knowledge no one has suggested that our form of government be changed for the sake of the fishery. Are there steps that might be taken to improve decision-making to bring about incremental improvement in the fishery, without fundamental change in the division of powers, and reliance on local, state and federal government? An answer to this question is far from obvious. But what is obvious is that if this to be done, there will be need to identify and build upon existing social capital in the region.

The implementation of such a strategy would draw heavily on the intellectual disciplines of fishery biology, economics, and systems science. There is considerable excellence in these disciplines in the Pacific Northwest region. Representatives of these areas of specialization may be found in the universities as well as the various state and federal agencies concerned with the fishery. These communities of scholars constitute an important source of social capital for the region. There is, however, a major problem associated with mobilizing and utilizing this reservoir of talent. Some of this talent is found in agencies that have particular policy positions that may not coincide with an improvement in the fishery as outlined above.

When such agencies are asked for an opinion regarding fishery matters the position of the agency is likely to reflect the political objective of the agency. The considered judgment of fishery biologists, economists, or other scientists within the agency may be obscured. This makes it difficult for decision-makers to know of the reasoning, evidence, and differences of opinion that exists within the various relevant disciplines.

Some tentative steps have been taken to tap into this potential reservoir of intellectual talent. The independent scientific advisory group that produced *Return to the River* reflects the potential that exists if the talent available is used. The action of the Power Planning Council to establish an Independent Economic Advisory Board is also consistent with such an approach. Yet these groups are small in number, limited in resources, and often have limited and highly circumscribed assignments. To realize this potential a more realistic objective will be required than the utopian notion of restoring all fish runs to some predevelopment level.

There is recognition that the decision-making structure is a major problem in the restoration of fish runs. Oregon's

Governor Kitzhaber has proposed a restructuring of the Northwest Power Planning Council, but the up-stream states have given his proposal a cool reception. There has been virtually no discussion in policy-making circles of the unrealistic notion of attempting to restore all fish runs. Without attention being given to the matter of objectives and the relevant social capital in the region, attempts to reform decision-making from the top down is unlikely to be successful. There is also the matter of the categorical imperatives inherent in the Endangered Species Act and Clean Water legislation. The endangered species legislation is intended to protect all species from extinction. The listing of endangered species is consistent with such an objective. A case needs to be made that protecting endangered species is more likely to be successful if incremental movement is made toward the objective set forth in *Return to the River*. The clean water legislation poses a different kind of problem. In most instances the clean water standards will enhance the fishery. A possible exception may occur when standards are set of the basis of controversial biological opinion regarding what is the most desirable for fish. The nitrogen super saturation issue provides an example.

Summary and Conclusions

1. The reestablishment of fish runs in the Columbia River Basin is a more complex problem than adjusting a trade-off between environmental preservation and economic development. The discovery of such a trade-off is a challenging intellectual problem and attempts to make such estimates yield interesting and useful information. The more fundamental problem pertains to the policy making process for the Columbia River fishery. As currently conducted, the process suffers from two major deficiencies.
2. An attempt to reestablish fish runs at an arbitrary predevelopment level is unrealistic. This is accepted by most workers in the decision making process but no workable alternative has been established. A workable objective will reflect the reality that the future Columbia Basin fishery must exist in the presence of substantial economic development. It must also reflect the reality that significant economic costs will be required to reverse the declines that have characterized the fishery in recent years. The need is to establish a plan that provides for a series of incremental improvements in the fishery. Such a plan will provide for a joint biological and human trajectory as the region moves forward through time.
3. Incentives do not exist which require that participants in the process consider the effect of their actions on the fishery resource. This is the second major flaw in

the process. Our democratic government, with its emphasis on the division of powers among legislative, administrative, and judicial branches, as well as among federal, state, and local government, does not conform to the biological needs of fish. Attempts to reform the process from the top down within this structure have been unsuccessful.

4. The human capital of the region needs to be assessed as to how it might be used to improve the decision making process. Both the public and private sectors of the economy function only if there is a degree of trust, an expectation of reciprocity, and information exchange. If the decision structure affecting the fishery is to be effective, it needs to reflect these characteristics.
5. Within the universities, as well as within public and private sector organizations, there exists a reservoir of talent in fishery biology, systems science and other intellectual disciplines relevant to fishery management. This talent has not been brought to bear on the practical problems of fishery management generally, although promising conceptual work has occurred in fishery biology. A major obstacle is that this talent is located within organizations with objectives that do not coincide with fishery management objectives.
6. The outline of a particular reform is sketched here intended to correct the two flaws identified above. Of course, there is more than one way reform might be undertaken and it is hoped the thoughts expressed here will suggest other approaches. The implementation of these suggestions would require federal legislation but would leave our basic system of government intact.
 - a) The Northwest Power Planning Council should be given overall management responsibilities for all federal and state fish restoration activities with a name consistent with those responsibilities. Among other responsibilities, the renamed Northwest Power Planning Council should have administrative responsibility for the fish mitigation expenditures, now administered by the Bonneville Power Administration. These funds would be used to attract talent from within the various organizations to develop a realistic objective and management plan for the public sector decision process. A workable objective would permit the development of a joint biological and human development trajectory plan designed to bring about incremental improvements in the fishery in the presence of significant economic development. Such a plan will not necessarily need to meet a benefit cost test, but neither will it have as an objective the establishment of fish runs at an arbitrary pre economic development level. The members of a

number of intellectual disciplines, such as fishery biology, constitute a form of social capital. If freed from the need to support policy positions of their respective agencies, such people can be expected to respond to the intellectual leadership provided by the renamed Power Planning Council.

- b) The establishment of a realistic objective for fishery management is a necessary, but not a sufficient condition, for improvement. As noted, federal legislation would be required. Such legislation would recognize the primacy of the Northwest Power Planning Council in the management of the Columbia River fishery. Its policies could be made binding on other federal and state agencies unless strong reasons for exceptions are made through an appeal process. The renamed Council should make the case that survival of salmon species generally is dependent on incremental improvements. Attempts to reestablish all species at arbitrary earlier level runs the risk of losing even those species that may flourish under a management plan which provides for both the fishery resource and human economic development.

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