

THE USE OF SCIENCE, POLICY, AND POLITICS
IN THE IMPLEMETATION OF THE NORTHWEST POWER ACT

Masters Report
Marine Resource Management

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The Internship

From June, 1983 to June, 1984, I worked as a research intern for the Northwest Power Planning Council in Portland, Oregon. I worked in the Fish and Wildlife Division of the Council, the division responsible for anadromous and resident fish and wildlife mitigation and enhancement on the Columbia River. My initial contract was for six months and was extended another six months.

During the year of working for the Council, I worked on numerous projects and had a variety of responsibilities. All of my work centered around implementation of The Fish and Wildlife Program, a document that had been written before I arrived at the Council. The Program was a directive to the Bonneville Power Administration, the Corp of Engineers, the Bureau of Reclamation, and the Federal Energy Regulatory Commission for protection, mitigation, and enhancement of the fish and wildlife affected by the development and operation of the Columbia River hydroelectric system.

Because I was involved in so many areas of implementation I will break my discussion into sections for each project or area.

1. Computerization and computers

Initially, I was charged with developing a computerized data management system based on dates found in the program. This system was never really finished because the dates and the way they were viewed changed during the year. However, this project

gave me a good introduction to the Program and served as a basis for much of my future work on scheduling of Program actions and computerization of the Division. The initial work was done on a large mainframe computer (Vax) using a preexisting data management system. Finding this system cumbersome for the types of work our division was doing, I initiated a proposal to purchase three small computers (IBM PC's). I did all of the background work, purchase ordering, and set-up of this system.

2. Funding

During the year I was at the Council, I became the division expert on Program related costs and budgets. I analyzed the budgets of the implementing agencies for content and accuracy in program needs, studied the impacts of the Bonneville Rate Case on our Program, developed an expenditure tracking system for the Bonneville funded projects, and developed long-term spending level projections. Included in this was the writing and presentation of budget information in numerous reports and meetings.

3. The Fish Propagation Panel

During the first six months of the internship, I was in charge of material preparation, meeting organization, minute taking, and other tasks related to the functioning of the Council's scientific advisory group, the Fish Propagation Panel. I organized and attended their regular (twice monthly) meetings and organized two information gathering field trips for them. This work involved extensive travel within the region and much basic organization.

4. The Yakima

I was responsible for the implementation of one section (out of eleven) of the Program. This section was the only section that was defined by an area, the Yakima Basin in central Washington, rather than a type of work. Most of the implementation going on during the year was directed toward the development of new and improved fish passage facilities at irrigation dams throughout the basin. My work involved developing Council policy on funding and scheduling of the work and then seeing that this policy direction was followed. I wrote documents that were used by Congress in setting budget levels for the Bureau of Reclamation and attended numerous organizational meetings. I monitored the progress of the pre-design and engineering of the facilities.

5. Mapping

The Council, in the FY 1984 budget, had funds to develop an atlas or set of maps to be used to track Program development. I developed the initial background on mapping, developed contacts throughout the region, and wrote a contract to do some initial information gathering and mapping. The project was never finalized because of shifts in priorities and changing commitments of my time.

6. The Amendments

The Fish and Wildlife Program was adopted in 1982 and is to be amended every two years thereafter. The amendment process started during the second half of my internship and consumed much of the remaining time. Responsibilities within this process included reviewing applications for amendment, summarizing

proposed amendments, writing and presenting issue papers on the content of sections of the amendments, and developing Council policy direction and decisions on the disposition of the proposals. I was also responsible for a staff proposed amendment to add a scheduling section to the Program, an Action Plan.

INTRODUCTION

On December 5, 1980 Congress passed the Pacific Northwest Electric Power and Conservation Act (The Act). This Act created the Northwest Power Planning Council (the Council) and in 1981 this group was formed to develop a regional conservation and electric power plan and a program to protect, mitigate, and enhance fish and wildlife. The Council is composed of eight members, two from each of the four major states in the Columbia River drainage - Oregon, Washington, Idaho, and Montana. Its central offices are located in Portland, Oregon with state offices in each of the four states. The Council is supported by a staff of economists, forecasters, attorneys, energy planners, and fisheries experts. In November of 1982 the Council adopted the Columbia Basin Fish and Wildlife Program (the Program) as a mechanism to protect, mitigate, and enhance the fish and wildlife of the Columbia River Basin, impacted by the management and operation of the Columbia River Power System and other power generating facilities.

From June, 1983 to June, 1984, I worked as a research intern in the Fish and Wildlife Division of the Council's staff. During that time I worked on many areas of program implementation including budgeting and funding, Yakima Basin passage improvements, scheduling of actions for Bonneville Power Administration, the Corps of Engineers, and the Bureau of Reclamation, and computerization of the Program. Because of the number of projects I was involved in, I felt that it would be useful to attempt to analyze one aspect of the Council functionings that ran throughout all of my tasks, rather than

just describe what I did for a year.

The following analysis will deal with the use of science in the development of policy and the execution of the Power Act. Specifically, it will address how science, policy, and politics play different roles in development, writing, and implementation of a regional resource plan. To discuss this, some background on the Power Act is necessary, as is a description of the process used to develop and implement the Fish and Wildlife Program. The various facets of implementation, from writing to actual action, will be discussed briefly. The roles science, policy, and politics play differ in each phase of the development. Using the Act and the Fish and Wildlife Program as an example, the evolution from ideas to writing to implementation and the changes needed in the roles of science, policy, and politics will be addressed.

The opinions presented are my own and do not reflect the opinions of the Council or the Council staff.

THE NORTHWEST POWER ACT

One version or another of the Northwest Power Act was debated in the Senate or Congress from 1977 until 1980 when it was finally passed. During this time numerous changes were made, including the acknowledgement of a fisheries interest in power system operation and a need for a program to protect, mitigate, and enhance the fish and wildlife of the region, primarily the anadromous fish. Appendix 1 contains the relevant parts of the

Power Act.

The program was to be developed from recommendations prepared by the Federal and State fish and wildlife agencies, Indian tribes, utilities, and the public in the region. One criteria established for program measures was that they were to "be based on, and supported by, the best available scientific knowledge" (4.(h)(6)(B)). Congressman Dingell (D - MI), in explaining this language, stated that "it is clear that the criterion that the measures be based on, and supported by, the best available scientific knowledge requires a certain amount of judgement by the council with the help of the fish and wildlife agencies in determining whether or not the measures meet this kind of test." He went on to state "Clearly, the council should rely heavily on the fish and wildlife agencies of the State and Federal Governments and not try to become a superfish and wildlife entity." (p. 139 BPA, 1981). Yet due to the time constraints, the quality and quantity of data was not to serve "as a basis for turning down any recommendation" (House report 96 - 976, (Commerce), p. 57).

The House Commerce Committee did not choose to define "protect, mitigate, and enhance" for fear of it being applied too narrowly (p. 57). Nor did they define "best available scientific knowledge." They may have seen the Act and the Council's program as a mechanism for gathering information. By requiring scientific knowledge and judgement, the Act became one mechanism for dealing with incomplete information. It was the first step of the information gathering process. Incremental steps were needed to determine the gaps in understanding and to fill them in.

The original amendment adding the fishery interest was "prepared by the regional ad hoc Fisheries Committee whose intent was to achieve balance among competing uses of the river resource, and to establish an administrative framework for resolving resource conflicts," in the form of a regional planning council (BPA, 1981 p. 83). The agencies, in supplying this amendment to the Power Act were not only asking for help in information gathering but also for help resolving conflicts that could not and had not been settled by other mechanisms. The House Interior Committee Report [279 House report 96 - 976, (Interior) p. 37] on the Power Act stated: "The bill creates a forum for the resolution of conflicts between fisheries and power interests on this unique and complex river system, and provides a means for funding the fish and wildlife provisions adopted as part of the program." The House Commerce Committee, (House report 96 - 976, (Commerce)) noted that "no single agency had been addressing the problems of the fish and wildlife." The report also noted that "neither is it expected that the fish and wildlife agencies or Indian tribes shall be required to agree with each other or with the power interests and others in the region to what might be aptly described as 'consensus' recommendations in order to satisfy all interests. . . The objective is to give flexibility to all concerned to devise effective and imaginative measures that are also reasonable and will not result in unreasonable power shortages or loss of power revenues" (HR 96-976, p. 57).

The Act basically represented a last ditch effort to save a

diminishing resources, salmon and steelhead. Previous planning and mitigation had not provided sufficient rehabilitation. The hope was that this Act, requiring one central group to develop a systemwide approach with few constraints on funding, might prove effective. The key was to use the regional knowledge and separate it from the jurisdictional boundaries and political management schemes.

THE PLAYERS

A brief understanding of the many players and interest groups in salmon management and protection highlights the political situation under which the Council is required to work. The Columbia drainage runs through two countries, five states in the U.S., and numerous Indian reservations. Each state and tribal agency has a vested interest in the production and management of the salmon and steelhead resources. The Federal government has also had extensive involvement in the resources through its Fish and Wildlife Agency, the National Marine Fisheries Service, the Bureau of Indian Affairs, the Corps of Engineers, and the Bureau of Reclamation. There are numerous accounts of the history of management of the salmon resource, starting long before Lewis and Clark arrived in the Pacific Northwest, and continuing through the period of development of the Columbia River's industrial and hydroelectric potential. For a good account of this history see Anthony Netboy's The Columbia River Salmon and Steelhead Trout - Their Fight for Survival, 1980.

In the past 20 years there have been numerous attempts to

mitigate the damage done by the development in the Columbia Basin. Most of this mitigation has entailed building fish hatcheries to replace the fish lost going up and down past the dams. There has also been extensive work done on the dams to alleviate some of the up and down stream passage problems. All of the attempts have been fraught with disagreement, either between different states, or between the states, the tribes, and the Federal government.

Each agency's objective is different and each has a different idea about what will save the resource. The tribes want naturally spawning fish to return to the upper river, tribal fisheries. The state management agencies have trouble managing these upriver areas and believe too many smolts, on their way to the ocean, will be lost as they pass seaward through the system of dams. The states also have a management responsibility for the harvest, both in the river and in the ocean. Each of these management responsibilities serves to compound the problem of management and planning for a common property resource.

In addition to the groups responsible for the fish, there are also those entities that operate the power system in the Columbia basin. The Corp of Engineers built the dams and is responsible for providing safe passage of fish. The public and private utilities also operate hydroelectric and irrigation projects and the Bonneville Power Administration administers the power production of these facilities to ensure the Northwest's energy supply. The Bureau of Reclamation uses the river for irrigation and recreation and the Forest Service owns much of the

land that the tributary streams flow through. These are some of the best spawning areas in the basin.

Each of these entities has a different opinion of what the damage to the resource has been, how much it should cost to mitigate for any damage, and what the best method of mitigation is. There are many fisheries biologists in the region working for each of the different entities and even they rarely agree on the technical details of the problem.

There are also the resource users, the sport and commercial fishermen, the university researchers, and the general public who wish to see the fish in the rivers.

THE DEVELOPMENT OF THE FISH AND WILDLIFE PROGRAM

Once the Act was adopted, execution of its mandates was to begin immediately. The intent was clear, the best available scientific information was to be used in all stages of planning, writing, and amending of the Fish and Wildlife Program. Regional experts were to be used throughout development of the Program. How to determine what the "best available" science is, and how to use it properly, are not clear. The Act prescribed numerous mechanisms to input science but failed to give clear direction on the goals to be achieved by this, or how to deal with incomplete or poor information.

The recommendations for the program, as mandated in the Act, were requested on June 10, 1981 and were received by November 15, 1981, 5 months later. These recommendations comprised some 2200 pages of information from the agencies, tribes, utilities,

and general public. These recommendations were developed using the best available scientific information. Experts from each of the interest groups got together to develop lists of all of the potential projects to protect and enhance the salmon resource in the Columbia Basin. This monumental effort was unique because the state agencies and tribes worked together on their set of recommendations.

Based on the recommendations received, the Council had to write the Fish and Wildlife Program. They had to realize that the recommendations were often conflicting and often incomplete. The Council used the recommendation and consultation process to its fullest and developed numerous methods of dealing with the obvious incomplete information.

Lawrence (1983), in a Masters thesis on the Water Budget (one section of the Program), gives a good indication of how scientific input was incorporated into the initial writing of the program. In notes on an interview with Dan Evans, then chairman of the Council, Lawrence states that "because the Council was not an elected body, the Council had to be perceived as a neutral problem solver to stay viable. He [Evans] believed the key to being successful depended on: (1) being independent and (2) being analytical rather than political. He also was convinced that although it was clear the results of the process would have political implications, decisions had to be based on a sound analytical framework." (Lawrence, p. 54).

Besides the recommendations for specific projects, there were numerous requests for advisory groups, study groups, and teams. There were also numerous requests for additional studies

and feasibility reports where information was not complete. There were basic admissions that there was a lack of understanding in many areas. This is summarized best by this statement from the recommendations of the agencies and tribes:

Because no broad concensus has been established among all participating parties at either the level of species-specific biological requirements in the hatchery, or the objectives that hatcheries are to fulfill under the auspices of the Power Act, a study with the following objectives must be initiated: . . . Establish management objectives . . . establish biological criteria . . . establish guidelines for expenditures . . . and establish a decision making process (p. 611, Vol II, Recommendations).

A draft of the Program was put out for public comment in September, 1982. Comments, written and oral, were received and incorporated into the final document.

In developing the Program, every recommendation had to be considered and discussed in a public forum. The rejection of any recommendation had to be justified. The Council held numerous public meetings in all four states and had separate meetings with the agencies, tribes, and utilities.

The Council also had a Scientific and Statistical Advisory Committee to help evaluate the comments and recommendations. This group had a very limited function, the Council relied more heavily on the agencies, tribes, and utilities for help.

Once complete, the Fish and Wildlife Program comprised a volume of approximately 90 pages plus an appendix. This was a condensation of the four volumes of recommendations and of the comments received. The Program is comprised of a series of sections, each dealing with a different issue. Each section contains mandates, using the word "shall", for the federal

implementing agencies: Bonneville Power Administration (BPA), the Corps of Engineers (Corps), the Bureau of Reclamation (USBR), and the Federal Energy Regulatory Commission (FERC). Implementation of the Program was to begin immediately.

IMPLEMENTATION OF THE FISH AND WILDLIFE PROGRAM

The Fish and Wildlife Program was expected to be a 20-year planning document. However, there was a push to do everything first and fast. BPA's implementation began even before the Program was adopted by the Council. In September of 1982, BPA sent out a notice of program interest (NOPI) and received 196 proposals. Of these, about 50 were funded in Fiscal Year 1983 (October 1982 to September 1983) for a total of \$10 million. In FY 1984 the total was up to \$20 million and in FY 1985 it is expected to be over \$30 million.

The Council may have worked hard at being analytical during the writing of the document, but once work was begun and money was being spent, the situation changed. Out of necessity, the Council became less involved in the technical aspects of implementation of the Program. They were writing the second phase of the Act's mandate, the Power Plan.

Implementation became a matter of funding or seeking funding for the hundreds of measures in the Program, rather than utilizing the knowledge gained from them or overseeing the progress.

BPA had the responsibility for funding much of the research and study under the Program. They are also the contract monitors

and project definers. Because of their position and funding authority there was little room for input into the procurement process. The projects they funded were supposed to be consistent with the Program but had few other constraints placed on them by the Council.

This led to a number of projects being funded without a clear indication of what type of information would be received or without a clear definition of the goal of the research. Because the Council is the decision-making body and Bonneville is the funding body, a clear and mutually understood indication of research objectives and goals was needed. However, what happened was the BPA staff and the Council staff analysed the proposals and reached a compromise agreement on which projects best fit the Program. These were funded. There was limited direction from the Council in interpreting the areas of the Program that were not clear. Most interpretation was left to the BPA staff. The development of the statements of work and all modifications of the original proposals were also left to them.

Implementation by the other agencies started more slowly, mainly because of funding considerations. There was no money in the budgets of the Corps and the USBR to undertake major works. Most of their work remained in the planning stages during the first years of the Program. There was limited success in areas where cooperation was needed with these groups. The Corps responded to requests for changes, from fishery interests, in the operation of their projects, but not always quickly or positively. Many of the Program measures addressing these agencies were continuations of ongoing work and evaluations of

existing information. This was not as clear and action oriented direction, and would not produce results in the near term.

Besides the directives for the four federal agencies, there were areas of the Program assigned to the Council's own advisory group, The Fish Propagation Panel (the Panel). The Panel was composed of eight members, designated by the various groups for their expertise in areas of hatchery practice, genetics, engineering, fisheries management, and natural propagation. They included representatives of the agencies, tribes, utilities, and educational institutions. They were not expected to represent these groups, but to perform as scientists and remain neutral on all issues.

Their goal, on paper, was to provide all of the scientific advice the Council would need to implement the largest section of the Program, - Section 700: Wild, Natural, and Hatchery Propagation. The Panel was asked to evaluate the potential for propagation, develop propagation objectives, prioritize projects, and develop recommendations on goals for the Program. These were areas that the agencies, tribes and utilities could not agree on and therefore had recommended be addressed by study groups.

The Panel was expected to make recommendations to the Council but had no responsibility for the final decisions on their recommendations, nor were they given a clear channel of communication to the Council. The panel, acting on its own motion, disbanded in 1984, after only a year of their two year charter.

Most of the implemetation of the Fish and Wildlife Program that was begun in 1983 continued into 1984. However, during 1984 the Council was more involved in amending the Program than in the implemetation of the existing measures. Some of the unclear areas in the first version will be cleared up in the next, some areas will become more vague. There will be few major policy changes to the Program, but there will be an attempt to clarify the scheduling and proirities.

Implemetation of this Program should take 20 years, but it is unlikely that the fish can wait this long without some dramatic steps early on.

In the first years of implementation, the problems of understanding the program have become evident. Some of the problems are political, many are related to how to use information. Because of the many and varied implemeting groups, interpretations of information are different and often do not transfer well.

The following section will look at these ideas in more depth.

DISCUSSION

Little science was necessary in the writing of the Act, it was much more a job of compromise and speculation. Technical justification for the fish and wildlife mandate, in the form of the ad hoc recommendations, was necessary, however these recommendations may not have been the primary force behind the Act. Politics, regional and national, supported the Power Act as an experiment in comprehensive regional planning. The Act was

designed to insure that all possible interest groups were included in consultations with the Council and that there were numerous opportunities for public comment and input. This is the purest political phase of the process.

The role of science and politics changed as the writing of the Act ended and the development of policies for execution began. The writing of the Program was the policy formulation stage. This was the time when the expectations were built that would continue throughout implementation. Development of policy is the cultivation of expectations for actual action. Unless the policy has spelled out what the exact results are to be, problems arise when each group's expectations are different.

"Hard" science (physical and biological as opposed to "soft" science, social and political) was supposed to have been used to develop many of the recommendations. Scientists from throughout the region were enlisted to develop sets of recommendations for the tribes, agencies, and utilities. However, each of these groups had an interest in the outcome of the written document. Each group presented the scientific propositions that would most benefit their interest.

In developing the recommendations the experts started with the same basic data. It was the interpretation of the data and the solutions they proposed that varied, because of the variety of backgrounds doing the interpreting. There was not one "best" solution, rather each solution was based on a different set of assumptions. Each was scientifically valid.

Scientific information was used to support and strengthen

the views of the particular groups. It became the Council's job to evaluate and choose between the solutions. The Council used discretion when viewing the proposals by questioning the economic feasibility, the long and short term needs, and the system-wide impacts and benefits. They may have had a clear understanding of the technical aspects but they also had to have an understanding of the political and social aspects.

The Program represented the Council's policy and planning, but the implementation of this policy was another question.

The change in the role of science from writing the original document to the implementation of its proposals has been the change from favoring technical knowledge and situations to facing the realities of the political system. It is easier to define problems than to find "the solutions." In a highly political system like the Columbia River Management System, all solutions will be fraught with political, social, and economic consequences. Because of these consequences, the planners and program implementers must be aware not only of the technical solutions, but of the possible outcomes in these other areas as well. Implementation can not be a purely technical response. Failure to understand the many implications can lead to disaster or, at the least, to very slow progress.

In the Program, the Council was able to incorporate new technical ideas without a clear indication of how they would be used. They were able to walk the fine line between technical and political by (as Lawrence, 1983, proposes) having technical persons agree on the basics and then filter this up to the policy level (Lawrence, p. 120). What was not addressed was how new

information would be used, and when the problems arose, who would solve them.

Once written, there was basic satisfaction with the Program. No one sued the Council over the contents. There was enough vagueness in the politically difficult areas that all groups were appeased. Each interest group interpreted the words in the Program differently, taking the meaning they wanted from it. Lawrence states, "although attacking the problem on the technical level may in fact be effective in breaking out new ideas, a true solution to the problem will not be assured until policy-makers of the various institutions are comfortable with all the policy implications" (Lawrence, p. 121). I would add to this that the solution is not assured until it is tested, no matter how good it looks on paper. The challenge of the implementation process became one of testing the ideas in a real world situation and then evaluating the resulting political situation.

The writing of the program was different than the actual implementation of its many projects. During writing, many questions were left unanswered and it then became the goal of implementation to answer them.

Once implementation started the realities of the situation emerged. The Council retained the need for scientific input for three reasons, the Act's mandate, gaps in information, and the need for better understanding in many areas. Scientific input during implementation was to come from the many research projects and studies funded under the Program, from the Council's designated advisory group, and from the Council's own staff.

An elaborate yet uncoordinated research program was begun by BPA. However, for the research to be useful for the Council's Program, the researcher must be aware of the complex nature of the questions being asked and of his role in finding the answer. He must also have some responsibility for seeing that the results of his research can be used in the decision making process. Without the ability to understanding the scientific information, decisions will be made without the benefit of scientific input. The managers also have the responsibility to try to understand the science.

It is doubtful that either the scientist or the manager will see his role in this light. Science is still an isolated institution. As much as has been written and said about the need for science to fit into the broader picture of the social and political world there is still a hesitancy for scientists to step in. There is still a problem of credibility and professional standards when a scientist applies his work outside the narrow bounds of his discipline. There is little effort to learn to communicate with the politicians and managers that use the science.

There was also no effort made by the Council or the agencies to ensure that the research being funded would be applied to the questions it was meant to answer. Often the questions were so unclear that they could not be defined. There was no attempt to educate the researchers to the needs of the Program. Nor were there any provisions in the Program that outlined how the information generated from research and studies was ever going to be applied. The new scientific investigations undertaken under

the auspices of the Fish and Wildlife Program were independent of the Program.

One reason for these problems was the general nature of wording used in the Program. Because the Program was written by balancing differing opinions about solutions, neutral and ambiguous statements were often necessary. The Council could not come out clearly in support of one side of the issue.

The Program used statements of what "shall be" done not how to do it. Without clear direction, interpretation was open to all. This led to research being funded which may not answer the questions, because no questions were asked.

A similar problem was inherent in the role of the Fish Propagation Panel. The Panel was a group of scientific experts in a wide range of fields. They were formed to analyze the technical aspects of the Program that were most difficult. However, many of the tasks outlined were not technical but highly political instead. Rather than being asked to do a detailed analysis, they were asked to interpret the science in a political context. The questions were for judgements with controversial social and political impacts, based on science that was complex yet not in and of itself controversial.

It was the Council that would ultimately have to make the tough decisions, but in writing it was easier and more credible to assign the tasks to proven experts. This also gave the various groups a source of direct input to Council decisions. Possibly what the Council was really looking for was a group to back the decisions after they were made, and to provide the credibility

for the political decisions that were needed.

The recommendations clearly asked for advisory groups, but the use of these groups was not clear. The scientific community may have viewed this as an appropriate channel for input, while the political community was not clear on the use. Different interpretations of the real role of the Panel and differing expectations over their recommendations led to a lack of understanding on all sides (See Price 1954, Chapter V, The Machinery of Advice).

The advisory group failed to provide the needed scientific input and could not make political, policy level decisions. The policy level was not ready to utilize the Panel for its ability to lend credibility to their decisions. Although the scientific input is necessary, at least for image, it must be used properly, and players on both sides must understand the bounds of their responsibility. When there are no clear bounds, misunderstandings are likely to occur. In this case there was a clear lack of understanding and a misuse of scientific input. Although the scientists involved finally realized the political nature of their appointment, they were not allowed to utilize it. They were expected to be scientific and neutral in a position where only politics was of value. The role of science in the process of implementation was poorly defined and thus has, to a large degree, failed to provide the benefits of which it is capable.

CONCLUSIONS

The writing and implementing of the Power Act shows a natural evolution from saying to doing. It also shows an

evolution from science to policy to politics. The scientific input was developed with limited political acknowledgement. This was then formulated into policy. The implementation of the policy becomes and will remain highly political.

The transition from one to the next is based on the evolution of the agency. Early influence was in science, now it is in politics. The political solutions take over. The political system will respond to group pressure more than the scientific and will adjust to conflicting interests and solutions. Science will not be conflicting but the interpretation of it will be. This should be where the Council's role becomes best defined. They should be the interpreters of their Program, but they should also clearly understand the different interests at stake and be able to put these into the implementation process.

Francis Rourke (1976) notes that "the appraisal of policy alternatives has not always included the feasibility of implementation within the framework of analysis." This is exactly what has caused the difficulty in implementation of the Fish and Wildlife Program. The "how to" questions are missing.

The lack of these questions on the part of the governing body, the Council, is a reality. It is also expected. The Council did not feel the need to address these issues, as they expected the experts in the area to do this. However, the experts, the scientists, will not or can not look at the problems in the same political light that the Council can.

What is seen is a basic miscommunication of the role of

science and the scientist. The policy makers expect the scientist to play a larger role than the scientist is ready to play. Yet the responsibility for all decisions is still with the policy makers. Each should have a responsibility to the other and each should have an open channel of communication.

The policy people must ask harder questions than the scientists want to answer because the scientists will claim that they are outside the realm of making policy decisions and answering tough questions. If either the policy person or the scientist was left alone nothing would ever get done. Both are necessary and both must work together.

The need is for the two groups to be able to talk to each other. This means speaking the same language, or at least being able to speak the others language, when needed. It is a two way street. The policy maker identifies the questions that need to be answered and the limitations and the scientist answers them. Both hold responsibility for the final decision.

Implementation of the Fish and Wildlife Program will continue and change as the political climate of the Columbia Basin changes. The writing of the Program was a major achievement and what is now needed is the incremental steps toward the major changes that all involved parties expect. The progress will not and should not be fast, but hopefully it will be fast enough for the resources that are in need.

APPENDIX 1

The Power Act - Public Law 96-501, 94 Stat. 2697

Purpose

2.(3)(A) the development of regional plans and programs related to energy conservation, renewable resources, other resources, and protecting, mitigating, and enhancing fish and wildlife resources.

2.(6) to protect, mitigate and enhance the fish and wildlife, including related spawning grounds and habitat, of the Columbia River and its tributaries, particularly anadromous fish which are of significant importance to the social and economic well-being of the Pacific Northwest and the Nation and which are dependant of suitable environmental conditions substantially obtainable from the management and operation of the Federal Columbia River Power System and other power generating facilities on the Columbia River and its tributaries.

Recommendations

4.(h)(2) The Council shall request, in writing, promptly after the Council is established under section 4(a) or 4(b) of this Act and prior to the development or review of the plan, or and major revision therto, from the Federal and the region's appropriate Indian tribe, recommendations for -

4.(h)(2)(A) measures which can be expected to be implemented by the Administrator, using authorities under this Act and other laws, and other Federal agencies to protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, affected by the development and operation of any hydroelectric project on the Columbia River and its tributaries;

4.(h)(2)(B) establishing objectives for the development and operation of such projects on the Columbia River and its tributaries in a manner designed to protect, mitigate, and enhance fish and wildlife; and

4.(h)(2)(C) fish and wildlife management coordination and research and development (including funding) which, among othr things, will assist protection, mitigation, and inhancement of anadromous fish at, and between, the region's hydroelectric dams.

Program Development

4.(h)(5) The Council shall develop a program on the basis of such recommendations, supporting documents, and views and ingormation obtained through public comment and participation, and consultation with the agencies, tribes,

and customers referred to in subparagraph (A) of paragraph (4). The program shall consist of measures to protect, mitigate, and enhance fish and wildlife affected by the development, operation, and management of such facilities while assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply. Enhancement measures shall be included in the program to the extent such measures are designed to achieve improved protection and mitigation.

4.(h)(6) The Council shall include in the program measures which it determines, on the basis set forth in paragraph (5), will -

4.(h)(6)(A) complement the existing and future activities of the Federal and the region's State fish and wildlife agencies and appropriate Indian tribes;

4.(h)(6)(B) be based on, and supported by, the best available scientific knowledge;

4.(h)(6)(C) utilize, where equally effective alternative means of achieving the same sound biological objectives exist, the alternative with the minimum economic cost;

4.(h)(6)(D) be consistent with the legal rights of appropriate Indian tribes in the region; and

4.(h)(6)(E) in the case of anadromous fish -

4.(h)(6)(E)(i) provide for improved survival of such fish at hydroelectric facilities located on the Columbia River system; and

4.(h)(6)(E)(ii) provide flows of sufficient quality and quantity between such facilities to improve production, migration, and survival of such fish as necessary to meet sound biological objectives.

4.(h)(7) . . . shall resolve such inconsistencies in the program giving due weight to the recommendations, expertise, and legal rights and responsibilities of the Federal and state Fish and Wildlife agencies and appropriate Indian tribes. . . .

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