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Title: Implementation of Regional Plans in the Pacific Northwest: An Analysis of the Northwest Power Planning Council's Water Budget and Model Conservation Standards 1984 - 1993.

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An innovative regional planning institution, the Northwest Power Planning Council, was created to plan for two conflicting water-related resources, fish and wildlife and electrical power. The Council is responsible for regional planning but implementation of those plans is largely the responsibility of four federal agencies and four state governments. As with any planning institution, one of the Council's greatest challenges is securing implementation of its plans. This research addresses the Council's success by examining factors affecting implementation of two representative measures, the "water budget" within the Columbia Basin Fish and Wildlife Program and the residential "model conservation standards" within the Northwest Conservation and Electric Power Plan.

The objectives of this research were to identify the degree to which the two key measures developed and adopted by the Council were implemented, to analyze the factors affecting implementation, and to recommend strategies to facilitate better linkage between the planning and implementation process. A policy analysis model was used to determine the factors impacting implementation from 1984 through 1993. The results suggest that while the Council was at least moderately successful, a

number of factors impeded effective implementation of both measures over the course of the ten-year analysis period. The Council was somewhat less successful in addressing implementation problems surrounding the water budget than it was for the residential model conservation standards. Critical factors which impeded implementation of the water budget included its vague objectives, uncertainties surrounding the measure's ability to achieve the Program's goals, the Council's lack of enforcement authority, and implementors who were largely unsympathetic to the salmon recovery effort. Factors negatively affecting regional adoption of the model conservation standards included regional implementors' resistance and the large degree of change required of them, state and local government's ability to block adoption, plus initial hostile reactions from the building industry.

This research concludes that the Council provided an innovative model for regional planning. The strengths of the Council included its relatively clear enabling legislation, its inclusive planning process and its substantial political and financial resources. The Council's model also gave the four northwest states greater control over policy-making for two important regional resources.

IMPLEMENTATION OF REGIONAL PLANS IN THE PACIFIC NORTHWEST: AN ANALYSIS OF THE NORTHWEST POWER PLANNING COUNCIL'S WATER BUDGET AND MODEL CONSERVATION STANDARDS 1984 - 1993

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Chair of Department of Geosciences

Dean of Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Jo Beth Mullens, Author

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CHAPTER 1

INTRODUCTION

During the past century professional planners, academicians, and policy-makers have attempted to design and establish water resources institutions which would be better able to address resource conflicts crossing jurisdictional boundaries than the standard fragmented institutional approach. The regional planning concept hypothetically has numerous advantages over the fragmented planning approach commonly found in most river basins across the United States. Despite its presumed advantages, many regional planning organizations have come up against a crippling phenomenon which has detracted from potential benefits. This phenomenon occurs when there is poor linkage between the plans created and the activities carried out and has been referred to as the "implementation gap" (Lowry 1985). Most organizations undertaking resource planning face difficulties when attempting to implement plans but it has been particularly problematic for regional planning institutions (Wengert 1980; Mitchell 1983; Viessman 1989). Despite this demonstrated problem, these regional institutions continue to be relied upon to address some of the more complex water resources issues and conflicts.

An institution established in the Pacific Northwest has attracted the attention of professionals interested in the design of regional water resource planning organizations. This entity is the Northwest Power Planning Council (Council), officially formed April 28, 1981 to plan for and integrate management of two conflicting water-related resource uses: fish and wildlife, and electric power generation. Established through passage of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (the Act), the Council was given three main responsibilities: 1) formulate a 20-year regional conservation and electric power plan, 2) prepare a program that will protect, mitigate, and enhance fish and wildlife in the Columbia Basin, and 3) incorporate broad public involvement into the planning process. Those who drafted the regional legislation envisioned that the Council, through a comprehensive regional planning process, would provide a forum for resolving regional disputes over energy use and affected fish and wildlife and environmental resources (Volkman 1987).

The Northwest Power Planning Council is a unique regional institution from the standpoint of its authority and role. Legally, it is regarded as an interstate compact organization between the four northwest states of Oregon, Washington, Idaho, and Montana. What distinguishes the Council from other existing interstate compact entities is that Congress gave this regional institution a limited and rather nebulous authority to guide and sometimes constrain actions taken by four powerful federal agencies. No other established regional entity without federal representation has been given the role of setting policy for and constraining certain activities of federal agencies. The establishment of the Council's authority represents a step away

from historical dominance of federal control in the Columbia River Basin.

The Council is the only regional institution in the Northwest charged with providing integrated plans to both satisfy energy needs and accommodate fish, wildlife and environmental values. Although the Council is to function as a regional planner, implementation is dependent upon the cooperation of existing federal, state, and local agencies, Native American tribes and private individuals and corporations. Since its inception, there have been a number of concerns raised about the Council's ability to secure implementation of both its fish and wildlife program and power plan (Blumm 1984, 1987, 1990; Cole 1986; Blumm and Simrin 1991; FPC 1991 and 1994; Doppelt, Scurlock, Frissell and Karr 1993). Opposing views exist on the Council's effectiveness as a regional planner and leader. This has led some to propose that the Council's authority and role be strengthened (Lee 1991a), and others to suggest that the institution be abolished and replaced (Blumm and Simrin 1991).

Securing implementation for its plans is arguably the Council's greatest challenge. The Council is a regional body which has undertaken a centralized planning process which must rely upon a decentralized implementation process in an institutionally fragmented river basin. Despite the difficulties faced and concerns raised, it has also been noted that the Council has achieved a degree of success in securing implementation required to move the region toward realizing the goals established in the Act (Wilkinson 1985; Volkman and Lee 1988; Muckleston 1990a; Schwartz 1990).

PROBLEM STATEMENT AND OBJECTIVES

The Northwest Power Planning Council was created to provide a regional power plan for the Pacific Northwest and a fish and wildlife program for the Columbia River Basin. Questions have been raised by those concerned with the achievement of the Pacific Northwest Electric Power Planning and Conservation Act's goals over the Council's ability to secure implementation of the measures within its power plan and fish and wildlife program. This dissertation provides an assessment of implementation of two representative measures, the "water budget" within the Council's Columbia Basin Fish and Wildlife Program, and the residential "model conservation standards" within the Council's Northwest Conservation and Electric Power Plan. The ten-year period of 1984 through 1993 was used for the analysis. Three principal objectives were identified for this research. These objectives are:

- To analyze the degree to which the water budget from the Columbia Basin Fish and Wildlife Program and the residential model conservation standards from the Northwest Conservation and Electric Power Plan were implemented during the years of 1984 through 1993.
- To identify those factors which facilitated and impeded implementation of the water budget and the model conservation standards.
- To recommend strategies which will facilitate implementation through better linkage between the Northwest Power Planning Council's planning efforts and implementation efforts made by institutions operating within the region.

SIGNIFICANCE OF THE RESEARCH

There are a number of current issues and regional events which make an implementation analysis of the Council's regional plans a desirable and timely research undertaking. The first issue involves an impending energy shortfall facing the region. The Northwest consumed approximately 19,800 average megawatts (aMW) of electricity in 1993 (BPA 1994). The Northwest Power Planning Council's 1991 energy demand forecast for the Pacific Northwest under moderate growth conditions indicated that the region would need an additional 2,000 aMW by the year 2000 (NPPC 1991). The region in the early 1990s is in a load/resource balance, meaning that power supplied by the existing system is about equal to power demanded. Although load growth cannot be predicted precisely, it is expected under moderate growth conditions to average around one percent per year over the next 20 years (BPA 1993).

Securing a reliable energy future for the region has become a difficult undertaking since surplus power is gone and policies and laws addressing environmental impacts have been added. Now, more than ever, the region needs a coordinated planning process to secure economically and environmentally acceptable energy resources. Such a planning process has been provided, but regional benefits from the Council's efforts will partially depend upon implementation. An implementation analysis will help identify the weaknesses and strengths in the linkage between the Council's centralized regional power planning efforts and the decentralized implementation efforts.

Secondly, the Council's attempt to reverse the decline of anadromous salmonid populations through implementation of its Columbia Basin Fish and Wildlife Program is a critical concern for the region. In 1991, three stocks of salmon were officially placed on the endangered species list under the 1973 Endangered Species Act (ESA). Fish and wildlife agencies, experts, and environmentalists argue that these listings are only the beginning. Nehlson, Williams, and Lichatowich (1991) estimated that there are around 175 anadromous fish stocks which face the threat of extinction in the Columbia Basin and Northwest coastal rivers. An implementation analysis has the potential to provide useful information for the salmon recovery effort by identifying barriers to as well as avenues of success encountered by the Council in its attempt to secure implementation of the key measure in its Columbia Basin Fish and Wildlife Program.

In light of current conflicts surrounding fish and power, it is timely to evaluate linkage between the regional central planning approach and the decentralized implementation approach used during the past decade. There is evidence which suggests that the Council has provided a valuable regional forum for a variety of interests concerned with regional energy and fish and wildlife issues. Questions remain however about Council's effectiveness in securing region-wide implementation of its plans. The Council's attempt to balance fish and wildlife needs with power demands will be considerably more difficult in future years. With regional surplus power depleted, there will be increased pressures to maximize river flows for hydropower purposes while at the same time ESA recovery actions will probably lead to increased restrictions on the use of water and land in the Columbia River Basin.

Third, assessing the Council's viability as a potential institutional prototype not only for the Pacific Northwest but also for other regions adds to the significance of this study. Interest in replicating the Council's form in other areas of the United States such as the Missouri River Basin and the six states of New England, as well as in Canada and New Zealand, has been expressed. In their discussion of the Council, several researchers have indicated that this organization might offer useful precedents (Blumm 1984; Wilkinson 1985; Volkman and Lee 1988; Muckleston 1990a). Muckleston (1990a, 12) noted that if the Council is successful in its efforts to strike a balance between hydropower and salmon "... it might serve as a prototype for the resolution of environmental problems in other regions." Volkman and Lee (1988) also considered the Council as a potential model for other regions and basins facing complex resource conflicts. The Council's unique potential position in shaping federal activities affecting the region's economy and environment has increased in value as costly decisions are increasingly required to protect declining anadromous salmonids while also ensuring a reliable energy future for the region.

In addition to the Council striking a somewhat better balance between conflicting uses, Wilkinson (1985, 328) stated that "...the institutional arrangement set out in the Northwest Power Act might be an appropriate way to give proper recognition both to national needs and state prerogatives." Wilkinson's point is worth considering since the battle which has ensued between states and the federal government over water resources control continues to demand innovative institutional solutions.

Given that the "implementation gap" has been a crippling problem for regional planning entities, it is important to examine any proposed institutional model's success and failures in overcoming this problem. The information gained from this analysis can help identify problem areas and recommend strategies for future Council activities as well as for future regional planning bodies of this kind. A formal implementation analysis provides useful information for future policy decisions.

LITERATURE REVIEW

The reviewed literature was organized around two themes: regional water resources planning institutions; and implementation analysis.

Regional Water Resources Planning

The use of a region or river basin as a spatial unit for the purpose of planning and managing water resources has long been advocated by numerous professionals in the water resources field (Hart 1971; Derthick 1974; North, Dworsky and Allee 1981; White 1986). In the United States, before the turn of the century and large scale water development, John Wesley Powell's "Arid Land Report" (1878) argued for the organization of western lands along natural river basin boundaries. The concept of water management on a whole-catchment basis came into prominence during the 1930s and 1940s (Mitchell and Pigram 1988). Franklin D. Roosevelt's "New Deal Administration" politically embraced the use of regions to organize the nation's natural resources (Reuss 1992). Roosevelt's Administration advocated the regional approach because it was expected to produce better integrated and more economically efficient plans to meet regional needs and national priorities. It was during this time that the Tennessee Valley Authority was created to put into practice the regional planning and management concept.

Since the 1930s, the regional planning concept has received a great deal of support from professionals in numerous water resource fields, especially those coming from the academic arena (North, Dworsky and Allee 1981). To support their position, those who advocate regional organizations have developed a number of

persuasive arguments based on both the theoretical and demonstrated advantages of regional organizations and the failures of traditional fragmented organizational schemes.

Arguments for Regional Planning

Advocates of regional planning and management often first cite the inherent interdependencies involved in a river system since modifications made to the river for one use will usually have spill-over effects for other uses (Fox and Craine 1962). Muckleston (1990b) noted that supporters of regional management schemes argue this approach will mitigate some resource problems by spatially matching the physical resource unit with the jurisdictional planning and managing unit. Lee (1993) in his book entitled The Compass and the Gyroscope, argues that planning and managing natural systems from a fragmented perspective promotes unsustainable abuse of the environment. This is partially because institutions seek to achieve individual statutory missions which are often incompatible with the sustainable use of the environment as a whole. When a water resource planning and managing agency fails to consider the ramifications of its management actions on the resource and other users, externalities (effects on a third party) may be imposed, causing conflicts. In river systems, upstream/downstream conflicts are particularly common. An example of this type of conflict is when an operator of a reservoir makes a decision to hold water in storage for the purposes of satisfying irrigation and recreational demands without considering downstream fish and navigation needs.

A second closely related argument for using a regional approach is based on the assumption that regional entities are more predisposed to adopt a holistic planning and management approach than traditional agencies (Kromm 1985). Little faith has been placed in the ability of existing agencies with narrow missions to be able to adopt a comprehensive perspective. It is often perceived to be outside the legal authority granted to these institutions and/or conflicts with the interests of the established constituency. Thus concerns raised about traditional agencies' willingness to plan or manage holistically has led to the promotion and creation of new regional entities vested with this goal (Kromm 1985; Volkman and Lee 1988; Reuss 1992).

A third argument centers around the desire for eliminating inefficiencies related to duplication, common to fragmented systems (Wandschneider 1984a; Kromm 1985). Whenever a duplication of planning efforts, provision of services, or other operations occur among various entities without any corresponding benefits, it is considered to be an inefficient use of resources. Demonstrating efficiency has become increasingly important during the last few decades and it appears that this will continue as financial sources for agencies involved with water resources management continue to decline.

A fourth argument addresses the need for establishing institutional jurisdictions which encompass a spatial or functional scope which is significantly broad enough to allow an organization to address issues and conflicts at the "problemshed" level (Viessman 1990). Water resource problems rarely conform to superimposed jurisdictional boundaries. This makes it difficult for agencies to fashion effective solutions when their authority does not allow them to fully address the spatial scope

of the problem. Resource management entities' unwillingness to coordinate or even cooperate with one another makes long-term solutions difficult to obtain.

A final argument favoring regional planning and management centers on the unresponsiveness of many existing agencies, especially federal agencies, to political, social, economical, and environmental conditions within and surrounding their jurisdictional area (Ingram 1973). During the past century, numerous complaints have been lodged against federal agencies which have failed to provide accountability to regional, state, and local interests. Derthick (1974) found that regional institutions were more likely to satisfy preferences of those within their boundaries because they had regionally defined responsibilities and were more concerned with and accessible to the interests of the region.

While advocates of regional planning and management freely admit that this approach is far from a panacea, in many situations, it is more likely to produce good results than the disjointed efforts of various subregional entities (Viessman 1990). If given sufficient authority, these regional entities could provide solutions to problems either caused or made enigmatic by the present fragmented water resources planning and management system.

Types of Regional Organizations

Derthick (1974) identifies two general types of regional organizations. The first type involves organizations which have been given planning, operating, managing, or regulating authority. Examples of this type of institution include the Tennessee Valley Authority, the Delaware River Basin Commission, and the

Susquehanna River Basin Commission. The other type of regional organization is created solely as a planning or coordinating institution. This type of organization is not given authority to implement plans but instead must rely upon other organizations to put the plans into action. Their influence over implementation may therefore vary significantly. Examples of this type of regional organization include the now defunct Title II River Basin Commissions, the Puget Sound Water Quality Authority, and the Northwest Power Planning Council, the subject of this study.

Both types of regional entities have drawn strong opposition from federal and state organizations who view regional management schemes to be a threat to their legitimate roles (Muckleston 1990b). The first type of regional institution, having both planning and implementation authority, generates the greatest opposition and as a result only a few of these entities have been created in the United States. Discussion over creating the all encompassing type of regional entity produces a "turf battle" and is often determined to be politically and socially infeasible (Ingram 1973). Regional organizations which only have planning authority are more acceptable to existing entities and consequently are more commonly sanctioned to address regional resource problems and issues.

Regional Institutions and the Implementation Gap

Despite the persuasive arguments for greater use of these entities, regional water resources planning and management institutions have not been a common political choice. Although the idealized concept has been embraced by a number of water resources professionals, the performance of these institutions has come under

heavy criticism. One of the primary reasons for this criticism is that a number of organizations fashioned to plan and/or manage water resources from a regional perspective have not been very successful in achieving their goals and objectives (Hart 1971). A main reason for regional institutions' failure to achieve their goals and objectives is that despite the extensive effort put into regional planning, these organizations are often not very successful in getting their plans implemented (Visseman 1990; Mitchell 1983). It is all too common to find regional water plans which were painstakingly formulated, simply ignored and left unused on office shelves. With this legacy, it becomes hard to justify expending shrinking financial resources on costly regional planning efforts which hold little hope of achieving implementation.

An ineffective or weak linkage between the planning and implementation phase exists when policies or activities adopted and defined in the plans are not carried out, or do not match the intent of the planners. The general problem has been referred to as the "implementation gap" (Lowry 1985, 288), and over the past two decades, scholars from disciplines such as geography (Mitchell 1983, 1989; Good 1992; Root 1993), and political science (Baum 1981; Sabatier and Mazmanian 1983; Ingram 1990b) have begun to research this problem. The weak linkage between the planning and implementation efforts has been identified as an issue of significant concern for many types of water resources entities, especially those involved in regional and river basin planning approaches (Mitchell 1983; Viessman 1989). A number of regional water resources planning institutions have been created to integrate and plan for resource management activities but actual implementation of regional plans developed

by these institutions has been very limited.

In Mitchell's (1983) examination of regional planning institutions, he attributed the failure to make the transition from planning to implementation to four causes: 1) not all basins need comprehensive plans, 2) planning recommendations are often too numerous and too ambiguous to help implementing agencies, 3) planning processes incorporating public participation and accountability take too much time, and 4) adequate institutional arrangements do not exist to facilitate coordination of management functions and activities during both the planning and implementation phase.

Hart (1971) and Gregg (1989), in evaluating the Title II River Basin Commissions, called attention to the low correlation between conceptualized plans formulated by the commissions and projects actually carried out by various state and federal agencies. The inherent weaknesses demonstrated by these institutions led them both to question the viability of the regional planning approach. Getches (1988, 24) in his examination of planning efforts in several western states also highlighted this problem by stating "Planning for water resources, as other planning, has often been merely an academic exercise." After completing his examination, Getches pointed out that state and regional water resources planning efforts have in fact produced a useful but largely unused compilation of information.

Several speakers at the American Water Resources Association's (AWRA) symposium entitled "Unified River Basin Management" addressed the "implementation gap" problem faced by regional and river basin organizations. Mitchell (1980, 93) summarized the AWRA symposium conclusions on this issue by

asserting that "...emphasis too often is placed upon planning considerations without adequate thought to the implementation stage." Viessman (1990, 159) criticizes water resources planning by stating that "Traditional planning processes too often fail to come to closure, have weak linkages with implementation processes, lack of coordination with affected publics, and do not embrace the full dimensions of the issues they focus on."

The regional or river basin planning approach has not fared any better in Canada. Cardy (1981) noted that the water resources planning process for river basins in Canada had in fact become the product since implementation rarely occurred. O'Riordan (1981) analyzed the river basin planning experience in British Columbia and found that the planning process was costly in terms of time and resources, had produced an extensive list of recommendations, but that only a small proportion had been implemented.

If regional entities are to be viewed as potential alternatives to the existing fragmented system, it is important to examine the strengths and weaknesses of different regional organizations. Based on various analysis criteria, several former and existing regional entities have been examined by researchers (Hart 1971; Dethrick 1974; Kromm 1985). In light of the "implementation gap" problem, it is particularly important to assess regional entities' success in securing implementation of their policies and plans.

Implementation Analysis

Definitions of Implementation

A number of definitions of implementation have been developed by researchers over the past two decades. Pressman and Wildavsky (1973, p. xiii) adopted their definition of implementation from Webster's New World Dictionary stating that implementation means to "carry out, accomplish, fulfill, produce, complete." Essentially, they defined implementation to mean "getting things done." Van Meter and Van Horn became more specific in their definition. They defined implementation as "those actions by public and private individuals that are directed at the achievement of objectives set forth in prior policy decisions" (1975, 447). Nakamura and Smallwood (1980, 1) define implementation to mean "the process of carrying out authoritative public policy directives." Sabatier and Mazmanian (1981, 5) define implementation as "the carrying out of a basic policy decision, usually made in a statute." Goggin (1986) characterized implementation as a problem solving activity involving behaviors which have both administrative and political content. Definitions adopted in current research studies should reflect the conditions surrounding the specific analysis.

Approaches to Implementation Research

The study of public policy implementation is a relatively new field of inquiry. Concerns over alleged failures of legislative policies and programs enacted in the mid-1960s and early 1970s provided the catalyst for a number of detailed implementation studies (such as Muckleston 1973). Ineffective implementation of these programs was

identified as a critical problem by Pressman and Wildavsky in their ground-breaking book entitled Implementation (1973). Although a few earlier published articles and books discussed various aspects of the implementation process, Pressman and Wildavsky's book was the first notable publication on the subject. An important aspect of this early effort was their emphasis on the connecting relationship between policy formulation and policy implementation. This emphasis represented a shift from a "classical" policy process theory in which the design stage and the implementation stage were thought to be distinctly separate and unrelated, to a more circular theory in which a connection was emphasized (Nakamura and Smallwood 1980, 14). Two years later, Van Meter and Van Horn (1975) noted that the published literature exhibited a limited understanding of the process of policy implementation. Their research went beyond earlier efforts by producing an implementation process model based on six "clusters of variables" which they suggested affected the linkage between planning and implementation. McLaughlin (1976), in an analysis of federal educational change programs, focused on the link between those who were formulating the policy and those who were implementing it. Bardach (1977) characterized the implementation process as a game in which the various participants developed strategies in order to achieve their goals. Rein and Rabinovitz (1978) built upon earlier arguments that the implementation process could not be viewed as one dimensional. They introduced the "principle of circularity" to characterize the entire policy formulation and implementation process. Lipsky (1978) suggested that it is often the implementors who end up defining and "making" the policy since they ultimately define what policy measures are undertaken. Berman (1980) urged

researchers to go beyond cataloging ways for programs to fail and focus on designing strategies to achieve effective implementation. He postulated that a critical component of designing implementation strategies is that any strategy should be developed within the context in which the policy is to be implemented. Researchers should match the strategy to the situation.

The first generation of implementation studies, most of which were conducted in the 1970s, provided a foundation for the understanding of the policy-implementation process by defining many of the complexities and factors which affect the success or failure of the process. In the early 1980s, a successful effort was made to establish a research direction for "second generation" implementation studies. This effort was led by Sabatier and Mazmanian who contended that the first generation studies, too immersed in the case study details, were lacking in an attempt to conceptualize the macro-level and political variables structuring the entire process (Sabatier and Mazmanian 1981). To address this concern they developed a conceptual framework model of the implementation process based upon three broad categories: 1) the tractability of the problem(s) being addressed, 2) the ability of the statute to favorably structure the implementation process, and 3) the net effect of a variety of "political variables" on the balance of support for statutory objectives (ibid., 542).

In an implementation analysis of the 1972 California Coastal Planning Initiative, Sabatier and Mazmanian (1983) built upon their early framework model by identifying six conditions which enhanced the policy implementation process. This model was built around the assumption that successful implementation is largely a planning problem which can be tempered by providing greater program specificity, a

better integrated administrative hierarchy, and a means for ensuring compliance (Lowry 1985). This model has been applied to the federal Coastal Zone Management Act (Lowry 1985), the Oregon Beach Protection Act (Good 1992), and instream flow protection legislation in Oregon (Root 1993).

Ingram, Mann, Weatherford and Cortner (1984) emphasized the importance of institutional arrangements, especially political factors, in affecting achievement of water resource policies and programs. They recommended that researchers include information on the "actors" involved, the resources accessible to them (legal, financial, political, technical, administrative, and organizational), and the biases inherent in alternative decision-making structures. The importance of the institutional setting in this process was reiterated by researchers throughout the 1980s (Maynard-Moody 1989).

Goggin (1986), in his review of first and second generation implementation studies, made several important observations, one of which is that perfect implementation does not provide a guarantee of programmatic success. In her examination of past implementation studies, Ingram (1990b) argued for the adoption of a more flexible framework which could be customized to match the needs of the different conditions surrounding various cases being studied. The third generation implementation studies have been called to provide not only explanatory but also predictive information. These studies are expected to recommend strategies for achieving a more effective linkage between planning and implementation. In addition to political scientists, researchers in other disciplines such as geography are beginning to devote research efforts to the implementation process.

Geographers and Water Resources Policy Analysis Research

Geographers have a history of involvement in examining the distribution of resources and the spatial organization and management of them by human institutions. Geographers have also made significant contributions to the study of regional water resources planning and management schemes (Platt 1993). Gilbert White, one of the most prominent 20th Century geographers, was one of the early promoters of using regions and river basins to organize institutional planning and management units for water resources. White called for these approaches in order to achieve more holistic natural resource policies (White 1957). Although geographers have promoted regional planning schemes, there is a need for us to spend more time evaluating these institutional arrangements (Mitchell 1989).

The Water Resources chapter in Geography in America calls for geographers conducting research in the water resources field to examine the comparative effectiveness and equity of different spatially organized planning and management schemes (Tobin, et al. 1989). Although numerous studies are often conducted regarding what needs to be done with a natural resource, very few focus on assessing the implementation process. Muckleston's research on the problems and issues of implementing the Federal Water Project Recreation Act in the Pacific Northwest is an example of this type of evaluation. Mitchell (1989, 305) in his book Geographers and Resource Analysis suggests that geographers focus more research efforts on the "operational matters" of natural resources planning and management. Through these studies, geographers can provide valuable information to policy-makers attempting to devise more effective water resource institutions.

While it has been political scientists who have developed and promoted the use of implementation analysis, geographers have begun to utilize these models as tools to evaluate the effectiveness of various legislative acts, public policies and planning schemes (Good 1992; Root 1993). This dissertation contributes to the growing body of policy analysis research. It also provides an evaluation of the effectiveness of a unique natural resources planning institution, the Northwest Power Planning Council.

OVERVIEW OF THE RESEARCH CHAPTERS

Chapter 1 provided an introduction to this research, the problem being examined, and the literature review. Chapter 2 provides a brief discussion of the Pacific Northwest and Columbia River Basin. This chapter also describes past regional institutions associated with water resources adopted in the Pacific Northwest. Chapter 3 discusses the events which led to the passage of the 1980 Pacific Northwest Electric Power Planning and Conservation Act, relevant components of the Act and the Northwest Power Planning Council. Chapter 4, provides an outline the methodology and implementation analysis framework used in this research.

The implementation analysis of the water budget and of the residential model conservation standards is presented in Chapters 5 and 6, respectively. Chapter 5 contains background information on and the analysis of the water budget from the Council's Columbia Basin Fish and Wildlife Program. Chapter 6, contains an outline of the residential model conservation standards from the Council's Northwest Conservation and Electric Power Plan, and the applied implementation analysis framework. Chapter 7 presents the conclusions of the research, a comparison of the

results from the two implementation analyses, and recommendations for improving the link between the Council's plans and implementors' actions.

CHAPTER 2

THE PACIFIC NORTHWEST AND REGIONAL RESOURCE PLANNING INSTITUTIONS

THE COLUMBIA RIVER BASIN

The Pacific Northwest is defined for this research to encompass the states of Oregon, Washington, Idaho and Montana west of the Continental Divide. With approximately 9 million citizens, these four states are loosely bound together physically and culturally by the Columbia River Basin. The Columbia River is considered by many to be the Pacific Northwest's most valuable natural resource.

Draining approximately 219,000 square miles in the United States and another 39,500 square miles in Canada, the Columbia is the fourth largest river in North America (Figure 1). The Columbia flows 1,214 miles from its headwaters in the Canadian Rocky Mountains to the Pacific Ocean (BPA 1993). The average annual runoff at its mouth is 198 million acre-feet (Maf), however, the river's flow from year to year is dependent on the region's weather patterns. This makes the annual runoff in the basin somewhat variable. A snow fed river, the natural river regime occurs with highest flows during the late spring and the lowest flows during the winter. Approximately two-thirds of the basin's annual precipitation falls between October and March.

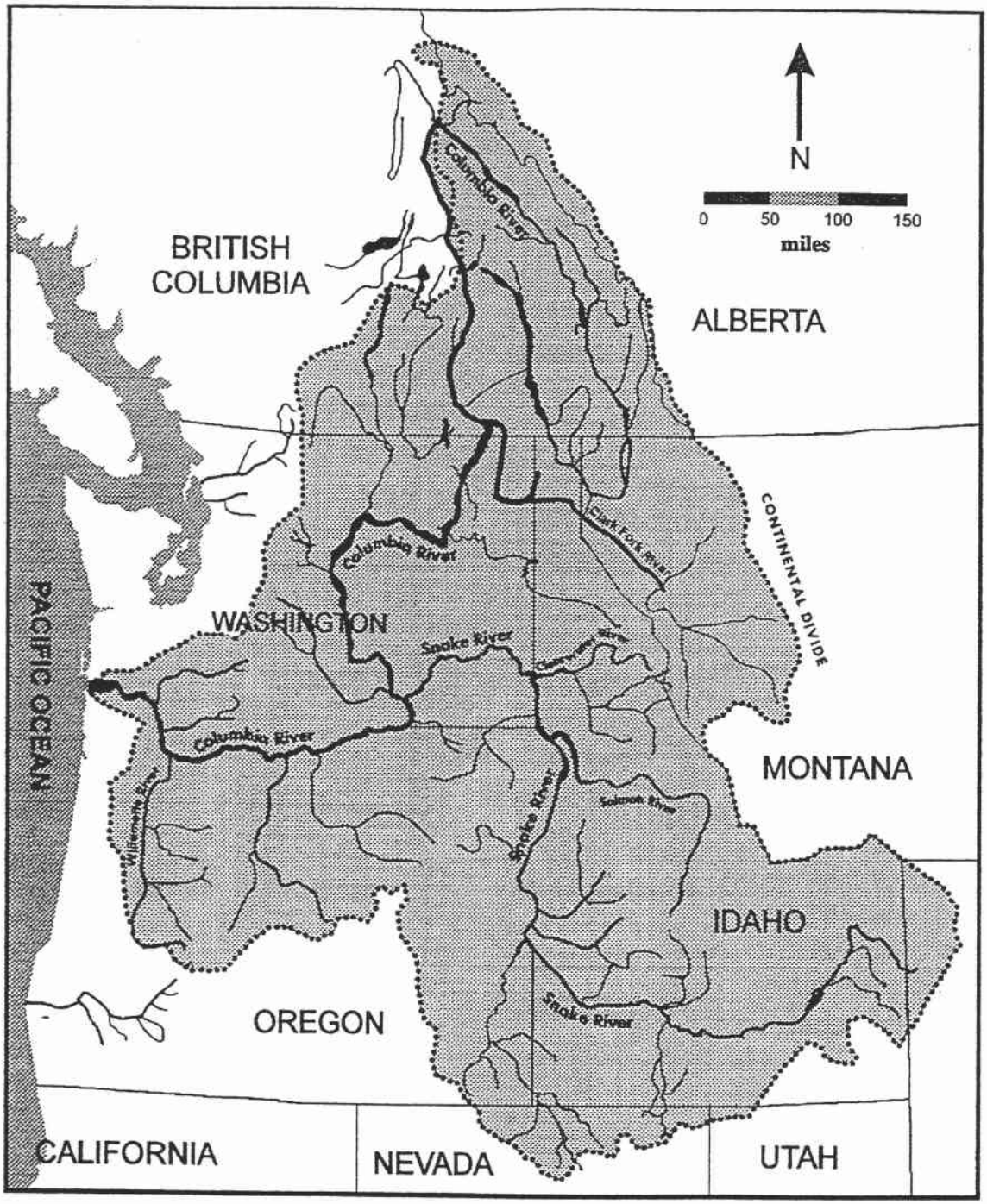


Figure 1. The Columbia Basin.
Base Map Source. Interagency Team. 1993. Power System Coordination: A Guide to the Pacific Northwest Coordination Agreement. p. 4.

The Cascade Mountain Range, running north-south through Oregon and Washington, divides the region into two unequally areal and distinctly different climatic zones. West of the Cascades, the climate is marine with mild and wet winters and dry summers. On the east side of the Cascade Mountains, seasonal temperature variations are more extreme with significantly less precipitation. Runoff east and west of the Cascades varies temporary. Most of the precipitation on the east side falls as snow in the mountains. The snowpack, held in natural storage in the higher elevations during winter, is released in the spring and early summer as the daily temperatures rise. Thus, the greatest runoff east of the Cascades occurs in spring and early summer. In contrast, west of the Cascades the precipitation falls mostly as rain rather than snow. Thus the highest runoff occurs during the winter and early spring.

The Columbia's Resources

The natural river regime of the Columbia and its tributaries has been modified over the past 50 years to accommodate diverse water-related demands of an increasing Northwest population. Navigation provided the earliest motivation for taming the Columbia's flows, but few flow modifications took place solely because of navigational needs. Frequent flooding and the desire to provide farmers with irrigation water in the drier climate east of the Cascades further encouraged the federal government to structurally develop the river.

Large scale dam development began in 1933 when the federal government authorized $60 million dollars to construct Grand Coulee Dam for irrigation storage

and $20 million to construct Bonneville Dam for navigation purposes (McKinley 1952; Norwood 1981). The Columbia is now controlled by 19 large storage facilities (high-head dams in which the reservoir water level is 150 feet above the water level downstream of the impoundment) and over 5 dozen smaller run-of-river dams (Figure 2). The storage capacity of all facilities is about 42 million acre feet (Maf) (BPA 1993).

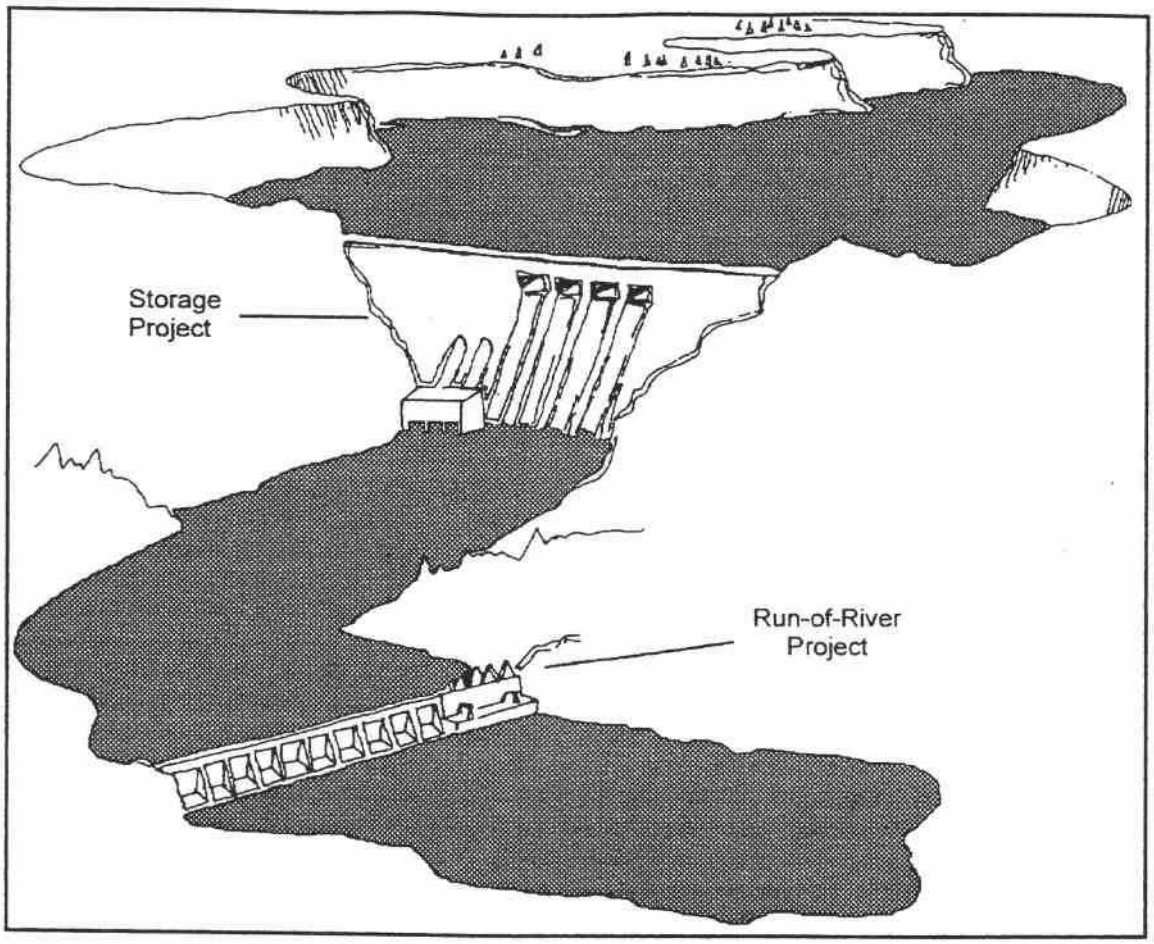


Figure 2. Storage and Run-of-River Projects.
Source. Interagency Team. 1991. The Columbia River System: The Inside Story. p. 9.

An important product of dam construction, which greatly influenced the decision to structurally develop the basin, was hydroelectricity. Dropping approximately 2 feet per mile and transporting low amounts of sediment, the river has proven to be an excellent hydropower resource. A network of over 75 public and private hydroelectric facilities built in the basin over the last century taps the energy of the river's falling water. Today, the 29,800 megawatts of installed capacity from the hydroelectric system accounts for approximately two-thirds of the electricity delivered in the region (NPPC 1991, 503). On average the falling water annually produces 16,400 aMW of energy (ibid., 503).

Per capita use of electrical energy in the Northwest is approximately twice that of the national average. This higher than average demand has been encouraged through regional-wide low electrical rates which have run about 40 percent lower than the national average (BPA 1993). In turn, low electrical rates attracted the electrical energy intensive aluminum industry to the Northwest. No other region in the United States depends so heavily on the flows of a river system for energy. Because of the importance of hydroelectric power to the region, many management activities within the Columbia River System have been driven by a desire to maximize the river's hydroelectric power potential.

Modifications to the Columbia have, however, had a negative impact on other important Northwest resources. They have been a primary causal factor in the precipitous decline of anadromous salmonid populations. The Columbia River, once one of the world's greatest producers of salmon, has lost 95 percent of its natural populations (Lichatowich 1993). The proliferation of dams and subsequent

modification of flows in the Columbia have affected both upstream and downstream anadromous fish travel. In 1987, the Northwest Power Planning Council estimated that declines in the annual run size due to hydropower developments and operations ranged from 5 to 11 million adult fish (total declines from all causes range between 7 and 14 million adult fish) (NPPC 1987a, 38). Despite the declines, the Columbia salmon fishery continues to support a significant but declining commercial and recreational fishing industry. In the early 1990s, the industry employed approximately 60,000 and generated $1 billion annually for the region (Lichatowich 1993). Aside from the economic value, salmon are important for their cultural and religious value to the region's Native American tribes.

In addition to power, fish, navigation, flood control, and irrigation, the river provides for municipal, industrial and recreation demands. Despite the seemingly abundant water supply of the Columbia, all demands have not been satisfied, especially during years of lower than average streamflows. Increase in demand over time has led to competition and conflict among different interest groups in the basin. Though the 30 federal hydroelectric projects in the Columbia are operated to provide for multiple uses, some interests have been prioritized over others. Lee (1989, 8) pointed out that river uses have been clearly prioritized with power at the top, then municipal and industrial uses, agriculture, flood control, navigation, recreation and lastly fish and wildlife. This prioritization is reflected in the institutional infrastructure which has evolved in the Columbia Basin.

The Institutional Infrastructure

The institutional infrastructure of the Columbia has been and continues to be highly fragmented and decentralized. A myriad of public agencies operate at different levels of government, follow different statutory mandates, and provide different services. The U.S. Corps of Engineers, the U.S. Bureau of Reclamation, state and federal fish and wildlife agencies, public utilities districts, local irrigation districts and municipalities are a few of the groups involved in operation of the Columbia. In addition to the public agencies, a plethora of private organizations such as the private utilities are also involved in river management. While no single institution has overriding authority over the activities in the basin, influence among the groups does vary significantly. Four federal agencies, the Bonneville Power Administration (BPA), the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Reclamation (Bureau), and the Federal Energy Regulatory Commission (FERC) have taken a lead role in the development and operation of facilities in the Columbia.

To transmit hydroelectric power, the BPA built and now operates over 14,700 miles of transmission lines (the power grid includes a high capacity connection to the southwest) (Norwood 1981). The BPA markets and transmits virtually all federal and a significant amount of non-federal hydroelectric power in the region. Bonneville is a wholesaler of electricity: the agency sells power to local utilities, who then deliver it to the customers. The BPA also sells power to the direct service industries (DSIs) which are primarily aluminum reduction plants. Though BPA does not own or operate the dams in the basin, its power sales to a large extent govern river operations.

The Corps and the Bureau built and operate the federal dams. The facilities operated by the Corps and the Bureau, and transmission facilities and the marketing organization of BPA make-up what is known as the Federal Columbia River Power System. The Corps and Bureau have multiple purpose responsibilities at their facilities but each agency follows different legislative mandates. While the primary responsibilities of the Corps are flood control and navigation, the Bureau is most concerned with providing water for irrigated agriculture. Inter-agency competition between the Corps and the Bureau has on occasion been a problem (Worster 1985). Conflicts are most often a result of their differing statutory missions and competition for congressional sponsorship or constituency support.

Both the Columbia's flows and different reservoir levels are regulated to a large extent by the Corps. The Corps' responsibilities for flood control and navigation give the agency authority to set overall limits for reservoir water levels and river flow rates and changes. Although a larger number of actors are responsible for establishing general river operating requirements, the Corps, through their Reservoir Control Center is responsible for seasonal, weekly and daily alterations in operations (Wandschneider 1984b).

The Federal Energy Regulatory Commission (FERC) plays an important but less involved role in river management. Although not engaged in the day-to-day operations, FERC is responsible for licensing the nonfederal hydroelectric dams, which are well represented in the Columbia drainage basin. The Commission licenses both public and the private utilities' hydropower facilities. The organization has the authority to force these nonfederal operators to modify operations. The FERC

licensing process is the mechanism for compelling non-federal operators to cooperate with other non-power river operations like fish protection. These additional operating requirements are defined in the FERC operating license for each nonfederal facility (Wandschneider 1984b).

Numerous state and local organizations also operate within the basin. These include state fish and wildlife agencies, municipalities and irrigation districts. It has been difficult for state and local agencies to establish a position of significant authority given the past and continuing strong influence of the federal government.

Like many large river basins affected by numerous independent institutional arrangements, little coordination has existed between agencies. River development has proceeded on a project-by-project basis with limited effort given to functional interdependencies which exist among all users. Despite the lack of coordination, operators of hydroelectric facilities on the Columbia are guided and constrained by three separate but related arrangements: 1) the Columbia River Treaty; 2) the Pacific Northwest Coordination Agreement; and 3) Federal Flood Control Statutes (Interagency Team 1991, 16).

The Columbia River Treaty, signed in 1964 after years of lengthy negotiations, resulted in a doubling of the basin's storage capacity by providing for the construction of four storage reservoirs (three in Canadian and one in Montana) (Lee, Klemka and Marts 1980; Norwood 1981). Of the 15.5 Maf of active storage created, most is located in Canada but available for use downstream in the United States. This additional storage has been used largely for the benefit of power production and flood control. It has provided downstream generating facilities located in the United States

with approximately 2,800 average megawatts of dependable output (BPA 1993). The four storage facilities built as a result of the Columbia River Treaty gave reservoir operators greater control over the timing of the river's flows. By creating more storage capacity in the system, operators were able to better match regional demand for electricity with the river's hydroelectric generation capacity.

The second arrangement which serves to guide river operations is the Pacific Northwest Coordination Agreement, signed by the BPA, the Corps and 14 public and private utilities. This 30-year arrangement is the single most influential river coordinating agreement in the basin and governs many of the terms under which hydro-facility operators can ask for release of stored water (Wandschneider 1984b). The coordination which has resulted between power producers has undeniably given power interests the greatest decision-making leverage in the Columbia.

Under the Coordination Agreement, the river's flows are modified through a complex set of daily operational agreements. The primary goal is to maximize the Columbia for power production by operating the river as if it were owned by one utility (Interagency Team 1993b). Under the agreement, facility operators adopt annual operating plans during each July before knowing the yearly runoff. To guide river operations, reservoir operating levels or "rule curves" have been established at each reservoir. Rule curves are graphic representations of water levels specified in feet for single reservoirs and converted to units of electrical energy for systems. Four basic rules curves are used in planning for facility operations. These are the "critical rule curve" the "assured refill curve", the "flood control rule curve" and the "variable energy content curve". Figure 3 illustrates the level that a reservoir must

be at to meet requirements of each rule curve.

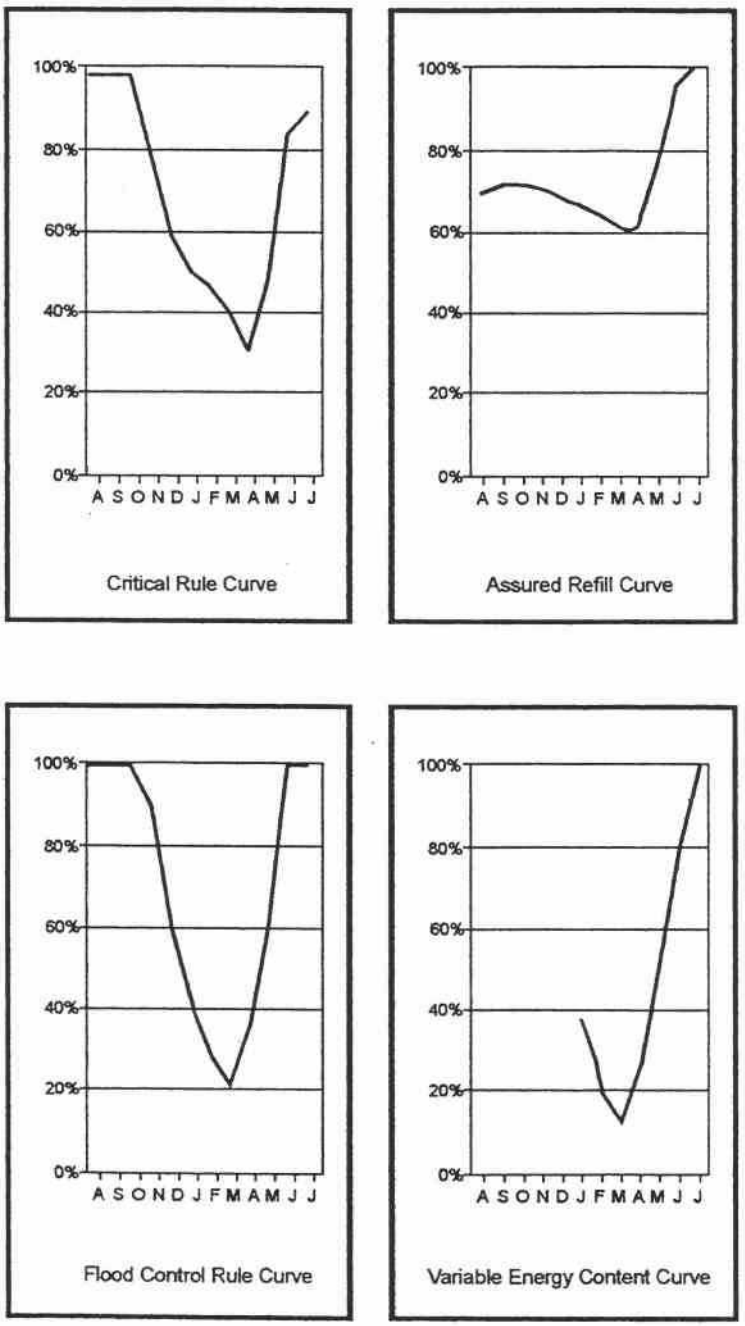


Figure 3. Reservoir Rule Curves
Source. Interagency Team. 1991. The Columbia River System: The Inside Story. pp. 54-55.

The critical rule curve indicates how full a given reservoir needs to be at each month's end in order to provide generation capacity to meet firm power loads (the amount of energy that is assured to be demanded) during the critical planning period. This critical period is based on an actual historic sequence of runoff during drought years (1929 through 1932) and is often defined as the worst case scenario for runoff. The assured refill curve shows the lowest drawdown level a given reservoir can be and still refill if the third-lowest runoff year occurs (the 3rd lowest runoff year occurred in 1931) (Interagency Team 1991). The variable energy content curve is used to guide nonfirm power generation. It shows how much water must be stored in a reservoir to create a 95 percent probability of refill by July 31 (Interagency Team 1993b).

Over the past century, flood control operations have provided significant justification for flow modification on the river. The U.S. Corps of Engineers is the agency responsible for ensuring that flood control operations are implemented at each reservoir in the Columbia Basin without regard to agency or ownership. The strategy for controlling floods is to reserve enough storage space in the system's storage reservoirs to contain potential damaging runoff. Flood control operations require a draft of water from each storage facility to create the space needed prior to and during the high runoff periods (east of the Cascades, flood control drawdowns occur in the fall and winter; west of the Cascades, flood control drawdowns occur in the fall). The flood control curve helps the Corps determine the level that a given reservoir must be to reserve space to control flood waters.

In the 1960s, the ratification of the Columbia River Treaty, the signing of the 30-year Pacific Northwest Coordination Agreement, and the completion of the Northwest-Southwest Electric High Voltage Intertie System (a power grid which allows the Northwest and Southwest to exchange surplus power and take advantage of the diversity in seasonal demands, streamflows, and peak loads), significantly expanded the scope of power operations and flood control (PNRBC 1970). The culmination of these three events mandated coordination among the many public and private utilities operating hydroelectric dams in the basin. These events further caused dam operators to favor power production and flood control over other uses of the river.

REGIONAL PLANNING INSTITUTIONS IN THE PACIFIC NORTHWEST

Although a decentralized and fragmented management system has dominated operations in the basin, several attempts have been made to create regional institutions for planning and management. Concern over the sustainability of all uses of the river has led some over the past century to call for regional integrated planning and management efforts. An assessment of past regional planning organizations indicates they have not significantly influenced water resource development and management activities in the Columbia Basin. Policy-makers, when establishing regional organizations, have been reluctant to give them sufficient legal authority and administrative resources needed to ensure that plans created will be implemented. To do so would have required reducing the authority of existing agencies. As a result, political support for regional entities has been sporadic, and existing federal, state,

and local agencies operating in the region have generally not cooperated with regional entities. This has severely limited the ability of regional organizations to constrain and influence the activities of water resource actors.

Various organizations have been established since the 1930s to institute regional planning schemes for water resources in the Pacific Northwest. A brief chronology of the more prominent Pacific Northwest planning organizations is provided to outline these past organizations' regional roles, organizational structures, and successes and failures.

The Pacific Northwest Regional Planning Commission

One of the first planning associations concerned with the Columbia was the Pacific Northwest Regional Planning Commission (PNRPC). The Commission was established in 1934 by the Natural Resources Planning Board, a national organization formed by President Roosevelt the previous year. The Natural Resources Planning Board divided the United States into 10 regions. The Pacific Northwest Regional Planning Commission was created for the states of Oregon, Washington, Idaho, and Western Montana. The PNRPC acted as a fact-finding, advisory, and counseling organization. The organization was without legislative statute and therefore had limited authority. Membership on the commission included a representative from each of the four state's planning boards and a representative from the National Resources Planning Board. Federal agencies were not formally represented though some did join PNRPC's two technical committees. The lack of a formal mechanism for federal representation was an important factor which limited the commission's

influence over federal natural resources agencies operating in the region (McKinley 1952).

In late 1935, PNRPC presented a report which offered two major recommendations for the region: establish a statutory regional planning commission including federal and state representation and create a federal power marketing agency (Marple 1965). Congress failed to create the recommended statutory regional commission but in 1937 did create the federal power marketing agency, the Bonneville Power Administration (BPA). The Bonneville Power Act authorized the formation of the BPA to market federally produced power and construct and operate a regional electric grid. In its enabling legislation, the BPA was not given the authority to acquire resources nor was it to produce regional resource plans.

The Pacific Northwest Regional Planning Commission was also instrumental in launching and directing major public works projects in the Columbia (Norwood 1981). However, this regional organization, along with the Natural Resources Planning Board, failed to secure and maintain vital political support. As a result, Congress refused to appropriate funds for the Board and commissions in 1943, and they were dismantled as national attention and resources focused on the war effort. During its 9 year existence, the Northwest Regional Planning Commission furthered the concept of regional planning and comprehensive basin management among some professional planners and policy-makers working the Columbia Basin (Wengert 1980). McKinley (1956) noted that its greatest success was in initiating state and local planning. Unfortunately, when the PNRPC was terminated, so were most of the planning efforts the organization had initiated (ibid., 466).

The Columbia Basin Inter-Agency Committee

On the national level, the successor to the Natural Resource Planning Broad was the Federal Inter-Agency River Basin Committee (FIARBC), established by a departmental agreement between the Secretaries of Agriculture, War, Interior and the Chair of the Federal Power Commission. The four departments formed FIARBC partially as a defense against the threat posed by the proposals to create valley authorities in major river basins across the country. Agencies under these four departments feared that they would lose much of their authority if other comprehensive valley entities like the Tennessee Valley Authority were established. Though numerous attempts were made to establish a valley authority in the Columbia, none were successful.

In response to this threat, FIARBC passed a resolution in 1946 which led to the formation of a new regional organization in the Pacific Northwest, the Columbia Basin Inter-Agency Committee (CBIAC). The CBIAC was to implement FIARBC's policies by facilitating coordination and information exchange among federal agencies and between federal and state agencies. The organization's membership was made up of a representative from each federal agency but no state representative. The CBIAC was severely limited in that it was purely a voluntary association without a statutory basis, legal authority, budget, staff, or means for making definitive decisions (Mckinley 1952). Scheufele (1970) observed that the creators of FIARBC and the Regional Inter-Agency Committees sought innovation without change.

The CBIAC's did not produce plans for coordinated resource development, and those activities which it did pursue were dependent on the will of participating

members. The Interagency Committee's major accomplishment was in providing a forum for compiling general and technical information and for exchanging ideas and discussing common problems. Although CBIAC failed to resolve major resource problems and conflicts in the basin, it did on occasion produce an environment for conflict negotiation. After operating for 14 years in the Columbia Basin, CBIAC was replaced in 1967 by a newly created regional organization, the Pacific Northwest River Basins Commission.

The Pacific Northwest River Basins Commission

In 1965, the Water Resources Planning Act (P.L. 89-80) formally allowed establishment of basin planning activities. The Act provided an institutional infrastructure designed to assess water resource needs, produce unified river basin plans, and establish guidance for selecting federal water projects. To develop basin plans, Title II of the Act allowed for the creation of new state-federal cooperative river basin commissions. The Title II River Basin Commissions were to prepare comprehensive, coordinated, joint plans for water and related land resources. Unlike the inter-agency commissions, the river basin commissions had a legal mandate, statutory authority, budget, permanent office, staff and established operating procedures. Another characteristic distinguishing the river basin commissions from earlier organizations such as CBIAC was its inclusion of the states as participatory members.

In the Northwest, the Pacific Northwest River Basins Commission (PNRBC) was created. Its membership included a chairperson appointed by the President, one

member from each of the states of Oregon, Washington, Idaho, Montana, Wyoming (one of the state representatives was a vice-chairperson for the Commission, a position which rotated among the participating states), one member from each of the 10 federal departments with water interests, and the chairman of the U.S. entity for the Columbia River Treaty. An important cohesive force for the PNRBC was the threat posed by water-seeking interests in the southwest. There were those in the southwest who aspired to tap the seemingly abundant water supply to the north by means of a large Columbia River diversion project. Some interests who opposed the diversion plans envisioned the PNRBC as a vehicle for an opposition coalition.

The PNRBC approached regional planning with the premise that state planning capabilities should be used to identify needs and goals, and federal resources should be used for implementing the planning goals and priorities (Hart 1971). The commission was meant to supplement, not supersede planning efforts of the state and federal agencies operating in the basin. The PNRBC also had to act from consensus of its members. Given the diverse and conflicting interest of its membership, this greatly limited the organization's actions.

A major weakness of the PNRBC and the other Title II River Basin Commissions was the gap that existed between planning and execution (Hart 1971; Gregg 1989). Since none had implementation authority, a recommendation was made that they be given some degree of budgetary control over water resource project funding in order to better link the conceptualized plan with the project activities carried out. This did not happen and as a result, the PNRBC did not have a significant influence over project selection.

From their inception, significant problems impeded the success of the river basin commissions. Some of these problems included: the comprehensive nature of the planning approach was a liability; the commissions could not really influence project funding or selection; and the nation's attention had shifted to water quality concerns, which the commissions were not fully authorized to address (Gregg 1989). Wengert (1980) asserts that these organizations' efforts failed to produce measurable improvements in river basin integration and coordination. Gregg (1989, 16) contends that the river basin commissions "died of institutional limitations and historical obsolescence." The Pacific Northwest River Basins Commission along with the other commissions and the National Water Resources Council were terminated with little political dissent as a result of a 1981 Presidential Executive Order.

Interstate Compacts

In addition to the regional institutions created in the basin, there have been varying levels of interest since the 1930s in establishing a Columbia River Interstate Compact (Doerksen 1972). Interstate compacts are agreements which have the force of law over participating parties and must be defined and ratified by both the compact states and the U.S. Congress. In 1952 Congress passed legislation enabling seven Pacific Northwest states to enter into a Columbia River compact. The purpose of the compact was to apportion water between the states. In an effort to ratify an acceptable compact, the Northwest states formed the Columbia Interstate Compact Commission. Though numerous compact bills were submitted, each failed to pass all participating states' legislative bodies.

Most efforts to establish interstate compact regional committees or river basin organizations which have significant authority have been strongly opposed by existing agencies operating within the Columbia Basin. Fearing the shift of authority, federal agencies have been particularly resistant to the creation of regional entities. The lack of cooperation and even hostile resistance from federal agencies has greatly impaired past regional organizations' activities. As a result, regional planning efforts had limited influence on water resources development and daily operational activities in the Pacific Northwest and the Columbia River. Despite brief periods of political support, these organizations were unable to secure lasting cooperation of established federal and state actors to ensure that their recommendations and plans were carried out. Past regional institutions' greatest contributions have been in compiling resource information and providing a regional forum where conflicts were discussed and occasionally resolved.

CHAPTER 3

THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

EVENTS LEADING TO THE PASSAGE OF THE REGIONAL ACT

From 1967 to 1979, a succession of events in the Pacific Northwest provided impetus for promotion and passage of a regional energy act. These events were also significant enough to lead the four Northwest governors and the United States Congress to favor the creation of an institution with legal authority to constrain federal agencies' activities, create a region-wide, comprehensive energy planning process, and undertake a process to address fish and wildlife needs in the Columbia River Basin.

The first issue of significance surfaced in the early seventies when the Bonneville Power Administration (BPA), in conjunction with public and private electrical utilities, attempted to expand the region's generating capacity. During the sixties the region's hydroelectric generating capacity was greatly expanded (see the Columbia River Treaty on page 32), creating a surplus of power. However, by the end of that decade, some energy analysts were forecasting that regional power demands were going to rapidly overtake the surplus. With the best hydroelectric sites already developed and an increase in public opposition to building new dams, it appeared to power suppliers that more costly coal and nuclear generated thermal power would be needed to meet future demands. Realizing the long lead time

required to site thermal plants, BPA doubled its planning horizon from 10 to 20 years in 1967, and in 1968 initiated the Hydro-Thermal Power Program (Norwood 1981).

The goal of the Hydro-Thermal Power Program was to expand the region's electrical generating capacity through the construction of thermal plants, additional hydroelectric generators for peaking power and additional transmission facilities (Norwood 1981). Of critical importance to this program was a financing arrangement known as net billing. Net billing allowed utilities with little equity to be able to invest in thermal plant construction while BPA underwrote the costs. Bonneville did this by spreading the cost and risk of investment among all BPA customers (Blumm 1983a).

The Hydro-Thermal Program appeared to provide a promising approach to regional acquisition of new resources until two problems arose. First, construction costs rose beyond what BPA could support through net billing. Second, the U.S. Internal Revenue Service denied tax exemption status to bonds sold by the utilities to finance plant construction when BPA planned to purchase over 25 percent of the generated power (Lee, Klemka and Marts 1980, 85). Bonneville was forced to terminate its net billing program late in 1973 but not before construction on seven thermal plants had begun.

Two important outcomes resulted from what came to be known as Phase I of the Hydro-Thermal Power Program. The first was the use of net billing to finance power system expansion and the second was the program began to shift hydroelectric power from a base to a peaking power resource (Blumm 1983a). A resource used to provide the base load operates at a fairly constant level and varies in output only

slightly over a specific time period. A resource used for peaking power is variable in its output and is used to meet peaks in electric demand. Through a complex set of agreements between BPA and dam operators, the hydroelectric facilities in the Columbia were scheduled to increasingly meet peak loads while thermal power would be used as a base load resource (Lee, Klemka and Mart 1980).

With Phase I of the Hydro-Thermal Program in trouble, demands were once again projected to outstrip supply. The first shortage arose as early as 1973. The shortage forced BPA to terminate sales of firm power (guaranteed power) to private utilities and notify Direct Service Industries (DSI) (industrial customers, almost exclusively aluminum smelters, that buy electricity directly from BPA) of termination of supply as contracts expired. The inability of BPA to guarantee private utilities future firm federal power was of particular concern to the majority (60 percent) of the region's residences. Without guaranteed power, private utilities had to depend upon more costly sources of electricity to meet demands. This forced them to pass these costs along to their customers. What resulted were significant regional disparities between rates charged by public utilities districts (PUDs), defined by the 1937 Bonneville Project Act as "preference customers," and private utility rates. (The Preference Clause requires that "the administrator at all times, in disposing of electric energy..., give preference and priority to public bodies and cooperatives." [16 U.S.C. §832 c(a) (1976)].)

Rates increased in such an unequal fashion between public and private utilities in the seventies, that many residences served by private utilities were paying twice as much for power as those served by public utilities. As rate disparities between

private and public utilities grew, lawsuits were filed and state legislation was initiated. The City of Portland, Oregon filed in a lawsuit against the BPA, claiming the city had a right to federal hydropower. In 1977 the State of Oregon initiated legislation to create a state-wide public utilities district, "The Domestic and Rural Power Authority," in hopes of qualifying as a BPA preference customer (Goble 1986). These actions and a number of other proposed actions would have greatly increased the number of BPA preference users, thus reducing available preference supplies.

Faced with increasing regional criticism and court challenges, BPA initiated Phase II of the Hydro-Thermal Power Project (Lee, Klemka and Marts 1980). Phase II was to pick up where Phase I left off and it was designed to produce at least seven additional thermal plants (Blumm 1983a). Problems arose in 1975 when BPA failed to provide a formal public review and an environmental impact statement for the construction of proposed facilities. Phase II was enjoined by the courts for violating the National Environmental Policy Act of 1969 and BPA's involvement was terminated (ibid., 227).

Projected shortfalls of over 3,000 average megawatts of power by the mid-1980s threatened to plunge the region into an energy crisis (Evans and Hemmingway 1984). With rate disparities growing and utilities facing difficulties securing additional resources, policy-makers and power managers feared that without some sort of regional initiative lengthy court battles over the limited low-cost federal hydropower resources would continue to create regional strife (Blakley 1989).

In the midst of these problems, two climatic events highlighted the vulnerability of the Northwest's energy portfolio. In 1973 the Pacific Northwest

experienced lower than critical water year streamflows (Columbia River Water Management Group 1978). These low stream flows threatened to greatly curtail the hydropower surplus. Luckily, rains received in December eased the hydro-crisis but during the 1976 through 1977 water year the Pacific Northwest was not as fortunate and experienced its worst drought in over 100 years. Runoff as low as 54 Maf, which is 49 percent of normal, was recorded at the Dalles Dam and flows were at or below the minimum record at many locations in the Columbia Basin (Lawrence, Lee and Palmer 1983).

The various users in the Columbia were thrown into competition over the scarce supply. Fishery agencies estimated that several stocks of salmon would near extinction unless special measures were taken to increase river flows (ibid., 32). Scarcity of fishery resources led to a greater number of legal battles between Native American tribes and state fish and wildlife agencies. There were also petition initiated under the Endangered Species Act in the late 1970s for a few Snake River salmon stocks.

To mitigate conflicts over future allocation of the Columbia's waters, a regional process was needed to develop a plan and planning process which would be capable of ensuring a reliable energy supply while also accommodating other uses during times of scarcity. It was also apparent that to be politically and socially feasible the planning process needed to be open to a broader range of interests. State policy-makers and special interest groups were no longer willing to allow BPA and the utilities to solely determine the region's energy policy. Environmentalists, fishery interests and Native Americans were among the vocal groups demanding that their

voices be heard in the decision-making processes shaping the region's power supply and the flows of the Columbia River. After decades of closed door decision-making between BPA and the utilities, the states, fishery interests and environmentalists were doubtful that their voices would be heard without a congressional mandate.

The succession of events between 1967 and 1979 left the region in a stalemate over viable solutions for the forecast energy shortage. Without cooperation among the various interests affecting decisions on the Columbia, the fragmented decision-making process would continue to produce less than desirable solutions to meet the region's demands for energy while also giving due consideration to other users of the river. Realizing the implications of inefficiency in securing a reliable supply, many power interests and state policy-makers began to look to Congress to piece together a regional solution.

THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

The regional solution developed by Congress to address these events is known as the Pacific Northwest Electric Power Planning and Conservation Act (the Act). The legislative history of the Act is marked by over three years of congressional debate, intense lobbying efforts, and numerous regional hearings. The first comprehensive power bill drafted was introduced in Congress in 1977. However, it took the introduction of a restructured bill and several amended versions before congressional approval was granted. The final version was signed into law by President Carter on December 5, 1980.

Like the majority of legislation which makes it successfully through the congressional maze, the Northwest Power Planning Act represents a compromise between many interests. Public and private utilities, the four northwest state administrations, direct service industries, fish and wildlife interests and several environmental groups all converged on Capitol Hill to demand a voice in shaping the regional legislation. When the Act passed through Congress, it received praise from many including Senator Mark Hatfield of Oregon who called it "...the most important piece of legislation to affect the Pacific Northwest since the 1937 Bonneville Project Act" (Congressional Record - Senate, November 19, 1980, Proceedings and Debates of the 96th U.S. Congress, Vol. 126, Part 23, p. 30181).

The Act was created out of the expressed need to solve the energy problems that had emerged in the 1970s as well as those problems that were predicted for the 1980s. Primarily, the Act was created to provide a means in which the Northwest could secure a reliable, adequate and cost-effective supply of electricity to meet regional demands while also addressing environmental concerns.

To help the Northwest achieve this goal, the drafters of the Act wrote in several unique and untested approaches. Among the unique approaches was one which promoted and encouraged the region-wide adoption of conservation. The Act broadly defined conservation to be any reduction in electric power consumption resulting from increases in the efficiency of energy use, production or distribution. The Act also placed the highest priority on the acquisition of conservation resources. Specifically, it required that conservation be treated as a resource to be acquired just as any other conventional resource. In addition, the Act gave conservation a 10

percent price advantage over other resources under consideration. With the historically ample supply of cheap hydroelectricity, there had been little economic incentive to undertake conservation efforts in the Northwest. When the Act passed, conservation was largely an untapped resource.

Another key provision of the Act designed to help the region secure an adequate supply of electricity was one which granted BPA the authority to acquire new resources from non-federal entities. While BPA still may not own generating resources, the Act gave the organization the authority to buy power from nonfederal plants on a long-term contract basis. The Act upheld BPA's responsibility to give preference to public utilities when allocating power, but added a section giving private utilities the ability to procure BPA power for their residential customers at preferential rates (Wandschneider 1984b). While acquiring adequate resources to meet the electrical demands of the region, BPA must also consider any new resource's cost-effectiveness, including the environmental costs.

An unexpected section added to the Northwest Power Planning Bill occurred late in the congressional review process. This section was devoted to the protection, mitigation, and enhancement of fish and wildlife of the Columbia River and its tributaries. The Bill was delayed in the House Energy and Commerce Committee when John Dingell, a Michigan Congressman, made a decision to draft in a strong fish and wildlife provision. This provision was fashioned to address the losses to fish and wildlife, particularly anadromous salmonids, resulting from the development and operation of hydroelectric facilities on the Columbia River.

The Columbia and its tributaries provide habitat for one of the United State's

most abundant and valuable anadromous salmonid fisheries. With returning adults once numbering around 10 to 16 million yearly in pre-white settlement days, salmon runs today have declined to around 2.5 million (NPPC 1994a). While a number of anthropogenic activities have contributed to the decline, the construction and operation of hydroelectric facilities have been the greatest contributors, accounting for roughly 75 percent of the total estimated losses (NPPC 1987a, 38). Fishery interests in the region expressed concern that without a major restoration effort, runs of anadromous salmonids would continue to diminish towards unrecoverable levels. As a result of this campaign, these interests were successful in securing an extensive fish and wildlife provision into the Northwest Power Planning Act. The Act, which was originally to address the region's energy crisis, ended up containing a provision which extended the legal obligation of hydropower operators to the protection of fish and wildlife throughout the Columbia Basin. The language enacted was strong in its requirement that "equitable treatment" be given to fish and wildlife.

Neither Congress nor the policy-makers in the Northwest were willing to give the Bonneville Power Administration an expanded authority to acquire new resources without a guarantee that states would be included in the decision-making process. State policy-makers were concerned that they would not have an effective way to constrain BPA's acquisition of expensive resources and that those acquisitions would result in higher electric rates and higher environmental damages. State policy-makers were particularly concerned about their access to the energy decision-making arena. In previous decades state administrations and agencies, as well as public interest groups, were denied meaningful involvement in the federal energy planning process.

Dams and power plants were constructed and regional energy policies formulated without full consultation with state governments.

To address this concern, Congress and the four northwest governors sought a means to ensure that BPA would acquire only those resources needed, and only those in the best interest of the regional ratepayers. In response, the governors introduced a proposal to check BPA's new authority. State policy-makers impressed upon Congress that the states were entitled to a primary role in the formation of a regional energy policy and not just a role of monitoring of policy development (Hemmingway 1983).

The solution proposed by the four state governors was an interstate regional planning body. The governors proposed that this body be a energy demand forecasting and planning institution for BPA and the region. What resulted from this proposal was a unique regional institution which shifted some of the policy-making authority away from four federal agencies. These agencies had largely dictated the flow of water in the Columbia River and the flow of electrical power throughout the Northwest.

THE NORTHWEST POWER PLANNING COUNCIL

The Northwest Power Planning Council (Council), was officially created on April 28, 1981 after the legislative bodies of the four northwest states passed legislation allowing their governors to appoint the members. Approval of the four states was required because Congress declared the Council to be an interstate compact entity (The compact clause of the United States Constitution allows states, with the

approval of Congress, to enter into agreements to solve issues that cross state boundaries). The Northwest Power Planning Council did not resemble a typical compact agency in that the organization did not evolve from long negotiations between the participating states and did not have a federal representative. When Congress passed legislation allowing for the Council's formation, it called for the sharing of authority between the federal government and the northwest states. The states were thereby given an unusual power through the Council, to guide and constrain activities of four federal agencies in the region.

The Council was composed of an appointed eight member voting body and a technical and administrative staff. The governors of Idaho, Oregon, Washington and Montana each appointed two members to the Council. The members functioned as representatives of their respective states and typically were appointed for a three-year term. This made the Council an organization which often underwent changes in personalities, philosophies and approaches to problem solving as the membership changed.

Most decisions and actions of the Council required the approval of the majority of members present and voting. An exception occurred during the adoption of the regional Energy Plan and Fish and Wildlife Program. These major decisions required the approval of the majority of all Council members including at least one vote from each state (or approval by six members of the Council). This meant that major decisions required a degree of consensus from the representatives of the four northwest states. All decisions regarding the Energy Plan and Fish and Wildlife Program were made in public meetings held in various locations within the four

states. These meetings were directed by the Council's Chairperson, a position selected by the members themselves (the Council attempted to rotate the position among the four states).

Over the ten-year study period, professional backgrounds of the appointed Council members varied significantly. The diversity of membership included a former governor, university professors and business people. Like many appointed bodies, the common unifier between members was their direct connection to regional or state politics.

While members tended to be politically astute, few had a background in the two areas which they were called to provide plans for: energy, and fish and wildlife. For expertise the members looked to the Council staff as well as professionals outside the organization. The staff provided continuity and the technical expertise for the Council. Although the Council members ultimately decided the direction of the organization, the staff provided the analysis and recommendations on which most of those decisions were based. The Council contracted much of its technical support and analysis, especially in the early years.

The number of staff was small compared to many public natural resource agencies. In 1983, the Council staff was composed of 35 individuals but increased to around 70 in 1993 (NPPC 1994d). The staff was an interdisciplinary group composed of energy analysts, fish and wildlife biologists, public planners, public relations specialists and administrative support. To carry out the Council's mission, staff members were divided into the power division and the fish and wildlife division. It was common for most staff members to have some involvement with both divisions.

The Northwest Power Planning Council's central office and staff were located in Portland, Oregon. In addition, the members had an office located in their home state.

Funding for the Council's operations came from the regional electric power consumers. The BPA, who marketed and transmitted most of this electricity, was charged with financing implementation of the Council's planning programs using revenue from power sales. Thus, the costs for implementing the Act were primarily distributed among users of electricity in the northwest and in other locations where BPA transmitted electricity generated in the region. The Council's operating budget grew from $5.9 million in 1984 to $6.6 million in 1988 to $8.6 million in 1993 (NPPC 1994d).

Regional Responsibility

In the enabling legislation, Congress gave the Council three primary charges (NPPC 1983c, 4):

- Develop a power plan for the four-state Pacific Northwest which will enable the region to secure an adequate, reliable and cost-effective supply of electricity to meet present and forecasted demands;
- Develop a Columbia River Basin Fish and Wildlife Program which shall consist of measures to protect, mitigate and enhance fish and wildlife affected by the region's hydroelectric facilities;
- Use broad public involvement in developing the power plan and the fish and wildlife program.

The Council's first charge was to produce a plan to meet the region's electric energy needs for a 20-year period. This plan served as a blueprint for guiding BPA's resource acquisitions as well as for implementing prescribed conservation measures.

The Act set a priority scheme for resource acquisitions which gave the first priority to conservation; the second to renewable resources like hydropower; the third to generating resources using waste heat or high fuel conversion efficient techniques; and the fourth to conventional resources such thermal or nuclear plants. The Council was also required to select those resources which were most "cost-effective." Cost-effective measures or resources were those that were reliable and available within the time needed at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative (NPPC 1991, 12). In addition, the Act explicitly required the Council to develop model conservation standards for the Northwest. Model conservation standards were cost-effective building codes for residential and commercial structures.

To develop a reliable 20-year energy plan for the region, the Council undertook a planning strategy which emphasized flexibility and risk management as the two underlying principles. To produce the Power Plan, advisory committees were formed to review different energy demand forecasts for the region and assess alternative resources. Hundreds of possible future demand scenarios were examined. Instead of producing a single 20-year forecast, the Council concluded that it was more useful to create an energy portfolio for four different energy demand scenarios (NPPC 1983a). Once the scenarios were established, the Council determined the resources and actions needed to supply a range of forecast demands. Because the energy profile of the Northwest was so heavily dependent on hydroelectricity, much of the Council's power division work was devoted to determining how to use the river system to better accommodate both the energy demands in the region and the fish and wildlife needs.

In satisfying its second charge, formulating the Columbia Basin Fish and Wildlife Program, the Council was mandated to solicit and evaluate recommendations from federal and state fish and wildlife agencies, 13 Indian tribes, and other interested parties. The Council compiled all submitted recommendations into a draft document and initiated a public comment period. During the comment phase, individuals and groups were given the opportunity to provide public testimony or written comments. The Council staff then revised and modified the draft and Council members voted whether to adopt the program. Recommendations submitted from the agencies and tribes which the Council did not adopt had to be justified by the Council, in a public "Response to Comments", as being either inconsistent with the standards of the 1980 Act, or less effective than the measure(s) adopted.

The program was authorized to address the needs of fish and wildlife affected only by hydroelectric developments and operations in the Columbia Basin. Declining anadromous salmonids received the greatest attention because of the strong correlation between their decline and dam construction and operation. Included in the program were measures to improve both upstream and downstream passage conditions for these migratory fish as well as propagation measures, habitat improvement measures and measures which addressed the protection and enhancement of resident fish (species which don't migrate to the ocean) and wildlife. The Council established a quantitative goal for salmon recovery in its 1987 program. At that time, the Council stated that the overall goal was to double the salmon runs from 2.5 million to 5 million returning adults (NPPC 1987a, 35). In the 1991 amendments, the Council adopted a new goal of doubling the runs without losing further biological diversity.

The Council's program was the only effort to treat the entire Columbia River Basin as a single system for fish and wildlife purposes during the study period. This program did not come cheaply. In 1993, Lee estimated that Fish and Wildlife Program funding from BPA revenues averaged around $130 million per year (1993, 41). By 1994, the Council had spent more than $1.7 billion since 1981 on efforts to rebuild salmon stocks (Frederick 1994, 22). Costs incurred by the Columbia Basin Fish and Wildlife Program made it one of the world's largest ecosystem restoration efforts.

The third mandate for the Council required the organization to incorporate public participation into each planning process. Through the public participation process, any individual or group was given the opportunity to present information and views to the Council before any major decisions regarding either the Power Plan or Fish and Wildlife Program were made. In the first year of its existence, Council members and staff realized that given the organization's limited authority over actors in the basin, the Power Plan and Fish and Wildlife Program would be doomed to failure without the inclusion and support of various interests in the planning process (Evans and Hemmingway 1984). As a result, the Council encouraged individuals and organizations to participate in the process. The public affairs division of the Council kept interested parties informed of activities by distributing free of charge a monthly newsletter, a bi-monthly news publication, and staff issue papers. The public planning process allowed the Council to consider the views and needs of all interested groups and individuals, not just those with an interest in power and fish.

Authority

The Council was an unusual institution of American government. It was a regional body appointed by four states, but its plans were created to guide specific activities of four federal agencies: the BPA, Corps, Bureau, and FERC. When Congress authorized the Council, it did not clearly define the Council's authority over these federal agencies. The authority which the Council had came mostly from Section 839b(h)(11)(A)(ii) of the Act which stated that the BPA, the Corps, the Bureau, and FERC were mandated to take the Council's plans into account "at each relevant stage of decision-making processes to the fullest extent practicable." In addition, the Act required BPA to use its funds and authority in a manner "consistent" with the Council's adopted program (16 U.S.C. §839b(h)(10)(A)) and plan (16 U.S.C. §839b(d)(2)). The Act also required BPA to obtain the Council's approval for all major resource acquisitions (16 U.S.C. §839d(a)). If BPA proposed a resource acquisition which was found by the Council to be inconsistent with the Power Plan or Fish and Wildlife Program, BPA was required to look directly to Congress for approval. This enabled the Council to function as a regional check on BPA's resource acquisition authority.

The words which gave the Council power over federal entities did not carry much direct authority. The Council was also reluctant to press the four federal agencies on conflicting issues and instead opted to put effort into developing a working relationship with them. Despite these efforts, the Council's unclear authority at times resulted in conflict with the implementors. The Council's authority was interpreted by its legal counselor to be limited to guiding federal agencies but not

commanding them (Volkman 1993).

As discussed, the Council, which was a state level entity developing policy for federal entities, was legally a new type of organization. The constitutionality of the Council to direct the four federal agencies was challenged in the Seattle Master Builders *v.* Northwest Power Planning Council case (Seattle Master Builders Association *v.* Pacific Northwest Electric Power, 786 F.2d 1359 (9th Cir.) cert denied, U.S., 107 S Ct. 939 (1987)). Filed in July 1983 only months after the Council released the first power plan, a coalition of home builders and building associations challenged the newly adopted model conservation standards and alleged that the Council was unconstitutional. The plaintiffs contended that the Council was actually a federal agency and not an interstate compact. The plaintiff's argument was based on the fact that the Council was given authority under a federal statute and its role was to set policy for federal agencies. The appointment clause of the U.S. Constitution stipulated that appointments to a federal entity had to be made by the President of the United States and not state governors. When the case was brought before the Federal Ninth Circuit Court of Appeals, the Council was upheld as an interstate compact agency making the organization exempt from the appointment clause requirements. The Council's constitutionality was upheld.

CHAPTER 4

RESEARCH METHODS AND ANALYSIS CRITERIA

The principal objectives of this research are to identify the degree to which two prominent measures developed and adopted by the Northwest Power Planning Council were implemented from 1984 through 1993, to analyze the factors affecting implementation, and to recommend strategies to facilitate better linkage between planning and implementation. To achieve the objectives, an implementation analysis was carried out on two measures from the Council's plans. Implementation is defined for the proposes of this research to mean the undertaking and carrying out of recommended activities by designated institutions or groups, to the extent to which they were specified in the adopted Northwest Conservation and Electric Power Plan and the Columbia Basin Fish and Wildlife Program.

The idea for this research grew out of my studies of regional planning for water resources and integrated water resource management. My understanding of the complexity of large ecosystems and the problems arising when fragmented management exists led me to consider advocating a planning scheme based on a regional scale for some resources such as river systems. However, the lack of implementation success achieved by many regional planning institutions persuaded me to address the "implementation gap" problem.

MEASURES TO BE ANALYZED

For this study, I have taken two specific activities in the Council's regional plans, identified the degree to which implementation took place from 1984 through 1993, and analyzed the conditions affecting their implementation success based upon a set of eight criteria. The first measure assessed is the "water budget", selected from the Columbia Basin Fish and Wildlife Program. Adopted in late 1982 as part of the Council's first Fish and Wildlife Program, the water budget is a block of water set aside in the Columbia System to facilitate downstream migration of juvenile salmonids. The second measure, "residential model conservation standards," was selected from the Council's Northwest Conservation and Electric Power Plan. Residential model conservation standards (MCS), adopted by the Council in 1983, are cost-effective building codes for single and multifamily homes which the Council recommended to local governments, state legislatures, electrical utilities, and individual homebuilders (NPPC 1991).

The water budget and the model conservation standards were selected because they reflect the diversity and complexity of issues involved in the Council's regional planning efforts, they continued to be prominent features of the two regional plans and they were both in place for over ten years. In addition, the measures involved a variety of regional implementors, thus providing a challenge to the Council's ability to secure successful implementation.

IDENTIFICATION OF THE IMPLEMENTATION ANALYSIS CRITERIA

As discussed in the literature review in Chapter 1, examination of policy implementation evolved from identifying the elements of the implementation process, to examining conditions affecting implementation and finally predicting problems and recommending strategies which will limit implementation barriers. For this research eight criteria were used as a framework for analyzing conditions affecting implementation of the water budget and the residential model conservation standards in the Council's two regional plans.

Five of the eight criteria adopted for this research were based on the work of Sabatier and Mazmanian (1983). In their examination of the implementation of California's Coastal Initiative, the researchers developed six conditions which they argued overwhelmingly influence whether or not implementation was achieved. Five of the original six criteria for effective implementation were adopted but slightly modified to meet the conditions surrounding this study. A sixth criterion (Criterion #5 in this study) was adopted from a conceptual implementation model established in an earlier work by Sabatier and Mazmanian (1981). The six criteria from Sabatier and Mazmanian's works, used in this research, focus on how the policy or measure was designed to facilitate implementation, how well the issue addressed by the measure can be tracked, and the effect of nonstatutory variables on the implementation process.

Where this research significantly departs from the Sabatier and Mazmanian framework is in the development of two additional criteria (Criteria #3 and #7). In my research, I assumed that there are components of the institution's organizational

structure that can have a profound impact on whether a measure or policy is implemented. Criterion seven evolved out of my consideration of institutional analysis discussions by Clarke and McCool (1985), Gormley (1987), Ingram, Mann, Weatherford, and Cortner (1984), and Mitchell (1989 and 1990). These researchers pointed out that the institution itself plays a critical role in the establishment and implementation of a policy. I contend that it is particularly important to examine the Council's organizational structure since it is a unique institution and has been considered as a prototype for replication in areas such as New England, British Columbia and the Missouri River Basin.

Criterion three was adopted to incorporate consideration of the planning process in the analysis. I argue this is an important consideration in this implementation analysis since the Council has planning authority but does not have implementation authority. The planning process is the time when the Council can have the greatest influence over implementors. Specifically, I wanted to consider the degree to which implementors were involved in the planning process and how this affected implementation. The eight criteria for the analysis are listed in Table 1. To facilitate the analysis, the criteria are listed as a question.

Discussion of Analysis Criteria

The first criterion is whether the objectives of a measure were clearly defined and consistent with the goals of the original statute, the 1980 Northwest Power Planning Act. Objectives are differentiated from goals in that the former are specific statements outlining a desired course of action and specific desired results whereas the

later is a broad statement of a desired result. Objectives which are unambiguous and are consistent with the original statutory mandate or goal will be more likely to be carried out than those that are vague and/or conflict with other directives. Clearly defined objectives which convey expectations about the outcome are not as likely to be misinterpreted by implementors.

Table 1. Criteria for Implementation Analysis

1. To what extent were the goals and objectives of an adopted measure clearly stated, defined and consistent with the goals outlined in the 1980 Pacific Northwest Conservation and Electric Power Act?

2. What was the level of scientific and technological uncertainty regarding the ability of the measure to achieve planning goals and objectives?

3. What was the level of involvement of the implementor during the planning process for each measure?

4. To what extent was the measure structured to maximize the probability that implementors would perform as desired?

5. To what degree does the recommended measure require broad institutional or behavioral modifications from implementors?

6. What was the level of political support for the measure among state policy-makers?

7. How well does the Council's organizational structure facilitate securing implementation of the adopted measures?

8. How high a priority are the original statutory goals of the Act for key actors in the region, how have priorities changed over time due to the emergence of conflicting public values, and how have changes in relevant circumstances and socioeconomic conditions affected political support for the statute and adopted measure?

Also considered under the first criterion is whether the measure conflicts with other statutes guiding implementors. If conflict is present, the implementing agency will be loyal to the directive with which it has a historical tie and/or is linked with its financial and political resources.

The second criterion is the degree to which there exists a sound causal relationship between the measure to be implemented and the desired effect. Uncertainty about the causal relationship can undermine support for a measure or policy. A weak causal relationship is a disadvantage for those groups attempting to build support for a given measure or policy.

Criterion three, developed to analyze how implementors' involvement in the planning process influences implementation, is based on the assumption that the greater the degree of involvement of implementors in the planning process, the more likely implementation will take place. At stake is the consideration of implementors' concerns and their ownership of the measure. Does the planning process provide a forum in which the implementors are involved to a meaningful degree? The greater the degree of implementor involvement, the greater the likelihood that they will feel ownership and a responsibility to implement.

Criterion four is a compilation of several issues which are meant to assess whether the measure is structured to assure, in so far as possible, that implementors will perform as desired (i.e. implement the measure). The first issue examined under criterion four is whether implementors have sufficient jurisdiction over the resources which impact implementation. Without sufficient jurisdiction over resources or target groups, implementation is more difficult to achieve. The second issue involves

whether implementing agencies are sympathetic toward the measure's objectives. Implementation success is much higher for measures which are supported by implementors than when they are reluctant players. Thirdly, is there an integration of groups involved with implementation in a way which minimizes the ability of one or more players from thwarting the process? The fourth and fifth issues in this criterion involve whether adequate financial and political resources are provided. Without adequate financial resources implementation cannot occur, and without ongoing support from constituency groups implementors' efforts are likely to erode over time.

The fifth criterion focuses on the changes required of key implementors who carry-out the measure or policy. The greater the amount of change required or the greater the number of individuals or groups involved, the more difficult to secure implementation. If change is required of a relatively small, well-defined subset of the population, compliance is more likely to occur.

The sixth criterion focuses on the level of political support for the measure coming from key state policy-makers and administrative units. The greater the degree of support generated by regional leaders, the more likely implementation will take place.

An important aspect of this study is an examination of the Council's organizational structure in achieving an effective link between the centralized regional planning process and the decentralized implementation efforts. Under criterion seven, the components of the Council's organizational structure are examined including the Council's jurisdictional authority, legal mandate, interagency relationship with implementors, and credibility. The more compatible the Council's jurisdictional

authority and mandated role are with the measure, the more likely implementation will be facilitated. The better the relationship between the policy-making body and the implementing bodies, the more likely conflict can be resolved and the measure implemented. Lastly, the greater the organization's credibility, the more legitimacy its plans will have.

The eighth and final criterion requires an examination of the changing conditions surrounding the original statutory goals of the Act as well as the measure being implemented. Have events (e.g. placement of a species on the Endangered Species List) or socioeconomic conditions affected political support for the statue or the measure in a negative, or positive way? If priorities have shifted away from the goals of the Act or the objectives of the measures, implementation is less likely to occur.

INFORMATION SOURCES AND COLLECTION TECHNIQUES

The implementation analysis begins with a description of two measures, whose implementation is analyzed, the water budget and the residential model conservation standards. Included in this section are the circumstances surrounding the measures' formulation and adoption. The changes made in subsequent amendment processes are also listed to describe how the measures have changed. After providing an explanation of the water budget and the residential model conservation standards, the degree to which implementation of each measure occurred between 1984 and 1993 is presented to serve as a starting point for the analysis. Quantitative information on the implementation of the water budget and the residential model conservation standards

was loosely documented by the Council, the Corps of Engineers, the Bonneville Power Administration, the Council-created Fish Passage Center, and the four state energy offices. This information was compiled and organized for the study.

After presenting a discussion of implementation, the analysis framework is applied. To answer the questions posed by the eight criteria, information was collected from the following three types of sources:

1. Documents including intra- and inter-agency letters and memorandums, minutes of the Northwest Power Planning Council's meetings, published journal articles, newsletters, regional newspapers, published reports, Congressional and administrative documents, and the Council's power plans and fish and wildlife programs;
2. Archival records from the Northwest Power Planning Council dating back to 1980;
3. Interviews with current Council staff, staff of implementing agencies, and various representatives of interest groups.

Multiple sources of evidence were relied upon to answer the questions outlined in the analysis framework. The Council maintains both a current library containing related documents and extensive archival materials. The Council has a policy of keeping and filing all communications related to its activities. These files are public records and were made available to the researcher. Other agencies such as the Bonneville Power Administration, the U.S. Corps of Engineers, and the Fish Passage

Center have also compiled reports and materials on the two measures selected for analysis in this research.

To augment collected written material, a number of personal interviews were conducted. Interviews were conducted with representatives from the Council's staff, the Corps of Engineers, Bonneville Power Administration, the Fish Passage Center, state energy offices, and Oregon's Natural Resource Defense Council. A free-form interview format was adopted. While a set of questions was developed and organized before the interview, discussions were not limited to those questions.

The two measures are discussed and analyzed separately. Chapter 5 contains the implementation analysis of the water budget and Chapter 6 presents the analysis of the residential model conservation standards. In Chapter 7, the results from these two analyses are compared and recommendations for improvements in the link between the Council's plans and implementors' actions are made.

CHAPTER 5

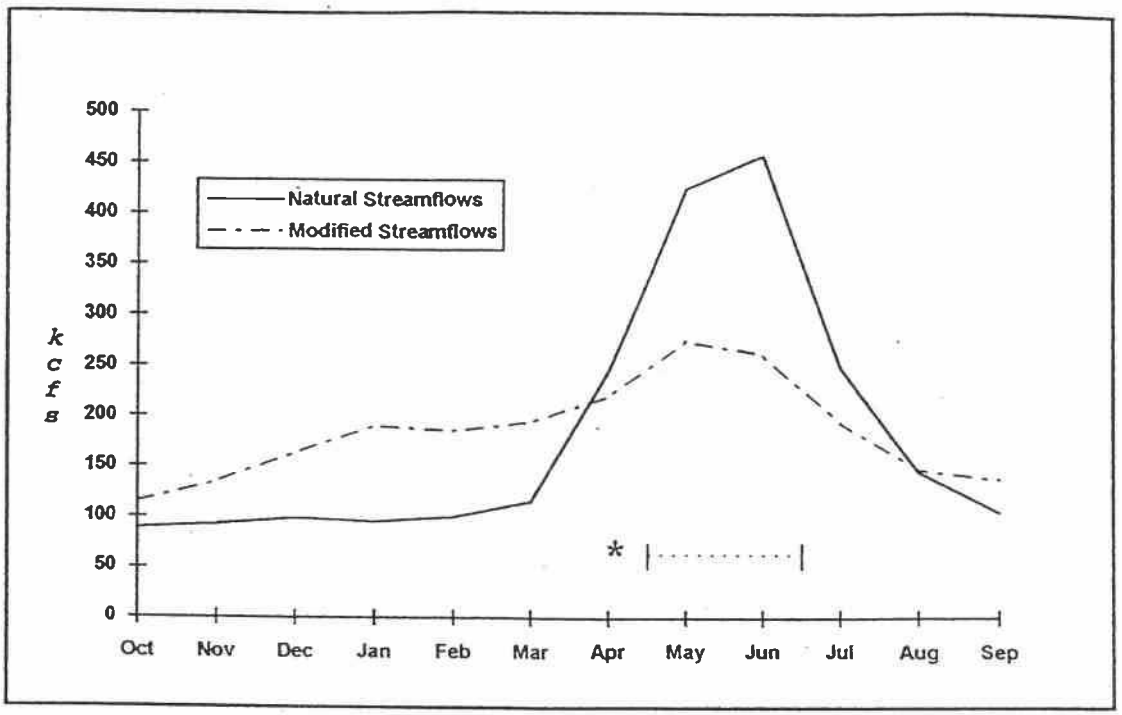
THE WATER BUDGET

RIVER MODIFICATIONS AND THE DECLINE OF ANADROMOUS SALMONIDS

The construction and operation of storage reservoirs on the Columbia River and its tributaries changed both the magnitude and timing of flow in the river system. Upper river storage reservoirs on the Columbia and the Snake have been operated to store the high runoff which occurs in the spring, for use during periods when runoff is lower, primarily in the fall and winter. Figure 4 compares the historic natural river flows on the lower Columbia with the modified flow regime resulting from operations of upper river storage reservoirs.

Although the modifications made to the basin's natural river regime are beneficial for power production and flood crest reduction, fishery experts contend that flow modifications impose high negative impacts on downstream-migrating anadromous salmonids. The life-cycle of the Pacific Northwest salmon generally requires them to travel from fresh-water hatching and rearing areas downstream to the Pacific Ocean (sometimes as far as 900 miles) where they spend 2 to 4 years growing to maturity, and then return to their freshwater natal areas where they spawn and die. The reduction in runoff volume and velocity during the spring months has resulted in dramatic increases in travel time for juvenile salmonids migrating from their natal areas to the ocean (CBFWA 1991). In addition, pondage behind run-of-river dams creates slack-water in the river channel. The slack-water behind dams slows

downstream travel for juvenile salmonids when they move through the greater cross-sectional areas. In addition, salmonids are lost to predators, such as "squaw fish" and "sea gulls", which congregate in and around these pools.



* Period Water Budget could be used.

Figure 4. Natural and Modified Stream Flows in the Lower Columbia
Source. Ruff, J.D. and J.F. Fazio. 1993. Hydropower Costs of Columbia River Salmon Recovery. Issue Paper. Northwest Power Planning Council.

Time is a critical factor when anadromous salmonids make the physiological transformation from a freshwater to a salt water species. Fish biologists have

recommended a time frame of no more than 30 days for a salmonid's movement between these two environments (CBFWA 1991). Beyond this time, experts maintain that both the salmonid's migratory drive and physiological ability to make the transition from freshwater to salt water significantly decreases. Other problems for smolts (a juvenile salmon or steelhead migrating to the ocean which is making a physiological adaption to a saltwater environment) related to delayed travel time include a higher susceptibility to disease, greater physiological stressors from higher water temperatures, and changes in water chemistry.

Before the dams were built, migrating smolts could travel about 15 miles a day (Kadera 1984). In the slack-water of reservoirs which now line the Columbia, travel time may be as slow as 5 miles a day (ibid., D9). The construction and operation of dams in the Columbia Basin have been blamed for increasing travel time from an average 22-day migration (from the Salmon River in Idaho to the sea) to 41 days (Ebel 1977). There are other areas of the basin where travel time was only 2 to 7 days but has been lengthened to over 30 days (Maher 1986).

During years when natural runoff is low, poor passage conditions for juveniles become worse. In lower runoff years, facility operators attempt to store more of the runoff for power demands as well as other uses such as irrigation and recreation. In addition, a greater percent of the impounded water is released through the turbines to generate power, and less is spilled over the dams. This means that smolts must pass through the turbines causing higher mortality rates than if they travel through the spillways. An example of high salmonid mortality rates caused by reservoir operations during a low runoff year occurred in 1977. During the record low runoff

year of 1977, operators conserved the limited spring runoff for reservoir refill and allowed less water to pass through the facilities during the spring migration period. That year, the average travel time for juvenile salmonids migrating from the Salmon tributary in the Snake to the lower Columbia took around two months (Sims, Bentley and Johnson 1978).

While experts disagree over the exact percentage of fish losses attributed to modifications made to the Columbia's natural river regime, clearly flow changes have been a significant factor (Bevan, Harville, Bergman, Bjornn, Crutchfield, Klingeman and Litchfield 1994). Other significant factors which have contributed to the decline of the salmon include excessive harvest, loss and deterioration of spawning and rearing habitat, decreased water quality, increased disease and predation and negative impacts from hatchery fish. Although the rapid decline of the salmon is attributed to the cumulative impact of all these factors, when the Northwest Power Planning Council began to put together the fish and wildlife program, it was obvious that one of the first and most important issues to address was flow for juvenile salmonid migration.

Formulating a Flow Augmentation Measure

On June 10, 1981 the newly appointed Northwest Power Planning Council (Council) requested that federal and state fish and wildlife agencies and treaty tribes in the basin submit recommendations for measures which would protect, mitigate or enhance the fish and wildlife affected by development and operation of Columbia's hydroelectric projects. The Council set a deadline of November 15, 1981 for

submission of recommendations. Of the more than 2,200 pages of recommendations and related documents submitted to the Council for consideration, over 200 pages related to downstream passage of migrating juveniles (NPPC 1982a, Appendix II). Out of these recommendations, the flow measures considered centered around two proposals. One was made initially by a coalition of fisheries interests in 1979, and a second from an ad hoc committee formed in 1981 to function as an integrated fishery voice in the basin.

The two proposals were studied by the Instream Flow Work Group. The Instream Flow Work Group's membership consisted of the Corps, BPA, technical representation from federal and state fish and wildlife agencies, the Bureau, representatives from the Council's staff, the Columbia River Inter-Tribal Fish Commission (CRITFC) (a commission composed of the fish and wildlife committees of four tribes in the basin, the Yakima, Warm Springs, Umatilla and Nez Perce), the Pacific Northwest Utilities Conference Committee (PNUCC) (an organization which represents the three major customer groups of BPA: public utilities, investor-owned utilities, and direct service industries), and the water resource departments of the four northwest states. The group's primary role was to evaluate the impacts of different downstream migration flow proposals on power production while also taking into account constraints imposed by existing river uses. The Instream Flow Work Group functioned as a forum to address technical issues and concerns of its members. For the most part, the group steered away from political issues and concentrated on technical issues (Lawrence, Lee and Palmer 1983).

Sliding Scale "Share the Wealth" Minimum Flow

As mentioned, one of the two primary proposals considered by the Council and the Instream Flow Work Group was submitted by an ad hoc fishery committee. The committee was composed of representatives from fish and wildlife agencies and basin tribes. This was a nontraditional alliance between two groups historically in conflict over the allocation of dwindling fishery supplies.

The proposal submitted by the ad hoc committee involved a flow program called "Share-the-Storage." This program was based on establishing weekly average minimum flows for each month (the amount of flow considered essential to maintaining fish runs at an acceptable level (ibid., 75)). Minimum flow estimates for the anadromous salmonid migration were made in the late 1970s by a subcommittee within the Columbia River Fisheries Council (this group was a precursor to the ad hoc committee). In addition to minimum flows, the ad hoc committee recommended a sliding-scale plan to share water with other river users during low as well as high runoff years. This meant that in years of high runoff the minimum flows would be increased and in low runoff years decreased. Flows would be adjusted up or down depending on the annual April 1 runoff forecast. Implementation of the fishery committee's "Sliding Scale" approach was predicted to cause an annual loss of 490 average megawatts (aMW) of Firm Energy Load Carrying Capacity (FELCC) of hydropower or almost 4 percent of the FELCC produced in the Columbia System. The FELCC for hydropower is the amount of energy the region's generating system can be guaranteed to produce on a firm basis during actual operations (Interagency Team 1991, 79).

Optimum Flow

The basin treaty tribes did not endorse the "sliding scale" minimum flow recommendation. The tribes' perspective was that the federal government's obligations to Indian treaties were not subject to the consideration of power constraints in the river (Lawrence, Lee and Palmer 1983). Based on this, the tribes recommended that the Council adopt optimum flows in the river. Optimum flow for downstream migration of anadromous salmonids is the amount estimated to achieve maximum smolt survival through the mainstem reservoirs. The Instream Flow Group estimated that if optimum flows were instituted, a loss of 3600 aMW of FELCC per year would result. This amount was enough to supply electricity to three-and-a-half cities the size of Seattle.

Reactions to the Fish Flow Proposals

After publishing the original recommendations in December of 1981, the Council began a process of taking public comments. The primary concerns over flow recommendations were: 1) how losses to FELCC would be made up; 2) whether flow increases would result in higher survival rates for migrating juveniles; and 3) whether a phased-in incremental program would better allow for monitoring the impact of the measure (Lawrence, Lee and Palmer 1983). Some power interests argued that insufficient information existed to justify instituting a fish flow measure. The PNUCC agreed that flow modifications had negatively impacted fish on the Snake River, but contended that except for very low runoff years, fish had adequate flow for a timely migration to the ocean (NPPC 1982a Appendix II). The Corps refused to

support the "sliding-scale" proposal, voicing a major concern over its effect on their existing river management planning process and reservoir refill (Lawrence, Lee and Palmer 1983).

The ad hoc fishery committee proposal was generally endorsed by all participating fishery interests, except the tribes who called for optimum flows. Tribes eventually agreed to a flow regime based on peak migration times instead of monthly minimum or optimum flows for the entire year. The tribes' shift in position was largely due to the recommendations of Malcohm Karr, a hydrologist hired by the Columbia River Inter-Tribal Fish Commission. Karr's study of fish travel time through the lower eight Columbia and Snake dams led him to propose that any flows for fish should be "shaped" and "timed" to the actual migration period (Karr 1982). By calling for "shaping" and "timing of the flow, Karr meant that instead of providing storage releases on an average monthly basis, reservoir operators would release a volume of water only when smolts were actually migrating downstream. Karr's recommendations had a significant influence on the Council when it developed its own flow measure.

Formulation of the Council's Water Budget

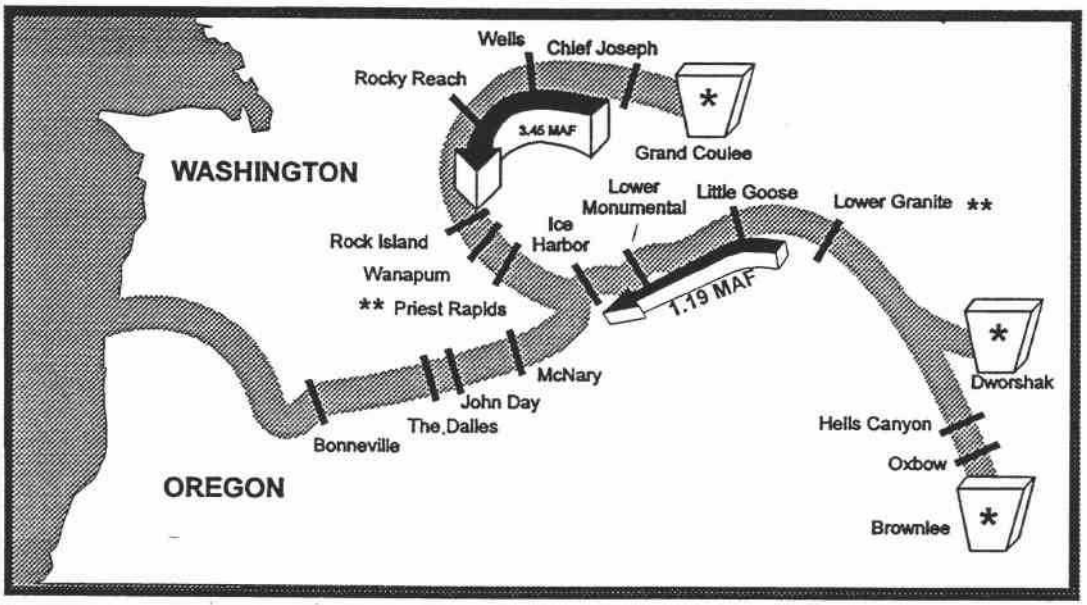
After the comment period, Council members and staff, under the leadership of Chairman Dan Evans (the former governor of Washington State), proposed a compromise flow measure, the "water budget." Instead of relying on minimum or optimum flows, the water budget was envisioned as a volume of water released during the peak smolt migration period between April 15 and June 15. The water budget

was designed to act as a partial artificial freshet, increasing flows in the river during the spring when the natural freshet has been retained for refilling reservoirs (the water budget volume was only small amount of water compared to the average flow of the river).

To determine the size of the water budget, the Council first estimated the volume of water needed to aid migrating juveniles through the river system in a 30-day period. It then calculated the impact that that volume would have on the power system's ability to generate firm energy and guarantee reservoir refill (Ruff 1987). The actual size of the water budget was calculated by adding the positive differences between average monthly flows recommended for the smolt migration period (April through June) and average monthly flows realized during the 42 and one-half month critical period (1928-1932) (Ruff 1987). The final water budget volume was 4.64 million acre-feet (Maf) (78 kcfs-months), and was divided between the Columbia and the Snake (Figure 5). In the Columbia River, 3.45 Maf was designated for migrating salmonids and in the Snake River, 1.19 Maf was the established water budget volume. The Instream Flow Work Group estimated average annual loss in FELCC from implementation of the Councils' proposed water budget to be 550 aMW per year (Lawrence, Lee and Palmer 1983).

Following the release of the draft Columbia Basin Fish and Wildlife Program in September 1982, the Council held a series of meetings with groups and agencies voicing concerns over the water budget. One of the concerns centered on the Council's authority over agencies actually managing the river. Bonneville, members of the PNUCC and the Corps all expressed their reluctance to give the Council and its

Program overriding authority when existing river operations were affected (NPPC 1982a).



* Primary Reservoirs for Water Budget Storage
** Monitoring Locations for Water Budget

Figure 5. The Water Budget.
Source. Interagency Team. 1991. The Columbia River System: The Inside Story. p. 20

A concern was also raised, primarily by fishery interests, over the quantification of base flows. Base power flows are the flows that would be released for power generation independent of the water budget. Several parties contended that the Council needed to establish a fixed schedule of flows for firm power generation in order to provide a base from which to measure the water budget's use. In response,

the Council quantified firm base power flows for both Priest Rapids Dam, the water budget monitoring point in the mid-Columbia, and Lower Granite Dam the monitoring point in the Snake (Figure 5). The flows specified for Priest Rapids were 76 kcfs during the period of April 15 through June 15. At Lower Granite, base power flows were set at 50 kcfs from April 15 through 30, 65 kcfs in May, and 60 kcfs from June 1 through 15.

The fishery agencies generally supported the water budget concept, but voiced concerns over what they perceived to be an inadequate volume of water, particularly in the Snake River (Lawrence, Lee and Palmer 1983). It should also be noted that although never endorsing the agencies' minimum flow or the water budget, the tribes eventually softened their demand for optimum flows. This made the adoption of the water budget more politically feasible.

Plans for the water budget were finalized with the adoption of the first Columbia Basin Fish and Wildlife Program in November 1982. The measure was the centerpiece of the Program.

How the Water Budget was Implemented

To facilitate integration of the water budget into the Columbia River systems operations, the Council called for creation of the Water Budget Center (the name changed to the Fish Passage Center in the mid 1980s and will be referred to hereafter as such). Two fish passage management positions were established to function as the voice for basin fishery interests regarding the water budget and other related Council measures. One manager was to represent the views of the majority of 13 Columbia

Basin Treaty Tribes and the other to represent states' and federal fish and wildlife agencies. In addition, the two managers hired a small staff to assist them in their responsibilities. By centralizing requests for water budget operations through the Fish Passage Center, agencies and tribes were given a louder voice in river operations.

The water budget was incorporated into river operations through the annual Coordinated Plan of Operation (CPO). Developed during the first three months of each calendar year by the Water Budget Implementation Work Group Committee, the CPO detailed the procedures and rules for water budget use in both the mid-Columbia and Snake Rivers for each year's migration period. The Water Budget Implementation Work Group was chaired by the Corps. The group's membership also included the fish passage managers, the Council's fish passage advisor, and operators of the power system which included representatives from BPA, PNUCC, mid-Columbia PUDs, Bureau, and Idaho Power Company (IPC). After the annual CPO was developed and agreed upon by the majority of the participating members, the Corps submitted the plan to the Council. Although attempts were made to reach consensus over water budget procedures in the CPO planning process, the Corps made the final decision as to what went into the plan.

The runoff forecasts made during the first three months of the year were critical to the development of the CPO. The runoff forecast was and continues to be made by the Columbia Water Management Group. This is an interagency group composed of state and federal water resources agencies. The runoff forecast was important to the CPO because it determined how much flexibility was available in the system. In low runoff years, system operations were considered less flexible because

of the need to optimize the limited runoff for power production.

Figure 6 illustrates the flow of institutional and technical guidance for water budget activities. During the high spring migration season, April 15 through June 15, the fish passage managers used the weekly runoff forecast, other streamflow conditions, and juvenile fish movement including releases from all applicable hatcheries to guide them in requesting water budget releases. A simulation run by the Instream Flow Work Group projected that in both the mid-Columbia and the Snake River the water budget volume would not be sufficient to maintain minimum flows over the 60 day smolt migration period during many years (especially in the Snake River where there is considerably less natural runoff and storage capacity) (Lawrence, Lee and Palmer 1983). Because the water budget volume was not large enough to be continuously used throughout the water budget period, the fish passage managers attempted to best match their flow requests with needs of the migrating salmonids. In response, the fishery agencies and tribes agreed that the water budget would be used when 10 percent of the juveniles began to migrate and when the flows were below minimum target levels (CRBT and FWA 1984).

To use the water budget, the fish passage managers made a written request to the Corps' Reservoir Control Center. The Reservoir Control Center coordinated water budget implementation among project operators and regulators. The water budget volume came from either drafting water from upstream reservoirs or by not impounding natural runoff that would have been stored previous to the water budget's adoption. Instead of requesting a release of a specific volume of water, the fish passage managers requested target flows for Priest Rapids reservoir in the mid-

Columbia and Lower Granite reservoir in the Snake (Figure 5). As noted, these were the two locations at which the Fish Passage Center and Corps monitored the water budget flows (see Figure 5). As illustrated by Figure 6, the Corps, who controls reservoir releases, had the greatest ability to determine whether or not the water budget flows were provided.

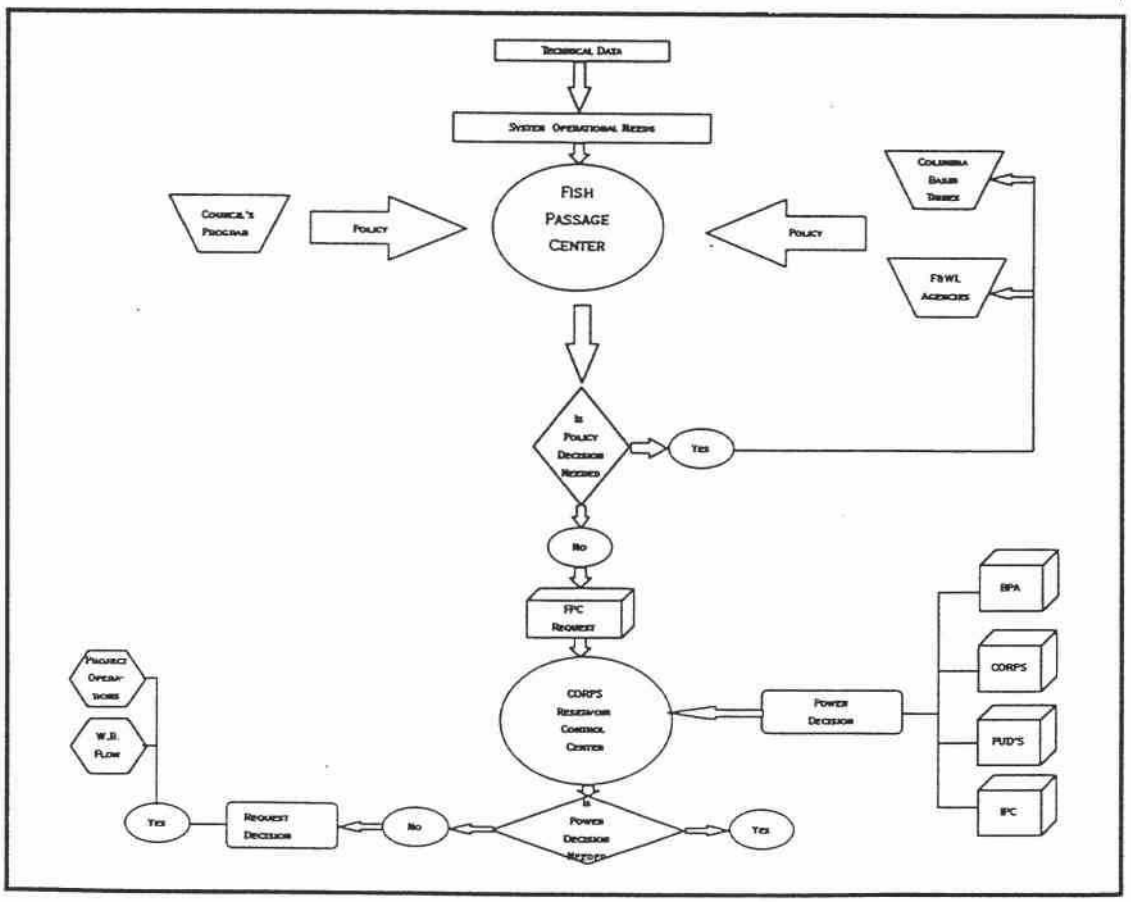


Figure 6. Institutional Guidance for Water Budget Activities.
Source. Water Budget Center. 1983. Annual Report. p. 6.

In addition to coordinating the water budget, the Fish Passage Center conducted other activities in the basin including monitoring smolt movement, coordinating reservoir spill, monitoring actual runoff and evaluating effectiveness of the spill usage. Lastly, each fall the fish passage managers submitted an annual report to the Council detailing water budget implementation.

Amendments to the Water Budget

When the Council released its first fish and wildlife Program, it openly acknowledged that the Program would need to be regularly revised in order to incorporate new research results, legal developments and changing technology (NPPC 1982a). In the Northwest Power Act, Congress specified that the Council was to undertake a review process for the Columbia Basin Fish and Wildlife Program at least once every five years (16 U.S.C.A. §839b(k)).

From 1983 to 1990, the Council made relatively few changes to the water budget but did use the amendment process to provide greater specificity for its operations. In the 1984 amendments, the only notable addition made was the Council's adoption of an adaptive management policy. Adaptive management is an approach to resource management which stresses learning through a series of experiments (see Lee and Lawrence 1986; Lee 1993). The Council selected to adopt adaptive management as a guiding philosophy. However, the organization did not specify how the policy would become operational for measures such as the water budget.

In the 1987 amendments, the Council reported that hydropower development in the basin had come at an annual loss of 5 to 11 million returning adults. The Council set a quantitative goal for the fish and wildlife Program, to double the then existing runs from 2.5 million to 5 million with no date established for attainment.

Like the previous amendment process, the Council did not modify the water budget volume in the 1987 amendments. It did address implementation problems by clarifying water budget procedures. The most significant addition was the specification of the accounting procedure. The Council made it clear that the water budget was to be accounted for by taking the difference between the actual weekly flows or the fish passage managers' flow request at Priest Rapids and Lower Granite dams (whichever was less) and the firm power flows. In addition, the water budget account was only to be debited if the fish passage managers had made a request for flow augmentation. For example, if the fish passage managers requested flows of 120 thousand cubic feet per second (kcfs) at Priest Rapids and the flows were actually 110 kcfs, the water budget should have been debited 34 kcfs which is the actual flow, 110 kcfs, minus the base power flow, 76 kcfs. The Council's attempt to clarify the water budget accounting method was significant because the Corps had been only taking the cumulative total of the difference between the base power flows and the observed weekly average flows during the week when the water budget had been requested, even if the fish passage managers had requested less. Using the Corps' method, if the fish passage center requested 110 kcfs but flows were 135 kcfs the Corps would have debited the water budget 59 kcfs (135 kcfs minus 76 kcfs) not 34 kcfs. In most years, the Corps' method exhausted the water budget volume sooner than the

Council's method.

In early 1991, the Council initiated a four phase rule-making process to amend the Columbia Basin Fish and Wildlife Program. The threat of species listings under the 1973 Endangered Species Act in the late eighties gave the process a greater sense of urgency. Unlike the previous amendments, the water budget volume was increased in both the Columbia and the Snake Rivers. Despite the use of the water budget, the Snake River in the late eighties was persistently plagued by low flows. The Council increased the water budget volume in the Snake River in an effort to provide a flow equivalent of at least 85,000 cfs at Lower Granite during April 15 to June 15.

In addition to increased water budget volumes, a series of other measures were also adopted to help meet target flows. These measures included drafting and operating four lower Snake River projects (Lower Granite, Little Goose, Ice Harbor, and Lower Monumental) at minimum operating pools. Operation of these four reservoirs in the 1980s created a situation where a large volume of water was required to bring about even a small change in river velocity. By calling for lower water levels in the four lower Snake reservoirs, the Council hoped that water budget releases would have a greater impact on juvenile travel times. The amendments also called the Corps to shift flood control operations from Dworshak in the Snake drainage to Grand Coulee in the Columbia. The Corps was to use the additional water that would have been drafted for flood control purposes, for augmentation of the water budget. Under the 1991 amendments, Dworshak became primarily a fish flow storage project during the spring (Ruff 1993) (Figure 5). Depending on the runoff forecast, Dworshak operators are required to provide as much as 900,000 acre-

feet of water for flow augmentation, plus any additional water gained from shifting flood control space to Grand Coulee. In addition, the Council called upon Idaho Power Company to continue to draft up to 110,000 acre-feet for spring migration in lower than average water years.

In the Columbia, the 3.45 Maf water budget volume remains available for spring fish flow augmentation. An additional 3 Maf of water from storage can be designated for use in poor to moderate water years (NPPC 1994a). This additional volume was designed to vary from zero to 3 Maf on a sliding scale depending on the runoff forecast. The lower the forecast, the more water allocated for the water budget. Unlike the original 3.45 Maf, the additional 3 Maf does not decrease the firm power supply. Obviously it is not a hard constraint on operations. Instead, the additional water was made available from either curtailing secondary energy sales (the amount of energy in excess of firm or guaranteed energy) or by making out-of-region energy purchases. The mid-Columbia water budget period was also shifted from April 15 through June 15 to May 1 through June 30th.

A number of other changes were made in 1991. First, under the recommendation of the fish and wildlife agencies and tribes, the Fish Passage Center began operating with only one manager representing both groups. This was significant because it represented an outward sign of unanimity between the agencies and tribes over the Fish Passage Center's operations. Secondly, the 140 kcfs flow cap at Priest Rapids Dam was lifted. This meant the fish passage manager could request flows greater than 140 kcfs in the mid-Columbia. Third, beginning in 1992 the fish passage manager was authorized to request flows for the lower Columbia at

The Dalles Dam. This amendment, coupled with the lifting of the 140 kcfs flow cap, meant that the fish passage manager could call for releases to augment flows in the lower Columbia. Flow requests targeting the lower Columbia were not allowed before the 1991 amendments. Fourth, the Council called for the formation of a Fish Operations Executive Committee to address flow measures and problems. The Committee was designed to expedite conflict resolution and address other implementation problems for fish operations. Finally, the goal to double the number of Columbia River anadromous salmonids established in 1987 was modified to emphasis that doubling was to be achieved with no further loss of biological diversity among or within anadromous and resident fish populations. The Council set 2015 as the date for attainment.

IMPLEMENTATION OF THE WATER BUDGET 1983-1993

The following consists of a brief narrative account of water budget implementation in the mid-Columbia and Snake Rivers for the years of 1983 through 1990. Although 1983 is not included in the policy analysis (because it was a trial year for implementation) it is included in the following discussion. A discussion of water budget implementation is also provided for the years of 1991 through 1993. These three years are treated separately because of significant changes made to the water budget after 1990.

Implementation in the mid-Columbia 1983 through 1990

From 1983 through 1990, most storage for the mid-Columbia water budget came from the reservoir behind Grand Coulee Dam. Other upstream storage projects such as Hungry Horse and Libby were also used, but mainly to refill Grand Coulee's reservoir. Grand Coulee has been used as the primary storage facility for water budget flows because it has nearly 5.2 Maf of usable storage, and it modifies runoff from 78 percent of the drainage area in the basin and nearly 92 percent of the runoff above Priest Rapids Dam. In addition, it is the first storage reservoir above the Priest Rapids monitoring point and thus effects from flow releases would be quickest. To help guide fish passage managers in making requests for flow, fish and wildlife agencies and tribes established a minimum runoff target of 134 kcfs at Priest Rapids Dam. The objective was that the water budget would be used when the middle 80 percent of smolts were migrating (referred as the middle 80 percent of smolt migration) and the flows at Priest Rapids dropped below 134 kcfs. The fish passage managers were restricted to making requests in the mid-Columbia on a weekly basis thus the managers had less flexibility to shape the flow on a daily basis.

Table 2 displays the water budget volume resulting from storage releases and natural runoff in the mid-Columbia during the years of 1983 through 1990. During the trial year of 1983 and the implementation years of 1984, 1985 and 1988, the full water budget volume of 3.45 Maf was provided. During 1986, 1987, 1989 and 1990, less than 3.45 Maf was provided for the water budget. Two of these years, 1987 and 1990, the full volume of water was not used because runoff at Priest Rapids exceeded the 140 kcfs cap during a portion of the water budget period. According to the

Council's Program, the fish passage managers were thus precluded from making any water budget flow requests during the time that runoff exceeded 140 kcfs. As would be expected, during years when runoff was lower than average it was more difficult for the Corps to provide the full water budget volume because more tradeoffs from other uses were required. The years when runoff was below average at Priest Rapids included 1985, 1987, 1988 and 1989.

Table 2. Water Budget Volume Used from Storage in the Columbia.

Year	Priest Rapids Dam
1983	3.45 Maf
1984	3.45 Maf
1985	3.45 Maf
1986	3.14 Maf
1987	2.52 Maf *
1988	3.45 Maf
1989	3.17 Maf
1990	2.66 Maf*

* High Flows (above 140 kcfs) at Priest Rapids Dam prevented fish passage managers from using the water budget during periods of these years.

Data Source. Ruff, J. 1993. The Northwest Power Planning Council.

Figure 7 displays for the period of 1983 through 1990, the total number of days that the water budget was used during the 60 day period, the number of days the middle 80 percent of smolt migration (based on chinook) (see page 91) lasted, and the number of days flow levels were above the requested target flow of 134 kcfs at Priest Rapids while the middle 80 percent of smolts were migrating. For example, during 1985, the middle 80 percent juvenile passage period was 31 days (out of the 60 days) with an average flow of 137 kcfs. Only 22 days (73 percent of the time) during this 31 day period were the flows at Priest Rapids above or equal to the minimum flow target. Water budget flows were provided for 45 of the 60 days and the full water budget volume was used. In 1986, water budget flow augmentation took place only during 28 days of the 60 day water budget period. The middle 80 percent of juvenile migration lasted for 34 days with flow above the 134 kcfs target for 26 days.

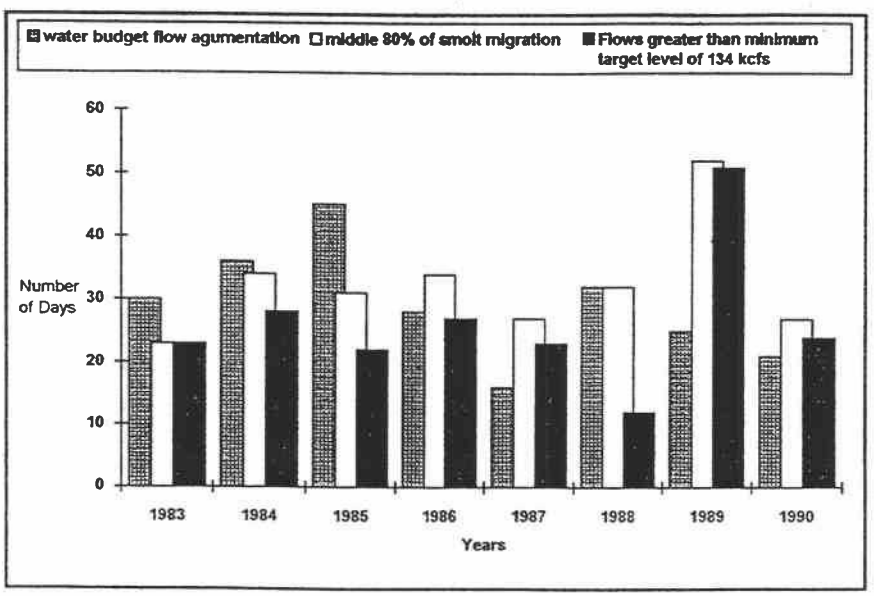
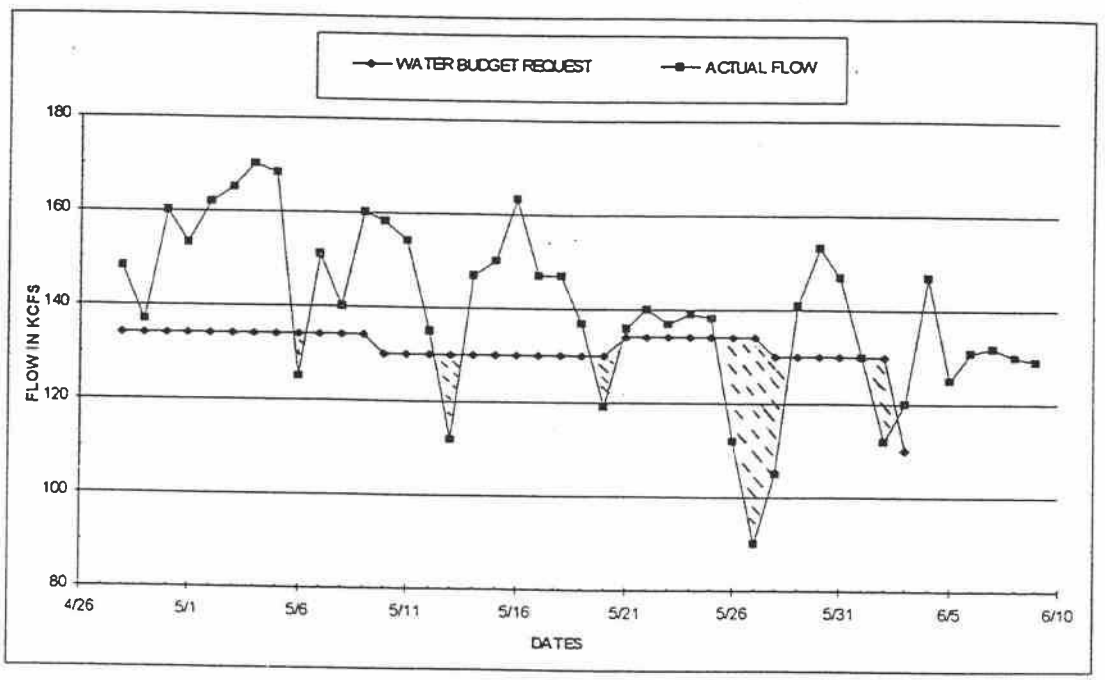


Figure 7. Mid-Columbia Water Budget Augmentation Analysis.
Data Source. Ruff, J. 1993. The Northwest Power Planning Council.

Despite the high volume of storage to draw from in the mid-Columbia, implementation problems occurred most years. During the first trial year of 1983, a dispute between the Corps and the fish passage managers over the accounting method used to keep track of the water budget surfaced. The Corps' method took the cumulative total of the difference between the base power flow (specified by the Council's Program) and the observed weekly average flow or the requested flow (from fish passage managers) which ever was greater. The fish passage managers maintained that the Corps should take the difference between the base power flow and requested flow for the water budget unless actual flow was less than that requested (in which case the actual would be used). By using the Corps' method, the water budget volume was depleted faster. In 1985, the difference in accounting methods in the mid-Columbia meant the Corps' method exhausted the water budget 12 days earlier than the fish passage manager's method. Fishery advocates contended that the water budget was being used to subsidize power (Blumm 1990). Despite strong objections from fishery interests, the Corps refused to alter their accounting procedure. As a result, this issue continued to generate conflict throughout most of 1983 through 1990 year period. Disputes continued even after the Council clarified the accounting procedures in its 1987 program amendments (see page 87). For example, in 1993 the Fish Passage Center accused the Corp of subtracting flood control releases from the water budget without releases being requested by the fish passage manager (FPC 1994, 13)).

In 1984, a new implementation problem occurred when BPA and the Corps decided to shape flows for secondary power sales instead of for juvenile migration.

On several weekends when the water budget had been requested, the Corps significantly reduced releases from storage to match drops in power demands. This caused flows during several weekends to dip below 130 kcfs. The fish passage managers sharply criticized the Corps' actions. This was particularly discouraging for fishery interests because a few of the days corresponded with the highest juvenile migration period. A question arose over who was really in control of the water budget releases: the Corps and BPA or the fish passage managers. Figure 8 illustrates this 36-day water budget period in the mid-Columbia and the weekend flows deviations which occurred.



= Flows less than water budget request

Figure 8. 1984 Mid-Columbia Weekend Flow Deviations
Source. Water Budget Center. 1984. Annual Report. p.17.

During the three day Memorial Day weekend, flows were particularly low (as they had been in the past). In 1985, during the development of the Coordinated Plan of Operations, a procedure was negotiated to address the problem of the reduction of weekend flows. The Corps agreed to keep the flow levels 80 percent or more of the previous 5 day average. With a few exceptions, this agreement was effective in solving the weekend low flow issue.

Fish passage managers raised another contentious issue in 1987 over the need to augment flows in the lower Columbia. Managers recommended that a minimum flow level for the lower Columbia be set at 220 kcfs. They maintained that the Council's flow cap of 140 kcfs in the mid-Columbia kept flows in the lower Columbia below the minimum target level during several years. This was attributed to the low flow contributions from the Snake River. For example, the recommended 220 kcfs target could not be met when the Snake River was only contributing around 50 kcfs and the mid-Columbia around 140 kcfs. Fish passage managers and fishery advocates argued that the 140 kcfs cap on flow requests should be lifted for the mid-Columbia and that flow requests for the lower river should be allowed. Based on this argument, during the 1987 migration period the fish passage managers requested flows for the lower Columbia. The Corps' unwillingness to provide these flows led to a policy-level dispute. The Council, through its dispute resolution process, facilitated a negotiated settlement to provide higher flows in the lower Columbia. Although a settlement was reached for 1987, the issue over the lower Columbia flow was not resolved until the 1991 amendment process when the flow cap was dropped. During 1987 and 1990 the full 3.45 Maf volume was not used because runoff above 140 kcfs

at Priest Rapids precluded the fish passage managers from securing higher flows. If the 140 kcfs flow cap had not been established by the Council, the fish passage managers could have called upon the remaining water budget volume to augment the lower Columbia flows.

Implementation in the Snake River 1983 through 1990

Of the 1.19 Maf allocated for the Snake River water budget during 1983 to 1990, approximately two-thirds came from natural runoff and one-third from stored water. The water budget from storage came from the Corps' Dworshak reservoir on the North Fork of the Clearwater River and Idaho Power Company's Brownlee reservoir on the mainstem of the Snake River (Table 3). These two facilities had a combined storage capacity of 3 Maf. A minimum flow target of 85 kcfs at Lower Granite was established by the fish and wildlife agencies and tribes to help guide them in making water budget requests. The limited water budget amount from storage was to be used to increase flows during peak smolt outmigration periods. Because of the limited amount of storage, request for the water budget releases in the Snake River could be made on a daily basis instead of on a weekly basis like in the mid-Columbia, thereby giving the fish passage managers added flexibility.

Table 3. Water Budget Volume used from Storage in the Snake River.

Year	Dworshak Dam	Brownlee Dam	Dworshak and Brownlee
1983	0.000 Maf	0.000 Maf	0.000 Maf
1984	0.000 Maf	0.000 Maf	0.000 Maf
1985	0.000 Maf	0.000 Maf	0.000 Maf
1986	0.000 Maf	0.000 Maf	0.000 Maf
1987	0.287 Maf	0.152 Maf	0.439 Maf
1988	0.295 Maf	0.182 Maf	0.477 Maf
1989	0.240 Maf	0.160 Maf	0.400 Maf
1990	0.308 Maf	0.150 Maf	0.458 Maf

Source. Ruff, J. 1993. The Northwest Power Planning Council.

In 1984, the Corps agreed to provide a sliding amount of water from Dworshak reservoir for the water budget. Under the agreement, the actual amount provided was to be determined each year by the April 1 runoff forecast. When the forecast was less than 23 Maf at Lower Granite, a sliding amount of water from storage was marked for water budget use. This is referred to as the "shapable" water, and could be called upon by the fish passage managers to augment Snake River flows during the water budget period. Figure 9 illustrates the shapable water budget coming from Dworshak. A runoff forecast of 12 Maf at Lower Granite meant 300,000 acre-feet of storage was shapable. A forecast greater than 23 Maf at Lower Granite meant that no water from Dworshak storage was to be designated as shapable for the water budget. During high runoff years more of the water budget had to come from natural runoff. This meant fish passage managers were given less control over outflows as more flow was determined by the timing of natural runoff.

The first four years of water budget implementation, runoff was forecast above 23 Maf at the Lower Granite Dam for the April 15 through June 15 period. Under the Corps' agreement, no water was shapable from Dworshak. The next four years, (1987-1990) runoff was below average. During these years, a varying amount (0.400 to 0.477 Maf) was shapable for water budget operations from both Brownlee and Dworshak (Table 3). Since natural flow was relied upon to provide two-thirds of the water budget volume, water flows were poorer for smolt outmigration than the previous four years.

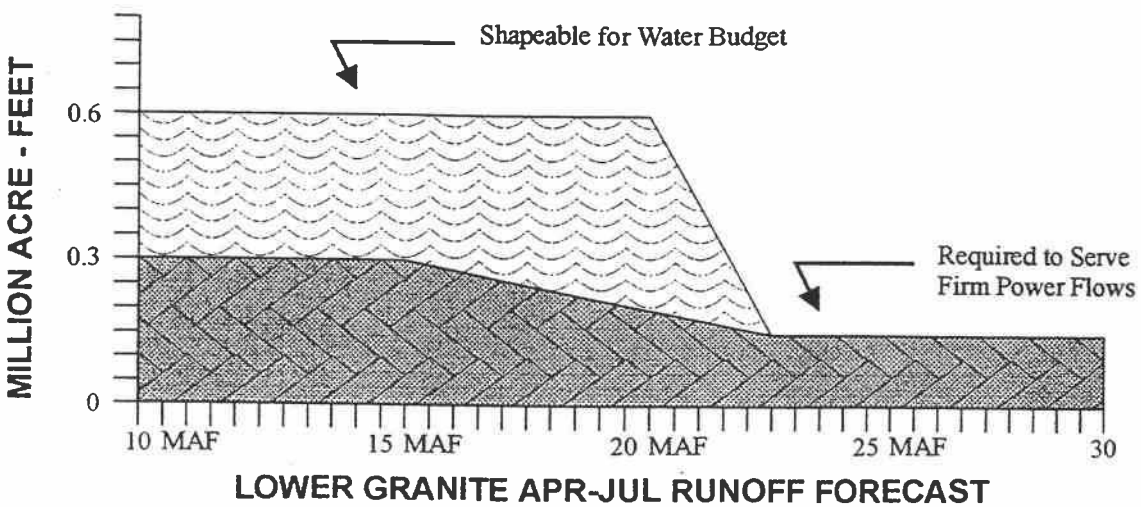


Figure 9. The Shapable Water Budget Volume at Dworshak.
Source. Columbia River Water Management Group. 1986. Columbia River Water Management Report for Water Year 1986. p. 83.

Figure 10 displays the total number of days the water budget was used in the Snake River out of the 60 day water budget period, the number of days the middle 80 percent of smolts (based on chinook outmigration) were migrating, and the number of days during the 80 percent migration that flow levels met the requested target of 85 kcfs at Lower Granite. In 1985 the chinook migration period lasted around 42 days and no water budget volume was used from storage since flows were above or equal to 85 kcfs for 21 days. In 1987, the chinook outmigration lasted 21 days with flows averaging only 65 kcfs. Flows at Lower Granite met the 85 kcfs minimum flow target on only 5 days. The fish passage managers called for flow augmentation from the water budget in early May but there was only enough water designated from storage to last 11 days. In 1989, the middle 80 percent of chinook outmigration occurred over a 39-day period with flows meeting 85 kcfs on 25 days. Fish passage managers requested flow augmentation in late April and water was available for 17 of the 39-day chinook migration period.

A major impediment to the implementation of the Snake River water budget was Idaho Power Company's (IPC) reluctance to provide flow releases from Brownlee Reservoir. During the first few years, BPA negotiated with IPC for the use of Brownlee's storage (Figure 5). Both BPA and IPC exhibited a degree of resistance to the negotiation and formal agreement was not reached until 1987. The terms of the agreement required BPA to compensate IPC for any losses caused by water budget releases. Like Dworshak, 1987 was the first year Brownlee storage was used for the water budget. When combined, storage commitments from the Corps and IPC only amounted to one-third of the 1.19 Maf water budget established for the Snake River.

This was considerably less guaranteed flow than was originally envisioned would occur under the Council's Snake River water budget (Dodge 1990).

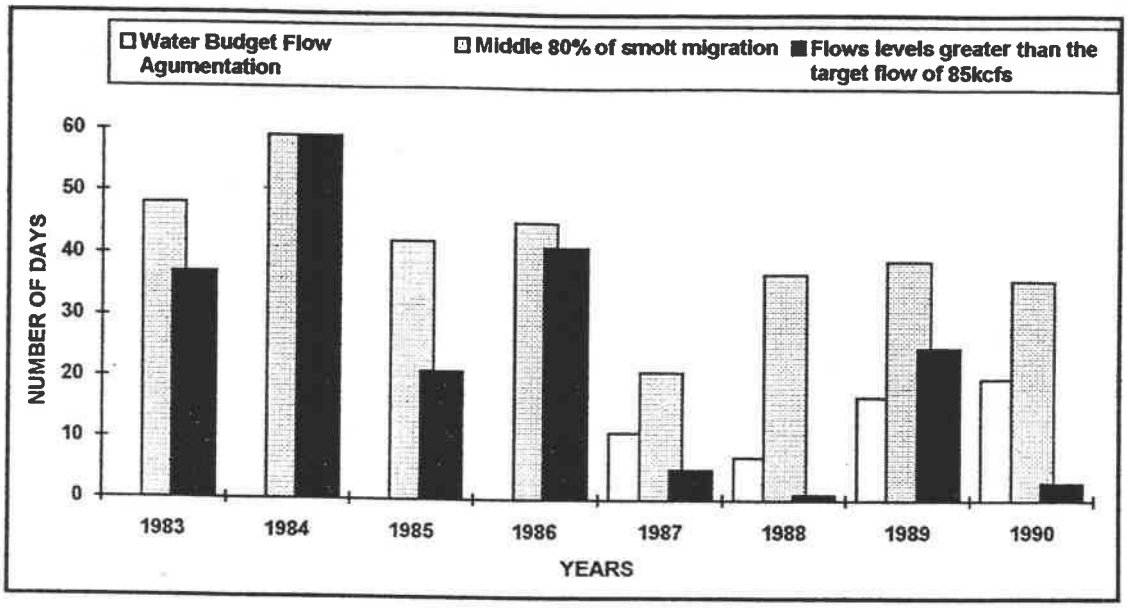


Figure 10. Snake River Water Budget Augmentation Analysis. Source of Data. Ruff, J.D. 1993. Northwest Power Planning Council.

During both 1987 and 1988 the water budget volume of 1.19 Maf was not provided. Only around two-thirds of the water budget volume, including both natural runoff and water made available from storage, was provided for outmigration. In 1987, the first year the water budget was actually released from storage for flow

augmentation in the Snake, there was only enough water allocated from storage to augment flows for 11 days. Results from that year's operations made it more clear that the water budget that had evolved in the Snake River was inadequate to significantly assist migrating salmonids. Further evidence of this was provided in 1988 when the fish passage managers only had enough allocated storage to augment flows for 7 days. During these 7 days, flows averaged only 77 kcfs, and passage indices (counts of fish passing) were very low, indicating high mortalities.

In addition to an inadequate water budget volume, a new implementation problem occurred during 1987 when operators failed to maintain the base power flows when there was a drop in power demand. Key to successful implementation of the water budget concept was the assumption that base power flows for hydropower generation would be maintained throughout the water budget period (April 15 through June 15). The water budget was to be used to supplement these base flows. In years when base power flow were not maintained, there was less flow available to meet migrating salmonid needs. During several periods in 1987, 1988 and 1989, the operators reduced flows below the base level (Ruff 1993).

The full 1.19 Maf allocated for the Snake River water budget was never provided from storage during the 1984 to 1990 period. This resulted because: the small amount of storage available in Snake River reservoirs; the limited commitment by the Corps and IPC to use Dworshak and Brownlee reservoirs, respectively, for the water budget; and lower than average runoff. All of these combined to decrease the fish passage managers' ability to even come close to the 85 kcfs target flows.

Implementation in the mid-Columbia and Snake 1991, 1992, and 1993

In 1991, the water budget was affected by primarily two regional events. First, several petitions were filed with the National Marine Fisheries Service (NMFS) requesting a review of five species of salmon for endangered species designation. Second, changes were made to the water budget in 1991 as a result of the regional Salmon Summit proceedings held between October 1990 and March 1991 (FPC 1992). The Salmon Summit was a series of meetings between various river interests. The Summit, led by Oregon's Senator Hatfield, was a political response to the petition filed with the NMFS. The main objective of the meetings was to design a regionally acceptable recovery plan for Columbia River Salmon (Wilkinson 1992, 215-216). Although the meetings ended without such a plan, intermediate actions were agreed upon for increasing the spring flows for juvenile migration. The actions taken regarding flow releases for spring smolt migration in 1991 represented a departure from the initial water budget measure. The CPO that year was essentially drawn-up from the agreements made at the Salmon Summit (FPC 1992).

In the mid-Columbia during the 1991 spring migration period, the fish passage manager was precluded from calling for water budget releases from storage because runoff was above 140 kcfs at Priest Rapids (FPC 1992). In the Snake, as a result of negotiations during the Salmon Summit, the total water budget volume was increased from 1.19 to 1.254 Maf. The Corps secured an additional 0.064 Maf by shifting the flood control responsibilities from Dworshak to Grand Coulee, and by lowering the four lower Snake River reservoirs and John Day reservoir to minimum operating pools. Shifting flood control to Grand Coulee allowed the Corps to maintain

Dworshak at higher reservoir levels during the late winter and early spring. The additional water held behind Dworshak was then used for the water budget, which allowed the Snake River water budget to be used to some degree every day between April 27 and June 4. Table 4 displays the water budget volume in both the Snake and the Columbia for 1991, 1992 and 1993. Despite these modifications, target flows of 85 kcfs at Lower Granite were only met 72 percent of the time.

Water budget planning and implementation in 1992 and 1993 was affected by the Council's 1991 amendments to the water budget as well as action taken by NMFS under the Endangered Species Act (ESA). The 1992 spring migration period was the initial year for implementation of the Council's amended version of the water budget measure. It was also the first spring the Snake River Sockeye was listed as an endangered species, having been placed on the federal endangered species list in November 1991. As a result of the Sockeye's endangered status, NMFS was required under Section 7 of the ESA to produce a "Biological Opinion" to guide federal agencies in their river operations. According to the ESA, federal operators are not allowed to conduct operations that jeopardize listed species.

Runoff during 1992 was severely limited. In the Columbia, between May 1 and June 30, the original 3.45 Maf was provided plus an additional 3.0 Maf released from Grand Coulee Dam and British Columbia's Keenleyside Dam (Arrow Lakes). In the Snake over 1 Maf of water was released from Dworshak and 110 Kaf from Brownlee. In addition to the spring flow releases, there were summer releases in July, August and September on the lower Snake River.

Table 4. Water Budget in the Columbia and Snake Rivers 1991-1993.

Year	Columbia River	Snake River
1991	0.000 Maf *	1.225 Maf
1992	6.450 Maf	1.617 Maf
1993	7.580 Maf **	2.880 Maf

* High flows (above 140 kcfs) at Priest Rapids Dam prevented the fish passage manager from using the water budget during this year.
** Includes summer flows used.

Source. FPC. 1994. Annual Report 1993. p. 12.

In 1993, in addition to the FPC operations, the NMFS's Federal Columbia River Power System Biological Opinion guided the river operations in both the Snake and mid-Columbia in the last month of the water budget period. The role of the Fish Passage Center, as outlined in the Council's Columbia Basin Fish and Wildlife Program, was not recognized during this time because the "Biological Opinion" superseded the fish passage manager's authority (FPC 1994). The "Biological Opinion" (released May 28, 1993) changed the operating regime from a flow augmentation volume (the water budget) to a flow target. These flow targets were specific for Lower Granite on the lower Snake River and McNary dams on the lower Columbia.

High runoff and releases from modified flood control procedures kept the river

conditions good for smolt migration in both the Snake and the Columbia during spring of 1993. Despite the high runoff levels and the shift in control of the flow augmentation to NMFS, conflict continued to exist between the Corps and the Fish Passage Center. The conflict was once again over the accounting procedure used for the water budget: the fish passage manager accused the Corps of making flood control releases and debiting the amounts from the water budget (Filardo 1993).

Water Budget Implementation Summary

Implementation of the water budget in the mid-Columbia and the Snake rivers produced mixed results in terms of flow increases. In years when runoff was below average, the water budget releases produced only limited increases in flow. Flow problems were particularly troublesome in the Snake. The adequacy of the water budget's volume was questioned by fishery advocates in most years. Even with the increases in the water budget's volume in 1992 and 1993, a question remained whether the measure significantly augmented flow for downstream migration.

In the 1993 Annual Report, the Fish Passage Center compared average monthly flows for the ten year period preceding the water budget (1973 to 1983) to the ten year period the water budget was in place (1983 to 1993) (FPC 1994). The Fish Passage Center analysis concluded that migration flows did not improve with the water budget in place. Although runoff for the 10 year water budget period was much lower than during the preceding 10 years, FPC argued that this did not discount the fact that the water budget's implementation had only a limited positive impact on the Columbia and Snake Rivers' flow conditions for downstream migration.

WATER BUDGET IMPLEMENTATION ANALYSIS

In the remaining portion of Chapter 5, an implementation analysis based on the eight criteria framework will be applied to the water budget. Each criterion will be examined separately to identify the factors that influenced the Council's efforts to secure implementation of the water budget.

Water Budget Objective

To what extent was the objective of the water budget clearly stated, defined and consistent with the goals outlined in the 1980 Act?

In the Northwest Power Planning Act, Congress directed the Council to adopt measures which would "provide flows of sufficient quality and quantity between such facilities to improve, production, migration, and survival of such fish [anadromous] as necessary to meet sound biological objectives" (16 U.S.C.A. § 839b(h)(6)(e)(ii)). This statement authorized the Council to establish the water budget. The objective for the water budget "... to increase flows, for juvenile migration during the spring months," was general and did not provide a clear statement of the desired results nor did it define what flow conditions were sufficient to improve migration conditions (NPPC 1982a, §303). In a presentation to the Council's Fish and Wildlife Committee, the two fish passage managers testified that the absence of a common water budget objective among implementors was the key element to which other implementation problems were related (Dehart and Karr 1989).

When adopted, few understood what the water budget was or what it would do. Jim Ruff, the Council's water budget advisor, said that it was "all things to all people" (Ruff 1993). Confusion over the water budget's objective and meaning resulted in a number of conflicts between power operators and fishery advocates.

The lack of a precise and quantifiable objective also made the evaluation of the water budget's success more difficult. For example, the fishery interests have often based their judgment of success on the water budget's ability to provide minimum flows. The water budget, however, was not a minimum flow measure. Equating the water budget with minimum flow was possibly reinforced because of the way in which the fish passage managers made their request. Instead of requesting specific volumes of release, the managers were instructed to request target flows at Priest Rapids Dam in the mid-Columbia and Lower Granite Dam in the Snake. In contrast, the Corps thought of the water budget in terms of blocks of water, regardless of whether that amount of water met fishery advocates' flow targets.

Although the general objective of the water budget was clearly consistent with the fish and wildlife goal of the Northwest Power Planning Act, it conflicted with established goals which guided river operations. Institutional arrangements such as the Pacific Northwest Coordination Agreement and the Columbia River Treaty had been adopted to maximize power benefits (See pages 32). A main objective of the BPA and utilities was to satisfy water budget requirements while minimizing effects on power operations. On numerous occasions, dams were operated in a manner which treated fish flows as a lower priority than reservoir refill or secondary power generation. The fact that the water budget was a low priority for operators was

apparent during the 1985 water budget period when flow releases from Dworshak Dam were held up in the Lower Granite pool for the purpose of generating secondary or nonfirm power (NPPC 1985a, 7). This action resulted in an outflow of only 53 kcfs from Lower Granite to the remainder of the lower Snake River.

Anticipating the high degree of conflict over implementation, the Council established a dispute resolution process for the water budget. The Council was to act as a mediator when conflicts arose between fish passage managers or between the managers and the federal project operators and regulators. No mediated disputes occurred between fish passage managers, but the Council resolved conflicts between the fish passage managers and federal implementors. Considering the number of conflicts which arose between the two groups over the implementation of the water budget, relatively few were resolved at the Councils' level. Conflicts which were resolved, were most often resolved directly between the disputing parties (Filardo 1983). For example, the conflict between the fish passage managers and the implementors over weekend flow deviations was addressed and partially resolved in the CPO process.

Different interest groups, especially fisheries, raised questions over the adequacy of the established dispute resolution process and the Council's effectiveness as a fair arbitrator (Filardo 1993; Blumm 1990). Three problems with the dispute resolution process were that the Council did not provide timely solutions since its members could not meet on short-term notice; the Council was limited in enforcing the negotiated solutions; and fishery interests contended that the Council was often biased in favor of power interests. In the 1987 amendment process, the Columbia

River Inter-Tribal Fishery Commission recommended that the Council adopt a formal process to deal with problems in program implementation (NPPC 1987a, Appendix C at 21 and 28). The Council rejected this request.

Through the adoption of the water budget, the Council demonstrated an attempt to achieve a main goal of the Act: "to protect, mitigate and enhance fish and wildlife, ...of the Columbia River and its tributaries, particularly anadromous fish... (16 U.S.C.A. §839(6))." While the water budget objective "... to increase flows, for juvenile migration during the spring months," was clearly consistent with this goal, various interpretations by different parties complicated implementation of the measure. A more detailed objective from the Council might have reduced the amount of conflict over water budget operations. However, it is unclear if all parties would have endorsed a more specific objective, such as guaranteed minimum flows, since fundamental conflicts existed between the water budget's objective and the goals of agencies' directing dam operations.

Causal Relationship

What is the level of scientific and technological certainty regarding the ability of the water budget to achieve its objective(s)?

One critical challenge surrounding the water budget was the lack of conclusive scientific data supporting a cause and effect relationship between water budget releases and increased smolt survival. The supposition for adoption of the water budget was that increasing the spring runoff decreases smolt travel time, thereby increasing their survival rates. Most scientific studies since the 1970s tended to

support the assumptions behind flow augmentation (Cada, Deacon, Mitz and Bevelhimer 1994; CBFWA 1990), although the research supporting flow augmentation was incomplete. The primary study that the Council relied upon to justify the water budget was prepared for the National Marine Fisheries Service by Sims and Ossiander (1981). This study demonstrated a strong correlation between flow and travel time, and flow and survival of juvenile salmonids migrating from the upper Snake River.

Since the water budget was adopted, there have been other studies, such as the one funded by the Direct Service Industries, that did not fully support the positive relationship between flow and survival rate (McNeil 1992 and 1993). In 1993, some scientists continued to maintain that a single factor such as flow may not be enough to increase survival. In twenty years of research, agreement was not reached over the specific relationship between the river's flow and velocity and the survival of migrating salmonids (Martin 1993). In addition, BPA-funded research programs to test the assumptions behind flow augmentation were stalled as fish biologists and utility scientists argued over the validity of various research methodologies (Harrison 1994).

Scientists were also not able to calculate how much flow augmentation was needed to be beneficial for fish. The water budget volume was relatively small compared to the natural fluctuations in the river's flow. This complicated efforts to establish a positive correlation between the water budget and smolt survival. Those opposed to augmenting river flows for fish became very skilled in utilizing the scientific uncertainty surrounding the water budget to benefit their operating agenda.

For example, the uncertainty strengthened the utilities' argument against increases in water budget flows during the Council amendment processes during the 1980s and 1990s.

The scientific uncertainty surrounding the water budget's effectiveness was such a divisive issue that the Council remained unwilling to increase the water budget's volume during amendment processes in the eighties. During the 1987 Program amendment process, an Oregon Council member responded to discussions over increasing water budget flows by stating "Further increases in the water budget would be problematic until the benefits of the current water budget have been demonstrated" (Godard 1987, 4). This was the position of the Council until 1991 when it elected to modify the water budget. When the Council did increase the water budget's volume for the 1992 and 1993 migration period, the organization was severely criticized by utilities. Given that flow augmentation was one of the most costly elements of the Council's Program, influential power interests like BPA and PNUCC demanded that benefits to fish be quantified. Estimates of revenue lost because of the water budget ranged from $30.7 million to $74 million per year depending on conditions in the power market and yearly runoff (Mendelsohn, Whitelaw and Niemi 1988; Lee and Lawrence 1986). Paul Lorenzini, President of Pacific Corporation Utility, asked the Council, "How much are you going to impose on the (hydropower) system that cannot be justified by biology?" (Harrison 1993, 18). Kai Lee, a former member of the Council, pointed out "from the outset it was unclear how to ground such a measure objectively because the biological benefits were difficult to assess precisely in the massively altered ecosystem" (1991a, 794).

What the Council needed was a guiding doctrine which acknowledged the scientific uncertainty involved with the restoration efforts yet still required action. As a member of the Council from 1983 to 1987, Lee introduced the concept of "Adaptive Management" as a guiding doctrine. Adaptive management, first discussed by Canadian ecological theorist C.S. Hollings (1978), means that environmental restoration efforts are designed as experiments to help resolve scientific uncertainties regarding human interactions with the environment (Lee and Lawrence 1986). Adaptive management is used to learn from successes as well as failures in order to reduce the scientific uncertainty (Lee 1993).

In the case of flow augmentation to aid juvenile migration, the use of adaptive management was limited. First because it was politically infeasible to embrace failure as a success when investing large amounts of public funds and impacting species on the brink of extinction (Volkman and McConnaha 1992). Secondly, implementors were generally unwilling to try experiments when they required a departure from the language of the Councils' Program (FPC 1991). For example, the Fish Passage Center (1991) in their 1990 Annual Report, stated that nearly all recommendations made that represented any departure from the water budget requirements specified in the Councils' Program were rejected by the implementors. Lastly, to detect anything above the natural variability in the river required large manipulations in the system since there were so many other variables influencing smolt survival. Because of these issues, adaptive management did not hold the solution for resolving questions over the relationship of flows to fish survival during the eighties and early 1990s. Margaret Filardo, Staff Biologist for the Fish Passage Center, argued that instead of asking

fishery interests to prove how flows are good for fish, society should demand that power interests prove how hydropower operations do not harm fish (1993).

Fish and wildlife agencies and tribes supported the assumptions behind the water budget, but after over a decade of implementation were critical of the measure itself, especially the limited volume of water allocated to the water budget (CBFWA 1990; CBFWA 1991; FPC 1994). The measure's inability to provide adequate flows was most apparent in the Snake River. Because of the dependence upon natural runoff to provide two-thirds of the water budget in the Snake River, minimum flows targeted for fish migration often did not occur, particularly in years of low runoff such as in 1987 and 1988. What was more troubling, even in good water years such as 1985, implementors took actions which resulted in poor flows for fish. Blumm (1990) asserts that investing faith in the water budget, especially in the Snake River, was a mistake for those interested in the recovery of anadromous salmonid runs: the Council's staff reported to the Council members as early as 1984 that flow levels resulting from implementation of the water budget in the Snake River were inadequate to meet minimum flow levels recommended by fishery agencies and tribes (Gibson 1984). Despite these reports, the Council members, partially as a result of the scientific uncertainty surrounding the flow issue, refused to make significant alterations in the water budget until the 1991 amendment process.

Despite over a decade of research, there remained in 1993 a limited understanding of how flows affect smolt travel times and more importantly, survival rates. The reality is that it may never be possible to quantify the water budget benefits given the many variables involved and the complexity of the ecosystem. An

independent review of all available scientific work on the issue was released by researchers at Oak Ridge National Laboratories in March 1994. In their conclusion, researchers supported the general relationship of flow and survival. Like other past examinations, they were unable to be more specific in terms of amount of flow needed to achieve higher survival rates (Cada et al. 1994). There remains a significant amount of debate over the water budget's ability to achieve the planning goals of the Columbia Basin Fish and Wildlife Program. Results from this debate have been so problematic that the Council recently took major steps to address it more thoroughly as part of its 1994 Program (NPPC 1994a). The lack of a clear, quantifiable causal relationship between flow and juvenile survival clearly remained one of the most influential factors undermining the water budget concept and efforts to increase its volume.

Planning Process

To what extent were implementors involved in the water budget's planning process?

When Congress passed the Northwest Power Planning Act, it placed faith in the creation of a sound planning process to satisfy regional energy needs while accommodating fish and wildlife and environmental values. The water budget was a product of the process. It was not the isolated idea of one agency or group, but instead was formed from the combination of many ideas arising during the Council's planning process (Ruff 1987).

The two primary implementors, the BPA and the Corps of Engineers, were involved in the initial water budget planning process, the amendment processes and the annual Coordinated Plan of Operations. It was particularly important to have these two agencies involved because they played key roles in implementation. Another reason for their involvement was that the water budget ran counter to their traditional missions and could therefore be perceived as a threat. Water budget operations conflicted with the way in which these agencies historically managed the river system. The Council attempted to reduce the threat and conflict by working through concerns and negotiating agreements. Given the Council's limited authority over implementation, this was a wise decision. Instead of fashioning a plan solely based on the fish and wildlife agencies' and the tribes' recommendations, the Council sought to incorporate facility operators' concerns and constraints into the process. This meant that the water budget was very much a compromise measure. There is little doubt that this approach was far more helpful to the Council in gaining implementors' acceptance for the water budget than if they were not consulted.

While conflicts were undoubtedly reduced by the inclusive planning process, they were not eliminated, as each spring the Corps and/or BPA showed resistance to the water budget. For example, during several years BPA refused to endorse the CPO for the water budget. However, while BPA's resistance was undesirable, it did not fully block implementation. The planning that took place during the CPO meetings was very important from the standpoint of successfully implementing the water budget for that year. The process to create the CPO provided a forum for conflict resolution and negotiation. Though both power and fish interests often came

away from the CPO planning process less than satisfied, it helped to institutionalize the water budget.

Greater cooperation among the various agencies and interests opposing and supporting the water budget also came out of the approach to decision-making that the Council encouraged. During the initial planning stage for the water budget, the Council attempted to create a learning environment between participants and reduce the adversarial posturing (Lawrence, Lee and Palmer 1983). A direct result of the planning process was an increase in communication and cooperation between agencies. Before the Council's planning process, fishery agencies and hydroelectric facility operators and regulators rarely communicated.

Another benefit of the planning process was that it helped bring state and federal fish and wildlife agencies and basin treaty tribes together in an alliance. After the numerous court battles over harvest rights between state agencies and basin tribes during the 1970s, the working relationship that developed between these groups in the 1980s surprised many. Although the Council cannot be credited with the cooperative environment which emerged between the tribes and agencies, the Council did provide an important forum and reason for coordination. Speaking with "one voice" instead of different voices increased the agencies' and tribes' ability to influence the Council's decisions and ultimately impact river operations. In the eighties and early nineties, although there remained areas of disagreement, the tribes and agencies developed an alliance. This was demonstrated in 1990 when they opted to have only one fish passage manager representing both groups instead of each having a separate manager.

A short-lived success of the Council's planning process was the decrease in adversarial action through the courts during the eighties. The planning process created a regional forum in which disputes between parties could be voiced and negotiated. Also, fishery advocates who had been filing petitions under the 1973 Endangered Species Act in the late 1970s, were willing to place faith in the Council's Program in the 1980s. This situation changed in the 1990s. Decreased run sizes and increased frustration and a lack of confidence in the Council's Program on the part of fishery advocates became apparent by the increased number of petitions for Endangered Species Act listing. This changing climate was also apparent when reviewing the increased number of suits filed against the BPA, the Corps and even the Council. Fishery interests were no longer willing to rely solely on the Council's plans to provide "equitable treatment for fish."

In spite of the increasingly litigious atmosphere, the Council's planning process helped to legitimize the water budget among other influential parties in the region. Conducting an open decision-making process and allowing all concerns to be heard and considered helped the Council gain support from important actors in the regional such as politicians and interest group leaders. Political support and credibility are important resources for any institution, but it was particularly critical for securing implementation of the fish and wildlife program since the Council's authority over the Corps and the BPA was and continues to be limited. Instead of creating a "Council Program," the Council helped create a "Regional Program." Program implementation was also less likely to be reversed given the support generated among a broad base of interests in the region (Lee 1991a).

The Council's planning process and the annual CPO were important assets for securing implementation of the water budget. Groups and individuals with direct interest in and responsibility for the water budget became and continue to be involved. Equally important was the legitimacy and political support generated from these planning efforts. In 1993, although still hampered by opposing values and objectives, communication was more commonplace between fishery interests and river operators. Bringing together the various implementors and other interested parties was one of the Council's greatest successes.

Structure of Water Budget Implementation Process

To what extent was the water budget structured to maximize the probability that implementors would perform as desired?

Implementors' Attitude Regarding the Water Budget

The two main federal agencies involved with water budget implementation, the Corps and BPA, were not sympathetic to the flow needs of anadromous salmonids nor the Council's intrusion into their operations. This stemmed largely from the fact that these two agencies' historical missions did not include a responsibility to fish and wildlife. Both agencies had river operation obligations under other statutes which preceded the passage of the Northwest Power Planning Act. Balancing their new responsibilities to fish with their ongoing responsibilities was admittedly difficult for both agencies (George 1993). It was particularly challenging for the regional office of the Corps, whose orders from its Washington D.C. headquarters stressed flood control, navigation and hydropower operations. The Corps' regional implementors

found themselves occasionally caught in the middle of conflict as they had to be accountable to not only the regional Act but also to their national headquarters and to other federal legislation. The Chief of the Corps' Water Management Branch, pointed out that the Corps was bounded on all sides by legislative and legal arrangements and this complicated their ability to implement measures such as the water budget (Dodge 1993).

Clearly, both BPA and the Corps had an obligation to fish and wildlife under the 1980 Northwest Power Planning Act. But it remained unclear what their exact obligation was. Congress did not clearly spell out the federal agencies' implementation duties. Bonneville's responsibilities under the Act were more extensive than those of the Corps and somewhat more well defined. Although BPA clearly resisted full implementation of the water budget in many years, its actions on the whole were more in accord with the Council's Program than those of the Corps, Bureau, or FERC (Lee 1993).

Despite the Council's intent, both the Corps and BPA were guilty of neglecting full water budget implementation in an effort to reduce losses to hydropower operations. This was demonstrated from the beginning when during several weekends in the spring of 1984 the Corps reduced flow releases well below amounts requested by the fish passage managers in order to match the drop in power demand (Figure 8). On Memorial Day weekend that year, these actions resulted in a drop of weekly flows averaging around 140 kcfs to weekend flows as low as 90 kcfs (FPC 1984).

Conflicts between the Fish Passage Center and the Corps and BPA erupted over issues such as control over timing of flows in average or better runoff years, flow requests for the lower Columbia, weekend flow fluctuations, scheduling of water budget requests, and the provision of base power flows. Generally, most conflicts occurred because the Corps and BPA had significantly different operating objectives from the Fish Passage Center.

One of the most difficult issues to resolve was the conflict over the accounting procedure. Essentially, the Corps followed an accounting method which "used up" the water budget volume more quickly than would have occurred under the method advocated by the fish passage managers (see page 87). The Corps' method was less advantageous for fish flows than it was for power generation. Although the Council prescribed an accounting procedure in its 1987 amendments, it remained a contentious issue between the Corps and the Fish Passage Center (Filardo 1993). For example, in 1993, the Fish Passage Center contended that although they had not made a request for a water budget release in the Snake, the Corps began debiting the water budget account when they made flood control releases (FPC 1994).

Maintaining higher reservoir levels during the period preceding the spring migration season for the water budget also conflicted with the flood control responsibilities of the Corps. Preceding the spring runoff season, the Corps called reservoir operators in the Basin to draft storage levels to the flood control rule curve (See page 35) in order to make room for the spring snow melt. Drafting a reservoir to the flood control curve in early spring meant that a reservoir had less water to provide for the water budget during late spring. Recognizing this problem, the

Council requested that the Corps reevaluate their flood control rule curves for each reservoir (NPPC 1987a, 164). In compliance with this request, the Corps modified the flood control rule curves in the late eighties. These modifications allowed operators to maintain higher reservoirs levels in the months preceding the water budget (Corps 1987).

The Corps also demonstrated resistance to the water budget in the Snake River by only contributing 300 thousand acre-feet (Kaf) of shapable storage in Dworshak instead of 600 Kaf. The other 300 Kaf, which were not guaranteed, were to be released as power demands dictated, which infrequently occurred between 1983 and 1991. This resulted in total releases of less than 600 Kaf when the critical water year was approached (Dodge 1990). When asked about their limited commitment the first years of water budget operations, the Corps stated that they were unable to provide any more guaranteed volume for the water budget under the environmental assessment which they filed (Gibson 1984).

Bonneville also slowed the negotiation process with Idaho Power Company (IPC) over use of storage in Brownlee reservoir for the Snake River water budget. In March 1985, IPC sent BPA a draft agreement to provide storage releases from Brownlee for the water budget. That year, if the proposed releases by IPC had been agreed upon, outflows at Lower Granite would have been above the minimum flow level during the peak smolt migration period (Sheet 1985). Bonneville chose not to execute the agreement and flows were lower than the minimum flow target during part of the outmigration period.

Given the Council's limited enforcement authority and the Corps' unclear implementation responsibilities, why did the Corps implement the water budget? The Chief of the Corps' Water Management Branch, said his agency, along with others, implemented the water budget because they thought it would help reverse the trend of declining salmon populations (Dodge 1993).

Sufficient Jurisdiction over Resources

During most years between 1983 and 1990, the Corps had sufficient control over facility operations to satisfy the mid-Columbia water budget requirements. An exception occurred during critically low runoff years. During these years arrangements were negotiated with B.C. Hydro for use of water stored in Canada. Implementing the 1991 amended mid-Columbia water budget required that water from Canadian projects, such as Keenleyside Dam (Arrow Lakes), be increasingly relied upon. For example, in 1993 a series of three agreements made with B.C. Hydro (which manages the three Columbia Treaty Projects), secured water releases from Columbia River Treaty Projects to supplement U.S. storage releases. Canadian releases are typically negotiated on a yearly basis and cannot be guaranteed. Increasing the reliance on Canadian storage makes full implementation of the water budget both more tenuous and costly.

In the Snake River, effective implementation of the water budget was stalled from 1983 until 1987 essentially because of limited storage capacity and a dispute over responsibility for its provision. The Council's program did not specify the method of allocating flows between two designated reservoirs. Instead it instructed

the BPA to secure flows through an agreement with IPC for use of Brownlee's storage, and the Corps to specify the amount available from Dworshak. From 1987 to 1990 the Corps' Dworshak Dam provided 65 percent of the Snake water budget volume from storage while the other 35 percent came from IPC's Brownlee Dam. It must be remembered that the water budget from storage in the Snake only amounted to a third of the 1.19 Maf called for by the Council.

In the case of Brownlee Reservoir's contributions, IPC and BPA did not reach an agreement until 1987. The final agreement provided much less water than was expected when the water budget was adopted. It was originally anticipated that yearly Brownlee would contribute 600 Kaf (Dodge 1993). The amount provided during the years of 1987 through 1990 averaged only around 110 Kaf. In addition, IPC retained the option not to provide flows if projected reservoir refill would be jeopardized. The lack of control over IPC's actions made guaranteeing the water budget volumes for fish in low runoff years in the Snake even more unlikely.

Integration of Implementing Agencies

Implementation of the water budget required modifications to the institutional environment managing the river system. The hydro-electric facilities operations already had a significant amount of coordination. The Pacific Northwest Coordination Agreement (PNCA) was the primary mechanism for achieving this integration. In addition, the Corps, through their operating requirements for flood control at each reservoir, could command some reservoir operations. The Corps' overriding authority over reservoir levels at each project and the operators'

obligations under PNCA limited the ability of the numerous actors to block the water budget flows. An exception occurred in the Snake River where IPC had control over a portion of the water budget's volume. Although IPC had to comply with the Corps' flood control rule curves, the company operated somewhat independently from the coordinated operating environment agreed upon by other hydro-facility operators.

One of the most difficult aspects of water budget implementation was bringing fishery interests into the decision-making process guiding river operations. The power and fish organizations in the basin were not integrated and had not cooperated with one another in the past. Communication was hampered by distrust as well as many institutional boundaries. It is not surprising that conflicts continued to surface between the Corps and the Fish Passage Center over the operation of the water budget.

Financial Resources

Revenue generated from the sale of federal hydropower financed water budget operating expenses. A contractual arrangement with the BPA provided the funding for the Fish Passage Center's staff and operations. There were three important benefits from using BPA ratepayer financing. First, the BPA's "deep pocket" allowed the Council to avoid lengthy delays and uncertainties involved in the Congressional authorization and appropriation process. Second, billing those who benefit from hydroelectric facilities for the external cost of fish and wildlife losses appeared to present a fair financing scheme. Lastly, the Northwest ratepayers had more of an opportunity to influence the Council's budget requests than the Federal Office of

Management and Budget or the Congressional Appropriations Committees.

Despite these benefits, there were problems involved in BPA's funding: on several occasions BPA made attempts to reduce or withhold funding. On July 8, 1985, in a clash over objectives, management prerogatives and obligation to fund technical support, BPA accused the Fish Passage Center of being a special interest advocacy group for fish. Based on this, BPA stated that the Fish Passage Center was not eligible for financing from ratepayer money (NPPC 1985a). In spite of periodic disputes, BPA financing continued to be a positive force for implementation of the Council's water budget.

Relative Strength of Support Groups

The Council approached organizational leaders within and outside the government to develop a constituency for its Program (Lee 1989). Groups and agencies who opposed the Council's water budget were typically those who wanted to maintain river operations as they had been before the passage of the 1980 Northwest Power Planning Act. Groups who opposed the water budget, such as the utilities and the Direct Service Industries, were highly organized and had a history of involvement and influence in the development and operational arrangements guiding the Columbia River. Even though increases in electric rates as a result of the water budget were largely unfelt by ratepayers, both the utilities and DSIs felt an obligation to act as watchdogs over water budget operations to ensure that the benefits outweighed the costs (Lee 1993).

Supporters of the water budget were the state fish and wildlife agencies, basin treaty tribes and many environmental groups. The Council's Program was one of the few avenues that supporters had to gain access to and influence over policies guiding river operations. Those organizations and individuals who supported flow augmentation for fish historically had been blocked out of the decision-making process for river operations and had not been as organized as the utilities and DSIs. In general, many of the supportive groups possessed significantly fewer resources to influence the decision-making process. This unequal power of the supporters and opponents worked against full implementation of the water budget.

Institutional and Behavioral Modifications

To what degree does the water budget require broad institutional and/or behavioral modifications from implementors?

In the Columbia Basin Fish and Wildlife Program, the Council directed federal project operators and regulators to incorporate the water budget into all systems planning and operations performed under the Columbia River Treaty, the Pacific Northwest Coordination Agreement, all related reservoir rule curves, and in other applicable procedures affecting river operations (NPPC 1987a, 56). The Council further called for the water budget to be treated as a "firm" constraint (mandatory) in river operations. This meant that a volume of water had to be retained in storage reservoirs during the months preceding the spring migration period instead of releasing it for power production.

Because reservoirs had been generally operated to maximize firm power production and meet flood control requirements, implementing the water budget required river operators to make significant modifications. Responsibility for guiding the institutional change fell largely on the Corps' Reservoir Control Center. To implement the water budget, the Corps set operating limits for upstream reservoirs located in the U.S., and called for operation of the downstream dams to allow for the flow. Establishing new operating limits required that the Corps readjust operating rule curves at each reservoir. More water was needed in storage for the spring migration season so less could be released in the winter for power generation. The firm energy curve (See page 35) had to be seasonally shifted. Less electricity could be guaranteed during the fall and the winter but more could be guaranteed during the spring. The water budget was incorporated as a nonpower constraint into system operations in the 1984 annual operating plan for the river (FPC 1984).

The Corps, through its Reservoir Control Center, was ultimately in control of the flow of the river. This agency set the overall limits for reservoir water levels and river flow rates. Non-federal dam owners were required to comply with the Corps' limits in order to maintain their operating licenses from the FERC. The FERC licensing process provided the enforcement mechanism for non-federal operations despite FERC's reluctance to implement the Council program (Lee 1991b, 360).

In addition to modifications on the part of U.S. entities, Canada was also asked to change some of its operations. Because the 1964 Columbia River Treaty with Canada only addressed power and flood control, the Council was unable to incorporate the water budget into Treaty operations. The Canadians were not

particularly enthusiastic about their reservoirs' storage augmenting fish flows in the United States (George 1993; Ruff 1993). Bonneville however negotiated contracts with Canada for improving water budget flows. For example, in 1988 BPA and B.C. Hydro negotiated a deal in which B.C. Hydro would reduce its power generation in the spring and receive electricity from BPA over the Northwest High Voltage Intertie. Between July 1 and November 30, that energy in the form of water would be returned to U.S. reservoirs. This allowed BPA to sell extra power generated during the water budget period while also having greater assurance that U.S. reservoirs used for the water budget would refill during the summer and early fall (Nutt 1988).

The river operators and regulators who modified operations to meet water budget requirements were a well defined group in the Columbia Basin. In addition, these entities were linked together through arrangements such as the Pacific Northwest Coordination Agreement and the Northwest Power Pool (an association of generating utilities and agencies and regulators). Although these arrangements exist primarily to maximize power benefits, the resulting coordination facilitated incorporating the water budget into river operations on a basin-wide scale.

Although significant modifications were required to integrate the water budget into reservoir operators' plans, the coordinating mechanisms existing between the Corps and the other river operators and regulators helped expedite the process. The Corps' authority and experience placed them in a good position to integrate the water budget into river operations. In spite of this, the Corps said it took thousands of work hours and a tremendous negotiation effort to incorporate the water budget into system operations (Dodge 1993). Implementation was facilitated because a well

defined and organized group was charged with making the institutional modifications. The political influence of hydroelectric facilities operators and regulators, though still significant, had weakened in the 1980s and early 1990s as society's values shifted to some degree from steadfast adherence to traditional utilitarian goals such as maximizing hydropower generation to more appreciation for leisure/aesthetic goals such as maintaining healthy ecological systems.

Political Support

What was the level of political support for the water budget among key state policy-makers and state administrations?

Given its limited statutory authority, the Council's influence over implementors' actions could be strengthened by unified support from the political administrations and policy-makers of the four states. At times, the Council relied upon policy-makers to pressure BPA and the Corps into action (See Hamilton and Durbin 1993; Laatz 1993b). However, just as unified regional support positively influenced implementation, disagreement and dissention among the states weakened the Council's influence. The four states, as would be expected, viewed the water budget differently.

Created as a compromise between fish and power interests, the water budget produced relatively little regional conflict between 1983 and 1990. During these years, the water budget at times received a high level of support from the four states. This stemmed largely out of hope that the measure would help increase anadromous salmonid runs while only imposing minor negative impacts on hydropower operations.

Actual increases in electric power rates for the region's ratepayers due to the water budget were small. Since the cost of the water budget during the first eight years was mostly limited to power, relatively few complaints were filed by other river users (George 1993; Ruff 1993). An exception occurred during some low flow years like 1987 when individuals in upstream communities with revenues tied to reservoir recreation filed complaints about low reservoir levels. These individuals argued that water budget releases in the spring resulted in lower summer reservoir levels. This was an erroneous connection, according to Russ George at the Corp's Reservoir Control Center, who insisted that low annual runoff and not the water budget was responsible for low reservoir levels (George 1993). George speculated complaints would have been filed with or without the water budget.

Unified support from the four states began to erode in the early 1990s as the Council started deliberations on a water budget amendment. The new water budget was more controversial partially because when fully implemented, it would not only imposed higher losses on hydropower operations but would also impact other river users. As a result, the Council faced increased regional disagreement over its main downstream flow measure. Dissent threatened to become serious in the upper Columbia between the upstream state of Montana and the downstream states of Oregon and Washington. Conflict also surfaced in the Snake River between Oregon and Washington and the upstream state of Idaho.

Unlike the other three northwest states, Montana does not have anadromous salmonids. However, until the late 1980s Montana did not exhibit strong resistance to the water budget despite the fact that reservoir storage located in Montana had been

used to improve flow for downstream migrating salmonids (Ruff 1993). Storage from Libby and Hungry Horse reservoirs, located in Montana, were used to fill Grand Coulee, located in Washington, for spring flow augmentation. Despite some degree of support for the Council's efforts, the last two administrations in Montana during this study period argued that too much water was provided for the benefit of out-of-state fish. A prevalent feeling began to surface in Montana that its citizens were being forced to sacrifice recreation in Libby and Hungry Horse Reservoirs to mitigate losses caused by downstream uses (Interagency Team 1993). Montana's policy-makers and residents also expressed concern that releases from these two facilities for water budget purposes were harmful to Montana's resident fish population. The possible listing of resident fish species such as the white sturgeon and the bull trout under the 1973 Endangered Species Act (ESA), further fueled Montana's objections. Governor Mark Racicot testified before the Council that inexpensive electricity, tourism and healthy fisheries were important to Montana and should not suffer from downstream salmon recovery plans (NPPC 1993b).

The water budget also drew additional opposition from the upstream state of Idaho. Policy-makers and special interest groups such as irrigators and recreators became increasingly critical of the Council's effort to solve the Snake River salmon problem with what they considered to be Idaho's water when downstream dams were to blame. In the early 1990s, the governor of Idaho, Cecil Andrus, advocated drawing down reservoirs at the Corps' projects in Washington State to increase river velocity in the Snake instead of increasing the water budget's volume. His administration argued that velocity, not quantity of flow, would have the greatest

positive impact on juvenile travel times. Because it would not require large water releases from reservoirs located in Idaho or conservation measures by Idaho farmers, the drawdown approach would protect upstream irrigators that draw heavily on water from the Snake River. Idaho policy-makers were also critical of storage at Dworshak being used during the spring to increase fish flow. The releases at Dworshak called for under the new water budget adopted in 1991, would leave boat ramps, docks and marinas unusable or diminish their utility appreciably during the summer recreation season.

Because of the rapid decline in anadromous salmonid populations and the actions taken to list specific species under the ESA, it was much more difficult for the Council to reach an agreement over the downstream passage measures in the 1991 amendment process. During amendment discussions, conflict was often bitter over the amount of flow needed to improve downstream passage conditions and periodically threatened to divide both the region and the Council. At the same time, the governors of the four states were acutely aware of the importance of regional support for the Council and its measures. A unified backing from the region would have made it more likely that NMFS include the Council in its planning process to devise a recovery plan for species listed under the ESA. The Council was the four states' primary instrument by which to influence NMFS's recovery plan. Because of the potential negative economic impacts of a federally devised recovery plan, each of the four governors attempted to show some degree of unified support for the Council's program. In December of 1993, the governors of the four states each publicly acknowledged their support for the Council's Program and called for its

immediate implementation (NPPC 1994b).

Organizational Structure of the Council

How well does the Council's organizational structure facilitate water budget implementation?

Role of Integrating Power and Fish

The Council was given a unique regional role to plan for both the region's long range electrical demands and the recovery of the fish and wildlife harmed by hydroelectric power development and operations in the Columbia Basin. This dual role was both beneficial and harmful for implementation of measures like the water budget. It was beneficial because the Council's dual mission facilitated involvement with both power advocates and fish and wildlife advocates. If the Council was solely created to develop a fish and wildlife recovery plan, then its access to and communication with hydropower operators would have been more limited. Hydropower operators would have viewed the water budget with considerable suspicion like most other measures requested by fishery advocate organizations. By establishing itself as planner for electric resources, the Council gained greater access to the power planning and acquisition process.

Playing both roles of power planner and fish protector also proved to be a disadvantage for water budget implementation. John Volkman, Senior Legal Attorney for the Council, said that at times it was difficult for the Council's staff to deal with these sometimes opposing missions (1993). The power division in the Council always had the advantage partially because less uncertainty was involved in power planning

than in developing a program to bring about recovery of salmon in the Columbia Basin. The Council's power division was satisfied with the original water budget because it had a minimum impact on the region's energy picture. The fish and wildlife staff, however, were displeased with the water budget amounts but were unable to provide the data to justify volume increases (Volkman 1993). Fishery interests pointed out that the Council was more zealous in its power planning role than its fish and wildlife protection role, and less willing to pursue conflict with the Corps or BPA when water budget implementation problems arose (Filardo 1993). Partially as a result, the Council did not achieve the same leadership position for fish and wildlife that it did for some energy related matters.

Another weakness of the Council's role which negatively impacted water budget implementation was that the Northwest Power Act did not give the Council authority to make decisions which impact water rights or land use planning. Mark Maher, a former water budget manager, noted that the Council's lack of authority over irrigation rights impeded operations of the water budget in the mid-Columbia in 1984 (Kadera 1984). The problem occurred when requests for Grand Coulee Reservoir releases were denied because the Bureau of Reclamation was obligated to maintain certain reservoir elevations to meet demands for irrigation and resident (non-migratory) fish.

Until the nineties, the Council was very careful to stay within its official charge. After the Salmon Summit (see page 141) ended in 1991 without a regional recovery plan, the charge of the Council was unofficially expanded. At the request of the governors of Idaho, Washington and Oregon, the Council was called to look at all

impacts on the salmon (not just hydropower) and devise an integrated recovery plan (NPPC 1992a, 7). With its new charge, the Council released the Strategy for Salmon in 1992 which included measures impacting a wide range of users. Implementation of the amended version of the water budget in both the Snake and the Columbia not only impacted hydropower operations but also to some degree irrigation, navigation and recreation.

Jurisdiction

The Council's jurisdiction encompassed all significant portions of the Columbia Basin in the United States. This was clearly more advantageous in implementing the water budget than a more spatially restricted jurisdiction given implementation took both cooperation and/or water releases from projects located within each of the four states. The Council's lack of jurisdiction over headwaters of the Columbia Basin located in Canada posed another challenge in some years. Although the Canadian portion only amounts to 15 percent of the Columbia's drainage area, it accounts for approximately 30 percent of the river's total runoff. While it would be much easier to guarantee the full water budget volume in the Columbia in low runoff years if the Council had authority to guide B.C. Hydro's operations (the operator of the major storage facilities located in Canadian portion of the Columbia), a regional subnational organization of one country cannot be expected to have such authority over the resources of a sovereign state.

Although the U.S. storage facilities had sufficient volumes of water to provide for the mid-Columbia water budget in most years in the eighties, Canadian storage

was important for the water budget in the mid-Columbia in a few low run-off years like 1988 (George 1993). The increased volume in the mid-Columbia water budget made in 1991 also means that releases from British Columbia would be needed more often.

Relationship to Agencies Implementing the Water Budget

The Council's working relationships with BPA and the Corps were important to implementation since the Council lacked any real enforcement authority over these agencies. Instead, the Council had to rely upon these agencies' cooperation. When implementors did not act in "good faith" the only recourse the Council had was to voice its complaints directly to state policy-makers and members of Congress. In fact, the Council sometimes used key political figures in the region to pressure BPA and the Corps into greater compliance (Laatz 1993a).

In the early and middle 1980s, there was a great deal of friction and adversarial posturing between the Council and the Corps and BPA. Dan Evans, the first chairman of the Council, used the phrase "creative tension" to describe the Council's relationship with BPA (NPPC 1986a). By the mid-1980s, the public rhetoric between the Council and the Corps and BPA was often more negative than the day to day working relationships (Mahar 1986). A change in the BPA administrator, the Corps' Chief, or Council members often brought about changes in the relationships between the organizations. The most obvious example occurred when in 1987 Jim Jura was appointed as the BPA Administrator. Jura was much more cooperative with the Council than the previous administrators had been. As a

result, the Jura tenure helped to greatly improve the relationship between the Council and BPA (Fazio 1993).

The Council also holds more leverage over BPA than it does the Corps. The Council, through its power plan, defines the resources which can be acquired by BPA to meet the region's energy demands. Any major resource acquisition which BPA wishes to make must first be checked by the Council. Thus, one might assume that it would also be advantageous for BPA to pursue a good working relationship with the Council. Despite improved relations, the Council's lack of authority over the Corps and BPA continues to challenge program implementation. This manifested itself in the early 1990s in the battle between the Council and the BPA over the level of program funding (Hamilton and Durbin 1993).

Credibility

Given its limited authority, the early members realized that the Council needed to establish its credibility with power and fish interests as well as regional policy-makers in order to influence the implementation of its program (Evans and Hemmingway 1984). The Council worked to establish its credibility as a "fair" planning organization. The organization's credibility largely came from the open regional planning process and record of careful analysis. The Council also established credibility among regional policy-makers by producing a program which on the surface appeared to be able to balance the region's needs for electricity with the needs of anadromous salmonids. The Council's membership itself increased the organization's credibility among policy-makers. The political connections and

contacts of members such as former Governor Dan Evans of Washington State (who led the effort to create the water budget) added stature to the Council's political standing in the region.

Among fishery and environmental interests, the Council did not maintain a high degree of credibility. When first released, the water budget drew praise from a wide audience in the fishery field. Some fishery advocates including Michael Blumm, one of the Council's most vocal critics in the late 1980s and early 1990s, initially applauded the water budget (Blumm 1983b). During the mid to late 1980s when it was apparent the water budget would be unable to guarantee sufficient flow in low runoff years, fishery interests leveled sharp criticism toward the Council and its flow measure. Professionals in fish and wildlife organizations attacked the Council's lack of knowledge, experience and commitment. Jim Goller, a former Council Chairman from Idaho, remarked that during its ten year existence the Council had not been able to move into the leadership position for the fish and wildlife program in the same manner as it had for the power plan (1991). The high degree of scientific uncertainty over the water budget's impacts on smolt survival, agency friction and competition for authority, and limited success in achieving its goals hampered the Council in its leadership role.

As of 1993, fishery advocates often accused the Council of succumbing to regional power politics. Andy Kerr, Conservation Director for Oregon Natural Resources Council (ONRC), said the Power Planning Council was unwilling to ask for more than the Corps or BPA felt like doing (Kerr 1993). As a result, his organization filed a lawsuit against the Council for failing to carry out its

responsibilities under the 1980 Act. The ONRC suit contended that the Council's measures did not provide flows or velocity of sufficient quantity in the Snake and Columbia rivers to improve production, migration or survival of anadromous salmonids.

Changing Priorities and Goals in the Northwest

How high a priority are the original statutory goals of the Act for key actors in the region, how have priorities changed over time due to the emergence of conflicting public values, and how have changes in relevant circumstances and socioeconomic conditions affected the political support for the Act and the water budget?

After the water budget was established in 1983, a number of socioeconomic, political, and environmental events in the region altered priorities regarding the fish and wildlife goals set forth in the 1980 Northwest Power Planning Act. As of 1993, some of these events increased the region's commitment to the water budget while others threatened to weaken it. However, there is little doubt that both the original fish and wildlife goal of the Act "to protect, mitigate and enhance fish and wildlife... of the Columbia..." and the general objective of the water budget "...to increase flows for juvenile migration..." were higher priorities in the early 1990s than during the previous decade.

Some of the more important incentives for participation in the water budget stemmed from regional events such as the listings of some of the Columbia Basin salmon runs under the 1973 Endangered Species Act (ESA). An unprecedented decline in several salmon runs coupled with a heightened awareness of the decline

increased many key actors' commitment to the Act's fish and wildlife provision and the water budget objective. Petitions under the ESA filed in the early 1990s and the listings which followed generated the political will for greater regional action. These listings also made more citizens in the Northwest aware of the real environmental costs of hydroelectric operations.

While in the late eighties it appeared that actions taken under the Council's program were having a positive impact on runs, the numbers in the early 1990s suggested a different story. During the first years of the 1990s, the run sizes declined dramatically. As a result, a number of groups petitioned the NMFS to list several species as endangered under the ESA.

A political response to the threat of species listing under the ESA was the Salmon Summit. Under the leadership of Oregon's Senator Hatfield, approximately 30 individuals representing agencies and interests involved in river and anadromous salmonid issues met from October 1990 to March 1991. As a direct result of those meetings, river operators committed more water from storage to the Snake River water budget in the spring of 1991 (Wilkinson 1992, 216; Volkman 1992, 13).

The Salmon Summit ended without the participants reaching consensus on an integrated regional recovery plan. When this happened, the Northwest governors made a request that the Council take-up the task (NPPC 1993b). When the Council accepted the mission, the regional spotlight was redirected toward it. In the early nineties, the Council and its program received greater public attention and encouragement from various policy-makers in the region. However, with the NMFS's appointment of a Snake River Salmon Recovery Team in 1993, some of the

attention shifted away from the Council. The recovery team was an independent research group appointed by NMFS, to make recovery plan recommendations for the endangered Snake River Sockeye. The NMFS is presently (1995) using those recommendations to draft a final recovery plan for the Sockeye. By law, NMFS's final recovery plan will supersede the Council's Program. Technically the water budget could be discarded. It is apparent, however, that some sort of flow augmentation measure will remain in place as the NMFS recovery team in its final recommendations, called for a continuation of the Council's water budget until additional research could determine whether the measure was effective in improving smolt survival (Bevan et al. 1994, 17).

A shift in power from the Council and the Fish Passage Center to NMFS as a result of actions taken under the ESA, was apparent during the 1992 and 1993 water budget period. Unlike previous years the NMFS's Biological Opinion (a document which came out of NMFS consultation with federal river operators), not the Council-created Fish Passage Center, governed flow releases late in the spring migration period. A concern about actions taken under the ESA is that the recovery process targets single species, in this case the Snake River Sockeye, while other species' needs are not fully considered. The Council's program (unlike NMFS's future recovery plan) was developed to address all fish and wildlife in the Basin, not just the Snake River Sockeye.

As of 1993, another event which had the potential to impact water budget implementation was the new federal administration. Efforts to devise a strong salmon recovery plan are more likely to be supported by the Clinton Administration than the

previous two conservative administrations. A second factor which had the possibility to impact implementation in 1993 was the possibility that the Council's legislative authority and role was going to be changed. After reviewing complaints over the weak linkage between the Council's efforts and federal implementors' actions, Congressman Peter DeFazio of Oregon stated that the organization could either be given more authority or that the members might be replaced by presidential appointments (Laatz 1993b). Either alternative would increase the Council's influence vis-a-vis BPA and the Corps.

Events that threatened to detract regional attention and commitment from the water budget and the fish and wildlife goal of the 1980 Act included a predicted regional energy shortage and a decline in BPA's financial status. Throughout the eighties, the region enjoyed a surplus of electricity. This was an advantage for securing implementation of the water budget because the surplus gave managers greater flexibility in modifying hydroelectric operations. The energy picture in the region changed by the early 1990s. As of 1993, the Northwest was in load resource balance (demand is equal to supply), but power shortages were forecast for some areas by the end of the century (NPPC 1991). Shifting water from hydropower operations to fish migration will eventually require that BPA and the utilities acquire new energy resources. If utilities are forced to develop more conventional resources such as thermal plants, regional electrical rates will increase and the region will be faced with other environmental costs.

In addition, BPA, the funding source for the water budget, owed the U.S. Treasury billions of dollars as of the early 1990s. In 1983 BPA was handed a heavy

financial burden when Washington Public Power Supply System (WPPSS) defaulted on $2.25 billion of municipal bonds borrowed to construct and finance five nuclear power plants. Compounding this problem, BPA's profits are at the mercy of the weather and the world prices for aluminum and petroleum. In the early nineties, a regional drought and a declining world aluminum market decreased annual receipts. Moreover, lower petroleum prices usually translate into less sales over the extra high voltage intertie to California. This put added pressure on the BPA to increase revenue through power sales. The loss of revenue from the water budget was approximately $40 million per year during the 1980s but increased to an estimated $55 million per year after the 1991 water budget amendments were adopted (Ruff and Fazio 1993). As BPA's debt increased, the agency attempted to reduce monetary commitments made to the Council's Program. This forced the Council on several occasions to challenge BPA's proposed funding for the fish and wildlife measures.

Given the increase in actions on the part of regional and federal policy-makers and agencies, the fish and wildlife goal established under the 1980 Northwest Power Planning Act, "to protect, mitigate, and enhance fish and wildlife... of the Columbia River and its tributaries, particularly anadromous fish... (16 U.S.C.A. 839(6))" was an even higher priority by 1993 than it had been the previous decade. The Council's general water budget objective "...to increase flows, for juvenile migration during the spring months" was also a more critical concern in 1993 than it had been earlier. The ESA listings in the fall of 1991 and the spring of 1992 presented a loud wake-up call to the Northwest. In addition, the Corps, BPA and their constituencies were somewhat more willing to comply with the water budget measure when it became

clear that the ESA posed an even greater threat to their operations. Despite the shift of events toward greater consideration of anadromous salmonid species, the water budget faces a future where the economic value of water for power as well as for other uses is going to go up.

Summary of Chapter Five

The Council adopted the water budget in 1983 to address flow needs of downstream migrating anadromous salmonids. The implementation of the water budget which occurred from 1984 through 1993 produced mixed results in terms of flow increases. While the water budget was implemented to some degree each year, there were numerous conflicts between river operators charged with providing the water budget and fishery advocates concerned with downstream migrating salmonid survival rates. The water budget implementation which occurred did not modify river operations in favor of fish to the degree fishery advocates initially hoped it would. In short, the water budget did not produce significant improvements in flow for downstream migrating salmonids. The Snake River water budget operations were less successful than those in the Columbia as the supply available for the water budget was limited by both natural runoff and river operators' unwillingness to draft water from the relatively limited storage.

The results of the implementation analysis indicate that five of the eight criteria for effective implementation were met at least moderately well during the analysis period. Criterion one was met moderately well as the water budget was clearly consistent with the goals of the Northwest Power Act. However, confusion

among implementors over the objectives of the water budget contributed to the implementation problems which occurred.

Criterion two which involved the uncertainty over the water budget's ability to achieve its objective, was one of the three criterion not met. Researchers were not in agreement over the water budget's effectiveness during the ten years. Overtime this divisive issue weakened the support for the measure from key regional actors and reduced some Council members' commitment to improving the measure through the amendment process.

Criterion three, the degree to which implementors were involved in the planning process, was met as many key implementors were involved in both initial water budget planning stages and the yearly planning processes. These inclusive planning processes helped to legitimize the water budget among influential parties and provided a forum for implementors to voice concerns.

An assessment of criterion four, the structure of the implementation process, and the implementation of the water budget revealed that key implementors were not sympathetic to the salmon recovery effort when it meant trade-offs with their operating objectives. Out of the components examined under this criterion, implementors' resistance to the measure resulted in this criterion not being adequately met during the analysis period.

Criteria five and six, institutional and behavioral modifications required by implementors and political support from key actors, were met moderately well during the analysis period. Although significant river operation modifications were required to integrate the water budget into river operators' plans, the coordinating mechanisms

existing between the Corps and other river operators expedited the process. In meeting criterion six, the Council was able to secure and maintain a moderate degree of political support from key state policy-makers and state administrations during the ten years. This support did however, shift as state administrations changed. During the last few years of the analysis period, support eroded significantly from policy-makers in Montana.

Criterion seven involved the Council's organizational structure. The Council's structure was not well suited to securing implementation of the water budget because it had limited authority over resistant implementors and was unwilling to push for greater implementor compliance with the water budget operating requirements. The Council did not make a significant attempt to test its authority over implementors in part because it was at odds internally with its role as a fish protector when trade-offs with power were required.

Finally, criterion eight considered the extent to which the fish and wildlife goal of the Northwest Power Planning Act and the water budget remained a priority for many key actors. Events occurred during the ten-year study period that strengthened and/or weakened key regional actors' commitment to the water budget. The most significant event which impacted this criterion being met was the listing of some salmon species under the Endangered Species Act. While listings increased the commitment of several policy-makers to the water budget and the Council's salmon planning efforts, it also resulted in a shift of power from the Council and the Fish Passage Center to the National Marine Fisheries Service. Factors which threatened to reduce key regional actors' commitment included concern over a predicted energy

shortage in the 1990s and BPA's declining financial resources. It was however apparent that the original fish and wildlife goals of the Act and the objective of the water budget were higher priorities in the early 1990s than during the previous decade.

CHAPTER 6

MODEL CONSERVATION STANDARDS

ENERGY CONSERVATION IN THE NORTHWEST

Two critical issues in the Pacific Northwest which needed to be addressed by the Northwest Power Planning Act were how utilities could provide for increasing electrical demands while keeping the cost to ratepayers and the environment low, and how to decrease the rate disparities between the preference utilities who were receiving large volumes of low cost federal hydropower, and those private utilities that were not. A major component of the congressional solution which evolved out of the regional and national debates over the Northwest Power Bill was conservation. Conservation is defined for the purposes of the Act to be any reduction in electric power consumption as a result of an increase in efficiency of use, production or distribution (NPPC 1983a). When the Act passed, conservation was largely an untapped resource in the region. In the Northwest inexpensive federal hydropower had been a disincentive for making investments in energy efficient technologies.

In the late 1970s, as the cost of electricity began to increase and the surplus supply decrease, conservation began to be viewed as a promising alternative to the region's investment in expensive conventional resources (Lee, Klemka and Marts 1980). Conservation presented the region with an opportunity to avoid or delay many of the economic and environmental costs associated with construction and operation of conventional generating facilities. If the region pursued an active conservation program, it could reduce energy demands and help stabilize electrical rates. Framers

of the Act also hoped conservation could ease the conflict over the allocation of low cost federal hydroelectricity. By investing in demand management, non-preference utilities (privately owned utilities) could delay investing in more expensive generating resources and thus delay increasing their rates to pay for those new resources. Every megawatt saved through conservation was a megawatt that did not have to be generated through new and more costly resource development.

When the Northwest Power Planning Act passed, conservation became one of the key mandated solutions for the region's electrical problems. Congress made it clear that BPA and BPA's preference utilities (public utilities) were to treat conservation as a resource just as they would any conventional generating resource. The newly created regional Council was also called to prioritize the acquisition of conservation over conventional resources when developing the region's long term power plan. The assumption behind the mandate was that conservation was the least cost energy resource available to the region.

As part of the conservation mandate, Section 4(f) of the Act directed the Council to develop, adopt and promote cost-effective and economically feasible model conservation standards (MCS). Model conservation standards are energy efficient performance standards for new electrically heated structures. Of all the conservation measures that could be implemented, MCS for new electrically heated structures are considered to be the most important because they capture lost opportunity resources. Lost opportunity resources are resources that must be captured before a certain point in time to keep them from becoming too expensive or physically impossible to fully take advantage of at a later time. For example, a residential home not initially built

using energy efficient technologies reduces the potential conservation savings that could occur if built in a more energy efficient manner. If the owner decides to increase the energy efficiency some time in the future, it will be costly to retrofit the non-efficient structure and the savings would not be as great over the life of the structure.

The Development of the Residential Model Conservation Standards

The Council began its power planning process with a clear directive to develop MCS for new electrically heated residential structures. In developing the power plan, the Council was authorized and encouraged through the Act to seek "advice" from and "consultation" with BPA and the utilities within the region (16 U.S.C. §839b(g)). However, the Act did not require the Council to solicit recommendations from any group when developing the Northwest Conservation and Electric Power Plan as it did when developing the Columbia Basin Fish and Wildlife Program. Consequently, the residential MCS that went into the first power plan were a product of over a year of the Council's own discussion, analysis, and testing.

Developing the residential MCS entailed five major steps for the Council's staff (Eckman and Watson 1984). The first step involved establishing "base case" housing characteristics or factors which affected energy use in the home. Council staff examined existing energy codes in Oregon and Washington and surveyed current construction practices in Idaho and Montana to help establish base case characteristics for residential construction. Costs for implementing these base cases were also determined.

Step two involved estimating the cost of improving the energy efficiency of structures built to these base cases. For this task, the Council hired a consulting firm to survey builders, subcontractors and suppliers in the region. The results from the survey gave the Council an estimate of possible cost to the region from adoption of different proposed energy efficiency levels for single and multi-family homes.

The third step entailed determining the amount of electricity that would be saved by installing different components of the conservation packages. Components of MCS structures included items such as more efficient wall insulation, windows, and door frames (See Figure 12). The Council and its staff needed to know how well the individual components would perform. A computer model was used to obtain estimated savings from different individual components of the proposed conservation packages. The model calculated energy use on a daily basis taking into consideration climatic data, building thermal performance data and solar radiation data (NPPC 1989a). The Council staff then compared the numbers produced by the model to those generated from houses actually built to the MCS levels. Results from these studies indicated that the model predictions for savings were very close to actual saving achieved in the houses built to MCS (Eckman and Watson 1984).

In step four, the Council staff had to determine if alternative conservation packages would be cost-effective for the region to acquire and economically feasible for consumers. Congress was explicit in defining cost-effectiveness in the Act, but left it to the Council to define economic feasibility. Cost-effectiveness was defined by the Act to mean simply that a given resource cost no more than that of the least-cost similarly reliable and available alternative resource. After exploring a number of

approaches, the Council determined that a MCS home was economically feasible for consumers if it cost less to own and operate over its life than the same house built to current building codes (NPPC 1983a). The Council also stipulated that the annual savings in electrical cost must more than compensate for the net increase after tax in mortgage payments that resulted from the energy efficiency measures used during construction of the home. A standard which meets these two criteria is considered by the Council to be economically feasible.

After the first four steps were completed, the Council had a basic foundation for the residential MCS. The last task required the Council to select the way in which the standards would be conveyed to the region. The Council had to choose between specifying prescriptive requirements for individual building components, establishing a performance standard for each component, or establishing a total energy performance budget for an entire structure. The Council selected the latter and set a ceiling for annual energy use for residential space heating. The organization left it up to builders to pick an array of methods to achieve the efficiency level. Builders or designers were given the flexibility of selecting any number of options for achieving the Council's specific energy use budget. For example, a builder could elect to use better insulation or different energy efficient construction techniques, or even install solar energy technologies.

Reactions to the Council's Proposed MCS

The Council released its draft proposal for the first power plan which included the MCS for new residential buildings in late 1982. More than 1,000 individuals and

organizations submitted comments on the draft power plan and 379 public testimonies were recorded at the Council's public hearings (NPPC 1983b). A large portion of the comments were directed toward the Council's residential MCS. The comments given on the standards eventually resulted in a few changes including a small adjustment to the residential MCS annual space heating requirements.

One of the most discussed issues during the comment phase was the economic feasibility and cost-effectiveness of the Council's MCS. Some groups and individuals disagreed with the Council's estimated cost of implementing MCS. This disagreement was primarily led by homebuilders' organizations, suppliers of building materials and real estate companies. The housing industry argued that the Council's estimated numbers failed to reflect actual conditions under which the MCS would be implemented (NPPC 1982b). The industry feared that the Council's standards would increase the cost of new buildings and negatively impact their marketing potential.

Another heated topic was whether the Council should impose a surcharge on those localities who failed to adopt MCS. The Act authorized the Council to direct BPA to impose a surcharge on those electrical service territories receiving wholesale rates which failed to implement the standards. The surcharge was to be used for "persuading" regional interests to implement the Council's conservation measures. The surcharge was strongly opposed by utilities and local and state jurisdictions. Under heavy criticism, the Council maintained it was the intent of the Act that a surcharge be imposed on the share of a utility's load where a state, political subdivision or utility failed to adopt MCS (NPPC 1983a).

A third issue commented on by a wide audience including BPA, numerous electric utilities, homebuilders and local governments was whether economic incentives should be given to builders constructing houses to MCS efficiency levels. The Council called BPA to provide financial assistance to both jurisdictions adopting the standards and builders constructing the MCS homes. Bonneville and the utilities voiced strong concern over their responsibility for builder incentive programs. Despite this resistance, the Council maintained that it was in BPA's best interest to provide incentives to builders until new codes were adopted (NPPC 1982c). This argument was based on the assumption that the money BPA would save through delayed investment in more costly resources as a result of MCS implementation would be more than the money BPA would spend for the incentives to increase MCS market penetration rates. The MCS market penetration is the number of houses built to MCS levels compared to all the homes built.

Several who made comments, most notably representatives from the Pacific Northwest Utilities Conference Committee (PNUCC) and BPA, suggested that the Council's models used to simulate home energy use overestimated the energy savings potential from implementation of MCS. The foundation for this argument was the fact that the heat loss methodology used by the Council and BPA for new electrically heated buildings constructed to MCS produced different estimates (Harris 1994). The PNUCC, BPA and other utilities were concerned that the Council had overestimated the percentage reduction in energy use per square foot that could be achieved.

Other areas which generated comments included regional penetration rates, the desired level of government involvement in securing region-wide adoption, and

approaches for conservation marketing. Bonneville also raised concerns over indoor air quality as a result of the MCS. Because the standards would reduce the exchange of indoor and outdoor air, there was concern that pollutants typically found within homes would concentrate, becoming harmful to occupants. After numerous discussions with BPA's staff over indoor air quality, the Council recommended installing air-to-air heat exchangers for mechanical ventilation.

The Final MCS and the Council's Implementation Strategy

The first Northwest Conservation and Electric Power Plan was adopted by the Council on April 27, 1983. Conservation was the cornerstone of the Plan and the model conservation standards were considered the most important conservation measure adopted. Although the Council's power plan emphasized conservation in all sectors (e.g. irrigation and industrial) and MCS for commercial structures, it was the MCS for new electrically heated residential structures that were considered most pivotal. The standards represented a revolutionary change for the building industry. The final MCS adopted for residential structures are displayed in Table 5. The standards are listed as annual energy use per square foot per year. The Council estimated that a home which complied with the MCS would use about one-third less of the heating energy required of a home built without the standards (NPPC 1985b).

The standards were calculated for both single family and multi-family residences and also varied according to three different climate zones. The three climate zones are based on the number of heating degree days (Figure 11). Although the zones are generally delineated on the basis of climate, they are also influenced by

political boundaries such as the state boundary between Idaho and Montana. Zone 1 encompasses the mild marine climate west of the Cascade Mountains and a small area east of the Cascades which gets some marine climate influences via the Columbia Gorge. Zone 2 encompasses the more extreme climate east of the Cascade Range except for some of the higher elevations of Idaho where the heating degree days are higher. Zone 3 includes western Montana and some of the higher mountainous elevations of Idaho. Generally, western Washington and Oregon fall in Zone 1, Washington and Oregon east of the Cascades and Idaho fall in Zone 2, and western Montana falls in Zone 3.

Table 5. Model Conservation Standards for Residential Structures.

	CLIMATE ZONE		
Building Type	1 (kWh/sq ft/yr)	2 (kWh/sq ft/yr)	3 (kWh/sq ft/yr)
Single-Family	2.0	2.6	3.1
Multi-Family	1.2	2.3	2.8

Source. NPPC. 1983. Northwest Conservation and Electric Power Plan. p.10-9.

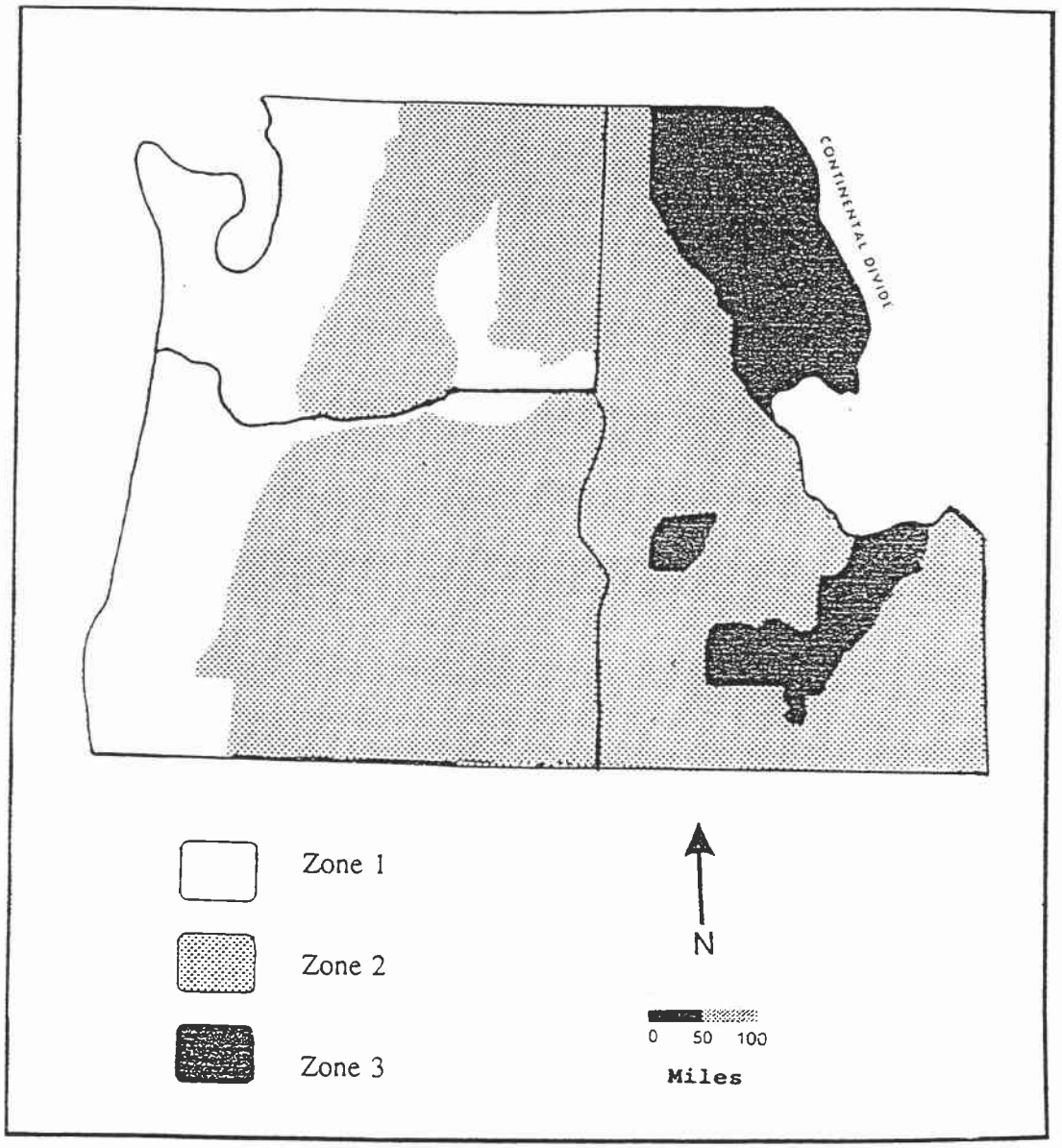


Figure 11. Northwest Climate Zones for the Model Conservation Standards.

Source. BPA. 1992. A Builders Guide to Super Good Cents Construction and Sales. DOE/BP-1828. Portland, Oregon.

Although the MCS took the form of an energy budget, prescriptive building recommendations to help builders meet the standards were outlined in Appendix J of the energy plan. Some of the typical features in an energy efficient home are displayed in Figure 12. The Council's staff had about two weeks to generate Appendix J before the Plan was adopted (Eckman 1994). Because of the adoption deadline, there was not sufficient time to submit Appendix J for public review.

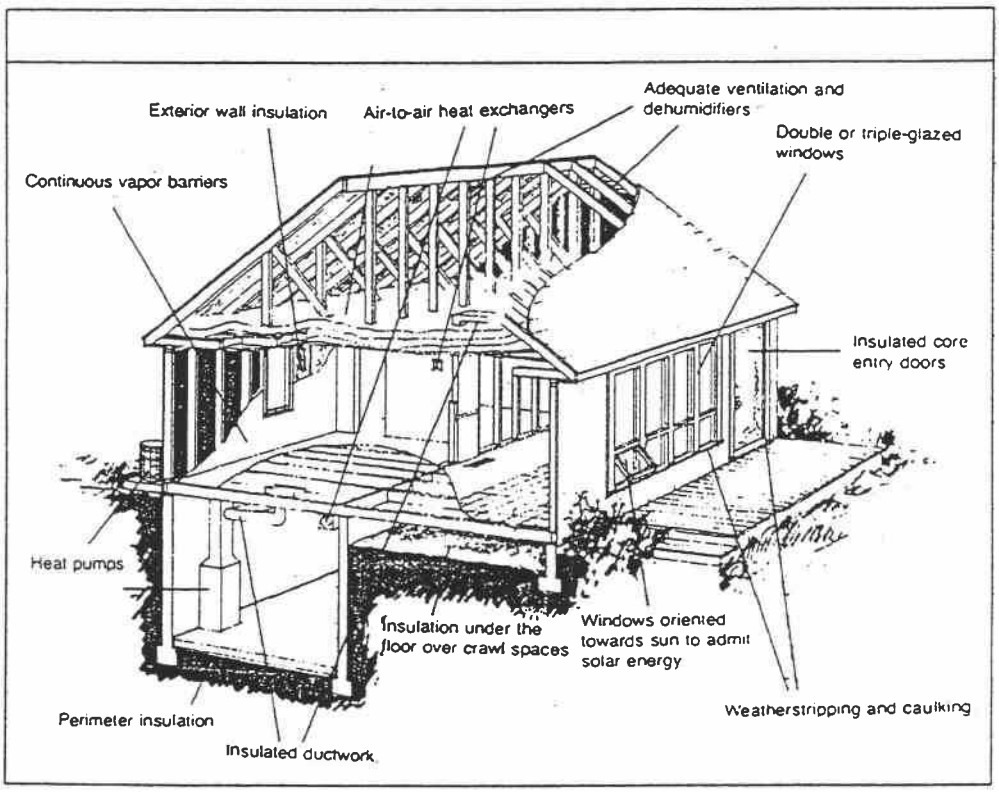


Figure 12. Features in an Energy Efficient House

Source. NPPC. 1988. Energy Efficient Homes for the 21st Century. Northwest Energy News. 7(6). Special Insert.

There are three ways in which MCS can be implemented. Both Congress and the Council originally envisioned implementing the standards as building codes. Building codes can be adopted for a state, a county or an individual city. Building codes are typically enforced by local governments according to the authority granted them by the state. The second alternative to building codes is utility-financed incentives or marketing programs. These are voluntary programs targeting local jurisdictions, builders and homebuyers. The third way is through a combination of government codes and utility programs. The third approach can be used in a jurisdiction which has a code but it does not meet the Council's MCS. In these locations, utility programs can be used to encourage builders to construct homes more energy efficient than the jurisdiction's sub-MCS code requires.

The Council had to rely upon a decentralized approach in implementing its conservation programs. This meant implementation of the MCS required the effort of the Council, BPA, public and private utilities, state and local governments, builders, and even individual citizens. Over time the Council's strategy for securing implementation of its MCS consisted of four different approaches. The first approach was through demonstration and builder training programs. In its first Plan, the Council called on BPA to finance demonstration programs. One of the most popular was the "Residential Standards Demonstration Program." It was designed as a training program to assist builders in learning to construct homes to MCS levels. This program also gave the Council a chance to test its cost and energy savings estimates. Each state designed and operated its own demonstration program and BPA financed them.

The second approach was to provide information and financial assistance to and through the states for technical assistance and code enforcement. The state energy offices in turn provided invaluable training and technical assistance to builders and local governments. Financial assistance to local governments for establishing an administrative process and securing enforcement of builder practices was also provided.

The third approach called for by the Council was an incentive program offered to local governments who voluntarily adopted MCS as their energy code. The Early Adopter and its renamed version, the Northwest Energy Codes, were the two primary programs offered through BPA to encourage local governments to adopt MCS level codes.

The forth approach used to secure MCS adoption was the incentive programs for builders and buyers of MCS homes. Incentives were offered to builders through BPA's customer utilities. These financial payments, offered on a house by house basis, were fashioned to offset the higher incremental costs of energy efficient construction. The most popular program was BPA's Super Good Cents Program. Operated by local utilities, Super Good Cents was a voluntary program combining advertising, technical assistance, and financial payments to builders.

As the principal implementor of the Council's Power Plan, BPA's primary role regarding MCS was to provide technical assistance and financial resources. In the "Two-Year Action Plan" included in the power plan, the Council outlined programs for BPA to develop and implement. Bonneville in turn used revenues generated from electrical sales to finance program implementation. As stated, programs which

required BPA funding included reimbursements to code enforcement agencies for the cost of MCS implementation and inspection; education programs for builders, code enforcement officials, and others regarding the provisions of MCS; an incentive program to encourage the construction of buildings which meet or exceed the Council's efficiency standards for new structures; technical and financial assistance programs for the shelter industry (builders, lenders, appraisers); and MCS demonstration projects.

The main role for state and local government was to either adopt and enforce MCS by January 1, 1986 or prepare an alternative plan to achieve comparable savings. Failure to adopt MCS or a program of equivalent savings by the deadline would subject the utilities serving the jurisdiction to a 10 percent surcharge on electricity purchased from BPA (NPPC 1983a). The surcharge was to help the region recoup on lost opportunity savings as a result of noncompliance. The surcharge only applied to those jurisdictions within BPA's service territory serviced by utilities which receive wholesale power from BPA in longterm power exchanges. These are primarily the public utilities or preference customers.

IMPLEMENTATION OF THE RESIDENTIAL MCS 1984 THROUGH 1993

Tracking implementation of the Council's residential model conservation standards over the ten year period proved to be a difficult task. No organization, including the Council, undertook the job of pulling together a comprehensive tracking system for the standards. For this research, information was compiled from the Council's records and conservation tracking reports, BPA's and utilities' conservation

data and information from the states' energy offices. While implementation data are not entirely complete, the chronological narrative account and numbers presented do display an accurate picture of MCS implementation patterns across the region over the past decade.

The original implementation goal for residential model conservation standards was for all jurisdictions in the region to adopt MCS as building codes for new residential structures by January 1986 (NPPC 1983a). The Council knew this would be a difficult goal to obtain when it adopted the first power plan (Eckman 1994). To facilitate the institutional changes needed for the region to adopt MCS level codes, the Council called BPA to start the Residential Standards Demonstration Program (RSDP) in early 1984. As mentioned, RSDP was created to assist builders in learning new energy efficient building practices by actually building houses to MCS levels. The demonstrations were also used to test the Council's estimates on energy savings and costs. Washington State Energy Office provided administrative support for the RSDPs while the state energy offices of Oregon, Idaho, and Montana were charged with local project implementation. Through RSDP, from 1983 to 1986, 450 housing units were constructed to the Council's MCS (BPA 1986b).

The first local jurisdiction to adopt the Council's MCS was Tacoma, Washington. Tacoma adopted MCS level codes on June 1, 1984. Mayor Doug Sutherland of Tacoma testified to the Council that his city adopted the standards because they recognized that conservation was the best resource available and would help keep the city's rates as low as possible (NPPC 1984a). Bonneville, with encouragement from the Council, put together a financial support package, which

consisted of four main components (compliance, information, marketing and incentives) to help Tacoma deal with the details of implementation and enforcement (Riley 1984). The knowledge gained from Tacoma's pioneer effort helped the Council and BPA fashion the components of the Early Adopter program.

The Early Adopter was a program designed to encourage MCS adoption by local jurisdictions. Through this program, reimbursements where made to local jurisdictions for the costs incurred by MCS code adoption and enforcement. The strategy for using this program was that once the majority of local governments adopted MCS, a state would more readily make the transition to a statewide code. The Early Adopter program worked by providing a flat payment per MCS home inspected. This program also provided financial incentives to builders who built homes to MCS efficiency levels. Payments per home built to MCS levels were given to the builders to offset the costs incurred in installing energy efficient features.

The Council hoped these financial reimbursements and the threat of a utility surcharge would prompt local governments to adopt MCS level codes. Tacoma and five other jurisdictions in Washington adopted MCS level building codes in 1984 and 1985. In the mid 1980s, the Early Adopter program was renamed the Northwest Energy Code program.

By January 1986, none of the four states had adopted energy codes equivalent to the Council's MCS and little progress had been made in local jurisdictions. At the end of 1986 only 11 jurisdictions in the region had adopted the standards as their building codes (BPA 1986b). Outside of these few early adopter jurisdictions and BPA's demonstration programs, little progress was made with MCS implementation.

When the Council developed the MCS, it did so under the assumption that the standards would be modified as new information and advanced technology became available. The first amendment to MCS occurred in late 1985. The standards did not change but the way in which they could be implemented did. Beginning in 1986 the Council changed implementation strategies by depending more on BPA and the utilities to develop and offer programs to overcome the market and institutional barriers which had discouraged conservation investments. These were incentive oriented, house-by-house programs designed to help the housing industry make the transition to building energy efficient structures.

Energy codes were still the primary objective of MCS implementation but when state or local governments were unwilling or unable to adopt codes, BPA and the utilities were to design marketing and incentive programs to promote MCS building. The utilities were called on to either participate in a BPA/utility residential MCS program or submit their own proposals for an equivalent alternative program. Alternative utility programs were required to meet the average energy savings achieved by the BPA/Utility MCS programs. Through the first amendment process, MCS evolved from a code program to a code and utility program.

Instead of calling for a surcharge when the region did not meet the implementation deadline, the Council voted to extend the deadline to January 1989. A new objective for MCS was to capture at least 85 percent of the savings which would have been obtained had all new electrically heating homes been built to the Council's MCS (NPPC 1985b). To obtain this objective, it would be necessary to get each state to adopt MCS level codes or offer utility programs to capture equivalent

energy savings (NPPC 1986b).

The primary incentive and marketing program developed as a result of the Council's new implementation strategy was BPA's "Super Good Cents" Program. Super Good Cents was developed to be a marketing, education, incentive and certification program offered through participating utilities. In the Super Good Cents Program, BPA offered utilities money to pay homebuilders a portion (this ranged from around $2,700 per single family home in the milder Climate Zone I, to $3,800 in Climate Zones II and III) of the marginal cost of building to the standards. Payment was also given to utilities to undertake a marketing campaign to promote the energy efficient structures. To be eligible for the Super Good Cents Program, a home had to be built in the service territory of a utility participating in the program.

The first year for major changes in statewide energy codes was 1986. During that year, both Oregon and Washington upgraded their residential energy codes. In Washington, the perceived threat of the Council requesting a surcharge persuaded the majority of legislatures to approve the code upgrade (Schwartz 1990). The new code in Washington provided 59 percent of MCS level savings in Climate Zone 1 (western Washington) and 50 percent in Climate Zone 2 (most of eastern Washington). Oregon's new code, adopted by an administrative process, initially provided 32 percent of the savings of MCS. This was increased to 58 percent of MCS level savings in 1989.

Along with the changes in Oregon and Washington building codes, a few local jurisdictions, primarily in Washington, upgraded their energy codes to meet the Council's MCS. By the middle of 1988, 36 cities and counties in the region had

become Early Adopters (NPPC 1988a). Washington had 19 local jurisdictions and Idaho 16, while Montana only had one and Oregon none. Montana and Oregon have a maximum/minimum law which does not allow local jurisdictions to deviate from state energy codes. This law restricted local jurisdictions' participation in the Early Adopter program in Oregon and Montana. Missoula, Montana, which obtained a variance from the state, was the only jurisdiction to become an Early Adopter. Oregon had no Early Adopters, although a few jurisdictions such as Ashland undertook significant local efforts to improve the energy efficiency of new structures in their communities. In 1986, Ashland was recognized by BPA for having 80 percent of new electrically heated homes meet the Council's MCS (Collete 1987). In addition to the Early Adopters, by 1988 100 out of 116 public utilities had signed on to BPA's Super Good Cents Program (NPPC 1988a).

Table 6 displays the annual number of MCS houses (both single family and multi-family structures) built in the four states from 1984 through 1988. These houses were constructed through the Residential Standards Demonstration Program, the Early Adopter Program and the Super Good Cents Program. Washington State, with the highest total housing starts, also led the region in the number of houses built to MCS. This was primarily a function of the higher number of Early Adopter jurisdictions in Washington and utilities' higher participation rates in BPA's MCS incentive programs. It must be noted that approximately 77 percent of residential units in Washington were served by PUDs receiving wholesale power from BPA, whereas only 37 percent of residential units in Oregon and 14 percent in Idaho were served by PUDs (Lee, Klemka and Marts 1980). Thus, BPA had more connection

and clout in Washington when it came to utility and jurisdiction participation in MCS incentive programs. Table 7 displays the MCS penetration rates based on year and state (percent of MCS houses built compared to non-MCS houses). Both Washington and Idaho, by participating more heavily in the Early Adaptor Program, had the highest penetration rates over the five year period. Oregon came in third and Western Montana a distant fourth.

Table 6. Annual Number of MCS Houses Built through the Early Adopters, Super Good Cents and the Residential Demonstration Program from 1984 - 1988.

STATE	1984	1985	1986	1987	1988	TOTAL
Washington	302	502	3254	3535	4414	12007
Oregon	69	32	124	331	2075	2631
Idaho	59	85	240	199	582	1165
W. Montana	73	34	9	9	43	168

Source. Eckman, T. 1993. Northwest Power Planning Council.

Table 7. Market Penetration Rates for MCS by Year and State 1984 - 1988. (Expressed as percent of houses built to MCS levels compared to those which were not).

STATE	1984	1985	1986	1987	1988
Washington	1	2	13	14	15
Oregon	2	1	2	6	31
Idaho	2	3	10	9	27
W. Montana	5	3	1	1	2

Source. Eckman, T. 1993. Northwest Power Planning Council.

Five years after the Council's MCS had been adopted, few jurisdictions were implementing MCS level building codes. By the Council's 1989 deadline for regionwide adoption, only 40 city and/or county jurisdictions in the four states had adopted and were enforcing MCS level codes. Again, Washington led the region with 21 jurisdictions implementing MCS. Idaho came in second with 18 cities and/or counties participating. Missoula, Montana was still the only jurisdiction to adopt MCS in Montana, and in Oregon no cities or counties had officially adopted the standards (NPPC 1989d). In 1989, 109 public utilities and all major private utilities offered some form of the Super Good Cents Program to encourage energy efficient building in areas where MCS codes were not in place (ibid., 2).

The penetration rate for residential MCS structures was well behind the 85 percent objective established by the Council in the 1985 amendments. The Council estimated that over 15,000 MCS homes were built from 1984 to 1989 through utility marketing, incentive and code adoption programs (NPPC 1989b). The averaged regionwide penetration rate for all residential MCS programs was around 11 percent for the 1984 to 1989 period (ibid., ii). The penetration rate for 1988 only was much higher at around 23 percent. When the 1989 deadline for regionwide code adoption passed, the Council again did not recommend a surcharge on non-complying jurisdictions.

In 1990, great strides were made in implementing MCS when the Washington legislature voted to upgrade the state's energy codes to saving levels equivalent to MCS (The Washington legislature failed to upgrade to MCS levels the previous year). The codes took effect on all new homes permitted after July 1, 1991. After

Washington upgraded its energy codes, almost half of all new buildings in the region were constructed to MCS levels. In 1993, the Washington State Energy Office conducted a study of compliance levels with the state's new residential codes. It found that compliance on a component basis was very high and that the non-complying areas were having a marginal impact on conservation savings (Noland, 1993).

In November 1990, Oregon's Structural Code Advisory Board and the Energy Conservation Board, through an administrative process, upgraded the state codes to MCS levels. In January 1992, the state of Oregon began enforcing an energy code equivalent to the Council's MCS for new electrically heated residential structures. By the end of 1990, seven years after the first power plan was adopted, the Council could celebrate the adoption of energy codes equivalent to MCS in the two most populous states in the region. These two states were most important in terms of conservation savings because they consumed over 80 percent of the region's electricity (BPA 1989). When Washington and Oregon adopted MCS level codes, the Super Good Cents Program and the Early Adopter or Northwest Energy Codes Program were achieving roughly a 25 percent market penetration rate in new electrically heated homes (NPPC 1993a). In 1991 the Council predicted that the new state codes would result in approximately 87 percent of all new electrically heated single family units and 96 percent of multi-family units being built to MCS levels by early 1992 in Washington and Oregon (NPPC 1991, 43).

Although codes were enacted in Washington and Oregon, BPA was still called to provide financial support to state and local jurisdictions to partially offset the

incremental costs of implementing the new codes. In addition to the code upgrades, by 1990, 120 local governments in the Northwest had adopted the MCS as part of their building codes and all major public utilities offered some type of conservation program (NPPC 1990, 23).

In 1991 Idaho adopted a residential energy standard, which was significantly less stringent than the Council's MCS, as the minimum energy conservation standard for new homes built in the state. Idaho did not have a statewide mandatory building code. Instead, the Idaho legislature authorized but did not require local governments to uniformly adopt and enforce specific codes promoted at the state level. Idaho, like Washington, did allow local governments to adopt codes more stringent than the state's standards. BPA's Early Adopter program was (and continues to be in 1995) the only approach utilized by government jurisdictions to implement MCS in Idaho. Outside of a few local jurisdictions' participation in the Early Adopter Program and BPA's demonstration projects and utility incentive programs, Idaho made little progress toward MCS implementation on a statewide level.

By December 1991, BPA reported that 32,000 homes had been built to the Council's MCS through the Super Good Cents Program in the region. Table 8 displays yearly incremental average megawatt savings and number of housing units built through the Super Good Cents Program. Starting in 1985, the savings and number of units increased steadily until 1992 when some of the utility programs were reduced or dropped as a result of the adoption of new MCS level energy codes in Washington and Oregon (after code adoption it fell to Oregon and Washington, not the utilities, to finance code implementation). In 1992, BPA reported that the

combined savings that had resulted from these programs was enough to power a city of 8,000 for 70 years (BPA 1992). Building codes equivalent to MCS that went into place in 1992 in Oregon and Washington made the Super Good Cents Program less necessary in those two states. The Super Good Cents Program had been very valuable in that it helped the regional implementors, most notably builders, gain experience with and acceptance of MCS (Eckman 1994).

Table 8. Annual Energy Savings from the Super Good Cents Program 1985 - 1993.

	1984	1985	1986	1987	1988
Average Megawatts	0	0.2	0.1	0.3	0.4
# units	0	44	275	1,607	2,512

	1989	1990	1991	1992	1993
Average Megawatts	0.8	1.0	1.2	0.7	0.3
# units	5,415	6,736	7,210	4,207	1,803

Source. BPA. 1994. Conservation and Generation Resources Energy Data. The Red Book. p. 8.

Table 9 displays the annual megawatt savings attributed to MCS in Washington from 1986 through 1993. Washington led the region in energy savings with a cumulative 65.3 aMW for the eight year period, followed by Oregon, Idaho and Montana (actual savings for these three states was not available) (Schwartz, Byers, and Mountjoy-Venning). Figure 13 displays an estimate of the annual savings achieved through government energy code changes in the region from 1984 through

1993 (BPA 1994, 7). The annual savings from residential energy codes in 1993 was 12.8 aMW while the total amount of electricity consumed by residential units was approximately 6,336 aMW (BPA 1994). The state of Washington was credited with 9.7 aMW or approximately 76 percent of the energy savings achieved during 1993 (Table 9). Although annual energy savings from code adoption were extremely small when compared to the total amount of energy used, they increased steadily over the ten-year period (with the exception of 1990 and 1991 when fewer houses were built in jurisdictions which enforced the Council's MCS).

Table 9. Annual Average Megawatt Savings Attributed to MCS in Washington 1986 - 1993.

Washington	1986	1987	1988	1989	1990	1991	1992	1993	Cumulative Total
	6.4	6.7	7.7	8.4	7.0	9.7	9.7	9.7	65.3

Source. Schwartz, H., R. Byers, and A. Mountjoy-Venning. 1993. Getting to Code: Economic Costs and Benefits of Developing and Implementing Washington State's Residential Energy Code, 1983 - 2003. p. 8.

As a result of demonstration programs, utility marketing programs, the Northwest Energy Code program, and statewide energy code upgrades in the region, 85 percent of the new electrically heated single residential homes and 90 percent of multi-family homes were covered by energy codes in 1993 (NPPC 1993a). Between 1986 and 1988, new electrically heated homes made up approximately 58 percent of new homes being built in the Pacific Northwest (NPPC 1994e, 12)). The new codes

in the early 1990s, reduced space heating requirements by more than half of what they did in 1983 when the Council adopted it first power plan (NPPC 1993a, 10).

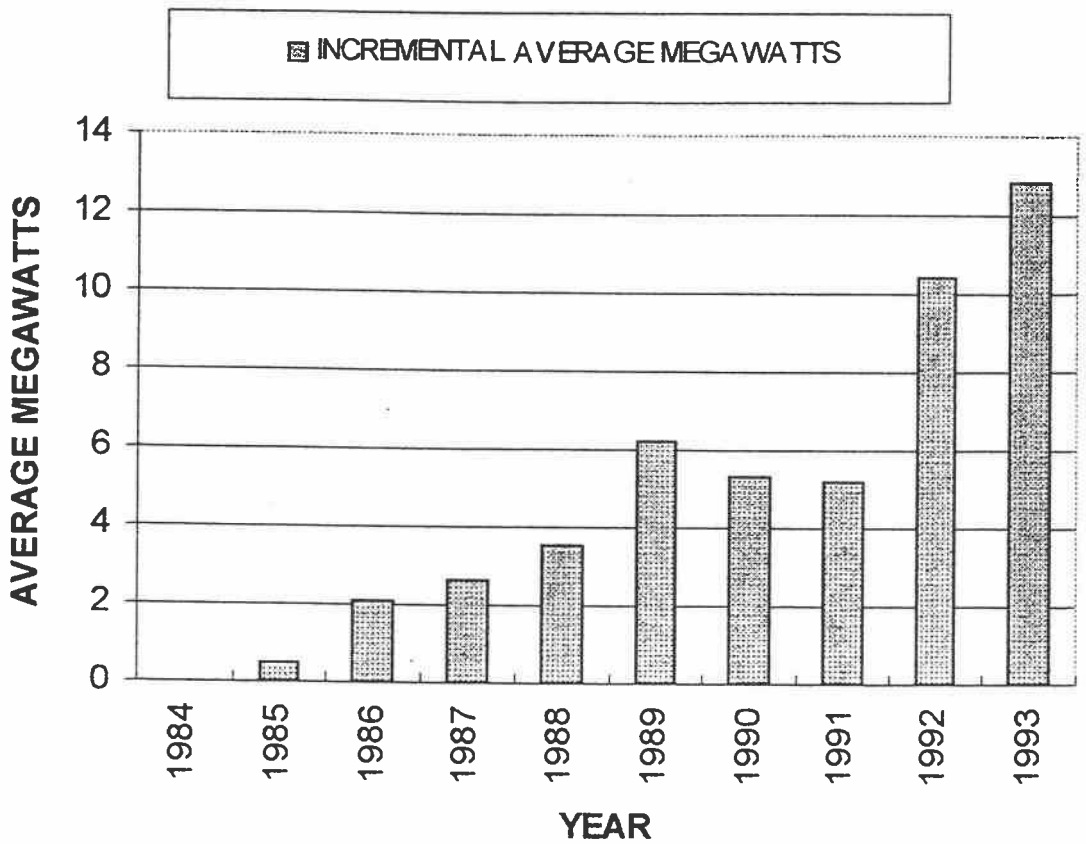


Figure 13. Residential Energy Savings from Building Codes in the Four Northwest States 1984 through 1993.
Data Source. BPA. 1994. Conservation and Generation Resource Energy Data: The Red Book. p. 7.

At the end of 1993, Oregon and Washington were working to ensure their new energy codes were enforced. Idaho and Montana however, still faced a long battle in securing statewide MCS level energy codes. Several jurisdictions in Idaho continued to implement the Council's standards through BPA's Northwest Energy Code

Program. Tom Eckman, Conservation Analyst for the Council, (1994) stated that it would probably take 80 percent or more of Idaho's local jurisdictions participating in a MCS code adoption program before the legislature would adopt statewide codes. Montana, with only Missoula enforcing MCS in 1993, also was facing a long battle to adopt MCS level codes. Because local jurisdictions in Montana were restricted in deviating from state codes, the Council continued to push for statewide MCS adoption in 1993.

Summary of MCS Implementation

Implementation of MCS went through three stages. The first occurred from 1984 through 1985, when the Council's strategy was to implement the standards through up-grades in state and local government energy codes. The Council, however, underestimated the time it would take to get jurisdictions to adopt MCS level codes. During this stage, the region did not come close to achieving the Council's objectives for MCS implementation. Only a few Early Adopters in Washington and BPA's demonstration programs were using the Council's standards. In stage one, the Council began to guide the region in developing the infrastructure to support regionwide MCS implementation.

The second stage of implementation (1986-1989) began when the Council amended its MCS and called on BPA and the utilities to develop programs to help the region make the transition to greater use of the standards. During this stage, BPA and almost all of its service utilities began offering some type of Super Good Cents Program. The number of local jurisdictions in Washington and Idaho adopting MCS

level codes also increased and Washington and Oregon upgraded their statewide codes to approximately half of the MCS energy efficiency levels. Stage two was a period when the region made more significant strides in implementing the standards.

During the third stage (1990-1993) the region made the greatest progress toward full adoption of MCS. This was a stage when the two most populated states moved from reliance on utility program implementation to implementation of the standards through statewide codes. As of 1993, Washington and Oregon were both implementing and enforcing Council level codes in all new electrically heated residential structures. Although implementation of MCS got off to a slower start than desired, the Council achieved its original goals and objectives for its standards in these two states.

In Idaho and Montana by 1993, 10 years after the Council called upon the region to adopt MCS, implementation was still dependent upon BPA/utility programs and local jurisdiction code adoption. Montana, through an administrative process, flirted with MCS adoption, but the last two state administrations and special interest group politics (opposition from the housing industry) circumvented these efforts. Implementation of MCS continued to occur on a house-by-house basis through utility incentive programs since local jurisdictions were not authorized to deviate from state codes. In Idaho, where a statewide code did not exist, the Council continued to encourage local jurisdiction adoption of MCS. Working on a city-by-city and county-by-county basis, the Council hoped to eventually convince Idaho's legislature to pass a statewide code (Eckman 1994). As of 1994, statewide implementation of MCS in Idaho and Montana continued to be an elusive goal for the Council.

MODEL CONSERVATION STANDARDS IMPLEMENTATION ANALYSIS

At the close of 1993, the implementation of the Council's residential model conservation standards had taken place in only part of the region and did not come about without considerable effort on the part of numerous actors. The remaining portion of Chapter 6 is an implementation analysis of the standards based on the eight analysis criteria introduced in Chapter 4. As with the water budget's analysis, each criterion is addressed separately.

Model Conservation Standards Objective

To what extent was the objective of the residential model conservation standards clearly stated, defined and consistent with the goals outlined in the 1980 Act?

The Northwest Power Planning Act was clear with regard to the Council's role in developing model conservation standards. The Act directs the Council to adopt model conservation standards which "...produce all power savings that are cost-effective for the region and economically feasible for consumers..." (Section 4(f)1 of 16 U.S.C. §839b(f)(a)). This and other statements in the Act left little doubt that Congress intended the Council to formulate energy efficient building standards and guide the four northwest states and the regional electric utilities in implementing them. The standards were considered so important to the region's energy future that in Section 4(f)(2) of the Act Congress gave the Council the authority to recommend that BPA impose a surcharge on jurisdictions unwilling to implement them.

Expanding on the Act's clear directive, the Council established both goals and objectives for its residential model conservation standards. The general objective for the MCS was "to improve the efficiency with which new residential and commercial buildings use electricity..." (NPPC 1986b, 9-5). When the Council adopted the first power plan in 1983, it established a target goal of implementing MCS regionwide by January 1, 1986. The Council defined this to mean that state and/or local governments in the region were to adopt and enforce MCS as building codes. While waiting for jurisdictions to adopt MCS, the Council called on electrical utilities to pursue programs designed to result in at least 25 percent of new electrically heated residential buildings being built to the standards in advance of adoption of regionwide codes (NPPC 1983a). The original target goal for regionwide adoption was revised by the Council in 1985 after it became apparent more time was needed to secure state building codes. The new objective was to build 85 percent of new electrically heated residential structures to MCS by the year 1989 (NPPC 1986b). The Council acknowledged that to achieve this goal would require all four northwest states adopting the standards or utility programs securing an equivalent level of savings.

In addition to general MCS objectives and goals, during the past ten years the Council outlined a specific number of average megawatts to be saved by using MCS in new electrically heated residential structures. When calculating the average megawatt savings' objectives, the Council took four different regional electric load growth scenarios based on alternative sets of assumptions about the region's economy (high to low) and established target savings for each scenario for up to a 20 year period. For example, in its 1983 power plan, the Council called the region to save

855 aMW under a high load growth, 505 aMW under medium high growth, 305 aMW under medium growth and 125 aMW under a low load growth scenario by the year 2002 (NPPC 1983a, 10-5). These objectives provided regional implementors with specific and quantifiable targets to work toward and clearly conveyed the Council's expectation for conservation's role in meeting the region's electrical demands.

The Council did not establish a conflict resolution process solely for its conservation resources. Instead there were two ways in which an individual or party could attempt to influence the Council's decisions regarding MCS. Both processes were used during the 10-year analysis period. The first allowed a party to file a petition for change under the Council's amendment process. The Council was required to review its plan it at least once every five years. During the review process, parties could give written or oral testimony for the Council's consideration. The second way was that a party could file suit at any time against the Council and its plan in a federal court of law. The only suit which was considered by the federal court between 1984 and 1993 was the "Seattle Master Builders Ass'n *v.* Pacific Northwest Electric Power," (see page 61) This suit was unsuccessful in modifying the standards. The Council did however, make several modifications to the standards as a result of petitions to its amendment process.

In an attempt to clarify its intent and decrease conflict surrounding MCS, the Council in the early years held panel discussions with regional leaders, builders and utilities to address implementation problems. It was often in these forums that issues of conflict were discussed and occasionally resolved. For example, in a Council

meeting in April of 1984, a panel discussion was held with utility leaders regarding their MCS implementation responsibilities (NPPC 1984b). During that meeting, the Council was able to clarify its objectives for the MCS and its expectations for the utilities' contributions to those objectives, as well as listen to utility leaders' concerns.

Congress gave the Council a clear mandate to develop model conservation standards, and the Council gave BPA, state and local governments, and utilities a strong directive to adopt and implement them. The Council established both general and more specific and quantifiable objectives for residential MCS as well as target dates for compliance. These objectives were helpful in guiding MCS program formulation and in evaluating regional MCS implementation progress. Clearly, Congress and the Council increased the likelihood of implementation success by providing relatively clear and unambiguous goals and objectives for the standards.

Causal Relationship

What is the level of scientific and technological certainty regarding the ability of the residential MCS to achieve its objective?

When developing the power plan, the Council used a least cost planning approach to determine which new resources it would recommend BPA acquire. This meant that to meet forecast energy demands the Council relied first upon those energy sources which came at the lowest total cost to society. The primary assumption supporting the high prioritization of MCS in the Council's resource acquisition scheme was that electricity saved through MCS was the least costly energy resource for the region.

When comparing investment costs for conservation components of the MCS to investment costs in conventional resources, MCS clearly was the least costly. In 1987, the Council estimated that implementation of MCS cost the region around 2.8 cents per kilowatt hour compared to 4.2 cents per kilowatt hour for a new coal fired plant (NPPC 1987b). Although other higher estimates of MCS costs were presented, these estimates did not discredit the Council's assumption that the standards were one of the least costly resources available to the region (Cantor and Cohn 1988, 105; BPA 1986c).

Adding to the cost advantage of MCS were many other less tangible benefits. These included a shorter lead time than conventional resources; lower environmental costs; the ability of MCS savings to follow increases in demand; increased comfort for owners of MCS level homes; and the compatibility of MCS with the protection and restoration of fish and wildlife in the region. These significant but intangible benefits were partially acknowledged through the 10 percent cost advantage given to conservation over other conventional resources during the planning process.

Using MCS's as a reliable energy resource was not without its uncertainties. A fundamental question which had to be considered was whether model conservation standards could be relied upon to produce the amount of electrical savings called for by the Council's plan at a given cost. There were primarily three issues of uncertainty surrounding this question.

The first and largest uncertainty surrounding the use of MCS as a resource was over market penetration rates. How many new buildings would actually be built to the standards compared to those which would not? When the Council developed

MCS it was forging a new path in the energy conservation field. There was little information or experience across the country for the staff to draw upon. Yet predicting how many jurisdictions or builders would respond to a particular program or incentive was an uncertainty that had to be considered.

What penetration rate could the Council rely upon in drafting its resource acquisition plans? A high penetration rate could mean delaying construction of additional conventional resources. On the other hand, if the region was slow to adopt MCS and the electrical demand increased, new conventional resources would need to be planned for and acquired. Between 1984 and 1988, the regionwide penetration rate for all residential MCS programs and codes was approximately 11 percent and produced a savings of 27 aMW (NPPC 1989b). It was estimated that if the penetration rate had been near 100 percent, the Northwest could have saved over 88 aMW (ibid., 3-4). If the region had been in a load resource balance (electric supply is equal to demand) during that time, the difference of 61 aMW could have saved the region from building a small thermal plant.

A second area of uncertainty was over the actual energy savings produced by MCS structures compared to the predicted amounts. With thousands of builders and enforcement officers, there existed the potential for large variations in compliance and thus energy savings. In fact, electrical savings might vary significantly for houses of similar design and construction. In response to the anticipated variability, the Council set a target goal for houses built to MCS levels. The target was to achieve 85 percent of the Council's model case scenario savings. Cantor and Cohn (1988) found that homes built under the Early Adopter program produced mixed results when it came to

meeting the Council's desired electrical consumption levels. In general, single family structures met the 85 percent goal more often than multi-family structures. The single-family homes studied exceeded the Council's target annual electricity consumption for MCS residential buildings by 9 percent while multi-family buildings exceeded the target by 23 percent (ibid., 108). Also builders with experience constructing MCS homes were more likely to build structures to the target savings levels (ibid., 127).

The third area of uncertainty centered around the costs of MCS. Like energy savings, costs for constructing buildings to MCS levels can vary significantly. Before adopting MCS, the Council calculated the cost of building homes to MCS levels and tested these estimates with demonstration projects. Bonneville conducted an additional cost-effectiveness study in 1985 which produced similar cost estimates. After the first few years of implementation, the Council made some adjustments to its estimates but the original numbers were fairly accurate. Like energy consumption levels, the builders and contractors with greater MCS experience generally had their costs run more closely with or even below the Council's estimates (Cantor and Cohn 1988). Because an MCS home is more expensive for consumers in front end costs, builders in the competitive market place were particularly concerned with the cost uncertainties. This led to a significant amount of resistance on the part of many builders not familiar with the MCS construction practices and costs.

The level of uncertainty surrounding market penetration, variations in energy consumption, and cost-effectiveness decreased over time as the region gained experience with MCS structures and BPA and others undertook research on MCS.

These uncertainties were not significant enough to undermine the finding that residential MCS were one of the lowest cost resources available to the region. Nor did these uncertainties discount the regional benefits produced by greater reliance on conservation as a resource. While uncertainty surrounding costs had the greatest negative impact on BPA's willingness to finance MCS programs and builders' willingness to construct to MCS levels, information accumulated over a decade of experience significantly reduced these uncertainties.

Planning Process

To what extent were implementors involved in the residential model conservation standards planning process?

When developing the Northwest Conservation and Electric Power Plan, the Council functioned in more of an independent legislative role than it did when formulating the Columbia Basin Fish and Wildlife Program. For the program, the Council had to solicit fishery agencies' and Indian tribes' recommendations. When developing the power plan, the Council was only encouraged to seek consultation with and advise from BPA and regional utilities.

The Council developed the original MCS with a limited amount of involvement from implementors (Harris 1994). Although the Council did consult with a number of builders, utilities and energy agencies and analysts in the region, those groups primarily provided background information used in the Council's analyses. When the standards were released, they were initially the Council's standards, not the regional implementors' standards. A consequence of this was that regional implementors did

not have a feeling of ownership (Harris 1994). In a November 1985 Council Meeting, Council Member Mueller pointed out that the Residential Demonstration Program taught the Council that factors other than money, such as utility ownership and enthusiasm, were necessary to successfully market MCS homes (NPPC 1985c).

Partially because of their limited involvement, implementors were initially critical of the MCS and rigorously questioned the Council's logic and analyses. An example of this was when BPA in 1985 conducted a full scale cost-effectiveness study because they were not convinced of the accuracy of the Council's cost-effectiveness analysis. Bonneville's study, however, produced similar results and ended up reenforcing the Council's original findings with a few exceptions (BPA 1986c). It was only after completing its own study that BPA accepted the standards and gained a greater sense of ownership toward them (Harris 1994).

The Council provided its analyses to support the cost and savings estimates and projections for the MCS, but regional actors wanted to see demonstrated results. Builders had to be shown that MCS were economically feasible for consumers and would not negatively impact business. Bonneville and the utilities had to be shown that conservation was a cost-effective resource that was worth the investment. Jurisdictions had to be shown that the resources spent on MCS and the regulations imposed on the building industry would produce significant societal benefits within their respective jurisdictions. If BPA and others critical of the Council's analyses had been more extensively involved in the initial studies, resistance to implementation might well have been reduced. However, when considering the adversarial relationship that existed between the Council and the regional implementors (most

importantly BPA) in the early 1980s, it would have been unlikely that full cooperation would have come about without a protracted effort on the Council's part. In addition, greater implementor involvement would have slowed the planning process and the Council might not have adopted the stringent standards that it did.

Other factors that limited the amount of implementor involvement in the planning phase included the deadlines faced by the Council when devising the plan. For example, Tom Eckman recalled that he was asked to develop Appendix J (which outlines many of the programs needed to support MCS implementation) in only a few weeks time before the Council was to adopt the first plan (1994). As a result, Appendix J was not thoroughly reviewed by implementors until after it was adopted.

Another existing barrier limiting implementors' involvement in the planning stage was that the Council was a new institution following new rules and procedures. The Council's planning process was very different from the way in which energy codes traditionally had been adopted and modified in the four states. Rowan (1986, 6.67) stated that the Council's process of developing and requesting MCS code adoption in the states "...did not accommodate and was even contrary to the natural code development process in sequence, timing, and protocol." Jurisdictions which had codes were accustomed to incremental changes taking place over several years, not revolutionary changes. The Council, playing by different rules in a relatively short period of time, adopted energy efficient building standards which were much more stringent than any codes being implemented in the region.

Another probable result from implementors' limited involvement was the underestimation of time needed to develop the infrastructure to support MCS and time

needed for builders to move up the MCS learning curve. By setting January 1986 as the compliance deadline for jurisdictions, the Council erroneously thought MCS could be adopted and enforced as state codes in a two year period. After the two years had elapsed no states and only 11 local jurisdictions had adopted energy efficient building codes equivalent to MCS (BPA 1986b).

Structure of Model Conservation Standards Implementation Process

To what extent were the residential model conservation standards structured to maximize the probability that implementors would perform as desired?

Implementors' Attitudes Regarding MCS

Unlike policies which are implemented by a single organization, implementing MCS required the cooperation of a large federal agency, public and private utilities, state and local governments and thousands of individuals and firms in the housing industry. Out of these groups, only the BPA had direct implementation responsibility under the Northwest Power Planning Act. While BPA and the local service utilities played a major role in securing MCS implementation, they could not directly implement the standards. Instead, this task fell to state and local jurisdictions and ultimately to the construction industry. Attitudes toward the Council's MCS differed significantly between and within the implementing groups.

Bonneville Power Administration and the Public and Private Utilities

Bonneville and the utilities played a critical role in helping the region build MCS homes. Unlike the homebuilding industry which was overwhelmingly opposed to MCS, utilities' attitudes ranged from highly supportive, to indifferent, to strongly opposed. Partially, a utilities' level of support was a function of the source and amount of electrical supply available to them and the economic conditions influencing the entity. In the early and mid-eighties when an expensive electrical surplus existed and electrical rates had been raised to pay for new resource acquisitions, BPA and many utilities, especially private and smaller utilities, were very resistant to implementing MCS programs. Their main argument was that implementing the programs would be "too expensive and too disruptive" and would require them to increase electric rates (NPPC 1984b). The problem was that conservation reduced utility sales and revenues. Utilities were in the business of producing and selling electricity not conserving it. However, when facing electrical shortages, power producers have the option of either building more expensive energy sources which result in increases in power rates, a politically unpopular option, or finding ways to increase energy efficiency, thereby reducing demand and thus minimizing rate increases. Without an electricity shortage, there was little incentive for the utilities to invest in conservation.

In general, public utilities were much more supportive of MCS than private utilities (Schwartz 1990). Public utilities (especially in Washington), municipally owned utilities and rural electric cooperatives were the most supportive of MCS because they had the most to gain if MCS were implemented (delay building new

costly generating facilities) and lose if the standards were not (the threat of a surcharge on their wholesale electrical rates purchased from BPA). On the other hand, private utilities were the most resistant to spending resources on MCS programs since they had to provide a greater percentage of the financial support for the program than public utilities did and stood to lose more by a decrease in revenues. Both public and private utilities were more favorable to implementing MCS through state or local codes instead of utility run programs. The incentive-based MCS programs offered by BPA and the utilities were both capital and staff intensive while the code adoption process was the responsibility of the government jurisdictions. Public utilities were one of the strongest supporters of state adoption of MCS codes. It was the public utilities' legislative lobbying efforts in Washington that helped secure the support needed to pass a bill to upgrading energy codes to MCS levels in 1990 (Schwartz, Byers and Mountjoy-Venning 1993).

As noted, BPA was not always an ally of MCS especially when called to provide financial support for conservation programs. After its 1985 cost-effectiveness study results supported the Council's cost-effectiveness estimates, BPA was much more supportive of implementation. It was, however, always difficult to get BPA and the utilities to commit the financial support needed to secure regionwide adoption (Eckman 1994). This was partially because BPA and the utilities did not fully view conservation savings as a resource equal to generating resources. Instead they tended to view conservation as a customer service (NPPC 1989e).

State Governments

To achieve regionwide implementation of the MCS required that state governments adopt the standards as building codes. This would have been the quickest approach for the region to implement the standards. As Lee pointed out "Building codes, however, are enacted by governments sensitive to political pressures..." (Lee 1993, 39). Partially as a result, state adoption of MCS did not take place in the 1980s.

As will be discussed on pages 201-205, the four state governments varied significantly in their support for the Council's standards. Common to all four states' policy-makers was their concern over the resources required to implement and enforce the MCS as well as the impact the standards would have on the building industry. Although conservation made economic sense for the region in the long-run, implementation of MCS as a building code required greater state government intervention into the economy. State legislative members and administrators remained sensitive to the opposition to MCS from the building industry who claimed to represent the wishes of home buyers. These concerns directly impacted implementation of MCS by delaying upgrading the codes in Washington and Oregon for eight years and thwarted the adoption of statewide codes in Idaho and Montana (ibid, 39).

Local Governments

Local governments' support of MCS was critical to implementation since it was their responsibility to enforce building codes. Their support varied widely

throughout the Northwest. While cities such as Tacoma, Washington were quick to support the standards, other jurisdictions remained less supportive and even hostile toward MCS adoption. Two troubling concerns for decision-makers at both the state and local levels over MCS adoption were the restrictive or regulatory nature of enforcing energy building codes and the financial resources needed. When the Council adopted MCS, local governments were quick to argue that they deserved compensation if the burden of enforcement of MCS was going to be placed on them (Schwartz 1990).

Some jurisdictions were not only resentful of the regulatory and financial burdens but also of the threat of a surcharge should they not comply. Resistance from jurisdictions also occurred simply because institutional change was required. Even though programs such as BPA's Early Adopter were available to help municipalities with the financial and technical side of MCS, many local governments perceived MCS adoption as putting too great a drain on already scarce resources (Cantor and Cohn 1988).

Building Industry

With a few exceptions, the building industry exhibited the greatest amount of resistance to MCS. Builders' lack of support for MCS adoption stemmed primarily from two concerns. First, many did not believe MCS would be cost-effective to implement or economically feasible for their customers. They argued that the market and not the Council should drive conservation efforts (NPPC 1982b). Builders and contractors were concerned about the marketability of the structures because

residential homes built to MCS would initially cost customers $2500 to $4500 more per unit. Even though MCS homes cost customers less over the life of the structure than those built to inefficient levels, homebuilders were concerned with the first cost not the life cost.

The second reason for builders' resistance to MCS was an ideological one: many in the building industry did not want to face another regulation on their business. Builders initially regarded MCS as an unwarranted intrusion onto their turf (Eckman 1994; and Lee 1993). Only months after the first plan was released, a suit was filed by the Seattle Master Builders Association challenging the validity of the Council's MCS. The lawsuit was an attempt by homebuilders to stop MCS adoption for both economic and ideological reasons.

Integration of Implementing Agencies

The two primary methods of implementation, utility programs and state or local energy building codes, had separate implementors, implementation processes and different levels of integration. If MCS were to be implemented as codes, the states held the ultimate veto power. State and local governments had the ability to impede the Council's MCS by not adopting the standards as building codes. If a state or local jurisdiction did adopt the standards, the new energy efficient building codes were directly integrated into the building permit process. Like other building code requirements, MCS level codes were incorporated and enforced as new building requirements. It was the state's role to authorize and/or mandate local jurisdictions to administer and enforce the new codes. Although inspection and enforcement varied

from place to place, implementing MCS through building codes meant that there was some degree of integration and accountability.

When relying upon utility programs to implement MCS, the structure was less defined and less integrated. While BPA and the utilities had more responsibility under the Act and thus less veto power, they had not historically been in the business of implementing or enforcing building standards. In addition, participation by target groups in utility programs was largely voluntary, unlike the mandatory compliance with building codes.

One method of integrating the MCS programs among utilities and BPA was through utilities' resource planning process. In the 1980s, all major utilities in the Northwest began preparing long-range least-cost resource plans. These provided detailed outlines of how the utilities perceived their resource future. Since least-cost resources were priorities, conservation and the MCS were considered in these plans.

Adding to utility integration problems was the fact the Northwest Power Planning Act only applied to BPA and those utilities that had longer-term power exchange contracts with BPA, generally the preference or public utilities. Utilities which had adequate power supplies of their own (mostly private utilities) did not always find it advantageous to enter into exchange agreements with BPA, especially if that meant they had to expend more resources on conservation programs. While utilities which relied upon BPA for their electrical supply could be subjected to a surcharge if they did not implement MCS programs, BPA had little or no leverage on private utilities in this respect.

Although the states had the ultimate authority to block adoption of MCS as

building codes, they did have a fairly well established building code administration and enforcement process. In comparison, when implementing MCS through BPA/utility incentive programs, BPA had more responsibilities under the Act and thus less veto power than the state's, but there was less integration between BPA and the utilities. Additionally, BPA had no real control over the homebuilding industry as the states did through building code requirements.

Financial Resources

The burden for financing support programs for MCS implementation fell largely upon BPA. Bonneville's revenue from hydroelectric power sales paid for builder training, demonstration, and incentive programs as well as reimbursements to state and local governments. Bonneville as a funding source was advantageous for MCS implementation because the Council did not have to rely upon the lengthy and uncertain Congressional appropriations process, and ratepayers had more of an opportunity to influence budget requests. A third advantage for implementation was that MCS, when in place, would eventually generate economic benefits for both BPA and the regions' ratepayers by reducing long term resource acquisition needs. In the long run, implementing MCS meant that both BPA and electric customers should benefit.

Despite projected long term benefits of MCS implementation, it has always been an effort to get BPA to allocate money for MCS incentive programs (Eckman 1994; Nybo 1994). At the heart of this issue was BPA's attitude toward conservation. Despite the Council's efforts, BPA did not view a megawatt saved as

equal to a megawatt generated. This became apparent from BPA's willingness to accept the risk and cost of funding conventional resource acquisitions while at the same time routinely delaying investments in conservation resources even though the risk and cost per kilowatt were much smaller (Northwest Conservation Act Coalition 1993). For example, in 1993 BPA pushed for and received the Council's approval for constructing a new 248 megawatt natural gas-fired plant (Tenaska Washington II power plant), while at the same time proposed to cut the budget for the conservation program (DiPeso 1993).

Public testimonies attest to BPA's unwillingness to financially support conservation efforts. In July of 1993 a public meeting was held by Oregon Representative Peter DeFazio to hear testimony on BPA's performance under the Northwest Power Planning Act. One of the sharpest criticisms leveled against BPA was over its lack of funding for regional conservation efforts (Laatz 1993c; Northwest Conservation Act Coalition 1993). At the 1993 regional utility conference, executives of the power utilities agreed that the largest stumbling block for conservation was inadequate financing and blamed this on BPA (NPPC 1993c). In 1994 Randy Hardy, the BPA Administrator, stated that although his agency was fully supportive of conservation, it could not keep funding high and keep rates low (Hardy 1994).

Although a significant portion of the financial resources were provided by BPA for programs to support MCS implementation, these resources did not cover all associated costs to state and local governments. A portion of the costs had to be provided by the jurisdiction itself. The perceived cost of code implementation was one of the main reasons for jurisdictions resisting MCS adoption. Cantor and Cohn

(1988) found that jurisdictions often perceived MCS implementation as putting a significant burden on available resources including personnel. During a significant portions of the analysis period (the early and mid-eighties) utilities' fiscal budgets were strained by a regionwide economic recession. During that time, few government jurisdictions had excess resources to allocate for conservation efforts.

While BPA as a funding source was certainly more advantageous to MCS implementation than if money were appropriated from Congress or the states, the Council and others interested in implementation of regionwide conservation were not always successful in procuring adequate funding from that agency. This remained an ongoing battle in 1993 as BPA proposed to reorganize in response to its growing financial debt.

Relative Strength of Support Groups

Supporters of the Council's model conservation standards included environmental groups, state energy offices, some state and local politicians, members of the alternative building community and some public utilities. The Natural Resources Defense Council, Oregon Natural Resources Council, the cities of Tacoma, Washington and Ashland, Oregon, and the Solar Energy Association of Oregon were examples of groups supporting implementation of the Council's MCS. The organization which remained a bastion of support for MCS was the Northwest Conservation Act Coalition (NCAC). The Coalition, a regionwide alliance of environmental and other public interest groups, monitored the implementation of the Northwest Power Act. Conservation was one of their highest priorities. The four

states' energy offices also provided essential support for the Council's MCS. Without their efforts and political backing, it is doubtful that MCS would have been implemented to the degree it was by 1993.

The strongest supporters of conservation had historically had less access and authority over both regional electrical resource acquisitions, and the decisions made for and by the building industry. Utilities and building industry coalitions had the greatest influence over decisions made in these areas. In the housing industry, for example, builders were formidably well organized and had effectively impeded adoption of statewide energy codes in Idaho and Montana, and delayed upgrading of codes in Oregon and Washington (Lee 1991b). Utilities had also operated with a high degree of autonomy regarding resource acquisitions.

The Act's clear mandate for MCS coupled with the Council's strong public participation program helped groups with historically less influence over energy decisions gain a stronger voice. When the Washington legislature upgraded the state's building codes to MCS levels, the collective voice of these supportive groups was critical in helping defeat the building industry's lobbying efforts.

Institutional and Behavioral Modifications

To what degree do the MCS require broad institutional and/or behavioral modifications from implementors?

Successful implementation of model conservation standards was dependent upon the decisions of BPA, over 130 public and private utilities, state and local governments, hundreds of homebuilders, and to some degree the 9 million citizens of

the Pacific Northwest. As instructed by the Act, the Council called for development of conservation as the primary new energy resource in the region. Unlike acquiring conventional generating resources, acquiring energy conservation required a radically decentralized approach. While building one generating plant might largely involve only one utility, securing an equivalent amount of conservation required the combined actions of the utilities, state and local governments and the building industry.

Two of the most significant reasons for the delay in MCS implementation were the magnitude of change required and the exhibited resistance to those changes by key actors. Regionwide implementation of MCS required a large number and variety of actors, many of whom were not supportive of the Council's standards, to make significant commitments to institutional change. For this reason, it took considerably more time than the Council originally expected for the institutional changes to occur (Harris 1994).

To implement the MCS, behavioral and institutional modifications were required of three main groups. These groups were state and local governments and agencies, BPA and the public and private electric utilities in the region, and the building industry. In short, implementation of MCS required a high degree of change from these diverse groups.

State and Local Governments

The Council's intent was that the four states in the Northwest implement MCS as energy building codes. The states were asked to mandate revolutionary changes in the building industry. Building codes are adopted and enforced by local governments

according to state law; changes in these codes however, normally occur gradually. Since state resources and political support were needed to adopt the codes, the Council, calling states to adopt and enforce MCS by January 1986, forced the states into a difficult position. The Council was asking for revolutionary changes within only a two year period.

Another barrier to state and local government implementation was that building codes are not applied universally in each of the Northwest states. The process to code adoption also differs widely among the four states. Each state had to take a different path to implementation. For example, to adopt codes on a statewide basis in Washington and Idaho required action by the states' legislatures but in Oregon and Montana an administrative process could be used.

When it came to actual enforcement of energy codes, local governments were responsible. Local jurisdictions which adopted codes themselves or were in a state which had an energy code, had to commit a significant amount of resources and staff time to developing a local process to enforce the codes. This meant modification of related administration activities and initiation of an enforcement and inspection process.

Bonneville Power Administration and the Utilities

As noted earlier, within the first few years it became apparent that adoption of codes equivalent to MCS on a state or even local level would take longer than the Council originally envisioned (NPPC 1985b). As a result, BPA and the public and private utilities were asked to develop a number of programs to stimulate greater

regionwide implementation of MCS and demonstrate the cost-effectiveness of the standards. The objective was to use utility marketing programs to secure 25 percent of new residential buildings being built to the Council's MCS. Although most of the burden of developing and financing programs to support MCS fell upon BPA, it took the local utilities' efforts to actually administer the programs. Bonneville provided the program rules, guidelines and financial assistance and the utilities offered the programs to home builders and buyers in the local communities.

When the Council adopted its MCS, BPA was not prepared to deal with all the Council's requests (Eckman 1994). Prior to MCS, neither BPA nor the utilities had extensive experience in developing conservation programs. Although many had offered some popular voluntary programs to their customers, none had dealt with the type of programs needed to facilitate a regionwide transformation in the building industry. Programs such as the Early Adopter and Super Good Cents did not fall into the traditional scope of the electric utility functions (Lee 1993). In addition, program development and implementation were both capital and labor intensive for BPA and participating utilities. Bonneville and utilities had assigned limited staff (in both numbers and technical capability) to the conservation division. These resource limitations reduced their ability to respond to program needs.

The Building Industry

At the core of implementing MCS were the changes required of the building industry. Thousands of builders in the region had to significantly modify their building practices. To help them in this task, BPA and state energy offices were called on to undertake regionwide training workshops in a number of locations in all

four states. Simply put, the industry had to move up the MCS learning curve before it could be expected to build cost-effective and economically feasible structures.

In addition to builders modifying their practices, the building supply industry had to provide new technologies and materials for the MCS structures. For example, aluminum window frames were replaced with the more energy efficient vinyl frames, and new technologies such as the air-to-air heat exchangers required for indoor air quality had to be improved. Although resistant to change, the building supply industry did eventually provide these new construction materials in jurisdictions where MCS were adopted. Programs such as the Early Adopter and Super Good Cents forced local buyers and suppliers to respond or lose a portion of their customers.

Political Support

What was the level of political support for residential model conservation standards among key state policy-makers and state administrations?

While energy efficiency in general was politically popular to support, implementing specific conservation programs such as MCS required a significant commitment to institutional and social change. The changes required, especially when there was a regulatory component, were sometimes politically unpopular. Thus, those who agreed that conservation was a prudent undertaking did not necessarily vote for measures which would have ensured its implementation. Policy-makers who were called to adopt MCS had to remain sensitive to the political pressures of well organized and powerful special interest groups like the building industry. In addition,

the Council's power and authority was partially derived from the political acceptability of its measures.

When it came to adopting building codes, MCS were at the mercy of political dynamics within the four states. Although the state code adoption and upgrading process appeared simple and straightforward from the outside, in reality it was a complex and highly political undertaking. In each state, support by key policy-makers and organized special interest groups was a significant factor in determining whether MCS level codes were adopted. Assumptions about the Council's standards being embraced by state policy-makers because of the Council's make-up as an organization of states proved false. The Council had to devote a significant amount of time and resources toward securing the needed political support from state and local policy-makers.

From a broad perspective, policy-makers in the four states differed significantly in terms of ideology toward government regulation of private industry and thus MCS. The common link of support among each Northwest state came from the states' energy offices. Undeniably, without the supportive efforts of each state's energy office, MCS would have had much less of a chance of being implemented. In contrast, support from elected officials in each state and other decision-makers within the electric utilities and housing industry ranged from actively supportive to actively against MCS adoption.

When comparing levels of support from elected officials among the states, those in Washington were the most supportive of MCS. Washington officials recognized the threat from the surcharge on BPA electrical rates as well as the

benefits from using energy efficiently. In addition, Washington and Oregon had energy codes in place previous to the Council's first power plan. Although Oregon became second in terms of making strides toward MCS implementation, support for the Council's standards among elected officials was generally weaker than in Washington (Harris 1994). For example, in 1985 the Council asked the Oregon legislature to grant local governments the authority to adopt codes more stringent than Oregon's state codes. This would have allowed local jurisdictions in Oregon the opportunity to participate in the Early Adopter Program. The Oregon governor at the time, Victor Atiyeh, and a few influential members of the legislature were opposed to adopting the Council's standards. Their opposition helped kill the proposal in committee (Schwartz 1990). Neil Goldschmidt, who became governor in 1986, and Barbara Roberts in 1990, were generally supportive of adoption of the Council's standards. Their support helped with MCS code adoption and implementation.

In Washington, despite intense lobbying efforts by the building industry, the state legislature adopted building codes equivalent to MCS levels for residential structures in 1990. This came after an unsuccessful attempt was made to upgrade the codes in 1989. An administrative process several months later upgraded Oregon's codes to MCS levels. Although these two states led the region in MCS code adoption, their paths toward MCS adoption was very different. In Washington, the decision to adopt MCS was more political as it had to pass through the state legislative process. In Oregon the decision was less political and more systematic since it was made in an administrative process.

In both Washington and Oregon, the Cascade Range divides the states not only climatically but also ideologically. The east side of the two states are dominated by small towns and rural populations (Spokane, Washington is an exception in size of population) and more conservative political ideology. Policy-makers from the east side, with few exceptions, were less supportive of stringent energy codes in new structures than those representing urban population centers west of the Cascades. That the winters are colder on the east side and thus the MCS more expensive to meet has not helped the Council secure support from east side policy-makers (see Figure 12).

The relatively rural, conservative populations of Idaho and Montana also resulted in less support for MCS among state and local officials and decision-makers (Schwartz 1990). When the first power plan was released in 1983, only about 40 percent of Idaho's population was covered by any type of energy efficient standard compared with Oregon and Washington in which a statewide code was in place (Skog 1984). In addition, Idaho's energy standard was in reality only a guideline for local government, meaning it could be enforced, modified, or ignored. For example, after a 1992 survey of building practices in Boise, Idaho (a jurisdiction which falls in Idaho Power Company's service territory and accounted for 50 percent of new starts in Idaho in 1991) researchers concluded that less than 4 percent of the new homes met Idaho's energy standards (Noland 1992). Moreover, these standards where much less stringent than the Council's MCS.

Montana presents a special problem in adopting MCS. Only a portion of Montana, the portion west of the continental divide, is covered under the Northwest

Power Planning Act. Well over half of the state's territory is exempt from implementing the Council's Power Plan. To adopt statewide building codes in Montana, decision-makers in eastern Montana had to be persuaded to participate even though they did not fall under the Act's jurisdiction and thus were not eligible for BPA financial assistance. This fragmentation of Montana contributed to limited support from public officials and even from the Montana members on the Council (Schwartz 1990).

Montana, like Oregon, had a minimum/maximum standard law meaning that cities and counties could not adopt codes that exceeded or were less strict than the state's code. Since Montana's energy code was much less stringent than the Council's, those jurisdictions wishing to adopt MCS had to request a variance from the state. This was a major impediment for local jurisdictions wishing to adopt MCS level codes. Missoula was the only local jurisdiction to obtain a special dispensation from the state to allow for the stricter code. Consequently, Missoula remained the only local government in Montana implementing MCS level codes. As one of the more populous parts of Montana, implementation of the MCS in Missoula was, however, important.

Support for MCS among policy-makers within the four states changed dramatically with a change in state leadership. In no other place was this more apparent than in Montana. In 1989, Montana came very close to allowing MCS as an optional code for local governments through an administrative process. This process was abruptly stopped when newly elected Governor Stephens and his two newly appointed Council members withdrew their support for MCS adoption (Harris 1994).

In a state administrative hearing, Montana's Council Member Brenden testified against state adoption of MCS energy codes. He stated that the codes were burdensome and were clearly not in the best interest of Montana's citizens (Northwest Conservation Act Coalition 1989). The subsequent Racicot administration was also opposed to MCS level codes in the state and blocked similar attempts to upgrade state codes.

Organizational Structure of the Council

How well does the Council's organizational structure facilitate MCS implementation?

Role of Integrating Power and Fish

The Council's dual responsibility for a regional Power Plan and a Fish and Wildlife Program for the Columbia Basin was beneficial for the Council's commitment to implementation of the model conservation standards. The long term environmental and economic benefits generated by greater reliance on energy efficiency complimented both the Council's role as a power and fish and wildlife planner. Investing in demand management measures in the long run could help the region take advantage of a less expensive source of energy, ease the pressure on the hydroelectric system and postpone utilities' need to invest in other environmentally harmful resources. When considering its dual mission, the Council found it advantageous to devote a significant amount of resources to adoption of regionwide model conservation standards.

As noted in Chapter five, the Council was always stronger in its power planning role than in it role as a fish protector. This was partially because there was less uncertainty involved with the power plan than the fish and wildlife program. The organization was clearly more comfortable in its power planning role. Partially as a result, the Council was willing to devote a significant amount of resources to studying and promoting its model conservation standards among the four states, the utilities, and home builders.

Jurisdiction

The Council develops its long term plan for Oregon, Washington, Idaho, and Montana west of the continental divide. The Council, however, has limited influence on those jurisdictions outside BPA's service territory. Bonneville's service territories consist of those jurisdictions which receive its wholesale power. Wholesale power is generally purchased and distributed by public utilities. Bonneville provides around 40 percent of the electricity supplied to the Pacific Northwest. The other electrical supply generated in region comes from public and private utilities.

In 1985, the Council called BPA to use both positive and negative incentives to simulate use of its energy efficient building codes. Only areas in service territories of utilities purchasing power from BPA were subject to those incentives. Utilities which only bought power from BPA on a spot basis (generally private utilities) were not subject to many of the conditions placed on long term agreements. Generally, the less the tie with BPA, the less influence the Council had over a utility and the communities it served. In the Northwest, Washington had the greatest number of

jurisdictions within BPA's service territory. Approximately 77 percent of Washington's electrical power was distributed by public utilities which received wholesale power from BPA (Lee, Klemka, and Marts 1980). This meant that the Council had greater influence over jurisdictions in Washington. Washington was followed by Oregon in which only 37 percent of the electricity was distributed by public utilities (ibid, 28). In Idaho 14 percent of the electrical power was distributed by public agencies receiving wholesale power from BPA (ibid, 28). Montana falls last in terms of public electric power distribution.

There were some positive incentives devised to influence private utilities who were not subject to BPA's power purchasing conditions to develop MCS programs. These however, were very limited in their success. An example was the billing credits. Billing credits could be issued to customers who took action to reduce BPA's need to acquire new resources. Billing credits, either in the form of cash or in reduced billings, were offered to encourage utilities both public and private to develop conservation programs.

In addition to the Council's lack of influence over private utilities, Montana also presented a unique jurisdictional problem for the Council since only a portion of the state was included in the power plan. Interest groups and policy-makers in eastern Montana had to be convinced that MCS were beneficial enough to adopt even though they were not within the Council's planning jurisdiction. Within the four northwest states, there were gap areas where the Council had limited or no influence. The Council's limited authority over Eastern Montana and jurisdictions outside of BPA's service territory adversely affected MCS adoption.

Council's Relationship to Agencies Implementing the Model Conservation Standards

Bonneville Power Administration

The Council was a new agency with planning responsibilities overlapping those of the Bonneville Power Administration. A significant amount of the Council's role was to help BPA be a better steward of ratepayers' money and the region's resources. Implementation of MCS would go along way towards fulfilling this role. With this mission, there was naturally tension between the two organizations.

The tension between BPA and the Council was most apparent in the eighties when the Council, as a new regional institution, was defining its role. When the newly formed Council began its work on the MCS, BPA had already begun to posture itself defensively against the Council and its activities. Essentially, BPA perceived that the Council had infringed upon its territory. In addition, initially there were those at BPA who thought they would be asked to develop the MCS for the region (Harris 1994). When the Council adopted its own standards, technical people within BPA and the Council had a difference of opinion over the cost-effectiveness and economic feasibility of MCS.

As stated in Chapter Five, starting in the late 1980s the relationship between BPA and the Council began to improve. A pivotal point in the relationship was reached when Jim Jura took over as BPA's Administrator. Jura, unlike his predecessors, was willing to communicate and negotiate with the Council over disputed issues including the standards (Fazio 1993). As a result, Jura helped his agency create an environment of cooperation with the Council.

Since the late eighties, the relationship between the two organizations was strained at times but not as adversarial as in the early years (Harris 1994; Fazio 1993). This was partially because BPA had time to adjust to the Council's role in the region and its own responsibilities to the Council's power Plan. The Council also had time to prove itself as a valuable and credible power planner. Although the two organizations certainly did not agree on everything after Jura's arrival, the Council's thorough and accurate analysis helped it gain respect from BPA as an important actor regarding the region's energy future.

Utilities

As with BPA, the Council's relationship with the utilities was tense. The Council's mission was to create a long term energy plan to benefit the region as a whole. This meant that measures such as MCS might go against what would be most beneficial in the short-term for an individual utility. Energy savings in times of surplus, as during the 1980s, generally were viewed as lost revenues by the utilities. In addition, the Council was asking the utilities to expend resources on programs to promote MCS implementation at a time when utilities argued their available resources were scarce. The threat of the utility surcharge on those jurisdictions not in compliance with MCS also brought about a strong negative reaction from the utilities against both the Council and the MCS.

Turf battles and a number of contentious issues independent of the MCS also surfaced to strain Council/utility relations during the first few years. For example, there was a strong desire to control the utilities coming from the four states (Nybo 1994). States were afraid utilities without some type of state check would make

investments in costly new resources, (such as the WPPSS nuclear project, see page 144) which would result in dramatically higher electrical rates. State policy-makers expected the Council to play that restraining role. The Council was caught in the middle of maintaining a working relationship with the utilities while trying to fulfill the wishes of states.

Similar to its relationship with BPA, the Council's relationship with the utilities improved significantly in the late 1980s. This was due largely to the responsiveness of the Council to the utilities' concerns, the fact that the utilities became accustomed to the Council, and the expressed support for MCS by some utility customers (NPPC 1989c).

State and Local Governments

As noted earlier, out of the organizations involved in the MCS implementation, the state energy offices were most supportive of the Council and MCS. State energy offices supported the Council's MCS with both political and financial resources. State and local policy-makers were more tentative about the Council and its standards than their energy offices. Despite the fact that the Council's membership was composed of political appointees from the states, there were expressions of concern by state and local governments over adopting the standards as codes. Main concerns were that implementing MCS would drain already low government resources and create an economic hardship on home builders and buyers. Given that the Council's ultimate goal was regionwide adoption of MCS level building codes, state concerns and resistance to MCS were problems the Council could not

ignore. Council members and staff, with the help of state energy offices had to work hard to inform states about the real costs and benefits of MCS. These efforts helped the Council strengthen its relationship with state and local jurisdictions. That the Council did not impose a surcharge on the jurisdictions also improved the relationship between the Council and states interests.

Credibility

The Council's staff over the ten-year analysis period gained a significant degree of credibility for its thorough and accurate analysis of the MCS. When the MCS were first released, implementors were very skeptical of the projected cost-effectiveness. After the first few years of testing, however, a significant number of implementors' opinions changed in support of the standards. Bonneville conducted its own cost-effectiveness analysis and the numbers originally produced by the Council's study where close to those from BPA's analysis as well as from actual demonstration projects. An important result of the findings of this study was that the Council gained a significant degree of credibility in the eyes of utilities.

For the first few years after its formation, implementors continually challenged the Council's role and expertise in matters of energy conservation. Since the late 1980s, the Council became a more accepted part of the institutional infrastructure guiding BPA's energy acquisitions. The Council gained considerable credibility for its analysis and its planning process. The symbiotic nature of the organization's technical credibility and the backing of key members who were respected in the region and helped the Council move its standards closer to regionwide adoption.

Changing Priorities and Goals in the Northwest

How high a priority are the original statutory goals of the Act for key actors in the region, how have priorities changed over time due to the emergence of conflicting public values, and how have changes in relevant circumstances and socioeconomic conditions affected political support for the Act and the model conservation standards?

When the Northwest Power Planning Council was formed in 1990, the new organization found itself operating in a vastly different energy environment from the one which had stimulated its creation. Some of the original conditions propelling the passage of the Act had vanished by the early 1980s, and other unforeseen events had emerged. Prior to the passage of the Act, analyses by utilities and energy-oriented agencies predicted the region would face an energy shortage by the mid 1980s. However, instead of an energy deficit, events in the early 1980s resulted in a costly energy surplus. Rising electrical rates coupled with a depressed regional economy slowed the demand for electricity. An over building of the region's thermal generating capacity and a number of high runoff years which provided excess hydropower also contributed to the surplus.

The surplus of generating capacity relative to demand reduced motivation to adopt and implement the MCS. Bonneville and the utilities, facing a costly surplus, were not enthusiastic about pursuing conservation programs which would further decrease their revenues at a time when demand was declining. They claimed they were too stripped financially to invest in conservation (NPPC 1994c). Moveover, in the early 1980s, BPA was forced to increase its electrical rates to cover mounting construction costs of the failed Washington Public Power Supply System's (WPPSS)

nuclear projects. Bonneville had a hard time justifying additional expenditures on conservation measures which would decrease revenue and possibly require it to further increase electrical rates. Along with the utilities, state and local governments were being asked to contribute to MCS implementation at a time when their resources and budgets had been drastically reduced. The economic recession in the Pacific Northwest had left both state and local governments with fewer resources to allocate for new conservation efforts.

Despite the seemingly negative impact of the energy surplus on conservation, there were other ways in which it benefited MCS implementation. A Staff Conservation Analyst for the Council, said that the surplus gave the region time to develop the infrastructure needed to properly implement MCS (Eckman 1994). Additionally, the slow growing economy gave builders a chance to learn how to construct MCS buildings. In a rapidly growing economy it would have been more difficult to get builders to participate in programs such as BPA's Residential Standards Demonstration Program.

By the early nineties, the energy surplus was gone. The slow economy of the eighties gave way to regionwide, although uneven growth. When the Council released its 1991 Power Plan, the region was in a load resource balance. This meant the region was using about as much power as it was producing. During the eighties, the few utilities in load resource balance were much more likely to initiate greater conservation efforts than those with a surplus. For example, Puget Sound Power and Light Company (PSPLC) was nearing load resource balance in the late eighties. This encouraged PSPLC to operate the largest conservation acquisition program among all

major private owned utilities (NPPC 1989b).

Another factor which probably stimulated higher interest in conservation in the early 1990s was the high degree of legal, political and public support behind the salmon recovery effort. Hydroelectric facilities in the Columbia were increasingly required to modify operations to accommodate endangered salmon thereby reducing the ability of hydropower operations to meet electrical demand. Other conditions which fostered greater interest in conservation were the rising cost of electricity and an increase in environmental concerns over the alleged contribution of fossil fuel burning to the global warming phenomenon. In addition the 1993 closure of Trojan nuclear power plant also eliminated an average of 726 aMW of power from the region.

During the early 1990s, the predicted future economic conditions influencing BPA and the utilities threatened to negatively impact financial support for MCS incentive and support programs. In the face of declining revenues and increasing financial debt, BPA was attempting to make major cuts in its budget. Bonneville used its fiscal crisis to justify cuts in conservation expenditures. As the major financier of MCS programs, BPA had already made cuts in the area of conservation and proposed a number of others (Hardy 1994). These cuts threatened to jeopardize the Council's standards in some jurisdictions. In Idaho, for example, local jurisdictions which adopted MCS were receiving financial assistance and incentives through BPA's Northwest Energy Code Program. This program, however, was scheduled to be cut at the end of 1995. Without continuing the former level of BPA financing, it appeared uncertain whether Idaho jurisdictions could continue to implement and

enforce MCS.

Renegotiation of two major agreements which impacted the amount of hydroelectric power available in the region were also looming in the near future. The Canadian Entitlement (see page 32) was up for renegotiation. If not renegotiated, the Pacific Northwest would be required to return 600 aMW of firm energy and 1,400 aMW of capacity by the year 2003 to British Columbia (Lessor 1990). It appeared doubtful that the Canadians would agree to resell their entitlement as they had 30 years earlier (Ruff 1993).

The Pacific Northwest Coordination Agreement (See page 33) was also scheduled to end in 2003. It would need to be renegotiated if it were to continue. A number of changes in the utility operating environment would certainly affect the renegotiation of the Agreement and the implementation of utility conservation programs. The most significant change was that utilities looked less and less to BPA as a viable power supplier, which indirectly reduces the Council's ability to implement MCS incentive programs still important to Idaho and Montana. When the Northwest Power Planning Act passed, expectations were that BPA would play a major leadership role in securing new regional resource acquisitions. Instead of relying upon BPA, utilities in the early 1990s were increasingly seeking other sources of power. Individual utilities, in addition to generating their own energy, looked increasingly to other power suppliers in California and to Canadian utilities and less and less to BPA. It appeared that future electrical resource developments in the near team would be built and financed on a more decentralized basis. As utility ties with BPA weakened, the Council's ability to influence the utility resource acquisition

process and enforce the Northwest Power Planning Act's provisions decreased. Moveover, utilities concerned over their competitiveness and short-term profits might be expected to direct money away from conservation support programs.

Summary of Chapter Six

The Council adopted model conservation standards for new electrically heated residential structures in 1983. Implementation of the MCS went through three stages during the analysis period. In the first stage, 1984 through 1985, little progress was made in implementing the standards as the Council overestimated the four states' commitment to energy efficient building codes and underestimated the time it would take for the implementors to develop the infrastructure to support regionwide implementation. In the second stage, 1986 through 1989, more significant implementation strides were made when the Council called BPA and the utilities to develop programs to help the region make the transition to greater use of the standards. During the third stage, 1990 through 1993, the greatest degree of implementation took place when Washington and Oregon moved from reliance on utility programs to statewide MCS building codes.

The results from the implementation analysis indicated that six of the eight criteria for effective implementation were met at least moderately well during the analysis period. In meeting criterion one, Congress gave the Council a clear mandate to develop MCS and the Council gave the implementors specific objectives for energy savings and target dates for compliance. For criterion two, the Council faced three primary areas of uncertainty regarding MCS: the uncertainty surrounding market

penetration, achievement of the Council's estimated energy consumption levels and predicted costs. While the uncertainty regarding MCS cost-effectiveness had the greatest negative impact on implementation, none of the three areas of uncertainty were significant enough to undermine the Council's findings that MCS were the most cost-effective supply of electricity for the region.

The Council did a poorer job in meeting criterion three, implementors' involvement in the planning process. The Council did not fully involve implementors in its planning and analysis stage for the residential MCS. This resulted in implementors' lack of ownership toward MCS and contributed to their skepticism of the savings achievable and cost-effectiveness. The components of criterion four, the structure of the implementation process, were met in a mixed fashion, from low to high. The weakest component of criterion four was implementors' attitudes toward MCS. The strongest component was the Council's funding source, the BPA.

Criterion five, the degree of institutional and behavioral modifications required, was the criterion which caused the greatest delay in implementing the standards. Implementing MCS required significant changes from numerous groups. The magnitude of change required and the exhibited resistance to those changes by some implementors, impeded and delayed implementation, especially during the first seven years of the analysis period.

Although criterion six, political support for the MCS, was met moderately well, it did vary significantly within and between states as well as over time. While it was politically popular to support energy efficiency, policy-makers were reluctant to support specific measures like MCS. Criterion seven addressed how the components

of the Council's organizational structure facilitated or impeded MCS implementation. After developing improved working relationships with primary implementors in the mid-1980s and establishing its credibility as a regional power planner, the Council's organizational structure generally helped in securing implementation.

Lastly, criterion eight, changing regional priorities, generally supported implementation of the MCS after the early 1980s. The surplus of electricity in the early 1980s, which reduced the region's motivation to pursue conservation measures like MCS, was gone by the late 1980s and early 1990s. Although the region was faced with acquisition of additional generating resources, these costly additions would be lessened by continued implementation of MCS. In addition, society's increased concern over impacts of hydroelectric production on anadromous salmonids and thermal energy generation on air and water quality signaled a desire to seek less environmentally damaging sources of power. Despite the threat of the decreased funding levels from BPA and the new operating environment adopted by utilities, by the end of the period of analysis, conditions and events in the region supported future implementation of MCS.

CHAPTER 7

SUMMARY AND CONCLUSIONS

This dissertation assessed the implementation of the water budget and the residential model conservation standards developed by the Northwest Power Planning Council under its mandate to provide a Northwest Power Plan and a Fish and Wildlife Program for the Columbia River Basin. These two policies were analyzed to examine factors influencing their implementation for the study period of 1984 through 1993. This chapter summarizes the results from the two analyses and makes recommendations to the Council and other natural resource planning institutions for securing effective implementation.

SUMMARY OF THE POLICY ANALYSES

In general, the Northwest Power Planning Council was at least moderately successful in securing implementation of the water budget from its Columbia Basin Fish and Wildlife Program and residential model conservation standards from its Northwest Conservation and Electric Power Plan. A number of factors, however, impeded and delayed full implementation of both measures during different times over the course of the ten-year period. An eight criteria framework was used to identify those factors which facilitated and impeded effective implementation. Table 10 summarizes the extent to which the eight analysis criteria were met for the water budget and the model conservation standards. An ordinal scale was used to rate the criteria according to how well they were met.

Table 10. A Summary of the Extent to Which the Water Budget and the Model Conservation Standards Met the Eight Criteria for Effective Implementation.

MEASURE / CRITERIA	CRITERION 1 OBJECTIVE FOR THE MEASURE WAS CLEARLY DEFINED AND CONSISTENT WITH ACT	CRITERION 2 HIGH LEVEL OF CERTAINTY ABOUT THE MEASURE'S ABILITY TO ACHIEVE THE OBJECTIVE	CRITERION 3 IMPLEMENTORS WERE INVOLVED IN THE PLANNING PROCESS	CRITERION 4 IMPLEMENTATION PROCESS WAS STRUCTURED TO MAXIMIZE PROBABILITY IMPLEMENTORS WOULD PERFORM AS DESIRED	CRITERION 5 A LIMITED NUMBER OF BEHAVIORAL AND INSTITUTIONAL MODIFICATIONS WERE REQUIRED FROM IMPLEMENTORS	CRITERION 6 THE MEASURE RECEIVED A HIGH LEVEL OF POLITICAL SUPPORT	CRITERION 7 COUNCIL'S ORGANIZATIONAL STRUCTURE FACILITATED SECURING IMPLEMENTATION	CRITERION 8 CHANGING PRIORITIES OF KEY REGIONAL ACTORS DID NOT UNDERMINE SUPPORT
WATER BUDGET	MODERATE	LOW TO MODERATE	MODERATE TO HIGH	MIXED BUT GENERALLY LOW TO MODERATE	MODERATE	1984-1990 MODERATE TO HIGH 1991-1993 MODERATE	LOW TO MODERATE	MODERATE TO HIGH
MODEL CONSERVATION STANDARDS	HIGH	MODERATE TO HIGH	LOW TO MODERATE	MIXED BUT GENERALLY MODERATE	LOW	MODERATE	MODERATE TO HIGH	MODERATE

The six categories used were low, low to moderate, moderate, moderate to high, high, and mixed. A rating of low means the criterion was clearly not met and thus exerted a negative influence on implementation. A rating of low to medium means the criterion was generally not met, but there were factors which kept it from exerting as strong a negative impact on implementation as criteria which received a rating of low. A moderate rating means the criterion was partially met and was at least neutral in its impact on implementation. A moderate to high rating means the criterion was met but that there were factors that resulted in it having less of a positive impact on implementation than a criterion with a rating of high. A rating of high means the criterion was fully met and effective implementation was facilitated. A mixed rating means that there were parts of the criterion rated from low to high.

The degree to which the conditions were met varied for the two measures. Implementation of the water budget met five out of the eight criteria at least moderately well during the 1984 through 1993 period. In the implementation analysis of the model conservation standards, six out of the eight criteria were met at least moderately well during the same period. The next few pages summarize results displayed in Table 10.

When comparing criterion one, how well the Council defined the objectives and policy directives for the two measures, clearly it did a better job with the model conservation standards. While the Council did define a general objective for the water budget which was consistent with the fish and wildlife goal set forth in the 1980 Northwest Power Planning Act, its vagueness led to different interpretations and conflicts among entities involved with implementation. Additionally, the conflict

resolution process established for the water budget was perceived as biased by some key actors. For the model conservation standards, the Council defined specific objectives and implementation expectations. Although initial deadlines for achievement of MCS objectives turned out to be unrealistic, the deadlines did give implementors clear directives consistent with the 1980 Act. While criterion one was fully met for MCS, it was only partially met for the water budget.

Criterion two examined the causal relationship between the measure and the desired policy outcome. Despite a general agreement that increased flow was needed for juvenile salmonid survival, the water budget's effectiveness remained unclear throughout the 10-year analysis period. The high degree of scientific uncertainty surrounding the effects of the water budget kept this criterion from being met. With MCS, the criterion was met to the degree that the standard's ability to produce cost-effective energy savings was rated moderate to high. However, uncertainties surrounding MCS cost-effectiveness, low market penetration rates and ability to achieve predicted energy savings did negatively impact implementation rates during the first few years.

Criterion three focused on implementors' involvement in the planning process. It is assumed that the greater the degree of implementor involvement, the greater their feelings of ownership toward the measure would be. This in turn would result in implementors exerting greater willingness to carry out the measure. For the water budget, several important actors influencing implementation were involved in testing the original flow proposals and continued to be involved in negotiating water budget operating procedures each year. Although implementors were clearly resistant to

carrying-out the water budget (largely because it was in conflict with their other operating objectives), resistance would have most likely been magnified if the Council had not included implementors in the initial development and discussion stages. A moderate to high level of involvement by implementors resulted in this criterion being adequately met for the water budget. Criterion three was not adequately met for model conservation standards because the Council did not heavily involve implementors in the initial planning stage. Implementors' lack of involvement, particularly the Bonneville Power Administration, led to more skepticism over the Council's MCS analyses, less implementor ownership, and more resistance toward adopting the standards. Failure to meet this criterion contributed to the slow MCS implementation progress during the first few years.

Criterion four was used to examine whether the water budget and model conservation standards were structured to maximize probability of compliance by implementors. Composed of several issues, the analyses' results for both measures were mixed in meeting this criterion. Implementation of both measures had to be carried out by relatively unsympathetic groups with mixed levels of jurisdiction over needed resources, and mixed levels of integration supporting implementation. While both measures did have the advantage of BPA's financial assistance, access to the decision-making process by supportive groups was greater for the MCS than for the water budget.

Criterion five focused on the degree of change required for implementation of the measure. The less change required and the fewer groups involved, the higher the likelihood of implementation. The water budget met this criterion to a greater degree

than did the model conservation standards. Although the water budget required a significant change in river operations, implementation was facilitated because a relatively small and well defined group was charged with making these changes. In contrast, the Council's MCS required a high degree of change by a larger, less well defined group of implementors. This criterion was partially met for the water budget but not met for the model conservation standards.

Criterion six, the level of political support coming from key policy-makers in the four states, was at least moderately well met for both measures. The original water budget (1983-1990) enjoyed a moderate to high degree of support from state policy-makers since negative impacts were limited and expectations for salmon recovery were hopeful. However, the Endangered Species Act listings, the costs of the new water budget (1991-1993) and increased conflicts between upstream and downstream interests divided and weakened regional support in the last few years of the analysis period. For model conservation standards, political support generally grew since the early implementation years (with the exception of Montana in the early 1990s) as the regional energy surplus of the 1980s vanished, new acquisitions of electrical power became necessary, economic and environmental concerns over resource choices increased, and the region gained experience implementing the measure.

For criterion seven, several components of the Council's organizational structure were examined to determine whether they facilitated implementation of the two measures. For the water budget, the Council's organizational structure was rated low to moderate in facilitating effective implementation. Problems occurred over the

Council's credibility as an effective planner for the salmon restoration effort and its limited jurisdiction and authority over implementors. In comparison, the Council's structure was more effective for its role in securing implementation of model conservation standard. Higher credibility as a technically competent power planning body and the complimentary nature of conservation with its fish and wildlife responsibilities gave the Council more incentive to work toward securing MCS implementation. Criterion seven for MCS was given a moderate to high rating.

Criterion eight, the influence of changing priorities and events, was at least moderately well met for both the water budget and the model conservation standards. A decreasing energy surplus and increasing concern for the environment and declining anadromous salmonid populations were a few important issues which positively influenced implementation of both measures. A negative influence on water budget implementation occurred in 1992 and 1993 when the National Marine Fisheries Service, under Section 7 of the ESA, began to exert more control over spring flows. This shifted influence away from the Council and the Fish Passage Center.

Like many policy measures, implementation of the water budget and the model conservation standards evolved over time. While the water budget could be partially implemented the year following the release of the Council's program, the process toward implementing the model conservation standards occurred more slowly and in incremental steps over the ten-year period. The degree of change required for adopting the standards, the fact that the region initially had a surplus of electrical resources, state and local governments' ability to block MCS code adoption, plus initial hostile reactions from the building industry all contributed to delaying MCS

implementation. Positive influences for implementing the standards included, the Act's clear directive to adopt MCS, the Council's specific and consistent objectives, a strong causal relationship between MCS implementation and energy savings, support for MCS from the four states' energy offices, the Council's thorough analysis of MCS and effort toward convincing implementors in the region of MCS benefits, and financial support from BPA. For the water budget, vague objectives, uncertainties surrounding the water flow-salmonid survival relationship, the Council's lack of enforcement authority and implementors which were largely unsympathetic to the salmon recovery effort were the greatest factors undermining effective water budget implementation. Implementation of both the water budget and the model conservation standards required federal actors to diverge from their historical missions. However, involvement of implementors in initial water budget formulation and yearly planning processes, political support in the early years, the measure's consistency with the Northwest Power Planning Act, and adequate financial resources all helped the Council secure a degree of water budget operations each year.

RECOMMENDATIONS FOR THE NORTHWEST POWER PLANNING COUNCIL AND OTHER NATURAL RESOURCE PLANNING INSTITUTIONS

This research identified many of the critical factors which impacted implementation of the residential model conservation standards in the Northwest Conservation and Electric Power Plan and the water budget in the Columbia Basin Fish and Wildlife Program during 1984 through 1993. When considering recommendations to the Northwest Power Planning Council and other regional

planning institutions, it is useful to determine the degree to which the Council or other similar institutions can influence these factors. Table 11 categorizes the eight criteria used in the study according to the degree to which regional institutions can have influence over them. When considering natural resource planning institutions, there are some factors over which organizations have little if any control. Of the eight criteria, changing events and socioeconomic conditions cannot be influence by an institution like the Council. Priorities of society and events affecting those priorities will continuously shift, especially in the area of natural resource allocation and management. This makes many of our natural resources policies vulnerable to fluctuations in support. Planning institutions like the Council cannot control the effect of most events causing a regional energy surplus or the listing of species under the ESA. However, what they can do is monitor these events, determine how the events are likely to impact implementation of plans, and then alter implementation strategies accordingly.

The factors impacting implementation which planning institutions can have the greatest influence over are the objectives and the planning process itself. Planning institutions can make early mistakes if they do not define clear, consistent and quantifiable objectives for their plans and measures within those plans. Objectives should provide specific guidance for implementation, not be points of confusion and conflict. Clear and consistent objectives are particularly important when implementors are allowed to independently interpret and implement measures in light of their other obligations.

Table 11. Ability of Planning Institutions to Influence the Eight Criteria for Effective Implementation.

REGIONAL INSTITUTIONS CAN		
MOST OFTEN INFLUENCE	OCCASIONALLY INFLUENCE	RARELY INFLUENCE
* OBJECTIVES	* POLITICAL SUPPORT	* CHANGING PRIORITIES AND GOALS
* PLANNING PROCESS	* STRUCTURE OF IMPLEMENTATION PROCESS	
	* INSTITUTES ORGANIZATIONAL STRUCTURE	
	* CASUAL RELATIONSHIP	
	* INSTITUTIONAL AND BEHAVORAL MODIFICATIONS	

Planning institutions should use the planning process as a forum for involving implementors and resolving implementation conflicts. The planning process itself is a way in which to gather support for the policy. When asked one of the most important things he had learned during his work on both BPA's and the Council's staff, Jeff

Harris stated that he learned that "process is everything" (1994). Institutions like the Council, with limited or no implementation authority, cannot afford to draft their plans behind closed doors even though a commitment to an inclusive process requires significant resources. Regional planning institutions must spend energy and time incorporating all pertinent parties, especially implementors, into the process from the beginning. This helps the planning institution gain legitimacy for its product and increase the ownership among pertinent parties. Failure to do this was a demonstrated shortcoming for the MCS. When a planning institution calls for a measure requiring a significant amount of change from resistant implementors, it is critical for those implementors to be involved in planning stages. The importance of adopting an inclusive planning forum cannot be overstated.

Regional planning institutions can have varying degrees of influence over factors which make-up the remaining five criteria used in this research: causal relationship; structure of the implementation process; political support; behavioral and institutional modifications required; and its own organizational structure. The level of influence over these criteria vary according to such factors as the strength of the institution's enabling legislation, the type of issues being addressed, those defined to implement the measure, the type of implementation action called for, amount of conflict surrounding the issue and the salience of the planning issue among organized interest groups and policy-makers.

Organizations planning for complex ecosystem problems, like the salmon recovery effort, will always face uncertainties regarding their policy choices. These uncertainties need to be addressed proactively by the planning organization. The high

degree of uncertainty surrounding the flow-survival relationship, and the Council's inability and/or unwillingness to adequately address it eroded the support for the measure and the Council's credibility as a viable planning institution for fish recovery. In contrast, the Council's efforts to resolve uncertainty issues surrounding the model conservation standards increased support for of the MCS and the Council's credibility as a regional power planner.

While guiding philosophies like adaptive management are useful, translating these philosophies into a working policy which can provide answers and reduce uncertainties requires a commitment not only from the planning institution but also from the implementors. When implementors are resistant to modifying operations to accommodate measures such as the water budget, planning institutions cannot expect them to embrace actions required to achieve adaptive management objectives. This was demonstrated when the Council attempted to use adaptive management for resolving water budget uncertainties.

Regional planning institutions' ability to structure the implementation process in a manner which will maximize the probability that a policy will be carried out, will vary significantly among different organizations and according to the type of policies adopted. The enabling legislation will be one of the primary factors impacting this criterion. Clearly, it is advantageous for regional planning institutions to have strong enabling statutes that clearly outline their roles as well as implementors' responsibilities. While strong and clear enabling legislation will not guarantee that a regional planning institution will secure effective implementation, it does significantly improve its chances as well as ensure greater institutional stability for the planning

body.

Regarding political support for a plan or policy, planning institutions must prepare for fluctuations in support. There are actions regional institutions can take to increase support, such as establishing credibility and remaining sensitive to state, local and regional demands. However, if committed to achieving statutory or policy objectives, institutions will inevitably face declining or even opposing political support over time from some of the actors in the region.

To protect against the cycles in political support, organizations usually attempt to secure support from organized interest groups. These interest groups can continue to offer stable support when state or local policy-makers do not. This strategy does not work effectively for organizations like the Council (as it did not for the Title II River Basin Commissions and many other regional planning institutional structures). This is because regional planning bodies like the Council do not provide any material benefits to one or a few select groups, nor do they align themselves with one strongly defined cause or interest group. As a result, while BPA relied upon support from utilities, the Council did not have a solid constituency group to give it stable support.

Given that its voting members are representatives of state government, the Council was able to procure more support from state policy-makers than would be expected from most regional organizations. On the one hand, the Council's political appointees were often able to tap into political support at the state and even federal level, and use the support to pressure implementors into action. On the other hand, these connections made the organization vulnerable to cycles in state politics. There were times during the ten years when Council members' political connections to state

government impeded the Council's decision-making process and threatened to fracture the organization's collective position on issues regarding both the MCS and the water budget. A shift toward conservative state leadership generally meant an eroding of support for implementation of the Council's Plan and Program. The Council's vulnerability to cycles in state politics and its inability to establish a strong constituency support make its long term future questionable, especially during periods of conservative political leadership. Intraregional harmony between states involved in a regional institution like the Council is very important if the organization is going to achieve the goals of its enabling Act. Toward the end of the analysis period, harmony between the four northwest was becoming a thing of the past as old upstream/downstream conflicts resurfaced over allocations of water in the Columbia River Basin.

Components of criterion seven, the organizational structure, is at least partially defined by the regional planning body itself. While some of the key aspects of an institution's organizational structure, like authority over implementors and jurisdiction, will be outlined in the enabling legislation, other aspects like relationship to the implementors and credibility will be defined by the planning body itself. Over the ten years of analysis, the Council continuously made decisions affecting how it dealt with conflict (both within the Council itself and between the Council and implementors), how it dealt with hostile resistance from implementors, and whether or not it established itself as a credible leader for regional fish and wildlife and power issues.

One aspect which gave the Council trouble was that at times the organization internally was at odds over how best to give fish coequal status with power since this required a reduction in hydropower output. While it is assumed that integrated resource planning leads to more holistic and sustainable resource use, this does not mean all resources will be treated equally, even within organizations vested with this goal. Creating an integrated regional resource planning institution does not necessarily mean that under-represented interests will receive equal consideration. This is especially the case where one resource appears to be a higher priority and there is greater uncertainty regarding goal achievement for the lower priority resource.

Finally, regional planning institutions should conduct or direct efforts to track and monitor implementation of measures and policies as well as monitor successes in achieving defined objectives. This gives planning institutions necessary information to make adjustments to plans and credible data to back-up those decisions. Clearly regional planning institutions need adequate feedback mechanisms and processes.

CONCLUSIONS

Securing effective implementation of measures within natural resources plans will continue to be one of the greatest challenges facing regional planning institutions like the Northwest Power Planning Council. Conflicting goals of management agencies, interest groups and policy-makers will become more acute in the next century as society increasingly recognizes that its growing economic demands are jeopardizing the environment which sustains life. Despite their limitations, regional

planning institutions which develop integrated plans addressing both economic and environmental realities and that have achieved some success in securing implementation of those plans present us with an opportunity to better manage our natural resources.

The implementation analysis of the water budget and the residential model conservation standards used in this research led to mixed but somewhat optimistic conclusions about the Northwest Power Planning Council's success in securing effective implementation. While the Council did face numerous obstacles and challenges in securing implementation of both measures, they also enjoyed a number of victories. For the entire ten-year analysis period, the Council was somewhat less successful in addressing the implementation issues surrounding the water budget than it was for the model conservation standards. A regional institution such as the Council which must base its plans on compromise, political feasibility and has limited enforcement authority and jurisdiction, might not be the most appropriate vehicle to ensure the restoration of endangered species. The changes needed in the Columbia Basin to restore anadromous salmonids, exceeded what the Council was authorized to do.

This research concludes that there are a number of components of the Northwest Power Planning Council which should be considered for replication when developing future planning institutions. There are also limitations to using the Council as a model such as its limited authority over implementors and its instability during times when the region is fractured politically. Future organizations, especially regional bodies should attempt to examine lessons learned from the successes as well

as failures of the Council's efforts. A notable lesson is that the regional institutional approach is not necessarily better than a fragmented approach if the regional organization does not or cannot take advantage of its unique position, resources, and structure.

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APPENDIX

Appendix

Acronyms and Abbreviations

aMW	Average Megawatts
BPA	Bonneville Power Administration
Bureau	Bureau of Reclamation
CBFWA	Columbia Basin Fish and Wildlife Authority
CBIAC	Columbia Basin Inter-Agency Committee
cfs	Cubic Feet per Second
Corps	Corps of Engineers
CPO	Coordinated Plan of Operations
CRITFC	Columbia River Inter-Tribal Fish Commission
DSI	Direct Service Industries
ESA	Endangered Species Act
FELCC	Firm Energy Load Carrying Capacity
FERC	Federal Energy Regulatory Commission
FIARBC	Federal Inter-Agency River Basin Committee
FPC	Fish Passage Center
HDD	Heating Degree Days
IOU	Investor Owned Utility
IPC	Idaho Power Company
Kaf	Thousand Acre-Feet
kcfs	Thousand Cubic Feet per Second
Maf	Million Acre-Feet
MCS	Model Conservation Standards
NMFS	National Marine Fisheries Service
ONRC	Oregon Natural Resources Council
PGE	Portland General Electric
PNCA	Pacific Northwest Coordination Agreement
PNRBC	Pacific Northwest River Basin Commission
PNRPC	Pacific Northwest Regional Planning Commission
PNUCC	Pacific Northwest Utilities Conference Committee
PP&L	Pacific Power and Light
PUD	Public Utility District
RSDS	Residential Standards Demonstration Program
WPPSS	Washington Public Power Supply System