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THESIS

ECONOMIC AND LEGAL PROTECTION FOR AQUATIC HABITATS IN THE UNITED STATES

Submitted by

David Ross Allardice

In partial fulfillment of the requirements

for the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

August, 1974

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COLORADO STATE UNIVERSITY

August 1974

WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION

BY David Ross Allardice

ENTITLED Economic and Legal Protection for Aquatic Habitats in the United States

BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy

Committee on Graduate Work

Adviser

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ABSTRACT OF THESIS

ECONOMIC AND LEGAL PROTECTION FOR
AQUATIC HABITATS IN THE UNITED STATES

The face of America has changed greatly over the past two-hundred years in response to population growth and economic activity. The use of natural resources aimed at achieving our growth and development goals has often led to intrusions into nature's fragile aquatic habitats. Specific cases of total habitat destruction and elimination throughout the Unites States that are due to man's intrusions into the water environments are all too numerous, while the damage has been greatest in the areas of heavy population concentrations, no state has been free from these intrusions into the aquatice habitats.

This study provides answers to questions concerning: (1) what is being done to protect the aquatic habitats, and (2) why it is being done, with specific reference to non-market concerns and values. The study employs a legal-economic framework for the analysis.

The focus of the study is upon state laws and policies that will protect, preserve or have an otherwise desirable impact upon the aquatic habitats. Two bodies of law are identified as being most relevant. They are: (1) traditional water law doctrines, and (2) conservation laws.

Provisions found within the various state water law doctrines frequently have a degrading effect upon the aquatic habitats. Specific attention is given to the biological and economic impact and implications of the beneficial and reasonable use provisions.

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In addition to the traditional water laws, six types of conservation laws have been identified, discussed and evaluated in this study. These laws are: (1) wild and scenic rivers; (2) stream preservation and encroachment; (3) highway construction; (4) dam construction; (5) marsh, estuary and wetlands; and (6) state environmental policy and protection laws.

The study views the legal and economic systems as being related in both form and content. Both are subject to change. As individuals place new demands upon the legal-economic institutions, either new norms are created or there is a change in the existing body of rules and laws. In response to the growing concern over the loss of aquatic habitats, and based upon the existing body of state laws and their economic implications, the study proposes policy recommendations intended to further protect and preserve the remaining aquatic habitats.

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CHAPTER 1

INTRODUCTION

1-1. The Problem

The face of America has changed greatly over the past two-hundred years. This fact is self-evident. Large cities have grown-up in areas that were once primeval forests. Highways span the nation and provide great savings in terms of both cost and time. Multiple-purpose water projects have been developed on the Nation's rivers to control and harness the fugitive water resources for the benefit of mankind. What began as a pioneering society was transformed into an agricultural society and by the mid-twentieth century had progressed to an industrialized-urbanized society.

This external physical transformation is representative of the changes that have taken place in the internal social, economic, legal and political structure of our society. The progression from the pioneering to the industrialized society reflects in part our social goals with respect to economic growth and economic development.[1] Continued economic expansion has stimulated the demand for an ever growing number of private and public goods and services. To provide these goods and

---

[1] Economic growth meaning that more goods and services are produced, whereas, economic development implies more production as well as changes in the form, manner and institutional arrangements of the production. See Charles P. Kindleberger, Economic Development (New York: McGraw-Hill Book Co., 1965), p. 3.

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services we have, in past years, increased the rate of natural resource use.[1] Today the Nation faces choices between continued economic growth and a deteriorating natural environment.

Under certain circumstances, the use of natural resources aimed at achieving our growth and development goals has led to intrusions into nature's fragile aquatic habitats. Man's further intrusions into these aquatic habitats are becoming almost daily occurrences. For example, yesterday the intrusion may have been the result of a new highway being placed in a stream bed; today it may be due to the damming of a previously wild river and tomorrow it may be due to dredging and filling activities in a wetland or estuary. All of these man-made intrusions are irreversibly destroying large quantities of our limited supply of natural fish and wildlife habitats.

Specific cases of total habitat destruction and elimination throughout the United States that are due to man's intrusions into the water environments are all too numerous. In New Mexico, more than 8,000 acres of waterfowl habitat have been lost over the past 25 years due to river channelization and marsh land drainage.[2] In Illinois, channelization on the Vermilion and Embarras Rivers over a 70 year period has caused the elimination of 20 species of fish from these rivers.[3] Over eight miles

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[1]For definitional purposes, "rate of resource use" refers to either an average rate within a specified time period or an instantaneous volume of use. Natural resources are viewed as a function of man's objectives, knowledge, and institutions over time. See S. V. Ciriach-Wantrup, Resource Conservation: Economics and Policies (Berkeley: University of California Agricultural Experiment Station, 1963), pp. 31, 29.

[2]State of New Mexico, Department of Game and Fish, A Special Report on the Wildlife Resources of the Rio Grande Valley, Cochiti to Socorro, (1967), pp. 1-8.

[3]P. W. Smith, "An Assessment of Changes in the Fish Fauna of Two Illinois Rivers and Its Bearing on Their Future," Trans. Illinois State Acad. of Sciences, Volume 61 (Chicago, Ill.: n.p., 1968), pp. 31-45.

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of river habitat have been destroyed by the cutting out of oxbows from the main channel of the Wild Rice River in Minnesota. These cases represent only a few of the numerous examples, and no state has been free from these intrusions into the aquatic habitats.

The loss of habitats is significant for many reasons. In some instances this loss is reflected in the market and in others it is an extra-market consideration. The loss of habitats may be reflected by a loss of incomes to those persons whose incomes are dependent upon fish and wildlife and their habitats. Persons involved in commercial fishing and sectors of the economy dependent upon the recreational use surrounding these habitats are cases in point.

Much of the loss is not easily, if at all, expressible in monetary terms due to the extra-market nature of the loss. Ecosystem and habitat alteration has been the primary cause of the loss of certain aquatic species.[1] For example, prior to 1941 the Gila topminnow, Poeciliopsis occidentalis, was one of the most common fish in the Colorado River drainage basin. Currently, the topminnow exists only in one spring area in Santa Cruz County, Arizona.[2] Little public attention has been focused upon the loss of these lesser known species although it is reasonable to assume that their loss to society may be as great as the declining populations of the blue whales.[3]

---

[1] David W. Ehrenfeld, Biological Conservation (New York: Holt, Rinehart, and Winston, Inc., 1970), p. 95.

[2] Ibid., p. 96.

[3] For an economic analysis of the blue whale problem see Paul W. Barkley and David W. Seckler, Economic Growth and Environmental Decay (New York: Harcourt Brace Jovanovich, Inc., 1972), pp. 13-131, 148-150.

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The loss of habitats also represents a loss of opportunity for educational and scientific research activities. Research surrounding aquatic areas has and most likely will continue to produce discoveries, such as new medicines, which will benefit both present and future generations. The importance of the aquatic areas for scientific and medical research is made clear when we realize that over 17 percent of all prescriptions filled in America in 1960 used some form of plant product.[1] Destruction of habitats limits the range of this kind of research opportunity.

Aquatic habitats and their associated fish and wildlife species also provide amenities associated with unaltered natural environments. Few would dispute that free flowing streams with their surrounding flora and fauna are more aesthetically appealing than a channelized-vegetation barren stream. Thus the aquatic habitats are valued for their aesthetic and amenity values.

Given the problem as setforth above, the point is reached to ask what is being done to prevent the types of destruction mentioned and why it is being done. It is the asking of these questions and the search for their answers that surrounds the objectives of this study.

1-2. Objectives

The objective of this study is to search for answers to the questions concerning: (1) what is being done to protect the aquatic habitats, and (2) why it is being done, with specific reference to non-market concerns and values. From this search, conclusions will be drawn concerning the

---

[1] See R. E. Schultes, "The Future of Plants as Sources of New Biodynamic Compounds," in Plants in the Development of Modern Medicine, ed. Tony Swain (Cambridge: Harvard University Press, 1972), p. 105. Also M. B. Kreig, Green Medicine: The Search for Plants that Heal (Chicago: Rand McNally and Co., 1964).

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possible course and future alternatives for the protection of the aquatic habitats within an interface between law and economics.

To answer the first question the search involves primarily problems of specific identification. The general problem area had already been identified--man-made intrusions and alterations of aquatic habitats tend to promote adverse natural, social, and economic consequences for which at least partial remedies are being sought through legislation. The problem of concern herein deals only with man's physical intrusions into the aquatic habitats and does not deal with the more conventional pollution topics (i.e., water pollution, industrial discharges, sewage discharges, etc.).

To be able to answer what is being done, we must first specify "what is being done by whom?" In this study, the active parties (whom) are primarily the state governments and agencies. Only indirect attention is given to the activities of the federal government and agencies to protect and preserve aquatic habitats. The reason for the focus of attention upon the state level is the belief that too little attention has been given in the past to problems at the state and local level, relative to the federal level.

Concerning what is being done, the focus is upon state laws and policies that will protect and preserve or have an impact upon the aquatic habitats. With respect to the legal protection afforded, two bodies of law have been identified as being relevant. First, the traditional body of water law is surveyed for its impact on the habitats. Two features within the water law doctrines have been identified as being crucial for the protection of the habitats. These features are the concepts of beneficial use and of regulating minimum stream flows and lake levels.

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The second major body of law, distinct from traditional water laws, that provides protection for the habitats are identified as conservation laws. Six types of conservation laws have been identified and are discussed and evaluated in the body of this study. These laws are: (1) wild and scenic rivers; (2) stream preservation and encroachment; (3) highway construction; (4) dam construction; (5) marsh, estuary and wetlands; and (6) state environmental policy and protection laws.

Having identified what is being done, the question arises as to why it is being done. This question searches for answers to the reason that laws have developed and evolved for the protection of aquatic habitats and for what purposes. To answer this question, the analysis centers upon the interaction between the legal and economic systems to obtain insights concerning the development, evolution, and economic-legal implication of the existing body of laws and policies. Reasons for the evolution and development of the laws and their economic implications are applied throughout the descriptive discussion of the particular laws. Based upon these insights, conclusions will be derived concerning the course of possible future protection for aquatic habitats in the United States.

1-3. Procedures

With respect to the above stated objectives, it was necessary first to identify and analyze the existing state laws relating to the protection of aquatic habitats. To acquire this information, three research techniques were employed. First, questionnaires were sent to each of the water engineers (or water resource agencies), legislative research councils, highway departments, and fish and game agencies for each of the 50 states. These questionnaires sought specific information concerning the

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presence or absence of specific legislation intended to protect and preserve the aquatic habitats.

Second, an extensive library research was conducted to identify additional legal data. This research sought statutory as well as case laws relating to the protection of the habitats.

The last research technique employed was that of making on site field investigations in four states, these being: New York, Florida, Wisconsin and Montana. These efforts provided the opportunity to view first hand the problems associated with habitat destruction and protection efforts. They also provided the opportunity to discuss policy and administrative problems with members of the various state agencies. From these discussions, insights were obtained concerning the agencies views concerning the reasons for the development of the laws and the effectiveness of those laws.

These three research techniques provided the data necessary for the foundation of this study. It was then necessary to develop a conceptual framework to analyze these various laws and policies within the context of economics. The conceptual framework subsequently developed provides the thread of uniformity throughout the entire study reported on herein.

This report is composed of six chapters, the first being this introduction. Chapter 2, On Law and Economics, contains the conceptual framework necessary for the analysis of the laws. It is directed primarily at the interaction between the legal and the economic systems, and how through this interaction new laws and policies evolve to protect the aquatic environments for the "benefit" of society. Chapter 3 reviews the two basic water law doctrines that have evolved and been adopted within the United States: the riparian and appropriation doctrines. Also contained within

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this chapter is a brief discussion of a third water law doctrine: the federal reservation doctrine. Chapter 4 examines two particularly relevant legal concepts, that of beneficial use and minimum stream flow and lake levels, both of which have an influence on the aquatic habitats. Chapter 5 surveys existing state conservation laws intended to protect and preserve the natural aquatic habitats. Chapter 6 is a summary and conclusion to the study and provides some policy guidelines and insights derived from the study effort.

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CHAPTER 2

ON LAW AND ECONOMICS

2-1. Introduction

A dichotomy appears to exist today in the formulation of policy recommendations directed towards eliminating or reducing environmental disruptions. On the one side of the dichotomy are located groups that tend to formulate policies primarily with respect to legal criteria. On the other side of the dichotomy are groups that formulate policies primarily with respect to economic criteria.[1]

Those who question or reject the interaction between law and economics often adopt the view of the self-sufficiency of either law or economics. On the legal side, the parties hold that law is by nature "imperative, a norm, a command."[2] The norms are the result of statutory regulation, which descends from the State. On the economic side, the economist has ignored the law if it causes no problem. But if it does cause problems, he has viewed law and its devotees as an obstruction, with little effort to understand the reason for the problems or to interact with the system in efforts to achieve acceptable solutions.[3]

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[1] In a historical sense Jeremy Bentham has been held responsible for divorcing economics from law, custom, and ethics. See John R. Commons, Institutional Economics: Its Place in Political Economy (Madison: The University of Wisconsin Press, 1959), p. 218.

[2] Fritz Berozheimer, The World's Legal Philosophies, trans. R. S. Jastrow, Modern Legal Philosophy Series, Volume II (New York: Augustus M. Kelley Publishers, 1968), p. 23.

[3] K. N. Llewellyn, "The Effect of Legal Institutions Upon Economics," American Economic Review, Volume XV (December, 1925), p. 665.

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The legal and economic systems are not two separate and mutually exclusive social sciences. When viewed in an evolutionary sense, both systems act and react to one another. Under an open and responsive economic system, changes in economic conditions will call forth changes in laws and legislation. Laws and legislation on the other hand, can act as a brake on rapidly changing economic conditions. In a static framework, law and economics are united as one. Citing Berolzheimer:[1]

> If we may conceive the evolutionary wave as formed of single points, then it would be true of each such point, statically considered, that economics and law at any given moment are one and the same.

This close association between law and economics explains in part the reason that more and more the courts have been turning to the economist for insights into the nature and operation of the law. Economists, on the other hand, are turning to the law for facts and insights into the theory of economics. As viewed herein, and elsewhere,[2] law and economics are taken to be in close association, as form and content, ends and means, nut and bolt.

The purpose of this chapter is to examine the relationship between the legal and economic system and to identify those forces which have prompted public protection of the aquatic habitats. It follows on the premise that, in formulating sound policies for the preservation, protection, and management of our natural resources, it is essential to view these two criteria not as separate systems, but as integral parts of the entire decision-making process.

---

[1] Berolzheimer, The World's Legal Philosophies, p. 22.

[2] For example see Berolzheimer, The World's Legal Philosophies, p. 5, and John R. Commons, The Economics of Collective Action (New York: Macmillan, 1950), p. 373.

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2-2. The Nature of Economics and Law

Economics is viewed in this study as a social science that is concerned with the management of scarce resources within a given social system.[1] This broad view of economics is concerned with certain economic phenomena (production, exchange, consumption and utilization); economic quantities (wages, interest, rents and profits); economic organisms (institutions and organizations) and cultural associations and intellectual movements.[2]

Human beings function within the confines of a given social order and experience certain wants and desires. These wants and desires are satisfied by resources known as goods and services. Goods and services are scarce in both an economic and physical sense; therefore, some of man's wants and desires are bound to go unfulfilled. This situation in turn forces a focus on priorities. Given the scarcity, efficient use of the resources is desired to achieve the maximization of social wants and desires, but in the case of renewable natural resources, subject to the constraint of maintaining safe minimum standards.

Once resources are identified as being scarce, their acquisition leads to a conflict of interests. To avoid a situation of anarchy and a breakdown in the social and economic system, the social order must be maintained. Law is viewed herein as a system for establishing social order, which, among other things, is essential for the operation of the economic system.

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[1] For a discussion of the nature of economics see O. Lange, "The Scope and Method of Economics," The Review of Economic Studies, Volume XIII (1945-1946), pp. 19-32.

[2] See Kenneth E. Boulding, Economic Analysis, Volume 1: Microeconomics (New York: Harper and Row, Publishers, 1966), pp. 3-5.

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Under a system of law, the social order is maintained due to the fact that individuals are aware that deviant forms of action will result in physical or psychological pressures intended to restore the social order. Furthermore, the laws are applied by a body of men empowered to maintain the social order.[1]

The social order is founded upon rules and/or norms of behavior which allows the consequences of social choice to be predictable and subject to evaluation. Rules and norms may be related "back" to basic value principles such as freedom and the dignity of man and/or "forward" to consequences resulting from these actions which are evaluated in terms of the basic values and the prevailing goals of society.[2]

The social order may be upheld for reasons of pure expediency or by motives of tradition. Such behavior may become habitual in nature and unstable when faced with conflict situations. More stable social orders, which evolve out of habitual order, are founded upon the belief in the legitimacy of the social order.

Legitimacy of the social order may be founded upon motives which are purely self-interest oriented or from motives that are non-self-interest oriented. Persons may conform to the legitimacy of the social order in various ways.[3] In one sense it may be for reasons of tradition; a belief in the order which has always existed. Secondly, it may be founded on the rational belief in certain absolute values. Lastly, legitimacy

---

[1]The conceptual ideas expressed herein are based upon the work of Max Weber, see Max Weber, The Theory of Social and Economic Organization, trans. A. M. Henderson and Talcott Parsons, with an Introduction by T. Parsons (New York: The Free Press, 1947), pp. 124-135.

[2]See L. M. Hartman and E. B. Nash, "Changing Water Resource Institutions: An Analysis." (Unpublished paper, Fort Collins, Colorado, 1971), p. 2.

[3]Weber, The Theory of Social and Economic Organization, p. 130.

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may rest in the belief in legality, whereby persons are willing to conform with certain rules that have been established in a rational-formal manner and are imposed via accepted procedures.

Habitual or traditional legitimate order is stable when not faced with real or potential conflicts. Once a conflict situation arises a new order is established. This order may be founded upon certain absolute values. The natural law theories are representative of this second means of legitimacy. The theories were founded on the belief that man is a moral and rational being. As such, there was a direct relation between law and moral justice. Law was viewed as a theory of right and wrong (iusti atque iniusti scientia). Aquinas, who is representative of this view, held that:[1]

> Law is nothing else than an ordinance of reason for the common good, promulgated by him who has the care of the community.
>
> The natural law is promulgated by the very fact that God instilled it into man's mind so as to be known by him naturally.

The natural law doctrine in both the legal and economic fields stressed extreme individualism and liberalism. The doctrine emphasized the importance of natural ownership and the unconstrained freedom of contract. Carried to its extreme, the doctrine may adversely influence social welfare. One such situation is illustrated in the Adkin's case.[2] Therein the United States Supreme Court ruled against the adoption of minimum wage legislation for women in the District of Columbia, since it was felt to be a constraint upon the natural right of women to freely negotiate in contract bargaining.

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[1]Cited in M. P. Golding, ed., The Nature of Law: Readings in Legal Philosophy (New York: Random House, 1966), p. 9.

[2]261 U. S. 525 (1922). Cited in Alf Ross, On Law and Justice (London: Stevens and Sons, Ltd., 1958), p. 98.

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Today the primary basis of legitimacy rests in the belief in legality, whereby persons are willing to conform with certain rules that have been established in a rational-formal manner and are imposed via accepted procedures.

In what is often referred to as the functional school, Berman has set forth four functions that law performs in modern western civilizations.[1] First, laws are intended to restore, maintain, and establish social order when it has previously been disrupted by social conflicts and frictions. These conflicts may be real or potential in nature.

Secondly, law acts as a communication mechanism that aids society in predicting and calculating the consequences of their action and conduct. This view assumes men will rationally calculate the consequences of their action under a given legal system to achieve an efficient solution to social conflicts. This aspect of the law establishes the framework of legal security which promotes transactions and investments in the economic sector of the economy.

Thirdly, laws provide a means of instilling moral and legal concepts and attitudes in society. The laws try to teach society the right belief, feeling, and action. The goal of this function is to ensure uniform action with respect to cultural beliefs and values.

The last function of the law is to provide a mechanism via which historical continuity and consistency of social doctrine may be maintained. This function emphasises the evolutionary process of society in general and law in particular. Under this premise the system of jurisprudence is seen as an organically developing process that is highly dependent upon the organically developing socio-economic system.

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[1] Harold J. Berman, The Nature and Functions of Law (Brooklyn: The Foundation Press, Inc., 1958), pp. 34-40.

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In contemporary times we have been preoccupied with the goal of economic growth. Thus, certain value principles and institutional norms (i.e., property rights) have come to be viewed as tools for the attainment of economic growth. The achievement of this economic goal, however, has led to the sacrifice of other social goals often held in a higher priority by some groups and individuals in the social structure.

Increasing levels of regulation and control which arise from the conflict situation are attempts to maintain and reestablish the social order. In the pioneering society, referred to earlier, alternatives could be predicted and evaluated without imposing external rules and regulations to establish social order. As we progressed to the industrialized-urbanized society and were faced with conflicts which arose due to development and increasing populations, more externally imposed rules and regulations were required to maintain the social order.

For the most part, this study is concerned with a body of rules and regulations that have evolved which are not primarily concerned with the goal of economic development. They are laws that have arisen out of conflict situations which are viewed as critical to preserve certain common values associated with natural environments; i.e., laws which are intended to preserve the alternatives of certain types of social choice and establish order in the social system.

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2-3. The Interrelationship Between Law and Economics.

Many authors in both the economic and legal fields have previously examined the relationship between law and economics.[1] Therefore, it is by no means attempted herein to deal in an intensive manner with the complete workings of the legal and economic systems. Rather, what follows is a general discussion of the major views concerning the interrelationship between the legal and economic systems.

As stated earlier herein, law and economics are viewed in close association, as form and content, ends and means, nut and bolt. Why this close association? In one sense both the market system and the legal system, as well as the system of moral rules and norms, are modes for establishing social control and social order. The presuppositions upon which the economic order is founded are ensured by legal institutions. For example, the concept of free competition implicitly assumes that physical violence will not be tolerated in the social order.

In an evolutionary sense, the differentation and specialization of economic activity, which are key factors in the rise of Western capitalism, were made possible by legal institutions. The role of differentiation and specialization as factors in the evolutionary rise of capitalism were analyzed in detail by Max Weber.[2]

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[1]For example see Huntington Cairns, Law and the Social Sciences (New York: Augustus M. Kelley Publishers, 1969); John R. Commons, Legal Foundations of Capitalism (New York: The Macmillan Co., 1924); R. T. Ely, Property and Contract in Their Relations to the Distribution of Wealth, 2 vols. (New York: The Macmillan Co., 1922); Llewellyn, "The Effect of Legal Institutions Upon Economics," pp. 665-683; R. A. Posner, Economic Analysis of Law (Boston: Little, Brown and Co., 1972); Frank J. Trelease, "Policies for Water Law: Property Rights, Economic Forces, and Public Regulation," Natural Resources Journal, Volume 5 (May, 1965), pp. 1-48.

[2]Max Weber, Law in Economy and Society, ed. Max Rheinstein, trans. Edward Shils and Max Rheinstein (New York: Simon and Schuster, 1967).

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Weber held the view that Western capitalistic civilization was unique from all other forms of civilization. What made it unique was its overriding pursuit of profit via a rationalized system of economic enterprise. Weber saw capitalism oriented towards some practical purpose (profits) and this purpose was determined by rational choice. Thus, in Weber's terminology, economic activity was conducted in a purpose-rational fashion.[1]

Generally, Weber felt that the legal system was essential for the operation of purpose-rational economic activity, in that law favors optimum evaluation and predictability in economic relations. These relations involve economic activities with the state, and relations between private economic actors.[2]

Specifically, Weber believed that Western capitalism arose to a great degree based upon a legal system that was logical-formal rational, meaning that rules are expressed by the use of abstract concepts created by legal thought itself and viewed as constituting a complete system. Thus, the counterpart to the rational legal system is the purpose-rational economic system and from the two arises the unique capitalistic system.

Concerning the interrelationship, economic factors have been viewed among the strongest influences in the creation of law.[3] And so it is, but the causation may run equally well in the opposite direction, that is, much of economics is fundamentally legal in nature. The following comment

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[1] Ibid., p. 1.

[2] Weber, The Theory of Social and Economic Organization, p. 49.

[3] Weber, Law in Economy and Society, p. 37.

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by Weber illustrates the importance of the legal system to the economic order:[1]

> "Conceptually" the "state" thus is not indispensable to any economic activity. But any economic system, especially of the modern type, could certainly not exist without a legal order with very special features which could not develop except in the frame of a "statal" legal order. ...The tempo of modern business communications requires a promptly and predictably functioning legal system, i.e., one which is guaranteed by the strongest coercive power.

John R. Commons in his Legal Foundations of Capitalism views the economic system in two ways.[2] Relations between man and nature are termed engineering economy, which involves issues surrounding the production, exchange and consumption of goods and services. Relations between man and man are termed business and political economy. Jurisprudence, according to Commons, arises from morals and ethics which deal with questions concerning right and wrong, good and bad. Jurisprudence is concerned not only with the powers and duties of the state but also the rights, duties and liberties of property, all of which involve relations of man to man.

Commons devoted much of his life's work to identifying and explaining the relationship between law and economics. He identified three phases of evolution that both the legal and economic systems had gone through. These phases are characterized by the principles of mechanism, scarcity and jurisprudence. Commons concludes that the early economic and legal theories were concerned with man's relation to nature, engineering economy, and developed mechanistic theories of value and cost. They were

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[1] Ibid., p. 7

[2] Commons, Legal Foundations of Capitalism, p. 3.

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mechanistic in the sense that the theories looked to the physical sciences for their formulation and solutions were worked out in a mechanistic fashion. Later theories were based on the Malthusian scarcity principle. According to Commons, "scarcity in economics is property in jurisprudence," and it was the rights and duties associated with property that became the operative rules of the state in control of scarcity.[1] In the evolutionary process, Commons concludes that:[2]

> ...both legal theory and economic theory, in modern times, have based their explanations first on Newton's principle of mechanism, then on Malthus' principle of scarcity, then on juristic principles of common rules that both limit and enlarge the field for individual wills in a world of mechanical forces and scarcity of resources.

From Commons' point of view, a complete understanding of the economic order could not be fulfilled without an understanding of its relation with the legal order. For Commons the basic unit of economic study and investigation was the transaction, which was comprised of both social and individual action. It is from economic transactions that certain practices evolve which serve as guidelines to the judicial system and aid in the resolution of economic conflicts in the courts. Citing Commons:[3]

> A transaction occurs at a point of time. But transactions flow one into another over a period of time, and this flow is a process. The courts have fully developed the notion of this process in the concept of a "going concern," which they have taken over from the customs of business and which is none other than a technological process of production and consumption of physical things and a business process of buying and selling, borrowing and lending, commanding and obeying, according to shop rules or working rules or laws of the land.

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[1] Commons, The Economics of Collective Action, p. 89.

[2] Commons, Legal Foundations of Capitalism, p. 7.

[3] Ibid., p. 8.

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Thus, Commons came to the point of view that economic and legal orders form an interrelated and integrated working whole. On one basic level, however, this relationship has been challenged by ulitilarian theory. Bentham and the nineteenth century utilitarians based their individualistic view of mankind and their attitudes toward problems of policy upon the principle of utility.[1] In their view, individuals are rational-self-interest motivated maximizers of "pleasure" over "pain", and the role of the state is to achieve the greatest good for the greatest number. The courts, on the other hand, looks to past and prevailing customs and norms in ariving at its decisions. Thus, a communication gap developed between the two schools.[2]

Rather than basing their decisions on concepts of "pleasure" and "pain", the courts look to preceding decisions to make their present decisions consistent. In the absence of a precedent decision or in situations where there is conflict, the courts search for a custom or norm to provide the needed consistency.

If the courts do not find the necessary consistency in precedent or custom, then statutes and/or constitutions (written laws) are sought which provide the consistency. These statutes or constitutions evolving from the state in an attempt to modify the customs or precedents in light of the prevailing social norms and values so as to obtain consistency, equality of treatment and social order.

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[1] William Fellner, Emergence and Content of Modern Economic Analysis (New York: McGraw-Hill Book Co., Inc., 1960), p. 53.

[2] For an analysis of the separation see Commons, Institutional Economics: Its Place in Political Economy, pp. 218-243.

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Although the two schools have polarized, the interrelationship remains. It remains in the institutions an organizations of society that are both economic and legal in nature. These institutions and organizations will be referred to as the interfaces.[1]

2-4. The Interfaces Between Law and Economics.

All institutions and organizations are social in nature. The concern herein is to identify those institutions and organizations that are both legal and economic in nature. Those identified as such are as follows:[2]

I. Institutions
   1. Property: Public and Private
   2. Contract
   3. Inheritance (Succession)
   4. Money-lending
   5. Taxation
   6. Business

II. Organizations
   1. Corporations and Partnerships
   2. Labor Unions
   3. Special Interest Groups

The organizations or associations identified above are representative of groups of persons who are organized for collective or common interests.[3] For the most part, the organizations identified are concerned with promoting the economic well-being of their members. For example, corporations and partnerships strive to maximize profits; labor

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[1] A term adopted from J. H. Dales, "The Property Interface," in Economics of the Environment, eds. Robert Dorfman and Nancy S. Dorfman (New York: W. W. Norton and Co., 1972), pp. 308-322.

[2] Based upon Cairns, Law and the Social Sciences, p. 50; R. T. Ely, Property and Contract in Their Relations to the Distribution of Wealth, Volume I, pp. 51-66; and Mancur Olson Jr., The Logic of Collective Action (Cambridge: Harvard University Press, 1965).

[3] See Olson, The Logic of Collective Action, p. 7, and Harold Laski, A Grammar of Politics, 4th ed. (London: George Allen and Unwin, 1939), p. 67.

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unions strive to obtain higher wages and special interest groups may seek either profits or higher wages. The organizations are presented only to illustrate the areas of interface and are not studied herein in any detail since they do not pertain directly to the objectives at hand.

Six institutions are listed above that are both legal and economic in nature. With respect to defining what an institution is, J. R. Commons' definition is basically relied upon. Commons said that institutions were "collective action in control, liberation and expansion of individual action."[1] To clarify the definition it may be said that the institutions referred to are those which are sanctioned or legitimized modes of collective action. Further, institutions are not concrete objects, rather they are abstract ideas. As with all abstract ideas, they are subject to change over time. Thus it is with institutions.

Although all of these institutions might have an impact upon the aquatic habitats, it is the institution of property in control, liberation and expansion of individual action that has had the most noticable impact on the environments. Therefore, the only institution examined in detail is that of property.

No single institution has received such wide spread study as has the institution of property. From an economic point of view the interest in property and property rights is receiving increasing attention due to its relation with the current environmental disruptions.[2] Why is property so critical in the study? To answer this question requires a brief discussion concerning the meaning of property and property rights.

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[1] Commons, Institutional Economics: Its Place in Political Economy, p. 842.

[2] For example see Gene Wunderlich and W. L. Gibson, Jr., eds., Perspectives of Property (University Park, Pennsylvania: Institute for Research on Land and Water Resources, The Pennsylvania State University, 1972).

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The concept of property has been viewed at various times either as a negative or a positive influence upon social development by various writers. According to Rousseau, the creation of property led to the formation of civilization and injustice.[1] In Aquinas' view property was an essential feature for human life. To Aquinas, property was important for the following reasons:[2]

> First because every man is more careful to procure what is for himself alone than that which is common to many or to all: since each one would shirk the labour and leave to another that which concerns the community, as happens where there is a great number of servants. Secondly, because human affairs are conducted in more orderly fashion if each man is charged with taking care of some particular thing himself, whereas there would be confusion if everyone had to look after any one thing indeterminately. Thirdly, because a more peaceful state is insured to man if each one is contented with his own. Hence it is to be observed that quarrels arise more frequently where there is no division of the things possessed.

In Commons' analysis of the foundation of capitalism, he concludes that the system was built upon the legal foundation of private property.[3] In his analysis he sees the system of feudalism as being built upon the foundation of real values of physical things which evolve from the direct control of lands and other tangible property. Capitalism and industrialism, on the other hand, were built on a system of nominal values, which arise from the interaction of produces and consumers, via a credit system, a division of labor and a system of free bargaining. The change in the economic order was reflected in the legal order was reflected in the

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[1] Paul E. More, "Property, the Basis of Civilization," Rational Basis of Legal Institutions, The Modern Legal Philosophy Series, Volume XIV (New York: Augustus M. Kelley Publishers, 1969), p. 307.

[2] Cited in Cairns, Law and the Social Sciences, p. 77.

[3] Commons, The Economics of Collective Action, p. 22.

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legal order by an "expansion of the common law from the protection of tangible property and persons in an age of violence to the protection of business and position in the peaceful expansion of markets."[1]

Commons' statement points out the fact that property is not a material object but consists of rights which extend over certain property objects. As such, property has come to be viewed as a "bundle of rights."[2] These rights include the right to exclude, acquire, possess, use and sell the property object. The essence of property being the right to exclude others, which confers powers upon the property owner. More importantly, it determines what men shall acquire. For example, the protection of property rights of a landowner gives him the right to collect rents and to exclude trespassers. Protection of property rights in water gives the owner the right to use water to produce wealth for that individual. Thus when the courts make a ruling over property rights, they are not only protecting property already held, but are determining that a certain amount of future social product shall accrue to that property owner.

Property rights, although they may be exclusive in nature, are never absolute.[3] Since property involves "relations among men arising out of their relations to things",[4] it then implies that certain limits, rights and duties will be associated with property. For example, an individual may believe that he may use his property in any manner that he desires.

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[1] Commons, Legal Foundations of Capitalism, p. 314.

[2] For an early statement on the bundle of rights concept see Eaton v. The Boston, Concord and Montreal R. R., 51 n. H. 504, 510-12 (1872).

[3] R. T. Ely and G. S. Wehrwein, Land Economics (Madison: The University of Wisconsin Press, 1964), p. 105.

[4] Ely, Property and Contract in Their Relations to the Distribution of Wealth, Volume I, p. 96.

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His use is limited, however, in the sense that he may not cause injury or harm to other parties in the process, sic utere tuo ut laedas. Another example of the limited nature of rights may be found in the field of water law. Under the riparian water law doctrine, which is discussed in the following chapter, a landowner has the right to the "reasonable use" of water, which means that his use must not "unreasonable" interfere with the rights of other water users.[1] Thus, for property rights to be truly effective as a means of establishing social order, they must be based upon limits or duties on the part of the owners.

Property rights may be classified as either private, public, qualified or common in nature according to the location and control over the "bundle". Private rights are vested in individuals or groups of individuals (e.g., corporations and partnerships). Public rights reside with the sovereign.

Several defences have been developed to justify the existence of private property.[2] The earliest defense developed to justify the existence of private property was that the individual was entitled to that which he discovered or physically occupied.[3] Later theories stressed that man was entitled to that which he applied his labour. From Hegel arose the view that property was necessary for the individual to act and develop as free being. To be free one must be able to extend his power over the external world, and private property provided this opportunity to extend one's power.

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[1]Richard L. Dewsnup and Dallin W. Jensen, eds., A Summary-Digest of State Water Laws (Arlington: The National Water Commission, 1973), p. 3.

[2]Morris R. Conen, Law and the Social Order (New York: Archon Books, 1967), pp. 49-57.

[3]For a discussion of the occupation theory see Henry Summer Maine, Ancient Law, 10th ed., with an introduction by F. Pollock and preface by Raymond Firth (Boston: Beacon Press, 1963), pp. 243-248.

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This economic justification is founded upon the belief that private property will promote the maximum production. The argument, as recently illustrated, proceeds as follows. Once property rights are established, the object of the right becomes:[1]

> ...available for use by individuals to produce wealth. Since each person will try to make the best use of it that he can, the total of individual wealth will approach the production of maximum national wealth.

In this view the individual, in pursuit of wealth, is seen as the best determinator of economic and social action. In certain situations, this will hold true. It is generally accepted that it is in an individual's self-interest, for example, to apply soil conservation techniques to the use of his land. However, there is a differnece between this individual's desire "to produce wealth" and the type of productivity that may be socially desirable.

There is no indication that the supply of many goods will increase by making them private property. For example, private ownership of water and riparian lands has not increased the supply of scenic and wild rivers. As will be discussed in Chapter 5, the supply of these resources has only been maintained by collective social action. In fact, a strong case can be made to show that private ownership of these areas has led to private economic gain at the expense of social interests.

Returning to the other two classifications of property, qualified property has a rather uncertain status. An illustration of qualified property that relates directly to this study is that of fish and game.

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[1]Frank J. Trelease, "The Model Water Code, The Wise Administrator and the Goddam Bureaucrat," Natural Resources Journal, Volume 14 (April, 1974), p. 212.

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These objects of property rights are generally viewed as property controlled by the state but not owned by the state.[1] They are held in trust for the public as fugitive resources. Only when the fish or game are captured or shot by man do they become private property.

Common property may be viewed as undivided land owned by surrounding private landowners who have common rights to these lands. Frequently the rights were for grazing, religious and other social uses, and they were allocated on a basis of "first come--first served."[2] Overtime, individual goals with respect to the use of the commons outran its ability to absorb the individual uses. Economists and other writers have recently pointed out that common property is subject to environmental degradation due to the fact that the property will be used by individuals up to the point where its marginal utility is zero.[3] Given this situation, overcrowding and resulting degradation of the commons will occur. This situation surrounding common property illustrates well the view that "everyone's property is no one's property."

With respect to property rights in general, the rights are composed of two basic components: the individual's rights and the social (or public) rights. Individual rights are the rights to exclude, acquire, possess,

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[1]For an early case which upheld the right of state control over fish and game see Bittenhaus v. Johnson, 92 Wis. 58 (1896).

[2]For a discussion of the social legal evolution of common property see Lewis Henry Morgan, Ancient Society, edited with and introduction and annotations by E. B. Beacock (Cleveland: The World Publishing Co., 1877; A Meridian Book, 1963), pp. 549-560.

[3]See Garrett Hardin, "The Tragedy of the Commons," Science, Volume 162 (December, 1968), pp. 1243-1248; B. L. Crowe, "The Tragedy of the Commons Revisited," Science, Volume 166 (November, 1969), pp. 1103-1107; and J. H. Dales, "Rights and Economics," in Perspectives of Property, eds., Gene Wonderlich and W. L. Gibson, Jr. (University Park, Pennsylvania: Institute for Research on Land and Water Resources, The Pennsylvania State University, 1972), pp. 149-155.

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use and sell the property object. Social rights maintain that individual rights in property were established and enforced for the collective social welfare; thus, the effective rights of individuals would be sanctioned by the Sovereign as long as it benefited the collective social welfare. Individual rights always remain subject to the absolute power of the Sovereign.

In our pioneering-frontier economy, the individual's rights in property were promoted to foster the goal of economic growth and development. The social rights were in harmony with the individual rights since private goals complemented and fostered the achievement of social goals. As more property moved from public to private control individual rights gained a dominant position with respect to social rights.

Rather than complementary in nature, today the two views are in conflict. The individualistic view of property rights came to view the social rights as an infringement upon the individual's rights. Private property came to be viewed as sacrosanct and the society should in no way interfere or infringe upon this domain. As our social goals have changed the individualistic private rights have not led to or promoted the changing social goals.

Recent environmental concerns have strengthened the recognition of the social rights in property. The social goal of environmental quality implied that individuals have a right to a decent environment "simply by virtue of their status as members of the public and that those rights should be phrased in a way to put them on a plane with traditional property rights."[1] The view that man has rights in the environment has led to a re-emphasis in the social rights. Some states, as will be discussed

[1]Joseph L. Sax, Defending the Environment: A Strategy for Citizen Action (New York: Alfred A. Knopf, 1971), p. 158.

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in Chapter 5, have asserted this social right via constitutional enactments. As such, property owners, as members of the community, must subordinate some of their individual ambitions to those of the community. In some cases their compensation may be in monetary terms, in others it will be psychological in nature by associating their good with that of the community.

Property rights were designed to give the individual control over economic goods.[1] In the past, the economic goods were traditionally viewed as being land, water and other natural resources. Control over these resources has historically been one of the primary means of producing and accumulating wealth.

But overtime, the trend has been to produce and accumulate much of the nation's wealth via the acquisition of particular skills, application of technology and capital investment in activities not directly dependent upon the land base.[2] To protect the individuals interest in these means of making a living, a body of sanctioned controls has evolved, which are referred to as "new property."[3] The form of these rights include such things as occupational licenses, franchises, contracts and the use of public resources. As the United States has grown, the holding of "new property" rights is becoming increasingly important as a means of making a living.

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[1]Richard T. Ely, An Introduction to Political Economy (New York: Hunt and Eaton, 1889; revised ed., New York: Kraus Reprint Co., 1969), p. 210.

[2]Kenneth C. Nobe, "Emerging Issues in Land Use Planning and Legislation: Implications for Wildlife Managers," Keynote address at the 10th annual Game and Fish Management Short Course, Ft. Collins, Colorado, April 9, 1974 (Mimeographed).

[3]Charles A. Reich, "The New Property," The Yale Law Journal, Volume 73 (April, 1964), pp. 733-787.

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Holders of these "new property" rights are for the most part urban dwellers. As the quality of life in the urban centers declines, the "new property" holders seek a revision in the traditional rights of property in natural resources. They have begun to assert that land and water resources should provide to society a means of achieving a quality environment over and above their use as factor inputs in agriculture, forestry and mining activities. Thus, a growing demand for social rights in property is evolving. The exercise of these rights is illustrated in the purchase of scenic easements, constraints placed on the productive capacity of land and water to limit and control various forms of environmental disruptions, and the recognition of recreational and aesthetic rights in the public lands.

The movement from individual to social rights will promote new obligations and limits upon the rights of property owners. Due to the present concentration of private ownership of land and water resources in the hands of agricultural and forestry interests, these holders of property rights are likely to be first and most affected. Potential conflicts are likely to have arisen between the urban oriented "new property" owners and the traditional agricultural and forest users of private and public lands. On one level, the conflict is between tangible economic interests and intangible extra-market interests. At perhaps a higher level, the conflict centers around the rights of individuals to do as they desire with their own property and the interests of society in maintaining the integrity of the natural and social community.

This conflict situation between individual and social rights and the projected outcome was foreseen by Morgan almost 100 years ago. He state that:[1]

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[1] Morgan, Ancient Society, p. 561.

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> Since the advent of civilization, the outgrowth of property has been so immense, its forms so diversified, its uses so expanding and its management so intelligent in the interests of its owners, that it has become, on the part of the people, an unmanageable power. The human mind stands bewildered in the presence of its own creation. The time will come, nevertheless, when human intelligence will rise to the mastery over property, and define the relations of the state to the property it protects, as well as the obligations and the limits of the rights of its owners. The interests of society are paramount to individual interests, and the two must be brought into just and harmonious relations.

Morgan foresaw that property, as an end and an aim in itself, was not to be the final destiny of mankind, for if it were it would be self-destructing. The evolutionary outcome would result in a revival, on a higher social plane, of property and economic relations based upon liberty, equality and brotherhood, which remain universal to mankind.

The remaining chapters of this study will center primarily upon the areas of water and conservation law that have evolved to reflect the changing goals and values of society with respect to the preservation and maintenance of aquatic habitats. Also reflected in these chapters, is the changing emphasis from property rights as a means to an economic end, which was held above national interests, to property rights that reflect the national interests.

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CHAPTER 3

TRADITIONAL WATER LAWS

3-1. Introduction

The purpose of this chapter is to set forth the three traditional water law doctrines that exist in the United States, which are: the riparian, prior appropriation and reservation doctrines. The focus of attention of this chapter is upon any changes that have taken place in the doctrines concerning protection afforded the aquatic habitats in response to changing social and economic objectives. Points will also be noted where the doctrines have had an adverse impact upon the preservation and protection of the aquatic habitats.

As mentioned in the previous chapter, property rights may be exclusive, but are never absolute rights with respect to individuals. Citing an early English case, the courts stated:[1]

> Flowing water is publici juris, (the property of the state, held by it in trust for the people) not in the sense that it is a bonum vacans to which the first occupant may acquire an exclusive right, but that it is publici and common in this sense only; that all may reasonably use it who have a right of access to it, that none can have any property in the water itself except in the particular portion which he may choose to abstract from the stream and take into his possession only.

Due to the fugitive nature of water, water while flowing naturally cannot be owned. Thus the water right is referred to as a usufructuary right, where the property right is in its use and flow and not in the

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[1] Embrey v. Owen, 6 Ex. 353 (1851). Cited in Short Course on Legal Aspects and Responsibilities for Allocation of Water Resources (Moscow, Idaho: Idaho Water Resources Research Institute, 1969).

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corpus of water in a natural stream.[1] Thus, to become private property, the water must be captured. In many cases the fact that the water must be captured leads to adverse consequences for the aquatic habitats. Water tends to be captured and/or diverted from the streams so as to be subject to private control, thus promoting potentially adverse impacts upon the habitats.

3-2. The Riparian Doctrine

The water law concepts adopted in our early history were patterned after the laws of England.[2] Emerging from common ownership concepts, the riparian doctrine was developed. The major characteristic of the riparian doctrine is that it gives the owners of land adjacent to a body of water equal rights to the use of the water.[3] It is frequently stated that the riparian proprietors are entitled to the use of the natural flow of the stream past their lands, undiminished in both quantity and quality.[4] This right is referred to as the English rule of "natural flow."

Under the natural flow theory, the primary or fundamental right of each riparian proprietor on a water course or lake is to have the body of water maintained in its natural state, not sensibly diminished in

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[1] S. C. Wiel, Water Rights in the Western States, 2nd ed. (San Francisco: Bancroft-Whitney Company, 1908), pp. 233-238.

[2] Dewsnup and Jensen, A Summary-Digest of State Water Laws, p. 3.

[3] e.g., Amory v. Commonwealth, 321 Mass. 240, 72 N.E. 2d 546 (1947); Lockwood Co. v. Lawrence, 77 Me. 297 (1885); Hermanser v. City of Lake Geneva, 272 Wis. 293, 75 N.W. 2d 439 (1956); and Cox v. Howell, 108 Tenn. 130, 65 S.W. 868 (1901).

[4] Frank J. Trelease, Cases and Materials on Water Law (St. Paul: West Publishing Co., 1967), p. 1.

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quantity or impaired in quality.[1] Each proprietor, however, is recognized as having a privilege to make natural uses (e.g., for domestic purposes) as long as such uses do not sensibly or materially affect the natural quantity or quality of the water, and are made on or in conjunction with the use of the riparian land.[2]

In our early days, water was used primarily for non-consumptive purposes, and downstream areas could expect waters to arrive in or near its natural condition. As the consumptive use increased, however, and as more dams and obstructions were placed upon the streams, water no longer arrived downstream in its natural condition. The change in water use patterns made the natural flow doctrine increasingly unworkable, and gradually the courts shifted to the doctrine of "reasonable use."[3]

Under this so-called American rule of "reasonable use," the primary or fundamental right of each riparian proprietor on a watercourse or lake is to make a reasonable use of the waters on his own land consistent with the coequal right of other riparians on the watercourse.[4] What is reasonable depends upon the specific facts and circumstances surrounding each individual stream and body of water.[5] In general, each use must be

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[1]See e.g., Stein v. Burden, 24 Ala. 130 (1854); Taylor v. Rudy, 99 Ark. 128, 137 S.W. 574 (1911); and Board of Supervisors of Quitman County v. Carrier Lumber Co., 103 Miss. 324, 60 So. 326 (1912).

[2]Restatement (Second) of Torts, Ch. 41, Topic 3, Scope Note (Tent. Draft No. 17, 74-76, 1971).

[3]David Haber and S. W. Bergen, eds., The Law of Water Allocation in the Eastern United States (New York: The Ronald Press Company, 1956), pp. xxv-xxvi.

[4]See e.g., Muncie Pulp Co. v. Koontz, 33 Ind. App. 532, 70 N.E. 999 (1904); and Davis v. Getchell, 50 Maine 602 (1862).

[5]See e.g., Mason v. Whitney, 193 Mass. 152, 78 N.E. 881 (1906); and Hoover v. Crane, 352 Mich. 36, 106 N.W. 2d 563 (1960).

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beneficial in nature, suitable to the watercourse and of economic and social value. If these requirements are fulfilled, reasonableness may require each riparian to sustain certain minor inconveniences and to adjust to the quantity of water used or the method of use so that both parties and uses can coexist.

The riparian doctrine is further distinguished by the fact that a riparian retains his right to the water regardless of whether or not use is made of the water or any diversion is made; thus a riparian owner can commence his use at any time and require that his right be fulfilled.[1]

At the present time, twenty-two states apply the riparian doctrine (See Figure 3-1). It should be noted that not much remains of the riparian doctrine as it was first seen in England. At this time, there are at least eight states that have made some type of statutory modification to the "pure" riparian system. Some states have adopted features of the prior appropriation doctrine, most often by requiring a permit before making use of water.[2] In addition, nine states bordering the arid west have adopted both the riparian and appropriation water law doctrines for water distribution. These states are: California, Oregon, Washington, North and South Dakota, Nebraska, Kansas, Oklahoma and Texas. (See Figure 3-1)

It is increasingly apparent that the riparian system will work effectively only in those regions where there is adequate water to supply the

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[1]See e.g., Buddington v. Bradley, 10 Conn. 213 (1834). Non-use may result in a loss of riparian rights in some situations, see Lawrie v. Silsby, 76 Vt. 240, 56 Atl. 1106 (1903); and Smith v. Nechanicky, 123 Wash. 8, 211 Pac. 880 (1923).

[2]See e.g., New York Conservation Law, 450, 451 (McKinney, 1967); and 3C North Carolina Gen. Stat. secs. 143-215.11 to 143-215.22 (1971 Supp.).

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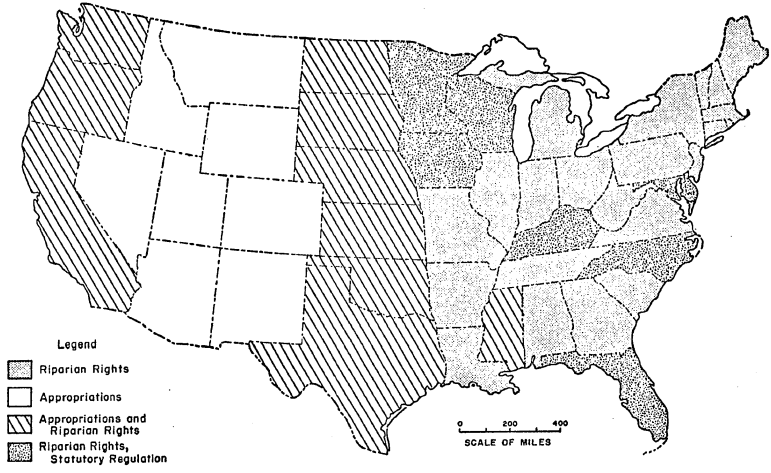

Figure 3-1. BASIC WATER LAW DOCTRINES IN THE 48 STATES

needs of the users, within the limits of reasonable use. Even now, however, the changes in the doctrine indicate that economic growth and development in some parts of the eastern United States has exceeded the natural supply of water and that greater administrative control and water user efficiency is required.

From an economic point of view, the riparian doctrine has been praised on the one hand since it leads to flexibility in the face of economic change, and criticized on the other hand since the rights are uncertain and insecure with respect to quantitative definition.[1] In light of the objectives herein, the riparian doctrine, especially the "natural flow" concept, works exceedingly well to protect and preserve the aquatic habitats. If water were left in the streams, undiminished in quantity and quality, it would foster the maximum amount of aquatic habitats consistent with natural conditions. As the evolution in legal thinking has illustrated, however, such a doctrine proved detrimental to the goal of economic growth and development during the 19th century and the doctrine was modified to allow for the growth.

In the East where water for the most part is abundant, the riparian doctrine has not had an adverse impact upon the aquatic habitats. Rather, the aquatic habitat problem in the East arises primarily from man's intrusions into the habitats. These problems are discussed in chapter 5.

In much of the arid and semi-arid Western United States, water supply was not adequate to meet the needs of the users. Therefore, the riparian doctrine could not be applied to the same extent that it had been in the East. Furthermore, the economic activities were different and placed

[1] S. V. Ciriacy-Wantrup, "Some Economic Issues in Water Rights," Journal of Farm Economics, Volume 37 (December, 1955), pp. 875-885.

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different demands upon the water supplies, many of which were conflicting in nature such as irrigation and mining.

3-3. The Prior Appropriation Doctrine

When the miners came to California in the late 1840's, they found little in the way of an established body of law to regulate the use and allocation of water resources. The miners were thus required to resort to rules of use that they themselves established with respect to the allocation of water. As such, it became customary for the first diverter of water to have a prior right to the use of water, during times of scarcity, over later appropriators. A priority of right system was soon established. These customary practices were readily accepted by the first agricultural settlers that followed the miners. As the industrial, agricultural and municipal sectors of the economy grew and conflicts arose, however, there developed a need for some unified social way to resolve these emerging conflicts. The water law doctrine that evolved to resolve these conflicts is known as the prior appropriation doctrine.[1]

The prior appropriation doctrine is basically the same as that first developed through custom by the miners in California. That is, a water diversion "first in time is first in right,"[2] thereby establishing a list of priorities.[3] Furthermore, in order to validly appropriate water, it

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[1]The first case establishing the prior appropriation doctrine appears to be Irwin v. Phillips, 5 Cal. 140 (1855).

[2]A principle that dominates the statutory and case law history of the West. Wells A. Hutchins, Water Rights Laws in the Nineteen Western States, completed by Harold H. Ellis and J. P. Debrahl, Volume 1, Misc. Pub. No. 1206 (Wash., D. C.: U. S. Dept. of Agric., 1971), p. 14.

[3]See e.g., Reagle v. Square S. Land Cattle Co., 733 Colo. 392, 276 Pac. 2d 235 (1954).

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must be diverted from the stream[1] and applied to a legally specified beneficial use.[2] Since its creation, a few other principles have been added to the doctrine. For example, ownership of land is not a prerequisite to appropriate water,[3] and water may be transferred out of the watershed of origin.[4] Also, an appropriation is for a specific quantity of water[5] and a property right is recognized in the appropriation which is salable like any other commodity.[6]

The prior appropriation doctrine has come to be the dominant water law theory applied in the eighteen states west of the 98th meridian. Nine of these states[7] have adopted the prior appropriation doctrine to the exclusion of the riparian doctrine of the East. The other nine states have adopted a combination of the prior appropriation doctrine and the riparian doctrine, "although the measure of practical importance of the

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[1]See e.g., McPhail v. Forney, 4 Wyo. 556, 35 Pac. 773 (1894); and State ex. re. State Game Commission v. Red River Valley Co., 51 N. Mex. 207, 182 Pac. 2d 421 (1945).

[2]The term beneficial use has never been defined in specific terms. Usually what is "reasonable" is beneficial. More is said on beneficial use in the following chapter.

[3]See e.g., First Security of Blackfoot v. State, 49 Idaho 740, 291 Pac. 1064 (1930); Laurance v. Brown, 94 Oreg. 387, 185 Pac. 761 (1919). Also see Hutchins, Water Rights Laws in the Nineteen Western States, pp. 254-269.

[4]See e.g., Miller v. Bay Cities Water Co., 157 Cal. 256, 107 Pac. 115 (1910); and Coffin v. Left Hand Ditch Co., 6 Colo. 443 (1882).

[5]Owens v. Snider, 52 Okla. 772, 153 Pac. 833 (1915).

[6]Hutchins, Water Rights Laws in the Nineteen Western States, pp. 546069.

[7]Alaska Const., art. VIII, sec. 13; Ariz. Const., art. XVII, secs. 1 and 2; Colo. Const., art. XVII, secs. 5 and 6; Idaho Const. art. IV, sec. 3; Mont. Const., art. IX; Nev. Rev. Stat., sec. 533:030; N. Mex. Const., art. XVI; Utah Const., art. XVII, sec. 1; Wyo. Const., art. VIII, secs. 1 and 3.

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riparian doctrine varies from 'underlying and fundamental' in some jurisdictions to quite limited in others."[1] (See Figure 3-1)

The constitutions or water codes of the eighteen western states specify which waters are available for appropriation. They range from all waters within the boundary of the state,[2] to all surface waters, or to just those waters in natural streams.[3] The states have also stipulated that the waters are either the property of the public held in trust by the state[4] or the property of the state. These waters are subject to appropriation as provided in the statutes of the respective states.

Even though a property right in the holder exists, the waters are not rigidly locked to that use; water rights are salable and transferable to other uses. For those uses given statutory preference, condemnation can be exercised by the preferred use over the non-preferred use. In addition, abandonment and forfeiture can reclaim unused water.

An early legal statement as to what is essential for an appropriation to exist is presented in the case of Union Mill and Mining Company v. Dangberg.[5] It provides the framework of the prior appropriation or "Colorado Doctrine" as it is sometimes called. The court held that:

> Under the principles of prior appropriation, the law is well settled that the right to water flowing in the public streams may be acquired by an actual appropriation of the water for a beneficial use; that,

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[1]Hutchins, Water Rights Laws in the Nineteen Western States, p. 3.

[2]See e.g., Colo. Const., art. XVI, sec. 5; and Kans. Stat. Ann., sec. 82a-703 (1969).

[3]Which may exclude sources of artifical origin. Fourzan v. Curtis, 43 Ariz. 140, 29 Pac. 2d 722 (1934).

[4]See e.g., Colo. Rev. Stat., 148-2-1.

[5]81 Fed. 73 (D. Nev. 1897).

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> if it is used for irrigation, the appropriator is only entitled to the amount of water that is necessary to irrigate his land, by making a reasonable use of the water; that the object had in view at the time of the appropriation and diversion of the water is to be considered in connection with the extent and right of appropriation; that if the capacity of the flume, ditch or other aqueduct, by means of which the water is conducted, is of greater capacity than is necessary to irrigate the lands of the appropriator, he will be restricted to the quantity of water needed for the purposes of irrigation, for watering his stock, and for domestic use; that the same rule applies to an appropriation made for any other beneficial use or purpose; that no person can, by virtue of his appropriation, acquire a right to any more water than is necessary for the purpose of his appropriation; that, if the water is used for the purpose of irrigating lands owned by the appropriator, the right is not confined to the amount of water used at the time the appropriation is made; the appropriator is entitled, not only to his needs and necessities at that time, but to such other and further amount of water, within the capacity of his ditch, as would be required for the future improvement and extended cultivation of his lands, if the right is otherwise kept up; that the intention of the appropriator, his object and purpose in making the appropriation, his acts and conduct in regard thereto, the quantity and character of land owned by him, his necessities, ability, and surroundings, must be considered by the courts . . . that the mere act of commencing the construction of a ditch with the avowed intention of appropriating a given quantity of water from a stream gives no right to the water; this purpose and intention are carried out by the reasonable, diligent, and effectual prosecution of the work to the final completion of the ditch, and diversion of the water to some beneficial use; . . . that the diversion of the water ripens into a valid appropriation only where it is utilized by the appropriator for a beneficial use . . . that, in controversies between prior and subsequent appropriators of water, the question generally is whether the use and enjoyment of the water for the purpose to which the water is applied by the prior appropriator have been in any manner impaired by the acts of the subsequent appropriator.

This rather lengthy, but legally concise statement, plus the informtion presented previously give rise to four general principles concerning the prior appropriation doctrine. First, beneficial use is the basis and measure of the right to water use. Secondly, the appropriation is based upon

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a specific quantity of water, and will not vary according to the conditions of the stream. In most of the states, the right further depends upon a physical diversion of the water from the stream.[1] Third, priority of rights will determine the allocation of waters in times of water scarcity. Fourth, an appropriation of water is a property right (usufructuary right), and, as such, conotes an economic value.

Based upon these principles, it becomes readily apparent that the doctrine was established to promote and foster the economic development of the water resources of the West. This development of the water resource was intended to promote the economic growth and general welfare of the people in an area where water is relatively scarce. This procedure made good sense only as long as our goals were directed primarily towards economic growth and development. But the concerns of the affluent "new property" holders are increasingly challenging these earlier adopted goals.

One area of the appropriation doctrine illustrates well the states desires to use the waters for economic growth and development purposes. This is in the area of preferences to the use of water. A true preference is one in which a junior appropriator may take water from a senior appropriator without having to pay compensation, based upon the fact that the junior's use is preferred to that of the senior. None of the western states have adopted this true preference system.[2]

Three broad types of preferences have been adopted by the western states: (1) where the preferred user may condemn and compensate a

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[1]Colorado removed the diversion requirement to acquire a water right in 1973. S. B. 97 amending C. R. S. 148-21-3(5), (6) and (7).

[2]Charles J. Meyers and A. Dan Tarlock, Water Resources Management (New York: The Foundation Press, Inc., 1971), p. 204.

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non-preferred user; (2) where the state may withdraw water from appropriation and hold it for the future use of a preferred user; and (3) using the preference system as a decision tool to allocate water between simultaneous applications.[1]

The underlying theme that runs throughout the preference statutes of the various states is that "some users are more important than others and should receive some type of favored treatment."[2] A review of the preference statutes indicates that the non-market uses (i.e., fish and wildlife habitat; recreational and aesthetic uses), for the most part, have not yet been recognized nor have they received any of this favored treatment. Various states in the past, as well as the present, continue to place primary emphasis on the economic development and life sustaining uses of water.

There is no general rule that may be stated as to how the states structure their preferences. Some examples will help to illustrate this point.[3] In Colorado, for example, the Constitution declares that:[4]

> Priority of appropriation shall give the better right as between those using the water for the same purposes; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

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[1] Ibid., pp. 204-205. Also see Frank J. Trelease, "Preferences to the Use of Water," Rocky Mt. Law Rev. Volume 27 (1954-1955), pp. 134-143.

[2] Trelease, "Preferences to the Use of Water," p. 158.

[3] For a summary of the appropriation states preference statutes see Hutchins, Water Rights Laws in the Nineteen Western States, pp. 419-425.

[4] Colo. Const. art. XVI, sec. 6. Similar wording is present in the Oregon Water Code of 1909, sec. 116-601.

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A technical distinction is often made between domestic and municipal uses of water, but together they usually rank first in the preference scheme. Agricultural use, as noted in the Colorado Constitution, is recognized in the preference system of most of the states.[1] Additional preferences, which reflect market uses of water, include items such as: manufacturing, stock watering, power, mining, navigation, "steam engines and general railway use, culinary, laundry, bathing, refrigeration, steam and hot water heating plants, (and) steam power plants."[2]

This study has found that only four of the nineteen western states--Arizona, Kansas, North Dakota and Texas--have placed the non-market uses of water into their preference systems. These statutes will be reviewed in turn.

In Arizona, the law holds that: "As between two or more pending conflicting applications for the use of water from a given water supply, where the capacity for the supply is not sufficient for all applications, preference shall be given . . . according to the relative values to the public for the proposed use."[3] These relative values to the public include: (1) Domestic and municipal use; (2) Irrigational and stock watering; (3) Power and mining uses and (4) Recreation and wildlife uses including fish.[4] Only the latter category can be classified as a non-market use.

Kansas has also recognized a non-market use--recreational purposes--in its statutes dealing with preferences.[5] In North Dakota, a broad

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[1] e.g., Idaho Const., art. XV, sec. 3; Nebr. Const., art. XV, sec. 6; Utah Code Ann., sec. 73-3-21 (1968).

[2] Wyo. Stat. Ann., sec. 41-3 (1957).

[3] Ariz. Rev. Stat., sec. 45-147 (A) (Supp. 1970).

[4] Ariz. Rev. Stat., sec. 45-147 (B) (Supp. 1970).

[5] Kans. Stat. Ann., sec. 82a-707 (b) (1969). Also see Earl B. Shurtz, Kansas Water Law, (Topeka: Kansas Water Resources Board, 1967), p. 27.

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range of market and non-market uses are recognized in the preference system. But, placed last in the preference system are fish, wildlife, and other outdoor uses.[1] The fourth state to recognize the non-market values in its preference system is Texas. Also, placed last in the preference-priority ranking are recreational and pleasure uses of water.[2]

As reflected in the cited state preference statutes, primary concern is still given to those uses of water which have a definite market value. Only in limited cases have the states recognized non-market values, and even when recognition is given, the non-market values are usually placed last in the preference ranking. Based on economic grounds, a case can be made for a reversal or realignment of the existing preferences.[3] But, although it may prove to be economically feasible in individual cases, it has been consistently politically infeasible to make a realignment based on such evidence.

As mentioned previously, the appropriation doctrine is a development orientated doctrine. One feature of this doctrine in particular, the diversion requirement, has proved to be and is potentially detrimental to the preservation of aquatic habitats. In most of the Western states a valid appropriation can be made only if the water is diverted from the stream. The intent of the requirement is to separate the claimed from the unclaimed water so as to increase the owners' security in their property right. As such, "in place" appropriations, i.e., those that leave water in the stream such as for recreational use, have only infrequently

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[1] N.D. Century Code, sec. 61-01-01.1 (Supp. 1971).

[2] Tex. Rev. Civ. Stat. Ann., art. 7471 (Supp. 1970). Also see Wells A. Hutchins, The Texas Law of Water Rights (Austin: The Texas Legislature and Texas Board of Water Engineers, 1961), pp. 212-213.

[3] Ciriacy-Wantrup, "Some Economic Issues in Water Rights," p. 881.

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been allowed. Therefore, the possibility exists that streams in the West could become totally appropriated. With all of the water diverted from the stream, complete destruction of the aquatic habitats would result. The following chapter cites two ways in which the possibility of this happening will be lessened and which in combination may enhance the claims of the "new property" holders in the aquatic habitats in common.

3-4. The Federal Reservation Doctrine

There exists a third system of water rights in the United States, one which reflects a public property right in the water resources. Known as the federal reservation doctrine, it gives the federal government the power to reserve water on lands that have been withdrawn from private appropriation. This right differs from other federal powers over water in that it is a distinct property right held in common. The reservation doctrine has been discussed and examined in detail elsewhere.[1] What follows is a brief summary of its background, meaning and implications to the objectives of this study.

Article IV, section 3, clause 2 (the Property Clause) of the Constitution states that: "The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States; and nothing in this Constitution

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[1] Meyers and Tarlock, Water Resource Management, pp. 156-184; E. H. Hanks, "Peace West of the 98th Meridian--A Solution to Federal-State Conflicts over Western Water," Rutgers Law Review, Volume 23 (Fall, 1968), pp. 33-50; R. J. Moses, "Federal-State Water Problems," Denver Law Journal, Volume 47 (1970), pp. 194-212; Frank J. Trelease, Federal-State Relations in Water Law, Legal Study No. 5 (Wash., D. C.: National Water Commission, 1971); U. S. Public Land Law Review Commission, One Third of the Nation's Land (Washington: U. S. Government Printing Office, June, 1970), pp. 141-145; National Water Commission, Water Policies for the Future, Final Report (Washington: U. S. Government Printing Office, June, 1973), pp. 464-471; and Dewsnup and Jensen, A Summary-Digest of State Water Laws, pp. 70-71.

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shall be so construed as to Prejudice any Claims of the United States, or of any particular State." Included in the "Property belonging to the United States" were the lands and adjacent waters in the Western states. As these states were admitted to the Union, they obtained power over navigable waters, but acquired no proprietary rights or title to the lands owned by the federal government nor waters arising on or flowing through such land. Thus, Moses has claimed that unless the United States has disposed of these lands, the federal government is still the owner.[1] The states have contended, however, that the federal government transferred the rights to water on the western lands by the Act of 1866,[2] the Act of 1870,[3] or the Desert Land Act of 1877.[4] Others hold the view that the federal government did not dispose of federal waters under these acts.[5]

The reservation doctrine is in conflict with many of the major principles of the prior appropriation doctrine. Federal reservation rights are: (1) created without diversion or application to beneficial use, (2) not lost by nonuse, (3) established according to the date the lands were withdrawn, and (4) the measure of the right is the amount of water reasonably necessary to fulfill the purposes for which the land has been withdrawn.[6]

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[1]Moses, "Federal-State Water Problems," p. 197.

[2]Act of July 26, 1866, ch. 262, sec. 9, 14 Stat. 253.

[3]Act of July 9, 1870, ch. 235, sec. 17, 16 Stat. 218.

[4]Ch. 107, 19 Stat. 377 (1877), as amended, 43 U.S.C. sec. 321 (1964). The court ruled in F.P.C. v. Oregon, 349 U. S. 435 (1955) that the Desert Land Act did not apply to reserved lands.

[5]See E. Morreale, "Federal-State Conflicts over Western Waters--A Decade of Attempted Clarifying Legislation," Rutgers Law Rev. Volume 20 (Spring, 1966), p. 423.

[6]National Water Commission, Water Policies for the Future, p. 464.

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These differences in doctrine have led to conflicts between federal and state objectives. As shown previously, many of the Western states still do not recognize non-market values in their preference statutes. This state of affairs has caused concern that Federal programs, particularly those for fish, wildlife and recreation, may not be fully served if the Federal agencies must continue to rely on state water law requirements and interpretations.

The reservation doctrine has strong implications for the preservation of aquatic habitats and other fish, wildlife, recreation and aesthetic resources. Federal reservation of waters may in many cases be directed to promoting these non-market values. The reservation doctrine will insure that sufficient water is available for these uses, without being subject to appropriation by other uses. In practice, much of the water required by the federal agencies is for instream use; thus will aid in the preservation of aquatic habitats in those states requiring waters be diverted from the stream for a valid appropriation.

Some have contended that, based on past experience, the water requirements for federal uses will be minimal and that the loss involved (where no compensation is paid) will be negligible. But, there are strong counter arguements to this position. First, there is nothing to insure that in the future requirements for waters on reserved lands will not become extensive. For example, with the rising demands for recreation, more water will be required to support it and thus will conflict with state and private demands for water. Secondly, the taking by the federal government cannot be approved merely because the taking is small. As Trelease points out, "unconscionable acts of the national government can

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hardly be justified on the grounds that they only result in petit larceny and only hurt little people."[1]

Several judicial rulings have evolved concerning the reservation doctrine.[2] In these cases the courts have recognized the right of the federal government to the continued flow of waters, as long as the waters are necessary for the beneficial uses of the government property.[3] Furthermore, the courts have held that the United States has the power under the Commerce Clause and Article IV, Sec. 3 of the Constitution to reserve water rights for its reservations and property.[4]

The scope of water rights claimed by the United States for reserved lands may be seen by a recent application in Colorado.[5] The application covers water rights in the White River, Arapaho, Routt, and Grand Mesa National Forests; Naval Oil Shale reserves, and lands owned and administered by the Bureau of Land Management.

These government claims for water include direct water rights, storage rights, transportation and well rights. These waters were to meet present and future needs of the reserved lands. The uses made of

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[1] Trelease, Federal-State Relations in Water Law, p. 119.

[2] See U. S. v. Grands Dam & Irr. Co., 174 U. S. 690 (1899); California Oregon Power Co. v. Beaver Portland Cement Co., 295 U. S. 142, (1935); F.P.C. v. Oregon, 349 U. S. 435, 75 S. Ct 832, 99 L. Ed. 1215 (1955); Arizona v. California, 373 U. S. 546, 83 S. Ct. 1468, 10 L. Ed. 2d. 542, decree entered 376 U. S. 340, 84 S. Ct. 755, 11 L. Ed. 2d. 757; Glenn v. U. S., Civ. No. C-153-61 (D. Utah, 1963) unreported; U. S. v. District Court, 2 ERC 1339, U. S. S. Ct. No. 87 (1971); U. S. v. District Court, 2 ERC 1341, U. S. S. Ct., No. 812 (1971).

[3] U. S. v. Grande Dam & Irr. Co., 174 U. S. at 703 (1899).

[4] Arizona v. California, 373 U. S. at 598 (1963).

[5] Application for information of reserved water rights in the White River National Forest. In the matter of the Application for water rights of the U. S. in Water Division 5, State of Colorado, 1971.

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the water were to be for timber production, recreation, domestic use, agriculture, stock watering, conservation and management of fish and wildlife resources, fire fighting and other uses.

With respect to fish and wildlife habitat protection, conservation and management, the federal government made a further claim, that was the:[1]

> right to the maintenance of such continuous, uninterrupted flows of water and such minimum stream and lake levels as are sufficient in quantity and quality to: (a) Insure the continued nutrition, growth, conservation, and reproduction of those species of fish which inhabited such waters on the applicable reservation dates, or those species of fish which are thereafter introduced. (b) Attain and preserve the recreational, scenic, and esthetic conditions existing on the applicable reservation dates, to preserve those conditions which are thereafter caused to exist.

The federal determination of the minimum flows required to attain the requirements in (a) above were determined on the basis of two seasons, spawning and the rest of the year.[2] During the spawning season, the government sought the right to the quantity of water, unappropriated as of the reservation date, the lesser of either:

(1) the natural flow of such unappropriated water remaining in the stream or,

(2) that flow which corresponds to the fortieth percentile of a flow duration curve, or its statistical, synthetic or empirical equivalent. A flow, historically equalled or exceeded 40% of the time.

During the non-spawning season the government claimed the right to the lesser quantity of either:

(1) the natural flow of such unappropriated water remaining in the stream or,

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[1] Ibid., pp. 2-3.

[2] Ibid., p. 3.

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(2) that flow which corresponds to the eightieth percentile on a flow duration curve or its equivalent. Eightieth percentile being the flow historically equalled or exceeded 80% of the time.

The preceding discussion illustrates how the application of the federal reservation doctrine may aid in the preservation of instream-extra-market values. The denial of these claims would no doubt have an adverse effect upon the aquatic habitats and the fish and wildlife resources.

3-5. Economic Implications

The discussion in this chapter has illustrated the impact of changing social values upon the traditional water law doctrines. The goal of economic development is reflected in the modification of the riparian doctrine from a "natural flow" to a "reasonable use" concept. The appropriation doctrine has always been a traditional water use and development oriented doctrine. Non-development oriented goals have brought about a gradual change in both doctrines, which reflect, in part, the growing social concern over the quality of the environment. Part of this change has been stimulated by market factors (i.e., demands for more recreational experiences) and part by extra-market factors (i.e., demands for "clean" water and air).

Over the years, a great deal of attention has been given by economists and lawyers to the economic implications surrounding the various water law doctrines. These doctrines have been examined with respect to their varying impacts upon the allocation and distribution of water resources. One of the fundamental principles of neo-classical economic theory applied in the analysis has been to strive for an optimum allocation of water resources in which all users will derive equal value in use from the marginal unit used. Once the marginal values in use have been equated, then

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economic efficiency is said to have been achieved. Explicit implementation of the efficiency criteria means that an accurate determination must be made of the relative values of water in alternative uses, i.e., both market and extra-market uses. If the optimum allocation were achieved, which it would be under a perfectly competitive market system then maximum social welfare would result. If the market is less than perfect, however, as it is, then the role of the State becomes one of adjusting for the failures.

With respect to the allocation of water resources between competing users and uses, two basic techniques have been stressed: administrative allocation and private decision-making via the market process.[1] Where it is possible to develop private property rights and to use the market system for the allocation of the resources, the private decision-making alternative has been viewed as most desirable.[2] In those cases where property rights can not be fully developed, where they prove not to be in the "public interest," and/or where the market system fails, then administrative allocation becomes necessary.

Three general criteria have been specified for an efficient system of property rights that will promote the optimum allocation of resources.[3] First, the property object should be owned or subject to ownership by someone. Second, the rights should be exclusive in nature so as to provide an incentive to invest labor and capital resources in the project

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[1] J. W. Milliman, "Water Law and Private Decision-Making: A Critique," The Journal of Law and Economics, Volume II (October, 1959), pp. 41.

[2] Ibid., p. 45.

[3] Posner, Economic Analysis of the Law, pp. 11-13.

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development. (Without this feature the property owner would not be assured of reaping the rewards of his investment.) Third, the rights should be transferable so as to achieve the optimum allocation of resources over-time. A system of property rights that are non-transferable would place a constraint upon the movement of resources from lower to higher valued uses.

The relative economic merits of the riparian and appropriation doctrines have previously come under close examination.[1] Each doctrine contains various strengths and weaknesses. From an administrative point of view, one of the basic weaknesses of the riparian doctrine is that the doctrine is not a suitable system to assure an optimum allocation of water in times of scarcity due to the lack of an established administrative structure and market system. Another weakness of the riparian system, based upon the previously mentioned criteria, is that the riparian rights are not transferable to non-riparian lands under most circumstances. Furthermore, there is an element of uncertainty surrounding the use of water for other than domestic purposes.[2]

One of the major weaknesses of the appropriation doctrine arises from its development oriented nature and the rigidity in which use priorities are institutionalized in law. In many cases, water is diverted in excess of the users' actual requirements, particulary in its use in irrigation. Since the water right is lost by non-use, appropriators will

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[1]For example see Mason Gaffney, "Economic Aspects of Water Resource Policy," The American Journal of Economics and Sociology, Volume 28 (April, 1969), pp. 131-144.

[2]F. E. Maloney, R. C. Ausness, and J. S. Morris, A Model Water Code (Gainesville: University of Florida Press, 1972), pp. v-vi.

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continue to apply excessive amounts of water in the short run in order to provide a basis for future water needs. This practice leads to overirrigation and waste of scarce water resources.[1] The courts have consistently ruled, however, that the appropriation doctrine does not include the right to make excessive diversions or to waste water when it can be avoided.[2] Waste has been a difficult term to define in a physical sense and the courts have usually referred to wastes that are unreasonable or unnecessary.[3] Economic determinations of efficient use are possible but vary from place to place and overtime so that the development of norms or guidelines sanctioned in law have not yet been developed or sanctioned.

The appropriation doctrine fares somewhat better than the riparian doctrine in terms of the ability to transfer water rights. However, the gains in terms of efficiency by using the appropriation doctrine relative to the riparian doctrine to allocate water rights appears to be very slight.[4] Once the rights are transferred, it appears that the legal certainty surrounding the appropriation rights are stronger than under the riparian system.[5] This factor is important in situations involving the use of borrowed capital because in part the interest rate changed is a reflection of the relative degree of rich involved.

The previous discussion has viewed the two water law doctrines from the point of view of economic efficiency. If the market system were

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[1] Gaffney, "Economic Aspects of Water Resource Policy," p. 137.

[2] e.g., Combs v. Agricultural Ditch Co., 17 Colo. 146, 28 Pac. 966 (1892); Washington v. Oregon, 297 U. S. 517 (1936).

[3] Burkart v. Meiberg, 37 Colo. 187, 86 Pac. 98 (1906).

[4] Gaffney, "Economic Aspects of Water Resource Policy," p. 140.

[5] Milliman, "Water Law and Private Decision-Making: A Critique," p. 47.

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perfect in nature, then the private decision-making process might be relied upon to allocate the water resources among competing uses to achieve an optimum social welfare position. From the perspective of this study, however, it would appear that the market has not functioned perfectly and in many instances it has not functioned at all.

Where has the market failed?[1] The extra-market values, such as aesthetics and aquatic habitats, are not allocated through the market system. The monetary values that have been imputed to these resources to justify public expenditures are not actual market prices. Even if actual prices did exist, it is doubtful that one or a small group of individuals would be able to acquire the resources in sufficient quantities to maintain and preserve their values.

The concept of economic efficiency is premised upon the belief that man is a rational being. However, if man does not possess complete and accurate information concerning all possible alternatives or if his interests are purely self-interest oriented, then it can not be presupposed that he will make decisions that are in the "public interest." Under the previously mentioned circumstances, collective action is required to promote and protect the public interest.

Several approaches have been taken on the part of the State to promote and protect the "public interest" in aquatic habitats. In cases where the market fails, ownership of the water rights may be vested in the public to achieve the needed protection. The implementation of the

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[1] For a discussion of market failure in the field of water law see Frank J. Trelease, "Policies for Water Law: Property Rights, Economic Forces, and Public Regulation," Natural Resources Journal, Volume 5 (May, 1965), pp. 37-42.

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federal reservation doctrine for the preservation of aquatic habitats is one such example of public ownership.

In many of the western states especially, the reservation doctrine may be implemented to protect extra-market uses which are not recognized as beneficial uses or have been placed low in the preference ranking, relative to other competing uses. The two most important economic and legal questions that must be resolved concerning the reservation doctrine are (1) the legal uncertainty that arises over its use, and (2) the economic-legal impact upon holders of private water rights, which may be curtailed if the doctrine is applied in a strict sense.[1]

At the state level, the water law doctrines may be amended to reflect the "public interest" in the extra-market values. One technique involves changing the definition as to what constitutes a beneficial use in a legal sense. The establishment of minimum stream flows and lake levels is another statutory modification which may be used to protect extra-market values. These two modifications are discussed in the following chapter.

[1]The Public Land Law Review Commission, One Third of the Nation's Land, pp. 146-147.

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CHAPTER 4

TWO LEGAL PROTECTORS OF AQUATIC HABITATS

4-1. Introduction

The water law doctrines discussed in the previous chapter have become firmly entrenched in the United States. As a result of socio-economic conflicts largely based or extra-market considerations, the basic concepts which were devised to meet the needs of profit seeking water users and to achieve the earlier dominant goal of economic growth and development are now being modified in light of non-developmental social goals.[1] Two legal principles which reflect the product of this evolutionary process are: (1) the diversion and beneficial use provisions, and (2) minimum stream flow and lake level requirements.

The degree of the beneficial or detrimental effects that these principles will have upon aquatic environments and habitats depends first upon the manner in which the principles are incorporated into the statutory law and the way in which they are interpreted by the various administrative and legal bodies. Their application under the riparian and appropriation doctrines varies, partly due to the underlying philosophy of the doctrines and partly due to the varying geo-climatic conditions and socio-economic demands placed upon the land, water and fish and wildlife resources.

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[1] A. R. Dickerman, G. E. Radosevich and K. C. Nobe, Foundations of Federal Reclamation Policies: An Historical Review of Changing Goals and Objectives, N.R.E. 8 (Fort Collins, Colorado: Department of Economics, Colorado State University, January, 1970), Appendix I.

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The adoption of minimum stream flow and lake level legislation, and changes in the beneficial use concept will have an impact upon demand for and allocation of water resources. Modification in these two legal protectors of aquatic habitats thus possess significant economic implications which are discussed in section 4-4.

4-2. Beneficial Use and Diversion Requirements

The beneficial use concept is an integral part in both the riparian and appropriation doctrines. The concept is inherently and implicitly contained within the riparian doctrine of "reasonable use." Under the "reasonable use" theory, emphasis is placed on a full and beneficial use of the water resource; each riparian proprietor has the option to make a reasonable use of water for any purpose, so long as such use does not cause harm or injury to the reasonable use of others.[1] Many of the riparian states have made the beneficial use concept explicit by defining beneficial use through statutory modifications in their water laws. The beneficial use requirement in the appropriation states has historically been as essential element within the doctrine, and is defined in their constitutions, statutes and/or case laws.

The beneficial use concept is of key importance to this study since the defining of beneficial use will determine the extent to which water may be used for non-market purposes. These non-market uses include aquatic habitat preservation, fish, wildlife, recreation and aesthetic uses of water. In this section, the degree to which the non-market uses have been recognized in both the riparian and appropriation doctrines and judicial interpretations of the beneficial use concept are examined.

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[1] 6A American Law of Property, sec. 28.56 (1954).

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a. The Riparian Doctrine

As noted previously, the beneficial use concept is inherently and implicitly contained within the American riparian doctrine of "reasonable use".[1] As to whether or not a specific use will be considered reasonable is a question of fact and depends upon the circumstances of the use.[2] Waite has pointed out that viewing public uses as being more beneficial to society than another use (private) is counter to the decided cases. As such, the courts have emphasized "present competing uses and circumstances relatively immediate to their exercise, rather than primarily their benefit to society at large"[3] in determining reasonable and/or beneficial use.

Many of the riparian states have made the reasonable beneficial use concept explicit through statutory modifications. Examples of statutory modifications are illustrated below with case studies of the states of Delaware, Florida and Minnesota.

For the most part, the nature and extent of riparian rights in Delaware are rather vague since the courts have not been frequently called upon to define these rights judicially.[4] However, Delaware has recognized that due to the rapid economic growth of the state its water and air resources must be "protected, conserved, and controlled to assure their reasonable and beneficial use in the interests of the people of

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[1]For a discussion of beneficial use in riparian states, especially Wisconsin and Indiana, see G. Graham Waite, "Beneficial Use of Water in a Riparian Jurisdiction," Wisconsin Law Rev. Volume 1969, No. 3, pp. 864-883.

[2]Dilling v. Murray, 6 Ind. 324 (1855); Apfelbacher v. State, 167 Wis. 233, 167 N.W. 244 (1918).

[3]Waite, "Beneficial Use of Water in a Riparian Jurisdiction," p. 879.

[4]Dewsnup and Jensen, A Summary-Digest of State Water Laws, p. 185.

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the State. . ."[1] Delaware law further recognizes that the development, utilization, and control of the water resources are "vital to the people in order to assure adequate supplies for domestic, industrial, power, agricultural, recreational, and other beneficial uses."[2] These "other beneficial uses" include, but are not limited to, wildlife and aquatic life preservation and uses.[3]

The State of Florida is illustrative of another riparian state that has explicitly defined the beneficial use concept through statutory modification of the traditional riparian doctrine. Under the Florida Water Resources Act of 1972,[4] the Department of Natural Resources is directed to formulate a state water use plan that gives due consideration to "the attainment of maximum reasonable-beneficial use of water. . ."[5] Under the Act, those uses which are referred to as being "reasonable-beneficial uses" include the use of water for the protection and procreation of fish and wildlife.

Whereas Florida's Water Resources Act stresses the attainment of a "reasonable-beneficial use" of water, the State of Minnesota has sought to use and manage water resources toward the goal of a "beneficial public purpose." As in the State of Delaware, the Minnesota statutes list specific uses which are considered beneficial. Under the Minnesota statute, "beneficial public purpose" includes the use of water for wildlife habitat,

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[1] Del. Code Ann., sec. 7-6001 (a).

[2] Del. Code Ann., sec. 7-6001 (b) (1).

[3] Del. Code Ann., sec. 7-6001 (b) (4).

[4] Laws of Florida, Chapt. 72-299 (1972).

[5] Florida Stat., sec. 373-036 (Supp., 1972).

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such as fish spawning and rearing areas, waterfowl nesting and feeding areas, and areas for the rearing, feeding, and protection of other wildlife.[1]

The statutory enactments of these riparian states show that in some cases non-market uses of water are becoming recognized as beneficial uses of water. But, although consideration is given to non-market uses, primary emphasis is still given to the uses of water to sustain the life of man and animals, and which will provide man with a recognizable economic return via the conventional market system.

Why did these states modify their traditional riparian doctrine by statutory enactments? First, the states were becoming aware that water is no longer so abundant as to be able to meet the needs of all users. The recognition of scarcity, brought about by increasing water demand, stimulated legislative action to ensure adequate supplies would be available to meet present and future public needs. Secondly, changes in the law were viewed as necessary to preserve and maintain certain social values, thus the legislation was as much a relative value question as it was a conflict situation.

The problems in South Florida illustrate the nature of the conflict situation.[2] In 1971, Florida experienced serious water shortages caused in part by increased water demands. The public was also becoming more aware of the plight of the Everglades, a circumstance arising primarily out of the overall rapid economic growth and development of Florida.

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[1] Minn. Stat., sec. 105.37, Subd. 6 (1972).

[2] For a more extensive discussion of the Florida problem see A. R. Marshall, "South Florida--A Case Study in Carrying Capacity," American Association for the Advancement of Science, 1972 Annual Meeting (Wash., D. C. n.p., 1972). (Mimeographed.)

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Population growth also contributed to the developing conflict. As a result, if adequate water was going to be available to meet the public needs, then changes were required in the traditional riparian doctrine.

b. The Appropriation Doctrine

The beneficial use requirement has been an essential element of the appropriation doctrine since its origin. As applied in the appropriation states, the beneficial use concept has two key elements. The first concerns the type of use and the second concerns the method of use. Specifically, if a type of use is determined to be beneficial, then a valid appropriation may be obtained. But, a determination must also be made as to whether or not the method of use is reasonably efficient and/or non-wasteful.[1] A "reasonable efficient manner" implies that unnecessary water waste shall be avoided. Therefore, beneficial use has come to be viewed as the antithesis of physical waste of water. Throughout the appropriation doctrine history the courts have held that wasteful water practices are unjustifiable.

Given this background information concerning beneficial use, the following is a brief survey of the beneficial use concept as expressed in the constitutions, statutes and/or court decisions of the riparian and appropriation states. In this analysis, primary emphasis is placed on the recognition or lack of recognition of the non-market uses of water.

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[1] Dewsnup and Jensen, A Summary-Digest of State Water Laws, p. 34. Hutchins pointed out that "reasonable beneficial use" implies that "not only must the use be beneficial to the appropriator, but it must be reasonable in relation to use by others who have access to the same source of supply." Hutchins, Selected Problems in the Law of Water Rights in the West, Misc. Publ. No. 418 (Wash., D. C.: U. S. Dept. of Agric., 1942), p. 317.

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The beneficial use concept has been expressed in the constitutions of eleven of the Western states.[1] For example, the Colorado Constitution merely states that: "The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied."[2] The only uses recognized in the Colorado Constitution, with respect to preferences, call for a priority order of (1) domestic, (2) agricultural, and (3) manufacturing.

The Alaska constitution, although not defining beneficial use in any detail, does allow for the appropriation of water for fish and wildlife purposes. Citing Article VIII, sec. 13 in its entirety:

> All surface and subsurface waters are reserved to the people for common use, except mineral and medicinal waters, subject to appropriation. Priority of appropriation shall give prior right. Except for public water supply, an appropriation of water shall be limited to stated purposes and subject to preferences among beneficial uses, concurrent or otherwise, as prescribed by law, and to the general reservation of fish and wildlife.

Ten of the western states water statutes contain the statement that "beneficial use shall be the basis, the measure, and the limit to the right to the use of water."[3] For the most part, the beneficial uses that have been stressed in the past are those that have market as opposed to extra-market uses. Most of the state statutes include, but

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[1] Alaska Const., art. VII, sec. 13; Ariz. Const., art. XVII, sec. 2; Cal. Const., art. XIV, sec. 3; Colo. Const., art. XVI, sec. 6; Idaho Const., art. XV, secs. 1 and 3; Mont. Const., art. III, sec. 15; Nebr. Const., art XV, secs. 5 and 6; N. M. Const., art. XVI, secs. 1, 2, and 3; Tex. Const., art. XVI, sec. 59 (a); Utah Const., art. XVII, sec. 1; and Wyo. Const., art. VIII, sec. 3.

[2] Colo. Const., art. XVI, sec. 6.

[3] Hutchins, Water Rights Laws in the Nineteen Western States, p. 439. Those states are: Arizona, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah and Wyoming.

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are not limited, to some of the following beneficial uses: domestic, agricultural, watering livestock, irrigation, municipal, industrial, generation of electric power, navigation, stream flow regulation, and railway use.

A review of the state statutes indicates that at least seventeen of the fifty states have statutes that recognize the non-market uses of water as being beneficial. Ten of the nineteen western states have, in their statutes, reference to non-market uses of water as being beneficial.[1] At least seven of the eastern riparian states recognize that the non-market uses of water may be considered beneficial.[2]

The non-market uses of water generally include the use of water for recreation, fish, wildlife and habitat preservation. The states approach the definition of beneficial use for non-market purposes in different ways. Some prefer to specify only one or a few of the non-market purposes. For example, the Nevada laws state that the waters from any stream or undergound source may be used for recreation, which is a beneficial use.[3]

Some states are vague in their definition of beneficial use, and as such do not necessarily limit the use to entirely market uses. The South Dakota statutes define "beneficial use" generally as: "any use of water

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[1]Alaska Stat., sec. 4615.260 (3); Ariz. Rev. Stat., sec. 45-141 (A); Colo. Rev. Stat. 148.21-3 (7); Kan. Gen. Stat., sec. 82a-1407; Rev. Code Mont., 89-3301; Nev. Rev. Stat. 533.030; N. D. Cent. Code, sec. 61-04-02; Ore. Rev. Stat., sec. 536.400; Vernons Tex. Code Ann., Water Code, 5.023 (A); and Wash. Rev. Code, sec. 90.14.031.

[2]Del. Code, sec. 6001 (b) (1); Florida Stat., sec. 373; Ga. Code Ann., sec. 17-505; Ind. Stat. Ann., sec. 27-1407 (5); Minn. Stat., sec. 105.37, Subd. 6; Laws of N. Y., E.C.L., sec. 15-0105.4; Ohio Rev. Code Ann., sec. 1525.01 (D); and Va. Code Ann., sec. 62.1-10 (b).

[3]Nev. Rev. Stat., sec. 533.030.

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that is reasonable and useful and beneficial to the appropriator, and at the same time is consistent with the interests of the public in the best utilization of water supplies."[1] Statutes such as this do not specifically exclude or include the use of water for non-market purposes. However, defining "the public interest" is no simple problem. As one author has noted, even asking the question as to what public interest is "invites the sort of smile reserved for small children and benign idiots."[2]

Other states are beginning to define beneficial use more specifically with respect to non-market uses. For example, a recent amendment to the Colorado statutes has made certain changes which were intended to provide more protection for and recognition of the non-market uses of water. This revision states that:[3]

> Beneficial use is the use of that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made and, without limiting the generality of the foregoing, shall include the impoundment of water for recreational purposes, including fishery or wildlife. For the benefit and enjoyment of present and future generations, 'beneficial use' shall also include the appropriation by the state of Colorado in the manner prescribed by law of such minimum flows between specific points or levels for and on natural streams and lakes as are required to preserve the natural environment to a reasonable degree.

Two points in the above statute should be noted. First, according to this amendment the water need not be diverted to make a valid appropriation to a beneficial use. Thus, water could be appropriated by the

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[1] S.D.C.L., 46-1-6 (6).

[2] U. S., Congress, Joint Committee Print, Peter O. Steiner, "The Public Sector and the Public Interest" The Analysis and Evaluation of Public Expenditures: The PPB System, 91st Cong., 1st Sess. Volume 1, Wash., D. C., 1969, p. 42.

[3] Colo. Rev. Stat., 148-21-3 (7) (1973).

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state and left in the stream for the preservation of the aquatic habitats. Second, for a private individual or entity to appropriate water for recreation and fish and wildlife uses, the water must be impounded. The waters impounded thus become unavailable for instream fish and wildlife uses unless indirectly made available through down stream releases.

The changes made in the Colorado statutes, and in the statutes of certain other appropriation states, reflect a change in some of the traditional appropriation doctrine concepts. Specifically, elimination of the diversion requirement reflects a change in the old dictum that every drop of water that runs to the sea without yielding a commercial return is wasted. The goal has been modified so as to maximize the social welfare from various water uses, not simply to maximize water use. Furthermore, this broader interpretation of beneficial use reflects a change of values from the traditional domestic-municipal, agricultural, industrial market oriented uses to social values that call for the preservation of aquatic habitats and environmental quality.

Traditionally, it has been up to the courts to determine what constitutes a reasonable beneficial use of water at any point in time. In certain situations, the courts have noted that the non-market use of water constitutes a valid appropriation or use of water, but that the use failed to meet certain other legal requirements. Some of the court decisions dealing with the recognition or non-recognition of the non-market uses of water will be discussed below.

Perhaps no case can illustrate better the problem of defining beneficial use and the conflicts that arise when market and non-market uses of water vie for the same water resource than Empire Water and Power Co. v. Cascade Town Co. In this case, the Cascade Town Company

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had for many years operated a resort along the banks of Cascade Creek in Colorado. One of the resort's chief attractions was a waterfall on the creek. The mist and spray from the falls provided water for vegetation in and along the banks of the Cascade Creek which added to the aesthetic and recreational appeal of the area.

The defendant, Empire Water and Power, intended to impound and divert water from above the falls for the purpose of generating power. The result of this impoundment would be to turn the canyon into a dry gulch which in turn would destroy the falls and related vegetation.

The defendants claimed that the use of the water was not within the beneficial use limits, as stated in the state constitution. The Colorado Federal District court did not accept the defendant's narrow interpretation. It stated that:[1]

> Places such as described here, favored by climatic conditions improved by the work of man, and designed to promote health by affording rest and relaxation are assuredly beneficial.

The District court held, however, that Colorado had rejected the Common-law rule and therefore the landowner did not have the right to have the stream run in its natural way without diminution. The court ruled, therefore, that the complainant was not entitled to a continuance of the falls solely for their scenic beauty.

The Eighth Circuit Court, on appeal, reversed the decision of the District court since it had considered only the artistic value of the falls, and did not inquire into the effectiveness of the use of the water in the way adopted as compared with the customary methods of

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[1] Cascade Town Co. v. Empire Water and Power Co., 181 Fed. 1011, 1017-18 (D. Colo. 1910). For a brief discussion of this case see H. L Bickley, "Does art and recreation contribute 'beneficial uses' of public waters?" Central Law Journal, Volume 95 (1924), pp. 195-197.

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irrigation and remanded the case for a decree consistent with its decision. The Circuit court expressed their preference for the efficient over the aesthetic use of water by concluding:[1]

> It may be that if the attention of the lawmakers had been directed to such natural objects of great beauty they would have sought to preserve them, but we think the dominant idea was utility, liberally and not narrowly regarded, and we are constrained to follow it.

The final decree was issued by the U. S. District Court for Colorado on October 15, 1915, enjoining the Empire Water and Power Company from interfering with the natural flow, except for the right to divert one-half of a second-foot from the south branch of the Cascade Creek from September through June of each year. The net effect of the decree was not only to preserve the foliage, but to retain the aesthetic value as well.

In 1966, the court in Colorado River Water Conservation District v. Rocky Mountain Power Co. ruled in favor of the power company which challenged claims made by the conservation district that water to the extent necessary for preservation and propagation of fish was to be preserved and kept in the stream and not diverted.[2] The district's claim was based on powers allegedly conferred by the relevant statute which reads as follows: "To file upon and hold for use of the public sufficient water of any natural stream to maintain a constant stream flow in the amount necessary to preserve fish."[3]

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[1] Empire Water and Power Co. v. Cascade Town Co., 205 Fed. 123, at 129 (8th Cir. 1913).

[2] 158 Colo. 136, 406 Pac. 2d 798 (1965). For a review see J. R. Gordon, "Water Law: A State Cannot Appropriate a Minimum Flow of Water in a Natural Stream for Preservation of Fish," Montana Law Rev., Volume 27 (1966), pp. 211-216.

[3] Colo. Rev. Stat., 150-7-5 (10) (1963).

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The power company asserted that the purported appropriation did not constitute a valid appropriation on the grounds that no appropriation could be claimed without an actual diversion. They further argued that the district's claim to a certain minimum flow was not in compliance with state law. In holding for the power company the court cited two earlier Colorado cases[1] and concluded that under the state laws, at that time, water could not be appropriated for a minimum water flow. The appropriator was required to divert a portion of the water from the natural course of the stream if it was to be used for piscatorial purposes.

It would appear from an examination of the preceding Colorado cases cited that the courts have never clearly rejected the use of water for non-market uses. What they do illustrate is that to make a valid appropriation for those uses, the appropriator must comply with all of the legal requirements to perfect his right. These early cases also seem to indicate that although the courts were aware of the importance of the non-market values they were constrained by previous cases and statutes which favored water uses that yielded a commercial (market) return.

A unique case concerning the right to appropriate water for waterfowl habitat was handed down in Utah in 1917.[2] The court denied an appropriation of water for the purpose of providing a waterfowl habitat on public domain lands on which the appropriator had no possessory rights. The appropriation was to have been for the irrigation of lands for the

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[1] Board of County Commissioners v. Rocky Mountain Water Co., 102 Colo. 351, 79 Pac. 2d 373 (1938); and City and County of Denver v. Northern Colorado Water Conservancy District, 130 Colo. 375, 276 Pac. 2d 992 (1954).

[2] Lake Shore Duck Club v. Lake View Duck Club, 50 Utah 76, 166 Pac. 306 (1917).

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production of food for wild waterfowl on unsurveyed, uninclosed and untilled lands of the public domain.

In determining whether a valid appropriation could be made under these circumstances, the court stated that:

> To our minds it is utterly unconceivable that a valid appropriation of water can be made under the laws of this state, when the beneficial use of which, after the appropriation is made, will belong equally to every human being who seeks to enjoy it. Furthermore, if the beneficial use for which the appropriation is made cannot, in the nature of things, belong to the appropriator, of what validity is the appropriation?

The court concluded that to have a valid appropriation the benefits must be subject to the complete dominion and control of the appropriator. This requirement for complete dominion and control does not appear to be a reasonable restriction to place upon the appropriation of water for recreational, and fish and wildlife purposes. If the use contemplated is in the public interest, and the water is available, however, then there are equally valid grounds for claiming that the appropriation should be allowed.

The problems with respect to defining beneficial use have subjected the concept to much criticism. As Ohrenschall and Imhoff have stated, the standard of beneficial use "originated and developed in, and correspondingly became infected with a socio-psychological (as well as an ethical) milieu of environmental exploitation by private interests, aided and abetted by public representatives."[1] The concept may have been

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[1] J. C. Ohrenschall and E. A. Imhoff, "Water Law's Double Environment: How Water Law Doctrines Impede the Attainment of Environmental Enhancement Goals," Land and Water Law Review, Volume 5 (1970), p. 271.

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intended to reduce waste and inefficiency, but it has served as a crude tool in attempting to achieve this objective.[1]

Beneficial use, in the opinion of Ohrenschall and Imhoff, is said to be "deficient in that it seeks to prevent physical waste of water of one order at the expense of promoting environmental waste of more serious orders."[2] Although pointed out herein examples of the recognition of non-market values, the legislatures and courts have been reluctant to consider non-market uses of water as beneficial uses in any broad and meaningful way. Any change from the traditional norms to new norms is an evolutionary process. As more conflict situations arise, the beneficial use concept will have to be redefined to reflect the physical and psychological needs that man has for recreation and aesthetics and the desire to maintain and preserve aquatic habitats at certain acceptable levels.

Once it can be established that the use of water for extra-market uses in general and aquatic habitat preservation in particular are beneficial uses, the next problem becomes who can acquire the waters and in what amounts. Where the extra-market uses are not recognized, a conflict situation arises with the concepts of minimum flows and lake levels.

4-3. Minimum Flows and Lake Levels

Minimum water level legislation and the recognition of the need for additional legislation is rapidly gaining influence throughout the United

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[1] Charles J. Meyers, A Historical and Functional Analysis of Appropriation Law, Legal Study No. 1 (Wash., D. C.: The National Water Commission, 1971), p. 8.

[2] J. C. Ohrenschall and E. A. Imhoff, "Water Law's Double Environment: How Water Law Doctrine Impede the Attainment of Environmental Enhancement Goals," p. 273.

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States at both the state and federal level. Policies directed at preserving the natural water environment for fish and wildlife resources can be effective only to the extent that there is an acceptable and sufficient amount of water available for use by the wildlife and fishery resources, and the food chain on which they depend.

There is also a protential economic inefficiency resulting from not adopting minimum water level legislation. For example, although all fifty states in the United States have programs for stocking fish and maintaining fish habitat by a designated state fish and game agency, only thirty-five of the states have established legislation for minimum water levels for impounded water and only about nineteen states have minimum flow legislation to maintain stream flows. With no correlation between the management programs and minimum water level enactments, many state stocking programs could result in a misallocation of resources. This situation is illustrated in the case of the John Martin Dam in Colorado.

The John Martin Dam on the Arkansas River in Colorado was authorized by Congress in the Flood Control Act of June 22, 1936. Construction was begun in the fall of 1939 and the dam was completed in October of 1948. No provisions were made at that time for the establishment of minimum water levels. Upon call, the reservoir may be completely drained of water to meet irrigation needs downstream.

At least five times, (in 1960, 1961, 1962, 1964, and 1968) the reservoir has been completely drained of water. This situation has resulted in a large expense to the Colorado Wildlife Division to re-stock the reservoir which in recent years had become a major fishing recreation facility for southeastern Colorado. As of this writing, the Division of Wildlife has acquired over one million dollars in water rights to serve

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as a recreation pool. However, downstream water users have contested the change in rights from agricultural to storage rights, and until this legal problem is resolved in the courts, no water will be made available to preserve the aquatic habitats.

Constraints within the riparian and appropriation doctrines have been obstacles impeding minimum stream flow and lake level legislation in the United States. However, the constraints are less in the riparian states. Specifically, under the traditional common law doctrine, riparians have rights to stream flows which are undiminished in quantity and quality (subject to reasonable uses by other riparians). As such, a minimum stream flow concept is built into the basic tenants of the doctrine.

In the appropriation states, however, the beneficial use and diversion requirements have acted to impede the adoption of minimum water level legislation. Since minimum flow requirements are associated with instream uses, no diversion is required. The concept of non-diversion being in direct conflict with the traditional approach of the appropriation doctrine has served as a severe constraint in attaining minimum flow legislation in these states.

Another important consideration is compensation for impaired water rights. The rights of water users may be infringed upon by restricting their reasonable uses and by limiting their diversions to provide minimum stream flows. Whenever any of these rights are infringed upon by the state for public use, compensation may or may not be called for, depending on whether the state acquired the rights by eminent domain or by police power.

As noted previously, nineteen states now have legislation to establish minimum flows in rivers so as to protect the public interest and

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preserve the aquatic habitats in these waters.[1] There are five general approaches taken by these various states in establishing minimum flows: first, through legislation prescribing a minimum flow to be maintained at all times in the streams; second, legislation authorizing a state body to appropriate water in the interest of the public; third, legislation which allows for the removal of waters from appropriation to maintain the minimum flow; fourth, requiring state permits before water can be diverted from the stream so as to protect the minimum flow; and finally, prohibition of additional diversions where the action will be harmful to instream uses, thus maintaining a minimum flow. An example of each of these approaches follows.

In line with the first procedure, the State of Washington has required its Department of Water Resources to establish minimum water flows (and lake levels) for streams and other public waters for the "purposes of protecting fish, game, birds or other wildlife resources, or recreational or esthetic values of said public waters whenever it appears to be in the public interest to establish the same."[2]

In keeping with the legislative requirements for the establishment of minimum flows, these were established, for example, for the Cedar River. The flows established are to be "maintained undiminished" from

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[1]Alaska Rev. Code, sec. 46.15.040; Calif. Water Code, sec. 1253 (West, Cumm. Pocket Part, 1973), Colo. Rev. Stat., sec. 150-7-5 (10); Delaware Code, title 7, part VII, sec. 6102; Laws of Fla., Ch. 72-299; Idaho Code, sec. 42-1734; Ill. Rev. Stat., Ch. 19, par. 52-78, sec. 23; Iowa Code ann., sec. 455A.22; Kan. Stat. Ann., sec. 82a-907; Mich. Stat. Ann., sec. 11.439 (9); Minn. Stat., secs. 105.37 et seq. (1971); Miss. Code, Ch 4A, secs. 5956-01 to -04; Rev. Code Mont. 89-801 (Cumm. Supp. 1971); N. J. Stat. Ann., secs 58:1-2 et seq.; Ore. Rev. Stat. 536.310 (7); Utah Code Ann., secs. 73-6-1 and 73-6-2; Code of Va., sec. 10-17.1 (5); Wash. Rev. Code, 90.22.010 (Supp. 1972); and Wis. Nat. Res. Laws, 31.34.

[2]Wash. Rev. Code, 90.22.010 (Supp. 1972). Also see "Water Resources Act of 1971," Wash. Rev. Code, 90.54.010 thrue 90.54.910.

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a gaging station at Renton, Washington to the mouth of the Cedar River.[1] Waters are to be maintained at levels which do not fall below specific quantities. The minimum flows established are for designated time periods throughout the year.

Another example of the establishment of specific flows is found in Wisconsin. Operators of impoundments on navigable waters must allow the passage of at least 25 percent of the natural low flow of water of a stream at all times.[2]

The second general procedure followed is state appropriation of water to maintain a minimum flow. For example, prior to the enactment of new legislation, a state agency in Colorado could not appropriate water to maintain a minimum flow. In April of 1973 the state legislature amended the law. "Appropriation" is now defined as the application of water to a beneficial use, and does not require a diversion.[3] "Beneficial use", as mentioned earlier, was re-defined so as to include "the appropriation by the State of Colorado in the manner prescribed by the law of such minimum flows between specific points or levels for and on natural streams and lakes as are required to preserve the natural environment to a reasonable degree."[4] Under the revised law, the Colorado Water Conservation Board is empowered to appropriate, in accordance with section 5 and 6 of article XVI of the state constitution, or acquire:[5]

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[1] Wash. Admin. Code, 173-30-030.

[2] Wis. Nat. Res. Laws, 31.34.

[3] Colo. Rev. Stat., sec. 148-21-3 (6), as amended 1973.

[4] Colo. Rev. Stat., sec. 148-21-3 (7), as amended 1973.

[5] Colo. Rev. Stat., sec. 148-21-2 (3) (1973). In Montana the State Fish and Game Department may file on water to maintain stream flows necessary for the preservation of fish and wildlife habitat. Rev. Code Mont., 89-801 (2) (Cumm. Supp. 1971).

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> Such waters of natural streams and lakes as may be required to preserve the natural environment to a reasonable degree. Prior to the initiation of any such appropriation, however, the board shall request recommendations from the Division of Wildlife and the Division of Parks and Outdoor Recreation.

The third general method employed by the states to maintain a minimum flow is by removing waters from appropriation. The state may be allowed to set aside and reserve certain waters for future use. In Oregon, for example, the waters of specific creeks, streams and lakes have been withdrawn from appropriation. The purpose of the withdrawal has been for the purpose of maintaining and perpetuating the scenic and recreational resources, and to "maintain, increase, and perpetuate game fish and game fish propagation within Oregon."[1]

A fourth general procedure procedure adopted by some states has been to require permits before water can be diverted from a stream in order to protect the minimum flow.[2] Under Iowa law, for example, a permit must be obtained for uses that deplete water and the permit must insure the protection of the average minimum flow of the stream.[3] "Depleting use" has been defined as any use which "might impair rights of lower or surrounding users or might impair the natural resources of the State or might injure the public welfare if not controlled."[4]

The Iowa act gives a detailed definition of "average minimum flow."[5] The standard adopted for stream flows by the Iowa Water Commission was

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[1]See Ore. Rev. Stat., 538.150, 538.170, 538.220, 538.351 and 538.270.

[2]See N. J. Stat. Ann., secs. 58:1-2 et seq.; and Minn. Stat., secs. 105.37 et seq.

[3]25 Iowa Code Ann., sec. 455A.22.

[4]25 Iowa Code Ann., sec. 455A.1.

[5]25 Iowa Code Ann., sec. 455A.1. For a discussion of the Iowa permit system see N. W. Hines, A Decade of Experience Under the Iowa Water Permit System, Monograph No. 8 (Iowa City: College of Law, Univ. of Iowa, 1966).

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that level "equaled or exceeded by the stream involved 84% of the time between April and September in the past years determined to be most representative of normal conditions." Provisions were made for determining minimum flows on particular streams possessing special characteristics.

The fifth procedure employed by various states is to limit appropriations when they will prove detrimental to the instream values. In Alaska, for example, the water code provides that applications for the appropriation of water are considered as having been simultaneously filed with its Department of Fish and Game.[1] The Department may submit objections to the approval. In considering the effect of the proposed appropriation, the Alaska Department of Natural Resources must consider the possible adverse impact upon the fish and game resources and on public recreation opportunities.[2]

Minimum flow legislation as enacted in the several states is hindered by the necessity of complete and accurate data. Such legislation commonly requires a determination on the part of state resource agencies as to what is a necessary level to be maintained to preserve the desired values. In many cases, this information may be lacking or difficult to obtain for specific water bodies. Furthermore, minimum flow legislation cannot be relied upon under all circumstances. For example, in the summer of 1973, the minimum flow requirements in Oregon were suspended due to a state wide water shortage. Therefore, at least in this state, minimum flow laws would appear to be most effective as long as extraordinary

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[1] Alaska Rev. Code., sec. 46.15.040.

[2] Alaska Rev. Code., sec. 46.15.080.

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demands are not placed on the scarce water resources. In some respects, this is antithetical to the basic idea of minimum stream flow legislation.

As stated previously, thirty-five states were found to have the authority to regulate the level of water for impounded waters.[1] It has been pointed out by Tarlock and Meyers that the statutes establishing minimum lake levels are often ambiguous and incomplete and result in a varying pattern of lakes subject to regulation.[2]

Regulation is also carried out for varying purposes. For example, in some states the lake levels are maintained to preserve the health of the community.[3] In others, such as in Nebraska, the lake levels must be maintained if the economic value of the fish culture, hunting and other purposes of the lake are greater than they would have for agricultural purposes.[4] In determining the water level at which lakes are to be maintained, the states have applied differing standards. Some states base the level on the "natural ordinary high water level,"[5] and others define the standard according to the "average normal water level,"[6] or the "normal height and level."[7]

The statutes in some cases require the state regulatory body to consider lake levels over a broad time period. In Mississippi, for

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[1]For a survey of the fifty states statutes concerning lake protection see Jon A. Kusler, Survey: Lake Protection and Rehabilitation Legislation in the United States (Madison: University of Wisconsin, 1972).

[2]Meyers and Tarlock, Water Resource Management, p. 765.

[3]Illinois Rev. Stat., Ch. 19, par. 52-78.

[4]Neb. Rev. Stat., sec. 46-801 (1960).

[5]Minn. Stat. Ann., sec. 105.43.

[6]Ind. Stat. Ann. 27-627-628.

[7]Mich. Stat. Ann., secs. 11.300 (2) (a).

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example, the Board of Water Commissioners is required to determine and establish "average minimum lake levels," for certain lakes. The "average minimum lake level" is determined on the basis of "the average of the minimum lake level during each of the five (5) lowest years in the period of the preceding twenty (20) consecutive years."[1] Water may be diverted below this level under certain circumstances as specified in the legislation.

For the most part, the courts have been reluctant to maintain lake levels for non-market purposes. As Mr. Hutchins pointed out, the courts have held that the preservation of the water environment and surrounding areas must possess tangible value and that mere esthetic enjoyment is not sufficient.[2] He cites Biggs v. Leffinwell[3] where the courts ruled that waters, though necessary, should not be maintained to "satisfy a mere artistic desire to see unappropriated and waste water flow by appellee's survey on its way to the sea."

Not all lake level maintenance has proved to be in the public interest. For example, in In Re Marting Lakes Project,[4] a recreational development grew up around a state owned artificial lake. Summer recreational demands of the littoral owners were in conflict with the State of Michigan's conservation program, which required water downstream for waterfowl habitat and fish propagation. The littoral owners had the lake level fixed to meet their needs. The state attorney general challenged their decision and the jurisdiction of the county board of supervisors. The court ruled

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[1] Miss. Code Ann., sec. 5956-02 (j) (Cumm. Supp. 1972).

[2] Hutchins, The Texas Law of Water Rights, pp. 393-394.

[3] 62 Tex. Civ. App. 665, 132 S. W. 902 (1910).

[4] 381 Mich. 180, 160 N. W. 2d 909 (1968). Discussed in Meyers and Tarlock, Water Resource Management, p. 766.

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that navigable waters were those navigable for commerce purposes and not navigable for flotation or fishing and held the lake to be non-navigable in the commerce sense and therefore under county control.

Appropriation doctrine states may be faced with a problem peculiar to the philosophy of the doctrine. This situation arises in those states whose constitutional or statutory declarations of the doctrine provides that all unappropriated waters are available for appropriation subject to a demonstration of beneficial use and no evidence of harm to existing rights. In many such states where the state is trustee over water for the public, the state agency responsible for distribution of water and administration of the water laws does not have authority to appropriate or acquire waters in its name on behalf of the public. To effectively establish minimum lake levels, a state agency must be able to obtain water, either appropriated or unappropriated. If all of the waters are appropriated, then the state agency should be provided powers (legal and financial) to purchase water from present users to maintain the minimum level.

Recommendations have been made to provide uniformity and consistency to the states minimum flow and lake level establishment procedures. The National Water Commission addressed the problem at some length in its final report.[1] It acknowledged the widely recognized fact that in the appropriation states, a water user may divert water out of a stream for traditional market purposes with little or no regard for the instream or extra-market values. As a result, there is no way, under the traditional appropriation doctrine, to maintain enough water in the stream to preserve

[1] National Water Commission, Water Policies for the Future, pp. 273, 287-289, 465.

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the aquatic habitats, fishery resources or recreational and aesthetic values whenever diversion demands are equal to or exceed supply levels.

To resolve the problem inherent in the public versus private conflict over the use of waters, the National Water Commission has concluded that:[1]

> Public rights should be secured through State Legislation authorizing administrative withdrawal or public reservation of sufficient unappropriated water needed for minimum stream flows in order to maintain scenic values, water quality, fishery resources and the natural stream environment in those watercourses or parts thereof, that have primary value for these purposes.

The Commission has recommended the establishment of minimum flows and lake levels on two bases:[2]

> (1) "Flows which should be preserved under average conditions of supply," (which the Commission termed as "desirable flows") and,
>
> (2) "Flows which must be preserved under all conditions"; (these being termed as essential flows.)

"Desirable flows" are those which would be more subject to alteration, depending in part on the seasons and the specific location of the flows. These "desirable flows" support values and uses that the public could forego in times of shortage. For example, certain recreational uses of water might fall under this category. "Essential flows" support values and uses that are so valuable that they should be maintained and preserved regardless of the circumstances. Water resources that support rare or endangered species of flora and fauna could be maintained by the "essential flows".

The Commission's report does not specify in detail all of the factors to be recognized in establishing minimum flows. It was noted that these

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[1] Ibid., at p. 279. Recommendation No. 7-40.

[2] Ibid., at p. 287.

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factors will be dependent upon the specific body of water to be protected and the specific geographical conditions. However, the Commission does recommend that the minimum flows be established on the basis of an assessment of the flows necessary to preserve and protect the instream water values.[1]

Much of the Commission's discussion of minimum flows deals with provisions to be included in a permit system for riparian states. Many of the concepts - desirable and essential flows - could be incorporated into the administration of water in the appropriation states. Legislation might be enacted to allow the state engineer or other water administrative body to appropriate an "essential" minimum flow for the people of the state. This "essential" flow might be established in order to protect the aquatic habitats, fish, wildlife, recreation and aesthetic values.

This chapter has dealt with two concepts within the riparian and appropriation water law doctrines that are considered essential to preserve and maintain the aquatic habitats. Two major forces, scarcity and changing social goals and values, are viewed as being responsible for the changes that have taken place in the two traditional doctrines. These two forces have generated conflict situations which have caused the courts and legislatures to implement policies to protect and preserve the aquatic habitats. The policies themselves have not removed the conflicts. The public versus private rights in water conflict still remains. As the public exercises its rights in the private "bundle", the conflicts are bound to grow, thus requiring new policies to maintain the social order.

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[1] Ibid., at p. 288.

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4-4. Economic Implications

As stated at the outset of this chapter, modifications in the beneficial use, and minimum stream flow and lake level statutes have economic, as well as, legal implications. These interrelated implications are discussed in this section.

The previous discussion on beneficial use pointed out that several of the states are beginning to recognize extra-market values of water in their beneficial uses statutes. As the statutes are modified via legislative enactments or by judicial interpretation extra-market demands that were previously constrained by the law, and only potential in nature, may now become realized demands.

Under some circumstances the demands may be realized via state acquisition of water rights for extra-market purposes, and some of the demands may come from the private sector, or a combination of both. If this situation comes about, it will mean that where there previously existed only municipal-domestic, agricultural and industrial bidders for the water resources there will be additional public and private bidders for water for recreational, aesthetic, aquatic habitat and other social uses. This transformation has certain economic implications in the nature and structure of the "market place".

A market with only a few buyers of a particular resource is referred to as an oligopsony.[1] Since there are only a few buyers in the market, the oligopsonist percieves his supply curve as being positively sloped. (See Figure 4-1) Consequently, changes in purchases of the resource will have an impact upon input prices; as purchases increase, the input price

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[1]For a more detailed discussion of imperfections in the resource market see C. E. Ferguson, Microeconomic Theory, revised ed. (Homewood, Ill.: Richard D. Irwin, Inc., 1969), pp. 401-413.

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will increase. With the upward sloping supply curve, the marginal resource cost[1] will be greater than the price of the resource. A profit maximizing oligopsonist will employ resources up to the point where the marginal resource cost equals the marginal revenue product.[2] In Figure 4-1, this is shown by the use of variable units of input in the amount (OQ_1). The oligopsonist will pay price (OP_1) for the resource which is less than its marginal revenue product.

Under this situation the oligopsonist will be able to restrict the quantity of resources used and pay a price less than its value of marginal product.[3] If both the commodity and input markets were perfectly competitive, OQ_2 units of the resources would be employed, and they would be paid price OP_2. Thus, by expanding the legally defined beneficial uses the resource becomes more "mobile" in the sense that it may now be applied to market, as well as extra-market uses as alternative employments. As this happens, additional units of the resources will be employed and the resource will be paid according to its value of marginal product.

There will also be an impact upon the allocation of water resources due to the expansion of beneficial uses. In those areas where the market is operative, some of the public and private water users will be able to bid water away from lower valued uses. Where the market is not operative, the public may take the water via the power of eminent domain and make compensation to the former user.

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[1]Marginal resource cost is defined as the change in the user's total cost resulting from a one-unit change in resource purchased.

[2]Marginal revenue product is defined as the change in total revenue resulting from the employment of one additional unit of the resource.

[3]Value of marginal product is defined as the marginal product of a variable input multiplied by the market price of the commodity in question.

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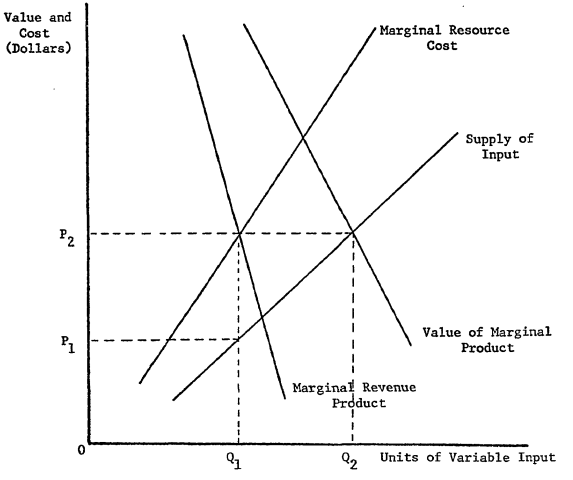

Figure 4-1. OLIGOPSONISTIC PRICING

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Adoption of minimum stream flow and lake level legislation raises certain economic questions that must be dealt with in the administration of the legislation. Take for example the Iowa minimum stream flow requirements.[1] If the Iowa Water Commission finds that diversions are drawing water down below the "average minimum flow" then it must curtail certain diversions. Due to the lack of a seniority system as is present in appropriation states, the most feasible solution becomes one of requiring all upstream diverters to limit their diversion by a certain amount. Due to problems of seepage and evapotranspiration it is possible that water diversions will be cutback in excess of the amount necessary to preserve the "average minimum flow".

If all upstream diversions are reduced an economic gain is provided to downstream users at the expense of upstream users, who are forced to curtail their diversions. The economic question that must be answered is whether or not the gains to downstream users are greater than, equal to, or less than the loss to upstream diverters. If the gains were greater than or equal to the loss then compensation could be made by the gainers to the losers and social welfare would be improved. If the gains were less than the loss to upstream users then the action would not be justified on economic grounds.

The same economic issues prevail under the appropriation doctrine. However, the administrative problems are lessened since the upstream diversions can be curtailed according to their priority dates of appropriation. This procedure in and of itself is not necessarily justified on economic grounds.

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[1]This problem is discussed in Clayton K. Yeutter, "The Administration of Water Law in the Central United States--A Legal-Economic Critique of Laws and Administrative Procedures in Colorado, Kansas, Nebraska and Iowa (Ph.D. dissertation, University of Nebraska, 1966), pp. 235-242.

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It would appear that the most desirable solution both from an economic and administrative point of view would be for the state to acquire water rights in behalf of the public interest. If the law allows, then the water resource could be left in the stream to maintain the instream values. This of course would require a modification in the traditional appropriation concept of diversion from the stream as being necessary to have a valid appropriation. This change has recently been accomplished in Colorado, subject to technical elements of "control" over the water.[1]

Having examined these two principles and their impact upon the aquatic environment and their economic implications, the study now turns toward an examination of the conservation laws that have evolved with the intent of enhancing the natural environments.

[1] Colo. Rev. Stat., 148-21-3 (7) (1973).

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CHAPTER 5

STATE CONSERVATION LAWS

5-1. Introduction

The water laws discussed in Chapter 4 were directed specifically towards the water resource itself. The conservation laws discussed in this chapter focus upon man's activities engaged in the use of the aquatic resources with specific emphasis on fish and wildlife, thus emphasizing the economic value aspects of the use of scarce resources.

Many of the laws discussed in this chapter are a by-product of and reflect the impact and values associated with what has come to be termed the "first conservation movement",[1] which extended from 1890-1920. A brief discussion of this movement will serve to set the stage for the following analysis of specific state conservation laws.

It has been said that a formally organized conservation movement began as early as 1873.[2] But, the years most frequently cited for the "first conservation movement" are 1890-1920. The conservation doctrine of this period was a conglomeration of views involving the natural sciences, economics, sociology, political science, philosophy, public health and

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[1] R. Burnell Held and Marion Clawson, Soil Conservation in Perspective (Baltimore: The John Hopkins Press for Resources for the Future, Inc., 1965), p. 29.

[2] Samuel T. Dana, "Pioneers and Principles", in Perspectives on Conservation, ed. Henry Jarrett (Baltimore: The John Hopkins Press for Resources for the Future, Inc., 1958), p. 25.

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administration.[1] The main threads that run through this movement were economic, political, and ethical in nature.

Caulfield has identified three major policy thrusts that evolved during this "first conservation movement" which have carried over into the present.[2] These three thrusts are (1) a developmental thrust; (2) a progressive thrust; and (3) a conservation thrust. Each of these will be briefly reviewed in turn.

The developmental thrust was a drive on the part of the federal government to foster the economic growth and development of the Nation's water and land resources. Waterways were to be made navigable to improve commerce and reclamation projects were developed to irrigate the arid lands of the West. The underlying tone of the movement was that of rational planning to foster the efficient use and development of all the Nation's natural resources.[3] It was via the application of science and technology that the efficient use and development of resources would be obtained, thus providing hope for an abundant future.

The progressive thrust was a political movement whose basic policy was that of equality.[4] As such, conservation came to include human, as

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[1]For a discussion of the early conservation movement see Harold J. Barnett and Chandler Morse, Scarcity and Growth: The Economics of Natural Resource Availability (Baltimore: The John Hopkins Press for Resources for the Future, Inc., 1963), pp. 72-97.

[2]Henry P. Caulfield, Jr., "The Living Past in Federal Power Policy," in Resources for the Future Annual Report 1959, (Washington, D. C.: Resources for the Future, Inc., 1959), pp. 24-33.

[3]Samuel P. Hays, Conservation and the Gospel of Efficiency, (Cambridge: Harvard University Press, 1959), p. 2.

[4]Charles R. Van Hise, "History of the Conservation Movement," in Readings in Resource Management and Conservation, eds. Ian Burton and Robert W. Kates (Chicago: The University of Chicago Press, 1960), pp. 179-185.

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well as natural resources. To a large extent, this thrust was an outgrowth of public concern over the growth of monopoly power. The "trusts" that developed in this period were in many instances organized to restrict competition, and thus were able to secure monopoly prices and profits. The place of competition in the economy was thus weakened and public regulation and ownership were two policies which evolved to shore-up the weakening competitive market structure.

The conservation thrust was the expression of concern by an educated elite over the problems of natural resource degradation and "exploitation." The elite came primarily from the natural science fields.[1] This educated elite, mostly scientific men, held the partly erroneous view that all resources are finite in nature, and therefore called for policies which stressed the "sustained yields" and the "wise use" of natural resources.

The "first conservation movement" thus was an amalgamation of the three policy thrusts, all of which contained major political, economic and social forces and implications. Although the original concepts and policies continue to evolve, the basic forces for change were founded in this movement and overtime institutionalized into law.

The conservation movement which exists today is a departure from the progressive tradition of the "first conservation movement."[2] This is due in part to our changing national interests and objectives. The view increasingly taken today is that the conservation movement should be

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[1]Recent studies indicate that the "new" conservation movement is also an elite movement. Joseph Harry, Richard Gale, and John Hendee, "Conservation: An Upper-Middle Class Social Movement," Journal of Leisure Research, Volume 1 (Summer, 1969), pp. 246-254.

[2]Grant McConnell, "The Conservation Movement-Past and Present," in Readings in Resource Management and Conservation, eds. Ian Burton and Robert W. Kates (Chicago: The University of Chicago Press, 1960), pp. 189-201.

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concerned with the temporal use rates of natural resources, rather than the size of the resource stock. Also, the concern, as it was with the "first conservation movement", should be with the future, since the conservation problem is not simply the result of present output or efficiency problems in a particular industry.[1]

The conservation movement of today is also concerned with a set of policies or social actions which are intended to influence the course of present and future events, and not to maintain a given state or situation. Krutilla has noted that one of the central issues today "seems to be the problem of providing for the present and future the amenities associated with unspoiled natural environments, for which the market fails to make adequate provision."[2] As such, heavier reliance is placed upon the public sector of the economy to produce and/or allocate goods, especially the extra-market type of goods and services dependent upon the natural resource base, such as fish and wildlife dependent upon aquatic habitats.

The following sections of this chapter deal with state conservation laws and policies, and their economic implications, that have evolved to protect and preserve the natural aquatic habitats. Six major categories of laws and policies and discussed herein. They are (1) wild and scenic rivers acts; (2) stream preservation and encroachment laws; (3) highway construction laws; (4) regulation of dam construction; (5) marsh, wetland and estuary protection laws, and (6) state environmental policy and protection acts.

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[1]Anthony Scott, Natural Resources: The Economics of Conservation (Toronto: University of Toronto Press, 1955), p. 17.

[2]John V. Krutilla, "Conservation Reconsidered," American Economic Review, Volume LVII (September, 1967), p. 778.

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These laws, with the exception of zoning ordinances, appear to be the major legal tools adopted by the states in an attempt to preserve and protect the aquatic habitats. It should be noted that the following laws and policies discussed provide protection for the aquatic habitats in varying degrees of intensity. Some of the laws are directed at specific activities (i.e., stream channelization), others afford protection on a broad scale (i.e., scenic and wild rivers acts) and others are intended to preserve the habitats via man's inalienable rights to a decent environment (i.e., state environmental protection acts).

5-2. Scenic and Wild Rivers

The question as to whether a state should or should not place all or a part of a river into a scenic and wild river system involves directly the conflict between conservation and development of natural resources. Provision of these unique natural wonders requires some form of public action to maintain the rivers in a natural state due to the failure of the market to adequately provide these areas. The reason for the market failure is due to the collective nature of the resource use in question.

Collective goods, or public goods as they are sometimes called, are members of society or group. Furthermore, when the goods are provided the benefits will occur to the society at large, and persons can't be excluded from partaking of the benefits.[1] Since private parties can not be excluded or only excluded at an extremely high cost the market system will fail to provide the necessary amount of the social goods. The only way they will be provided is through the public budget.

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[1]Richard A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill Book Co., Inc., 1959), pp. 6-15.

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Scenic and wild rivers usually possess other attributes that make their allocation unique from other natural resources.[1] Most of these areas are not reproducible by man, and do not possess any close substitutes. Their development for traditional economic use, therefore, involves an irreversible commitment of natural resources. At the same time, individual utilities derived from these areas may be rising overtime as they experience more and more of these unspoiled areas, relative to the values of these areas in commercial use.

In order to determine an optimal use of these areas, the relative rates of increase and decrease in value of the areas for preservation and development must be determined. Since all of the benefits from preservation are not completely subject to economic measurement, it has been suggested that it may be sufficient only to know that the present value of preserving the natural area exceeds a certain minimum.[2]

The analytical approach to the problem proceeds as follows. Ordinary benefit/cost techniques are used to determine the present discounted value of the commercial use of the natural areas. By estimating future population growth, changes in income, tastes and other variables, the increased demand for natural areas may be estimated. Given the rising demand for the natural areas, its rate of appreciation can be determined. Given this rate of appreciation in value, we can ask what the minimum

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[1]This discussion is based upon John V. Krutilla, "Conservation Reconsidered," pp. 77-786.

[2]This analysis based upon A. C. Fisher, J. V. Krutilla, and C. J. Cicchetti, "The Economics of Environmental Preservation: A Theoretical and Empirical Analysis," American Economic Review, Volume LXII (Sept., 1972), pp. 605-619.

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value of the natural areas need be in order that the present value of the natural area equals or exceeds the present value in commercial use.

Estimates derived from this technique will vary depending upon the rate of discount, rate of technological development, rates of increase in recreational use of the natural area, and the time frame considered. Use of this technique as applied to the use of Hell's Canyon as a preserved area, however, has shown the preservation values to be high enough to offset the developmental values.[1] The employment of this technique could aid state legislatures that are considering the adoption of scenic and wild rivers legislation.[2]

At this time, twenty-one states have already enacted scenic and wild rivers legislation to preserve and protect the water environment of those states for present and future generations. In addition to these states, the State of Wyoming has authorized stream preservation feasibility studies to determine which streams have potential value for inclusion in future legislation. Table 5-1 lists those states that have enacted some type of legislation to protect scenic and wild rivers, and the citation as to the location of the law in the state statutes.

Of these twenty-one states, five of the nineteen western states have adopted acts of this nature. The remaining sixteen states are located in the East. Stimulus for this type of legislation has come from two levels. At the state level, the laws appear to be the result of the awareness of the state legislatures and the people of the state as to the

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[1] Ibid., at p. 616.

[2] It has been suggested elsewhere that the main body of economic theory is unable to come to terms with this type of problem, and that "it may even be the case that the greatest service economists can render posterity is to remain silent". A. Coddington, "The Economics of Ecology", New Society, Volume 393 (April, 1970), p. 595.

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TABLE 5-1

CITATIONS TO THOSE STATES HAVING
WILD AND SCENIC RIVERS ACTS

State	Statute
1. California	"California Wild and Scenic Rivers Act," Public Resources Code, Secs. 5093.50 to 5093.64 (1972).
2. Georgia	"Georgia Scenic Rivers Act of 1969," Georgia Code Annotated Chapter 17-9.
3. Idaho	Idaho Code, sections 67-4301 through 67-4312.
4. Indiana	"Natural, Scenic and Recreational River System," P. L. No. 124, April 24, 1973, Indiana Code 1971, 13-2 Chapt. 26.
5. Iowa	"Scenic Rivers System," Iowa Code Annotated, Vol. 7, Cummulative Annual Pocket Part, 1972, secs. 108A.1 through 108.7.
6. Kentucky	"Kentucky Wild Rivers Act," Kentucky Rev. Stat. secs. 146.200 to 146.990 (1972).
7. Louisiana	"Natural and Scenic Rivers System," Louisiana Revised Statutes, Sections 1841 through 1849 (1970).
8. Maryland	Section 66C of Maryland Code.
9. Maine	"Scenic Water Ways," 12 M. R. S. A., Secs. 501 et seq.
10. Massachusetts	"Scenic and Recreational Rivers and Streams," Annotated Laws of Massachusetts, Chap. 13-26, section 17B (1971).
11. Michigan	"Natural Rivers Act," Michigan Code Laws Annotated, Secs. 281.761 to 281.776 (1970).
12. Minnesota	"Wild and Scenic Rivers," Laws of Minnesota, Chapter 271, secs. 104.31 to 104.40 (1973).
13. North Carolina	"Natural and Scenic Rivers System," Vol. 3A, The General Statutes of North Carolina 1971 Cumulative Supplement, Article 3, Secs. 113A-30 to 113A-43 (1971).

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TABLE 5-1 (cont.)

State	Statute
14. Ohio	"Wild, Scenic, and Recreational River Areas," Ohio Rev. Code, secs. 1501.16 to 1501.20, as amended.
15. Oklahoma	"Scenic Rivers Act," Oklahoma Statutes Ann., Cumulative Pocket Part 1972-1973, Title 82, Chapter 21, secs. 1451 to 1459.
16. Oregon	"Scenic Waterways," Oregon Revised Statutes, secs. 390.805 to 390.990 (1970).
17. Pennsylvania	"Pennsylvania Scenic Rivers Act," Act of the Pennsylvania General Assembly No. 283, December 5, 1972.
18. South Dakota	"Wild, Scenic and Recreational Rivers," South Dakota Compiled Laws, 1967, annotated 1972 Pocket Supplement, secs. 46-17A-3 to 46-17A-21.
19. Tennessee	"Scenic Rivers," Tennessee Statutes, secs. 11-1401 to 11-1417 (1968).
20. West Virginia	"Natural Streams Preservation Act," W. Virginia Natural Resources Laws, Article 5B, secs. 20-58-1 to 20-58-17 (1969).
21. Wisconsin	Wild Rivers, Wisconsin Natural Resources Laws, 1969-1970, Chapter 30, sec. 30.26. Wolf River preservation Wisconsin Natural Resource Laws, 1969-1970, Chapter 30, sec. 30.251.
22. Wyoming	"Stream Preservation Feasibility Study," Wyoming Stat., secs. 41-1.12 to 41-1.22 (Cum. Supp. 1973).

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importance of retaining streams and portions of streams in a free-flowing and natural condition. Action was taken in part out of a desire to provide present and future generations with the amenities associated with these unspoiled natural areas.

Stimulus for the adoption of state wild and scenic rivers legislation was also created with the passage of the Federal Wild and Scenic Rivers Act of 1968,[1] wherein it is stated that:

> . . . certain select rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

For the most part, the rivers covered under the state acts are independent of those covered by federal legislation. The advantage of a dual system of federal and state legislation is that it expands the coverage over the decreasing number of free-flowing streams.

Once a state has decided to adopt scenic and wild rivers legislation, it is felt that the following provisions, in varying degrees, should be included. (1) The law should identify specific rivers to be covered by the law. (2) Public hearings should be provided for prior to the placing of a river into a state system. (3) Actions to be prohibited in the established areas should be made clear. (4) The law should provide for the re-classification of rivers based on changing environmental conditions. (5) Provisions should be made for the additon of new rivers

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[1] Public Law 90-542. 16 U.S.C.A. secs. 1271-87 (Supp. IV, 1969). For a further discussion of scenic and wild rivers legislation see A. Dan Tarlock and Roger Tippy, "The Wild and Scenic Rivers Act of 1968," Cornell Law Review, Volume 55 (May, 1970), pp. 707-739; and A. Dan Tarlock, "Preservation of Scenic Rivers," Kentucky Law Journal, Volume 55 (1967), pp. 745-798.

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into the system. (6) Penalties should be specified for the violation of provisions within the act.

An indepth review of each of the twenty-two state wild and scenic rivers acts has been made elsewhere.[1] In light of the six previously mentioned criteria, a review of the state wild and scenic rivers acts revealed that the North Carolina act came the closest to meeting all of these criteria. This act will be reviewed in some detail and unique legal features that are present in the other state wild and scenic rivers acts will also be pointed out herein.

The "Natural and Scenic Rivers Act" of North Carolina is viewed herein as coming the closest to meeting the six criteria set forth in the beginning of this chapter. In establishing the law, the state felt that there was a "necessity for a rational balance between the conduct of man and the preservation of the natural beauty along the many rivers of the State."[2] To achieve this balance, certain rivers were to be maintained in their free-flowing state with protection given the waters and adjacent lands. The law emphasizes that uses of water under this act "constitutes a beneficial public purpose."

The types of rivers that are eligible under the North Carolina statute are as follows:[3]

> Class I. Natural river areas. Those free-flowing rivers or segments of rivers and adjacent lands existing in a natural condition. Those rivers that are free of man-made impoundments and generally inaccessible except by

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[1]David R. Allardice et al., Water Law in Relation to Environmental Quality, Completion Report Series No. 55 (Fort Collins, Colo.: Environmental Resources Center, 1974), pp. 232-278.

[2]Gen. Stat. N.C., sec. 113A-31 (Cumm. Supp. 1971).

[3]Gen. Stat. N.C., sec. 113A-35 (Cumm. Supp. 1971).

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> trail, with the lands within the boundaries essentially primitive and the waters essentially unpolluted.
>
> Class II. Scenic river areas. Those rivers or segments of rivers that are largely free of impoundments, with the lands within the boundaries largely primitive and largely undeveloped, but accessible in places by roads.

The North Carolina statute is very specific with respect to the criteria that must be met for the inclusion of a river or portion of one into the system. Under the law five criteria must be present for inclusion. These criteria relate to river segment length, boundaries, water quality, water flow and public access.[1]

The North Carolina statute has two significant features that are not often found in other state wild and scenic rivers acts. First, the law provides for the up-grading of a scenic river to the classification as a natural river area, based on the judgment of the Director of the Department of Conservation and Development.[2] Secondly, any contribution or donation of a scenic easement, right-of-way or any other easement or interest on land to the State is considered a contribution to the State. As such, it may thus be claimed as a charitable deduction for income tax purposes.[3]

Anyone who violates, fails, neglects or refuses to obey any provision of the law or regulations of the Director "may be compelled to comply with or obey the same by injunction, mandamus, or other appropriate remedy."[4] Violators of the law are guilty of a misdemeanor and may be punished by a fine of not more than fifty dollars for each violation.[5]

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[1] Gen. Stat. N.C., sec. 113A-35 (1) to (5) (Cumm. Supp. 1971).

[2] Gen. Stat. N.C., sec. 113A-37 (Cumm. Supp. 1971).

[3] Gen. Stat. N.C., sec. 113A-39 (Cumm. Supp. 1971).

[4] Gen. Stat. N.C., sec. 113A-42 (a) (Cumm. Supp. 1971).

[5] Gen. Stat. N.C., sec. 113A-42 (b) (Cumm. Supp. 1971).

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This act has been strengthened by the addition of a constitutional amendment that was adopted by the vote of the people in a general election held November 7, 1972. This new amendment, dealing with the conservation of natural resources, states that:[1]

> The policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this State its forests, wetlands, estuaries, beaches, historical sites, openlands, and places of beauty.

Initially, six rivers were suggested for study as possible additions to the North Carolina system. However, due to political and other reasons, none of the six rivers were added to the system. As of March 13, 1974, the Department of Conservation and Development indicated that the only river officially included and covered under the Natural and Scenic Rivers Act is a portion of the New River in North Carolina.

With respect to the remaining twenty-one state wild and scenic rivers acts, certain unique legal features and policy statements are worth nothing. One of the most recent wild and scenic rivers acts was passed by the General Assembly of the State of Indiana on April 24, 1973.[2] Section 2 of the act sets forth the state's policy with respect to the need and importance of these natural water areas. This policy is stated in its entirety below.

> Chapter 26, Sec. 2. As part of the continuing growth of the population and the development of the economy of the State of Indiana, it is necessary and

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[1] Constitution of North Carolina, article XIV, sec. 5.

[2] Ind. Code 1971, 13-2, Chapt. 26. Public Law No. 124.

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> desirable that rivers of unusual natural, scenic or recreational significance be set aside and preserved for the benefit of present and future generations before they have been destroyed; for once destroyed, they cannot be wholly restored. It is essential to the people of the State of Indiana that they retain the opportunities to maintain close contact with such natural, scenic and recreational rivers and to benefit from the scientific, aesthetic, cultural, recreational, scenic, and spiritual values they possess. It is, therefore, the public policy of the State of Indiana that a natural, scenic and recreational river system be established and maintained; that such areas be designated, acquired and preserved by the state; and that other agencies, organizations, and individuals, both public and private, be encouraged to set aside adjacent lands for the common benefit of the people of present and future generations.

This policy statement indicates very clearly that the state feels that the public rights in these unique areas are greater than the private rights. Although some of the private rights might be infringed upon and require that compensation be made, policy is consistent with the views of this study. It is through such collective action that the social well-being of all individuals is enhanced.

The Kentucky "Wild Rivers System" was established by the state legislature in 1972.[1] The intent of the legislation was as follows:[2]

> For aesthetic, as well as ecological reasons, the foremost priority shall be to preserve the unique primitive character of those streams in Kentucky which still retain a large portion of their natural and scenic beauty, and to prevent future infringement on that beauty by impoundments or other manmade works. Since the stream areas are to be maintained in a natural state, they will also serve as areas for the perpetuation of Kentucky's wild fauna and flora.

One of the unique legal features found within the Kentucky act concerns the means of obtaining funds for the management and expansion of the "Wild Rivers System."

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[1] Ken. Rev. Stat., Title XII, secs. 146.200 to 146.990.

[2] Ken. Rev. Stat., Title XII, sec. 146.220.

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Kentucky was the only state found with a wild and scenic rivers act that provides for a "wild rivers system fund." This fund consists of "all revenues derived from privileges, concessions, contracts, or otherwise, all moneys received by gifts, contributions, donations and grants from public or private sources."[1] This fund is intended to aid in the administration and help to meet the other expenses of the "Wild Rivers System."

The Tennessee Scenic Rivers Act has two features that make the law unique from several of the other states. The first unique feature concerns the classification of rivers within the system. Rivers in the Tennessee scenic rivers system are classified as being (1) Class I -- Natural Rivers; (2) Class II -- Pastoral Rivers and (3) Class III -- Partially developed river areas. Classification is dependent upon the degree of development in the respective areas.

General guidelines are established in the law for the management of the three classes of rivers within the scenic rivers system. Class I rivers should generally be managed so as to: (1) best maintain a wilderness type area; (2) allow camping and access only at designated public access areas; and (3) allow for public use only within prescribed public use easements or public access areas.[2] Class II areas would be managed so as to maintain the scenic values of the river and at the same time preserve the "right of riparian landowners to use the river for customary agricultural and other rural purposes."[3] Finally, Class III rivers should be managed in such a manner as to maintain and enhance the scenic values and at the same time,

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[1]Ken. Rev. Stat., Title XII, sec. 146.340.

[2]Tenn. Code Ann., Chapt. 14, sec. 11-1406 (1).

[3]Tenn. Code Ann., Chapt. 14, sec. 11-1406 (2).

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preserve the use of the river for agricultural, residential, recreational, commercial, and industrial purposes.[1]

The second unique feature of the Tennessee act is that it provides for a reclassification of rivers within the system to a higher status. If the Commissioner of Conservation feels a Class II or III river has been restored, he may recommend its reclassification to the general assembly. Furthermore, no river may be managed in such a manner as to require its reclassification to a lower level.[2]

The West Virginia "Natural Streams Preservation Act" illustrates how permits may be used to regulate activities within the areas of wild and scenic rivers systems. The policy of the State of West Virginia with respect to its natural streams is to:[3]

> ...secure for the citizens of West Virginia of present and future generations the benefits of an enduring resource of free-flowing streams possessing outstanding scenic, recreational, geological, fish and wildlife, botanical, historical, archeological, or other scientific or cultural values.

Under the law, it is considered unlawful for any person to modify any protected stream or part of it without first obtaining a permit from the Department of Natural Resources.[4] The term "person" is taken to mean any public or private individual or group.[5]

The law prescribes that no permit shall be issued unless the actions taken under the permit:[6] "(a) will not materially alter or affect the

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[1]Tenn. Code Ann., Chapt. 14, sec. 11-1406 (3).

[2]Tenn. Code Ann., Chapt. 14, sec. 11-1405.

[3]West Va. Code, sec. 20-5B-1.

[4]West Va. Code, sec. 20-5B-6.

[5]West Va. Code, sec. 20-5B-2 (h).

[6]West Va. Code, sec. 20-5B-6.

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free-flowing characteristics of a substantial part of a protected stream or streams; (b) is necessary to prevent an undue hardship; and (c) meets with the approval of the chief (of the Division of Water Resources)."

This section of Chapter 4 has set fourth the major points in the North Carolina "Natural and Scenic Rivers Act" and has identified certain unique legal features that exist in certain of the other state wild and scenic river acts. With almost one-half of all the states having adopted some type of wild and scenic rivers system, this activity would indicate that the people of these states are becoming aware of the importance of achieving a balance between developed and undeveloped natural streams. It was noted, however, that each state stresses somewhat different aspects in its legislation, depending upon the goals of the state and the differing geo-climatic conditions.

One thing that all of these laws have in common is that they provide broad-range coverage for unique rivers or segments of rivers within the state. They protect the designated areas from a large number of man's intrusions into the aquatic habitats. What are some of the general economic implications that may be drawn from this type of legislation?

In reviewing the wild and scenic rivers acts, it becomes apparent that not all of the motivations for their adoption were founded upon a concern solely for the natural environments. Several of the statute's policy statements point out that part of the reason for the establishment of the systems was to attract out-of-state visitors so as to assure the well-being of the state's tourist industry.[1] In those states that depend upon tourism as a significant source of revenue, failure to protect the wild

[1]See for example Ken. Rev. Stat., Title XII, sec. 146.220; and Wisconsin Natural Resource Laws, Chapter 30, sec. 30.26 (1).

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and scenic rivers of the state may cause a redistribution of income from that state to states that have provided legislative protection for their wild and scenic rivers.

The potential exists for this redistribution to take place between the States of Colorado and Wyoming. At the present time, Wyoming has adopted legislation to study the feasibility of establishing a wild and scenic rivers system.[1] The State of Colorado has no such legislation; although attempts have been made to establish such a system, they have failed. Both resident and non-resident fisherman spend in excess of $152,000,000 in the State of Colorado per year.[2] If the adoption of a wild and scenic rivers system in Wyoming led to the improvement of rivers relative to Colorado, then it is plausible that a certain amount of the Colorado expenditures would be shifted to Wyoming. For example, if a 10 percent reduction in fishing expenditures resulted, the annual loss to Colorado would be in excess of $1,520,000. Thus, there is a definite economic incentive to establish a wild and scenic rivers system under such circumstances.

The analysis developed by Krutilla and discussed previously gives a different perspective in evaluating the development versus preservation of wild and scenic rivers. His technique has been employed in various hearings concerning the licensing of hydro-electric projects on scenic

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[1] Wyo. Stat., secs. 41-1.12 to 41-1.22 (Cum. Supp. 1973).

[2] Kenneth C. Nobe and A. H. Gilbert, A Survey of Sportsmen Expenditures for Hunting and Fishing in Colorado, 1968. Technical Publication No. 22 (Denver: Colorado Division of Game, Fish, and Parks, 1970), p. 2.

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and wild rivers.[1] One important conclusion from this technique is that the initial year's preservation benefit may be relatively modest in relation to the developmental benefit and still justify keeping the river in its wild state.

Given the potential income effects and the social gains that may result from establishing a wild and scenic rivers system, it is likely that more states will adopt this type of legislation in the future. The following section examines legislation that is intended to protect water environments and aquatic habitats that may not be as unique in nature, but still require collective action to protect the habitats.

5-3. Stream Preservation and Encroachment Laws

The preceding discussion of state wild and scenic rivers acts illustrated one method adopted by the states in an attempt to protect and preserve the natural streams and related aquatic habitat from destruction. These acts provide blanket coverage for the streams involved. They are intended to limit and regulate all or many of the activities that take place on the streams and surrounding lands that remain in essentially a natural condition. However, many of the nation's streams have already been affected by man's activities. Thus arises the need for legislation to regulate activities on developed streams.

Legislation adopted in many states to prevent or regulate further degradation and/or intrusions into water courses and lakes are the stream preservation and encroachment laws. The designation "encroachment" law is intended to include those laws that regulate dredging and filling, and channelization.

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[1] U. S., Federal Power Commission, Intital and Reply Brief of Commission Staff Counsel, by Donald A. Sander and Arnold H. Quint, Pacific N.W. Power Co. and Washington Public Power Supply System (Washington, D. C.: Federal Power Commission, 22 October 1970), pp. 175-196.

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One feature that distinguishes a stream preservation law from the encroachment laws is that the stream preservation law is frequently directed towards limiting or controlling highway construction that may take place in or bordering on the stream. But, in many cases it becomes difficult to distinguish between a stream preservation and an encroachment law. Both deal with slightly different problems, and the distinction is quite subtle in many cases. Further, the end result or goal to be achieved is essentially the same; that is, the desire to maintain the stream and its related aquatic habitats, fish and wildlife, recreation, and aesthetic values in a state approximating natural conditions. The conflict that arises is that in most cases these laws are antithetical to the goals of economic development and growth.

Stream Preservation Laws

The first part of this discussion of stream preservation laws examines the conflicts and resulting legislation in the states of Montana, New York and Colorado. The second part reviews the laws in Idaho, Utah and Vermont, which are referred to as "stream alteration" laws which are more general in nature.

In early 1960, a conflict arose between the Montana Fish and Game Department and the road builders over the adverse impact of highway construction on trout streams.[1] As a result, one of the earliest and most significant stream preservation laws in the nation enacted was in Montana.

Documented proof was developed to substantiate the need for a stream preservation law. During 1961-1962, thirteen Montana streams were inventoried

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[1]John C. Peters, "Operation Since 1963 Under Montana's Stream Preservation Law" (Helena: Montana Fish and Game Department, March, 1970), p. 2.

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to determine the extent of stream alteration and the parties responsible for this alteration.[1] The study revealed that approximately 251 miles of natural streams had been altered (See Table 5-2). Over the 768 miles of streams inventoried, 1987 cases of stream alteration were found. More than one-fourth of the total number of alterations were the result of highway construction.

The resulting alteration had led to a reduction in aquatic habitats, as well as a reduction in the trout populations in those altered streams. Given this evidence of the impact of the stream alterations upon the natural streams, and through efforts of the Fish and Game Department, civic organizations, and the Montana Wildlife Federation a stream preservation law was enacted on a temporary basis in 1963.[2] It was permanently enacted in 1965. In contrast to the 1963 bill which passed by a narrow margin, the 1965 bill passed through the legislature with only one dissenting vote.[3]

The Montana Stream Preservation Law, as it presently exists, holds that:[4]

> It is hereby declared to be the policy of the state of Montana that its fish and wildlife resources and particularly the fishing waters within the state are to be protected and preserved to the end that they be available for all time, without change, in their natural existing state except as may be necessary and appropriate after due consideration of all factors involve.

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[1] John C. Peters and W. Alvord, "Man-made Channel Alterations in Thirteen Montana Streams and Rivers" (Helena: Montana Fish and Game Department, 1962).

[2] Peters, "Operation Since 1963 Under Montana's Stream Preservation Law," p. 3.

[3] Ibid., p. 4.

[4] Rev. Code Mont., sec. 26-1501.

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TABLE 5-2

THE LENGTH OF STREAM CHANNEL ALTERED, THE NUMBER OF ALTERATIONS, AND THE PARTY RESPONSIBLE FOR THE ALTERATIONS IN 13 MONTANA STREAMS OR RIVERS

River or Stream	Railroad Construction		Road Construction		Urban and Industrial Development		Agricultural Activities		Total			
	Miles[1] altered	No. of alterations	Miles[1] altered	No. of alterations	Miles[1] altered	No. of alterations	Miles[1] altered	No. of alterations	Miles[1] altered	No. of alterations	No. of stream miles	Per cent altered
Little Big Horn R.	39.8	48	2.9	22	2.0	7	19.2	114	63.9	191	120.0	53
St. Regis R.	13.0	54	10.7	60	1.6	6	0.1	1	25.4	121	37.1	68
Ninemile Cr.	0.1	5	0.6	24	1.9	4	2.4	48	5.0	81	23.9	21
Sheep Cr.	0.0	0	3.8	25	0.0	0	0.0	0	3.8	25	12.4	31
Otter Cr.	0.0	0	4.6	41	0.1	1	3.3	11	8.0	53	34.5	23
Belt Cr.	1.2	10	9.3	74	4.4	28	6.2	47	21.1	159	81.0	26
Beaver Cr.	1.5	3	2.7	25	0.2	10	1.0	28	5.4	66	49.5	11
West Gallatin R.	0.8	6	11.8	98	0.7	26	6.9	134	20.2	264	85.9	23
Rocky Cr.	3.6	7	1.6	22	1.0	26	5.4	53	11.6	108	18.4	63
Big Hole R.	3.8	21	6.1	50	1.3	12	34.9	312	46.1	395	147.6	31
Boulder R.	2.5	26	3.1	49	1.9	18	4.9	215	12.4	308	86.3	14
Prickley Pear Cr.	3.6	26	0.4	7	14.6	24	2.6	74	21.1	131	41.0	51
Ashley Cr.	0.8	9	0.7	35	1.3	3	4.1	38	6.9	85	30.2	23
Total	70.7	215	58.3	532	31.0	165	91.0	1075	251.0	1987	767.8	33

[1]Includes miles of stream channel lost as a result of the channel relocations.

Source: J. C. Peters and W. Alvord "Man-made Channel Alterations in Thirteen Montana Streams and Rivers," Montana Fish and Game Department (Helena, Montana, 1962), p. 2.

Under the law:[1]

> any agency of state government, county, municipality, or other subdivision of the state of Montana ...shall not construct, modify, operate, maintain, or fail to maintain, any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify or vary the natural existing shape and form of any stream or its banks or tributaries by any type or form of construction without first causing notice of such planned construction to be served upon the Montana Fish and Game Commission...

Thirty days after the Commission receives a request for a stream alteration, the Commission must determine whether or not the project will "adversely affect any fish or game habitat."[2] If adverse effects will be caused, the Commission may make recommendations to eliminate or reduce them. If the applicant refuses to modify the plans in accordance with the Commission's recommendation, a request is made for an arbitration board, which will decide the question at hand.

This control over stream alterations does not apply to irrigation district projects or to irrigation systems. Neither is the control extended over federal agencies. However, records are kept concerning acts and omissions on the part of the federal government which do or might affect adversely the fish and wildlife resources. These records are available to the public, and are intended to serve as an incentive to the federal agencies to correct their actions.

Sound physical data, which is lacking in many states, was in part responsible for the passage of the act. During the first six years of the act, several proposed road alignments were moved to prevent stream

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[1] Rev. Code Mont., sec. 26-1502.

[2] Rev. Code Mont., sec. 26-1504.

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damage, extra bridges were constructed to limit intrusions, and channel work was limited to the time of year when fish were not spawning.[1]

The act has been effective in Montana in two ways. Firstly, it allows for alterations in highway projects during the pre-construction phase, thereby eliminating possible adverse impacts. Secondly, it has brought about closer cooperation between the fish and game department and the highway department. Based on the findings of the field survey, it appears that some of this cooperation may have been due to the personalities involved in the administration of the law.

Not long after the final enactment of the Montana Stream Preservation Law, the State of New York became concerned with stream destruction caused from dredging gravel, alteration of stream beds to accommodate highways, and general misuse of the stream beds by riparian landowners. In response to these intrusions into the water environment, a stream protection law was enacted in 1965.[2]

Under this law, no person is allowed to "change, modify or disturb the course, channel or bed" of a stream, or to "remove any sand, gravel, or other materials" from within or near the stream, without first obtaining a permit for the work.[3] The law applies to any fresh surface watercourse greater than 10 acres at mean low water level which has been

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[1] Peters, "Operation Since 1963 Under Montana's Stream Preservation Law," p. 7.

[2] The New York Stream Preservation Law combined three previous laws: (1) Conservation Law, sec. 179 dealing with permits; (2) Navigation Law, sec. 31, covering dredging and filling regulations and (3) Conservation Law, sec. 948, which regulated dams.

[3] McKinney's Conservation Law, sec. 15-0501.1 (Sept. 1, 1972). Also see Dewsnup and Jensen, A Summary-Digest of State Water Laws, pp. 534-6.

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designated as class AA through C(t) for water quality standards.[1] Small lakes and streams that are "in the course of a stream" are also covered by the act, regardless of their classification as to water quality.

The New York law is more comprehensive than the Montana law. It covers three broad areas of stream disturbances: dredging, filling, and dams and locks. Requests for permits to conduct activities within the streams are filed with the Department of Environmental Conservation. Not only does the law apply to alterations of streams, but no person is allowed to construct any dam or structure across a natural stream, nor be allowed to build a dock, pier, or other temporary or permanent structures which are used for landing places.[2] "Marshes, estuaries, tidal marshes and wetlands that are adjacent to and contiguous at any point to navigable waters" are also protected from excavation or filling by the permit system.[3]

It was not long after the passage of the Montana and New York stream protection laws that the State of Colorado enacted a stream protection law. As early as 1968, the state legislature of Colorado noted the need for better cooperation between the State Game, Fish and Parks Division and the State Highway Department. A state report indicated that:[4]

> In order to protect the wildlife resources of the state, to as great a degree as possible, early participation of the Game, Fish and Parks Division in designing and planning of highway construction and similar programs is imperative. Therefore, the committee recommends that the General Assembly consider legislation to require that

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[1] McKinney's Conservation Law, sec. 15-0501.2.

[2] McKinney's Conservation Law, sec. 15-0503.

[3] McKinney's Conservation Law, sec. 15.0505.1.

[4] State of Colorado, Legislative Research Council, Game, Fish and Parks, Report to the Colorado General Assembly, Colorado Legislative Council Research Publications, No. 136 (November, 1968), p. xxiii.

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> the division participate in the initial planning of highways and other public facilities affecting wildlife and other aspects of outdoor recreation.

This recommendation was later acted upon, and in 1969 the legislature passed a stream protection law.[1] The law was stimulated by the passage of the Montana law, and is similar to it in some respects. As was the case in Montana, opposition to the law came from the State Highway Department. The Department's view was that the law was unnecessary, for in the past due consideration had been given to the impact of highway construction upon the streams and coordination had been made on a voluntary basis with the Game, Fish and Parks Division.

Due to the influence of the highway department and associated groups, such as the county commissioners, certain concessions were made to ensure the passage of the bill. The major concession was to remove "political subdivisions of the state from requirements under the law."[2] Unlike Montana, the stream preservation law in Colorado did not receive the widespread support of the state legislature.

As the law now stands:[3]

> No agency of the state--shall obstruct, damage, diminish, destroy, change, modify or vary the natural existing shape and form of any stream or its bank or tributaries by any type of construction without first notifying the game, fish, and parks commission of such planned construction.

As may be noted above, this act only applies to an "agency of the state" and does not include private individuals, counties or municipalities.

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[1] Introduced as S. B. No. 40, 47th Gen. Ass., effective July 1, 1969.

[2] An amendment the following year would have placed any person or state subdivision under the control of the law, but, the amendment failed.

[3] Colo. Rev. Stat., 62-14-2 (Supp. 1969).

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This is not the case with the New York law and the Montana law gives wider coverage to state bodies.

Three states have passed a type of stream preservation law referred to as "stream alteration" laws. They are Idaho, Utah and Vermont. For the most part, these laws are broader in nature than the typical stream preservation law, and thus approach the character of general encroachment laws.

In Idaho, it is the state's policy to protect all channels and their environment against "alteration for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality."[1] To achieve this goal, no individual or group, public or private, is allowed to engage in any project or activity which will alter a stream channel without applying for and receiving a permit from the Department of Water Administration.[2]

Certain exemptions are made under the law and provisions are made whereby the act may be waived in the case of an emergency when action is necessary to "protect life or property including growing crops." However, the stream work that is done under these conditions must be limited only to that work necessary to safeguard life or property during the emergency period.[3]

Under the Utah Natural Streams Relocation Act it is unlawful for any state agency, county, city, corporation or individual to relocate in any manner a natural stream channel or to alter or change the beds and banks

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[1] Idaho Code, sec. 42-3801.

[2] Idaho Code, sec. 42-3803 (a).

[3] Idaho Code, sec. 42-3808.

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of any natural stream for any purpose other than a beneficial use without a permit from the state engineer.[1]

The state engineer, upon the receipt of an application to relocate a stream, is directed, "without undue delay", to conduct necessary studies and investigations to determine whether the proposed relocation, alteration or change will: (1) impair vested water rights, or (2) will unreasonable affect any recreational use or the natural stream environment, or (3) will endanger aquatic wildlife.[2] The state engineer may approve the application, in whole or in part, or upon any reasonable terms and conditions that will provide for the protection of the specified water values.

The Vermont Stream Alteration Act provides that no person or municipality shall change, alter or modify a stream without the authorization of the Water Resources Department.[3] This law, as in the other states mentioned, does not apply to stream bank stabilization measures applied for the protection of lives and property.

Any person or municipality desiring to change or alter the cross section of a stream must apply in writing to the Vermont Water Resources Department for its approval. A copy of the application is also filed with the Fish and Game Department, which will investigate and certify to the water resources agency as to the effect the proposed action will have upon the fish life.[4] The Department of Water Resources will examine the

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[1]Utah Code Ann. 73-3-29 (1) (Repl. vol. 7B, Supp. 1973).

[2]Utah Code Ann. 73-3-29 (3) (Repl. vol. 7B, Supp. 1973).

[3]Vermont Stat. Ann. 10, sec. 1021.

[4]Vermont Stat. Ann. 10, sec. 1022.

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application to determine if the proposed change will (1) adversely affect the public safety, or (2) cause damage to fish life or wildlife, or (3) adversely affect riparian rights and (4) ensure that the application is consistent with the "public good."[1] If the Department feels that the application will have an adverse effect upon the above mentioned values, then the application shall be denied.

The stream preservation laws previously discussed have certain economic implications. These implications will vary depending on whether the party effected is a public or private entity. Take for example the Montana stream preservation law which is intended to restrict highway intrusions into stream beds. In the mountainous states, the least cost alternative for building highways is often to place them in the stream bed rather than having to traverse the mountains. Construction time is lessened and the stream bed provides a ready source of building materials all of which lessen the cost of highway construction. Thus, economic goals come into conflict with the goal of preserving the natural environment of the stream.

From an economic perspective, if the benefits from building the road in the stream are greater than the cost in terms of habitats and other values lost, then the road should be constructed in the stream. This will be the situation in many cases for not all streams are a good source of aquatic habitats or related fishery resources. Under other circumstances the reverse will be true.

If on the other hand, the impact of the preservation law falls upon private landowners, the economic consequences will differ. Those riparian landowners that are unable to alter the stream may be foreclosed

[1]Vermont Stat. Ann. 10, sec. 1023 (a).

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from obtaining an economic return from their property. The possibility exists that such activity will be transferred to non-riparian lands suitable for commercial development. Thus, the potential exists for a transfer of income from riparian to non-riparian landowners.

Stream Encroachment Laws

These laws are the broadest of the laws intended to protect and preserve the stream beds and related fish and wildlife habitats. They are primarily concerned with controlling channelization activities.

Recent years have seen a growing interest and concern over the impact of stream channelization and its effect on fish, wildlife, recreation and aesthetics. Congressional hearings on the problems of stream channelization cover in excess of 3,700 pages.[1] Also, a recent report dealing with stream channelization was submitted to the Council on Environmental Quality by A. D. Little, Inc.[2] The National Water Commission has concluded that in the past "insufficient weight has been given to the detrimental consequences of channelization, and particularly to losses not readily expressible in monetary terms."[3] Many of these losses have been to the fish and wildlife habitat and the aesthetic values of the streams and rivers.

Even with these detailed studies, the conclusions with respect to the physical damages caused by stream channelization are not clear. The

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[1] U. S., Congress, House, Committee on Governmental Operations, Stream Channelization, Hearings before a Subcommittee on Governmental Operations, 92d Cong., 1st sess., parts 1 thru 4, May and June 1971; and 93d Cong., 1st sess., parts 5 and 6, March 1973.

[2] Report on Channel Modifications, Volumes I and II. Prepared for the Council on Environmental Quality under Contract with Arthur D. Little, Inc., Wash., March, 1973.

[3] National Water Commission, Water Policies for the Future, p. 35.

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A. D. Little study was concerned with seven major issues dealing with physical alterations caused by stream channelization: wetland drainage; bottomland hardwood losses; cutoff oxbows and meanders; water table changes, erosion and sedimentation; downstream effects and the impact on aesthetics. After viewing 42 selected channelization projects, the researchers found that "about 25 to 30 of the selected projects did not significantly illuminate any of the 7 issues."[1] With respect to the impact of channelization of fish and wildlife resources a member of the Academy of Natural Sciences has concluded that, "channelization of natural streams and the productivity of fish and wetland wildlife ecosystems are unequivocally antithetical."[2]

For the most part, these projects have been formulated and justified around economic standards that have stressed comprehensive, coordinated, multiple-purpose, river basin development with the goal of national economic development in mind. In deciding upon projects in the public sector, benefit-cost analysis has been employed in an effort to "objectively" evaluate the desirability of proposed projects.[3] In applying the benefit cost technique, only those relevant costs and benefits that may be quantified and evaluated are considered directly; thus, extra-market values by definition are given a second order of priority in the analysis. Even though the state of the art has improved since its inception, the technique still lacks from serious data and measurement problems. The use of the technique applied to such problems as under discussion herein, have led

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[1] Stream Channelization, Hearings, part 6, p. 3431.

[2] Statement by Dr. Robin Vannote, Stream Channelization, Hearings, part 6, p. 3427.

[3] For a discussion of benefit-cost analysis see A. R. Prest and R. Turvey, "Benefit-Cost Analysis: A Survey" The Economic Journal, Volume LXXV (December, 1965), pp. 683-731.

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to the view that preservation and environmental values are not adequately protected.[1]

Given the present state of the art, what inferences may be drawn concerning the environmental versus economic tradeoffs surrounding channelization projects? The Report on Channel Modifications concluded that "small projects of substantial relative economic merit can be undertaken without pronounced environmental consequences."[2] No more specific conclusions could be drawn without a detailed study of each individual situation. It is not the purpose herein to expand such an analysis; rather, it is to point out that the public is concerned over the destruction that is being done as a result of objectively evaluated and "desirable" projects. This concern is being reflected in various legislative enactments.

The earliest attempts to control stream and channel encroachments began in the 1800's with the passage of state laws requiring railroads to provide for the flow and drainage of waters.[3] These laws required that railroads be built in such a manner as not to restrict the usefulness of watercourses, and in some instances required that the watercourse be maintained in its original or natural condition.

From these early beginnings, legislation to control encroachments into streams and channels expanded in terms of the types of intrusions

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[1]C. J. Cicchetti et al., Benefits or Costs? An Assessment of the Water Resources Council's Proposed Principles and Standards (Baltimore: The Johns Hopkins University, March, 1972).

[2]Volume I, p. 305.

[3]Edward W. Beuchert, "State Regulation of Channel Encroachments," Natural Resources Journal, Volume 4 (January, 1965), p. 489.

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prohibited and regulated, and the number of states adopting stream encroachment legislation. Two states, Illinois and Michigan, will be examined as case studies for their approach to preventing stream encroachments.

Illinois

Illinois was one of the first states to adopt general stream encroachment legislation on a statewide level.[1] Under the current Illinois legislation, the Department of Public Works and Buildings has general supervision over every body of water within the state where the state or the people of the state have any rights or interests. In carrying out this supervision, the Department of Public Works and Buildings is directed by law to "jealously guard the shores and waters of the State so that the true and natural conditions thereof may not be wrongfully and improperly changed to the detriment and injury of the State of Illinois."[2] The law specifies that it is unlawful to encroach into any of the public bodies of water within the State of Illinois, without first having received a permit for the work.[3]

The Department of Public Works and Buildings is required to make a careful investigation of every water body within the state and determine the extent to which the waters have been wrongfully encroached upon by private interests or individuals. Where cases of wrongful encroachment are found, the Department is required to commence appropriate action to recover full compensation for the damages caused.[4]

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[1] Ill. Ann. Stat., Ch. 19, secs. 70-78; Illinois Laws Relating to Waterways, 1971, sec. 5 through 29a.

[2] Illinois Laws Relating to Waterways, 1971, sec. 7, at p. 86.

[3] Illinois Laws Relating to Waterways, 1971, sec. 18, at p. 88.

[4] Illinois Laws Relating to Waterways, 1971, sec. 13, at p. 88.

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Michigan

On January 9, 1973, Michigan enacted the "Inland Lakes and Streams Act of 1972."[1] Under this act, a permit must be obtained from the Department of Natural Resources if a person intends to conduct activities which will alter or interfere with the natural flow of any inland lake or stream or otherwise encroach into the water bodies of the state. The act does not cover seasonal structures that are erected to facilitate private non-commercial recreational uses of water, as long as these structures do not "unreasonably" interfere with the use of the water by others or interfere with the water flow.[2]

The Department will issue a permit to an applicant if it is found that the project involved will not adversely affect the public trust or riparian rights. The Department in making its determination must consider the effect of the project upon the inland lakes and streams and the uses of all such waters, including uses for recreation, fish and wildlife, aesthetics, local government, agriculture, commerce and industry.[3]

These acts reviewed are but a few of the laws under which the states operate to protect the streams from encroachments. Other states not herein reviewed, such as Pennsylvania and New Jersey, have laws to prohibit structures within streams[4] or prohibit obstructions (broadly defined) which will affect the physical nature of the stream bed or channel without a permit.[5] Some of the states, for example Massachusetts, have also

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[1]Michigan Public Act 346, (1972).

[2]Michigan Public Act 346, sec. 4 (b).

[3]Michigan Public Act 346, sec. 7.

[4]e.g., Pennsylvania Act of June 25, 1913, P.L. 555, as amended; Pa. Stat. Ann., Tit. 32, secs. 681-91 (1949).

[5]e.g., New Jersey Stat. Ann., secs. 58:1-26 (1940).

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enacted legislation to protect certain designated rivers[1] or streams where public funds have been expended.[2] This protection may also be afforded to certain specified lakes[3] such as in Nevada. Other state encroachment laws provide broad coverage relating to any change which will effect the course, current or cross-section of nontidal streams or bodies of water.[4]

Beuchert has identified six major defects or weaknesses in state stream encroachment legislation.[5] The one defect which appears to be most significant is that the state laws are permissive rather than mandatory in nature. As noted in the above mentioned cases of Illinois and Michigan, the laws do not strictly prohibit intrusions, rather, they limit them if the regulatory agency believes that no private or public interest will be infringed upon. The laws are not always clear as to what encroachments will or will not be allowed, and this leads to legal as well as administrative problems.

The general purpose of the stream encroachment laws is to limit a broad range of intrusions into stream beds, especially channelization activities. The A. D. Little study, cited previously, concluded that small projects of substantial relative economic merit could be undertaken without significant adverse environmental impact. This is not the case in large channelization projects. In larger projects, both economic and environmental factors may indicate that the project should not be undertaken.

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[1] e.g., Mass. Gen. Laws Ann., Ch. 91, sec. 12.

[2] e.g., Mass. Gen. Laws Ann., Ch. 91, sec. 12 A.

[3] e.g., Nev. Rev. Stat., sec. 445.080 (2) (1969).

[4] e.g., Ann. Code of Maryland, sec. 8.05.03.05.

[5] Beuchert, "State Regulation of Channel Encroachments," pp. 492-3.

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The latter situation is illustrated in the case of the Trinity River Basin project. Part of this project called for the development of a multiple purpose channel 12 by 200 feet extending 360 miles from the Houston Ship Channel in Galveston Bay to Fort Worth, Texas. Initially the project would consist of 16 navigation dams and 20 navigation locks with future plans to widen the channel to 250 feet.[1]

In the judicial review of this project, the court dealt extensively with the benefit-cost analysis developed by the Corps of Engineers to justify the development of the project. With respect to one segment of the overall project, the Wallisville Project, the court noted that this segment of the project would produce an additional $38,000 of annual water supply benefits, but, would eliminate $291,000 of annual recreation benefits.[2] The potential also existed that the project would destroy certain rare and endangered species of wildlife.

The overall project was estimated by the Corps to have a benefit-cost ratio of 1.1 to 1. After reviewing the benefit-cost procedures used, the court concluded that the Corps had reduced the emphasis given to the loss of environmental amenities.[3] Thus, based in part upon a deficient benefit-cost analysis and upon the potential environmental impact, the court granted an injunction to halt the development of the project.

Summary and Analysis of Economic Implications

This section has dealt with the problems caused by man's intrusions into natural streams and the actions taken by the states to limit the intrusions. The courts appear to hold consistently in favor of the

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[1] Sierra Club v. Froehlke, 5 ERC 1033, 1043.

[2] 5 ERC 1033, 1057.

[3] 5 ERC 1033, 1095.

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public right when dealing with navigable waters which may place restrictions on the private right to use property as one chooses.[1] The extent of control which the states have over non-navigable waters or where lands are submerged and privately owned is less well defined than the navigable waters case. Attempts to expand the public rights are limited in nature. As Ausness points out, "most regulation of dredge and fill operations has been limited to coastal wetland areas and the scope of such legislation has generally been restricted to the protection of marine fisheries and similar ecological considerations."[2] This may not be as extreme, given the passage of the various stream preservation laws referred to herein, but the scope of the expansion of public rights is definitely limited.

As a general rule the beds of streams underlying non-navigable water bodies are subject to private ownership, and the public has little or no rights to the use of or control over their use.[3] Two general approaches have been followed by the courts in defining the private rights in riparian waters.[4] First a common law view holds that the riparian owner may use only that water which is immediately over the portion of the bed he owns, and that he may exclude the public from the use of the water or bed.[5] Second, a civil law or common use approach has been followed which

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[1] Carpenter v. Board of Commissioners, 58 N.W. 295 (Minn. 1894).

[2] Robert C. Ausness, "A Survey of State Regulation of Dredge and Fill Operations in Non-navigable Waters," Land and Water Law Rev. Volume 8 (1973), p.67.

[3] e.g., Beach v. Hagner, 207 Mich. 93, 173 N.W. 487 (1919).

[4] Ausness, "A Survey of State Regulation of Dredge and Fill Operations in Non-navigable Waters," pp. 68-69.

[5] e.g., Leonard v. Pearce, 348 Ill. 518, 181 N.E. 399 (1932).

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allows the riparian owner to use the surface of the water, so long as he does not interfere unreasonably with the rights of other riparians.[1]

With respect to the economic implications of the stream preservation and encroachment laws, there will be an impact upon both the private and public sectors of the economy. As noted previously, the implementation of these laws has the potential of transfering income from private riparian landowners to private non-riparian landowners. If the gains to the non-riparian landowners are greater than the loss to riparian landowners, then economic welfare would be improved if the non-riparian "gainers" were able to compensate the riparian "losers" and still be better off.

In the public sector, the adoption of stream preservation and encroachment laws will force the public agencies to evaluate the economic implications of their actions. As mentioned previously, the construction costs are likely to increase due to the implementation of the legislation. The combined environmental damages and increasing construction costs will place increasing pressure on public agencies to justify projects on the grounds that the benefits to society are greater than or equal to the social costs incurred.

It would appear that, although these afore mentioned statutes provide a reasonable amount of protection for the aquatic habitats, they are far from providing the broad coverage that society may deem necessary. The following section examines some of the state highway construction laws that have evolved in an attempt to protect the aquatic habitats.

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[1] Harris v. Brooks, 225 Ark. 436, 283 S.W. 2d 129 (1955).

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5-4. Highway Construction Laws

Particularly in recent years there has been a growing broad based concern over the impact of highway location on the environment in general and on the aquatic environment in particular. Therefore, this section reviews some of the laws, policies and programs adopted by selected state highway departments to protect the water environment and related fish and wildlife values.

Complete information concerning state highway department rules and regulations adopted for the protection of the water environment is exceedingly difficult to obtain. But at least most of the departments' requirements may be found in "Special Provisions" publications of these agencies.

In the future, the information-location process should be made easier with the publication of state highway Action Plans as now required by federal legislation.[1] These Plans are to be descriptive of the organization utilized and the process followed in the development of Federal-aid highway projects. Among other things, these Plans shall set forth the social, economic and environmental effects that are considered in highway planning and alternative courses of action to be followed. Therefore, these Plans will necessarily contain many of the policies and directives of the state highway departments with respect to environmental considerations.

Specifically, state highway departments are required to comply with federal and Federal Highway Administration rules and regualtions when

[1] As required by 23 U.S.C., sec. 109 (h).

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developing joint federal-state projects.[1] The Federal Highway Administration directives indicated, as early as 1963, that "every effort should be made in the planning, design, and construction of highway projects that cause a minimum of disturbance to and reasonable preservation of the nation's wildlife and related natural resources."[2] Since these early days, additional recognition has been given to the non-market values involved in federal-state highway construction projects. For example, in 1968 the federal statutes were amended so as to ensure consideration for social (non-market), as well as, market economic effects of proposed highway projects.[3] Outside of this federal control, what have the states themselves done? This question will be answered in the remainder of this section.

In general, most of the state highway departments do have specific regulations to cover erosion control work. These regulations cover the type of erosion control materials to be used to prevent erosion, the construction methods adopted to limit erosion and other related provisions to protect the streams generally form pollution resulting from the construction of highways.

Many of the state highway departments have also adopted specific regulations to limit the frequent fording of flowing streams by construction

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[1]For a discussion of federal highway regulations see Ronald C. Peterson and Robert M. Kennan, Jr., "The Federal-Aid Highway Program: Administrative Procedures and Judicial Interpretations," 2 ELR 50001-50023, (1970).

[2]Federal Highway Administration IM 21-5-63 (May 12, 1963).

[3]"Federal-Aid Highway Act of 1968," P.L. 90-495, sec. 128, August 28, 1968; 82 Stat. 828.

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equipment.[1] In addition, the highway construction activities have also been limited by the stream preservation and encroachment laws, which were examined in the preceding section. A few examples drawn from California, Maine, and New Hampshire will illustrate the specific actions taken by selected state highway departments to protect the water environment.

The California Division of Highways has been active in over a decade in promoting cooperation with the fish and game agencies. The Division's directives indicate that "meetings and conferences should be held as needed with Fish and Game to insure that fish and wildlife impact has been thoroughly considered" in the development of highway projects.[2]

In an attempt to preserve and protect the coastal zone environment of the State of California, the Department of Public Works recognized that:[3]

> The California Coastal Zone is a unique and irreplaceable natural resource with a limited capacity for use and development. The permanent protection of the natural and scenic resources of the California Coastal Zone is a paramount concern to present and future residents of the State and Nation.

The policy of the Department of Public Works with respect to the coastal zone is one of providing the "optimal transportation service consistent with local and regional total planning and with the objective of conserving the coastal resource."[4] All facilities constructed within the coastal zone are to be planned in such a manner as to enhance and preserve the environmental qualities and minimize the disruptions to the ecological system.

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[1] For example see Arkansas State Highway Department Special Provisions, "Job Abatement of Water Pollution," June, 1970.

[2] Division of Highways Circular Letter, 65-86 (1966).

[3] Department of Public Works, Circular Letter No. 66-275, (Dec., 1966).

[4] Ibid.

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The Department of Public Works is also required to submit its general plans to the Fish and Game Department:[1]

> ...of any project which will divert, obstruct or change the natural flow or bed of any river, stream or lake...or will use material from the stream beds.... The Department of Public Works and the Fish and Game Departments are directed to establish procedures for the review of proposed modifications and consideration of alternative conditions designed to protect existing fish and game resources.

In Maine, highway contractors are directed to exercise care in the work on streams. Specifically, they must exercise every reasonable precaution throughout the construction process to prevent siltation of rivers, streams, estuaries and other waters as well as tidal marshland.[2] Furthermore, construction operations in water and water areas are to be restricted to those areas where channel changes are shown on the plans and to those areas which must be entered for the construction of temporary or permanent structures. Upon completion of the work, all waters and water areas are to be promptly cleared of all obstructions placed there in the construction process. Frequent fording of live streams with construction equipment will not be permitted during the construction process. Temporary bridges or other structures are required wherever stream crossings are necessary.

In 1969, the State of Maine established the "Scenic Highway Board."[3] The purpose of the act was to establish a system of scenic highways in the State of Maine, and to preserve the scenic values along the scenic highway system. The Board includes, in part, the Chairman of the State Highway Commission, the Director of Parks and Recreation, the Commissioner

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[1] Cal. Fish and Game Code, secs. 1601 and 1501.5, as amended 1970.

[2] Maine State Highway Commission's Supplemental Specifications, Special Provision sec. 107, June 12, 1968.

[3] Maine Rev. Stat., Ch. 3, secs. 231 to 235.

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of Sea and Shore Fisheries, the Commissioner of Agriculture, the Commissioner of Inland Fisheries and Game, the Forest Commissioner, the Commissioner of the Department of Economic Development and the Director of State Planning.[1]

The Board is directed by law to adopt procedures, rules and regulations for the designation and development of the scenic highway system. Factors to be considered by the Board in establishing scenic highways include:[2]

1. Procedures to evaluate the scenic quality of proposed routes.
2. Safety aspects of proposed routes.
3. Procedures to direct motorists to and from scenic highways.
4. The economic implications of designating a route as a scenic highway.
5. Preservation of scenic values in the highway corridor.
6. Compatibility with other conservation plans.

"Prior to 1963, coordination between the Fish and Game Department and New Hampshire's Department of Public Works and Highways was strictly on an informal basis. In most cases, the damage was done to wildlife before it was noticed and the remedy was 'too little too late'."[3] In 1963, the New Hampshire Fish and Game Department and the Department of Public Works and Highways adopted procedures for cooperation and coordination in adopting plans for highway projects which would adversely affect fish and wildlife resources.

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[1]Maine Rev. Stat., Ch. 3, sec. 233.

[2]Maine Rev. Stat., Ch. 3, sec. 234 (1).

[3]"Serving Roads and Rods in New Hampshire," New Hampshire Highways (December, 1968), p. 1. (Reprint.)

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The New Hampshire Department of Public Works and Highways, in addition to Federal-Aid highway requirements, submits proposals on all state-financed projects to the Fish and Game Department for review. But, as yet, there is still no control over local town road construction projects.

The New Hampshire Department of Public Works and Highways Special Provisions requires that "whenever an appreciable number of crossings of live streams are necessary, temporary culverts or bridges shall be constructed to allow equipment to cross such streams without fording them."[1] Disturbances outside the limits of the construction project, as staked, are permitted only when necessary and ordered. All waterways must be cleared as soon as possible of obstructions placed in the water during the construction operation and not a part of the finished work. Additional measures must be taken by the highway contractor to limit erosion. These measures include: limiting the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations; incorporation of erosion control features into the project; and the reseeding of areas to limit later erosion.

Summary and Analysis of Economic Implications

Based in part upon the information received from the various highway departments, and upon the field trips to the selected states some general observations may be made. For one, it appears that state highway departments are becoming more environmentally aware of their impacts upon the water environment. They have made attempts to limit unnecessary highway intrusions into streams. Where channel changes are required they have attempted to leave in streams places for fish life to live so as to improve the prospect of recovery to prealteration conditions. For example, in

[1]Sec. 107 (1969).

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Montana boulders were placed in a stream bed following construction to provide for fish habitat. In New York, the highway department agreed to the construction of bridges to keep the highway from intruding into the Beaverkill River.

In the past, highway departments lacked trained personnel in the field of environmental and natural resources. At this time, fish and wildlife specialists added to the staffs of numerous highway departments, and the departments are receiving additional aid from the fish and game agencies.

The highway departments, regardless of their recent attempts to limit the damage caused by highway construction, are still construction oriented agencies. Their construction projects are approved or disapproved largely on economic grounds. Thus, the majority of highway projects are formulated on the basis of constructiong roads between two points in a manner that will produce a least-cost solution. State highway officials have indicated that much of the current environmental legislation has resulted in increasing highway construction costs and delaying project completion dates.

Highway officials complain of the lack of cooperation and communication with fish and game agencies. Fish and game agencies in turn level the same charge against highway officials. Highway departments indicate that they need better data and statistical information related to habitat values from the fish and game agencies to enable them to provide the necessary protection for the fishery resources. Fish and game departments have contended that they have not received timely notification on proposed projects, and thus, they feel that their inputs in many cases are too little or to no avail.

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The conflicts between the state fish and game departments and the highway departments appear to have resulted due to three problem areas. First, in many cases, there is insufficient legislation defining the desired interrelated activities of the two agencies to facilitate coordination between the two parties. Secondly, laws that exist may be criticized on the grounds that they are poorly worded and contain ill defined standards. Laws of this nature do little to promote cooperation and understanding between the parties involved. Thirdly, conflicts arise due to the personalities of the individuals involved and a lack of understanding by the individuals as to the goals and policies of the conflicting agencies. Some of these problems can be eliminated by improved communication channels.

In each of the three above mentioned problem areas, the possibility exists for making trade-offs to resolve these conflicts and to provide increased protection for the extra-market values. But the conflict situation can not be resolved if the agencies involved continue to view the problem as an either/or situation. Fish and game agencies must realize that not all of the aquatic areas provide high-quality recreation, aesthetic and aquatic habitats. Excluding all highway construction from these marginal regions would create social costs in excess of the social benefits. In those areas where highway construction would cause a significant amount of damage to the extra-market values, the benefits from exclusion may exceed the cost of not infringing into these areas.

Under most "average" situations, a trade-off will allow for highway construction that is consistent with the preservation of extra-market values. The work done in Montana to develop artificial meanders in altered streams and the bridge developments in New York illustrate examples of how the trade-offs may yield workable solutions to the problem.

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The following section examines some of the steps taken by the states to preserve and protect the aquatic habitats from the adverse impact of dam construction.

5-5. Regulation of Dam Construction

Dams act as barriers to both upstream and downstream migration of anadromous fish. The manner and timing of water releases from an impoundment into a stream may also adversely affect the fish life and aquatic habitat. This section reviews some of the steps taken by various states to protect fishery resources from the adverse impacts that may result from the construction of dams or other impoundments within a stream and analysis their economic implications.

Of the fifty states, all but one -- Alabama -- have state legislation to regulate or control the construction of dams. In general, before a person may construct, repair, alter, or remove a dam or other impoundment he must obtain approval from the appropriate state agency.

One of the primary concerns of the state authorities is that dams be constructed in a safe manner. For example, in North Carolina, before a person may construct, alter, repair or remove a dam he must seek the approval of the Department of Water and Air Resources.[1]

Prior to being able to construct a dam or other impoundment, several of the states require that a permit be obtained from the appropriate state agency.[2] In authorizing a permit, the state agency may consider a wide

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[1] North Carolina Gen. Stat., secs. 143-216.26 and 143-216.27.

[2] e.g., 25 Iowa Code Ann., sec. 469.1; Md. Code Ann., art. 96A, secs. 11 and 12; Mich. C. L. A., secs. 281, 131 to 281.135; 5 Miss. Code Ann., sec. 5956-20; N. J. Stat. Ann., secs. 58:4-1; Ohio Rev. Code, sec 1521.06; and Wis. Nat. Res. Laws, sec. 31.05.

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range of factors, such as the construction and maintenance procedures, the safety of the structure, the effect on downstream uses and the effect of the dam on the fish and wildlife resources.

The concern herein is primarily with those measures taken to preserve and protect the fishery and wildlife resources. In this regard, several of the states have legislation to require the construction of fishways or fish ladders in dams constructed on state streams.[1] The following examples illustrate the manner in which some of the states have offered protection for the fish and wildlife values.

Alaska

In Alaska, every dam, impoundment or other obstruction built in a stream which is inhabited by salmon or other fish may be provided with sufficient fishways to facilitate fish migration. But, these fishways are required only when the Department of Fish and Game considers them necessary.[2] Special provisions are made for those cases where fishways are impracticable, due to economic and engineering considerations. Under these circumstances, the Commissioner of the Fish and Game Department may require that the contractor pay compensation for the loss of fish and wildlife resources, or he may be required to construct a hatchery to replace the fish that are lost due to the construction.[3]

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[1] e.g., Alaska Stat., sec. 16.05.840; Calif. Water Code Ann., sec. 12582; Ga. Stat., sec. 17-101; Ill. Rev. Stat., ch. 19, secs. 50 and 60; 12 Maine Code, secs. 2201 et seq.; Md. Code Ann., art. 96A, sec. 16; Mass. Stat., ch. 130, sec. 19 and ch. 131 sec. 4; Nev. Rev. Stat., sec. 535.020; N. C. Gen. Stat., sec. 77-3; Ore. Rev. Stat., sec. 509.600 to 509.992; Code of Va., sec. 29-151; Wash. Rev. Code, sec. 90.54.020 (5), 90.24.050 and 90.24.060; and Wis. Stat., 31.02 (4) (c).

[2] Alaska Stat., sec. 16.05.840.

[3] Alaska Stat., sec. 16.05.850.

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California

In California, "adequate provisions shall be made for the protection of migratory fishes" in flood control and water conservation projects.[1] Again, however, the law limits this protection only to those projects where it is practical in engineering and economic terms. Designs for the fish and wildlife protection structures and facilities are to be prepared by the California Department of Fish and Game in cooperation with the United States Fish and Wildlife Service.

Oregon

Except as otherwise provided,[2] it is unlawful for any "person, municipal corporation, political subdivision or governmental agency to construct or maintain any dam or artificial obstruction across any stream" in the State of Oregon that is frequented by anadromous or food fish without "providing a passageway for such fish over the dam or artificial obstruction as near the main channel as practicable."[3] The State Fisheries Director is authorized to inspect all dams and obstructions in those waters frequented by anadromous and food fish. If there are not sufficient passageways for fish the Director may instruct the owner to provide free passage within a reasonable time.[4]

In those cases where fish ladders or fishways are impracticable, the Commissioner may require the dam owner to: (1) convey to the state a site for a fish hatchery; (2) erect a hatchery in accordance with plans

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[1] Calif. Water Code Ann., sec. 12582.

[2] Oreg. Rev. Stat., 498.732, 509, 640, 509, 645.

[3] Oreg. Rev. Stat., 509.605 (1) and 509.605 (3).

[4] Oreg. Rev. Stat., 509.605 (2).

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furnished by the fish commission and (3) furnish necessary water and light for the operation of the hatchery.[1] Dams are exempt from the provision that were built before February 18, 1921 and those for which permits were issued prior to 1955.[2]

Washington

The Washington Legislature has indicated that "multiple-purpose impoundment structures are to be preferred over single-purpose structures." Also, due consideration is to be given to "means and methods for protection of fishery resources in the planning for and construction of water impoundment structures and other artificial obstructions."[3] In Washington, the superior courts may require the construction of fish ladders and other devices to protect fish and game fish in certain lakes.[4] The cost of such devices is apportioned among the persons whose property abuts on the lake. Devices installed are done under the supervision of the Board of County Commissioners with the approval of the Department of Game and the supervisors of water resources of the State of Washington.

Wisconsin

As mentioned previously herein, the Department of Natural Resources in Wisconsin has the authority to regulate lake levels and the flow of water in all navigable waterways. The Department is further authorized to supervise the construction, operation, maintenance and equipment of any or all dams in navigable waters.[5]

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[1] Oreg. Rev. Stat., 509.635 (1) (a) to (c).

[2] Oreg. Rev. Stat., 509.635 (3) (a) and (b).

[3] Rev. Code Wash., sec. 90.54.020 (5). Water Resources Act of 1971).

[4] Rev. Code Wash., sec. 90.24.050.

[5] Wis. Nat. Res. Laws., sec. 31.02 (2).

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The Department is authorized to order and require, among other things, that dams constructed be equipped with "good and sufficient fishway or fishways."[1] In lieu of the requirement to install fishways, the owner may enter into an agreement with the Department of Natural Resources to pay for or to supply the state annually with quantities of game fish for stocking purposes as agreed to by the owner and the Department.

The Department is directed to hold a hearing on applications for a permit to construct, operate and maintain a dam.[2] Based upon information presented at the hearing, the Department shall consider the effect of the project on the ecological, esthetic, economic and recreational values. Furthermore, the enjoyment of natural scenic beauty and environmental quality are declared to be public rights to be considered along with other public rights and the economic need of electric power for the full development of agricultural and industrial activity and other useful purposes in the area to be served.[3]

The law goes on to point out that:[4]

> In considering public rights to the recreational use and natural scenic beauty of the river, the department shall investigate the potentialities of the lake and lake shore created by the flowage and shall weigh the recreational use and scenic beauty thereof against the known recreational use and scenic beauty of the river in its natural state...; if it appears that the river in its natural state offers greater recreational facilities and scenic value for a larger number of people than can by proper control of the flowage level be obtained from the use of the lake and lake shore and that the remaining sections of the river and other rivers in the area in

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[1] Wis. Nat. Res. Laws., sec. 31.02 (4) (c).

[2] Wis. Nat. Res. Laws., sec. 31.06 (1).

[3] Wis. Nat. Res. Laws., sec. 31.06 (3), as amended 1971.

[4] Ibid.

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> their natural state provide an insufficient amount of recreational facilities and scenic beauty, and if it further appears that the economic need of electric power is less than the value of the recreational and scenic beauty advantages of such river in its natural state, the department shall so find and the permit be denied.

It should be noted that some other states have also prescribed that fish and wildlife be considered in the construction of dams and the release of sufficient water to maintain fish life. For example, an Arkansas permit issued for the construction of water storage facilities is issued on the condition that sufficient water will be released each day to protect the fish and wildlife resources.[1]

New York

In New York, the Department of Environmental Protection must be notified and grant approval for certain impoundments. In granting this approval the Department must consider the effect of the project on public navigation, the safety of the structure and the impact on instream values.[2]

Vermont

In Vermont the Fish and Game Commission is required to review dam construction proposals. For dams impounding more than 500,000 cubic feet of water, the Commission must insure that the proposed project will not have an adverse impact upon the propagation and preservation of the salmon fisheries.[3] The economic benefits to recreation and the effect on environmental values of the proposed dam must also be considered.

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[1] Ark. Stat., sec. 21-1301.

[2] N. Y. Env. Cons. Law, secs. 15-0501 through 15-0515.

[3] 10 Vt. Stat., Ann., secs. 701 et seq.

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Delaware

Other states have exempted storage projects from certain restrictions if the project's purpose is for fish production and preservation. In Delaware, for example, an impoundment may be constructed for ponds not larger than 60,000 square feet, for purposes of "conservation, recreation, propagation and protection of fish or wildlife, watering of stock or fire protection," without regard to the minimum flow requirements of the state.[1]

Indiana

In Indiana, the Flood Control and Water Resources Commission is authorized to regulate the maintenance of dams. This control does not extend to dams built for the sole purpose, among other things, of recreation or providing a refuge for fish and wildlife. But, the dam constructed for these purposes must not be more than 20 feet in height or impound more than 100 acre-feet of water.[2]

Summary and Analysis of Economic Implications

From this review of legislation on dam construction, it is apparent this area of activity affecting the aquatic environment has received considerable and varied attention by the majority of states. This, of course, is due primarily to the clearly identifiable and definable physical features controlled.

Various techniques have been used to reduce the adverse effects of dams to the migration of fish. Where possible, as the previously mentioned statutes noted, fish ladders are installed to trasport fish over

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[1]Del. Code Ann., sec. 7-6103 (4).

[2]Ind. Stat. Ann., sec. 27-1804.

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and around dams. Where such solutions are not feasible, fish hatcheries have been installed in conjunction with the dam to replace the lost species. Past evidence indicates that the fish ladders are largely unsuccessful, especially at the larger dams. The fish ladders have been a failure in two respects. First, they have frequently been incapable of maintaining the fish runs on the impounded streams and rivers. Second, fish facilities costing many millions of dollars have been installed in dams only to find that they were useless.[1]

The possibility of both of these situations occurring was made clear in the hearings surrounding the proposed development of the High Mountain Sheep Dam on the Snake River. Most of the estimates made concerning the cost of installing fish passage facilities for this dam ranged from 20 to 23 million dollars.[2] Testimony presented at the hearing indicated that the construction of this dam would most likely destroy the anadromous fish run in the Imnaha River and that the installation of fish ladders and canals would be unable to prevent this damage.[3]

Under such circumstances, other alternatives must be examined in the light of possible trade-offs. In some areas, the installation of fish hatcheries may prove to be a feasible alternative to the use of fish ladders. Under other circumstances, where the damage to the anadromous fish runs is substantial, the alternative may be to consider other sources for power generation and thus maintain the free flowing nature of the river.

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[1] U. S., Federal Power Commission, Initial and Reply Brief of Commission, p. 280.

[2] Ibid., p. 77.

[3] Ibid., p. 278.

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The following section of this chapter examines the laws and economic impoications of state legislation intended to preserve and protect the marshes, wetland and estuaries.

5-6. Marsh, Wetland and Estuary Protection

This section will set forth the nature of the problems associated with the destruction of marshes, wetlands and estuaries, cites examples of legislative measures adopted by certain states to protect these areas from adverse impacts by man and analyzes the economic implications of such measures. It should be noted that, although the following discussion is broken down into two areas, inland and coastal zone protection, some states have laws that are all encompassing so as to include both inland and coastal protection. Such cases will be made clear in the discussion of the various laws.

Inland Wetland Protection

Natural wetlands and marshes involve a variety of plant and animal associations, varying from dispersed potholes with relatively simple ecosystems to the river bottom hardwood forests that have a very complex ecosystem. One characteristic that these areas have in common is that the water tables are usually fairly close to the surface of the ground. Another characteristic that they have in common is that in their natural condition they are unsuitable for most of man's commercially orientated activities. Therefore, man expends his labor and capital to drain and/or fill these lands so that they may function as a factor of production in the agricultural, industrial or residential sectors of the economy. This leads to a conflict between man's desires for economic gain and the continuation of the flora and fauna in these areas that increasingly are

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recognized as supportive of a number of non-market goods desired by society. For example, when these lands are drained or filled, the plant life that has adapted to the various wetland water regimes may die and be replaced by species that can exist under less moist circumstances. The fish and waterfowl that may be dependent on the original plant life may also be eliminated.

Estimates vary concerning the total loss of these wetlands due to man's activities. According to one such estimate, of the original wetland acreage of approximately 127 million acres in the United States, over 50 million acres have been drained and filled for commercial use.[1] Many of the remaining areas are unique in the sense that if they are destroyed, they may never be reestablished. Although, as individual units they do not cover as large a land area as does Hell's Canyon, many of the same kind of unique features exist and so does the irreversible character of the change. Thus the type of economic analysis suggested by Krutilla and discussed at the outset of this chapter could be applied to the wetland destruction problems.

Dredging and filling in wetlands is done for numerous reasons, but the major reasons are for agricultural land development, improvement of navigation, commercial and residential development, highway construction and garbage dumps. Regulation in most of the states has been directed towards controlling dredging and filling activities in the wetlands by requiring a permit from a specified state agency. Some states have broad

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[1] U. S., Department of the Interior, Fish and Wildlife Service, Wetlands of the United States: Their Extent and Their Value to Waterfowl and Other Wildlife, by Samuel P. Shaw and Gordon Fredine, Circular No. 39 (Washington, D. C.: U. S. Government Printing Office, 1956), pp. 5-7.

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legislation that requires notice be given on every project that affects wetlands or other wildlife habitat.[1]

Four states (Connecticut, Massachusetts, Ohio and Rhode Island) have been examined concerning their approach to preventing unnecessary destruction of inland wetlands. They appear to be representative of legislative policy measures taken in some of the other states to prevent wetland destruction.

Connecticut

The Connecticut Inland Wetlands and Watercourses Act adopted on May 19, 1972, provides for the preservation, protection, maintenance, and use of the inland wetlands and watercourses of the state.[2] The law emphasizes local rather than state regulation to achieve the goals of the act. If the municipalities fail to provide the needed protection, however, the Department of Environmental Protection may take action to protect these areas.[3] The Department is also responsible for establishing licensing procedures for all unregulated municipalities.[4]

The law specifies that a municipality may authorize or establish an "Inland Wetlands Agency" to promulgate such regulations as may be necessary to protect the wetlands and watercourses within their jurisdiction.[5] In granting, denying or limiting a permit the agency must consider several factors. These include, but are not limited to: (1) the environmental impact of the proposed action; (2) alternatives to the action; (3) the

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[1] e.g., Louisiana Rev. Stat., 38:18, Acts of 1956, No. 405, sec. 1.

[2] Conn. Pub. Act No. 155 (1972), as amended by Pub. Act No. 571 (1973).

[3] Conn. Pub. Act No. 155 (1972), as amended, sec. 7 (f) (1).

[4] Conn. Pub. Act No. 155 (1972), as amended, sec. 7 (f) (2).

[5] Conn. Pub. Act No. 155 (1972), as amended, sec. & (a) through (g).

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relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; (4) irreversible and irretrievable commitments of resources; (5) the character, degree, injury or interference with the health, safety and reasonable use of property and (6) the suitability or unsuitability of the activity within the area.[1]

There is one unique feature in the Connecticut law that differs from the general rule with respect to the restoration of damaged lands. The general rule adopted by most states is that the violator will restore the lands to or near their original condition. In Connecticut, all moneys collected from violators are to be used by the Commissioner of Environmental Protection to restore affected wetlands and watercourses to the condition prior to the violation.[2] The Commissioner, districts or municipalities may also purchase lands or an interest in lands, and enter into agreements with landowners to carry out the provisions of the act.

Massachusetts

Massachusetts has recently amended its Inland Wetlands Act.[3] Under the amended law, the Commissioner of Natural Resources, with the approval of the Board of Natural Resources, is required to adopt, amend or repeal orders regulating, restricting or prohibiting the dredging, filling or otherwise altering inland wetlands. The Commissioner is also directed to establish channel encroachment lines for the protection of watercourses. In establishing such orders and regulations, the Commissioner is required to hold a public hearing prior to adoption. Upon adoption, the Commissioner

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[1]Conn. Pub. Act No. 155 (1972), as amended, sec. 6 (a) through (f).

[2]Conn. Pub. Act No. 155 (1972), as amended, sec. 10.

[3]Mass. Gen. Laws, Ch. 131, sec. 40A, as amended by Acts of 1972, Ch. 782 (Effective July 1, 1973).

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is required to notify, among others, each assesed landowner affected by the orders.

Owners may petition the superior court in equity to determine whether such orders restrict the use of their property so as to deprive them of practical uses and thus constitute an unreasonable exercise of police power. If the court finds the order to be unreasonable, it will enter a finding that such orders do not apply to the petitioner's land. The Department may, upon such a finding, take the fee or any lesser interest in such land in the name of the Commonwealth by eminent domain. Orders established under the act are not intended to prohibit, restrict or regulate the use or improvement of land or water for agricultural purposes. Nor are the orders intended to affect the powers and duties of various other state agencies.

Ohio

The Ohio Department of Natural Resources has recently issued a statement concerning the Department's policy with respect to wetlands.[1] The policy of the Department is to "preserve the wetland ecosystem of Ohio, to protect them from any alteration which would result in their partial or complete destruction, and to restore wetlands wherever possible." These wetlands include marshes, swamps, bogs and other low-lying areas that are partially covered during normal water periods. The policy statement recognizes that these areas serve as habitat for fish and wildlife, aid in the purification of waters, act as a nursery for terrestrial and aquatic species, and have unique recreational and aesthetic values. Furthermore, these areas are recognized as being vulnerable and fragile areas.

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[1] William B. Nye, "Ohio Department of Natural Resources Policy Statement," Columbus, Ohio, 19 June 1973. (mimeographed.) Issued under the authority vested in the Director by Ohio Rev. Code, sec. 1501.01.

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The Department, recognizing the wetland values and man's dependence on them, will "use its utmost influence" to preserve and protect these areas from destruction. The Department's policy therefore, is to "minimize alterations in the natural flow of water" that supply the wetlands and to protect wetlands from dredging or filling alterations, construction activities, and general pollution. Wherever possible, based on a consideration of facts involved, the Department is committed to restoring wetland areas that have been previously altered or destroyed through improper land use.

Rhode Island

In 1971, the State of Rhode Island adopted a "Fresh Water Wetlands Act" to protect swamps, marshes and other fresh water wetlands.[1] The Act recognizes that these water areas are essential to reducing flood damage, providing for wildlife habitat, recreational areas, and necessary for the general well-being of the public. The Act is intended to preserve and regulate the swamps, marshes and wetlands from "random, unnecessary, and/or undesirable drainage, excavation, filling, encroachment" and other disturbances.[2] Under the Act, no public or private individual or group may conduct activities that would alter the character of any fresh water wetlands without the consent of the Director of the Department of Natural Resources. Approval must also be obtained from the town or city council within whose borders the proposed project lies.[3]

In those cases where a violation of the law has taken place, the Director has the power to order the "complete restoration" of the area

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[1] R. I. Gen. Laws Ann., secs. 2-1-18 thru 2-1-24 (1971).

[2] R. I. Gen. Laws Ann., sec. 2-1-18.

[3] R. I. Gen. Laws Ann., sec. 2-1-21.

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by the person or agency involved.[1] Failure on the part of the person or agency to restore the area shall empower the Director to have the work done and hold the violator responsible for the cost.

Coastal Zone Protection: Estuaries and Wetlands

In 1967, the Fish and Wildlife Service of the U. S. Department of the Interior estimated that, over a twenty year span, approximately seven percent of the estuarine area of the United States, had been lost due to dredging and filling. This figure represents a loss of approximately 570,000 acres in 26 states of major importance for basic fish and wildlife habitat (See Table 5-3). The area lost due to dredging and filling was done primarily for the purpose of improving navigation. Other purposes were for commercial and housing developments, highway construction, oil exploration, mining, marinas, military bases, garbage dumps, and beach erosion control.[2]

The growing concern over the destruction of the estuarine areas has resulted in numerous and extensive studies of the problem.[3] The National Estuary Study, at one point, was unable to propose definite solutions to the problems resulting from the interacting bio-physical, economic and institutional factors which operate in, and affect the estuarine

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[1] R. I. Gen. Laws Ann., sec. 2-1-23.

[2] U. S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine Areas, Hearings before a subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, 90th Cong., 1st sess., 1967, p. 30.

[3] For example see U. S., Department of the Interior, Fish and Wildlife Service, National Estuary Study, Volumes I-VII (Washington, D. C.: U. S. Government Printing Office, January, 1970); and U. S., Congress, House, Committee on Government Operations, Protecting America's Estuaries: Florida, Hearings before a subcommittee of the Committee on Government Operations, 93rd Cong., 1st sess., Part (1-A), 25 May 1973, and Part (2), 26 May 1973.

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TABLE 5-3

LOSS OF IMPORTANT FISH AND WILDLIFE ESTUARINE HABITAT

State	Total Area	Basic Area of Important Habitat	Area of Basic Habitat Lost by Dredging and Filling	Percent Loss of Habitat
Alabama	530,000	132,800	2,000	1.5
Alaska	11,022,800	573,800	1,100	.2
California	552,100	381,900	255,800	67.0
Connecticut	31,600	20,300	2,100	10.3
Delaware	395,500	152,400	8,500	5.6
Florida	1,051,200	796,200	59,700	7.5
Georgia	170,800	125,000	800	.6
Louisiana	3,545,100	2,076,900	65,400	3.1
Maine	39,400	15,300	1,000	6.5
Maryland	1,406,100	376,300	1,000	.3
Massachusetts	207,000	31,000	2,000	6.5
Michigan*	151,700	151,700	3,500	2.3
Mississippi	251,200	76,300	1,700	2.2
N. Hampshire	12,400	10,000	1,000	10.0
N. Jersey	778,400	411,300	53,900	13.1
N. York	376,600	132,500	19,800	15.0
N. York (Gr. Lakes)	48,900	48,900	600	1.2
N. Carolina	2,206,600	793,700	8,000	1.0
Ohio*	37,200	37,200	100	.3
Oregon	57,600	20,200	700	3.5
Pennsylvania	5,000	5,000	100	2.0
Rhode Island	94,700	14,700	900	6.1
S. Carolina	427,900	269,400	4,300	1.6
Texas	1,344,000	828,100	68,100	8.2
Virginia	1,670,000	428,100	2,400	.6
Washington	193,800	95,500	4,300	4.5
Wisconsin*	10,600	10,600	0	0.0
Total	26,618,200	7,988,100	568,800	7.1

Source: U. S., Congress, House, Committee on Merchant Marine and Fisheries, Estuarine Areas, Hearings before a subcommittee on fisheries and Wildlife Conservation of the House Committee on Merchant Marine and fisheries, 90th Cong., 1st sess., 1967, p. 30.

*In Great Lakes Only: shoals (areas less than 6 feet deep) were considered estuaries.

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environment.[1] They did feel, from a management point of view, that the states represented the logical managerial entity for these areas.[2] It is the action of this entity that is examined herein.

The need for proper use-management of the estuarine area is increasing due to the accelerating demand for shoreline areas as potential commercial sites. A recent study of San Francisco Bay by Luken has illustrated the impact of regulation upon the public and private sectors of the economy in the San Francisco Bay area.[3] Luken points out that restrictions placed upon the reclamation of wetland areas will result in the transferring of income in both the private and public sectors of the economy. In the private sector, the restrictions placed upon wetland reclamation cause the owner of wetlands to lose rental income and the owner of lands suitable for development to gain rental income as the development moves to his lands. Curtailment of reclamation of wetlands will also shift economic activity to those cities with no restrictions and possessing lands suitable for development, and these cities will thus gain in terms of increased tax revenues. The analysis is made more complex if we consider the environmental gains and/or losses resulting from the regulation.

The San Francisco Bay area study estimates potential gross rental losses of between $46,800 to $110,000 per acre due to restrictions placed on the reclamation of wetlands.[4] Legal controls placed upon the development

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[1] U. S., Department of the Interior, Fish and Wildlife Service, National Estuary Study, Volume 5, p. 49.

[2] Ibid., Volume 7, Appendix K, p. 7.

[3] Ralph A. Luken, "Preservation of Wetlands: The Case of San Francisco Bay," Natural Resources Journal, Volume 14 (January, 1974), pp. 139-152.

[4] Ibid., p. 144.

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rights and specific denial of title are suggested as one means of eliminating this rental gain. A system of transfer payments is also proposed to eliminate the gain and loss between communities.

Given this brief background information on the problems associated with the coastal zone wetland areas, the remainder of this section will examine some of the legislation and programs adopted by various states to preserve these estuarine areas from further physical alteration. Heath has identified four types of legislative controls employed by the states that go beyond the routine protection given estuaries and wetlands.[1] They are: (1) permits required prior to any dredging, filling or alteration of or in coastal wetlands (e.g., Alabama, Connecticut and Delaware);[2] (2) bulkhead lines required to control leasing or dredging and filling (e.g., Florida);[3] (3) interim permit controls over dredging and filling (e.g., California);[4] and (4) county zoning (e.g., Delaware).

As of 1970, several of the states had programs whereby estuarine areas may be acquired by a state agency.[5] In Connecticut, the Board of Fisheries and Game has attempted to acquire as much as possible of the remaining 14,800 acres of non-private tidal marshes. Similar attempts have been made in Delaware, where funding for the conservation and protection of estuarines has ranged from $50,000 to $300,000 annually. Most

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[1] Milton S. Heath, Jr., "Estuarine Conservation Legislation in the States," Land and Water Law Rev., Volume 5, (1970), pp. 356-7.

[2] Ala. enrolled Act, S. 311 (1973); Conn. Pub. Acts No. 695 (1969); and Del. Code, secs. 6601 through 6622 (1973).

[3] Fla. Stat., secs. 253.122-123 (1965).

[4] Cal. Gov't. Code, sec. 7.2 (1966).

[5] John O. Ledwigson, "Managing the Environment in the Coastal Zone," Environmental Reporter, Monograph No. 3 (May 1, 1970), pp. 6-10.

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all of the other coastal states have adopted programs for the acquisition of the wetland; however, it appears that their acquisition programs, for the most part, have been hampered by insufficient levels of funding.[1]

The estuarine protection legislation for the states of Maine, Maryland, New York and Washington will be discussed in the following pages of this section. These states are felt to be representative of the attempts made on the part of the states to protect the coastal estuarine and marsh areas.

Maine

In addition to its general water pollution control legislation, Maine's principle protection for estuarine areas is its 1967 Coastal Wetlands Alteration Act.[2] Under this law, no person, agency or municipality may fill, dredge, or otherwise alter any coastal wetland without a valid permit.[3] Application for permits are made with the municipal officers in the municipality affected and with the Wetlands Control Board. Permits may be denied if, in the opinion of either body, its issuance "would adversely affect the value or enjoyment of the property of abutting owners, or would be damaging to the conservation of public or private water supplies or of wildlife or fresh-water, estuarine or marine fisheries."[4] Appeals may be made to the Superior Court if the permit is denied or if the applicant feels that the conditional permit will deprive the owner of the reasonable use of property or result in a taking without compensation.[5]

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[1] Heath, "Estuarine Conservation Legislation in the States," p. 358.

[2] P. L. 1969, c. 348, as amended by P. L. 1969, c. 379; P. L. 1971, c. 336; and further amended by P. L. 1973, c. 256, 12 Me. Rev. Stat. Ann., secs. 4701 through 4709.

[3] 12 Me. Rev. Stat. Ann., sec. 4701.

[4] 12 Me. Rev. Stat. Ann., sec. 4702.

[5] 12 Me. Rev. Stat. Ann., sec. 4704.

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Certain exemptions are provided for under the Act. For example, the Wetlands Control Board may exempt certain activities or waive procedural requirements, as long as it will not be inconsistent with the purposes of the law.[1] Furthermore, the act does not "prohibit the normal maintenance or repair of installations and facilities of any utility...abutting or crossing said wetlands, provided no watercourse is substantially altered."[2]

The wetlands alteration law of Maine has come under court review in at least one instance.[3] The court was faced with the question as to whether the state, through the exercise of police power, could prevent a riparian from filling wetlands that he owned. Conforming to the prevailing opinion that police power is not justified, the court state that: "between the public interest in braking and eventually stopping the insidious despoliation of our natural resources which for so long have been taken for granted, on the one hand, and the protection of appellant's property right on the other, the issue is cast."[4] The court recognized that the appellant's land constituted a valuable part of the natural resources of the State of Maine and played a significant role in the conservation and development of aquatic and marine life, game birds and waterfowl, the protection of which was sought by the wetlands act. The court also recognized, however, that the appellant's land, in the absence of reclamation, possessed no commercial value whatever.

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[1] 12 Me. Rev. Stat. Ann., sec. 4707.

[2] 12 Me. Rev. Stat. Ann., sec. 4708.

[3] State of Maine v. Johnson, 265 A. 2d 711 (Me. 1970). Cited in Meyers and Tarlock, Water Resource Management, pp. 777-779.

[4] Meyers and Tarlock, Water Resource Management, p. 778.

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The court noted that the wetlands involved, of which the appelant's holdings are but a minute part, are nonetheless of statewide concern. Thus, the court stated that: "the cost of its preservation should be publicly borne. To leave appellants with commercially valueless land in upholding the restriction presently imposed, is, to charge them with more than their just share of the cost of this state-wide conservation program, granting fully its commendable purpose."[1] The court thus ruled that the application of the wetlands restriction, by denying the applicant's proposed fill, deprived them of the reasonable use of their property and thus constituted an unreasonable exercise of police power equivalent to taking within constitutional considerations.

Maryland

Following an extensive study done at the University of Maryland,[2] the state passed a wetland statute in 1970.[3] This act expressly recognizes the economic, ecological, recreational, and aesthetic values of wetlands, and realizes that these areas could be destroyed due to unregulated landfilling and reclamation by riparians.

The act is discussed here only with reference to one unique feature of the law; it distinguishes between two types of wetlands: public and private.[4] Public wetlands are defined as those below the mean high tide. Private wetlands are other lands bordering on or lying beneath tidal waters, which are subject to regular or periodic tidal action and which support

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[1] Ibid.

[2] U. S., Department of the Interior, Federal Water Pollution Control Administration, Chesapeake Bay in Legal Perspective, by Garrett Power, Estuarine Series Study No. 1 (Washington, D. C.: U. S. Government Printing Office, 1970).

[3] Md. Ann. Code, art. 66C, secs. 718-31 (1970 rep. vol. and 1972 supp.).

[4] Md. Ann. Code, art. 66C, sec. 719.

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aquatic growth. The Department of Natural Resources is authorized by the law to develop rules relative to dredging and filling activities in private wetlands.

The public wetlands may not be filled without a permit from the Board of Public Works. In granting, denying or limiting any permit, the Secretary of Natural Resources must consider the effect of the work on public health, marine fisheries, wildlife, economic benefits, and the public policy of law.[1] A public hearing must be held on all permit applications and a decision must be rendered within 30 days after the hearing.

According to the law, four uses are allowed on private wetlands. They are:[2] (1) conservation of soil, (2) trapping, hunting and fishing; (3) reclamation of fast land owned by a natural person and lost during his ownership of the land by erosion or avulsion to the extent of provable pre-existing boundaries.

A cease and desist order has been issued on at least one occasion by the Department of Natural Resources to halt an unlicensed dredging operation.[3] The work was being conducted on both public and private wetlands. The Department charged that the operation was being conducted without a permit as required under the act, and without a permit as required by state sediment control law.

New York

Since 1966, New York has had the authority to control dredging, filling, channelization and other physical alteration of navigable waters under its

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[1]Md. Ann. Code, art. 66C, sec. 727, as amended by H. B. 591 (1973).

[2]Md. Ann. Code, art 66C, sec. 723, as amended by H. B. 428 (1973).

[3]See Environmental Reporter Current Developments, Volume 3, (December 15, 1972), p. 946.

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Stream Protection Act. This law, however, excluded Nassau and Suffolk counties where the majority of the tidal wetlands are located. It has been noted that in these counties, "development had gone unchecked for three centuries with devastating losses to fish and wildlife habitat. Encroaching urban growth made tidal wetlands more valuable for fill and housing than for the vital environment functions they fulfill."[1] Therefore, effective June 22, 1973, the State of New York enacted a Tidal Wetlands Act, which provides for an inventory of such lands and establishes controls over their alteration.[2] The new law is intended to provide protection for these previously unprotected areas.

Under the 1973 law, the Commissioner of Environmental Conservation is required to make an inventory of all tidal wetlands in the state of New York. A tentative tidal wetlands boundary map will be prepared by the Commissioner and a public hearing will be held to provide person the opportunity to suggest deletions or additions to the map.[3] Based upon the hearing testimony, and other pertinent data, the Commissioner shall establish the final bounds for each wetland.[4] Persons aggrieved by the establishment of such boundaries may seek judicial review concerning the Commissioner's decision.

Prior to the effective date of regulations adopted by the Commissioner, no person may alter any tidal wetland or areas adjacent to them, unless a permit has been obtained.[5] Persons able to show a hardship caused by this

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[1] "Wetland--A New Public Policy," The New York State Environment, 1 August 1973, p. 2.

[2] Laws of New York, Chapt. 790, secs. 25-0101 through 25-0602 (June 22, 1973).

[3] Laws of New York, Chapt. 790, sec. 25-0201 (3).

[4] Laws of New York, Chapt. 790, sec. 25-0201 (4).

[5] Laws of New York, Chapt. 790, sec. 25-0202 (1).

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requirement may petition the Commissioner for a review of the application of the restriction. If the Commissioner, after a hearing, finds that the proposed alteration will not be contrary to the provisions of the act, then the activity may continue. Permission may be revoked, however, if the terms are violated.

Upon completion of the inventory, the Commissioner is required to adopt land-use regulations to cover the inventoried wetlands. In establishing these regulations, the Commissioner is required to consider, but is not limited to the following:[1] (1) the public policy of the act; (2) the present and potential value of these lands for marine food production; (3) the value as wildlife habitat; (4) the value for flood and storm control; and (5) the recreational, educational, and research value of the area.

Once the inventory is completed, certain activities in the area are subject to regulation. These regulated activities include dredging, filling, erection of any structures or roads, and the driving of pilings or placing any other obstruction in the area. Any other activities which might substantially impair or alter the natural conditions of the tidal wetland area are subject to regulation.[2]

Any individual or group, public or private, proposing or causing to be conducted an activity regulated under the act upon an inventoried tidal wetland must apply for a permit with the Commissioner.[3] When granting, denying or limiting a permit, the Commissioner must consider the compatibility of the activity with reference to the public health and welfare,

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[1]Laws of New York, Chapt. 790, sec. 25-0302 (1).

[2]Laws of New York, Chapt. 790, sec. 25-0401 (2).

[3]Laws of New York, Chapt. 790, sec. 25-0402 (1).

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marine fisheries, shellfisheries, wildlife, flood, hurricane and storm dangers, and established land use regulations.[1] The Commissioner may also impose certain limitations and conditions on the permit so that it will comply with the public policy of the act. A bond may also be required to insure compliance with the established conditions and limitations.[2]

Washington

The 1971 "Shoreline Management Act"[3] in Washington gives broad coverage to estuaries, as well as to other water environments. The Act basically covers all of the water areas of the State including reservoirs, and their associated wetlands. This Act established a cooperative program for shoreline management between local governments and the state, where the local governments have the primary responsibility for initiating and administering the regulatory program. The Department of Ecology operates in a supportive and review capacity to insure compliance with the provisions of the Act. The Department is also responsible for the establishment of guidelines consistent with the Act.[4] The public is given the opportunity to present statements and views on the proposed guidelines.

Local governments are responsible for an inventory of and the development of a master program for these shorelines.[5] The master programs are to include, when appropriate, the following elements or considerations:[6] (1) economic development; (2) public access; (3) recreation; (4) conservation;

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[1]Laws of New York, Chapt. 790, sec. 25-0403 (1).

[2]Laws of New York, Chapt. 790, sec. 25-0403 (3).

[3]Rev. Code Wash., Chapt. 90.58, as amended July 16, 1973.

[4]Rev. Code Wash., 90.58.060.

[5]Rev. Code Wash., 90.58.070.

[6]Rev. Code Wash., 90.58.100 (2).

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and (5) historic, cultural and other aspects. If the local governments fail to carry out this responsibility, then the obligation falls upon the Department of Ecology.

The Shore Line Management Act specifies that no development[1] may be undertaken except that which is consistent with the provisions of the Act. The provisions being applicable to all agencies of state government, counties, and public and municipal corporations.[2] No substantial development may be undertaken on shorelines of the state without first obtaining a permit from the government entity having administrative jurisdiction.

Final guidelines were established by the Department of Ecology on June 20, 1972.[3] The first section of the guidelines deals with the development and implementation of the master programs. Section two of the guidelines defines those natural systems to which the Shoreline Management Act applies. Section three of the guidelines examines specific uses or groups of uses, broadly defined, that must be considered in the development of local regulations. Twenty-one uses or groups of uses are discussed in section three. Frequent mention is made of the fact that special attention should be given to features such as the effect of the proposed use on aquatic life and wildlife habitat and propagation, the aesthetic quality of the area and scenic views, the recreational experience, and archeological and historic sites.[4]

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[1] "Development" is defined as "construction or exterior alteration of structures; dredging; drilling; dumping; filling; removal...bulkheading... or any project of a permanent or temporary nature which interferes with the normal public use of the surface of the waters overlying lands subject to this chapter...Rev. Code Wash., 90.58.030 (3) (d).

[2] Rev. Code Wash., 90.58.140 (1).

[3] Wash. Admin. Code, 173-16-010 through 173-16-200.

[4] See e.g., Wash. Admin. Code, secs. 173-16-060 (3) (h); 173-16-060 (2) (b); 173-16-060 (20) and 173-16-060 (21).

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Summary and Analysis of Economic Implications

The estuarine legislation, discussed previously, would appear on the surface to increase the degree of protection for estuarine areas. However, there may be some limitations in making these laws effective. As mentioned earlier, the states have been and still are hampered by inadequate funds to implement the legislation and acquisition programs to the highest degree. Second, the states that appear to have some of the most comprehensive legislation, New York for one, are those that have already suffered the greatest in terms of the loss in natural fish and wildlife habitats. The legislation will not be able to regain lands previously lost. The optimum goal for the legislation now must be to retard any further destruction of these lands.

The economic impact of the marsh, wetland and estuary legislation depends upon (1) the potential extra-market benefits resulting from the implementation of the legislation, and (2) the potential transfer of income in both the private and public sectors of the economy. If the potential extra-market benefits are greater than or equal to the potential loss of rental income to owners of lands suitable for development, then the legislation should be adopted.

Luken's study of San Francisco Bay illustrates the potential economic impact which results from the adoption of marsh, wetland and estuary legislation. To reduce part of the adverse impact of transfers of income within the private and public sectors of the economy, several alternatives appear to be desirable. In the private sector, legal constraints placed upon the right to develop certain land and specific denial of title to marsh, wetland and estuarine areas are possible means of eliminating the rental gains in the private sector. In the public sector, a system of

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transfer payments between communities and states is seen as one alternative to eliminating the gains and losses resulting from the adoption of the marsh, wetland and estuary legislation.

All of the legislation discussed up to now in this chapter have been laws intended to directly preserve and protect the natural habitats. They are restrictive laws in the sense that they are concerned with limitations placed upon the activities that individuals and agencies can perform within the natural habitat areas. The laws examined and discussed in the next section of this chapter might be viewed as liberating laws in the sense that they define certain "inalienable" rights that man possesses with respect to his environment.

5-7. State Environmental Policy and Protection Acts

The establishment of the National Environmental Policy Act (NEPA) of 1969,[1] has acted as a stimulus to promote state environmental policy and protection acts. At this time, approximately 20 states have adopted broad environmental protection legislation to protect the overall quality of the environments within the respective states (See Table 5-4). Each state act varies in specific features, but, in general, the goals of the acts and amendments are to preserve and protect the natural environments for present and future generations and to provide for and establish the rights of the citizens to pursue this goal.

The laws which are discussed below provide the broadest type of protection for the aquatic habitats. This protection is afforded not by specifically trying to protect the habitats, as in the case of a stream

[1] P. L. 91-190, January 1, 1970, 83 Stat. 852, 42 U. S. C. A. 4321 et seq.

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preservation law; rather, it is by specifying that the individuals have a right to a quality environment. This right includes the preservation and maintenance of the habitats in a manner that is condusive to achieving a high quality of life. It is by these acts that the individual is freed on the one hand to pursue his own goals, while constrained by the recognition that his actions must be consistent with the common values and goals of society.

In some respects, the state environmental policy and protection acts may be viewed as a "return to the commons." As noted previously in this study, individual aspirations, with respect to the use of the "common", led to its over-use and demise. Society has come to recognize that the "commons" function for society only when treated as a collective good. Key aspects of the state environmental policy and protection acts are tied to the principle that some of the elements in the "bundle" of property rights would benefit society more if they were held collectively by society rather than remain allocated among individuals.

State Environmental Policies

State enviornmental policies are expressed either in state constitutions or legislative enactments. These policies provide the guidelines and framework necessary to give purpose and direction to the area under control or regulation. Several such state policies are discussed below by way of illustration. In Illinois, as in at least eight other states,[1] the public is given the constitutional right to a healthful environment (See Table 5-4). The Illinois constitution provides that: "the public

[1]Florida, Michigan, Montana, New York, North Carolina, Pennsylvania, Rhode Island, Virginia. For a discussion on state constitutional adoptions see A. W. Reitze, Environmental Law, Volume 1, 2nd ed., (New York: North American, Int'l., 1972).

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TABLE 5-4

CITATIONS TO STATE ENVIRONMENTAL POLICY AND PROTECTION ACTS

State	Title of Act	Citation
California	California Environmental Quality Act of 1970	Calif. Public Res. Code, Secs. 21000 et seq. ER-State Air Laws, 321:0201
Connecticut	Connecticut Environmental Protection Act	Public Act No. 872, Laws of 1971 ER-State Air Laws, 331:0051
Delaware	Environmental Protection Act of 1973	Title 7, Del. Code, Secs. 6001 et seq.
Florida	Florida Environmental Protection Act of 1971	ER-State Air Laws, 346:0121
Idaho	Idaho Environmental Protection and Health Act of 1972	Idaho Code, Secs. 39-115 to 118 ER-State Air Laws, 361:0101
Illinois	The Environmental Protection Act of 1970	Ill. Ann. State Ch. 111 1/2, as amended 1973
Indiana	Indiana Environmental Management Act	Title 13, Inc. Code, Art. 7. ER-State Air Laws, 371:0201
Maryland	Maryland Environmental Policy Act	Act 41, Ann. Code Maryland, Sec. 4-7-51 ER-State Laws, 401:0201
Massachusetts	Massachusetts Environmental Protection Law	Ch. 12, Mass. Gen. Laws. Sec. 11D. ER-State Air Laws, 405:0301
Michigan	Thomas J. Anderson, Gordon Roackwell Environmental Protection Act of 1970	Mich. C. L. A., Secs. 691.1201 to 1207. ER-State Air Laws, 411:0201
Minnesota	Environmental Policy Act Minnesota Environmental Rights Act	Minn. Stat., 116D.01 et seq. Minn. Sess. Laws of 1971, Ch. 952.
Montana	Montana Environmental Policy Act of 1971	Rev. Code Mont., secs. 69-6501 to 9-6517 ER-State Water Laws 831:0201
Nebraska	Environmental Protection Act of 1973	Neb. Rev. Stat., Secs. 81-1501 to 81-1532
New Mexico	Environmental Quality Act Environmental Protection Act	N. M. Stat. Ann., Secs. 12-20-1 to 12-20-7 ER-State Air Laws 456:0651
New York	New York Environmental Conservation Law	New York Environmental Conservation Law, Article 1, General Provisions; Article 3. Department of Environmental Conservation; Article 5, State Environmental Board; Article 7, Council of Environmental Advisors; Article 17, Water Pollution Control; and Article 71; Enforcement; Laws of 1972, Chapter 664; Effective September 1, 1972; amended by Chapters 242, 400, 779, and 801, Laws of 1973
North Carolina	North Carolina Environmental Policy Act of 1971	Gen. Stat. N. C., Ch. 113A ER-State Water Laws 866:0201
Ohio	Ohio Environmental Protection Agency	Ohio Rev. Code, Secs. 3745.01 to .09
Washington	State Environmental Policy Act of 1971	Wash. Rev. Code, Secs. 43.21c.010 to 43.21c.900
Wisconsin	Wisconsin Envirionmental Impact Law	ER-State Air Laws, 551:0201
Wyoming	Wyoming Environmental Quality Act	Enrolled Act No. 107, 42d Sess., 1973. ER-State Air Laws 956:0201

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policy of the State and the duty of each person is to provide and maintain a healthful environment for the benefit of this and future generations."[1] "Each individual has a right to a healthful environment."[2] As such, each individual may enforce his right against any party, private or public.

Montana

In 1972, Montana amended its constitution to provide, according to one leading environmental law specialist[3] perhaps the broadest recognition of individual environmental rights held in common. The amendment provides:[4]

> ARTICLE II Declaration of Rights.
> Section 3. INALIENABLE RIGHTS. All persons are born free and have certain inalienable rights. They include the right to a clean and healthful environment and the rights of pursuing life's basic necessities, enjoying and defending their lives and liberties, acquiring, possessing and protecting property, and seeking their safety, health and happiness in all lawful ways. In enjoying these rights, all persons recognize corresponding responsibilities.
>
> ARTICLE IX Environmental and Natural Resources.
> Section 1. PROTECTION AND IMPROVEMENT. (1) The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations.
> (2) The legislature shall provide for the administration and enforcement of this duty.
> (3) The legislature shall provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources.

This amendment implies that the citizens of Montana have always had inalienable environmental rights and can personally pursue, via this right, the protection and enhancement of the environment, to include the

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[1] Illinois Const., Art. XI, sec. 1.

[2] Illinois Const., Art. XI, sec. 2.

[3] A. W. Reitze, Environmental Law, Volume 1, 2nd ed., 1973, suppl., p.8.

[4] Mont. Const., Art. II, sec. 3 and Art. IX, sec. 1, 2, 3.

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TABLE 5-5

STATE CONSTITUTIONAL PROVISIONS REGARDING THE ENVIRONMENT

State	Citation	Effective Date
Florida	Constitution, Article II, Section 7	1968
Illinois	Constitution, Article XI, Section 1 & 2	1970
Michigan	Constitution, Article 4, Section 52	1964
Montana	Constitution, Article II, Section 3, Article IX, Sections 1-4	1972
New York	Constitution, Article XIV, Section 4	1970
North Carolina	Constitution, Article XIV, Section 5	1972
Pennsylvania	Constitution, Article 1, Section 28	1971
Rhode Island	Constitution, Article 1, Section 17	1970
Virginia	Constitution, Article XIV, Section 2	1971

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preservation of aquatic habitats and their related fish, wildlife and recreational resources.

Maryland

The same recognition of the right to a healthful environment, as expressed in the Montana Constitution, is expressed in the Maryland Environmental Policy Act. The Policy of the State of Maryland being that "each person has a fundamental and inalienable right to a healthful environment, and each person has a responsibility to contribute to the protection, preservation, and enhancement of the environment."[1] The policy of the State is also to give most thoughtful consideration to economic, ecological, developmental, recreational, historic, architectural, aesthetic, and other values.[2] The Act recognizes that "adverse environmental effects of proposed actions can be anticipated, minimized, and often eliminated if environmental evaluations are made a part of the decision-making process of the State.[3]

Minnesota

The Minnesota Environmental Rights Act has declared that "each person is entitled by right to the protection, preservation, and enhancement of air, water, land, and other natural resources located within the state and that each person has responsibility to contribute to the protection, preservation, and enhancement thereof."[4]

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[1] Ann. Code of Maryland, Art. 41, sec. 448 (C).

[2] Ann. Code of Maryland, Art. 41, sec. 448 (E).

[3] Ann. Code of Maryland, Art. 41, sec. 448 (G).

[4] Minn. Stat. Ann., sec 116B.01. Also see Minn. Stat. Ann., sec. 40.02.

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California

The California "Environmental Quality Act of 1970"[1] establishes state policy with respect to the environment. This policy being, in part to:[2]

> Develop and maintain a high-quality environment now and in the future, and take all action necessary to protect, rehabilitate, and enhance the envrionmental quality of the state.
>
> Prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history.
>
> Create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations.

Connecticut

The "Connecticut Environmental Protection Act of 1971" points out that "the growing population and expanding economy of the state have had a profound impact on the life-sustaining natural environment."[3] Given this fact, the policy of the State of Connecticut is to "conserve, improve, and protect its natural resources and environment and to control air, land and water pollution in order to enhance the health, safety, and welfare of the people of the state."[4]

Delaware

The "Delaware Environmental Protection Act of 1973" also recognized the impact of growth on the environment. In view of the rapid growth of population and other economic activities, "the land, water and air

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[1] Calif. Pub. Res. Code, secs. 21000 to 21151.

[2] Calif. Pub. Res. Code, sec. 21001.

[3] Public Act No. 872, Laws of 1971, sec. 1.

[4] Ibid.

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resources of the state must be protected, conserved and controlled to assure their reasonable and beneficial use in the interests of the people of the state."[1]

Implementation of Policy

To implement and carry out the state policies, with respect to environmental protection, the states have established various environmental agencies and departments. Below are discussed some of the reorganizations made to implement the policies in a few case study states.

Connecticut

The Commissioner of Environmental Protection is responsible for carrying out the policies expressed in the Connecticut Environmental Protection Act. The Commissioner is directed to (1) promote and coordinate management of water, land and air resources to assure their protection and proper utilization; (2) provide for the protection and management of plants, trees, fish, shellfish, wildlife and other animal life of all types, including the preservation of endangered species; (3) provide for the protection, enhancement and management of natural areas; and (4) control other forms of pollution.[2]

Delaware

In Delaware, the Secretary of the Department of Natural Resources and Environmental Council is responsible for the enforcement of the provisions of the Delaware Environmental Protection Act.[3] The Act also established a seven member Environmental Appeals Board, appointed by the Governor with

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[1]Title 7, De. Code, sec. 6001 (b).

[2]Public Act No. 872, Laws of 1971, sec. 2.

[3]Title 7, Del. Code, sec. 6005.

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the advice and consent of the senate.[1] Persons whose interests have been substantially affected by the actions of the Secretary may appeal to the Board. The Board has the power to affirm, modify, or reverse the actions of the Secretary.[2]

The Board's decision may be appealed to the Superior Court. The Superior Court then has the power to affirm, reverse or modify the Board's decision.[3]

Illinois

In Illinois, administration of the "Environmental Protection Act" is under the direction of the Illinois Environmental Protection Agency. The Agency is established in the Executive Branch, and the agency under the direction of a Director, who is appointed by the Governor with the advice and consent of the Senate.[4] The Agency has the duty to investigate violations of the Act, conduct programs of continuing surveillance, and administer a permit system.

Minnesota

The Minnesota Environmental Quality Council is an eleven member agency established to deal with many environmental problems.[5] Its duties include, in part: the determination of those environmental problems of interdepartmental concern to state government; review of programs of state agencies that significantly affect the environment; and review of environmental regulations and criteria for granting and denying permits by state

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[1] Title 7, Del. Code, sec. 6007.

[2] Title 7, Del. Code, sec. 6008 (a).

[3] Title 7, Del. Code, sec. 6009 (b).

[4] Ill. Stat. Ann., ch. 111 1/2, par. 1004.

[5] Minn. Stat., sec. 116C.03.

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agencies.[1] The Council is also required to prescribe guidelines and regulations setting forth those instances in which environmental impact statements are required to be prepared for new and existing actions.[2] The Minnesota Environmental Policy Act requires that consideration be given to the preservation of natural habitats. This protection includes habitats for "rare and endangered species of plants, wildlife, and fish, and provide for the wise use of our remaining areas of natural habitation, including necessary protective measures where appropriate."[3]

Washington

The Washington "State Environmental Policy Act of 1971" notes that it's the "responsibility of the state of Washington and all agencies of the state to use all practicable means, consistent with other essential considerations of state policy, to improve and coordinate plans for the improvement of the environment."[4] The Act specifically notes that each generation is a "trustee of the environment for succeeding generations," and that the environment should be maintained to insure "diversity and variety of individual choice."[5]

Montana

The Montana Environmental Policy Act established a thirteen member Environmental Quality Council.[6] Among its many duties, the Council is

[1] Minn. Stat., sec. 116C.04.

[2] Minn. Stat., sec. 116D.04, subd. 2.

[3] Minn. Stat., 116D.02, subd. 2 (j).

[4] Wash. Rev. Code, sec. 43.21C.020 (2).

[5] Wash. Rev. Code, sec. 43.21C.020 (2) (a) and (e).

[6] Rev. Code Mont., 69-6508.

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directed to "conduct investigations, studies, surveys, research, and analysis relating to ecological system and environmental quality."[1] In making these studies and investigations, the Council is required to review and evaluate various state agency operating programs and activities in the environmental field to identify actual or potential conflicts, and to make recommendations to the legislature to remedy such situtations. This program review extends to state and local governments, and non-governmental entities or individuals, with particular emphasis concerning their effect on the environment and upon the conservation, development and utilization of natural resources.[2]

Impact Statements

The National Environmental Policy Act of 1969 was established in an effort to assess the impact and alleviate the adverse environmental consequences of federal agency activity. To ensure that environmental values are properly considered in the decision making process, Section 102 (2) (c) requires that "all agencies of the Federal Government shall...include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement..." Refered to as "102 statements," they have served as a stimulus and guideline for similar state action.

Many of the state environmental protection and quality acts require the submission of impact statements for proposed projects. The states of California and Massachusetts will be reviewed concerning their impact report requirements.

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[1] Rev. Code Mont., 69-65149 (d).

[2] Rev. Code Mont., 69-6514 (4).

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California

In California, no state agency, board or commission shall request or expend funds for projects "which may have a significant effect on the environment unless such request of authorization is accompanied by an environmental impact report."[1] The purpose of the environmental impact report (EIR) is to "provide public agencies with detailed information about the effect which a proposed project is likely to have on the environment," and allow these agencies the opportunity to propose alternatives to projects and list ways to reduce the adverse effects that may result.[2]

The requirements for environmental impact reports also apply to local, as well as state agencies. State agencies that are responsible for "allocating state or federal funds on a project-by-project basis to local agencies for any project which may have a significant effect on the environment," must require an impact report from the responsible local government agency.[3]

Specific requirements concerning impact reports may be found in the California Administrative Register 73.[4] This document sets forth proposed guidelines to cover the Environmental Quality Act, including: definitions; application of the Act to projects; evaluation of projects; exemptions from the Environmental Quality Act; contents of environmental impact reports.

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[1] Pub. Res. Code, sec. 21102. "Significant effect on the environment" meaning: (1) potential to degrade the quality of the environment; (2) individually limited but cumulatively considerable effect; (3) substantial adverse effects on human beings, either directly or indirectly. Pub. Res. Code, sec. 21083 (a)-(b).

[2] Pub. Res. Code, sec. 21061.

[3] Pub. Res. Code, sec. 21150.

[4] No. 6-B. Title 14 (Resource Agency). February 10, 1973.

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The California Environmental Quality Act of 1970 has already undergone court action. The first opportunity for the courts to construe the provisions of the Environmental Quality Act came in the case of Friends of Mammoth v. Board of Supervisors of Mono County.[1] The principle legal question in this case was whether or not the California Environmental Quality Act "applies to private activities for which a permit or other similar entitlement is required."[2] As enacted in 1970, the Environmental Quality Act did not define the term "project". The court, therefore, construed the term to mean that "before an environmental impact report becomes required, the government must have some minimal link with the activity, either by direct proprietary interest or by permitting, regulating, or funding private activity."[3]

Based upon this view, the court concluded that the case in question required the preparation of an impact report. The court stated that "if private activities for which a permit is required were exempted from the operation of the act, projects with admittedly deleterious ecological consequences would be covered only if construction, acquisition or other development were undertaken by the government authority but not if the same authority allowed private enterprise to engage in the identical activity."[4] Such a situation would prove to be unrealistic and have significant economic implications.

If private activities, for which a permit were required, were exempted from the law, this action would have the potential of shifting economic

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[1] 502 Pac. 2d 1049, 8 Cal. 3d 247, 104 Cal. Rptr. 761 (1972).

[2] 8 Cal. 3d 247, 252.

[3] 8 Cal. 3d 247, 263-264.

[4] 8 Cal. 3d 247, 264-267.

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activity from the public to the private sector. Public projects requiring a report would become more costly, relative to similar private projects which would not have to bear the added expense of preparing impact reports. In addition to possible environmental damages, trade-offs might result in favor of privately produced goods relative to public goods. In response to Friends of Mammoth, the California Environmental Quality Act was amended to clarify the term "project," which now applies as well to private activities for which a permit is required.

In 1973, the court once again was called upon to construe the California Environmental Quality Act. In the case of County of Inyo v. Yorty,[1] the question was whether the City of Los Angeles was "required to file an EIR with reference to its continued extraction of subsurface waters from the Owens Valley area" of Inyo County.[2] The court relied on the Friends of Mammoth case and guidelines promulgated by the California Resources Agency to once again define the term "project". The court found that Los Angeles' "tapping and extraction of underground water is an 'on going project', requiring an (environmental impact report) within the contemplation of section 15070 of the Guidelines."[3] Thus, the court held that the filing of an environmental impact report by the city was required.

Massachusetts

In Massachusetts, no agency of the state may commence any work or project that might cause damage to the environment until sixty days after it has published a final environmental impact report.[4] The impact reports

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[1]32 C. A. 3d 795.

[2]32 C. A. 3d 795, 798.

[3]32 C. A. 3d 795, 808

[4]32 C. A. 3d 795, 814.

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are to contain: detailed statements on the work proposed and its environmental impact; measures to minimize environmental damages, and alternatives to the proposed actions and their environmental consequences. All impact reports are to be begun during the initial planning and design stages of a project or activity.

The secretaries of the executive offices are each required to establish rules and regulations necessary to carry out the impact report requirements. These rules and regulations must be approved by the secretary of environmental affairs, and must conform with the requirements of the National Environmental Policy Act.

Funds made available for the purpose of design of or planning or performing of work on projects may be expended on research, preparation and publication of the impact reports. Funds may also be transferred or made available to other departments or agencies for the purpose of preparing impact reports.

Summary and Analysis of Economic Implications

This over view of state environmental protection and quality acts points up the fact that certain states are becoming more aware of the impact of public and private actions upon the environment. As such, they are taking positive steps to prevent or minimize the damage to the natural environment. The state environmental protection acts provide and illustrate another legal tool which has evolved in an attempt, in part, to protect the aquatic habitats. When used in conjunction with specific legislation, as noted previously, these acts leave little question as to the goals to be followed.

To effectively prevent or minimize damage to the environment, environmental protection laws, as with other related laws, must be complied

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with in spirit as well as in fact. Failure to meet both requirements results, in many cases, in a paper shuffling exercise.

The physical characteristics of the water and air resources make it inevitable that they be commonly owned by society. As noted previously, unrestricted use of these resources led to their over use and degradation, relative to private property. Only recently, as the human demands upon the resources grew relative to the available quantity of the resources, have the states established rules concerning the use of these common property resources. In the frontier days, the benefits to society from the control of the common property would have been far out weighed by the cost of such control. Thus, it paid to have a "no policy" policy.[1] Given the economic growth and development that has now taken place in the United States, however, the benefits from control may out weight the cost in the future, and this calls for positive policy action.

The state environmental policy and protection acts are key to bringing about protection of the common property resources. These acts require that the extra-market values be considered in the decision making process. The procedures set forth in the acts require that the extra-market values be considered and that explicity comparisons of all feasible alternatives be made by the administrative agencies. Such consideration allows for an estimation of the opportunity cost of the selection of any one alternative. Due to the collective nature of many of these values, if they are to be provided to society it must be via some form of collective action.

The evolution of the state environmental protection acts also reflects the influence of the "new property" right holders. As the pace of economic

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[1] J. H. Dales, Pollution, Property and Prices (Toronto: University of Toronto Press, 1968), p. 63.

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growth and development continues, the urban populations will continue to press for more social rights in private property, especially the landed rural property. The rights of the private property owners must be recognized to assure the individual's economic well-being, however, the individual's rights will have to be brought into balance with the rights of society.

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CHAPTER 6

AN OVERVIEW OF ECONOMIC-LEGAL AND POLICY IMPLICATIONS

The objectives of this study were to search for answers to questions concerning: (1) what is being done to protect the aquatic habitats, and (2) why it is being done, with specific reference to non-market concerns and values. These objectives were approached using a legal-economic framework for the analysis.

Research efforts directed towards answering the first question have led to the conclusion that the United States has a tradition of private property rights and progressive economic development which frequently ignores the extra-market values which society receives from the natural environment; the main concern has been that of fostering individual gain and advancement. In many instances the result has been the degradation and destruction of natural resources, particularly aquatic habitats on which some of these extra-market values are dependant.

In answering the first question, the focus has been upon state laws and policies that will protect, preserve or have an otherwise desirable impact upon the aquatic habitats. Two bodies of law were identified as being relevant. They are: (1) traditional water law doctrines, and (2) conservation laws.

From a public interest point of view, provisions found within the various state water law doctrines frequently have a degrading effect upon the quality of the natural environment in general and upon the aquatic habitats in particular. For example, under the traditional appropriation

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doctrine, the law has been biased in favor of commercial-economic uses of the water resource. To make a valid appropriation of the water, the doctrine calls for the diversion and application of water to beneficial uses. In the past most of the beneficial uses have been viewed by the courts, and defined in the statutes and constitutions of the states, in terms of market uses. Both the diversion and beneficial use requirements have led to conflicts concerning the market and extra-market uses of water. Conflicts of this nature are likely to increase as more demands are placed on the scarce water resources.

Other features in the water law doctrines have been able to partially off-set the degrading influences. For example, the traditional common law riparian doctrine, which called for the maintenance of water undiminished in quantity and quality, is complementary with the extra-market values. On the other hand, the common law doctrine has been modified in the United States to enable riparian landowners to make a "reasonable use" of the water resource and, as a result, conflicts arise between the market and extra-market values.

Certain changes have recently taken place in the basic doctrines which provide increased recognition for the extra-market values. Specifically, in some states the diversion requirement has been eliminated and in others the beneficial use concept has been modified to include recognition of the extra-market values. But, it was found that in those cases where the extra-market values were recognized, a bias still exists in favor of the traditional market values, i.e., agricultural and industrial uses have a higher priority ranking than recreational uses of water.

In addition to the traditional water laws, this study has identified and analyzed six other types of laws which have evolved in an attempt to

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preserve and maintain the aquatic habitats. These six types of laws, termed herein as conservation laws, have tended to lessen some of the adverse impacts emanating from the operation of the water laws. The conservation laws are intended primarily to control and eliminate those activities of man which were degrading and destroying the natural environments.

One overall conclusion that may be derived from the review of the water and conservation laws is that there is a significant lack of uniformity between the laws adopted by the individual states. Part of this lack of uniformity may be explained on the grounds of differing geo-climatic and socio-economic conditions. On the other hand, much of the lack of uniformity is due to the fact that the states are either unaware of or unresponsive to effective laws that exist in other states with similar geo-climatic and socio-economic conditions. This study should aid in making the states more aware of the existence of such laws and of their economic implications.

In answering the second question posed in the objectives, a socio-economic analysis was employed. To gain insights into the relationship between law and economics and the evolution of law in response to changing social preferences, the writings of John R. Commons, Richard T. Ely, Max Weber, and others were relied upon. This study concludes, as previous authors have also noted, that the legal and economic systems are not two separate and mutually exclusive social sciences. In a static sense, law and economics are related in both form and content, but both are subject to change. As individuals place new demands upon the legal-economic institutions, either new norms are created or there is a change in the existing body of rules.

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The legal system was viewed in this study as one of the primary institutions for establishing social order, which, among other things, is essential for the operation of the economic system. The social order is founded upon rules and/or norms of behavior which allows the consequences of social choice to be predictable and subject to evaluation. In modern-western civilizations, the legitimacy of the social order is most frequently founded upon the belief in legality, whereby persons are willing to conform with certain rules that have been established in a rational-formal manner and are imposed via accepted procedures.

The evolution of laws and legal concepts examined in this study have arisen out of the demands by individuals upon the legal-economic institutions and from conflict situations. Demands by individuals and conflicts surrounding the legal-economic institution of property illustrate how laws and legal concepts evolve in response to these demands and conflicts, and the economic implications of this change.

In response to demands for use of natural resources in various economic activities, private property rights evolved that were consistent with the goal of economic growth and development in the United States. Individual rights to exclude, acquire, possess, use and sell property objects, as a means of creating individual wealth, were viewed as a means of promoting maximum national wealth and development. As more property moved from public to private control, individual rights gained a dominant position with respect to social rights. But, in earlier times the social rights were still in harmony with the individual rights since private goals complemented and fostered the achievement of the dominant social goals of economic growth and development.

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Growing concern over the destruction and degradation of the environment have in recent years created demands and conflicts which in turn are bringing about changes in the relationship between individual and social rights in property. As a result, a body of "new property" rights evolved. As the quality of life in the urban centers declined, the "new property" right holders sought a revision in the traditional rights of property in natural resources. They have begun to assert that land and water resources should provide to society a means of achieving a quality environment over and above their use as factor inputs in agriculture, forestry and industrial activities. Thus, a growing demand for social rights in property is evolving, already sanctioned by some laws and in some states, and which are the impetus behind federal land use planning legislation.

The movement from individual to social rights will promote new obligations and limits upon the rights of property owners. Since the protection of property rights gives the owner the opportunity to collect rents and produce individual wealth from that property, the movement from individual to social rights will have an impact upon the distribution of wealth in society. Under certain circumstances, this change may require that individuals receive compensation for their loss. In some cases their compensation may be in monetary terms, in others it will be psychological in nature by associating their good with that of the community.

The preceding over view has dealt with the stated objectives of this study. The following pages set forth specific legal-economic and policy implications based upon this research on the various state water and conservation laws.

Three features within the traditional water law doctrines play an important role in the preservation and protection of the aquatic habitats.

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They are: (1) ownership of the water rights, (2) the concept of beneficial or reasonable use, and (3) the diversion requirement.

With respect to the ownership of water rights, the research conducted indicates that many of the states are unable to appropriate water in the name of the state or a state agency. This feature acts as a constraint upon the allocation of water resources to public uses, e.g., instream aquatic habitat preservation. For an efficient and effective system of property rights it exist, the rights should be transferable within and among the public and private sectors of the economy. It is recommended that the states, especially the appropriation states, adopt legislative provisions which allow for public acquisition of water rights in the name of the people of the state for public purposes, e.g., minimum stream flows and minimum lake levels. This change is justified on both traditional economic grounds and in the interests of the extra-market values.

Beneficial use or reasonable use of water has been the subject of litigation in many of the states. Part of the problem arises due to the lack of specific legal definitions for the terms. In the past, the courts have defined the terms on a case by case basis. Many of the state statutes which define beneficial use remain biased towards the market uses of water resources. This study supports the conclusion that, from an economic point of view, the public interest would be served by expanding the beneficial and reasonable use concepts to cover the widest possible range of uses. As such, any use which is of an economic and/or social value should be considered beneficial and reasonable. This change would allow for the allocation of water to both market and extra-market uses.

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The 1973 Colorado amendment of its water laws comes close to meeting this broad definition and may serve as a guide to other appropriation states. This law states that:[1]

> 'Beneficial use' is the use of that amount of water that is reasonable and appropriate under reasonable, efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made and, without limiting the generality of the foregoing, shall include the impoundment of water for recreational purposes, including fisheries or wildlife. For the benefit and enjoyment of present and future generations, 'beneficial use' shall also include the appropriation by the State of Colorado in the manner prescribed by law of such minimum flows between specific points or levels for and on natural streams and lakes as are required to preserve the natural environment to a reasonable degree.

This definition should have been even broader in the sense that it should have allowed for more alternatives than the "impoundment of water for recreational purposes, including fisheries or wildlife." All in-stream and extra-market uses should be considered as beneficial.

It should be noted that the cited Colorado statute makes no mention of the diversion requirement. The diversion requirement was established, among other reasons, to direct the use of water resources towards commercial uses. As such, it has acted as a constraint upon the use of water for extra-market, in-stream uses. It is recommended that the diversion requirement be eliminated in an attempt to protect the extra-market values.

In the discussion of the state water laws it was noted that the preference system is biased in favor of the market uses of water resources, i.e., agricultural and industrial uses. In light of the current environmental and energy concerns this system of priorities needs to be re-evaluated. G. E. Radosevich has recommended a unique modification to

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[1] Colo. Rev. Stat., 148-21-3 (7).

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this system.[1] Three categories of uses would be adopted and ranked as: (1) municipal-domestic, (2) public, and (3) private. The municipal-domestic users would maintain their preferred position, but public uses would be granted a position in the ranking which would enable the extra-market uses to be recognized for social functions. Under some circumstatnces the impaired private interests resulting from the public taking may warrant compensation. This compensation could be made via monetary payments, tax incentives or both.

The concept of a minimum stream flow and minimum lake levels for aquatic habitat preservation is extremely desirable from a biological perspective and it should be used nation wide. There is no need for minimum stream flows and lake levels to be defined in complex terms. Rather, what is necessary, is that a state administrative agency be given the authority to set forth specific standards and criteria that will lead to the protection of unique natural habitats in the state's lakes and streams. The standards and criteria should be flexible enough to allow for variations in geo-climatic conditions throughout the nation.

The two-tiered system of minimum flows and lake levels recommended by the National Water Commission could serve as a model for state legislation. This system consists of defining those stream flows and lake levels which must be maintained under all conditions (essential flows and levels), and stream flows and lake levels which should be maintained under "normal" conditions (desirable flows and levels). These minimum flows and lake levels should be subject to both public and private appropriation between

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[1] Allardice et al., Water Law in Relation to Environmental Quality, pp. 556-557.

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specific points or levels on natural streams and lakes as is necessary to maintain and preserve the aquatic and natural environments to a reasonable degree.

An additional means of securing the needed minimum stream flows would be to allow the states' water resource or fish and game agencies to attach the most senior downstream user's rights during periods of non-use. The most senior downstream user could be compensated for allowing the public to exercise his rights.

As pointed out in the body of this study, in the riparian states the most feasible solution to obtaining the needed minimum flows has been one of requiring all upstream diverters to limit their diversions by a certain specific amount. The potential exists that downstream users will be benefited to a lesser degree relative to the loss incurred by upstream users. From an economic point of view, all private and social gains and losses would have to be evaluated and taken into account before the administration of the minimum stream flow system would be justified on economic grounds.

Twenty-two states have already adopted some form of scenic and wild rivers legislation. There is every indication that as man's activities continue to infringe into the remaining unspoiled areas of the states, the public will demand more legislation to preserve and protect the remaining wild and scenic river areas. The North Carolina "Natural and Scenic Rivers System Act" and certain unique features developed in the other states should serve as models for future state legislation in this area of public concern.

This study supports the conclusion that there is a rational economic basis for adopting such proposed legislation. Krutilla's studies of Hell's

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Canyon indicated that the social benefits from preserving unique irreplaceable natural areas may well out run the social costs in terms of development opportunities foregone. Furthermore, this study concludes that the failure on the part of some states to preserve social values may result in a redistribution of income to those states with more adequate legislation. Thus, such legislation appears to be desirable from both a biological and economic point of view.

Stream preservation and encroachment laws provide another legal alternative to the states in attempting to preserve and protect the aquatic habitats. The relative success of the Montana and New York stream preservation laws seem to indicate that they might well serve as models for other states to follow in adopting such legislation.

It would appear, based on previous studies, that small stream intrusion projects with rather substantial economic merit may have a minor impact upon the aquatic habitats. Based on this study, however, this conclusion cannot be drawn in regard to major stream intrusion and channelization projects. Under these latter circumstances, the damage to aquatic habitats may be substantial and the economic merits of these projects have not shown themselves to be justified in all cases. Thus, stream preservation and encroachment laws appear to be needed and justified most when large projects are involved.

With respect to the laws and policies adopted by the various state highway departments in an attempt to preserve and protect the aquatic habitats, the major problem seems to be a reciprocal lack of understanding by both highway and fish and game officials, as to the goals, constraints, and problems faced by the respective agencies. To resolve the conflicts that have evolved in this area, both parties need to be aware of the

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existence of possible trade-offs to solve the problems. Highways can be designed with more consideration given to the aquatic habitats. Conversely, fish and game agencies should strive to provide the highway departments with more accurate and timely information concerning the impact of proposed highways upon the fish, wildlife, and aquatic habitats. This recommendation in turn implies that the fish and game agencies shall be notified well in advance of proposed highway projects. State policies and agency actions should be directed towards closer communication between these agencies.

In the construction of dams and other water impoundments, it is desirable from a biological point of view that, where feasible and effective, fishways and ladders should be installed. If they are feasible and effective the economic benefits will in most cases justify the cost. But, in cases where these facilities are not feasible and/or effective, and where the damage to the migration of fish and the destruction of aquatic habitats is severe, then other alternatives need to be considered, on being the refusal to allow the dam construction. Other alternatives include the use of fish hatcheries to replace lost fish and the proper management of water discharges that will minimize the damage to the aquatic habitats.

In response to the growing destruction of marsh, estuary, and wetland areas for commercial purposes, the people of the states have demanded and have received legislation intended to mitigate the damages caused in these areas. But in many cases, the legislation has been too little and too late. Irreversible changes have taken place that have destroyed valuable aquatic habitats in most areas of the nation. In those areas where the environmental damage appears to be extreme, legislative constraints should be

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placed upon the right to develop these areas and the public should consider acquiring these areas for the general public welfare. Such action would tend to eliminate the potential income transfers that would take place between the public and private sectors of the economy.

State enactment of environmental preservation and protection legislation and/or constitutional amendments have been positive steps towards recognizing and preserving the quality of life in general and the aquatic habitats in particular. The failure of many of these acts has been that they have not defined the public's rights in the environment and do not provide a means of protecting these rights. Legislation in two states are noted as exceptions to this general observation. The Montana constitutional amendment is noteworthy for its inalienable rights provision. The California Environmental Quality Act is desirable from the point of view that private activities for which a state permit or license is required are subject to review by the state environmental agency. Furthermore, the Act makes adequate provisions concerning the requirement of impact statements.

The evolution of the state environmental protection acts reflects the growing influence of the "new property" right holders. As the pace of economic growth and development continues, the urban populations will continue to press for even more social rights in private property, especially in landed rural property.

This study has reviewed and analyzed a rather substantial volume of legal and economic literature concerning the actions taken by the states to preserve and protect their aquatic habitats. Demands on the part of the people of the states for additional and new types of legislation to preserve these areas is bound to grow as less of the areas exist in an unaltered condition. This study is not viewed as an end in the search for

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new and existing legal techniques and economic implications; rather, it should serve as a foundation for more intensive studies of this critical problem area.

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