THESIS

MICHIGAN STATE LIBRARIES

3 1293 01826 4766

LIBRARY
Michigan State
University

This is to certify that the

dissertation entitled

EVOLVING PERCEPTION OF PROPERTY RIGHTS:
MICHIGAN'S WETLANDS MITIGATION POLICY

presented by

Kenrick J. Pierre

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Resource Development

A. Allan Schmid
Major professor

Date August 26, 1997

MSU is an Affirmative Action/Equal Opportunity Institution

O-12771

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.
MAY BE RECALLED with earlier due date if requested.

DATE DUE	DATE DUE	DATE DUE
NOV 0 5 2000 11 2 7 0 0		
APR 0 8 2001 03 29 01		
AUG 1 1 2002		

1/98 c:/CIRC/DateDue.p65-p.14

EVOLVING PERCEPTION OF PROPERTY RIGHTS: MICHIGAN'S WETLANDS MITIGATION POLICY

By

Kenrick J. Pierre

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Resource Development

1997

ABSTRACT

EVOLVING PERCEPTION OF PROPERTY RIGHTS:
MICHIGAN'S WETLANDS MITIGATION POLICY

By

Kenrick Pierre

Wetlands, in their natural state, perform many valuable functions that are difficult to duplicate. However, the demand for land for housing, roads, commercial enterprises and other construction spaces makes it inevitable that some wetlands be converted. By some estimates Michigan has lost about 50 percent of its original wetlands. Some segments of the population believe that the state should make greater efforts to protect wetlands.

Legislation restricting the conversion of wetlands has been enacted. Owners must first obtain permission from the Michigan Department of Environmental Quality (MDEQ) before they can convert wetlands and they must mitigate (recreate) more acreage than they have converted. Much of the wetlands are privately owned. Owners resist, what they consider to be, attempts by "big" government to restrict their private property rights. The ability of the state to regulate, within the existing polity, is limited.

The beneficiaries of wetlands are arguing that the on-site owners of wetlands do not own all the rights to the services of wetlands. The community owns some of the rights to the services of wetlands and is in fact an off-site owner. If the on-site owner converts a wetland, and in the process reduces the services that that wetland provides to the off-site owners, the off-site owners can make a property rights argument too and seek redress from

government. Historically, the on-site owners exercised most, if not all, of the ownership rights to wetlands.

A survey of 975 Meridian township homeowners was conducted to try to gauge peoples reaction to the idea of defining property rights to include the rights of the off-site owners. Three groups, of equal sizes, were given different frames for the wetlands debate. The presumption was that the framing of the debate would significantly affect people's reactions. In this study, the framing of the debate had no effect on people's attitude. Most of the subjects believed that wetlands were very valuable, to the extent that they would be willing to pay more in taxes to preserve them. They also felt a sense of ownership to the stream of benefits of the wetlands. But, they were opposed to any legislation that would limit the ability of a private (on-site) owner to convert his/her land.

Protecting private property from government has become a dogma among some of the active voters. However, the study also revealed that if a frame can be created which establishes the beneficiaries of wetlands as owners, who are entitled to have their property rights protected, there will be support for legislation to restrict the conversion of wetlands. This follows from the fact that there was wide spread support for the proposition that "if someone destroys a community resource he/she should compensate the community for the community's loss".

A case study of the Detroit Metropolitan airport expansion and mitigation project was conducted to provide a factual basis for how policies are actually made. The study revealed that the forces that were in favor of the airport expansion were much better financed and received a more sympathetic hearing from the MDEQ than their opponents. Early in the process, the pro-expansion group characterized the issue as a jobs-versus-the-

environment debate. When the debate is defined this way, those who seek to limit wetlands conversion lose the debate before they can even get their views out to the voters.

DEDICATION

This dissertatin is dedicated to my parents Gladstone and Floodina Pierre, my first and best teachers.

ACKNOWLEDGMENTS

I wish to express my sincere thanks to Professor Allan Schmid who, as Chairman of my Guidance Committee, advised and inspired me and contributed greatly to my intellectual development. I would also like to thank the rest of my Guidance Committee: Professors Cynthia Fridgen, Paul Strassmann and Eckhert Dersch.

TABLE OF CONTENTS

Chapter I
AN OVERVIEW OF THE WETLANDS MITIGATION DEBATE
Introduction 1
Problem Statement 2
Research Objective 4
Justification for the Study 6
Methodology and Data Collection 8
Mail Survey 9
Questionnaire 12
Research Question and Hypothesis 13
Framing the Debate 14
Measuring Attitudes 18
Wetlands Loss 21
Identifying Wetlands 22
Functional Capacity of Mitigated Wetlands 23
Private Good Public Benefit? 24
The Role of the State in Shaping the Economy 26
Valuing Wetlands: Use and Non-Use Values 30
Ownership and Exchange 32
Contingent Valuation 32
Whose Interest Count in Policy Making 34
Organization of the Rest of the Dissertation 36
References 37

Chapter II
LITERATURE REVIEW
Introduction 41
Schools of Thought 41
Origins of The Current Institutions 46
Economic Efficiency 52
Property Rights Externalities and Economic Interdependence 55
References 62

Chapter III
CASE STUDIES
Introduction 66
Cost of Recreating Wetlands 66
Monitoring Wetlands Functions 69
Delineating Wetlands 72
Detroit Metropolitan Airport Mitigation Plan 76
Incompatible Uses of Wetlands 80
Managing the Mitigation Process 83
References 85

Chapter IV
IMPACT OF POLICY FRAMING ON PERCEPTIONS OF PROPERTY RIGHTS
Introduction 86
Sample Frame 86
Analysis of Results 87
Test of Independence 96
References 102

Chapter V
SUMMARY, CONCLUSION AND RECOMMENDATION
Introduction 103
The Mitigation Process 106
The Effect of Framing on Ownership Perception 107
Conclusion 108
Recommendations for Groups Interested in Preserving Wetlands 109
Suggestions for Further Research 111
References 112

Appendix I
ANALYSIS OF VARIANCE: PRO-PRIVATE PROPERTY RIGHTS GROUP (GROUP 1), PRO-COMMUNITY RIGHTS GROUP (GROUP 2) AND NO MESSAGE GROUP (GROUP 3) 113

Appendix II
ANALYSIS OF VARIANCE: PRO-WETLANDS CONVERSION GROUP (GROUP 1) AND PRO-ECONOMIC GROWTH (GROUP 2) 114

Appendix III
COLONIZATION IN MITIGATED SITE: IMMEDIATELY AFTER MITIGATION (SUMMER, 1995) AND SIX WEEKS LATER 115

Appendix IV
CARTOON: THE SPOKANE SPOKESMAN JULY 7, 1995 116

Appendix V
MAP OF DETROIT METROPOLITAN AIRPORT AND MITIGATION SITE CREATED BY THE ENGINEERING FIRM OF JOHNSON, JOHNSON AND ROY. 117

LIST OF FIGURES

Figure I
Effect Of Message Framing On Citizen's Response. 89

Figure II
Positive Response Category. 92

Figure III
Negative Response Category. 93

Figure IV
POLICY IS MADE AT THE INTERSECTION OF
MULTIPLE FORCES. 104

Chapter I

A GENERAL OUTLINE OF THE WETLANDS MITIGATION ISSUES

Introduction

Wetlands contribute significantly to the quality of life we enjoy. Michigan has lost substantial quantities of wetlands to drainage for agriculture and more recently to development. Conversion of wetlands may benefit the owner, but it is often a loss to the society; the public loss may be greater than the private owner's gain. This situation raises some interesting property rights issues.

In 1979 the Michigan legislature enacted the Goemaere-Anderson Wetlands Protection Act[1] "to provide for the preservation, management, protection and use of wetlands..." The Act also provides for the mitigation of wetlands when they are unavoidably destroyed. The mitigated wetlands do not have the same attributes as the original wetlands. This raises the obvious question: why destroy the original wetlands in the first place?

---

[1] The Goemaere-Anderson Wetlands Protection Act has been incorporated into the Natural Resources and Environmental Protection Act of 1994, part 303 of PA 451. However, neither the wording nor the intent of the Act has changed.

As the economy expands and population increases, the demand for houses, roads and other construction spaces makes it almost inevitable that some wetlands be destroyed. (The Act does not affect wetlands already converted for agricultural purposes). This research seeks to examine (1) peoples' perception of property rights as they relate to wetlands and (2) does the framing of policy choices affect support for one policy over another? (3) the cost and efficacy of the wetlands mitigation policy.

Problem Statement

The conversion of wetlands is causing serious environmental problems. It is also causing financial losses to individual property owners in the form of flood damage. Since most of the wetlands that are being converted are privately owned, the state's ability to halt or at least slow down the rate of conversion is limited. The owners of wetland seek to maximize their gain and will put the land to whatever use will achieve that objective. However, using wetlands as building sites and allowing them to perform their natural functions are mutually exclusive activities. Which activity will take precedence over the other will eventually be decided in the political arena.

To give the state greater ability to protect the remaining wetlands while at the same time ensuring that land is available for development, legislation was introduced which designated certain areas as wetlands, that can be converted only with the permission of the state or municipal authorities. If permission to convert the wetland is granted it is usually

done with the condition that the owner mitigates (recreates) at least as much of the wetlands as was converted. Preferably, the mitigation should be done on site or if that is not possible, in the same watershed.

The legislation by itself does not solve the wetlands destruction problem. Wetlands mitigation is expensive and the mitigated wetland may contribute very little to total functional capacity; it is very difficult to duplicate the natural functions of wetlands. In addition to costs and biological constraints there are also institutional constraints. Wetlands owners are apt to go to courts to challenge the restrictions on the use of their property as a taking without compensation -- a violation of the Fifth Amendment provision "...nor shall private property be taken for public use, without just compensation".

The current system of rights and property ownership even when backed by legislation is not enough to protect wetlands. To protect wetlands, the concept of property rights must be redefined and broadened. People are socialized to believe in the sanctity of private property. Popular media and politicians reinforce that belief by constantly attacking the big, faceless and intrusive government. Even though the popular political trend is to reduce governmental "interference", the numerous levels of interdependence among stakeholders in the wetlands debate and the problems they create for each other necessarily involves governmental action for resolution.

This research assumes that it is important to examine stakeholders attitudes toward the idea of extending the concept of property rights to include the immeasurable and

intangible benefits that wetlands provide. These benefits are often high exclusion cost goods that both owners and non-owners enjoy.

Research Objective

The general objective of this research is to inform the debate on wetlands mitigation. Since nearly 50 percent of Michigan's wetlands have already been lost (Harrington 1993), many regard it as good public policy to try to protect the rest. The battle lines in the wetlands debate used to be clearly drawn between the developers on one side and the environmental groups on the other. As scientists make the benefits of wetlands more apparent, society seems to have an increased preference for wetlands, and environmental amenities in general. Even developers realize that a wetland can enhance the value of their property. With more parties: home owners, state and municipal authorities, sportsmen and other interested parties joining the debate, the lines of conflict and agreements are constantly shifting. Policy makers must now be more creative and well-informed when creating policies toward wetlands.

In order to suggest any framework for managing natural resources it is necessary to be able to predict and monitor responses in both human and ecosystem behavior. Policy makers, their advisers and the stakeholders should understand the institutions and the ways in which individuals exercising their rights within these institutions affect the natural resources.

Hanna and Munasinghe (1995) stress that the key to preserving the dynamism of the ecosystem is to have a proper match between the property rights regime and the contextual characteristics of the affected human beings and the ecosystem. The notion of property rights is continuously evolving, just as knowledge of the attributes of the good, in this case wetlands, is continuously increasing. How do people relate to wetlands through the mechanism of property rights?

Traditionally the owner of the land--the one who owns the title and can legally exclude others from it, owned most of the rights in (Barlowe's 1978) bundle of rights. How much control should he/she have over the ecological functions of the wetland? If the owner for instance, were to engage in an activity that does not affect the land or water but disturbs the ecological functions, to what extent should he/she be allowed to do so?

Conversely, should his neighbors be entitled to the ecological benefits of his land? More importantly, do they feel a sense of ownership to the ecological benefits of the wetlands? How much of the bundle of rights do people who are not considered owners, in the narrow sense of the word, but who have a stake in maintaining the functional capabilities of the wetlands really own? Is a person who has an interest in wetlands that is protected by a regulation an owner? How the active voters perceive these issues will eventually determine what policies are likely to support.

This research seeks to address one major question:

- Does the framing of the wetlands debate affect peoples perception of property rights?

Two other subordinate questions will also be addressed:

- What is cost of mitigating a unit of wetland of a particular quality?
- What is the functional quality of that unit of wetland mitigated wetland?

The two subordinate issues address economic and biological questions. If a production function for wetlands can be created, the policy makers can simply choose the combination of cost and functional quality they need. The major issue addresses psycho/social, legal and political questions. Peoples' attitude toward property rights as they relate to wetlands will determine whether wetlands will be disturbed in the first place.

Wetlands policies are made at the convergence of many forces: the scientific, economic, psycho/social cultural, and political forces. The strength of each force will be influenced greatly by how well the stakeholders behind each force frame their message.

Justification for the Study

The Goemaere-Anderson Act only protects wetlands that are five acres or greater, or are otherwise specifically designated protected wetlands. Municipalities, however, may enact ordinances that protect wetlands smaller than five acres. It is at the municipal level that many of the tough decisions regarding small parcels of wetlands that were bought before the zoning ordinances came into effect are likely to be fought. And it is at this level too that many of the takings cases are likely to arise.

This research is intended to help state and municipal policy makers who make decisions regarding wetlands. Environmental groups and property owners should also be interested in this research. Although wetlands are a very valuable resource, there are times when it is necessary to destroy some. When we do, we need to know what functions are being destroyed, how much we can recreate, and how much it would cost us to recreate them? Who would bear the cost of recreating them? Are the functional capacities so vital that we should preserve as is rather than try to recreate them?

The scientific knowledge of wetlands, indicating their usefulness, seems to have outpaced the ability of the institutional and political arrangements necessary to protect them. This may explain why we continue to convert them, aware of the fact that we are doing permanent damage to the ecosystem. The challenge to the policy maker is to preserve at least the minimum amount of wetlands that is necessary to ensure the ecological dynamism of the system. He/she must at the same time balance the interest of the various stakeholders: developers, owners of land designated as wetlands, the environmental groups, planners municipal authorities and researchers. To meet this challenge he/she has to work with an expanded definition of rights; the narrow, possessive, adversarial notion of rights would probably not be an applicable model for protecting wetlands. The old conception of rights tends to maintain the status quo.

This research seeks to measure attitudes toward expanding the concept of rights. The assumption is that an attitude is a predisposition to action. It is not is not to predict who is in favor of wetlands preservation and who is not, nor is it a poll to see who is in

favor of compensating owners who are prevented from converting their land and who is not. If we know people's attitudes toward the notion of expanding property rights, we can make predictions of how they would react to legislation that changes the rights structure. This research is also intended to help policy makers make more well-informed social choices.

Methodology and Data Collection

Case studies and a mail survey of residents of Meridian township were used to collect data for this study. At least six case studies will be used to address the two subordinate issues listed in the aforementioned objectives. The Wayne County Detroit Metropolitan Airport mitigation project is the biggest and most extensive of these projects and will be included among the case studies. The plan attempts to mitigate 400 acres to replace wetlands that were destroyed by an extension of the airport facilities. The Detroit Metropolitan Airport case is detailed because it provides a real life example how policy actually works.

Many mitigation sites created by the Michigan Department of Transportation (MDOT), that are in various stages of development will be studied. They were built to replace wetlands lost as a result of highway construction. Projects designed by private developers will also be examined. Every applicant for a permit to convert wetlands, which are to be mitigated, must submit a mitigation plan with the Department of Environmental Quality (DEQ) for approval.

The breakdown of cost information will be obtained from the developers and MDOT while the functional capacity of the wetlands would be determined by the monitoring reports submitted to the DEQ. DEQ personnel are supposed to visit the mitigated sites at least once in the fall and in the spring to determine how well they are functioning.

Mail Survey

The debate surrounding wetlands is conducted by two distinct factions: one holds the historical, view that policies toward wetlands should be guided by private property rights, the other holds the view that policies toward wetlands should be guided by Public Trust Doctrine and the benefits of wetlands should be communal property. Those who hold the private property rights view of society see the on-site owner as possessing nearly all the rights to the land. If a change in the rights structure causes the on-site owners to lose some of the rights to the benefits of the land which they previously enjoyed, the private property rights advocate argue, they should be compensated. If the public wants the on-site owners to mitigate wetlands that was converted on their property then the public should incur the cost of mitigation.

Those who hold a broader communal property rights view argue that some of the rights to the benefit of wetlands belong to the entire community. If a change in the rights structure causes the public to lose some of the rights to services which they previously enjoyed, then, they argue, the public should be compensated. If the on-site owner converts

wetlands and thereby reduces the functional capacity of the wetlands, he should be made to incur the cost of mitigation. People on both sides of the issue make a property rights argument so in the final analysis its really whose claim the state will support.

To determine the effect of the framing of the message on attitudes, a survey was designed in which three groups of people, selected randomly from a list of all the home owners in Meridian township, was surveyed by mail. One group was be given a written message expressing the narrow traditional private property rights view. Another group was given a message expressing the broad communal rights view.

The final group--the control group was not given a message and received only the survey questionnaire. The group which receives the communal property rights message will also receive a cartoon. The cartoon makes the point that both the broad and narrow view groups can use the argument that they are seeking to protect private property rights to support their particular point of view. In the cartoon, two owners are screaming. One argues that "If the government does not allow me to open a toxic waste dump on my own personal property, I should be compensated for my loss." The other argues that "If that dump hurts my property value, I should be compensated." (See Appendix IV).

Historically most of the ownership rights to the services of wetlands were exercised by the on-site owners. The government encouraged the conversion of wetlands because wetlands were perceived as abundant with close to zero opportunity cost. The issue of off-site ownership of wetlands never arose. Now wetlands are relatively scarce and their beneficial effects are much more widely known. How would people respond if they are

reminded that as off-site owners they can exercise more rights to the beneficial services of wetlands?

Three hundred and twenty-five surveys were mailed out to each group. The expectation was that the response rate would be around 30 percent, which will give a sample in each group of close to 100. Given the means obtained from the preliminary survey, a sample of 100 can lead to a statistical test with enough power to make definite conclusions Ott (1988).

The questionnaire sought to obtain a quantitative measure of participant's attitude toward an alternative notion of property rights. This alternative conception of rights considers the rights of the off-site owners as well as the on-site owners.

Meridian Township has a wetlands ordinance that is more restrictive than the state's Gomaere/Anderson Wetlands Protection Act. The ordinance has been in effect since 1991. Since the wetlands debate has been on-going it is reasonable to assume that most of the home owners would have heard some version of the arguments.

The following message represents the private property rights view:

> Wetlands provide many services and goods to humanity. They store excess water and moderate the effects of floods; improve the quality of water by removing pollutants and excess nutrients; provide a habitat for fish and wildlife; and provide aesthetics and recreational benefits such as bird watching and fishing.
>
> According to the U.S. Fish and Wildlife Service Report of 1990, Michigan has lost nearly 50 percent of its original wetlands. Most wetlands are owned by private individuals. Michigan's wetlands laws restrict the ability of private owners to convert wetlands.

The following message represents the community property rights view:

> Wetlands provide many services and goods to humanity. They store excess water and moderate the effects of floods; improve the quality of water by removing pollutants and excess nutrients; provide a habitat for fish and wildlife; and provide aesthetic and recreational benefits such as bird watching and fishing.
>
> According to the U.S. Fish and Wildlife Service report of 1990, Michigan has lost nearly 50 percent of its original wetlands. Most wetlands are owned by private individuals. Michigan's wetlands laws restrict the ability of the private owners to convert wetlands. These laws, in effect, reaffirm the right of ownership of an entire community to some of the benefits of the wetlands even though the community may not own other aspects of the wetlands. Through its elected representatives, a community exercises an ownership right over its wetlands, just as it does the air, the waters of the Great Lakes or a neighborhood free of noise or smell.

Questionnaire

Please choose one of the five responses to express your reaction toward each of the following statements. If none of the responses represent the way you feel, choose the one that most closely resembles your view. The responses are: a) strongly disagree b) disagree c) neutral d) agree e) strongly agree.

1) I believe that wetlands are a very valuable natural resource.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree.

2) Wetlands significantly enhance the value of the property of those who live in and around them.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

3) Although the tax revenue may have to come from another source, I would support a reduction in the property tax rate of wetlands owners as an incentive for not converting the land.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree.

4) If someone destroys a community resource, he/she should compensate the community for the community's loss.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

5) If a community wants a private owner to maintain their property as permanent wetlands, then the community should compensate them for it.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

6) If someone destroys a wetland he/she should mitigate (recreate) that wetland.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

7) If I owned land zoned as wetlands in Meridian Township, I would sell it to a developer even though I know he/she may convert the wetlands to other uses.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

8) I feel a sense of ownership to the benefits that wetlands provide for the entire community.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

9) The current wetlands protection policy in Meridian Township, which protects parcels of wetlands smaller than that protected by the State Wetlands Protection Act, goes too far to protect wetlands.
a) strongly disagree b) disagree c) neutral d) agree e) strongly agree

10) Of the two responses below, choose the one which is closer to your view. I am more concerned now with a) conserving wetlands than with economic growth. b) economic growth than with conserving wetlands.

Research Questions and Research Hypotheses

The data obtained from the DEQ, MDOT and the private firms will be used to answer the following questions:

1) What is the cost of mitigating a unit of wetland?

2) What is the functional capacity of that unit of mitigated wetland?

The data obtained from the survey would be used to test the following hypotheses:

H10: The message had no effect on the responses.

H11: The message had an effect on the responses.

H20: There is no difference between the responses of people who identify themselves as being more concerned with economic development and people who identify themselves as being more concerned with wetlands protection.

H21: There is a difference between the responses of people who identify themselves as being more concerned with economic development and those who identify themselves as being more concerned with wetlands protection.

Framing the Debate

Leaders like to claim that they make decisions based on the wishes of the majority of people. This is a claim that is difficult to prove or disprove. It is difficult to know the wishes of people at any point in time. There are usually many issues in any election. Voter A may vote for a candidate because he likes his stand on three out of five issues. Voter B may vote for the same candidate because he too likes his stand on three out of five issues. Voter B's issues may not necessarily be the same as voter A's or even if voter B's issues are the same as voter A's his ranking of the issues may be different. Even if we assume that the election is in the form of a referendum in which the electorate is asked to vote "yes" or "no" on a well-defined issue, popular opinion is still not a good basis for making public policy.

Popular opinion is especially not a good basis for making policies that involve long-term irreversible changes such as those that are being made to the environment. However, in the long run, a functioning democracy must abide by the wishes of a majority or at least a plurality of the active voters.

Policy making is ultimately done by elected officials. Voters, except in very local elections, rarely talk directly to politicians. They follow political candidates through their speeches and through the analyses of popular media. Politicians try to find out what the voters think through polls. This indirect method of communication between the voter and prospective office holder is very susceptible to miscommunication, misinterpretation and deliberate manipulation on both the side of those seeking office and those whom they are seeking to represent.

Societal values change and the ability to measure the effects of changes may lag society's ability to institute changes. What may be politically acceptable may not necessarily be "best" for society. It is popular for policy makers to rely, or at least say they rely, on the free market analysis to make decisions. But, market prices depend on a set of previously agreed upon rules and institutional arrangements. When, because of the characteristics of the good the market price does not indicate a value that policy makers believe is appropriate, the market is said to have failed. What is characterized as market failure should more accurately be described as institutional failure.

Markets do not reflect what is "best" for society, neither do they accurately reflect public choice (Read and Combs, 1978). Environmental policy making is fraught with

ignorance and uncertainty. Policy makers should always incorporate the ignorance and uncertainty factor in their decision making. The workings of the environment are still baffling to scientists much less lay people.

Tversky and Kahneman (1974) demonstrate that people are subjected to systematic biases in their judgment. These biases can only exacerbate the problem of uncertainty. The temporal remoteness of the consequences of an action also makes it difficult to appreciate the significance of those actions. People are not schizophrenic but they may not consider the same set of information, in similar situations, even when the information is available to them, and may consequently reach different conclusions. Making a choice requires effort to process information. One may simply make a heuristic decision rather than expend the effort on issue A at the expense of issue B.

Kahneman and Tversky (1982) also show that people's actions often violate the requirements for consistency and coherence that economic theory assumes. A decision maker's frame of reference is controlled partly by the formulation of the issue and partly by customs and norms. Reliance on the economic assumption that individuals are seeking to do what is best for them could lead to erroneous conclusions. In any case, there is no one method for determining what is "best".

The certain death of 400 people was judged to be less acceptable than the one in three possibility that 600 people will be saved. Most students agreed that if they bought a $10 ticket for a performance and found that the ticket was lost they would not buy another. If instead of losing the ticket they had lost a $10 bill before the performance they will still

buy a $10 ticket to the performance (Ibid). In both cases, the results are the same: 400 people dead and $20 spent. On a rational economic basis, when the outcomes are the same, people should be indifferent between the two choices.

Meyerowitz and Chaiken (1987), Robberson and Rogers (1988), Perkins and Scott (1986), Tversky and Kahneman (1982) and, Witte (1994) indicate that the fear of a loss is often a greater motivator than the hope of a gain. A message that stresses the negative effects of lung cancer, for instance, is more likely to cause a smoker to quit smoking than one which stresses the improvements in health that can occur as a result of quitting smoking.

Individuals usually have different levels of risk for themselves than they do for the general public. Lindell and Earle (1983) show that the proportion of people who support the construction of more nuclear power plants in the U.S. is higher than the proportion of people that support the construction of a nuclear power plant in their own community. The proportion of the population who support nuclear power plants in general is greater than the proportion who support any identifiable nuclear power plant. Individuals seem to have one view of a policy when presented with it in the abstract, but change their minds when presented with the impact that the policy can have on the lives of identifiable groups of people.

People become very risk averse if someone else is creating the risk to them. According to Baird (1986) people are much more willing to take risk if they understand the phenomenon that is creating the risks, if they feel they have some control over the risk, and

if they benefit from the risk. It may be that the fear of powerlessness is as great as the actual risky phenomenon.

The debate over wetlands mitigation raises four important issues: long term risk, the burden of the cost of mitigation, property rights and the distribution of benefits. How the issues are framed will determine people's attitudes, their actions and the policies they are likely to support. The conversion of wetland can have direct negative effects on the value of some property through reduction in hedonic values or through flooding and loss of wildlife habitat. There is also the issue of what multiplier effects an overall reduction in property values in an area would have on the economy of that area.

Measuring Attitudes

Pollsters are always seeking to gauge the attitudes of segments of the public toward issues that are important to their clients. Often, members of the targeted group have no fixed opinion but a range of partially consistent views (Zaller 1994). The very act of polling may help crystallize those views. How the public come by their attitude is not important to the pollster. What is important is whether the public attitude is being accurately measured.

Poll takers try to make sure that their methods are internally valid. They go to great lengths to ensure that the sample selected is representative of the population. The assumption is that "public opinion" is an aggregation of equally weighted individual opinions--a collective wisdom (Price 1992, Fletcher 1995). Some opinions are more

important than others. Experts and activists on a particular issue can sway opinion to their side.

Even if the methods used to gauge the public opinion are statistically valid, the framing and wording of the questions asked can significantly affect the responses. Smith (1987) found that when voters were asked if they would support an increase in government spending on the poor, they responded much more favorably than when asked if they would support an increase in government spending on welfare. The poor and the welfare recipients were the same group. His explanation is that "welfare" connotes sloth and idleness, but "poor" connotes the deserving poor. The expression "big government" met with different responses if it was used in the context of welfare-statism, corporatism or federal control and bureaucracy.

Krosnick (1989) studied the issue of whether judges, instead of the jury, should determine the amount of damage to be awarded after a jury had decided a law suit. He asked a group of voters if they found the idea of the judges deciding the amount of damage "acceptable" and the response was positive. When asked if they were in "favor" of the idea of having judges decide the amount of damage the response was not so positive. He also found that a slight alteration in the wording of a statement even without changing the meaning or intent of a sentence can have a marked change in the response.

O'muircheartaigh, Gaskell and Wright (1993) observed that intensifiers like "very" and "strongly" may or may not change the responses. If a question was asked first without the intensifier and then with the intensifier the responses tended to be close, apparently

most people do not notice the intensifier. But if the question with the intensifier was asked by itself, the result tended to be very different. They also found that question ordering was very important. When a sample of Americans were asked if Russian journalists should be allowed to work in the U.S. uninhibited, 37 percent answered yes. When this question was preceded by the reverse question: should American journalists be allowed to work in Russia, the percentage answering "yes" to the first question jumped to 72. Reminding Americans that restrictions on Russian journalists can result in Russians imposing restrictions on American journalists brought home the importance of giving journalists freedom of movement.

No attitude could be measured without error; even people with well-defined attitudes tend to exhibit response instability from time to time (Zaller 1994). People with no opinions, and very little knowledge of an issue, will give you an opinion if you ask them. Presser (1990) found that when respondents were given a closed set of answers, the responses were different from when they were given a "don't know" choice.

One should be cautious about interpreting the results of polls. Public policies should not be made simply on the basis of public opinion, however it is measured. At the same time elected leaders cannot ignore public opinion indefinitely and still remain in office.

Wetlands Loss

As of 1993, Michigan had lost nearly 50 percent of its original wetlands or nearly 8 million acres (Harrington 1993). The result has been an increase in flooding in certain areas which did not occur before, sedimentation of streams, loss of fish and wildlife, loss of quality and quantity of drinking water and many of the other problems associated with radical changes in the wetlands eco-system (Ibid). The conversion of some wetlands in a state in which a substantial portion of the land was originally wetlands is inevitable. The policy question is how much wetlands conversion is too much?

To prevent further wetlands loss or at least to slow the rate of wetlands loss, the Goemaere-Anderson Wetlands Protection Act was passed. The Act was also intended to bring Michigan's wetlands protection standards in line with federal levels to avoid duplication in some permit applications. In addition, some local jurisdictions seek to further protect their wetlands by using zoning ordinances.

The recent increase in the awareness of the importance of wetlands is due to an increase in preference for the ecological and environmental functions they perform. As (Williams 1990) notes, there is much imprecision as to when a function becomes a value. Wetlands provide a variety of function, some of which are yet to be fully documented and their links to the ecosystem established. It is very difficult to measure the functions of wetlands, it is therefore equally difficult to measure the effect of wetlands loss. The functions of wetlands vary depending on the soils and geo-hydrology. However, Hammer (1992) summarizes their functions into six categories: life support, hydrologic

modifications, water purification, erosion protection, open space and aesthetic and geochemical storage.

Bingham et al (1990) cautions that, whereas, it is important to protect wetlands, activities that may affect the flow of water into the wetland may have serious consequences on the wetlands even though the land itself is left undisturbed. The expression wetlands is ambiguous. Often, what changes is not the land but the very complex ecological relations that have evolved over thousands of years. Any wetlands program should look closely at water as well.

Chemical pollution may also leave both the land and water intact but may have serious consequences on the activities on the wetlands (Ibid). Simply counting converted acreage can mislead analysts and citizens as to the effectiveness of the wetlands protection program.

Identifying Wetlands

Wetlands identification is inherently variable. Annual rainfall and flood levels vary; what may be upland for most of one year may be submerged for most of the following year. Many a court battle has been fought over the boundaries of a wetland. If we cannot identify wetlands accurately then we cannot value them accurately either.

Mitsch and Gosselink (1993) distinguish between the definitions of wetlands used by scientists and that used by wetlands managers and regulators. The wetlands scientist is interested in a flexible definition that can facilitate classification, inventory, and research,

recognizing that the physical and biological characteristics are dynamic. The wetlands manager needs a jurisdictional definition of wetlands: a more legally binding definition, that can clearly distinguish between areas that can and cannot be modified.

Willard et al (1990) give a list of forty-five different definitions collected from federal and state regulatory agencies, and scientist. But they believe that the definitions of wetlands are finally beginning to converge. There are, however, three important criteria that are used for the identification of wetlands:

1) Wetlands are distinguished by the presence of water, either at the surface or within the root zone.
2) Wetlands often have unique soil conditions that differ from adjacent uplands.
3) Wetlands support vegetation adapted to the conditions (hydrophytes) and conversely are characterized by an absence of flooding-intolerant vegetation (Mitsch and Gosselink p 22, 1993).

Functional Capacity of Mitigated Wetlands

The Wetlands Protection Act allows for the conversion of wetlands, if similar wetlands can be created (mitigated) to those that are unavoidably destroyed. Proponents of mitigation see it as a way of maintaining wetlands while at the same time having the benefits from wetlands conversion. Are created wetlands a substitute for natural wetlands?

Created wetlands, even those that are contiguous to the original wetlands and are in the same watershed, cannot perform the same functions as those that are lost. Designers of restored wetlands try to reestablish the same soils, flora and fauna, but it takes a long time to establish ecological functions. Kentula et al, (1993) and Mitsch and Gosselink (1993)

suggest that wetlands should be reconstructed with certain specific goals in mind. For instance, wetlands may be reconstructed to serve one or two of the following functions: flood control, pollution control, waste water treatment, and wildlife or fisheries enhancement. A created wetland would not serve all of those functions.

Environmental engineers have been experimenting with constructed wetlands for wastewater treatment for over twenty years. And, for that particular function, constructed wetlands can do almost as well as the natural wetlands. Natural wetlands are characterized by extreme variability in their functional capacity because of changes in the species composition and the accumulation of pollution. Constructed wetlands offer some advantage over natural wetlands because the substrate, vegetation, and flow patterns can be varied to determine the best results (Moshiri 1993).

It takes considerable effort to monitor the functions of recreated wetlands, to determine how well they are functioning, especially as their functions change over time. This creates an incentive for those who want to convert wetlands, to do so and mitigate them at the lowest cost, irrespective of the usefulness of the recreated wetlands.

Private Good Public Benefit?

The benefits of wetlands are generally characterized as externalities, but what is an external benefit to the developer may be a primary benefit to the down stream fisherman. Similarly, a primary cost for the environmental user may be an external cost for the developer. In the traditional analysis of externalities the public gets a positive externality in

the form of clean water, flood control, spawning grounds and wildlife habitat. The private owner of the wetlands bears the costs of maintaining them as wetlands, even if he can convert them to a more lucrative alternative. This analysis does not examine the origins of the right of ownership.

Most of the wetlands in Michigan are privately owned. Owners of wetlands, or for that matter all lands, generally feel that ownership confers on them the right to use their property, in all respects, to maximize their gain. The question of property rights is fundamental in any effort to preserve wetlands. In a modern economy, ownership of land does not imply the absolute right of possession and control. The state has always reserved the right to regulate land-use using the three powers--police, eminent domain and taxation (Barlowe 1978).

Those who are opposed to regulation restricting wetlands conversion do so on the grounds that they are opposed to government intervention. What they are really opposed to is a particular assignment of rights which they may characterize as a re-assignment though the beneficiaries may consider it a clarification of a previously held right. Some heretofore assumed opportunities will be taken from the owners of wetlands and given to the public or vice versa. The question is how much of these asserted rights were really there to begin with. How much of these rights can be re-assigned or re-affirmed within the existing polity? Owners are very apt to go to courts to argue that the restriction on the use of their property amounts to a taking without compensation while other parties argue they have

always had the right to enjoy the wetlands and therefore development will be taking away their rights without compensation.

An executive order signed by President Reagan in 1988 requires the federal agencies to review health, safety and environmental legislation for their effects on property rights. Since then twelve states have introduced legislation of some kind that would prevent health safety and environmental legislation from violating an individuals property rights The New York Times (November 5, 1994). The assumption seems to be that property is a phenomenon that exists independently of human institutions.

Government is part of the policy equation. The issue is not whether or not government should intervene, but whose interest would be paramount (Samuels 1991 and Schmid 1987). Every change or affirmation instituted by government creates gainers and losers. Property rights must be understood in their social, political, economic and power context.

The Role of the State in the Directing the Economy

To question the rights structure in which the on-site owners of wetlands have historically enjoyed most of the rights to the benefits of those wetlands is to address broader ideological and philosophical issue of the role of government in the economy. When the role of government is addressed, the prescription is usually to reduce big, distant, intrusive and inefficient government. Economists tend to focus their attention on suggesting

technically "better" policies rather than addressing the fundamental issue of the role of government in shaping and defining the economy.

Most people regardless of their political and ideological orientation would agree that government serves at least two roles: (1) to protect itself and the citizenry, maintain a monopoly on the use of force -- and by all means avoid any tendency toward a Hobbesian "state of nature" and (2) to promote the general well being, which includes economic well being.

Since every change instituted by government necessarily creates gainers and losers attempts by government to promote the general well being are inevitably controversial. People who believe that government's role should be limited argue that government should simply create the right environment and allow people to do the best they can. In other words government should simply acts as a referee: protect property rights, enforce contracts and allow for free exchange. To believe that government should simply act as arbiter is to accept the existing rights distribution as fair. Under this view the existing patterns of power and wealth in the society is validated without regard to the antecedent conditions or how future opportunity sets will be affected.

Conventional economic theory seems obsessed with the concept of "free" exchange. This emphasis on "free" exchange diminishes the importance of power and hierarchical relationships that characterizes many types of transactions. (See Schmid (1987) for a more detailed analysis of different types of transactions). Over reliance on exchange also ignores some of the inherent qualities of the good at issue and various interdependencies that may

occur among economic agents. When A purchases wetlands from B the transaction can be looked at simply as an exchange between A and B. A may decide to build in the wetlands he purchased from B.

Wetlands as a building site and wetlands as a natural water storage and cleansing facility are incompatible uses. A may cause flooding in the basements of X and Y. In effect, X and Y have become inadvertent parties to a transaction between A and B.

A theory of exchange does not help in this situation, either A has the right to build in the wetland or X and Y have the right to be free from water in their basements. Who has the right can only be determined by government. The standard free market analysis would dismiss the plight of X and Y as externalities. But just about every transaction creates an externality, even those involving exchange of final goods. "Government may not eliminate the externalities; it may only choose to shift them from one party to another" (Schmid, 1989 pp 174).

Property as a relational relationship is often overlooked in favor of the more materialistic concept of the individual possessing something. Flynn (1989) observes that many property rights are directed toward defining status relationships and the status of those rights and responsibilities attached to the status defined, rather than basing rights and responsibilities on the human individual. Flynn cites for instance, that a person's status as an investor in the stock market entitles that person to certain predefined rights without regard to the individual's bargaining skills, knowledge or ability to protect that interest. The nineteenth century concept of exchange between individuals of relatively equal bargaining

power is no longer applicable as the primary conceptual device for allocating rights and responsibilities in most legal and economic transactions.

Government is deeply involved in the definition and creation of the economy. It is both a dependent and an independent variable; the interest which it chooses to support is the results of forces acting on and through it (Samuels, 1989). The current debate in the U.S. over campaign reforms exemplifies this phenomenon. The elected officials, some of whom were themselves elected with generous contributions from big donors, are now being asked to act independently to reform the system and limit the influence of the very big donors who financed their campaigns. The working rules of law govern the distribution and exercise of power and the distribution and exercise of power governs the development of the working rules of law (Ibid).

Even people who speak most derisively of big government want to capture government so that they can reorganize and redirect its role. They are not seeking to get the government out of the economy, as they often claim; they are seeking to shift its focus. People want and expect government to be responsive to their needs and at the same time they want government to provide opportunity and improve their economic well being. They elect officials whose conception of the worlds seems similar to theirs. Politicians trying to win elections try to identify with the values and issues they think are held by enough voters to allow them to win. In doing so they help to form voter preference and acts as conduits for voter preference. Politicians may also change their own preferences to comport with enough active voters so as to be elected. Voters may lead the politicians as

well as be led by them. Neither the politicians nor the voters have well defined preferences sets. Hence the reason, the framing of messages becomes so very important.

Another role of government that is often overlooked in the preoccupation with exchange is that of social reproduction. The business of society is reproduction -- physiologically and socially (Stanfield 1995). Even though preferences are often taken as given, the laws and traditions of the state proscribes the citizens preference sets. The concept of consumer sovereignty is really a bounded sovereignty. People preferences are molded by their social and economic circumstances. This is not to suggest that individuals do not have freedom of thought and action. However, if ones preferences stray too far from what is considered main stream it could not be legally satisfied.

How then does one identify the good institutional arrangements from the not-so-good ones? According to North (1994) the ideal institutional arrangement is one that is adaptively efficient, i.e, the one that can adapt to changes and create a framework of rules and norms that maximizes choices for the politically powerful and reduces the chance for market and government failure. In other words, the ideal institutional arrangement is that which limits the chances for political and economic chaos. The ideal institutional arrangement is one that adapts in order to perpetuate itself.

Valuing Wetlands Use and Non-Use Value

Determining the true value of a good is a task that has bedeviled generations of economists. Ricardo, then Marx, stressed a labor embodied theory of value. But, this theory

does not explain why goods that are in fixed supply, such as art are so valuable, or why labor intensive goods in excess supply becomes so cheap. The neo-classical economists are content to let market processes determine value (Deane 1979). The view that market prices indicate value is the dominant one. This ignores the rights foundation on which the market rests. When, as in the case of high exclusion costs goods like wetlands, the market proves incapable of indicating value, policy makers try to find proxies for value.

Pearce (1993) and Barbier (1994) distinguish between use and non-use value. They further divide use value into: direct use, indirect use and option value. The direct use value for wetlands can be calculated from the amount of fish, game and recreation obtained from the wetlands. Indirect use value can be determined from flood control and water purification services. Option value is the amount that society is willing to pay to make sure that a resource is available for future use; it is really an insurance policy (Scodari 1990).

Existence value is very difficult to determine. It is the intrinsic value placed on a good. Some people may value a wetland simply because it is a wetland - a natural creation. They may not know or care for the usefulness of its functions but will fight efforts to convert it. People contribute funds to protect species in the Amazon forest even though they have never been there and are unlikely to go there. Their preference for environmental amenities may be based on a moral, ethical and philosophical conviction, that all living creatures have a right to exist.

Ownership and Exchange

Political entities are just now beginning to address the issue of ownership of environmental resources. In the absence of declared owners organizing bids to determine the value of a particular resource becomes problematic. In a typical market transaction the initial ownership is presumed and an adversarial relationship is assumed between buyer and seller; the buyer seeks the lowest price while the seller seeks the highest price. If there is any difference between what the buyer is willing to pay and what the seller is willing to accept they can be negotiate or the seller can hold out for a higher price. The system breaks down when both sides to a transaction perceive themselves as owners and therefore the ones who are legally authorized to sell.

Contingent Valuation

One of the most widely used indirect valuation technique is the contingent method (CVM). The CVM tries to ascertain value by asking people how much they are willing to pay for any change in an environmental amenity. How much people are willing to pay for a change in an environmental amenity or whether they are willing to accept any change to the amenity will depend on whether or not they perceive themselves as owners or non-owners. But even if ownership rights are clearly established there are some inherent problems in CVM.

Before most projects are undertaken analysts and policy makers engage in some form of benefit cost analysis, explicitly or implicitly. They often use the CVM, in one of its

myriad forms to determine the value that individuals place on the good. Total benefits must exceed total cost to make the project viable.

Measuring the value of the benefits and costs of environmental amenities takes us beyond the model of the utilitarian consumer. Cooper (1994), Jordan and Elnagheeb (1994), Langford (1994), McFadden (1994) and Neil and Cummings et al (1994) have all questioned the accuracy of CVM method in indicating the value that agents place on a particular environmental amenity. People do not have the close market connection with environmental amenities that they do with private goods. Similarly, they lack the experience of repeated choices and the discipline of market forces. The validity of some of the methods used in (CVM) surveys are also questionable. Payment-card bids, where the agent is given a choice among bids, give different results from the referendum type take-it-or-live-it choices. Open-ended bids give different results from closed bids. The importance of question order, the susceptibility of interviewees to cues from the interviewer and strategic bargaining by over or understating preferences also cause wide variations CVM results. Perhaps the strongest case against the CVM is made by Diamond and Hausman (1994). They argue that the CVM is inherently unreliable. They refer to some studies in which the results violated some of the basic tenets of economics. People were surveyed to determine how much they were willing to pay to preserve three stands of forests. They were willing to pay more to preserve one stand than they were to preserve all three (including that particular stand). A similar violation of the transitivity axiom was observed when agents were questioned about their willingness to pay to clean up contaminated sites.

CVM indicates notional preference rather than effective preference. CVM may indicate what people would prefer to see happen if they had a way of giving effect to that preference.

This researcher would not use the CVM because CVM cannot answer the questions of ownership that must be addressed by any policy that seeks to protect wetlands. The basic question is whether the environmental advocates are owners (sellers) or non-sellers (buyers) of the services of wetlands.

Whose Interest Count in Policy Making?

The use of economic instruments to design environmental policy will be constrained by political feasibility. There must be a perception of equity, at least by the politically active groups in order for any environmental policy to be successful. Willingness to pay is constrained by ability to pay (Boyce 1994). If we pursue this logic, we would conclude that the poor should live in more environmentally degraded areas than should the rich. Is the efficient level of pollution higher when those who breathe the air are poor than when those who breathe the air are rich? There have been stories in the popular media of poor areas being subjected to high risks from hazardous waste. An article in The New York Times (December 13, 1993) describes how a proposed landfill split a community in Noxubee County, Mississippi. The poorer members, cognizant of the risks, welcomed it because it promised jobs, the more affluent residents fought its construction. In another article in the same newspaper (February 24, 1994) a small town in Argentina was happy to welcome

nuclear waste, even though environmental groups had warned the residents of the potential risks, again because they were promised jobs.

Environmental goods tend to be income elastic and are generally high exclusion cost goods. But just as it is difficult to exclude someone from the beneficial effects of environmental amenities it is equally difficult to exclude them from the harmful effects. Even if it were possible to isolate the risks and ensure that it was restricted only to the poor and desperate who are willing to bear it, in return for payment, such a policy would probably not be politically feasible. There are health and safety laws which proscribe the conditions under which workers should and should not work. Some workers might be willing to work under much more risky conditions than those stipulated by the laws.

Economic tools such as efficiency and individual choice give very little insight into the formulation of environmental policy. The most efficient course of action may very well be the one that is supported by the strongest interest groups. The real issue is which individuals interests count and some individuals' interests will not count without collective actions so they organize to make sure that policy makers enact policies that favor their version of efficiency.

Efficiency is not an objective condition; it embodies other values. Suppose the US government decide that the building of roads to reach logging sites is causing too much environmental damage. And from today, logging will be done only by helicopter. The logging companies would argue that logging by helicopter is inefficient and would cause the price of lumber to go up. Some environmentalist might argue that logging by

helicopter is efficient because it reflects the true cost of logging. The old price of lumber did not reflect the true value of lumber so lumber was previously underpriced. There is no objective way to tell whether the lumber companies or the environmental groups are right.

Organization of the rest of Dissertation

Chapter two reviews the relevant literature and presents a framework for analysis. Chapter three analyzes the data obtained from the various projects and tries to answer the two subordinate questions: what is the cost of mitigating a unit of wetland? And what is the functional capacity of that unit of wetland? The fourth chapter analyses the data obtained from the surveys and verifies the hypotheses. Chapter five analyses, summarizes, concludes and make recommendations based on the information obtained in the study.

References

Baird, Brian N.R. 1986. "Tolerance For Environmental Health Risk; The Influence of Knowledge, Benefit, Voluntariness and Environmental Attitudes". *Risk Analysts* Vol 6 No. 4.

Barbier, Edward. 1986. "Valuing Environmental Function: Tropical Wetlands". *Land Economics*, Vol. 70 No. 2.

Barlowe, Raleigh. 1978. *Land Economics: The Economics of Real Estate*. Englewood Cliff: Prentice Hall.

Boyce, James K. 1994. "Inequality as a Cause of Environmental Degradation". *The Ecological Economist* Vol 11 No.3

Bingham, Gail et al. 1990. *Issues in Wetlands Protection*. Washington D.C.: The Conservation Foundation.

Cooper, Joseph. 1994. "Dichotomous Choices and Contingent Valuation Surveys". *Land Economics* Vol. 70 No. 1.

Deane, Phyllis. 1979. *The Evolution of Economic Ideas*. London: Cambridge University Press.

Diamond, Peter and Jeremy Hausman. 1994. "Contingent Valuation: Is Some Number Better Than No Number". *Journal Of Economic Perspective* Vol. 8 No. 1.

Fletcher, Frederick J. 1995. "Polling and Political Communication" In David L. Paletz Ed. *Political Communication in Action*. Cresskill: Hampton Press Inc.

Flynn John J. 1989. "The Chicken and the Egg". In Warren J. Samuels (Ed.) *Fundamentals of the Economic Role of Government*. Westport: Greenwood Press Inc.

Hammer, Donald A. 1992. *Creating Fresh Water Wetlands*. Boca Raton: Lewis Publishers.
Hanna, Susana and Mahan Munasinghe. Ed. 1995. *Property Rights and The Environment: Social and Ecological Issues*. Washington D.C: The World Bank.

Harrington, Steve. 1993. *Wetlands Protection in Michigan*. Lansing: Michigan Department of Natural Resources.

Jordan, Jeffry and Adelmonein Elnaghagheeb. 1994. "Question Format in Contingent Valuation Data". *Journal of Economic Perspective* Vol. 70 No. 1.

Kentula, Mary et al. 1993. "An Approach to Decision Making in Wetlands Restoration and Creation". Boca Raton: C. K. Smoley, INC.

Krosnick, John A. 1989. "Question Wording and the Reports of Survey, Results." *Public Opinion Quarterly* Vol. 53.

Langford, Ian. 1994. "Dichotomous Choice Contingent Valuation". *Land Economics* Vol. 70 No.4.

Lant, Christopher. 1994. "The Role Of Property Rights In Economic Research on US Wetlands". *Ecological Economist* Vol. 11 No. 1.

Lindell, Michael and Timothy Earle. 1983. "How Close is Close Enough: Public Perceptions of Risk of Industrial Facilities". *Risk Analysts* Vol. 8 No. 4.

McFadden, Daniel. 1994. "Contingent Valuation and Social Choice". *American Journal of Agricultural Economics* Vol 76 No.4.

Meyerowitz, Beth E. and Shelly Chaiken. 1987. "The Effects of Message Framing on Breast-Self Examination. Attitudes Intentions and Behavior". *Journal of Personality and Social Psychology* Vol. 52 No 3.

Moshiri, Gerald A. 1993. *Constructed Wetlands for Wetlands Quality Improvement.* Boca Raton: Lewis Publishers.

Mitsch, William J. and Kames Gosselink. 1993. *Wetlands.* New York: Van Nostrand Reinhold.

North, Douglas. 1994. "Constraint on Institutional Innovation: Transaction Costs, Incentive Compatibility and Historical Considerations". In Vernon W. Ruttan (Ed.) *Agriculture Environment and Health.* Minneapolis: University of Minnesota Press.

O'muirchearteigh, Colin, George D. Gaskell and Daniel B. Wright. 1993. "Intensifiers in Behavioral Frequency Questions". *Public Opinion Quarterly* Vol 57.

Neil, Helen and Ronald Cummings et al. 1994. "Hypothetical Surveys and Economic Commitment". *Land Economics* Vol. 70 (2).

Ott, Lyman. 1988. *An introduction to Statistical Methods and Data Analysis.* Boston: PWS Kent Publishing Company.

The New York Times. December 13, 1993.

The New York Times. February 24, 1994.

The New York Times. November 5, 1994.

Pearce, David W. 1993. *Economics Values And The Natural World*. Cambridge: The MIT Press.

Perkins, Kenneth A. and Reda Scott. 1986. "A Low-cost Environmental Intervention for Reducing Smoking Among Cardiac Patients". *The International Journal of Addictions* Vol 21 No 11.

Presser, Stanley. 1990. "Measurement Issues in the Study of Social Change". *Social Forces* Vol. 68.

Price, Vincent. 1992. *Public Opinion*. Newbury Park: Sage Publications.

Read, Stephen and Barbara Combs. 1978. "How Safe is Safe Enough? A Psychometric Study of Attitudes Towards Technological Risks and Benefits". *Policy Science* Vol 9.

Robberson, Margaret R. and Ronald Rogers. 1988. "Beyond Fear Appeal: Negative and Positive Persuasive Appeal to Health and Self-Esteem". *Journal of Applied Psychology*. Vol. 73.

Samuels, Warren J. 1992. *Essays on The Economic Role of Government*. New York: New York University Press.

---------- . 1989. *Fundamentals on the Economic Role of Government*. Wesport: Greenwood Press Inc.

Schmid, A. Allan. 1989. Econmomy and State: "An Institutional Theory of Process and Learning". In Warren J. Samuels *Fundamentals of the Economic Role of Government*. Westport: Greenwood Press Inc.

---------- . 1987. *Property Power and Public Choice*. New York: Praeger

Scodari, Paul F. 1990. *Wetlands Protection: The Role of Economics*. Washington, D.C.: Environmental Law Institute.

Smith, Tom W. 1987. "That Which We Call Welfare By any Other Name Will Smell Sweeter". *Public Opinion Quarterly* Vol. 53.

Tversky, Amos and Daniel Kahneman. 1974. "Judgement Under Certainty: Heuristics and Biases". *Science* Vol. 185.

--------. 1981. "The Framing of Decisions and the Psychology of Choice". *Science* Vol. 211.

Willard, Dan. 1990. "Defining and Delineating Wetlands" in Gail Bingham et al. *Issues in Wetlands Protection.* Washington D.C.: The Conservation Foundation.

Williams, Michael Ed. 1990. *Wetlands: A Threatened Landscape*. London: Basil Blackwell.

Witte, Kim. 1994. "Fear Control and Danger Control: A Test of the Extended Parallel Process Model (EPPM)". *Communication Monographs* Vol. 61 June 1994.

Zaller, John. 1994. "Positive Constructs of Public Opinion". *Critical Issues in Mass Communication* Vol 11.

Chapter II

LITERATURE REVIEW

Introduction

Resource managers and policy makers often turn to economists for advice. Economic analysis is not the only input or for that matter the most important input into the policy formulation equation, however, economist do have some influence on policy makers.

Decision makers and politicians are well aware that most of public policy is about the reallocation of economic opportunities or the redistribution of economic advantages. Most public policy decision involving natural resources are purportedly made on the basis of efficiency, but efficiency is not a neutral concept it embodies the values of the person making the analysis.

Schools of Thought

The literature on the economics of the environment can be broadly divided into three distinct but overlapping schools:

1) the traditionalists, who try to sharpen the existing theories to make them applicable to natural resource analysis but hold on to the basic tenets of neoclassical economics (Baumal and Oates 1993 Randall 1987, Tietenberg 1992, Pearce 1993,1989, Neher 1990),

2) the institutionalists, who believe that institutional arrangements determine economic outcome and that the choice of institutions is the result of power play among the competing groups (Bromley 1991, Ostrom 1992, Ostrom et. al. 1994, Samuels 1989, and Schmid 1987).

3) the ecological economists who believe that existing economic theories are not useful for solving resource and environmental problems (Daly and Cobb 1989, Redclift 1987 and Glaeser 1995) and a host of other writers whose theories are underpinned by the idea of sustainability. They tend to argue that nature suggests policy.

The standard traditional neoclassical theory takes the existing institutions as given and makes analysis based on those institutional arrangements. Much of the recent literature questions these arrangements and attributes the inability of policy makers to solve some of the current environmental problems to these arrangements. Hoksbergen (1994) refers to those who rely on neoclassical theory as the foundationalists. They think that we can come to a true understanding of reality if the theories are logically based on some indubitable foundation. The foundationalists believe that using the traditional building blocks of neoclassical economics, free markets, maximizing agents, well defined private property rights and a legal system that delineates and protects property rights is sufficient to protect the environment, if used properly. Their contention is that the environment should be treated as any other good. They argue that the problem is not with the theory; there are built in mechanisms within the market system to prevent the misuse of any resource. The problem of environmental degradation arises because of the inability or the unwillingness of

policy makers to institute sound economic policies. There is an assumption of ideological neutrality on the part of these economist.

The second group can be described as the institutionalists, whose basic premise is that the tinstitutional arrangements determine economic results; in other to get the "right" results the "right" institutions must be put in place. Institutional arrangements will determine who will define the institutional structure and the institutional structure will determine how economic agents behave toward each other and toward the natural environment. Institutions proscribe the choice set within which individuals and groups operate but they should not only be seen as limiting economic activities they also enable economic activities.

The economic, social and political order changes as the interests of the dominant groups in society change. And the interests of the dominant groups also change as the economic, social and political order change; there is a feed back loop between those two variables. The theories that are suitable for one set of circumstances may be irrelevant for another. There can be no universal theories; theories must be culture specific.

Stone (1988), in his argument to give environmental amenities legal standing in the court, reminds us that the institutional innovation to make trusts, corporations, joint ventures and municipalities legal persons, initially confused many lay people and jurists alike. This institutional innovation has limited investors liability and contributed to economic growth. Society, or at least the politically powerful segment of it, creates the institutional arrangements that are necessary to solve its problems. Whether or not the

arrangements are made depends on the crucial issue of how much power the opposing groups can bring to bear on the political system.

Since every environmental issue must be looked at in relation to its particular social, cultural and historical circumstances then what is the purpose of theory? According to Hoeksbergen (1994), theory serves two major purposes: as a description and analysis of evolving systems and as a tool in problem solving--problems as determined by the dominant groups within the polity. Hoeksbergen could have added a third function, to serve as a guide to the choice of institutions.

The third group, the ecological economists are of the view that we do not understand the complexities of the environment, and rational economic decisions assumes that agents have some knowledge of the product with which they are dealing. This is not often the case with environmental amenities and natural resources. Ignorance is rampant and the products themselves are forever changing. Their main argument is that nature suggests policy.

The ecological economists emphasize the organic human uses of natural resources within a complex web of life for which the earth is the basic frame and indispensable support (Shrader-Frechette 1993). Economists in this school will stress that because maintaining the ecological viability is surrounded by much uncertainty, policy makers should always adopt a safe minimum standards policy. In other words, the preferences of the optimists who put their faith in technology should not count. They also note too, that the neoclassical method of summing individual valuation to get societal valuation is

incorrect, and can lead to destructive policies. There is a difference between what people want for themselves (individual preference) and what they want for society (Sweeney and Olson 1992).

The fundamental argument of this school is that traditional neoclassical economist are too concerned with economizing. They forget sometimes that society must economize within the bounds of nature. And since we do not know precisely the boundaries of the ecological space, we have to be careful not to cause irreversible harm to nature that would result in an even smaller ecological space in which to optimize (Dietz and van der Stratten, 1992).

Critiques of this school accuse them of being elitist and paternalistic. They promulgate a theory that articulates the intrinsic value of natural areas in an untransformed state. Human life depends on production and production implies transformation of the natural world (Thompson 1995). Ecological economist criticize the orthodox theories that stress consumption to promote economic growth as being incompatible with a sustainable society. But, they have not made a good case to say why the intrinsic values of nature must take precedence over human needs. And in any case, the bounds of nature are not obvious even to the well informed.

Origins of the Current Institutions

The institutions of the American economy have been strongly influenced by the writings of John Locke. Locke starts from the premise that the natural resources are a gift of nature.

> God, who hath given the World to Men in common, hath also given them reason to make use of it to the best advantage of Life and convenience.... We see in commons, which remain so by compact, that 'tis the taking any part of what is common, and removing it out of the state of Nature leaves it in, which begins the property; without which the Common is of no use. And the taking of this or that part does not depend on the express consent of all the Commoners.
> Thus the Grass my horse has bit; the Turfs my servants have cut; and the Ore I have digg'd in any place where I have a right to them in common with others, become my property, without the assignation or consent of any body. The labour that was mine, removing them out of the common state they were in, hath fixed my property in them (Locke, p 307).

Appropriation from the commons does not automatically confer ownership of the good to the appropriator. Not all labor is awarded the status of property. Some labor is considered theft. If an engineering student painstakingly builds himself a satellite dish that enables him to view television programs in his dormitory room for free he is liable to be prosecuted for theft. He may not, in any way, be affecting the ability of paying customers

to view television programs nor is he adding an extra cost to the television station that provides the program. On the other hand, if another student watches public television but never makes a contribution toward the cost of the programs he is not seen as engaging in theft. He is a free rider but free riding is not prosecutable under the existing institutional arrangements. Is there a real difference in the activities of the two students? "Property is not simply a derivative of a physical act; it also reflect a group choice about what kinds of effort are to count.." Schmid (1987).

Locke's idea that it was an individual's sacred duty to appropriate from the commons and turn that resource into private property found resonance in the writing of Adam Smith (1976). Locke's emphasis was on the supremacy of labor in determining private property and private benefit. But the ideas of both Smith and Locke have been crudely interpreted and appropriated by some of the groups in the western U.S. who are opposed to environmental legislation, like the Wise Use Movement. They never tire of using Smith's "invisible hand" analogy as a substitute for informed policy debate. (See Echeverria 1995 for the policies and strategies of the wise use movement).

Caldwell (1993) believes that the evolution of the laws governing land in the US can be traced to the attitudes that the early settlers from Europe, particularly England, brought with them to the New World. In Europe land ownership formed the basis of a very rigid social structure. In the minds of the early settlers land ownership became closely linked to personal freedom. A free market in land became associated with political and economic freedom, the very antithesis of the feudal system they left behind.

Caldwell also cautions that the emotional hostility with which some people respond to any kind of land use control measures cannot be explained wholly by economic self interest. Their reaction can be explained by some very old assumptions regarding human relations to the land and perceived self interest. In fact, some land owners may very well know that some of the regulations are necessary for the preservation of the land, and it may even benefit them. Many land owners display a cognitive dissonance (Festinger 1966). Their strongly held belief clashes with what they know is true.

Epstein (1985), like the Wise Use Movement, believes that government's attempt to legislate for environmental protection is excessive, and that government should limit itself to the activities that cannot be carried out in a Hobbesian state of nature. According to Epstein these two activities are to control private aggression and to secure the environment for private transactions and property rights. The only reason we need the state for these tasks is because voluntary transactions cannot provide the necessary centralized power. There are transaction costs, hold outs and free rider problems (Ibid). The sovereign has a monopoly on the legitimate use of physical force:

> This legal monopolist will act as any other monopolist whose conduct is left unconstrained. His laws and rules will expropriate most of the benefit of political union by allowing each individual member only the minimum inducement to remain quiescent. If the sum of private happiness in the state of nature is 100, and in organized society 150, the sovereign will be able to keep for himself most, but not quite all of the 50 units of gain. He may be constrained

> because he does not know the reservation price of individual and because he fears revolution (p 8).

Epstein's view may be extreme but it shows the ridiculous conclusions we can arrive at if we use a strictly utilitarian analysis to look at institutions. Humans beings do not form organizations only because the organization can be a means by which they increase their utility. The very act of coming together may provide utility. His argument is circular as well. The state that he is anxious to protect individual rights from is the one that grants rights in the first place. There are no rights in a state of nature.

A reductionist analysis which gives utility maximization as the prime motivator of human action is not a useful basis for making policy decisions. It puts too much emphasis on the rational homo-economicus and ignores how preferences (that gives utility) are formed. Hodgson (1988) believes that homo-economicus never existed; individuals never processed or even attempted to process information the way neoclassical economists assumed they did. Doucouliagos (1994) argues that homo-economicus has evolved into two separated beings, one with bounded rationality and the other with inter-dependent and endogenous preferences. Preferences are not exogenous to the economic process as orthodox theory assumes. The institutional and cultural norms under which a person lives affects the person's view of the world and his aspiration. One's choices are influenced by the environment. Homoeconomicus has probably evolved into many species each adapting

specialized features that enhances survival in his particular social environment as that environment changes.

The idea that private property is the only way to prevent environmental degradation was given credence by Hardin (1973). He theorized that common property will always lead to "the tragedy of the commons". Hardin's allegory of the tragedy of the commons was formalized into the game theory literature in the form of the prisoners dilemma. In the prisoner's dilemma one player may play a strictly dominated strategy knowing that he may not have to see the other prisoner again. In the case of the communal grazing ground, which Hardin describes, the agent knows that he will continue to live in the community, and sanctions can be imposed on him. He has an incentive to cooperate.

Bromley and Cernea (1989), Ostrom (1990, 1992), Ostrom et. al. (1994) show that private ownership right is not the only way to preserve natural resources. They cite several examples of local people forming organizations to manage common pool resources. In many cases the resource degradation began when the governments took control of the resource and destroyed the traditional institution thereby alienating the local users from the resource.

Bromley and Cernea (1989) distinguish among four types of ownership regimes:

1) state property regime;
2) private property;
3) common property regime and
4) non-property or open access regimes

Many writers fail to make the distinction between common property resource and open access. They assume that any regime except private property will lead to over use and destruction.

Ostrom (1992) documents how local farmers have used and managed local irrigation systems based on a series of "rules-in-use" which may often be informal. She notes too that there are really no blue prints for crafting local institutions. The rules established for a particular system are crafted by the users of that system and are specific to that system. Watson (1986) distinguish between active and passive management of natural resources. If management simply requires the movement of cattle according to the natural seasons then passive management may suffice. The more closely the management requirement, the more necessary it is for the users of the resource to cooperate and create structures for the management of the resource and the more likely it is that a private property regime will be successful.

Private ownership may or may not be a good way of protecting resources. Over 6 billion tons of top soil are lost to erosion each year in the US, and one-fourth of the nations agricultural lands has more than twice the established tolerable rate of erosion (Swanson et.al.,1986). Almost all of this land is privately owned. Neoclassical theory was formulated to explain economics when the focus was mainly on growth, growth at any cost and efficiency--efficiency as defined by the particular analyst. The availability of natural resources and the ability of the earth to absorb waste was not seen as a constraining factor. A growth-at-any-cost policy probably worked well in a frontier economy. Now that the

frontier is closed, new institutions and policies are needed to determine how the resources should be used and managed.

One of the main tenets of the neoclassical theory is that there is or should be a free market with willing buyers and willing sellers. In a Walrasian equilibrium, markets clear and every good fetches its market price which is a proxy for its value. The theory breaks down when the ownership of a good is contested and under the current arrangement it is not clear who is the buyer and who is the seller. Policy makers and regulatory agencies in many cities try to reduce air pollution to a particular level by selling the right to pollute. Economists agree that the buying and selling of this right (emissions trading) is the least costly way to reduce pollution. This policy usually incur public disapproval. Many people feel that firms should not be allowed to buy and sell the right to pollute. The public, or at least the activist section of it, feels that the right to clean air belongs to the public and they are not willing to sell. "To charge polluters a fee for polluting and the more you pollute the more you pay is like taxing burglars as an economic incentive to deter stealing" (Christian Science Monitor p 19).

Economic Efficiency

Proponents of the private property and free market regime see their method as the best way to achieve efficiency. Markets are a means to achieving efficiency under certain restrictive conditions. But, markets do not define efficiency (Griffin 1995). The institutional arrangements determine which of many efficient outcomes is to count.

There are two ways to make public policy decisions:

(1) by voting and letting the will of the active participants determine the outcome through the political process (there are many different political rules to determine which individuals count) and (2) by the market process using efficiency as the basis for the decision. Voting is used to make "political" decisions and the market process to make "economic" decisions. The lines between those two types of decisions are not clearly drawn, although some economists will argue that economic decisions are more objective.

Most market based decisions rely on the Pareto Improvement Test as the decision rule. But as Bromley (1991), Hammond and Coles (1995) argue, any particular distribution of endowments, under competitive equilibrium, has its own unique efficient outcome. If collective bargaining was outlawed overnight in the US, corporations will be operating at a different efficiency than they are doing currently. There would be a shift in benefits from labor to owners of capital but no one can argue that the economy would be more or less efficient with or without collective bargaining.

Hammond and Coles extend the Walrasian model of competitive markets to a peasant economy, to show that there can be Pareto Optimality without survival. When a lump sum tax and transfer is made, the compensated Walrasian equilibrium also leads to Pareto Optimality, with survival. If a policy maker is trying to formulate policies that will affect the environment, the Pareto Optimality test does not provide much guidance, or as Calabrasi (1991) puts it the Pareto test is really irrelevant to policy making.

The test of Pareto Optimality has a unanimity requirement. A society is not at its optimal position if there is at least one change that can make someone better off without making any one else worse off. If there is a change that can, ex ante, be made without anyone being harmed then the change would have already be made. Sine the change will hurt no one why will anybody object? This means that the set of changes which will make no one worse off and at least someone better is empty. In effect, every existing economic situation is Pareto efficient. The Pareto test ignores distributional issues and assumes that the status quo is efficient.

The reality is that there is no change that would make some one better off without making some one better off. Even if we use the Kaldor/Hicks version of the Pareto superiority test, where winners from a change can compensate losers there would still be objectors to the change. If a change makes everybody better off but reduces the gap between rich and poor there would be objectors who would resent the attempts of the state to try to reduce inequality. Some of the better off would feel that they could have been even better off had it not been for "state intervention." If the change increases the gap between rich and poor, those who are concerned with income inequality will object to the it.

Woddard and Bishop (1995) creates a scenario in which a completely efficient state is achieved. All market and non market valued goods have been measured and discounted at a rate that has widespread acceptance in the community. If resource managers then incorporate this information into their decision making process, would it then follow that all the environmental issues in that community will be resolved? They argue, no.

Environmental problems arise not because policy makers fail to make decisions based on "efficiency" criteria. Many environmental problems arise because agents fail to take intergenerational equity issues into consideration. The ability of the market to indicate efficiency across periods is limited. Vatn and Bromley (1994) in an appropriately titled article: "Choices Without Prices Without Apologies", argue that valuing environmental goods is neither necessary nor sufficient for coherent and consistent choices toward the environment. Hypothetical valuation may give legitimacy to a social choice but does not capture all, or even enough, of the information pertinent to a particular issue. If hypothetical prices do not convey enough of the information pertinent to a particular set of choices then policies informed by those prices cannot be credible?

Property Rights and Externalities

Probably the most contentious issues in environmental policy debate today are externalities and property rights. The 104th Congress has put property rights at the top of the policy agenda. The Republican majority see legislation to preserve the environment as the actions of an invasive and over zealous government. As they see it, supporters of environmental legislation are using environmental legislation as a club to beat the free market over the head.

Both environmentalists and property rights activists can use the issue of property rights to support their positions. Property rights advocates argue that the regulations go too far. They reduce the value of private property by so much, that they are in effect, takings

without compensation. The environmental activists argue that people have the right to enjoy smogless days; the right to breath clean air; the right to have clean water in their aquifers; and the right to be protected from flooding caused by the destruction of wetlands. Without regulation, development would constitute a taking without compensation.

The old adage that possession is 95 percent of the law seems to apply to the debate over environmental amenities. Those who possess the right may not have chosen to exercise it. Those who chose to exercise the right may not have had the legal mandate to do so. The environmentally active segment of the public did not choose to assert their right to environmental goods until the developers, miners and loggers started to take that right away. Having exercised the right to destroy environmental amenities for so long, the property rights activists are beginning to think that they really do have the right to do so. Society, has in effect, been subsidizing development by not requiring companies to pay for the environmental consequences of their activities (Campbell 1994).

Bromley (1993, p 15) defines a right "as the capacity to call upon the collective to stand behind one's claim to a benefit stream". What is at issue in environmental disputes, is that the private interest of one party (Alpha) against the private interest of another (Beta). Either the interest of Alpha will prevail, or the interest of Beta will prevail Samuels (1989).

But most environmental issues are not so clear cut. They usually involve many agents and it is often difficult to determine who is causing harm to whom. Rather than competing to see whose interest will prevail, it may be better to try to cooperate to determine a way to minimize transactions cost to all involved. Mensell (1991) cautions that

the focus of traditional law and economics upon the workings of the legal institutions misses the larger and more important question of institutional choice. Scientific uncertainty and the numerous potential ways parties may be responsible for causing harm severely limits the workings of the legal institutions. Transaction costs of determining who is liable is very high. A new arrangement to broaden the group that determines what the "best" scientific practices are would most likely be made.

Sandler (1993) notes that most environmental problems usually involve collective actions for solutions. Collective actions do not preclude individuals seeking their own interest. He cites the example of song birds which eat insect pests in the U.S. but spend their winters in Central America. Deforestation in Central America is destroying their breeding habitat and is causing a loss to U.S. farmers. U.S. farmers, who have an interest in protecting the song birds, have no choice but act collectively with the Central Americans to find ways to preserve the song birds and their habitat. The two groups will have to decide on the set of rights and responsibilities that each group has and the distribution of costs and benefits.

The developing nations are seeking to establish property rights to genetic materials that are discovered in the rain forests. Biological diversity and carbon sequestration are global public goods, but the trees are in the tropics. One can make the case that keeping the land in forest is a cost to developing countries. If the tropical countries can have the rights to some of the benefits of the materials discovered in the rain forests they would have a greater incentive to protect them. Nevertheless, some countries, including the U.S., are

reluctant to sign the Biodiversity Treaty which gives the Less Developed Countries the right to some of the benefits of discoveries emanating from tropical forests (Ibid). Many environmental problems cross regional and even international borders. They can only be resolved by cooperation i.e., agreement on ownership.

According to Baumol and Oates (1993 p 17) an externality occurs "whenever some individual's (say A's) utility or production relationships include real (that is, nonmonetary) variables, whose values are chosen by other (persons, corporations, governments) without particular attention to the effects on A's welfare." Baumol and Oates also try to distinguish between externality and economic interdependence. In their view interdependence is the relationship that occurs as result of free exchange and externalities are aberrations in the process of exchange. "When I rely on farmers for my food, no externality need be involved, for they do not decide for me how much zucchini I will consume, nor does my consumption enter directly into their utility functions" Ibid p 17.

This statement is not an accurate reflection of reality. When the USDA, under pressure from farmers (environmental groups), decides to certify (ban) pesticide X, their action creates an externality (positive or negative) for consumers of zucchini. The growing, marketing and consumption of zucchini does not take place in a vacuum. The growing of zucchini may be taking place on land that was formerly wetlands, to the environmentalist this is a major issue not an externality. The zucchini growers may use alien labor, which to the labor unions is a major issue not just an externality.

Externalities abound in the economy. To refer to some unintended economic costs or benefits as economic interdependence and others as externalities is to make a value judgement. Many policy makers would probably not find the distinction useful. It is not so important what externalities are; what is more important is their impact on the distribution of costs and benefits.

Mishan (1993) lists five conditions essential for property rights to be successful in protecting the environment:

1) a clear demarcation of the area of which exclusive property rights is to be conferred;
2) the resource or property in question must yield or be able to accommodate marketable goods, i.e., low exclusion costs;
3) the size of the area must be such that its conservation and maintenance of yields are necessary to its continued profitability;
4) collectable revenues must exceed the cost of exchangability, enclosing, deterring prosecuting and trespassing, i.e., low transaction costs and
5) other ecological or environmental imperatives are not infringed.

Most of the serious contemporary environmental problems: deforestation, endangered species, and non point pollution will fail to meet at least one of the five conditions.

The institutions that a society establishes to distribute rights and consequently power over natural resources, ultimately reflect the way power is distributed among individuals in the society. The environmental policy debate is a debate over power--not freedom, as the property rights advocates would argue. It is whether some people would be

made more free by granting them more rights to pollute while others would be made less free by subjecting them to the burdens of pollution.

Unlike some people's interpretation of Coase (1960), how rights are initially distributed in the society make all the difference. We may get to an efficient outcome regardless of the initial distribution of rights, but efficiency is not an end in itself and not unique to a particular distribution. It is a means to an end. If a policy maker begins with the premise that he is seeking an efficient outcome and is not concerned with the initial distribution of rights, he is in effect sanctioning the status quo. Conserving environmental amenities is a cost to many. It is a cost in the present with a stream of benefits in the future. Since we live in the present the rational maximizing agent would rather have the benefits in the present and the cost in the future. This is in fact what many who try to limit environmental regulations want to do.

Ownership of natural resources, even in fee simple, does not confer to the owner the right to do anything with his property. To protect and conserve environmental amenities requires an ethic by which ownership implies usufructuary rights throughout the owner's lifetime.

Legislation by itself cannot solve the problem of environmental degradation any more than tougher punishment can solve the problem of street crime. Wetlands can be protected under the Public Trust Doctrine and there are myriad laws already in existence that were intended to protect them. (See Goldfarb 1984, chapter 18 for more on laws that protect wetlands).

Environmental Partnerships are being created in many parts of the U.S. to protect particular resources. An environmental partnership is a voluntary collaborative effort between two or more organizations with jointly defined agenda. It focuses on a discrete attainable and potentially measurable goal (Long and Arnold 1994). It has no legally binding powers the focus is on collaboration. No extensive study of partnerships have yet been done to determine their performance, but they seem to be a good institution to accompany legislation that seeks to protect the environment.

References

Bromley, Daniel. 1991. *Environment and The Economy: Property Rights And Public Policy.* Cambridge: Blackwell.

Bromley, Daniel and Michael Cernea. 1989. *The Management of Common Property Resources.* Washington, D.C.: The World Bank.

Baumal, William and Wallace Oates. 1993. *The Theory of Environmental Policy.* New York and London: Cambridge University Press.

Caldwell, Lynton and Kristin Schrader-Frichette. 1993. *Policy For Land Law and Ethics.* Lanham: Rowman And Littlefield Publishers Inc.

Calabrasi, Guido. 1991. "The Pointlessness of Pareto: Carry Coase Further". *Yale Law Journal* Vol. 100 No. 5.

Campbell, Thomas. 1994. "The Public Trust, What Is It Worth?". *Natural Resource Journal* Vol. 34 No. 1.

Coase, Ronald. 1960. "The Problem of Social Cost". *Journal of Law and Economics* Vol. 3.

Coles, J.I. and P.J. Hammond. 1995. "Walrasian Equilibrium Without Survival" in K. Basu et. al. Ed. *Choices Welfare and Development.* Clarendon Press: New York.

Christian Science Monitor. 1989. "Taxing Pollution". January 4.

Daley, Herman and John Cobb. 1989. *For The Common Good.* Beacon Press: Boston.

Dietz, J. and Jan Van der Stratten. 1992. "Rethinking Environmental Economics: The Missing Link Between economic Theory and Environmental Policy". *Journal of Economic Issues* Vol. 26 No. 1.

Doucougliagos, Chris. 1994. "A Note on the Evolution of Homoeconomicus". *Journal of Economic Issues* Vol. 28 No. 3.

Echeveria, John and Raymond Ebey. 1995. *Let the People Judge.* Washington, D.C.: Island Press.

Epstein, Richard. 1985. *Takings: Private Property and the Power of Eminent Domain.* Cambridge: Harvard University Press.

Festinger, Leon. 1966. *Theory of Cognitive Dissonance*. Stanford University Press: Palo Alto.

Glaeser, Bernhard. 1995. *Environment, Development and Agriculture*. New York: M.E. Sharpe.

Golfarb, William. 1984. *Water Law*. Stoneham: Butterworth Publishers.

Griffin, Ronald. 1995. "Economic Efficiency in Policy Analysis". *Land Economics* Vol. 71 No. 1.

Hardin Garret. 1973. "The Tragedy of the Commons". In Allan Enthoven and Myrick Freeman III (Ed.) *Problems of The Modern Economy: Pollution, Resources and Environment*. New York: W.W. Norton and Co.

Hodgson, Geoffery. 1988. *Economics And Institutions*. University of Pennsylvania Philadelphia.

Hoksbergen, Ronald. 1994. "Postmodernism and Institutions". *Journal of Economic Issues* Vol. 28 No. 3.

Locke, John. 1967. *Two Treatises on Government*. London: Cambridge University Press.

Long Frederick and Matthew Arnold. 1994. *The Power of Environmental Partnerships*. Orlando: Dryden Press.

Mensell, Peter. 1991. "Limitations of Legal Institutions for Addressing Environmental Risk". *Journal of Economic Perspective* Vol. 5 No. 3.

Mishan, E.J. 1993. "Economists vs. The Greens: An Exposition and Critique". *Political Science Quarterly* Vol. 64 No. 2.

Neher, Phillip. 1990. *Natural Resource Economics: Conservation and Exploitation*. New York: Cambridge University Press.

Ostrom, Elinor et. al. 1994. *Rules Games, And Common Pool Resources*. Ann Arbor: University of Michigan Press.

Ostrom, Elinor. 1990. *Crafting Institutions For Self Governing Irrigation Systems*. San Francisco: Institute for Contemporary Studies.

Ostrom, Elinor. 1990. *Governing the Commons: Evolution of Institutions for Collective Action.* New York: Cambridge University Press.

Pearce, David. 1993. *World Without End.* Washington D.C.: The World Bank.

_____. 1989. *Economics Natural Resource Scarcity And Development.* New York: Cambridge University Press.

Randall, Allan. 1987. *Resource Economics.* New York: John Wiley and Sons.

Redclift, Michael. 1987. *Sustainable Development: Exploring The Contradiction.* New York: Methuen.

Samuels Warren J. (Ed.). 1989. *Fundamental of the Economic Role of Government.* Westport: Green Wood Press Inc.

Sandler, Todd. 1993. "Tropical Deforestattion: Market and Market Failures". *Land Economics* Vol. 69 No. 3.

Smith, Adam. 1976. *An Inquiry Into The Nature and Causes of the Wealth of Nations.* R.H Campbell (Ed.), Oxford: Clarendon Press.

Stone, Christopher. 1988. *Should Trees Have Standing.* Palo Alto: Tioga Publishing Co.

Samuels Warren J. 1989. *Fundamentals of the Economic Role of Government.* Westport: Greenwod Press Inc.

Schmid A. Allan. 1987. *Property Power and Public Choice.* New York: Preager.

Swaney, James and Paulette Olson. 1992. "The Economics of Biodiversity: Lives and Lifestyle". *Journal of Economic Issues* Vol. 26 No. 1.

Swanson, Louis et. al. 1986. "Barriers to Adaption of Soil Conservation Technology". In Lovejoy, Steve and Ted Napier Ed. *Conserving Soil Ankeny: Soil Conservation Society of America.*

Tietenberg, Thomas. 1992. *Environment And Natural Resource Economics.* New York: Harper Collins Publishers.

Thompson, Paul B. 1995. *The Spirit of the Soil.* London and New York: Routledge.

Vatn, Arild and Daniel Bromley. 1994. "Choices Without Prices Without Apologies". *Journal of Environmental Economics and Management* Vol. 26.

Watson, Dwight. 1986. "Evolution of Appropriate Management Systems". In Fikret Berkes (Ed.) *Common Property Resources*. London: Bellhaven Press.

Woodard, Richard and Richard Bishop. 1995. "Sustainability And Global". *Warming Ecological Economist* Vol. 14 No. 2.

Chapter III

CASE STUDIES

Introduction

It is difficult to establish any correlation between the cost of mitigating a unit of wetland and its functional capacity. This information is very important in helping decision maker decide among various wetlands policy choices. The cost of acquiring the land for mitigation will contribute greatly to the total cost of mitigation and the cost of acquisition varies according to location. It is too soon to make any conclusions about the functions of the recreated wetlands.

Cost of Recreating Wetlands

The law allowing for the mitigation of wetlands, the Goemaere-Anderson Act, requires that the mitigation be done on site, or in the same watershed. The Act specifies that mitigation off site should be a last option. The cost of mitigation will depend on the cost of land in the particular area. According the Michigan Department of Transportation (MDOT), the cost of land close to the city limits, is as expected, higher than the land further away from the city limits. Recent mitigation projects on the outskirts of Grand Rapids and Novi were above the average cost per acre.

The cost of mitigation will also depend on the topography and the depth to the water table. To convert an area from upland to wetland the general procedure is to remove as much soil as is necessary to get to the water table. Once the water table is reached the top soil is then replaced, or if the top soil is deemed unsuitable for the establishment of the desired plant species, a layer of muck is put in place of the top soil. In some cases because of the existing geohydrology creating a wetland may simply mean building a berm and establishing a perched wetland, in other cases creating a wetland may require the digging and transportation of tons of earth. If, for instance, MDOT is building or expanding a highway through a wetland, the material removed from the up-land may be used as filler material for the highway foundation. The process digging of the upland for filler material also starts the construction of the mitigated wetland. In this case the digging and filling processes compliment each other so the cost of highway expansion and wetland mitigation will be lower.

Portions of many of Michigan's highways are built in wetlands. During the early days of highway construction in Michigan, wetlands were still seen as wastelands. Since the land was readily available and was seen as having near zero opportunity cost, it was seen as the perfect place to build highways. Expanding the current network of highways is resulting in even more wetlands destruction, but MDOT is now mandated to mitigate the loss.

There are three broad categories of wetlands: forested, scrub-shrub and emergent. Forested and scrub-shrub wetlands are more expensive to recreate because they require the planting and maintenance of saplings--400 per acre of at least six different species. Emergent wetlands sometimes require the planting of seeds of plants that are predominant in the area. Other times the wetland may simply be left alone, after the right conditions have been created, for the desired plants species to colonize the area.

There is a debate among wetlands biologists as to whether or not saplings should be planted to try to recreate forested wetlands (Stanton 1995). Some biologist believe that it will be much cheaper to simply scatter the acorns of the desired species and allow them to grow in the wetland. It will be forty or fifty years before the trees are mature and we can tell how well the wetlands are doing, during that period the acorns that grew might catch up with the saplings anyway. As of now the law requires the planting of saplings in mitigated areas where forested and scrub-shrub wetlands were destroyed.

According to data from the MDOT and the Engineering firm of Johnson, Johnson and Roy the average cost of recreating an acre of wetland is between $45,000 and $50,000, with an additional $2,500 per acre for the purchase and maintenance of saplings. This figure does not include the cost acquiring the land which be between $1200 and $8000 per acre (Zelski 1995).

Monitoring Wetlands Functions

Hitherto 1995, there were no performance criteria mandated by the Michigan Department of Environmental Quality (MDEQ). If someone wanted to build in an area zoned as wetlands, he must explain to the MDEQ why it is necessary for him to build in the wetlands and submit a permit application to them. With the permit application he will also submit a mitigation plan indicating how she/he will recreate the wetland that is about to be destroyed. The MDEQ specialist can accept, modify or reject the plan.

MDEQ records indicate that 85 percent of all applications are accepted. Rarely does a mitigation plan meet with outright rejection. The plan is almost always sent back to the applicant to be modified. Of the 15 percent that are classified as rejections, the applicant generally did not bother to resubmit their application with the recommended modifications. The owner for reasons that may or may not be related to the application process decides to forego the building option (Bostwick 1995).

The focus of the MDEQ has been on the quality of the mitigation plan. There are no pre-construction inventories and analysis to compare with the post-construction analysis of functional capabilities. (Of course, the true capabilities of the constructed wetland will only be known forty or fifty years from now but pre-construction data will be needed for historical comparison).

MDEQ field staff, because of man power shortages, rarely visits the sites before or after construction (Ibid). They rely on the monitoring reports sent in by the permit recipient

or the specialist hired by him/her. If a permit recipient destroyed forested or scrub-shrub wetlands he/she is responsible for submitting annual reports for up to ten years. Permit recipients who destroyed emergent wetlands are responsible for submitting reports for up to five years.

A permit to, the Ann Arbor based Engineering firm: Johnson, Johnson and Roy for the construction of a golf course in Dearborn Hills (JJR No 14271.20) is typical of those issued by the MDEQ. It stated that the annual monitoring report will include the following:

1) Measure of the percentage of wetlands vegetation;
2) A measure of vegetation diversity;
3) A description of the animal community structure;
4) A record and description of the hydrologic development (including a characterization of water regimes, measurement of water depths, periods and degree of inundation and saturation zones;
5) A written summary of wetlands development that compares data gathering in the current monitoring year with data of all previous years;
6) A photographic history of all mitigation wetlands construction work and development is to be submitted with the annual report;
7) A report on the water quality of the lower River Rouge as it was immediately prior to initiation of the golf construction, with data gathered at points of entry to, and exit from, golf courses and
8) A report on water quality of the lower River Rouge during the current monitoring year, with data gathered at points of entry to, and exit from the golf course.

The permit specifies what is to be measured, but gives no indication of what the measurements should be in order to be in compliance. In 1994 in a permit issued to the MDOT for the US-31 Scottsville North project the DEQ mandated its first performance

criteria (Schuen 1995). These standards are necessarily broad because human activity like fire and natural occurrences like drought, mudslides and erosion are forever changing conditions in the wetland. The permit required that the following conditions be met:

* The perimeter of the wetland will be convoluted and the bottom contour will be undulating. The wetland is designed with a slope of 1 on 6 to 1 on 10 and a water depth of 0 to 8 feet. The shallow water areas will establish into emergent wetland, whereas, the slope and portion of the shallow water will vegetate into shrub growth. The deep water area (4.5 to 8 feet) is designed to maintain standing water in a portion of the wetland throughout the year.
* 40 percent open water, 2.2 acres of open water with a depth of two feet or more during high water periods (late March to mid May). Some submergents and obligate plant species may be present in these zone. Portions of this area will be inundated through out the year.
* 45 percent emergent -- 2.5 acres of a combination of obligate, facultative wet species will dominate this area. The emergent area will be inundated for a minimum of two subsequent weeks during high water periods and highly saturated for another two to three weeks after the water has infiltrated the ground.
* 15 percent scrub-shrub -- 0.8 acres of a variety of species of scrubs with an undergrowth of emergents. The area will be inundated a minimum of one week during high water periods and saturated for a minimum of two weeks following the recession of the water.

The projected status of the wetland at the end of three years is based on normal precipitation patterns during this period. If abnormal conditions occur during this time frame, the monitoring period can be extended from one to two additional years prior to implementing corrective action. To ensure that permit recipients adhere to the performance

criteria established, the DEQ is now requiring them to post performance bonds. So far, no one has been punished for not meeting the conditions laid out in his/her permit.

Monitoring reports to the MDEQ includes photographs and videos. Even to the untrained eye it is apparent that there are established plant communities in the wetlands, which may indicate that the wetland may be able perform some functions (See appendix III). How much of the intended functions and how much will these functions vary from year to year is still too early to tell.

Delineating Wetlands

Development tends to occur in clusters. A developer or investor would build in a particular area because that area possesses a comparative advantage and profit opportunity. Many developers would want to take advantage of this comparative advantage. This raises the question of how much development should be allowed in a particular area.

Counties and townships can have different standards for issuing permits as long as they do not contradict the states Goemaere-Anderson Act. Wetlands know no political boundaries and a municipality that is anxious to attract development may set less stringent standards than its neighbor that is trying to slow the rate of development.

The U.S. Fish and Wildlife Service specialists say that they do not yet have the information to make the maps that will give historical and current information of land use

patterns in every municipality in the state's. Knowing what the historic pattern of land use in an area will give a better indication of which land use should or should not be attempted.

Some areas are over built while other areas can accommodate more development without overwhelming the functional capacity of the wetlands. Aggregating the amount of wetlands in the state to satisfy the no-net-loss requirement of the Goemaere-Anderson Act may obscure the fact that the functional capacity of the wetlands may be lost where they are most needed. Recreating unconnected fragments of wetlands that were formerly part of the same watershed may satisfy MDEQ's requirement but severely reduce the functional capacity of the wetland.

The US-27 project in Olive Township in Clinton County demonstrates what can happen when wetlands policies are made by independently acting local jurisdictions. The MDOT, as part of their highway expansion project, destroyed some wetlands in Olive Township. MDOT scientists determined that the wetland would be more likely to be successful and could be mitigated more cheaply if it is rebuilt in neighboring DeWitt Township, in the same watershed.

DeWitt Township refused to grant permission for the mitigation project on the grounds that MDOT will be mitigating proportionally more wetlands in DeWitt Township than they destroyed there. DeWitt is seeking to increase growth and they do not want to convert land that they think can give a higher rate of return as developed upland into wetland. According to maps prepared the Ingham County Health Department the southern

part of Ingham County around Bunkerhill serves as a ground water recharge for the Lansing area. If the area around Bunkerhill made lands use plans independently of the Lansing area and suddenly went on a building boom. The Lansing area residents will be adversely affected. A county or state planning entity will probably forestall construction in areas around Bunkerhill that is likely to affect the ground water in Lansing.

Meridian township planners in Ingham County were locked in a battle with the state and county officials over the expansion of Dobie Road within the township. The state and county officials determined that expanding the road was necessary for the improvement of traffic flow. Meridian township planners did not want the road expanded. They feared that the road expansion would lead to more development. Township officials argued that they, and not the state or county officials, had the final jurisdiction over the project (Golembiewski 1995). The idea that the federal and state governments should devolve power to local authorities is very popular in contemporary American politics, but there has been no comprehensive study to date to indicate how such a shift in power may affect the environment.

Wetlands mitigation should be part of an overall land use plan that may go across political jurisdictions. The impact of an environmental policy is not restricted to any political jurisdiction, so policies should not be made only at the local level. Local officials tend to enact policies that are in the best interest of their jurisdiction or are likely to get them reelected. What is in the best interest of a locality may not be in the best interest of

the region. Some decisions should be made at higher levels with inputs from the local levels in order to prevent a situation in which local jurisdictions are working at cross purposes (Reed 1994).

A series of articles in the Lansing State Journal by Golembiewski (1996) and Upton (1996) highlight some of the problems that can arise from fragmented planning. Their focus was not so much on wetlands preservation as it was on open space preservation but the issues addressed are relevant to the wetlands debate. Many local planners in township just outside the Lansing city borders such as Bath, Watertown and Riley are anxious to attract developers. These township expend a lot of resources to build roads and extend sewer lines and water mains. Many of the people who are moving to these areas are coming from cities like Lansing that are decaying as the population moves out. However, these cities have an excess capacity of the same infrastructure: roads, sewers and water mains that are being recreated in the rural areas and may remain underutilized for a long time underutilized. More coordinated planning efforts on the part of city and township officials can probably lead to less movement from the cities and consequently the provision of more open space.

The value of property may be substantially greater when wetlands and open spaces are preserved. Arendt (1994) cites many studies which indicate that environmental amenities increase the value of nearby homes. Creative clustering of development on smaller lots rather than the large-lot subdivision has many positive economic effects:

(1) the demand for building space is reduced;

(2) the cost of building and maintaining infrastructure is lower;

(3) the per capita cost of providing service to residents is lower;

(4) the cost of administering local government is reduced so taxes can be lower and

(5) more open space will be preserved which can attract tourist to the area.

There are other non economic benefits too. Neighbors on smaller lots tend to talk more often to each other which can help to build better community relations.

Detroit Metropolitan Airport Mitigation Plan

During the late 1980's the Detroit Metropolitan Airport management decided that they needed to expand the airport facilities. Projected increases in the number of passengers were from 9.8 million in 1988 to 15.5 million in 1995. The larger planes used in international flights are too big for the existing international terminals, one plane takes up three gate spaces. The proposed expansion included building a second cross wind runway, a fourth north-south runway, a midfield international terminal, an access road to the south and a runway extension. The cost of the proposed project was estimated at $100 billion (Detroit Free Press, 1989).

The project had its opponents. Federal Aviation Administration officials and officials of Northwest and American Airlines, Metro Airport top carriers, believed that the

project was not necessary. They argued that the airport was operating with excess capacity as is. The project will also pave over 311 acres of wetlands.

The local environmental groups were mobilizing against the project. During the surveying of the project site three threatened plant species were identified, using the criterion of the states Endangered Species Act. The species were tree-awn grass, short fruited rush and alternative-leaved seedbox. Six species of special concern were also identified. With these findings the DEQ considered the site to be "a globally ranked and rare lake-plain ecosystem ... one of five locations left in the world" (Tuebor Terra November/December 1991).

The airport management authorities had their way. They made the usual arguments; the project will bring 49,000 jobs to the area and that it was necessary for the expected growth in the region. The DEQ granted permission for the destruction of the wetland and its subsequent mitigation. The cost of mitigation was expected to be $10 million, one-tenth the cost of the project (Ibid).

Once the decision was made to go ahead with the project, the next problem was how to go about the mitigation. The policy makers had three options:

1) on site mitigation
2) off site mitigation in the same watershed
3) mitigation at a site outside the watershed.

Option one would create a flight path hazard. Wetlands tend to attract migrating birds and the designers try to keep the birds as far away as possible from the aircrafts. Also, there was not enough land on site to mitigate in the proportions that the MDEQ required. Option two presented the same flight path hazard and will involve the displacement of some residents. The MDEQ and the designers of the wetland, the engineering firm of Johnson, Johnson and Roy settled on option three.

An 805 acre site in the southwest corner of Sumpter Township was proposed as the mitigation site, but Sumpter Township residents initially opposed it. Their main arguments were that there were already enough wetlands in their township and that the wetlands were not destroyed in their township.

There was a debate among biologists about the fate of the rare plant species. Johnson, Johnson and Roy biologists say they could successfully relocate them by moving entire blocks of soil, but some MDEQ biologists felt that no matter how the plants were moved there was no guaranty that plants would thrive in their new location; they just were too rare to be risked.

It turned out that the species that were considered rare were discovered at the mitigation site. Destruction of a rare species ceased to be an issue. However, there was also a sportsmen's club on the proposed mitigation site. Lead from expended bullets contaminated the soil to the extent that the lead levels were many times higher than the

standards set by the state. The leaching of the soils found in the area makes it difficult to clean up the site. There is a potential for negative impacts on the wildlife (Ibid).

Despite the problems the mitigation project went ahead. There were four parties the controversy: MDEQ; the Engineering firm Johnson, Johnson and Roy; the Detroit Metropolitan Airport management authorities and a local citizens council. The local citizens' council was the only group opposing the project. Although the Federal Aviation Administration and the management of North West and American Airlines did not think the airport expansion was necessary they did not join the effort to prevent it. In terms of financial resources the local citizens council was the weakest of the stakeholder groups.

To entice the resident to accept the project, the mitigated wetland was classified as a passive recreation site with paths for such activities as bicycling, jogging and horseback riding. Developers promised to build housing complexes around the edge of the wetland. The promise of residential development seemed to have weighed heavily on the decision to accept the project.

Houses around the edge of a mitigated wetland seems antithetical to the very idea of mitigation. The purpose of mitigation is to recreate the natural functions of wetlands that have been converted. Building on the edge of a mitigated site puts demands on the functional capacity of the site even before it is known how well the site will perform. This raises the question of why spend so much money on mitigation. Is mitigation just another cost of doing business, in which case a tax may have the same effect.

The MDEQ believed, (they were subsequently proven to be wrong), that there were endangered species on a site, one of only five locations left in the world, yet authorization was given to have the site paved over anyway. Critics of the MDEQ raised the question: if the MDEQ granted a permit that risked the destruction of even the rarest species, then under what conditions will they not grant a permit? The mitigation site is also adjacent to a land fill. MDEQ scientists suggested that the landfill drained away from the mitigation site and the landfill also served as a buffer to restrict activity on the edge of the landfill.

The Detroit Metropolitan Airport case demonstrates the difficulty local groups face in trying to prevent wetlands conversion when confronted by well organized, well funded groups. And when the issue is defined as one of jobs versus environmental preservation the pro-development group would invariably win the public relations battle. Defining the issue is crucial for winning the support of active voters. The forces allied against the local environmental groups were so overwhelming that they had very little chance of prevailing.

Incompatible Uses of Wetlands

The activities in a wetland constitute the general case of the "externality"--an "externality" in the sense that one person's choice affects another person's consumption or production. Building in a wetland generally requires filling in parts of the wetland, and filling in a wetland is incompatible to the natural functions of the wetland. Any use, of

wetlands by an owner, that is contrary to the natural characteristics for which the wetlands are suited will result in losses to others.

Neoclassical economic theory suggests that in a market economy with well defined property rights, if A's activity causes harm to B, B can go to courts to seek injunctive relief or damages and caused by A, assuming B is an owner. If B is not an owner, B can arrange to pay A to halt his activity or take some action to mitigate the effects of A's activity either way an efficient situation will be attained. In the case of damages resulting from alterations of the wetlands, it is difficult to tell who is creating a cost for whom and how much. Actions which destroy fish spawning ground or the breeding ground for migrating birds will have effects well beyond the boundaries of the wetlands and the effects may have multiple causes.

One party disturbing the wetland can create a cost for many. The transaction cost involved in determining who are the parties harmed and the extent to which they are harmed will be very high. Even if the parties involved in the transaction can come to some agreement as to the extent of the harm resulting from disturbing the wetlands, this private transaction may not result in the preservation of the "appropriate" amount of wetlands. The state has an interest in preserving enough wetlands as is necessary to maintain ecological diversity and functional capacity. Legislation to protect wetlands is very likely, especially if the beneficiaries are politically active.

Even with the laws protecting wetlands, wetlands are still perceived as a predominantly private good with mainly public benefits. Mitigation is a middle ground, intended to protect the on-site owners right to use his property while trying to maintain the public's right to the functional benefits of wetlands; maintaining development while protecting the environment. Mitigation is a catch-all term for any activity taken to avoid or minimize damage to the wetland, and to restore enhance or create as well (Salveson 1994).

To mandate that an owner recreate a wetland to meet certain design specification is analogous to compelling a coal burning plant or incinerator to install scrubbers to reduce the amount of pollutants they pour into the air. If the benefits from building the plant outweighs the cost, even with the scrubbers, investors will be tempted to build more plants. Since a scrubber is not an ideal substitute for not building the plant (some pollutants will escape into the air) at some point policy makers may have to consider an outright ban. Similarly if the benefits from building in the wetlands are greater than the cost even with mitigation, investors will be tempted to build in the wetlands. Since recreated wetlands are not perfect substitutes for natural wetlands, at some point policy makers may have to institute a complete ban on development in some particularly environmentally valuable lands.

Managing the Mitigation Process

The relationship between wetlands destruction and property damage is very real. Home owners who live around wetlands know that the destruction of the wetlands can cause flooding of their property. The destruction of wetlands also reduces the hedonic value of their property.

The law mandates that more wetlands must be recreated than destroyed, but quantity in this case is not a substitute for quality. The concept of mitigation looks suspiciously to many as a pretext to continue wetlands alterations. Policy makers are in effect risking the future of an ecosystem based on very limited empirical evidence.

Wetlands mitigation is still in its trial and error phase, but wetlands scientists are testing, refining and selecting the techniques that prove most promising. They are also advising developers on ways to avoid unnecessary wetlands alterations. To analyze the performance of a policy, the objective of the policy must be clearly stated along with the standards or units of measurement. The Goemaere-Anderson Act is "An Act to provide for the preservation, management, protection, and use of wetlands; to provide for a plan for the preservation, management, and use of wetlands; and to provide remedies and penalties". These are some general objective, making sure that they are met is the task of the enforcement agency. If the agency does not have the manpower and other resources necessary to meet the goals of the legislation, then the legislation will have no effect.

Policy makers should establish priorities. When recreating wetlands, the designers should rank the functions that they desire: duck habitat, biological filtration, storm water containment and spawning ground. Montgomery et. al (1994) believe that land management policies should seek to protect the entire ecosystem. This involves defining the intrinsic capabilities and limitations of different parts of the landscape to support a particular type of activity and instituting policies accordingly.

MDOT has mitigated just over 500 acres of wetlands, more than half within the last three years. MDOT admits that they are still learning the art and science of mitigation. They used to build the wetlands deeper, an average of six feet under the water table, now they are building them, on average only one and a half below the water table. They formerly built them with well defined edges, now they are building them with convoluted edges. Convoluted edges presents a greater area surface area for plant growth and more closely mimic the natural contour of the natural wetlands.

References

Bostwick, Peg. 1995. Interview by author, Land and Water Management Division of The Michigan Department of Environmental Quality, February 2.

Detroit Free Press. 1989. August 7.

Dempsey, Dave. 1991. "Unchartered Territory: Survival of Endangered Hinges on Success of Metro Airport's Risky Mitigation Plan". *Tuebor Terra* November/December.

Golembiewski, Chris. 1996. "Village Is The Newest Focus Of Growth". *The Lansing State Journal*. Jan 21.

----------. 1995. "Dobie Road Muddle Deepens". *The Lansing State Journal*. July 3 Montgomery, David R. 1995. "Watershed Analysis As A Framework For Implementing Ecosystem Management". *Water Resources Bulletin* Vol. 31 No. 3.

Reed Maureen. 1994. "Ecological and Social Impact Assessment". *Environmental Impact Assessment Review* Vol. 14 No. 4.

Salveson, David. 1994. "Wetlands: Mitigating And Regulating Development Impacts". Washington D.C.: The Urban Land Institute.

Schuen, David. 1995. "Annual Mitigation Report". Lansing: Michigan Department Of Transportation. (Unpublished).

----------. 1994. "Annual Mitigation Report". Lansing: Michigan Department of Transportation. (Unpublished).

Stanton, Erica. 1995. Interview by author, Project Planning Division, Michigan Department of Transportation: March 9.

Upton, Jodi. 1996. "Space Seekers Take Toll On Rural Areas". *The Lansing State Journal*. February 21.

Zelski, Robert. 1995. Interview, Design Division, Michigan Department of Transportation. March 10.

Chapter IV

IMPACT OF POLICY FRAMES ON PERCEPTION OF PROPERTY RIGHTS

Introduction

The purpose of the survey was to the determine the effects of the framing of message on people's policy preference and more specifically their attitudes towards wetlands mitigation. This researcher starts with the premise that most people do not generally have well formed opinions on public policy issues and may be susceptible to the "spin" that is placed on a message. Even people with well-formed opinions tend to show response instability. What effect will the framing of the message have on people who presumably have an opinion on the wetlands mitigation issue in Meridian Township.

Sample Frame

The names of 972 home owners in Meridian Township were randomly selected from the township treasurer's office. The list of 972 names were further randomly subdivided into three groups each with 324 names. One group received the pro-private rights message, another received the pro-community rights message and the third group -- the control group received no message.

Analysis of Results

Forty-one percent of the people surveyed responded. The distribution of the responses by group was as follows:

Group 1 (pro-private property rights)	132	33.3%
Group 2 (pro-community property rights)	118	29.8%
Group 3 (no message)	146	36.9%

The no-message group had the highest response rate probably because respondents felt that responding to a survey with no message required less effort. The pro-community rights group had the lowest response rate perhaps because responding to that survey required more effort. The pro-community rights group had the longest message and respondents were also asked to look at a cartoon. (See appendix IV).

The responses were calculated using a Likert scale: 1=strongly disagree, 2=disagree, 3=neutral, d=agree, e=strongly agree. The mean score was calculated for each questionnaire based on responses of the first nine questions, then the questionnaires were arranged in groups according to the message. A composite mean was calculated for each group. The composite mean for each group was used to perform a difference of mean test to determine whether or not the framing of the message had any influence on peoples' responses. The composite means were as follows:

Group 1 (pro-private property rights)	3.6236
Group 2 (pro-community property rights)	3.6176
Group 3 (no message)	3.6771

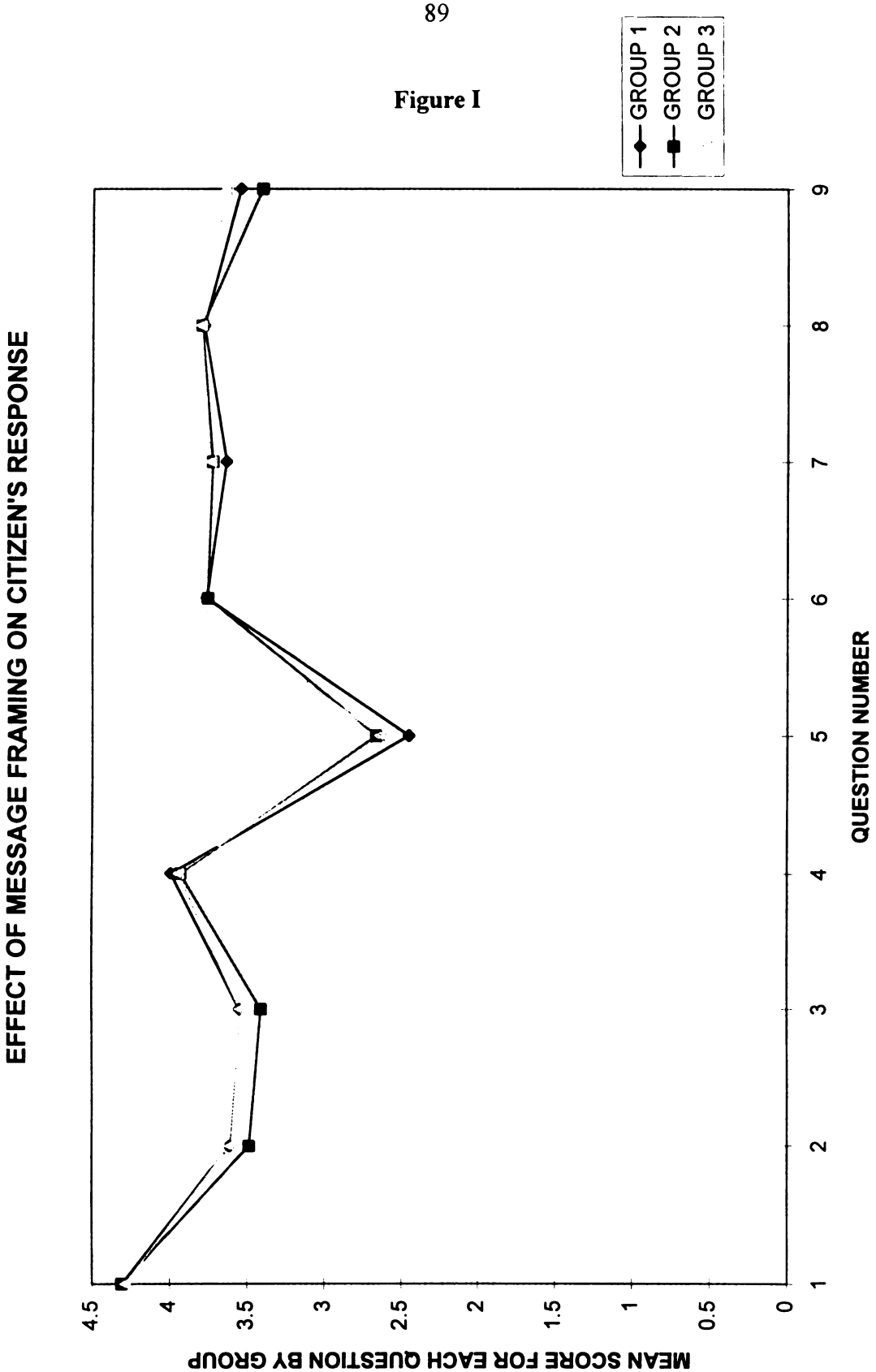
An Analysis of Variance table reveals that the data for each group are very similar (See Appendix I). The sum of squares between groups is very small (.8772) as compared to the sum of squares within groups (209.8813). This indicates there is more variation in the scores within the means for each group than there is among the composite means of each group. With an F ratio of .4406, using a .05 confidence level, there is strong evidence to accept the null hypothesis, H10: there is no difference in the mean scores among the three groups.

The mean score of respondents for each question based on the message for the first nine questions are also very similar. There is no question for which there is a statistically significant difference among the groups.

Question No.	Group No.1	Group No. 2	Group No. 3
1	4.3071	4.3095	4.2857
2	3.6129	3.4857	3.6143
3	3.5476	3.4857	3.5465
4	3.9919	3.9314	3.9429
5	2.4524	2.6635	2.6429
6	3.7630	3.7549	3.8841
7	3.6371	3.7255	3.7391
8	3.7822	3.7961	3.8029
9	3.5492	3.4078	3.6403

A graphical representation of the above data is presented in Figure I on the following page.

Figure I


EFFECT OF MESSAGE FRAMING ON CITIZEN'S RESPONSE
MEAN SCORE FOR EACH QUESTION BY GROUP
QUESTION NUMBER
GROUP 1
GROUP 2
GROUP 3
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
5
6
7
8
9

The standard deviation for each group is also very similar: 7316, .7446 and .7187 for groups 1, 2 and 3 respectively. If one constructs a 95 percent confidence interval for each of the three group means individually, the means of groups 1, 2 and 3 will all fit into all three intervals. A 95 percent confidence interval based on a grand mean -- the mean of the three group means, includes all three means. The evidence that there is no difference among the group means is overwhelming.

A similar analysis between the group which identify themselves as being more concerned with wetlands protection, (Group 1), and the group which identify themselves as being more concerned with economic growth, (Group 2) shows strong evidence that there is a difference between the two means (See Appendix II). A 95 percent confidence interval for Group A does not include Group B and a 95 percent confidence interval constructed for Group B does not include Group A. A 95 percent confidence interval based on a grand mean -- the mean of the two group means, includes neither the mean of Group A nor the mean of Group B. The F ratio of .000 indicates that at a .05 confidence level there is just about 0 probability that the means of the two groups can be the same. One must accept the alternative hypothesis, H22: there is a significant statistical difference between the mean scores of respondents who identify themselves as being more concerned with wetlands protection and those who identify themselves as being more concerned with economic growth.

Cross tabulation of the data from the three groups: pro-private property rights (Group 1), pro-community rights (Group 2) and no message (Group 3); and the scores for

each question shows the intensity to which views on a particular question are held. The responses to each question were aggregated into two categories: strongly disagree and disagree agree (negative); and strongly agree and agree (positive), as illustrated in the chart below. There was no noticeable difference in the intensity of responses by group. The variation patterns in the responses tended to be similar, when the responses were positive they were positive in relatively similar proportions. When, as in the case of question five, the responses were negative, they were also negative in relatively similar proportions. The neutral category was ignored because there was no way in the study to determine which way the people who are neutral were leaning. See charts below.

Negative Response Category Question No									
Group No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Group No. 1	9	24	32	14	79	23	27	18	35
Group No. 2	8	33	26	10	66	14	16	17	38
Group No. 3	11	27	33	14	79	15	22	17	27

Positive Response Category Question No.									
Group No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Group No. 1	116	72	76	100	29	87	77	87	73
Group No. 2	102	66	61	81	33	72	63	88	61
Group No. 3	128	87	87	107	42	107	102	92	87

A graphical representation of the above data is presented in Figure II and Figure III on the following pages.

Figure II

Positive Response Category
Number of Responses By Group
140
120
100
80
60
40
20
0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Question Number
Group No 1
Group No2
Group No 3

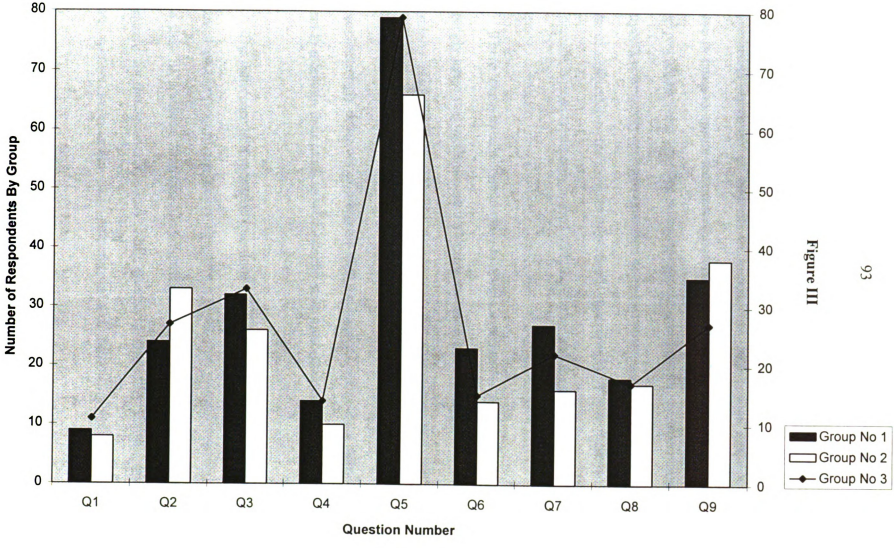

Negative Response Category
Number of Respondents By Group
80
70
60
50
40
30
20
10
0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Question Number
Group No 1
Group No 2
Group No 3

Figure III

An examination of the cross tabulated data in charts below reveals that an overwhelming majority of people, 87 percent, either agree or strongly agree that wetlands are a valuable resource. A majority of respondents, 56.6 percent agree to support an increase in taxes to ensure the preservation of wetlands. The other questions that evoked strong responses were whether someone should compensate the community if he/she destroyed a community resource (question 4) and whether members of the community feel a sense of ownership to the services of wetlands (question 8). Three quarters of the people 75.8 percent, agreed or strongly agreed with the former and the number for the latter is 68.3 percent.

There seems to be a contradiction in people's responses. A majority of people agree or strongly agree that wetlands are a valuable resource, believe that if someone destroys a community resource he/she should compensate the community and feel a sense of ownership to the benefits of the services that wetlands provide. Yet, only 26.4 percent of the people strongly disagrees or disagrees with the suggestion that if the state wants private owners to maintain their lands as wetlands the state must compensate them for it (question 5).

The difference in response to questions 4 and 5 indicate the strong negative attitude that most people have to any policy that seems to threaten private property. Question 4 states that "if someone destroys a community resource, he/she should compensate the community for the community's loss" while question 5 states that "if the community wants private owners to maintain their property as wetlands, then the community should

compensate them for it." Most people agree that an individual should not destroy a community resource without compensating the community for it's loss but apparently they could not make that connection to a private owner. It did not occur to a majority people that a private owner taking actions on his property can destroy a community resource. There seems to be a difference in perception of "private owner" and "someone".

In the framing of the debate over wetlands preservation, it is important for those who are seeking to enact legislation to protect wetlands to make the distinction between on-site ownership and off-site ownership of wetlands; a developer may have ownership of the land but the community has ownership of the functions of the wetlands. If ownership of the wetland is conceded to the on-site owner without the distinction between the two goods being clear, the environmentalist would probably lose the debate before their point of view is even considered. The development interest would continue to frame the debate as being one of private owners versus the "big" government and the current institutional arrangement is biased toward deferring to "private property" owners. Long exposure to the criticisms of big, faceless government and its attempts to violate the sanctity of private property has apparently created in people mind what Banaji et al. (1996) describe as an implicit stereotype. Banaji et al. demonstrated in a series of psychological experiments how implicit stereotypes can affect people's reasoning. In one of their experiments subjects responded more quickly when matching stereotypically female roles with feminine pronouns and stereotypically male roles with masculine pronouns. Subjects spent less time matching "nurse" with "her" and "engineer" with "him" than vice versa. When the

occupations and pronouns were reversed, subjects apparently had to think much harder to realize that it is possible for a man to be a nurse and a woman an engineer. The results were true for people who were explicitly sexist as well as for those who were explicitly nonsexist.

The significance of the work of Banaji et al. to this research is that it may help explain why people who hold favorable views toward the preservation of wetlands may oppose any attempts by government to limit the ability of developers to convert wetlands. People has a quick negative reaction -- an implicit stereotype, to any policies that are perceived as increasing the role of government, perhaps even before thinking through the issue just as Banaji's subjects did when matching occupations with gender. When presented with an electoral choice voters may simply act on their implicit stereotype.

Test of Independence

A chi-square test of independence is used to determine if there is any difference in the intensity of the response based on the message. Two variables are characterized, in a two way table, as independent if the probability that a measurement in a given cell is the probability of being classified in the row times the probability of being classified in the column. For instance, (using the responses to question 1), 23 or 5.8 percent of all respondents chose "strongly disagree". Given that there are 132 respondents in group 1, the number of respondents in group 1 who are expected to choose "strongly disagree" is (5.8*132)=7.7, (5.8 is the probability of finding a respondent in any group who responded "strongly agree".) The expected number of respondents for question 1 are: (5.8*32)=7.7,

(1.3*32)=1.7, (5.6*132)=7.3, (30.8*132)=40.7 ....(82.6*146)=82.6. In each cell, the first number is the actual number and the expected numbers are in parenthesis.

If there is independence between the message and the response, the difference between the actual and expected values will be small. If there is a non-independence between the message and the response, or if the message influenced the intensity of the response, the difference between the actual and expected values will be great. A visual examination of the numbers in each cell shows that the expected values are very similar to the actual values and the chi-square test of independence confirms that for each question at .05 level of significance, the intensity of the response is independent of the message. At a .05 level of significance and 8 degrees of freedom, the critical value is 15.51.

The results of the chi-square tests were as follows:

Question 1: I believe that wetlands are a very valuable resource

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	7 (7.7)	2 (1.7)	7 (7.3)	48 (40.7)	68 (74.7)	132 (33.3%)
Group 2	7 (6.9)	1 (1.5)	8 (6.6)	27 (36.4)	75 (66.7)	118 (29.8%)
Group 3	9 (8.5)	2 (1.8)	7 (8.1)	47 (45.0)	81 (82.6)	146 (36.9%)
Column Total	23 (5.8%)	5 (1.3%)	22 (5.6%)	122 (30.8%)	224 (56.6%)	396 (100%)

Chi-Square	Value	DF	Significance
Pearson	6.285	8	.61529
Likelihood Radio	6.432	8	.59888

Question 2: Westlands significantly affect the value of the property of those who live in and around them

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	7 (6.6)	17 (21.0)	33 (27.6)	41 (43.0)	31 (30.9)	129 (32.9%)
Group 2	8 (6.0)	25 (19.2)	19 (25.2)	38 (39.3)	28 (28.2)	118 (30.0%)
Group 3	5 (7.4)	22 (23.8)	32 (31.2)	52 (48.7)	35 (34.9)	146 (37.2%)
Column Total	20 (5.1%)	64 (16.3%)	84 (21.4%)	131 (33.3%)	94 (23.9%)	393 (100%)

Chi-Square	Value	DF	Significance
Pearson	7.116	8	.52410
Likelihood Radio	7.139	8	.52165

Question 3: Although the tax revenue may have to come from another source, I would support a reduction in property taxes rates of wetlands owners as an incentive for not converting the land

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	13 (10.6)	19 (22.9)	23 (23.3)	43 (41.9)	33 (32.3)	131 (33.2%)
Group 2	12 (9.6)	24 (20.7)	21 (21.0)	31 (37.7)	30 (29.1)	118 (29.9%)
Group 3	7 (11.8)	26 (25.4)	26 (25.8)	52 (46.4)	34 (35.7)	145 (36.8%)
Column Total	32 (8.1%)	69 (17.5%)	70 (17.8%)	126 (32.0%)	97 (24.6%)	394 (100%)

Chi-Square	Value	DF	Significance
Pearson	6.349	8	.60810
Likelihood Radio	6.671	8	.57249

Question 4: If someone destroys a community resource, he/she should compensate the community's loss

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	7 (5.3)	7 (7.2)	14 (18.4)	57 (57.3)	43 (39.8)	128 (32.9%)
Group 2	6 (4.7)	4 (6.5)	17 (16.6)	54 (51.4)	34 (35.8)	115 (29.6%)
Group 3	3 (6.0)	11 (8.3)	25 (21.0)	63 (65.3)	44 (45.4)	146 (37.5%)
Column Total	16 (4.1%)	22 (5.7%)	56 (14.4%)	174 (44.7%)	121 (31.1%)	389 (100%)

Chi-Square	Value	DF	Significance
Pearson	6.726	8	.56646
Likelihood Radio	7.103	8	.52553

Question 5: If a community wants private owners to maintain their property as permanent wetlands, then the community should compensate them for it

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	29 (25.3)	50 (49.2)	23 (21.9)	23 (24.3)	6 (10.3)	131 (33.2%)
Group 2	21 (22.6)	45 (43.9)	18 (19.6)	20 (21.7)	13 (9.2)	117 (29.7%)
Group 3	26 (28.2)	53 (54.8)	25 (24.5)	30 (27.1)	12 (11.5)	146 (37.1%)
Column Total	76 (28.2%)	148 (37.6%)	66 (16.8%)	73 (18.5%)	31 (7.5%)	394 (100%)

Chi-Square	Value	DF	Significance
Pearson	5.023	8	.75503
Likelihood Radio	5.114	8	.74205

Question 6: If someone destroys a wetland he/she should recreate (mitigate) the wetland

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	7 (4.7)	16 (12.0)	20 (25.4)	57 (52.8)	30 (34.4)	130 (33.4%)
Group 2	5 (4.1)	9 (11.2)	29 (22.5)	39 (46.7)	33 (30.4)	115 (29.6%)
Group 3	2 (5.2)	13 (14.1)	27 (28.1)	62 (58.5)	40 (38.1)	144 (37.0%)
Column Total	14 (3.6%)	38 (9.8%)	76 (19.5%)	158 (40.6%)	103 (26.5%)	389 (100%)

Chi-Square	Value	DF	Significance
Pearson	10.451	8	.23478
Likelihood Radio	10.870	8	.20916

Question 7: If I owned land zoned as wetlands in Meridian township, I would sell the land to a developer even though I know that he/she would convert the wetlands to other uses

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	9 (6.3)	18 (15.3)	28 (31.6)	37 (37.9)	37 (37.9)	129 (33.2%)
Group 2	7 (5.6)	9 (13.6)	36 (28.2)	26 (33.8)	37 (33.8)	129 (33.2%)
Group 3	3 (7.1)	19 (17.1)	31 (35.3)	37 (37.9)	40 (42.3)	144 (37.1%)
Column Total	19 (4.9%)	46 (11.9%)	37 (37.9%)	37 (37.9%)	37 (37.9%)	144 (37.1%

Chi-Square	Value	DF	Significance
Pearson	13.231	8	.10412
Likelihood Radio	13.803	8	.08704

Question 8: I feel a sense of ownership to the benefits that wetlands provide for the entire community

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	3 (5.0)	15 (12.3)	24 (23.6)	59 (55.5)	28 (32.6)	129 (33.2%)
Group 2	5 (4.5)	12 (11.1)	21 (21.2)	46 (49.9)	32 (29.3)	116 (29.9%)
Group 3	7 (5.5)	10 (13.6)	26 (26.2)	62 (61.5)	38 (36.1)	143 (36.9%)
Column Total	15 (3.9%)	37 (9.5%)	71 (18.3%)	167 (43.0%)	167 (43.7%)	98 (25.3%)

Chi-Square	Value	DF	Significance
Pearson	4.1567	8	.81781
Likelihood Radio	4.60202	8	.79914

Question 9: The current wetlands policy in Meridian township which protects parcels of wetland smaller than that protected by the States Wetlands Protection Act goes too far

Group No.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Row Total
Group 1	13 (14.1)	22 (18.7)	19 (21.9)	38 (38.0)	35 (34.4)	127 (32.7%)
Group 2	18 (12.9)	20 (17.0)	17 (20.0)	32 (34.7)	29 (31.4)	116 (29.9%)
Group 3	18 (12.9)	31 (25.0)	46 (43.4)	46 (43.4)	41 (39.2)	145 (37.4%)
Column Total	43 (11.1%)	57 (14.7%)	67 (17.3%)	116 (29.9%)	105 (27.1%)	388 (100%)

Chi-Square	Value	DF	Significance
Pearson	9.059	8	.10412
Likelihood Radio	9.037	8	.0804

References

Banaji Mahzarin R. 1996. "Implicit Memory and Survey Measurement". In Nobert Schwarz and Seymour Sudman (Ed.) *Answering Questions*. San Francisco: Jossey-Bass Publishers.

Chapter V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

Environmental policy is made at the intersection of many forces as shown in Figure IV on the following page. The final policy is the result of a power play among the contending forces. Each group is trying increase the size of its space; there are feed back loops among the contending forces. The strength of each force will depend to a large extent on the economic resources of the people in that particular area at that point in time. Ruttan (1971) suggests that people demand more environmental amenities as their incomes increase. Subsequent writers, among them Pearce and Warford (1993) make the inverse argument; the limited opportunities of poor people are causing them to take steps that lead to environmental degradation. Poor people generally have higher discount rates, so as long as there are substantial amounts of poor people there would be a tendency to over use resources now.

Figure IV

POLICY IS MADE AT THE INTERSECTION OF MULTIPLE FORCES.

Environmental amenities are not goods enjoyed and affordable only by the wealthy. Even poor people would be willing to expend resources to maintain the quality of certain environmental amenities. Poor people may be willing to pay to make sure that their drinking water is clean. The same people may not be willing to preserve an endangered species, especially if they could not make the connection between preserving the species and their overall well being. Public policy should reflect, at least in a general way, the feeling of the electorate. But, since there are many issues in an election, a candidate's views toward wetlands preservation may be subsumed by other issues such as unemployment and crime.

Meridian Township residents are better educated than much of the rest of the state of Michigan (52.9 percent of the residents above age 25 have at least a four year degree), and have higher incomes (house hold income of $41,00). The corresponding Figure for the rest of the state is 17.4 percent and $31,000 (Bureau of Census 1990). If, as Ruttan (1971) argued, demand for environmental amenities is income elastic then one would expect the residents of Meridian Township to be much more likely to support laws that seek to preserve wetlands. The township has also had a wetlands ordinance since 1991. The residents of the township have been exposed to the wetlands debate for a longer period than most of the other residents of Michigan. Areas with lower incomes and lower levels of education may have less favorable opinions regarding preserving wetlands.

The Mitigation Process

The cost of mitigating a unit of wetland varies widely depending on the proximity to a city, the topography of the land and the type of soil. According to data from MDOT and the engineering firm of Johnson, Johnson and Roy the average cost of mitigating an acre of wetland is between $45,000 and $50,000 per acre with an additional $2,500 per acre for maintenance. The cost of acquiring the land varies between $800 and $1200 per acre.

If a developer is willing to incur the cost of mitigation to build at site A, rather than site B, where there is no mitigation requirement, then site A must possess a comparative advantage and profit opportunity. Most developers would want to build in a municipality that they perceive as having a comparative advantage. Some local authorities believe that they have had enough development while others think they need more development. Since wetlands boundaries do not coincide with municipal boundaries local authorities may be working at cross purposes.

The functional capacity of a unit of wetland is yet to be known, even though permission is being granted to convert and to mitigate the conversion. MDEQ approves 85 percent of all the applications for permit. Rarely does a permit meet with outright rejection. In the vast majority of cases the permit is sent back to the developer so that he/she can modify the plan. In the cases of the 15 percent that are classified as rejections, the developer did not re-submit the plan for reasons that may be unrelated to the permitting process. Since decisions about wetlands are being made under uncertainty, one would expect that permits to convert them will be granted rarely and with a lot of scrutiny.

The attempt to totally stop the Detroit Metropolitan Airport project failed but the mitigation was made at an actual cost of $18.5 million, the original estimate was $10 million (Detroit Free Press, May 6, 1997). Today Crosswind Marsh, the wetland created as a result of the mitigation project is becoming an important tourist attraction. It is home to over thirty species of birds, including a pair of bald eagles, and over forty species of mammal. The 1,050 acre park has 5.4 miles of trails, 1.4 miles of boardwalk and facilities for canoeing and horseback riding (Ibid).

Effects of Framing on Ownership Perception

The cartoon poignantly illustrates that both sides to the wetlands debate can argue that their property rights are being violated. But, it will take more than a cartoon and a short message illustrating economic interdependence among wetlands stakeholders to change people's perceptions of property rights. Probably, most of the residents who responded to the survey already had well formed opinions on the subject. They were exposed to the debate before, in its traditional frame, in which private property rights are revered and government regulations are seen as infringing on the rights of individuals. This perception has been reinforced by politicians and the media for generations without much scrutiny given to the issue of ownership and the various levels of interdependence among the stakeholders.

Conclusion

People are constantly being bombarded with editorials and stories about 'big' government restricting the rights and freedoms of individuals through legislation. It is not surprising that a short message and a cartoon. The cartoon succinctly makes the point that says that when interests conflict the real issue is whose interest is given preference by government not government versus the people. Government decides who is to compensate and who is to be compensated, i.e., government necessarily decides who gets property rights.

People who value the environmental amenities of wetlands would have to do more than educate others about the value of wetlands. There is already general agreement on the values. If wetlands are to be preserved more people must support regulation which does not compensate would-be developers for maintaining their land in its natural wetlands state. It would take more than education about the beneficial services that wetlands provide. The education effort should be directed toward the perception of ownership. We have learned that ownership is sacred and owners are seen as on-site owners. Thus, anytime an individual owner is pitted against a faceless government, the selectively perceived on-site owner will tend to win. To frame the debate so that the off-site beneficiaries of wetlands are seen as owners who are entitled to compensation, if interfered with, is a challenge. But this research suggests that if such a frame can be established, there could be public support for regulation. This follows from the fact that there was wide spread support for the proposition that "if someone destroys a community resource he/she should compensate the community for the community's loss". But, if the developers are given the conceptual high

ground of being seen as the "owner", then by default the compensation should go in their favor and against the public. This follows from the fact that there is substantial agreement to the proposition that "if the community wants private owners to maintain their lands as permanent wetlands, then community should compensate them for it". This is inconsistent with the quote in the paragraph above. People's perception about private property was created over centuries, so it is unlikely that one message will change many minds. However, if the debate can be framed in such a way that it emphasizes that the off-site beneficiaries of wetlands are owners and are entitled to compensation, if their stream of benefits are disturbed by a developer, more people may be responsive to the message.

An education effort designed to get citizens to support regulations to preserve wetlands should focus on bringing the issue of economic interdependence to the forefront by noting that both sides can use the compensation argument. It should also seek to persuade voters that there is nothing scientific or natural about the historical assignment of property rights. Voters should have clear understanding of the fact that property rights are assigned by the state and that it is the interplay of political forces that determine the rules for the assignment of these rights.

Recommendation to Groups Interested in Preserving Wetlands

Based on the findings of the research, the following recommendations are suggested:

1) People seem confused about the notion of community rights. Even though they feel a sense of ownership to the benefits of wetlands, they are reluctant to support a law that would restrict the on-site owners ability to convert land and make the public rights effective. An education effort that distinguishes between the rights and

privileges of off-site and on-site owners will be necessary to change attitudes towards policies that exert the community rights over that of the developer. Images such as that in the cartoon must become as familiar as the image of the aggrieved owner losing out to the faceless government.

2) The United States Department of Agriculture/Natural Resource Conservation Service (USDA/NRCS) has a wetlands reserve program which assists communities in securing easements to private wetlands. Communities like Meridian Township could probably benefit by participating in the program.

3) Some communities are exploring the possibility of forming voluntary partnerships with wetlands owners. The partnership is not legally binding on any partner. Partnerships seem potentially useful because they are initiated and managed with input from the local community level.

4) It is important to distinguish between recent owners of wetlands and the long time owners of wetlands. If someone purchases a unit of land for the purpose of developing it and then suddenly the laws governing development change, the community should be willing to make exceptions to the ordinance on a case by case basis. For the long time owners, the acquisition value has already been recovered.

5) Creative planning can allow for development with less intrusion into the wetlands. Building on smaller lots not only reduces the cost of providing services to residents but has been shown to increase the value of the property.

6) Maps indicating the ancient wetlands areas should be created. Based on those maps and the location of the existing wetlands, wetlands should be ranked and the type and level of development that corresponds to the ranking allowed.

7) Collaborative planning among municipalities and other local government entities should be fostered.

Suggestions for Further Research

A short message and a cartoon indicating interdependence was not enough to change many people's attitude but a study could be designed with the aim of measuring the impact of the framing of messages on people's attitudes. The message could be more detailed and more directed toward explaining economic interdependence rather the importance of wetlands. The message should probably be framed around the proposition that property rights are given by the state and not by nature and that the interplay of political forces determine the rules for granting property rights.

In this study there was no way to determine who read the message and who simply responded based on their existing frames. In a future study, questions could be designed to determine if respondents actually read the message and they should also be asked directly whether or not they read the message. Respondents should also be asked what they thought the point of the cartoon was, and in some cases the cartoon could be explained. A future study could also be designed with three groups: group 1 gets one version of the message; group 2 gets another version and the other group -- the control group, gets no message and could have the cartoon explained to them.

Devolution of power to local units of government is a very popular idea. But, it is not yet clear what the environmental impact of this devolution of power will be. Research on the subject should also be conducted.

References

Detroit Free Press, May 6, 1997.

Pearce David and Jeremy Warford. 1993. *World Without End.* Washington D.C.: The World Bank.

Ruttan Vernon and Yuujiruo Hayami. 1971. *Agricultural Development an International Perspective*. Baltimore: Johns Hopkins Press.

APPENDICES

APPENDIX I

Appendix I

ANALYSIS OF VARIANCE: PRO-PRIVATE PROPERTY RIGHTS (GROUP 1), PRO-COMMUNITY RIGHTS GROUP (GROUP 2), AND NO MESSAGE GROUP (GROUP 3)

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	49.4371	49.4371	125.4369	.0000
Within Groups	368	145.0361	.3941		
Total	369	194.4732			

Group	Count	Mean	Standard Deviation	Standard Error	Minimum	Maximum	95 Pct Conf
Grp 1	306	3,8165	.6060	.0346	1.1111	5.0000	3.7483 T
Grp 2	64	2.8500	.7241	.0905	1.0000	5.0000	2.6692 T
Total	370	3.6493	.7260	.0377	1.0000	5.0000	3.5751 T

No range tests performed with fewer than three non-empty groups.

APPENDIX II

Appendix II

ANALYSIS OF VARIANCE: PRO-WETLANDS CONVERSION GROUP (GROUP 1) AND PRO-ECONOMIC GROWTH (GROUP 2)

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	.8772	.4386	.8213	.4406
Within Groups	393	209.8813	.5340		
Total	395	210.7585			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	132	3.5705	.7316	.0637	3.4445 to 3.6965
Grp 2	118	3.5833	.7446	.0685	3.4475 to 3.7190
Grp 3	146	3.6735	.7187	.0595	3.5560 to 3.7911
Total	396	3.6123	.7305	.0367	3.5401 to 3.6844

Group	Minimum	Maximum
Grp 1	1.0000	4.7778
Grp 2	1.6667	5.0000
Grp 3	1.1111	5.0000
Total	1.0000	5.0000

APPENDIX III

Appendix III

COLONIZATION IN MITIGATED SITE: IMMEDIATELY AFTER MITIGATION (SUMMER, 1995) AND SIX WEEKS LATER

APPENDIX IV

Appendix IV

CARTOON: THE SPOKANE SPOKESMAN JULY 7, 1995

APPENDIX V

Appendix V

MAP OF DETROIT METRO AIRPORT AND MITIGATION SITE