

HUMAN DIMENSIONS OF GREAT LAKES FISHERIES MANAGEMENT

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The Fishery Research Program (FRP) of the Great Lakes Fishery Commission includes as a research theme area “The Human Dimensions of Great Lakes Fisheries Management.” The term human dimensions refers to how and why humans value natural resources, how humans want resources managed, and how humans affect or are affected by natural resources management decisions. Human dimensions inquiries strive to understand human traits and how to incorporate that understanding into management planning and actions. It covers a variety of ideas and practices including cultural, social, and economic values; individual and social behavior; demographics; legal and institutional frameworks of management; communication and education; and, decision-making processes of management (Decker *et al.* 2001).

Based on that definition, human dimensions are defined in this theme to include demographics; cultural, social, political, and economic values; individual and social behavior; communication; legal and institutional frameworks, and decision-making processes of management. The theme seeks to help resource agencies improve sustainability of fisheries in the Great Lakes Basin (hereto on referred to as the Basin) through decisions that integrate human dimensions knowledge of fisheries management in the Great Lakes ecosystem. Researchers within this theme will involve managers and other stakeholders to clarify information needed for decision-making.

The human dimensions research theme strives to help resource agencies improve quality of life and sustainability of fisheries in the Basin. The theme will accomplish this goal through dual objectives of obtaining meaningful knowledge about human dimensions of fishery management, and developing ways to integrate this information with knowledge of ecosystems in decisions about resource use. In addition, integration of human dimensions research findings into resource management will advance a more comprehensive and effective planning regime. A multidisciplinary approach that incorporates natural and social sciences to understand and solve today’s environmental challenges is essential to achieving sustainability (Ehrlich 2002).

In this document, we outline initial steps that will elucidate key human dimensions issues. We anticipate that a Human Dimensions Theme Area will expand over time to include other significant issues, as has been the case with the environmental issues to which the GLFC has devoted significant attention. We intentionally narrow our focus here for purposes of launching a theme, and do not intend for this document to encompass the entire list of important human dimensions issues.

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BACKGROUND

As future prospects and strategies are considered and weighed, it should be remembered that the roots of human impacts on the Basin extend back in time to at least the first European settlers (Beattie Bogue 2000). Settlers quickly exploited the Basin's rich natural resources, and initiated a cascade of impacts on the whole system. Resource exploitation promoted the region's rapid economic development. However, earlier indigenous use over hundreds of years caused little change in the Basin's resources (Cleland 1992).

The human relationship with the Basin is just as important today as it was during the past 200 years. More than 40 million Canadians and Americans inhabit the region, which houses nearly 50% of Canadian and American industry (Groop 1999). The lakes support active transportation and shipping networks, natural beauty and recreational opportunities that create a strong tourist economy, abundant agriculture, and industries dependant on water resources. However, human use imposes costs on the ecosystem. Phenomenal growth of industry and human populations in the Basin during the nineteenth and twentieth centuries and their attempts to assert control over the ecosystem had numerous transforming and enduring impacts on the Basin's aquatic communities, resulting in degraded water quality, wetlands, streams, shorelines, and fisheries (Beeton *et al.* 1999). Challenges for fisheries management are especially difficult because human impacts on the system continue to be ubiquitous, poorly understood, and often uncoordinated. Furthermore, even though humans are a central element of the Basin's ecology, much of the Great Lakes fishery management focus has been on ecological issues pertaining to fish communities.

In addition to environmental complexity, cultural and political boundaries in the Great Lakes Basin create one of the most complex resource management situations in the world. The array of stakeholders in Great Lakes fisheries management has diversified, and stakeholder expectations for involvement in decisions have increased (Krueger and Decker 1999). Two nations, two provinces, eight states, a growing number of Indian tribes, and scores of local institutions formally participate in Basin fishery management. Large numbers of other stakeholders, who span a range of interests from commercial resource users to environmental protection, also actively seek to affect management decisions. Research is needed that integrates knowledge about the human and environmental dimensions to aid decision-making about the Great Lakes ecosystem.

Management of the Great Lakes fishery is largely the responsibility of sub-national governments, which on five lakes and their interconnecting channels, makes difficult the formation of a single overarching management authority. Though some argue such a centralized structure would help to foster ecosystem management, day-to-day fishery management is – and likely will remain – under the jurisdiction of sub-national governments. Institutions that play a role in Basin fishery management (such as the Great Lakes Fishery Commission via *A Joint Strategic Plan for Management of Great Lakes Fisheries*) generally embrace an ecosystem approach to management, and recognize humans as a central component of the ecosystem. Because of multi-jurisdictional governance and a strong sub-national presence, cooperation is a necessity.

Management includes more than intergovernmental relations and legal structures. To meet public trust obligations and to conserve natural resources, managers must apply more than insights from environmental sciences, and engage stakeholders in management while dealing with public relations, collaboration, and myriad other social issues. Research is needed that focuses on how managers engage stakeholders and each other to integrate knowledge of human and environmental dimensions in fishery management, bearing in mind that effective processes for integration of biological and human dimensions are still lacking (Johnson 1999).

Research agenda

The Human Dimensions theme will require an initial ten-year time frame. A progression of steps will be followed to create an information base from which additional steps may be taken to explicate this multifaceted area of inquiry.

Foundational steps include:

1. An evaluation of current human dimensions information and processes used in fisheries management and impediments to adoption of more effective decision processes.
2. An analysis of legal frameworks that establish jurisdictional authority for fishery management in the Great Lakes.
3. The development of theory, models, and methods for integration and application of knowledge about ecological and human dimensions that enhances the quality of decisions in Great Lakes fisheries management.
4. The establishment of venues such as workshops and symposia to strengthen networking of researchers and managers interested in the human dimensions theme.

Broadly speaking, to achieve the goals of the Human Dimensions theme, the Great Lakes Fishery Commission actively seeks research that follows three main lines of inquiry: 1) decision-making and the role of human dimensions information, 2) research into organizational structure and behavior (formal and informal), and 3) research into stakeholder participation in management, including communications, collaborative decision-making, and processes that foster interaction among fishery managers. Organized along these three lines of inquiry, material below provides background information, a statement of research focus, and a list of key research questions.

RESEARCH INTO DECISION-MAKING AND THE ROLE OF HUMAN DIMENSIONS INFORMATION

Background:

Fishery management shares traits of all genres of management. Management implies decisions about use of human and material resources to purposefully influence future conditions through deliberate, goal-focused action (Hellriegel *et al.* 1999). The task of decision-making pervades fishery management and is in an integral component of management (Riley *et al.* 2002). To determine optimal interventions, decision processes must integrate scientifically derived knowledge as well as experience-based insight about human and environmental dimensions. Decision processes vary with context, and necessitate different forms depending on distinct problems or opportunities. Regardless of context, any decision-making process should minimally include defining goals and objectives in terms of impacts, identifying opportunities and problems, assessing pertinent information, choosing potential alternatives and a course of action, and monitoring performance (Hammond *et al.* 1999).

Systems in which fishery management occurs are comprised of ecological, economic, sociocultural, and institutional components (Krueger *et al.* 1986). Whereas ecological facets often are well researched and a primary focus of management (Beeton *et al.* 1999), challenges in the latter three social, or human dimensions, have been identified as the most common barriers to effective decision-making (Holling 1995; Lee 1999). Human values, beliefs, and attitudes, including those of resource professionals, are part of social and institutional environments, which support management decisions or create restraints on what managers accomplish (Krueger and Decker 1999).

Changes in the Great Lakes management environment are part of a broader shift in precepts for natural resource management. Decision-making in public fishery management during the twentieth century was grounded in two precepts: sufficiency of biology and expert authority (Nielsen 1976). Though seldom stated explicitly, the sufficiency of biology precept reflected a belief that insights from biological sciences were the nearly exclusive keys to best management decisions (Decker *et al.* 1987). Building on this belief, the expert authority precept held that biologists, by virtue of their training and experience, should make resource management decisions (though in practice professional recommendations were filtered through commissions comprised of lay people with policy-making authority). Such decisions typically used input from select stakeholders (e.g., commercial harvesters, recreational anglers, marina operators), but with little or no formal participation sought from them or others in actual decision-making (Dochoda and Fetterolf 1987; Dochoda and Jones 2002). Of major consequence, the array of stakeholders in Great Lakes fishery management has diversified and their expectations for involvement in decisions have increased (Ferreri *et al.* 1999). Fishery managers now must carefully determine which stakes to address and weigh in a particular situation because the number and diversity may be large (Krueger and Decker 1999).

Fishery management made significant accomplishments by applying its traditional precepts. Nevertheless, out of necessity, these precepts are being enhanced by new

foundational precepts for management. These emerging precepts are: multidisciplinary integration and participatory management of decision processes (Dobson *et al.* 2002; Mangel *et al.* 1996). A core concept proposed to guide this management philosophy is impacts as fundamental objectives (Riley *et al.* 2002). Impacts are significant beneficial and detrimental effects resulting from events or interactions involving humans and fish (including fish habitats), fishery management interventions, and various stakeholders. Impacts, therefore, are a subset of effects from interactions or events sufficiently important to warrant management attention. They are defined and weighted by human values. To improve links between sound science, meaningful public participation, and acceptability of fishery management, value-based approaches are being developed and applied to a range of fisheries, estuary, and water quality problems (Gregory 2000; Keeney 1992).

Integrative techniques are not fully described yet in the resource management literature, nor are they portrayed as part of a conceptual framework that integrates biological and human dimensions. Lack of such a framework hinders advancement of Great Lakes fishery management desired by many managers and stakeholders (Ferreri *et al.* 1999). Most managers, as well as biological and social scientists, recognize an urgent need for integration of biological and human dimensions in management as practiced in the Great Lakes ecosystem (Redman 1999). Systematic evaluations are necessary to determine which techniques have been successful and why, what are impediments for adoption of these innovations, and what are human dimension research priorities to improve fishery management. A focus in and out of the Great Lakes basin may yield insights that individual states or agencies likely would not be able to achieve alone.

Research focus:

This theme will examine decision-making processes within the Great Lakes fishery management regime and investigate how information pertaining to human dimensions is or could be integrated into these decision-making processes. This theme will seek to define human dimensions in the context of the Great Lakes fishery, describe current use of human dimensions information in management, and provide guidance into how managers can better integrate human dimensions perspectives in policies.

Key Research Questions:

1. What are current human dimensions information and processes used in fisheries management, and what impediments exist to adoption of more effective decision processes?
2. What are key human dimensions data needed for effective Great Lakes fishery management?
3. How can knowledge about environmental and human dimensions be better integrated to aid resource management decisions? What are impediments to incorporating human dimensions information in the decisions?

4. Are changes occurring to human dimensions of Great Lakes fishery management and, if so, why are those changes occurring? What are key impacts of those changes and what will be the future composition of human dimensions in the basin?
5. What are potential strategies for mobilizing management capital in the policy-making processes to promote resource sustainability?

RESEARCH INTO ORGANIZATIONAL STRUCTURE AND BEHAVIOR

Background:

Research into institutional arrangements to manage the Great Lakes fishery is the second line of inquiry in the Human Dimensions theme. This section describes literature relevant to institutions and other multi-governmental arrangements and asks questions about how the Great Lakes are managed cooperatively.

The ecosystem approach is a dominant philosophy within the institutions that manage the Great Lakes fishery (Ferreri *et al.* 1999; Jude and Leach 1999). Until recently, management has been biased toward managing single species (Knight 1988) or within jurisdictional boundaries (Rabe 1997). Today, most multi-institutional arrangements on the Great Lakes—including the *Joint Strategic Plan for Management of Great Lakes Fisheries*—are often *explicit* in recognizing the need for ecosystem management. Yet, even as institutions embrace ecosystem management, rarely do they provide a clear definition of what ecosystem management is. One approach to ecosystem management specifically links humans and management institutions to the natural processes (Berkes *et al.* 1998; Grumbine 1994; Schramm and Hubert 1999). This approach acknowledges this inter-connectedness and embraces management that is carried out based on ecological boundaries, involves cooperation among agencies and stakeholders, and includes monitoring so that management can be adaptive (Grumbine 1994). Management cannot ignore the wishes of the humans who use natural resources.

The emergence of the ecosystem approach has prompted a renewed interest in how people and agencies work together to manage a shared natural resource (Donahue 1988). Indeed, by embracing the ecosystem approach, resource managers, governments, and citizens implicitly recognize that they must take a more holistic view of the resource and develop mechanisms to facilitate cooperation. Research will draw from disciplines (e.g., political science, law) that examine how people and governments cooperate within federalist systems and the role of institutions in facilitating intergovernmental cooperation.

Research will seek to describe and increase understanding of the historical context in which Great Lakes fishery management occurs. Previous research (Beattie Bogue 2000; Dobson *et al.* 2002; Gallagher *et al.* 1943; Regier *et al.* 1999, and others) provides a foundation for analyses. Understanding the reasons for the adoption of particular

approaches or institutions will assist in comprehending existing arrangements as well as speculating on possible enhancements.

Literature about common pool resources helps us better understand why people behave the way they do, particularly if the ecosystem approach necessitates collective behavior. Thus, research into the management of common pool resources (Dietz *et al.* 2002) is critical because of “its practical importance.” Such research sheds light on why people (and, perhaps, governments) behave the way they do when resources must be managed collectively. Mancur Olson and Garrett Hardin have each produced seminal works about collective action; works that have spawned significant literature and debate since their publication decades ago. Olson and Hardin are generally pessimistic about people’s willingness to take collective action because people have a natural incentive to free-ride, that is, to attain benefits without contributing to the collective action (Hardin 1968; Olson 1965). The common pool resource suffers because of a lack of proper stewardship. This is the Tragedy of the Commons. Many scholars have debated and built upon Olson’s and Hardin’s works over the years, looking at ways in which institutions can help avert this tendency toward the tragedy. In a particularly noteworthy study, Elinor Ostrom concludes that the tragedy is not inevitable; rather, successful regimes have most or all of several design principles in common and are able to overcome tendencies for constituents to free-ride or avoid compliance with rules (Ostrom 1990). More recently, a new book by Ostrom *et al.* (2002) reviews a variety of commons arrangements including privatization and tradable permits. They find “drama in the commons,” as management of common pool resources usually involves history, comedy, and tragedy. Dietz *et al.* (2002), for instance, point out that years of empirical research have shown that management sometimes resembles the tragedy while at other times is able to overcome the tragedy (Dietz *et al.* 2002). Humans, they argue, are known to engage in narrow self-interest (e.g., when they engage in one-time interactions), but also routinely embrace collective action (e.g., when things like communications, trust, and the possibility of future interactions are important to the constituents. See also (Axelrod 1984)). Research into common pool resources and the best institutions to manage in that environment continue apace.

The field of intergovernmental relations is also important to understanding the role and effectiveness of institutions. Intergovernmental relations concern the needs and antagonisms of the governmental authorities that must interact. Much of the discussion about intergovernmental relations falls within the tenets of federalism and cooperation literature. Federalism literature describes how the federal governments and the sub-national governments cooperate and which level of government is best suited to take the lead in implementing a program (Grodzins 1966; Nice 1987; Scheberle 1997). With the Great Lakes fishery, however, this particular approach to federalism is largely moot because the fishery management authority of the states, the province of Ontario, and the tribes is well established through common law, constitutions, and several court cases over the past century (Cimo 2002; Dochoda and Jones 2002; Piper 1967; Thompson 1974). Nevertheless, federal agencies in both Canada and the United States have made significant contributions to Great Lakes fishery management.

Cooperation is the other area of intergovernmental relations, where the focus is on cooperation among governments, rather than the formation of hierarchical institutions to deal with political fragmentation. That is, the attention is on cooperation between federal and sub-national governments to develop complementary and mutually beneficial policies (Scheberle 1997). For instance, in the Great Lakes fishery regime, while each institution needs others to achieve efficient fishery management, each participant also hopes the others will refrain from counterproductive management practices that undermine their jurisdiction's efforts.

The impact of fragmented authority on cooperation between sub-national and national governments is particularly relevant to the institutional portion of the Human Dimensions theme. This research theme will provide for an analysis of legal authorities and management responsibilities of various levels of government in the context of intergovernmental relations. In this connection, a key question asks: How does the institutional structure of the Great Lakes influence management? Understanding the specific mechanisms (e.g., institutions, policies, cooperative agreements, and binding agreements) that governments use to work together—and their successes and failures—would be valuable for guiding development of future arrangements. Scholars generally describe a regime (or an institution—most authors use the terms interchangeably) as a set of rules or accepted codes of conduct that people or organizations follow (Abbott and Snidal 1998; Krasner 1983; Soroos 1999; Vogler 2000; Young). Regimes range from informal norms to formal organizations and arrangements. Regimes are needed to help governments develop a clear legal framework for action, to help facilitate the transfer of information among participants, and, ultimately, to help governments actually manage multi-jurisdictional issues (Keohane 1982). They also provide a forum for multiple jurisdictions to discuss issues and plan joint initiatives, all in an effort focus on common problems and opportunities (Donahue 1991).

Oran Young (1994) delineates four approaches states have toward regimes: (1) states avoid regimes and institutions because they are often more trouble than they are worth and they involve too much compromise; (2) regimes are a way for states to exercise power outside of their boundaries (3) regimes help the parties learn about common problems (Young describes this as an “epistemic community” which is a group of similarly experienced thinkers who share knowledge); and (4) states bargain to avoid collective action problems, where institutions operate on consensus rules, not rules relating to power, self-interest, or epistemic communities (Young 1994). The institutional arrangements, Young adds, change over time to reflect the member's combined goals, domestic pressures, and other protean forces.

Considerable literature also exists to help determine whether and why regimes are effective. Multi-jurisdictional management regimes are successful if they solve the problems that need to be solved, if they change effectively the behavior of one or more of its members, if they are able to interact effectively with a member's domestic political structure, and if they are efficient, equitable, sustainable, or robust (Young 1996). Moreover, an institution is successful if the regime's constituents change behavior from thinking parochially to more collective or collaborative thinking, and if common initiatives create that equity and ability to solve problems (Young 1996). Other literature

(Miles *et al.* 2002; Young 1999) builds on Young's measures of effectiveness and applies many of Young's theories to case studies. Variables that might affect regime effectiveness relate to whether regimes contain adequate legal rules to govern behavior, ensure compliance, punish offenders, allow the member states to extend their governance beyond their borders, or whether the regime actually motivates the desired behavior (Vogler 2000).

Research focus:

This theme will examine the specific institutional characteristics (legal and other formal arrangements as well as non-binding and informal arrangements) of the Great Lakes fishery management regime. This theme investigates why institutions exist the way they do, how these institutions influence Great Lakes fishery management, and how the institutions could be improved to better foster cooperation.

Key Research Questions:

1. What are overlaps, gaps, and conflicts in legal mandates of Great Lakes fishery agencies?
2. How is the common pool natural resources of the Great Lakes best managed? What strategies exist to develop and implement common policies among several jurisdictions? Could co-management be adapted and employed?
3. How have institutions evolved to be more or less effective in Great Lakes fishery management? Do institutions successfully manage common pool resources? How is success measured and evaluated?
4. Why has the Great Lakes fishery management regime evolved the way it has? What accounts for the institutional arrangements that exist in the Great Lakes region?
5. To what degree does sub-national management authority over the Great Lakes fishery contribute to fragmented management of the Great Lakes fishery?
6. What are the legal frameworks that establish jurisdictional authority for fishery management in the Great Lakes? Do these frameworks promote cooperative management?
7. Do the management agencies on the Great Lakes cooperate effectively? What are impediments to cooperation? What facilitates cooperation?
8. Does the existing regime truly foster ecosystem-based management and/or adaptive management? Do management agencies seek to create or maintain "stability" in resource management in an atmosphere characterized by ever-changing ecosystems? Can agencies work together to carry out long-term natural resource programs while accommodating the desires of stakeholders and while recognizing that ecosystems change?

RESEARCH INTO STAKEHOLDER INVOLVEMENT IN FISHERY MANAGEMENT

Background:

Research into stakeholder involvement is the third line of inquiry of the Human Dimensions theme. This line of inquiry poses a number of questions, including how stakeholders' knowledge can improve management, how communications influence the fishery managers' ability to cooperate with each other, and how public participation influences success of institutions that manage the Great Lakes fishery.

Millions of people use the Basin fishery and care deeply about how it is managed. To meet public trust obligations fishery managers are compelled to engage stakeholders in many management decisions. Moreover, stakeholders also have important substantive information to contribute to the process. Management will be strengthened with more complete information and diverse perspectives on effective management strategies. Stakeholders may be "experts" as commonly understood or they may have specialized knowledge due to their longstanding connection to the resources or location.

Communicating with those interested in Great Lakes management is complicated by the fact that while the different political jurisdictions agree to develop common approaches, they also retain their right to manage their waters as they see fit. Ultimately, each jurisdiction remains accountable to its own stakeholders—the jurisdiction's governor and legislature, premier and parliament, and resource users. Whereas fishery managers develop science-based policies based on careful recommendations from biologists, parochial interests could prevent decisions from being implemented.

Within this topic, communication processes and networks are of critical importance. Appropriate communications are essential to the management process because regular interaction and collaboration among the managers themselves are crucial to the operation of the fishery management regime. Communications among managers determine the success of cooperation, and communications with stakeholders influence the direction of policies that the jurisdictions pursue. Indeed, some might argue that the fishery management regime on the Great Lakes (the *Joint Strategic Plan for Management of Great Lakes Fisheries*, for example) is not tangible. Rather, it exists as an ever-changing network of communication. Organizational communications is a field that looks at how and why interactions take place in organizations. Organizations are thought of as systems of interrelated and interacting behavior rather than a 'chartable' or static structure (Harris 1993). What this means is that organizations may be viewed as a network of formal and informal communications rather than as a particular thing. The network (as opposed to, say, a constitutional document or a "bricks-and-mortar" building) defines the organization (Deetz 2001; Harris 1993; Monge and Contractor 2001). Organizational communications focuses on who communicates with whom, why communications take place, how the networks emerge, and how the communications networks influence or drive the functions of the organization. Organizational communications helps us to better

understand the “climate” of an organization (not so much what exactly is being communicated), why people within an organization communicate, and how they do it (Falcione *et al.* 1987).

Communications with stakeholders is another central element of the Great Lakes fishery management regime. Today, a fishery manager’s decisions are based on a number of factors including biological data, public relations, personal preference, political pressures, ethics, economics, stakeholder values and preferences, and a number of other things (Axelrod 1984; Bence and Smith 1999; Fazio and Gilbert 2000; Ferreri *et al.* 1999; Jude and Leach 1999; Krueger and Decker 1999). Whether and how the audience understands the many trade-offs has a large bearing on the success and perceived success of Great Lakes fishery management. Also important is how, exactly, fishery managers involve stakeholders in their decision-making processes.

The formal processes fishery managers use to incorporate the public’s goals in management is a key element of a human dimensions theme. Managers are faced with challenges of making high quality decisions while remaining responsive to citizens those decisions affect (Beierle 1998). This challenge is particularly great in environmental matters because stakeholders and fishery managers must understand complex science, consider uncertainty, and weigh ecological realities against values and human needs (Beierle 1998). Consensus building has become an important element in fishery management for good reason: It encourages all affected parties to participate (Ferreri *et al.* 1999), it serves as an effective communication tool for agencies, and, when decisions are made with public involvement, it makes fishery management policies more “defensible” with stakeholders and other officials (Krueger and Decker 1999). However, decision processes focused on consensus often lead to inferior policy choices (Gregory *et al.* 2001). Uncertainty exists about what are the best approaches for stakeholder participation (Chase *et al.* 2001), whether consensus is achievable or desirable (Westley 1995), or even whether involving stakeholders leads to better policy choices (Coggins 1998; McCloskey 1996)).

Research focus:

This theme looks at how fishery managers involve stakeholders in management, how fishery managers seek and attain consensus among managers and stakeholders on management policies, and how fishery managers communicate among themselves and with other stakeholders.

Key Research Questions:

1. Who are the stakeholders who should be involved in Basin fisheries management?
2. In what ways are stakeholders currently involved?
3. Do stakeholders desire involvement, and what level of involvement is appropriate? Would increased stakeholder involvement improve management decisions or create more sustainable decisions?

4. How could stakeholder involvement be enhanced? (i.e., strengthen stakeholders' ability to participate)
5. How do managers perceive and use stakeholder involvement?

A sample of communication networks issues

1. What types of communication networks exist in the Great Lakes fishery management regime? Who communicates with whom? Is the formation of communication networks a prerequisite for cooperation?
2. How do the fishery managers communicate with each other? Do those communications influence cooperation? Are communications among fishery managers always done formally or do fishery managers create informal networks to facilitate an understanding of the fishery issues? To what degree do personalities influence these networks?
3. From where do people receive their information? How are people's attitudes and beliefs formed and how do those attitudes and beliefs relate to communications? What is the role of the mass media in shaping people's beliefs and attitudes?
4. What is the goal of communications between fishery managers and stakeholders? How could/should stakeholder preferences be used in management decisions?
5. How do fishery managers communicate with stakeholders? What are the best mechanisms fishery agencies and fishery managers can use to reach their audiences? How do agencies solicit and receive feedback from stakeholders?
6. How is the effectiveness of communications between fishery managers and stakeholders measured? What constitutes effective communications?

Networking of Human Dimensions Researchers

To facilitate sharing of insights and to develop new research directions, periodic workshops or conferences will be held that bring together Basin researchers information.

CONCLUSION

The Great Lakes Fishery Commission's research program has, over the years, focused its efforts on understanding the biological interactions taking place in the Great Lakes. Whereas the Commission has always recognized that humans are an integral component of natural systems, this theme summons an organized, systematic examination into the human dimensions of Great Lakes fishery management. The human dimensions theme seeks to promote research into the value humans place on natural resources, the expectations people have for

management, how and why governance structures have emerged the way they have, and how stakeholders relate to the management processes.

Projects completed under this research theme will help resource agencies better understand the role of human dimensions in their management programs and help agencies better incorporate this aspect into management. By better understanding how decisions can be improved, projects organized under this theme will help create a more solid foundation for management. Not only does greater attention to human dimensions help make management programs defensible, it also makes the programs relevant to people's lives. This enhanced understanding of the needs and goals of humans in management ultimately contribute to more sustainable and socially relevant management decisions (Riley *et al.* 2002).

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