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Recreation Specialization: Management Preferences & Behaviors of Upper Manistee River Shoreline Owner Anglers

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RECREATION SPECIALIZATION: MANAGEMENT PREFERENCES & BEHAVIORS OF UPPER MANISTEE RIVER SHORELINE OWNER ANGLERS

By

Brian Robert Valentine

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ABSTRACT

RECREATION SPECIALIZATION: MANAGEMENT PREFERENCES & BEHAVIORS OF UPPER MANISTEE RIVER SHORELINE OWNER ANGLERS

By

Brian Robert Valentine

Recreation Specialization is a managerial tool for identifying and describing the diversity within an outdoor recreation activity. Understanding diversity helps managers match recreators with the appropriate resources and forecast reaction to proposed policy changes. This study explored the relationship between specialization levels of upper Manistee River shoreline owner anglers and their management preferences and political behaviors. The study area is located in the northern Lower Peninsula of Michigan. Specialization was measured through skill, equipment, commitment, and centrality to lifestyle. In this study, mail surveys and a reminder postcard were sent to all 601 shoreline owners, and 67% responded. Specialization level was linked to preference for stocking, fish habitat manipulation, and tackle restrictions, but was not linked to public access issues. Specialization level was linked to the number of political actions used but not whether or not action was taken. Results also showed that a small number of specialization indicators are capable of producing results similar to studies that used several indicators. The framework used in this study to measure and report specialization should make the specialization concept more intuitively understandable and easier to operationalize.

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CHAPTER 1

INTRODUCTION

Promoting biodiversity, providing recreation opportunities, and maintaining the long-term productivity of the resource are common examples of natural resource management responsibilities (Owen, Chiras, & Reganold, 1998 and Meffe & Carroll, 1997). When ownership of a natural resource, like a state forest, becomes fragmented among public and private interests, people's willingness to follow regulations becomes the lynchpin of a successful management plan. However, people are a heterogeneous group vis-à-vis their values, attitudes, motivations, perceptions, preferences, and behaviors.

Policymakers who uncover and act upon the differences within those variables increase their odds of creating an acceptable management plan, and they could gauge reaction to proposed changes in recreation resource management policies (Wilde, Riechers, & Johnson, 1992). Unfortunately, in the Information Age, where personal information is a valuable commodity, people are more guarded about revealing their values, attitudes, perceptions, and behaviors (Meeks, 2003 and Napoli, 2003). They could also be more suspicious of those soliciting data concerning their values, attitudes, motivations, perceptions, preferences, and behaviors. Also, even if managers are able to collect such data, the data may change over time among the same people, due to aging and other factors.

Natural resource recreation managers would benefit from a tool that is a less intrusive, more indirect means to uncovering and predicting changes in the preferences

and behaviors of their stakeholders. Hobson Bryan's Concept of Recreation Specialization is such a tool.

Concept of Recreation Specialization

Bryan's (1977) concept proposes that as individuals accumulate experience in a recreational activity (e.g., trout fishing), they progress through different specialization levels, and each level is associated with a different set of motivations, behaviors, and management preferences. Fishing specialization level is measured by preferred fishing equipment and activity setting, experience, skill level, and the activity's overall importance and influence in an angler's life. For example, an angler who fishes infrequently, at a lake, with a cane pole, considers himself or herself unskilled, and for whom fishing is not a central life interest would be placed at the novice or general end of the specialization continuum. This angler would likely seek a different fishing experience and have a different opinion about fish stocking than a more experienced and skilled angler who uses fly-fishing equipment and does consider fishing a central life interest.

Because people may be more willing to talk about their recreational activities than their values and perceptions, gathering activity data to find their specialization level becomes an indirect means to uncover their possible recreation-related preferences and behaviors without overtly asking for them, thereby being less intrusive. Because an individual's continued participation in the activity conceptually makes him/her more specialized, knowing if and how much he/she continues to participate may help policy makers segment their constituents into clusters and make an educated guess as to which

cluster and its associated preferences and behaviors represents the majority or may become the majority sometime in the future.

Identifying a recreator's specialization level depends on the selected indicators and how they are measured. Bryan (1979) conceived specialization to be a multidimensional construct, that is, experience or skill alone is not enough to determine a person's level of specialization. Bryan and subsequent investigators (e.g., Bricker & Kerstetter, 2001, Miller & Graefe, 2000, Kuentzel & Heberlein, 1997, McFarlane, 1996, Hase, 1996, and Graefe, Donnelly, & Vaske, 1986) used several indicators that fall into four commonly named dimensions: experience/commitment (past and present), skill level, equipment used (also called economic commitment or investment), and centrality to lifestyle. Past investigators however do not agree on the number of dimensions or the number of indicators measuring them needed to measure specialization level. They also do not agree on a standard way to compute a specialization score.

In the absence of agreement on the number of dimensions, this study will fall back to Bryan's original use of four dimensions to be measured by indicators commonly used in later studies. Experience and current commitment refer to the number of years spent participating in the activity and the number of days annually spent doing the activity, typically measured for the previous year. Skill level is a person's self-rated ability to combine his/her innate coordination and dexterity with their learned knowledge to competently perform the recreational activity. Equipment used refers to the type of recreational equipment and/or cost of the supplies and tools needed to participate in the activity. Finally, centrality to lifestyle refers to how important the activity is to a person's quality of life and how much that activity influences other areas of, and

decisions in, that person's life. Again, the measurement of each indicator or the summed score of each dimension historically determined a person's level of specialization. This study's method to calculate specialization is covered in chapter three.

Management Preferences

The U.S.D.A. Forest Service applies the Recreation Opportunity Spectrum (ROS) concept to selected federal lands. The concept was designed to help administrators match outdoor recreation demand with supply by identifying recreators' setting preferences and the lands available to meet them. Management preferences are a subset of setting preferences, the other two subsets being physical and social preferences. Physical setting preferences describe the desired tangible recreational setting such as lakes versus small streams for fishing. Social setting preferences address the desired level of human interaction during recreation such as fishing alone or with friends. Managerial setting preferences refer to the type and amount of regulation imposed on recreators (e.g., warning signs versus uniformed law enforcement) and the resource (e.g., habitat management versus fish stocking) (Driver, 1989).

Bryan's and at least six ensuing studies (Bricker & Kerstetter, 2001, Chipman & Helfrich, 1988, Hase 1996, Kuentzel & McDonald, 1992, McIntyre & Pigram, 1992, and Virden & Schreyer, 1988) explored the relationship between specialization levels and management preferences, finding relationships between the two in some instances, while contradicting each other's results in others. In each study though, all investigators found at least partial relationships between at least a few of their selected management

preferences and specialization, either in its dimensions (e.g., skill, experience) or levels (e.g., low, medium, and high).

For example, Bricker & Kerstetter (2001) found relationships between specialization level and preference for a variety of management actions. They applied Bryan's concept to whitewater recreationists and found that as the level of specialization increased (they used discrete stages of low, medium, and high), support decreased for development that would change the appearance of the river's corridor. Examples of development options included constructing side trails, trash facilities, and gold dredging. These findings are consistent with Bryan's (1979) proposition that a high level of specialization inclines a person to favor preservation of natural settings.

Behaviors

In this study, behaviors are viewed as executed actions that attempted to fulfill an unmet need to reach a preferred state. This author understands this definition is a simplistic view of a very complex topic. Driver (1975) created a model to explain and predict recreational motivation and behavior, which forms the basis for this study's definition of behavior. His model proposed that behavior is the manifestation of a collection of past experiences and learning, home environmental conditions, socio-economic characteristics, and psychological characteristics that influence how individuals come to realize a gap between their existing state and their preferred state.

Bryan's (1977) study and at least eight later studies (Kuentzel & Heberlein, 1997, Kuentzel & Heberlein, 1992, Ditton, Loomis, & Choi 1992, Choi, Loomis, & Ditton 1994, McFarlane, 1996, Wellman, Roggenbuck, & Smith 1982, Williams & Huffman,

1985, and Wilde & Ditton, 1994) investigated the relationship between behavior and specialization levels or dimensions with about the same success as preference investigators. Each of the explored behaviors was examined in respect to a recreation activity (e.g., where to hunt, whom to fish with, and how often to race boats, etc). For example, Wilde and Ditton (1994) investigated specialization's application to bass fishing. They found less specialized bass anglers fish less frequently, are less likely to belong to fishing clubs, and purchase less fishing gear. However, Kuentzel and Heberlein (1992) were unable to prove that a person's level of specialization is related to choice of hunting sites.

Problem Statement

Since Bryan (1977) offered the concept, subsequent investigators explored the relationship between the dimensions and levels of recreation specialization and a variety of motivations, attitudes, preferences, and behaviors among various recreation groups. Expanding the inquiry of specialization to include non-recreation behaviors (e.g., political activity) and a new study population, while attempting to corroborate the results of prior studies would contribute additional material to this field of study.

Many of the earlier studies ultimately discussed specialization's application to natural resource management decisions. Recreation behaviors and management preferences were explored with the unintentional effect of giving managers the results of a statistical voting effort. None of these studies have explored specialization among the people who would live with those preferred policies and behaviors every day. The focus of this study is on such a population: the private shoreline landowners.

Private landowners are different than visiting recreators because they invest considerable capital in purchasing and maintaining their property, especially if it contains their primary or secondary home. Property owners may even have purchased their land to have greater access to their preferred recreation resource. If river policies change, dissatisfied visitors have less investment in a particular location and can more easily move to alternate recreation sites than property owners.

Among private property owners, will a highly specialized recreator have different management preferences and behaviors when he or she must think of him/herself as a property owner who recreates rather than solely as a recreator? For example, Bryan's study found that highly specialized anglers preferred habitat management to stocking to boost and sustain trout populations. Habitat management techniques though may require treed buffer zones to shade a river to lower its temperature. Shoreline owners however are often tempted to remove trees next to a river to make their property more aesthetically pleasing and raise its value (Mooney & Eisgruber, 2001). Are "specialized" shoreline owners more willing to limit their riparian ownership options if conservation strategies conflict with them? Also, will highly specialized anglers who advocate "flies only" prefer that policy on the water behind their own homes when it means their grandchildren will not be able to fish off the family's dock because they are too small to handle fly-fishing equipment? These and other questions are addressed in this study.

Furthermore, while previous studies explored the relationship between specialization and selected recreation behaviors, no study explored the relationship between specialization and taking political action to have those management preferences recognized and acted upon. Are highly specialized angler shoreline owners more likely

to be politically involved with river and fishing management than less specialized owners?

Past research provided recreation resource managers with valuable information about one stakeholder: the recreator. Recreators however, are only one actor in a cast of players who stake a claim on the value of a resource. Property owners have rights and influence visitors do not; rights and influence potentially affected by policy decisions pushed through by outside interests of visitors. Property owners are potentially powerful political players in resource planning and management efforts. The specialization concept can begin to segment property owners into meaningful groups to help managers anticipate and possibly avoid conflicts between groups and help forecast reaction to proposed policy changes.

Purpose Statement

The purpose of this study is to explore the relationship between the levels of specialization of upper Manistee River private shoreline owners who fish and their preferences for selected management actions and the political behaviors they used to influence government decision makers.

Study Objectives

1. Develop an angling specialization continuum using four dimensions (current commitment, skill level, equipment used, and centrality to lifestyle) for private shoreline owners of the upper Manistee River (UMR) in Michigan who fish.

2. Examine the relationship between the levels of specialization and selected management policy preferences.
3. Examine the relationship between the levels of specialization and the methods used to have management preferences heard and acted upon by government decision makers.

Study Hypotheses

Specialization and general characteristics:

Ha_1: Level of specialization should increase as the number of years fished increases.

Ha_2: As level of specialization increases, familiarity with the various stream-related insect hatches that occur during the fishing season should increase.

Ha_3: As level of specialization increases, the replacement cost of current equipment exclusive to fishing should increase (rod, reel, tackle).

Ha_4: As level of specialization increases, the replacement cost of current equipment shared by fishing should increase (boats, trailers, waders).

Ha_5: As level of specialization increases, fishing should increasingly become a respondent's most preferred outdoor recreational activity.

Ha_6: As level of specialization increases, the importance of fishing when making the decision to acquire a respondent's UMR property should increase.

Ha_7: As level of specialization increases, the importance of fishing in a respondent's life after buying his/her UMR property should increase.

Specialization and management preferences:

Ha_8: As level of specialization increases, preference for designated public access to the river should decrease.

Ha_9: As level of specialization increases, preference for information about public access points should decrease.

Ha_{10}: As level of specialization increases, preference for "flies only" designation should increase.

Ha_{11}: As level of specialization increases, preference for stocking of trout should decrease.

Ha_{12}: As level of specialization increases, preference for fish habitat restoration should increase.

Ha_{13}: As level of specialization increases, preference for fish habitat enhancement should increase.

Specialization and behaviors:

Ha_{14}: As level of specialization increases, anglers should release more of the fish they catch.

Ha_{15}: As level of specialization increases, the proportion of vacations/recreational trips involving fishing should increase.

Ha_{16}: As level of specialization increases, membership in selected fishing related organizations should increase.

Ha_{17}: As level of specialization increases, more methods overall (listed in the survey) should have been used to have policy preferences heard and acted upon by managers.

Ha_{18}: As level of specialization increases, use of any method listed in the survey to have policy preferences heard and acted upon should increase.

Definition of Terms

Bait casting: Fishing method whereby the weight of the lure or bait pulls line away from the reel. Intended targets are bass and northern pike. Bait casting facilitates a high probability of accurately placing bait in the water.

Behaviors: (for use in this study only) The manifestation of a collection of past experiences and learning, home environmental conditions, socio-economic characteristics, and psychological characteristics that influence how individuals come to realize a gap between their existing state and their preferred state.

Cane pole: Fishing method that uses fishing line tied to one end of the pole, with bait at the other end of the line. No reel is used. New anglers may learn to fish with a cane pole because of its simplicity and handling ease.

Centrality to lifestyle: How important the activity is to a person's quality of life and how much that activity influences other areas of, and decisions in, his/her life.

Equipment: The type of angling equipment needed to participate in the activity.

Experience and current commitment: The number of years spent participating in the activity and the number of days spent doing the activity in the previous year.

Federation of Fly Fishers: A private organization that leads activities, which enhance and support the fly fishing experience for all anglers who fish with the artificial fly (FFF, 2002).

Flies-only: A management policy that forbids the use of live bait and artificial lures (e.g., spinners and plugs) other than those that mimic flies.

Fly-fishing: Fishing method whereby the weight of the line is used to propel a lure that mimics a fly onto the water.

Government decision makers: The representatives and agents of governmental organization, who possess the legal authority and responsibility to enact, revise, enforce, and eliminate policies regarding river management including fishing.

Habitat: The environment in which an organism lives. The environment includes food, water, shelter, cover, and breeding sites.

Information Age: Period in time where business and personal data are important and easily obtainable because of electronic transmission. However, the availability of this information increases the difficulty of protecting privacy (Anitmoon, 2002 and U.S. Department of Commerce, 1997).

Management preferences: A desired course of action related to the type and level of river use regulation management.

Mediated interaction: Communication though a third party (e.g., fishing tips in a magazine)

Michigan United Conservation Clubs: The largest private statewide conservation organization in America that works to conserve Michigan's wildlife, fisheries, waters, forests, air, and soils by providing information, education, and advocacy (MUCC, 2001).

Recreation Specialization: Hobson Bryan's concept that as individuals accumulate experience in a recreational activity, they progress through stages of development, and

each stage of development is associated with a different set of behaviors, management preferences, and other variables with regard to that activity.

Recreation Specialization level: Arbitrarily defined waypoints in the specialization continuum. Bryan (1977) offered four profiles (lowest-highest specialization): Occasionalist, Generalist, Technique specialist, and Technique-setting specialist. Subsequent investigators (Bricker & Kerstetter, 2001, Chipman & Helfrich, 1988, Donnelly, Vaske, & Graefe, 1986, and Wellman, Roggenbuck, & Smith, 1982) classified their study populations into more and fewer specialization levels than Bryan and did not always use the same labels (e.g., low, medium, and high specialists).

Shoreline property owners: Individuals, groups, corporations, and government agencies with fee simple shoreline ownership. These rights include the prerogative to build structures, access the water body, remove vegetation, and exclude others from that parcel of land.

Skill: A person's self-rated ability to combine his/her innate coordination and dexterity with their learned knowledge to competently perform a task (e.g., fishing).

Spin-casting: A popular fishing method because its rods and reels (reels are close-faced) are relatively inexpensive and easy to use, but the technique is less accurate than other methods. Children and novices are primary users of this method.

Spinning: Fishing method used to catch virtually any species of freshwater fish and is an easier technique to master than bait casting or fly-fishing. Reel is open-faced and mounted below the rod (unlike baitcasting and spin-casting reels, which are mounted above the rod).

Study population: A body of persons similar in respect to researcher-defined characteristics.

The upper Manistee River: A recreational resource in the northern Lower Peninsula of Michigan (Figure 1). Fishing, camping, and non-motorized watercraft uses are popular recreation activities. The land adjacent to this stretch of river (~55 miles long from Mancelona Road in Otsego County to M66 in Kalkaska County) is publicly (State of Michigan and United States Government) and privately (individuals, groups, and corporations) owned. The Michigan Department of Natural Resources' (MDNR) Forestry, Minerals, and Fire Management Division is the lead management entity. MDNR's Parks and Recreation Bureau, Fisheries Bureau, and Law Enforcement Division assist the Forestry, Minerals, and Fire Management Division. Michigan's Natural Resource Commission established quality-fishing regulations (e.g., "flies only") on the middle stretch of the river.

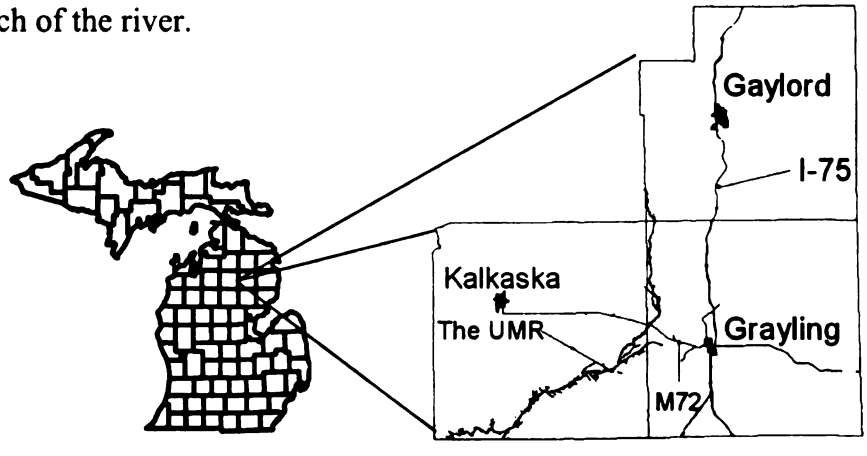

Figure 1. Upper Manistee River

Trout Unlimited: A private organization that conserves, protects and restores North America's trout and salmon fisheries and their watersheds (TU, 2001).

Upper Manistee River Restoration Committee: A diverse group of partners that works to stabilize stream banks, restore access sites, and create aquatic habitat on the upper

Manistee River (Huron Pines Resource Conservation and Development District, last date modified unknown).

CHAPTER 2

REVIEW OF LITERATURE

Literature that provided the foundation for this study is reviewed in this chapter. It is divided into five parts. The first part reviews Hobson Bryan's original work, its foundations and results. The second part provides an overview of subsequent specialization research. The third and fourth sections explore the specialization studies that addressed management setting preferences and behaviors. The fifth part reviews literature related to specialization and its dimensions.

Hobson Bryan's Concept of Recreation Specialization

Hobson Bryan developed the concept of recreation specialization to help recreation resource managers understand and explain the diversity of behaviors and attitudes within a particular outdoor recreation activity; Bryan (1977) used trout fishing. He felt managers and planners were overwhelmed with esoteric research, and that providing a simpler, more intuitively understandable framework for segmenting recreators would help them match recreators with the resources available to meet their needs, which should minimize conflicts between and within user groups. His original work was founded on the concepts of social worlds and behaviorism.

Shibutani (1955) offered and Unruh (1980) and Strauss (1978) expanded upon the concept of social worlds to describe the phenomenon of amorphous social organizations composed of people, practices, and events that revolve around a sphere of interest but which lack a centralized authority, formal boundaries, membership lists, or spatial territory. The "art world," the "academic world," and the "fishing world" are examples

of this phenomenon. Bryan took this to mean that people knowingly or unknowingly segment themselves and recreation specialization would help describe the people, practices, and processes that go on within the leisure social world of sport fishing. He suggested social worlds would guide recreators' behavior within the activity and may even influence other interests in their lives (Bryan, 1977, Bryan, 1979, and Ditton, Loomis, & Choi, 1992).

Bryan (1979) used behaviorism to describe why individuals in the leisure social world of sport fishing might become specialized over time. He proposed a person's behavior is learned when an action is followed by a reward because the reward increases the probability the activity that earned it will be repeated if under similar circumstances. Rewards can take two forms: extrinsic or intrinsic. Extrinsic rewards are dividends paid to the individual by other people (e.g., praise for catching a big fish) or by the action itself (eating the big fish). Intrinsic rewards are dividends paid to individuals by themselves (e.g., feeling of accomplishment). Bryan proposed that intrinsic rewards are stronger because they are subject to fewer intervening forces (e.g., being near someone who cares if one catches a big fish).

New entrants into the leisure social world of sport fishing are initially more likely to favor extrinsic rewards because they are more tangible, but over time, the same extrinsic reward loses its value as a reinforcer because it has satiated the recreator. Recreators may then turn to intrinsic rewards as they accumulate experience in their activity and thus become more specialized because as rewards change so do the behaviors that earn them. Essentially then, in our effort to distinguish ourselves from one another,

we segment ourselves into social worlds, some of which revolve around a leisure activity. We are likely to become more specialized over time because we seek different rewards.

Bryan (1977) first applied his concept to trout anglers. He chose trout fishing because of the variety of fishing methods and range of behaviors generally associated with fishing and because at the time of his 1977 publication, an existing literature review revealed fly fishing (a fishing technique that uses imitation insects to catch fish) represented an end point in the progression of angling experiences. He used 263 on-site interviews with anglers and participant observation techniques to establish his profiles of four specialization levels. Anglers answered questions about their fishing preferences, orientation to the stream resource, their history and activity in the sport, and the relationship of fishing to other areas of their lives. Participant observation addressed fishing techniques used (e.g., fly fishing), social settings (e.g., fishing with friends, family, or alone), and skill displayed (Bryan did not elaborate on how he measured skill).

Bryan developed four profiles of anglers in different levels of specialization. "Occasionalists" occupy the lowest end of the specialization continuum. "Generalists" inhabit the next level, followed by "technique specialists" (fly anglers), and finally "technique-setting specialists" (fly fishing in remote or pristine locations). Anglers in each profile differed from one another in their equipment preference, type of fish sought, setting preferred, resource management philosophy, angling history, social context of fishing, and vacation patterns. For example, occasionalists were less likely to have strong equipment preferences, more likely to emphasize number of fish caught, more likely to favor an active stocking policy, more likely to fish with their family, less likely to take longer fishing vacations or travel longer distances to their fishing destination, and less

likely to center their trips around fishing than technique-setting specialists. Although anglers do not have to start at the bottom of the experiential sequence or move to the top, Bryan theorized the inclination is to move from less to more specialized.

Bryan (1977) justified extending this angler typology in a framework because his study's results supported four propositions:

1. Anglers are inclined to run through the same set of experiences, usually moving into more specialized levels. Specialized anglers generally have more knowledge about and commitment to a variety of angling pursuits because of their greater time spent in, skill in, and commitment to the sport.
2. The most specialized anglers have essentially joined a leisure social world, and this social world becomes a reference point for its members.
3. As an angler's level of specialization increases, his/her attitudes and values about the sport also change. The angler shifts focus from catching fish to conservation of fish and fishing habitat. The act of fishing over catching fish becomes the object of the recreational experience.
4. Finally, as an angler's level of specialization increases, so does his/her resource dependency. Specialists prefer settings that facilitate predictability and manipulation; he/she wants to know that if a fish is caught, it was the result of skill not luck.

Bryan (1977) concluded people approach their sporting activities differently depending on their level of specialization. The implications of his work are that a variety of management strategies are required to match users with recreation resources that meet their needs, beginning with identifying and describing subgroups. He suggested the above inferences should be considered tentative until subjected to more organized testing

under varied and representative conditions because his study precluded rigorous control and testing of his variables. Subsequent researchers have attempted to do this.

Overview of Research After Bryan

Bryan (1979) ended his monograph by suggesting the specialization concept underlies any recreation activity and activities themselves could be arranged along a specialization continuum. He offered seven additional recreation activities as examples and briefly explored their possible typologies, then requested his framework be more rigorously tested with representative samples. Subsequent investigators invested their research efforts into some of these suggested activities such as hiking and backpacking (Graefe, Donnelly, & Vaske, 1986, Virden & Schreyer, 1988, and Williams & Huffman, 1986), canoeing (Wellman, Roggenbuck, & Smith, 1982) bird watching (McFarlane, 1994 & 1996), and hunting (Kuentzel & Herberlein, 1992 and Miller & Graefe, 2000). Sailing and motor boating (Donnelly, Vaske, & Graefe, 1986 and Kuentzel & Heberlein, 1997), (non-specific) non-motorized whitewater watercraft users (Bricker & Kerstetter, 2001 and Kuentzel & McDonald, 1992), vehicle-based campers (McIntyre & Pigram, 1992), and bridge players (Scott & Godbey, 1994) also received attention from investigators concerning their inclusion in the specialization concept. Fishing specialization received continued attention as well (Chipman & Helfrich, 1988, Choi, Loomis, & Ditton, 1994, Ditton, Loomis, & Choi, 1992, Hase, 1996, and Wilde & Ditton, 1994).

All of the subsequent investigators created a specialization continuum for their respondents but had mixed success when exploring relationships between their respondents' levels of specialization and dependent variables such as motivations, attitudes, preferences, and behaviors.

Research that did not find a link between specialization and dependent variables

Wellman, Roggenbuck, and Smith (1982) found their specialization levels were not linked to attitudes toward depreciative behavior (e.g., littering) among canoeists. They speculated a small number of methodological issues prevented them from accepting their hypotheses and suggested that specialization deserved further investigation.

Williams and Huffman (1986) were unable to conclude hiking specialists would process information differently than generalists when selecting a trail to hike or would be less sensitive to use redistribution efforts than generalists.

Choi, Loomis, and Ditton (1994) like Williams and Huffman (1986) were unable to link specialization level with recreational activity substitution decisions. Kuentzel and Heberlein (1992) were unable to link the specialization levels of their goose hunters to hunting site choices. Finally, Hase (1996) was unable to link her specialization dimensions to most of her selected management setting preferences. Only her skill/centrality to lifestyle dimension (one of three) was linked to certain management preferences.

Research that found a link between specialization and dependent variables

Despite the setbacks of some studies, other investigators did find links between specialization levels and dependent variables. Chipman and Helfrich (1988) found a relationship between an angler's specialization level and his/her motivations, perceptions, and management preferences. Generalist anglers were motivated to fish because they could spend time with their families, might catch a "trophy" fish, and could "just get away from it all," while specialist anglers were not motivated that way. Generalist anglers also perceived the minimum acceptable size of fish to keep differently than specialists; specialists rarely kept fish under ten inches and twice as many of them (compared to generalists) never kept the caught fish. Generalist anglers also preferred more liberal creel limits, while specialists preferred more restricted limits. Finally, generalists preferred stocking and public access improvements more than specialists.

Ditton, Loomis, and Choi (1992) found specialist saltwater anglers used mediated sources of saltwater fishing information (television shows and magazine and newspaper articles) more often than generalists. Their saltwater fishing specialists were also more concerned with the non-activity specific elements of fishing than generalists (e.g., relationship with nature, learning and discovery, and escape social pressure); generalists were less concerned with fishing's intrinsic benefits.

Wilde and Ditton (1994) found their bass specialists were more likely to participate in fishing tournaments and belong to fishing clubs. Their generalists were less invested in fishing than their specialists (e.g., they were less likely to own motorboats). These researchers provided managers with a quick means to segment bass anglers into distinct specialization groups using only the angler's response to the question of what

species they were fishing for, anglers who answered "largemouth bass" were categorized as specialists whereas anglers who answered "bass" were classified as generalists.

Finally, Miller and Graefe's (2000) research supported Bryan's proposition that sub-activities within a sport can be arranged by degree of specialization. These investigators concluded that archery deer hunting represents the most specialized level, followed by waterfowl, pheasant, grouse, muzzleloader deer, turkey, and rifle deer (least specialized). The authors arrived at their conclusions by comparing the mean specialization scores of the respondents in each of these hunting activities. Again, the underlying purpose of their research was to verify the heterogeneity of sporting participants, particularly hunters.

Past Investigator's Critiques of the Specialization Concept

Critiques of the specialization concept itself (as opposed to what other activities specialization has not yet been applied to) took three general forms: concerns about how specialization is defined, how it is measured, and under what conditions recreators become specialized.

Concerns about specialization's definition

Ditton, Loomis, and Choi (1992) were concerned the research effort into specialization was not advancing Bryan's original conceptualization. They argued that because his original definition was also an explanation of the concept, the definition is a tautology, a needless repetition of an idea. They re-conceptualized specialization as the intersection and ordered arrangement of social subworlds. At one end of their continuum is the least specialized subworld and at the other end is the most specialized subworld

with the intermediate subworlds in-between. The results of their hypothesis testing revealed their conceptualization was capable creating distinct recreator segments. Subsequent researchers however did not explicitly embrace their definition.

McIntyre and Pigram (1992) were concerned that specialization's formulation had limited explanatory power because previous investigators were describing the commitment (also known as affective attachment) dimension through surrogate behaviors such as club memberships and purchased equipment when they should have measured it by how much time individuals engaged in the activity, especially when they participated intensely but infrequently in the activity. These authors suggested recreation involvement (their manifestation of affective attachment) alone would be enough to define specialization among their vehicle-based campers. The authors departed from previous specialization investigators because they produced profiles of their visitors rather than a hierarchical typology. Their profiles differed on the sensitivity to the character and quality of facility provision in developed campsites. Subsequent researchers however did not embrace this conceptualization, though some researchers did include measures of how much time individuals engaged in the activity (e.g., days participated in previous year) without explicitly crediting McIntyre and Pigram's results.

Concerns about how specialization is measured

Kuentzel and McDonald (1992) believed that adding a person's different specialization scores to determine their specialization level would provide only a generic framework for understanding the relationship between specialization and dependent variables such as motivations, preferences, attitudes, or behaviors. They suggested an added score has less explanatory power. They still believed specialization had distinct

dimensions but commitment and centrality to life would fluctuate over time (as opposed to constantly increasing in Bryan's (1977) formulation) because people move between social groups and have changes in their life course. For example, an angler may go from being single to married to married with children. This change is likely to reduce time to participate at levels that would classify a person as a specialist even though at one time in their life their participation was at specialist level. Therefore, the dimensions cannot be logically summed.

To address their concerns, Kuentzel and McDonald used each of their three dimensions as independent variables. Therefore, each respondent had three specialization scores instead of the historical one. Their results showed different dimensions are differently associated with dependent variables. For example, their "past experience" dimension correlated differently from their commitment dimension with respect to dependent variables "risk" and "excitement."

After Kuentzel and McDonald (1992), only Kuentzel and Heberlein (1992) and Hase (1996) are known to have measured specialization in this manner. Kuentzel and Heberlein (1992) were not successful in linking their dimensions to behavioral choices. Hase (1996) was successful in linking one of her three specialization dimension scores with a small number of her management setting preferences.

Chipman and Helfrich (1988) were also concerned with the potential difference in contribution each dimension makes to the specialization framework. Unlike Kuentzel and McDonald (1992) though, they did not use each of their dimensions as independent variables, instead choosing to create an additive index of specialization scores and performing a cluster analysis of those scores to categorize their respondents into a

typology of six segments. Their analysis revealed the experience dimension (measured as total years fished, total years fished at study site, days fished previous year and days fished previous year at study site, frequency fished overall, frequency fished on-site) was the most discriminating indicator of specialization. Their centrality to life dimension (measured as fishing club memberships, desired social setting, etc.), investment dimension (measured as number of fishing items owned and cost of equipment investment), and resource use dimension (measured as preferred rod and reel type, preference for live or artificial bait, harvesting frequency, etc.) also satisfactorily contributed to the framework but not to the same degree as their experience dimension.

The two investigators concluded their typology segments differed from one another with respect to selected motivations, perceptions, and management preferences despite concluding as Kuentzel and McDonald (1992) would four years later that different dimensions contribute different levels of explanatory power in the specialization framework. However, they did nothing about it such suggesting future researchers weight the dimensions to create a more accurate single score.

Concerns about how recreators become specialized

One of the core tenets in specialization is that it is a function of individual choice, a desire for self-development, and that the process follows a leisure career model of participation. The leisure career model of participation proposes that leisure specialization would be a life long process, not just a refinement of leisure behavior learned in childhood. Only a small number of investigators tried to corroborate this belief.

McFarlane (1996) concurred with previous researchers that specialization was a useful concept in segmenting recreators but was concerned about the lack of attention to the socialization factors influencing specialization because most of the attention concentrated on the social factors operating once recreators began their specialization process (e.g., club memberships). She tried to determine if bird watchers followed the leisure career model implied by Bryan or if recreators followed a childhood determination model of socialization (that socialization during childhood influences participation styles, types of activities, and extent of involvement as an adult).

Her results provided support for both the childhood determination model and Bryan's (implied) leisure career model. McFarlane found participation in childhood was not a prerequisite for participation in adulthood, but those who did participate in childhood were more likely to have higher specialization scores, which supports the childhood determination model. McFarlane did not elaborate on the specific number of years it took for birdwatchers to reach the upper levels of specialization. She noted that birdwatchers who started later in life were more likely to fall into her lowest level of specialization, but this does not rule of the possibility that given enough time these older novice birdwatchers might reach the upper level of specialization. Bryan's implied leisure career model was supported because participation in childhood was not a prerequisite to adult participation, (suggesting individual choice), because role models (those higher up in the specialization continuum) were an important source of information about bird watching's values and appropriate behavior, and because family played less of a role in reaching the advanced level.

Kuentzel and Heberlein (1997) were also concerned with whether the process of specialization is a function of individual choice or if it is determined by social context. The specialization concept as originally formulated emphasizes the role of the individual and assumes recreators freely choose both their desired activity and degree of involvement. The investigators wanted to know if external factors such as social context (e.g., social class) affected the socialization process so much that specialization could no longer be advanced with the traditional self-development approach. They studied sailors who entered the leisure social world of sailing through boat shows (blue-collar), sailing schools (middle class), or yacht clubs (upper class).

The investigators' results supported Bryan's model. The social status and specialization models were evaluated by five factors: social status (blue-collar, middle class, and upper class), sailing experience (how often sailed, how introduced to sailing, and skill), specialized sailing behaviors (overnight trips, open water cruising, and racing), evaluations of the sailing experience (response to sailing scenarios), and commitment to sailing. The social status framework was partially linked to the sailing experience and specialized sailing behaviors but not at all linked to income level, education level, evaluations of the sailing experience, and commitment to sailing. The traditional specialization approach however was linked to specialized sailing behaviors, evaluations of the sailing experience, and commitment and was partially linked income level, education level, and sailing experience.

Despite concerns over the concept's accuracy, explanatory power, and applicability, recreation specialization has proven, more often than not, no matter how it was measured, that it can aggregate recreators within an activity into distinct groups that

differ on their attitudes, preferences, motivations, and behaviors (Bryan, 2000). The remaining two sections of this chapter review literature specific to this study: specialization's relationship with management preferences and behaviors.

Management Preferences

Preferences are general beliefs about desirable or ideal conditions (Graefe, Donnelly, & Vaske, 1987). Preferences typically revolve around three general types of settings: physical, social, and managerial. The following descriptions of these settings are derived from the U.S. Forest Service's Recreational Opportunity Spectrum, which used setting types to create different recreation opportunity zones in National Forests. Physical settings describe a recreational opportunity area's size, perceived level of remoteness from human sights and sounds, and the amount of human induced environmental change. Physical settings are fixed in nature and are more costly to manipulate than social or managerial settings. Social settings describe the interactions among recreators in different user groups (e.g., hikers vs. mountain bikers), within the same user group, and between users and adjacent property owners. The perceived density of use and conduct of other recreators are the two primary elements of a social setting. Although recreation resource managers cannot influence all the outcomes of these interactions, they can increase the odds of tolerable interactions by understanding how recreators evaluate a social setting. The managerial setting refers to the visible evidence of regulation (e.g., signs and uniformed police), the degree of regulation (i.e., how many rules to obey), the type of maintenance performed, and the type of acceptable services and facilities found in the recreational area (Driver, 1989). What follows is a

review of past specialization research that tried to link physical, social, and managerial setting preferences to specialization levels and dimensions. The reader will notice certain preferences reappear in different sections because those preferences can be categorized as physical, social, and/or managerial in nature per ROS description.

Setting Preferences and Fishing Specialization

The first half of this section will review literature from Bryan (1977), Chipman and Helfrich (1988), and Hase (1996) because these investigators explored the relationship between setting preferences and specialization among anglers, a similar study population to the one used in this study.

Research that found a link between fishing specialization and physical setting preferences

Bryan (1977) and Chipman and Helfrich (1988) found a significant relationship between their anglers' levels of specialization and their preference for public access (public access falls into the purview of physical settings because of the infrastructure needed to support it). As the level of specialization increased in their anglers (Bryan: trout, Chipman and Helfrich: bass), support decreased for additional or easier public access. Hase (1996) also found that as level of specialization increased in her skill/centrality dimension, preference increased for providing a separate area for watercraft use on her study's lakes.

Research that found a link between fishing specialization and social setting preferences

Although Hase (1996) could not prove all her specialization dimensions were significantly related to most of her management setting preferences, she did find her

skill/centrality to life dimension was significantly related to the use restriction part of the management setting preference variable. As her anglers' levels of skill/centrality increased, so did their support for restricting the use of personal watercraft to a specific part of the lake and restricting the number of people/watercraft using the lake during peak use periods. Use restrictions may intuitively fall into the management setting preference division, but they also apply to the social setting division because they address the type of conduct of other users and perceived density of other users.

Research that found a link between fishing specialization and management setting preferences

Chipman and Helfrich's (1988) results paralleled some of the results found by Bryan (1977). Both sets of investigators found preference for stocking had more support among generalists, while specialists supported habitat management and improvement. These investigators also supported each other's conclusions with respect to the inverse relationship between specialization and support for additional public access. Although public access intuitively falls into the physical setting division, it also applied to the management setting division because more, less, or easier access to fishing sites also implies a manager's inclination towards a particular user group's acceptable level of services and facilities. Chipman and Helfrich also found their specialists preferred stricter regulations including higher minimum length requirements before fish can be taken from the river, tackle restrictions (e.g., "flies only"), and catch-and-release rules. These findings are consistent with Bryan (1977) who observed an evolution of focus from harvest to conservation when anglers progressed from generalist to specialist. Hase (1996) again, found partial support for a relationship between one of her specialization

dimensions (skill/centrality to life) and preference for designated areas for watercraft use and restrictions on the number of people allowed to recreate on her study lakes when use was high.

Research that did not find a link between fishing specialization and physical setting preferences

Hase (1996) was unable to link (overall) her specialization dimensions to the majority of her management setting preferences. She divided those preferences into three categories: access and facilities, alternative recreation, and use restrictions. Access and facilities addressed preference for providing more developed launch access points, more parking, more and improved toilets, and more marina/boating facilities. Alternative recreation addressed preference for more hiking trails along the lake, more information about facilities, services, points of interest, and more camping and reservable picnic sites. Use restrictions addressed limiting watercraft to a designated area. Except for the relationship between skill/centrality to life and use restrictions described above, neither her general experience nor her recent experience specialization dimensions proved to be useful predictors of physical setting preferences.

Research that did not find a link between fishing specialization and social setting preferences

To review, Hase (1996) did not classify her anglers with a single specialization score. Each angler had three specialization scores generated from her three specialization dimensions. An angler may then have a high specialization score in "general experience" but a low score in "recent experience" or "skill/centrality to life." Therefore, using her results, a relationship does or does not exist between level of specialization and setting

preferences depending on which specialization dimension is considered. With respect to social setting preferences, her general experience and recent experience dimensions were not linked to the social setting preferences that would restrict use when the lake is crowded and provide separate areas for watercraft use (she did not specify if fishing was permitted in this area).

Research that did not find a link between fishing specialization and management setting preferences

Chipman and Helfrich (1988) were unable to conclude a significant relationship existed between their bass anglers' specialization levels and a preference for seasonally closing the smallmouth bass fishery. Also, when management setting preferences were explored with respect to Hase's (1996) general experience and recent experience specialization dimensions, no significant relationship was found between the variables.

Setting Preferences and Non-fishing Specialization

The second half of this section reviews the literature authored by Bricker & Kerstetter (2001), Graefe, Donnelly, & Vaske (1986), Kuentzel & McDonald (1992), McIntyre & Pigram (1992), and Virden & Schreyer, (1988), each of who explored the relationship between setting preferences (physical, social, and management) and specialization in activities other than fishing (non-motorized whitewater watercraft users, hikers, backcountry hikers, and vehicle-based campers).

Research that found a link between non-fishing specialization and physical setting preferences

Virden and Schreyer (1988) found their backcountry hiking specialists preferred revegetation programs more than backcountry hiking generalists. They also found an inverse relationship between level of specialization and preference for well-placed and accurate directional signs and well maintained trails. Bricker and Kerstetter (2001) also found an inverse relationship between their whitewater recreationists' level of specialization and preference for additional amenities and trails. Amenities included installing more composting toilet facilities and providing more dispersed camping opportunities on public lands. Kuentzel and McDonald (1992) like Hase (1996) did not assign a single specialization score to their riverine watercraft recreators, rather they used the scores of three dimensions created from a factor matrix: past experience, commitment, and lifestyle. Only the past experience dimension was linked to their selected management preferences, and then only to four of the nine preferences. Opening an upper section of the river to increase paddling opportunities was the only physical setting preference linked to a respondent's past experience specialization dimension score.

Research that found a link between non-fishing specialization and social setting preferences

Virden and Schreyer's (1988) specialists were more supportive of party size limits (10 or fewer people) than generalists and were moderately more supportive of quotas when the trail was busy. The authors also suggested that increasing levels of specialization tend to sensitize hikers to management issues. Graefe et al. (1986) found

their specialist hikers were more sensitive than generalists to perceived overcrowding because they had different preferences for the number of visitors they wanted to see on the trail. Kuentzel and McDonald (1992) also reported a significant negative relationship between their respondents' levels of specialization and their support for limits on commercial and private use and controlling put-in times.

Research that found a link between non-fishing specialization and management setting preferences

The same relationship reported above between Bricker and Kerstetter's (2001) respondents' specialization levels and their preference for social setting variables exists when those variables (e.g., amenities and trails) are also considered management preferences (because they address maintenance and desired level of services and facilities). As whitewater recreationists became more specialized, they preferred less and less to have additional toilets and trails, essentially following Bryan's proposed evolution from extractive ideology to preference for maintaining lands in their natural state. Virden and Schreyer's (1988) results parallel Bricker and Kerstetter (2001) in that as their hikers became more specialized, they favored more restrictions to maintain the natural character of the area physically (preferred fewer to no trails and signs but desired revegetation) and socially (supported quotas limiting use and restrictions on party size).

Research that did not find a link between non-fishing specialization and physical setting preferences

When Kuentzel and McDonald's (1992) results are evaluated using only their commitment and lifestyle specialization dimensions, their findings do not support the expected result of specialists preferring not to open an additional section of the resource

to users unless that particular section is more rustic in nature and more conservatively managed.

Research that did not find a link between non-fishing specialization and social setting preferences

A search of the specialization literature did not uncover investigations where links were not found between specialization development levels or dimensions and social setting preferences.

Research that did not find a link between non-fishing specialization and management setting preferences

Although Virden and Schreyer (1988) found their specialists (more than their generalists) wanted to see fewer people on the trail and were even willing to support a numerical cut off point, they were not different from generalists in their reluctance to support restrictions such as permits to hike or backpack, fees to use the backcountry, or sanctioning backcountry rules violators to make their preferences for fewer people on the trail a reality. Again, when Kuentzel and McDonald's (1992) commitment and lifestyle dimension is paired with managerial setting preferences such as their suggestion for controlled put-in times, no significant difference emerged between specialists and generalists.

Preferences Summary

Table 1 highlights specialization research efforts to link Bryan's concept with physical, social, and managerial setting preferences. McIntyre and Pigram's (1992) investigation developed profiles of their vehicle-based campers through cluster analysis

but did not classify their respondents as specialists or generalists per se (they argued against forming a hierarchical organization) only noting their clusters were unique from one another. Their analysis comparing open-ended comments and clusters did reveal certain clusters were more critical of management efforts to use permits, fees, and zoning. The most important element to take away from this part of the literature review is that specialization investigators who assigned a single specialization score to their respondents were more likely to find significant relationships between specialization and setting preferences than investigators who use multiple specialization scores. Further, the results for single specialization scores generally followed Bryan's propositions.

Table 1. Significant relationships between specialization and management preferences

Author, year published	**Activity**	**Management setting preference**	**Was specialization linked to this preference?**
Bryan, 1977	Trout fishing	Stocking	Yes
		Ease of access	Yes
		Habitat management	Yes
Graefe, Donnelly, & Vaske, 1985.	Hiking	Prefer to see fewer people on the trail	Yes
Chipman & Helfrich, 1988	Bass fishing	Habitat management	Yes
		Public access	Yes
		Stocking	Yes
		Size limits	Yes
		Creel limits	Yes
		Catch & release policy	Yes
		Artificial lures policy	Yes
		Closed seasons	No

Table 1 (continued). Significant relationships between specialization and management preferences

Author, year published	Activity	Management setting preference	Was specialization linked to this preference?
Virden & Schreyer, 1988	Backcountry hikers	Trail quotas for high use periods	Yes
		Revegetating overused areas	Yes
		Well placed and accurate signs	Yes
		Well maintained trails	Yes
		Limit party size	Yes
		Fining backcountry violators	No
		Fee to use the backcountry	No
		Required permits to backpack	No
		No regulations at all	No
		Permits to day hike	No
		Stocking backcountry lakes	No
		Readily available information on regulations	No
Kuentzel & McDonald, 1992	Whitewater recreation	Open upper section of river	Partially
		Limit commercial use	Partially
		Limit private use	Partially
		Control put-in times	Partially
		Fees for private use	No
		Favor facility development	No
		Enforce regulations more	No
		Abolish roadside parking	No

Table 1 (continued). Significant relationships between specialization and management preferences

Author, year published	Activity	Management preference	Was specialization linked to this preference?
Hase, 1996	Saltwater fishing	Provide a designated area for personal watercraft	Partially
		Restrict the number of people and watercraft when lake is busy	Partially
		Provide more roadside parking at access points	No
		Provide higher standard toilets	No
		Provide more toilets	No
		Provide more developed access points	No
		Provide more handicap accessible docks	No
		Provide more camping/picnic sites	No
		Improve existing access roads	No
		Provide more information about facilities/services/points of interest	No
		Provide more marina and boating facilities	No
		Provide more hiking trails along the lake	No
		Prohibit fishing in swimming areas	No
		Provide reservable camping/ picnic sites	No
Bricker & Kerstetter, 2001	Whitewater recreation	Provide trail accessibility to persons w/ disabilities	Yes
		Provide trails for hiking only	Yes
		Provide rustic (dispersed) camping on public lands	Yes
		Install more compost toilets	Yes
		Provide side trails from the river	
		Provide maps to public camping, access, and rest areas along the river	Yes
		Maintain public lands in their natural state	Yes

Behavior

For the purpose of this study, behaviors are defined as observable actions. They are manifestations of our motivations, preferences, and attitudes when we perceive a gap between an existing condition and a desired condition (Driver, 1975). Nine investigators including Bryan (1977) investigated, with mixed results, the relationship between behaviors and specialization in canoeing (Wellman, Roggenbuck, & Smith, 1982), saltwater fishing (Choi, Loomis, & Ditton, 1994 and Ditton, Loomis, & Choi, 1992), bass fishing (Wilde & Ditton, 1994), wilderness recreation (Williams & Huffman, 1986), sailing (Kuentzel & Heberlein, 1997), goose hunting (Kuentzel & Heberlein, 1992), and bird watching (McFarlane, 1992). Consistent with the previous section of this chapter, the literature concerning behavior and fishing specialization will be reviewed first.

Research That Found a Link Between Fishing Specialization and Behavior

Bryan (1977) was the first investigator to highlight a relationship between his constructed levels of specialization and selected behaviors. His original concept of the term "recreation specialization" actually refers to a continuum of general to specific behavior. He found differences between his generalists and his specialists with respect to the people they fished with, the equipment they owned, and where they had traveled to fish. For example, Bryan's generalists wear hip waders and carry large creels and wide nets whereas the specialists wear chest waders, carry more tackle, use more expensive rods, and do not carry nets or creels because fish are rarely kept. Specialist anglers are also more likely than generalist anglers to make fishing the central activity in an outing

instead of it being a companion activity, and specialists also socialize more with other specialists.

Wilde and Ditton (1994) concluded the specialization concept was a useful tool when fisheries managers needed to subdivide their bass angler constituents. The investigators discovered their generalists fished less than specialists in the previous year, did not participate in fishing tournaments as often as specialists, did not join fishing clubs as much as specialists and were less likely than specialists to own a motorboat. Ditton et al. (1992) were likewise successful in linking their Texas saltwater anglers' levels of specialization to their behaviors. They were able to show that specialist saltwater anglers used what the authors referred to as mediated interaction (e.g., television shows, and newspaper and magazine articles) more than generalist saltwater anglers.

Research That Did Not Find a Link Between Fishing Specialization and Behavior

Choi et al. (1994) were unable link specialization level to activity substitution decisions. They argued by logical extension that alternative activities would be less preferred as the level specialization increased.

Research That Found a Link Between Non-Fishing Specialization and Behavior

McFarlane (1996) found that as a birdwatcher's level of specialization increased, he or she participated in the activity more with friends and organized club members. Kuentzel and Heberlein (1997) found specialist sailors sailed more frequently and regularly than generalist sailors and did more open water cruising and spent more nights on the water.

Research That Did Not Find a Link Between Non-Fishing Specialization and Behavior

Williams and Huffman (1986) concluded the specialization concept might not be a useful tool for managers when explaining different behaviors of backcountry users. Specialists had accessed more information than generalists about where to go and stay within the park but did not use the information differently than backcountry generalists. Kuentzel and Heberlein (1992) likewise could not tie specialization among Wisconsin goose hunters to where those hunters chose to hunt. In some cases, their generalists hunted in areas of the resource the investigators believed would appeal only to specialists. Finally, Wellman et al. (1982) found specialization to be an attractive theory for segmenting canoeists but could not prove their generalists differed from their specialists with respect to canoeists' attitudes towards depreciative behavior (e.g., littering). However, they only measured attitudes towards behavior, not asking canoeists if they actually engaged in depreciative behavior or observing the behavior of canoeists.

Behavior Summary

Researchers generally found more links between specialization and behaviors when studying fishing than when studying other activities. Also important to note is that no investigator explored behaviors that occur outside the recreational opportunity. A summary of the behaviors presented and specialization's ability and inability to be associated with them among various recreation groups is presented in Table 2.

Table 2. Significant relationships between specialization and behaviors

Author, year published	Activity	Behavior	Was specialization linked to this behavior?
Bryan, 1977	Trout fishing	Wear specific clothes	Yes
		Carry specific gear	Yes
		Socialize with specific people	Yes
Wellman, Roggenbuck, & Smith, 1982	Canoeing	Attitudes towards depreciative behavior	No
Williams & Huffman, 1987	Backcountry hiking	Substitute recreational activities	No
Kuentzel & Heberlein, 1992	Goose hunters	Hunt in specialized zone	No
Ditton, Loomis, & Choi, 1992	Saltwater anglers	Use mediated interaction	Yes
Choi, Loomis, & Ditton, 1994	Saltwater anglers	Substitute recreational activities	No
Wilde & Ditton, 1994	Bass anglers	Days fished	Yes
		Participate in fishing tournaments	Yes
		Own a boat	Yes
		Use mediated interaction	Yes
		Join a fishing club	Yes
McFarlane, 1996	Birdwatchers	Watch birds with specific people	Yes
Kuentzel & Heberlein, 1997	Sailors	Days sailed	Yes
		Open water cruising	Yes
		Spend night on water	Yes

Literature Related to Specialization

Bryan is not the first author to suggest variability among recreationists within an activity or within the realm of leisure itself. Leopold (1966, originally published 1949) postulated such variability among hunters, ranging from the trophy recreationists to the hunter focused on husbandry of the sport, the wildlife and the land. Stebbins (1992) explored the variability of recreationists within the broader phenomenon of leisure.

Wilde, Riechers, and Johnson (1992) investigated the diversity of Texas anglers with the same purpose as Bryan (1977): to help managers avoid conflicts. Hammitt and McDonald (1983) and Schreyer and Lime (1984), each tried to explain recreationists' variation with one of Bryan's specialization dimensions.

Recreators Classified by Other Means

Leopold (1966, originally published 1949) proposed hunting could also be viewed as a process with five stages in his "Conservation Esthetic" essay. Similar to Bryan (1977), Leopold's components could be arranged hierarchically. Unlike Bryan, Leopold normatively encourages recreators to reach the top of the hierarchy. Recreators who take physical objects from the field such as berries and carrion are primarily concerned with his first component of recreation: "trophies." At the second stage, hunters are concerned with "the feeling of isolation," getting away from the everyday world and life. At the third stage, hunters focus on getting to the natural world, not merely getting away from the built environment. At the fourth stage, recreators begin to perceive and explore evolution and ecology through hunting. The fifth stage is the "sense of husbandry." Only hunters with perception of evolution and ecology and who interact with the resource through management prescriptions will reach this level. This stage often focuses on land owners.

Stebbins (1992) also articulates a structure to organizing recreationists that parallels Bryan's earlier work. Stebbins began his work searching for a way to explore amateur musicians and ended up expanding his work to cover various divisions within leisure itself. Stebbins' amateurs are guided by professional standards and they are not

"dabblers" with little commitment to the activity. His "professionals" however put more time into their activity and drew at least 50% of their economic livelihood from their "leisure" pursuit. His serious leisure division parallels Bryan's (1977) work in a variety of ways. First, serious leisure involves the accumulation and demonstration of special skills and knowledge. Second, serious leisure has "durable benefits" such as self-actualization, sense of social belonging, and feelings of accomplishment. Third, participants strongly identify with their activities; they speak proudly and excitedly about their recreational activity. Finally, participants in serious leisure develop their own subculture with unique beliefs, principles, traditions, and performance standards.

Wilde et al. (1992) is the only one of this group to empirically examine the relationship between diversity within a sport and its affect on attitudes toward a managerial issue (freshwater vegetation control). These researchers paralleled Bryan's assertion that appreciating the mix of recreators' attitudes and opinions helps recreation managers anticipate and avoid potential conflicts within and between users. Their research supported the proposition that anglers are not a homogenous group, and that anglers who belong to fishing clubs commonly represent the views of "average" anglers and wield considerable influence over the decisions made by fishery managers.

Elements of Specialization Used to Segment Recreators

Hammitt and McDonald (1983) proposed that past on-site experience (a specialization indicator used after Bryan) might determine how a recreator evaluates current management of recreation resources. They hypothesized that river floaters with greater on-site experience would feel more need to initiate controls and be more

supportive of management practices because they would be more sensitive to disturbances. Experience was positively related to disturbance sensitivity and support for most of the selected management practices, but not for additional regulatory control. The most significant conclusion these researchers made was that experience alone might have a "specializing" effect similar to Bryan's concept on how recreators perceive their environments and their management.

Schreyer and Lime (1984) proposed that people who have never engaged in a particular outdoor recreation activity would have different perceptions and behaviors than someone with experience. Their descriptions of "novice" incorporated a similar characteristic of Bryan's "occasionalist," specifically that they are much less committed to the activity. The researches also suggested that more experienced recreators might be more likely to pursue legal action to remedy their dissatisfaction, a proposition that influenced the selection of behaviors in this study. Ultimately, their results lend support for the use of multiple indicators to measure specialization. They determined that a "novice" is not always a novice; that experience in a recreation environment similar to the one they are using for the first time affects their perceptions of the new resource. Thus, a single indicator (like experience) would not always be capable of flushing out a recreator's level of specialization.

What distinguishes Bryan from these authors is that although each of them speaks to the attitudes toward and diversity of experiences sought by different recreationists, Bryan offers a conceptual "umbrella" to explain the divisions, why they occur, how they change, how they can be organized, and how that information applies to recreation resource managers.

Summary

Since being conceived, the specialization concept has been constructed in discrete stages, as a continuum, and segmented into its selected dimensions. Past investigators met with mixed success when they tried to measure specialization's relationship with recreators' attitudes, motivations, preferences, and behaviors across a variety of activities. The concept has been critiqued, operationalized, and measured in a variety of ways, each attempting to strengthen the usefulness of the concept and its explanatory power.

Investigators who found significant relationships between specialization levels and management preferences and behaviors articulated three propositions. First, recreators in any outdoor recreation activity are not a homogenous group with respect to their skills, experiences, and economic commitment levels. Second, the differences in these dimensions are significant enough to segment recreators into unique groups within a given activity. Third, these subgroups can be placed along a continuum because their attitudes, motivations, preferences, and behaviors will be general to specific. These three propositions provide the outline this study will work within to explore specialization's relationship with management preferences and behaviors of upper Manistee River shoreline owners who fish.

CHAPTER 3

METHODS

This chapter covers the procedures used to complete this study. The first section outlines the sampling procedure used to identify the study population that was also the sample. Study variables are operationalized in the second section. The data collection method is described in the third section. The fourth section highlights the statistical analysis procedures used to test the study's hypotheses. The fifth section reviews modifications to analysis methods because of unforeseen complications in data return.

Sampling Procedure

This study was a census of upper Manistee River private shoreline owners from Mancelona Road in Otsego County to M66 in Kalkaska County (see Figure 1) who fished at least once in their life. Many of the river's shoreline owners take advantage of its fishing opportunities, and trout are the most common target species (Nelson, Valentine, & Lynch, 2002).

The census was derived from a list of property owners obtained from Equalization Offices of the three affected counties: Crawford, Kalkaska, and Otsego. All the private shoreline owners were sent a recreational assessment questionnaire in the fall of 2001. Shoreline owners holding multiple parcels were sent only one questionnaire. Twenty-six of the 627 owners who received that assessment questionnaire either refused to complete the survey, were unreachable, deceased, owned shoreline just outside the study area's boundary, or sold their property before the time frame of interest in the questionnaire.

After the fall 2001 survey effort, 601 shoreline owners remained to be included in this research effort.

After this study's final survey mailing was complete, the number of shoreline owners eligible for analysis was identified through the use of a filter question that asked if the respondent had ever fished in his/her life, and that number is 343 (88.6%) of 387 respondents.

Variable Operationalization

Recreation specialization, management preferences, and behaviors used to have those preferences heard and acted upon are this study's three main concepts to be operationalized. Bryan (1977) originally proposed that specialization is a multidimensional concept incorporating skill, equipment used, and activity setting preferences. Since Bryan's study framed the concept, several researchers have also used skill and equipment dimensions to operationalize specialization along with dimensions Bryan highlighted in his descriptive data set like centrality to lifestyle and experience/current commitment. Together, these four dimensions were commonly used to measure recreation specialization across a variety of outdoor activities in the literature reviewed to prepare this study (e.g., Bricker & Kerstetter, 2001, Miller & Graefe, 2000, and Hase, 1996). Table 3 summarizes the dimensions used by various specialization researchers.

Table 3. Specialization investigators and their preferred dimensions

Author, year published	**Specialization dimension(s) used**
Bryan, 1977	Participation Technique Setting preferences

Table 3 (continued). Specialization investigators and their preferred dimensions

Author, year published	Specialization dimension(s) used
Wellman, Roggenbuck, & Smith, 1982	Canoeing investment
	Past experience
	Centrality to lifestyle
Donnelly, Vaske, & Graefe, 1986	Participation
	Equipment
	Skill
	Boating related interests
Schreyer & Beaulieu, 1986	Experience
	Commitment
Williams & Huffman, 1987	Amount of participation
	Centrality to lifestyle
	Commitment
Graefe, Donnelly, & Vaske, 1987	Skill level
	Experience
Virden & Schreyer, 1988	General experience
	Recent experience
	Equipment & economic commitment
	Centrality to lifestyle
Chipman & Helfrich, 1988	Resource use
	Experience
	Investment
	Centrality to lifestyle
Ditton, Loomis, & Choi, 1992	Participation
Kuentzel & Heberlein, 1992	Past experience
	Commitment
	Centrality to lifestyle
	Technique
	Media participation
Kuentzel & McDonald, 1992	No dimensions were specified
McIntyre & Pigram, 1992	Attraction
	Self expression
	Centrality
	Number of visits to recreational site
	Number of years involved in the activity
Wilde & Ditton, 1994	Experience
	Number of days fished in last 12 months
	Tournament participation
	Membership in fishing clubs
	Boat ownership
McFarlane, 1994	Past experience
	Economic commitment
	Centrality to lifestyle
Scott & Geoffrey, 1994	No dimensions specified (qualitative study)
Choi, Loomis, & Ditton, 1994	Number of days fished in last 12 months

Table 3 (continued). Specialization investigators and their preferred dimensions

Author, year published	Specialization dimension(s) used
McFarlane, 1996	Past experience
	Economic commitment
	Centrality to lifestyle
Hase, 1996	Past experience
	Skill level
	Equipment investment
	Centrality to lifestyle
Kuentzel & Heberlein, 1997	Experience and frequency of participation
	Specialized boating behaviors
	Evaluation of the sailing experience
	Commitment to sailing
Miller & Graefe, 2000	Participation
	Skill
	Lifestyle
	Equipment
Bricker & Kerstetter, 2001	Level of experience
	Skill level
	Equipment investment
	Centrality to lifestyle

Using past research as a guide, this study initially tried to measure specialization with the four most common dimensions: experience/current commitment, skill, equipment investment, and centrality to lifestyle. These dimensions and the selected indicators are highlighted in Table 4. Experience/current commitment were typically measured by total years a person had fished, frequency he/she fished in a specific period, years fished a selected water body, and the frequency fished in the selected water body in a specific period. This study initially added beginning and current fishing technique (as indicators of movement in the specialization continuum), preferred setting (lake, stream, or river) and harvesting history as additional experience/current commitment indicators.

Table 4. Initial specialization dimensions and indicators used in this study

Dimensions	**Indicators**
Experience and current commitment	Ever fished in life Years fished Fished previous year Ever fished the Manistee Years fished the Manistee Most fished Manistee section Preferred water body to fish Days fished preferred water body Days fished Manistee Beginning fishing technique Current fishing technique Keep or release fish history
Skill level	Self evaluated skill level Insect hatch familiarity Participation in a professionally organized fishing tournament
Equipment investment	Replacement cost of current equipment
Centrality to lifestyle	Importance of fishing in life Fishing most preferred outdoor recreation activity Proportion of trips involving fishing Importance of fishing before property purchase Importance of fishing after property purchase Membership in fishing-related organizations

Skill and equipment investment were historically measured by a small number of indicators, and were initially measured by a small number of indicators in this study. In this study, skill was measured by self-assessment as beginner to expert and by familiarity with the various insect hatches that occur along the upper Manistee River during the spring and summer seasons (beginners were assumed to know less about the hatches than specialists). Equipment investment was measured by total replacement cost of currently

owned equipment in two categories: exclusive to fishing (e.g., rod and reel) and shared by fishing (e.g., boat, trailer, and waders).

Hase (1996) included participation in a fishing tournament as an indicator of specialization based on Bryan's and various Ditton studies. Although Hase included fishing tournament participation in her centrality to life dimension, it will be included in this author's skill dimension. Without a follow up question to determine the frequency of participation in fishing tournaments (which this questionnaire did not contain), the author assumed any participation in fishing tournaments was infrequent. Whereas frequent participation in tournaments may be an indicator of centrality to life, any participation in tournaments was assumed to be more an indicator of skill.

Seven indicators initially measured centrality to lifestyle. Importance of fishing in a respondent's life, fishing during a vacation, and membership in fishing related organizations are historically used indicators. Importance of fishing before and after the purchase of a respondent's property was added to track the movement of a respondent along the specialization continuum. Fishing as the most important outdoor recreation activity was added to determine how fishing measured up against the other outdoor recreation activity opportunities (e.g., hunting and ORV use) available to a respondent.

The management preference dimension was initially operationalized through seven variables. The seven variables were chosen based on their relevancy to the resource and their potential to be acted upon as indicated by upper Manistee River resource managers and private interests (Table 5). Respondents indicated their preference by choosing a(n) increase, similar amount, or decrease in the amount of a particular management action.

Table 5. Management actions that decision makers can act upon

Management actions (provide more, same amount, or less)
Designated public access to the river
Information about public access points
"Flies only" designation
Law enforcement on the river (later removed from analysis)
Stocking of trout
Fish habitat restoration
Fish habitat enhancement

Shoreline owners may use a variety of methods to have their river management concerns heard and acted upon by various government entities. Nine possible methods (including an "other" category) were selected as possible means to reach policy makers.

The types of government identified in the questionnaire as entities respondents could contact about management of the UMR included local (city, township and county), Michigan Department of Natural Resources, other Michigan government entities such as the Department of Environmental Quality, the Governor's office, the State Legislature, and Federal government entities like the U.S. Forest Service, the U.S. Fish and Wildlife Service, and Congress. Table 6 contains the complete list of selected behaviors.

Writing a letter to the editor of a newspaper or magazine is also offered as an option to have river management concerns recognized and acted upon by management entities but is not included in Table 6's list because letters to the editor are typically written for mass public consumption and reach management entities by hearsay.

Table 6. Actions private shoreline owners used to have preferences heard and acted upon

Citizen actions (used with local government, MDNR, other MI government, Federal government)
E-Mail
Traditional mail
Telephone
Face to face visit
Attend public meetings
Serve on advisory committees
Initiate legal proceedings
Other

One 13-page, booklet formatted questionnaire was developed to measure shoreline owners' levels of specialization, their management preferences, and means to have those preferences heard and acted upon by government entities. This study's variables were included in a survey requested by the principal funding agency, the U.S. Department of Agriculture Forest Service North Central Experiment Station. The U.S. Forest Service sought information about shoreline owners' property characteristics, perceptions of environmental quality, and their assessment of UMR managers' job performance. This study represents the second half of a research effort begun in the fall of 2001, which assessed recreational use emanating from UMR public access sites and private shoreline property and the physical condition of the access sites. Results of the fall effort are found in Nelson, Valentine, and Lynch (2002). This questionnaire was divided into five sections.

The first section of the survey sought data about a shoreline owner's property. Variables included method of property acquisition, likelihood of splitting and conveying a portion of their property to another person, and category of their property (principle

home, second home, vacant land, or vacant land with temporary structure). The second section requested a respondent's assessment of various river conditions (e.g., water quality, fish populations, and shoreline conditions) over time. Section three contained the variables needed to construct an importance/performance matrix (e.g., amount of public access, population of trout in the river, and conflicts between river users and landowners) for resource managers. Section four contained the primary variables of interest for this study. Experience and current commitment variables were first, followed by skill variables, then management preferences and finally means to have those preferences heard and acted upon. The fifth section contained demographic variables such as gender, age, employment status, number of people living in primary residence, and income. A complete copy of the survey instrument is found in Appendix A.

Data Collection

On February 26, 2002, the initial mailing (cover letter explaining the purpose of the study, survey, and postage-paid return envelope) was sent to the 601 shoreline owners who had a valid address and had not refused the previous recreation use survey. Approximately four weeks later (March 26, 2002), shoreline owners who had yet to respond were sent a second mailing (revised cover letter, survey, and postage-paid envelope). Four weeks after the second mailing (April 25, 2002), shoreline owners who still had not returned the survey were sent a reminder post card encouraging them to respond. Shoreline owners who still had not yet responded were sent a third (final) survey mailing (revised cover letter, survey, and postage-paid envelope) on May 31, 2002.

During the mailing process, the U.S. Postal Service returned 12 envelopes (containing survey, cover letter, and return envelope) and five postcards because the shoreline owner's forwarding order expired or because the Postal Service declared the mail undeliverable as addressed. Surveys were re-sent to these potential respondents after their respective County Equalization Offices were contacted and updated addresses obtained.

One shoreline parcel changed ownership between the fall 2001 mailing (spring/summer recreation assessment) and this study's mailing. The new owner replaced the old owner in the sampling frame and received this study's mailing; the previous owner was not asked to complete this study's survey.

Analysis

A variety of statistical procedures were initially needed to describe the study's population and test the study's hypotheses. These included frequencies, means, reliability analysis, Analysis of Variance (ANOVA), correlation, and Chi-squares. The Statistical Package for the Social Sciences (SPSS) version 10.0 for Microsoft Windows was used to store the data and analyze it with the previously listed procedures.

Previous researchers explored specialization through its levels, dimensions, and as a continuous variable. Discrete stages are typically composed through an additive index where the standardized indicator scores of each respondent are summed, and then respondents are divided into stages based on their total score (e.g., Bricker & Kerstetter, 2001). Classifying respondents into stages is an intuitively easier concept to grasp, but carries risks and limitations (Hase, 1996 and Kuentzel & McDonald, 1992). For

example, previous specialization level researchers inconsistently conceptualized each dimension. They do not agree on the number or type of indicators that define a dimension and one investigator's indicator of a particular dimension may become a dimension itself with its own indicators in another study. These circumstances carry the possibility of marginalizing the "reality" of specialization among and its effect on private shoreline owners.

Hase (1996) and Kuentzel and McDonald (1992) were concerned that the different dimensions and a summed score segmentation process do not equally affect or adequately explain the dependent variables (e.g., preferences and behaviors), overlook life course changes, and ultimately provide only a generic framework for describing specialization's relationship with a dependent variable. Acknowledging that this study will not explain 100% of the variance between specialization, preferences, and behaviors, a generic framework will suffice, especially when Bryan himself contended the framework is not definitive. A discrete stage application is also useful to managers who need just an inclination to mentally segment their constituents and understand their profiles. Table 7 identifies the initial variables used to construct the specialization levels and how those variables were measured.

Table 7. Means to measure initial specialization indicators

Experience and current commitment:

1. Ever fished in life[a]
2. Years fished[b]
3. Fished previous year[a]
4. Ever fished the Manistee[a]
5. Years fished the Manistee[b]
6. Most fished Manistee section[a]
7. Preferred water body to fish[b]
8. Days fished preferred water body[b]
9. Days fished Manistee[b]
10. Beginning fishing technique[a]
11. Current fishing technique[a]
12. Keep or release fish history[a]

Skill level:

13. Self evaluated skill level[c]
14. Insect hatch familiarity[d]

Equipment investment:

15. Replacement cost of current equipment[b]

Centrality to lifestyle:

16. Importance of fishing in life[e]
17. Fishing most preferred outdoor recreation activity[a]
18. Proportion of trips involving fishing[f]
19. Importance of fishing before property purchase[e]
20. Importance of fishing after property purchase[g]
21. Membership in fishing-related organizations[a]

[a] measured by categorical variable (spincasting, spinning, baitcasting, fly-fishing, other)
[b] measured by open-ended question (numeric)
[c] measured by 5-point Likert-like scale (1=beginner, 3=intermediate, 5=expert)
[d] measured by 3-point Likert-like scale (1=unfamiliar, 2=moderately familiar, 3=very familiar)
[e] measured by 5-point Likert-like scale (1=not at all important, 3=moderately important, 5=extremely important)
[f] measured by 5 categories (a=none of the time, c=1/2 of the time, e=all the time)
[g] measured by 7-point Likert-like scale (-3=much less important, 0=same, 3=much more important)

This author initially categorized each respondent as low, medium, or high on the specialization continuum through seven steps. First, the data used to make the continuum were checked for outliers. Any data point falling outside 1.5 times the interquartile range

was reduced to the 1.5 threshold for analysis. Second, the scores were standardized. Standardizing brings all values, regardless of their distributions and original units of measurement, to compatible units. Transformation is accomplished by subtracting each value from the sample mean, then dividing it by the sample standard deviation (StatSoft, 2003). Third, a reliability analysis was run on the indicators within each dimension. Any variable that did not contribute to the reliability of the dimension (i.e., those with low item-total correlation and/or those that if deleted would bring the dimension's Cronbach's Alpha score above .60) were omitted. The threshold of .60 was selected after reviewing the procedures used by Hase (1996), who referenced a factor analysis textbook by Comrey, which stated a .55 to .63 threshold would strengthen reliability. Fourth, the scores within each dimension were added. At this point, every respondent potentially had four dimension scores (if they answered all the applicable questions): an experience and current commitment score, a skill score, an equipment score, and a centrality to life score. Fifth, each dimension was multiplied by a weight (a percentage). Experience scores were multiplied by .40 and the other three scores multiplied by .20. Sixth, each respondent's weighted dimension scores were added to get their quantitative specialization score. Finally, SPSS was used to break the final scores into three groups using quartiles, which segmented the quantitative specialization scores into nominal groups (low, medium, and high). These groups were then used as the independent variables in later hypothesis testing.

The dimension scores were weighted because previous researchers implied that experience and current commitment might drive the specialization process more than the other dimensions. These investigators were concerned some of the dimensions were

contingent upon each other; for example, increased skill likely comes with increased experience. Hammitt and McDonald (1983) proposed experience alone might have a similar specializing effect on how river floaters perceive management of a resource. Schreyer and Lime (1984) also suggested overall experience influences recreators' perceptions and might affect their behavior with respect to how those with greater experience will seek redress for their dissatisfaction. Choi, Loomis, and Ditton (1994) and Ditton, Loomis, and Choi (1992) used only the experience dimension of specialization to explore relationships between it and their dependent variables. Hase (1996) and Kuentzel and McDonald (1992) also tested the relationship between experience and their dependent variables with success (they also used other specialization dimensions but did not create a summed index). In short, segmentation of users by experience alone can and has produced association results similar to other specialization studies that combined all the dimensions. The degree of the weight (.40) was the author's estimate of experience's influence in an individual's level of fishing specialization based on the literature cited above. Previous researchers have not weighted their specialization scores.

Analysis of variance (ANOVA) and Chi-square calculations were the statistical procedures used to test this study's hypotheses. Analysis of variance allows investigators to study multiple variables simultaneously when trying to determine if groups (in this case respondents in different specialization levels) differ from one another with respect to a certain variable (e.g., management preference). Chi-square calculations test whether a relationship exists between the variables in rows and columns of contingency tables.

Revised Methods Due To Unexpected Realities

Two circumstances prompted the need to revise the method initially used to assign specialization scores to respondents. First, additional reviews of the specialization literature revealed that at least three groups of researchers might have inappropriately used categorical variables in their statistical analysis (Miller & Graefe, 2000, Kuentzel & Heberlein, 1992, and Wellman, Roggenbuck, & Smith, 1982). These researchers standardized their respondent's scores because the variables were measured on different scales (e.g., ordinal, categorical, and interval). However, standardizing a score requires computing an average score, which is not applicable to categorical variables (e.g., yes/no, type of rod used...) because the result is nonsensical. Because this author initially incorporated yes/no variables as part of the means to determine specialization (following the lead of these researchers), yes/no variables were dropped from analysis except for the "have you ever fished" variable.

Second, without the benefit of personal interviews, the investigator could not ensure all applicable survey questions were answered. Without an answer to every question in the model (disregarding now even the categorical variables), no specialization score could be calculated. Only 51 respondents answered all 19 specialization measurement questions, which meant the previous specialization measurement scheme would only cover ~15% of the private shoreline owners, an unacceptable proportion. A leaner number of specialization indicators with a higher response probability were needed to capture more of the population in the specialization framework.

Amended Study Variables

The revised measurement scheme contains four variables/indicators from the original list of 19 to measure specialization: number of days fished last year (on preferred body of water and Manistee River), skill level, importance of fishing in one's life, and preferred fishing method (e.g., spinning, fly-fishing...). Each of the variables is still part of Bryan's (1977) four implied dimensions: experience/current commitment, skill level, equipment used, and centrality to life and they were measured as previously stated. Although preferred fishing method is a categorical variable, it was used in this iteration because it could be recoded to a hierarchical scale based on a review of previous literature.

The historical tendency in specialization research was to use multiple indicators because it was assumed several indicators would lead to a more accurate assessment of specialization and would compensate for varying circumstances such as a novice angler using very expensive fly-fishing equipment. However, a small number of researchers used as few as one indicator to measure specialization (e.g., number of days fished in previous 12 months) (Kuentzel & Heberlein, 1997, Wilde & Ditton, 1994, Choi, Loomis, & Ditton, 1994, Ditton, Loomis, & Choi, 1992, Loomis & Ditton, 1987, and Bryan, 1977). Therefore, it was deemed acceptable to use fewer indicators, especially since Bryan himself used only three. The indicators were chosen for the straightforward nature of their relevance to each dimension, their higher probability of being answered by more respondents, and the ease with which natural resource managers might collect data on them in the future.

An assortment of variables initially used to measure specialization (e.g., replacement cost of fishing equipment, familiarity with insect hatches...) became dependent variables to determine if they would be useful indicators of specialization in any future research effort involving this study population and their level of specialization if personal interviews or other methods are used to increase response to measurement questions.

The management preference "law enforcement on the river" was dropped from analysis. The author realized that it was illogical on a river with a high amount of commercial watercraft traffic involving youth, alcohol, and noise during the summer months that any significant difference would be found among any segment of private property owners. This was based on the author spending over 500 hours on the river during the summer of 2001.

The response options ("similar amount" and "decrease") for the variables "preference for fish habitat restoration" and "preference for habitat enhancement" were consolidated to meet a Chi-square assumption that every expected cell count is at least five (Devore & Peck, 1997).

Revised Specialization Computation Procedure

Under the revised specialization computation procedure, existing indicator data would be recoded and summed to create a specialization score. Expertise of the investigator's academic advisor, deference to Bryan's original propositions, consideration of managers' need for an intuitively understandable specialization framework, and a review of specialization measurement procedures used in Donnelly, Vaske & Graefe

(1986), Graefe, Donnelly, & Vaske (1987), and Miller & Graefe (2000) guided the recoding process. Also, all recoded responses were mutually exclusive.

First, number of days fished in the previous twelve months was computed by adding the number of days fished on an angler's preferred body of water and the number of days fished on the Manistee River. An angler who fished zero to ten days total was given a score of one. An angler who fished 11-30 days total was given a score of two. An angler who fished 31 days or more was given a score of three.

Second, an angler whose self-assessed skill level was beginner to beginner-intermediate was given a score of one. An angler whose self-assessed skill level was intermediate was given a score of two. An angler whose self-assessed skill level was intermediate-expert to expert was given a score of three.

Third, an angler who reported spincasting or "other" ("other" was most commonly cane pole, which is a pole without a reel) as the preferred fishing method was assigned a score of one. An angler who reported spinning or baitcasting as the preferred method of fishing was assigned a score of two. An angler who reported fly-fishing as the preferred fishing method was given a score of three. The rationale for this classification is that cane pole, spincasting, spinning, baitcasting, and fly-fishing each occupy an increasing step up on the fishing technique ladder because each is increasingly more difficult to master (Discover the Outdoors, 2002). Pictures of each reel type are found in Appendix B.

Finally, an angler who reported that fishing is not at all or somewhat important in his/her life was assigned a score of one. An angler who reported that fishing is moderately important in his/her life was assigned a score of two. An angler who reported

that fishing is very important or extremely important in his/her life was given a score of three.

At this point, each respondent has a maximum of four specialization scores (depending on how many of the four questions they answered). The scores of each respondent who answered all four questions were then summed. The lowest score a respondent could have was four, the maximum score a respondent could have was 12. Finally, respondents were segmented into their respective categories of novice, intermediate, or advanced based on their composite score. Novices are respondents with specialization scores of four to seven. Intermediates are respondents with specialization scores of eight to 10. Advanced (specialist) respondents have specialization scores of 11-12. This part of the scheme is similar to that of Graefe, Donnelly, & Vaske (1985).

Although the precedent for calculating a specialization score in this manner is found in the literature, a methodological note applies here because interval data was added to ordinal data. Nominal data was transformed into ordinal data. The literature also does not address the idea that the difference between the new ordinal categories (the different fishing methods) is of equal value (i.e., that the difference in skill required to master spin-casting versus spinning is the same as the difference required to master baitcasting versus fly-fishing). The superceding consideration in this study though is the framework's potential to be intuitively understood by managers, anglers, and other interested parties. Table 8. summaries the recode framework.

Table 8. Revised indicators used to measure specialization

Indicators	Original measures	Score
Days fished last 12 months (at preferred water body and UMR)	0-10	1
	11-30	2
	31+	3
Skill level	Beginner or beginner-intermediate	1
	Intermediate	2
	Intermediate-expert or Expert	3
Preferred fishing method	Spincasting	1
	Spinning or Baitcasting	2
	Fly-fishing	3
Importance of fishing in life	Not at all important or somewhat important	1
	Moderately important	2
	Very important or extremely important	3

- A-priori, three specialization levels based on summated variable
    - Novice = 4-7; Intermediate = 8-10; Advanced = 11-12

Hypothesis Testing Procedures and Acceptance Rules

Analysis of Variance (ANOVA), Chi-square calculations, frequencies, and descriptive statistics (mean, median...) remained as the means to test study hypotheses and describe the study population. Hypotheses were accepted if the results were statistically significant at $p<.05$. Specifically, hypotheses 1, 3-4, and 17 were accepted if ANOVA reported the results as statistically significant. Hypotheses 2, 5-16, and 18 were accepted if Chi-square calculations revealed the results to be statistically significant.

CHAPTER 4

RESULTS

This chapter details selected results of the questionnaire and the data analysis related to the study's hypotheses. The first section explains the study's response rate. The second section describes selected characteristics of the upper Manistee River private shoreline owners. The third section explains results of the specialization segmentation process. The fourth section explores the results of the relationship analysis between the specialization levels and management preferences. The fifth section reports the results of the relationship analysis between the specialization levels and behaviors. The sixth section addresses possible non-response bias. The seventh (final) section addresses possible violations of statistical tests (ANOVA and Chi-square).

Response Rate

Each of the 601 remaining shoreline owners had an opportunity to participate in the study by returning the questionnaire. To encourage a response, the substance of each cover letter was changed with each mailing, the outer envelope was printed with a unique identifier to distinguish it from the fall recreation assessment survey, reminder postcards were sent, and initially undeliverable mail was re-delivered after updated addresses were obtained. Twenty-one shoreline owners were removed from the study because they either refused to participate, were deceased (and new owner address information was not available), owned property just outside the study area's boundary, or were ultimately unreachable because the Equalization Office did not have a current mailing address.

Five hundred eighty shoreline owners then remained as potential survey respondents. From that group, 387 surveys were returned by the cut-off date. Seven surveys were returned with their identification number removed by the respondent. The data from these surveys was included in the study's results because it was assumed these surveys did not come from shoreline owners who had already completed the survey and did not remove its identifier. In summary, a total of 387 completed and returned surveys from the 580 possible produced a response rate of 67.1%.

Descriptive Results

The majority of respondents reported that their shoreline property was the site of their second home. Slightly more than a quarter of respondents classified their property as the location of their primary home. The remaining respondents described their property as vacant land or vacant land with a temporary structure. Primary homeowner respondents were typically older (65+ years), lived with fewer people, were retired, and had incomes more widely distributed than other homeowner segments. Second homeowner respondents were typically younger than primary homeowners (36-54 years), had children living in their households, worked full-time, and more frequently reported household incomes of $80,000 per year. Vacant landowners with a temporary structure were similar to second homeowners. Vacant landowners without a structure tended to be younger, more likely to have children under 18 and to be employed full time than other groups. Demographic results are summarized in Table 9.

Table 9. Demographic characteristics of UMR shoreline owner respondents 2002

	Principal home	Second home	Vacant land w/ temp structure	Vacant land w/o structure	All
Type of ownership	25.8%	56.7%	8.6%	8.9%	100%
Gender					
Male	76.3%	88.5%	78.8%	83.9%	84.1%
Female	23.7	11.5	21.2	16.1	15.9
Total	100%	100%	100%	100%	100%
Age					
18-35	3.1%	1.4%	0.0%	0.0%	1.6%
36-54	28.2	43.1	39.4	64.5	40.4
55-64	27.0	32.1	30.3	22.6	30.0
65+	41.7	23.4	30.3	12.9	28.0
Total	100%	100%	100%	100%	100%
Number of people in primary residence					
1-2	86.2%	66.5%	68.8%	53.3%	70.8%
3-4	8.5	26.8	28.1	43.4	23.5
5+	5.3	6.7	3.1	3.3	5.7
Total	100%	100%	100%	100%	100%
Number of children (<18 yrs) in primary residence	86.9%	81.2%	86.7%	60.0%	81.3%
0	7.1	14.8	13.3	40.0	15.0
1-2	6.0	3.5	0.0	0.0	3.4
3-4	0.0	0.5	0.0	0.0	0.3
5+	100%	100%	100%	100%	100%
Total					
Current level of employment					
Retired	62.5%	39.2%	45.4%	19.3%	44.4%
Employed full-time	21.9	48.3	45.5	71.0	42.9
Self-employed	7.3	11.0	3.1	6.5	8.9
Homemaker	4.2	0.0	3.0	0.0	1.3
Employed part-time	4.1	1.5	3.0	3.2	2.7
Unemployed	0.0	0.0	0.0	0.0	0.0
Student	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0
Total	100%	100%	100%	100%	100%
2001 household income	5.1%	1.4%	3.0%	0.0%	2.8%
<$20,000	17.1	7.4	6.1	2.9	9.6
$20,000-$39,999	17.2	9.6	15.1	8.9	11.9
$40,000-$59,999	14.1	12.9	15.2	17.6	13.7
$60,000-$79,999	11.1	44.7	21.2	41.2	33.3
$80,000+	35.4	24.0	39.4	29.4	28.7
Choose not to answer	100%	100%	100%	100%	100%
Total					

On average, primary homeowners owned fewer acres of property and fewer feet of shoreline frontage than second home or vacant landowners but owned their property for a slightly longer period of time than the other property owners (Table 10).

Table 10. Basic facts about private shoreline owners' properties

	Principal home	Second home	Vacant land w/ temp structure	Vacant land w/o structure	All
Acres owned					
Mean	4.9	8.1	8.1	11.6	7.8
Mode	2.0	2.0	10.0	1.0	2.0
0-10	86.2%	75.6%	74.2%	79.4%	78.4
11-20	11.7	18.2	22.6	5.9	15.7
21+	2.1	6.2	3.2	14.7	5.9
Total	100%	100%	100%	100%	100%
Frontage owned (ft.)					
Mean	365.9	518.6	440.0	566.8	493.8
Mode	100.0	200	200.0	100.0	100.0
0-100	18.3%	19.6%	26.7%	31.3%	21.1
101-200	30.1	26.5	33.3	21.8	27.4
201+	51.6	53.9	40.0	46.9	51.5
Total	100%	100%	100%	100%	100%
Year acquired this property					
Mean	1982	1985	1985	1988	1985
Mode	1987	1994	1988	1998	1995

A super majority (>2/3) of each group of landowners was not likely to split their property within or beyond five years. Also, a majority of second home and vacant landowners (with and without a temporary structure) were not likely to convert their property to their permanent home within five years. However, if the approximately 25% of residents who were likely to convert their properties within five years do so, that event would approximately double the percentage of principal home owners on the UMR. Moreover, nearly one-third of these property owners considered it likely that they would convert their property at some point beyond five years, which makes a change in the makeup of UMR shoreline ownerships a certain event in the near future (Table 11).

Table 11. Likelihood of converting and splitting property within or beyond five years

	Principal home	Second home	Vacant land w/ temp structure	Vacant land w/o temp structure	2nd home & vacants
Likelihood of *converting property* to permanent home within 5 years	N/A				
Not likely		72.6%	78.6%	77.8%	73.8%
Somewhat likely		12.4	10.7	7.4	11.7
Very likely		15.0	10.7	14.8	14.5
Total		100%	100%	100%	100%
Likelihood of *converting property* to permanent home beyond 5 years	N/A				
Not likely		63.4%	61.5%	50.0%	61.5%
Somewhat likely		23.8	23.1	42.9	26.1
Very likely		12.8	15.4	7.1	12.4
Total		100%	100%	100%	100%
Likelihood of *splitting property* within 5 years					
Not likely	93.5%	94.2%	94.0%	93.1%	94.0%
Somewhat likely	4.3	3.4	3.0	0.0	3.3
Very likely	2.2	2.4	3.0	6.9	2.7
Total	100%	100%	100%	100%	100%
Likelihood of *splitting property* beyond 5 years					
Not likely	91.8%	93.5%	89.3%	92.6%	92.7%
Somewhat likely	5.9	4.5	3.6	3.7	4.7
Very likely	2.4	2.0	7.1	3.7	2.6
Total	100%	100%	100%	100%	100%

In response to an open-ended question, most shoreline owners did not belong to a property owners association or a river association. The most common river association membership was the Upper Manistee River Association. Those who belonged to a property owners association were most likely to list the Manistee River Talbot Pines Association and the Upper Manistee River Association (Table 12).

Table 12. Private shoreline owner membership in property and river associations

	Principal home	Second home	Vacant land w/ temp structure	Vacant land w/o temp structure	2nd home & vacants
Belong to property owners association					
No	81.1%	74.9%	84.4%	84.8%	78.0%
Yes	18.9	25.1	15.6	15.2	22.0
Total	100%	100%	100%	100%	100%
Property owners association name					
MTP[1]	44.4%	18.9%	0.0%	40.0%	24.4%
UMRA[1]	33.3	35.8	50.0	40.0	36.6
No name provided	5.6	13.2	50.0	20.0	11.0
Other[2]	16.7	32.1	0.0	0.0	28.0
Total	100%	100%	100%	100%	100%
Belong to area river association					
No	55.2%	49.1%	60.6%	76.5%	53.7%
Yes	44.8	50.9	39.4	23.5	46.3
Total	100%	100%	100%	100%	100%
Area river association name					
UMRA[1]	97.7%	87.2%	92.3%	87.5%	89.8%
No name provided	2.3	7.3	7.7	12.5	5.7
Other[2]	0.0	5.5	0.0	0.0	4.5
Total	100%	100%	100%	100%	100%

[1] UMRA is the Upper Manistee River Association & MTP is the Manistee River Talbot Pines Association

[2] Bear Lake TWP Association, Big Manistee, Cold River Gardens, Mus-ca-moo, and Wood River.

Specialization Segmentation

A leaner number of specialization indicators resulted in a broader coverage of respondents in a specialization framework. Under this study's original formulation, ~15% of the respondents could be assigned a specialization score because they answered all 19 applicable questions, whereas under the revised formulation, ~92% of respondents (315 of 343) could be assigned a specialization score because they answered all four applicable questions. This coverage level was acceptable because between the two groups of researchers who reported the number of applicable segmentation questions, the

author calculated Choi, Loomis, & Ditton's (1994) coverage percentage at 94.6% (one applicable question) and Wilde & Ditton's (1994) coverage percentage at 51.9% (one applicable question that was open ended).

The first objective of this study was to create an angling specialization continuum for private shoreline owners using current commitment, skill level, equipment used, and centrality to lifestyle variables to measure specialization. Using the revised methods, a fairly normal distribution of specialization scores emerged: "novice" - 32.1%; "intermediate" - 40.3%; "advanced" - 27.6%.

Anglers in each specialization level were in their mid to late 50's (average age) and most classified their UMR property as the site of their second home, particularly the advanced anglers (65.5%). Property type ownership however was not associated with any one level of specialization over another ($X^2 = 5.521$, $p = .238$). Advanced anglers more frequently reported household incomes of $80,000+ in the past year, which is consistent with the findings of previous research that showed more specialized anglers usually earned more income. Finally, as the level of specialization increased, a greater number of anglers reported the Manistee River as their preferred fishing location. Bryan (1979) noted that an increasing level of specialization manifests itself in resource specificity. Although Bryan only addressed the type of water body preferred by his different anglers (deep water vs. shallow stream), this finding logically parallels that result and was statistically significant ($X^2 = 35.103$, $p = .000$). Table 13 summaries these findings.

Table 13. Specialization's relationship with selected descriptive variables

	Novice	Intermediate	Advanced	Test statistic
Age				Not calculated
Mean	59.4	58.1	55.8	
Median	58.0	58.0	54.0	
Property type				$X^2 = 5.521$
Principal home	28.7%	25.4%	18.4%	$p = .238$
Second home	49.5	58.8	65.5	
Vacant land w/ temp	10.9	7.9	6.9	
structure	10.9	7.9	9.2	
Vacant land w/o temp	100%	100%	100%	
structure				
Total				
Income				Not calculated
< $20,000	2.0%	2.4%	0.0%	
$20,000-39,000	13.9	7.9	6.9	
$40,000-59,000	12.9	11.0	4.6	
$60,000-79,000	13.9	11.0	20.7	
$80,000	29.7	37.8	44.8	
Chose not to answer	27.7	29.9	23.0	
Total	100%	100%	100%	
Manistee is preferred				$X^2 = 35.103$
fishing location				$p = .000$
Yes	52.7%	69.6%	77.6%	
No	47.3	30.4	22.4	
Total	100%	100%	100%	

Specialization and General Characteristics

Ha_1 stated that the number of years fished should increase as levels of specialization increased. Although number of years fished was historically used to measure specialization, it was not included as an indicator in this study because the author wanted to corroborate previous specialization-related research that proposed experience alone could discriminate between specialization levels. Also, it was assumed that fishing is a perishable skill, so measuring days fished in the previous year would more accurately assess current specialization level. Ha_1 is accepted because the ANOVA result was significant ($F = 18.557$, $p = .000$).

Ha_2 proposed that as level of specialization increases, familiarity with the various stream-related insect hatches that occur during the fishing season should increase. The

basis for this hypothesis was grounded in the proposition that specialists seek settings that allow them the opportunity to discriminate between skill and luck when a fish is caught. Because knowledge of insect hatches allows an angler to manipulate the probability of catching a fish to his/her favor (fish feed heavily on the emerging species during hatch hours), the author argues that specialists will be more familiar with the hatches. Ha_2 is accepted because the Chi-square result was significant ($X^2 = 127.006$, $P = .000$).

Ha_3 proposed that as the level of specialization increases, the replacement cost of equipment exclusive to fishing should increase. Equipment exclusive to fishing includes tackle, reel, and rod. The basis for this hypothesis was grounded in Bryan's (1977) study, which stated that specialist anglers often owned more expensive equipment. Ha_3 is accepted because ANOVA reported a significant difference in mean scores of novice, intermediate, and advanced anglers ($F = 54.928$, $p = .000$).

Ha_4 proposed that as the level of specialization increases, the replacement cost of equipment shared by fishing should increase. Equipment shared by fishing includes waders, boats, and trailers. Again, the basis for this hypothesis was that more specialized anglers would own more expensive equipment. Ha_4 is accepted because ANOVA reported the difference in mean scores of novice, intermediate, and advanced anglers to be significant ($F = 10.241$, $p = .000$).

Ha_5 proposed that as the level of specialization increases, fishing should increasingly become a respondent's most preferred outdoor recreational activity (over all others regardless of season). The basis for this hypothesis was grounded in Bryan's monograph, which stated that specialists are likely to spend their leisure and vacation

time fishing (Bryan, 1979). Ha_5 is accepted because the Chi-square result was significant ($X^2 = 101.195$, $p = .000$).

Ha_6 proposed that as the level of specialization increases, the importance of fishing when the respondent purchased his or her UMR property should increase. This hypothesis was grounded in the assumption that recreational pursuits might affect decisions external to recreation, that as fishing becomes more important in an angler's life, the angler would seek means to make fishing opportunities and the surrounding natural resources more accessible, which shoreline ownership provides. Ha_6 is accepted because the Chi-square result was significant ($X^2 = 117.417$, $p = .000$).

Ha_7 proposed that as the level of specialization increases, the importance of fishing in a respondent's life after buying his or her UMR property should have increased. The basis for this hypothesis was that specialization is a continuous process. It is assumed that an increase or stability in fishing effort was commensurate with property purchase, and with fishing effort comes skill, centrality to life, and possible fishing method change and thus overall specialization level. In other words, "too much of a good thing" (i.e., owning property that facilitates fishing opportunities) does not occur such that it erodes the importance of fishing in a respondent's life. Ha_7 is accepted because the Chi-square result was significant ($X^2 = 26.951$, $p = .000$). Table 14 summarizes the results of these hypotheses.

Table 14. Specialization's relationship with unused indicators

Preference	Test statistic	Test result	Hypothesis accepted or not
Ha_1: Number of years fished should be capable of discriminating between low, medium, and high specialization scores under this study's specialization framework.	ANOVA 'F'	F = 18.557 p = .000	Accepted
Ha_2: As level of specialization increases, familiarity with the various stream-related insect hatches that occur during the fishing season should increase.	Chi-square 'X^2'	X^2 = 127.006 p = .000	Accepted
Ha_3: As level of specialization increases, the replacement cost of current equipment exclusive to fishing should increase.	ANOVA 'F'	F = 54.928 p = .000	Accepted
Ha_4: As level of specialization increases, the replacement cost of current equipment shared by fishing should increase.	ANOVA 'F'	F = 10.241 p = .000	Accepted
Ha_5: As level of specialization increases, fishing should increasingly become a respondent's most preferred outdoor recreational activity.	Chi-square 'X^2'	X^2 = 101.195 p = .000	Accepted
Ha_6: As level of specialization increases, the importance of fishing when making the decision to acquire a respondent's UMR property should increase.	Chi-square 'X^2'	X^2 = 117.417 p = .000	Accepted
Ha_7: As level of specialization increases, the importance of fishing in a respondent's life after buying their UMR property should have increased.	Chi-square 'X^2'	X^2 = 26.951 p = .000	Accepted

Table 15 summarizes the descriptive results associated with these hypotheses.

Table 15. Descriptive results of specialization's relationship with unused indicators

	Novice	Intermediate	Advanced	Test
Years respondent has fished				F = 18.557
Mean	27	39	41	p = .000
Median	30	40	40	
Familiarity with stream insect hatches				X^2 = 127.006 p = .000
Unfamiliar	45.5%	10.2%	4.6%	
Moderately familiar	50.5	71.7	34.5	
Very familiar	4.0	18.1	60.9	
Total	100%	100%	100%	
Replacement cost of current equipment exclusive to fishing (e.g., rod and reel)				F = 54.928 p = .000
Mean	$481	$1427	$2897	
Median	300	700	2500	
Replacement cost of current equipment shared by fishing (e.g., boat, waders)				F = 10.241 p = .000
Mean	$1474	$2504	$3851	
Median	375	1000	2500	
Is fishing most preferred outdoor recreation activity (regardless of season)?				X^2 = 101.195 p = .000
No	96.0%	60.8%	75.9%	
Yes	4.0	39.2	24.1	
Total	100%	100%	100%	
Importance of fishing in decision to buy UMR property				X^2 = 117.417 p = .000
Unimportant - Moderately important	86.1%	49.2%	6.9%	
Very important - Extremely important	13.9	50.8	93.1	
Total	100%	100%	100%	
Importance of fishing in respondent's life after purchase of property				X^2 = 26.951 p = .000
Less important	25.0%	22.2%	9.2%	
Same	52.0	35.7	32.2	
More important	23.0	42.1	58.6	
Total	100%	100%	100%	

Specialization and Management Preferences

Ha_8 stated that as the level of specialization increases, preference for designated public access to the river should decrease. The rationale for this hypothesis was an

extension of Bryan's work that stated an increasing level of specialization is associated with a desire to fish with one's peers. An increase in designated public access to the upper Manistee River may facilitate more rental canoe traffic and more use from non-specialized anglers, which is assumed to be less tolerable among anglers of increasing specialization. This hypothesis is rejected however because the Chi-square result was not significant ($X^2 = 1.910$, $p = .752$).

Ha_9 stated that as the level of specialization increases, preference for information about public access points should decrease. The rationale for this hypothesis was an extension of the previous hypothesis. Anglers of increasing specialization may want to limit information about public access as a means to reduce river traffic and the number of anglers who are not "peers." This hypothesis is rejected however because the Chi-square result was not significant ($X^2 = 2.877$, $p = .579$).

Ha_{10} stated that as the level of specialization increases, preference for "flies only" designation on the river should increase. The rationale for this hypothesis was that as anglers experience an increase in their level of specialization, they would prefer to use tackle that requires more skill to master and prefer a setting that required such skill. Ha_{10} is accepted because the Chi-square result was significant ($X^2 = 33.280$, $p = .000$).

Ha_{11} stated that as the level of specialization increases, preference for stocking should decrease. The rationale for this hypothesis was that as anglers experience an increase in their level of specialization they would move from a preference for a "good return" on their license money (i.e., high probability of catching lots of fish) to a preference for settings that allow them to distinguish between luck and skill when catching fish. Bryan (1979) also learned from his streamside conversations with some

trout anglers (specialists) that habitat management was preferred over stocking because these anglers did not want the naturally occurring trout population to be contaminated with hatchery-bred trout. Ha_{11} is accepted because the Chi-square result was close enough to the hypothesis acceptance p-value to be significant ($X^2 = 9.374$, $p = .052$).

Ha_{12} stated that as level of specialization increases, preference for fish habitat restoration should increase. This may include erosion control, sand traps in the stream, removal of human induced sand bedload, etc. Habitat restoration involves "rebuilding" habitat that once existed. The focus is on supporting naturally reproducing fish populations throughout their life cycle. Restoration is a logical extension of Bryan's (1979) finding that specialists more than generalists prefer habitat enhancement. Ha_{12} is accepted because the Chi-square result is significant ($X^2 = 34.301$, $p = .000$).

Ha_{13} stated that as level of specialization increases, preference for fish habitat enhancement should increase. Enhancement supplements existing habitat. This may take the form of providing additional structures in the water such as large woody material, creating undercut banks, additional riffle/pool structure, etc. The rationale for an increasing preference in habitat enhancement is that its manifestations (e.g., half logs) blend in with the natural surroundings but do not facilitate an increase in the fish population to an artificial level. Ha_{13} is accepted because the Chi-square result was significant ($X^2 = 28.384$, $p = .000$). Table 16 summarizes the hypothesis testing between specialization and preferences.

Table 16. Specialization's relationship with management preferences

Preference	Test statistic	Test result	Hypothesis accepted or not
Ha_8: As level of specialization increases, preference for designated public access to the river should decrease.	Chi-square 'X^2'	$X^2 = 1.910$ $p = .752$	Rejected
Ha_9: As level of specialization increases, preference for information about public access points should decrease.	Chi-square 'X^2'	$X^2 = 2.877$ $p = .579$	Rejected
Ha_{10}: As level of specialization increases, preference for "flies only" designation should increase.	Chi-square 'X^2'	$X^2 = 33.280$ $p = .000$	Accepted
Ha_{11}: As level of specialization increases, preference for stocking of trout should decrease.	Chi-square 'X^2'	$X^2 = 9.374$ $p = .052$	Accepted
Ha_{12}: As level of specialization increases, preference for fish habitat restoration should increase.	Chi-square 'X^2'	$X^2 = 34.301$ $p = .000$	Accepted
Ha_{13}: As level of specialization increases, preference for fish habitat enhancement should increase.	Chi-square 'X^2'	$X^2 = 28.384$ $p = .000$	Accepted

Table 17 summaries the descriptive results associated with these hypotheses.

Table 17. Descriptive results of specialization's relationship with management preferences

	Novice	Intermediate	Advanced	Test result
Designated public access to river				$X^2 = 1.910$ $p = .752$
Same amount	74.7%	72.1%	74.4%	
Increase	14.8	11.5	12.8	
Decrease	10.5	16.4	12.8	
Total	100%	100%	100%	
Information about public access points				$X^2 = 2.877$ $p = .579$
Same amount	66.0%	69.2%	66.7%	
Increase	24.5	20.0	27.6	
Decrease	9.6	10.8	5.7	
Total	100%	100%	100%	

Table 17 (continued). Descriptive results of specialization's relationship with management preferences

	Novice	Intermediate	Advanced	Test result
"Flies only" designation				$X^2 = 33.280$
Same amount	51.7%	43.4%	20.7%	$p = .000$
Increase	29.2	41.8	71.3	
Decrease	19.1	14.8	8.0	
Total	100%	100%	100%	
Stocking of trout				$X^2 = 9.374$
Same amount	34.4%	34.4%	36.0%	$p = .052$
Increase	62.4	58.2	48.8	
Decrease	3.2	7.4	15.1	
Total	100%	100%	100%	
Fish habitat restoration				$X^2 = 34.301$
Same amount or decrease	40.6%	18.0%	5.7%	$p = .000$
Increase	59.4	82.0	94.3	
Total	100%	100%	100%	
Fish habitat enhancement				$X^2 = 28.384$
Same amount or decrease	39.6%	20.5%	6.9%	$p = .000$
Increase	60.4	79.5	93.1	
Total	100%	100%	100%	

Specialization and Behaviors

Ha_{14} put forward that as the level of specialization increases, anglers should release more of the fish they catch. The grounds for this hypothesis are that as anglers experience an increase in their level of specialization, the reward system changes from extrinsic (e.g., keeping a fish to show others, eat, etc.) to intrinsic (e.g., enjoying the fishing experience itself). Bryan (1979) also found that as a management philosophy, catch-and-release materializes when the practice helps maintain a healthy trout population. Ha_{14} is accepted because the Chi-square result was significant ($X^2 = 29.925$, $p = .000$).

Ha_{15} put forward that as the level of specialization increases, the proportion of vacations/recreational trips involving fishing should increase. The grounds for this hypothesis are that as fishing specialization increases, the sport increasingly becomes more central to an angler's life, a phenomenon that can influence recreational activity

choice decisions. Specifically, Bryan (1979) proposed that anglers would increasingly center their vacation time on fishing as their level of specialization increases, but requested his proposal be tested under more strict conditions. Ha_{15} is accepted because the Chi-square result was statistically significant ($X^2 = 94.087$, $p = .000$).

Ha_{16} put forward that as the level of specialization increases, membership in fishing related organizations should increase. The grounds for this hypothesis are that anglers should increasingly want to fish and socialize with their "peers," an opportunity that membership in Trout Unlimited (TU) and Federation of Fly Fishers (FFF) provides. Membership in fishing-related organizations also provides an outlet for political action, a means to advocate various policy preferences, which is a function of Trout Unlimited, the Federation of Fly Fishers, Michigan United Conservation Clubs (MUCC), and the Upper Manistee River Restoration Committee (UMRRC). Ha_{16} is accepted because the Chi-square results were significant (Combined TU and FFF, $X^2 = 58.833$, $p = .000$; MUCC, $X^2 = 14.271$, $p = .001$); UMRRC, $X^2 = 6.639$, $p = .036$).

Ha_{17} put forward that as the level of specialization increases, more selected methods overall should have been used to have policy preferences heard and acted upon. The assumption for this hypothesis is that as anglers experience an increase in their level of specialization they are unlikely to "walk away" when efforts to have their needs heard and acted upon by government decision makers fail, thus using more than one method. Ha_{18} is accepted because ANOVA reported a statistically significant difference in the mean numbers of behaviors used by novice, intermediate, and advanced anglers ($F = 8.896$, $p < .000$).

Ha_{18} put forward that as the level of specialization increases, use of any of this study's selected methods to have policy preferences heard and acted upon should increase. The assumption for this hypothesis is that as fishing becomes more central in an angler's life, he or she will be more likely to initiate action to have their preferences related to UMR management recognized. Ha_{17} is not accepted though because its Chi-square result was not significant ($X^2 = 2.707$, $p = .258$).

Table 18 summarizes the results of hypothesis testing between specialization and behaviors.

Table 18. Specialization's relationship with selected behaviors

Behavior	Test statistic	Test result	Hypothesis accepted or not
Ha_{14}: As level of specialization increases, anglers should release more of the fish they catch.	Chi-square 'X^2'	$X^2 = 29.925$ $p = .000$	Accepted
Ha_{15}: As level of specialization increases, the proportion of vacations/recreational trips involving fishing should increase.	Chi-square 'X^2'	$X^2 = 94.087$ $p = .000$	Accepted
Ha_{16}: As level of specialization increases, membership in fishing related organizations should increase.	Chi-square 'X^2'	TU & FFF X^2=58.833, p=.000 MUCC X^2=14.271, p=.001 UMRRC $X^2 = 6.639$, $p = .036$	Accepted
Ha_{18}: As level of specialization increases, more selected methods overall should have been used to have policy preferences heard and acted upon.	ANOVA 'F'	$F = 8.896$ $p = .000$	Accepted
Ha_{17}: As level of specialization increases, use of any selected methods to have policy preferred and acted upon should increase.	Chi-square 'X^2'	$X^2 = 2.707$ $p = .258$	Rejected

Table 19 summaries the descriptive results associated with these hypotheses.

Table 19. Descriptive results of specialization's relationship with selected behaviors

	Novice	Intermediate	Advanced	Test result
Catch and release ethic on UMR				$X^2 = 29.925$ p = .000
Keep none of trout caught	46.3%	39.5%	63.2%	
Keep a few trout	25.4	47.9	28.7	
Keep most trout	17.9	5.0	8.0	
Keep all trout	10.4	7.6	0.0	
Total	100%	100%	100%	
Proportion of vacations/recreation trips that involved fishing				$X^2 = 94.087$ p = .000
Less than ~1/2 of the time	94.9%	59.1%	25.3%	
More than ~1/2 of the time	5.1	40.9	74.7	
Total	100%	100%	100%	
Member of fishing-related organization				Not calculated
No	75.2%	48.0%	28.7%	
Yes	24.8	52.0	71.3	
Total	100%	100%	100%	
Name of fishing-related organization				TU & FFF X^2=58.833, p=.000 MUCC
Upper Manistee River Restoration Committee	17.8%	29.9%	33.3%	X^2=14.271, p=.001 UMRRC
Trout Unlimited	2.0	25.2	50.6	X^2 = 6.639, p=.036
Federation of Fly Fishers	0.0	2.4	10.3	
Michigan United Conservation Clubs	5.9	21.3	25.3	
Number of selected methods used to have preferences heard and acted upon				F = 8.896 p = .000
Mean	1.9	2.4	3.8	
Median	1.0	1.0	2.0	
Use of any selected method to have preferences heard and acted upon				$X^2 = 2.707$ p = .258
Yes	57.4%	61.4%	69.0%	
No	42.6	38.6	31.0	
Total	100%	100%	100%	

Non-Response Bias

The possibility that those who did not respond to this survey would have answered the survey's questions differently than those who did creates the potential for non-response bias. In other words, are the data contained in the returned surveys truly

representative of the opinions and facts available for capture among the private shoreline owners of the upper Manistee River who have fished at least once in their life? A mix of procedures was considered to reduce the potential for and check the possibility of non-response bias.

A high response rate reduces the possibility of non-response bias. Three mailing attempts and a reminder post-card facilitated a 67% response rate, a level that meets the threshold of 60% suggested by the Advertising Research Association to minimize non-response bias (Readex, 2001). The U.S. Department of Education also suggests a 60% response rate acceptably reduces the potential for non-response bias (U.S. Department of Education, 2000).

The initial plan to check non-response bias was to compare the response rates of property owner types (e.g., principal home, second home, vacant land with temporary structure, and vacant land without temporary structure) using information contained in Equalization Office data about homestead property tax credit. Property tax records are not maintained in a consistent format or level of detail across these three MI counties, and because the information of interest was only available from Crawford County, the initial plan to check non-response bias was abandoned.

The revised plan to check non-response bias was to compare the demographic and specialization results of late respondents with the rest of the respondents using the assumption that late respondents were similar to non-respondents (Wellman, et al., 1980). This plan was abandoned because the final mailing resulted in only 27 respondents, too a low number for meaningful analysis. The issue is possibly moot because Wellman et al. (1980) tentatively concluded that an appreciable difference between early and late

respondents (and by extension, non-respondents) did not exist in their study, which implies non-response bias is less likely provided intense efforts to increase response rate were made and were effective.

It does not appear that any one county was over represented in the results. Crawford County contained 46.1% of the study population, Kalkaska County contained 52.1%, and Otsego County contained 1.8%. Of the shoreline owners who responded, 45.6% were from Crawford County, 52.5% were from Kalkaska County, and 1.8% were from Otsego County.

Ultimately, the author assumed that non-response bias was unlikely because of the study's 67% response rate. Moreover, the author was not trying to apply these results anywhere beyond the population of interest in this study.

Violation of Statistical Test Assumptions

Assumptions are circumstances we take for granted. Statistical tests require certain assumptions be met for their results to be meaningful. For example, ANOVA assumes that data values are normally distributed and that each score is independent of another (HyperStat, 2002). Chi-square calculations assume that each respondent contributes data to only one cell, that each cell has an expected count of at least five, and that the total number of respondents available for analysis is at least 20 (HyperStat, 2002).

The ANOVA assumptions are of primary concern. The result related to the number of methods used to reach policy makers was not normally distributed and did not have homogeneity of variance. However, ANOVA is a robust test with respect to

violations of these assumptions and tends to give a more conservative result when its assumptions are violated (Devore & Peck, 1997 and StatSoft, 2003). Data values met the independence assumption because the author assumes respondents did not collaborate on their answers and because respondents themselves were independently identified.

The Chi-square assumptions were met; although in two cases, two variables had to be consolidated to meet the minimum five count assumption (habitat enhancement and restoration). The total of the cell frequencies equaled the number of respondents entering into each analysis, which meets the assumption that each respondent contributes data to only one cell. Finally, the total number of respondents entering each Chi-square calculation never fell below 20.

Summary

The purpose of this chapter was to describe the study population using selected study variables and to report the results of statistical tests used to affirm or refute the study's hypotheses. Overall, the results support the use of a small number of variables to measure recreation specialization among private shoreline owners of the UMR who have fished at least once in their lives, and support the hypothesis that specialization is related to certain management preferences and the number of behaviors used to have those preferences heard and acted upon. The results also lend support to the use of historical indicators that measured specialization. Finally, specialization's link to indicators that were dropped from the specialization segmentation procedure (e.g., years fished and familiarity with insect hatches) suggests these indicators could be used in future fishing specialization studies on the UMR if investigators desire more than four indicators.

Interpretation of these results, their implication for managers, and relevance of the specialization concept itself are discussed in the next chapter.

CHAPTER 5

DISCUSSION

The final chapter of this thesis covers a variety of topics. The first section explores the meaning and relevance of the study's results. The second section covers probable limitations that affected this study's results. The chapter concludes with recommendations for mangers and future recreation specialization research.

Meaning and Relevance of Specialization Results

This section of the chapter has four parts. The first part explores the meaning of the classification results (novice, intermediate, and advanced) in light of previous research and how these results could help UMR managers. The second part explores the meaning of the results that cover specialization's relationship with some general characteristics of anglers and how those results could help UMR managers. The third section explores the meaning of the results related to specialization's relationship with management preferences and how those results could help UMR managers. The fourth section explores the meaning of the results related to specialization's relationship with selected behaviors and how those results could help UMR managers.

Meaning and Relevance of Specialization Segmentation Process

An unexpected result of this investigation was that a comparably small number of specialization indicators produced results showing more and stronger links between specialization and management preferences and behaviors than previous studies. General

wisdom in much of the literature was that using more indicators would capture a truer specialization score, which would increase the validity of the hypothesis testing results. These results appear to contradict that wisdom. Although some specialization researchers used as few as one indicator, they did so for reasons other than to prove that specialization could or should be measured with a small number of indicators.

Use of these four variables to measure specialization in the future would help resolve an operational contradiction of an assumption made earlier in the thesis. Recall that the author proposed the Information Age made people more guarded of their personal information like values and behaviors, and that use of the specialization concept would be an indirect means to uncovering that personal information. However, this author's original specialization measurement scheme required an answer to 19 questions. In essence, respondents were burdened with several direct questions just so the author could indirectly uncover the answers to a smaller set of questions. Using fewer variables in the future reduces intrusion on the respondent and the effort required of the survey administrator (e.g., resource manager).

The results also support predetermining who is and is not a specialist based the distribution of possible answers to specialization measurement questions. Historically, the majority of investigators allowed their respective software packages to break down the specialization makeup of their respondents using factor analysis, quartiles, or cluster-analysis. However, because past investigators used skill, centrality to life, current commitment, and equipment related indicators, it is logical to assume they agreed with Bryan's propositions that specialists would (for example) be more skillful or believe fishing was more central in their lives. It is logical then, that future specialization

researchers begin to "draw lines" at which a respondent is or is not a specialist with respect to a particular indicator (e.g., "expert" skill = advanced) as this study did, because it produced results similar to previous studies that did not "draw lines." This finding and proposal should help make specialization more intuitively appealing to managers because it allows for straightforward and relatively accurate classification of respondents. It should also be easier for them to assess because they do not need advanced statistical knowledge or software to compute scores.

This study's segmentation process does not support Bryan's original, mutually exclusive classification scheme. His original scheme did not allow a "technique-setting specialist" to be anyone who did not exactly fit the equipment, setting, or behavioral requirements. Subsequent specialization studies did not take this "bright line" approach and this study supports that more recent choice. Only 40 of 315 respondents (~13%) with specialization scores exactly met the mutually exclusive requirements as would have been proposed by Bryan (e.g., intermediate were of middle skill, fished the middle number of days, felt fishing was of middle importance in their lives, and fished with methods in the middle of the continuum). Flexibility in measuring specialization accepts the complexity of individual development and is capable of producing results similar to what Bryan suggested should be found.

The results also support additional trials of single score specialization use. Recall that some previous researchers were concerned that a single summed specialization score marginalized the explanatory power of the concept because each dimension might have a different relationship with dependent variables than a summed score. However, in this study, the issue appears moot because the majority of hypotheses were accepted using a

single score. Again, for specialization to be perceived useful by managers it should be easy to understand, a task accomplished here by simplifying the way one classifies respondents.

Meaning and Relevance of Specialization and General Anglers Characteristics

All of the variables used in this section were originally developed to measure specialization, but were dropped from analysis because an insufficient number of people answered these questions in combination with other questions. Instead, these variables were tested to determine if in the future, they might be useful indicators of specialization. Respondent fatigue and/or confusion are possible explanations for incomplete surveys and are likely the result of a failure to pretest the instrument among the study population.

Familiarity with the various insect hatches proved to be significantly related to specialization level because "advanced" anglers knew more about the hatches than "intermediates" or "novices" (Ha_2). No other previous investigator tested this variable. For any future study of specialization among these property owners, this variable could be used as an indicator. The mutually exclusive nature of this variable's measurement could lend itself as the sole indicator of specialization. Although this author does not advocate such action, previous researchers (Choi, Loomis, & Ditton, 1994, Ditton, Loomis, & Choi, 1992, and Wilde & Ditton, 1994) successfully used only one indicator to measure specialization and found relationships similar to what Bryan (1977) first proposed. Thus, for example, during a public meeting, a manager could ask for a show of hands as to who is unfamiliar, moderately familiar, or very familiar with UMR insect

hatches to obtain a glance of the make-up of their audience and begin formulating responses to their likely concerns.

The hypothesis testing results related to the replacement cost of current equipment shared by and exclusive to fishing are consistent with previous research (Ha_3 and Ha_4). Previous studies used the amount, type, and cost of equipment owned by recreators to measure specialization. Upon further reflection, the indicator "equipment shared by fishing" is probably not a useful choice to measure specialization among UMR shoreline owners in the future. Although more than half of all boating in Michigan is done in pursuit of fishing (Stynes, Wu, & Mahoney, 1998), which prompted the "probably" characterization, the indicator should have been phrased "equipment shared by fishing but primarily used for fishing" just to be thorough. Boats and trailers are the most likely cause of high replacement values reported (e.g., maximum reported replacement cost of equipment shared by fishing was $60,000). Therefore, a respondent who owns a $30,000 boat used primarily for entertaining and almost never for fishing might receive a higher specialization score than justified. This author contends that it is better to use the type of rod and reel preferred when measuring specialization with an equipment indicator (as long as the equipment indicator is not used alone because ~38% of "novices" prefer to use a fly rod as do ~71% of "intermediates").

One of the most interesting results of the study is the possible influence of specialization in a decision not directly related to recreation: purchasing property (Ha_6). Although this study did not assert specialization level causes property purchases, it did find that one of its dimensions (the importance of fishing in a respondent's life) was a factor in the purchasing decision. Most respondents with specialization scores (84.4%)

reported fishing was at least "slightly important" to their purchasing decision and 50.6% noted it was "very" or "extremely" important.

The implication for managers is that their policy and planning decisions influence property ownership in the community adjacent to their recreation resource. For example, an angler for whom fishing is very important might be more likely to purchase property on the UMR if the UMR is managed to his or her satisfaction. The potential value of the specialization concept in this situation is that it is associated with decisions extending beyond the realm of recreation, although in this study, specialization was also significantly related to fishing being the most preferred outdoor recreation activity regardless of season (Ha_5).

An interesting question to ask is: Can a person's specialization score ever go *down*? The intuitive answer is "yes," assuming the scores of the four specialization indicators fluctuate over time, perhaps because of other obligations in life (a phenomenon that could explain why one of the preference hypotheses had a weaker relationship than expected). However, even among advanced anglers, the importance of fishing in their lives increased after purchasing their property (Ha_7), a finding that appears to contradict this idea. Perhaps more continuous contact with the resource and its fishing opportunities does not produce "too much of a good thing," but solidifies and increases fishing's importance, especially among second home and vacant land owners who do not have year round residency on the UMR.

Finally, it was not surprising that the number of years fished was linked to specialization level because previous researchers frequently used number of years fished to measure specialization (Ha_1). It logically follows that individuals do not start fishing

with advanced skill, centrality, or equipment. As the number of years fished increases, an angler will likely be exposed to different fishing techniques, equipment, and other factors that change the angler's level of specialization if he or she is willing to adopt these new techniques. Therefore, even if the number of days fished a year fluctuates, the probability of being exposed to variable experiences that stimulate specialization change increases almost by default after (e.g.) 30 years of fishing. Using the belief that current commitment and number of years fished are meaningful indicators of specialization, managers can measure specialization by mining data from existing sources such as licensing agencies and other sources such as private organizations, universities, or government agencies like the U.S. Fish and Wildlife Service who are more likely to collect these numbers.

Meaning and Relevance of Specialization's Relationship with Management Preferences

One of the implied objectives of this thesis was to corroborate the results of existing studies. Recall that Bryan (1977) and Chipman and Helfrich (1988) both concluded that preference for fish stocking should decline as an angler becomes more specialized. The results of this study support that statement (Ha_{11}), although the relationship is weaker than expected. Impromptu conversations with UMR anglers during the summer of 2001 revealed that fishing success was down from previous years, which was attributed to a perceived lack of fish in the UMR. This anecdotal evidence leads the author to speculate that the relationship between an angler's level of specialization and the stocking preference is fluid; that although intrinsic rewards are the

primary motivator at the specialized level, extrinsic rewards (e.g., catching a fish) might assert themselves when they have not been satisfied for an unacceptable period of time.

One of the most frequently cited "other" issues shoreline owners wanted the MDNR to consider was an exception to the "flies only" rule for children. To the author, this implies that the life course can affect policy preferences when they are meant to benefit someone other than the angler, that there is an interaction effect between the preferences of a life course stage and the preferences of a specialization level.

The weaker than expected relationship reminds the author that specialization is perhaps better suited to contextualizing observations, to explaining the underlying dynamics that influence preferences and behaviors. Specialization was designed to explain why certain management preferences occur most of the time, not all the time. This finding implies managers should supplement their future specialization findings with additional demographic data, which is more readily available and which likely interacts with and affects certain preference relationships and specialization.

Selected preference results also parallel those of Bryan (1977), Chipman and Helfrich (1988), and Virden and Schreyer (1988) (Ha_{13} and Ha_{14}). These researchers found relationships between their respondent's (anglers and backcountry hikers) levels of specialization and preference for habitat enhancement and/or restoration, which was also the case for UMR private shoreline owners. What is not evident in these findings is what other factors influence the preference for habitat enhancement and restoration. Are these specialization results capturing a generic preference for habitat improvement or did these respondents make a conscious decision to prefer enhancement and restoration to benefit fish because of their specialization level? Because a majority of respondents in each

specialization level supported an increase in restoration and enhancement, the author suggests it is a generic preference, which should help managers understand that anglers across the spectrum advocate habitat improvement. Future research that forces respondents to prioritize enhancement or restoration would be of greater value to managers because in this study, respondents answered under the assumption resources exist to fulfill both preferences.

Accepting the "flies only" hypothesis upholds the same conclusion made by Bryan (1977) and Chipman and Helfrich (1988) who found that as the level of specialization increased, the preference for more restrictive fishing regulations (Ha_{10}) increased. What is interesting to note is that the UMR shoreline owners in one particular township (Bear Lake Township) who are forced to live with that rule and who, anecdotally the author was told, may not have initially supported it, now appear to do so with 81.6% of Bear Lake respondents preferring a similar amount or an increase in "flies only" area.

In the beginning of this thesis, the author proposed that shoreline owners were an important group to study because their management preferences might differ from visitors For example, shoreline owners may not want "flies only" restrictions adjacent to their property because it restricts the recreational freedom of their family, friends, or themselves. However, UMR shoreline owners have preferences similar to anglers previously studied. For managers, this finding supports the decision to institute such regulations on the UMR, but again highlights that it will likely be the more advanced anglers who most prefer to increase the "flies only" designation (novice: 29.2%,

intermediate: 41.8%, advanced: 71.3%), and they are but a quarter of the respondents (advanced: 27.6%).

By rejecting the hypotheses related to public access and public information about access, this study departs from Bryan's (1977), Bricker and Kerstetter's (2001) and Chipman and Helfrich's (1988) findings that an increasing level of specialization is linked to a decreasing level of support for more physical access or making it harder to find existing sites by withholding information about their location (Ha_8 and Ha_9). Hase (1996) though, also found no overall significant relationship between her specialization dimensions and public access issues.

Two possible explanations exist for this result. First, commercial canoe use, especially by large parties of college-age people (and the associated use of alcohol) was one of the most frequently cited concerns of shoreline owners. Frustration with trespassing, litter, and noise may transcend specialization level preferences when additional access might compound the problem by giving these recreators more options for shorter or longer canoe trips. For example, if a new public access point developed closer to a canoe livery is installed, and a number of customers desire a shorter trip, property owners near this access point or the livery will have more frequent contact with livery customers. An alternative to the first explanation is that property owners desire more physical access and information about that access because livery customers possessing that information might be more likely to avoid trespassing and littering when they know a public access point with bathrooms and trash barrels is near.

Second, designated public access and information about it is important to property owners because it guarantees them the recreation opportunities they seek for themselves,

their families, and their guests. For example, property owners need access up-stream so they can float back to their property and need access throughout the area to reach the most productive fishing spots. These suggested explanations are only speculation and require further testing for confirmation, especially because Bryan (1977) was operating under the assumption that additional access and information about it referred to more remote access.

Meaning and Relationship of Specialization's Relationship with Selected Behaviors

A few variables originally selected to measure specialization became part of the behaviors section. One proposition of the specialization concept is that as recreators' levels of specialization increase, they experience an evolution in their reward system. This proposition is evident in the "catch and release" results (Ha_{14}). As anglers' levels of specialization increased, they decreased the number of fish they kept after catching them. These findings are consistent with the results of Bryan (1977) and Chipman and Helfrich (1988) who found their specialized anglers preferred stricter creel limits for others and rarely kept fish for themselves more than their generalist anglers. To managers, this result helps identify those anglers most likely to be sympathetic towards certain conservation policies such as quality fishing regulations on the UMR.

Previous investigators assumed and concluded that membership in fishing organizations is associated more with specialized anglers than generalist anglers (Wilde & Ditton, 1994 and Chipman & Helfrich, 1988). McFarlane (1996) also concluded that specialist birdwatchers socialized more with their own "peers" and organized club members. UMR private shoreline owner anglers followed this precedent, which confirms

the idea that membership in fishing related organizations is an indicator of specialization (Ha_{16}), although it cannot solely identify where along the continuum a person resides. To UMR managers, this result emphasizes the fact that many of the private groups they negotiate and partner with are composed of anglers in the advanced stages of specialization, and although these representatives provide leadership to the lower specialization levelss, they (fishing clubs) do not represent the majority of landowner anglers.

Resource specificity is also an historical specialization indicator but was not used to measure specialization in this study. Bryan (1977) originally stated that being a specialist necessarily means partiality towards a type of recreation setting (e.g., spring-fed streams). Kuentzel and Heberlein (1992) however, were unable to support this conclusion because their novice hunters hunted in the same areas as their advanced hunters, and the advanced hunters did not use parts of the resource investigators felt they should prefer. Although resource specificity was not explicitly tested in this study, "advanced" shoreline owners did prefer to fish the UMR more than "intermediates" or "novices", a finding that supports Bryan but contradicts Kuentzel and Heberlein. This finding should be taken with caution because respondents weren't asked why they preferred the UMR or any other specific body of water for fishing. The UMR may be these anglers' default choice because of their property investment. Resource specificity should not be used as a measure of specialization until more conclusive evidence materializes that links specialization to specificity. Regardless, managers should take this finding as additional evidence that any preference to the UMR likely increases sensitivity to management policies that govern the resource.

Bryan (1977) stated that his anglers centered more and more of their leisure and vacation time on fishing as their level of specialization increased. UMR shoreline owners followed this idea (Ha_{15}), which provides additional evidence that fishing is an important aspect of these anglers' lives.

Specialization level does appear to sort out people more likely use more methods overall (Ha_{17}) to have their UMR policy preferences heard and acted upon. This is a logical conclusion because only those for whom fishing is quite important are likely to continue voicing their opinion if their first attempt fails. This result helps identify those shoreline owners most likely to make repeated communication attempts. It also suggests that many public meetings, hearings, or decision-making efforts are missing participation from the less committed "silent majority."

Failure to accept the hypothesis that level of specialization affects the decision to use at least one method to have policy preferences heard and acted upon by decision makers is not surprising (Ha_{18}). Because fishing is less important to "novices" and "intermediates," these anglers may have less reason to put forth any more than a basic effort to have their voices heard but will nevertheless *be* heard. This finding is not much help to managers who need to sort out the committed from the uncommitted; to sort out who might help managers or work against them. In this case, property type may be the dominant influence in the decision to act because the question was not phrased to solicit an answer about fishing specifically, but river management generally. Principal home owners (67.7%) were more likely than second home owners (54.4%), vacant land with temporary structure owners (51.5%), and vacant land without temporary structure owners (50.0%) to use at least one of the selected behaviors to have their policy preferences

heard and acted upon. However, this result was not statistically significant ($X^2 = 4.693$, $p = .196$)

Study Limitations

A variety of circumstances might limit the explanatory power of this study's results and its usefulness to UMR managers. With respect to execution of the study, the existence of quality fishing regulations, non-response, and lack of data from visitors and guests of landowners are possible study limitations.

Limitations Related to the Preparation and Execution of the Study

Quality fishing regulations are enforced on the middle stretch of the UMR, and this circumstance could have influenced the answers related to the specialization indicator "preferred fishing method." Although the question asks which method is *preferred* now, shoreline owners on this stretch of the river who answered this question might have instinctively selected "fly fishing" because that is the only method allowed adjacent to their property. For example, the "flies only" rule applies to residents of Bear Lake Township, who were included in this study and comprise 26% of the respondents who were given a specialization score.

Measurement of the "current commitment" indicator is also a possible limitation to accurately calculating a respondent's level of specialization. Although previous investigators used number of days fished in the previous year as the sole measure of specialization, most did not identify a "magic number" associated with being (for example) a "novice" versus an "intermediate," stating only that one group fished more

than the other. Because this study predetermined who was and was not a specialist by the range of possible answers (e.g., ≥ 31 days fished = advanced), relying on the use of professional experience and judgment. This approach is not corroborated by a majority of other specialization researchers.

Also, the questionnaire only solicited the number of days fished on a respondent's preferred body of water and the UMR if the UMR was not the preferred water body to fish. Thus, a respondent who prefers to fish in Montana, who only fished the UMR twice, and who spent little time in Montana would have been incorrectly given a lower score with respect to the current commitment dimension. Failure to ask respondents how many days they fished overall in the previous year is a study limitation. Ability of the respondents to recall the number of days they fished is also a challenge in any study asking about behavior stretching back over a year because of memory bias.

Finally, the study assumed that the number of days fished in the previous year was a typical description of annual fishing effort. Perhaps a revision of the question in the future might ask for or calculate an average number of days fished in previous years because the current year's fishing effort could be an anomaly (e.g., use a three year rolling average). For example, an angler who typically fishes 31+ days a year but who fished only five days last year because of illness or other reasons would be given a specialization score lower than they deserved (assuming all other indicators are the same). Failure to compute or request an average number of days fished is a minor limitation because overall, the number of possible respondents dilutes the effect of a few fishing days outliers on the result.

Non-response bias is also a potential study limitation. The author concluded the possibility of a non-response bias was unlikely because of the relatively high response rate (67%), the proportion of respondents by county being very similar to the study population, and the conclusions of previous researchers. However, without follow-up among non-respondents, this type of bias lingers as a possible limitation. Non-response could have been facilitated by study preparation and execution. Overall, the survey was quite long (13 pages, 58 questions), and no pre-test of the instrument was done among the study population because of limited time, financial resources, and a small sample population. However, UMR private interests (including six landowners) and managers reviewed the instrument and their feedback was incorporated into the instrument.

Also, without the use of personal interviews or follow-up surveys, the author could not ensure 100% completion of all of the survey's questions. This circumstance limits the study's ability to classify all respondents under the revised specialization measurement framework and negates the possibility of analyzing the effectiveness of the original measurement formulation, which could affect the relationship found between specialization and selected management preferences and behaviors. Follow-up with non-respondents, by telephone for example, was not done because of limited financial resources and time. Moreover, UMR managers were concerned about perception of harassment among shoreline owners because of the number of research efforts seeking owners' input within the past year.

Finally, the timing of this study could also have facilitated non-response. The original plan was to administer a single survey to these landowners in July or August of 2001. Because this author did not complete the proposal for this study by that time, the

landowners received two separate surveys several months apart. Respondents may have confused this survey with the fall recreation assessment and thrown it away, or more likely (because approximately 87% of these respondents also returned the fall assessment survey), refused to respond because of apathy or feeling harassed. Also, a faculty member in this author's department was administering a wildfire survey in Crawford County around the same time this study was being administered. It is possible there was some over lap in the study areas' boundaries because the author received a wildfire survey in a shoreline owner's return envelope. Again, this study's respondents may have felt over burdened by participation requests or were confused by the variety of MSU surveys they were receiving and simply refused to respond.

Usefulness Limitations for Managers

The ultimate test for the specialization concept will be its application among resource managers. Each piece of literature reviewed for this study proposed the potential value of the specialization concept to managers, but not one study referenced its use by managers even though it may have occurred. Specialization per se will remain of limited value until knowingly applied by field personnel because they are Bryan's (1977) target population. However, quality fishing regulations, which zone the UMR for different types of angling and harvest opportunities use the basic tenets of specialization.

A helpful companion piece to this study will be an investigation of the specialization levels of visiting anglers. As stated earlier, visiting anglers are an important user group to consider when developing management policies and planning strategies. Without the benefit of a parallel study of visiting anglers, managers do not

actually know if the policy preferences and behaviors of visiting anglers are significantly different from the shoreline owners; i.e., managers do not know how many distinct groups are using UMR. For example, what if the majority of visiting anglers are "novices?" Results indicate the majority of shoreline owners are "intermediates," but the quality fishing regulations are most strongly supported by the "advanced" anglers. Would this situation represent suppression of the "silent majority's" desires?

This argument is debatable though because the fishing opportunities of the UMR must be viewed in light of the fishing opportunities available within the surrounding landscape. First, it should be noted that neither the whole of the Manistee River nor the study area is replete with tackle and fish possession restrictions. In other words, the study area and the river as a whole provide opportunities for anglers of all specialization levels. Second, fishing opportunities for anglers of all specialization levels are found in the water bodies of the surrounding counties. The point of this reflection is that understanding the specialization level of property owners and visiting anglers can help UMR managers direct anglers to nearby fishing opportunities when the UMR cannot provide the experience they seek.

Perhaps one of the most important limitations refers to a proposition made earlier in this paper: that specialization could help identify when a change in preferences or behaviors *would* occur. Because no previous study of specialization was conducted among these property owners, there is no comparison data, which would help managers identify shifts in specialization levels and the average length of time it took for that change to occur. Comparison data would also benefit the study of specialization itself by confirming or refuting that these anglers followed Bryan's conceptual progression of

"general to specific." This study provides a baseline upon which managers and researchers can compare the results of future specialization studies.

A shift in the specialization level makeup of UMR property owners *might* occur within or beyond the next five years. Among respondents for whom their UMR property is not the site of their permanent home, 26.2% of them reported it is "somewhat" or "very" likely that they will convert their UMR property to the site of their permanent home *within* the next five years. Of this 26.2%: 41.1% are in the "advanced" level of specialization, 35.7% are in the "intermediate" level, and 23.2% are in the "novice" level. Among respondents for whom their UMR property is not the site of their permanent home, 38.5% of them reported it is "somewhat" or "very" likely that they will convert their UMR property to the site of their permanent home some time *beyond* five years. Of this 38.5%: 29.3% are in the "advanced level of specialization, 40.0% are in the "intermediate" level, and 30.7% are in the "novice" level. If this level of conversion comes to fruition, then the "advanced" angler property owners would likely become the dominant group among permanent residents.

Recommendations

During the course of this investigation, the author learned first hand about the difficulty of applying the specialization concept. He makes the following recommendations to help future researchers in their efforts to examine Bryan's ideas.

1. **Come to a conclusion on a standard format for operationalizing, measuring, and reporting specialization.** Managers are usually wary of social science techniques. Disagreement among social scientists over operationalizing, measuring, and reporting

specialization only reduces a concept's usefulness and validity in the eyes of managers. Future studies should investigate the minimally acceptable number of indicators required to measure specialization in different activities and settings, such that managers have a relatively standard procedure to drawn from when they want to measure specialization.

2. **Initiate test cases of recognized specialization in the field.** Managers are the ultimate arbiters of specialization's usefulness, but there are no documented cases of managers *knowingly* applying the specialization concept to their recreation resources. Michigan natural resource managers acted upon the *essence* of the specialization concept when they created an extensive assortment of fishing opportunities in Michigan to meet the various needs of anglers in all specialization levels. However, without managerial recognition of the overall framework and background support, specialization per se remains what Bryan hoped it would not: another piece of esoteric, social science. The value of specialization lies in its simplicity; a few variables help explain certain types of variation in people. It is this simplicity that should help managers feel more comfortable applying the concept on their own. For example:

   - UMR managers should assess the specialization makeup of their visiting anglers. Because the shoreline owners generally followed the same results pattern of anglers in other studies, the author suspects UMR shoreline owners and visiting anglers are similar (i.e., an "advanced" visitor is probably not going to have significantly different management preferences than an "advanced"

property owner). This effort should help UMR managers determine how many groups they are dealing with and who is the majority.

- Other riverine resource managers who are considering implementing quality fishing regulations should first determine the specialization levels of their visitors and adjacent property owners (if applicable). Using the results of that effort would test specialization's ability to help managers anticipate and avoid conflicts, especially in the unlikely event that suitable alternatives are not close by. For example, what if UMR managers had assessed the specialization makeup of their shoreline owners before implementing the quality fishing regulations, would they have been able to anticipate and preempt the disagreement among shoreline owners by selecting a different part of the river for these regulations?
- Geographic information systems (GIS) could help in this analysis and should be used in the next specialization investigation. The database element of GIS could help managers display the range of specialization scores across a shoreline area, which might have helped UMR managers select the best location for their quality fishing regulations (e.g., along a stretch with the highest concentration of "advanced anglers"). GIS and specialization assessment could also help determine where stocking efforts should be invested (e.g., stretches of river fished most heavily by "novices"). These efforts must however be coordinated with biological data such as where are the fish, where do they move, habitat quality, and can their populations withstand the effects of a change in fishing rules.

3. **Investigate the probable effect of life course on specialization.** The comments from respondents about exempting children from the "flies only" rule and the weaker relationship between preference for stocking and specialization level suggest that a person's specialization score is flexible and probably changes with events in the course of his or her life. The cautionary note to this suggestion is that specialization could be analogous to riding a bike: one may lose technique but never forgets how to do it. Thus, once a person reaches the "advanced" level, are motivations, values, attitudes, preferences, and behaviors fixed forever even if the specialization score goes down, or will some or all of these dependent variables fluctuate with time?
4. **Investigate the timing of changes in specialization.** One of the arguments this author used to support applying specialization is that it could help managers determine *when* preferences and behaviors might change in their landscape by knowing when specialization levels might change. For example, in a 20-year management plan, managers could phase in or out regulations to meet the probable changes in user demands if specialization could tell them approximately when their users will evolve from "novice" to "advanced." This may involve a panel, longitudinal study.
5. **Determine why people advance or do not advance from one specialization level to the next.** This recommendation and recommendation number four require longitudinal studies. The investigations thus far have been "snap shot" efforts. They confirm the roles of certain variables in determining specialization but they do not investigate why these variables change. For example, why does fishing become more important in a person's life? We know the tendency is for people to move towards

the specialized end of the continuum, but this is not a certainty. What makes people stay in one specialization level? For example, perhaps the frequency of fishing affects how fast or if someone advances to the next stage. If this is the case, what elements affect frequency of fishing? Knowing this information might allow investigators to manipulate the environment to accelerate or slow the specialization process.

6. **Use personal interviews or shorter, self-administered surveys in the future to measure specialization.** Failure to classify shoreline owners using the original measurement scheme was this study's greatest disappointment. Although use of fewer variables confirmed the existence of specialization per Bryan's original propositions, it would have been valuable to determine if the use of more indicators would have produced a different specialization makeup among respondents, confirming or refuting the conceptual value of using fewer indicators. Using personal interviews or on-site, self-administered questionnaires with fewer and shorter questions increases the probability of answering all the required questions.

Conclusion

Despite some rejected hypotheses, this study taken in its totality produced results that paralleled Bryan's (1977) original conception of specialization, which satisfies the request he made that future researchers test his concept under more controlled conditions. Future investigators will scrutinize these results and the methods used to obtain them, and it will be their judgment that determines the satisfactory nature of this research effort. Specialization ultimately asserts that recreators seek a variety of opportunities for a variety of reasons; a maxim incorporated into such management frameworks as the U.S. Forest Service's Recreation Opportunity Spectrum and the Michigan Fishing Rules. The concept of recreation specialization was not designed to explain or predict all of the variance in recreators, but until managers make the mental link between the concept and the guidance it provides for their policies, recreation specialization per se will remain more in the province of social science and less of a management tool than it should.

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APPENDIX A: RESEARCH QUESTIONARIE

Upper Manistee Landowners Opinion Survey

Sponsored by:
the United States Forest Service and
the Michigan Department of Natural Resources

Instructions:

Thank you for taking the opportunity to complete this survey about your opinions regarding the management of the upper Manistee River. Please read each question carefully before responding. Answer to the best of your ability and save any additional comments for the end.

Upper Manistee Shoreline Owner Questionnaire

The first section asks about your property along the Manistee River.

1. How many acres do you own on the Upper Manistee River (Mancelona Rd. to M66)? (If less than one, use a decimal) ___**3**___Acres (Median)

2. Is the property _ **97%**_yours or are you __**3%**__ a member of a club/association owning it?

3. Do you own land on one or both sides of the Upper Manistee River (Mancelona Rd. to M66)?
_**89.7%**_One side _**10.3%**_ Both sides

4. How many feet of frontage on the Upper Manistee do you own? __**220**___ Feet of frontage
(if own on both sides, report total frontage) (Median)

5. Is the property your _**25.8%**_ principal home, _**56.7%**_second home, _**8.6%**_vacant land with temporary housing (trailer, etc.) or _**8.9%**__ vacant land with no housing temporary or permanent?

   →If there is some housing, to what degree is it winterized for year-round use?
   __Not winterized __Partially winterized __Completely winterized

6. Please estimate how many days your property was occupied during each season of the year 9/2000 - 8/2001. Include days it was occupied by you, other household members, guests or renters. There are roughly 90 days in each season.

	Fall 9/1-11/30	Winter 12/1-2/28	Spring 3/1-5/30	Summer 6/1-8/30	
# Days occupied	__**34.2**__	_**24.8**__	__**30.8**_	__**41.8**__	(Mean)

7. If your property is not the site of your permanent home, how likely is it that you will convert it to your permanent home?

	Very Likely	Somewhat Likely	Not Likely
Within the next 5 years?	_**73.8%**_	_**11.7%**_	_**14.5%**_
At some time beyond 5 years?	_**42.8%**_	_**18.2%**_	_ **8.6%**_

8. How likely is it that you will split your property and convey a portion to another?

	Very Likely	Somewhat Likely	Not Likely
Within the next 5 years?	_**94.0%**_	_**3.3%**_	_**2.7%**_
At some time beyond 5 years?	_**92.7%**_	_**4.7%**_	_**2.6%**_

9. When did **you** acquire this property? __**1985**__ Year (Mean)

10. How did **you** acquire it? (Check all that apply)

    _**15.0%**_ Property was handed down or purchased from within the family
    _**53.2%**_ Found and purchased with the help of a realtor or sales office
    _**28.7%**_ Purchased directly from previous owner without a realtor
    _ **5.2%**_ Purchased from a friend or acquaintance
    _ **0.5%**_ Purchased during tax auction/foreclosure

11. When did a member of your family first own land on the Upper Manistee? _**1978**_ Year (Mean)

12. Do you belong to an area property owners association? _**22.0%**_ No _**78.0%**_Yes
(name__**UMRA**___)

13. Do you belong to an area river association? _**53.7%**_ No _**46.3%**_ Yes
(name___**UMRA**_____)

The second section asks about your assessment of Upper Manistee River conditions.

14. Which best describes Upper Manistee water quality trends since you've owned this property?

_**10.1%**_Significantly improved _**21.2%**_Slightly improved _**53.1%**_Similar _**12.2%**_Slightly worse
_**3.4%**_ Significantly worse

What is the **one** most important reason for this trend? ___**Haven't seen change, don't know, or no response offered**_____

15. Over the next 10 years, do you expect Upper Manistee water quality to:

_**8.2%**_Significantly improve _**26.9%**_Slightly improve _**43.1%**_Be similar _**18.1**_Slightly worsen
_**3.7%**_ Significantly worsen

What is the **one** most important reason for this trend? __**Education efforts of property owners, UMRA, and the DNR**___

16. Which best describes Upper Manistee shoreline condition trends since you've owned this property?

_**12.5%**_Significantly improved _**24.7%**_Slightly improved _**39.4%**_Similar _**18.1%**_Slightly worse
_**5.3%**_ Significantly worse

What is the **one** most important reason for this trend? __ **Haven't seen change, don't know, or no response offered** ___

17. Over the next 10 years, do you expect the shoreline conditions on the Upper Manistee to:

_**5.7%**_Significantly improve _**28.6%**_Slightly improve _**39.7%**_Be similar _**21.6%**_Slightly worsen
_**4.3%**_ Significantly worsen

What is the **one** most important reason for this trend? __ **Don't know or no response offered**__

18. Which best describes fish population trends on the Upper Manistee since you've owned this property?

_**6.6%**_Significantly improved _**15.0%**_Slightly improved _**35.8%**_Similar _**28.0%**_Slightly worse _**14.5%**_ Significantly worse

What is the **one** most important reason for this trend? __ **Haven't seen change, don't know, or no response offered** ___

19. Over the next 10 years, do you expect fish populations on the Upper Manistee to:

_**6.6%**_Significantly improve _**22.8%**_Slightly improve _**42.1%**_Be similar _**20.7%**_Slightly worsen
_**7.8%**_ Significantly worsen

What is the **one** most important reason for this trend? __ **Don't know or no response offered** __

20. Which best describes the trend in the overall quality of the Upper Manistee river environment (water quality, shoreline condition and fish populations) since you've owned this property?

_**6.5%**_Significantly improved _**21.3%**_Slightly improved _**45.0%**_Similar _**23.4%**_Slightly worse
_**3.8%**_ Significantly worse

What is the **one** most important reason for this trend? ___ **Haven't seen change, don't know, or no response offered** __

21. Over the next 10 years, do you expect the overall quality of the Upper Manistee river environment (water quality, shoreline conditions and fish populations) to:

_**5.7%**_Significantly improve _**23.3**%_Slightly improve _**40.9%**_Be similar _**23.3%**_Slightly worsen
_**6.8%**_ Significantly worsen

What is the **one** most important reason for this trend? __**Education efforts of property owners, UMRA, and the DNR**___

The third section asks about the importance of selected Upper Manistee issues and the performance of resource managers concerning those issues.

22. Using a scale of 1 - 5, where 5 is extremely important, 4 is highly important, 3 is moderately important, 2 is slightly important and 1 is unimportant, please rate the importance of these selected issues concerning the Upper Manistee by circling your rating for each issue.

	Rating (Mean score reported)									
Issues	Extremely Important		Highly Imp.		Moderately Imp.		Slightly Imp.	Unimportant
Amount of public access	5		4	**3.7**	3		2	1
Number of river users	5		4		3		2	1
Water quality in river	5	**4.7**	4	**3.4**	3		2	1
Presence of litter	5	**4.5**	4		3		2	1
Use of alcohol	5		4	**3.8**	3		2	1
Sense of personal security	5		4		3		2	1
Level of regulation of recreation	5		4	**3.7**	3		2	1
Appearance of shoreline	5	**4.2**	4		3		2	1
Population of trout in river	5	**4.3**	4		3		2	1
Trespass on private lands	5	**4.2**	4		3		2	1
Upkeep of public recreation sites	5	**4.0**	4		3	**2.9**	2	1
Conflicts between watercraft/anglers	5		4	**3.4**	3		2	1
Conflicts between drifting/wading anglers	5		4		3	**2.9**	2	1
Conflicts between river users/ landowners	5		4	**3.7**	3		2	1

23. Is there any other issue that you wish managers (e.g. DNR) to consider? _**40.4%**_ No _**59.6%**_ Yes

If yes, what? _**Tighter control of canoers and fishing guides**_

24. Thinking of the issues you rated as extremely important (5), which ONE would be most important for managers to immediately deal with?

___**Water quality in river**_____

25. What solutions would you suggest? ___**See: Nelson & Valentine, 2003**_____

26. Using a scale of 1 - 5, where 5 is very good, 4 is good, 3 is OK, 2 is poor and 1 is very poor, please rate the performance of resource managers on these selected issues concerning the Upper Manistee by circling your rating for each issue. If you have no knowledge of resource manager performance for an issue, circle NK.

	Rating (mean score reported)							
Issues	**Very Good**	**Good**		**OK**		**Poor**	**Very Poor**	**No Knowledge**
Amount of public access	5	4	**3.5**	3		2	1	NK
Number of river users	5	4	**3.1**	3		2	1	NK
Water quality in river	5	4	**3.6**	3		2	1	NK
Presence of litter	5	4		3	**2.9**	2	1	NK
Use of alcohol	5	4		3	**2.7**	2	1	NK
Sense of personal security	5	4	**3.3**	3		2	1	NK
Level of regulation of recreation	5	4		3	**2.9**	2	1	NK
Appearance of shoreline	5	4	**3.3**	3		2	1	NK
Population of trout in river	5	4		3	**2.9**	2	1	NK
Trespass on private lands	5	4		3	**2.7**	2	1	NK
Upkeep of public recreation sites	5	4	**3.3**	3		2	1	NK
Conflicts between watercraft/anglers	5	4	**3.1**	3		2	1	NK
Conflicts between drifting/wading anglers	5	4	**3.2**	3		2	1	NK
Conflicts between river users/ landowners	5	4		3	**2.9**	2	1	NK

27. Thinking of the issue on which you rated performance of resource management lowest, what was reason for your low rating? __**"Other" issues**_____Issue

Reason for low performance rating____ **See: Nelson & Valentine, 2003**_____

28. What solutions would you suggest? ____ **See: Nelson & Valentine, 2003**_____

The fourth section addresses the importance of fishing in your life and your personal fishing history, technique, setting, and policy preferences.

29. Have you ever fished? Yes_**89.1%**____ No__**10.9%**___ (if "No," skip to question 49)

30. In total, how many years have you been fishing (if less than 12 months, please enter "1")? _**37.2**_ year(s)

31. Did you fish in the last 12 months? Yes_**77.4%**_ No_**22.6%**_

32. Which method of fishing did you *begin* with?
a. Spincasting _**26.3%**_ b. Spinning _**11.8%**_ c. Baitcasting _**31.9%**_ d. Flyfishing _**19.2%**_
e. Other _**10.8%**_ (please explain) __**cane pole**_____

33. Do you fish on the Upper Manistee (Mancelona Rd. to M66)? Yes_**90.1%**_ No_**9.9%**_

→If "yes," what year did you first fish the Upper Manistee River? _**1975**_ (Mean)

34. If you fish the Upper Manistee, which **ONE** section do you fish most?
_**36.6%**_Mancelona Rd to M72

_**36.2%**_M72 to CCC Bridge

_**26.7%**_ CCC Bridge to M66

35. In MI, what is your most preferred body of water to fish? _**Upper Manistee River (48.1%)**__

36. How many days during April 28 - September 3, 2001 did you fish your preferred body of water? _**14.6**_ days (Mean)

37. How many days during April 28 - September 3, 2001 did you fish the Upper Manistee River (if the Manistee is your preferred place to fish, please leave blank)? _**10.3**_ days (Mean)

38. Which is true of the trout you catch on the Upper Manistee?

_ **5.8%**_ I keep all the legal trout I catch
_ **9.0%**_ I keep most of the legal trout I catch
_**36.3%**_ I keep a few of the legal trout I catch
_**48.9%**_ I release all of the legal trout I catch

39. How would you evaluate your fishing skill (where 1 is a beginner, 3 is an intermediate, and 5 is an expert)? *(please circle one response)*

Beginner		Intermediate		Expert
1	2	3	**3.4** (Mean) 4	5

40. Have you ever participated in a professionally organized fishing tournament?
Yes _**8.1%**_ No _**91.9%**_

41. How familiar are you with the various stream related insect hatches that occur during the fishing season?

Unfamiliar _**20.9%**_ Moderately familiar _**54.2%**_ Very familiar _**24.8%**_

42. If you had to replace all of your current fishing equipment with new equipment, approximately how much would it cost? *(please estimate the dollar amount, enter '0' to indicate you don't own)*

Equipment **exclusive** to fishing (e.g., rod, reel, tackle, graph) $_**1000**_ (Median)

Equipment **shared** by fishing (e.g., boats, trailers, waders) $_**1200**_ (Median)

43. Which method of fishing do you most prefer to use *now*? (*please √ check one*)

a. Spincasting _**8.2%**_
b. Spinning _**12.7%**_
c. Baitcasting _**10.4%**_
d. Flyfishing _**66.5%**_
e. Other _**2.2%**_ (please explain) __**cane pole**_____

44. In general, how important is fishing in your life? *(please circle one response)*

Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important
1	2	**3** (Mean)	4	5

45. Is fishing your most preferred outdoor recreational activity (over all others regardless of season)? (*please √ check one*) Yes __**36.6%**__ or No _**63.4%**__

→If "no," what is your preferred outdoor recreational activity? _____**hunting**_____

46. How often do you plan your vacations/recreational trips around fishing (*please √ check one*)

a. none of the time _**29.9%**_
b. about ¼ of the time _**32.3%**_
c. about ½ of the time _**19.6%**_
d. about ¾ of the time _**14.8%**_
e. All the time _**3.3%**_

47. How important was fishing when making the decision to acquire your property on the Upper Manistee River? *(please circle one response)*

Unimportant Important	Slightly Important	Moderately Important	Very Important	Extremely
1	2	3 **3.2** (Mean)	4	5

48. How has the importance of fishing in your life changed since you've acquired this property? *(please circle one response)*

Much Less Important	Moderately Less Important	Slightly Less Important	Same	Slightly More Important	Moderately More Important	Much More Important
-3	-2	-1	0 **0.3** (Mean)	1	2	3

49. Please √ check all of the following organizations in which you have a current membership.

_**20.2%**_ Trout Unlimited
_**3.1%**__ Federation of Fly Fishers
_**22.5%**__ Upper Manistee River Restoration Committee
_**14.5%**__ Michigan United Conservation Clubs

50. Earlier in this survey you were asked to rate the importance of various issues related to public use of the Upper Manistee River. Now, please indicate your preference for the following potential policies regarding a selected few of those issues. *(please √ the appropriate line)*

		Increase	Similar amount	Decrease
a.	Designated public access to the river:	_**13.5%**_	_**73.5%**_	_**13.0%**_
b.	Information about public access points	_**23.3**_	_**67.7**_	_ **9.0**_
c.	"Flies only" designation	_**42.4**_	_**43.2**_	_**14.4**_
d.	Law enforcement on the river	_**51.0**_	_**46.8**_	_ **2.3**_
e.	Stocking of trout	_**55.5**_	_**36.6**_	_ **7.9**_
f.	Fish habitat restoration	_**73.5**_	_**25.1**_	_ **1.4**_
g.	Fish habitat enhancement	_**72.4**_	_**25.6**_	_ **1.9**_

51. The list below contains methods one may use to have policy preferences about the Upper Manistee River heard and acted upon by decision makers. Please check each one you have used to reach policy makers in the corresponding governmental parties. *(please √check all applicable boxes)*

	Local government (township, city, county)	Michigan Department of Natural Resources	Other parts of MI government (DEQ, Governor, Legislature)	Federal government (Congress, FS, USFWS)
E-Mail	**3.1%**	**5.9%**	**5.2%**	**3.6%**
Traditional mail	**15.5**	**18.1**	**7.8**	**7.0**
Telephone	**19.4**	**23.0**	**6.7**	**4.4**
Face to face visit	**16.3**	**21.4**	**5.2**	**2.8**
Attend public meetings	**20.9**	**17.8**	**3.9**	**2.3**
Serve on advisory committees	**4.7**	**3.4**	**0.8**	**0.3**
Initiate legal proceedings	**0.5**	**0.8**	**0.5**	**0.0**
Other (please describe, use back of survey if additional space is needed):	**0.8**	**1.0**	**0.5**	**0.3**

52. Have you written one or more letters to the editor of a newspaper or magazine concerning the Upper Manistee River? (*please √ check one*)
Yes __**5.3%**__ (paper/magazine title) ___ **See: Nelson & Valentine, 2003**_____
No _**94.7%**_

The final set of questions asks about you, allowing comparison of your opinions to those in similar situations.

53. What is your gender? Male_**84.1%**_ Female _**15.9%**_

54. What is your age? __**58**__ Years (Mean)

55. How many people live in your primary residence? ___**2.4**___# people (Mean)

56. How many members in your primary residence are children under 18? __**0.4**__# children (Mean)

57. Which statement best describes your current level of employment? (*please √ check one*)

☐ Employed, Full **42.9%** ☐ Retired **44.4%** ☐ Unemployed **0.0%** ☐ Student **0.0%**
☐ Employed, part **2.7%** ☐ Self-employed **8.9%** ☐ Homemaker **1.3%** ☐ Other **0.0%**

58. Which statement best describes your total 2001 household income (from all sources and before taxes)? *(please √one)*

☐ Less than $20,000 **2.8%** ☐ $40,000-$59,000 **11.9%** ☐ $80,000 or more **33.3%**
☐ $20,000-$39,999 **9.6%** ☐ $60,000-$79,999 **13.7%** ☐ Choose not to answer **28.7%**

Thank you for sharing your opinions and time. This will let your voice be heard by resource managers as they consider future management issues. If you have any other comments related to the Upper Manistee, please share them below and on the back of this survey.

APPENDIX B: FISHING REEL TYPES

Spin-casting reel

Spinning reel

Baitcasting reel

Fly-fishing reel

APPENDIX C: SURVEY MAILING ELEMENTS

MICHIGAN STATE
UNIVERSITY

February 15, 2002

Dear Manistee River Shoreline Owner:

As part of an MSU study of recreation on the Upper Manistee River (from Mancelona Rd. bridge in southwest Otsego County to the M66 bridge at Smithville in southwest Kalkaska County) I sent you a survey in September regarding your river recreational activities and those of your household and guests this past summer. As I mentioned in that cover letter, I wanted to give you an opportunity to express your opinions on the management of the river and its shores. The enclosed questionnaire is designed to provide you that opportunity.

Your name was selected from the assessors' records for Otsego, Crawford or Kalkaska County as a riverside landowner. To fully understand shoreline owners I am surveying all the 602 private owners identified. Please take the 20 minutes needed to complete the questionnaire and then mail it to me in the postage paid envelope. You indicate your voluntary agreement to participate in this study by completing the questionnaire and mailing it back. Your responses will be confidential and your name will not be connected with any of the results of this research. If you choose not to participate you will not suffer any penalty.

If you have any questions or concerns about this survey, please contact me at the phone number on the left, extension 116 or by e-mail at nelsonc@msu.edu. If you need to contact someone regarding your role and rights in this research, Dr. Kumar, the chairperson of the MSU Committee on Research Involving Human Subjects, can be reached at (517) 353-2180 or by e-mail at ucrihs@msu.edu.

Thanks for your help in better understanding management issues from the landowner viewpoint and your priorities for the future.

Sincerely,

Chuck Nelson,
Associate Professor

Enc.

DEPARTMENT OF
PARK, RECREATION AND TOURISM RESOURCES
Michigan State University
131 Natural Resources Bldg.
East Lansing, MI
48824-1222
517/353-5190
FAX 517/432-3597

MICHIGAN STATE
UNIVERSITY

March 21, 2002

Dear Manistee River Shoreline Owner:

About a month ago I sent you a survey about your opinions on the management of the Upper Manistee River and its shores. I am happy to report that hundreds of shoreline owners have responded and provided valuable information concerning their opinions of river management. Unfortunately, yours was not among them. If you have sent your completed survey and our letters cross in the mail, please accept my apologies. If you have not had the opportunity to complete the survey or it is not available, I have sent another copy.

As you remember, this is part of an MSU study of recreation on the Upper Manistee River. In September 2001 I sent you a survey regarding your river recreational activities and those of your household and guests last summer. As I mentioned in that cover letter, I wanted to give you an opportunity to express your opinions on the management of the river and its shores. The enclosed questionnaire is designed to provide you that opportunity.

Your name was selected from the assessors' records for Otsego, Crawford or Kalkaska County as a riverside landowner. To fully understand shoreline owners I am surveying all the 602 private owners identified. Please take the 20 minutes needed to complete the questionnaire and then mail it to me in the postage paid envelope. You indicate your voluntary agreement to participate in this study by completing the questionnaire and mailing it back. Your responses will be confidential and your name will not be connected with any of the results of this research. If you choose not to participate you will not suffer any penalty.

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Thanks for your help in better understanding management issues from the landowner viewpoint and your priorities for the future.

Sincerely,

Chuck Nelson, Associate Professor
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517/353-5190
FAX: 517/432-3597

April 22, 2002

Dear Manistee River Shoreline Owner:

In the past 6 weeks I mailed you two copies of a survey asking your opinions about managing the Upper Manistee (Mancelona Road to M66). This survey was distributed to all 627 shoreline owners. To date, more than half have responded. Unfortunately I have not received yours. If our correspondence crosses in the mail, please accept my apologies. You may have inadvertently confused the envelope containing the current survey with one conducted last fall on river recreation. This current study builds on that previous one, looking to future river management. Please take the time to complete the survey so resource managers will clearly understand your opinions. A final mailing to non-respondents will be sent in a couple weeks. However, if yours is still available, please complete and return it and I will not contact you further. Thanks.

Sincerely,

Chuck Nelson, Associate Professor

MICHIGAN STATE
UNIVERSITY

May 28, 2002

Dear Manistee River Shoreline Owner:

About a month ago I sent you a post card reminder concerning a survey about your opinions on the management of the Upper Manistee River and its shores. I am happy to report that the majority of shoreline owners have responded with valuable information about their opinions of river management. I noted that I would try to contact you one last time if I had not received your response. Unfortunately, yours was not among them. If you have sent your completed survey and our letters cross in the mail, please accept my apologies. If you have not had the opportunity to complete the survey or it is not available, I have sent a final copy. While some have contacted me with concerns they are unfamiliar with some aspects of the river, I want to encourage you to do the survey based on your knowledge/experience, whether you live there or visit occasionally.

This is part of an MSU study of recreation on the Upper Manistee River. In September 2001 I sent you a survey regarding your river recreational activities and those of your household and guests last summer. As I mentioned in that cover letter, this companion survey is to give you the opportunity to express your opinions on the management of the river and its shores.

Your name was selected from the assessors' records for Otsego, Crawford or Kalkaska County as a riverside landowner. To fully understand shoreline owners I am surveying all the 602 private owners identified. Please take the 20 minutes needed to complete the questionnaire and then mail it to me in the postage paid envelope. You indicate your voluntary agreement to participate in this study by completing the questionnaire and mailing it back. Your responses will be confidential and your name will not be connected with any of the results of this research. If you choose not to participate you will not suffer any penalty.

If you have questions or concerns about this survey, please contact me at the phone number on the left, extension 116 or by e-mail at nelsonc@msu.edu. If you need to contact someone regarding your role and rights in this research, Dr. Kumar, the chairperson of the MSU Committee on Research Involving Human Subjects, can be reached at (517) 353-2180 or by e-mail at ucrihs@msu.edu. Thanks for your help.

Sincerely,

Chuck Nelson, Associate Professor
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