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Dain Ryan Palmer

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ATTITUDINAL, KNOWLEDGE, AND BEHAVIORAL CHARACTERISTICS OF
PARTICIPANTS IN NATIONAL WILDLIFE FEDERATION'S
BACKYARD WILDLIFE HABITAT PROGRAM

By

Dain Ryan Palmer

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ABSTRACT

ATTITUDINAL, KNOWLEDGE, AND BEHAVIORAL CHARACTERISTICS OF PARTICIPANTS IN NATIONAL WILDLIFE FEDERATION'S BACKYARD WILDLIFE HABITAT PROGRAM

By

Dain Ryan Palmer

Few researchers have studied the impacts of residential wildlife stewardship programs, such as the National Wildlife Federation's (NWF) Backyard Wildlife Habitat (BWH) program. We used an evaluative approach using implementation theory and program theory, adapted from Weiss (1998), to study the characteristics of BWH participants. Environmental attitudes were measured using a subset of the New Ecological Paradigm (NEP) scale and attitudes toward wildlife-related issues were measured using the Wildlife Attitudes and Values Scale (WAVS). Finally, we examined the relationships between selected variables and stewardship behaviors (i.e., wildlife management or resource conservation activities) of participants. The most common form of educational assistance (used by 64% of nationwide participants) was free NWF materials. For each of the 5 most popular forms of assistance, participants using the assistance performed significantly more stewardship behaviors than their counterparts. Consistent with the Theory of Reasoned Action, we found that attitudes toward stewardship behaviors were the strongest predictor of number of stewardship behaviors performed. Based on these results, we recommend that administrators of residential wildlife stewardship programs emphasize to participants the importance of planning processes. We also recommend that program administrators ensure that participants in wildlife habitat education programs have access to a variety of information sources.

To Bill and Evelyn Palmer- you helped instill in me a fascination with nature

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Next, I would like to thank the faculty, staff, and students of the Michigan State University Fisheries and Wildlife Department for their assistance and support during this study. I would specifically like to thank the members of my graduate committee, Dr. Rique Campa and Dr. Angela Mertig for their excellent guidance. I owe special thanks to my advisor, Dr. Shari Dann, for pushing me to do my best work even while under tight deadlines. Her dedication to fostering environmental stewardship in youth and adults is truly inspiring.

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INTRODUCTION

Much of the wildlife habitat in the United States is under private control. More than 60% of the land in the United States is privately owned (Vesterby and Krupa 2001). These private lands contain 80% of wildlife habitats (Benson 2001); therefore, activities of private landowners impact wildlife habitat significantly. To ensure that suitable habitat for wildlife is provided, the involvement of private landowners in active wildlife management of their properties is essential.

Many Americans are already engaged in activities around their homes that can benefit wildlife. Nationwide, in 2001, 62.9 million Americans participated in residential wildlife-watching activities, such as feeding wildlife, cultivating plants for the benefit of wildlife, and maintaining natural areas for wildlife (U.S. Dept. of Interior 2002).

Even though many citizens have initiated wildlife attraction and habitat improvement activities largely on their own, there is a need for programs that provide information and technical training to assist landowners in providing wildlife habitat. For instance, 76% of Pennsylvanians said it was important for the Pennsylvania Game Commission to assist private landowners in improving fish and wildlife habitat (Responsive Management 1996). One approach to address these needs is National Wildlife Federation's (NWF) Backyard Wildlife Habitat (BWH) Program.

The BWH program is a residential wildlife stewardship program in which participants provide wildlife habitat on their properties. Participants begin the process by determining which of 4 basic habitat components (food, water, shelter, and a place to raise young) are present on their properties. Participants then make property modifications to provide additional wildlife habitat components. Finally, landowners

submit an application to NWF that details habitat improvements to their properties. The application includes a \$15 application fee. NWF staff review applications, and successful applicants receive: a certificate, a letter from the NWF President, answers to any questions indicated on the application form, and an invitation to submit information to NWF for a press release to the applicant's local newspaper (Tufts 1990).

NWF offers various kinds of assistance to help people improve their properties for wildlife. Information about initially assessing property and providing habitat components is available from NWF in printed materials and on NWF's website. Additional information is contained in a BWH Information Kit that can be ordered from NWF or purchased through Wild Birds Unlimited, a national chain of retail stores. For additional assistance to landowners involved in the BWH program, NWF trains volunteer community mentors, known as Habitat Stewards, who offer technical support to some participants during various stages of the application process.

Until now, the BWH program has never been comprehensively studied. The goal of this project was to understand the characteristics of participants in the BWH program and to examine how various program components and participant background characteristics are associated with stewardship behaviors of participants.

Following protocol approved by the MSU University Committee on Research Involving Human Subjects (UCRIHS), we conducted the study in two major phases (Appendix A). In the first phase we piloted a survey for BWH participants. The survey was given to 46 participants at a workshop in southwestern lower Michigan for landowners interested in providing wildlife habitat, but not certified in the BWH program (Appendix B). Also as part of the first phase, we conducted a focus group comprised of

six workshop participants (Appendix C). During the second study phase, we surveyed a representative sample of 1427 certified BWH participants from across the U.S. (Appendix D).

Chapters I and II detail the phases of this study of the BWH program. Chapter I reviews the BWH program content and processes, and it contains results from the workshop survey and the focus group. Chapter I will be submitted for publication to *Applied Environmental Education and Communication*, and is written and formatted accordingly. In this manuscript, we summarize our observations pertaining to communication strategies used by NWF to deliver BWH programming to participants, and the numbers of participants who used various forms of assistance while becoming certified.

Chapter II is based on the mail survey of certified BWH participants. We wrote Chapter II in a style appropriate for submission for publication to *The Wildlife Society Bulletin*. This chapter contains details relating to our objectives of determining the demographic, attitudinal, and knowledge characteristics of nationwide BWH participants, determining the kinds of materials and assistance that BWH participants used, and determining which of these variables are associated with BWH stewardship behaviors.

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CHAPTER I

Using Implementation and Program Theory to Examine Communication Strategies in National Wildlife Federation's Backyard Wildlife Habitat Program

Abstract: We used an evaluative approach using implementation theory and program theory, adapted from Weiss (1998) to examine communication processes and results for a national wildlife habitat stewardship education program. Using a mail survey of 1427 participants certified in National Wildlife Federation's (NWF) Backyard Wildlife Habitat (BWH) program and a study of participants at a BWH workshop in Michigan who were not certified in the BWH program we examined the communication strategies employed by NWF to assist participants. The most common form of assistance (used by 64% of nationwide participants) was free NWF materials. For each of the 5 most popular forms of assistance, participants using the assistance performed significantly more wildlife management or resource conservation activities than their counterparts. Using program theory and implementation theory is valuable for describing and assessing national and local environmental communications initiatives such as the NWF BWH program.

Communication in Residential Wildlife Stewardship Programs

Overview of the Backyard Wildlife Habitat program

The Backyard Wildlife Habitat (BWH) program is a residential wildlife stewardship program offered by the National Wildlife Federation (NWF). This program involves the certification of residents who document provision of basic habitat

components. Since the inception of the BWH program in 1973, over 30,000 sites have been officially certified by NWF. According to David Mizejewski, (personal communication, 2001) NWF's national BWH manager, in recent years, almost 3,000 new sites have been certified annually.

Until now, the BWH program has never been comprehensively studied. Our study objectives were to examine the effectiveness of communication strategies used by NWF to deliver BWH programming to participants, and to determine the numbers of participants who used various forms of assistance while becoming certified. To accomplish these objectives, we first describe implementation theory and program theory for the BWH program. We then use these frameworks in our analysis of data collected from program participants. Based on our findings we provide several recommendations for agencies and organizations that offer wildlife habitat education programs.

Communication Strategies for Affecting Environmentally Responsible Behavior

Administrators of wildlife habitat education programs must use effective communication techniques with program participants. According to Schoenfeld and Griffin (1981, p. 130), "Nowhere in wildlife management are the human factors so crucial as in the management of wildlife on private lands." Because there are few studies that have examined communication strategies for residential wildlife habitat education programs, we reviewed some research and best practices in communication strategies used by agencies or organizations to share wildlife or ecological messages with landowners.

Program administrators have many options to deliver wildlife habitat education programming to participants. Traditional methods, such as written materials or

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consultations from extension agents are widely used. Rodewald (2001) found that printed materials were used the most by Ohio landowners to receive wildlife-related extension information. In Michigan, extension delivery methods used most commonly by farmers were extension newsletters and bulletins (Suvedi, Campo, & Lapinski, 1999). Less frequently farmers had contact with an extension agent and attended meetings or workshops.

Several studies have had landowners rate the usefulness of various extension delivery methods (Bruening, 1991; Gamon, Bounaga, & Miller, 1992; Rollins, Bruening, & Radhakrishna, 1991). Generally, meetings, face-to-face discussions, and demonstrations were considered relatively useful. Newsletters and magazines were also rated as fairly useful. Bruening (1991) also found that landowners considered assistance from neighbors and friends to be useful information sources.

Web-based resources can make large amounts of information available at relatively low costs. Yet, only 1.4% of farmers used extension information available online (Suvedi, Campo, & Lapinski, 1999). Also, Ohio landowners preferred more traditional communication methods over online information and workshops and seminars (Rodewald, 2001). Master Volunteer programs provide training to volunteers who in turn donate their time and expertise to others (Laughlin, & Schmidt, 1995). Training is now offered online for Oregon Master Gardeners (VanDerZanden, Rost, & Eckel, 2002) and Minnesota Master Gardeners (Jeannette, & Meyer, 2002). Both online trainings produced learner outcomes similar to classroom trainings.

Backyard Wildlife Habitat Education Program: Implementation Theory and Program Theory

There exist many paths and processes through which individuals become aware of and certified within the BWH program (Figure I-1). Participants progress through various levels of involvement from awareness of the BWH program to long-term participation in NWF action and consumerism. To understand program dynamics, we describe the program theory and implementation theory of the BWH program (based on Weiss, 1998).

Weiss (1998, pp. 57) refers to program theory as “the mechanisms that mediate between the delivery (and receipt) of the program and the emergence of the outcomes of interest.” She goes on to say that the instruments for change are the responses to program activities, not the activities themselves. Program activities are designed to affect these responses in participants. Implementation theory refers to specific program activities and the order in which they are carried out. According to Weiss, program theory and implementation theory can be useful when evaluating programs because they demonstrate the expected results of various program components; evaluators can collect data on all of the theorized steps that lead to the intended program outcomes.

The first stage in the BWH program theory is awareness of the BWH program and recruitment into the program (Figure I-1). In order for this stage to be effective, participants must be motivated to be involved in the program. In stage 2, participants learn about basic ecological concepts and about landscaping techniques that benefit wildlife. Participants in stage 3 carry out activities that lead to certification. The fourth participant stage involves the impacts of the program on participants.

There are many paths through the BWH program, and one of the challenges of studying the program is that it is unlikely that any 2 participants had exactly the same

“treatment.” In other words, there are multiple ways that a person can go from awareness of BWH to post-certification activities. For example, a person may become aware of the program and decide to participate due to one, several, or none of the ways indicated in Figure I-1. Also, there is variation of program treatments across and within regions. It is up to individual NWF representatives located in various regions of the U.S. to decide presentation content or which handouts to distribute. Finally, the BWH program changes over time. New or revised handouts replace older ones, the website is constantly updated, and the roles of staff and volunteers are continuously changing. Figure I-1 contains major program components, but it does not represent all of the possible paths taken by participants. The remainder of this section details some of these components.

Stage 1 of BWH Involvement: Awareness and Motivation to Participate

There are many possible reasons for residents to become motivated to participate in the BWH program. For example, people may participate due to a desire to positively impact wildlife or because they want to attract wildlife to their properties. People may also be more inclined to take part if they believe that there are potential social benefits, such as the enjoyment of working with a neighbor on a landscaping project, or if they want recognition from NWF for property improvements they have made. The desire to learn wildlife management or environmentally friendly landscaping techniques is another possible motivation for participation.

There are numerous ways for residents to hear about the BWH program and become motivated to participate. The BWH slideshow is one recruitment/awareness tool that NWF staff and volunteers use. The slideshow has an accompanying script to guide presenters. The content of the show includes the 4 basic habitat components and an

overview of the certification process. The slideshow is designed for both the general public and people who are already involved in clubs or activities that are related to gardening or wildlife. Some examples of suggested audiences are butterfly clubs, landscape architect/design associations, native plant societies, and assisted living facilities (NWFa, n.d.).

People can learn about BWH and be recruited into the program by NWF staff and volunteers. NWF representatives attend many wildlife and landscaping related trade shows. In addition to handing out print materials, they answer questions of BWH participants and recruit new BWH participants. Habitat Stewards are volunteers who receive 24 hours of training from NWF in order to assist BWH participants and contribute at least 50 hours of volunteer service. Stewards teach participants landscaping and wildlife management skills and assist with other aspects of certification (NWFb, n.d.). The Habitat Stewards component of BWH is relatively new, and about 900 Stewards nationally have been trained (D. Mizejewski, personal communication, 2001).

Friends, neighbors, or family members who are already involved in BWH may also persuade residents to participate in the program. Employees of retail stores that specialize in landscaping or wildlife related activities are another potential way BWH participants are recruited. Wild Birds Unlimited has an official partnership with NWF, and employees can answer questions about the BWH program, as well as distribute free NWF handouts.

NWF's website is another way for people to learn about BWH program and become motivated to participate. The site contains general BWH program information and an overview of the certification process (NWFc, n.d.).

NWF provides free print materials that are designed to give people a general overview of the BWH program, and to recruit new program participants. NWF staff members distribute BWH handouts at landscaping, gardening, and wildlife shows. The Backyard Wildlife Habitat brochure is a promotional pamphlet that gives a brief overview of the BWH program and the basic habitat components (food, water, cover, and places to raise young) (NWFd, n.d.). The brochure describes practices such as “reducing your lawn size by 50%” and “planting natives and cutting out chemicals.” It features attractive full color photographs and contains inspirational participant quotes.

NWF hosts public events such as tours of certified BWH properties, garden tours, and public planting days. These events provide opportunities to recruit new participants into the BWH program (C. Rogers, personal communication, February 5, 2002).

Media coverage of NWF events is another way for people to hear about and become recruited into the BWH program. Press releases containing profiles of BWH participants are one way that the BWH program is promoted through the media (C. Rogers, personal communication, February 5, 2002).

Stage 2 of BWH Involvement: Development of BWH Knowledge and Skills

Participants gain skills and knowledge to perform BWH stewardship (improve wildlife habitat and practice resource conservation in their yards) from several different BWH program components. The Habitat Stewards program of BWH is an emerging way for BWH participants to get support throughout the certification process. Stewards give individuals information on basic ecological concepts and provide assistance in landscaping/gardening methods.

Friends and family members who have knowledge of ecology or wildlife are a possible resource for learning habitat improvement methods. Participants may also receive assistance from wildlife or natural resource professionals, such as county extension agents, wildlife biologists, wildlife consultants, or Natural Resource Conservation Service employees. Employees of retailers such as Wild Birds Unlimited and native plant suppliers can also assist in educating participants about BWH techniques.

The NWF website offers even more in-depth information for participants to learn about BWH techniques. The website offers information about the life cycles of and methods of attracting: bats, birds, bees, butterflies, hummingbirds, frogs, lizards, and insects. There are also tips on promoting bird health at artificial feeders, keeping squirrels out of birdfeeders, identifying insects, carrying out seasonal projects (such as planting trees in fall), controlling European starlings, photographing backyard wildlife, organically gardening, meeting special wildlife needs in the winter and summer, and designing backyard habitats that are accessible to persons who are physically challenged. In addition, there are monthly tips on resource conservation and simple habitat projects, such as creating a brush pile for wildlife.

The BWH website contains general information on: landscaping with native plants, sensory gardens, reducing the size of traditional lawns, the wildlife benefits of poison ivy, and native and non-native hollies. The website has information on resource conservation issues, such as the environmental and economic disadvantages of traditional lawns, water conservation, the effect of drought on native plants, preventing predation by domestic cats, reducing yard waste, and organic gardening. The BWH website has

instructions for several habitat projects including nest boxes for birds, an amphibian habitat, a storm water marsh, a backyard pond, a log pile, a bee house, and a bat house.

The BWH website also includes lists of books on a variety of subjects, including: backyard ecology, dealing with human-wildlife conflicts, resource conservation, birding, caring for injured animals, native plants, and providing food for wildlife. There are also links to the following websites: Wild Birds Unlimited, Lady Bird Johnson Wildflower Center, Frogwatch USA, National Wildlife Rehabilitators Association, and Plant Conservation Alliance.

The BWH website has several features that may assist participants. One tool is the enature online community discussion bulletin board. Some of the discussion subjects are: Birds & Birding, Gardening & Plant Life, Butterflies, Animal World, Ocean & Seashore, and Our Environment. Enature also has an online guide that gives regionally specific information on plants.

NWF offers free handouts explaining ecological concepts and wildlife management techniques that landowners can use to provide habitat on their properties. These materials are commonly distributed at wildlife or landscaping-related trade shows, often with the Backyard Wildlife Habitat brochure. Handouts are also provided at BWH slideshows and other NWF workshops. The handouts are sometimes printed in color, but most often are photocopied on colored paper with black ink. The sheets mainly offer general information intended for BWH participants in all 50 states. Materials currently being distributed give life/natural history requirements information and tips on attracting butterflies, songbirds, and hummingbirds. Other sheets give arguments for lawn reduction and native plants. One handout gives an overview of considerations relating to

designing a residential pond, and includes tips such as providing gradation to allow easy access for animals. NWF also distributes 1-page plans for constructing nest boxes and other shelters for specific types of animals. Plans include illustrations and an instruction paragraph. Examples of plans include: northern flicker nest box, bat house, mourning dove and mallard nest basket, and rabbit den.

Another resource for participants to gain skills and knowledge in BWH stewardship is the Backyard Wildlife Habitat Information Kit (Mizejewski, 2002). The Kit is a guide to certification that can be purchased by program participants for \$25 plus tax. It can be ordered from NWF over the phone, or can be bought at Wild Birds Unlimited. The kit is advertised in various BWH handouts, at BWH workshops, and on NWF's website. Several thousand kits are sold each year in the U.S. The kit has been recently revised and contains a newly published Wildlife Habitat Planning Guide. The 48-page booklet is printed in color and contains photographs of BWH sites. It is the most comprehensive guide to BWH that NWF has offered to date. It ties together ideas and techniques that were historically on separate handouts or web pages.

The guide begins with an introduction to BWH and the 4 basic habitat components. Next are tips for resource conservation, such as: reduction of pesticides and fertilizers, lawn reduction, water conservation, waste reduction, and preventing predation by domestic cats. The guide offers several approaches to designing and constructing habitat sites, depending on the amount of time and effort that individuals are willing to invest. The methods range from The Wait and See Approach, which allows "nature to take its course," (Mizejewski, 2002, p. 21) to The Holistic Approach, where the goal is to have only species which were present before European settlement. The

guide also addresses the differences in gardening for wildlife in urban versus rural settings. For example, where landscaping is impractical residents can do container gardening or assist with a community garden.

Stage 3 of BWH Involvement: Habitat Improvement and Applying for BWH Certification

A participant practices BWH stewardship by performing habitat improvement and applying for BWH certification. Participants complete the BWH Application for Certification to document their habitat improvements. The Application is designed to help guide participants through the certification process, as well as to communicate to NWF staff what participants have done to their properties. In addition to contact information, the application asks for the size of property, whether the property is in an urban, suburban, or rural setting, how long the applicant has been “gardening for wildlife” at the property, and whether or not a Habitat Steward assisted the applicant. Applicants then list plants present at their residences.

Next, applicants check categories provided on the application (including a box for ‘other’) to indicate the food, water, cover, and places to raise young available for animals at their residences. Some of these categories are: “berries,” “suet [feeder],” “riverfront,” “spring/seep,” “bramble patch,” “rock pile/wall,” “water garden/wetland” and “dens in the ground.”

They then indicate resource conservation they practice on their properties by checking appropriate categories, such as “Xeriscape,” and “removing invasive exotics,” and check broad categories of animals (invertebrates, fish, amphibians, reptiles, birds, mammals) seen in their yards. They also list individual species. The final section of the form asks applicants to send a sketch or photos of the habitat.

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According to NWF staff, “many people are intimidated by the application process” (NWFa, n.d.); so Habitat Stewards and NWF staff make efforts to demystify the procedure. BWH workshop leaders, when available to an applicant, can assist participants in filling out portions of the application. Habitat Stewards also help applicants on a one-to-one basis. NWF especially stresses the importance of creating an inventory of habitats, plants, wildlife, and local landscapes, and creating a base map of the property before making any property modifications. Habitat Stewards, where they are available, may assist a few applicants a year with these activities. Retailers, friends, and family members with appropriate expertise may also assist applicants with wildlife habitat improvements.

The habitat inventory involves listing vegetation types present and evaluating the condition of these vegetation types. For the wildlife inventory, NWF suggests making a wildlife journal to record how various animals are using the property; applicants write down animals and animal signs present. The plant inventory is a list of plant species present on the property. NWF also suggests examining how the applicant’s property fits into the larger landscape to determine vegetation types that are present or missing (NWFb, n.d.).

The inventories are used to construct base maps of the properties that contain major habitat components present, as well as specific features that impact wildlife, such as water flow and amount of sunlight (NWFb, n.d.).

Next, participants do landscaping and habitat projects on their properties. According to the Habitat Stewards training manual, a management plan should be devised based on the information from inventory and base mapping activities, but this

project step is not emphasized in other NWF communications. NWF advises Stewards that applicants should decide which animals to manage for, based on the natural history of the area and the conditions that are currently present on a site. The applicant then plans and executes projects designed to meet the management goals. For instance, to manage for certain amphibians a pond might be constructed. No participant materials (besides those provided at Habitat Stewards workshops) give instructions on making a management plan for one's yard. Participant materials describe how to construct habitat projects, but not how to devise an integrated plan for wildlife management. Wildlife management planning instruction is provided only for participants who attend BWH Habitat Stewards workshops.

The online Habitat Planner is a resource available through the BWH website that is an interactive certification guide for BWH participants (NWFc, n.d.). Much of the information that participants provide is similar to that asked for on the paper Application for Certification. Participants first provide their contact information. The Planner then has participants inventory the habitat components on their properties. They indicate the presence or absence of certain habitat structural attributes, such as "lawns," "native flowers," "evergreen shrubs," "lakeshore," "fountain/birdbath," and "high deciduous trees." Participants then indicate the extent to which they provide the four habitat components stressed by NWF: food, cover, water, and places to raise young. They specify the presence/absence of components such as "nuts," "seed feeders," "rock pile," "prairie/meadow patch," "natural pond," "recirculating waterfall," "nesting shelves," and "dead trees (snags)."

The Planner has people illustrate what resource conservation techniques they practice by checking categories such as “reducing/eliminating pesticide & chemical fertilizer use” and “keeping your cat indoors.” There are also fields for participants to enter open-ended descriptions of their properties as well as “to do” lists where participants can plan tasks involving their properties. In addition, participants can upload photographs of their properties.

Potentially the most helpful Habitat Planner tool is the individualized species list. The species list is connected to an enature field guide that assists participants in identifying wildlife on their properties. The field guide can be searched by type of animal or geographic region and contains pictures and natural history information for over 4800 plants and animals from across the U.S. Once a species is added to an individual’s list, there is a picture of the animal and basic natural history information. People can also record the date that they observed the animal and add open-ended comments.

Stage 4 of BWH Involvement: Long-Term Impacts of the BWH Program on Participants

The last program activity is a review of BWH applications by NWF representatives. Applicants mail (or submit electronically) their application, a sketch or photograph of their habitat, and \$15 application fee to NWF’s national headquarters in Reston, Virginia. There, applications are sorted by state and a state native plant list from the Lady Bird Johnson Wildflower Center is attached to each application. Additional supplemental state materials are attached to applications from Ohio, Florida, Wisconsin, and South Carolina. An NWF intern or a trained volunteer reviews each application. They use the Backyard Wildlife Habitat Application Checklist to check for required

components: fee paid; property size indicated; plants listed; year round food, water, cover, and a place to raise young; and a sketch or photograph of the habitat. If any components are missing, the application is returned with a note indicating what needs to be included to resubmit the application. If all components are satisfactory, a note with feedback is attached, along with any appropriate handouts (e.g., invasive plant handouts), a letter from NWF's president, and a certificate. Also included is a generic press release that has blanks for participants to fill in details about themselves and their habitat to provide to the local media. If all components are present but there are major areas of weakness, the habitat may be "certified with reservations." In which case, information related to the area of weakness is included along with the other acceptance materials. Almost all applicants are eventually certified (D. Mizejewski, personal communication).

According to D. Mizejewski (November 16, 2001, personal communication), "the long-term goal of the [BWH] program is to give people the knowledge to turn their backyards and communities into valuable wildlife refuges, to teach the rewards of connecting with nature by inviting wildlife into one's life, and to provide opportunities for further action and engagement for certified participants." One form of 'engagement' is to draw people into lifelong support for NWF activities, including activities only indirectly related to the BWH program (D. Mizejewski, November 16, 2001, personal communication). For example, a person who originally became involved with NWF through the BWH program may develop a habit of writing their elected representatives regarding conservation issues. Some examples of engagement are not directly tied to any NWF programming. NWF staff member Carey Rogers (May 2, 2002, personal communication) hopes that BWH participants "become stewards of the places where they

live – by volunteering with NWF or an affiliate...altering transportation [or consumption] habits, [and] testifying on an issue.”

Because one focus of BWH is on developing participant action, and engagement with NWF, efforts are made to certify as many people as possible. This means that some people are certified while doing a minimal level of improvements. As an extreme example, a person could conceivably get certified by setting up a birdfeeder, birdbath, birdhouse, and planting a shrub or two in their yard, as long as all required certification elements were indicated on the application. NWF staff expects that once such participants are certified, they will continue to learn about landscaping for wildlife, make further habitat improvements, and gradually become involved in other NWF programs and action opportunities.

NWF tries to educate certified BWH participants with its website. There are resources that feature more advanced landscaping techniques and habitat projects. The website also contains feature articles on BWH events across the country. Every few weeks a new article is posted. *Habitats*, a BWH newsletter, is sent to all certified participants and is also available online. Topics relate to landscaping, wildlife, and other environmental and ecological issues.

The Habitat Stewards program is another tool for post-certification involvement of BWH participants. By training and mentoring other BWH participants, Stewards have a chance to share their expertise. NWF also tries to recruit BWH participants to become engaged in the Schoolyard Habitats, Workplace Habitats, and Community Wildlife Habitat programs.

It is likely that after participants are BWH certified they will have increased knowledge of wildlife, positive attitudes toward wildlife, tolerance of the negative impacts of wildlife, and intentions to perform long-term maintenance and improvement to benefit wildlife.

Methods

Pilot Study: Pre-Certification Backyard Wildlife Habitat Participants in Michigan

To examine in detail the experiences of one group of BWH participants in stage 1 of implementation theory and program theory (awareness and motivation to participate) (Figure I-2), we gave 44 participants a written survey at an April 2002 BWH workshop at Pierce Cedar Creek Institute (PCCI) in Michigan. Trained Habitat Stewards conducted this daylong, weekend workshop for residents who had not yet been certified.

In June 2002, we conducted a focus group with six participants from the April workshop in order to learn more about the experiences and attitudes of this particular group who had begun developing their BWH knowledge and skills and were beginning to work on applying for BWH certification (stages 2 and 3) (Figure I-2). We randomly selected 18 workshop participants who lived within 16 miles of PCCI to invite to the focus group. Six participants were able to attend the focus group. We asked focus group participants about the communication sources they had used while developing their BWH knowledge and skills.

Nationwide Backyard Wildlife Habitat Participants

To measure attitudinal and behavioral characteristics of BWH participants from across the country, we conducted a mail survey of certified participants who may have become involved in long-term BWH program action (Stages 3 and 4) (Figure I-2).

Beginning in July 2002, we surveyed a stratified random sample of 1427 of the 8117 BWH participants certified in the U.S. in 1999, 2000, and 2001. Because nearly 3 times the number of certified participants lived in the eastern U.S. (6093) as the western U.S. (2024), we over sampled the western participants. We surveyed 708 eastern participants and 719 western participants. We used a modified version of Dillman's (1978) Total Design Method and sent participants up to three mailings.

A total of 1053 BWH participants responded to the survey. The adjusted overall response rate for the survey was 77%. The adjusted response rate was computed by omitting addresses with errors and persons ineligible to respond (minors and deceased persons). The adjusted response rate was 79% for eastern participants and 74% for western participants. Compared to other studies utilizing mail surveys, especially those that survey the general public, our response rate is considered quite high.

Survey Instruments for Pilot and Nationwide BWH Participants

We measured several demographic and property variables of workshop and nationwide participants (Table I-1). To examine the motivations of workshop and nationwide participants in the BWH program, we asked them to rate the importance of 27 reasons for participation on a 5-point scale; higher numbers indicate higher importance (Table I-2). We also investigated the use of communication sources used by participants (Table I-3). For items that they had used, respondents rated the helpfulness of each form of assistance on a 5-point scale with "very important" coded as 5 and "very unimportant" coded as 1. The total number of forms of assistance used was calculated by summing the number of "yes" responses, for a possible range of 0 to 7.

We asked certified respondents whether or not they had practiced certain natural resource conservation, planning, and inventorying techniques and processes (BWH stewardship behaviors) (Table I-4). We determined BWH stewardship with 18 survey items that asked respondents whether or not they had done certain behaviors related to resource conservation and wildlife management. We calculated the total number of behaviors performed by summing the number of “yes” responses, for a possible range of 0 to 18. When we calculated total BWH stewardship scores for respondents who omitted four or fewer stewardship items we assumed that missing items indicated that the behavior was not performed. Respondents who omitted five or more stewardship items did not receive a total score.

We asked certified respondents about their involvement in NWF-related action and consumerism (Table I-6) using 10 items. We examined participation by BWH participants in activities similar to activities listed on NWF’s website as ways to “take action:” writing an editorial, contacting an elected representative, testifying at a public meeting, organizing a fundraiser, petition drive, or letter writing campaign, or giving a media interview concerning a wildlife, natural resource, or environmental issue. Other activities involved the more direct use of BWH processes and techniques: volunteering with community wildlife, natural resource, environmental, gardening, or landscaping projects. One item asked about purchasing behavior based on natural resource considerations.

Data Analysis

We analyzed survey data by using SPSS 10.0.7 for Windows Software for Social Statistics (2000). Because our sample stratification for the nationwide survey over-

represents the western U.S., we applied case weights based on region for descriptive analyses, in order that our results were representative of the BWH participants from across the U.S. We used *t*-tests to compare mean number of BWH stewardship activities performed by participants who did or did not receive specific types of assistance. Also, we used Pearson's Correlation to compare the total number of stewardship activities performed and the total number of forms of assistance used. Following the recommendation of Winship and Radbill (1994) regarding the use of statistical tests which depend on standard errors, we did not use weighted data with *t* tests or correlations.

Results

Pilot Study: Pre-Certification Backyard Wildlife Habitat Participants in Michigan

Demographics

Michigan workshop participants ranged in age from 24 to 84 years (Table I-1) ($M = 54.0$, $SD = 14.8$, $Mdn = 53.0$); the age of the overall Michigan population is lower ($Mdn = 35.5$ years) (U.S. Census Bureau, 2000). While only 51.0% of the general Michigan public is female (U.S. Census Bureau, 2000), over 79% of workshop attendees were female. All of the workshop participants had graduated from high school, and over 38% of workshop participants had completed a bachelors, graduate, or professional degree. Comparatively, only 21.8% of Michigan residents 25 years or older have at least a bachelors degree (U.S. Census Bureau, 2000). Fewer workshop participants (35.0%) than Michigan residents (44.7%) (U.S. Census Bureau, 2000) have incomes below \$40,000. More workshop participants (57.5%) than Michigan residents (42.7%) (U.S. Census Bureau, 2000) have incomes between \$40,000 and \$99,999, and fewer workshop participants (7.5%) than Michigan residents (12.7%) (U.S. Census Bureau, 2000) have

incomes of \$100,000 or higher. Over 93% of workshop participants lived in rural areas or small towns and only about 7% lived in urban or metropolitan communities, while 25.3% of the general Michigan public live in rural areas and 74.7% live in urban areas (U.S. Census Bureau, 2000).

Stage 1: Awareness and Motivation to Participate

In general, motivations that involve positive impacts for wildlife were strong reasons cited by workshop participants for BWH participation (Table I-2). Helping wildlife survive the winter; helping wildlife survive the spring, summer, and fall; and helping wildlife by preserving and improving wildlife habitat were all strong motivations for participation, having mean responses of 4.8 or higher.

Workshop participants seemed to be quite interested in possible educational benefits of the BWH program (Table I-2). Learning about wildlife, learning techniques for providing habitat, and having educational opportunities for children had mean responses of 3.8 to 4.7 and were relatively strong motivations for participation in the BWH program.

The motivation of BWH participants to attract wildlife varied according to the type of animal (Table I-2). Attracting smaller, more colorful species of wildlife (songbirds and butterflies) had high mean responses of 4.7 to 4.8. Weaker motivations for participation were reported for attracting mammals, larger birds, reptiles, and insects (not butterflies); these items had mean responses 3.6 or lower.

Social factors were weak motivations for workshop participants to take part in the BWH program (Table I-2). Gaining recognition from NWF was one of the least popular motivations for participation. Also, participants rated getting recognition from friends,

family members, or neighbors, having a project to work on with friends, family members, or neighbors, and being encouraged to participate by friends, family members, or neighbors as relatively unimportant motivations for participation with mean responses of 3.7 or lower.

Prior to attending the workshop, only 21% of pilot study participants reported using free NWF produced written materials. Seven percent or fewer participants had used the BWH website, Information Kit, or had attended an NWF slideshow or presentation. No workshop participants had received assistance from a Habitat Steward. About a third had received assistance from neighbors, friends, or family members.

Stage 2: Development of BWH Knowledge and Skills

At the focus group, participants reported using a variety of kinds of assistance to improve their knowledge and skills in BWH processes and techniques. Two participants reported purchasing or reading books pertaining to the BWH program. Two participants had acquired and used written extension materials; the workshop “spurred me to look further” and get a soil map from the Soil Conservation District, said one participant. One woman at the focus group had an extension agent visit her prairie restoration, one cited the workshop materials and presentations to be helpful, and one had “spent a lot of time on the net” since the workshop.

Nationwide Backyard Wildlife Habitat Participants

Demographics

Nationwide BWH participants ranged in age from 23 to 89 years (Table I-1) ($M = 54.1$, $SD = 11.4$, $Mdn = 54.0$ years) and were older than the general U.S. population ($Mdn = 35.3$ years) (U.S. Census Bureau, 2000). A much larger proportion of BWH

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nationwide participants were female (70.2%) than the proportion of the overall U.S. population that is female (50.9%) (U.S. Census Bureau, 2000). Certified BWH participants have completed more formal education (54.9% have at least a bachelors degree) than U.S. residents who are 25 years or older (21.8% have completed at least a bachelors degree) (U.S. Census Bureau, 2000). Certified participants had higher household incomes (20.4% < \$40,000, 28.3% ≥ \$100,000) than the general public (47.4% < \$40,000, 12.3% ≥ \$100,000) (U.S. Census Bureau, 2000).

About half of certified participants lived in rural areas or small towns and half lived in urban or metropolitan areas (Table I-1). Twenty-one percent of the general public live in rural areas and 79% live in urban communities (U.S. Census Bureau, 2000). The majority (56.5%) of BWH participants had properties smaller than an acre, with about a third reporting property from 1 to 10 acres. Only 7% of BWH participants had property of 11 acres or larger.

Stage 1: Awareness and Motivation to Participate

When asked to recall their reasons for participation, nationwide BWH participants reported that motivations to positively impact wildlife were very important (Table I-2). Helping wildlife by conserving and improving wildlife habitat; helping wildlife survive the winter; and helping wildlife survive the spring, summer, and fall were all quite important reasons for participation; they all had mean responses of 4.9. In addition, BWH participants reported that health benefits (relieving stress and getting exercise) were fairly important motivations for participation with mean responses of 4.1 and 3.8 respectively.

Certified BWH participants were also interested in educating themselves. Learning techniques for providing habitat and learning about wildlife were strong motivations for participation in the BWH program, with mean responses of 4.5 and 4.3. However, educating children had a mean response of 3.7 and was a less popular motivation for participation (Table I-2).

Participants had different levels of motivation depending on the type of animal in question (Table I-2). Attracting smaller, more colorful species of wildlife (songbirds and butterflies) were the strongest motivations for participation; the mean responses for the importance of attracting these two types of animals were 4.9 and 4.8 respectively. Weaker motivations for participation (mean responses of 4.1 and lower) were reported for attracting amphibians, larger birds, insects (not butterflies), reptiles, and mammals.

Social motivations were relatively unimportant reasons for participating in the BWH program. Gaining recognition from NWF had a mean response of 2.7 and was one of the least popular motivations for participation. Also, getting recognition from friends, family members, or neighbors, joining with others that have similar interests, having a project to work on with friends, family members, or neighbors, and being encouraged to participate by friends, family members, or neighbors were weak motivations for participation with mean responses of 3.3 or lower.

Stage 2: Development of BWH Knowledge and Skills

The most common source of information or assistance for certified BWH participants to gain skills and knowledge in BWH stewardship activities were free NWF handouts, which were used by 64% of respondents (Table I-3). Less than half of those surveyed reported using the other forms of assistance. Forty-four percent of participants

have used the BWH website, and 38% have used the BWH Information Kit. Habitat Stewards have given personal assistance to very few participants (4.2%), but again, the Stewards program is relatively new and presently available only in certain regions. Neighbors, friends, or family members gave 38% of participants assistance. Only 30% of participants reported they got personal assistance from a wildlife or natural resource professional. The total number of forms of assistance used ranged from 0 to 7 ($M=2.2$, $SD=1.4$). BWH assistance was generally rated as quite helpful, with a mean response of 4.4 to 4.8 for all items.

Stage 3: Habitat Improvement and Applying for BWH Certification

Landscaping with native plants, reducing chemical pesticide use, reusing yard waste, and mulching are popular BWH stewardship activities, done by 91% or more of participants (Table I-3). These activities are commonly described in NWF materials.

Controlling invasive exotic species, decreasing lawn size, reducing chemical fertilizer use, conserving water, allowing natural predators to survive, and preventing predation by domestic animals have been done by fewer participants (58% to 86%). Some of these activities (reducing fertilizer use, conserving water, decreasing lawn size) are highlighted in NWF materials. Several BWH materials mention invasive exotic species. However, the BWH Information Kit is one of the few materials that describes ways that humans can introduce invasive exotic species and outlines negative impacts of invasive species (e.g., invasive exotic plants can replace native plant communities). The Kit is currently being used by 38% of certified participants. Less than half (44.7%) of respondents said they had set wildlife management goals and objectives. The BWH Information Kit outlines general objective and goal setting processes (e.g., determining

habitat components to provide based on the types of animals desired). Sixty-percent or fewer BWH participants reported inventorying or mapping activities. The number of total backyard wildlife activities conducted (total BWH stewardship scores) ranged from 1 to 18 ($M = 11.5$, $SD = 3.3$).

INFORMATION AND ASSISTANCE SOURCES AND BWH STEWARDSHIP

For the five most commonly used materials and assistance (Table I-3), we compared the mean number of stewardship activities performed for those who had and had not used each form of assistance. Those BWH participants who had used free NWF materials, the BWH website, the BWH Information Kit, had received assistance from friends, family members, or neighbors, or from a wildlife professional, performed significantly more BWH stewardship activities than their counterparts who had not used such materials or assistance (Table I-5). The Pearson Correlation for the total number of stewardship activities performed and the total number of forms of assistance used is 0.290 ($p < 0.01$, $n = 976$).

Stage 4: Long-Term Program Impacts

Over 92% of certified participants have made purchasing decisions based on environmental concerns (Table I-5). This is quite high compared to the percentage of the general U.S. public (26%) and even the percentage of U.S. environmental leaders and activists (64%) who regularly read labeling to assess the environmental impact of products (Roper Organization Inc., 1990).

Thirty-one to 41 percent of participants had volunteered as: an educator who instructs others in gardening or landscaping processes or techniques, an educator that instructs others in wildlife, natural resources, or environmental issues, a volunteer with

community gardening or landscaping projects, or a volunteer with community wildlife, natural resource, or environmental projects.

Fewer BWH participants had been involved in political or community activism related to wildlife, natural resource, or environmental issues. The most common action was the contacting of an elected representative; this has been done by 35.6% of participants. By comparison, only 4% of the general public and 24% of environmental leaders and activists regularly write to politicians regarding the environment (Roper Organization Inc., 1990). Fewer than 20% of BWH participants had written editorials, testified, given media interviews, or organized letter-writing campaigns regarding environmental issues.

Discussion and Recommendations

Using Implementation Theory and Program Theory to Examine Backyard Wildlife Stewardship Communication Processes

During this study, we found that certain program activities were more commonly used than other program activities. This may be an indication that some program activities are more important than others for influencing the mechanisms for change.

Stage 1: Awareness and Motivation to Participate

Even though 33% of Michigan workshop participants had received assistance from a friend, family member, or neighbor, social motivations were a relatively unimportant reason for participation in the program. This suggests that program activities other than being introduced by friends, neighbors, or family may be more important for hearing about the BWH program and becoming motivated to participate. NWF may want to highlight the most popular reasons for participation, such as attracting

songbirds or butterflies, conserving wildlife habitat, or helping wildlife survive, in introductory BWH materials.

Stage 2: Development of BWH Knowledge and Skills

The five most popular forms of assistance (free NWF written materials, the BWH website, the BWH Information Kit, assistance from neighbors, friends, or family members, and assistance from a wildlife professional) were all associated with the number of BWH stewardship activities performed by certified participants and the number of forms of assistance used is positively associated with the number of BWH stewardship behaviors performed. Therefore, these program activities may all be important ways for participants to gain BWH stewardship skills and knowledge.

Stage 3: Habitat Improvement and Applying for BWH Certification

Currently, 60% or fewer of the nationwide BWH participants are performing inventorying and mapping activities during stage 3 of BWH involvement. So, many participants are practicing BWH stewardship without systematically determining the current conditions on their properties. This could potentially lead to dissatisfaction with the program by participants if they are unsuccessful at achieving goals and objectives that are inconsistent with the natural history of their properties and surrounding landscapes. Most BWH materials give general information on inventorying and mapping activities. However, the BWH Information Kit gives an overview of why inventorying is important and how to conduct inventories.

Stage 4: Long-Term Program Impacts

Certified BWH participants are more involved in several NWF-related action and consumerism activities than the general public. However, these differences are likely due

at least in part to BWH participants being a self-selected group of individuals who performed more of these activities than the “general public” even before they became involved with the BWH program. Therefore, without knowing which of the behaviors were performed before participation in the BWH program, it is difficult to determine to what extent the program causes changes in these behaviors.

Improving Communication Strategies In Backyard Wildlife Stewardship Education Programs

Delivering program content to a large number of participants who live in different regions or states can be a challenge for administrators of residential wildlife stewardship programs. Organizations and agencies must deliver program content, much of which involves instruction in complex techniques or processes, using a variety of methods. The newly updated BWH website contains information that probably increases knowledge of ecology, residential wildlife management issues, and BWH techniques and processes for BWH participants. However, because less than half of participants have used the BWH website, NWF should continue to use other delivery methods to disseminate information. It is essential that the free printed materials, which are the by far the most widely used form of assistance, are kept up to date and include content that meets the needs of participants.

Because all of the five most popular materials and forms of assistance (free NWF written materials, the BWH website, the BWH Information Kit, assistance from neighbors, friends, or family members, and assistance from a wildlife professional) were associated with more stewardship behaviors in nationwide BWH participants, NWF should try to increase the dissemination of all of these sources of assistance. This could be done by updating the free written materials, which are used by more participants than

any other form of assistance, to highlight other sources of information and assistance. NWF could also distribute materials that point participants to sources of assistance, such as county extension offices, which provide services for landowners in specific communities.

There is also a need for more personal assistance for BWH participants. The processes and techniques of managing wildlife and wildlife habitat on residential properties are complex. However, if participants have knowledge and skills in wildlife management planning, practices, and assessment then we can expect that they are likely to have more positive experiences in the BWH program, and there are likely to be more beneficial impacts to wildlife on their properties. The mastery of these practices is most effectively fostered through direct instruction. However, fewer than half of participants have used any kind of hands-on instruction in BWH processes and techniques. The lack of personal assistance may be a reason that low proportions of participants report using more complex or unfamiliar processes and techniques, such as: controlling invasive exotic species, inventorying current conditions and species present, base mapping, goal setting, and management planning.

Continuing the expansion of the Habitat Stewards program is one way to provide direct instruction in BWH processes and techniques to BWH participants. There is great potential for recruiting current BWH participants into the Habitat Stewards program. Over a third of nationwide BWH participants have volunteered for community wildlife, natural resources, or environmental projects, yet only about 3% of participants are Habitat Stewards. NWF may be able to recruit certified participants into the Stewards program by increasing awareness of the program. At the Michigan workshop, several

participants asked about how they could become involved in the Stewards program.

NWF could also provide more direct instruction by increasing partnerships with state or local wildlife or gardening education programs offered by agencies, extension and/or private organizations.

Administrators of residential wildlife habitat education programs should be aware of the demographic characteristics of program participants. NWF has had success in certifying a large number (over 30,000) of participants in the BWH program. However, those certified in 1999, 2000, and 2001 are not representative of the demographic composition of the U.S. as a whole. This may mean that the program is currently serving many people that would be performing BWH stewardship activities regardless of their involvement in the BWH program. To make a greater impact on increasing BWH stewardship behaviors, NWF should try to involve more individuals from underrepresented demographic groups.

Based on our BWH study results, organizations and agencies that administer similar programs likely have an opportunity to increase participation from racial and ethnic minorities, people with lower education levels, and people with lower incomes. One way to accomplish this is by involving more schools in urban or rural areas in the Schoolyard Habitats program. Having children engaged in providing habitat at school may be a way for their parents to hear about the BWH program; parents may also learn BWH processes and techniques if they volunteer to help plan, construct, or maintain a Schoolyard Habitat. Since women outnumber men over two to one as participants in the BWH program, there is also probably an opportunity to increase BWH participation by men in other residential wildlife programs.

Because most BWH participants have small property (less than an acre), there is an opportunity to involve more rural or suburban residents with larger properties. Rural or suburban residents (especially those who farm) may be more likely to use extension resources than residents of more urban areas. Partnering with local extension offices to provide awareness of the BWH program and BWH materials to rural or suburban residents may be a way to recruit residents with larger properties into the BWH program. For the BWH program and other similar programs, having more participants with larger properties could potentially have increased benefits for wildlife if this means that larger tracts of land are being modified to provide wildlife habitat.

Future Research

The implementation theory and program theory should represent the ways that program activities can ultimately lead to program outcomes; these theories are developed based on the beliefs of stakeholder groups, such as program administrators and staff members (Weiss, 1998), and are based on the program goals and objectives (Pomerantz and Blanchard, 1992). During program evaluation, evaluators determine the extent to which the goals and objectives are met. Developing the implementation theory and program theory for wildlife stewardship education programs can be useful because it requires the examination of program goals and objectives.

When examining the goals and objectives of the BWH program with NWF staff members, we determined that many of the written program objectives are process-related. Processes are the participation, activities, and resources of the program; outcomes are the desired impacts that the program has on participants (Bennett, 1978). Even though most of the written objectives are related to process, NWF staff members have expressed

desires for outcomes. NWF staff hopes that BWH participation leads to the outcomes of long-term NWF action and consumerism. Bennett (1978) would call these social, economic, and environmental outcomes. So, the development of implementation and program theory demonstrates the need for NWF and similar wildlife education organizations to clearly articulate desired practices, knowledge, opinions, skills, and aspirations, and reactions outcomes.

The development of these theories is also helpful, as Weiss (1998) suggested, when determining data collection points for wildlife stewardship education programs. The biggest drawback to using Weiss's approach is that, especially when the desired program outcomes are not clearly expressed, it requires a great deal of time and effort on the part of the researcher to communicate with program staff and to gather program materials. However, once the implementation theory and program theory are developed, they can help researchers and program staff members to understand how the program may work.

This study provides some hints at the effectiveness of various communication techniques. The study results also indicate some areas on which future BWH and wildlife habitat education program studies should focus: the use of specific materials by participants and how best to improve these materials, the differences between implementation of the program in different regions of the U.S., the effectiveness of in depth programs, such as the Habitat Stewards Program, and trends in the attitudes, knowledge, and behaviors of wildlife stewardship education program participants over time.

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Table I-1

Demographic and Property Characteristics of Nationwide BWH Participants and Attendees of a Michigan Workshop

Characteristic	Categories	US respondents		MI respondents	
		%	<i>n</i>	%	<i>n</i>
Age in 2002			966		41
Sex	Male	29.8	1008	20.9	43
	Female	70.2		79.1	
Highest education level	Not a high school graduate	0.5	1011	0.0	44
	High school graduate	13.1		25.0	
	Vocational or trade school	4.4		2.3	
	Associate's degree	7.8		13.6	
	Some college	19.3		20.5	
	College graduate	26.2		18.2	
	Graduate or professional degree	28.7		20.5	
Gross household income	<\$20,000	5.1	863	5.0	40
	\$20,000-\$39,999	15.3		30.0	
	\$40,000-\$59,999	16.8		22.5	
	\$60,000-\$74,999	17.2		22.5	
	\$75,000-\$99,999	17.3		12.5	
	\$100,000-124,999	13.2		5.0	
	\$125,000-149,999	4.5		0.0	
	≥\$150,000	10.6		2.5	
Approximate size of property	<1 acre	56.5	1024	–	–
	1-10 acres	36.4		–	
	11-50 acres	5.9		–	
	>50 acres	1.2		–	
Community size	Rural/farm	7.2	1018	25.0	44
	Rural/non-farm	22.2		38.6	
	Small town (≤25K people)	21.2		29.5	
	Urban area (25K -100K)	25.0		4.5	
	Metropolitan area (>100K)	24.5		2.3	

Table I-2

Motivations of Nationwide Participants and Attendees of a Michigan Workshop for BWH participation

Reason for participation ^a	US respondents			MI respondents		
	<i>M</i> ^b	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
To attract songbirds to property	4.9	0.4	1037	4.8	0.5	41
To conserve and improve wildlife habitat ^c	4.9	0.4	1037	4.8	0.5	44
To help wildlife survive the winter	4.9	0.5	1033	4.9	0.3	44
To help wildlife survive the spring, summer, and fall	4.9	0.4	1038	4.8	0.4	44
To attract butterflies to property	4.8	0.5	998	4.7	0.5	41
To view new species of wildlife on property	4.6	0.7	1035	4.2	0.9	43
To learn environmentally friendly techniques for providing wildlife habitat	4.5	0.7	1033	4.7	0.5	43
To make property more attractive	4.3	1.0	1035	4.6	0.5	43
To learn about wildlife	4.3	0.9	1017	4.6	0.7	43
To attract amphibians to property	4.1	1.1	1028	3.2	1.3	43
To attract hawks, eagles, or owls to property	4.1	1.2	1035	3.2	1.4	43
To relieve stress by providing wildlife habitat	4.1	1.1	1030	3.9	1.0	43
To attract other insects (not butterflies), spiders or other invertebrates to property	4.0	1.1	1030	3.6	1.3	42
To attract small mammals to property	4.0	1.2	1031	3.0	1.5	43
To have a fun recreational activity	4.0	1.2	1025	–	–	–
To get physical exercise by providing wildlife habitat	3.8	1.2	1034	3.9	1.1	43
To attract reptiles to property	3.7	1.3	1030	2.9	1.3	43
To provide educational opportunities for children	3.7	1.3	1021	3.8	1.2	43
To attract 'water birds' to property	3.6	1.4	1017	3.2	1.6	42
To have friends, family members or neighbors to know about the improvements made to property	3.3	1.4	1031	3.7	1.3	44
To join efforts with others who share the same interests	3.2	1.3	1026	–	–	–
To increase the financial value of property	3.1	1.5	1027	3.4	1.4	43
To attract large mammals to property	2.7	1.5	1020	2.9	1.6	43
To have a project that I can work on with friends, family members, or neighbors	2.7	1.4	1004	3.5	1.3	42
To get recognition from NWF for improvements made to property	2.7	1.4	1024	2.9	1.3	43
Because of encouragement to participate in the program by a friend, family member, or neighbor	2.5	1.5	981	2.5	1.4	39
To have a new hobby	2.3	1.3	985	3.0	1.4	40

^a "I decided to participate in the Backyard Wildlife Habitat program because:"

^b Mean response on 5-point scale with "Very Unimportant" coded as 1 and "Very Important" coded as 5.

^c This item was worded as "preserve and improve wildlife habitat" for the Michigan questionnaire and "conserve and improve wildlife habitat" for nationwide questionnaire.

Table I-3

Use of BWH Materials or Assistance by Nationwide BWH Participants and Attendees of a Michigan Workshop

BWH material or assistance ^a	US Respondents				MI Respondents		
	%	<i>n</i>	<i>M</i> ^b	<i>SD</i>	<i>n</i>	%	<i>n</i>
Free NWF written materials ^c	63.6	1024	4.5	0.6	644	20.5	44
NWF BWH website	44.0	1024	4.4	0.7	439	6.8	44
BWH Information Kit	37.7	1016	4.6	0.6	675	2.3	44
NWF slideshow or presentation	9.4	1038	4.6	0.7	92	4.7	43
Assistance from a Habitat Steward	4.2	1029	4.8	0.5	41	0.0	44
Assistance from neighbors, friends, or family members	38.8	1037	4.6	0.5	389	32.6	43
Assistance from a wildlife management or natural resource professional	29.7	1037	4.6	0.6	304	–	–

^a “For each of the following National Wildlife Federation materials, please indicate whether or not you have used the resource. If you have used a resource, please indicate how helpful or unhelpful the resource was.”

^b Mean rating by respondents who reported using the material or assistance with “Very Helpful” coded as 5, “Somewhat Helpful” coded as 4, “Unsure” coded as 3, “Somewhat Unhelpful” coded as 2, “Very Unhelpful” coded as 1.

^c For actual item wording, please see Appendices B and D.

Table I-4

Percentage of Nationwide BWH Participants Performing BWH Stewardship Processes and Techniques

Process or technique ^a	% ^b	<i>n</i>
Controlling invasive exotic species ^c	58.1	1015
Landscaping with native plants	95.0	1043
Reducing the size of traditional lawn	85.6	1035
Reducing the use of chemical pesticides	90.8	1047
Reducing the use of chemical fertilizers	84.3	1048
Reusing yard waste	90.5	1048
Mulching	97.1	1035
Water conservation	59.2	1043
Setting wildlife management goals and objectives	44.7	1041
Planning actions to meet wildlife management goals and objectives	52.2	1035
Base mapping to document current wildlife habitat conditions	33.8	1040
Inventorying soils	13.8	1033
Inventorying plants	60.3	1040
Inventorying animals	41.9	1042
Inventorying unique wildlife-related features	53.5	1044
Inventorying water features	43.9	1038
Allowing natural predators to survive	86.4	1034
Preventing domestic animals from hunting	64.6	1041

^a “For each of the following wildlife habitat activities, please indicate whether you have or have not done the activity on your property.”

^b Percentage that have used the process or technique.

^c For actual item wording, please see Appendix D.

Table I-5

Comparison of Total Number of BWH Stewardship Activities Performed Between Selected Groups of Nationwide Participants

Characteristic ^a	<i>M</i> ^b	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>
Have used free NWF materials	12.1	3.1	632	7.34**	769.9
Have not used free NWF materials	10.6	3.3	387		
Have used BWH Information Kit	12.2	3.4	379	4.58**	762.9
Have not used BWH Information Kit	11.2	3.2	633		
Have used BWH website	12.1	3.2	451	5.13**	972.3
Have not used BWH website	11.1	3.3	567		
Have received assistance from friends, family members, or neighbors	11.9	3.2	402	3.28**	871.5
Have not received assistance from friends, family members, or neighbors	11.3	3.3	631		
Have received assistance from a wildlife professional	12.4	3.2	298	5.65**	546.1
Have not received assistance from a wildlife professional	11.2	3.2	735		

^a We did not test for differences based on use or nonuse of assistance from a Habitat Steward or an NWF slideshow or presentation because less than 10% of participants reported using either of these communication methods.

^b Mean number of stewardship activities performed.

** $p < 0.01$

Table I-6

Involvement of Nationwide BWH Participants in NWF-Related Action and Consumerism

Activity ^a	% ^b	<i>n</i>
Household purchasing decisions based on wildlife, natural resource, or environmental issues ^c	92.8	1043
Volunteering as a gardening or landscaping educator	41.3	1039
Volunteering with community wildlife, natural resource, or environmental projects	36.3	1043
Volunteering with community landscaping or gardening projects	35.5	1040
Volunteering as a wildlife, natural resource, or environmental educator	31.1	1040
Writing, phoning or meeting with an elected representative based on a wildlife, natural resource, or environmental issue	35.6	1045
Submitting an editorial to a newspaper or magazine based on a wildlife, natural resource, or environmental issue	19.1	1044
Testifying at a public meeting about a wildlife, natural resource, or environmental issue	12.7	1043
Giving a media interview concerning a wildlife, natural resource, or environmental issue	11.4	1043
Organizing a fundraiser, petition drive, or letter writing campaign regarding a wildlife, natural resource, or environmental issue	8.3	1045

^a "Please indicate which of the following activities you have done in the last 5 years."

^b Percentage that have done the activity.

^c For actual item wording, please see appendix D.

Figure I-1. Implementation theory and program theory for the BWH program (based on Weiss, 1998).

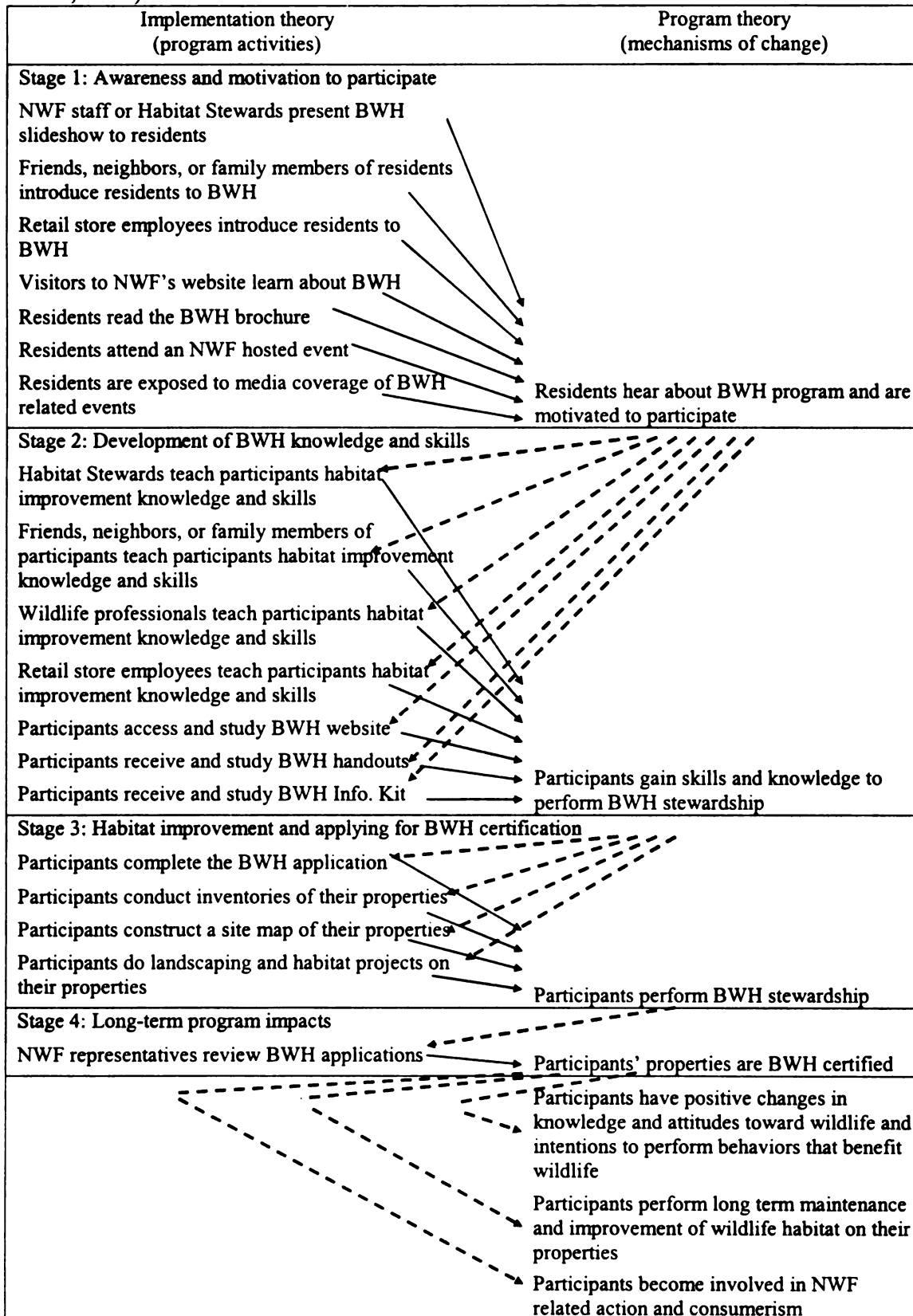
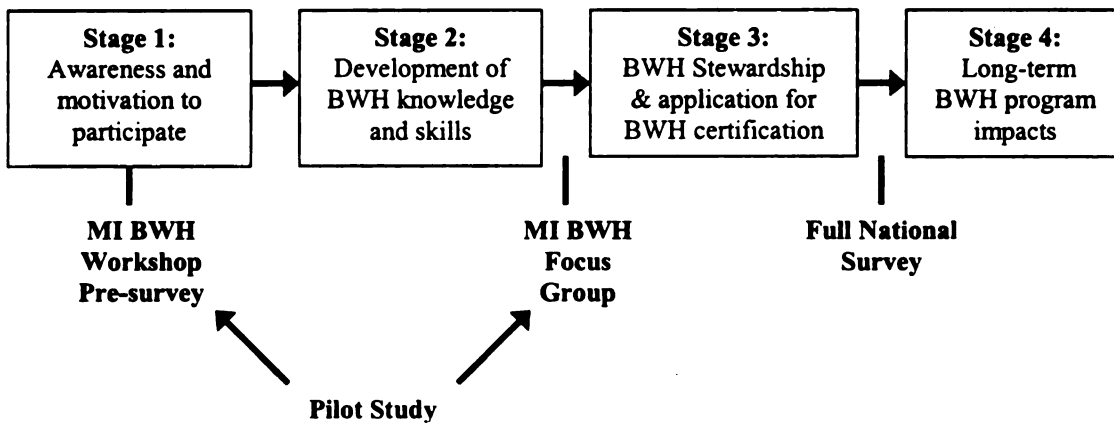


Figure I-2. Stages of BWH participant involvement and study methods.



CHAPTER II

Use of wildlife management processes, techniques, and expertise by participants in National Wildlife Federation's Backyard Wildlife Habitat Program

Abstract: Although 49 state agencies and many private organizations offer programs to aid landowners in providing wildlife habitat (Benson 2001a), few studies have been done to determine the impacts of residential wildlife stewardship programs, such as the National Wildlife Federation's Backyard Wildlife Habitat (BWH) program. To date, approximately 30,000 landowners have certified their backyard habitats with the BWH program. We used a mail survey of 1427 BWH participants to examine the demographic, attitudinal, and knowledge characteristics of national participants in the BWH program. Environmental attitudes were measured using a subset of the New Ecological Paradigm (NEP) scale and attitudes toward wildlife-related issues were measured using the Wildlife Attitudes and Values Scale (WAVS). We also determined the kinds of educational materials and assistance used by participants in the program. Finally, we examined the relationships between these variables and stewardship behaviors (i.e., wildlife management or resource conservation activities) of participants. Consistent with the Theory of Reasoned Action, we found that attitudes toward stewardship behaviors were the strongest predictor of number of stewardship behaviors performed. The number of different kinds of materials and assistance used, attitudes about the importance of communicating about wildlife, property size, and knowledge of general ecology and BWH processes were also significantly correlated with stewardship behaviors at the multivariate level. Although only 30% of participants received personal assistance from a wildlife professional, those who did were significantly more likely to have used

inventorying and management planning processes than those who did not have such assistance. Based on these results, we recommend that administrators of residential wildlife stewardship programs emphasize to participants the importance of planning and inventorying techniques and processes. We also recommend that program administrators ensure that participants in wildlife habitat education programs have access to a variety of materials and personal assistance. We believe that by following our recommendations, residential stewardship program staff will be more effective at maximizing positive outcomes for participants.

Key words: attitudes, backyard wildlife habitat, knowledge, residential wildlife stewardship programs, stewardship behaviors, wildlife education

Much of the wildlife habitat in the United States is under private control. More than 60% of the land in the United States is privately owned (Vesterby and Krupa 2001). These private lands contain 80% of wildlife habitats (Benson 2001b); therefore, activities of private landowners can significantly impact wildlife populations and habitat. To ensure that suitable habitat for wildlife is provided the involvement of private landowners in active wildlife management of their properties is essential. According to Kellert (1984:18), “the ultimate fate of wildlife will depend on landowner attitudes and, correspondingly, their willingness to forego certain benefits for the sake of wildlife.”

Many Americans are already engaged in activities around their homes that can benefit wildlife. Nationwide, in 2001, 62.9 million Americans participated in residential wildlife-watching activities, such as feeding wildlife, cultivating plants for the benefit of wildlife, and maintaining natural areas for wildlife (U.S. Dept. of Interior 2002). A majority of Maine (55%) (Boyle et al. 1991) and Pennsylvania (75%) (Snyder and George 1981) residents have attempted to feed or attract animals. Up to a third of New York state metropolitan residents reported providing food, water, or shelter for wildlife on their properties (Brown et al. 1979).

Even though many citizens have initiated wildlife attraction and habitat improvement activities largely on their own, there is a need for programs that provide information and technical training to assist landowners in providing wildlife habitat. Indeed, a handful of studies have shown public interest in such assistance (Brown et al. 1979, Responsive Management 1996).

Forty-nine state agencies offer programs which aid landowners in providing habitat for game species; many of these agencies also have nongame private lands

programs, including 12 states which offer assistance for residents specifically interested in “backyard wildlife” (Benson 2001a). Some state programs provide financial compensation to participants, while others, such as the Acres for Wildlife Program, offer only technical assistance and (in some states) free plant materials (Deknatel 1979).

The Backyard Wildlife Habitat (BWH) program is a residential wildlife stewardship opportunity offered by the National Wildlife Federation (NWF). Since the program began in 1973, NWF has certified over 30,000 sites. The popularity of the BWH program is growing, with almost 3,000 new habitats currently being certified annually (Mizejewski, NWF, personal communication).

There are many possible ways that participants may become involved in the BWH program. Landowners may hear about the program through contact with NWF staff or volunteers, by visiting NWF’s website (NWF), or by receiving BWH materials. NWF offers various kinds of assistance to help BWH participants improve their properties for wildlife. Information about initially assessing property and providing habitat components is available from NWF in print and electronic forms. Additional information is contained in a Backyard Wildlife Habitat Information Kit that can be ordered from NWF or purchased through Wild Birds Unlimited retail stores. For additional assistance to landowners involved in the BWH program, NWF trains volunteer community mentors, known as Habitat Stewards, who offer technical support to participants during various stages of the application process (Mizejewski, NWF, personal communication). Because the activities of landowners in the BWH program are largely directed by the participants themselves, the materials used to guide management and natural resource conservation

practices and the extent and the source of assistance from others likely varies widely from one participant to another.

Participants begin the process of applying for NWF certification of their properties by determining which of 4 basic habitat components (food, water, shelter, and a place to raise young) are present on their properties. Participants then may make property modifications to provide additional wildlife habitat components. Finally, residents submit an application to NWF that details the habitat components of their properties. NWF staff review applications, and successful applicants receive: a certificate, a letter from the NWF President, answers to any questions indicated on the application form, and an invitation to submit information to NWF for a press release to the applicant's local newspaper (Tufts 1990).

Voluntary residential wildlife programs have the potential to positively influence participant behaviors that are beneficial to wildlife. There may be growing opportunities to involve residential landowners in such programs. Applegate (1981) speculated that landowners who are not economically dependent on their lands might have more time and money to devote to enhancing their properties for wildlife than landowners who rely on their lands for income. As nonfarm residential rural land use in the U.S. is increasing (Vesterby and Krupa 2001), there exists increased need for wildlife habitat education to reach these rural, nonfarm residents.

Our study objectives were to determine the demographic, attitudinal, and knowledge characteristics of BWH participants, to determine the kinds of materials and assistance that BWH participants used, and to determine which of these variables are associated with BWH stewardship behaviors. Based on our findings we provide several

recommendations for agencies and organizations that offer residential wildlife habitat education programs.

Factors associated with wildlife-related and environmental stewardship behaviors

Theory of Reasoned Action

According to the Theory of Reasoned Action (TRA), there are two major variables that determine intentions to perform a behavior: attitudes toward the behavior and the subjective norm (Fishbein and Manfredo 1992). Attitudes toward a behavior are formed based on two factors: the beliefs that an individual has that carrying out the behavior will produce certain outcomes and the evaluation of these outcomes by the individual. The stronger the belief that a behavior will produce positive outcomes or prevent negative ones, the more positive the attitudes towards performing that behavior (Fishbein and Manfredo 1992).

The subjective norm of a behavior is a combination of what a person believes that key individuals feel about whether or not the person should perform the behavior, and how motivated the person is to act in accordance with those individuals. A person is more likely to feel pressure to perform a behavior if that person believes that others approve of the behavior (Fishbein and Manfredo 1992).

Researchers have applied the TRA to investigate wildlife-related recreation behaviors. Rossi and Armstrong (1999) found that attitudes and subjective norms toward hunting were significant predictors of intentions to hunt, and Fulton et al. (1996) discovered that attitudes toward hunting predicted intentions to hunt. Young and Kent (1985) observed that intentions to camp were predicted by attitudes and subjective norms toward camping.

TRA variables have also been demonstrated to affect responsible environmental behavior. In other studies, changes in intentions to support a controlled burn policy were predicted by changes in attitudes and subjective norms toward the policy (Bright et al. 1993), and intentions to support the reintroduction of wolves (*Canis lupus*) were predicted by attitudes toward wolf reintroduction (Bright and Manfredi 1996). Hanna (1995) found that attitudes about wilderness issues were associated with intentions to become involved in wilderness and environmental issues. As these examples illustrate, attitudes and subjective norms are correlated with intentions to perform behaviors, and intentions are predictive of the actual behaviors (Ajzen 1991). There is therefore a probable correlation between attitudes and subjective norms toward behaviors and the behaviors themselves.

Variables and models for environmentally responsible behavior

Researchers have found general environmental attitudes as measured by the New Ecological Paradigm (NEP) scale (Dunlap et al. 2000) to be associated with environmental stewardship behaviors. NEP attitudes have been demonstrated to be significantly correlated with consumer and political environmental behaviors (Scott and Willits 1994) and political and general behaviors relating to the environment (Steel 1996, Widegren 1998).

Knowledge has also been found to be related to environmental stewardship. Hines et al. (1986/87) described an association between knowledge of ecology and environmental issues, and environmental stewardship behavior. In one specific study, boaters who had higher knowledge of issues related to dumping raw sewage were more

likely to dispose of sewage in an appropriate onshore dump station than those with less knowledge (Cottrell and Graefe 1997).

This previous research concerning environmental knowledge, attitudes and activities is consistent with Hungerford and Volk's (1990) model describing factors that influence responsible environmental behavior. According to this model, there are three major categories of variables that determine environmentally responsible behavior: entry-level variables, ownership variables, and empowerment variables.

One important entry-level variable is environmental sensitivity. A way to increase environmental sensitivity is by providing meaningful outdoor experiences over a long time period; these experiences can include outdoor recreation activities, such as hunting and fishing. Hungerford and Volk (1990:11) assert that entry level variables "appear to be prerequisite variables [to environmentally responsible behavior], or at the very least, variables that would enhance a person's decision-making, once an action is undertaken."

Entry level variables may influence ownership variables. Ownership variables give people a personal connection to environmental issues. These variables deal with the personal importance of issues to individuals. A major ownership variable is an in-depth knowledge of environmental issues. If a person "owns" an issue by being knowledgeable about the issue, this can affect her or his behaviors related to the issue.

Ownership variables may influence empowerment variables, which are variables that allow people to believe that they can "make a difference" when dealing with an environmental issue (Hungerford and Volk 1990: 11-12). The perceived level of ability in using strategies to benefit the environment is an empowerment variable. If a person

believes they have the skills necessary to deal with environmental issues they are more likely to perform environmentally responsible behaviors.

Conceptual model of BWH Stewardship

We developed the conceptual model of BWH stewardship (Figure II-1), which combines elements of Hungerford and Volk's model and the TRA to explain how certain variables may influence stewardship behaviors expressed by BWH participants. BWH stewardship behaviors are defined as the implementation of wildlife management processes and techniques on one's property in order to benefit wildlife and help conserve natural resources.

At the center of the BWH stewardship model are the BWH materials and assistance that participants may have used. These materials and assistance may influence entry-level, ownership, and empowerment variables. For example, use of BWH materials and assistance may increase knowledge of ecology, knowledge of residential wildlife management issues, knowledge of the consequences of BWH processes, and knowledge of BWH practices and activities. Conceptualization and measurement of entry-level, ownership, and empowerment variables in this study are based on previous research regarding responsible environmental behavior (Hines et al. 1986/87, Hungerford and Volk 1990, and Cottrell and Graefe 1997). BWH materials and assistance may also affect attitudes toward BWH stewardship. Attitudes toward BWH stewardship, subjective norms toward BWH stewardship, and intentions to practice BWH stewardship are adapted from the TRA (Ajzen 1988).

We measured BWH materials and assistance used, attitudes towards BWH stewardship, and selected entry-level, ownership, and empowerment variables. For this

study, we measured only selected variables from the conceptual model of BWH stewardship.

Entry-level variables important to BWH stewardship are: environmental attitudes, attitudes toward wildlife, knowledge of ecology, wildlife management background, landscaping background, and demographic and property characteristics (Figure II-1). Entry-level variables may influence the motivation to participate in the BWH program, as well as influence ownership variables. For example, a person who has more positive environmental attitudes or has been providing food for birds for several years may be more likely to be motivated to participate in the BWH program than a person with less positive environmental attitudes or who has not fed birds; the person who has fed birds may also have a greater personal investment in residential wildlife management (an ownership variable). For this study, we measured environmental attitudes, attitudes toward wildlife, and demographic and property characteristics. We also measured knowledge of ecology, but for purposes of analysis, we combined ecological knowledge with knowledge of residential wildlife management and consequences of BWH processes (ownership variables), and knowledge of BWH practices and activities (empowerment variable).

Ownership variables that may indirectly influence BWH stewardship are: knowledge of residential wildlife management issues, personal investment in residential wildlife management, and knowledge of consequences of BWH processes. For example, knowing that certain invasive exotic plants can negatively impact native wildlife is one area of knowledge regarding a residential wildlife management issue. Knowing that reducing pesticide use can benefit wildlife is an example of knowledge of a consequence

of a BWH process. Ownership variables may affect empowerment variables. Persons who know about residential wildlife management issues or the consequences of BWH processes, or who have a personal investment in residential wildlife management may choose to develop their knowledge and skill in BWH practices and activities. In turn, empowerment variables such as knowledge and skill in BWH practices and activities may lead ultimately to BWH stewardship; BWH participants who are more knowledgeable and skilled in BWH practices and activities may be more likely to perform stewardship behaviors than those with less knowledge or skill.

Intentions to practice BWH stewardship can lead finally to expression of BWH stewardship behaviors. Intentions to practice BWH stewardship may be influenced by empowerment variables, attitudes toward BWH stewardship, and subjective norms toward BWH stewardship.

Methods

Mail survey

To measure knowledge, attitudinal, and behavioral characteristics of BWH participants, we conducted a mail survey. Beginning in July 2002, we surveyed a stratified random sample of 1427 of the 8117 BWH participants certified in the U.S. in 1999, 2000, and 2001. Because nearly 3 times the number of certified participants lived in the eastern U.S. (6093) as the western U.S. (2024), we over sampled the western participants. We surveyed 708 eastern participants and 719 western participants. We used a modified version of Dillman's (1978) Total Design Method and sent participants up to three mailings.

A total of 1053 BWH participants responded to the survey. The adjusted overall response rate for the survey was 77%. The adjusted response rate was computed by omitting addresses with errors and persons ineligible to respond (minors and deceased persons). The adjusted response rate was 79% for eastern participants and 74% for western participants. Compared to other studies utilizing mail surveys, especially those that survey the general public, our response rate is considered quite high.

Survey Design

Demographic and property characteristics of BWH participants

We measured several demographic and property variables (Table II-1). These variables were included due to the following observations about past studies. Age is associated with environmental attitudes (Van Liere and Dunlap 1980, Arcury 1990, Jones and Dunlap 1992, Scott and Willits 1994, Gooch 1995, Hanna 1995, Dunlap et al. 2000), attitudes toward consumptive uses of wildlife (Dahlgren et al. 1977), environmental knowledge (Arcury and Johnson 1987, Hanna 1995), and environmental behavior (Widegren 1998). Researchers have found male-female differences in environmental attitudes (Van Liere and Dunlap 1980, Mohai 1992), attitudes toward consumptive uses of wildlife (Dahlgren et al. 1977), environmental knowledge (Arcury et al. 1986, Arcury and Johnson 1987, Arcury 1990), and environmental behavior (Scott and Willits 1994). Level of education is associated with environmental attitudes (Van Liere and Dunlap 1980, Arcury 1990, Gooch 1995, Dunlap et al. 2000), attitudes toward consumptive uses of wildlife (Dahlgren et al. 1977), environmental knowledge (Arcury et al. 1986, Arcury and Johnson 1987, Arcury 1990), and environmental behavior (Arbuthnot 1977, Scott and Willits 1994, Cottrell and Graefe 1997, Widegren 1998). Although researchers have

argued that income is not an important determinant for environmental attitudes (Morrison and Dunlap 1986, Mertig and Dunlap 2001), we included income as a dependent variable since we suspected that income might influence a person's ability to engage in certain stewardship behaviors. Size of one's community of residence is associated with environmental attitudes (Arcury 1990, Jones and Dunlap 1992) and environmental knowledge (Arcury and Johnson 1987, Arcury 1990). Finally, it is likely that participants with larger properties may perform more stewardship activities because they have more space and possibly a greater diversity of habitat components.

Environmental and wildlife attitudes of BWH participants

We measured general environmental attitudes of BWH participants using 10 selected items from the NEP scale (Koval and Mertig 2002) (Table II-2). A principal component factor analysis of the 10 NEP items used in our study identified 2 factors that explain 50% of the variance between the items. The 10 items had a Cronbach's Alpha reliability value of 0.81. Other researchers have found the NEP scale to contain up to 3 dimensions (e.g., Albrecht et al. 1982, Scott and Willits 1994, Gooch 1995, Shanahan et al. 1999, Koval and Mertig 2002). However, Dunlap et al. (2000) recommend the treatment of all NEP items as a single measure unless there are substantive reasons not to, or if the reliability of the items when combined is not acceptable. Thus, for our subsequent analysis, we treated the 10 NEP items as a single measure. We summed responses for all items to determine a total NEP score with a possible range of 10 to 50. Higher total scores indicate more positive environmental attitudes. For respondents who omitted 2 or fewer NEP items, we inserted mean responses for missing items when

calculating that individual's total NEP scores. We did not calculate total NEP scores for participants who did not respond to 3 or more of the NEP items.

We used the 18 item Wildlife Attitudes and Values Scale (WAVS) to measure the attitudes of respondents toward wildlife, and their attitudes concerning the roles of wildlife in contemporary society (Purdy and Decker 1989a) (Table II-3). The WAVS has been used to study the attitudes of the general public regarding wildlife, as well as to determine the attitudes of various stakeholders, including members of wildlife-related organizations (Butler et al. 2001). Researchers using the WAVS have found that there are 3 or 4 distinct attitudes that are measured by the scale (Butler et. al. 2001, Purdy and Decker 1989a, Purdy and Decker 1989b). The social benefits attitude indicates the appreciation of the existence of wildlife. The traditional conservation attitude involves consumptive uses for wildlife and the sustainable harvest of wildlife. The communication benefits attitude indicates the value placed in communication about and observation of wildlife. The problem tolerance attitude involves the acceptance of the negative impacts of wildlife (Butler et al. 2001). We subjected the 18 WAVS items to a principal component factor analysis and found that there were indeed 4 dimensions, although we had two items that loaded with the communication benefits attitude that other researchers (Butler et al. 2001) have found loaded with other attitudes¹. We combined items based on the dimensions indicated by our factor analysis results. Four items that loaded to form the social benefits factor explained 10% of the common variance, and had a Cronbach's Alpha reliability of 0.72. There were 4 items in the traditional conservation dimension that accounted for 7% of the common variance; the

¹ The item dealing with economic benefits of consumptive recreation has previously loaded with the traditional conservation attitude and the item about the importance of understanding wildlife behavior has previously loaded with the social benefits attitude.

Cronbach's Alpha value for this dimension was 0.70. The communication benefits factor contained 6 items that explained 25% of the common variance, and had a Cronbach's Alpha of 0.70. The remaining 4 items loaded together as the problem tolerance dimension and accounted for 13% of the common variance; this dimension had a Cronbach's Alpha value of 0.80. We calculated a total attitude score for each attitude type by summing the coded responses for each attitude item for that attitude type (higher total scores indicate more positive attitudes). The possible ranges for each attitude score are as follows: social benefits: 4 to 20, traditional conservation: 4 to 20, communication benefits: 6 to 30, problem tolerance: 4 to 20. For respondents who omitted 1 or fewer WAVS items for an attitude type, we inserted mean responses for missing items when calculating total WAVS scores. We did not calculate WAVS scores for participants who did not respond to 2 or more of the WAVS items for that attitude type.

BWH participants' knowledge

To assess their knowledge of landscaping and wildlife management processes and techniques, as well as their knowledge of basic ecological concepts, we asked respondents to answer 14 multiple-choice items (summarized in Table II-4). We counted an item as correct if the one response that we considered the best answer was selected. A total knowledge score, with a possible range of 0 to 14, was calculated by summing the number of correct answers.

Use of materials and assistance by BWH participants

We asked respondents whether or not they had used certain written materials available from NWF, or had received personal assistance from NWF staff or volunteers, or friends, family members or neighbors while becoming certified in the BWH program

(Table II-5). The total number of forms of assistance used was calculated by summing the number of “yes” responses, for a possible range of 0 to 6. When we calculated the total number of information sources used, for respondents who omitted 1 or fewer assistance items we assumed that missing items indicated that the form of assistance was not used. Respondents who omitted 2 or more assistance items did not receive a total score.

We also asked respondents whether or not they had received assistance from wildlife management or natural resource professionals. We did not include professional assistance in our total forms of assistance count so that we could specifically examine the relationship between professional assistance and BWH stewardship behaviors.

Attitudes of participants toward BWH stewardship

We measured participant attitudes toward BWH stewardship using 11 items (Table II-6). A principal component factor analysis of the BWH stewardship attitude items revealed 3 factors that explain 54% of the common variance. However, the dimensions did not have substantive meaning and contained as few as three items. To insure that the scale had acceptable reliability, we treated the 3 factors as a single variable. The scale has a Cronbach’s Alpha of 0.78. We calculated a total attitude score for participants by summing their coded responses for each attitude item. Higher total attitude scores indicate more positive attitudes toward BWH processes and techniques, with a possible attitude score ranging from 11 to 55. For respondents who omitted 3 or fewer stewardship attitudes items, we inserted mean responses for missing items when calculating total attitude scores. We did not calculate total attitude scores for participants who did not respond to 4 or more of the attitude items.

Stewardship behaviors of BWH participants

We determined BWH stewardship behaviors with 18 survey items that asked respondents whether or not they had done certain behaviors related to resource conservation and wildlife management (Table II-7). The total number of behaviors performed was calculated by summing the number of “yes” responses, for a possible range of 0 to 18. When we calculated total BWH stewardship scores, for respondents who omitted 4 or fewer stewardship items we assumed that missing items indicated that the behavior was not performed. Respondents who failed to respond to 5 or more stewardship items did not receive a total score.

Data analysis

We analyzed data by using SPSS 10.0.7 for Windows Software for Social Statistics (2000). Because our sample stratification over-represents the western U.S., we applied case weights based on region for the percentages and means. We used multiple regression analysis to examine possible explanatory variables for BWH stewardship. We used Pearson’s Chi-square test to determine whether significant differences existed between percentages of participants performing BWH stewardship activities. Following the recommendation of Winship and Radbill (1994) regarding the use of statistical tests which depend on standard errors, we did not use weighted data in our multiple regression model or with Chi-square tests.

Results

Demographic and property characteristics of BWH participants

Most BWH participants (79.3%) are 45 years or older, with 18.9% 65 years or older (Table II-1). Participants range in age from 23 to 89 years (\bar{x} = 54.1, SD = 11.4).

Over two-thirds (70.2%) of BWH participants are female. More than 74% of BWH participants have completed at least some college, with over 28% having a graduate or professional degree. So, this is a relatively well-educated audience for wildlife management messages. BWH participants also have relatively high incomes, with 63% reporting gross household incomes \$60,000 or higher, and over 28% have incomes \$100,000 or higher.

Only about 7% of the certified habitats are in rural, farm areas. Most participants have their properties in metropolitan (24.5%) or urban (25.0%) areas, and several more are in small towns (21.2%) or rural, non-farm (22.2%) regions. The majority (56.5%) of BWH participants have property smaller than an acre, with about a third reporting property from 1 to 10 acres¹. Only 7% of BWH participants have property of 11 acres or larger.

Environmental and wildlife attitudes of BWH participants

BWH participants have strongly positive total NEP scores. Mean responses to NEP items ranged from 2.6 to 4.6 (Table II-2). Total NEP scores for respondents had a range of 15 to 50 (\bar{x} = 39.4, SD = 6.7). Seventy percent of participants had total scores of 36 or higher. The mean total for BWH participants is higher than the mean total of 34.5 for the general public in Michigan on the same 10 NEP items (Koval and Mertig 2002).

BWH participants have strongly positive communication benefits attitudes (Table II-3). Mean responses to WAVS communication benefits items ranged from 3.4 to 4.7. Total WAVS communication benefits scores had a range of 10 to 30 (\bar{x} = 25.2, SD =

¹ This may seem like a small amount of acreage per person being modified to benefit wildlife, but NWF not only attempts to use the BWH program to try to benefit wildlife, but also as a way to encourage lifelong environmental stewardship in participants.

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3.4). BWH participants have strongly positive WAVS social benefits attitudes. Mean responses to social benefits items had a range of 4.7 to 4.9. Total WAVS social benefits scores ranged from 11 to 20 (\bar{x} = 19.1, SD = 1.5). Participants have much less positive traditional conservation attitudes than social benefits attitudes. Mean responses to WAVS traditional conservation items had a range of 1.2 to 3.9. Total WAVS traditional conservation scores had a range of 4 to 20 (\bar{x} = 8.1, SD = 3.0). Participants have fairly positive WAVS problem tolerance attitudes. Mean responses to problem tolerance items ranged from 3.7 to 4.3. Total WAVS problem tolerance scores had a range of 4 to 20 (\bar{x} = 15.8, SD = 3.4).

BWH participants' knowledge

Overall, BWH participants have high knowledge scores. The percentages of participants who correctly answered individual knowledge items ranged from 52.3% to 97.2% (Table II-4). The total knowledge scores had a range of 0 to 14 (\bar{x} = 10.8, SD = 2.5). Over 97% correctly answered the item that asked about habitat components, while only 52.3% of participants responded that “Human-made alterations to the landscape” are “important to include in a property base map.”

Use of materials and assistance by BWH participants

Sixty-four percent of respondents reported using free NWF handouts (Table II-5). Less than half of those surveyed reported using any of the other kinds of materials or assistance. The number of different kinds of materials or assistance used (excluding assistance from a wildlife professional) by BWH participants ranged from 0 to 6 (\bar{x} = 2.0, SD = 1.3). Only 29.7% of respondents indicated that they had received assistance from a wildlife or natural resource professional.

Attitudes of participants toward BWH stewardship

Participants have strongly positive attitudes toward several BWH stewardship behaviors (Table II-6), especially certain practices highlighted in NWF materials. Participants have the most strongly positive attitudes toward reducing chemical pesticide use, mulching, reducing chemical fertilizer use, and landscaping with native plants; responses to these items have a mean of 4.7. Participants have moderately positive attitudes toward reusing yard waste, allowing natural predators to survive, conserving water, preventing predation by domestic animals, decreasing lawn size, and controlling invasive exotic species; responses to these items have a mean of between 4.4 and 4.6. Creating a management plan has a less positive/favorable mean attitude score of 4.1. This is an important practice for effective wildlife management, but a practice not emphasized in NWF materials. Total BWH stewardship attitude scores ranged between 19 and 55 ($\bar{x} = 49.4$, $SD = 4.6$).

Stewardship behaviors of BWH participants

Reducing chemical pesticide use, mulching, landscaping with native plants, and reusing yard waste are popular BWH stewardship activities, having been done by 91% or more of participants (Table II-7). These are activities that are commonly described in NWF materials.

Reducing chemical fertilizer use, allowing natural predators to survive, conserving water, preventing predation by domestic animals, decreasing lawn size, and controlling invasive exotic species have been done by fewer participants (58% to 86%). Some of these activities (reducing fertilizer use, conserving water, decreasing lawn size, and controlling invasive exotic species) are highlighted in NWF materials. Less than half

(44.7%) of respondents said they have set wildlife management goals and objectives.

The number of total backyard wildlife activities conducted (total BWH stewardship scores) ranged from 1 to 18 (\bar{x} = 11.5, SD = 3.3).

Predicting BWH stewardship behaviors

Because we believed that it would be particularly useful for professional wildlife managers to know about the effect that assistance from a wildlife professional has on BWH stewardship, we examined professional assistance separately from the other forms of assistance. Participants who received assistance from a wildlife professional were significantly more likely to have performed planning or inventorying BWH stewardship processes or techniques than those who had not received such assistance (Table II-8). They were also more likely to have controlled invasive exotic species or to have conserved water.

Of the demographic and property variables, only sex, income, and property size were significantly correlated with BWH stewardship behaviors at the bivariate level (Table II-9). All three correlations were weak, with income having negative correlations with stewardship and property size having a positive correlation with stewardship; being female was negatively correlated with BWH stewardship. In the multiple regression, only property size remains statistically significant.

All of the attitudinal, assistance, and knowledge variables had significantly positive bivariate correlations with BWH stewardship behaviors (Table II-9). However, only five of these variables had significant multivariate regression coefficients. BWH stewardship attitudes were a strong predictor of BWH stewardship behavior. The only other attitudinal, assistance, and knowledge variables that predicted BWH stewardship

behavior in the multivariate model were WAVS communication benefits attitudes, BWH materials and assistance, assistance from a wildlife professional, and BWH knowledge.

Discussion

Demographic and property characteristics of BWH participants

BWH participants are older (median = 54.0 years) than the general U.S. population (median = 35.3 years) (U.S. Census Bureau 2000). A much larger proportion of BWH participants are female (70.2%) than the proportion of the overall U.S. population that is female (50.9%) (U.S. Census Bureau 2000). Certified participants have completed more formal education (54.9% have at least a bachelors degree) than U.S. residents who are 25 years or older (21.8% have completed at least a bachelors degree) (U.S. Census Bureau 2000). BWH participants have higher household incomes (20.4% < \$40,000, 28.3% ≥ \$100,000) than the general public (47.4% < \$40,000, 12.3% ≥ \$100,000) (U.S. Census Bureau 2000). About half of certified participants live in rural areas or small towns and half live in urban or metropolitan areas. Twenty-one percent of the general public live in rural areas and 79% live in urban communities (U.S. Census Bureau 2000).

The significant, yet weak, bivariate regression coefficients between sex (being female) and BWH stewardship, income and BWH stewardship, and property size and BWH stewardship indicate that BWH participants who are male, have lower incomes, or have larger property sizes have performed more stewardship behaviors than their counterparts. Males may be more likely than females to perform landscaping and yard care behaviors, and this may explain why they are more likely to perform a greater number of BWH stewardship activities than females. The significant bivariate

relationships between sex and BWH stewardship and income and BWH stewardship behaviors disappear at the multivariate level. The significant multivariate regression coefficient between property size and BWH stewardship may be due to BWH participants with smaller properties believing that some of the stewardship activities are impractical or unnecessary in their yards. This may be especially true for planning and inventorying processes and techniques. Urban residents, as well as other residents with small properties, may not perform activities such as setting management goals and objectives, base mapping their properties, or inventorying soils, plants, or wildlife, because these are not emphasized by NWF materials and/or because they may believe that such activities are not worth the effort in terms of benefits to wildlife and their own satisfaction in the program.

Environmental and wildlife attitudes of BWH participants

Based on the bivariate regression results, we can conclude that BWH participants with more strongly positive NEP attitudes or WAVS attitudes (all types) have performed more BWH stewardship behaviors. However, only 2 of the 5 general attitude measures we used were still significantly correlated with BWH stewardship behaviors at the multivariate level. We expected that participants who had more positive environmental attitudes would have performed more BWH stewardship behaviors when we controlled for other variables. However, the NEP measures general environmental attitudes and our BWH stewardship items gauge specific environmentally responsible behaviors, and according to the TRA (Ajzen 1988), attitudes toward specific behaviors are better predictors of specific behaviors than general attitudes.

The lack of a significant multivariate correlation between WAVS social benefits attitudes and BWH stewardship behaviors was unexpected. We had anticipated that participants who believed that it was important to appreciate the role of wildlife in the “natural environment” would perform more BWH stewardship behaviors. A possible explanation as to why our results did not indicate such a relationship is that scores for the social benefits scale had little variation ($\bar{x} = 19.1$, $SD = 1.5$), making it difficult to co-vary with stewardship behaviors.

The significant multivariate relationship between WAVS communication benefits attitudes and BWH stewardship may have to do with the nature of the BWH program. Because the BWH program is a communication program, participants who believe that communicating about wildlife is important may be more likely to use materials provided by NWF or other sources that highlight BWH stewardship activities. This additional exposure to such materials may result in these participants performing more stewardship activities than those participants who believe that communicating about wildlife is less important. They may also be more likely to seek personal assistance from NWF staff, wildlife professionals, or friends, family and neighbors, than those who feel wildlife-related communication is less important.

Because the BWH program involves nonconsumptive uses of wildlife, it makes sense that there is not a significant multivariate correlation between WAVS traditional conservation attitudes and BWH stewardship. BWH stewardship activities do not directly involve traditional wildlife-related activities such as hunting and trapping.

We were not expecting the lack of a significant multivariate relationship between WAVS problem tolerance attitudes and BWH stewardship. We had anticipated that

participants who were more willing to accept the unwanted impacts of wildlife would perform more stewardship activities. Although this is true at the bivariate level, the results of our multivariate regression analysis did not indicate such a relationship. One or more of the other variables in our regression model caused the relationship to disappear at the multivariate level. This lack of a significant multivariate coefficient may be because people who have dealt with more wildlife problems were also more likely to have performed more stewardship activities than participants who have had fewer wildlife problems. Participants who have experienced more wildlife problems may be less accepting of those problems than participants who have experienced fewer such problems.

Use of materials and assistance by BWH participants

We had expected that participants with more exposure to different kinds of materials and assistance would perform more BWH stewardship behaviors than participants with less exposure. The significant bivariate and multivariate relationships between the 2 variables support this expectation.

We were also expecting participants who received assistance from a wildlife professional to perform more stewardship behaviors than participants who did not receive such assistance. Our multivariate results indicate a weak, although significant, relationship. This weak relationship might come from wildlife management professionals giving instruction in some BWH stewardship processes or techniques but not others. The results of our Chi-square tests show that participants who received assistance from a wildlife professional were much more likely to perform wildlife habitat and management planning activities. These activities are a part of adaptive wildlife

management (Haney and Power 1996, Holling 1978) and are advocated by Warner and Brady (1996) for farmland management but are not generally included in BWH materials for participants provided by NWF. Participants probably are exposed to many of these processes and techniques when they are assisted by a wildlife professional. However, some of the resource conservation techniques, such as reducing yard waste, may not be highlighted by wildlife professionals. This may explain why we did not find significant differences in the use of many of these techniques between participants who did or did not receive professional assistance. Also, as a result of the inventorying and planning processes they employ, wildlife professionals may advise residents against particular approaches, thus narrowing the scope of behavior choices for landowners. Wildlife professionals may guide participants to a narrow set of the most effective behaviors that are specifically related to goals and objectives.

BWH participants' knowledge

There were significant bivariate and multivariate relationships between BWH knowledge and BWH stewardship. These relationships were consistent with our predictions.

Attitudes of participants toward BWH stewardship

The strong correlation between BWH stewardship attitudes and BWH stewardship behaviors is consistent with the TRA (Rossi and Armstrong 1999, Bright and Manfredo 1996, Hanna 1995, Bright et al. 1993, Young and Kent 1985).

Recommendations

Needs of wildlife habitat education program participants with smaller properties

It is important for coordinators of wildlife habitat education programs to understand that participants who live on smaller properties may be less likely to perform as many stewardship activities as those with larger properties. This may be because owners of smaller properties believe that they do not have sufficient space to create a variety of vegetation conditions. Because many participants may have properties smaller than an acre, wildlife education programmers should continue to expand instruction in techniques, such as container gardening, that can be done in small spaces.

Program staff should emphasize the importance of planning and inventorying techniques and processes that participants, especially those with smaller properties, may see as unnecessary. For example, an urban resident living in a high rise apartment could be encouraged to inventory the current conditions for wildlife on her balcony and in relation to the surrounding landscape ecology, set realistic goals for providing habitat, plan and implement projects to achieve goals, and revise and update goals.

Understanding attitudes of participants in wildlife habitat education programs

The best predictors of stewardship behaviors of participants in the BWH program are attitudes towards the behaviors. If agency and organizational personnel want to affect behaviors of participants in wildlife habitat education programs, they need to be aware of the attitudes of participants toward the desired behaviors. If participants do not have strong positive attitudes toward certain behaviors, they are unlikely to perform these behaviors.

Coordinators of education programs should also be aware that attitudes regarding the value of communicating about wildlife are associated with stewardship behaviors of participants. Therefore, it may be difficult for program coordinators to effectively share information with participants who do not strongly value the processes of hearing about wildlife through various communication channels.

Because our results do not indicate that participants with greater acceptance of wildlife problems performed more stewardship behaviors than those who were less accepting of wildlife problems, there may be a need to educate participants in the BWH and similar programs about the possible negative impacts of BWH stewardship activities and how these impacts can be minimized.

Knowledge of participants in wildlife habitat education programs

This study indicates that knowledge is associated with BWH stewardship. Although it is unclear whether there is a direct causal link between knowledge and behaviors, staff members in wildlife habitat education programs should continue efforts to educate participants in wildlife management processes and techniques as a possible way to increase stewardship behaviors.

Materials and assistance in wildlife habitat education programs

This study also indicates the need for wildlife habitat education programs to make available a variety of materials and personal assistance to program participants. In the BWH program, participants who used a greater number of materials or got more personal assistance performed more stewardship activities.

Because so few BWH participants performed planning and inventorying processes and techniques, and because BWH participants who received assistance from a

wildlife professional were more likely to have used planning and inventorying processes and techniques, participants in wildlife habitat education programs should be encouraged to use processes based on adaptive management, such as adaptive impact management (AIM) (Riley et al. 2002). AIM employs many processes from traditional adaptive management (e.g., situational analysis, goal and objective setting, identifying alternative management options, management intervention, and monitoring) (Holling 1978), but is focused more on impacts. Impacts are the evaluation of the effects of wildlife events or interactions by various stakeholder groups. Persons using AIM try to maximize positive impacts and minimize negative impacts. NWF staff should help BWH participants determine how best to achieve goals based on the beliefs of individual participants about the positive and negative impacts of wildlife. NWF staff should also examine the extent to which impacts are consistent with the desires of residents.

With thousands of new participants becoming certified each year, the BWH program has the potential to positively impact wildlife habitat improvement and resource conservation behaviors. By understanding the relationship between participant demographic, attitudinal, knowledge, and assistance variables and BWH stewardship, BWH administrators and leaders of similar programs may be better able to impact residential wildlife stewardship behaviors.

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Table II-1. Demographic and property characteristics of BWH participants certified in 1999, 2000, and 2001.

Characteristic	Categories	% of respondents	n
Age in 2002			966
Sex ¹	Male	29.8	1008
	Female	70.2	
Highest education level ²	Not a high school graduate	0.5	1011
	High school graduate	13.1	
	Vocational or trade school	4.4	
	Associate's degree	7.8	
	Some college	19.3	
	College graduate	26.2	
	Graduate or professional degree	28.7	
Gross household income ³	<\$20,000	5.1	863
	\$20,000-\$39,999	15.3	
	\$40,000-\$59,999	16.8	
	\$60,000-\$74,999	17.2	
	\$75,000-\$99,999	17.3	
	\$100,000-124,999	13.2	
	\$125,000-149,999	4.5	
	≥\$150,000	10.6	
Community size ⁴	Rural, farm	7.2	1018
	Rural, non-farm	22.2	
	Small town (≤25K people)	21.2	
	Urban area (25K -100K)	25.0	
	Metropolitan area (>100K)	24.5	
Approximate size of property certified ⁵	<1 acre	56.5	1024
	1-10 acres	36.4	
	11-50 acres	5.9	
	>50 acres	1.2	

¹ Coded as 0 for "male," 1 for "female."

² Coded as 1 for "less than high school graduate," 2 for "high school graduate or GED," 3 for "vocational or trade school," 4 for "associate's degree (2 year degree)," 5 for "some college," 6 for "college graduate (bachelor's or 4 year degree)," and 7 for "graduate or professional degree."

³ Coded as 1 for "less than \$20,000," 2 for "\$20,000 to \$39,999," 3 for "\$40,000 to \$59,999," 4 for "\$60,000 to \$74,999," 5 for "\$75,000 to \$99,999," 6 for "\$100,000 to \$124,999," 7 for "\$125,000 to \$149,999," and 8 for "\$150,000 or more."

⁴ Coded as 1 for "rural, farm" or "rural, nonfarm," 2 for "small town," 3 for "urban area," 4 for "metropolitan area."

⁵ Coded as 1 for "less than one acre," 2 for "1 to 10 acres," 3 for "11 to 50 acres," and 4 for "more than 50 acres."

Table II-2. Mean responses of BWH participants to NEP items.

Statement ¹	Mean Response	SD	<i>n</i>
We are approaching the limit of the number of people the earth can support.	3.9 ²	1.2	1033
When humans interfere with nature it often produces disastrous consequences.	4.4 ²	0.9	1037
The earth has plenty of natural resources if we just learn how to develop them.	2.6 ³	1.4	1036
Plants and animals have as much right as humans to exist.	4.4 ²	0.9	1033
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	4.0 ³	1.1	1037
Despite our special abilities humans are still subject to the laws of nature.	4.6 ²	0.7	1030
The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	3.9 ³	1.2	1032
Humans were meant to rule over the rest of nature.	3.8 ³	1.4	1033
Humans will eventually learn enough about how nature works to be able to control it.	3.9 ³	1.1	1039
If things continue on their present course, we will soon experience a major ecological catastrophe.	3.8 ²	1.2	1036

¹ Survey question: "The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree."

² For pro-environmental statements, the mean response was calculated with "Strongly Agree" coded as 5, "Mildly Agree" coded as 4, "Unsure" coded as 3, "Mildly Disagree" coded as 2, "Strongly Disagree" coded as 1.

³ For anti-environmental statements, the mean response was calculated with "Strongly Agree" coded as 1, "Mildly Agree" coded as 2, "Unsure" coded as 3, "Mildly Disagree" coded as 4, "Strongly Disagree" coded as 5.

Table II-3. Mean responses of BWH participants to WAVS items.

Attitude	¹ It is important to me personally:	Mean Response ²	SD	n
social benefits	That I know that wildlife exist in nature.	4.8	0.5	1025
	That I consider the presence of wildlife as a sign of the quality of the natural environment.	4.8	0.5	1040
	That I appreciate the role that wildlife play in the natural environment.	4.9	0.4	1039
	That wildlife are included in educational materials as the subject for learning more about nature.	4.7	0.6	1042
traditional conservation	That game animals are managed for an annual harvest for human use without harming the future of the wildlife population.	3.9	1.2	1034
	That I hunt game animals for food.	1.7	1.2	1034
	That I trap furbearing animals for the sale of fur or pelts.	1.2	0.6	1035
	That I hunt game animals for recreation.	1.4	0.9	1031
communication benefits	That I observe or photograph wildlife.	4.7	0.7	1041
	That I talk about wildlife with family and friends.	4.3	0.8	1026
	That local economies benefit from the sale of equipment, supplies, or services related to wildlife recreation. ³	3.8	1.0	1036
	That I understand more about the behavior of wildlife. ⁴	4.6	0.7	1040
	That I express opinions about wildlife and their management to public officials or to officers of private conservation organizations.	3.4	1.2	1038
	That I see wildlife in books, movies, paintings or photographs.	4.4	0.8	1041
problem tolerance	That I tolerate most wildlife nuisance problems.	4.3	0.8	1038
	That I tolerate the ordinary personal safety hazards associated with some wildlife.	3.9	1.1	1035
	That I tolerate the ordinary risk of wildlife transmitting disease to humans or domestic animals.	3.7	1.2	1040
	That I tolerate most levels of property damage by wildlife.	3.9	1.0	1040

¹ Survey question: "The following statements talk about wildlife-related issues. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree."

² Mean response on 5-point scale with "Strongly Disagree" coded as 1 and "Strongly Agree" coded as 5.

³ Other researchers (Butler et al. 2001) have found this item loaded with the trad. conservation attitude.

⁴ Other researchers (Butler et al. 2001) have found this item loaded with the social benefits attitude.

Table II-4. BWH participant responses to knowledge items ($n = 1053$ for all items).

Item ¹	% of respondents with correct response
Basic habitat components	97.2
Functions of wetlands	84.1
Ecological role of predators	83.3
Humans impacts on wildlife	82.5
Influence of soil type on plants found in an area	81.5
Methods to control invasive exotic plants	76.4
Importance of inventorying current conditions before setting management objectives	76.4
Importance of considering carrying capacity while managing for wildlife on residential properties	74.0
Ways to find out which plants are native to an area	72.7
Advantages of using native plants	71.7
Definition of ecosystem	69.1
Components of a property base map	52.3

¹ For actual item wording, please see Appendix D.

Table II-5. Use of BWH materials or assistance by participants.

BWH material or assistance ¹	% of respondents who have used material or assistance	<i>n</i>
Free NWF written materials ²	63.6	1024
NWF BWH website	44.0	1024
BWH Information Kit	37.7	1016
NWF slideshow or presentation	9.4	1038
Assistance from a Habitat Steward	4.2	1029
Assistance from neighbors, friends, or family members	38.8	1037
Assistance from a wildlife management or natural resource professional	29.7	1037

¹ Survey question: "For each of the following National Wildlife Federation materials, please indicate whether or not you have used the resource."

² For actual item wording, please see Appendix D.

Table II-6. Mean responses of participants to BWH stewardship attitude items.

Process or technique ¹	Mean Response ²	SD	<i>n</i>
Eliminating invasive exotic species ³	4.4	0.8	1023
Landscaping with native plants	4.7	0.6	1024
Reducing the use of chemical pesticides	4.7	0.6	1037
Reducing the use of chemical fertilizers	4.7	0.6	1033
Decreasing size of traditional lawns	4.4	0.8	1035
Reusing yard waste	4.6	0.7	1031
Mulching	4.7	0.6	1035
Practicing water conservation	4.4	0.8	1037
Creating a wildlife management plan	4.1	0.9	1027
Allowing predators to survive	4.5	0.8	1035
Preventing domestic animals from hunting	4.4	0.9	1035

¹ Survey question: “The following techniques are sometimes used to provide wildlife habitat. How important or unimportant do you personally believe it is for people to use the following landscaping/wildlife management techniques on their properties?”

² Mean response on 5-point scale with “Very Unimportant” coded as 1 and “Very Important” coded as 5.

³ For actual item wording, please see Appendix D.

Table II-7. Percentage of participants performing BWH stewardship processes and techniques.

Process or technique¹	% that have used process or technique	<i>n</i>
Controlling invasive exotic species ²	58.1	1015
Landscaping with native plants	95.0	1043
Reducing the size of traditional lawn	85.6	1035
Reducing the use of chemical pesticides	90.8	1047
Reducing the use of chemical fertilizers	84.3	1048
Reusing yard waste	90.5	1048
Mulching	97.1	1035
Water conservation	59.2	1043
Setting wildlife management goals and objectives	44.7	1041
Planning actions to meet wildlife management goals and objectives	52.2	1035
Base mapping to document current wildlife habitat conditions	33.8	1040
Inventorying soils	13.8	1033
Inventorying plants	60.3	1040
Inventorying animals	41.9	1042
Inventorying unique wildlife-related features	53.5	1044
Inventorying water features	43.9	1038
Allowing natural predators to survive	86.4	1034
Preventing domestic animals from hunting	64.6	1041

¹ Survey question: "For each of the following wildlife habitat activities, please indicate whether you have or have not done the activity on your property."

² For actual item wording, please see Appendix D.

Table II-8. Comparison between the use of BWH stewardship processes and techniques between participants who received assistance from a wildlife professional and those who did not receive such assistance¹.

Process or technique performed	% of respondents who have done process or technique		χ^2	<i>n</i>
	Did receive assistance from wildlife professional	Did not receive assistance from wildlife professional		
Controlling invasive exotic species	65.9	56.5	7.48**	1004
Landscaping with native plants	97.0	94.4	3.01	1030
Reducing the size of traditional lawn	87.1	83.1	2.46	1023
Reducing the use of chemical pesticides	90.3	91.3	0.27	1033
Reducing the use of chemical fertilizers	85.6	84.4	0.22	1036
Reusing yard waste	92.3	89.7	1.62	1037
Mulching	97.3	95.8	1.27	1021
Water conservation	67.8	60.5	4.73*	1030
Setting wildlife management goals and objectives	55.4	41.2	17.21**	1029
Planning actions to meet wildlife management goals and objectives	65.0	47.9	24.59**	1023
Base mapping to document current wildlife habitat conditions	41.6	30.2	12.40**	1030
Inventorying soils	19.5	10.5	15.03**	1024
Inventorying plants	68.7	56.7	12.68**	1029
Inventorying animals	51.5	39.5	12.44**	1031
Inventorying unique wildlife-related features	62.1	50.3	11.76**	1033
Inventorying water features	51.2	41.7	7.68*	1026
Allowing natural predators to survive	89.2	85.6	2.35	1025
Preventing domestic animals from hunting	61.1	66.2	2.37	1030

¹ *df* = 1 for all items

** *P* < 0.01

* *P* < 0.05

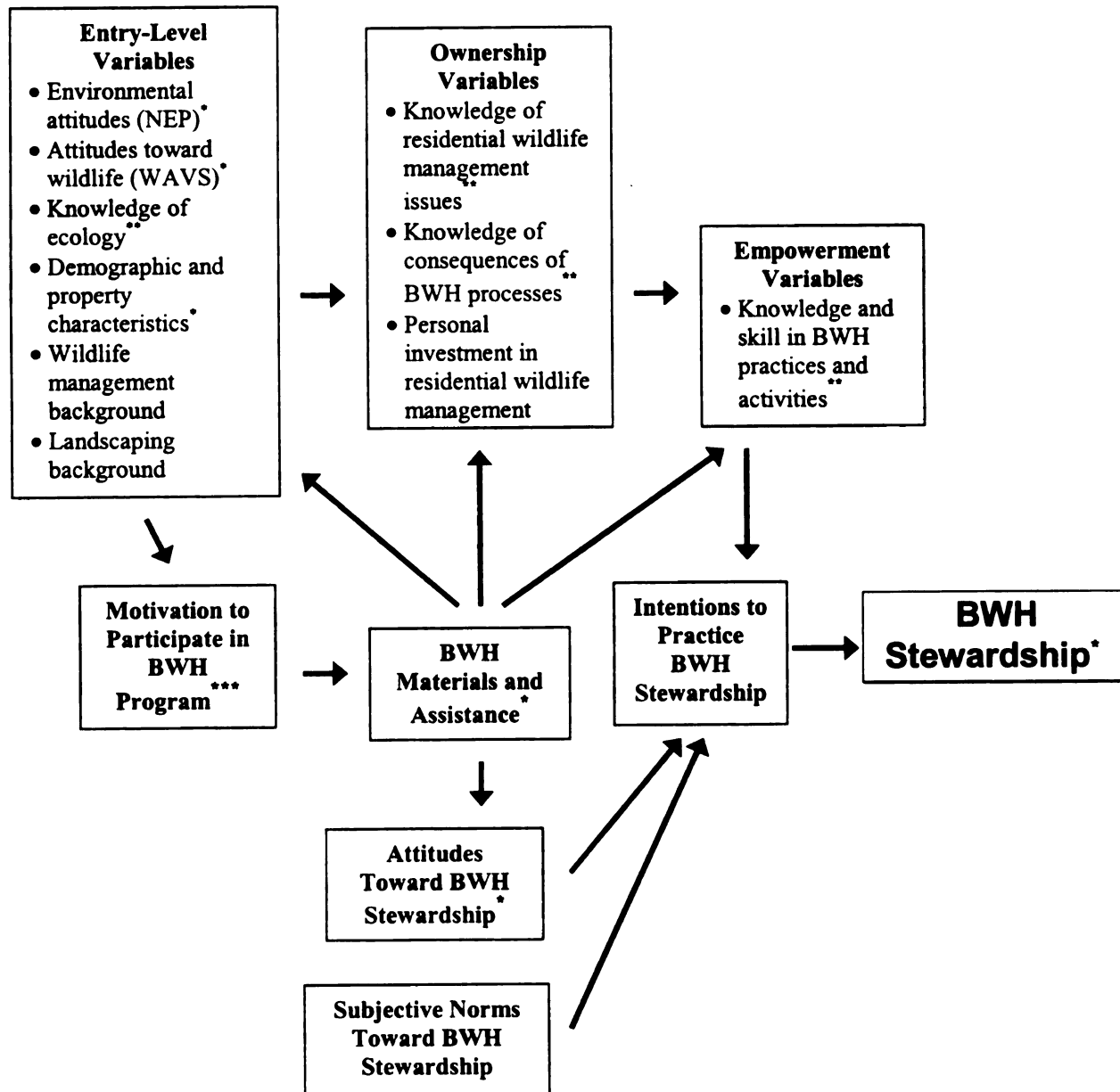
Table II-9. Relationship of demographic, attitude, knowledge, and assistance variables to number of BWH stewardship activities conducted by participants ($n = 768$).

Variable	Bivariate Regression Coefficient	Standardized Multivariate Regression Coefficient
Age	-0.035	0.011
Sex	-0.024	-0.081*
Education level	-0.025	-0.008
Income	-0.100**	-0.020
Property size	0.100**	0.119**
Community size	-0.059	0.024
NEP	0.205**	0.017
WAVS social benefits	0.223**	-0.052
WAVS traditional conservation	0.099**	0.054
WAVS communication benefits	0.319**	0.128**
WAVS problem tolerance	0.219**	0.013
BWH materials and assistance	0.281**	0.173**
Assistance from a wildlife professional	0.199**	0.092**
BWH knowledge	0.193**	0.114**
BWH stewardship attitudes	0.493**	0.410**
R^2		0.346

* $P < 0.05$

** $P < 0.01$

Figure II-1. Conceptual model of BWH Stewardship (adapted from Hungerford and Volk 1990, Cottrell and Graefe 1997, Ajzen 1988, Hines et al. 1986).



* Measured in this study

** For ease of analysis, all knowledge items were combined.

*** Measured, but not reported in this article.

STUDY LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This study resulted in descriptive information about the BWH program. We were also able to examine some relationships between selected program components and participant background characteristics.

One limitation of this study is that we are unable to determine conclusively with the study design employed that the BWH program experience affects participants' attitudes, knowledge, and behaviors. In order to investigate direct impacts of the NWF BWH program components on participants, a research design would need to include contact with participants well in advance of when they first start learning about or implementing wildlife practices and before they hear about the BWH program. The pilot study indicated that although one group of Michigan pre-certification BWH participants had done fewer stewardship activities and used fewer information sources than certified nationwide participants, persons who attend BWH workshops likely have already started some activities related to BWH certification.

Causality would be somewhat easier to investigate with a research design that involved detailed investigation of characteristics of a control group of non-BWH participants (equivalent in demographic and other characteristics) in comparison with participants. Because BWH program participants are self-selected, it would be difficult to identify a control group. These longitudinal and control group research designs are much more costly and time intensive than existing resources allowed.

There are also some limitations in the ways that we measured certain variables. Although the NEP scale is one of the most widely used measures of environmental attitudes, it does have some drawbacks. The original NEP scale was developed in the

1970s, and even though it has been revised, it reflects a somewhat outdated view of ecology and uses language that was common in the late 1970s. Therefore, it may not be appropriate to sample publics, especially those (such as BWH participants) that are highly educated and that have an increasing level of sophistication regarding environmental issues (Lalonde and Jackson 2002).

The WAVS scale also has some deficiencies. First, all of the items are worded in the first person and respondents may “strongly disagree” with certain items that describe behaviors that they personally do not perform, but “strongly agree” that others should be able to perform. For example, respondents may not see an appropriate response to the item about the importance “that I trap furbearing animals,” if they themselves do not trap, but feel it is important for others to do so. Also, all of the WAVS items are worded in the same direction (a response of “strongly agree” always means a strongly positive attitude).

There are some limitations in the items we used to measure use of BWH materials, assistance, and BWH stewardship. Because these variables are dichotomous, they do not indicate specifics (e.g., duration and frequency). For our multiple regression model which used the number of stewardship behaviors performed as the dependent variable, we lumped all of the stewardship items into a single variable. In other words, we combined items as diverse as base mapping and mulching into one stewardship behavior score. We also did not ask participants the extent to which they had done any of the stewardship activities. For example, a participant who planted a single native flower in front of his house (and did no other stewardship behaviors) would have the same score as a participant who maintained a 10 acre native prairie restoration. This simplified our analysis, but may lessen the validity of our measure.

A more valid measure would have broken down “stewardship” into separate categories (e.g., planning and inventorying processes, natural resource conservation activities, and direct management techniques). We also could have applied weights to individual items based on the likely positive ecological impacts of activities. For instance, preventing predation by domestic animals might result in a lower stewardship score than controlling invasive exotic species. Finally, the use of a simple count of the number of stewardship activities performed does not take into account which activities are most effective or appropriate for participants to use based on their goals and objectives and the characteristics of their properties. Participants who choose a few activities that will help them best meet their goals and objectives may affect more positive wildlife impacts than participants who do many activities without regard to which activities are most appropriate.

A limitation of our BWH stewardship attitudes scale was that it did not measure attitudes toward all BWH stewardship items. To limit the length of the survey instrument, we did not ask about attitudes toward many of the inventorying and planning processes and techniques.

The knowledge items that we developed have some deficiencies. Knowledge scores were high and at least 52% of participants correctly responded to all the knowledge items. This indicates that the items may be too easy for BWH participants. Also, we did not distinguish between knowledge from entry-level, ownership, and empowerment variables. If we had separated knowledge items into these three categories of variables, we could have been able to determine the predictive ability of each type of variable on BWH stewardship.

We recommend that future studies be based on the BWH program theory and implementation theory. These studies should focus on the use of specific materials by participants and how best to improve these materials, the differences between implementation of the program in different regions of the U.S., the effectiveness of the Habitat Stewards Program, or trends in the attitudes, knowledge, and behaviors of BWH participants over time.

The relationships in the BWH stewardship conceptual model that we did not examine in this study (e.g., the linkage between entry-level variables and BWH materials and assistance used by motivation to participate in the BWH program or the effect of subjective norms toward BWH stewardship on intentions to practice BWH stewardship) should also be studied. We did not measure these variables in our study to ensure that the survey instrument was not too long. Additionally, there is a need to examine the wildlife impacts of the BWH program.

The growing popularity of the BWH program and the lack of literature on the effectiveness of residential wildlife stewardship programs demonstrate the need to continue researching programs such as BWH. It is the responsibility of program managers to ensure that participants have the tools they need to set and achieve goals related to backyard wildlife stewardship. Program managers will be more effective if they understand the attitudinal, knowledge, and behavioral characteristics of participants.

STUDY LIMITATIONS--LITERATURE CITED

Lalonde, R. and E.L. Jackson. 2002. The New Environmental Paradigm scale: has it outlived its usefulness? *Journal of Environmental Education* 33(4):28-36.

APPENDICES

APPENDIX A: UCRIHS APPROVAL LETTERS

**MICHIGAN STATE
UNIVERSITY**

TO: Shari DANN
13 Natural Resources Bldg.

RE: IRB# 01-626 CATEGORY:2-F

TITLE: ASSESSING THE IMPACT OF BACKYARD HABITATS ON
PARTICIPANT KNOWLEDGE, ATTITUDES, AND BEHAVIOR

PRELIMINARY APPROVAL DATE: September 4, 2001

UCRIHS has reviewed this proposal and granted "PRELIMINARY" APPROVAL. This approval will be effective for one year from the approval date above. The approval is "Preliminary" because it is not possible to fully evaluate the research instruments or detailed procedures at this time. As you indicated, one of the purposes of the research project is to develop these instruments and procedures. After you develop the instruments and detailed procedures and prior to any data collection, you must seek standard UCRIHS approval. When you submit your full UCRIHS application, please write the IRB# listed above on the upper right corner of the enclosed application.

Thank you for bringing this project to our attention. If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. All UCRIHS forms and instructions are located via the web: <http://www.msu.edu/user/ucrihs>



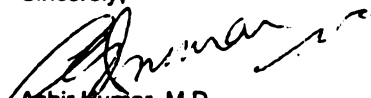
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**University Committee on
Research Involving
Human Subjects**

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX: 517/353-2976
Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

Sincerely,


Ashir Kumar, M.D.
Interim Chair, UCRIHS

AK: kj

cc:

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MSU is an affirmative-action,
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**MICHIGAN STATE
UNIVERSITY**

April 2, 2002

TO: Shari DANN
13 Natural Resources Bldg.

RE: IRB# 01-626 CATEGORY: EXEMPT 1-2

APPROVAL DATE: March 27, 2002

**TITLE: ASSESSING THE IMPACT OF BACKYARD HABITATS ON PARTICIPANT
KNOWLEDGE, ATTITUDES, AND BEHAVIOR**

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project.

***This letter approves the Pre-Workshop Survey and Post Workshop
Survey (Backyard Wildlife Habitat Workshop) only.***

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu. Please note that all UCRIHS forms are located on the web: <http://www.msu.edu/user/ucrihs>

Sincerely,



Ashir Kumar, M.D.
UCRIHS Chair

AK: kj

cc: Dain Palmer
16 Natural Resources



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University Committee on
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**MICHIGAN STATE
UNIVERSITY**

May 1, 2002

TO: Shari DANN
13 Natural Resources Bldg.

RE: IRB # 01-626 CATEGORY: 1-2 EXEMPT

TITLE: ASSESSING THE IMPACT OF BACKYARD HABITATS ON PARTICIPANT
KNOWLEDGE, ATTITUDES, AND BEHAVIOR

ANNUAL APPROVAL DATE: March 27, 2002

REVISION REQUESTED: April 19, 2002

REVISION APPROVAL DATE: April 30, 2002

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS APPROVED THIS PROJECT'S REVISION.

Approves the revisions made to the focus group portion of this protocol including advertisement/recruitment and the consent document.

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewal are possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu.

Sincerely,



Ashir Kumar, M.D.
Chair, UCRIHS

AK: kj

cc: Dain Palmer
16 Natural Resources



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**MICHIGAN STATE
UNIVERSITY**

June 24, 2002

TO: Shari DANN
13 Natural Resources Bldg.

RE: IRB # 01-626 CATEGORY: 1-2 EXEMPT

TITLE: ASSESSING THE IMPACT OF BACKYARD HABITATS ON PARTICIPANT
KNOWLEDGE, ATTITUDES, AND BEHAVIOR

ANNUAL APPROVAL DATE: March 27, 2002

REVISION REQUESTED: June 18, 2002

REVISION APPROVAL DATE: June 20, 2002

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS APPROVED THIS PROJECT'S REVISION.

Approves the addition of a survey mail phase, revised subject recruitment and consent form.

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewal are possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu.



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Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

Sincerely,

Ashir Kumar, M.D.
Chair, UCRIHS

AK: kj

cc: Dain Palmer
16 Natural Resources

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**MICHIGAN STATE
UNIVERSITY**

February 3, 2004

TO: Shari DANN
13 Natural Resources Bldg.
MSU

RE: IRB # 01-626 CATEGORY: 1-2 EXEMPT
RENEWAL APPROVAL DATE: March 3, 2003
EXPIRATION DATE: February 3, 2004

TITLE: ASSESSING THE IMPACT OF BACKYARD HABITATS ON PARTICIPANT
KNOWLEDGE, ATTITUDES, AND BEHAVIOR

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS APPROVED THIS PROJECT'S RENEWAL.

RENEWALS: UCRIHS approval is valid until the expiration date listed above. Projects continuing beyond this date must be renewed with the renewal form. A maximum of four such expedited renewals are possible. Investigators wishing to continue a project beyond that time need to submit a 5-year renewal application for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please include a revision form with the renewal. To revise an approved protocol at any other time during the year, send your written request with an attached revision cover sheet to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@msu.edu.

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Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

Sincerely,

A handwritten signature in black ink, appearing to read "Ashir Kumar".

Ashir Kumar, M.D.
UCRIHS Chair

AK jm

cc: Dain Palmer
16 Natural Resources

APPENDIX B: WORKSHOP SURVEY MATERIALS

Workshop Cover Letter

MICHIGAN STATE UNIVERSITY

April 6, 2002

Dear Backyard Wildlife Habitat Workshop Participant:

Today, we are asking for your help with a study of participants in the National Wildlife Federation's Backyard Wildlife Habitat program being conducted by the Michigan State University Department of Fisheries and Wildlife. This study is part of an effort to learn about the experiences and opinions of participants in the Backyard Wildlife Habitat program.

We are surveying workshop participants before and after the workshop to ask their opinions about the Backyard Wildlife Habitat program and why they decided to participate in the program.

Results from the surveys will be used to help National Wildlife Federation staff members and volunteers better understand the opinions and motivations of Backyard Wildlife Habitat participants. This information will allow National Wildlife Federation staff members and volunteers to strengthen the Backyard Wildlife Habitat program in the future.

Your answers are completely confidential. Your name will never be associated with your responses in any way, and your privacy will be protected to the maximum extent allowable by law. While your response to this survey and any of the questions is completely voluntary, you can help us very much by taking a few minutes to share your opinions and knowledge about the Backyard Wildlife Habitats program. You indicate your voluntary agreement to participate by completing this survey.

If you have any questions or comments about this study, we would be happy to talk with you. Call us at (517) 432-5037, write to us at the address on the letterhead, or email us at palmerda@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact—anonynously, if you wish—Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 353-2976, e-mail: ucrihs@msu.edu, or regular mail: 246 Administration Bldg, East Lansing, MI 48824.

Thank you very much for helping with this important study.

Sincerely,

Shari L. Dann
Project Manager
Associate Professor of Fisheries and Wildlife

Dain Palmer
Graduate Research Assistant

P.S. Please do not complete the survey if you are under 18 years of age.

Pre-Workshop Survey

BACKYARD WILDLIFE HABITAT WORKSHOP

A Michigan State University Survey

Pierce Cedar Creek Institute, April 6, 2002

This survey will give you an opportunity to express your opinions on issues relating to landscaping for wildlife and to share experiences you may have had in the Backyard Wildlife Habitat program. Your responses will be helpful, even if you have had no previous experience landscaping for wildlife.

PLEASE WRITE DOWN THE KIND OF ANIMAL LISTED ON YOUR NAMETAG.

(THIS INFORMATION WILL BE USED TO TRACK CHANGES IN THE RESPONSES OF INDIVIDUALS OVER TIME. Your name will never be associated with your responses in any way.)

LANDSCAPING AND GARDENING ACTIVITIES AND TRAINING

1. Have you ever certified a backyard wildlife habitat with the National Wildlife Federation's Backyard Wildlife Habitat program? (Check one)

- 1 ☐ Yes
 2 ☐ No → (Skip to question 3)

2. In what year was the backyard wildlife habitat certified with National Wildlife Federation's Backyard Wildlife Habitat program? _____
 (Give your best estimate)

3. *About how often, in a typical year, do you do the following activities? (Circle one response for each)*

		1 Often	2 Sometimes	3 Rarely	4 Never
a.	Watch wildlife on your property	O	S	R	N
b.	Provide food for wildlife on your property	O	S	R	N
c.	Provide water for wildlife on your property	O	S	R	N

4. Have you ever provided shelter or nesting boxes for wildlife on your property? (Check one)

- 1 ☐ Yes
 2 ☐ No

5. Have you ever landscaped or gardened at your property? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 7)

6. About how many years total have you landscaped or gardened at you property? (Check one)

- 1 ☐ Less than 1 year
2 ☐ From 1 to 2 years
3 ☐ From 3 to 5 years
4 ☐ From 6 to 10 years
5 ☐ More than 10 years

Wildlife-Related Activities

7. Have you been a member of or contributed money to the National Wildlife Federation in the last 5 years?

- 1 ☐ Yes
2 ☐ No

8. Please list any organizations (other than the National Wildlife Federation) related to wildlife or natural resources that you have been a member of or contributed money to in the last 5 years.

9. Please list any organizations related to gardening or landscaping that you have been a member of or contributed money to in the last 5 years.

10. Please indicate which of the following activities you have done in the last 5 years. (Circle one response for each)

		1 Yes	2 No
a.	Have you helped any friends, family members, or neighbors certify their yards through National Wildlife Federation's Backyard Wildlife Habitats program?	Y	N
b.	Have you been trained as a Habitat Steward by the National Wildlife Federation?	Y	N
c.	Have you hosted a training for Habitat Stewards?	Y	N
d.	Have you been a volunteer who educates others in groups or individually about wildlife, natural resources, or environmental issues?	Y	N
e.	Have you been a volunteer who assists others in groups or individually in gardening or landscaping?	Y	N
f.	Have you volunteered your help with any wildlife, natural resource, or environmental projects in your community?	Y	N
g.	Have you volunteered your help with any landscaping or gardening projects in your community?	Y	N
h.	Have you made household purchasing decisions based on wildlife, natural resource, or environmental issues?	Y	N
i.	Have you submitted an editorial to a newspaper or magazine regarding a wildlife, natural resource, or environmental issue?	Y	N
j.	Have you written, phoned, or met with in person, an elected representative regarding a wildlife, natural resource, or environmental issue?	Y	N
k.	Have you testified at a public meeting regarding a wildlife, natural resource, or environmental issue?	Y	N
l.	Have you organized a fundraiser, petition drive, or letter writing campaign regarding a wildlife, natural resource, or environmental issue?	Y	N
m.	Have you given a television, radio, or newspaper interview concerning a wildlife, natural resource, or environmental issue?	Y	N

National Wildlife Federation Publications and Programs

11. For each of the following National Wildlife Federation publications, please indicate all publications that you have purchased, read (or viewed), or given to a child within the last 5 years. (Circle one response for each)

	1 Yes	2 No
a. National Wildlife magazine	Y	N
b. International Wildlife magazine	Y	N
c. Ranger Rick magazine	Y	N
d. Your Big Backyard magazine	Y	N
e. Wild Animal Baby magazine	Y	N
f. Any books published by the National Wildlife Federation	Y	N
g. Any videos or software published by the National Wildlife Federation	Y	N
h. Please list other National Wildlife publications that you have purchased, read (or viewed), or given to a child within the last 5 years.		
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>		

12. For each of the following National Wildlife Federation Programs, please indicate all programs that you have volunteered for or participated in within the last 5 years. (Circle one response for each)

	1 Yes. I Have volunteered for or participated in the program.	2 No. I Have not volunteered for or participated in the program.
a. Schoolyard Habitats	Y	N
b. Campus Ecology	Y	N
c. Earthsavers	Y	N
d. Earth Tomorrow	Y	N
e. NatureLink	Y	N
f. Please list other National Wildlife Federation programs that you have volunteered for or participated in.		
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>		

Motivation for Participating in Backyard Wildlife Habitat

13. For each of the following possible reasons, please indicate how important or unimportant they have been in your decision to participate in the Backyard Wildlife Habitat Program. (Circle one response for each)

I decided to participate in the Backyard Wildlife Habitat program because:		1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
a.	I want to be able to view new species of wildlife on my property.	VI	SI	U	SU	VU
b.	I want to attract frogs, salamanders, or other amphibians to my property.	VI	SI	U	SU	VU
c.	I want to attract lizards, snakes, or other reptiles to my property.	VI	SI	U	SU	VU
d.	I want to attract songbirds to my property.	VI	SI	U	SU	VU
e.	I want to attract waterfowl, wading birds, or other 'water birds' to my property.	VI	SI	U	SU	VU
f.	I want to attract hawks, eagles, or owls to my property.	VI	SI	U	SU	VU
g.	I want to attract small mammals, such as rabbits, woodchucks, foxes, or opossums, to my property.	VI	SI	U	SU	VU
h.	I want to attract larger mammals, such as deer or coyotes, to my property.	VI	SI	U	SU	VU
i.	I want to attract butterflies to my property.	VI	SI	U	SU	VU
j.	I want to attract insects (other than butterflies), spiders, or other invertebrates to my property.	VI	SI	U	SU	VU
k.	I want to help wildlife survive during the spring, summer, and fall.	VI	SI	U	SU	VU
l.	I want to help wildlife survive during the winter.	VI	SI	U	SU	VU
m.	I want to help preserve and improve wildlife habitat.	VI	SI	U	SU	VU
n.	A friend, family member, or neighbor encouraged me to participate in the program.	VI	SI	U	SU	VU
o.	I want a new hobby.	VI	SI	U	SU	VU
p.	I want a project that I can work on with friends, family members, or neighbors.	VI	SI	U	SU	VU
q.	I want to learn more about wildlife.	VI	SI	U	SU	VU
r.	I want my friends, family members or neighbors to know about the improvements I make to my property.	VI	SI	U	SU	VU
s.	I want recognition from the National Wildlife Federation for the improvements I make to my property.	VI	SI	U	SU	VU
t.	I want to increase the financial value of my property.	VI	SI	U	SU	VU

I decided to participate in the Backyard Wildlife Habitat program because:

	1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
u. I want to make my property more attractive.	VI	SI	U	SU	VU
v. I want to provide educational opportunities for children.	VI	SI	U	SU	VU
w. I want to get good physical exercise by landscaping for wildlife.	VI	SI	U	SU	VU
x. I want to help relieve stress in my life by landscaping for wildlife.	VI	SI	U	SU	VU
y. I want to learn environmentally friendly landscaping techniques.	VI	SI	U	SU	VU
z. Please list any other reasons that you decided to participate in the Backyard Wildlife Habitat Program.					

Management/Landscaping Techniques Used

14. For each of the following landscaping or management activities, please indicate whether you have or have not done the activity on your property. (Circle one response for each)

	1 Yes. I Have Done the Activity.	2 No. I Have Not Done the Activity.	3 Unsure
a. Controlling invasive exotic species	Y	N	U
b. Landscaping with native plants	Y	N	U
c. Reducing the size of your traditional lawn	Y	N	U
d. Reducing the use of chemical pesticides	Y	N	U
e. Reducing the use of chemical fertilizers	Y	N	U
f. Reusing yard waste	Y	N	U
g. Mulching	Y	N	U
h. Conserving water with techniques such as drip irrigation or collecting rainwater	Y	N	U
i. Setting management goals and objectives	Y	N	U
j. Planning actions to best meet management goals and objectives	Y	N	U
k. Inventory of plants on your property	Y	N	U
l. Base mapping your property to document current wildlife conditions	Y	N	U
m. Inventorying animals on your property	Y	N	U
n. Inventorying soils on your property	Y	N	U
o. Inventorying landscape features, such as ponds and ditches, on your property	Y	N	U

Backyard Wildlife Habitat Materials Used

For each of the following National Wildlife Federation materials, please indicate whether or not you have used the resource.

15. Have you used free National Wildlife Federation written materials, such as fliers on attracting butterflies, building ponds, or building nest boxes? (Check one)

1 ☐ Yes

2 ☐ No

16. Have you used the Backyard Wildlife Habitat Information Kit purchased from National Wildlife Federation or Wild Birds Unlimited? (Check one)

1 ☐ Yes

2 ☐ No

17. Have you used the National Wildlife Federation Backyard Wildlife Habitat website? (Check one)

1 ☐ Yes

2 ☐ No

18. Have you attended a slide show or other presentation by National Wildlife Federation staff or a Habitat Steward? (Check one)

1 ☐ Yes

2 ☐ No

19. Have you received personal assistance from a Habitat Steward? (Check one)

1 ☐ Yes

2 ☐ No

20. Have you received personal assistance from neighbors, friends, or family members? (Check one)

1 ☐ Yes

2 ☐ No

21. Please list any other sources of information (e.g., books, magazines or websites) you have used while landscaping for wildlife.

ATTITUDES TOWARD LANDSCAPING/MANAGEMENT TECHNIQUES

22. The following techniques are sometimes used while landscaping for wildlife. How important or unimportant do you personally believe it is for people to use the following landscaping/wildlife management techniques on their properties? (Circle one response for each)

		1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
a.	Eliminating invasive exotic species	VI	SI	U	SU	VU
b.	Landscaping with native plants	VI	SI	U	SU	VU
c.	Reducing the use of chemical fertilizers	VI	SI	U	SU	VU
d.	Decreasing the size of traditional lawns	VI	SI	U	SU	VU
e.	Reducing the use of chemical pesticides	VI	SI	U	SU	VU
f.	Reusing yard waste	VI	SI	U	SU	VU
g.	Practicing water conservation techniques such as drip irrigation or collecting rainwater	VI	SI	U	SU	VU
h.	Practicing mulching	VI	SI	U	SU	VU
i.	Creating a wildlife management plan	VI	SI	U	SU	VU

Attitudes Toward Wildlife Issues

23. Please indicate the extent to which you agree or disagree with the following statements. (Circle one response for each)

It is important to me personally:		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	That I observe or photograph wildlife.	SA	MA	U	MD	SD
b.	That I talk about wildlife with family and friends.	SA	MA	U	MD	SD
c.	That local economies benefit from the sale of equipment, supplies, or services related to wildlife recreation.	SA	MA	U	MD	SD
d.	That I understand more about the behavior of wildlife.	SA	MA	U	MD	SD
e.	That game animals are managed for an annual harvest for human use without harming the future of the wildlife population.	SA	MA	U	MD	SD
f.	That I hunt game animals for food.	SA	MA	U	MD	SD
g.	That I know that wildlife exist in nature.	SA	MA	U	MD	SD
h.	That I tolerate most wildlife nuisance problems.	SA	MA	U	MD	SD
i.	That I express opinions about wildlife and their management to public officials or to officers of private conservation organizations.	SA	MA	U	MD	SD
j.	That I see wildlife in books, movies, paintings or photographs.					
k.	That I trap furbearing animals for the sale of fur or pelts.	SA	MA	U	MD	SD
l.	That I tolerate the ordinary personal safety hazards associated with some wildlife.	SA	MA	U	MD	SD
m.	That I consider the presence of wildlife as a sign of the quality of the natural environment.	SA	MA	U	MD	SD
n.	That I tolerate the ordinary risk of wildlife transmitting disease to humans or domestic animals.	SA	MA	U	MD	SD
o.	That I hunt game animals for recreation.	SA	MA	U	MD	SD
p.	That I appreciate the role that wildlife play in the natural environment.	SA	MA	U	MD	SD
q.	That I tolerate most levels of property damage by wildlife.	SA	MA	U	MD	SD
r.	That wildlife are included in educational materials as the subject for learning more about nature.	SA	MA	U	MD	SD

Environmental Attitudes

24. The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	We are approaching the limit of the number of people the earth can support.	SA	MA	U	MD	SD
b.	When humans interfere with nature it often produces disastrous consequences.	SA	MA	U	MD	SD
c.	The earth has plenty of natural resources if we just learn how to develop them.	SA	MA	U	MD	SD
d.	Plants and animals have as much right as humans to exist.	SA	MA	U	MD	SD
e.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	SA	MA	U	MD	SD
f.	Despite our special abilities humans are still subject to the laws of nature.	SA	MA	U	MD	SD
g.	The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	SA	MA	U	MD	SD
h.	Humans were meant to rule over the rest of nature.	SA	MA	U	MD	SD
i.	Humans will eventually learn enough about how nature works to be able to control it.	SA	MA	U	MD	SD
j.	If things continue on their present course, we will soon experience a major ecological catastrophe.	SA	MA	U	MD	SD

KNOWLEDGE OF WILDLIFE AND LANDSCAPING

We would like to find out what you know about landscaping for wildlife. This is not a test; it is a way to help us strengthen the program. For the following questions, please check the one best answer.

25. Which of the following is a basic habitat component for wildlife? (Check one)

- 1 ☐ Food
- 2 ☐ Water
- 3 ☐ Cover
- 4 ☐ All of the above are basic habitat requirements

26. Which of the following terms is used to describe all of the living and nonliving interacting features of a given area? (Check one)
- 1 ☐ Habitat
 - 2 ☐ Ecosystem
 - 3 ☐ Community
 - 4 ☐ Biodiversity
27. Which of the following statements about invasive exotic species is true? (Check one)
- 1 ☐ Most invasive exotic plants or animals were introduced naturally to new areas
 - 2 ☐ Most invasive exotic plants and animals benefit native plant and animal species
 - 3 ☐ Invasive exotic plants and animals usually cannot compete with native plants and animals
 - 4 ☐ None of the above are true
28. Which of the following statements about traditional lawns is true? (Check one)
- 1 ☐ Traditional lawns usually require less water than yards with native plant species
 - 2 ☐ Traditional lawns are more beneficial to more wildlife species than yards with native plant species
 - 3 ☐ Runoff of pesticides and fertilizers from traditional lawns is a major cause of water pollution
 - 4 ☐ Virtually no wildlife species thrive on traditional lawns
29. Which of the following has the greatest influence on the types of plants that can live in a particular area? (Check one)
- 1 ☐ The kind of soil that is found in the area
 - 2 ☐ The species of animals that live in the area
 - 3 ☐ The amount of sunlight during the growing season
 - 4 ☐ The amount of carbon dioxide (CO₂) in the atmosphere
30. Carrying capacity refers to the number of individuals of a species who can be supported in a given area indefinitely. Why is it important to understand carrying capacity when managing for wildlife on a residential property? (Check one)
- 1 ☐ Over long periods of time, property owners should attempt to attract numbers of individual animals that are more than the carrying capacity of the area
 - 2 ☐ Over long periods of time, property owners should attempt to attract numbers of individual animals that are equal to or less than the carrying capacity of the area
 - 3 ☐ It is impossible to exceed the carrying capacity of an area, even for short periods of time
 - 4 ☐ Carrying capacity is not important to understand when managing for wildlife on a residential property

31. Which of the following is an effective and potentially ecologically sound technique for controlling invasive exotic plants? (Check one)
- 1 ☐ The use of chemical fertilizers
 - 2 ☐ The use of controlled burns
 - 3 ☐ The flooding of areas with water
 - 4 ☐ There is no reason to control invasive exotic plants
32. Which of the following is the best way to find out which plants are native to your area? (Check one)
- 1 ☐ Contact a local native plant nursery.
 - 2 ☐ Find out which plants your neighbors are successfully landscaping with. The plants that are doing well are likely native to your area.
 - 3 ☐ Inventory the plant species currently on your property. Most of these species are likely native to your area.
 - 4 ☐ None of the above are good ways to find out about native plants in your area.
33. Which of the following is true about wildlife management planning? (Check one)
- 1 ☐ With the right management techniques, any wildlife species can be attracted to any yard
 - 2 ☐ An inventory of habitats, wildlife, plants, soils, and local landscapes should be done before determining management objectives
 - 3 ☐ For most yards under an acre in size, little can be gained by carefully planning landscaping activities based on management goals and objectives
 - 4 ☐ All of the above are true
34. Which of the following is important to include in a property base map? (Check one)
- 1 ☐ Climate information
 - 2 ☐ Human-made alterations to the landscape
 - 3 ☐ Vegetation types for the entire state
 - 4 ☐ None of the above are important to include
35. Which of the following is true about wetlands? (Check one)
- 1 ☐ They protect shorelines and banks from erosion
 - 2 ☐ They store floodwater
 - 3 ☐ They maintain groundwater supplies
 - 4 ☐ All of the above are true

Background Information

In order for us to more fully understand people's responses to the previous questions, we need to know a few things about your background. Remember that your responses are completely confidential and that neither your name nor your address will be directly linked to your responses in any way.

36. In what type of area do you currently live? (Check one)

- 1 ☐ Rural, Farm
- 2 ☐ Rural, Non-Farm
- 3 ☐ Small Town (25,000 people or fewer)
- 4 ☐ Urban Area (From 25,001 to 100,000 people)
- 5 ☐ Metropolitan Area (More than 100,000 people)

37. In what state do you currently live? _____

38. In what county do you currently live? _____

39. What is the highest level of formal education that you have completed?
(Check one)

- 1 ☐ Less than high school graduate
- 2 ☐ High School graduate or GED
- 3 ☐ Vocational or Trade School
- 4 ☐ Associate's Degree (2 year degree)
- 5 ☐ Some College
- 6 ☐ College Graduate (Bachelor's or 4 year degree)
- 7 ☐ Graduate or Professional Degree

40. We would like to know if you have any special training in landscaping or wildlife management. For each of the following areas, please indicate if you have a four year degree or graduate or professional degree in the area **OR** have had at least 5 years of work experience in the area. (Circle one response for each)

		1 Degree or 5 years experience	2 No degree and less than 5 years experience
a.	Botany	Y	N
b.	Ecology	Y	N
c.	Forestry	Y	N
d.	Landscaping	Y	N
e.	Range Management	Y	N
f.	Wildlife Management	Y	N
g.	Zoology	Y	N

41. Are you male or female?

- 1 ☐ Male
- 2 ☐ Female

42. In what year were you born? 19____

43. What is your race or ethnicity? (Check all that apply)

- 2 ☐ White
- 3 ☐ Black or African American
- 4 ☐ Hispanic or Latino
- 5 ☐ American Indian or Alaska Native
- 6 ☐ Asian
- 7 ☐ Native Hawaiian or Other Pacific Islander

44. What was your gross household income (before taxes) in 2001? (Check one)

- 1 ☐ Less than \$20,000
- 2 ☐ \$20,000 to \$39,999
- 3 ☐ \$40,000 to \$59,999
- 4 ☐ \$60,000 to \$74,999
- 5 ☐ \$75,000 to \$99,999
- 6 ☐ \$100,000 to \$124,999
- 7 ☐ \$125,000 to \$149,999
- 8 ☐ \$150,000 or more

Thank you for helping us with this project!

If you have any other comments you would like to share with us, please use the space below.

APPENDIX C: FOCUS GROUP MATERIALS

Focus Group Phone Recruitment Script

Hello, my name is Dain Palmer. I'm from the MSU, Dept. of Fisheries and Wildlife. I am calling to talk with _____. Is he/she is available?

Hi _____, this is Dain Palmer from the Michigan State University Dept. of Fisheries and Wildlife. I also work at Pierce Cedar Creek Institute in Hastings, and I helped moderate the April 6 Backyard Wildlife Habitat workshop at Piece Cedar Creek Institute.

I am calling today to tell you about an opportunity to share your experiences in the workshop, as well as other experiences you may have had while planning and doing projects that provide wildlife habitat.

We are inviting people from the April 6 workshop to participate in a focus group discussion about the Backyard Wildlife Habitat program. We'll hold the discussion on June 3, from 7:00p.m. to 8:30 p.m. at Pierce Cedar Creek Institute in Hastings.

Results from the discussion will be used to help National Wildlife Federation staff members and volunteers better understand the opinions and motivations of Backyard Wildlife Habitat participants. This information will help National Wildlife Federation consider how they provide the Backyard Wildlife Habitat program in the future.

Are you interested or able to participate in the discussion on June 3?

If participant responds "Yes"

Let me tell you a few things about the discussion. Though participation in the focus group discussion is completely voluntary, you will be helping us greatly by sharing your experiences in the Backyard Wildlife Habitat program. Your responses will be kept completely confidential. No references to your identity will be included in any reports or transcripts. Your privacy will be protected to the maximum extent allowable by law.

Would you still like to participate in the discussion on June 3?

Thank you for volunteering to talk with us. You will soon be mailed a letter that details information that I discussed today about the focus group discussion.

Do you have any questions about the discussion?

Thank you once again for helping with this study. We look forward to seeing you on June 3!

If participant responds "No"

Thank you for your time today.

Have a good evening.

Focus Group Cover Letter

MICHIGAN STATE **U N I V E R S I T Y**

May 21, 2002

Thank you for agreeing to participate in the focus group discussion on **June 3, 2002 from 7:00p.m. to 8:30 p.m. at Pierce Cedar Creek Institute in Hastings, Michigan.** We have invited people from the April 6 Backyard Wildlife Habitat workshop to participate in the discussion.

Results from the discussion will be used to help National Wildlife Federation staff members and volunteers better understand the opinions and motivations of Backyard Wildlife Habitat participants. This information will help National Wildlife Federation consider how they provide the Backyard Wildlife Habitat program in the future.

Though participation in the focus group discussion is completely voluntary, you will be helping us greatly by sharing your experiences in the Backyard Wildlife Habitat program. Your responses will be kept completely confidential. No references to your identity will be included in any reports or transcripts. Your privacy will be protected to the maximum extent allowable by law.

If you have any questions about the focus group discussion, we would be happy to talk with you. Call us at (517) 432-5037, write to us at the address on the letterhead, or email us at palmerda@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact—anonynously, if you wish—Ashir Kumar, Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 353-2976, e-mail: ucrihs@msu.edu, or regular mail: 246 Administration Bldg, East Lansing, MI 48824.

Thank you very much for helping with this important study. We look forward to seeing you on June 3rd.

Sincerely,

Shari L. Dann
Project Manager
Associate Professor of Fisheries and Wildlife

Dain Palmer
Graduate Research Assistant

Focus Group Consent Form

Michigan State University Backyard Wildlife Habitat Consent Form

Today, we are again asking for your help with a study of participants in the National Wildlife Federation's Backyard Wildlife Habitat program being conducted by the Michigan State University Department of Fisheries and Wildlife. This study is part of an effort to learn about the experiences and opinions of participants in the Backyard Wildlife Habitat program.

Results from the focus group will be used to help National Wildlife Federation staff members and volunteers better understand the opinions and motivations of Backyard Wildlife Habitat participants. This information will help National Wildlife Federation consider how they provide the Backyard Wildlife Habitat program in the future.

Your participation in this discussion and your answering of any of the questions is completely voluntary and you may withdraw from participating in this study at any time. However, you can help us very much by taking some time to share your opinions and knowledge about the Backyard Wildlife Habitats program during this discussion.

The discussion will be audio taped to insure an accurate record of the discussion. Upon completion of transcription tapes will be erased. Your responses will be kept completely confidential. No references to your identity will be included in any reports or transcripts. Your privacy will be protected to the maximum extent allowable by law.

If you have any questions or comments about this study, we would be happy to talk with you. Call us at (517) 432-5037, write to us at Department of Fisheries and Wildlife, Michigan State University, 13 Natural Resources Building, East Lansing, MI 48824, or email us at palmerda@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact—anononymously, if you wish—Ashir Kumar, Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 353-2976, e-mail: ucrihs@msu.edu, or regular mail: 246 Administration Bldg, East Lansing, MI 48824.

By signing this form, you are acknowledging your voluntary participation in today's discussion.

(Print Name)

(Sign Name)

(Signature of principal investigator or authorized representative, Dain Palmer)

(Date)

PLEASE KEEP A COPY OF THIS FORM FOR YOUR RECORDS!

Focus Group Script

Introductions

Hello, my name is Dain Palmer. I'm a graduate student in the MSU Dept. of Fisheries and Wildlife. I'll be moderating the focus group discussion. This discussion is part of my Master's research project. Assisting me tonight is Heather Lundrigan. Heather is a PhD student in Fisheries and Wildlife at MSU.

Orientation

We've organized this discussion group to gather information that will be used to learn about the experiences of people in the Backyard Wildlife Habitat program. Results from the discussion will be used to help National Wildlife Federation staff members and volunteers better understand the opinions and motivations of Backyard Wildlife Habitat participants. This information will help National Wildlife Federation consider how they provide the Backyard Wildlife Habitat program in the future.

For today's discussion we'll follow a focus group format. The purpose of focus groups is to gain insight on various views and perceptions in a structured format. This is different from a general discussion session because there are specific questions outlined.

Now we'll take care of some paperwork [I'll hand out the consent forms at this point]. Please read through this form carefully. There are a few things I would like point out. We're taping our discussion today so that I don't have to take detailed notes. The tapes will be securely stored and destroyed at the conclusion of this study. I want to assure you that your names will remain confidential and will not appear in any document resulting from this study.

It's important that you share what is on your mind regarding the topics we discuss. This is a small group, so comments from each participant are very important. There may be some differences in opinion here today, but please don't let that keep you from sharing your thoughts. There are no right or wrong answers.

Please feel free to ask for clarifications any time a question is unclear. Also, you may decline answering any or all questions posed in this discussion. And, if you choose, you may withdraw from this discussion and this study at any point in time.

In order for us to explore several questions related to the Backyard Wildlife Habitat Program, it may be necessary for me to occasionally ask you to be brief. And, sometimes I may need to redirect the discussion to other topics. So, please understand that if I interrupt you, it's only because we need your input on so many different things. Please try to speak one at a time so that all of your comments can be clearly understood when I go back over the tape.

Are there any questions before we get started? We appreciate you taking the time to participate in this focus group.

Now let's talk about your experiences in the Backyard Wildlife Habitat program.

Focus Group Questions

1. First, let's go around the whole group. Please share with us some reasons that you decided to participate in the BWH program.
2. Now, would someone like to share their experiences in Backyard Wildlife Habitat program work since the April 6 workshop?
 - a. Since the workshop, have you done any activities to manage your property for wildlife?
 - b. If so, what have you done so far, and how has it gone for you?
 - c. If not, why haven't you?
3. Have your goals for providing wildlife habitat changed during or since the workshop?
 - a. Have you abandoned plans for your property that you no longer feel are feasible?
 - b. Do you have any new plans?
 - c. Do you think these changes were caused by the workshop?
4. Has your knowledge about providing wildlife habitat changed during or since the workshop?
 - a. Have your techniques for providing wildlife habitat changed during or since the workshop?
 - i. Has your knowledge about techniques for providing wildlife habitat changed during or since the workshop?
 - b. Do you think these changes in your knowledge were caused by the workshop?
 - c. What were the one or two MOST IMPORTANT OR USEFUL things you learned at the workshop that have been most helpful to you?
5. What resources or assistance have you found helpful while providing wildlife habitat?
 - a. What resources from the workshop have you used the most?
 - i. What books, magazines, websites, etc. have you used?
 - b. What OTHER resources have you found SINCE the workshop?
 - c. What assistance have you received from experts in providing wildlife habitat?
 - d. What additional resources or assistance would you find helpful?
 - e. What information or resources do you feel you have been most lacking?
6. Have your attitudes changed since the workshop?
 - a. Have your attitudes toward techniques for providing wildlife habitat changed?
 - b. Have your attitudes toward the Backyard Wildlife Habitat program changed?
 - c. Have your attitudes toward the National Wildlife Federation changed?
 - d. Have your attitudes toward Pierce Cedar Creek Institute changed?
 - e. Do you think any of these changes in your attitudes were caused by the workshop?

7. So far, what have you found most rewarding about providing habitat for wildlife?
8. So far, what have you found most challenging about providing wildlife habitat?
9. Knowing what you know now, is there anything you would recommend for modifying or improving the workshop you attended?
10. What advice would you offer to the organizers of the BWH program?

Closure

Before we wrap up tonight...are there any other comments or thoughts you would like to add before we finish? Anything that I may have overlooked? If you have any further questions or comments, I'd be happy to talk with you about anything related to this focus group. My contact information is on the Consent Form.

Thanks for your participation and input!

APPENDIX D: NATIONWIDE SURVEY MATERIALS

Nationwide Survey Cover Letter 1

MICHIGAN STATE UNIVERSITY

July 17, 2002

I am writing to ask for your help in a study of participants in the National Wildlife Federation's Backyard Wildlife Habitat program. This study is being conducted by the Michigan State University Department of Fisheries and Wildlife as part of an effort to learn about the experiences of participants in the Backyard Wildlife Habitat program.

We are contacting a random sample of people who have properties certified in the Backyard Wildlife Habitat program to ask about their opinions, why they participate in the program, and how they benefit.

Results from the surveys will be used to help National Wildlife Federation staff members and volunteers better understand the needs of Backyard Wildlife Habitat participants. This information will help National Wildlife Federation consider how it provides the program in the future.

Your answers are completely confidential. Your name will never be associated with your responses in any way, and your privacy will be protected to the maximum extent allowable by law. While your response to this survey and any of the questions is completely voluntary, you can help us very much by taking a few minutes to share your ideas about the Backyard Wildlife Habitat program. You indicate your voluntary agreement to participate by completing this survey.

This survey takes most people about 20 minutes to complete. As a token of our thanks, we have enclosed a National Wildlife Federation bookmark.

If you have any questions or comments about this study, we would be happy to talk with you. Call us at (517) 432-5037, write to us at the address on the letterhead, or email us at palmerda@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact—anononymously, if you wish—Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 353-2976, e-mail: ucrihs@msu.edu, or regular mail: 246 Administration Bldg, East Lansing, MI 48824.

Thank you very much for helping with this important study.

Sincerely,

D. Palmer
Project Coordinator

P.S. Please do not complete the survey if you are under 18 years of age.

Nationwide Survey Thank You/Reminder Postcard

July 26, 2002

Recently you were mailed a questionnaire seeking your opinions and experiences related to the Backyard Wildlife Habitat program.

If you have already completed and returned the survey, please accept our sincere thanks! If not, please do so today. Your feedback will provide valuable information to National Wildlife Federation staff and volunteers.

If by some chance you did not receive the questionnaire, or it got misplaced, please call us at (517) 432-5037 or email us at palmerda@msu.edu and we will get another one in the mail to you.



Nationwide Survey Cover Letter 2

MICHIGAN STATE **UNIVERSITY**

August 6, 2002

WE HAVEN'T HEARD FROM YOU YET!

A few weeks ago we sent a questionnaire to you that asked for your opinions and experiences related to the Backyard Wildlife Habitat program. To the best of our knowledge, it has not yet been returned. *If this letter and your completed survey have crossed in the mail, please accept our sincere thanks for your participation in this study!*

The comments of people who have already responded show that participants in the Backyard Wildlife Habitats program hold a wide variety of views and have had a wide variety of experiences in the program. We think the results are going to be very useful to the National Wildlife Federation.

We are writing again because it's important that we receive your questionnaire to ensure that we'll get accurate results. **We need to hear from nearly everyone in the sample to be sure that the results are truly representative.**

Please be assured that we will not share your personal information with anyone else. Your name will never be associated with your survey responses in any way and your privacy will be protected to the maximum extent allowable by law.

Your responses to the survey and any of its questions are completely voluntary. We hope that you will fill out and return the questionnaire soon, but if for any reason you prefer not to answer it, please let us know by returning a note or blank questionnaire in the enclosed stamped envelope.

If you have any questions, please feel free to call us at (517) 432-5037 or email us at palmerda@msu.edu. If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact—anonynously, if you wish—Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 353-2976, e-mail: ucrihs@msu.edu, or regular mail: 246 Administration Bldg, East Lansing, MI 48824.

Sincerely,

Dain Palmer
Project Coordinator

P.S. Please do not complete the survey if you are under 18 years of age.



BACKYARD WILDLIFE HABITAT SURVEY

A Michigan State University Survey



This survey will give you an opportunity to express your opinions on issues relating to providing wildlife habitat and to share experiences you may have had in the Backyard Wildlife Habitat program.

Your Early Backyard Wildlife Activities

1. In what year was your backyard wildlife habitat certified with National Wildlife Federation's Backyard Wildlife Habitat program? _____ (Give your best estimate)
2. Prior to the time you applied for Backyard Wildlife Habitat certification, did you ever landscape or garden on your property? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 4)

3. About how many years total did you landscape or garden on your property before being certified? (Check one)

- 1 ☐ Less than 1 year
2 ☐ From 1 to 2 years
3 ☐ From 3 to 5 years
4 ☐ From 6 to 10 years
5 ☐ From 10 to 20 years
6 ☐ More than 20 years

4. Prior to certification, did you do any activities to benefit wildlife and/or improve wildlife habitat on your property?

- 1 ☐ Yes
2 ☐ No



General Wildlife-Related Activities

5. About how often, in a typical year, do you do the following activities on your property? (Circle one response for each)

	1 Often	2 Sometimes	3 Rarely	4 Never
a. Watch wildlife	O	S	R	N
b. Provide food for wildlife	O	S	R	N
c. Provide water for wildlife	O	S	R	N
d. Provide or maintain cover for wildlife, such as brush piles or shrubs	O	S	R	N
e. Provide or maintain places, such as nesting boxes, for wildlife to reproduce and raise young	O	S	R	N

6. Have you been a member of or contributed money to the National Wildlife Federation in the last 5 years? (Check one)

- a. ☐ Yes
b. ☐ No

7. Please list any organizations (other than the National Wildlife Federation) related to wildlife or natural resources that you have been a member of or contributed money to in the last 5 years. Please write out full organization name(s).

8. Please list any organizations related to gardening or landscaping that you have been a member of or contributed money to in the last 5 years. Please write out full organization name(s).

9. Please indicate which of the following activities you have done **In the last 5 years**.
(Circle one response for each)

		1 Yes	2 No
a.	Have you helped any friends, family members, or neighbors certify their yards through National Wildlife Federation's Backyard Wildlife Habitat program?	Y	N
b.	Have you been trained as a Habitat Steward by the National Wildlife Federation?	Y	N
c.	Have you hosted a training for Habitat Stewards?	Y	N
d.	Have you been a volunteer who educates others in groups or individually about wildlife, natural resources, or environmental issues?	Y	N
e.	Have you been a volunteer who assists others in groups or individually in gardening or landscaping?	Y	N
f.	Have you volunteered with any wildlife, natural resource, or environmental projects in your community?	Y	N
g.	Have you volunteered with any landscaping or gardening projects in your community?	Y	N
h.	Have you made household purchasing decisions based on wildlife, natural resource, or environmental issues?	Y	N
i.	Have you submitted an editorial to a newspaper or magazine regarding a wildlife, natural resource, or environmental issue?	Y	N
j.	Have you written, phoned, or met with in person, an elected representative regarding a wildlife, natural resource, or environmental issue?	Y	N
k.	Have you testified at a public meeting regarding a wildlife, natural resource, or environmental issue?	Y	N
l.	Have you organized a fundraiser, petition drive, or letter writing campaign regarding a wildlife, natural resource, or environmental issue?	Y	N
m.	Have you given a television, radio, or newspaper interview concerning a wildlife, natural resource, or environmental issue?	Y	N

National Wildlife Federation Publications and Programs

10. For each of the following National Wildlife Federation publications, please indicate all publications that you have purchased, read (or viewed), or given to a child **within the last 5 years**. (Circle one response for each)

		1 YES. I have purchased, read, or given a child the publication.	2 NO. I have not purchased, read, or given a child the publication.
a.	National Wildlife magazine	Y	N
b.	International Wildlife magazine	Y	N
c.	Ranger Rick magazine	Y	N
d.	Your Big Backyard magazine	Y	N
e.	Wild Animal Baby magazine	Y	N
f.	Any books published by the National Wildlife Federation	Y	N
g.	Any videos or software published by the National Wildlife Federation	Y	N

For each of the following National Wildlife Federation Programs, please indicate all programs that you have volunteered for or participated in **within the last 5 years**.
(Circle one response for each)

		1 YES. I have volunteered for or participated in the program.	2 NO. I have not volunteered for or participated in the program.
a.	Schoolyard Habitats	Y	N
b.	Campus Ecology	Y	N
c.	Earthsavers	Y	N
d.	Earth Tomorrow	Y	N
e.	NatureLink	Y	N

Wildlife Habitat Techniques Used

12. For each of the following wildlife habitat activities, please indicate whether you have or have not done the activity **on your property**. (Circle one response for each)

		1 YES. I have done the activity.	2 NO. I have not done the activity.	3 UNSURE
a.	Controlling invasive exotic species	Y	N	U
b.	Landscaping with native plants	Y	N	U
c.	Reducing the size of your traditional lawn	Y	N	U
d.	Reducing the use of chemical pesticides	Y	N	U
e.	Reducing the use of chemical fertilizers	Y	N	U
f.	Reusing yard waste	Y	N	U
g.	Mulching	Y	N	U
h.	Conserving water with techniques such as drip irrigation or collecting rainwater	Y	N	U
i.	Setting wildlife management goals and objectives	Y	N	U
j.	Planning actions to best meet wildlife management goals and objectives	Y	N	U
k.	Inventorying plants	Y	N	U
l.	Base mapping your property to document current wildlife habitat conditions	Y	N	U
m.	Inventorying animals	Y	N	U
n.	Inventorying soils	Y	N	U
o.	Inventorying water features, such as ponds and ditches	Y	N	U
p.	Inventorying unique wildlife-related features, such as cover or areas to reproduce or raise young	Y	N	U
q.	Allowing natural predators, such as snakes, to live on your property	Y	N	U
r.	Preventing domestic animals, such as cats, from hunting wildlife on your property	Y	N	U

Attitudes Toward Techniques for Providing Wildlife Habitat

13. The following techniques are sometimes used to provide wildlife habitat. How important or unimportant do you personally believe it is for people to use the following landscaping/wildlife management techniques on their properties? (Circle one response for each)

		1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
a.	Eliminating invasive exotic species	VI	S	U	SU	VU
b.	Landscaping with native plants	VI	S	U	SU	VU
c.	Reducing the use of chemical fertilizers	VI	S	U	SU	VU
d.	Decreasing the size of traditional lawns	VI	S	U	SU	VU
e.	Reducing the use of chemical pesticides	VI	S	U	SU	VU
f.	Reusing yard waste	VI	S	U	SU	VU
g.	Practicing water conservation techniques such as drip irrigation or collecting rainwater	VI	S	U	SU	VU
h.	Practicing mulching	VI	S	U	SU	VU
i.	Creating a wildlife management plan	VI	S	U	SU	VU
j.	Allowing natural predators, such as snakes, to survive	VI	S	U	SU	VU
k.	Preventing domestic animals, such as cats, from hunting wildlife	VI	S	U	SU	VU

Motivation for Participating in the Backyard Wildlife Habitat Program

14. For each of the following possible reasons, please indicate how important or unimportant they are in your decision to participate in the Backyard Wildlife Habitat Program. (Circle one response for each)

I participate in the Backyard Wildlife Habitat program because:		1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
a.	I want to be able to view new species of wildlife on my property.	VI	S	U	SU	VU
b.	I want to attract frogs, salamanders, or other amphibians to my property.	VI	S	U	SU	VU
c.	I want to attract lizards, snakes, or other reptiles to my property.	VI	S	U	SU	VU
d.	I want to attract songbirds to my property.	VI	S	U	SU	VU
e.	I want to attract waterfowl, wading birds, or other 'water birds' to my property.	VI	S	U	SU	VU
f.	I want to attract hawks, eagles, or owls to my property.	VI	S	U	SU	VU

I participate in the Backyard Wildlife Habitat program because:		1 Very Important	2 Somewhat Important	3 Unsure	4 Somewhat Unimportant	5 Very Unimportant
g.	I want to attract small mammals, such as rabbits, woodchucks, foxes, or opossums, to my property.	VI	S	U	SU	VU
h.	I want to attract larger mammals, such as deer or coyotes, to my property.	VI	S	U	SU	VU
i.	I want to attract butterflies to my property.	VI	S	U	SU	VU
j.	I want to attract insects (other than butterflies), spiders, or other invertebrates to my property.	VI	S	U	SU	VU
k.	I want to help wildlife survive during the spring, summer, and fall.	VI	S	U	SU	VU
l.	I want to help wildlife survive during the winter.	VI	S	U	SU	VU
m.	I want to help conserve and improve wildlife habitat.	VI	S	U	SU	VU
n.	A friend, family member, or neighbor encouraged me to participate in the program.	VI	S	U	SU	VU
o.	I want a new hobby.	VI	S	U	SU	VU
p.	I want a project that I can work on with friends, family members, or neighbors.	VI	S	U	SU	VU
q.	I want to learn more about wildlife.	VI	S	U	SU	VU
r.	I want my friends, family members or neighbors to know about the improvements I make to my property.	VI	S	U	SU	VU
s.	I want recognition from the National Wildlife Federation for the improvements I make to my property.	VI	S	U	SU	VU
t.	I want to increase the financial value of my property.	VI	S	U	SU	VU
u.	I want to make my property more attractive.	VI	S	U	SU	VU
v.	I want to provide educational opportunities for children.	VI	S	U	SU	VU
w.	I want to get physical exercise by providing wildlife habitat.	VI	S	U	SU	VU
x.	I want to help relieve stress in my life by providing wildlife habitat.	VI	S	U	SU	VU
y.	I want to learn environmentally friendly techniques for providing wildlife habitat.	VI	S	U	SU	VU
z.	I want a fun recreational activity.	VI	S	U	SU	VU
aa.	I want to join efforts with others who share the same interests as I do.	VI	S	U	SU	VU

Backyard Wildlife Habitat Materials Used

For each of the following National Wildlife Federation materials, please indicate whether or not you have used the resource. If you have used a resource, please indicate how helpful or unhelpful the resource was.

15. Have you used free National Wildlife Federation written materials, such as flyers on attracting butterflies, building ponds, or building nest boxes? (Check one)

i. ☐ Yes
ii. ☐ No → (Skip to question 17)

16. How helpful or unhelpful were the written materials? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

17. Have you used the Backyard Wildlife Habitat Information Kit purchased from National Wildlife Federation or Wild Birds Unlimited? (Check one)

1 ☐ Yes
2 ☐ No → (Skip to question 19)

18. How helpful or unhelpful was the Information Kit? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

19. Have you used the National Wildlife Federation Backyard Wildlife Habitat website? (Check one)

1 ☐ Yes
2 ☐ No → (Skip to question 21)

20. How helpful or unhelpful was the website? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

21. Have you attended a slide show or other presentation by National Wildlife Federation staff or a Habitat Steward? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 23)

22. How helpful or unhelpful was the slide show? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

23. Have you received personal assistance from a Habitat Steward? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 25)

24. How helpful or unhelpful was the assistance? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

25. Have you received personal assistance from neighbors, friends, or family members? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 27)

26. How helpful or unhelpful was the assistance? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

27. Have you received personal assistance from wildlife management or natural resource professionals, such as a wildlife biologist, extension agent, wildlife consultant, or a Natural Resource Conservation Service (NRCS) employee? (Check one)

- 1 ☐ Yes
2 ☐ No → (Skip to question 29)

28. How helpful or unhelpful was the assistance? (Check one)

- 1 ☐ Very Helpful
2 ☐ Somewhat Helpful
3 ☐ Unsure
4 ☐ Somewhat Unhelpful
5 ☐ Very Unhelpful

Attitudes Toward Wildlife Issues

29. The following statements talk about wildlife-related issues. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each)

It is important to me personally:		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	That I observe or photograph wildlife.	SA	MA	U	MD	SD
b.	That I talk about wildlife with family and friends.	SA	MA	U	MD	SD
c.	That local economies benefit from the sale of equipment, supplies, or services related to wildlife recreation.	SA	MA	U	MD	SD
d.	That I understand more about the behavior of wildlife.	SA	MA	U	MD	SD
e.	That game animals are managed for an annual harvest for human use without harming the future of the wildlife population.	SA	MA	U	MD	SD
f.	That I hunt game animals for food.	SA	MA	U	MD	SD
g.	That I know that wildlife exist in nature.	SA	MA	U	MD	SD
h.	That I tolerate most wildlife nuisance problems.	SA	MA	U	MD	SD
i.	That I express opinions about wildlife and their management to public officials or to officers of private conservation organizations.	SA	MA	U	MD	SD
j.	That I see wildlife in books, movies, paintings or photographs.	SA	MA	U	MD	SD
k.	That I trap furbearing animals for the sale of fur or pelts.	SA	MA	U	MD	SD
l.	That I tolerate the ordinary personal safety hazards associated with some wildlife.	SA	MA	U	MD	SD
m.	That I consider the presence of wildlife as a sign of the quality of the natural environment.	SA	MA	U	MD	SD
n.	That I tolerate the ordinary risk of wildlife transmitting disease to humans or domestic animals.	SA	MA	U	MD	SD
o.	That I hunt game animals for recreation.	SA	MA	U	MD	SD
p.	That I appreciate the role that wildlife play in the natural environment.	SA	MA	U	MD	SD
q.	That I tolerate most levels of property damage by wildlife.	SA	MA	U	MD	SD
r.	That wildlife are included in educational materials as the subject for learning more about nature.	SA	MA	U	MD	SD

Environmental Attitudes

30. The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	We are approaching the limit of the number of people the earth can support.	SA	MA	U	MD	SD
b.	When humans interfere with nature it often produces disastrous consequences.	SA	MA	U	MD	SD
c.	The earth has plenty of natural resources if we just learn how to develop them.	SA	MA	U	MD	SD
d.	Plants and animals have as much right as humans to exist.	SA	MA	U	MD	SD
e.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	SA	MA	U	MD	SD
f.	Despite our special abilities humans are still subject to the laws of nature.	SA	MA	U	MD	SD
g.	The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	SA	MA	U	MD	SD
h.	Humans were meant to rule over the rest of nature.	SA	MA	U	MD	SD
i.	Humans will eventually learn enough about how nature works to be able to control it.	SA	MA	U	MD	SD
j.	If things continue on their present course, we will soon experience a major ecological catastrophe.	SA	MA	U	MD	SD

Knowledge of Wildlife and Landscaping

We would like to find out what you know about landscaping for wildlife. This is not a test; this will help us consider how we provide Backyard Wildlife Habitat programs in the future. For the following questions, please check the one best answer.

31. Which of the following is a basic habitat component for wildlife? (Check one)

- 1 ☐ Food
- 2 ☐ Water
- 3 ☐ Cover
- 4 ☐ All of the above are basic habitat requirements

32. Which of the following terms is used to describe all of the living and nonliving interacting features of a given area? (Check one)

- 1 ☐ Habitat
- 2 ☐ Ecosystem
- 3 ☐ Community
- 4 ☐ Biodiversity

33. Which of the following statements about invasive exotic species is true? (Check one)

- 1 ☐ Most invasive exotic plants or animals were introduced naturally to new areas
- 2 ☐ Most invasive exotic plants and animals benefit native plant and animal species
- 3 ☐ Invasive exotic plants and animals usually cannot compete with native plants and animals
- 4 ☐ None of the above are true

34. Which of the following statements about traditional lawns is true? (Check one)

- 1 ☐ Traditional lawns usually require less water than yards with native plant species
- 2 ☐ Traditional lawns are more beneficial to more wildlife species than yards with native plant species
- 3 ☐ Runoff of pesticides and fertilizers from traditional lawns may cause major problems with water pollution
- 4 ☐ Wildlife can obtain none of their habitat needs from a traditional lawn

35. Which of the following has the greatest influence on the types of plants that can live in a particular area? (Check one)

- 1 ☐ The kind of soil that is found in the area
- 2 ☐ The species of animals that live in the area
- 3 ☐ The percent of sunny versus cloudy days
- 4 ☐ The amount of carbon dioxide (CO₂) in the atmosphere

36. Carrying capacity refers to the theoretical number of individuals of a species that can be supported in a given area indefinitely. Why is it important to understand carrying capacity when managing for wildlife on a residential property? (Check one)

- 1 ☐ Over long periods of time, property owners should attempt to attract numbers of individual animals that are more than the carrying capacity of the area
- 2 ☐ Over long periods of time, property owners should attempt to attract numbers of individual animals that are equal to or less than the carrying capacity of the area
- 3 ☐ It is impossible to exceed the carrying capacity of an area, even for short periods of time
- 4 ☐ Carrying capacity is not important to understand when managing for wildlife on a residential property

37. Which of the following is an effective and potentially ecologically sound technique for controlling invasive exotic plants? (Check one)

- 1 ☐ The use of chemical fertilizers
- 2 ☐ The use of controlled burns
- 3 ☐ The flooding of areas with water
- 4 ☐ There is no reason to control invasive exotic plants

38. Which of the following is the best way to find out which plants are native to your area? (Check one)

- 1 ☐ Contact a local native plant nursery
- 2 ☐ Find out which plants your neighbors are successfully landscaping with. The plants that are doing well are likely native to your area
- 3 ☐ Inventory the plant species currently on your property. Most of these species are likely native to your area
- 4 ☐ None of the above are good ways to find out about native plants in your area

39. Which of the following is true about wildlife management planning? (Check one)

- 1 ☐ With the right management techniques, any wildlife species can be attracted to any yard
- 2 ☐ An inventory of habitat conditions, wildlife, plants, soils, and local landscapes should be done before determining management objectives
- 3 ☐ For most yards under an acre in size, little can be gained by carefully planning
 - a. landscaping activities based on management goals and objectives
- 4 ☐ All of the above are true

40. Which of the following is important to include in a property base map? (Check one)

- 1 ☐ Climate information
- 2 ☐ Human-made alterations to the landscape
- 3 ☐ Vegetation types for the entire state
- 4 ☐ None of the above are important to include

41. Which of the following is true about wetlands? (Check one)

- 1 ☐ They protect shorelines and banks from erosion
- 2 ☐ They store floodwater
- 3 ☐ They maintain groundwater supplies
- 4 ☐ All of the above are true

42. Which of the following is true about predators? (Check one)

- 1 ☐ Predators play an important role in food chains found in backyard wildlife habitats
- 2 ☐ Predators are a major threat to entire populations of prey
- 3 ☐ Individuals of a predator species generally greatly outnumber the number of individuals of a prey species
- 4 ☐ Predators generally increase competition for scarce resources, such as food, between individuals of a prey species

43. Which of the following is an advantage of using locally native plants? (Check one)

- 1 ☐ Native plants usually are more resistant to herbicides than exotic plants
- 2 ☐ It is usually legal to harvest native plants on public lands
- 3 ☐ Native plants usually can be purchased from any business that sells plants
- 4 ☐ None of the above are advantages of using locally native plants

44. Which of the following are ways that humans impact wildlife? (Check one)

- 1 ☐ Humans often create edge, a boundary between different types of plants, that benefits some wildlife species and harms others
- 2 ☐ Humans can alter succession, the changes in plant species in an area over time
- 3 ☐ Human activities have resulted in habitat damage for many wildlife species
- 4 ☐ All of the above are human impacts on wildlife

Background Information

In order for us to more fully understand people's responses to the previous questions, we need to know a few things about your background. Remember that your responses are completely confidential and that neither your name nor your address will be directly linked to your responses in any way.

45. In what type of area is the property you certified in the Backyard Wildlife Habitat Program? (Check one)

- 1 ☐ Rural, Farm
- 2 ☐ Rural, Non-Farm
- 3 ☐ Small Town (25,000 people or fewer)
- 4 ☐ Urban Area (From 25,001 to 100,000 people)
- 5 ☐ Metropolitan Area (More than 100,000 people)

46. What is the approximate size of the property you certified in the Backyard Wildlife Habitat Program? (Check one)

- 1 ☐ Less than one acre
- 2 ☐ 1 to 10 acres
- 3 ☐ 11 to 50 acres
- 4 ☐ More than 50 acres

47. In what state do you currently live? _____

48. In what county do you currently live? _____

49. What is the highest level of formal education that you have completed? (Check one)

- 1 ☐ Less than High School Graduate
- 2 ☐ High School Graduate or GED
- 3 ☐ Vocational or Trade School
- 4 ☐ Associate's Degree (2 year degree)
- 5 ☐ Some College
- 6 ☐ College Graduate (Bachelor's or 4 year degree)
- 7 ☐ Graduate or Professional Degree

50. Are you male or female?

- 1 ☐ Male
- 2 ☐ Female

51. In what year were you born? 19____

52. What is your race or ethnicity? (Check all that apply)

- 1 ☐ White
- 2 ☐ Black or African American
- 3 ☐ Hispanic or Latino
- 4 ☐ American Indian or Alaska Native
- 5 ☐ Asian
- 6 ☐ Native Hawaiian or Other Pacific Islander
- 7 ☐ Some Other Race

45. What was your gross household income (before taxes) in 2001? (Check one)

- 1 ☐ Less than \$20,000
- 2 ☐ \$20,000 to \$39,999
- 3 ☐ \$40,000 to \$59,999
- 4 ☐ \$60,000 to \$74,999
- 5 ☐ \$75,000 to \$99,999
- 6 ☐ \$100,000 to \$124,999
- 7 ☐ \$125,000 to \$149,999
- 8 ☐ \$150,000 or more

Thank you for helping us with this project!

If you have any other comments you would like to share with us, please use the space below (or add additional sheets if necessary).

Please use the enclosed addressed and stamped envelope or return this survey to:

**Backyard Wildlife Habitat Surveys
Department of Fisheries and Wildlife
13 Natural Resources Building
Michigan State University
East Lansing, MI 48824**