

Michigan's Eastern Massasauga Rattlesnake Outreach Initiative: Rattlin' an Image

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The Eastern Massasauga rattlesnake (*Sistrurus catenatus catenatus*) is one of North America's smallest rattlesnakes, measuring, on average, less than two feet in length (Ernst and Ernst 2003). Its cryptic coloring and defensive stance of "sitting tight" make this animal difficult to detect, even by trained technicians (Black and Parent 1999).

The range of the Eastern Massasauga rattlesnake extends from southern Ontario and central New York west to Iowa and eastern Missouri (Ernst and Ernst 2003). Michigan is believed to be central in the range of this animal and currently provides its last stronghold in terms of known populations.

The conservation plight of this animal was already apparent in the mid-1990s, and a status assessment of the species was published by the United States Fish & Wildlife Service (USFWS) (Szymanski 1998). Reported threats to the snake included habitat loss and degradation and human persecution (Szymanski 1998), and the snake was granted "candidate" status by the USFWS in 1999.

History of the Outreach Initiative

In 2001, Michigan began the process of entering into a Candidate Conservation Agreement with Assurances (CCAA) with the USFWS to enable continued management of habitat for Eastern Massasaugas, in spite of some incidental take in the process. As a part of the CCAA, the Michigan Department of Natural Resources and Environment (MDNRE) and Michigan Natural Features Inventory (MNFI) applied for funds from the USFWS to enter into educational outreach as a part of their efforts to address current conservation threats to the species in Michigan as reported by Legge (1996). Unfortunately, the educational outreach portion of the CCAA proposal was not funded through USFWS and so other potential funding was sought.

In 2002, one of the authors (Christoffel) entered into a graduate degree program at Michigan State University (MSU) with the intent of studying the human dimensions of snake conservation and management. She met with MDNRE and MNFI personnel prior to arrival on campus to



KILE ROUCHER

Eastern Massasauga rattlesnakes (*Sistrurus catenatus catenatus*) are among the smallest North American rattlesnakes.

discuss opportunities to work together on testing the efficacy of educational outreach for conservation of Eastern Massasaugas.

In 2003, we applied for and received funding through the U.S. Environmental Protection Agency's (EPA) Environmental Education Grants program to develop and implement an educational outreach initiative featuring Eastern Massasaugas in southeastern Michigan. This area is one in which a number of Eastern Massasauga populations have been documented, human population pressures have been increasing, and human-snake conflicts are likely. A second application was made and funded by the U.S. EPA in 2007 to expand our efforts to southwestern Michigan, another area with a number of Eastern Massasauga populations that has been experiencing rapid human population growth.

The goals of the project were fourfold: (1) Develop and initiate an Eastern Massasauga education and outreach initiative in Michigan modeled after similar efforts in Ontario, (2) provide accurate and consistent information pertaining to Eastern Massasaugas, (3) provide people with knowledge and skills to make informed decisions about how to safely co-exist with Eastern Massasaugas, and (4) identify and develop strategies or mechanisms for sustaining Eastern Massasauga education and outreach for the long-term.

Six objectives were identified for our project: (1) Assess public attitudes toward the Eastern Massasauga and snakes in general, (2) develop and/or revise educational materials about Eastern Massasaugas and snakes in general, (3) develop a local resource network to deal with human-snake conflicts, (4) develop and conduct educational workshops, (5) promote balanced media coverage of the Eastern Massasauga and snakes, and (6) evaluate the effectiveness of our efforts.

We identified several target audiences for our efforts: Natural resource managers, naturalists, outdoor writers, landowners living in rattlesnake habitat, wildlife damage operators and animal control personnel, educators and schoolchildren, future "snake responders," veterinarians, local hospitals and health departments, and utility workers.

We used an approach modeled after an existing and successful program in Ontario that was developed and conducted by the Toronto Zoo and the Canadian Eastern Massasauga Rattlesnake Recovery Team. This approach consisted of workshops featuring a talk and PowerPoint presentation given by two of the authors (Christoffel and Lee) and Andy Snider (then Curator of Reptiles at the Detroit Zoo), an essential member of our team. The workshop consisted of several components, including a discussion of the value of snakes, the natural history of snakes in Michigan, identification of the Eastern Massasauga and five of its mimics or look-alikes, the ecology and conservation status of the Eastern Massasauga, threats

to this species, and research and conservation efforts focused on Eastern Massasaugas in Michigan. Participants were given the opportunity to view an Eastern Massasauga and its mimics or look-alikes in tanks during the program. The look-alike snakes were handled during the program by one of the presenters who "modeled" a safe interaction between a human and snake. The latter half of the program dealt with human-snake interactions and included a discussion of how to encourage or discourage snakes from living on your property, the use of snake deterrents, how to avoid and treat Eastern Massasauga bites, and, for professional audiences, how to communicate with the public about rattlesnakes. At the end of the workshop, audiences were given a demonstration on how to safely move an Eastern Massasauga from an area if absolutely necessary. The presenters stressed the importance of leaving the snake alone to leave or move along on its own whenever possible.

A list of workshop venues and target audiences was compiled by one of the authors (Hyde) to guide our efforts, make efficient use of resources, and ensure that we reached the audiences most likely to benefit from the programs. In addition, we wanted to minimize travel distances for audiences while attempting to reach as many people throughout the study area as possible.

To design our workshops, we began by attending an Eastern Massasauga workshop held by the Toronto Zoo and led by Bob Johnson and Andrew Lentini. The script and accompanying PowerPoint presentation we developed for use in Michigan were based on the Toronto material as well as workshop materials used by one of the authors (Christoffel) in Wisconsin that featured the Timber Rattlesnake (*Crotalus horridus horridus*). One of the authors (Christoffel) designed pre-program, post-program, and long-term assessment instruments or surveys to measure gains in knowledge and changes in attitude that occurred as a result of attending a workshop.

In 2004 and 2005, we conducted 23 workshops that were attended by >700 people. This included nine natural resource professional and naturalist audiences, and 14 workshops for private landowners and the general public, including a workshop for about 270 sixth-grade students and their teachers and chaperones. In 2008 and 2009, we held 19 workshops in southwestern and southeastern Michigan that were attended by >700 participants. These included six workshops specifically for naturalists, natural resource, and other professional personnel, one workshop for medical professionals, nine workshops for private landowners and the general public, and three workshops for combined natural resource professionals and the general public. Natural resource and other professionals that attended the Eastern Massasauga workshops in 2008 and 2009 represented more than 30 different public or private agencies and organizations.

We reviewed existing education and outreach materials about Eastern Massasaugas and their management to identify materials that we could use in their current form or that could be revised for use in Michigan, and materials we would need to develop. New educational materials produced by our team included a "Snakes of Michigan" identifier, an Eastern Massasauga rattlesnake fact sheet, guidelines for interpreting venomous reptiles to the public, a listing of Eastern Massasauga rattlesnake contacts and information resources, and a PowerPoint presentation and accompanying script for use by natural resource professionals and naturalists.

The Ontario team, particularly Bob Johnson and Andrew Lentini, were incredibly supportive of our efforts and provided us with many materials that we were able to adapt for use in Michigan including a "dogs and snakebite" fact sheet. Andy Snider of the Detroit Zoo orchestrated the transformation of an existing poster from Ontario for its use with Michigan audiences. A Michigan Eastern Massasauga rattlesnake web site (<http://web4.msue.msu.edu/mnfi/emr>) has been developed. It was modeled after the Canadian Eastern Massasauga Rattlesnake Recovery Team's site (<http://www.massasauga.ca>). A snakebite prevention and treatment fact sheet was assembled from Minnesota, Wisconsin, and Ontario materials. We obtained permission from Bob Hay, retired herpetologist from the Wisconsin Department of Natural Resources, to take a Wisconsin brochure



YU MAN LEE

U.S. Environmental Protection Agency (EPA) Environmental Education Grants funded the development and implementation of an educational outreach initiative featuring Eastern Massasauga Rattlesnakes in southeastern Michigan.



YU MAN LEE

The volunteer snake responder network in Michigan consists of trained professionals and citizen volunteers who deal with human-snake reports and conflicts in local communities.

about how to live with snakes and adapt it for use in Michigan. Funding was obtained to reprint the USFWS brochure, “Live and Let Live,” featuring the Eastern Massasauga. A MNFI species abstract, Detroit Zoo brochure, and MI DNRE information card about the Eastern Massasauga also were distributed.

Because not all target audiences were able to attend the workshops, especially law enforcement personnel, we initiated production of an Eastern Massasauga training DVD that individuals can view at their convenience. Funding for production of this DVD was granted by the John Ball Zoological Society in 2008 and the Michigan Society of Herpetologists in 2009. We have been working with Steven Evans of MSU’s College of Agriculture and Natural Resources (CANR) Communications Office to produce the DVD. The DVD will be available in autumn of 2010 through MNFI, and will be distributed to project partners and priority target audiences whom we were unable to reach through our workshops.

Efforts to develop and maintain a corps of volunteer snake responders to deal with human-snake reports and conflicts in local communities were initiated in 2004. This effort was modeled after volunteer snake responder programs in Minnesota and Wisconsin. We developed a second training module for individuals who had attended one of our workshops and were interested in helping us in our snake conservation and management efforts.

Andy Snider of the Detroit Zoo had a great deal of experience in dealing with phone calls from angry or frightened people who wanted someone to come out and remove what they believed to be rattlesnakes on their properties. He was able to guide us in deciding what specific questions to ask of callers to determine whether an on-site visit was needed. He emphasized the need to calm excited callers in order to obtain useful information.

The volunteer snake responder network in Michigan consists of trained professionals and citizen volunteers who are coordinated regionally and statewide. In 2006, we had trained 13 volunteers and identified another 20 potential volunteers. In 2009, we held two volunteer training workshops and were able to train an additional 17 individuals and identify another 75 potential volunteers. The MNFI currently serves as the statewide coordinator of the volunteer network in collaboration with the MI DNRE, and the Binder Park Zoo and Detroit Zoo currently serve as the regional coordinators. An Eastern Massasauga response protocol was developed to guide regional network coordinators and volunteer snake responders.

We identified outdoor writers in Michigan with whom we could collaborate on feature stories about Eastern Massasaugas. We wrote or co-wrote several articles with information on the identification, natural history, management, and conservation of Eastern Massasaugas and other Michigan snakes. Among these was a special issue of the Toronto Zoo’s “Rattlesnake Tales” newsletter highlighting Eastern Massasauga research, outreach, and conservation efforts in Michigan.

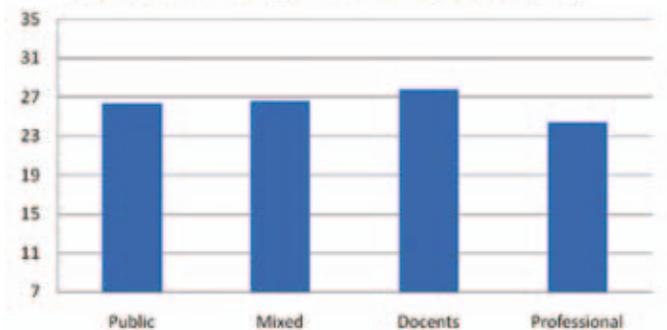
Our assessment of the Eastern Massasauga workshops demonstrated that participants increased their knowledge and had more favorable attitudes toward snakes after attending our programs. We also found out that fear levels did not change, although our participants generally demonstrated a healthy respect for the animal and thus would not put themselves in situations where they were likely to be bitten (i.e., handling an Eastern Massasauga Rattlesnake or trying to kill such a snake).

Future of the Outreach Initiative

The future of Michigan’s Eastern Massasauga Rattlesnake Outreach Initiative includes several more areas of emphasis. We would like to see our efforts eventually expand statewide because the Eastern Massasauga has been documented throughout Michigan’s Lower Peninsula.

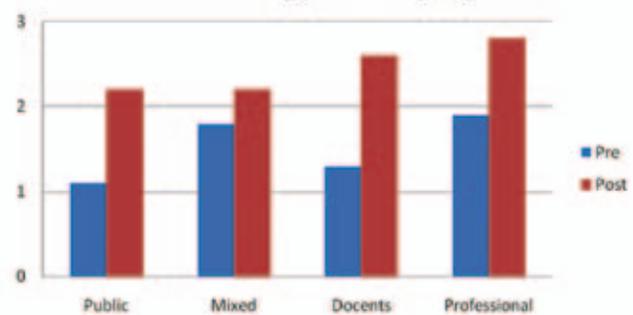
The youth of Michigan is one important group with whom we have had limited interactions. The future and the fate of the Eastern Massasauga lies with decision makers that will emerge from this group. We are working toward the development and distribution of an Eastern Massasauga educational traveling trunk and curriculum that can be used in primary and middle schools.

Changes in Feelings due to Participation (7-35)



Average scores regarding how participation in a snake workshop had changed the feelings of four audience types toward snakes. Scores ranged from 7–35, with 7 indicating that participation had greatly decreased positive feelings and greatly increased negative feelings toward snakes, 21 indicating no change in feelings toward snakes due to participation in a workshop, and 35 indicating that participation had greatly increased positive feelings and greatly decreased negative feelings toward snakes.

Knowledge Scores (0-3)



Average knowledge scores for four audience types who attended a series of snake workshops presented in southwestern Michigan in 2008. Pre-workshop scores for each audience type included: Public = 1.1, Mixed = 1.8, Docents = 1.3, and Professionals = 1.9. Post-workshop scores and net gain in knowledge scores for each audience type included: Public = 2.2 (a 1.1 point gain); Mixed = 2.2 (a 0.4 point gain); Docents = 2.6 (a 1.3 point gain), and Professionals = 2.8 (a 0.9 point gain).

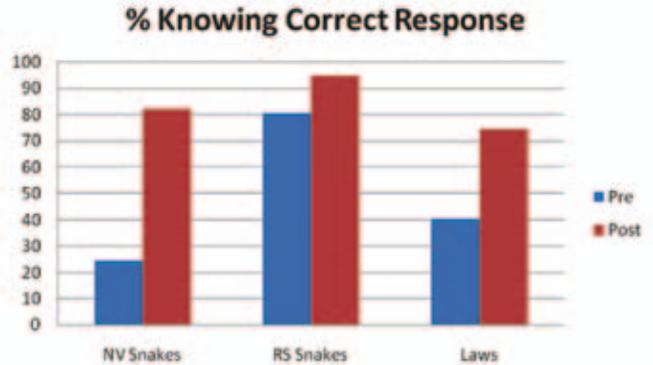
Because of the role they play in the management of Eastern Massasaugas and public perceptions of rattlesnakes, we continue our efforts to work with veterinarians, county health departments, and law enforcement personnel. Accurate information regarding bites to humans, pets, or livestock in Michigan and the outcomes of bites when they do occur is rarely available. Such information is crucial to efforts to conserve and manage Eastern Massasaugas. We are planning to write additional articles for use in local newspapers, which feature snakes and information on how to keep pets, livestock, and people safe in Eastern Massasauga habitat. Other articles, such as how to manage habitat for Eastern Massasaugas, also are in development.

We must increase the geographic scope and number of volunteers in local communities to respond to human-snake conflicts. Such volunteers are a vital part of conservation efforts geared toward Eastern Massasaugas in Michigan. Volunteers are able to respond more quickly and are more likely to be trusted by their neighbors than an “expert” who drives from a centralized city.

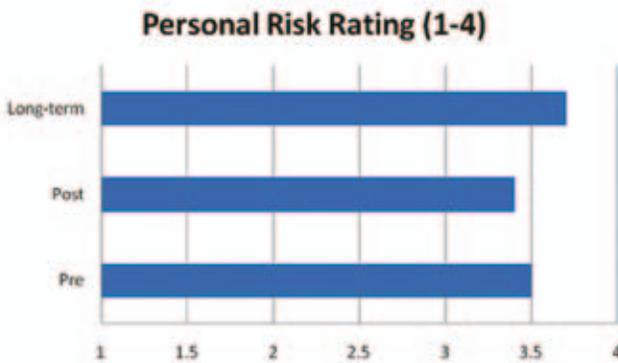
Many individuals who recreate in Michigan are unaware of the presence of Eastern Massasaugas and may not behave appropriately when visiting rattlesnake habitat. Eastern Massasauga outreach materials have been developed, distributed, and installed in several state parks. We have initiated work with the MI DNRE to develop a traveling informational display on the Eastern Massasauga and other rare herpetofauna in Michigan that can be loaned out and displayed at sites where Eastern Massasaugas are found and other public places.

We feel very fortunate to have had the opportunity to embark on this adventure and we learned many important lessons along the way. We

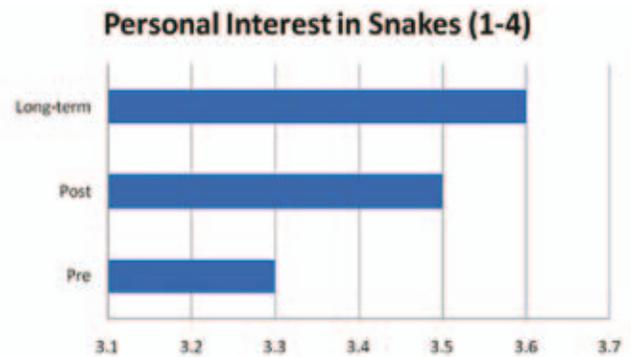
learned the joy of modifying existing materials and programs, rather than creating materials from scratch. We learned that it is very helpful to be flexible in terms of planning workshops and operating within the time constraints of various organizations. Most of the workshops that we held for professional audiences were incorporated into existing training days or events. As we have proceeded with this project, we have identified additional target audiences for our efforts. We have learned that adequate time and money are never available — but that somehow we can pull off the



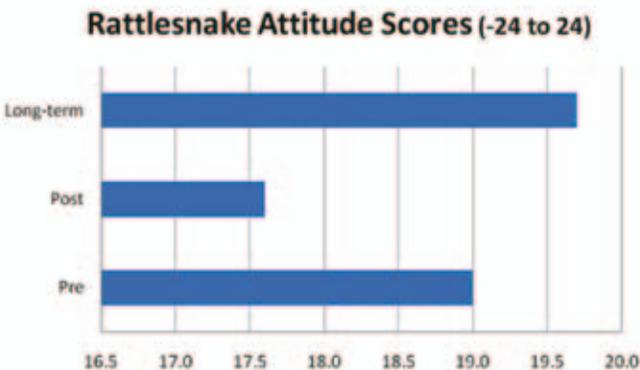
Percentage of participants attending a series of snake workshops held in southwestern Michigan in 2008 who knew: (a) The approximate number of non-venomous (NV) snake species that are found in Michigan, (b) the exact number of rattlesnake (RS) species that reside in Michigan, and (c) laws exist that protect snakes in Michigan.



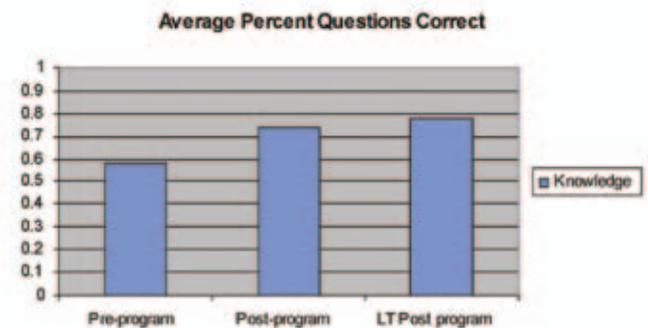
Average personal risk ratings due to rattlesnakes for audiences who attended a series of snake workshops held in southwestern Michigan in 2008. Responses included: I am at great risk (1), I am at some risk (2), I am at slight risk (3), and I am at no risk (4).



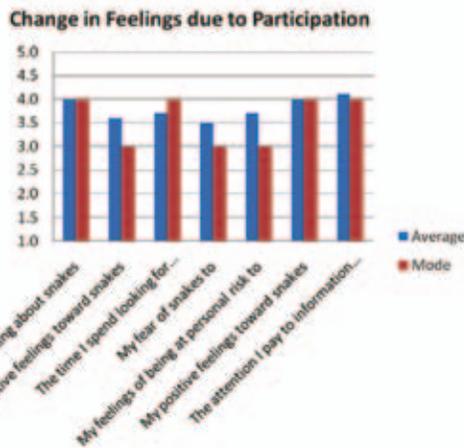
Mean interest in snakes as reported by participants in a series of snake workshops held in southwestern Michigan in 2008. Responses included: Very disinterested (1), Somewhat disinterested (2), Somewhat interested (3), and Very interested (4).



Pre-workshop, post-workshop, and long-term questionnaire “rattlesnake attitude” scores for participants at a series of snake workshops held in southwestern Michigan in 2008.

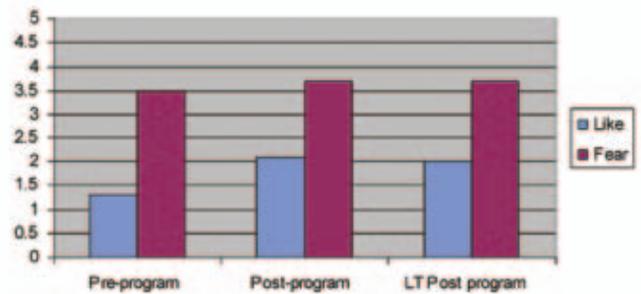


Mean percentage of knowledge questions answered correctly by participants at Eastern Massasauga workshops in 2004 and 2005 at three time intervals (pre-program, immediately post-program, and 6–8 months after attending program).



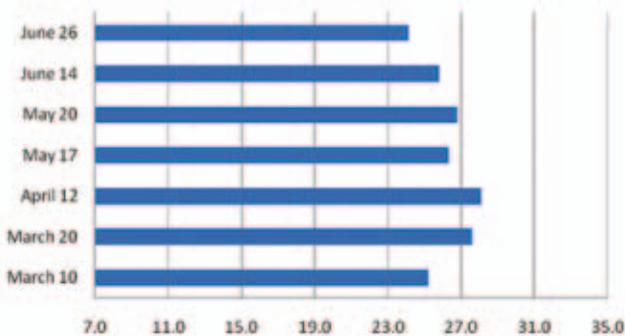
Average and mode scores for changes in feelings toward snakes, as assessed by participants at a series of snake workshops held in southwestern Michigan in 2008. Responses were scored with a 1 (a respondent's feeling about an item had become much more negative), a 2 (a respondent's feeling had become somewhat more negative), 3 (a respondent's feeling had not been affected), 4 (a respondent's feeling had become somewhat more positive), and 5 (a respondent's feeling had become much more positive).

Average Like and Fear Scores Across Time



Average fear and "like" levels toward snakes of participants at Eastern Massasauga workshops held in Michigan in 2004 and 2005 at three time intervals (pre-program, immediately post-program, and 6–8 months after attending program). Fear levels increased from 5 (I feel no fear at all) to 0 (I could not be in the room if a television program featured this animal) and "like" levels increased from 0 (the only good snake is a dead one) to 5 (this is one of my favorite animals and I'd do whatever I can for it).

Respondents Self-attribution to Participation Scores (21-35)



Respondents' average self-assessment score of how participation in a snake workshop held in southwestern Michigan in 2008 had affected their feelings toward snakes. Scores ranged from 7–35, with a score of 7–13 indicating that their feelings had become more negative, a score of 14–20 indicating a somewhat negative change, a score of 21 indicating that their feelings had not changed due to attendance at a workshop, a score of 22–29 indicating that their feelings were somewhat more positive since attending the workshop, and a score of 30–35 indicating that a respondent's feelings had become much more positive since attending the workshop.

seemingly impossible. Finally, we have realized that educational outreach initiatives are very long-term efforts and that partners are critical to the success of such programs.

Acknowledgements

Funding for this project and associated outreach materials was provided by the U.S. Environmental Protection Agency's Environmental Education Grants Program, John Ball Zoo, Michigan Society of Herpetologists, Detroit Zoo, Oak County Parks, and the U.S. Fish and Wildlife Service. Key partners on this project have included Andy Snider (Fresno Chaffee

Zoo, formerly Detroit Zoo), Bob Johnson and Andrew Lentini (Toronto Zoo), Bruce Kingsbury (Indiana-Purdue University at Ft. Wayne [IPFW]), Joe Sage (Florida Fish and Wildlife Conservation Commission, formerly IPFW), Lori Sargent and Tom Goniea (MI DNRE), Chris Gertiser and Lisa Duke (Binder Park Zoo), Jeff Jundt (Detroit Zoo), and Steve Evans (MSU CANR Communications). Additional partners include Michigan Department of Natural Resources and Environment, Wisconsin DNR, Huron-Clinton Metroparks Authority (Kensington and Indian Springs Metroparks), Love Creek Nature Center, Nature Discovery, Binder Park Zoo, Detroit Zoo, John Ball Zoo, Pierce Cedar Creek Institute, Kalamazoo Nature Center, Edward Lowe Foundation, Sarett Nature Center, Howard Christensen Nature Center, Wolf Lake Fish Hatchery, Gerald E. Eddy Discovery Center, Calvin College Bunker Interpretive Center, Dahlem Environmental Education Center, Matthei Botanical Garden, Michigan Poison Control Center, Barry and Cass County Conservation Districts, and The Stewardship Network. We are grateful to the many, many other individuals who are not listed but were incredibly helpful to us in our efforts.

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ANDREA MARTINEZ

The Utila Iguana (*Ctenosaura bakeri*) is endemic to Utila, one of the Honduran Bay Islands.