



# LEWS NEWS



Photo: Dr. Richard King

Volume III

May, 2001

## Protecting Lake Erie's Natural Heritage

As LEWS News enters its second year of publication, the staff of the U.S. Fish and Wildlife Service and the Ohio Department of Natural Resources, Division of Wildlife would like to take the opportunity to thank the island communities for their continued support and protection of the Lake Erie water snake (LEWS). With few exceptions, most of the people we have worked with in the last several years have shared our desire to understand the snake and to protect this unique species. Although many people dislike and fear snakes, through continuing education and outreach, we hope to dispel any myths about the snake being harmful or scary. One of our most important jobs is to help people understand that a healthy natural system contains many different species, and that as species are lost, one by one, the system becomes degraded and ceases to function normally. How many species can be lost before the entire system collapses? Do we really want to find out the answer to that question? One of the Service's main premises is to protect every species from extinction so that we do not have the chance to find out at what point an ecosystem will collapse. Your help in protecting the snake aids us in our quest to protect our precious natural resources for the benefit of all people. We gratefully thank each one of our readers for their interest in protecting the LEWS and its shoreline habitat!

### MOVEMENT PATTERNS AND HIBERNATION SITES OF THE LAKE ERIE WATER SNAKE

Starting in July, 2000, Kristin Stanford, Rich King, and Doug Wynn began a study of movement patterns and hibernation sites of the Lake Erie water snake. Kristin is a graduate student working on a master's degree in biology at Northern Illinois University. Rich (Kristin's advisor), an Assistant Professor at Northern Illinois University, first started conducting research on LEWS in 1979 when he was a graduate student at Bowling Green State University. Doug teaches high school in Westerville, Ohio and is an authority on Ohio reptiles. He is leading research projects on timber rattlesnakes, massasauga rattlesnakes, and plains garter snakes which are also protected in Ohio.

Kristin, Rich, and Doug are surgically implanting miniature radio transmitters into the body cavity of adult water snakes. Transmitters weigh 10 – 14 g (compared to adult water snakes that weigh 150 to more than 800 g) and have a long flexible antenna that runs under the snake's skin. Depending on the size of the battery, these transmitters will continue to function for 1–3 years. Each transmitter produces a signal with a unique frequency that can be detected with a receiver from a distance of 500

meters or more.

Last summer, transmitters were implanted into 20 adult water snakes on Kelleys Island. These snakes were relocated every few days from late-July through mid-October and again in December. When each snake was located, its geographic coordinates (latitude and longitude) were recorded using a hand-held GPS receiver that determines location based on signals broadcast by orbiting satellites. Using geographic information system (GIS) software, these locations could then be plotted on an aerial photograph of the island.

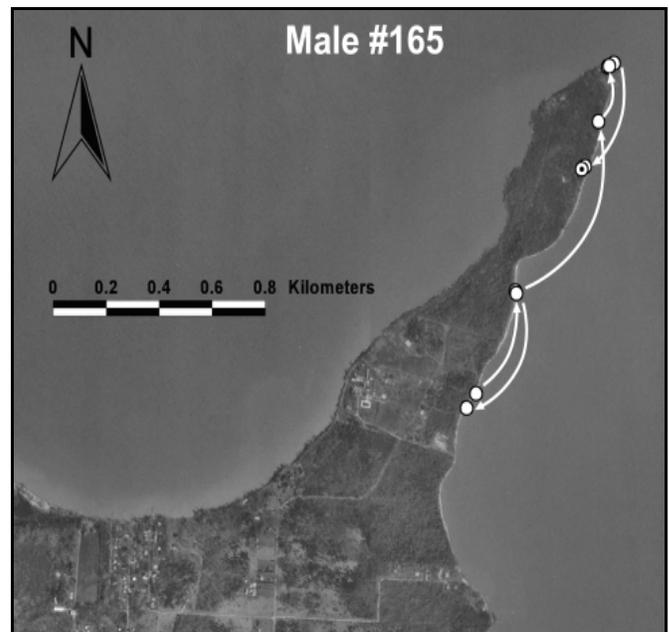
Individual water snakes differed greatly in the distance they moved with movements ranging from about 60 to more than 1300 meters (m). Water snakes began entering into hibernation in late September, although some individuals were still active on warm days in October. Some water snakes selected hibernation sites in shoreline habitats close to where they spent the summer. Others moved long distances along the shore (up to 1400 m) to hibernate. Hibernation sites were mostly within 50 m of shore but several water snakes moved well inland to hibernate at locations 100, 150, and 580 m from shore. Hibernation sites were typically located in rocky substrates and were sometimes covered with soil, leaf litter, decaying wood, and grass. Hibernation sites included both open and wooded areas.

Radio transmitters were implanted in four water snakes captured on crib docks along the south shore of Kelleys Island. These snakes remained in or near these docks throughout the summer, but all four moved ashore to hibernate. This suggests that crib docks provide useful water snake habitat during the summer, but they may not provide appropriate hibernation sites.

Fieldwork on Kelleys Island will resume in March and April 2001 in order to determine when water snakes again become active and to characterize movement patterns during the spring courtship season. In addition, radio transmitters will be implanted in about 30 water snakes on South Bass,

Middle Bass, and North Bass Island. These snakes, along with those on Kelleys Island, will continue to be monitored into the summer of 2002.

-Dr. Richard King, Department of  
Biological Sciences, Northern Illinois  
University



Locations (open circles) of a male Lake Erie water snake implanted with a miniature radio transmitter on Kelleys Island from July – December 2000 showing general movement patterns (arrows) and hibernation site ('bulls-eye').



### **CREATING OUR NEW STATE PARK**

As the Planning Team continues the master plan effort for Middle Bass Island State Park, we are often asked, "where is ODNR (Ohio Department of Natural Resources) in the master plan process?" The master plan process is developed in three phases. These phases are called; Inventory, Analysis, and Goals/Recommendations. Within these general phases are many detailed efforts and processes that are utilized to establish a comprehensive information base and an

opportunity to gain insight about the issues within and surrounding our new park area.

Currently, we are in the Inventory phase (See chart in following column). Simply described, the Inventory is the collection of data. It's asking the questions: what, when, where, why, how and who. It's taking a close look at the natural and man-made features of the area. The next phase is the Analysis, which is the comparison or study of the data. This phase begins to establish answers to the questions posed during the Inventory phase. Lastly are the Goals/Recommendations. This phase is presented in a draft form first, and later evolves into a final form called the Master Plan.

A unique subset of the ODNR master plan process involves the development of a Lake Erie water snake conservation plan. ODNR-REALM, working in cooperation with the USFWS and the ODNR, Division of Wildlife, are incorporating measures that ODNR will undertake to monitor, avoid and minimize adverse impacts to snake habitat at Middle Bass Island State Park. USFWS and ODNR, Division of Wildlife will perform an in-service training for ODNR, Division of Parks and Recreation staff this spring to explain water snake conservation measures. Interpretive signage, exhibits, and printed information may be utilized at Middle Bass Island State Park to educate and inform park visitors on the rare Lake Erie water snake in the future.

Regardless of where we are in the process, public input continues to be a key factor. ODNR has participated in meetings with various groups representing the island and mainland communities. The Planning Team looks forward to continuing this dialogue.

-Phil Miller and Kim Baker, Ohio Department of Natural Resources

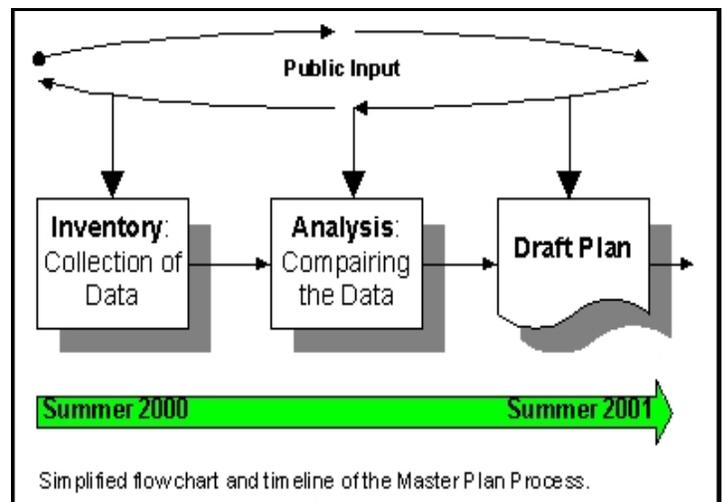


**SNAKE CHECK-UP**

*This section will be appearing in each issue of LEWS News, and will feature a brief description of what the Lake Erie water snakes are doing at this particular time of year.*

In late April, the water snakes begin to emerge from hibernation. Both juvenile and adult snakes can be found throughout the island where water is present. Because Lake Erie's water is still quite cold, the snakes are more likely to forage for food in smaller, warmer bodies of water; for example, ponds, wetlands, and temporary pools formed by rain and melted snow. The snakes will mainly eat small amphibians in the first few weeks of emergence. As temperatures begin to rise, the water snakes will gradually move toward the lake to forage.

The Lake Erie water snakes participate in courtship behavior in May and June. Often, several males will simultaneously court the same female, and the group will form a large "mating ball" of snakes. This squirming coil of snakes may appear frightening, but it is a natural part of the snakes' reproductive cycle, and it is imperative to the future success of the population.



**SAVE THE SNAKE: WHAT IS  
BIODIVERSITY AND WHY IS IT  
IMPORTANT?**

“To keep every cog and wheel is the first precaution of intelligent tinkering.” -Aldo Leopold

Since the Lake Erie water snake (LEWS) was listed as a Federal threatened species in August, 1999, it is difficult to count the number of times that we have been asked, “What is so important about the LEWS? Why are you trying to save this snake?” We regularly hear this question about the LEWS and every other Federally listed species.

These questions can most easily be answered by discussing the concept of biodiversity. Although the “scientific-ness” of this word may seem intimidating at first, simply stated, biodiversity refers to variety within a living system. “Biodiversity” could be applied to the variety of genes within an individual, the variety of traits within a species or population, or the variety of species within an ecosystem. An ecosystem is defined as a group of interacting organisms and the physical environment they inhabit at a given point in time.

In terms of ecosystem biodiversity, it is generally agreed that the more biodiversity present, the more stable the ecosystem will be. (This idea does not include the biodiversity that is introduced into a system by exotic or invasive species, species that are not native to the area in question.) This concept is derived from the idea that if environmental changes occur, the more diverse a species or ecosystem is, the better the chance that it can adapt to the change and not be exterminated by it. If we look around, it is easily observed that our environment is changing on a daily basis. In parts of the world, entire ecosystems are being wiped out by pollution, unsound agricultural practices, urban sprawl, and a variety of other sources. Even if the entire ecosystem is not destroyed, biodiversity can still decrease as the more sensitive species die from these modifications. In the long run, how will this loss of biodiversity impact us?

The rivet hypothesis compares species in an ecosystem to the rivets that hold an airplane together. The loss of a few rivets (species) from the system may not have an immediate impact, however beyond some minimal threshold, losses will result in a catastrophic collapse. We don’t know what this threshold is, nor do we want to find out! The redundant species hypothesis states that a minimum amount of biodiversity is necessary to keep an ecosystem functioning, and beyond these minimum species, the rest have redundant roles. In this instance, ecosystem function is little impaired by species losses if representatives of all functional groups remain. Another hypothesis states that as diversity changes, so does ecosystem function, but because each species has a unique role within the community, the effect of these losses is unpredictable. There is a general consensus that in most cases there is some redundancy among species roles in an ecosystem, but we don’t know at what point loss of species will result in a collapse. It is critical to remember that diversity is necessary to continually cope with changes and stress in the environment.

You may wonder, besides maintaining the stability of ecosystems, what benefit do I get from preserving biodiversity? There are both “use” and “non-use” benefits derived from biodiversity. “Use” benefits could include food, medicine, recreation, chemicals, fuel, and fiber. The “non-use” benefits would include the broad range of ecosystem functions that recycle and renew our resources. These benefits include air and water purification, decomposition, climate maintenance, soil formation, and oxygen, carbon, nitrogen, and phosphorus cycling, among others. It is estimated that the value of these complex ecosystem functions is between \$16-54 trillion (that’s \$16,000,000,000,000) per year! (Costanza, R., et. al. 1997. *Nature* 387: 253-260.) Other “non-use” benefits of biodiversity include intrinsic value, educational value, spiritual enlightenment, and the potential of future uses. In short, our Earth maintains our existence! Ecosystems provide food, air, water, shelter, energy, and everything else we need to maintain our lives as we know them. We, as humans, do not dominate the Earth, but are a

part of the complex web of life that inhabits this planet. As such, we should maintain our resources so that they can continue to provide for future generations of humans, animals, and plants. This means protecting our ecosystems and their diversity.

In the case of the LEWS, one more factor contributes to the loss of biodiversity: the island habitat. Islands that are isolated from the mainland for extended periods of time (ie, millions of years) have a tendency to develop unique species. This happens as the islands gradually form, and a single population of the mainland species is divided into a mainland and an island population by the water barrier. Differences between the habitats, climate, food supply, and shelter on the mainland and island result in certain traits becoming more common on the islands than on the mainland. After long periods of time, the isolated island population begins to develop into a new species. If an island species becomes too rare, it is more likely to go extinct than the mainland species, because there are no habitats from which to replenish its numbers. Once habitat has been destroyed, there is no place for the species to migrate because islands have a finite amount of space. The smaller the island, the more severe this effect.

So, although at times it may seem that there is an overabundance of LEWS, we must look at the bigger picture. How much habitat is left now? Are we degrading it? Are areas of good habitat connected or isolated? Do LEWS have sufficient genetic diversity to survive changing conditions? Are the snakes subjected to harassment or killing? In the case of the LEWS, we believed that shoreline habitat was rapidly being developed and that good habitat for the snake would eventually be reduced to small, isolated pockets. As this occurred, more and more snakes would die. Natural death, coupled with continued intentional and unintentional persecution by humans, would soon lead to large scale decreases in the population size. As population size dwindles, genetic diversity, and therefore the ability to cope with changes in the environment, decreases. The combination of all these factors would soon lead to the extinction of the LEWS. But really, so what if

it went extinct? Why should you care about this snake?

The LEWS may not provide us with food, fuel, fiber, or cures for disease. But as an island community that is home to a species that occurs nowhere else in the world, we are entrusted with the unique opportunity to preserve a small but vital part of the greater picture. We see that humans are altering our planet, destroying habitat and killing wildlife in the process. We are responsible for degrading biodiversity, so it is now our duty to restore it. Although the LEWS may not seem to serve a crucial role in the ecosystem, we may not find out until it's too late. To coin a familiar phrase, "extinction is forever", so now we must consider whether or not we want to see the consequences of extinction on our islands. The LEWS is part of these islands' heritage, as this area's former name, "Isle of the Serpents," describes. To preserve this species is to preserve a part of history for future generations to enjoy.

So, save it for its elegance; save it for its inherent right to life; save it for posterity; save it as a piece of history; save it to prevent further degradation of our island ecosystem; save it for any reason that makes sense to you, but please, Save the Snake!

-Megan Sullivan, Wildlife Biologist,  
USFWS

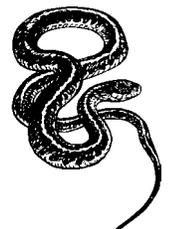


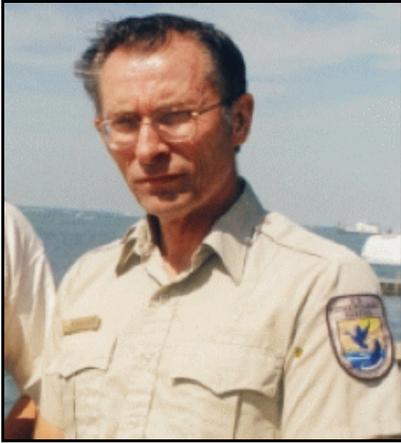
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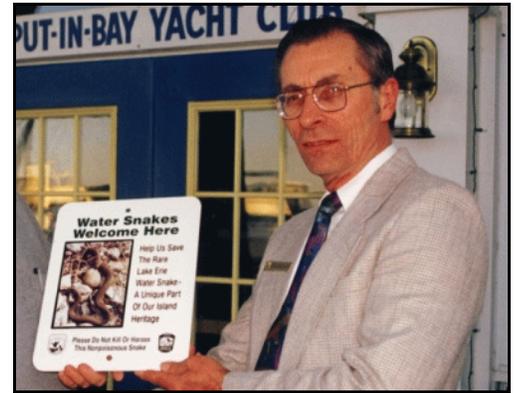


Kent Kroonemeyer 1942-2001

### IN MEMORIAM

This issue of LEWS News is dedicated to Kent Kroonemeyer, Supervisor of the Reynoldsburg, Ohio Field Office of the U.S. Fish and Wildlife Service from 1980-2001, and “Father” of LEWS News. Kent passed away on March 15, 2001, after a yearlong battle with cancer. Both before and after the LEWS was listed as a Federal threatened species, Kent spent many summer days on the Lake Erie islands trying to help himself and others overcome their

fears of snakes! Kent was very sympathetic to those who didn't like the idea of protecting snakes, but patiently worked to help people understand why it is necessary to conserve this kind of wildlife. His dedication to his vocation, his respectful guidance, and uplifting personality will be missed by all who knew him.



We'll miss you Kent!



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