Rhinelander Environmental Stewardship Academy

The Rendezvous Site

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GIS and Fisheries Management

By Alex Gaber

GIS, GPS and SI units what in the world?

Geographic Information Systems (GIS) and Global Positioning Systems (GPS) provide a mechanism to digitally pinpoint a location on Earth, view the spot on a map, and use the spot and its data to study things like aquatic species or their habitat. These new tools can provide more accurate data to be used to improve the management of fish habitat and fish populations in lakes.

Using a GPS Side Imaging sounding unit, scientists can collect data on the substrate composition of a lake, the depth, water temperature, side imaging returns, and GPS position. The way the data is collected is generally a simple task. All you have to do is drive your boat the length or width of the lake, back and forth until the entire lake is scanned. The data is recorded as you are driving. One can then take the SD card from the unit and copy the data to a computer. Then, the data is put in a GIS program that maps the rocks, boulders; emergent, submergent, and floating vegetation; trees, and substrate types. This process creates a fish eye view of the available habitat.

Detailed lake depths and cover information can be a real big help with the fisheries research that the DNR is doing. The help comes by telling them about the exact habitat location and quantity. Knowing the location and area of the weedbeds, sandbars, and rockbars will provide cover and habitat information. It can also help by locating all the potential spawning substrate types for different types of fish. Also you can find the wood that is lying at the bottom of the lake and find exactly where each individual crib is located and whether the fish are tight around the crib, suspended off it or if it is not used by the fish community.

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A GIS map of near shore zone lake habitat. The data used to create the map may allow researchers to better understand fish-habitat relations.

News on RESA songbird research on page 2

Upcoming Events:

June 1-2
Fly fishing on Boom Lake

June 4
Take a kid fishing day at Hodag Park

June 6-10
Fisheries survey of bluegill and bass populations on Stella Lake

July 11-15
Oak forest restoration data collection and exploration of the Wisconsin River

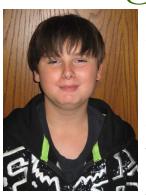
RESA students mentored 6th grade students from James Williams Middle School (JWMS) in ornithology and leadership while at the Ced A. Vig Outdoor Classroom.

JWMS students received a hands-on experience banding various songbirds commonly found in upland deciduous forest cover types.

This chickadee nest (above) found May 16, is the first of 2011. Chickadees use moss, inner bark of white cedar, and mammal fur as the main nest materials. In 2008 the first chickadee nest was observed on May 13, in 2009 on May 29, and on April 23 in 2010. Nicknamed "Einstein" we banded this hatchling May 27, 2010 (below), which was a month earlier than what we predict for this year.

Once per week, students check 32 nesting boxes and record data on species, clutch size, and hatchling condition. The data are then sent to the Bluebird Restoration Association of Wisconsin which compiles data from nearly 10,000 nesting boxes.

Nesting box research from 2008 to 2010



By Justin Campbell

Looking over the data from our bluebird research in 2008, 2009, and 2010, interesting observations can be made about four cavity nesting songbirds common to our area.

The K-box has been the most effective nesting box. According to researchers, the K-box has been the most productive because it simulates an abandoned woodpecker hole. The nest platform is designed to be 4-5 inches below the entry hole. Scientists say that this box is the most productive because of the oval hole because bluebirds are able to stick their heads through the hole to feed there young without entering the elongated box. This tip-down feeding process conserves energy and time, thus the parents have more time available to hunt for food for the hatchlings.

In 2010, 16 out of 17 K-boxes were used by either bluebirds, chickadees, tree swallows, or house wrens. Of the 16 nests, 57 fledglings were produced for an average fledgling productivity of 3.56. Out of all three years, the K-box was used 94% of the time and fledgling productivity averaged 3.4 per box. This result compares well with the average fledgling productivity recorded by the Bluebird Restoration Association of Wisconsin of 2.94 to 3.60 bluebird fledglings per box from 2006 to 2009.

The North American Bluebird Society (NABS) style nesting boxes have been successful in our research, but not to the extent of the K-box. In 2010, the 4 out of 10 NABS boxes were used producing 14

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Bones and Ash

By Ezra Stachowicz

In early May, RESA students were cleaning the nesting boxes in our research area by dumping out any nest and egg material left from last year. When we opened box # 13, I looked inside to find old nest material from a wren nest and then I noticed something silver, shimmering amongst the twigs and feathers. So, I reached my hand in and felt around trying to grab it. Mr. Kohler, the RESA instructor, gave me a glare that seemed to say, "What are you doing, get your hand out of the box so I can clear it out. I told you to keep your hands away from the droppings which may possess undesirable bacteria."

I finally felt the metal and pulled it out of the box. When I took a glance at it, I realized it was a bird band attached to some leg bones. Suddenly Mr. Kohler was interested. He explained to the class the many ways hatchlings can die. The cause of death of the house wren hatchling with band number 2320-208-51 is unverified but could be a number of things including: disease, ant or other insect infestation of nest box, hypothermia, and more things related to those variables. This poem is dedicated to wren 2320-208-51.

2320-208-51 is bones and ashes doomed to the treachery of this world.

This wren's brothers are flying and free,

But this mortal wren will never be.

Sentenced to darkness never again to see the sun nor fear the dark.

The reaper has come and will come again.

To this days end no longer here, this wren will be.

Bluebird Restoration Association of Wisconsin

By Derrick Dumpprope

RESA students have been learning about all the different species of birds from the Birds of Wisconsin book for their May thematic unit. Students were mostly interested in the eastern bluebird (*Sialia sialis*). Luckily, Mr. Kohler knew about the Bluebird Restoration Association of Wisconsin (BRAW). BRAW's mission is to bring to light the efforts of citizens in America who have been helping the bluebirds constant struggle to survive.

BRAW is an organization created in 1986. When BRAW was first created, it was said that the eastern bluebird population decreased by 90% (in its home range). Researchers explain that the decreases are, "Due to changes in agriculture practices, competition from the house sparrow and European starling, severe weather in its central, and southern wintering range, and the loss of nest sites, such as tree cavities and hollow wooden fence posts." Yet BRAW recorded 30,000 eastern bluebird fledglings in the season of 2010.

BRAW recommends to those interested in bluebirds to use the NABS style box, K-box, and the Peterson box because these are the most productive boxes. For each of the three bird boxes, BRAW gives descriptive instructions on how to build the bird box with pictures to help you know what it should look like. I

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Sylvania: A place with a history of stewardship

By Thomas Melancon

Sylvania, a wilderness area in the Upper Peninsula (U.P.) of Michigan is special place featuring old growth forest largely untouched by man's saw. Sylvania's tract of 18,327 acres is a popular place for hiking, canoeing, and fishing. Its 34 lakes with portages make it a miniature version of Minnesota's Boundary Waters Canoe Area. Sylvania contains one of two large remnants of virgin northern hardwoods remaining in the Great Lakes Region. It is truly the crown jewel of the Ottawa National Forest.

Albert D. Johnston originally purchased the land for timber harvesting which would later become Sylvania. However, he decided to keep the land. His friends slowly began to invest in Sylvania because of its beauty and after Johnston died, they made the Sylvania Club, which was closed to the public. The Sylvania Club built three buildings; one of the buildings was an extravagant log château. According to the organization, The Friends of Sylvania, the Thompson Lodge, featured 16 bedrooms, 13 fireplaces, an indoor tennis court, and European antique furniture. It was constructed from logs brought by rail and for the last 7 miles, hauled by a team of horses.

Eventually all the members of the Sylvania Club died, except Lawrence Fisher and Clarence Christiansen. For some time, they were the only people with shares to the property. But eventually they died and when

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The male indigo bunting was clearly a "show stealer". The brilliant blue plumage caught the eyes and warmed the hearts of the students. To hold and band such a bird, creates a memory that lasts forever.

Nesting box monitoring

By Josh Whitesides

May 17, 2011 was the RESA students first time monitoring bird boxes.

The RESA students are doing research on bird box productivity. For some students it is their first time researching the productivity and selection of nesting boxes.

The tools we need to do the research are data sheets, a drill to open the boxes, and a sheet that tells us how old the birds are by growth and development of primary and secondary wing feathers.

The first day of monitoring birds was exciting because the RESA got to see the start of the nesting process. Students observed nests that were just started that morning and some that were finished and some even had tree swallow eggs! Alex Gaber commented, "I like the learning experience studying the cavity nesters and over at our study site by the ice arena, we saw and felt the heat off of the eggs moments after the incubating female left the nest."

Tree swallows are unique birds, they are in Wisconsin for the summer but they migrate all the way to Mexico and Central America. Tree swallows primarily eat insects and generally arrive at their breeding grounds a month after bluebirds. However, because of the effects of global warming, tree swallows are arriving at their breeding grounds the same time as bluebirds. The competition be

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RESA students mentored 6th grade from JWMS at the Ced A. Vig Outdoor Classroom. RESA students taught lessons in leadership focusing on the four components of leadership initiatives: fun, cooperation, communication, and trust. This was a great opportunity for students to apply their communication skills to help other students learn techniques to use when working in groups.

Fish aging techniques

By Cole Jensen

Aging fish… how in the world? The students at RESA have been learning how to age fish to better understand fish populations across different types of lakes.

First, a fish scale needs to be collected from a fish. Therefore, students need to go fishing or sample the fish community in a lake by setting few fyke nets out in the lake. Then, when the fish are removed from the nets, students collect a scale sample by scraping the side of the fish with the tip of a knife. The scales are then placed in a small envelope and date, lake, species, species number, and length of the fish are recorded on the envelope. Then the fish is released back into the lake.

Josh Whitesides stated, "I think I'll like the sampling more than counting the zone of winter circuli because we get to go to the lake and get up close with the fish with out harming the fish." Alex Gaber testified, "It seems interesting, and it is a project that most students just don't get to do very often."

Then, when students get back to the classroom they look at the scales under a microscope. To age a fish with scales, students count the number of annuli from the focus to the edge of the scale. The focus is the little ring on the scale near its center. The focus is essentially the original scale formed not long after the fish hatched. Then, the RESA students count

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GIS and fish management: cont. from page 1

There are a number of ways that this kind of data gathering, analysis, and display can help with fisheries studies. One example of a study application would be comparing the current stocking program in a lake to the available spawning habitat. One goal of fish stocking is to increase the population of a fish species in a lake to levels that allow the fish to sustain their own population. One consideration in spawning success is knowing if the fish have enough available spawning habitat in the lake. For example, walleye spawn on gravel and rock bars in shallow water. By knowing exactly where and how much habitat is available could tell fisheries biologists if stocking strategies for a lake will work or are cost effective.

Bluebird Restoration Association of Wisconsin: cont. form page 2

think that BRAW does this hoping to increase bluebird productivity in Wisconsin by providing the nesting boxes that increase survival of hatchlings.

The Bluebird Restoration Association of Wisconsin has come a long way in its ability to manage eastern bluebirds more efficiently. I hope that they will go even farther into knowing and understanding the life of the eastern bluebird.

Nesting boxes: cont. from page 2

fledglings for an average of 3.5 fledglings per box.

Assuming equal opportunity for selection, it appears the K-box is preferred over the NABS box by the cavity nesting songbirds in our study area. To maximize productivity of cavity nesting songbirds in our area, the K-box should be used instead of the NABS box.

Sylvania: cont. from page 3

they did, their heirs wanted to sell the land to their neighbor, the U.S. Forest Service. When the Forest Service got the offer, they saw the prospects intimately. Sylvania officially opened in the fall of 1967 when the First Lady, Bird Johnson spoke at an opening ceremony at Lake Clark.

From a Wisconsin lumber baron to the Sylvania Club to the U.S. Forest Service, there are many people who have saved Sylvania. It has been watched over as a summer home and vacation spot, but was never engorged by the public until the 1967.

Sylvania is an amazing landscape for hikers, campers, canoeists, and scientists alike. This place is ours to enjoy and learn from while following the guidelines of Leave No Trace. For more information on how you can plan a wilderness trip to Sylvania, contact the Watersmeet Ranger District at (906) 358-4551.

Aging fish: cont. from page 3

the rings called zone of winter circuli and zone of summer circuli. Circuli are rings on the scales produced as the fish grows during the summer and winter, unlike a tree, many circuli are formed each year. The RESA students look at the zone of "winter" circuli those are when the rings get really close together that will mark the end of one year's growth. You could use the otolith (a bone in the head of the fish) and fin rays to age fish, but to collect the otolith the fish needs to be killed and to use fin rays, technical equipment is needed to slice a thin cross-section of the ray..

By aging fish, RESA students learn whether or not the predator and prey populations are old or young and whether their growth is good, bad, or average for the particular type of lake. Depending on these metrics, biologists may choose to improve fisheries by changing minimum size and daily bag limit regulations.

The RESA students have been learning how to age fish and why biologists have different regulations on different lakes. This is going to be a groovy unit.

Monitoring nesting boxes: cont. from page 3

tween the two seems to favor the tree swallow. Their size is 5-6" (31-15 cm) and the incubation period is 14 to 16 days. It takes 20 to 24 days for the fledglings to be able to fly. By the end of this week, there should be hatchlings in several boxes!

One of the RESA students saw two bluebirds sitting on a telephone pole in our study area, Cole Jensen quoted, "I'm excited to think those two bluebirds might be a mating pair that will use one of our boxes; this was a really exiting day."

Monitoring boxes is a great science learning experience for RESA students. It is the type of experience that can change students' view of science research and surely an experience they will remember forever.

RESA students taught students from James Williams Middle School about bird banding and how birds are indicators of global climate change. The showy indigo bunting (left) is a neotropical migrant, flying to South America and back to North America on it's annual migration. The chickadee (right) is an adored resident of the Northwoods. Both share breeding habitat in deciduous forests during the summer. There is something magical when a child learns about birds by studying them up-close and observing the intricacy and beauty of their plumage.

Rhinelander Environmental Stewardship Academy

Phone: 715 365-9220 (ex. 7114)
E-mail: kohlekir@rhinelander.k12.wi.us

We're on the web: //www.rhinelander.k12.wi.us/resa/

The mission of the Rhinelander Environmental Stewardship Academy is to engage students in the application of science, social science, and communication skills to conserve sustainable ecosystems for the health of the greater Rhinelander community.

To locate the 2011-12 enrollment application, log into the RESA web page and select "RESA Application" in the quick links menu.

By May 16 in our study area, tree swallows had already started incubating. According to researchers, tree swallows historically nested four weeks later than eastern bluebirds because their wintering areas were much farther south. However, the effects of global warming now have bluebirds and tree swallows nesting at the same time, thus increasing competition in which tree swallows seem to have an advantage.

Alex Gaber and Cole Jensen measure the distance between each claw mark to determine if a bear or some other mammal ate the bait in the box. In a different site, a raccoon was determined to have opened the box and eaten the bait.

While at the public library, Sophia and fellow RESA students and parents, hosted a nature crafts workshop for kids. RESA students helped kids make creative bird feeders and lectured about bird banding and identification.

Bob Willging, biologist for USDA Wildlife Services, presents a project where deer were removed from Sand and York Islands of the Apostles Islands National Lakeshore, in order to protect a rare plant community featuring Canadian yew (above).

Cole Jensen inspects claw marks on a white spruce tree where a bear bait box was placed. This was the one site out of seven where a bear ate the peanut butter, marshmallows, and tetracycline pills.

Students practice aging fish scales to prepare for their fisheries research project on Stella Lake. In June, students will conduct a population estimate on bluegill and largemouth bass and compare the fisheries to those studied the last three years.