

Winter

2014



BAD RIVER NATURAL RESOURCE

Common Ground

WOODED WETLANDS – AN IMPORTANT RESOURCE BY JESSICA STRAND, WETLANDS SPECIALIST



Above is an aerial shot of Honest John Lake.

Forested wetlands are those often overlooked by the general public when they take notice of local wetlands in the landscape. Unlike wet meadows, open marshes, and alder thickets they are not easily distinguished by the untrained eye—mostly because the open water and emergent species (like cattail and lilies) that people look for are oftentimes not found in these ecosystems. Instead wooded wetlands are forested swamps dominated by mature conifers and hardwoods that can tolerate wet conditions on a seasonal or permanent basis. There are times during the year that you could walk through a forested wetland and not even need boots to keep your feet dry. However, that doesn't mean that they aren't wetlands and that they aren't an important part of the surrounding landscape.

There are several types of forested wetlands on the Reservation—hardwood swamps, coniferous swamps, coniferous bogs, and floodplain forests—and each has an important part to play in maintaining the local environment. If you think about it, you can probably realize some of the reasons forested wetlands are important.

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- *2014 Radon Youth Contest Winners*
- *New Bad River Fisheries Specialist*



WOODED WETLANDS – AN IMPORTANT RESOURCE

BY JESSICA STRAND, WETLANDS SPECIALIST

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For example, have you ever walked down a road or a trail through the woods at dusk in the spring? What have you heard? If you are remembering choruses of frog calls then you were probably walking by some forested wetlands, which are important breeding grounds for many of our amphibian species.

Or maybe it wasn't dusk when you were walking, so you didn't hear any frogs, but maybe you looked down and noticed some flowers springing up out of the ground in some wet mossy areas under the trees. These flowers that you enjoyed might be unique to the forested wetland around you since many perennial and

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Left Top: A hardwood swamp in the spring just as leaves are starting to emerge on the trees. **Right Top:** Another hardwood swamp whose dominant fern understory almost conceals a mother black bear and her cubs in the distance. **Left Bottom:** Marsh marigold growing in a hardwood swamp near West Fire Lane indicates that there is probably some groundwater seeping to the surface in this location. **Right Bottom:** Common winterberry in a hardwood swamp in the fall has bright red berries that stand out against its green and gold foliage. Photos © Bad River Natural Resources Department.

WOODED WETLANDS – AN IMPORTANT RESOURCE

By JESSICA STRAND, WETLANDS SPECIALIST



Left: A coniferous swamp inundated with water from the spring melt. **Right:** A cluster of bunchberry plants growing up through a carpet of pine needles in a coniferous swamp. Photos © Bad River Natural Resources Department

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annual plants rely on forested wetlands for suitable habitat. For example, one of our State-threatened species, a delicate little orchid known as the fairy slipper, grows only in old-growth white cedar forests.

Or maybe you weren't even walking through the woods when you observed why forested wetlands are important. Perhaps you were in your car driving to town and you were just about to cross the U.S. Highway 2 bridge over the Bad River in the spring of 2013. Looking on the south side of the road you saw the rising floodwaters swirling among the trunks of the trees alongside the river. What you were observing was the ability of a forested wetland to slow and contain floodwaters by dispersing them away from the river.

These are just three opportunities you may have had to notice the importance of forested wetlands, but there are so many more reasons these wetlands are important. Aside from providing unique habitats for plants and animals and helping to slow and disperse floodwaters, forested wetlands also: 1) slow runoff across the landscape so that more water is absorbed into the ground to replenish local aquifers; 2) slow snowmelt by shading snowy areas so they melt more slowly than open areas; and, 3) filter pollutants, debris, and sediments from waters before they move downstream. All of these functions and others combined help support the health of the ecosystem and environment around us.

If you want to learn how to identify these wetlands, continue reading to learn specifics about the different plant community types for each of the forested wetlands found on the Reservation. Knowing what plant species to look for is the easiest way to begin to identify forested wetlands.

Hardwood swamps are dominated by mature deciduous tree species such as black ash, red maple, yellow birch, balsam poplar, quaking aspen, American elm, and northern white cedar. They have an understory component of assorted dogwoods and willows, as well as nannyberry, common winterberry, jewelweed, marsh marigold, skunk cabbage, jack-in-the-pulpit, and many others. Oftentimes there is only standing water in the spring or after heavy rains in these areas and (for the most part) they are dry for most of the growing season. Sometimes if inundation lasts longer than usual in the spring the herbaceous understory will be absent for the year.

Coniferous swamps are dominated by mature evergreen tree species such as tamarack and northern white cedar, though balsam fir is also a common species and other conifers grow within the wetland. The understory is dominated by fern species though many other species grow in these wetlands including flowering plant species such as northern white violet, wood anemone, starflower, blue-bead lily, wild lily-of-the-valley,

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WOODED WETLANDS – AN IMPORTANT RESOURCE

BY JESSICA STRAND, WETLANDS SPECIALIST

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bunchberry, wild sarsaparilla, jack-in-the-pulpit, and Ram's-head lady's-slipper. These wetlands usually have saturated soils with high water tables throughout the summer, and (during certain periods) up to a foot of standing water.

Coniferous bogs are dominated by mature tamarack and black spruce and have an understory dominated by sphagnum moss.

Other plants that grow in bogs are orchids, evergreen shrubs, pitcher plants, and other species that can survive in low-nutrient soils; some common shrub species include leatherleaf, sweet gale, bog rosemary, Labrador tea, and cranberry. Examples of coniferous bogs can be seen within the boundaries of the Kakagon and Bad River Slough Complex on the Reservation.

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Top left: The shoreline of Honest John Lake where the bog is dominated by tamarack and black spruce. **Top right:** An aerial shot of Honest John Lake showing how open and conifer-dominated bog alternates within the slough complex. **Bottom left:** Cranberry flowers and fruit growing in the bog within the Kakagon-Bad River Slough Complex. **Bottom right:** Leatherleaf shrubs in flower. Photos © Bad River Natural Resources Department.

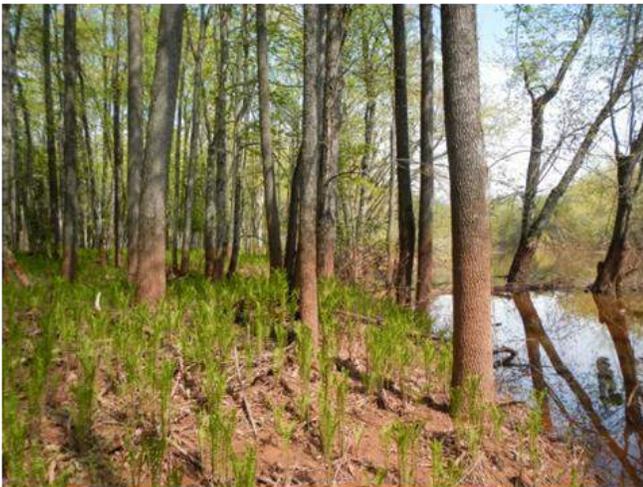
WOODED WETLANDS – AN IMPORTANT RESOURCE

BY JESSICA STRAND, WETLANDS SPECIALIST

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Floodplain forests are lowland forests along large streams and rivers whose primary hydrological influence comes from inundation from periodic flooding (usually from melting snow during the spring or large storm events in the summer). Floodplains contain mature tree species such as basswood, silver maple, box elder, green and black ashes, and red maple, however, few shrubs and saplings usually establish because of

the floodwaters. Woody vines are common in floodplain forests, and include species such as wild grape, Virginia creeper, moonseed, and wild cucumber. Overall the plant species found in the floodplain can be very diverse. These areas are biologically unique, and serve as a migration corridor for many species, so it isn't unusual to see black bear, white-tail deer, garter snakes, wood turtles, grey wolves, and many other species wandering through.



Top Left: The trunks of trees in the floodplain forests surrounding the Bad River are marked with sediment deposits, showing how high the recent floodwaters rose. **Top Right:** A wetland near the Bad River boat landing during flooding in 2013. **Bottom Left:** A garter snake basks on a drift line made up from debris left by recent flooding. **Bottom Right:** A female wood turtle moving through the sedge and forb undergrowth in a floodplain forest near the Bad River. Photos © Bad River Natural Resources Department.



ANA Environmental Regulatory Enhancement Grant “Boozhoo Nijii Onjibaa Mashkii Ziibii”

By Tony Corbine, ANA Grant Administrator

Our project is in its second year of a three year grant. The goal of this project is to develop the Tribal Government’s capacity to articulate traditional socionatural (i.e. human-landscape) connections within a framework of Tribal Water Quality Standards implementation. The Natural Resources staff was instrumental in the development of this project. Cyrus Hester (Environmental Specialist) and Naomi Tillison (Water Resources Specialist) are the visionaries who created the project plan, objectives, goals, and overall impact that benefits the community. I, Tony Corbine, am the Grant Administrator and I was hired 10 months into the project and quickly accomplished the tasks for year one and began coordinating efforts for the second grant cycle and planning for the third and final year of funding.

The first phase of the project was critical as we had to develop a respectable level of rapport with tribal members and elders so they feel comfortable with sharing cultural sites. It is with their detailed and specific knowledge of the landscape and practices of the Tribe that the capacity and true depth of the community’s link to the landscape will be revealed. These site-specific interactions are essential for understanding correlations between environmental quality, public health, sociocultural practices and environmental protection requirements. It was a wonderful experience to look at the past through the eyes of our elders. Although many specific sacred sites were identified several elders spoke about the whole area, “All of our land is sacred. How can I say this place is more sacred than that one? All of it is sacred.” The interviews with the elders were fascinating. A few months before the interviews we contracted the expertise of a cultural anthropologist, Professor Larry Nesper, UW-Madison, and a historian and Native American studies educator, Professor Chantal Norrgard, Northland College, together with the Grant Administrator conducted several interviews during the summer of 2012. Ultimately the information gathered from the interviews will be an essential piece in a two part document temporarily titled: “Human Landscape Report”.

The second phase of the project involves the collection of water quality data at the sites identified in phase 1. The sites are assessed, inspected and prioritized for the feasibility of sampling and consideration for the presence of perennial water resources, the distribution of sites in the watershed and the environmental significance of the site. Paleoecological investigations through the use of deep sediment cores will enable tribal resource manager to acquire a rare and definitive

glance into the environmental history of the site. Currently, sediment cores have been collected for six different locations located within the watershed. The cores collected will provide two key benefits: 1) long term data on natural variability and baseline conditions at the site, and 2) data on a comparable time scale to community memory and perspectives. At minimum, all core samples will be dated and analyzed for decadal trends in nitrogen, wild rice density, mercury, and lead. Standards for core sampling have followed the University of Minnesota’s Limnological Research Center (dba LacCore) Standard Operating Procedures for Surface Coring. Special thanks goes out to the Fond du Lac Environmental Department, Tom Howes and his crew for their expertise and assistance with obtaining sediment core samples during winter 2013. Fortunately this winter’s core sample collection was conducted with the assistance of LacCore staff, Kristina Brady and Jessica Rodysill.

Historical perspectives are inherently valuable. However, their worth is exponentially increased when they provide a better context for understanding the present.

“For it is with yesterday that we learn for tomorrow.” – Benton Benai

The third and final phase of the project emphasizes the formal synthesis of information for phases I and II. The last phase begins with environmental and anthropological staff participating in a series of structured meetings over the course of several months to review and discuss analyses of trends. It is with the interdisciplinary results and at the conclusion of the meetings that substance and format of the draft report will have been defined. With this framework established a collective draft will be created, “Human Landscape Report on Water Quality”. The findings will be presented to Tribal Council and to the community seeking feedback which will be incorporated into a final revision of the report. The Project Administrator will incorporate the results into the steps outlined in the sustainability plan; institutionalizing the benefits to inform the community, tribal decision makers, and guide the implementation of tribal water quality standards of this grant-supported effort.



Critter Highlight:

Nigig – The North American River Otter – *Lontra Canadensis*

By Lacey Hill, Wildlife Specialist



River otters are members of the weasel family. Historically they were found in almost every major waterway on the Northern American continent. Over trapping, wetland loss, and pollution all contributed to its decline in the early twentieth century. Due to education and recovery efforts they currently occupy the majority of their historical range, but there is still a lot of work to be done.

The otter resembles a long cylinder with a long body and tail and short, stocky legs and large webbed feet. The average otter will weigh between eleven and thirty pounds and measure three to four feet in length! They have dark brown waterproof fur that they groom pretty regularly. On land some people may confuse them with a mink, but mink are a lot smaller and usually will have a patch of white underneath their lower jaw. In the water they can often be mistaken for beavers and muskrats but look closely for a long slender body and tail.

Otters hunt on land and in the water. They eat a variety of animals with fish being their favorite. They will also eat reptiles, amphibians, crayfish, mussels, birds, and small mammals. They can be secretive animals so most of the times you will see otter sign before you see the otter. They mark their territory with urine, feces, and musk. These scent posts are more commonly referred to as latrines. River otters on average have a three mile home range and use burrows in the earth or a logs, brush piles, or even abandoned beaver lodges. In the winter time you may notice long slides. Otters will travel in the winter by bounding 3-4 times then sliding up to 15 feet! They are the only animal that travels on the snow like that on the Reservation so if you see these slide marks you know that an otter was there!

Baby otters known as pups are born typically April through May and are only around four inches long. Litters size is typically between two-four. Otters are completely weaned and know how to swim by eight weeks and by one year of age they are out on their own.

Otters are referred to as a flagship species of wetlands with ample and high-quality water.

Nigig - River Otter

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D C K I S T P Y A R J G Q E V
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DEN
FISH
FLAGSHIP
FUR
GROOM
LATRINE
MINNOWS
OTTER
PUP
RIVER
SLIDES
SWIM
WEBBED
WET



Wildlife Management Updates

By Lacey Hill, Wildlife/ GIS Specialist



Winter Severity Index

The winter severity index (WSI) is a way of assessing how difficult of a winter it has been on the deer herd. This winter we have using data collected from the weather station in New Odanah to keep track of the local WSI. Throughout the reservations temperatures and snow depths fluctuate so it will not be the same across the board. The WSI is found by adding the number of days where the snow depth is greater than 18” to the number of days where the minimum daily temperature is less than 0°F. This year our below zero temps began on December 6th and on December 23rd we were well above having 18” of snow. From there the snow and cold has continued.

The Wisconsin Department of Natural Resources (WDNR) ranks the WSI in Wisconsin as a 50 or less is considered a mild winter, 50 – 99 is a moderate winter, 80-99 is severe, and anything over 100 is a very severe winter. The WSI for New Odanah at the end of December was 24, end of January it was at a 73, and at the end of February we are considered in the very severe winter category at a 120.

The Deer Trustee Report and its implications to Deer Management on the Reservation

For the past couple of years there have been a lot of conversations about the deer trustee report. Back in June 2012, Dr. James Kroll and two of his colleagues submitted a report and recommendation on deer management in Wisconsin to the Wisconsin Department of Administration. From this report there will be a number of changes being made to deer management in Wisconsin. One of these changes is the changing of deer management units (DMUs) in the state to county boundaries. This change will not affect the Bad River DMU. Instead of being DMU 7 it will be known as the Bad River Reservation Unit. That being said so far it does not appear that the changes being made by the state will have any direct impact at this moment to how deer management is currently being done on the Bad River Reservation.

Bad River Wolf update

Bad River Natural Resources Department (BRNRD) is interested in any and all images or recent sightings of wolves on the Bad River Reservation. BRNRD keeps a Wolf Observation Log book in the department. Pictures and observations can also be emailed to wildlifegis@badriver-nsn.gov. We have noticed a reduction in the wolf population on the Reservation over the past couple years. One of the Reservation packs also has also been documented with mange which is tough on them during this extremely cold winter.

Critter of the Month

By Christina Dzwonkowski, BRNRD Conservation Warden

Bad River Natural Resource Conservation Officer, Christina Dzwonkowski, and Bad River Natural Resources Wildlife Specialist, Lacey Hill, have implemented a new program for our Bad River Headstart children called “Critter of the Month”. Once a month, Christina and Lacey get together and do a presentation for the children that includes reading a book involving the Critter of the Month, showing a hide and skull of the critter, showing a picture of the tracks the critter makes, teaching the ojibwe word for the critter and leaving the children with a coloring book. We believe that giving the children an inside look at animals that live on our Reservation will foster a good relationship with the outdoors and an appreciation for nature.

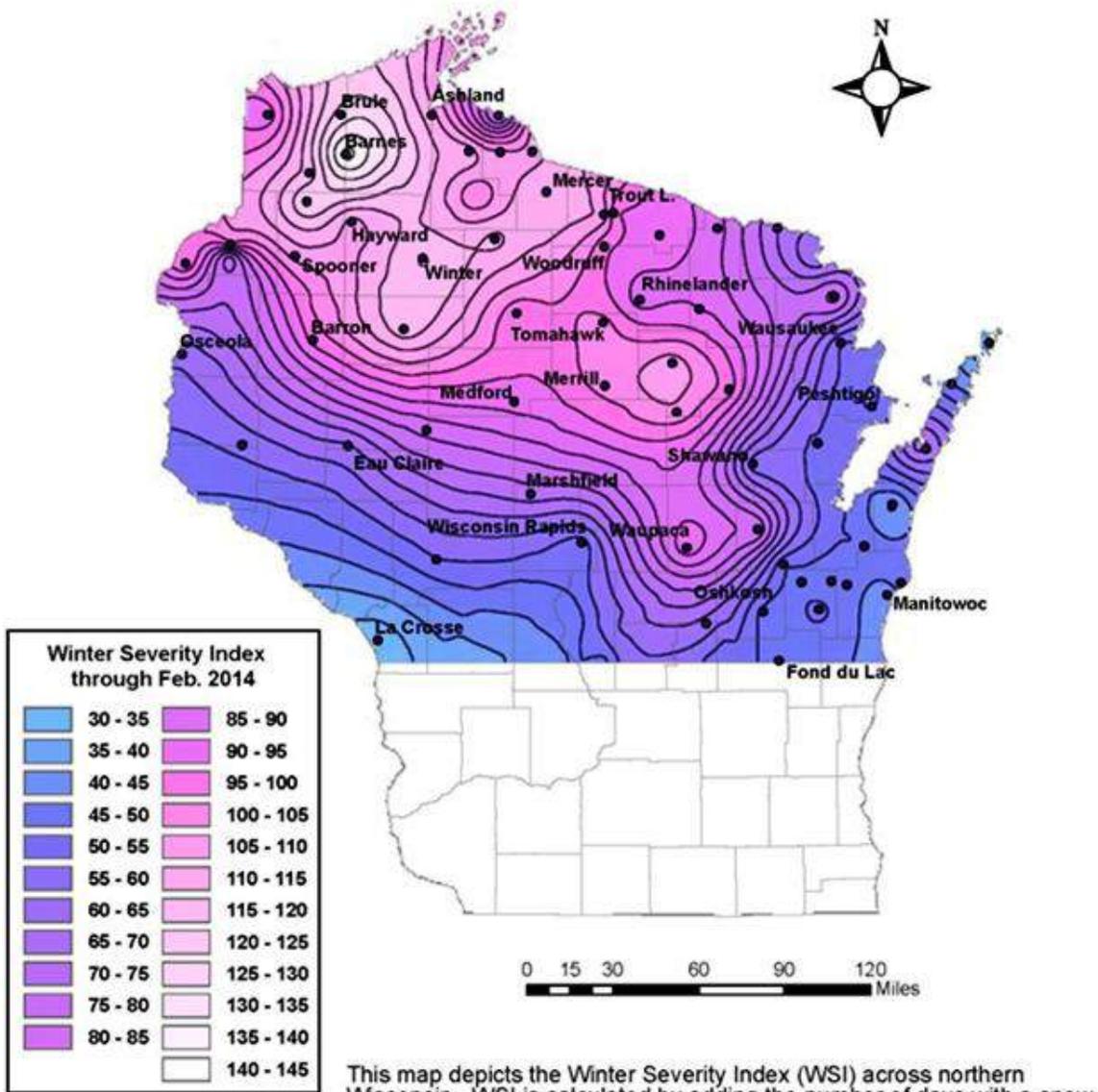


Wildlife Management Updates *Continued*

By Lacey Hill, Wildlife Specialist

Winter Severity Index through Feb. 2014

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This map depicts the Winter Severity Index (WSI) across northern Wisconsin. WSI is calculated by adding the number of days with a snow depth of at least 18 inches to the number of days when the minimum temperatures were 0°F or below. WSI points accumulate through the winter. WSI of 50 or less is considered mild, 50 to 79 is moderate, 80 to 99 is severe, and over 100 is very severe. Most WSI readings are taken by WDNR biologists across northern Wisconsin, but some readings are from National Weather Service stations. The stations used are displayed on the map. A statistical procedure uses that data to estimate WSI in the areas in between stations. Questions can be directed to Daniel.J.Storm@wisconsin.gov.

METALS, RECYCLING, AND OPPORTUNITY

By Cyrus Hester, Bad River Environmental Program



As the United States underwent rapid industrialization, the demand on resources changed in both magnitude and character. At the close of the 20th Century, only 5 percent of new materials were renewable (versus 41 percent a 100 years prior). Crushed stone and sand for construction activities make up the dominant share of that industrial resource profile. But, metals are also ubiquitous due to their fracture

toughness, thermal and electrical conductivity, and performance at high temperatures.

The challenge for modern society is that the extraction and waste of metals can result in undesirable impacts to public health, private property, and the environment. But, that waste is also a loss of economic opportunity. In 2000, recycling contributed 80.7 million tons of metal, over half the apparent supply by weight.¹ That lost metal is valued at \$17.7 billion dollars.

The rate at which a metal is recycled tends to mirror its prevalence in easily recoverable products. Metals in small quantities in complex relationships are, in current practice, more challenging to recycle. However, iron (including steel) is currently the most widely used of metals. There is an estimated 835 million metric tons of steel in landfills and solid waste facilities today. That's about 11,000 times the steel needed to make the Golden Gate Bridge. In addition, an estimated 600 million metric tons of iron is also stored in mine tailings. Tailings and landfills represent the largest losses of iron in the US economy.

Another 4.13 billion metric tons of steel is circulating society. But, the majority of that is not coming from iron mining. In fact, the largest input of iron-containing materials in the US is the net importing of goods. This influx of iron-bearing goods is being driven by a combination of population, technology, and affluence, that latter one is also known as our *habit of consumption*. Unfortunately, we are not making the most of iron-containing products in today's society. The figure to the right depicts the recycling rates for a number of recyclable materials; notice the variability and the opportunity for growth.

Recovering a metric ton of scrap steel conserves around 2270lbs of iron ore, 1278lbs of coal, and 110lbs of limestone.

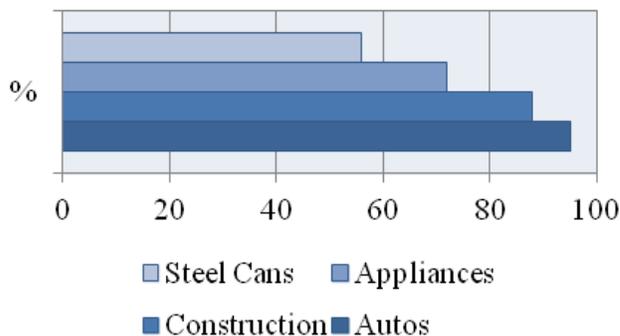
¹Apparent supply = Production + Recycled Material + Net Imports + Stock Changes

It's important to note that the steel industry is also dependent on abundant, cheap energy. The industry is estimated to use around 9-10% of the energy consumed by the entire US industrial sector. Recycling eliminates the need for the most energy-intensive step in the steel making process: the conversion of iron ore to iron in a blast furnace. Recycling reduces primary energy consumption by 75%; which, in turn, reduces energy costs and air pollution (like greenhouse gases and mercury). Recycling steel saves the energy equivalent of running one-fifth of US households each year.

But, the recycling system, as it currently operates, has its limitations. Challenges to recycling include:

- Product designs that make material separation difficult;
- Rapidly changing products that make material composition unclear;
- Support for recycling technologies that is insufficient to keep pace with product development;
- The lack of adequate recycling infrastructure in many parts of the world; and
- A generally low awareness about the loss of resources and the resulting impacts from the system.

Thermodynamics and the gradual dilution of metals may impair the achievement of 100% metal capture by recycling. But, we are a long way from reaching even that level of renewal. More importantly, as a society, we can begin designing products with a renewable and recyclable end in mind; using a system that truly accounts for the costs of production, distribution, and use.



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EPA's new rules to prevent air pollution

Nathan Kilger, Air Quality Specialist

Proposed Standards for Residential Wood Heaters

A rule from the Environmental Protection Agency (EPA) is set to begin being phased in starting next year (2015). The proposed rule will require manufacturers of wood stoves to engineer and produce stoves that pollute less. A beneficial side-effect of designing a stove to produce less pollution is that the stove burns more efficiently. Newer wood stoves produce much less

pollution than older stoves and fireplaces, while producing more heat.

This rule only applies to newly-manufactured wood stoves, so any wood stove already installed or purchased does not have to meet these new requirements. As these new wood stoves are installed and used over time, overall pollution from all wood stoves will decrease, benefiting human and environmental health.

METALS, RECYCLING, AND OPPORTUNITY *Continued*

By Cyrus Hester, Bad River Environmental Program



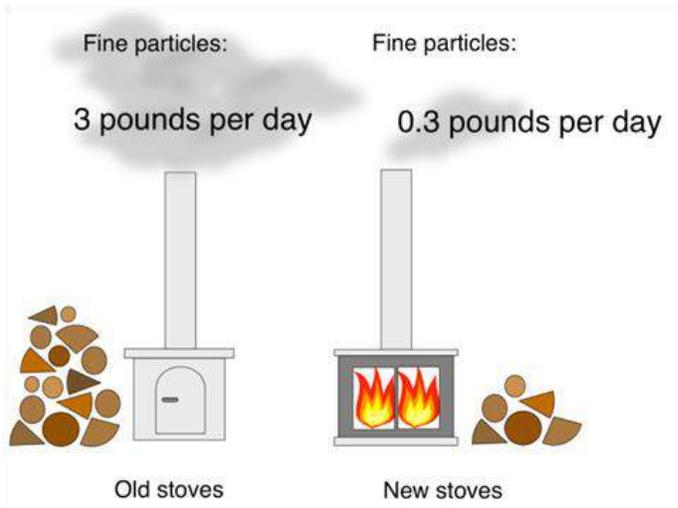
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That means recognizing the ecological and social costs of consumption the same way we appreciate market costs. When we begin to actually account holistically for the true cost and value of the goods we produce and consume, resilient and renewable systems will become increasingly logical compared to our current extractive model. What would we call that true cost accounting? I don't know... maybe capitalism. But then, I'm not sure what we'd call the current system...



Burning wood in a fire place is the least efficient way to warm up house and it produces the most pollution. Wood stoves designed under the newest EPA rules will be up to 90% efficient, producing the most heat with the least pollution, requiring less wood.

The type of fuel also makes a difference. Burning anything besides wood (such as plastics, color newspaper, diapers, magazines, packing material, and painted or treated wood) can damage your stove and coat the inside of your chimney with creosote, making chimney fires more likely. Burning only clean and dry wood provides a more efficient fire with less pollution.



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EPA's new rules to prevent air pollution *Continued*

Nathan Kilger, Air Quality Specialist

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Visible smoke is an indicator of how efficient a fire burns – a fire with very little smoke is burning hot and is very efficient, whereas a fire with a lot of smoke is burning poorly, inefficiently, and is not producing much heat. When you see thick smoke rising from a chimney, that smoke is a sign of an inefficient wood stove where the wood isn't burning well and produces smoke instead of heat.

It's a win-win scenario when a home is being heated with less wood while producing less pollution.

Tier 3 Vehicle Emission and Fuel Standards Program

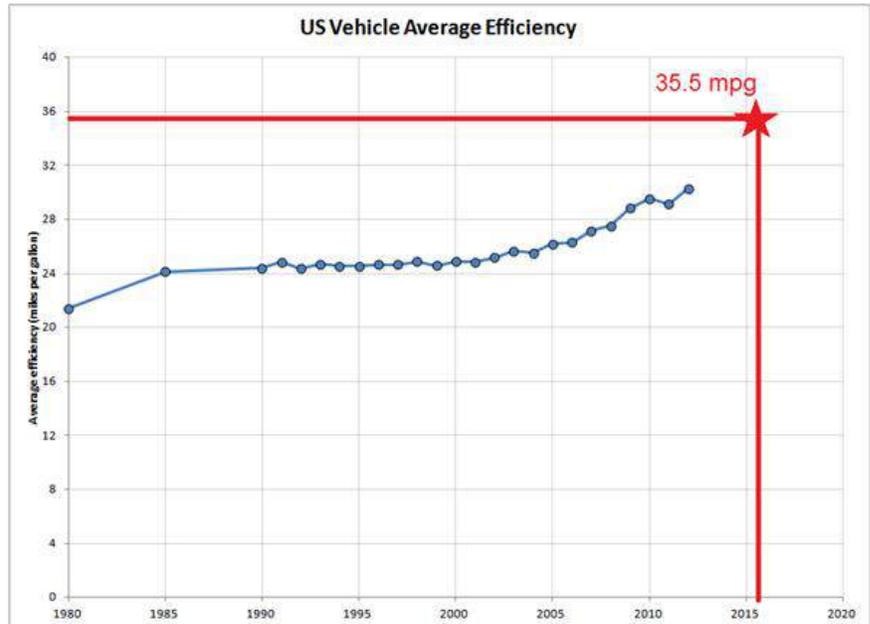
The other rule being finalized by the EPA affects fuel efficiency of vehicles, mandating that by 2016 the average fuel economy of all U.S. vehicles (cars and light trucks) of 35.5 miles per gallon (mpg).

These rules will be implemented in phases over time, step-by-step, so that once the rule is fully implemented, all vehicles will get better gas mileage while producing less greenhouse gases and pollutants that contribute to the formation of smog and haze.

Some expected benefits from increased mileage and reduced pollution from vehicles include:

- CO₂ emissions reduced by 2.2 billion tons by 2025 (not counting heavy-duty vehicles)
- A total of \$1.7 trillion saved from fuel costs
- 2.2 million barrels of oil saved (compared to 2010 usage levels)
- Up to 2,000 premature deaths prevented by 2030

Previous rules like this from EPA cut sulfur in gasoline by 90% and brought new emission control technologies to vehicles manufactured today. This graph shows how overall vehicle fuel efficiency has been slowly rising since 1980, with the first target of 35.5 mpg in 2016 highlighted in red. This proposed rule would help spur fuel efficiency to continue rising after being flat-lined for twenty years.



How these new rules will affect air quality on the Bad River Reservation

Measured ozone levels at Bad River, while the lowest measured in Wisconsin, are still relatively high and very close to the National Ambient Air Quality Standards. Any reduction in vehicle pollution will help reduce smog and bad ozone at ground level. Fine particulates measured by on-going sampling at Bad River are lower than many locations, but reduction of fine particulates from wood stoves will only help to maintain and protect human and environmental health.

More information can be found on EPA's website (<http://www.epa.gov>) by searching for "NSPS for Residential Woodstoves" or "Tier 3 Vehicle Emission Standards". Numbers in this article were pulled from the US Environmental Protection Agency, the US Department of Transportation, and the US Department of Energy websites.



Maps on the Mind: Why Manage Digital Data

By Kim (Ness) Sundeen,

Geographic Information Systems (GIS) Specialist



Understanding the benefits of managing digital data is not very intuitive. Many organizations spend vast amounts of money to contract out data collection (water quality, wetland delineations, surveying of buildings or leases, flying to take aerial photographs...etc). Unfortunately, many of these organizations forget to make a plan to manage the digital once it is collected. Here are a few tips for managers to plan for the future management of their digital data.

The Obstacle: Not knowing who should manage the digital data after it's collected.

Even with the optimal project planning and scoping in mind, upfront costs of managing digital data products from that project are frequently forgotten. As any information technology managers realizes, managing digital data is not flowery or exciting work. It is, however, critical to long-term secured management of tribal property.

The Solution: Know who will take responsibility for managing digital data before it's collected.

The solution is to make a plan from the beginning of a project for managing the digital data before it is collected. Planners and others contracting out data collection should consider these questions:

1. Who will take responsibility of holding onto the digital data in a secure location?
2. Who will be responsible for updating the digital data?
3. What digital data format does your project require?
4. If your project involves mapping-related data, does your project budget account for digital data management in a Geographic Information System (GIS)?
5. Is the digital data properly documented (will a novice be able to understand the digital data)?
6. If other department can use the digital data from your project, how will you share the digital data?

Many types of digital data are associated with real-world locations. More recently, collected data are transferred in both paper and digital (electronic) formats, such as maps, utility lines, building outlines, or spreadsheets of GPS-collected location points over e-mail, CDs, DVDs, or external hard drives. Perhaps surprising to some, such data can be viewed, edited, printed, and managed using Geographic Information System (GIS) technology.

What is a Geographic Information System (GIS)?

Geographic Information Systems or "GIS" encompasses a technology—a suite of tools—used for managing, analyzing, and displaying information linked to real-world locations. GIS is used mainly to manage the data and information to display on

maps such as stream locations, land parcel ownership, utility lines, forest stands, and burial sites. Managers in any field use GIS tools to answer questions like "Where is the closest hospital to tribal members?"; "If an oil pipe bursts, where will the oil affect the nearby streams?"; "Where is the ideal location to begin developing of new houses?"; How much harvestable timber will be available in 10 years?

How Does the Bad River Tribe Benefit using GIS?

GIS/Map Services directly relate to the critical operations of the Bad River Tribe for managing data, producing paper and digital maps, and creating new digital data of location-based information. Three examples listed below illustrate how the Bad River Tribe has used and continues to use Geographic Information System (GIS) services, such as maps, data, and analysis, to inform tribal management decisions related to the proposed Gogebic Taconite Mine in the Penokee Range.

Example 1: Mapping where the Bad River Watershed Association sampled water quality in the Penokee Range.

The Bad River Watershed Association (BRWA) is a major partner to the Bad River Tribe in understanding the water-related resources in the Bad River Watershed. The BRWA requested the GIS/Map Services Program to design a poster-sized map of water quality sampling points the BRWA monitors. The poster (Figure 1) was presented at the 2014 Wisconsin Wetlands Association conference in Madison, WI. (Time spent on request: 10 hours).

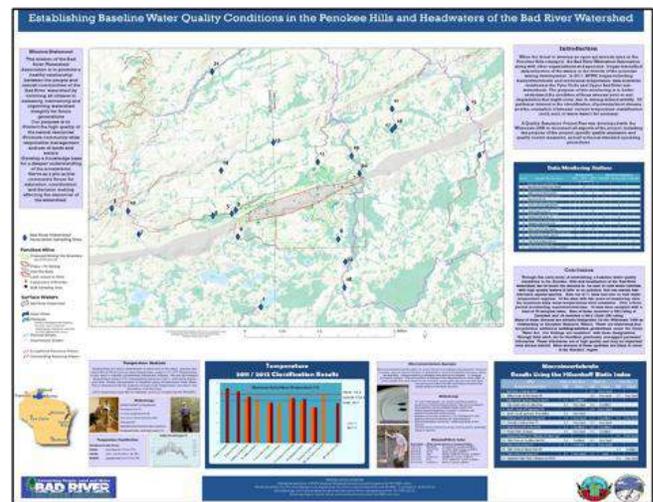


Figure 1. Poster map designed for the Bad River Watershed Association for illustrating water sampling locations and methods around the Penokee Range.

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Maps on the Mind: Why Manage Digital Data Continued

By Kim (Ness) Sundeen,

Geographic Information Systems (GIS) Specialist

(Continued from page 13)

Example 2: Mapping geology, trout streams, and other water resources in the Bad River Watershed.

The map was originally designed to assist with educating the public about the water resources in the Bad River Watershed in proximity to the proposed mine. Figure 2 has been showcased many times to inform various audiences of the presence of important water resources within and around the Bad River Watershed. Important water resources encompass designated trout streams, high quality standards in rivers and streams, the bedrock geology throughout the watershed, among others.

(Time spent on request: 45 hours)

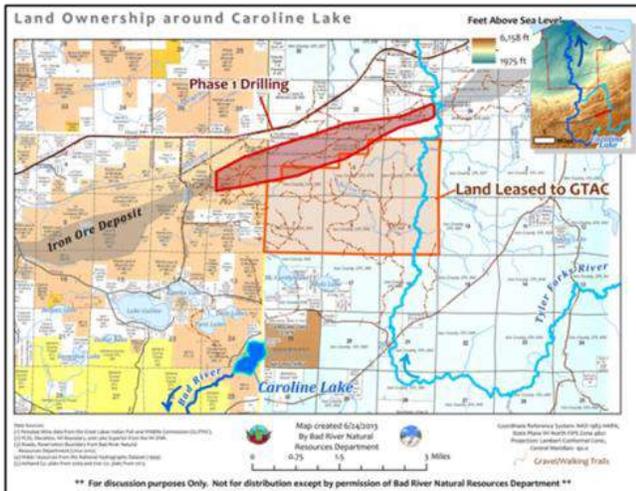


Figure 2. (Above) Poster map was designed for the Bad River Natural Resources Department to depict a bird's eye view of the Bad River Watershed and the proposed Gogebic Taconite mine location in the Penokee Range. It also illustrates the water resources such as trout streams and designated exceptional and outstanding lakes, rivers, and streams with higher water quality. This poster is also available online at http://www.badriver-nrn.gov/images/stories/docs/MiningUpdate/PenokeeOreBody_LargeOverview_350dpi_Reduced.jpg

Example 3: Mapping ownership and lakes and rivers downstream from the proposed GTAC mine.

The GIS/Map Services Program designed two maps detailing the location of the ownership around the proposed mine (Figure 3) and rivers downstream if the headwater lake, Caroline Lake (Figure 4). Plat maps were overlaid to explain ownership of the areas. (Time spent on request: 20 hours).

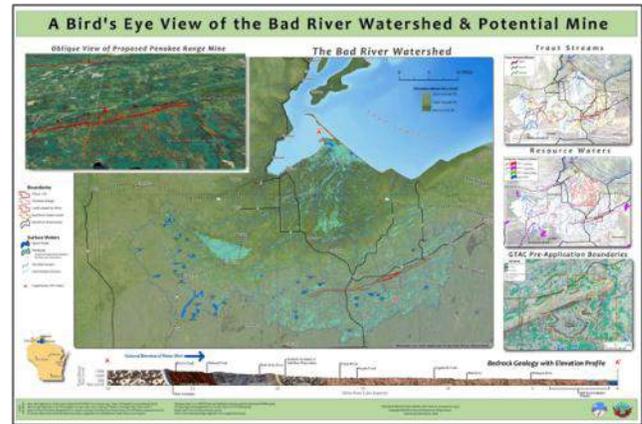


Figure 3. (Above) Map of plat ownership (2009 in Ashland County and 2013 plat in Iron County) in the Penokee Range. The Tyler Forks River and Bad River are highlighted to show where water may flow downstream.

Figure 4. (Below) A topographic map centered on the major rivers connected to the headwaters in Caroline Lake. The Bad River and Tyler Forks River are connected downstream of Caroline Lake.



Spring is right around the corner!

By John Patrick, BRNRD Conservation Warden



There is still a possible month before spring actually arrives, some may hope sooner. In the meantime, people are gearing up for sugar maple sap run. Soon to be followed by spring fishing! Currently, collecting birch trees is still in progress.

There has been an interest to harvest birch trees. Traditional wiigwaas or birch bark harvest is an annual spring event that tribal members do each spring for making wiigwaas makak or birch bark baskets and other crafts. Today, there is a new market for birch trees as they are used for interior decorating and other contemporary craft designs. Curious tribal members are wondering about the future of the birch tree.

In educational research, Bad River Natural Resource Department (BRNRD) is collecting information and data from organizations with similar curiosities. Overall, it is understood that the demographic of the birch tree has decreased over the years and appears to be in continued population decline. Other Ojibwe tribes along with Great Lakes Indian Fish and Wildlife Commission and US Forest Service, North Research Station Forest Inventory and Analysis program are developing an inventory protocol for forest land collection and estimations. Most current reports are still being drafted.

What has been observed and documented by BRNRD and Bad River members is most of the birch tree harvesters cut along the roadway. It is easier for harvesters to collect along the roadway rather than trudging through deeper snow conditions. Birch



trees being harvested range in size, lengths up to 10' with a diameter of 2", 3", 4" and so on up to 8". Each diameter at length tree sells for a different price. Bundles of small branches are included in what's being harvested.

A few possible drawbacks: Stumps left behind may be an "eye sore" to some, cosmetically speaking. It also takes away from those less able to travel deeper into the woods to harvest wiigwaas. Not all birch tree harvesters cut along the road way. Some harvesters create paths packing them down with snowshoes or until the path has heavier use. The path becomes easier to walk into the woods away from the roadway.

Until release of sufficient information describing the overall condition of the birch tree population, it is asked that all "birch tree harvesters" consider elder tribal members that harvest birch bark. It is challenging for tribal elders to walk for long distances into the woods to find a tree(s) that is suitable for harvest needs. Birch trees along the roadway are easier for elder harvesters to collect wiigwaas. So with this in mind, it would be courteous to take the extra effort and create those paths deeper into the woods to harvest birch trees. It would then also be courteous to the declining birch tree population to use a hand saw rather than a chain saw when harvesting. Currently, there is no regulation on birch harvest. With understanding the research being done BRNRD is looking to drafting its own conservation regulation on the "birch tree harvest".

Native American Fish and Wildlife Society Conference

By Christina Dzwonkowski, BRNRD Conservation Warden



In early September the Bad River Conservation Wardens attended the Native American Fish and Wildlife Society (NAFWS) regional conference held at the Shooting Star Casino on White Earth Reservation. This conference is attended by Tribal Wardens from Minnesota, Michigan and Wisconsin. During this conference the Wardens were trained in basic tracking by Joel Hardin, a nationally renowned tracker known for tracking missing and endangered people as well as fugitives all over the world. The information gained from this training could be deemed extremely valuable in the event that we had a missing or lost person in our area.

Also during this conference the wardens had their Regional Qualification Shoot. During this shoot the wardens have a timed course of fire that they follow. The top five shooters qualify for the Great Lakes Regional Shoot Team along with two alternates. This shoot team travels to the Native American Fish and Wildlife Society National Conference that is being held in May in Pendleton, Oregon. Warden Christina Dzwonkowski came in third overall and made the Great Lakes Regional Shoot Team. This team will compete against other regions at the National Conference.

Beach Monitoring Plans for 2014

By: Naomi Tillison, Water Resources Specialist, wqs@badriver-nsn.gov



Figure 1: Amnicon Bay beach located within the portion of the Bad River Reservation on Madeline Island (left) and two deer playing at Waverly beach (right).

With winter still upon us, it's hard to imagine in a couple of months the snow will be gone, the waters open, and beach season will be here (for those willing to brave the cold waters of Lake Superior). Although the snow banks are still large, the Bad River Natural Resources Department (BRNRD) is reviewing and refining the monitoring design for Lake Superior coastal waters within the Bad River Reservation. And we would appreciate your help with this effort.

History of the Beach Monitoring Project

BRNRD initiated beach monitoring in the summer of 2011 utilizing Great Lakes Restoration Initiative funds obtained through the Chequamegon Bay Area Partnership. Upon the finalization of the Bad River Tribe's Water Quality Standards developed under Clean Water Act program authority, the Tribe became eligible for funding under the Beach Environmental Assessment and Coastal Health (BEACH) Act. More information about the BEACH Act and the health of coastal waters can be found on EPA's website at: <http://water.epa.gov/type/oceb/beaches/>

Summary of 2013 Beach Monitoring

In the summer of 2013, BRNRD routinely monitored seven beaches within the Bad River Reservation and sampled two other beaches upon the request of a Tribal Council member. Waverly beach was monitored most frequently, typically sampled twice per week. Beaches at Joe Rose's, Madigan, and the mouth of the Bad River were routinely monitored once per week whereas Amnicon Bay (on Madeline Island) and Sand Cut

were sampled one every two weeks.

We collected a total of 166 water samples from these beaches and had them analyzed for *E. coli*, an indicator of fecal contamination. We compared the sample results to the Tribe's bacteriological criteria described in the WQS. If a sample exceeded this threshold (meaning the *E. coli* concentration was equal to or greater than 235 CFU/100 mL or comparable units), then BRNRD would issue a swimming advisory for the specific beach where the sample was collected. The swimming advisory would be lifted when a sample collected from that specific beach had an *E. coli* concentration lower than the threshold.

We tried multiple approaches to notify the community when we issued a swimming advisory due to elevated *E. coli* levels. We posted a yellow advisory sign at the beach where the advisory was in effect and distributed copies of the advisory sign at various locations throughout the community, such as at the Casino and the Moccasin Trail Center. Partway through the summer, we were able to set up a beach phone line (Thanks, John Strom!), and we updated the recorded message when an advisory was issued or when one was removed.

BRNRD posted nine swimming advisories in 2013 at beaches within the Reservation; dates and locations of these advisories are provided in Table 1. Five out of the nine beaches sampled had at least one advisory issued. The nine advisories occurred on five different days.

(Continued on page 17)

Beach Monitoring Plans for 2014 *Continued*

By: Naomi Tillison, Water Resources Specialist, wqs@badriver-nsn.gov

Table 1: *E. coli* Exceedances Occurring in 2013 at Beaches within the Reservation.

Beach	# Samples Collected	# Exceedances	% Exceedances	Dates of Exceedances
Amnicon Bay	10	0	0	
Bad River Mouth East	25	1	4	6/24/2013
Bad River Mouth West	23	2	9	6/24/13; 8/28/13
Bell Creek Mouth	4	0	0	
Joe Rose	21	1	5	8/26/2013
Madigan	23	2	9	8/26/13; 8/28/13
Sand Cut	10	0	0	
Second Landing	3	0	0	
Waverly	47	4	9	6/6/13; 7/8/13; 8/26/13 (2)
TOTAL	166	10	6	

(Continued from page 16)

An exceedance of the *E. coli* criterion measured at one beach does not necessarily indicate *E. coli* concentrations are at advisory levels at other beaches as the water quality at each beach is affected differently. The beach at Joe Rose’s and Madigan beach were sampled on 7/8/13 along with Waverly beach; however, only the *E. coli* level in the sample collected from Waverly was greater than the threshold. On 8/28/13, both beaches bordering the mouth of the Bad River were sampled; although, only the *E. coli* concentration in the sample collected from the beach west of the mouth was greater than the criterion.

E. coli exceedances (and corresponding swimming advisories) are often associated with runoff events. Table 2 provides the total rainfall received within 24-hours of sampling, which typically starts at 9:00 a.m. Although no rainfall was measured at the Tribe’s weather station within 24-hours of sampling occurring on 6/24/13, *E. coli* exceedances occurred at the two beaches at the mouth of the Bad River. Over 2 inches of rain was measured a few days prior, commencing on 6/20/13. The flow in the Bad River recorded at the Elmhoist Road crossing (approximately 25 river miles upstream of the mouth) peaked at around 7,000 cfs on 6/22/2013 (Figure 2). The *E. coli* exceedance measured on 6/24/13 at the Bad River beaches is likely the result of non-point source pollution associated with the storm event that occurred a few days prior; Figure 3 shows the turbid waters observed on 6/24/13.

2014 Plans for Beach Monitoring Project

BRNRD received BEACH Act funds from the EPA to continue monitoring the health of beaches within the Reservation. Monitoring frequencies will vary by beach, based on beach use and potential risk to human health presented by pathogens. The beaches within the Reservation were classified into three tiers,

(Continued on page 18)

Table 2: Rainfall Measured within 24-hours of Sampling Associated with *E. coli* Exceedances.

Exceedance Date	24-Hour Precipitation (in)
6/6/2013	0.87
6/24/2013	0
7/8/2013	0.55
8/26/2013	3.29
8/28/2013	0.02

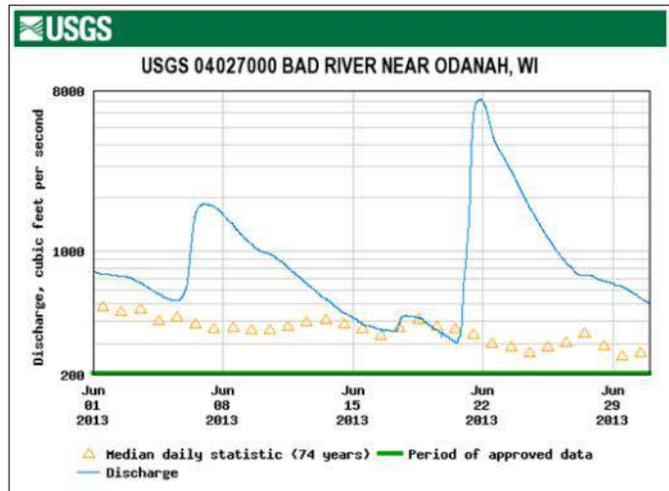


Figure 2: Discharge measured in the Bad River at the Elmhoist Road crossing (around 25 river miles upstream of the mouth) in June peaked on 6/22/2013. Figure created from USGS website accessed on 3/24/2014: http://nwis.waterdata.usgs.gov/wi/nwis/uv?site_no=04027000

Beach Monitoring Plans for 2014 *Continued*

By: Naomi Tillison, Water Resources Specialist, wqs@badriver-nsn.gov



Figure 3: Turbid waters are observed on 6/24/13 at the Bad River Mouth West beach (left) as compared to the water clarity captured on 6/26/13 (right).

(Continued from page 17)

with monitoring to occur most frequently at Tier 1 beaches (Table 3). BRNRD is soliciting input from the community on the beach monitoring plan that is proposed for the 2014 swimming season.

We would also like your input on the methods we should implement to notify the public when E. coli exceedances are measured and swimming advisories are issued. BRNRD is proposing to continue posting a yellow advisory sign at the

beach where an advisory is in affect along with posting copies of this sign throughout the community, such as at the Casino and Moccasin Trail Center. We plan to utilize the beach phone line and regularly update the recorded message you hear when you call 715-685-7870. Please let us know your thoughts on both the proposed monitoring design and notification methods.

Table 3: Proposed Beach Monitoring Plan for 2014.

Monitoring Location	Tier	Monitoring Frequency
Amnicon Bay (Madeline Island)	2	1x per 2 weeks
Bad River Mouth East	1	1x per week
Bad River Mouth West	1	1x per week
Bell Creek Mouth	3	1x per season (more if requested)
Graveyard Creek Mouth	3	1x per season (more if requested)
Honest John	3	1x per season (more if requested)
Joe Rose Beach	1	1x per week
Long Island East	3	1x per season (more if requested)
Madigan	1	1x per week
Morrison Creek Mouth	2	1 x per 3 weeks
Navago Creek Mouth	2	1 x per 3 weeks
Sand Cut	3	1x per 4 weeks
Second Landing	1	1 x per 3 weeks
Waverly	1	2x per week

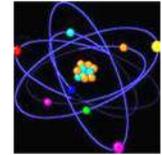
PUBLIC COMMENTS WANTED

You can submit comments on the proposed beach monitoring plan and/or notification methods via email to wqs@badriver-nsn.gov (please type “beach project” in the subject line) or via mail to: Water Resources Specialist, Bad River Natural Resources Department, P.O. Box 39, Odanah, WI 54861. Comments will be accepted through **Friday, May 16th, 2014.**



Tribal Indoor Radon Program

By Daniel Wiggins, Air Quality Technician



In previous articles we have discussed what is radon, the health effects of radon exposure, how to reduce exposure, and the importance of radon awareness. However, what has been established locally or nationally and what resources have been made available to protect homeowners, homebuyers and tenants from high indoor radon levels?

First, the US EPA addresses radon under the State Indoor Radon Grant Program (SIRG). SIRG is federal funding that was created under the 1988 Indoor Radon Abatement Act and is administered by the Environmental Protection Agency. The funds are distributed to States and Tribes to protect the health of the public, specifically against radon related lung cancer. Some of the activities and projects funded under the grant include outreach and education, radon surveys, purchasing radon test kits, radon training for state/tribal employees, and initiating programs towards radon reduction.

Federal agencies, such as the Housing and Urban Development (HUD), have worked with the EPA and have addressed radon by adopting some policies. HUD recently adopted the HUD Office of Multifamily Development Radon Policy, which affects only multifamily housing. However, they do leave the open-option for each individual Private Housing Authority Program to address radon, by testing and/or applying radon reduction methods, if they find it is necessary.

There are private agencies that benefit the public and used by Radon Professional throughout the world. Agencies, such as Cancer Survivors Against Radon (CanSAR), were established to bring radon awareness, give a voice to those who have developed radon related cancers and further advocate for radon regulations and laws.

In the state of Wisconsin, radon testing is not required by law nor is it regulated. Minnesota also does not regulate testing or mitigation, but has required radon resistant construction (in newly built homes) since 2009. However, Wisconsin does have a Radon Program and provides numerous radon services through Radon Information Centers (RIC). RICs can conduct radon research, provide test kits, and consultations to the public. Programs and RIC information for the State of Wisconsin can be found at <http://www.dhs.wisconsin.gov/radiation/radon/index.htm>.

Some Tribes do have Radon Programs; however, Tribes still do not require or force testing among Tribal members. The Bad River Tribe is fortunate to have a Tribal Indoor Radon Program funded under the SIRG Program. The Tribal Radon Program

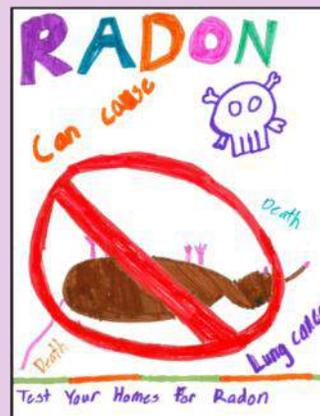
offers free radon testing to Tribal Members, outreach and education to the community, and radon training for Tribal employees.

It is important for these State and Tribal Programs to provide radon education to homeowners, tenants, and even Private Housing Agencies. Although it may not be regulated there are resources available for the public, but it is still incumbent on the homeowner or tenant to push for their residence to be tested.

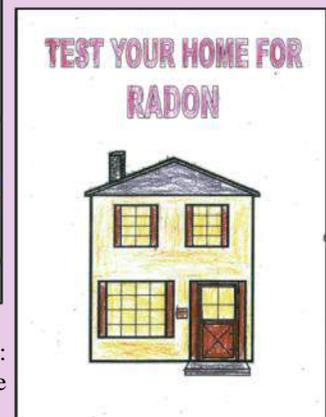
Radon is found in 1 out of every 15 homes in the US, cannot be detected by human senses, and is known to develop lung cancer in humans. Testing is the only way to know! If you would like to test your home or have any question about radon you can contact Daniel Wiggins-Air Quality Technician at 715-682-7123, extension 1553 or email at Air1@badriver-nsn.gov.

2014 Radon Contest Winners

Each year the Radon Program sponsors a Youth Radon Poster Contest and Coloring Contest towards radon awareness. This year they were 10 submissions into the Poster Contest and over 30 into the Coloring contest. Winners of both contests received a tablet. Special thanks goes out to the Boys & Girls Club, Birch Hill Community House, and all the participants.



Poster Contest Winner:
Shaleana White



Coloring Contest Winner:
Ayden White



BAD RIVER NATURAL RESOURCES

Bad River Natural Resource Department

Chief Blackbird Center

72682 Maple Street

Odanah, WI 54861

Phone: 715-682-7123

Fax: 715-682-7118



Photo by Tony Corbine

"Head Waters of Tyler Forks

(Lake O'Brien)"

We're On The WEB!

www.badriver-nsn.gov



New Employee

**Bad River Fisheries Specialist,
Christopher Dean**

My name is Christopher Dean and I will be assuming the position of the Fisheries Specialist with the Bad River Natural Resource Department. I am originally from Luther, Michigan while also having lived in Gladstone, Michigan for a better part of my life. I attended college at Lake Superior State University in Sault Ste. Marie, Michigan graduating with a degree in Fisheries Management. My previous career started off working with the U.S. Geological Survey for sea lamprey control dealing with sea lamprey pheromone studies in Millersburg, Michigan. In the following season I worked as a Fisheries and Aquatics Technician for the Little River Band of Ottawa Indians located in Manistee, Michigan. At the Little River Band of Ottawa Indians I gained extensive experience working with sturgeon restoration, inland fisheries, and water quality. I moved to Coos Bay, Oregon shortly after to work as a Marine Fisheries Biologist dealing with the regulation of the commercial fishing industry for the National Oceanic and Atmospheric Administration. During my two years in Oregon I worked in Washington, Oregon, and California aboard a variety of different commercial fishing vessels in the Pacific Ocean. Fishing trips lasted anywhere from one day deployments on near shore fishing vessels to offshore trips lasting over a month in length. I have over three hundred days of at-sea experience while having lived in Oregon for two years. My hobbies include steelhead and walleye fishing year round, along with many outdoor activities and spending time with my family. I have been excited to move back to the area and could not be happier to continue my career in fisheries.

-MISSION STATEMENT-

The Department strives for resource management which both conserves the natural resources for the future generations and provide for the needs of the present. The departments existence reflects the importance the Bad River Tribe places on its right and ability to exercise sovereignty, self-determination and self-regulation in the area of natural resource management.