Summer

2013

BAD RIVER NATURAL RESOURCE

Common Ground

Part VI: MINING AND WATER TREATMENT

By Cyrus Hester, Bad River Environmental Program

Above: The Butte Mine Water Treatment Plant will operate into perpetuity to treat contamination associated with nearly a century of copper mining. Photo credit: C.A. Young

Earlier this year, the Wisconsin Legislature passed into law a new framework for reviewing and permitting iron mining in the State. That law was based upon a number of findings; including that "mining for non-[iron] metallic minerals is different from mining for [iron] minerals because in mining for non-[iron] metallic minerals, sulfide minerals react, when exposed to air and water, to form acid drainage." The assumption behind such a finding is that sulfide minerals do not occur alongside iron minerals in sufficient quantities to generate acid.

However, a report released last January confirmed the presence of iron as sulfide in both the iron formation itself and the overlying Tyler Formation. This report was not the first to identify the presence of pyrite (i.e. fool's gold, FeS^2) in the Penokee Hills. H.R. Aldrich identified pyrite in the Yale Member (a layer within the iron formation) in his extensive 1929 report. Pyrite was also confirmed via a drill core analyzed by N. King Huber in 1959. These occurrences were reiterated in the 2007 US Geological Survey professional paper by Bill Cannon and others. Pyrite draws its name from the Greek phrase meaning "stone which strikes fire," referring to

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Part VI: MINING AND WATER TREATMENT

Continued

By Cyrus Hester, Bad River Environmental Program

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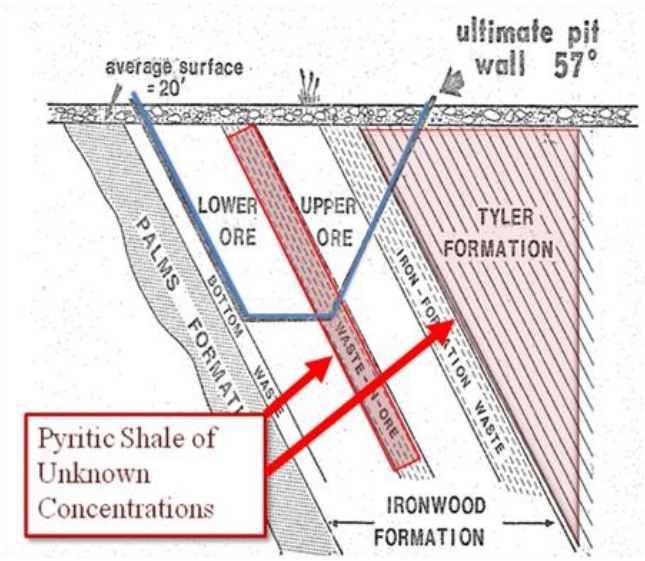
the sparks it creates when struck on a hard surface. But, we can also think of that phrase metaphorically in that its potential to generate acid has created something of a political firestorm around the issue of mining in the Penokee Hills.

As acknowledged above, sulfides like pyrite become an environmental concern when they are oxidized through exposure to air and water. Beneath the earth, this exposure is limited. But, when mining operations liberate these minerals while excavating for ore, they increase the reactive potential of the rocks. If sulfides are present in sufficient amounts, this can lead to acid generation. In addition, acid mine drainage



Above: A diagram of the iron formation by Ralph W. Marsden with labels appended to identify formations with known sulfide occurrences.

frequently contains higher concentrations of metals (like iron, aluminum, and manganese) and metalloids (like arsenic) leached from the rock, adding another layer of potential risk to the environment. Acidic metal-laden waters can form in waste heaps and tailings. Following mine closure, the rebound of the water table can also lead to the discharge of contaminated groundwater from the mine workings.

So, the first question is: how much pyrite is present and could it generate enough acid to pose a risk to human health or the environment? The scientific literature seems to indicate that it's plausible. But, that question can only be conclusively answered by a comprehensive geochemical analysis. The second question is: if there is significant acid generating potential, what engineering options are available to mitigate that risk? This is the question we shall explore here.

Johnson and Halberg break treatment options for acid mine drainage into two categories: 1) "source control" and 2) "migration control." Source control methods aim at preventing acid generation at the source and include the flooding of mine workings and tailings, sealing waste heaps, blending of wastes with neutralizing agents, and inhibiting the activity of the bacteria that catalyze the reactions.

Flooding or sealing mine workings is only applicable for underground mines and is only effective if the influx of oxygen-containing water is prohibited. Similarly, the flooding of tailings is only successful if the resuspension of wastes by wind and waves is prevented. On that topic, it is worth noting that Gogebic Taconite has committed to utilizing dry-stacked methods for tailings management; which reduces the surficial footprint, but also removes the ability to mitigate acid generation via flooding.

For dry stacked tailings, mining companies can attempt to seal waste heaps in order to prevent exposure to air and water. This typically means constructing an impermeable base beneath the tailings and adding multiple layers atop the heap to seal, protect, and stabilize the cover. The challenge to the sealing option is that materials can degrade and cycles of freezing and thawing can crack the cover. Over time, this allows for the infiltration of precipitation and oxygen, thereby negating the preventative capacity of the technique.

Moving on to the application of neutralizing agents, the goal of this method is to properly blend acid-generating materials with acid-consuming materials. This means that mining engineers must identify ahead of time how acid-generating wastes will be distributed in the tailings and ensure that acid-consuming materials are effectively blended in sufficient quantities to

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Part VI: MINING AND WATER TREATMENT

Continued

By Cyrus Hester, Bad River Environmental Program

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neutralize the acid as it is produced. That can be challenging for intensive operations of the scale we're talking about. Beyond prediction and effective application, neutralizing agents can be inhibited when they become "armored." That is to say, the surface reacts to create a coating around the neutralizing agent and prevents much of the material from reacting and consuming the generated acid.

The last source prevention method to be discussed here is the chemical inhibition of oxidizing bacteria. Iron- and sulfur-oxidizing bacteria can play a central role in generating acid mine drainage. The application of biocides has been attempted to prevent their activities in tailings piles. Unfortunately, the effectiveness of this method has been shown to be highly variable, require repeated applications, and offer only a short-term solution, at best.

If you're still with me, we'll move from "source control" to "migration control" methods. Migration controls seek to minimize the impact of polluted water on the receiving streams and rivers. These methods tend to be the only alternatives when the practical challenges of source controls render those options untenable. Migration controls can be broken down into active and passive treatments.

At their core, active treatment methods are conceptually very similar to the blending of neutralizing agents described previously. Alkaline material is added to the acidic water in order to raise its pH and cause metals in the polluted water to be drawn out as sludge. This sludge then has to be disposed of. Active methods are generally more expensive in the long run since they require perpetual maintenance. They are also only effective while they are actively operating. Given that water contamination from mining activities can last decades (and in some cases centuries), active treatment is rarely practical when treatment is necessary for a long period of time following mine closure.

Passive technologies for migration control tend to employ anoxic limestone drains, sometimes in conjunction with constructed wetlands. The intent of the anoxic limestone drain is to create an environment free of oxygen, avoid the risk of armoring described above, and allow the limestone to neutralize the acidic drainage. However, these systems run into problems when used to treat aerated water. Likewise, a system's drain permeability can fail in as little as 6 months when the mine drainage contains elevated concentrations of aluminum or ferric iron. In line with this, it is important to note that while they are termed "passive technologies," maintenance is still required, albeit to a lesser degree than active methods.

This discussion is not an exhaustive approach to the topic of water treatment technologies for acid mine drainage. Other methods include forms of biological remediation; which tend to be more expensive, have larger footprints, and perform less predictably than chemical treatment systems.

Regardless, we can see that there are a range of options for the treatment of acid mine drainage. But, with each, there are engineering and maintenance challenges. We should also remember that there are numerous other forms of pollution which can be associated with modern, metallic mining. This is why I often say that modern mining is a waste-, water-, and energy-intensive process that requires transparency, meticulousness, and -above all- humility.

Above: Installation of a passive treatment technology (vertical flow pond). Photo credit: C.A. Young

Youth Wild Rice Harvest Workshop

By Jessica Soine, Wetlands Specialist

This year's workshop was a resounding success as there were eleven children in attendance at the event (as well as quite a few adults who volunteered to help). Hilary Butler and John Denomie shared their knowledge about the migration story, knocking sticks, push poles, and harvesting with the kids. Joe Dan Rose spoke to the kids about how to process the green rice. Jeremy McClain, Charles Connors, Ed Wiggins, Myron Burns, Brad Bigboy, and the parents of the children who attended worked with the kids as they carved their own knocking sticks and as some harvested manomin for their first time. The children were even provided with breakfast and lunch, which was prepared by Stephanie Julian and served by BRNRD staff.

The Water Resources Program would like to thank all those who helped with the workshop. Miigwech!

Above left: Ed Wiggins and Hilary Butler propel children respectively, through the manomin near the hatchery.

Left: The adults at the workshop all helped to show the children how to use planers to shave their rough pieces of cedar into the correct shape.

Above: John Denomie and Hilary Butler demonstrated how to split a cedar log into pieces that will be carved into knocking sticks.

Above: Brad Bigboy demonstrates to his son, how to use the different woodworking tools at the workshop to shape a knocking stick.

2013 Fish Hatchery Production

By Tim Wilson, Fisheries Specialist

Although delayed due to the cold snowy spring, the Bad River Hatchery Crew has successfully completed another season at the Bad River Fish Hatchery. During 2013, 48% of the 13.6 million walleye eggs incubated in the Bad River Fish Hatchery successfully hatched. The walleye rearing ponds, Kakagon River, and Bad River were stocked with 0.8, 4.8, and 0.9 million two day old walleye fry respectively. Walleye were reared in the hatchery ponds for 50 to 53 days and the 320,500 walleye fingerling harvested from the ponds averaged 1.95 inches. Fingerlings were stocked in the Bad and Kakagon rivers, with 164,500 fingerlings being stocked in the Bad River and 156,000 fingerlings being stocked in the Kakagon River.

This year, 1 million yellow perch eggs were also collected and incubated in the Bad River Fish Hatchery. The perch eggs had a higher hatch rate than the walleye eggs, with approximately 840,000 of the perch eggs hatching and being stocked into a rearing pond. The yellow perch were reared for up to 80 days and the 330,900 two inch fingerlings harvested from the pond were stocked in the Kakagon River, Bad River, and Chequamegon Bay.

If you have any questions regarding this year's fish production or if you would like more information, contact Tim Wilson, Tribal Fisheries Specialist at 715-682-7123 ext. 1552.

Fisheries Aide Augustine LaGrew stocking walleye fry into a rearing pond. Photo by Ed Leoso, BRNRD.

Underwater picture of fingerling walleye being stocked into the Kakagon River. Photo by Tim Wilson, BRNRD.

New THPO Employee!

The Bad River Tribal Historic Preservation Office would like to welcome aboard Loretta Livingston, our new THPO Processing Clerk. Loretta will be responsible for processing Section 106 requests for review from federal agencies for off-reservation federal undertakings.

Tribal Historic Preservation Office Update!

By Edith Leoso, THPO

Boozhoo from the THPO Office! Niiwii kwajitoon da Ojibwemoyaan![1]

As we make our way through Waatebagaa Giizis we reflect on fond summer memories and look forward to the crisp and shorter days of Dagwaagii. We're reminded that Gikinoo'amaadiiwigamig has started again and there are many extra-curricular activities that parents will have to add to their "*to do lists*". The Manomin is processed and we remember to harvest our gitigaaning before the frosts. Another Biboon is coming and there is much to prepare for in the next couple of Giizisag. Waawashkeshii are beginning to herd. Binesiiwag are flocking for the long journey to their Biboon akiin. Before we know it, goon will be settling on the ground!

This Dagwaagii and Biboon, remember to practice to preserve our beautiful Ojibwemowin. Parents and Grandparents please take a moment of your time to speak a little Ojibwemowin to your children and grandchildren. Children and Grandchildren, please take a little of your time to speak Ojibwemowin to your Parents, Grandparents, siblings, Aunts, Uncles, your pets and yourself!

The THPO Office also urges all Tribal Programs to incorporate Ojibwemowin as part of your standard communication every day, even if it is only a greeting like, "Boozhoo!", or, a phrase on your program brochure. Most do not realize that they might be speaking Ojibwemowin every day! *Kinnick-Kinnick, Odanah, Wausau* and even, *Wisconsin* are all Ojibwe words!

There are several on-line sources that help us to learn Ojibwemowin. The THPO Office recommends *The Ojibwe People's Dictionary* site at: http://ojibwe.lib.umn.edu/ The Ojibwe People's Dictionary site is updated weekly and also provides an opportunity to hear the word spoken by local language speakers from Minnesota and Wisconsin.

When we learn to speak our Ojibwe language and use it frequently, we strengthen our identity, our culture, and, our Tribal Sovereignty. The more language we know, the more our language is preserved and maintained for Gii-niijaanisiminaanig - *Our children, even those yet to be born*. Miigwech!

[1]I am trying to speak the Ojibwe language!

ANA Project Update

By Tony Corbine, ANA Grant Administrator

We are winding down year 1 of the project and with much success. All of the tasks we established have been accomplished. Next, we look forward to having a draft of the "Mashkiizibbii: Water and Human Landscape Report" to be completed in the next month. The report will be available to the public once it is complete. Moving forward, this winter season we will be conducting water sampling at the sites that were identified through the interviews and water quality data will be analyzed.

After the sites have been inspected they will be prioritized based on the program's knowledge of past sampling efforts, the significance of the site to the community, the distribution of sites in the watershed, and the environmental significance of the site. Each sampling site will be accurately identified by Global Positioning System (GPS) and as an alternative the distance and direction from the flagging to the sample site will be recorded.

Following the winter freeze, two NRD staff will return to previously marked sample sites and collect sediment surface by employing a drive rod surface corer to extract the top most two meters of sediment. Extracted cores will be packaged for storage and transportation and shipped to University of Minnesota Limnological Research Center laboratory for detailed analysis of a number of environmental quality metrics. The core samples will be dated and analyzed for decadal trends in nitrogen, wild rice seed density, mercury, and lead.

There will be a community event in the near future at the Bad River Convention Center. The announcement will be sent to all tribal employees and a flyer will be posted at all community notice locations. We look forward to seeing everyone there.

If you have any questions or would like to participate in a survey, please contact Tony Corbine at 715-682-7123 ext. 1560.

What air pollution is monitored at Bad River?

Nathan Kilger, Air Quality Specialist

That's a great question, I'm glad you asked! The Environmental Protection Agency (EPA) identified six pollutants that were important to human and environmental health over the last 40 years. Those six pollutants of special concern are:

- SO_2 – sulfur dioxide
- NO_2 – nitrogen dioxide
- CO – carbon monoxide
- PM – particle pollution
- Pb – lead
- O_3 – ground-level ozone

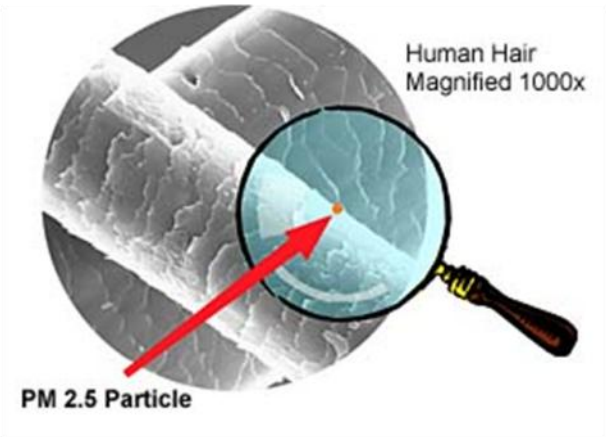
At the same time, federal limits were set for each of these pollutants, these limits are called National Ambient Air Quality Standards and they are set for all land within the United States to protect everyone, equally.

When each measured pollutant rises about the federal limit, special rules require that the state incorporates a plan into their state-wide regulation process to bring the pollutant down to more acceptable levels. This is usually done by requiring polluters that are contributing to the problem to install better cleaning systems, burn cleaner fuel, or change their process and make it more efficient. If the problem continues, more steps can be taken to reduce the pollution emitted. But it's not just large industry that causes air pollution, everyone contributes to pollution daily and that also has a noticeable impact on their air we breathe.

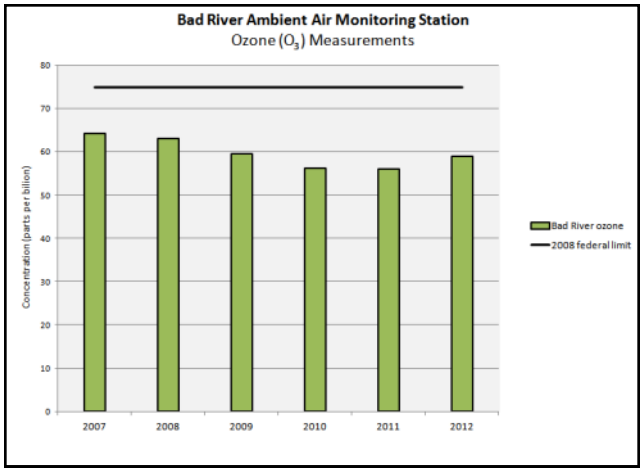
Of the six pollutants, the Air Program of the Bad River Natural Resource Department monitors ozone and fine particulate pollution.

Ozone is invisible by itself but when it combines with other pollution or high humidity, it can be seen as haze or smog on sunny and warm days. While ozone high up in the atmosphere protects us from some of the harmful UV sunlight, ozone near the ground is bad and causes health problems when breathed into our lungs. Ozone near the ground is created when chemicals we use combine with sunlight – those chemicals include gasoline, paints, laundry products, windshield washer fluid, car exhaust, and large factories, just to name a few sources.

Fine particles are all around us and are not usually a problem unless there's too many of the particles for our bodies to scrub out of our lungs. Fine particles (smaller than 2.5 microns) can get deep into our lungs and then pass from our lungs into our bloodstreams. Such incredibly small particles that we breathe can easily get into the human body and affect human health – this is exactly why fine particle pollution is so important.



Without any nearby pollution monitoring, Bad River started monitoring fine particle pollution in 2002 and ozone monitoring began in 2004. Three years of monitoring are needed to begin assessing each pollutant, so by the end of 2012 we have eight years of fine particulate data and six years



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What air pollution is monitored at Bad River? *Continued*

Nathan Kilger, Air Quality Specialist

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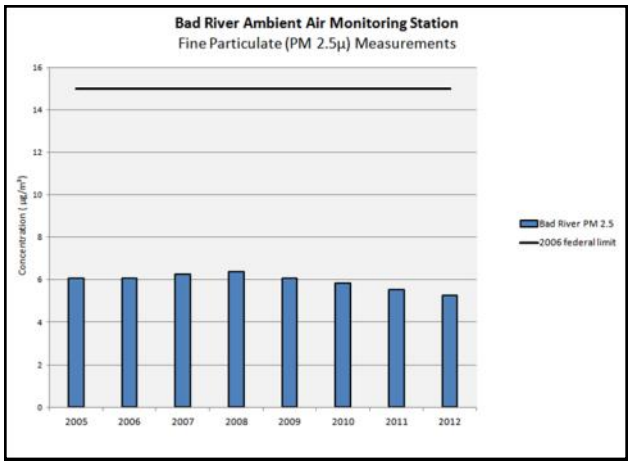
of ozone data.

While Bad River's monitoring site measures the lowest amount ozone in Wisconsin, ozone levels across the state are relatively close to the federal limits. Of the six important pollutants, ozone is the highest and is the greatest concern. For this reason, we will continue to monitor ozone and the Air Program will continue to stress the importance of reducing chemical usage that contributes to the creation of ozone.

Actions that help reduce the amount of ozone we breathe in can be as simple as reducing the amount of driving we do, carpooling, turning your vehicle off while you run an errand, mowing your lawn and filling up your gas tanks after sunset, recycling instead of using a burn barrel, and using a fan instead of an air conditioner.

The northern third of Wisconsin has relatively low levels of fine particulates, much lower than the southern third of the state. In general, levels measured at Bad River are less than half the federal limit. This is great news, but we will continue monitoring fine particles to see if the trend changes in the future.

You can help keep our air clean and reduce fine particles by driving slowly over gravel roads, recycling instead of using a burn barrel, keeping your wood stove burning efficiently, and burning only cured wood.



Building New Homes Radon Resistant

By Daniel Wiggins, Air Quality Technician

Bad River is located in the northern part of Wisconsin, where winters can be long and very cold. This type of outdoor environment can elevate pollutants, such as radon, within indoor environments, therefore, contribute or aggravate health problems. The average person also spends over 90% of their time indoors, which further stresses the importance of addressing possible indoor pollutants[1]. A person can plan ahead, when building a home, to avoid indoor pollutants or additional costs in the future. For example, moisture control methods are the norm for new construction to limit the damage of excessive moisture and mold.

However, radon can often be overlooked by contractors, builders, and homeowners, likely due to the lack of awareness. Radon is everywhere in every state and in every reservation. Although a person really doesn't know until after the home is built, they are living in it, and have then tested what the radon levels will be, they can still plan accordingly and build radon-resistant, from the start. It is cheaper to install a system during construction then to install it once the home has already been built. Builders haves suggested costs as low as $100 dollars during construction compared to that of $800-$2,000 post-construction[2].

Finding a contractor or home-builder that offers radon-resistant built homes can be one of the first steps for the homeowner. However, there are still considerations when choosing a contractor and building a radon-resistant home.

First of all, are you required by code to already use radon-resistant techniques? Some states may require certain radon resistant methods to be applied during construction.

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Building New Homes Radon Resistant *Continued*

By Daniel Wiggins, Air Quality Technician

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Second, is there a contractor certified for radon mitigation (reduction) or measurement testing in the local area? Certified radon mitigation contractors and measurement providers in Wisconsin can be found at www.dhs.wisconsin.gov/radiation/radon/index.htm. If there are not any certified contractors or builders, what types of radon services are available? It may take some investigation on the homeowners behalf, but saving money and avoiding a potential health risk should be enough reason.

Finally, what type of system or methods are you considering? Most homes are already being built with gas permeable aggregate (gravel beneath the basement or floor slab), plastic sheeting (soil gas retainer), and quality sealing (caulking), which is employed with moisture control. With the addition of these features, below are the systems recommended:

- ***Passive:*** In many cases adding the vent pipe and junction box alone may be extremely cost efficient and effective in reducing radon levels. The pipe is simply added when pouring the foundation slab and extended above the roof's edge. Although the junction box does not serve a purpose, initially, if the home is found to need additional support to lower radon levels a radon (inline) fan can easily be added later using the junction box for electrical connections. Sealing is also very important. Depending on what type of foundation the sealing and consideration of (radon) leakage points will vary. For example, if you have a crawlspace the entire crawlspace must have plastic sheeting and be sealed to the walls[2].
- ***Active:*** the addition of a radon fan, along with the above features, would likely lower the radon levels if the passive system is not found effective. The homeowner can choose to do this initially during construction or after the home has been tested and found with elevated levels[2].
- ***Rough Designs:*** Either two options above should be the only options the homeowner considers when going radon-resistant. Some contractors will have a rough design **without** a vent pipe ran above the roof's edge. The "rough" method would likely not avoid any additional costs if the home was still found to have elevated levels[2].

The above considerations are important to remember when thinking of a contractor or builder to hire. Quality work is always important in how effective the methods and design are. Making sure the contractor has the experience usually will reflect the efficiency and effectiveness of the radon-resistance construction. In addition, always test post-construction, when you are living in your home, to assure the methods applied are effective in lowering levels. Even with the radon-resistant features, there is a chance of still having elevated levels; however, having these features will avoid plenty of hassle. The EPA has extensive information on radon-resistant construction, which can be found at *www.epa.gov/radon/rrnc/index.html*.

The Bad River Tribal Indoor Radon Program offers free radon measurement testing to Tribal Members and is certified for radon mitigation. If you have any questions concerning radon resistant construction or testing please contact Daniel Wiggins, Air Quality Technician, at 715-682-7123 extension 1553.

[1] Learn About IAQ, What is IAQ, United States Environmental Protection Agency (EPA), July 2013, can be found @ www.epa.gov/iaqtribal/learn.html

[2] Building Radon Out, A Step-by-Step Guide to Building Radon-Resistant Homes, EPA, Office of Air & Radiation, April 2001

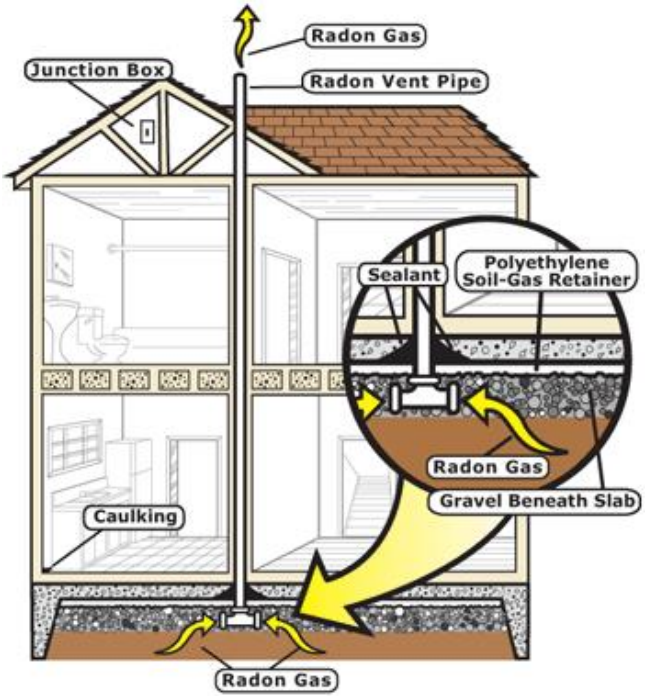


Image courtesy of U.S.EPA, Builders Basic Techniques

Critter Spot Light

The Little Brown Bat (*Myotis lucifugus)*

By Lacey Hill, Wildlife/ GIS Specialist

There are eight species of bats found in Wisconsin; five of these eight have been documented on the Bad River Reservation. In 2010, the WDNR, in coordination with the Bad River Natural Resources Department (BRNRD), conducted the first bat survey on the Bad River Reservation. Since then, Bad River Natural Resources has "amped up" its bat monitoring program. With the use of a bat call detecting system, BRNRD is now conducting three – 30 mile transect bat surveys throughout the Reservation during the summer. You also may have noticed an increasing amount of bat houses appearing around the Reservation.

I know in a previous article I spoke briefly about a fungus that is wiping out millions of bats across the country, White Nose Syndrome. One of the bats that are getting hit the hardest was not too long ago, one of the most common bats in most of the country, the little brown bat (*Myotis lucifugus)*. This species of bat is not a long distance migrator like other species of bats. This bat will fly to the nearest suitable cave to hibernate for the winter, which is what makes this bat so susceptible to white nose syndrome.

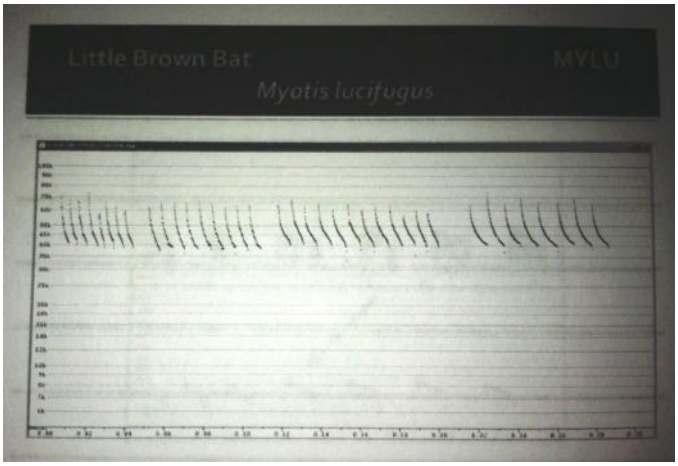
White nose syndrome is caused by a fungus known as *Geomyces destructans* that thrives in the cool, moist conditions provided by the same caves that these bats hibernate in. This fungus is not native to the United States and was first documented in New York during the winter of 2006-07. Since then it has been spreading east and killing millions of cave hibernating bats in the process. It is estimated that over 5.5 million bats have been killed by this fungus and it is documented in 22 states and five Canadian Provinces! It has not yet been documented in Wisconsin but it is getting closer.

Some people might think, "Who cares? They are just bats!" Bats, however, consume a lot of insects. Fewer bats could potentially lead to higher insect abundances, which in turn could potentially impact agriculture in the United States. So what can you do to help? For starters, do your research on bats and learn more about the benefits they can provide to being in your yard. Before evicting bats from your home, make sure it is done properly and follows local laws. A number of bats have been listed as threatened or endangered so there are regulations on when and how they can be evicted. If evicting bats from your home, create an alternative roosting spot like a bat house for them. Designs for these bat houses and additional information can be found online or provided by BRNRD or WDNR.

More about the little brown bat…

The little brown bat is appropriately named as they weigh in at only 5-14 g, five grams is equivalent to the weight of a nickel! They can fly at speeds up to 22 miles per hour while foraging chasing insects. These bats will breed in the fall but they do not give birth until they reach their summer roosts in June. These summer roosts can sometimes be the attic of your house, that is why it important not to construct any type of bat exclusions between June 1st and August 15th (it is also illegal to do any exclusions during this time period), because the mothers will leave there young in the roost while they go and forage at night and if they cannot get back in the pups (baby bats) will die.

The little brown bat only gives birth to one pup a year. It only takes four weeks and the pups are as large as the adults and able to sustain themselves. They will typically live to be seven years of age on average but have been documented as old as 31 years. Most new pups will not survive their first winter due to their smaller body mass. A nursing female little brown bat can eat more than her weight in insects a night!



Above: The call sequence of the Little Brown Bat as it appears on a bat detector

Critter Spot Light

The Little Brown Bat (*Myotis lucifugus) Continued*

By Lacey Hill, Wildlife/ GIS Specialist

(Continued from page 10)

Bats communicate using echolocation. Using a bat detector we can pick up these calls and identify different behaviors and species of bat. Each species of bats have varying call frequencies and call patterns that enable us to distinguish the difference between them.

A great resource for more information regarding bats in Wisconsin and additional links on how you can help can be located here: http://dnr.wi.gov/topic/WildlifeHabitat/bats.html.

Above: Bat houses on a flag pole near the Bad River Fish Hatchery

The Beach Monitoring Program 2013

By Tony Gilane, Beach Act Coordinator

The Water Resource Program currently tests water samples taken from seven reservation beaches; this monitoring is supported by BEACH Act funds through the EPA. Water samples are tested for elevated levels of bacteria with E.coli as the indicator. E.coli is a good indicator for other microbial organisms present in the water that could make swimmers and recreational water users sick. When E.coli levels exceed the limits of the Tribe's water quality criteria, a swim advisory is issued for the specific beach where the exceedance occurred. Yellow advisory signs are then posted in areas of high Tribal traffic or activity. The beaches are re-sampled until E.coli levels fall below the Tribe's water quality criteria. When these levels decrease, the advisory is cancelled, and all the yellow signs are removed and replaced by green signs indicating it is safe to swim.

Routine Sampling Schedule 2013

Tribal Beach	Sampling Day
Waverly Beach (2x)	Monday and Thursday
Madigan and Joe Rose Beaches	Mondays
Amincon Bay Mad. Is. / Sandcut	Alternate Tuesdays
Bad River Mouth East/West Beaches	Thursdays

Fortunately, advisories this summer were far and few between. From the beginning of the monitoring on May 30, 2013, we experienced only three swim advisories before the fourth of July. One advisory occurred at Waverly beach on June 6, 2013, and the other two advisories were at the mouth of the Bad River, at the East beach and West beach on June 24th. The next advisory occurred at Waverly beach on July 8, 2013. The beach monitoring continued without advisories for nearly a full two month stretch. E.coli criteria were not exceeded at tribal beaches again until August 26, 2013, when Waverly, Joe Rose and Madigan beaches were put under advisories.. Two days later, the Bad River mouth beach on the west side was sampled and put under an advisory. The swim advisories this season seemed to be associated with larger precipitation events. The beach monitoring season ended in September, and the Water Resources Program will resume beach monitoring next summer.

The program was able to acquire and activate a recorded message. During the swimming season, folks can call 715.685.7870 to get regular updates for reservation beaches regarding swim advisories. In the future a web page accessible from the new Tribal website will be created and updated with beach status on a regular basis.

BAD RIVER NATURAL RESOURCES

Bad River Natural Resource Department

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We're On The WEB!

Www.badriver-nsn.gov

2013 Wild Rice Harvest Pictures

Above: 2013 Big Slough, located in the Kakagon Sloughs

Below: Opening day of the Manomin (wild rice) Harvest was cut short with the storm that rolled in rather quick during the afternoon.

-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.