



Fall 2019



UPEnvironment

AN APPEAL TO A WIRELESS GENERATION

Evan Zimmermann

Wireless communications have brought substantial benefits to our society, but as we approach a major shift in how these technologies are deployed, we should pause and consider the unintended consequences they may bring to our environment. Fifth-generation wireless technology (5G) encompasses both improvements to previous protocols called Long-Term Evolution (LTE), and New Radio (NR), which is divided into two frequency ranges (FR). FR1 uses the same spectrum as previous generations, up to 6 GHz, while FR2 expands to previously unused millimeter waves up to 52.6 GHz.

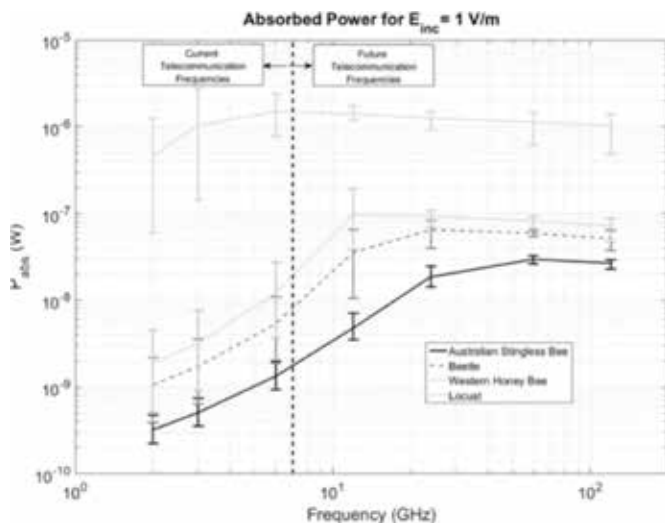
The 5G Appeal (5gappeal.eu), signed by over 250 doctors and scientists, recommends a moratorium on the deployment of FR2 due to environmental and health risks. 5G will accelerate the development of the Internet of Things (IoT), in which tens of billions of devices of all types will be connected, necessitating a massive increase in energy use and radiation exposure. Because technologies using this spectrum have never been deployed long-term, we are subjecting the most sensitive aspects of our ecosystem to an unpredictable experiment. Studies show potential effects on insect populations,¹ which are already collapsing, and potential effects on bacterial development, including resistance to antibiotics,² compounding some of the most significant challenges we face.

Although the full impact on biological systems is unknown, other effects are predictable and uncontroversial. Weather prediction relies on measuring radiation emitted by water vapor at 23.8 GHz. FR2 operates near the same

frequency, causing false satellite readings. Unlike previously used frequencies, FR2 does not pass unattenuated through solid matter. An area once covered by a single cell tower may require thousands of small towers. The first generation of these have already begun to break down. The connected devices they power are similarly short-lived. As the world struggles to reduce pollution and energy use, the development of 5G and the IoT will make this goal less attainable while disrupting our ability to measure the effects.

Communities throughout the world have begun to fight back by declaring local moratoria. In response, the Federal Communications Commission (FCC) in 2018 declared both express and de facto moratoria illegal (FCC 18-133). A lawsuit by the city of San Jose, California, requesting a repeal followed shortly after and remains unresolved in the Ninth Circuit Court.

The ability of local governments to protect the health of their people and environment should not be blocked by federal regulations. We have already made too many mistakes in underestimating the dangers of untested technologies of convenience. We must now reconsider the balance between the defense of irreplaceable biodiversity and marginal benefits to electronic communication speeds. We should demand that both government and industry make sustainability the priority of all technology generations.



Source: Thielens et al. 2018

(1) Thielens, Arno, et al. 2018. Exposure of insects to radio-frequency electromagnetic fields from 2 to 120 GHz. *Scientific Reports*, 8:3924. <https://doi.org/10.1038/s41598-018-22271-3>

(2) Torgomyan, Heghine, and Armen Trchounian. 2013. Bactericidal effects of low-intensity extremely high frequency electromagnetic field: An overview with phenomenon, mechanisms, targets and consequences. *Critical Reviews in Microbiology*, 39:1. <https://doi.org/10.3109/1040841X.2012.691461>

Evan Zimmermann serves on the UPEC Board of Directors.

THE UPPER PENINSULA'S MAINLAND MOOSE POPULATION 2019 UPDATE

Bill Ziegler

The 2019 Michigan Department of Natural Resources moose survey indicates an encouraging small population increase in the west-central UP moose range. This year's moose population estimate indicated about 509 moose in the Upper Peninsula; up from about 378 in 2017. Wildlife biologists calculate the moose population has been growing at a long-term average of about 2% per year.

Russ Mason, Michigan DNR Wildlife Division chief, reported the survey results at the January 2019 Natural Resource Commission meeting in Bellaire. Mason stated "the growth rate is low, but remains positive. Moose are continuing to maintain a foothold in the Western UP, continuing to extend the lineage of a population airlifted to the area from Canada in the mid-1980s."

In 2017 the entire moose population estimate could not be completed; the population estimate of 378 moose was calculated from the core higher-density zone where the survey was complete. Researchers think if they could

the days we could fly, conditions were good; snow covered most stumps and down logs and we had good snow cover for most of the survey which aided our survey." Good snow cover makes the moose stand out against the background vegetation and cover.

Beyer said that "in the past the core zone supported 80 to 90% of the moose population." He continued, "The western UP moose range covers about 1400 square miles in parts of Baraga, Iron, and Marquette Counties."

This year's survey indicated a population of 509 moose compared to only 378 in 2017 and 451 in 2013. Beyer stated, "From 1997 to 2007 the UP moose population was growing by 10 percent a year."

Beyer explained that the DNR's survey efforts have been focused on the western UP moose population that was reintroduced in the "Moose Lift" program. Beyer explained that the moose herd in the eastern UP "likely number fewer than 100." The source of the eastern UP moose is not known for certain. It is possible that a few scattered moose remained from the native moose population, although it is also likely some moose migrated from eastern Ontario or the western UP. Moose also maintain a strong population in Michigan's Isle Royale National Park.

In 2011, the DNR Moose Hunt Advisory Council, a legislatively created council, investigated the potential of a moose hunt in Michigan. The council felt a moose hunt was a feasible option provided the moose surveys indicated that the moose population continued to grow at a sustained growth rate of over 3% per year.

In recent years concern has been growing among wildlife management agencies across the southern tier of the US moose range. On the southern tier of the moose range, state wildlife conservation agencies such as those in New Hampshire and Montana have also reported a decline in their moose population. Maine reports declines in their moose population from about 76,000 five years ago to between



Bull moose browsing on plants in the evening twilight in Baraga County.

have completed the entire 2017 population survey it would have yielded a population estimate of between 420 and 470 moose.

Dr. Dean Beyer of the Michigan DNR Wildlife Division monitors the Michigan moose population. In a February interview, Beyer said that their "wildlife staff had completed the aerial moose survey." Brad Johnson, the wildlife technician who coordinates the aerial survey, said, "Overall flying conditions were difficult, flights had to be cancelled on 23 days primarily because of snow and high winds. On

BILL ZIEGLER



Left: Cow and calf moose near the author's deer camp in the Ottawa National Forest. Right: A cow moose feeding on aquatic plants in a Iron County pond. Aquatic plants provide critical nutrients to the moose. Moose can swim well and often just wade to access the aquatic plants.

60,000 to 70,000 animals now. New Hampshire reports their moose population has declined almost 50% to 5000 animals now. New England's moose herds' greatest problem is reported as winter tick infestations. Researchers report that 90% of moose calves died from heavy winter tick infestations. They found an overall calf mortality rate of 70% compared to about 15% two decades ago. Frigid weather and extended snow conditions is thought to keep winter ticks controlled. With milder winters, winter tick infestations are increasing.

The Minnesota DNR reports they have two geographically separate moose populations. Minnesota has had a stable moose population with a carefully regulated hunting season for many years. But the northwest Minnesota moose

Although the 2019 UP moose population appears to be up modestly, there is still concern about long-term trends. Retired Michigan DNR moose biologist Rob Aho said, "The moose have not filled all the available UP habitat." A good qualitative indicator that moose have reached their population potential would be when they occupy the entire good moose habitat. Future surveys that are conducted every other year will be necessary to identify any long-term trend for Michigan's moose population.

Bill Ziegler is a retired fisheries biologist and frequent contributor to UP Environment.

population has dropped dramatically since the 1990s, from about 4000 down to about 100 recently. The northeastern Minnesota moose population is also dropping, from a high of about 8000 as recently as 2006, down to about 3000 in 2013. Recent 2016, 2017, and 2018 Minnesota moose aerial population surveys indicate the trend in their northeast herd is declining but the rate has been leveling off.

Although a number of factors are likely to have contributed to Minnesota's moose decline, Minnesota DNR suspended their 2013 moose hunting season as a precaution. Tom Landwehr, Minnesota DNR commissioner, said, "It is now prudent to control every source of mortality we can as we seek to understand the causes of population decline."

HIT US WITH YOUR BEST SHOTS! UPEC photo and video contests now on

UPEC photo contest! Deadline: November 1, 2019

Our annual photo contest is now open. Help us recognize and share the beauty of our landscape and its inhabitants through your photos. Send us your best shots representing the beautiful UP, including photos you may have on file from any season of the year. Winners will be announced in each category in the winter 2019–2020 UPEC newsletter, and winning photos will be published there and in later newsletters. They also may be part of an on-line photo gallery and on display at the next Celebrate the UP!, scheduled for March 2020 in Houghton.

You can be from anywhere, but your photos must be from the Upper Peninsula, with one submission per category per person. You may submit *one* photo in each of these four categories. Each category has latitude open to the photographer's interpretation.

- Nature panoramas, wildlife, and landscapes (category designation: NP)
- Humans engaged with the natural world (HE)
- Close-ups of hidden or overlooked beauty (HB)
- Wonderful fluid water (FL)

To be considered, photos must be submitted according to the following instructions:

- Send a separate email, with a single photo attached, for each category you enter, indicating the category name in the subject line.
- In the body of the email, include a full caption (no more

than 15 words) indicating the place shown and any other aspects of the scene or subject.

- Name your photo file like this: your last name, a two-word description, and the two-letter category designation: NP, HE, HB, or FL. Example: richardson evening sunset HB.jpg
- Include a statement granting permission for UPEC to publish the photo. You can cut and paste this text, if you like:

I hereby grant the Upper Peninsula Environmental Coalition permission to publish the attached photograph in its newsletter, on its website, and/or on its social media, and to display it at its Celebrate the UP! event, properly attributed to me. I retain copyright and all other publishing rights to the photo.

Attach your high-resolution (1 megabyte or larger) photo in .jpg format and email to upec@upenvironment.org.

UPEC video contest! Win up to \$100 • New this year—Snap Videos invited! • Deadline: March 14, 2020
Now there are two ways to enter! You can shoot a Short Video, 3 minutes or less, highlighting the UP environment. Or, enter our 10-seconds-or-less **Snap Video** category for a quick impact. Upload to YouTube and send a link with your name to upec@upenvironment.org by March 14, 2020. Include your age if you are under 18.

Top picks in youth and adult categories will show at Celebrate the UP! March 27–28, 2020, in Houghton.

Anyone can participate. All you need is a love of the UP and a desire to show other people why!

Last year's winner Alex Maier showed us "What Really Matters" with emotional and dramatic photography, and runner-up Christopher Lamers introduced us to "Cool Places in Marquette, MI" with an approachable style that encourages anyone to get out and discover nature.

See these and more inspirational videos at <http://bit.ly/upecvideo>.

UPEC'S ENVIRONMENTAL EDUCATION GRANTS PROGRAM: Making a generational difference

Editor's note: Elsewhere in this newsletter is the announcement of the 2020 round of grants. Here, we share stories from three of the 2019 recipients.

Life of Lake Superior

Rob Wiener

Life of Lake Superior was started in 2000 as a way of providing youth and families with opportunities to learn about and participate in outdoor and environmental activities related to the Lake Superior region. The goal is that through these experiences, UP citizens will become more well-informed about natural resource and environmental issues of the region, which will help them to make responsible and sustainable lifestyle choices.

The four-day series is primarily geared toward youth aged 9–14. However, parents (and grandparents) are welcome to attend, and each year multiple generations of families attend the programs together. This is one of the most satisfying aspects of the program for me to observe: seeing kids interact with their parents and grandparents in nature. I can only imagine the bonding and growth that takes place for these families experiencing the activities together.



Top left: Planting native pollinators on a Grand Island restoration project.
 Top right: Becoming one with nature on the shores of Lake Superior.
 Bottom left: Drawing landscapes on the Lake Superior shoreline.

Although most of the topics and activities are different each year, the goals remain the same. First, to offer a means for participants to experience their local natural resources. The UP is a place to which people come from all over the world to visit, yet many kids who live here have never had an opportunity to experience some of these incredible natural assets in their own backyards.

A second goal of the program is for participants to gain respect and an appreciation for our natural environment. When it comes to environmental education, you're planting a seed. The first step is to show people that being in nature is fun! If they also learn some interesting things about the resources, it further helps to cultivate their curiosity—they are hooked! This is how it all starts. Discovery, learning, appreciation, respect. Ultimately, this seed can blossom into a lifelong steward of our natural resources.

My third main goal is for kids to be introduced to different career options in natural resources. Throughout the programs, I routinely partner with government agencies, nonprofits, local businesses, and retired professionals. This all helps to show kids that there are many viable career options for them in environmental/natu-

ral resource fields, many without even having to leave their home area.

In 2019, some of the program themes were art in nature, forests, pioneer days, and sounds in nature. Everyone also got a chance to kayak on Lake Superior, ride a horse, and go fishing (the fish they caught became our dinner!).

I know this program makes a difference. Throughout the five years I've been administering this series, I've seen some of the same kids five years in a row—starting as young teens, and now graduating high school! I've seen some of

the participants at area trails, hiking or skiing. And, I know of at least one youth who is going to be pursuing an environmental degree in college next year, due in part to the experiences she had at Life of Lake Superior. I am also able to witness the gratification parents and grandparents feel from being able to spend time with their child outdoors. In this digital age we live in today, I can tell these adults are thrilled to see their kids put down their electronic devices and have fun outside!

Rob Wiener directs the Life of Lake Superior program, which is offered by the Alger County Michigan State University Extension.

Three Lakes Academy's Exploration Stations

Katie Kunze

Three Lakes Academy's exploration station project has been a labor of love. The original exploration station was built in the early 2000s but unfortunately after a time fell into disrepair and was abandoned. This past year felt like the right time to rejuvenate the station. Prior to starting the clean-up work, our preschool class was already exploring the space. This gave us the motivation to start bringing it back to life.

The exploration station now consists of a seating area, display board with informational posters and a place to hang chart paper for lessons, areas of native plants, and an entrance to our forest. With all of these areas now in place, the goal is to have students not only learning outdoor education subjects but to become immersed in the natural world as they work on their core subjects. This coming spring, the students will be planting native plants and creating informational signs to accompany those plants.

The exploration station has received a multitude of visitors, ranging from community members with their families, to our second graders who use the space to learn shelter building, to our preschoolers who will tell you with great joy that the exploration station is "their classroom" and that they "don't know why others are in their classroom." Visitors can learn about Michigan wildlife and ecosystems thanks to posters donated by the Michigan Department of Natural Resources.

Our class seating area complete with display board showcasing Michigan wildlife information.





Left: Looking from the seating area towards our entrance to the forest. Right: The entrance to the station—a doorway to exploration and learning!

Our students have been very excited about being able to take their work outdoors, learn about the wildlife and resources we have in our area, and, most of all, have the chance to explore. Currently we are working to add mulch to the classroom to keep the weeds down, allowing for more use with less maintenance. The mulch was graciously donated for our project.

This year each classroom has been given a backpack of supplies to help teach about the environment and outdoor education. They were purchased with the generous grant from UPEC. Each teacher has a backpack that contains a binder of wildlife information and lesson ideas, binoculars, magnifying lenses, measuring tapes and rulers, emergency whistle and blanket for teaching survival skills, a compass, as well as several field guides. Both staff and students are excited to get the year started and have the opportunity to explore the natural world around them.

Katie Kunze leads the Exploration Station program at Three Lakes Academy in Curtis.

Bonifas Arts Center Fourth Grade Afield Program

Irina Bruno

Fourth Grade Afield is an exciting field trip for the fourth grade specifically designed to supporting school curricula. Each September and October all fourth graders in the Escanaba, Rapid River, and Gladstone public school systems step out for a day-long exploration that combines the scientific method, the art of journaling, botanical drawing, and raising environmental awareness.

The program has run successfully for the past six years. All components of the program are developed by experts based on Michigan's fourth-grade curriculum. Each part of the program (Science, English and Art) is taught by qualified instructors. The kids learn that plants and animals have distinct traits that help them adapt to their environment. Students also develop skills through art and science activities to observe the natural world to generate questions and understanding of relationships in nature. They also get an introduction to the tools scientists use in the field to make these observations. In short, the program doesn't just support the school curriculum; it helps local youth feel connected and more aware and knowledgeable of their natural surroundings and prepares them to be the stewards of the Upper Peninsula's great outdoors.

This fall the program dates were September 16 through October 3. The Escanaba schools have their program at Aronson Island, Gladstone schools in the Van Cleeve Park/ beach area, and Rapid River at the school's nature trail and forest. The Junior Duck Stamps Exhibit follows the field trip portion of the program. Junior Duck Stamps are a traveling exhibit of the best 36 duck illustrations drawn by children in kindergarten through twelfth grade from participating



Right: A nature scavenger hunt on the Lake Michigan shore combines learning with the fun of discovery.

Below: Lessons about bird body parts and habitats gives children knowledge about animals that they encounter almost every day.





Journaling encourages students to make a personal connection with nature by describing their observations and feelings.

schools in the state of Michigan. The exhibit is on loan from the US Fish and Wildlife Service Michigan Junior Duck Stamp program and will be on display at the schools during the month of October.

“This outdoor program provides fourth graders from Escanaba, Gladstone and Rapid River schools with a fun and educational field trip that caters to different learning styles,” explains Irina Bruno, Bonifas Education Coordinator. “Students will observe and explore their outdoor surroundings, study wildlife, as well as write and draw in their journals about wildlife.”

US Forest Service educators lead the science portion of the program. One group participates in the bird beak demonstration game, which includes trying different tools resembling bird beaks (straw, pliers, pincers, chopsticks, slotted spoon, etc.) to pick up different types of foods that birds eat. That activity will be followed by binocular observation of pictures of birds and live birds, accompanied by instruction on bird body parts and habitats, including native plants.

The other science group goes on a scavenger hunt and studies the objects they collect through magnifying glasses to emphasize the environmental concepts they have learned. The two groups then do observational drawing and nature



Above: Sketching wildlife is another way for young people to see themselves as part of the natural world.

journaling activities building on the material presented in the science session. In the journaling portion of the program, students learn about using their five senses to describe natural objects. The lessons incorporate takeaways from the scavenger hunt and bird beak game. Students will take home their journals and scavenger hunt booklets.

The program is available to the schools free of charge thanks to UPEC's Environmental Education Grants program, and the support of Wildlife Unlimited of Delta County.

According to Bruno, the Fourth Grade Afield program is both educational and inspirational for students. "The goal of the Fourth Grade Afield program is to stimulate lifelong observational skills and written and artistic expression," she says. "We want to encourage appreciation for nature as students go beyond textbooks to experience and learn about the outdoors."

Irina Bruno is education coordinator at Bonifas Arts Center in Escanaba.

During the 2019 program, 338 students participated.

For Anne Cashen, a fourth grade teacher at Holy Name School, it's a "very hands-on program that gets the kids to appreciate nature in a more in-depth way. Kids enjoy the art portion and using all your senses [in science and journaling]." Andrew Hamlin, a Holy Name fourth-grader, agrees: "I like the program because we got to learn a lot about Aronson Island. The drawing is fun and I liked to use the binoculars."

ANNOUNCING THE 2020 UPEC GRANTS PROGRAMS

Up to \$500 for Environmental Education projects • Up to \$10,000 for Community Conservation

Deadline: January 10, 2020

Environmental Education Grants

Are you a teacher with a great idea for getting your students interested in the environment? We invite you to make your idea a reality through our Environmental Education Grant program.

For over 15 years, UPEC's Board has approved up to \$4000 annually to support environmental education in the Upper Peninsula by providing small grants to educator-promoted environmental projects within public or private K-12 schools. Grants of up to \$500 are available.

UPEC believes this grant series is especially important because schools are strapped for dollars to do innovative environmental education programs.

In 2019, UPEC funded seven programs: "Life of Lake Superior" (Munising area), "Lake Superior Youth Symposium" (Western UP area), "4th Grade Afield" (Escanaba area), "Reduce Your Waste" (Western UP area), "Exploration Station" (Curtis area), and "Native Food Garden" (Calumet-Laurium-Keweenaw area).

Applications for the 2020 round of grants are due January 10, 2020.

Environmental Education Grant FAQs

- **WHO?** K-12 educators in Upper Peninsula schools, public or private, or other groups and institutions wanting to create or enhance an environmental education program or support an ongoing activity.
 - **WHY?** Grants will be funded to provide financial assistance to quality environmental education programs and/or ongoing projects in need of support. We welcome proposals that provide hands-on experiences for young people in outdoor settings.
 - Special consideration will be given to fund at least one grant that uses the arts (visual arts, dance, or music) to advocate for environmental protection. This grant award is made in memory of the late Bonnie Miljour.
 - **WHAT?** Grant may not be used for salaries, but all other expenses (for example, transportation, meals, supplies, honoraria) are acceptable. Grant recipients will be required to present a final report that includes an accounting of funds expended and outcomes achieved upon completion of the program. Reports may be published in the UPEC newsletter and may be edited.
 - **HOW MUCH?** Depending upon the quality of the application as evaluated by the UPEC board, monetary awards up to \$500 each will be made for projects completed over the next 12-month period. We welcome new proposals and seek to help new projects receive funding.
 - **WHEN do I need to apply?** Applications are due January 10, 2020.
- For more information and an application form, go to upenvironment.org/upec-grants.

Community Conservation Grants

UPEC's Community Conservation Grant Program is designed to challenge UP communities to promote conservation values within their watershed or local area. The program honors the late Tom Church of Watersmeet, a long-time UPEC member whose bequest made this fund possible.

In the past short-sighted actions by corporate or individual landowners often degraded the UP landscape. Today, state and federal environmental programs as well as the private conservancy movement work to protect natural areas for public benefit and to safeguard significant populations of wildlife and the ecosystem processes that support them. UPEC's Community Conservation Grants initiative focuses on communities that want to step up the protection of conservation values in their locality.

UPEC wishes to encourage more proactive stewardship with this program. Grants could be awarded for finding ways to enhance native plant and animal life and the systems that support them. They can be for starting a community forest or preserve, or restoring a stream or wetland, or putting on a program about local medicinal plants, rare frogs, or top predators. These are only examples; local communities can come up with their own ideas.

The grants, up to \$10,000 each, are for planning or implementing local conservation projects that engage a variety of stakeholders within a community, from recreational and sportsmen's groups to naturalists, township officials, churches, and schools. The UPEC Board anticipates the program will stimulate grassroots conservation activity in localities throughout the UP.

Community Conservation Grant FAQs

- **WHO?** Conservation activists inspired to step up the practice of conservation values within a community are the target. Most of these activists have been affiliated with a local land conservancy seeking to set up a community forest or related land protection initiative (Yellow Dog Watershed Preserve, Keweenaw Land Trust, Upper Peninsula Land Conservancy, Northwoods Alliance). But other groups have also applied for educational exhibits at museums and a county-wide watershed education program.
- **WHY?** Despite extensive public land in the UP, land in private ownership (corporations and individuals) offers new opportunities to enhance protection through community action. Degraded landscapes can be restored, and good ones protected from development by creative use of tools such as conservation easements and by educational campaigns.
- **WHAT?** Grants may be used as a local match to purchase land, but other purposes related to a community land initiative are also suitable, such as educational videos, legal expenses, or wildlife inventories. A detailed budget is expected, as well as a final report on how the money was actually spent.
- **HOW MUCH?** Grant awards have varied from \$1500 to \$10,000, depending on the likelihood of the award to contribute permanently to conservation values in a community. Will the grant have a lasting impact? Are diverse community stakeholders engaged? Motivated activists and strong groups are the keys to long-range protection.
- **WHEN** do I need to apply? Applications are due January 10, 2020.

For more information and an application form, go to upenvironment.org/upec-grants.

Going shopping? You can help UPEC at the same time!



Do you shop at Econofoods? If so, please save your receipts and donate them to us. Keep an envelope handy at home where you can deposit the receipts after shopping. When it's full, mail them to us. We turn them in to Econofoods' "We Share" program and get a donation! **Turn your Amazon shopping into a force for good.** If you shop on Amazon, bookmark smile.amazon.com/ch/38-2561218. Login there, make your purchases, and Amazon donates a portion of the proceeds to UPEC!

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LIZ WIENER

Getting up close and personal with a hemlock tree in the Life of Lake Superior program. Read about this and other recipients of UPEC Environmental Education grants, starting on p. 4.

Support UPEC by becoming a member or renewing your membership today! Just fill out the form below. All memberships run with the calendar year. Not sure if your membership is current? Email us at upec@upenvironment.org – we'll be glad to help!

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- \$ Mining Action Group
- \$ Community Conservation Grants
- \$ Environmental Education Grants

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