



WEATHER

WHAT A ROLLER COASTER

From the hottest year in decades –to the Polar Vortex that covered most of the United States
in January 2014!

November 2013 was the warmest since modern temperature record keeping began in 1880, the National Oceanic and Atmospheric Administration announced in its [latest State of the Climate report](#), which summarizes climate-related news from around the world.

With a combined land and ocean surface temperature of 56.6 degrees Fahrenheit, November 2013 also was the 345th consecutive month – and the 37th November in a row – with a global temperature higher than the 20th century average, the NOAA report added.

Higher-than-average monthly temperatures were reported on nearly every continent around the world, including much of Europe and Asia, coastal Africa, Central America and central South America, as well as in the North Atlantic Ocean, southwest Pacific Ocean and the Indian Ocean.

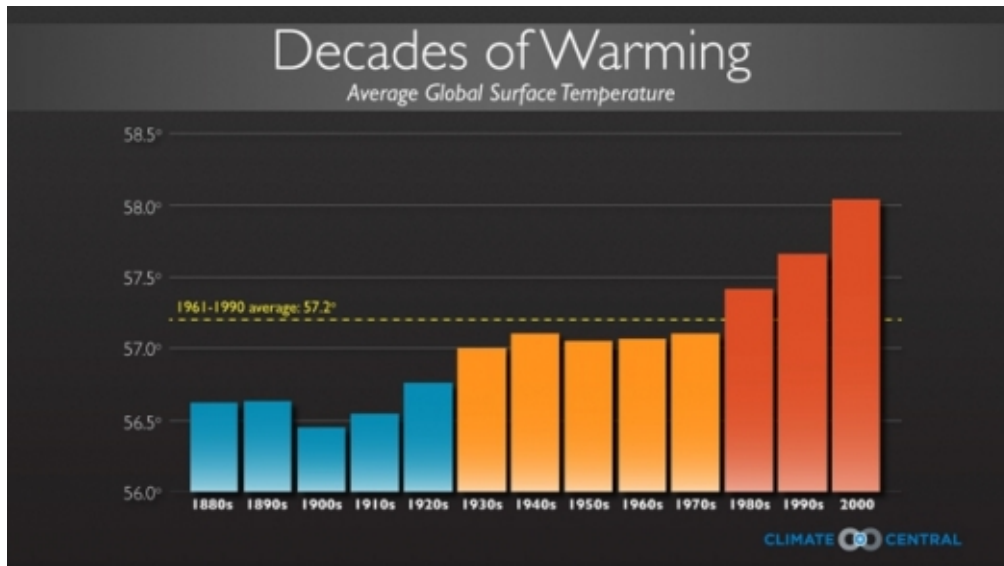
Russia experienced its warmest November since national weather records began in 1891, as some parts of the country like Siberia and the Arctic islands in the Kara Sea recorded temperatures more than 14 Fahrenheit degrees higher than the monthly average.

A [recent report](#) from the [U.N. Intergovernmental Panel on Climate Change](#) (IPCC) found that global average sea level is likely to rise anywhere from 10.2 to 38 inches by 2100, depending on the pace of greenhouse gas emissions and warming of the climate system.

The WMO report, which was released in Warsaw, Poland, where diplomats met to forge a path forward toward a new global climate treaty in 2015, found that temperatures in 2013 are about the same as the average annual temperature during 2001-2010, which was the warmest decade on record.

“All of the warmest years have been since 1998 and this year once again continues the underlying, long-term trend,” Jirraud said. “The coldest years now are warmer than the hottest years before 1998.”

The increase in temperatures compared to 2012 likely has to do with the absence of La Niña conditions since April of last year, along with the effects of increasing concentrations of greenhouse gases in the atmosphere. During a La Niña event, ocean temperatures in the equatorial tropical Pacific Ocean are cooler than average, which can work to hold down global average surface temperatures.



Each of the past three decades has been among the warmest in the instrument record, and likely the Northern Hemisphere's warmest in more than 1,000 years. **Click image to enlarge.**

Credit: Climate Central

In a [separate report](#) released on Nov. 6, the WMO found that the amount of carbon dioxide (CO₂), which is the main long-lived greenhouse gas responsible for manmade global warming, hit a record high in 2012 of 393.1 parts per million, or 141 percent of the pre-industrial level of 278 parts per million.

Largely as a result of all the extra CO₂ and other greenhouse gases pumped into the air, worldwide average temperatures have already risen by 1.6°F between 1901-2012 and are projected to increase by between 0.54°F to 8.64°F by 2081-2100 compared to 1986-2005 levels, depending on the future amounts of greenhouse gases in the air, according to the IPCC.

The WMO report amounts to a status report of the global climate system, and it notes that Australia experienced the most unusually warm weather this year, while parts of North and South America, northern Africa, and much of Eurasia also saw warmer than average temperatures. Cooler-than-average temperatures were observed over parts of North America, central South America, and parts of northeastern Asia, among other areas.

SO ---FROM HOT TO COLD!

(CNN) -- Americans in two dozen states from the Midwest to the Southeast and Northeast shivered this week courtesy of a distorted polar vortex. The rush of cold air sent southward is the biggest visitor from the North Pole since Santa Claus. The gifts it brings, however, are chilling and generally unwelcome. Much of the United States plunged into a deep freeze from record low temperatures.

CNN International senior meteorologist Brandon Miller answers a few pressing questions about this phenomenon.

What is a polar vortex? What distinguishes it?

The polar vortex, as it sounds, is circulation of strong, upper-level winds that normally surround the northern pole in a counterclockwise direction -- a polar low-pressure system. These winds tend to keep the bitter cold air locked in the Arctic regions of the Northern Hemisphere. It is not a single storm. On occasion, this vortex can become distorted and dip much farther south than you would normally find it, allowing cold air to spill southward.



Ice forms around rocks on the Brooklyn waterfront, across from Lower Manhattan, on Tuesday, January 7, in New York City.



Ice builds up along Lake Michigan at Chicago's North Avenue Beach on Monday, January 6.



A woman makes her way through a snow drift in downtown St. Louis on January 6.



A man shovels the snow off his car in Indianapolis on January



A man clears the sidewalk in front of his home in Carmel, Indiana, on (Guess what – I am now living in Carmel, IN!!!!!! -Jane)



A car is buried in snow January 5 in Zionsville,

How frequently does this polar vortex distortion occur?

[On *All Things Considered*](#), *Washington Post* weather editor Jason Samenow described the polar vortex this way:

"We're talking about a huge sprawling area of circulating cold air originating from the North Pole. It's a low-pressure center, and typically during the winter months it resides up there. At times, some tentacles of it will slip southward and bring cold air outbreaks into the U.S., but this year, we're seeing a huge chunk of it, most of it descending into the U.S."



[The Two-Way](#)

[Hang In There — Warmer Air Is Coming](#)

High-pressure systems over Alaska and Greenland, Samenow added, are "allowing the jet stream to dive south over the U.S. and also for this polar vortex to drop south with the jet stream."

For a more visual image of what's happening, though, we suggest an analogy offered by science writer Andrew Freedman, [who spoke with Morning Edition's David Greene](#).

"This is air that is circulating the Arctic," Freedman said. "In the last couple of days, it's sort of become lopsided — sort of like a figure skater that has extended their arms and then tripped.

"You know, when a figure skater pulls their arms in, they spin tighter and tighter and faster and faster. But when they put their arms out, they are a little bit slower and a little bit more wobbly and more prone to fall or stop skating at the end of their routine.

"What's happening now is that a piece of it is down on the other side of the globe, but a piece of it kind of got lopsided and came down on top of us."

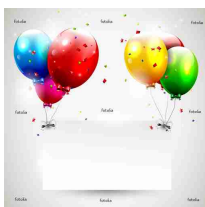
The next logical question is why the vortex has weakened so much that a big piece of it has spun down over the U.S.

Along with the effects that those high-pressure systems over Alaska and Greenland are having, there's the possibility that climate change is also a factor.

Scientific American [writes that](#):

"More and more Arctic sea ice is melting during summer months. The more ice that melts, the more the Arctic Ocean warms. The ocean radiates much of that excess heat back to the atmosphere in winter, which disrupts the polar vortex. Data taken over the past decade indicate that when a lot of Arctic sea ice disappears in the summer, the vortex has a tendency to weaken over the subsequent winter."

EDUCATION NEWS



CELEBRATE ---IT IS 30 YEARS FOR PRCST!

Incorporated in 1983-4 PRCST has offered professional development opportunities for K-12 teachers in our area for 30 years now!

Beginning with the LASER (Local Access to Science Education Resources) Database -remember that – long before the WWW PRCST provided support for teachers of science in their quest to stay up to date on research (new findings) and instructional strategies. Early the LASER newsletter was initiated along with professional development workshops offering help in how to integrate everything new into the classroom. Expansion beyond science disciplines occurred early as the Science-Technology-Society (STS) approach was foremost. Work with CMU and Dr. Indira Nair helped enhance this instructional strategy with the addition of the engineering component – and later the Green area – to STS by Green Design. PRCST was the first to incorporate these components into their programs –LONG before STEM – using a C3 approach: Content-Context-Conation.

Development of the “Environment and Health: A Systems Approach” program brought more emphasis on the interactions of our health and Earth’s systems....growing concerns globally. The four topic areas of Obesity – including agricultural practices; Air quality – especially fine particulates; Water Quality; and Climate Change address these issues and proved valuable in classrooms statewide over a three year testing program.

The recent STEM Education Series leading to the STEM in Action program has offered the opportunity for teachers to experience firsthand the “STEM” jobs available in a wide range of sites. Moving beyond mere talk and translated into the classroom, teachers can better support students into staying in the academic strands.

Moving from one-shot workshops to sustained professional development, PRCST early integrated work with NASA programs – especially the GLOBE protocols. A perfect fit with PRCST programs, GLOBE programs provided venues for more in-depth focus in topic areas along with access to free resources and NASA Mission information and interaction.

Looking ahead, there is much work to be done addressing expansion of Systems Thinking and placing more emphasis on the Earth Sciences and environmental issues – including early learning education. Incorporating the new Common Core Standards in Science is in sight and in progress.

Happy New Year PRCST!

News from NSTA

- [Safety and School Science Experiments](#)
- [NSTA Hosts January 14 Web Seminar on NRC Report: Developing Assessments for the *Next Generation Science Standards*](#)
- [Winter Reading for Young Minds](#)
- [Web Seminars Feature STEM Lessons and Tips for the Classroom](#)
- [How to Avoid Disqualification in the ExploraVision STEM Competition](#)
- [Online Courses from the American Museum of Natural History](#)

STANDARDS NEWS

The Next Generation Science Standards are the culmination of more than a half century of growing concerns about the state of science education in the United States. To learn more about both the new standards and their development, please join us on Thursday, January 16 for ***Next Generation Science Standards: Answering the Nation's Call for STEM Literacy.***

This hour-long webinar will bring together science education and assessment experts to highlight the promise of the new standards and shed light on how they were developed.

The webinar is hosted by *Education Week* and sponsored by Measured Progress, a non-profit developer of assessment products for states, districts, and consortia.

Panelists

- **Peter J. McLaren**, science and technology specialist, Rhode Island Department of Education
- **Susan Tierney**, content specialist - science, Measured Progress

Moderator

- **Tim Crockett**, senior advisor, Measured Progress

When

- Thursday, January 16, 2014, 2:00 to 3:00 P.M. EST

[Register](#) for the ***Next Generation Science Standards*** webinar today.

DIRECTIONS

2014 PENNSYLVANIA KIDWIND CHALLENGE OPEN FOR REGISTRATION

Event date: March 1, 2014

Location: Mt. Nittany Middle School, State College, PA

Audience: 4 – 12th grade teams

Prizes for winning teams AND the winning teams are eligible to attend the National Kidwind Challenge in DC!

For more information: <http://csats.psu.edu/projects/currentprojects/kidwindchallenge-archive.cfm>

WHAT IS IT?

The KidWind Challenge is a student-oriented wind turbine design contest. Over a period of a few months, students spend time designing and constructing their own wind turbines with the goal of creating a device that is efficient, elegant and highly functional. There are 2 divisions of the competition: 4th – 8th grade and 9th – 12th grade. Form a team and sign up! Scholarships are available for teams, contact Leah Bug at leahbug@psu.edu for details.

WHO CAN PARTICIPATE?

Any group of students who are of middle or high school age are eligible to enter a team in the KidWind Challenge. This includes students from public and private schools, home schoolers, after school clubs, boy and girl scout troops, 4-H clubs, etc. Each team must have a chaperone. Cash prizes for winning teams and a chance to attend the 2014 National Kidwind Challenge in DC, held at the USA Science and Engineering Festival April 26 & 27, 2014.

NEW THIS YEAR!

During the challenge, there will be activities for team members to join in and have fun! Not only will there be hands-on activities, but a tour of the school's wind turbine will be offered.

CONTACT INFORMATION

For more information, rules, and registration, visit the web site listed above. For additional information not found on the web site, contact Leah Bug at leahbug@psu.edu.

Professional Development

Enroll in a winter term course by **January 22, 2014** for the chance to win FREE, in-person PD training from PBS for your entire school.* [Learn more here!](#)

Featured Courses:

Digital Lesson Planning for Different Learning Styles

Grades K-12 | 30 Hours | INST120 | [Enroll Now](#)

Children's Authors on the Web: Online Sites that Motivate Students to Write

Grades K-6 | 30 Hours | RDLA125 | [Enroll Now](#)

PBS TeacherLine offers 3, 15, 30, and 45-hour online, professional development courses in science, reading, STEM, social studies, math, and instructional strategies/technology. For course details and additional information, visit us today at www.pbs.org/teacherline

[PBS LearningMedia](#) is a **FREE** digital media service designed to inspire teaching and enhance classroom learning. With a library of over 35,000 lesson plans, videos, and interactive games - finding trusted content has never been easier! To begin your search, [create an account here](#).

For a complete list of NOAA OER teacher professional development across the nation please visit: http://oceanexplorer.noaa.gov/edu/development/onsite_development.html

All life on Earth relies on the ocean— yet, the ocean is 95 percent unexplored, unknown and unseen by human eyes...

An essential component of the NOAA Office of Ocean Exploration and Research (OER) mission is to enhance ocean science literacy and to build interest in careers that support ocean-related work. To help fulfill this mission, the Okeanos Explorer Education Materials Collection was developed to encourage educators and students to become engaged in real time with the voyages and discoveries of the NOAA Ship Okeanos Explorer—America’s first Federal ship dedicated to Ocean Exploration.

Participants will be introduced to Volume 1 of the Okeanos Explorer Education Materials Collection: Why Do We Explore? Participants will learn how to use standards-based lessons and other online resources that guide classroom inquiries into important reasons for ocean exploration including Climate Change, Energy, Ocean Health and Human Health. This is Part One of a two-part professional development series. Part Two will be offered at a later date.

Registration is required and space is limited. Educators attending the full day will receive Volume 1 of the Okeanos Explorer Education Materials Collection, Why Do We Explore?, other resources, a NOAA Ocean Exploration Certificate of Participation, a continental breakfast and lunch. Those educators attending Part One and Part Two will receive a \$100 stipend. Please register using the information provided on the flyer.

**Tune in to our FREE live, interactive events
to inspire kids to pursue STEM careers**

JASON Live is proud to announce our STEM Career Role Model series schedule for January through June, 2014! We have an exciting and diverse mix of scientists and engineers coming your way. Save these dates and be sure to connect with these fascinating role models LIVE!

More information on our role models and their events will be available on the JASON website as their dates approach. A listing of all of our upcoming and archived live events can always be found at www.jason.org/live.

As always, feel free to contact us at live@jason.org if you have any questions, comments, or feedback on our programs!

All events begin at 1:30pm Eastern unless otherwise noted.

Can't watch the events live?

All of JASON's live events are recorded, archived, and posted to the event page soon after the event ends, so you can watch at your convenience. If you know you'll be watching later, be sure to pre-submit questions -- you'll still have a great chance of having your question answered in the program! (Especially if you send in a video question!)

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The Spectroscopy Society of Pittsburgh and the Society for Analytical Chemists of Pittsburgh will be conducting two teacher workshops at the National Energy Technology Laboratory in South Park in March. Both workshops offer 5 hours of Act 48 credit for Pennsylvania teachers.

The SSP "Light, Color & Spectroscopy for Kids" workshop on Thursday, March 20th. Information and a registration form can be found at www.ssp-pgh.org under the "Workshops" link. At the workshop, designed for elementary and middle school teachers, you will take home most of the materials to conduct the activities in your own classroom. You can also contact John Varine at varine@pittcon.org.

The SACP "Computer Software Workshop for Chemistry & Physics Teachers" on Thursday, March 27th. Information and a registration form can be found at www.sacp.org under the "Workshops" link. At the workshop you will take home all of the software for use in your own classroom. You can also contact Hub MacDonald at macdonald@pittcon.org.






SSP Scholarships and Grants

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SSP is dedicated to educating members of the scientific community, students, and teachers about spectroscopy and science. We achieve this goal by providing schools in need with equipment necessary to educate students on science. Below is a list of grants we are currently offering.

Each grant has its own set of application guidelines, so make sure to review the application instructions. Check back often, as new grants will be continuously posted throughout the year.

SSP sponsors the following the grants:

-  [Elementary School Science Olympiad Program \(ESSOP\)](#)
-  [High School Equipment Grants \(HSEG\)](#)
-  [Pittsburgh Conference Memorial National College Grants Program \(PCMNCG\)](#)
-  [College Equipment Grant Program \(CEGP\)](#)









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SACP sponsors the following the grants:

-  [ES/MS Equipment Grants Program](#)
-  [Pittsburgh Conference Memorial National College Grant \(PCMNCG\)](#)
-  [Elementary School Science Olympiad Program \(ESSOP\)](#)
-  [Starter Grant](#)
-  [College Chemistry Scholarship](#)
-  [Undergraduate Analytical Research Program \(UARP\) Grant](#)

NASA NEWS

Big Solar Flare may mean major geomagnetic storm!

Big Solar flare from a huge naked-eye sunspot group. If you live in the northern tier of states, you might want to subscribe to our "spacalrt" email, so you will get the notice of possible auroras.

<http://www.nbcnews.com/science/sunspot-goes-wild-x-class-solar-flare-blasts-our-direction-2D11875714>

to subscribe to spacalrt and get three hours notice of geomagnetic storms, send email to:

spacalrt-subscribe@mailman.rice.edu

Happy ten years on Mars!

Spirit and Opportunity are celebrating ten years on the Martian surface! Here's a NASA website of their accomplishments!

<http://mars.nasa.gov/mer10/>

10 years ago this month — January, 2004

NASA's Rovers Land on Mars

On January 4, 2004, NASA's Mars Exploration Rover *Spirit* lands on Mars, and begins transmitting images of the surface of the Red Planet. The *Spirit* twin Rover, *Opportunity*, lands on the Martian surface on January 25th.

Download the 2014 skies for Space Update

If you have a copy of our software "Space Update" installed, it's time to update the sky maps for 2014. Go into the "Sky Tonight" module, click "update data" (on the top right), then select the year and latitude range you want. (30N and 40N are good for most of the US, but we have available from 60N to 30S). It will take a while, since the movies are large. Also so into the "Astronomy", "Solar System" and "Space Weather" modules too and click "update data" (choose "download new" not "download all"). Or you can purchase an upgrade version for only \$5 from our online store (plus shipping. You must put your existing serial number in the comments to get this special price.

<http://spaceupdate.com/store/software.html>

Astronomy Course for Houston Teachers

This semester I will be offering my "Teaching Astronomy Lab" course (ASTR 430). Cost only \$1200 for three hours of credit. For more information:

<http://space.rice.edu/ASTR430>

Maven Opportunities

January 25: Red Planet Houston

<http://lasp.colorado.edu/maven/red-planet/houston-workshop/>

July 14-18: Maven Educator Ambassador program, Boulder, CO

DATABASE



The STEM Classroom Archive

[Sign up to receive future issues of *The STEM Classroom*](#)

Science, technology, engineering, and math (STEM) education is on everyone's mind, and the National Science Teachers Association is publishing *The STEM Classroom* to provide a forum for ideas and resources middle and high school teachers will need to support these disciplines. By coordinating science and math courses with technology and engineering courses, teachers can give students a better understanding of the world in which they live. Few of today's students understand the way in which these fields benefit our society or the variety of career opportunities that are available to them.

Soils Sustain Life

Soil is the reservoir on which most life on earth depends, as the primary source of food, feed, forage, fiber, and pharmaceuticals.

Soil plays a vital role in sustaining human welfare and assuring future agricultural productivity and environmental stability. The study of soil as a science has provided us with a basic understanding of the physical, chemical, and biological properties and processes essential to such a complex ecosystem.

The Soil Science Society of America (SSSA) is a professional scientific society, made up of soil scientists, educators, and consultants focused on promoting soil science, including enhancing soils topics in schools. For more information about us, [contact us](#). SSSA is pleased to provide teachers with these Soil Essentials:

Available Soil Resources

Looking for useful tools to assist in the soil education of your class? SSSA has numerous resources to help you talk to students about soils:

- [I "Heart" Soils Rulers](#)
- [Soils Bookmarks](#)
- [I "Heart" Soils Stickers](#)
- [12 Soil Orders Poster](#)

- [Soils Overview](#) 
 - [Soil Science Career Poster](#) 
 - [Careers in Soil Science Brochure](#) 
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Nutrition Voyage: The Quest To Be Our Best

Friday, July 20, 2012

Nutrition Voyage: The Quest To Be Our Best takes 7th and 8th grade classes on an exploratory journey into school wellness.

Opportunities for students to investigate, participate in a challenge, evaluate, and reflect.

File Upload:

 [Introduction \(302.37 KB\)](#)

 [Grade 7, Trek 1: The Path to Fruits and Vegetables \(628.15 KB\)](#)

 [Grade 7, Trek 2: Field Correspondents - Conducting a School Survey \(529.22 KB\)](#)

 [Grade 7, Trek 3: Leading the Way \[as Agents of Change\] \(507.51 KB\)](#)

 [Grade 8, Trek 1: Finding Fitness \(522.82 KB\)](#)

 [Grade 8, Trek 2: Backpack Full of Snacks \(908.99 KB\)](#)

 [Grade 8, Trek 3: From Farm to You \(838.33 KB\)](#)

GREAT Chemistry Connections:

[ACS Weekly Newsletter for January...](#)

Finding, Buying and Serving Local Foods Webinar Series Kicks Off January 9

Beginning this week, the USDA Farm to School Program will host two webinars each month to showcase the variety of ways school districts can purchase local foods. **The webinars will be held at 2:00 p.m.**

Eastern Time on the second and fourth Thursdays of the month. Topics will include everything from procurement basics to using geographic preference, to finding local producers, to buying local through DoD Fresh. See the schedule below for more information.

- Introduction to Procurement – January 9
- Conducting a Local Procurement Baseline Assessment – January 23
- Finding Local Producers – February 13
- Using the Informal Procurement Method – February 27

- Using Specifications to Target Local Products – March 13
- Working with Distributors – March 27
- Using a Forward Contract – April 10
- Introduction to Geographic Preference – April 24
- Using Geographic Preference – May 8
- Using USDA Foods as a Resource to Purchase Local – May 22
- Using DoD Fresh to Purchase Local – June 12
- Tying It All Together and Digging In – June 26

Our first webinar will cover procurement fundamentals, including informal and formal procurement methods and maintaining competition. This hour will serve as a primer for those just venturing into the procurement world. While each webinar will build on the ones before it, feel free to pick and choose sessions based on your interest.

To register for this webinar or any future sessions, please click [here](#). All webinars will be recorded and available on the USDA Farm to School website within 1-2 weeks of initial viewing.

[Endangered Species Act turns 40.](#) Environmentalists are celebrating the 40th anniversary of the Endangered Species Act, which they say is a powerful and successful tool for preserving the nation's biodiversity. But critics say the law is costly, poorly administered and has resulted in the recovery of only a fraction of protected species. [San Francisco KQED Public Radio](#), California. <http://bit.ly/1gmgees>

Happy Chinese New Year, 2014 the Year of the Horse!

The Chinese New Year's Day is **January 31, 2014**. The Chinese New Year's Days are also called the **Spring Festival**. The Spring Festival lasts 10 days, the Horse Year lasts one lunar year (12 months) --until Feb. 18, 2015.

Chinese Lunar Calendar began in 2697 BC when the Yellow King became king. 2014 is the 4712th **Chinese Year** beginning from Jan. 31, 2014, the **Year of the Horse**.

SCIENCE SNIPPETS

Engineering marvel may be needed to stop Asian carp

Corps of Engineers says separating Lake Michigan from carp-filled waterways could take \$18 billion, 25 years



Voracious Asian carp were first brought to the southern United States in the 1970s and have been eating their way up the Mississippi and Ohio rivers for years. (Scott Strazzante, Chicago Tribune / September 25, 2013)

Among the options outlined Monday by the Army Corps of Engineers to thwart the voracious fish and other invasive species from spreading is permanently separating Lake Michigan from the river and its connected waterways. Such a project would restore the once natural divide between the Great Lakes and rivers southwest of Chicago that drain into the Mississippi River.

Chicago blasted through that hydrological barrier when it dug the Sanitary and Ship Canal and Cal-Sag Channel at the turn of the last century to divert the region's sewage away from its source of drinking water. It also created a shipping link between two of the nation's major trade routes.

The fish escaped during floods and have been eating their way up the Mississippi and Ohio rivers for years. Spawning populations are as close as 40 miles from where the Sanitary and Ship Canal spills into the Des Plaines River and flows into the Illinois River.

With no natural predators, the fish are aggressive competitors with native game fish such as walleye, perch and whitefish that depend on tiny plankton during crucial stages of development. Two types of Asian carp, bighead and silver, now dominate parts of the Illinois River.

"If you really want to prevent the movement of species and keep Lake Michigan clean, it's going to cost money," said Joel Brammeier, president of the Alliance for the Great Lakes, a nonprofit environmental group. "We can't just keep patching over these problems and hoping they go away."

Experts agree the primary routes for carp and other invasive species to cross between the Mississippi watersheds and the Great Lakes are the Chicago-area waterways. Most of the potential methods to prevent their spread would upend a freight route that in recent years has declined in significance but retains influential political backers.

A less expensive option outlined by the Corps would involve spending \$68 million a year netting and poisoning carp and maintaining an electrical barrier in the Sanitary and Ship Canal north of Lockport. But last month the Corps reported that fish can swim through the barrier when they get trapped in the wake of passing barges. Carp DNA already has been found several times on the lake side of the barrier.

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From [environmentalhealthnews.org](http://www.environmentalhealthnews.org)

<http://www.cbc.ca/news/canada/saskatchewan/pesticide-contaminating-prairie-wetlands-scientist-1.2482082>

In Depth

Pesticide 'contaminating' Prairie wetlands: scientist

Researcher suggests pesticide may be linked to insect, bird declines

By Geoff Leo, [CBC News](http://www.cbc.ca) Posted: Jan 06, 2014 5:30 AM CT Last Updated: Jan 06, 2014 8:29 AM CT

Neonicotinoids are commonly used to control pests in western Canadian canola fields. University of Saskatchewan biologist says many wetlands across the Prairies are being contaminated by a relatively new pesticide that is threatening the ecosystem.

Christy Morrissey says that over the past few years neonicotinoids have been used increasingly on crops in Western Canada and the chemical is making its way into wetlands, potentially having a devastating "domino effect" on insects and the birds that rely on them.

'The impact on biodiversity could be probably bigger than we've ever seen before.'—*Christy Morrissey, biologist*

Morrissey is just a year and a half into a four-year study, but she's alarmed by what she's finding.

"This is huge" Morrissey said. "The impact on biodiversity could be probably bigger than we've ever seen before if we keep going at this rate."

Neonics, as they're commonly called, hit the market in the early 2000s, but sales have taken off over the past five years.

They're used on a wide variety of crops such as corn, soybeans, wheat, oats, barley, potatoes and fruit. In Western Canada, neonics are most commonly found on canola. Virtually all of the 8.5 million hectares of canola planted in Saskatchewan, Manitoba and Alberta are now treated with them.

Based on confidential data obtained from the federal government, Morrissey said her conservative estimate is 44 per cent of crop land in the Prairies was treated with neonics in the year she reviewed.

"We're not talking about a little regional problem. We're talking about something that's happening over tens of millions of acres."

Morrissey said her study is the first in Canada looking at how the widespread use of this chemical may be affecting wetlands across the Prairies.

Neonics 'contaminating' western wetlands

Her research has found the chemical is commonly showing up in wetlands in concentrations at least three to four times higher than what has been deemed habitable for insects.

"In some cases we have peak concentrations that are 100 times or more higher than those benchmarks of safe levels." Morrissey said. She and her fellow researchers have sampled hundreds of wetlands and have found that "upwards of 80 to 90 per cent of the wetlands are contaminated."

Most alarming, she said, is that the chemical was detected in the water before farmers planted in the spring. Morrissey said her research shows neonics are persisting in the water for months and in some cases years. She said that is likely to be devastating to insects.

"The longer that the chemical is in the water the longer the exposure time for the bugs. So they basically are being hit continuously with the chemical."

Insect and bird populations may be affected

Morrissey said preliminary data suggests just what she suspected: an apparent decline in mosquito and midge populations, which could have serious ramifications for birds.

"So birds that are flying around, they are primarily eating midges and mosquitos," Morrissey said. "The

ducks in the ponds, they are reliant on the midges, for example. So we know that these insects are basically the food supply for a lot of wildlife."

Former government scientist calls for neonic ban

Morrissey isn't alone in her concerns. In March 2013, American Bird Conservancy published a paper citing data from Canada, California and the Netherlands claiming "that concentrations of several of the neonicotinoid insecticides are high enough to be causing impacts in aquatic food chains."

The paper is titled "The Impact of the Nation's Most Widely Used Insecticides on Birds." It was written by Pierre Mineau, a former senior research scientist specializing in pesticide ecotoxicology with Environment Canada, and an adjunct professor at Carleton University and the University of Saskatchewan.

The paper refers to Morrissey's research and other findings that led Mineau to conclude "it is clear that we are witnessing contamination of the aquatic environment at levels that will affect aquatic food chains. This has a potential to affect consumers of those aquatic resources, be they birds, fish or amphibians."

Morrissey criticizes the U.S. Environmental Protection Agency for its continued approval of new neonicotinoids for use in that country.

"EPA risk assessments have greatly underestimated this risk, using scientifically unsound, outdated methodology that has more to do with a game of chance than with a rigorous scientific process."

Mineau said concerns about neonics have now led the American Bird Conservancy and partners in the National Pesticide Reform coalition to urge the EPA to ban the use of neonics as seed treatments and do a thorough review of their effects on the ecosystem.

Despite these concerns, there is not unanimity in the scientific community regarding the reasons behind declining bird and insect populations. Another study by Mineau points out that "most investigators have blamed farmland bird declines on some aspect of agricultural intensification."

In other words, declining bird populations could be explained by farms that are larger and more dense than in the past, and as a result wildlife is losing its previous habitat.

Other scientists blame the decline on increased predation, which they argue is also a consequence of changes in habitat.

Neonics more environmentally friendly, industry says

The companies that manufacture neonicotinoids, Bayer CropScience and Syngenta, say their products have been rigorously tested and were found to be safe before they were introduced into the market.

CropLife Canada is an industry group that speaks on behalf of those companies. It said there's no reason to believe that neonics persist in water over long periods of time.

"The companies have done studies in Europe and in North America where they've applied the product consecutively for 10 years and have seen no accumulation, no bioaccumulation," explained CropLife Canada's Pierre Patelle. "And they've also seen no persistence beyond the levels that you would expect in a field for one year."

"The levels that would be detected under normal use won't pose a problem."—*Pierre Patelle, CropLife Canada*

And so, while he hasn't yet seen Morrissey's data, he's quite sure, based on previous research, that it won't identify significant concerns with neonics.

"We're confident that the levels that would be detected under normal use won't pose a problem. So we would love to discuss these data with the researchers."

Patelle said that neonics, far from causing harm, are a welcome replacement to older sprayed-on pesticides that were potentially harmful to humans and animals.

"This class of insecticide [neonicotinoids] had extremely low toxicity to humans, extremely low toxicity to other mammals as well as birds and fish."

Patelle said the coated seeds make a lot of sense because they do away with the possibility of overspray

and allow farmers to avoid multiple applications of pesticides throughout the growing season. But Morrissey said that it's still quite possible farmers are applying more chemical to their fields now, using these treated seeds.

"Obviously the disadvantage from an environmental perspective is that every single plant is treated whether it needs it or not." said Morrissey. "So now you have a situation where large tracts of land are basically treated when they may or may not need to be treated."

Neonics embroiled in global bee controversy

Until now, neonics have primarily raised environmental concerns because of their perceived effect on bees.

In April of last year the European Union placed a two-year trial ban on the chemical because of complaints from beekeepers about dramatically declining populations, and scientific evidence that may show neonics are partly to blame.

'The problem here is that now you've got activist groups who've got a very clear anti-pesticide perspective.'—*Pierre Patelle, CropLife Canada*

CropLife Canada said the ban was a reaction to overheated rhetoric.

"The problem here is that now you've got activist groups who've got a very clear anti-pesticide perspective and they don't hide that," Patelle said. "And it's unfortunate."

He said there's no unambiguous evidence to suggest that neonics are to blame for the decline in bee populations.

Report: Great Lakes only region to gain wetlands. The eight-state Great Lakes region - extending from western New York to eastern Minnesota - was the only section of the U.S. where coastal wetland acreage increased during a five-year period when scientists took extensive measurements with satellites and field photography. [Associated Press](http://bit.ly/KvASh)
<http://bit.ly/KvASh>

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US cities weigh costs of ash borer fight. A decade ago, foresters feared an invasive Chinese beetle would spell doom for American ash trees, but a counterpunch emerged: a powerful pesticide that can not only save infested trees but inoculate them against the emerald ash borer. [Associated Press](http://bit.ly/1f7P7Xj)
<http://bit.ly/1f7P7Xj>

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Colorado river drought forces a painful reckoning. The sinuous Colorado River and its slew of man-made reservoirs from the Rockies to southern Arizona are being sapped by 14 years of drought nearly unrivaled in 1,250 years. Many experts believe the current drought is only the harbinger of a new, drier era. [New York Times](http://nyti.ms/19ZwEo4) [Registration Required]
<http://nyti.ms/19ZwEo4>

CALENDAR OF EVENTS

Feb. 24-26 Climate Leadership Conference, Hyatt Regency Mission Bay, San Diego, CA
www.climateleadershipconference.org/restration.html

March 4-6 Building Energy 14 Conference and Trade Show for Renewable Energy and Green Building Professionals, Seaport World Trade Center, Boston, MA 413.774.6051

March 14-15, 2014 Antiochian Village, (near) Ligonier, PA
2014 PAEE Conference
“Spheres of Influence: Shaping the Curve of Environmental Education”

March 15-17, 69th ASCD Annual Conference, Los Angeles, CA
www.ascd.org/annualconference

April 12 PA NASA ERC workshop –FREE - Carnegie Science Center. Join us as you prepare for EarthDay 2014. 8:30am-3:00pm. Six Act 48 hours. Email konrad@pitt.edu for information.

Maven Opportunities

January 25: Red Planet Houston
<http://lasp.colorado.edu/maven/red-planet/houston-workshop/>

July 14-18: Maven Educator Ambassador program, Boulder, CO
<http://lasp.colorado.edu/home/maven/education-outreach/for-educators/mea/boulder-workshop/>

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NSTA NEWS:

April 3-6 Boston – National Conference on Science Education
www.nsta.org/boston

May 14-17 New Orleans - **2014 STEM Forum and Expo**
www.nsta.org/2014STEM

Regional Conferences:

Oct.16-18 Richmond, VA

Nov. 6-8 Orlando ,FL

Dec. 4-6 Long Beach, CA

Looking ahead for PRCST

TBD : Workshop planning in progress

Watersheds – Water a Critical Issue - July

Pittsburgh Geological Society workshop series

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