

# From Shore to Shore

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Water Resources Team

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## Engaging Youth and Empowering Educators to Increase Watershed and Land Use Literacy

John Bilotta, University of Minnesota Extension, 612-624-7708, [jbilotta@umn.edu](mailto:jbilotta@umn.edu)

Minnesota Extension and Minnesota Sea Grant educators added a new tool to the *Watershed Game* (WSG) suite. The new *WSG Classroom Version* is designed for groups led by K12 teachers and informal water and environment resource educators. Professional staff and volunteer instructors such as Master Gardeners, Master Naturalists, Master Water Stewards, and 4-H Club leaders will also find the game to be an engaging way to help students understand the relationships among land uses within a watershed, water quality and their community.

Working in teams, students apply tools (practices, plans, and policies) to decrease water pollution while balancing financial resources. The goal of the activity is to reduce pollution from various land uses to the stream without going broke.

The *Classroom Version* comes in a boxed kit much like any other board game you may buy off the shelf. It has the added value of a [related website](#) that provides resources including an optional electronic score card along with videos, teacher presentations, and supporting lessons and activities that can be used with students.

The launch of the *WSG Classroom Version* has been accomplished through a number of training opportunities across the state. These opportunities produced the following results:

- 100 kits were distributed to teachers and informal educators across Minnesota and Wisconsin.
- More than 100 formal and informal educators participated in five hands-on interactive trainings. Additional trainings are scheduled for Minneapolis and Rochester, Minnesota.
- A successful training model has been adopted that combines the *WSG Classroom Version* with Project WET (Water Education for Teachers), partnering with the Minnesota Department of Natural Resources and their Project WET programming.
- A national training for Extension and Sea Grant staff will be held in June in Vermont.
- The new *Classroom Version* has been nominated for an innovative program award through the Association of Natural Resource Extension Professionals.

The completion and publication of the *Classroom Version* adds to the suite of the *Watershed Game*. The *Stream, Lake, and River Versions for Local Leaders* (2012) are designed to be used with audiences of elected and appointed officials and community leaders by trained facilitators who are often water/environment/natural resource educators and professionals.

For more information regarding the *Watershed Game*, visit [northlandnemo.org/watershedgame.html](http://northlandnemo.org/watershedgame.html) or contact John Bilotta at [jbilotta@umn.edu](mailto:jbilotta@umn.edu) or 612-624-7708. ■



## Calendar of Events

For the most current calendar items and more details, visit [www.extension.umn.edu/environment/water/calendar/](http://www.extension.umn.edu/environment/water/calendar/).

### Watershed Game Classroom Version and Project WET Teacher Training

Date: April 21 and 22

Location: Rochester, MN

Contact: John Bilotta, 612-624-7708, [jbilotta@umn.edu](mailto:jbilotta@umn.edu)

### Urban Waters Forum

Date: April 23

Location: Chaska, MN

For more information:  
[www.arboretum.umn.edu/2016UrbanWaters.aspx](http://www.arboretum.umn.edu/2016UrbanWaters.aspx)

### Stormwater Practice Inspection and Maintenance Certification Professionals

Date: May 9

Location: Chaska, MN

Contact: Shahram Missaghi, [miss0035@umn.edu](mailto:miss0035@umn.edu), 952-221-1333

### Hubbard COLA Water Quality Workshop

Date: June 17

Location: Park Rapids, MN

Contact: Karen Terry, [kterry@umn.edu](mailto:kterry@umn.edu), 218-770-9301

## Inside...

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## Smart Ponds and Sexy Soil: Minnesotans on the Front Lines of Climate Adaptation

*Jennifer Gasperini with input from Hilarie Sorensen and Sharon Moen, Minnesota Sea Grant. Transcript from Minnesota Sea Grant's radio show, The Sea Grant Files. Listen to this episode and others at [www.seagrants.umn.edu/radio/sgf](http://www.seagrants.umn.edu/radio/sgf) or via The Sea Grant Files podcast.*

How could it be 67 degrees in New York on Christmas Day ... then weeks later, have a record-breaking two feet of snow bury the city? After four years of drought, torrential rains are falling in California in a way that is reminiscent of Duluth's epic 2012 flood. Of course, El Nino is at play this crazy-weather winter but the data also tells us that the Earth's climate has, and is continuing to, change.

Knowing that it is prudent to brace for coming storms and, likewise, climate change, Minnesota Sea Grant joined the University of Minnesota's Water Resources Center and many others to host the annual Minnesota Climate Adaptation Conference. The conference, launched by meteorologist and entrepreneur Paul Douglas, was a reality check and a call to action to collaborate. He asked the audience to embrace the weather changes with creativity and resilience. This is prime time to tackle the unknowns of the future with technology and innovation. Who better to take up the challenge than a hardy group of can-do Minnesotans?

At the conference, representatives from Minnesota homegrown business titans Best Buy, 3M, and General Mills shared their company plans for sustainable growth. In every case, embracing renewable resources is enhancing their bottom lines. Best Buy alone is saving \$40 million a year by installing renewable energy technology including automating lighting and energy controls in stores. It's also entering the residential solar market. 3M outlined its commitment to reduce water use in manufacturing by 50%; the company has already reduced greenhouse gas emissions by 60% since 2002.

Jerry Lynch of General Mills perked up the audience with a declaration to "make soil sexy." After a century of treating soil like dirt, he said the company plans to reduce its dependence on nitrogen fertilizer, an energy-intensive product that contributes to the greenhouse gas load in the atmosphere as it breaks down. The 150-year-old company even brought a coalition of farmers to the Paris COP21 climate talks to share field experiences with politicians.

Can climate adaptation efforts be reflected in the food on your plate? You betcha! The University of Minnesota's Regional Sustainable Development Partnership supports local food projects that embrace climate adaptation. Projects include deep-winter greenhouses that use passive solar lighting to produce copious greens even in February. The Main Street Project in Northfield is another model. It reaps \$15,000 per acre, a gigantic economic leap from the more standard \$1,200 harvest realized by traditional techniques. The 40-acre model of energy efficiency also reduces environmental impacts. You might also note that deep-rooted hybrid hazelnut and American chestnut trees can withstand extreme temperature variations, produce for hundreds of years, and capture three times more carbon than row crops. Did you know that people were eating bread made of chestnut flour long before wheat was introduced?

Climate change is having a marked effect on water resources ... from water temperature, evaporation to lake levels. Lakes are losing ice and warming. This has significant impacts for water quality, water supply, recreation, shipping, lake

ecology and shoreline erosion. Lake Superior is one of the fastest-warming lakes in the world with summer surface water temperatures increasing faster than air temperatures. Rapid warming is also occurring in many small lakes. In response, scientists linked to the Great Lakes Temperature Collaboration are studying changes in evaporation and long term trends in Great Lakes water levels, water supply, water quality and aquatic ecosystems so that society can better prepare for what lies ahead.

And cities...let me tell you about cities. Many waste up to half the energy they produce; new technologies are improving that ratio. Not only are cities building coalitions to prepare for extreme weather events, some are moving toward energy-efficient integrated systems of transportation, sewage, water, heating and cooling. In Minnesota, 80 cities along the Mississippi River are working together on sustainability planning around invasive species, drinking water and changes in industry impacted by climate change.

What can you do to adapt to the changing climate? Stay on the cusp of the revolution in efficiency and sustainability. How? Buy local products when possible. Opt for wind and solar energy if offered through your energy provider; minimize your water footprint; invest in a hybrid or electric car; plant eco-friendly grass that requires less watering, less mowing and no pesticides, and plant trees and shrubs with the next 20 years in mind. Find out what your community is doing and ask how you can be part of their adaptability strategy.



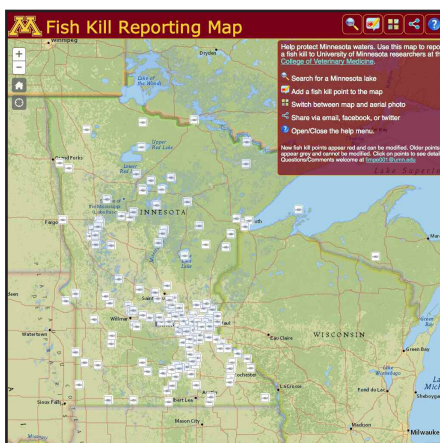
# Fish Kills – What You Can do to Help

Dr. Nick Phelps, University of Minnesota, College of Veterinary Medicine and Minnesota Aquatic Invasive Species Research Center; [phelp083@umn.edu](mailto:phelp083@umn.edu)

Imagine this: You are relaxing on the beach on a sunny day in mid-June. The loons are calling as the water gently laps at the shoreline. Your kids are jumping off the dock and there is a pungent smell in the air. Wait, what?!

You are smelling dead fish, technically defined as a fish kill: a die-off of at least five fish of the same species in close proximity in space and time. Fish kills in Minnesota are widespread and can lead to public health concerns, costly cleanups, and potentially significant declines in fish populations. At a minimum, fish kills impact our perspective of what it means to be a pristine Minnesota lake. While some of these events are the result of serious fish diseases, many are associated with other causes, such as warm water, low oxygen, and algae blooms. However, these so-called natural processes can be heavily influenced by human activity, such as climate change, nutrient runoff, agriculture and urbanization to name a few.

Researchers at the University of Minnesota (UMN) are trying to better understand the causes and trends of fish kill events to inform proactive and adaptive management strategies – and we



<http://z.umn.edu/fishkill>



## Minnesota Fish Kill Facts

- June is the most common month to observe a fish kill
- Bluegills and bass are found in 44% of fish kills in Minnesota
- 33% of fish kills are associated with physical environmental factors and 23% are associated with infectious diseases.
- Fish kills are not randomly distributed, they are more likely to be near urban areas, although this may be reporting bias.

*\* Data from fish kill events reported to DNR from 2003-2013.*

need your help. An estimated 500 fish kill events occur each year in Minnesota, yet only an average of 35 per year were documented in the Minnesota Department of Natural Resources' (DNR) primary database since 2003. Lake users calling the State Duty Officer or their local DNR office report the majority of these events; however, inconsistent information and limited reporting frequency present challenges for data analysis.

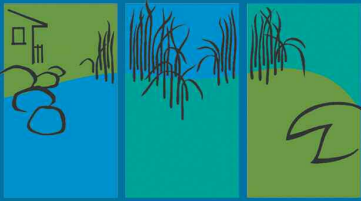
To standardize and simplify reporting for lake users and biologists alike, there is a new and easy-to-use website: <http://z.umn.edu/fishkill>. On this site, you can see past fish kill reports and report new events. After answering a few simple questions, such as what species

were affected and how many, what was the weather like, etc., the event is geo-referenced and reported. Researchers at the UMN are notified of new fish kill events daily and share that information with the DNR. If the event warrants further investigation, veterinary students or biologists will be sent to the site to collect samples and diagnose the cause of death.

With your help, UMN researchers and fisheries managers can better protect the health and sustainability of Minnesota's fish populations. ■

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*A publication of the Water Resources Team, dedicated to educating Minnesota citizens about water resources issues to improve water quality, habitat, and aesthetics of our lakes and rivers.*

*From Shore to Shore is a free quarterly electronic newsletter. Archived issues are available online at [www.shorelandmanagement.org](http://www.shorelandmanagement.org)*

*To subscribe or unsubscribe, please contact Heidi Olson-Manska at [olsonh@umn.edu](mailto:olsonh@umn.edu) or 320-589-1711.*

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# Building Your Statistical Strengths for Clean Water

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The University of Minnesota Extension Water Resources Team, in collaboration with regional and state agencies and industry professionals, is offering a new statistical educational series.

These workshops are designed for natural resource managers and technicians, scientists, technical managers, reviewers and anyone who wants to build their statistical strengths. The series helps people learn how to apply statistics to extract basic information from a vast pool of data and how to identify the relationships within the data.

If you have been hearing more and more about statistics in recent years, you are not alone. As we learn more about the physical, chemical, and biological processes of our world, we are also learning to better measure these processes and generating increasing amounts of data. Our world is becoming quantitative and we rely on statistics to see the reality of our world and to illuminate patterns such as changes in our climate. As a matter of fact, the U.S. News and World Report, identified “statistician” as the best business job in 2016.

Statistics has long been part of a researcher’s job. Dr. J. Edward Deming (1900-1993) was one of the champions for using statistics as a tool to better manage work and improve quality through “Statistical Process Control.” One of the techniques that Deming focused on was the use of the “Plan, Do, Study and Action Cycle,” where all stages of management and manufacturing processes are constantly measured and analyzed. The goals of these concepts are to eliminate variations (errors) in the processes, improve quality and to answer basic questions of:

1. What are we trying to accomplish?
2. What changes can we make that will move us closer to our goal?
3. How will we know that a change is an improvement?

Natural and water resources managers are also faced with these three questions. They study data and numbers that provide

important information about our world. Therefore, they have to make sure that the data or numbers studied are trustworthy. They must be sure that their measurement reflect reality so they can draw real and practical conclusions from the data. Plus, they may face an additional challenge: the majority of manufacturing processes and data follow the well-known bell curve (normal distribution). However, many natural processes do not follow such a pattern. Fortunately, advancements in computer technologies have provided resource managers with ways to conduct intense calculations and use newer statistical methods (nonparametric) to accurately analyze systems.

The new Environmental Statistics Workshop Series offers participants the opportunity to gain a solid understanding of basic statistics and learn basic operations with R statistical software. Topics covered include: data description; comparison of two groups of data; linear, multiple and logistic regressions; analysis of covariance; trend analysis. Visit the Stormwater Education Program website to learn more about these classes ([www.extension.umn.edu/environment/stormwater](http://www.extension.umn.edu/environment/stormwater)).

An online Statistical Assessment Tool is also available to help you build your statistical strength. The Statistical Assessment Tool includes an overview of terms, definitions and basic calculations. The site also includes a welcome video, presentations, exercises, sample files and a quiz to check your learning.

To access the Statistical Assessment Tool:

- Go to [www.umn.edu/dirttools/guestaccounts](http://www.umn.edu/dirttools/guestaccounts).
- Request a guest account.
- Forward your guest ID to [miss0035@umn.edu](mailto:miss0035@umn.edu) for course access.
- Receive your access code to start building your statistical strength.

For “all things statistics,” you might also want to explore the website of The American Statistical Association ([www.amstat.org](http://www.amstat.org)). ■