Coastal CLIMATE Adaptation & Resilience Workshop

 supporting climate and coastal resilience planning in the Western Lake Erie Basin

June 19, 2013
8 am to 4:30 pm

@ Owens Community College
Toledo Area Campus
Audio/Visual Classroom Center 30335
Oregon Road, Perrysburg OH 43551

Participants:
Planners and professionals addressing land use, public health, stormwater, watersheds, economic development, emergency preparedness, sustainability, agriculture, ports and natural resources.
June 19, 2013 Agenda

8 am - Registration and check-in

8:30 am - Welcome
The Honorable Tina Skeldon Wozniak, Commissioner of Lucas County
Tim Murphy, Commissioner City of Toledo Division of Environmental Services

Workshop Overview and Introductions
Heather Elmer, Ohio Department of Natural Resources Division of Wildlife
Patrick Robinson, University of Wisconsin Extension

8:45 am - Setting the Stage – Developing a Great Lakes Coastal Resilience Planning Guide
Jeff Stone, Association of State Floodplain Managers

9:15 am - Climate Trends in the Western Lake Erie Basin
Molly Woloszyn, Midwest Regional Climate Center

9:45 am - Climate Change Science and Regional Impacts
Jeffrey Andresen, Michigan State University

10:15 am - Break

10:30 am - Adapting to Climate Change - Planning Strategies and Tools
Tashya Allen, NOAA Coastal Services Center
Patekka Pope Bannister, City of Toledo
Melissa Greene, Lucas Soil & Water Conservation District

NOON - Lunch

1 pm - Breakout Session Tracks
Track A (Room 121) - Adaptation Planning in the Western Lake Erie Basin (pg 2)
Track B (Room 122) - Developing Western Lake Erie Case Studies for the Great Lakes Coastal Resilience Planning Guide (pg 3)
Track C (Room 123) - Climate Change Adaptation Tools and Resources (pg 4)
Track D (Room 124*) - Climate Change Communication, Engagement & Action (pg 5) * 3pm session Maze in auditorium

4 pm - Next Steps and Closing Remarks

4:30 pm - Adjourn
Adaptation Planning in the Western Lake Erie Basin

1 pm – Integrating Adaptation into Municipal Plans and Programs

Learn about engagement between the Great Lakes Adaptation Assessment for Cities and the City of Toledo, including key areas of concern the city identified through an adaptation workshop and ongoing discussions. Hear findings from GLAA-C on how adaptation strategies are being integrated into a variety of non-climate action plans from across the country. Participants will identify areas of impact and key departments needed to respond to these impacts and brainstorm on how greater inter-departmental collaboration could leverage resources to respond to climate impacts.

Patekka Pope Bannister, City of Toledo
Beth Gibbons, University of Michigan

2 pm – Integrating Climate Change Resilience into the Toledo-Lucas County Sustainability Plan

Join this brainstorming and strategy conversation to discuss how climate change can be addressed in the Lucas County sustainability plan. The session will focus on how climate change may impact the plan’s focus areas and how the county’s sustainability goals within those focus areas are addressing climate change.

Melissa Greene, Lucas Soil and Water Conservation District
Becky Fedak, Brendle Group

3 pm – Climate Smart Habitat Restoration

This session will identify which Great Lakes’ coastal species and systems are most likely to be negatively impacted by a changing climate; clarify why these resources are vulnerable, considering the interaction of climate and existing stressors; and elicit restoration techniques that are ‘climate-smart,’ particularly for western Lake Erie.

It will introduce NWF’s ‘Great Lakes Coastal Future: Tools for the Design and Implementation of Climate-Smart Restoration’ and ‘Guide to Climate Change Vulnerability Assessment.’ Participants will interact with vulnerability assessment and climate-smart restoration resources, highlighting western Lake Erie examples. It will conclude with a discussion of how restoration can help urban communities adapt and introduce a nature-based solutions to urban adaptation tool kit.

Melinda Koslow, National Wildlife Federation
James Cole, The Nature Conservancy

Notes:
Scientists have conducted extensive research on the fundamental characteristics of the climate system and their understanding will continue to improve. Current climate change projections are reliable enough to help humans evaluate potential decisions and actions in response to climate change. (Source: Climate Literacy Principle 5e.)

Developing Western Lake Erie Case Studies for the Great Lakes Coastal Resilience Planning Guide

1 pm – Examining Habitat & Environment Case Studies
Healthy coastal zone and watershed ecosystems are able to buffer upland areas from erosive forces like wind, waves and storm surge; absorb excess waters to minimize flooding; and adapt to a range of changing short- and long-term conditions including lake level fluctuations. This session will look at the data, tools and applications that could help address habitat planning and management decisions related to natural hazards, such as heavy rainfall, and the impacts that a changing climate may have on those decisions. We will also explore ideas for new case studies and local stories that look at habitat issues, natural hazards and climate change.

Katie Kahl, The Nature Conservancy
Rachael Franks Taylor, The Nature Conservancy

2 pm – Examining Land Use & Zoning Case Studies
Planning and managing land use involves tradeoffs and the balancing of multiple objectives (e.g. fiscal, economic, aesthetic and environmental). This requires an understanding of natural hazards and risks, including potential impacts resulting from climate change. This session will look at data, tools and applications that could help address land use decisions related to natural hazards, such as flooding and the impacts that a changing climate may have on those decisions. We will also explore ideas for new case studies and local stories that look at land use issues, natural hazards and climate change.

Bob Freitag, University of Washington
Jim Schwab, American Planning Association

3 pm – Examining Infrastructure Case Studies
Coastal infrastructure planning and management is about helping coastal communities and maritime interests understand which critical “gray” and “green” infrastructure is vulnerable to potential climate variation and hazards, as well as the potential risks and economic and environmental impacts throughout the coastal zone and uplands. This session will look at the data, tools and applications that could help address infrastructure planning and management decisions related to natural hazards, such as lower lake levels, and the impacts that a changing climate may have on those decisions. We will also explore ideas for new case studies and local stories that look at infrastructure issues, natural hazards and climate change.

Roger Gauthier, Roger L. Gauthier Consulting
Gene Clark, University of Wisconsin Sea Grant Institute

Notes:
Natural processes that remove carbon dioxide from the atmosphere operate slowly when compared to the processes that are now adding it to the atmosphere. Thus, carbon dioxide introduced into the atmosphere today may remain there for a century or more. Other greenhouse gases, including some created by humans, may remain in the atmosphere for thousands of years. (Source: Climate Literacy Principle 4G)

Climate Change Adaptation Tools and Resources

1 pm – Introduction to Vulnerability Assessment and Identifying Vulnerabilities in Your Community
This interactive session will include a brief introduction to vulnerability assessment through individual and group work to help participants qualitatively identify vulnerabilities across sectors in their community or organization. Discussions will include barriers to and benefits of adaptation, key stakeholders, action time frames and the next steps to take locally.

Tashya Allen, NOAA Coastal Services Center

2 pm – Stepping through Coastal Resilience Planning using the Climate Adaptation Collaboratory
This session will familiarize users with the Climate Adaptation Collaboratory, an online, interactive resource and workspace for conservation practitioners, decision-makers, and researchers to find and discuss information, tools and experiences related to climate change adaptation. The session will introduce a new adaptation workflow concept through a live, local example and illustrate how the Collaboratory links to partner resources, tools and data around the Great Lakes basin to facilitate information sharing and dissemination. It will also give participants an opportunity to link their organizations’ resources.

Katie Kahl, The Nature Conservancy
Kim Hall, The Nature Conservancy

3 pm – Economic Assessment of Flooding Impacts and Economics of Green Infrastructure
The NOAA Coastal Services Center will share methods for assessing the economic impacts of flooding and identifying green infrastructure strategies to help reduce those impacts. The session will draw from a project in progress in Toledo and Duluth, Minn. The Coastal Services Center is conducting this effort in partnership with the cities of Toledo and Duluth, Eastern Research Group and the Association of State Floodplain Managers.

Lori Cary-Kothera, NOAA Coastal Services Center
Jeff Adkins, NOAA Coastal Services Center
Tashya Allen, NOAA Coastal Services Center
Nancy Cofer-Shabica, NOAA Coastal Services Center

Notes:
Reducing human vulnerability to the impacts of climate change depends not only upon our ability to understand climate science, but also upon our ability to integrate that knowledge into human society. Decisions that involve Earth’s climate must be made with an understanding of the complex inter-connections among the physical and biological components of the Earth system as well as the consequences of such decisions on social, economic, and cultural systems. (Source: Climate Literacy Guiding Principle B)

Climate Change Communication, Engagement & Action

1 pm – Fostering Climate Action: Community-Based Social Marketing and other Strategies

This session will highlight best practices and tips for successful climate change communication, including social marketing approaches that support individual action.

Bret Shaw, University of Wisconsin-Madison

2 pm – Connecting People and Climate Change - Climate Wisconsin Videos

Climate Wisconsin is an educational multimedia project featuring stories of climate change. Produced by Finn Ryan, the stories are supported by research conducted in collaboration with the Wisconsin Initiative on Climate Change Impacts. Participants will learn about what went into developing the videos and how they have been used to impact climate awareness and action. This session will explore interest in developing a similar project for Ohio, including potential themes, available research on climate impacts, funding sources and how stories of a changing climate in Ohio might be similar or different from Wisconsin.

Patrick Robinson, University of Wisconsin Extension
Heather Elmer, ODNR Div. of Wildlife, Old Woman Creek NERR

3 pm – Virtual Session: Climate Masters Program, University of Oregon Climate Leadership Initiative

Enjoy this virtual session on the University of Oregon’s Climate™ Master Program, a set of model programs that provide cost-effective, actionable education and training to help individuals, businesses, and youth reduce greenhouse gas emissions and prepare for local climate impacts. These programs are designed to be easily replicable and to motivate behavioral change among participants and their organizations and communities.

Sarah Mazze, The Resource Innovation Group (TRIG)

Notes:
Breaking down the Buzzwords: Climate Terms Defined

[Then explained in common words.]

**Weather** – state of the atmosphere at a place and time in regard to heat, cloudiness, dryness, sunshine, wind, rain, etc. [Look out the window or check the widget on your smart phone. Weather changes day to day.]

**Climate** – patterns of energy transfer on earth that create the weather conditions prevailing in an area over a long period of time. [For Ohio, the climate is: summer = warm to hot; fall = temperate; winter = cold to very cold, spring = lions and lambs. Climate varies from season to season.]

**Climate Variability** – year to year and even decade to decade, the climate of a location will naturally fluctuate. Climatic variables including temperature and precipitation, will fluctuate in how they depart from some average state, either above or below the average value. [Even without human-induced climate change, one year (or decade) can be cooler and wetter while the next year (or decade) can be drastically different and warmer and drier.]

**Climate Change** – different patterns of energy transfer on earth that create weather patterns that are inconsistent with the recent historical record. [An 80 degree December day then trees blooming in March followed by two feet of snow in April which quickly melts and creates flooding.]

**Climate Change Mitigation** – Efforts to reduce or prevent emission of greenhouse gases. Mitigation includes using new technologies and renewable energies, making older equipment more energy efficient, and changing management practices or consumer behavior. It can be as complex as a plan for a new city, or as a simple as improvements to a cook stove design. Efforts underway around the world range from high-tech subway systems to bicycling paths and walkways. Protecting natural carbon sinks like forests, wetlands and oceans, and creating new sinks through silviculture or green agriculture are also elements of mitigation. [Actions big and small help reduce the amount of fossil fuels used and slow climate change.]

**Adaptation** – Initiatives to reduce the vulnerability of natural and human systems against actual or expected climate change effects. [It’s getting hot in here, so take off a layer of clothes and prepare your community for new climate patterns. While you’re at it, try not burning up all of your brother’s fossil fuels.]

**Coastal Hazards** – a variety of natural hazards, including coastal storms, flooding, coastal erosion, lake level changes and other weather-related events along areas of land that are close to the Great Lakes and threaten lives, property, the natural environment, and, ultimately, economies. [a.) The risks you take to enjoy the view. b.) Why we have insurance.]

**Greenhouse Gases** – chemical compounds found in the Earth’s atmosphere that allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth’s surface, some of it is reflected back towards space as infrared radiation (heat). Greenhouse gases (GHG) absorb the infrared radiation and trap the heat in the atmosphere, collecting energy sent from the sun instead of allowing the energy to be radiated back into space. Human produced GHG include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases. Water vapor is a natural GHG. [Invisible gases that trap heat in the atmosphere, including stuff coming out of coal plants, cars and cows, and coming from industrial processes like making aluminum, nylon and man-made fertilizers.]

**Natural Climate Change/Variability** – different patterns of energy transfer on earth related to variations in nature, including volcanic eruptions and gradual changes in the Earth’s rotation and orbit around the Sun. For at least the last 1 million years, these changes occurred in the 100,000-year cycles that produced the ice ages and the shorter warmer periods between them. [A long-term change in weather patterns beyond our control.]

**Human-induced Climate Change/Variability** – different patterns of energy transfer on earth caused by human activities—burning fossil fuels and deforesting large areas of land, for instance. [A long-term change in weather patterns caused by us. (a.k.a. Mom, sissy spilled all my greenhouse gas and now I can’t get my lake to freeze.)]

**Resiliency** – the ability to recover/adjust easily to change. [Finding strength through flexibility.]

**Resiliency to Coastal Hazards** – the ability to recover/adjust to the increasing frequency of coastal hazards in our world. [Making stuff along the coast, and the people who live there, more durable through flexibility.]
The chemistry of ocean water is changed by absorption of carbon dioxide from the atmosphere. Increasing carbon dioxide levels in the atmosphere is causing ocean water to become more acidic, threatening the survival of shell-building marine species and the entire food web of which they are a part.

(Source: Climate Literacy Principles 7d.)
Exploring, understanding and communicating about the Lake Erie ecosystem are interdisciplinary efforts. They require close collaboration among professionals in science, technology, engineering and math, as well as public outreach and education. (Source: Lake Erie Literacy Principles - Concept 7f.)

A prominent physical feature of North America is the five Great Lakes—Superior, Huron, Michigan, Erie and Ontario—which are part of the system containing 95 percent of North America’s fresh surface water and 20 percent of the world’s fresh surface water.

While smallest by volume at 127.7 trillion gallons (2.1 percent of all water in the Great Lakes), Lake Erie is the shallowest, warmest and most biologically productive of the Great Lakes. Lake Erie is an internationally shared resource forming part of the political boundary between the United States and Canada. The lake provides drinking water to 11 million people. One-third of the Great Lakes Watershed population lives in the Lake Erie Watershed.

In Ohio, Lake Erie and its watershed have highly diverse ecosystems supporting thousands of species of fish, wildlife and plants, including many rare and endangered species. Approximately 2.53 million Ohioans live in the state’s coastal counties; 3 million Ohioans tap Lake Erie as their source of daily drinking water; and more than $10 billion is spent annually by visitors to the coastal region.

Ohio’s Lake Erie shore and watershed include the most southerly reaches of the Great Lakes ecosystem. The watershed has large and small businesses and industries, world-class institutions of higher-education, welcoming residential communities, prime farmland, scenic rivers, lush forests, natural wetlands, recreational beaches, sand dunes, thriving estuaries and countless other resources.

Lake Erie’s Western Basin and the watershed areas that feed it are arguably one of the most important regions of the Great Lakes. Consisting of 8,136 square miles, Maumee River Watershed is one of the larger watersheds in the Great Lakes system. This land area once consisted almost entirely of the Great Black Swamp but starting in the 1850s was tiled and drained. Now more than 16,000 miles of drainage ditches crisscross the surface of the land which is predominantly used for agricultural purposes.

Even though 90 percent of Ohio’s coastal wetlands are gone, coastal areas in the Western Basin have some of the last remaining stretches of coastal wetlands. The wetlands provide important spawning areas for fish, migratory and nesting areas for birds, and tourist stops for people.

Issues facing Lake Erie’s Western Basin include excess nutrients in the water caused by runoff from agriculture fields along with untreated sewage released into the system during storm events. The nutrients can lead to harmful algal blooms.
Jeffery Adkins

Jeffery Adkins is an economist with the NOAA Coastal Services Center in Charleston, S.C., who promotes the use of economics by state and local government and other managers of our nation’s coastal resources. Areas of interest include ocean economics, market and non-market values, and return on investment. Mr. Adkins has a MS degree in Water Resources Administration (Southern Illinois University) and a BBA in economics (Marshall University). Jeff is the lead economist for NOAA’s Economics: National Ocean Watch (ENOW) data that provide time-series data for six economic sectors that depend on the oceans and Great Lakes. (csc.noaa.gov/enow.action)

Tashya Allen

Tashya Allen is a coastal hazards specialist working for The Baldwin Group at the National Oceanic and Atmospheric Administration’s Coastal Services Center, headquartered in Charleston, S.C. The center supports state and local coastal resource managers throughout the United States. Tashya’s background is in community-based risk and vulnerability assessments. She also specializes in the development of decision support tools for hazards management and community resilience planning.

Jeffrey A. Andresen, Ph.D.

Jeffrey A. Andresen, Ph.D., is associate professor and the state climatologist for Michigan with Michigan State University’s Department of Geography. He is co-director of the Pileus Project, focusing on weather and climate’s influence on regional tart cherry production and grain quality. A native of the Quad Cities area of Iowa/Illinois, he obtained a bachelor’s degree from Northern Illinois University in the field of meteorology, and M.S. and Ph.D. degrees from Purdue University in the field of agricultural meteorology and climatology. He currently serves as director of the Michigan Climatological Resources Program and associated extension/outreach activities, including administration of the Michigan Automated Weather Network (MAWN), a network of automated weather stations that provides quality, detailed online weather data to the state’s agricultural industry.

Lori Cary-Kothera

Lori Cary-Kothera is a physical scientist at the National Oceanic and Atmospheric Administration’s Coastal Services Center. She works on a variety of projects helping local coastal resource agencies better utilize technologies including GIS and social media. Recently she has been leading much of the center’s Digital Coast project – an effort to provide data, tools and training for coastal managers. She has a BS in biology and environmental science from Bowling Green State University and a MS in Biological Oceanography from Florida Institute of Technology.

Gene R. Clark, P.E.

Gene R. Clark, P.E. has more than 31 years of coastal engineering design experience, including the last eight years at the University of Wisconsin’s Sea Grant Institute as the coastal engineering specialist and the University’s Lake Superior field office outreach manager. In these roles Gene provides Great Lakes communities, state and local agencies and shoreline property owners education and guidance on shoreline development BMPs, erosion process and control, and port/harbor/marina technical engineering assistance (infrastructure & dredging). Mr. Clark is the state co-chair of the Great Lakes Dredging Team (GLDT) and is the GLDT Beneficial Use of Dredged Material committee chairman. Mr. Clark serves on the Duluth/Superior harbor technical advisory committee as the dredging committee chairman and works with the USACE on harbor dredging, beneficial re-use issues, and the accelerated freshwater corrosion problem in the harbor. Gene is a licensed engineer in Wisconsin and Minnesota. He holds bachelor’s and master’s degrees in ocean, coastal and civil engineering from Texas A & M University, the University of Florida, and the University of Wisconsin.

Nancy Cofer-Shabica

Nancy Cofer-Shabica is a physical scientist at at the National Oceanic and Atmospheric Administration’s Coastal Services Center focusing on coastal conservation and resilience planning applications and training. She leads projects to help diverse partners apply science and geospatial information for management and decision making. Nancy holds graduate degrees in marine geology (M.S.) and marine affairs (M.M.A.).
James Cole

James Cole works for The Nature Conservancy (TNC) as their Lake Erie Coastal Program Director. More than 13 years ago and on a quest for a more fulfilling profession, James left a successful career as an electrical engineer to pursue a calling in natural resources and conservation. His current work with TNC encompasses both conservation science and practice in the western Lake Erie watershed. He is responsible for developing projects and partnerships to advance TNC’s restoration goals within the coastal landscape, particularly those benefiting the globally-significant migratory bird populations that stopover in the region. Presently, James is managing several Great Lakes Restoration Initiative (GLRI) projects, which focus on invasive phragmites management and coastal wetland restoration. James’ office is located at The Conservancy’s Oak Openings Project Office, within the Kitty Todd Nature Preserve near Toledo.

Heather Elmer

Heather Elmer is Coordinator of the Ohio Coastal Training Program (CTP) at Old Woman Creek National Estuarine Research Reserve, a partnership of the National Oceanic and Atmospheric Administration and the Ohio Department of Natural Resources Division of Wildlife. Heather has over 10 years of experience as a trainer, facilitator, and researcher helping Great Lakes communities achieve sustainable water resource management. She currently leads development of science-based training and collaborative research processes to bridge science with management and policy on a wide range of issues including stormwater management and climate change.

Becky Fedak, PE

Becky Fedak, PE supports a wide range of projects at Brendle Group, including greenhouse gas inventories; energy profiles; climate and sustainability planning; water footprinting; and on-site energy, water, and waste assessments. She also has extensive experience as a water resources engineer and is well versed in water operations modeling and large scale water resources planning and design. Becky also has a comprehensive set of business skills, including project management, triple bottom line analysis, and business plan development. With an undergraduate degree in civil and environmental engineering, she continued her education with a master’s degree in business administration focusing on global, social, and sustainable enterprise. While completing her graduate work, she founded Running Water International, a social enterprise in Kenya, Africa, that addresses water resource challenges of the developing world. She continues to serve as technical director for the organization’s multi-cultural team.

Rachael Franks Taylor

Rachael Franks Taylor serves as The Nature Conservancy’s Great Lakes director of coastal conservation. She is identifying and implementing coastal conservation strategies across the region with an emphasis on the physical processes that sustain coastal systems, coastal resilience, and restoration. Before coming to work for the Michigan Chapter in 2007, Rachael worked for the Massachusetts Chapter in Boston for five years, where she was most recently responsible for developing the chapter’s first marine program. Rachael earned a bachelor’s degree from Kalamazoo College (biology, English and environmental studies) and a master of environmental management degree from Duke University’s Nicholas School of the Environment (coastal and marine science and policy). She is based in Traverse City, Mich.

Bob Freitag

Bob Freitag, CFM is director of the Institute for Hazards Mitigation Planning and Research, and affiliate faculty at the University of Washington. The institute promotes hazards mitigation principles through courses, student intern opportunities and research. He is coauthor of “Floodplain Management: a new approach for a new era” (Island Press 2009). Bob was past director of the Cascadia Region Earthquake Workgroup (CREW). Before coming to the University, he had a 25-year career with the Federal Emergency Management Agency serving as federal coordinating officer; and as a public assistance, mitigation and education officer. Prior to that he was employed by several private architectural and engineering consultant firms in Hawaii and Australia, and taught science as a Peace Corps Volunteer in the Philippines. Freitag received his master’s in Urban Planning degree from the University of Washington.
Roger Gauthier

Roger Gauthier is principal of Roger L. Gauthier Consulting. Mr. Gauthier provides professional support services for an array of water resources engineering, planning and management projects. His expertise includes expert knowledge on Great Lakes hydrology, tributary hydraulic modeling, coastal engineering and management and geospatial data analysis and management. He formerly served as program director at the Great Lakes Commission where he managed an array of Great Lakes - St. Lawrence River system-wide projects, including: atmospheric toxic research and emissions inventory development; habitat restoration planning; watershed water quality assessments; and emergency response coordination. He was the inaugural executive director of the Great Lakes Observing System, a non-profit organization involving federal and state agencies and academic institutions. He also retired from the U.S. Army Corps of Engineers as a senior hydrologist after a 30-year federal career.

Beth Gibbons

Beth Gibbons is project manager of the Great Lakes Adaptation Assessment for Cities (GLAA-C) at the Graham Institute for Sustainability at the University of Michigan. As the GLAA-C project manager, Beth is responsible for providing place-based information needed for developing and improving policy decisions and infrastructure investments related to climate adaptation in the Great Lakes Region. Beth’s work includes fostering the transfer of information on climate change and community and economic resilience from the research side at the University of Michigan to city stakeholders throughout the region. Her past positions include extensive community engagement and strategic planning work in the United States and Africa. Through work collaborating with local, regional and national level stakeholders, she has developed a keen ability to communicate effectively with diverse people community and economic development initiatives. Beth received her master’s degree in urban and regional planning from the University of Michigan.

Melissa Greene

Melissa Greene is the sustainability conservationist at the Lucas Soil & Water Conservation District. She is also the acting chair of the Toledo-Lucas County Sustainability Commission. She has six years of previous experience implementing sustainability initiatives at the university level. Melissa is currently managing the development of a regional sustainability plan for the community. She holds a bachelor’s degree in environmental policy & analysis and masters of public administration in environmental management from Bowling Green State University.

Kimberly Hall, Ph.D.

Kimberly Hall is the Great Lakes climate change ecologist for The Nature Conservancy (TNC), and is based in Lansing, Mich. Her work focuses on assessing climate change impacts, and working with TNC’s Great Lakes Project staff and partners to update conservation strategies and priorities so that our efforts are efficient, effective and promote sustainable natural systems that benefit nature and people as the climate changes. More broadly, her job involves sharing information, ideas and best practices on climate change adaptation across the Great Lakes region. Examples include the Climate Adaptation Collaboratory (led by the University of Notre Dame), contributions to the Midwest Chapter of the National Climate Assessment, and active collaboration with many partners on new tools, guidance, and case studies. Prior to joining TNC in 2008, Kim received her master’s and PhD in terrestrial ecology/conservation biology from the University of Michigan.

Katherine Kahl, Ph.D.

Katie Kahl is the Great Lakes conservation policy & practices specialist for The Nature Conservancy. She works with a multi-disciplinary team of TNC staff and partners to help develop and communicate long term conservation and policy strategies across the Great Lakes region. Katie created a series of climate adaptation case studies to translate examples of climate-adapted conservation planning and on-the-ground implementation in various Great Lakes systems. Her current work is focused on intersections between TNC’s Great Lakes Coastal, Climate and Aquatic Invasive Species strategies. Prior to joining TNC in 2011, Katie worked as the director of conservation and policy research for the Heart of the Lakes Center for Conservation Policy, representing
Melinda Koslow
Melinda Koslow is regional program manager for Climate Change Adaptation for the National Wildlife Federation (NWF). Ms. Koslow has been working at the Great Lakes Regional Center of the NWF since 2008. Her work includes developing and implementing strategies for natural resource and urban adaptation, guiding climate-smart conservation and ecological restoration practices, dealing with uncertainty and hazard mitigation, and building alliances that help safeguard wildlife in the Great Lakes region against climate change. Prior to NWF, she worked as a research scientist at the Cooperative Institute on Environmental Science (CIRES) collaboratively planning adaptive practices such as urban relocation and coastal wildlife management with the Arctic city of Barrow, Ala. Koslow holds an master’s in natural resources from the University of Michigan School of Natural Resources and Environment and a bachelor’s in environmental and atmospheric science from the University of Colorado at Boulder. She is an expert on climate change vulnerability assessment and co-author of Restoring the Great Lakes Coastal Future.

Sarah Mazze
Sarah Mazze is the community energy program manager for the Resource Innovation Group (TRIG) and a senior fellow at Willamette University. Her most recent work includes the creation of an online decision support tool to facilitate the development of community solar projects and an innovative program to boost the marketing of energy efficiency offerings by building contractors, called Energize Corvallis Green Shares. Previously, Sarah ran TRIG’s climate change education program where she developed the Climate Masters at Home and at Work outreach programs and co-wrote the Junior Climate Stewards curriculum. She works with communities nationally and internationally to replicate the programs. Sarah managed TRIG’s media program, providing training for journalists on covering climate change. Sarah has more than a decade of environmental education, outreach and program management experience. Sarah has a bachelor’s degree in psychology from Northwestern University, with studies at Oxford University. Sarah’s two masters’, in environmental studies and journalism, and her certificate in nonprofit management are from the University of Oregon.

Tim Murphy
Tim Murphy is the commissioner of environmental services for the city of Toledo. He is responsible for overseeing the Division of Environmental Services which performs duties including compliance with all air and water regulations, brownfield redevelopment, citizen complaints, emergency response, sustainability and public education and outreach. Tim holds an bachelor’s degree in environmental science and a master’s degree in public administration from the University of Toledo. He is a member of numerous professional organizations including the Water Environment Federation, Toledo – Lucas County Sustainability Commission, Toledo Metropolitan Area Council of Governments, Partners for Clean Streams and Leadership Toledo.

Patekka Pope Bannister
Patekka Pope Bannister has worked almost fifteen years protecting natural resources. She has experience in wastewater, air, hazardous materials and storm water programs. As stormwater coordinator for the city of Toledo, she develops policies and programs for the stormwater program which includes actively encouraging green infrastructure projects and complying with Phase I MS4 requirements.
Patrick Robinson

Patrick Robinson is the co-director and environmental studies specialist for the Environmental Resources Center (ERC), which is a center jointly administered by the University of Wisconsin-Madison and University of Wisconsin-Extension. ERC has more than 40 dedicated staff working on projects related to water resource management, sustainable agriculture, and integrated natural resource management. Patrick has worked on natural resource issues across the Great Lakes Region throughout his career. He is currently involved with a number of national and statewide projects and committees working on climate change related topics.

Jim Schwab

Jim Schwab is senior research associate and manager of the Hazards Planning Research Center at the American Planning Association. He also serves as co-editor of Zoning Practice. He has managed numerous major APA sponsored research projects producing training or research related to hazards and environmental planning. As adjunct professor, he also teaches a course on disaster planning for the University of Iowa School of Urban and Regional Planning. Schwab received a bachelor’s in political science from Cleveland State University, a master’s in journalism and urban and regional planning from the University of Iowa.

Bret Shaw

Bret Shaw is an environmental communication specialist for University of Wisconsin Extension and an assistant professor in the Department of Life Sciences Communication at the University of Wisconsin-Madison. He focuses on planning and evaluating social marketing campaigns dealing with natural resource management issues such as water quality, land use and environmental conservation. He has published broadly in the areas of environmental and health communication.

Jeff Stone (GISP, CFM)

Jeff Stone (GISP, CFM) joined the Association of State Floodplain Managers (ASFPM) in November 2007 as a project manager and GIS coordinator. Jeff has more than 20 years of experience developing and applying GIS and geospatial web technologies to a variety of public and private sector projects. As part of the Science Services Program at ASFPM he manages research and outreach projects that take a science-based approach towards investigating flood risk and hazard related data, analysis and software and their possible implications on policy and regulations at the local, state and national level team.

Molly Woloszyn

Molly Woloszyn is the extension climatologist for the Midwestern Regional Climate Center and Illinois-Indiana Sea Grant, which are both a part of the University of Illinois at Urbana-Champaign. As the extension climatologist for both programs, Molly is responsible for communicating climate-related information to various audiences throughout the Midwest. Molly’s educational background includes a master’s in atmospheric science from Colorado State University and a bachelor’s in meteorology from Northern Illinois University. Prior to being an extension climatologist, Molly was an earth science instructor at community colleges in Oklahoma and Illinois.

Tina Skeldon Wozniak

Lucas County Commissioner Tina Skeldon Wozniak has served county citizens since December 2002. From 2005-2008, she was unanimously elected and served as the president of the Board of Lucas County Commissioners. As commissioner, she has led the efforts to combat the serious foreclosure crisis facing Toledo and Lucas County by co-chairing the Save Our Homes Task Force. Tina has also consistently fought for alternative energy and green-jobs for Lucas County residents, leading the effort for a county Sustainability Commission.

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Jim Schwab is senior research associate and manager of the Hazards Planning Research Center at the American Planning Association. He also serves as co-editor of Zoning Practice. He has managed numerous major APA sponsored research projects producing training or research related to hazards and environmental planning. As adjunct professor, he also teaches a course on disaster planning for the University of Iowa School of Urban and Regional Planning. Schwab received a bachelor’s in political science from Cleveland State University, a master’s in journalism and urban and regional planning from the University of Iowa.

Bret Shaw

Bret Shaw is an environmental communication specialist for University of Wisconsin Extension and an assistant professor in the Department of Life Sciences Communication at the University of Wisconsin-Madison. He focuses on planning and evaluating social marketing campaigns dealing with natural resource management issues such as water quality, land use and environmental conservation. He has published broadly in the areas of environmental and health communication.

Jeff Stone (GISP, CFM)

Jeff Stone (GISP, CFM) joined the Association of State Floodplain Managers (ASFPM) in November 2007 as a project manager and GIS coordinator. Jeff has more than 20 years of experience developing and applying GIS and geospatial web technologies to a variety of public and private sector projects. As part of the Science Services Program at ASFPM he manages research and outreach projects that take a science-based approach towards investigating flood risk and hazard related data, analysis and software and their possible implications on policy and regulations at the local, state and national level team.

Molly Woloszyn

Molly Woloszyn is the extension climatologist for the Midwestern Regional Climate Center and Illinois-Indiana Sea Grant, which are both a part of the University of Illinois at Urbana-Champaign. As the extension climatologist for both programs, Molly is responsible for communicating climate-related information to various audiences throughout the Midwest. Molly’s educational background includes a master’s in atmospheric science from Colorado State University and a bachelor’s in meteorology from Northern Illinois University. Prior to being an extension climatologist, Molly was an earth science instructor at community colleges in Oklahoma and Illinois.

Tina Skeldon Wozniak

Lucas County Commissioner Tina Skeldon Wozniak has served county citizens since December 2002. From 2005-2008, she was unanimously elected and served as the president of the Board of Lucas County Commissioners. As commissioner, she has led the efforts to combat the serious foreclosure crisis facing Toledo and Lucas County by co-chairing the Save Our Homes Task Force. Tina has also consistently fought for alternative energy and green-jobs for Lucas County residents, leading the effort for a county Sustainability Commission.
Workshop Funders:

- Great Lakes Restoration Initiative
greatlakesrestoration.us
- Ohio Department of Natural Resources (ODNR)
ohiodnr.gov
- ODNR Division of Wildlife
ohiodnr.com/wildlife
- Old Woman Creek National Estuarine Research Reserve
oldwomancreek.com
- ODNR Office of Coastal Management
ohiodnr.com/coastal
- National Oceanic & Atmospheric Administration
NOAA noaa.gov
- National Oceanic & Atmospheric Administration
OCRM coastalmanagement.noaa.gov
- National Oceanic & Atmospheric Administration
NERR nerrs.noaa.gov
- University of Wisconsin Environmental Resources Center
uwex.edu/erc
- Association of State Floodplain Managers
floods.org
- Friends of Old Woman Creek
ohiodnr.com/tabid/15323/default.aspx
- Ohio State University
osu.edu
- OSU Ohio Sea Grant College Program
ohioseagrant.osu.edu
- The Nature Conservancy
nature.org/greatlakes
- Michigan Sea Grant
miseagrant.umich.edu

Workshop Collaborators:

- Lucas Soil and Water Conservation District
co.lucas.oh.us/index.aspx?nid=458
- Toledo-Lucas County Sustainability Commission
LucasCountyGreen.com
- City of Toledo
toledo.oh.gov
- University of Wisconsin Extension
uwex.edu
- NOAA Coastal Services Center
csc.noaa.gov
- American Planning Association
planning.org
- Coastal States Organization
coastalstates.org
- National Association of Counties
naco.org
- Midwest Regional Climate Center
mrcc.isws.illinois.edu
- Illinois-Indiana Sea Grant
iisgcp.org
- American Rivers
americanrivers.org
- Ohio State University Watershed Extension
ohiowatersheds.osu.edu
- National States Geographic Information Council
nsgic.org
- University of Michigan Graham Sustainability Institute
graham.umich.edu
- Great Lakes Integrated Sciences & Assessments Center
glisa.umich.edu

Workshop Contacts:

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Toledo Division of Enviro. Services 419-936-3015

Workshop Credits:

Approved for 6 Certified Floodplain Management (CFM) Core Credits
Approved for 6 APA Certification Maintenance Credits
Web Resources for Climate Change:

- **Collaboratory**
  Continue conversations and collaboration beyond today’s workshop! Visit the Collaboratory for an online forum, presentations and workshop resources focused on research, education, and collaboration in the area of adaptation and climate change. The Collaboratory is funded by the National Science Foundation and the University of Notre Dame in partnership with The Nature Conservancy’s Great Lakes Project. [Visit Collaboratory](https://adapt.nd.edu/groups/coastalcommunities)

- **Great Lakes Coastal Resilience Planning Guide**
  The GLCR Planning Guide includes resources that Great Lakes counties and municipalities can use to communicate coastal hazards and climate change issues that enhance community resilience in areas including future land use, infrastructure and natural resource plans and policies. [Learn more](greatlakesresilience.org)

- **NOAA CSC Coastal Climate Adaptation**
  NOAA’s Coastal Climate Adaptation website includes adaptation and action plans, case studies and strategies, climate change communication aides and outreach materials, science and impacts of climate change, guidebooks, example policies and legislation, risk vulnerability assessments, stakeholder engagement techniques, training and workshop materials, and coastal state-specific information. [Click here](collaborate.csc.noaa.gov/climateadaptation/default.aspx)

- **Great Lakes Adaptation Assessment for Cities**
  [graham.umich.edu/glaac](graham.umich.edu/glaac)

- **Great Lakes Integrated Sciences + Assessments Center**
  [glisa.umich.edu](glisa.umich.edu) or [glisa.msu.edu](glisa.msu.edu)

- **Midwest Regional Climate Center**
  [mrcc.isws.illinois.edu](mrcc.isws.illinois.edu)

- **Wisconsin Initiative on Climate Change Impacts**
  [wicci.wisc.edu](wicci.wisc.edu)

- **NOAA Digital Coast**
  [csc.noaa.gov/digitalcoast](csc.noaa.gov/digitalcoast)

- **Ohio State University Changing Climate**
  [changingclimate.osu.edu](changingclimate.osu.edu)

- **Great Lakes Adaptation Assessment for Cities**
  [graham.umich.edu/glaac](graham.umich.edu/glaac)

- **Great Lakes Integrated Sciences + Assessments Center**
  [glisa.umich.edu](glisa.umich.edu) or [glisa.msu.edu](glisa.msu.edu)

- **Midwest Regional Climate Center**
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- **Wisconsin Initiative on Climate Change Impacts**
  [wicci.wisc.edu](wicci.wisc.edu)

- **NOAA Digital Coast**
  [csc.noaa.gov/digitalcoast](csc.noaa.gov/digitalcoast)

- **Ohio Lake Erie Commission**
  [lakeerie.ohio.gov](lakeerie.ohio.gov)

- **See also list of workshop funders and collaborators on page 14**

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Climate change will have consequences for the Earth system and human lives. (Source: Climate Literacy Principle 7)

**What are you doing today to make tomorrow a better place?**