Moving the report card forward

Completing a report card for the entire Mississippi River basin will rely on the participation of many groups, individuals, and agencies. Following the September 2012 Summit in St. Louis, America’s Watershed Initiative formed a work group which meets regularly to lead the report card process. The group is coordinating workshops in each sub-basin of the watershed with experts in environmental, social, and economic evaluation to help gather input on issues, indicators, and measures relevant to sub-basins. Following the completion of these workshops, we will integrate the sub-basin measures into the overall Mississippi River Basin Report Card.

We plan to present a draft report card for the entire Mississippi watershed at the America’s Watershed Initiative Summit in 2014 and provide opportunity for summit participants to provide feedback.

Report cards allow us to distill key messages from large amounts of information in a tiered approach. These key messages are important for communicating priority management needs to decision and policy makers. Our vision for the report card framework is based on tracking status and progress towards achieving goals identified in America’s Watershed Initiative. The framework incorporates information from social, economic, and environmental sectors, and is intended to be transparent and clear. The primary purpose of the report card is to identify status and trends that need to be addressed, and to celebrate successes.

This framework enables the communication of results to broad audiences and provides a scientific foundation for the report card results. Users should be able to clearly understand the content and proposed uses of the report card, and be able to access information that was used to derive the results. This access provides the transparency necessary for understanding and acceptance.

The reporting framework is set up like tiers in a cake. The foundation is based on the supporting material for the report card, with the report card itself at the top.

For more background information about America’s Watershed Report Card and updates on our workshops to develop the report card in each of the sub basins, please visit http://americaswatershed.org and select the report card tab.

For more information, visit www.americaswatershed.org or call (608) 445-8543.

Report Card Work Group
Rainy Shorey (Caterpillar, Inc.), Roger Wolf (Iowa Soybean Association), Heath Kelsey (University of Maryland Center for Environmental Science), Jonathan Higgins (The Nature Conservancy), and Angela Freyermuth (U.S. Army Corps of Engineers).

Science communication, design, and layout by the Integration & Application Network, University of Maryland Center for Environmental Science. June 2013.

Photo credits
Front cover: Tim Caruthers, Jane Hawkey, Joanna Woerner
Back cover: Jay Harold/TNC

Workshop participants provide knowledge of the system as well as feedback on the generation of the report card.

A vision for America's Watershed Report Card

For more information, visit www.americaswatershed.org and select the report card tab.
America’s Watershed Initiative

America’s Watershed Initiative is working to bring a collaborative, basin-wide perspective to the Mississippi River Watershed’s greatest management challenges while also supporting the many initiatives and work at multiple scales. This effort is designed to support federal and state authorities, communities, and businesses by working to make their efforts more integrated and effective, and seeks to leverage creativity that emanates from diversity rather than being hampered by opposing viewpoints. We seek to build and implement a vision based on collaboration and mutually beneficial outcomes in contrast to single-purpose advocacy. We will help to find solutions to issues that span multiple regions—issues such as transportation, water quality, energy, and more comprehensive flood management—while respecting vital work at smaller scales.

We will develop a vibrant network that can:

- Maintain supply of abundant, clean water.
- Provide reliable flood risk reduction.
- Support local, state, and national economies.
- Support and enhance healthy and productive ecosystems.
- Provide world-class recreational opportunities.
- Serve as the nation’s most valuable river transportation corridor.

The America’s Watershed Initiative Report Card

This example report card is intended to present one vision of a possible framework and communications tool. We enthusiastically seek feedback on how to improve the framework and values associated with the larger goals of America’s Watershed Initiative. The general process for establishing the report card may follow the process outlined below.

1. Create a conceptual framework
   - Create a framework defining goals and major aspects of each goal that should be evaluated over time.

2. Choose indicators
   - Select indicators that convey meaningful information and can be reliably measured.

3. Define thresholds
   - Define status categories, reporting regions, and method of measuring threshold attainment.

4. Communicate results
   - Communicate results using visual elements, such as photos, maps, and conceptual diagrams.

5. Calculate scores
   - Calculate indicator scores and combine into index grades.

NOTE: The content of this table is meant to be illustrative, not an accurate or final product.

Potential Results

<table>
<thead>
<tr>
<th>Maintain supply of abundant, clean water</th>
<th>Provide reliable flood risk reduction</th>
<th>Support local, state, and national economies</th>
<th>Support and enhance healthy and productive ecosystems</th>
<th>Provide world-class recreational opportunities</th>
<th>Serve as the nation’s most valuable river transportation corridor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Very good</td>
<td>Improving</td>
<td>Stable</td>
<td>Improving</td>
<td>Stable</td>
<td>Stable</td>
</tr>
</tbody>
</table>

A tool to communicate current status

The report card score is intended to communicate current status, which is a result of effects from human activities as well as from factors that are mostly uncontrollable. Management activities may alter effects that human activities have on status, but factors such as variable weather and global economic changes are difficult to influence.

An alternate way to communicate status and trends is from the perspective of economic, social, and environmental sectors. We expect that each goal will have indicators and metrics that reflect on more than one sector. For instance, indicators for the goal “Maintain supply of abundant clean water” may include water security and water quality, which have implications for each of the society, economic, and environment sectors.
America’s Watershed Initiative is a collaboration of organizations, businesses, and agencies which will bring a basin-wide perspective to the Mississippi River Basin’s greatest challenges. Developing a comprehensive watershed report card is an important component of the Initiative. It will summarize and communicate the status and trends in achieving objectives for six broad management goals. The report card results will encourage people and organizations to engage in issues affecting the watershed.

The America’s Watershed Initiative concluded the series of workshops in the five basins with a meeting in Arlington, Virginia to discuss the integration of basin results into the overall watershed results. The meeting also addressed issues that are applicable at the scale of the entire watershed, but that were not evident from the basin workshops. This meeting built on the results of the workshops held in each of the 5 basins in the watershed over the previous year. During these workshops, stakeholders chose indicators to measure the status of achieving each of the six America’s Watershed Initiative goals.

The Mississippi River watershed includes five basins, which will each have their own indicators, scores, and report card results. Workshops were held in each of the five basins, during which experts provided input on goals, values, desired conditions, and indicators of watershed health in each of the basins.

Watershed-level issues relate to the immense area covered and to the river’s role linking areas across the continent and from the sea to the continental interior. Concerns include the contribution of agricultural practices on the Gulf of Mexico hypoxic zone and the consequence of climate change on the reliability of transportation and flood control. The conservation of migratory waterfowl involves the entire watershed, which includes summer nesting habitat in the north and wintering habitat in the south. Participants cited the need for better coordination among regional programs directed at ecosystem restoration and economic development across the watershed.

The Mississippi River watershed provides critical habitat for migratory waterfowl.

Mississippi River Basin Report card workshop

America’s Watershed Initiative is a collaboration of organizations, businesses, and agencies which will bring a basin-wide perspective to the Mississippi River Basin’s greatest challenges. Developing a comprehensive watershed report card is an important component of the Initiative. It will summarize and communicate the status and trends in achieving objectives for six broad management goals. The report card results will encourage people and organizations to engage in issues affecting the watershed.

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The Mississippi River watershed provides critical habitat for migratory waterfowl.
The report card process and timeline

Developing the AWI report card relies on diverse stakeholders with expertise related to six America’s Watershed Initiative goals. This collaboration is intended to create a data-driven and transparent report card that is relevant to the issues and concerns most important to each region. The report card will account for the unique differences throughout the watershed by performing assessments in five basins, and integrating the results to create the overall report card results as well as seeking information at the watershed scale. Workshop participants provide expert knowledge on the features, values, issues, and threats that are most important and then used these issues to identify indicators that measure status of the six America’s Watershed Initiative goals. Over 250 participants representing non-profit, private, academic, and local, state, and federal government organizations from 23 states in the Mississippi River watershed joined us in a series of 10 workshops and meetings. The workshop process has created dialog between a diverse set of organizations that each have a stake in creating a shared approach for management in the Mississippi River. The draft report card will be presented for feedback at the AWI Summit October 2014 and the final report card released spring 2015.

America’s Watershed Initiative goals

- Maintain supply of abundant clean water
- Support and enhance healthy and productive ecosystems
- Provide reliable flood control and risk reduction
- Provide world-class recreation opportunities
- Support local, state and national economies
- Serve as the nation’s most valuable river transportation corridor

Workshop participants:
Steve Mathies (AECOM)
Harald (Jordy) Jordahl (America’s Watershed Initiative)
Teri Goodmann (City of Dubuque)
Alexis Segal (Council on Environmental Quality)
Stephen Dawson (Dawson & Associates, Inc.)
Kellis Moss, Dan Wrinn (Ducks Unlimited)
Nancy DeLong (DuPont Pioneer)
Pamela Hunter (Engineering News-Record)
Eileen McLellan (Environmental Defense Fund)
Dan Mecklenborg (Ingram Barge Company)
Larry Weber (Iowa Flood Center, University of Iowa)
J. Gordon Arbuckle (Iowa State University)
Sharon Bucinco (Natural Resources Defense Council)
John Doyle (Jones Walker)
Charles Somerville (Marshall University)
Stephen Gambrell (Mississippi River Commission)
Amy Larson (National Waterways Conference)
Bramble Klipple, Sarah Murdock, Michael Reuter,

Science communication and facilitation:
C. Wicks, B. Walsh, H. Kelsey, W. Nuttle, W. Dennison, J. Thomas, S. Spitzen (University of Maryland Center for Environmental Science)
A. Freyermuth (US Army Corps of Engineers)
The report card process

Generating a report card requires participation from managers, scientists, researchers, subject experts, and other stakeholders knowledgeable about resources and available data. The process requires broad representation across sectors and geographic areas throughout each sub-basin. These experts provide input on goals, values, desired conditions, and indicators of watershed health in each of the sub-basins. The workshop process brings different groups together to create a product and promotes broad perspectives, dialogue, and collaboration among different sectors and participants.

Information and feedback from other sources unable to attend the workshops will be sought to strengthen the report card. The Mississippi River watershed includes parts of 31 states and two Canadian provinces. The watershed includes six sub-basins, which will each have their own indicators, scores, and report card results. Stakeholders from all sectors will participate in workshops in each sub-basin. A report card for the whole watershed will be developed using the information from all of the sub-basins.

Report card workshop
Upper Mississippi River Sub-Basin

The America’s Watershed Initiative Report Card project began with a regional workshop for the Upper Mississippi River Sub-Basin, held in Moline, Illinois on September 11–12, 2013. At the workshop, stakeholders and experts from social, economic, and environmental sectors identified easily understood and transparent ways to measure status and trends for the Upper Mississippi River Sub-Basin in relation to six broad goals. Similar workshops will be convened in each of the five remaining sub-basins and results will be integrated into a report card for the entire Mississippi River Basin.

The map (top) shows the Upper Mississippi River Sub-Basin land use types. It is dominated by agricultural row crops and has several large urban centers. However, there are sections of the river that still remain unaltered (photo). Image courtesy of USACE.
The Upper Mississippi River Sub-Basin is a large and diverse watershed, supporting a variety of uses and natural resources. These include a population of about 30 million people, with nearly 80% of this in urban areas such as Minneapolis–St. Paul, MN; St. Louis, MO; and Chicago, IL, over 100 million tons of commodities transported annually on the 1,200 navigable miles of the Upper Mississippi and Illinois River systems, where navigation is supported by a series of locks and dams (Mississippi River system locks, figure at right); over 60% of basin land engaged in agriculture (cropland or pasture); a variety of industries relying both directly and indirectly on water supplies; drinking water supplied for millions of residents; wildlife habitats, fisheries, and flyways; and a recreation hub drawing millions of visitors per year.

Maintaining the viability and vitality of the basin will mean addressing difficult current and future challenges including aging infrastructure in the navigation, water supply, and wastewater sectors; increasing variability in weather patterns and water flows; continuing demands on water supplies from growing populations; impacts to water quality from non-point sources of pollution; invading exotic species; preserving ecosystem functions and recreation opportunities; minimizing flood damages; and maintaining economic competitiveness.

A dynamic, working landscape

How to measure status

America’s Watershed Report Card is designed to report on the status of achieving six broad goals developed at the America’s Watershed Summit in September 2012. The goals were developed to reflect the things that people value in the watershed. In multiple venues and contexts, including the 2012 Summit, stakeholders were asked to identify things of specific value within each of the goal areas. These values could then guide the appropriate measures needed to design an assessment and reporting framework. These value statements were summarized for each goal. Potential indicators were determined at the Upper Mississippi River Sub-Basin workshop. The final list of indicators will be determined by several factors, including data availability and how well they represent the goals.

Goals, values, and potential indicators for the Upper Mississippi River Sub-Basin

People value clean surface and ground water for multiple uses, including human consumption, agricultural and industrial water supplies, recreation, and ecosystem health.

Potential indicators
• Environmental flow needs met
• Water scarcity index
• Drinking water standards met
• Percent river miles attaining designated uses

People value protection of life and property through well-maintained flood protection and risk management infrastructure and the thoughtful integration of natural features that historically tempered flood risk.

Potential indicators
• Percent miles of levee inspected and certified
• Number, intensity of flood events
• Number of people living in mapped hazard areas
• Number of flood disasters declared
• Critical infrastructure at risk

People value high agricultural, industrial, and energy productivity.

Potential indicators
• Employment by sector
• Unemployment rates
• Income
• Productivity by sector

People value safe, secure, well-maintained, and future-oriented inland navigational infrastructure that is integrated with rail and highway transport to support cost-effective movement of goods and materials.

Potential indicators
• Condition rating
• Stoppages
• Wait times at locks
• Tonnage/capacity

This list of potential indicators is not intended to be comprehensive, but provide examples from what was generated at the workshop.
The report card process and timeline

Generating a report card requires participation from managers, scientists, researchers, subject experts, and other stakeholders knowledgeable about resources and available data. The process requires broad representation across sectors and geographic areas throughout each basin. These experts provide input on goals, values, desired conditions, and indicators of watershed health in each of the basins. The workshop process brings different groups together to create a product and promotes broad perspectives, dialogue, and collaboration among different sectors and participants. Information and feedback from other sources provided by individuals unable to attend the workshops will be sought to strengthen the report card. The Mississippi River watershed includes 31 states and two Canadian provinces. The watershed includes six major sub-basins, and each have their own indicators, scores, and report card results. Stakeholders from all sectors will participate in workshops in each basin. A report card for the whole watershed will be developed using the information gathered from the six basins.

Workshop participants:

<table>
<thead>
<tr>
<th>Workshop Location</th>
<th>Workshop Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Mississippi workshop in Moline, IL</td>
<td>2012</td>
</tr>
<tr>
<td>Lower Mississippi workshop in Memphis, TN</td>
<td>2013</td>
</tr>
<tr>
<td>Missouri workshop</td>
<td>2014</td>
</tr>
</tbody>
</table>

The America’s Watershed Initiative Report Card project continued with a regional workshop for the Lower Mississippi River Basin, held in Memphis, Tennessee, March 25–26, 2014. At the workshop, stakeholders and experts from social, economic, and environmental sectors worked to identify easily understood ways to measure status and trends for the Lower Mississippi River Basin in relation to six broad goals. Similar workshops have or will be held in each of the river basins and the results will be integrated into a report card for the entire Mississippi River Basin.

Report card workshop

Lower Mississippi River Basin

America’s Watershed Initiative is a collaboration of organizations, businesses, and agencies which will bring a basin-wide perspective to the Mississippi River Basin’s greatest challenges. Developing a comprehensive watershed report card is an important component of the Initiative. It will summarize and communicate the status and trends in achieving objectives for six broad management goals. The report card results will encourage people and organizations to engage in issues affecting the watershed.

Participants at the regional workshop discuss Lower Mississippi River Basin health related to the six goals. Image courtesy of A. Freyermuth.

Catfish are a primary species targeted for recreational fishing in the Lower Mississippi River basin. Image courtesy of Mike Wintroath.

A flock of ducks lands in a rice field. Image courtesy of Ducks Unlimited.

For more information: Harald (Jordy) Jordahl, Director America's Watershed Initiative hjordahl@tnc.org americaswatershed.org

The Nature Conservancy

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The Nature Conservancy

The Nature Conservancy

A flock of ducks lands in a rice field. Image courtesy of Ducks Unlimited.

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The Lower Mississippi River Basin supports a diversity of uses, dependent upon both natural and human engineered systems. For example, the river is used extensively for transportation, which is made possible by a natural supply of abundant water from upstream sources, as well as through an engineered system of channel maintenance. Similarly, there are abundant natural areas which provide recreational opportunities like paddling, birding, fishing, and hunting. Innovative channel structure design such as notched dikes provide recreational opportunities off the navigation channel, as well as increase diversity of habitats available to river-dependent species. These diverse uses and systems are supported through the Mississippi Rivers and Tributaries Project (MR&T), authorized through the Flood Control Act of 1928. The features of the MR&T Project work together to provide a safe and dependable commercial navigation channel on the Mississippi River, while protecting adjacent towns, farms, industry, manufacturers, energy providers, public and private investments, ports and transportation systems from ‘uncontrolled’ flooding. This increases reliability and productivity and protects the nation’s high value investments. Google “MR&T project” to learn more.

Potential indicators for the Lower Mississippi River Basin

America’s Watershed Report Card is designed to report on the status of achieving six broad goals developed at the 2012 America’s Watershed Summit. These goals reflect things people value in the watershed, are supported by both natural and human systems, and are interconnected. People living and working in the 31 states that make up the Mississippi River watershed are connected in many different ways. Regional workshops conducted by the America’s Watershed Initiative are exploring connections between six broad goals that people share for the river and its watershed. This figure represents some of the connections revealed at the workshops. These will be used to develop a basin-wide report card for the watershed.

Ecosystem services

- Water supply
  - Maintain supply of abundant, clean water
  - Designated use/303(d) list
  - Aquifer depletion
  - # days drinking water advisories

- Water security
  - Reduce losses
  - Storage
  - Flood
  - Risk reduction
  - # people at risk
  - Miles of levee inspected/certified
  - River discharge capacity

- Hydrologic connectivity
  - Habitat
  - Maintain baseflow
  - Habitat connectivity
  - Altered water levels

- Energy services
  - Employment by sector
  - Total tonnage transported
  - Per capita income by sector

- Infrastructure services
  - Provide reliable flood control and risk reduction
  - Serve as the nation’s most valuable river transportation corridor
  - Draft restrictions
  - Unscheduled stoppages
  - Dredging low-use inland ports

- Recreation
  - Provide world-class recreational opportunities
  - Hunting/fishing
  - Non-consumptive recreation
  - Festivals/events/races

- Ecosystem services
  - Support and enhance healthy and productive ecosystems
  - Plants and animals
    - Benthic trawl fish
    - Rare/threatened/ endangered species
  - Water
    - Phosphorus & nitrogen
    - Gulf hypoxia
    - Flow regime
  - Habitat
    - Bottomland hardwood & marshes
    - Side channel connections

- Economics
  - Support local, state, and national economies
    - Per capita income by sector
    - Total tonnage transported
    - Employment by sector

A conceptual diagram illustrates the main threats and key features of the Lower Mississippi River Basin.
The report card process and timeline

Generating a report card requires participation from managers, scientists, researchers, subject experts, and other stakeholders knowledgeable about resources and available data. The process requires broad representation across sectors and geographic areas throughout each basin. These experts provide input on goals, values, desired conditions, and indicators of watershed health in each of the basins. The workshop process brings different groups together to create a product and promotes broad perspectives, dialogue, and collaboration among different sectors and participants. Information and feedback from other sources unable to attend the workshops will be sought to strengthen the report card. The Mississippi River watershed includes parts of 31 states and two Canadian provinces. The watershed includes six basins, which will each have their own indicators, scores, and report card results. Stakeholders from all sectors will participate in workshops in each basin. A report card for the whole watershed will be developed using the information from all of the basins.

Workshop participants:
Harry Stone (Battelle)
Suzanne Hoxmeier (Hydrosav, Inc.)
Jay Ruble (Cruise Corporation)
David Bailey (Electric Power Research Institute)
Bresiter Roses (Siven Umbrella)
Deborah Lange (Headwaters Resource Committee at Carnegie Melon)
Patrick Brennan, Dan Medisemborg (Ingram Barge Marine Group)
Stephen Now (KY Association of Mitigation Managers)
Steve Mathias (Lower Mississippi River)
Stephen Gambrell (Mississippi River Commission)
Missam Kermani (Northern Kentucky University)
Mark Bevelhimer (Oak Ridge National Lab)
Tom Lopez, Greg Nagyco (Ohio DNR)
Mary Hettie, Mary Kosinger, Fred Nyhus, Chuck Somerville (Ohio River Basin Association)
Tiao Chang (Ohio River Basin Consortium for Research and Education)
Richard Cogen (Ohio River Foundation)
Jem Schulte, Peter Tremont, Jeff Thomas (ORSANCO)
Scott Peayian, Alan Vosly (Science Consulting)

Michael Reuter, Diane Rudin, Robert Sinkler, John Stark (The Nature Conservancy)
Chris Lowery (Thomas More College)
Pandy English, Bill Reeves (Tennessee Wildlife Resources Agency)
Mike Miller (University of Cincinnati)
Dru Burtin (Upper Mississippi River Basin Association)
Brian Astifan, Brandon Brummett, Erich Emery, Kevin Grode (US Army Corps of Engineers)
Jack Kuhn (USDA Natural Resources Conservation Service)
Joseph Fombetcher, Sally Gutierrez, Jim Lazorchak (US EPA)
Richard Bartz, Mike Grimm (USGS)
John King (US Dept of Environmental Protection)

Science communication and facilitation:
C. Wicks, B. Walsh, H. Kelsey, W. Rattle, W. Dennison, J. Thomas (University of Maryland Center for Environmental Science)
A. Freyermuth (US Army Corps of Engineers)

Workshop participants of the regional workshop:
Angela Freyermuth
For more information:
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America’s Watershed Initiative
hjordahl@tnc.org
americaswatershed.org

Report card workshop
Ohio River Basin

America’s Watershed Initiative is a collaboration of organizations, businesses, and agencies which will bring a basin-wide perspective to the Mississippi River Basin’s greatest challenges. Developing a comprehensive watershed report card is an important component of the Initiative. It will summarize and communicate the status and trends in achieving objectives for six broad management goals. The report card results will encourage people and organizations to engage in issues affecting the watershed.

The map (top) shows the Ohio River Basin land use types. It is dominated by developed, forested and cropland areas. A barge full of coal piles slowly passes Cincinnati, Ohio on its way upriver. Image courtesy of B. Walsh.
The Ohio River Basin is the 200,000 square-mile eastern drainage of the Mississippi River watershed, covering an area from southwestern New York to northern Alabama, including parts of 14 states. The basin is dominated by forests, row crop agriculture, pastureland for livestock, and urban development. Due to its vast resources of coal and water, it is home to 29 million people and produces roughly 20% of the electricity in the United States. At the heart of the basin lies the Ohio River, a 981-mile resource that is one of the major industrialized rivers of the world. With the help of navigation dams, the Ohio hosts the largest inland port in the nation and moves more than 230 million tons of cargo per year. The river provides 230 million tons of cargo per year. The river also serves as the source of drinking water for more than 5 million residents.

Survey results from the Ohio River Basin workshop are summarized from a) topical experts and b) the non-experts participating in the workshop. The percent rank was calculated from the rank ordering of each potential indicator following expert group breakouts and communication to the overall workshop.

Potential indicators for the Ohio River Basin

American’s Watershed Report Card is designed to report on the status of achieving six broad goals developed at the America’s Watershed Summit in September 2012. The goals were developed to reflect the things that people value in the watershed. Potential indicators for each goal were determined at the Ohio River Basin workshop. The final list of indicators will be determined by several factors, including data availability and how well they represent the goals.

This list of potential indicators is not intended to be comprehensive, but provide examples from what was generated at the workshop.

**Ecosystems**
- Benthic Index of Biotic Integrity
- Fish Index of Biotic Integrity
- Water quality
  - Phosphorus
  - Nitrogen
  - 303D listing

**Recreation**
- Participation levels
- Access points
- Outdoor education

**Transportation**
- Stoppages: scheduled/unscheduled
- Condition rating
- Maintenance backlog

**Economy**
- Total jobs
- Business startups/licenses
- Total GDP
- Energy cost to consumer
- Energy security

**Flood risk**
- Mapping accuracy
- People at risk—uncontrolled reaches
- Structures at risk—uninsured

**Flood control and risk reduction**
- Levees safety rating
- Hazard mitigation plans
- Dam safety
- Flood protection in place

**Water supply**
- Water availability/demand/sustainability
- Designated uses met
- Cost of water

**Water quality**
- Benthic Index of Biotic Integrity
- Fish Index of Biotic Integrity

**Biodiversity**
- Invasive species
- Endangered species

**Habitat**
- Impervious surface
- Floodplain development

**Water supply**
- Cost of water
- Water availability/demand/sustainability
- Designated uses met

Flow capacity for the Mississippi River in thousands of cubic feet per second, based on the 1956 project design flood. Graphic courtesy US Army Corps of Engineers.

A conceptual diagram illustrates the main threats and key features of the Ohio River Basin.
The Ohio River Basin is the 200,000 square-mile eastern drainage of the Mississippi River watershed, covering an area from southwestern New York to northern Alabama, including parts of 14 states. The basin is dominated by forests, row crop agriculture, pastureland for livestock, and urban development. Due to its vast resources of coal and water, it is home to 29 million people and produces roughly 20% of the electricity in the United States. At the heart of the basin lies the Ohio River, a 981-mile resource that is one of the major industrialized rivers of the world. With the help of navigation dams, the Ohio hosts the largest inland port in the nation and moves more than 230 million tons of cargo per year. The river provides opportunities for industrial development, power production, commercial navigation, and widespread recreation. The river also serves as the source of drinking water for more than 5 million residents.

Industrialization and urbanization came at the expense of the river itself, as with most of the great rivers throughout the nation and world. Today, however, due to a conscious effort by state and federal agencies, nonprofit organizations, private businesses, and municipalities, the Ohio River combines economic and development opportunities with recreational and ecosystem goals.
The report card process and timeline

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Workshop participants:
- Marty Herlic (American Electric Power)
- Harry Stone (Ballard)
- Suzanne Hoehne (Biohabitats, Inc.)
- Jay Ruble (C-Hour Corporation)
- David Bailey (Electric Power Research Institute)
- Breeden Rhoads (Green Umbrella)
- Deborah Lane (Headwaters Resource Committee at Carnegie Mellon)
- Patrick Brennan, Dan Mckeebrough (Ingram Barne Marine Group)
- Stephen Nave (KY Association of Mitigation Managers)
- Steve Mathes (Lower Mississippi River)
- Stephen Gambrell (Mississippi River Commission)
- Miriam Keanan (Northern Kentucky University)
- Mark Bewermer (Oak Ridge National Lab)
- Ted Lister, Greg Nageotte (Ohio DNR)
- Mark Reinger, Fred Nyhus, Chuck Summers (Ohio River Basin Association)
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The America’s Watershed Initiative Report Card project continued with a regional workshop for the Arkansas River and Red River Basins, held in Tulsa, Oklahoma on May 14–15, 2014. At the workshop, stakeholders and experts from social, economic, and environmental sectors identified easily understood and transparent ways to measure status and trends for the Arkansas River and Red River Basins in relation to six broad goals. Similar workshops will be convened in each of the remaining basins and results will be integrated into a report card for the entire Mississippi River Basin.

The map (top) shows land use in the Arkansas and Red River Basins. The graph (bottom) shows the gradient of average annual precipitation (in inches) across the basins from west to east.

Report card workshop
Arkansas River & Red River Basins

The America’s Watershed Initiative Report Card process continues with a regional workshop for the Arkansas River and Red River Basins, held in Tulsa, Oklahoma on May 14–15, 2014. At the workshop, stakeholders and experts from social, economic, and environmental sectors identified easily understood and transparent ways to measure status and trends for the Arkansas River and Red River Basins in relation to six broad goals. Similar workshops will be convened in each of the remaining basins and results will be integrated into a report card for the entire Mississippi River Basin.

The map (top) shows land use in the Arkansas and Red River Basins. The graph (bottom) shows the gradient of average annual precipitation (in inches) across the basins from west to east.
The Arkansas River’s headwaters are fed by melting snowpack in the Colorado Rockies. From Colorado, the Arkansas River flows east and southeast through Kansas, Oklahoma, and Arkansas before reaching the Mississippi River. At 1,469 miles, it is the sixth-longest river in the U.S. and the second-longest tributary in the Mississippi River watershed. Beginning in Oklahoma, there are 18 locks and dams which are part of the McClellan–Kerr Arkansas River Navigation System (MKARNS) that enables commercial navigation and enhances recreational use. The system also provides water supply, hydroelectric power, and flood control for the lower Arkansas River Basin. Above the MKARNS, there are two other multipurpose reservoir projects on the Arkansas River.

From its headwaters in New Mexico, the Red River flows along the Texas–Oklahoma border and into Arkansas before reaching its confluence with the Mississippi River in Louisiana. The Red River Compact between Arkansas, Louisiana, Oklahoma, and Texas apportions the waters of the Red River and its tributaries. High levels of naturally occurring chloride in some surface waters of the basin are a concern, and federally funded chloride control projects have been operating there since 1962. Denison Dam on the Red River near the Texas–Oklahoma border forms Lake Texoma, the 12th largest reservoir in the U.S. The dam was authorized for construction in 1938 for authorized project purposes of flood control, water supply, hydropower, regulation of Red River flows, improvement of navigation, and recreation.

Arkansas River & Red River Basins

Potential indicators for the Arkansas River & Red River Basins

America’s Watershed Report Card is designed to report on the status of achieving six broad goals developed at the America’s Watershed Summit in September 2012. The goals were developed to reflect the things that people value in the watershed. Potential indicators for each goal were determined at the Arkansas River and Red River Basins workshop. The final list of indicators will be determined by several factors, including data availability and how well they represent the goals.
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The report card process and timeline

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Report card workshop
Arkansas River & Red River Basins

America’s Watershed Initiative is a collaboration of organizations, businesses, and agencies which will bring a basin-wide perspective to the Mississippi River Basin’s greatest challenges. Developing a comprehensive watershed report card is an important component of the Initiative. It will summarize and communicate the status and trends in achieving objectives for six broad management goals. The report card results will encourage people and organizations to engage in issues affecting the watershed.

The America’s Watershed Initiative Report Card project continued with a regional workshop for the Arkansas River and Red River Basins, held in Tulsa, Oklahoma on May 14–15, 2014. At the workshop, stakeholders and experts from social, economic, and environmental sectors identified easily understood and transparent ways to measure status and trends for the Arkansas River and Red River Basins in relation to six broad goals. Similar workshops will be convened in each of the remaining basins and results will be integrated into a report card for the entire Mississippi River Basin.

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The report card process and timeline

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Report card workshop
Missouri River Basin

The lower-most levee breach at levee L-575, along the Nishnabotna Wildlife Management Area. Image courtesy of S. Sullivan.
The Missouri River is the longest river in the United States with headwaters at the Continental divide in the Rocky Mountains to the west and the Laurentian provinces - about one sixth of the lower 48 states. Some major tributaries include the Yellowstone, Cheyenne, Platte, Kansas/Republican/Smoky Hill, and Osage rivers.

The Missouri River basin issues and threats

- Sedimentation
- Irrigation
- Hydraulic fracturing
- Oil mining
- Sand and aggregate mining
- Power plants
- Mining
- Native species loss (Marray)
- Bank erosion
- Coal mining
- Invasive species
- Water contamination

A conceptual diagram illustrates the main threats and key features of the Missouri River Basin.

America’s Watershed Health Report Card Goals

America’s Watershed Report Card is designed to report on the status of achieving six broad goals developed at the 2012 America’s Watershed Summit. These goals reflect things people value in the watershed, are supported by both natural and human systems, and are interconnected.

- Maintain supply of abundant clean water
- Provide reliable flood control and risk reduction
- Support local, state and national economies
- Support and enhance healthy and productive ecosystems
- Provide world-class recreation opportunities
- Serve as the nation’s most valuable river transportation corridor

Water supply in the Missouri River Basin

The water supply goal generated the most discussion during the Missouri River basin workshops. Water supply is one of six goals that guide the development of the AWI report card. The major divide in climate and landscape is the 100th meridian, which passes just east of Bismarck, ND, and very near Dodge City, KS. Generally lower rainfall west of the 100th meridian is accompanied by changes in irrigation from surface to groundwater, particularly near the Ogallala Aquifer in the Nebraska area of the basin. This disparity leads to differences in distribution and allocation of water resources.

A system of six large reservoirs along the mainstem of the river can store more than three times the mean annual flow at Gavin Point, the lowest dam in the system. These reservoirs support multiple water uses, including flood control, water supply, water quality, protection of fish and wildlife, hydropower, navigation, recreation, and irrigation. Changes in the water uses, unanticipated new water uses, and climate change complicate the task of managing these reservoirs.

Navigation is not as extensive as anticipated, however, water for navigation supports other uses downstream of Sioux City. Hydraulic fracturing for oil and gas development introduces a new, demand for water. Climate change appears to be affecting the distribution of water availability by decreasing streamflow in the west and increasing flows in the east. Water supply in the Missouri basin has become the focus of complex disputes and competing legal claims.
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The Missouri River basin features
- Corn farming
- Sugar beet farming
- recreation
- Recreational fishing
- Hunting
- Banks
- Navigation
- Wind energy
- Prairie pothole region
- Native American reservations

Underlying geology
- Ogallala aquifer

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Average annual precipitation (inches)
- 5.01-12.00
- 12.01-20.00
- 20.01-30.00
- 30.01-40.00
- 40.01-50.00
- 50.01-70.00
- >75.01

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The report card process and timeline

Report card workshop
Missouri River Basin

The America's Watershed Initiative Report Card project continued with regional workshops for the Missouri River Basin, held in Rapid City, South Dakota, May 22–23, 2014 and in Kansas City, Missouri, August 26, 2014. At the workshop, stakeholders and experts from social, economic, and environmental sectors identified easily understood and transparent ways to measure status and trends for the Missouri River Basin in relation to six broad goals. Similar workshops have been convened in all of the basins and results will be integrated into a report card for the entire Missouri River Basin.