

2020 GRADE

2020 MISSISSIPPI RIVER WATERSHED REPORT CARD



WATER QUALITY
& ECOSYSTEMS



FLOOD CONTROL &
RISK MANAGEMENT



RECREATION



TRANSPORTATION



ECONOMY



WATER SUPPLY



The Mississippi River Watershed is America's watershed

Stretching across 31 US states and 2 Canadian provinces, America's Watershed benefits millions of people and thousands of communities. It supports our many economic activities while remaining a natural and recreational treasure of global importance. To ensure that the Mississippi River Watershed remains productive and healthy for future generations, we call on the nation to:

- **INVEST:** \$2 Billion in annual funding through private and government sources to address critical needs in inland navigation, regenerative agriculture, ecosystem function, and flood and water management.
- **LEARN:** Establish a science agenda, improve data information systems, and report progress against goals to inform decisions and ensure wise use of funds.
- **EDUCATE:** An informed citizenry—coupled with transparent and data-informed decision-making by basin leaders—will facilitate progress toward goals.
- **ACT:** Greater collaboration among complementary and competing interests will improve our ability to manage in a way that values all uses of this tremendous resource.

This 2020 Mississippi River Watershed Report Card describes progress toward achieving the goals established in the 2015 Report Card, highlights some of the important work that partners across the watershed are doing to make positive change, and documents the additional work that remains.

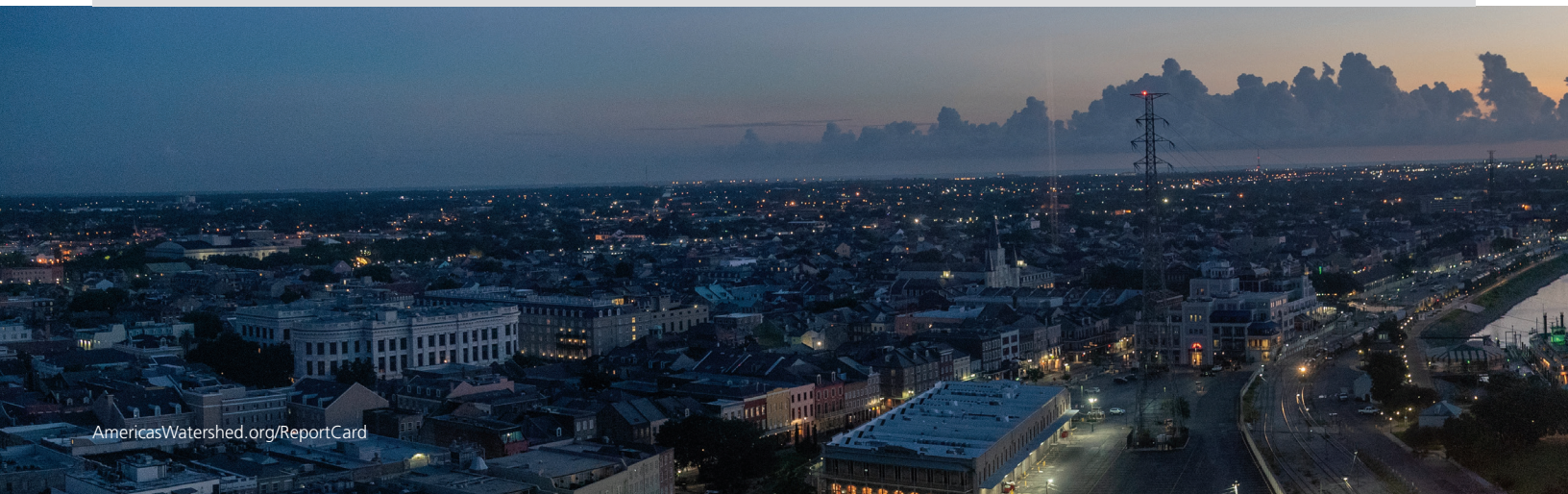
THE WATERSHED

PROVIDES:

- \$50 billion in agricultural products
- Flood mitigation and resilience
- Habitat for diverse and important living resources
- Recreational opportunities and public land access
- 25% of America's total hydropower

IS THREATENED BY:

- More frequent and extreme floods and droughts
- Lagging habitat and coastal restoration funding
- Continued urbanization and agricultural intensification
- Persistent nutrient and chemical pollution
- Nutrient runoff that contributes to the "Dead Zone" in the Gulf of Mexico



A message from the Executive Director

Rivers have shaped me like they shape the landscape. Growing up mostly in cities on the east and west coasts, summers spent fishing with my grandfather on an Illinois River tributary, or motoring out on Uncle's boat along the Upper Mississippi were precious times. These experiences had a profound impact on me and when it came time to pick an undergraduate major, biology was an obvious choice. Since then I have had the good fortune to have my career shaped by rivers—the Savannah River, the Connecticut River, and now back to where this love of rivers started, America's Great River, the Mississippi.



As I start this next chapter, I am reminded of all this great River provides—abundant wildlife, unmatched beauty, our home, and our livelihoods. All of us have a stake in what the watershed provides for our future. When America's Watershed Initiative (AWI) envisioned a Mississippi River Watershed report card five years ago, we took great care to listen to and measure all aspects of the River's health that were important to you.

The results of the 2020 Mississippi River Watershed Report Card allow us to see how those important features are trending by assigning letter grades. Some grades and their stories illustrate what is working so that the next time we measure progress we see improvement. Some grades tell us that the Mississippi River Watershed faces difficult challenges with implications for the health and safety of Americans, the security that comes with reliable availability of clean and abundant water (called “water security”), and the American economy. These challenges are national issues, impacting all of us.

Therefore, it is imperative to preserve the Mississippi River Watershed through investment, learning, education, and action. We hope you will join efforts to protect and strengthen the Watershed, so that it might continue to power our economy and livelihoods, today and for coming generations.

Kimberly A. Lutz
Executive Director

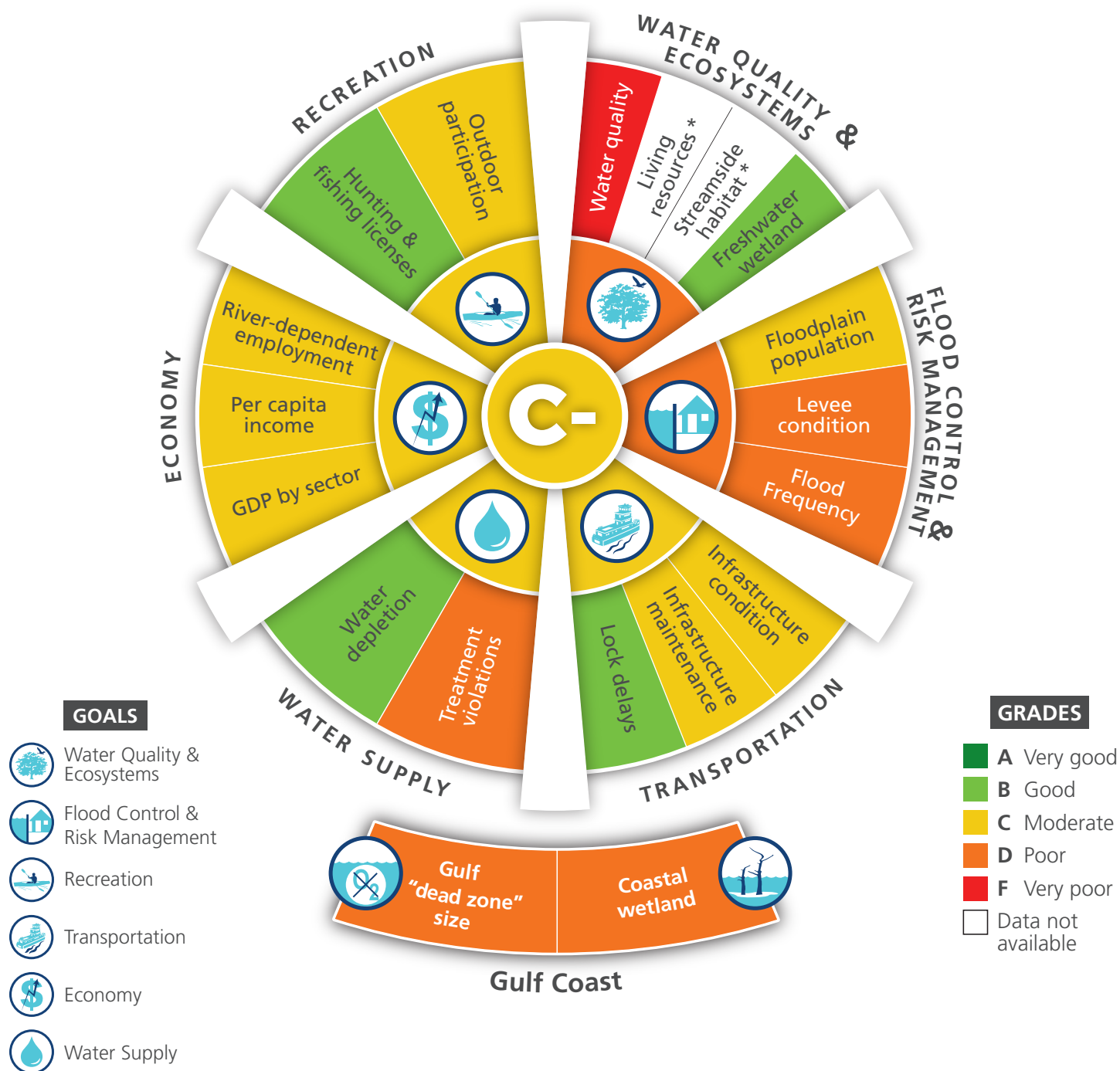


Levees can provide protection against the high waters of the Mississippi River, however people in the watershed are too often in poor condition.
Lorie Shaull/Flickr CC.

2020 MISSISSIPPI RIVER WATERSHED REPORT CARD

Employing new methods and indicators

The 2020 Mississippi River Watershed Report Card includes several improved indicators and analysis methods for water quality in: Water Quality and Ecosystems (see page 6); Flood Control and Risk Management (see page 7); Transportation (see page 8); and Water Supply (see page 9). These new indicators improve our understanding of key issues and concerns in the Watershed. The Mississippi River Watershed earns a C- in the 2020 Report Card. Direct comparisons to the 2015 Report Card are difficult because of changes in the methods and indicators, but the 2020 scores are a slight improvement from the D+ result in 2015.

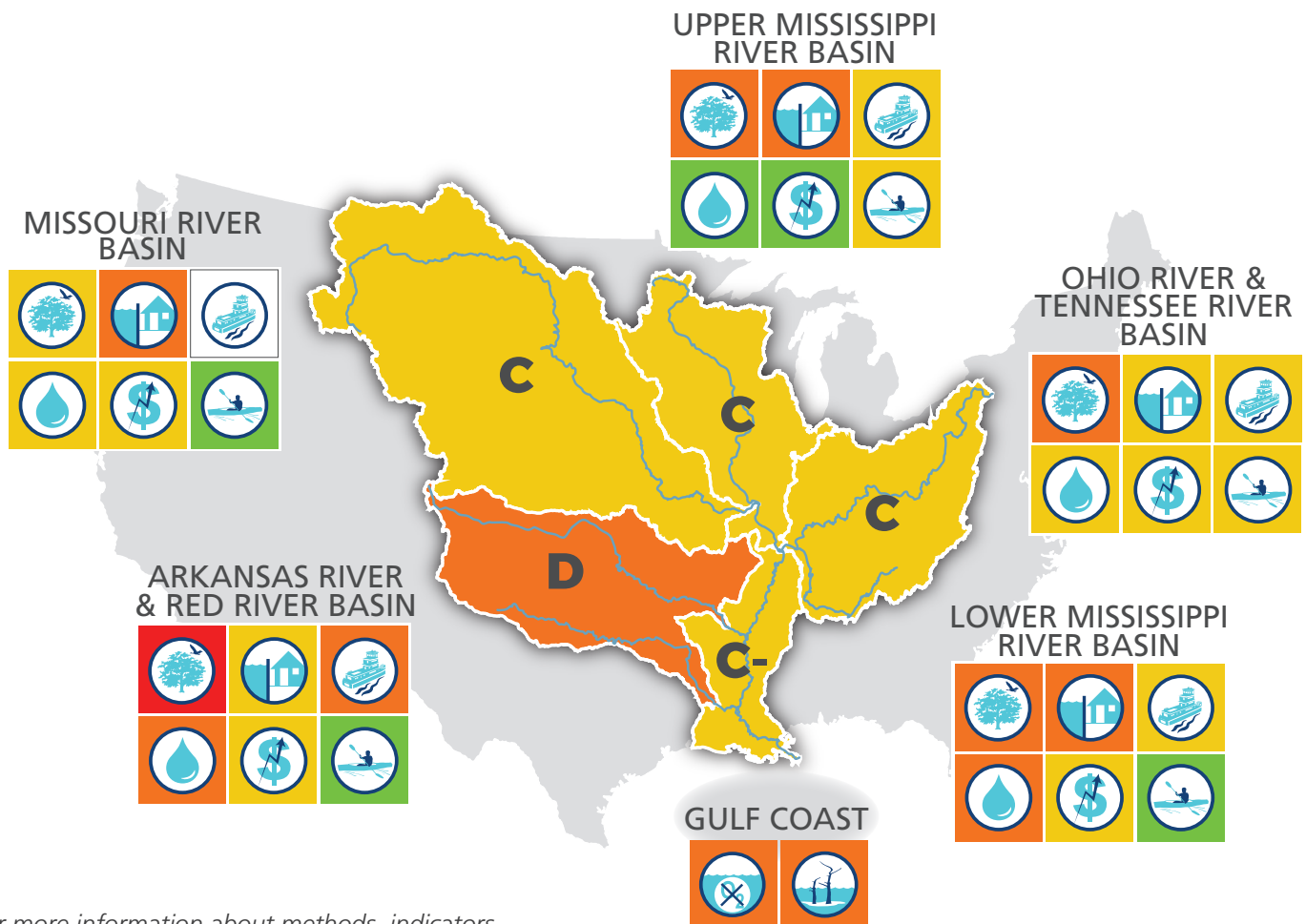


* Data from the US EPA Rivers and Streams Assessment to update scores for Living Resources and Streamside Habitat is not yet publicly available.

GRADES SHOW URGENT ACTION NEEDED

WATERSHED HEALTH AND WATER SECURITY REMAIN AT RISK

- **Upper Mississippi River Basin:** Water quality is poor, as a result of high nutrient runoff from regional agriculture. Frequency of floods is increasing, likely a result of rainfall increases and drainage modifications. Lock delays remained low when compared to historical data, reflecting ongoing maintenance efforts to keep old infrastructure operational.
- **Ohio-Tennessee Rivers Basin:** Conditions are driven by high nutrient inputs, increasing frequency of floods, and improvements in infrastructure. Per Capita Income is relatively low in some areas.
- **Lower Mississippi River Basin:** Affected by all the basins upriver, nutrient loads are high especially in the tributaries and streams. Flood Frequency scores are moderate and Transportation scores improved with increased funding for dredging and infrastructure maintenance.
- **Arkansas-Red Rivers Basin:** Poor or very poor scores for Freshwater Wetland, Levee Condition, Lock Delays, and Treatment Violations result in a low overall score for the basin. Although the average age of locks is the lowest of all basins, they still need rehabilitation.
- **Missouri River Basin:** Improved scores for Freshwater Wetland and moderate scores for Per Capita Income. Levee Condition is poor and trends in frequency of floods is increasing.
- **Gulf Coast:** The average size of the Gulf dead zone since 2015 is still almost three times as large as the Gulf Hypoxia Task Force target, and the historical loss of coastal land in Louisiana is an ongoing issue despite efforts to rebuild it.



For more information about methods, indicators, and scoring, visit AmericasWatershed.org/ReportCard.



WATER QUALITY IMPACTS

Excess nutrients threaten resources

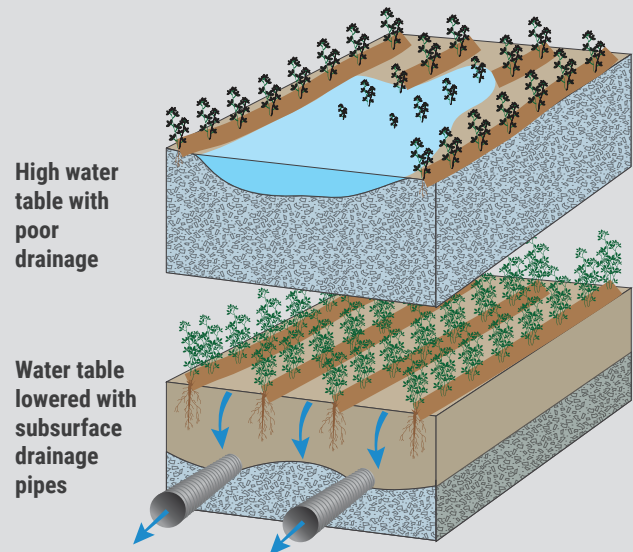
High nutrient loads from wastewater, run-off, fertilizer, and livestock manure can create water treatment concerns and cause the growth of harmful algae that eventually reduces dissolved oxygen in the Gulf of Mexico.

DRINKING WATER SOURCES ARE THREATENED

High nitrogen concentrations in drinking water are unhealthy for people and its removal increases cost to consumers. For example, at the Des Moines, Iowa water treatment facility, water quality data from 1994–2020 show that nitrogen concentration exceeded safe levels as much as 74% of the time (i.e. 270 days in 2015). This tends to happen in non-drought years, when fertilizer and livestock manure applied to fields washes into rivers, especially following drought periods.

FURTHER NUTRIENT REDUCTION IS NEEDED

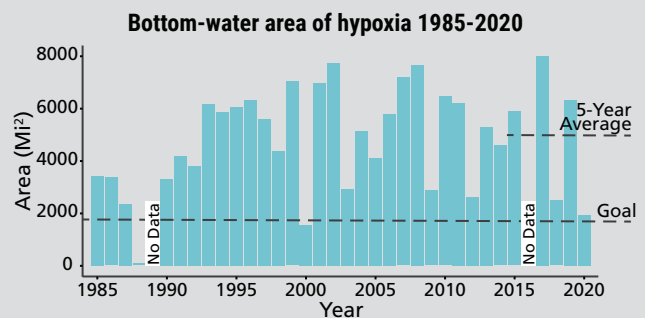
Annual nutrient load at key locations in each basin have been steady or have gone up over the last five years, resulting in poor Water Quality scores in the report card. The USGS reports that about 1.5 million tons of nitrogen are delivered to the Gulf every year, a large proportion of this is from agriculture. Crop production, even on well-managed fields, invariably results in nutrient losses through surface runoff and tile drainage. Farmers struggle with how to produce crops to meet world demand while minimizing nutrient losses and environmental impacts. More farmers are adopting precise nutrient management techniques under several states' nutrient loss reduction strategies, but more needs to be done. In Iowa, it is estimated that over 1 billion pounds of nitrogen was delivered to the Mississippi River and its tributaries in two of the last four years, resulting in a doubling of the nitrogen load leaving the state in the past 20 years.



Drainage, or tiled systems, improve soil drainage and increase crop yields, but also provide efficient conduits for nutrient runoff. Modified from Ohio State University.

DEAD ZONE SIZE DOUBLE THE GOAL

The “dead zone” is an area of low dissolved oxygen (hypoxia) in the Gulf of Mexico that can kill fish and other marine life, affecting the US seafood and tourism industries. Although it is naturally occurring, nitrogen losses from fertilized agricultural lands have been a major contributor to an increase in the dead zones annual size. Over the last 5 years, the dead zone averaged 5,408 square miles, which is about three times larger than the Gulf of Mexico Hypoxia Task Force target of 1,950 square miles. The agriculture sector continues to develop new, more effective, and practical technologies to further reduce nutrient losses.



The 2020 Gulf dead zone (2116 square miles) was smaller than expected due to Hurricane Hanna, but the 5-year average is still larger than the goal set by the Hypoxia Task Force. LUMCON/NOAA.

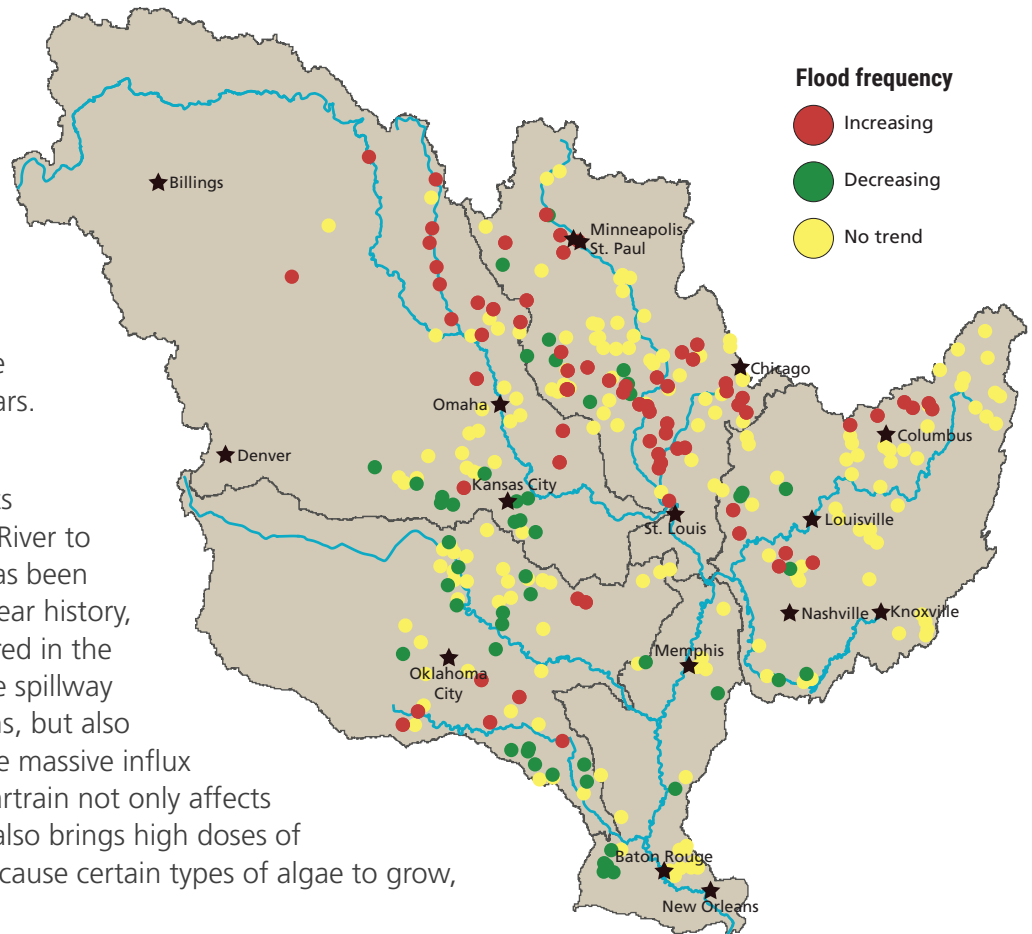


FREQUENCY OF FLOODS

New vision for watershed management is essential

The poor Flood Frequency scores in the report card reflect increasing trends in annual days of high water flow (discharge). Over the last several decades, the number of days that exceed flood discharge thresholds every year has been increasing, likely as a result of changes in precipitation patterns, and changes in the landscape. These patterns are becoming more extreme, with alternating periods of drought and high rainfall storms; these changes make risk reduction challenging. Extreme flooding occurred in the watershed in 5 of the last 10 years.

The Bonnet Carré Spillway, just upstream of New Orleans, diverts floodwater from the Mississippi River to protect the city. The floodway has been opened only 15 times in its 90-year history, but 6 of those times have occurred in the last 10 years. The opening of the spillway reduces flood risk in New Orleans, but also has ecological consequences: the massive influx of fresh water into Lake Pontchartrain not only affects the fish and shellfish there, but also brings high doses of nutrients into the lake, that can cause certain types of algae to grow, which can be toxic.



More locations in the Mississippi watershed are showing increases in flood frequency than are showing decreases. Data: G. Villarini, U of Iowa, and Steven Guinn, UMCES.

Many activities are occurring in the Mississippi River Watershed to reduce the impact of increased flood trends. For example, areas are reconnecting flood plains to the river channel to create water storage areas (see page 11). Additionally, in some areas affected by flood damage, people are relocating rather than rebuilding in flood-prone areas, supported by state and federal programs designed to “buy-out” homes in these areas. These types of activities will need to be accelerated due to the observed changes in rainfall and flooding.



The Bonnet Carré Spillway, just upstream of New Orleans, diverts floodwater from the Mississippi River and protects the city. It has been opened 6 times in the last decade. Gulf Restoration Network/HealthyGulf.org.

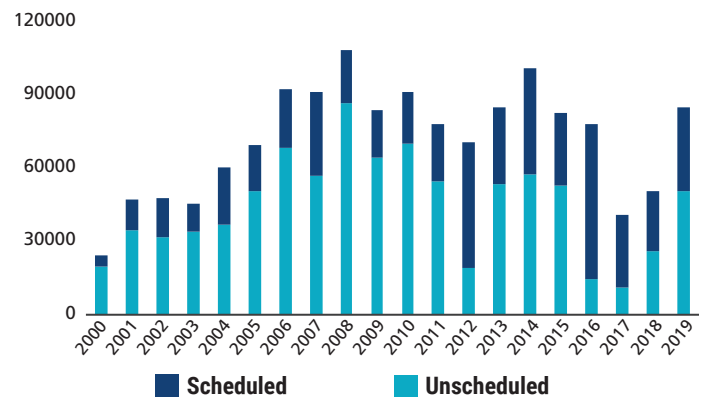


AGING INFRASTRUCTURE

Continued funding for transportation remains critical

Transportation scores improved from 2015, partly due to lock delay and infrastructure funding improvements. New methods were developed to reduce the variability of results from year to year, and an updated infrastructure list was used to better reflect the locks, dams, and ports within the river system. However, improvements are still needed in the amount of transparency and sustainability of funding. Infrastructure upgrade, regular maintenance, and capacity expansion is urgently needed to accommodate increasing demands on transportation and increasing frequency of emergency situations such as flooding and natural disasters.

Significant repairs to critical locks are continuing. For example, the construction of the Olmsted Locks and Dam complex in 2018 represented a milestone in upgrading transportation infrastructure on the Ohio River. Numerous additional infrastructure projects are ongoing or are scheduled, particularly on the Upper Mississippi. Funding



Hours of unscheduled lock unavailabilities have been decreasing in the Mississippi River. Data from USACE-LPMS.

of and expenditures from the Inland Waterways Trust Fund have also been improving. In addition, funds for the maintenance and operations of the Mississippi River Ship Channel—which are vital to the Lower Mississippi deep draft navigation—have increased substantially since 2015.

Overall, lock delays were reduced in the Watershed over the last 5 years. An increase in scheduled lock delays was observed, as a result of needed infrastructure construction and repairs; managing these delays is still a major challenge for transporters. While overall trends in this indicator improved, the near-record flooding in 2019 increased lock delays across the watershed.

Importantly, the average age of transportation infrastructure along the Mississippi River is far beyond their designed life expectancy of 50 years. While major rehabilitation of these locks can extend their useful life by as much as 25 years, increased maintenance and required system upgrades often result in required but scheduled closures that also increase delays.

Finally, funding for maintaining authorized channel dimensions at deep draft ports in the lower part of the Mississippi River is increasing. Dredge contractors are building new dredges to overcome the limited capacity of the commercial dredging fleet. These ports are vital to US exports and imports, and maintaining access for deep draft shipping is critically important. Seven draft restrictions (times and locations at which water depth is less than the 47-foot target) were recorded in 2020.



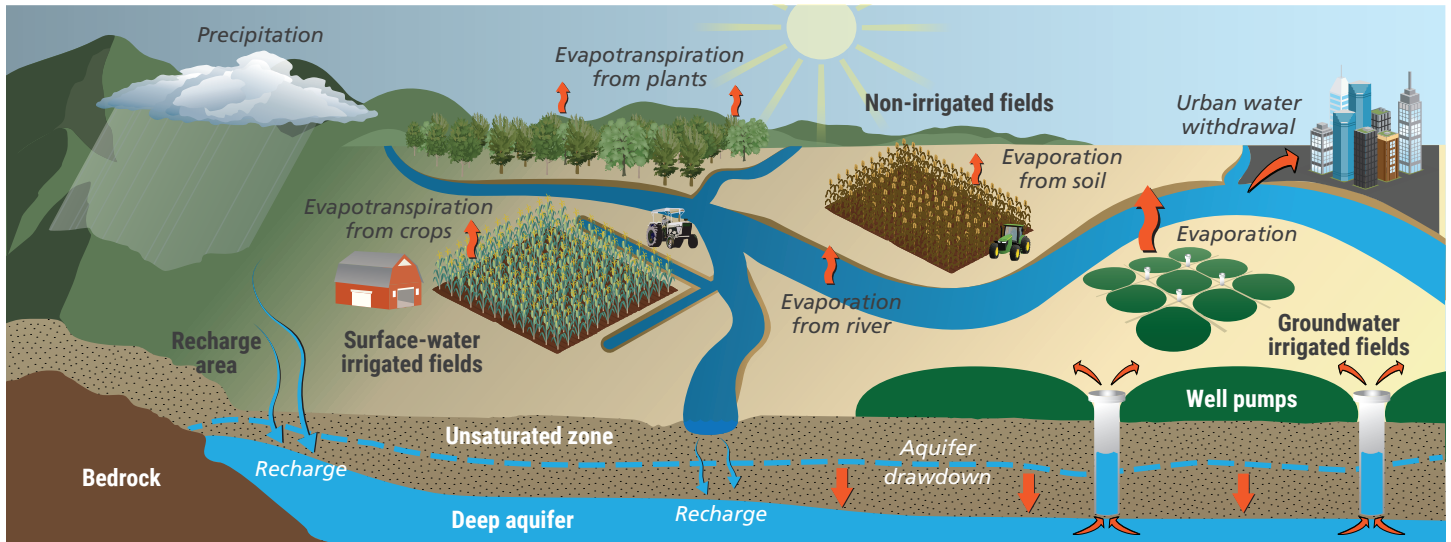
Vital to inland navigation, a tow passes through Lock and Dam 4 in Alma, Wisconsin. USACE 2018.



VITAL RESOURCE

Water supplies are at risk

The Mississippi River Watershed provides water for many purposes, including drinking water for millions of people and wildlife, irrigation for agriculture, industrial uses, recreation, and transportation. But these critical resources are threatened. For example, drinking water supplies are frequently affected by high nitrogen concentrations (see page 6). Additionally, groundwater from deep aquifers is being extracted much faster than it is refilled. Current withdrawal rates for the Ogallala Aquifer—a significant source of irrigation water in the corn belt—will eventually deplete it completely. AWI calls for a detailed research agenda to evaluate the timing and impacts of aquifer depletion in the watershed.



Deep aquifers supply water for multiple purposes, but pumping groundwater faster than it is replenished over the long-term causes problems. Sustained groundwater pumping may lead to water-level decline or even aquifer depletion.



PILLAR OF NATIONAL AND GLOBAL ECONOMY

More investment needed to support economic diversity

The diverse economy of the Mississippi River Watershed continues to drive the national economy and other global economies. Although incomes are not recovering as fast as in some areas of the country after the global economic downturn, the area has shown signs of resilience. For example, employment has remained relatively high compared to other areas in the US, owing in part to the regions' incredible economic diversity, which includes agriculture, energy, industry, transportation, and recreation, among many other sectors. However, as important as the Mississippi River Watershed is to the national economy, national investment to support the watershed has not kept pace.



Corn is a major economic driver in the Watershed. NCGA Field of Corn Contest winner, Katherine Plessner.



JOB AND PUBLIC ACCESS

Recreation provides opportunities and supports livelihoods



Competitors crowd the Cannelton Locks and Dam on the Ohio River during a catfishing tournament. USACE 2017.

Recreation has been a major economic driver for the watershed. In the Upper Mississippi River basin, for example, outdoor recreational activities are valued at \$4 Billion per year, supporting 420,000 jobs. Likewise, the Mississippi River Delta, with its unique assemblage of species, is known for fishing and hunting.

Outdoor recreation area use and park visitation have increased dramatically in 2020 as a result of the Covid-19 pandemic; more people are seeking natural open spaces closer to home. This increased public demand and need for additional natural land clearly illustrates the vital role these areas provide in ecosystem services and public health and well-being.

Recreational areas and opportunities are under pressure by competing uses and ecological stresses like invasive species. Asian Carp, for example, continue to take over habitat of other beneficial fish species. To ensure that recreational opportunities continue to improve, continued investment is needed from local, state, and federal sources.

WHAT'S NEXT? EXPLORING WATERSHED POTENTIAL

Looking toward renewable energy sources

The Mississippi River Watershed provides energy from hydropower (25% of the nation's hydropower is produced in the Mississippi River Watershed) and renewable sources like wind, solar, and biofuel, and there is capacity for more. Each of these can contribute to a diverse and safe energy portfolio, while providing new jobs and supporting a diverse economy. AWI supports an integrated renewable energy system that addresses environmental concerns using a combination of these and other sources. AWI continues to develop a meaningful way to evaluate renewable energy in the region; we envision indicators that reflect renewable energy will be included in future report cards.



Wind Farm in the Minnesota River Basin. Bob Beduhn, HDR Inc.

WHAT'S NEXT? CREATING A NEW INDICATOR

Natural infrastructure has multiple benefits

Natural infrastructure refers to restored networks of floodplains, wetlands, and uplands that work together to provide benefits such as flood damage reduction, water storage, and habitat conservation. For example, floodplains can be "reconnected" to river channels, so that rivers can safely expand beyond their banks as floodwaters rise. Floodplains, natural and restored wetlands, and other natural areas offer numerous benefits, such as providing critical habitat for aquatic and bird species, combating land loss caused by subsidence and erosion, and reducing nutrient load. Along the coast, wetlands provide critical storm surge protection to vulnerable communities during hurricanes and tropical storms.



The Bee Branch Watershed Flood Mitigation Project has helped mitigate flash flooding. City of Dubuque, IA.



Gunn Island, a man-made island, provides habitat for over 50,000 birds, including Royal Terns. P.J. Hahn, Pelican Coast Consulting and the Big River Coalition.

Additional natural infrastructure efforts could further benefit the entire basin and could help raise the grade for multiple indicators in this report card. It can provide floodwater storage to minimize flood damage to infrastructure and property, and prevent overall loss of critical wetland habitat. It can also reduce nutrient pollution in rivers and streams, ultimately preventing that pollution from reaching the Gulf of Mexico.



Dredge materials have been used to help rebuild coastal Louisiana. P.J. Hahn, Pelican Coast Consulting and the Big River Coalition.

America's Watershed Initiative

Uniting people, land, and water across 31 states

The Mississippi River Watershed is vital to our nation's prosperity. It provides drinking water for millions, water for agriculture and industry, and the world's largest inland navigation system. The watershed is a recreational and environmental treasure. It is also facing growing challenges. This report card outlines modest improvements in the past 5 years; however, as can be seen in the grades, the demands on water, land resources, and the natural and built infrastructure continue to grow. We believe that real progress can be made toward a sustainable Mississippi River system that provides opportunity and potential for all its residents, but only if we act together and with urgency.

A resilient and resourceful network of diverse interests collaborating on behalf of the Mississippi River is "social capital" that is every bit as important as the physical and natural capital our nation depends upon. Bringing forward science to improve decision making. Listening. Earning and building trust. Encouraging and championing innovation. Through collaboration and broad cross-sector partnership, we have a better chance to define and chart a different course for the future. One that is better, healthier, stronger, and supportive of a high-quality life and economic productivity.

Leaders in business, conservation, navigation, agriculture, academics, basin associations, and government all call for integrated management of our water resources to safeguard our collective future and to help us meet the challenges of a dynamic and changing Mississippi River Watershed. Cooperative management and development of America's Watershed will provide a secure future for our nation and the world. This is not easy. It requires patience, disciplined listening, and consideration of other people's positions on issues. It takes experience within our tremendous river basins, as well as learning from other basins in the United States and around the world. We can then gain an understanding of where we are and how we can intelligently focus actions to raise the grade. We are a part of shaping our country for the future. Let's do this, together.

Please join us on our journey to a prosperous and healthy Mississippi River Watershed. Visit AmericasWatershed.org to learn more.

2018 elevation data image showing the meandering course of the Mississippi River southwest of Memphis, TN, and potential floodplain areas to 'reconnect' Daniel Coe/Flickr CC

Developing a comprehensive watershed report card is an important component of America's Watershed Initiative. It will help the public and policy-makers get information about the status and trends in achieving objectives for six broad management goals. Results from the report card will help develop a roadmap for collaborative actions to improve the 31-state Mississippi River Watershed and encourage people and organizations to engage in issues affecting the watershed.



Support

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