

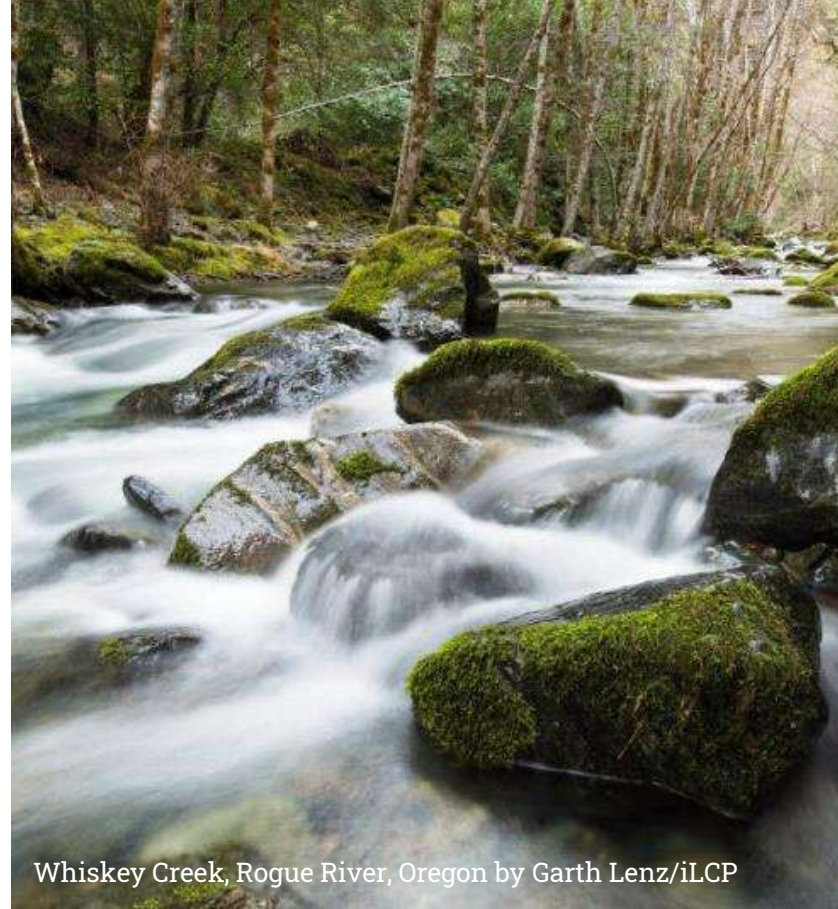


USGS Mississippi River Science Forum
Climate Science Needs on the Mississippi River

February 16, 2023



**AMERICAN
RIVERS**



Whiskey Creek, Rogue River, Oregon by Garth Lenz/iLCP



American Rivers restores damaged rivers, protects wild rivers, and conserves clean water for people and nature.



Eileen Shader, CFM
Director, Floodplain Restoration

Olivia Dorothy, CFM
Director, Mississippi River



Protecting the Land, Water, Wildlife and People of America's Greatest River

The Mississippi River Network (MRN) is a coalition of nearly 60 member and partner organizations working together to protect the River.



USGS Mississippi River Science Forum

Climate Science Needs on the Mississippi River

How does/will
climate change
impact
the Mississippi River?

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the Mississippi River
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climate change?

Ref. River_C_Budget



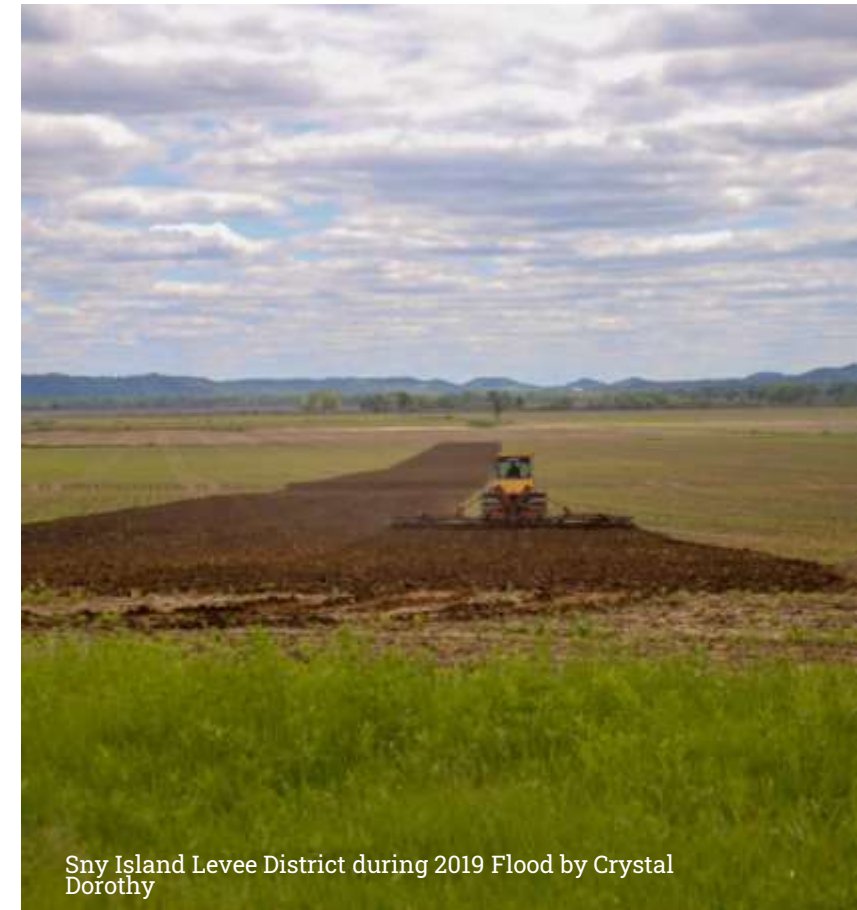
How does the Mississippi River contribute to climate change?



Coal spill in the Mississippi River by Jonathan Henderson / Gulf Restoration Network and SouthWings



Natural gas barge by Olivia Dorothy



Sny Island Levee District during 2019 Flood by Crystal Dorothy



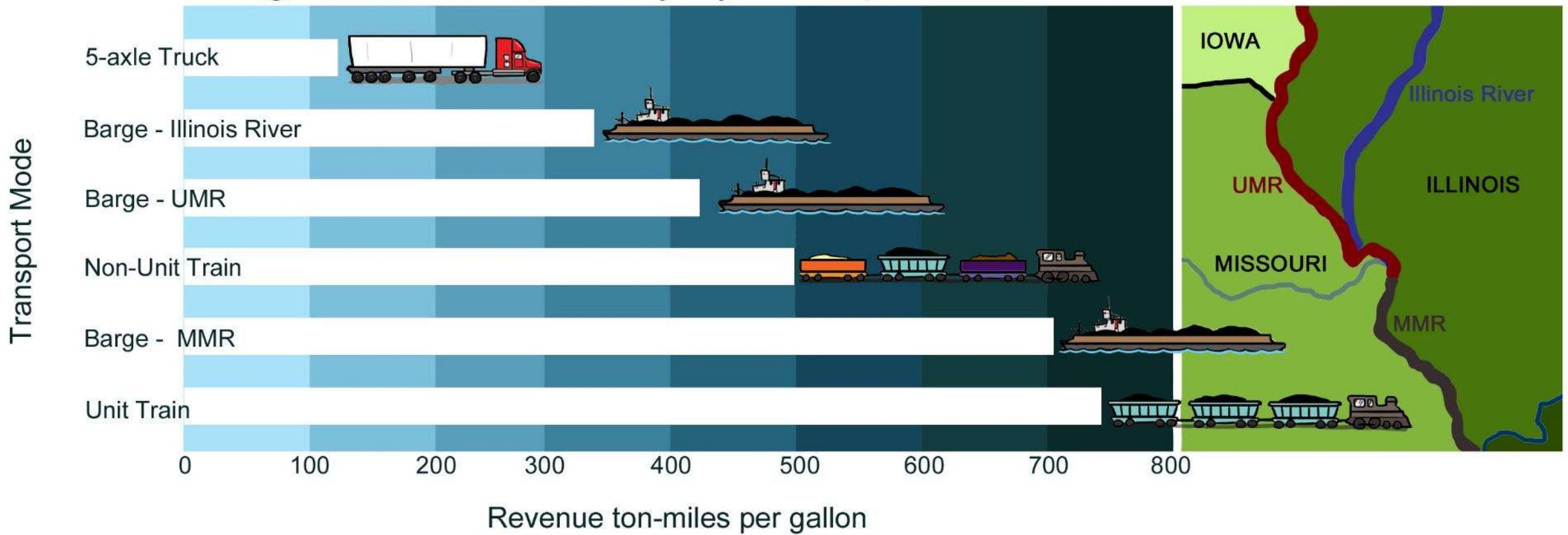


How does the petrochemical industry directly and indirectly fuel climate change and land loss in Coastal Louisiana?



What is the carbon budget for the Mississippi River transportation corridor?

Regional Fuel Efficiency by Transportation Mode



[Source: Tolliver, Denver, Pan Lu, Douglas Benson. 2013]





How much carbon is emitted by the dammed and modified Mississippi River?

Decomposing sediments create methane that bubbles to the surface.

Water passing through turbines degasses methane to the atmosphere.



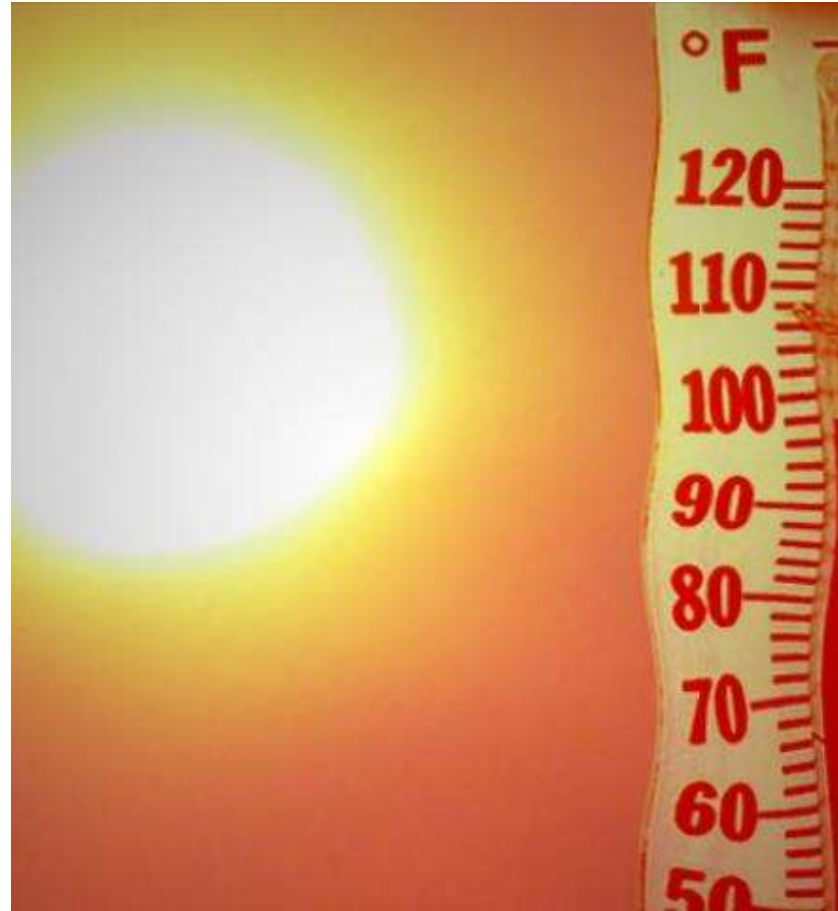
How can we
change our
agricultural
system to reduce
GHG emissions?



How will Climate Change Impact the Mississippi River?



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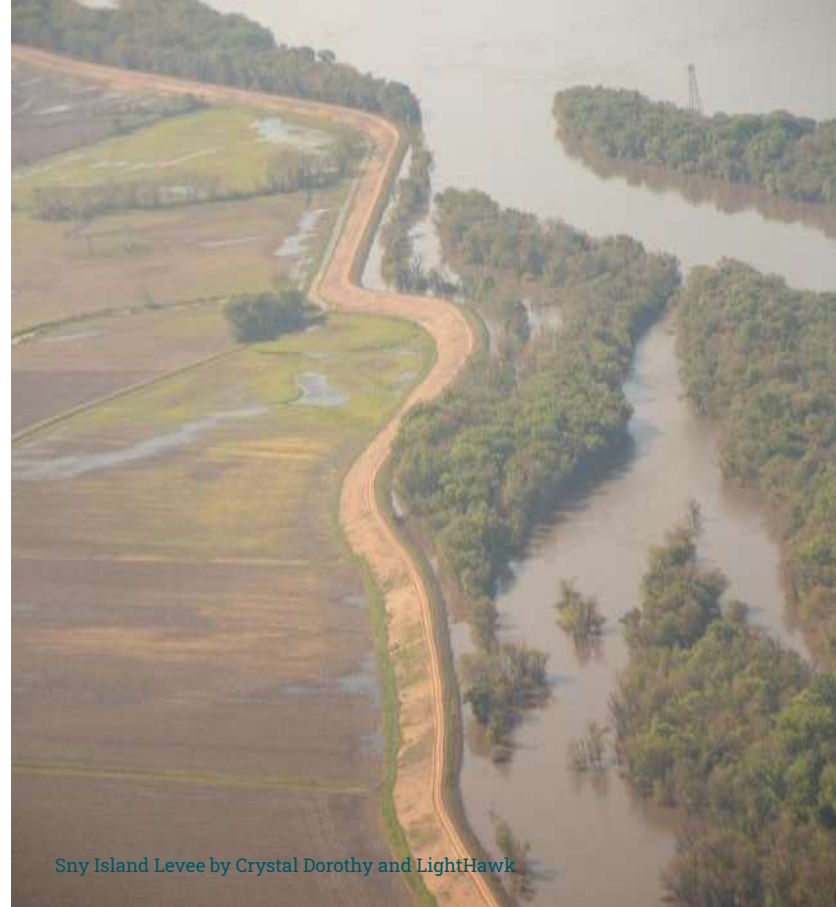


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Coal Spill provided by Healthy Gulf



Sny Island Levee by Crystal Dorothy and LightHawk

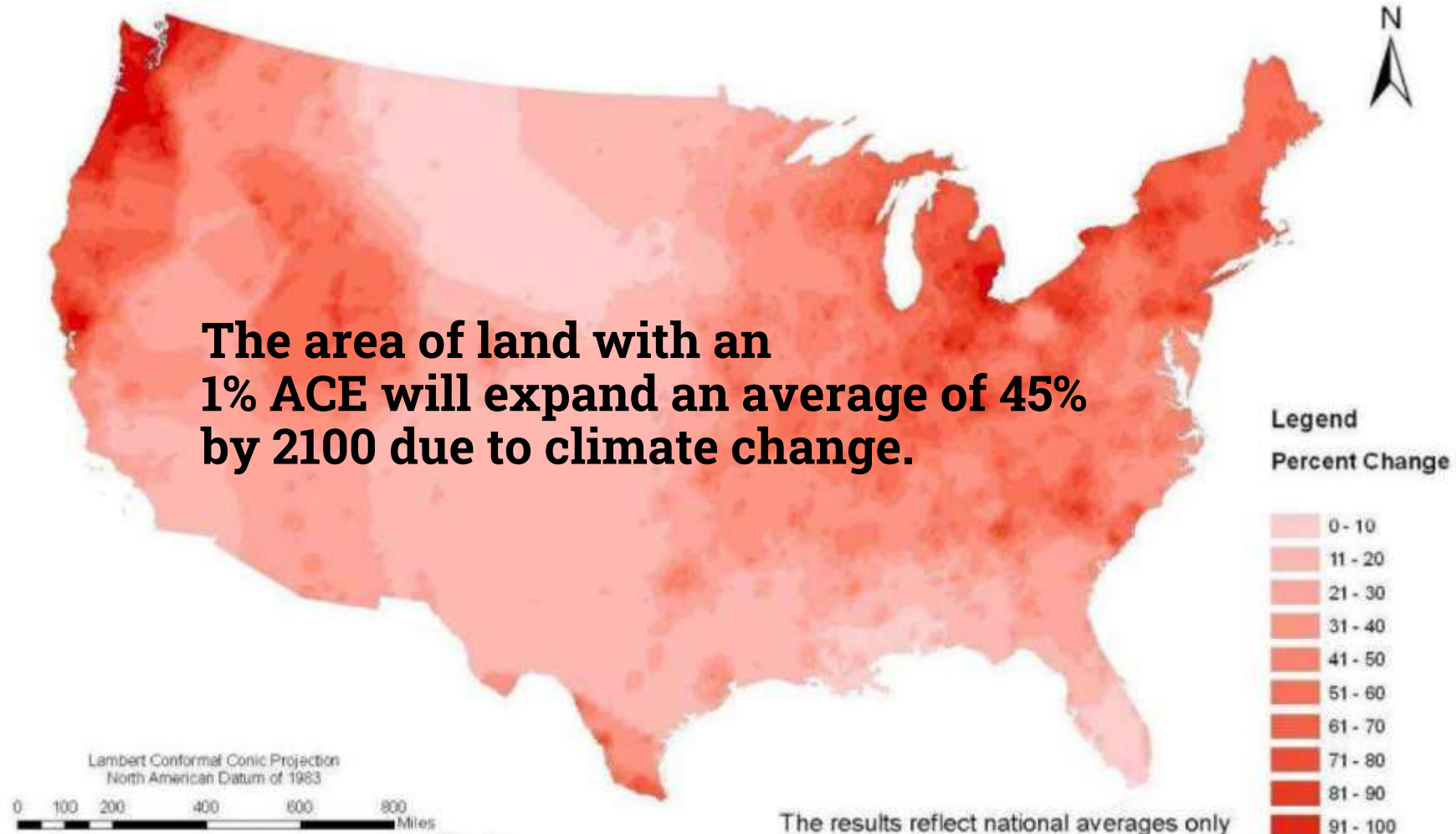


Invasive bighead carp by Chris Young

How and where will climate change most acutely impact natural resources on the Mississippi?



Is our flood control infrastructure adequate for the new climate of prolonged flood events?



Ref. Flooding



improved 95 %; e. Trend of desirability next 10-15 yrs. Down

_____ ; b. Estimated annual family income \$ 500-1200

es 10 %; Swedish & Italian predominating; d. Negro = ; _____ %

above _____ ; f. Relief families Mary

Yes

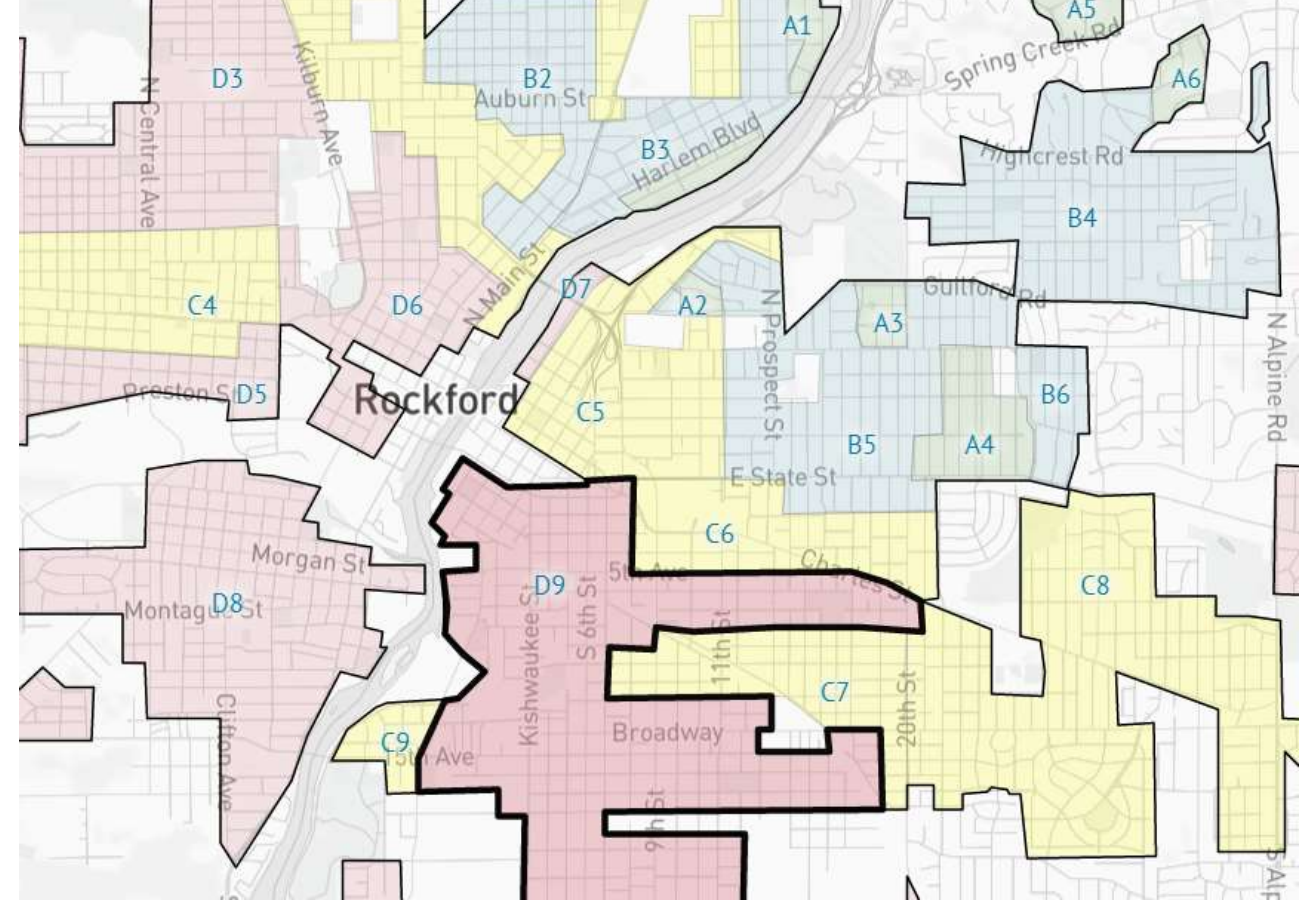
o. Rent range \$ _____ \$ _____ \$ _____ \$ _____ \$ _____

Grade D. African American Population = 0. Redlined because "Keith Creek at times overflows its banks"

4. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase _____ ; b. Home building _____

5. CLARIFYING REMARKS:
 Property north of Broadway better class and commands higher rental - property south is mostly 1 story bungalow type and cheaper rentals and property value. Keith Creek at times overflows its banks and floods adjacent areas, however, there are improvements in process to correct this. Upkeep poor - very spotted. An old area with poor income group.

6. NAME AND LOCATION _____ SECURITY GRADE D AREA NO. 9



Where did we deliberately put African Americans in areas of high flood risk?



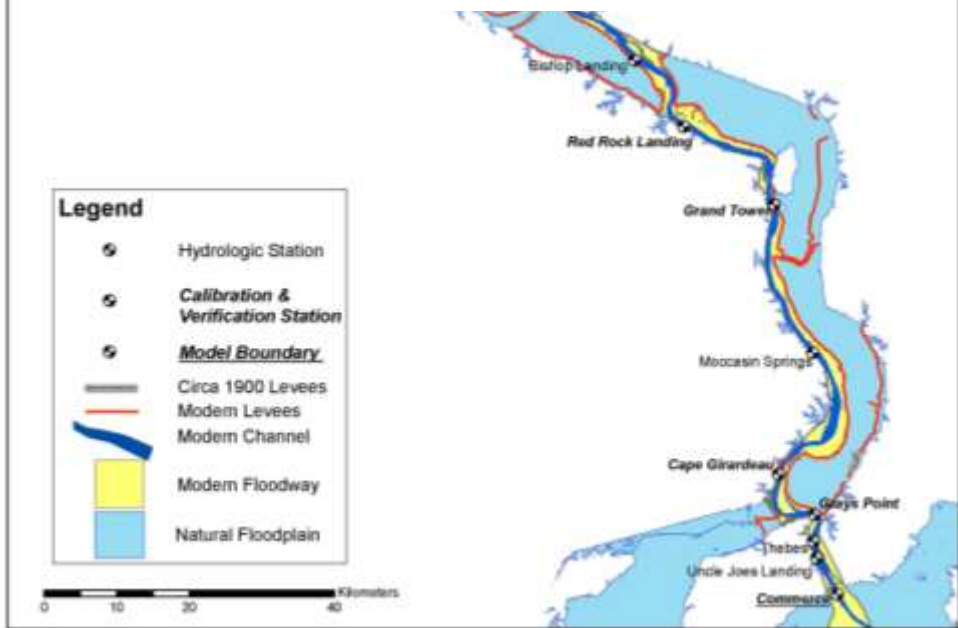


How does transportation and flood control infrastructure impact flood risk?





~ 60% Reduction in floodplain area

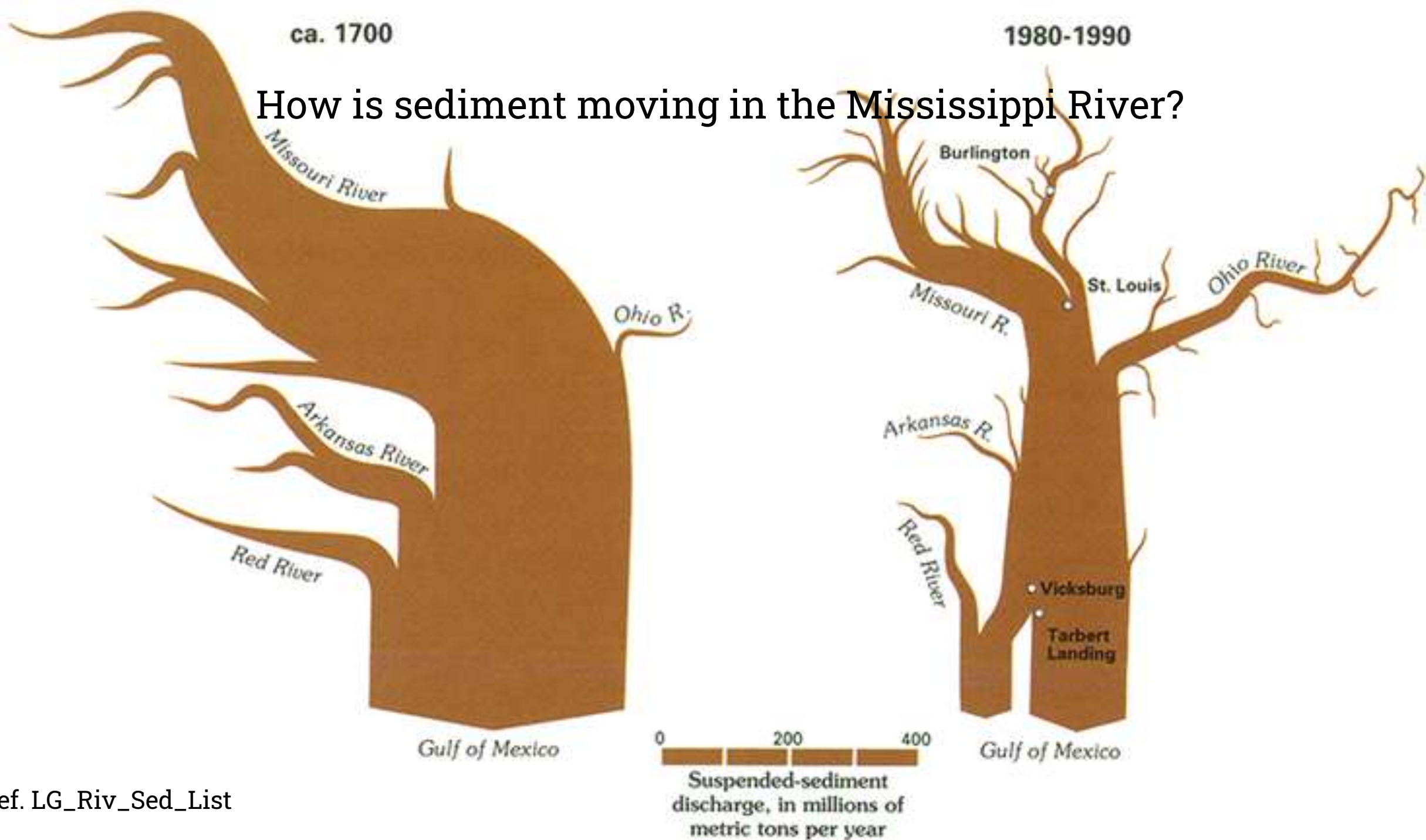


Where is the river "pinched"?

Ref. Flooding



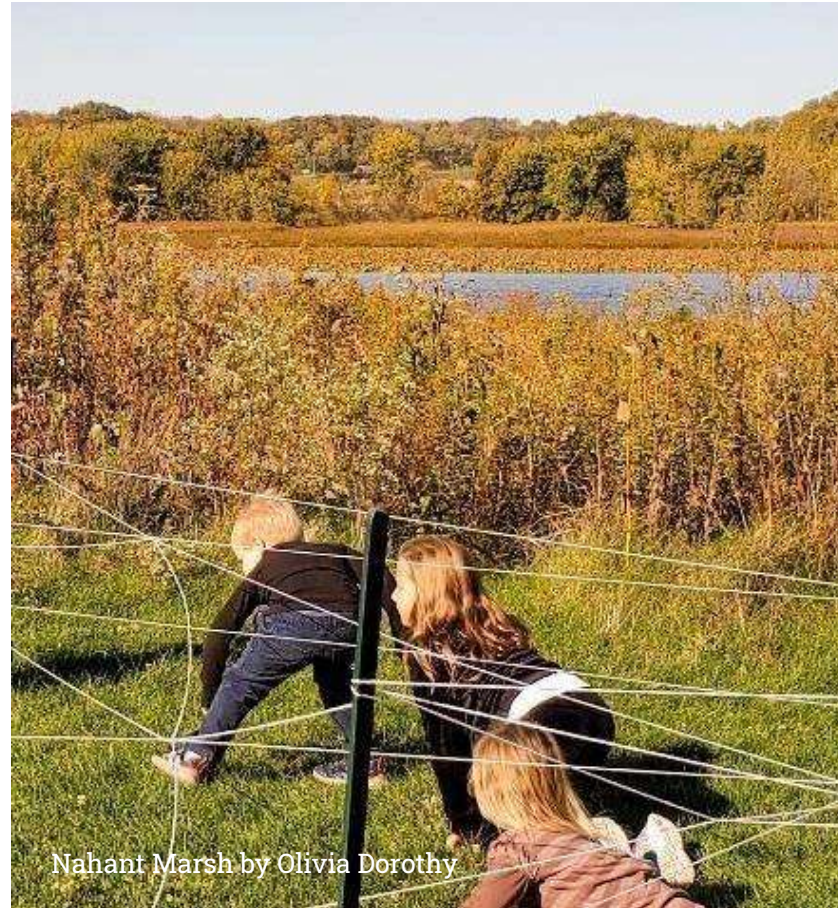
How is sediment moving in the Mississippi River?



What is a floodplain?



Mississippi River by Crystal Dorothy & LightHawk



Nahant Marsh by Olivia Dorothy



Yazoo Backwater by Stephan Kirkpatrick





What is the value
of natural
floodplain
functions?





How has the loss of ecologically functional floodplains impacted species decline?





How can we expand the use of conservation practices, like floodplain and wetland easements, to improve soil health to reduce nitrogen and phosphorus pollution?



How will warming water impact the range of aquatic invasive species?



Ref. AIS

Illinois River by Chris Young

Corexiting the problem



Ignoring an EPA order to stop, BP dumped 2 million gallons of this toxic substance on the Gulf, and under the Gulf, using an untested deep water application.

How are emerging pollutants compounding the impacts of climate change? And how are polluting industries on the Mississippi contributing to climate change?





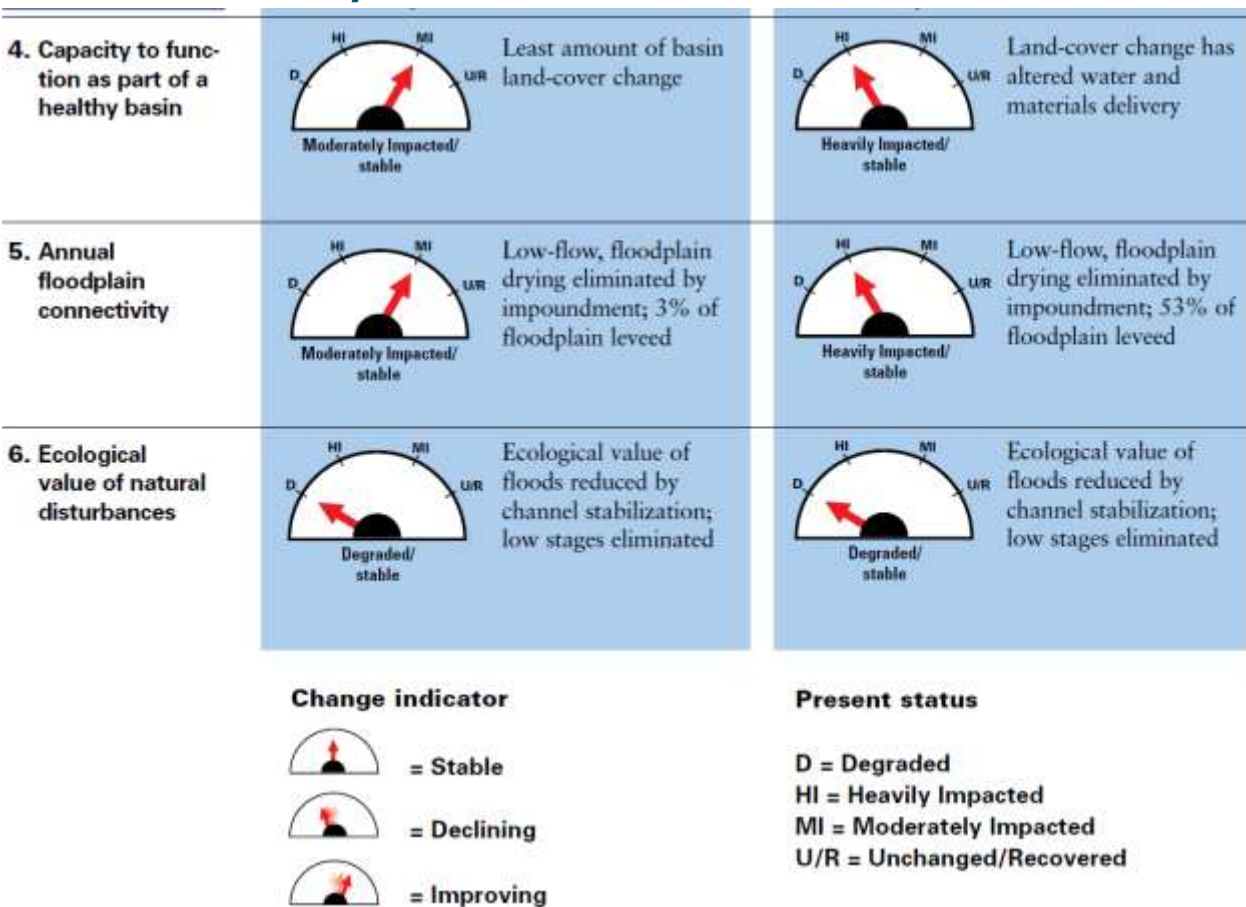
Conclusion

We need a Mississippi River Science Program



**AMERICAN
RIVERS**

We need standardized environmental communication from trusted experts and not influenced by polluting and/or extraction industries.



USGS. 1999. Status and Trends Report for the Upper Mississippi River

		Upper impounded			Impounded	Unimpounded		
		Pool 4	Pool 8	Pool 13	Pool 26	Open River	La Grange	
Water quality	Main channel suspended solids (flow-normalized concentration)	▼	▼	■	▼	▼	▼	
	Main channel nutrients (flow-normalized concentration)	Nitrogen	▲	■	▲	■	▲	▼
		Phosphorus	▼	▼	▼	▼	■	▲
	Aquatic vegetation	Chlorophyll <i>a</i>	■	■	■	■	■	~
Backwater hypoxia (dissolved oxygen < 5 milligrams per liter)		Summer	~	~	~	~	■	~
		Winter	▲	~	~	■	■	■
Submersed aquatic vegetation prevalence		▲	▲	~	■	■	■	
Invasive submersed species	▼	▼	▼	■	■	■		
Aquatic vegetation diversity	~	▲	~	■	■	■		
Free-floating plant dominance	▼	▼	▼	■	■	■		
Emergent vegetation	▲	▲	■	■	▲	▲		
Fisheries	Fish community	■	■	■	■	■	■	
	Lentic fishes	▲	▲	■	■	▲	▼	
	Lotic fishes	■	■	■	■	■	■	
	Nonnative fishes (excluding <i>Cyprinus carpio</i> [common carp])	■	■	■	▲	■	▲	
	Forage fishes	▼	■	■	▼	▼	▼	
	Recreationally valued native fishes	■	▲	▲	▼	■	▼	
Commercially valued fishes	Native	■	▲	▲	■	■	▼	
	Nonnative	▼	▲	▲	▼	▼	▼	

EXPLANATION

▲ Significant long-term increase ▼ Significant long-term decrease ■ No trend ◆ No data available or analyzed ~ Dynamic trend

USGS. 2022. Status and Trends Report for the Upper Mississippi River.





Standard models and inputs need to be developed and agreed upon for the Mississippi River.



It's time for the science agencies to have a more prominent role on the Mississippi River.



Olivia Dorothy, Director, Mississippi River Restoration Program
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Life Depends on RiversSM



<https://bit.ly/USGS-Forum>