



# Mississippi Headwaters: The Business Case for Conservation

# About the authors and their methodology

This report is a collaboration among McKinsey, The Nature Conservancy, and Ecolab to analyze the benefits and costs of improving water quality in the Mississippi Headwaters through land preservation and restoration

McKinsey & Company



Sources of insight and data and include:

- **More than 50 studies and data sources** from environmental research, state and federal reports
- **More than 15 interviews with experts** from Minnesota Pollution Control Agency, Explore Minnesota, other conservation efforts across the United States, universities, Ecolab, McKinsey, and TNC
- **Six case studies** of land conservation and water quality preservation across the US
- **Primary geospatial analysis**



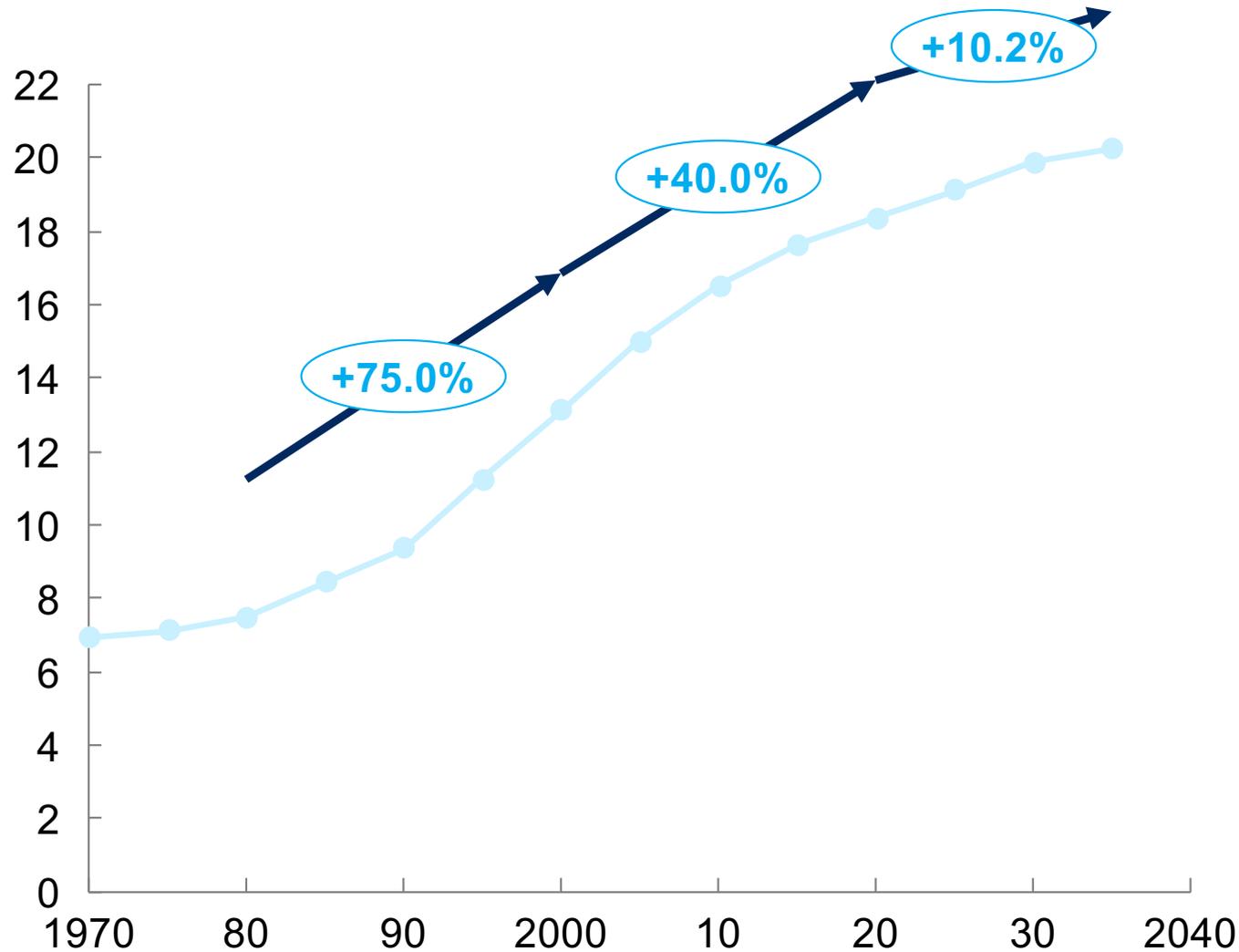
Minnesota Pollution Control Agency



# We have a problem – pollution in the Mississippi River Headwaters is rising

## Average nitrogen loads in the Mississippi River Headwaters

Kilograms of nitrogen, millions



Nitrogen is just one pollutant entering the Mississippi River

Others, like phosphorus and chloride, show similar increases

# Conversion of natural lands to housing, food production and industrial development is a major cause of pollution in the Mississippi River Headwaters

Land conversion causes decreased water quality because it ...



## Increases pollutant use on land such as:

- Nitrogen and phosphorus in fertilizers for crops and lawns, sewage, and manure
- Chlorine in road salt
- Bacteria and viruses in sewage and manure

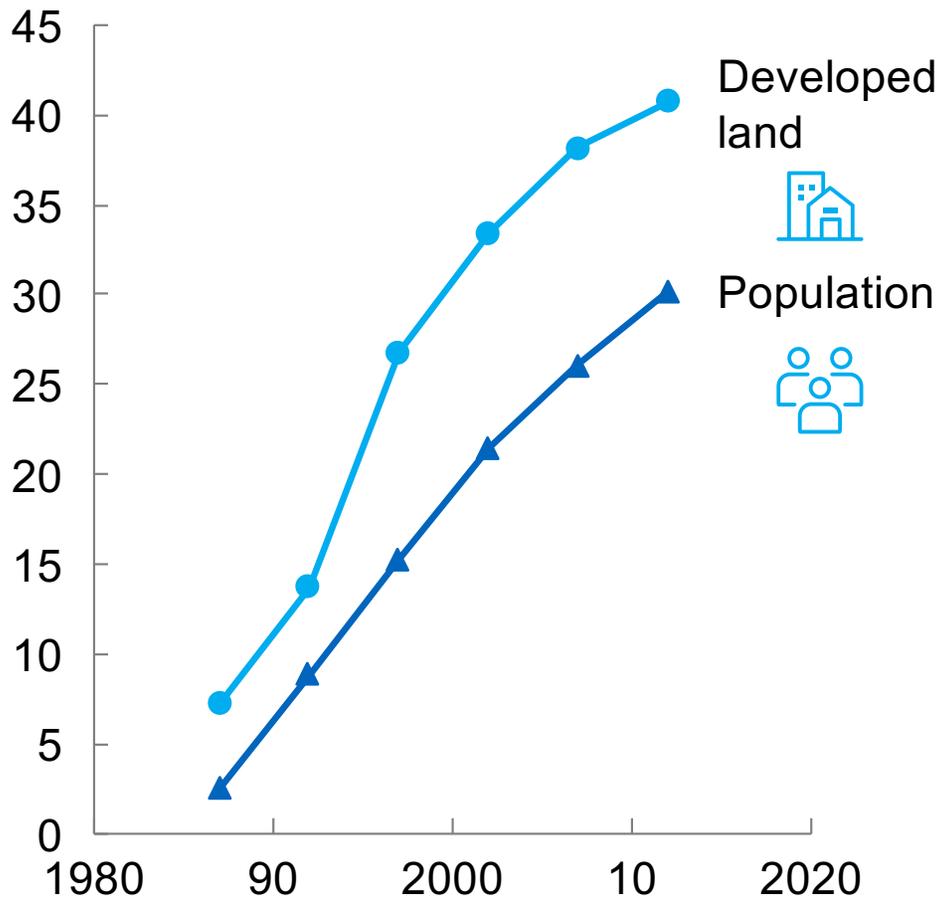
## Decreases natural lands available to filter pollutants

- From 2007 to 2012 Minnesota had the:
- Highest wetland loss
- Second highest rate of deforestation

# Land conversion in Minnesota is continuing as our population and economy continue to grow

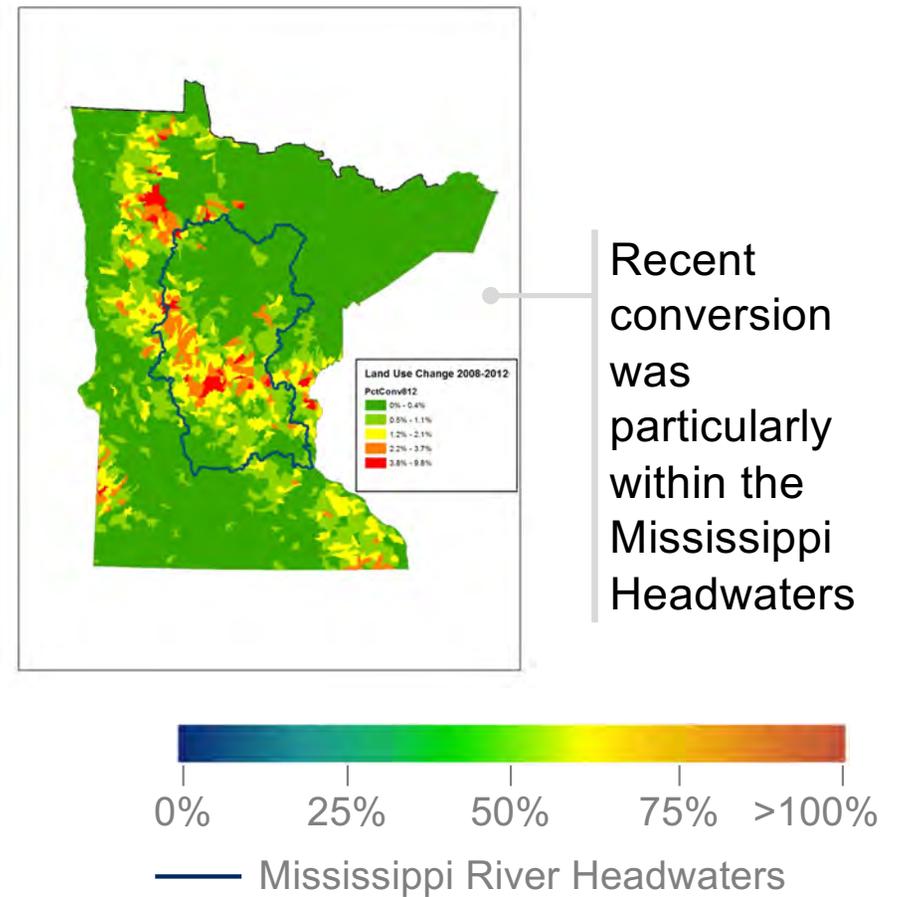
About 100,000 acres were converted for development from 2007 to 2012

Percent growth since 1982



About 250,000 acres were converted to cropland

Relative cropland expansion, 2008-2012<sup>1</sup>



<sup>1</sup> Map shows new cropland in 2012 since 2008. In red hotspots, cropland more than doubled.

The negative impact of land conversion on water quality has already been observed in Southern Minnesota throughout the Minnesota River Basin

In the Minnesota River Basin little natural land remains

And water quality has degraded

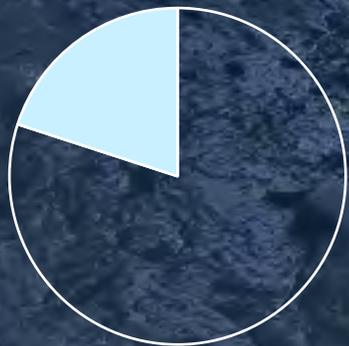
Majority of water bodies cannot support aquatic life or are unsafe for swimming



**90%**  
**wetlands**  
**drained**



**57%**  
**of lakes**



**80%**  
**of land converted**

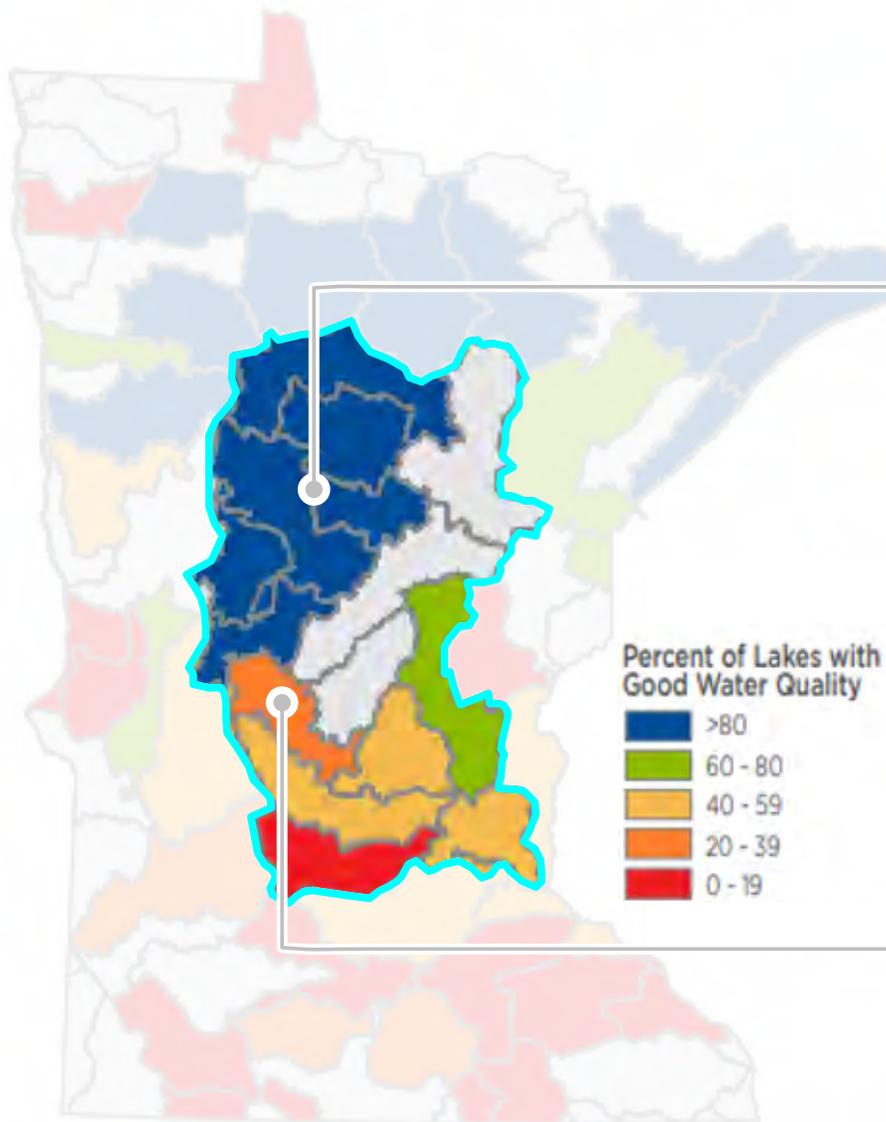


**80%**  
**of rivers**  
**and streams**

# And the Mississippi Headwaters is quickly heading in the same direction

## Water quality in Minnesota's lakes

— Mississippi River Headwaters



Beautiful lakefront homes and resorts  
Gull Lake in Brainerd



Toxic algae blooms  
Little Rock Lake in Benton County



We face a clear choice in the Mississippi Headwaters:  
Protect our clean water now, or try to clean it up after  
we've polluted it



Minnesota River

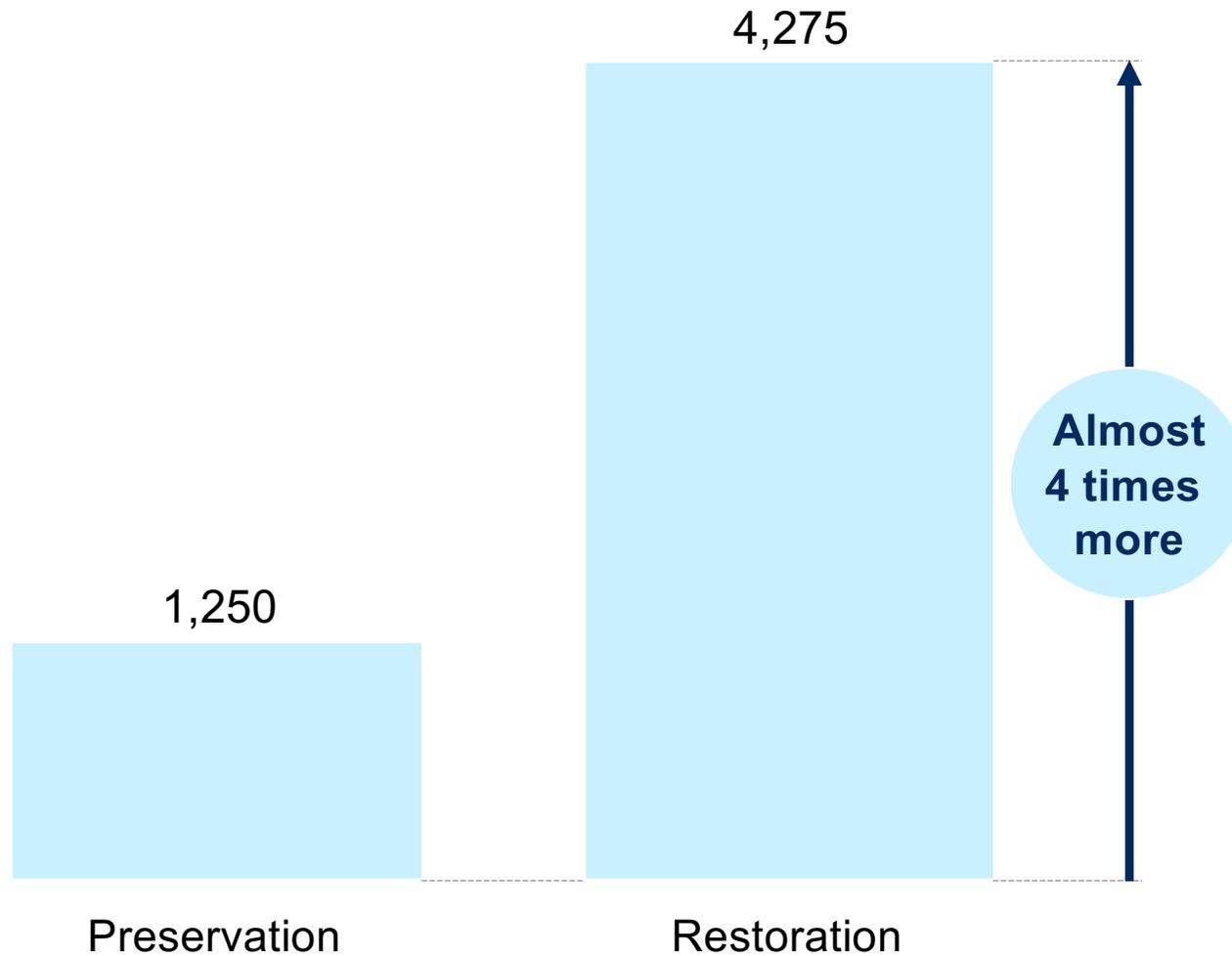
Mississippi River

Once a river is polluted, it is very expensive to clean up

Estimates to clean up the Minnesota River are around

**\$2 billion**

Costs for the Mississippi River Headwaters, a larger watershed, would be higher



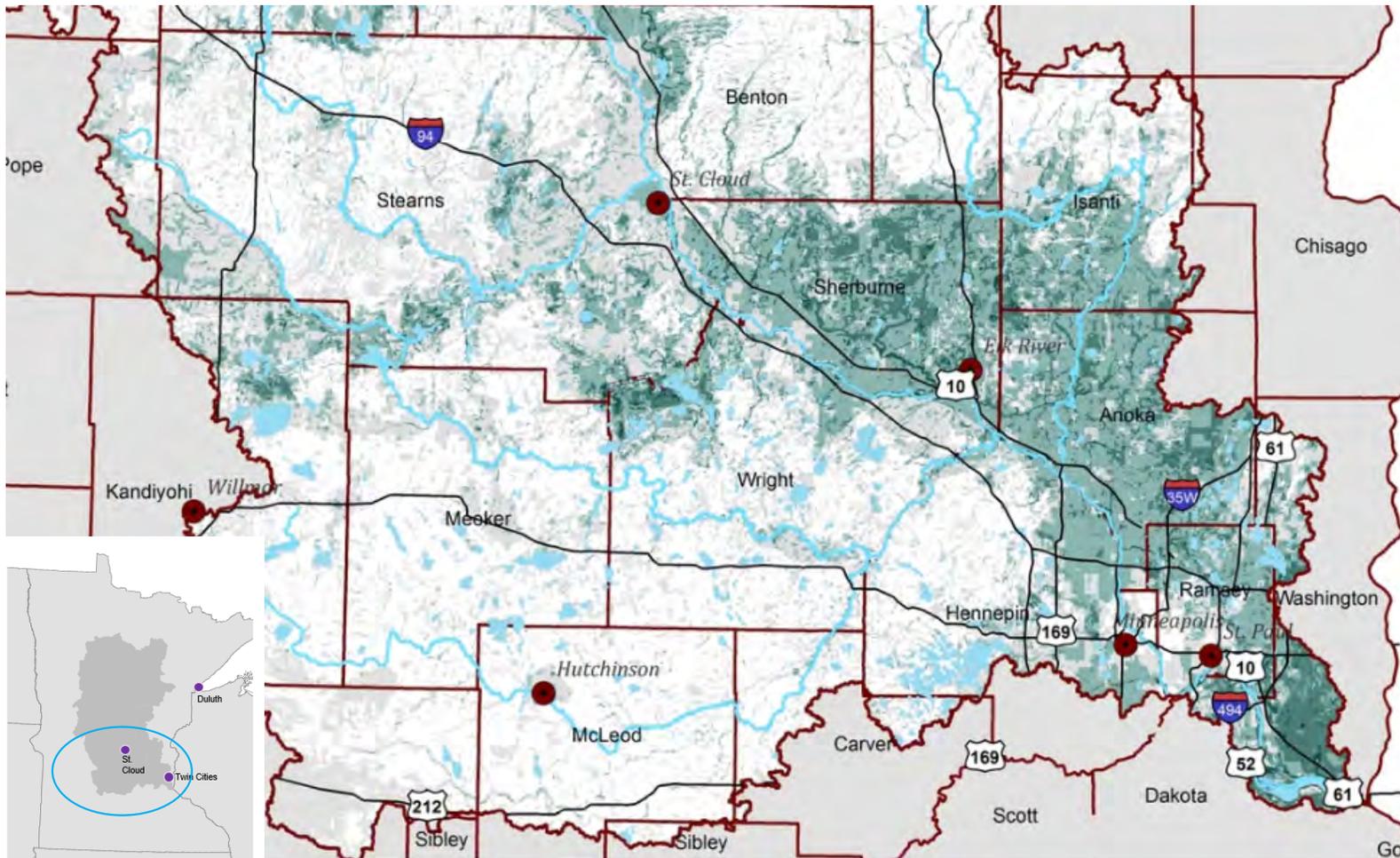
Average cost per acre in Minnesota, \$



It costs almost four times more to restore the land around a polluted river than to protect the river before it is polluted

# The Nature Conservancy has proposed a highly targeted plan to protect and restore the most critical 200,000 acres

Multiple benefits analysis prioritized the most critical 200,000 acres, less than 2% of the 13 million acre Mississippi Headwaters



Darker areas deliver the highest number of benefits

Note: Map shows subset of plan. Analysis was conducted for 100% of Headwaters

SOURCE: The Nature Conservancy

Cost of proposed plan to protect Mississippi River is \$0.4 – 0.6 billion

Estimates to protect the Mississippi River Headwaters are around

**\$0.4 – 0.6 billion over 10 years**

Plan includes...

Restoring  
**100,000**  
acres  
of land



Protecting  
**100,000**  
acres of  
wetlands,  
grasslands,  
and forests

**\$0.4 –  
0.6** billion

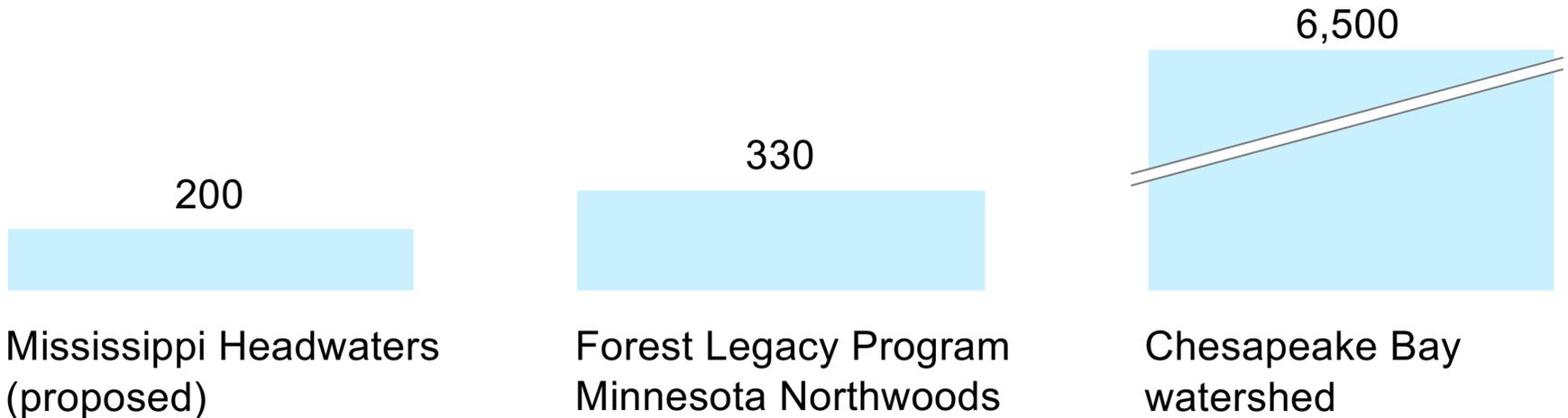


- Investments would include protecting up to 100,000 acres through conservation easements from willing landowners, with minimal impact on local tax revenues

# The Nature Conservancy has seen success from similar programs

## The Nature Conservancy

# of acres protected or restored



### Benefits observed

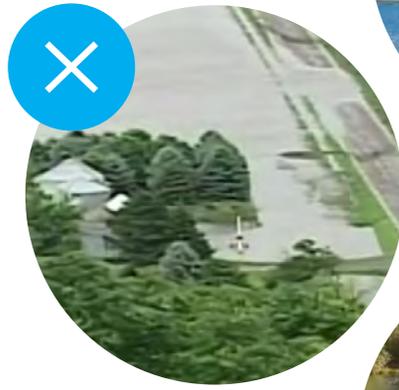
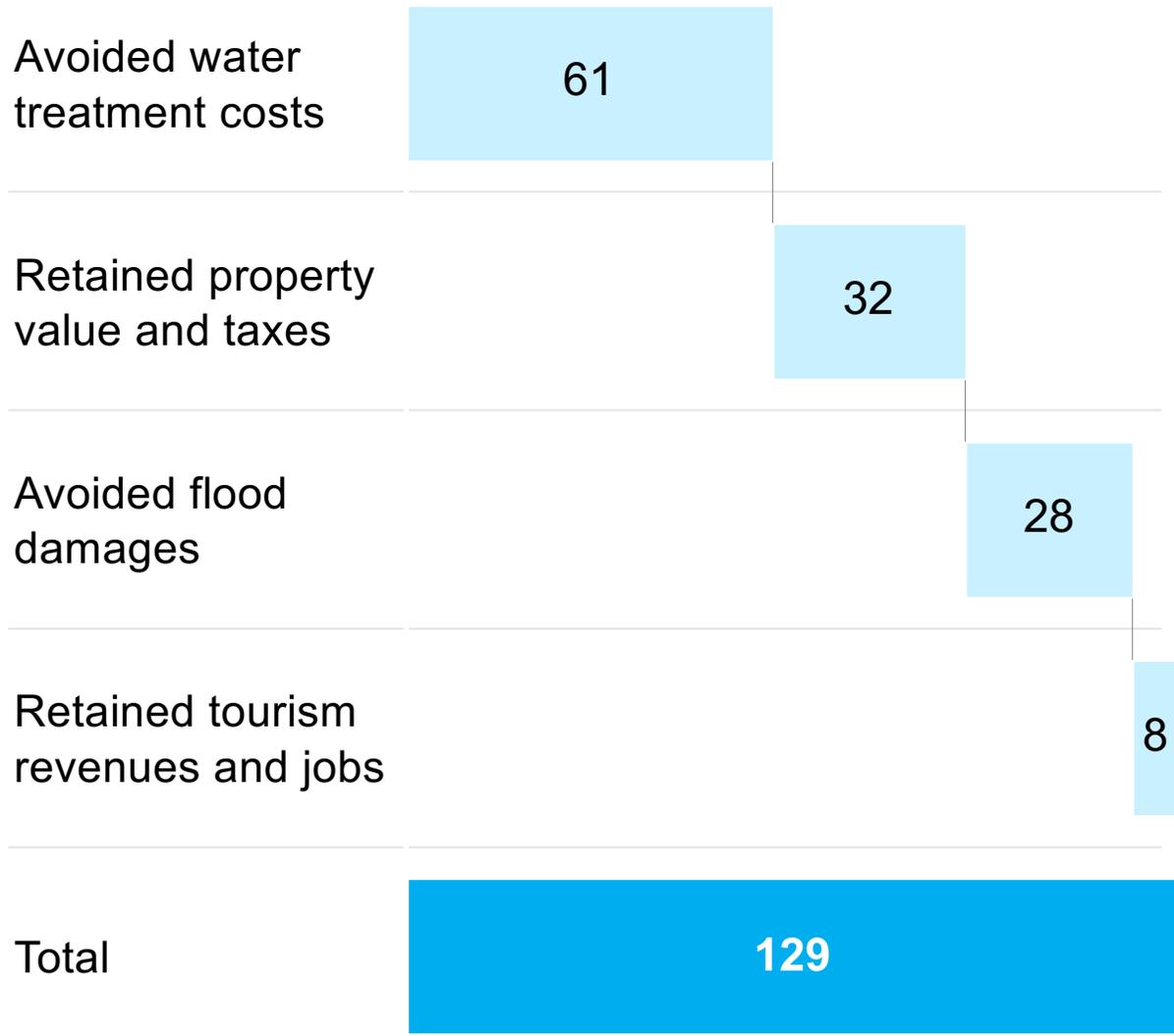


Land continue to provide forest products, jobs, access to outdoor recreation, and tourism revenues

Generates an estimated **\$24 billion** from retained tourism, avoided water treatment costs, cleaner air, etc.

# The plan would help protect about \$130 million in direct benefits

Benefits of restoring or preserving about 200,000 acres in the Mississippi Headwaters  
 \$ millions, 2020-2050<sup>1</sup>



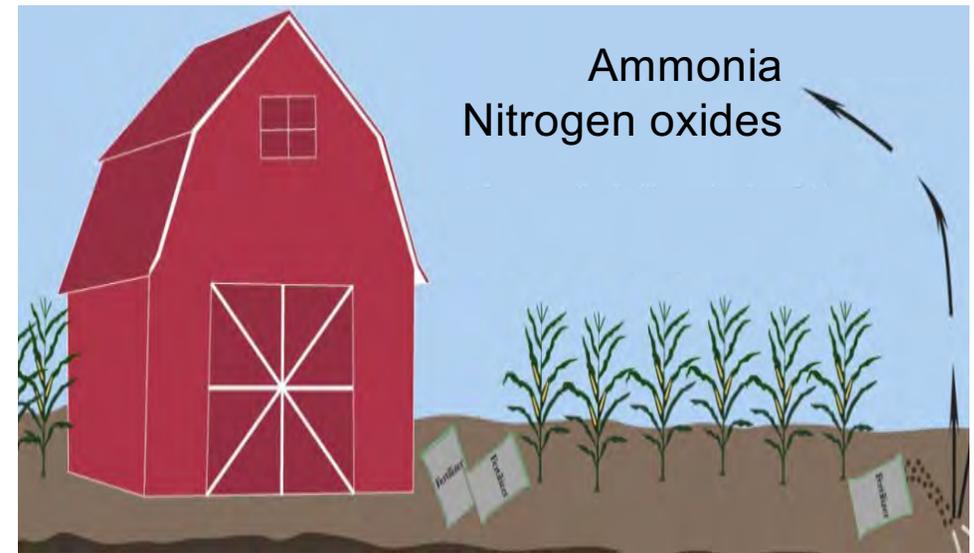
<sup>1</sup> Present value figures from 2019 to 2050, assuming benefits begin accruing the year restored or protected acres are purchased, discounted at 2.875% as recommended by the Bureau of Reclamation for federal water infrastructure projects.

Additional indirect benefits, such as clean air, would be worth \$360 million

**\$243 million in carbon mitigation**



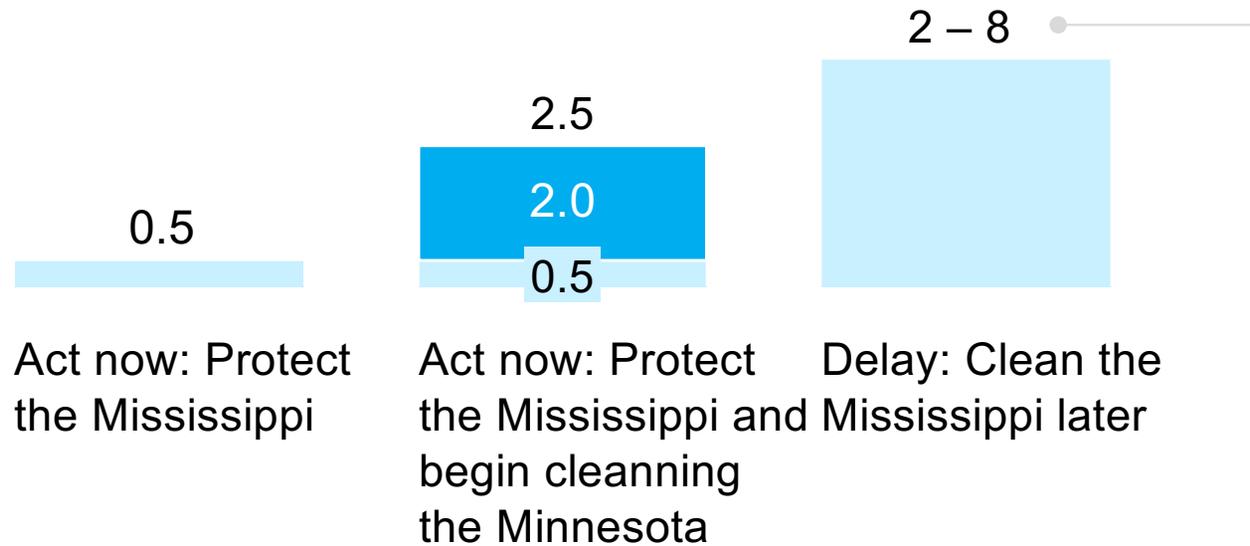
**\$116 million in public health benefits from cleaner air**



**Total Direct and Indirect Benefits = \$490-500 Million**

# Protecting the Mississippi River Headwaters now avoids billions in future costs and allows us to enjoy clean drinking water and clean rivers

## Estimated costs of protection and restoration \$ billions



■ Minnesota River ■ Mississippi River

**Delaying action will carry costs beyond the \$3-8 billion in clean up, some of which cannot be restored, including:**

- Years of living with polluted rivers and lakes
- Higher water treatment costs
- Lost property value
- Lost tourism revenues and jobs
- Increased flood damages
- Lost biodiversity



# Executive summary



Clean water is crucial for the health of Minnesota's economy and people. Natural lands such as forests, grasslands, and wetlands act as nature's filtration system and are important for keeping our water clean



However, our water quality is at risk. Pollution in our water is increasing as the natural lands in the Mississippi Headwaters convert to development, farmland, and industry increasing the pollutants entering the system and reducing the presence of natural filters



We have already seen the negative impact of land conversion on water quality in the Minnesota River Basin and expect similar outcomes in the Mississippi Headwaters if it is not protected



We face a choice: to protect our waters now and prevent further pollution or delay action and hope to clean them later



If action is delayed, it will cost billions to clean the Mississippi River Headwaters



Acting now to protect our water by preserving about 100,000 acres and restoring another 100,000 in the Mississippi Headwaters – a tiny fraction of the 13 million acres of the Headwaters – would cost \$400-600 million



Acting now retains \$130 million in direct benefits such as avoided water treatment costs, retained property values and tourism revenue and jobs, plus \$360 million in indirect benefits

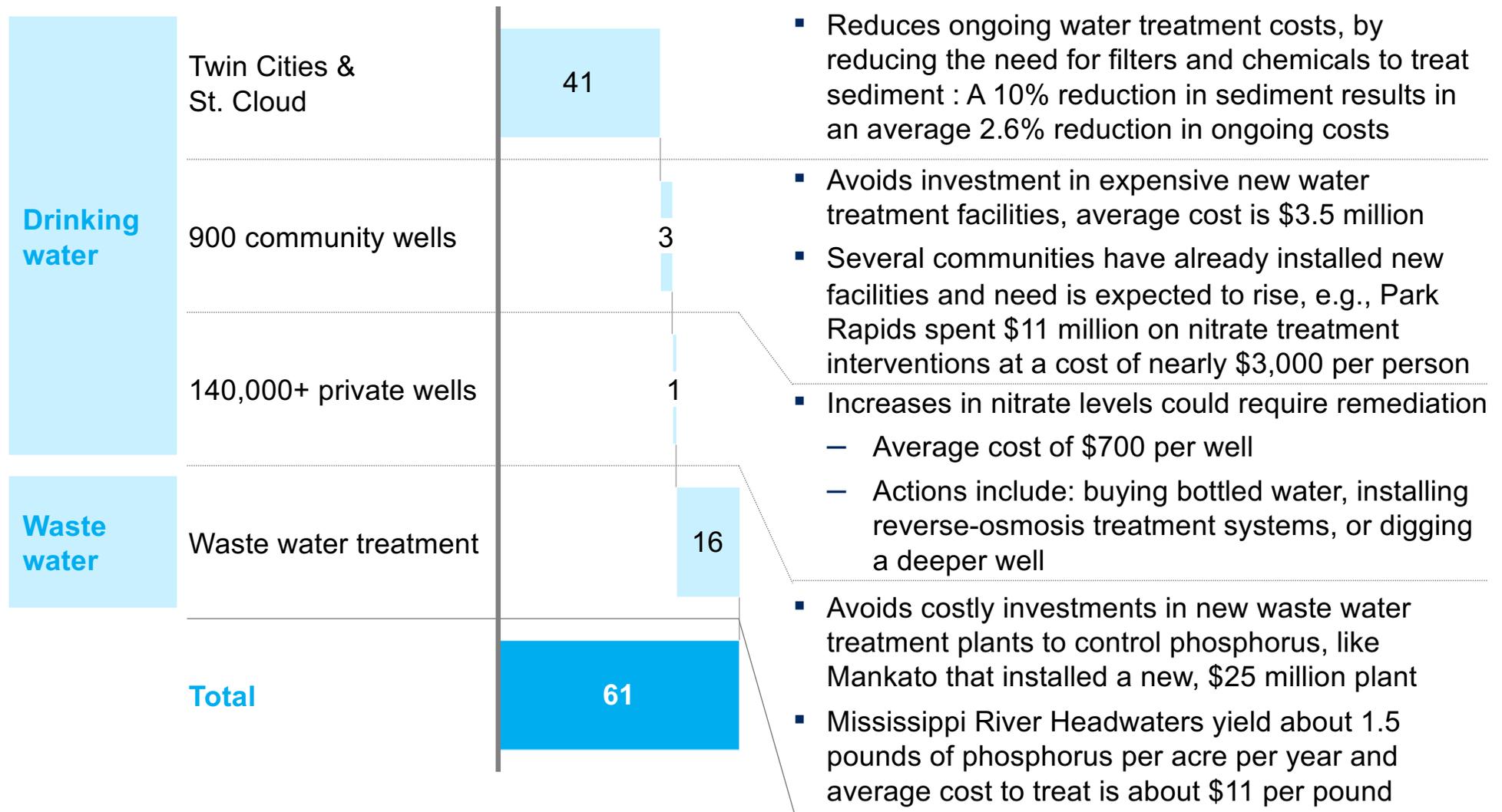


Protecting the Mississippi River Headwaters now avoids billions in future costs and allows us to enjoy clean drinking water and clean rivers

# The plan to act now avoids about \$61 million in water treatment costs

## Avoided water treatment costs from land conservation in Mississippi Headwaters

\$ millions, 2020-2050<sup>1</sup>



<sup>1</sup> Present value figures from 2019 to 2050, assuming benefits begin accruing the year restored or protected acres are purchased, discounted at 2.875% as recommended by the Bureau of Reclamation for federal water infrastructure projects.

Additionally, lakefront homeowners across the Headwaters will retain over \$30 million in property value



**Evan Trompeter wades through algae in Little Rock Lake in June 2018**

When nutrients, like nitrogen and phosphorus, enter the lakes algae grows

Algae growth reduces water clarity, chokes out native plants, threatens fish, and can be toxic leading to illness

The property values of the nearly **100,000** lakefront homes in the Mississippi Headwaters depend on clean, clear lakes for swimming, fishing, and boating



**Swimming is no longer an option**

# Acting now retains about \$32 million in property value and taxes

## Maintaining water quality and keeping our lakes clean and clear maintains property values at lakefront and near lakefront homes

- Land conservation reduces the phosphorus and nitrogen that enter our lake which in turn limits algae growth and helps maintain lake clarity
  - TNC's plan reduces the nitrogen load in the Mississippi by about 5% and similar reductions are expected in lakes
- **From 2020 to 2050 maintaining water clarity is worth about \$32 million**
  - Each Minnesotan lakefront homes loses about 0.5% of it's property value per foot of clarity lost
  - The average lakefront property is now worth around \$250,000
  - There are 80,000 to 100,000 lakefront homes in the Mississippi River Headwaters



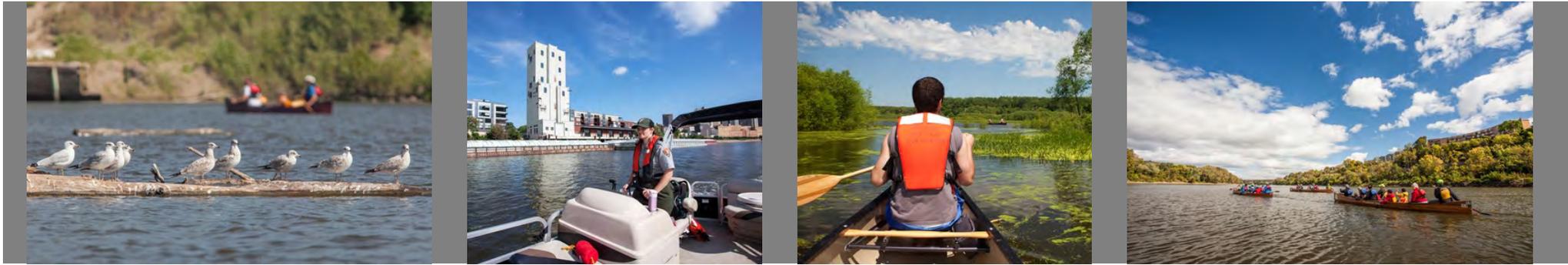
Preventing pollution of the Mississippi Headwaters also protects the economy of north central Minnesota, which is based on tourism

Tourism brings over **\$2.3 billion** annually to the counties in the Mississippi Headwaters



In the short term, keeping waters clean will save **200** jobs in resort industry

# Acting now retains about \$8 million in tourism revenues and jobs



## Maintaining water quality and keeping our lakes clean and clear also keeps out of state tourists visiting the Mississippi Headwaters



### Tourism revenues

- Each foot of clarity translates to 70 out of state visits lost per lake
- The average visitor spends \$130 visits per trip



### Jobs

- Tourism spend supports 160,000 tourism related jobs in the Mississippi River headwaters, especially in Anoka, Stearns, Wright, and Crow Wing
- Conservation plan would save around 200 jobs

## Acting now yields about \$29 million in flood control benefits

- **\$29 million in flood control benefits through 2050<sup>1</sup>**
  - Wetlands in Minnesota provide about \$54 per acre in flood control benefits by retaining storm waters and releasing them slowly
  - TNC's plan conserves 24,300 acres of wetland: 20,800 acres planned for and 3,500 protected from conversion
- Overall, Minnesota faces about \$100 million in flood damage annually – a figure that is likely to rise if the climate continues to become warmer and wetter



*June 2018 floods in Jackson, Minnesota*

<sup>1</sup> Present value figures from 2019 to 2050, assuming benefits begin accruing the year restored or protected acres are purchased, discounted at 2.875% as recommended by the Bureau of Reclamation for federal water infrastructure projects.