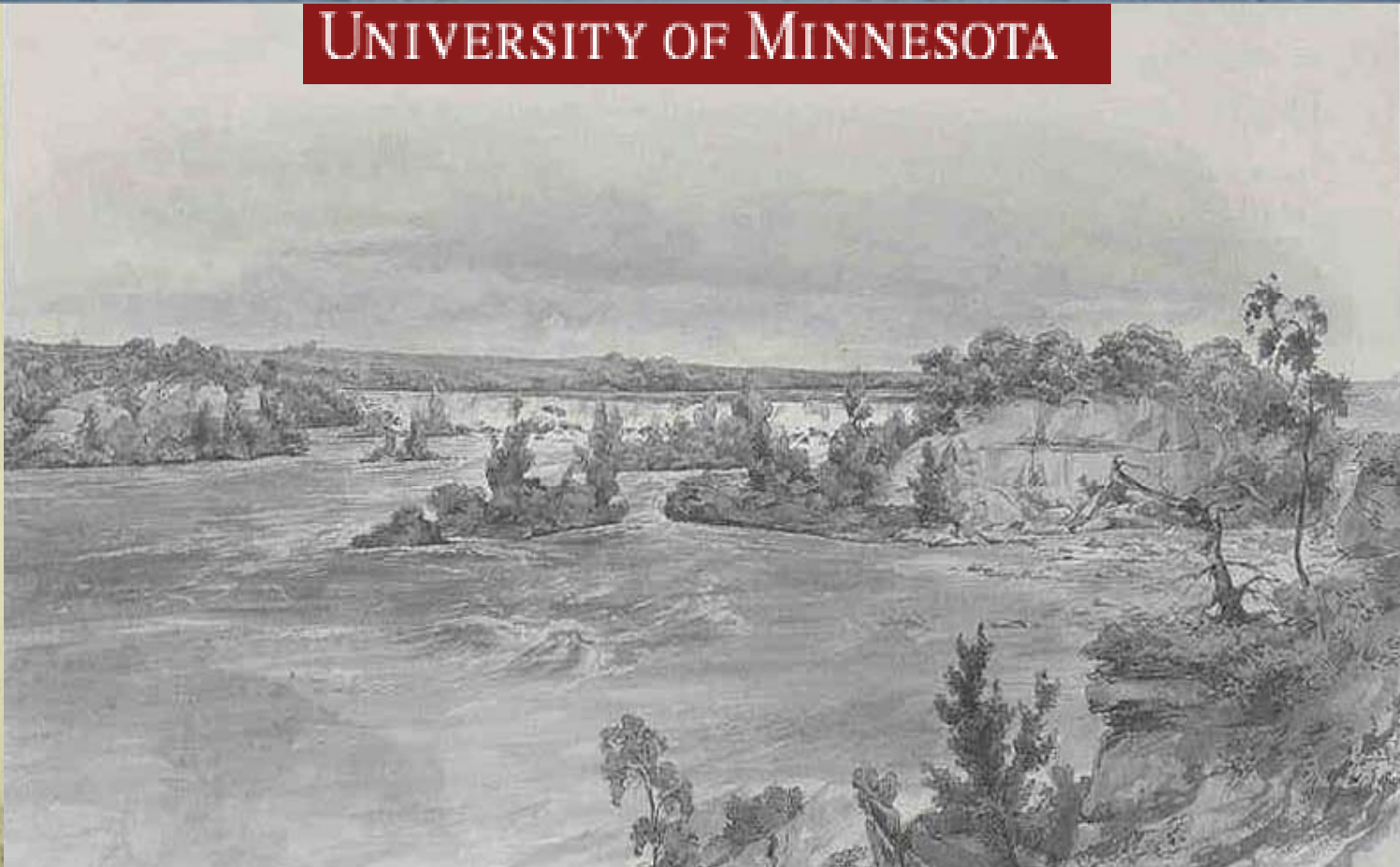


Feasibility of Restoration of the Mississippi River in the Twin Cities

Christian Lenhart, Lucius Jonett, John Nieber

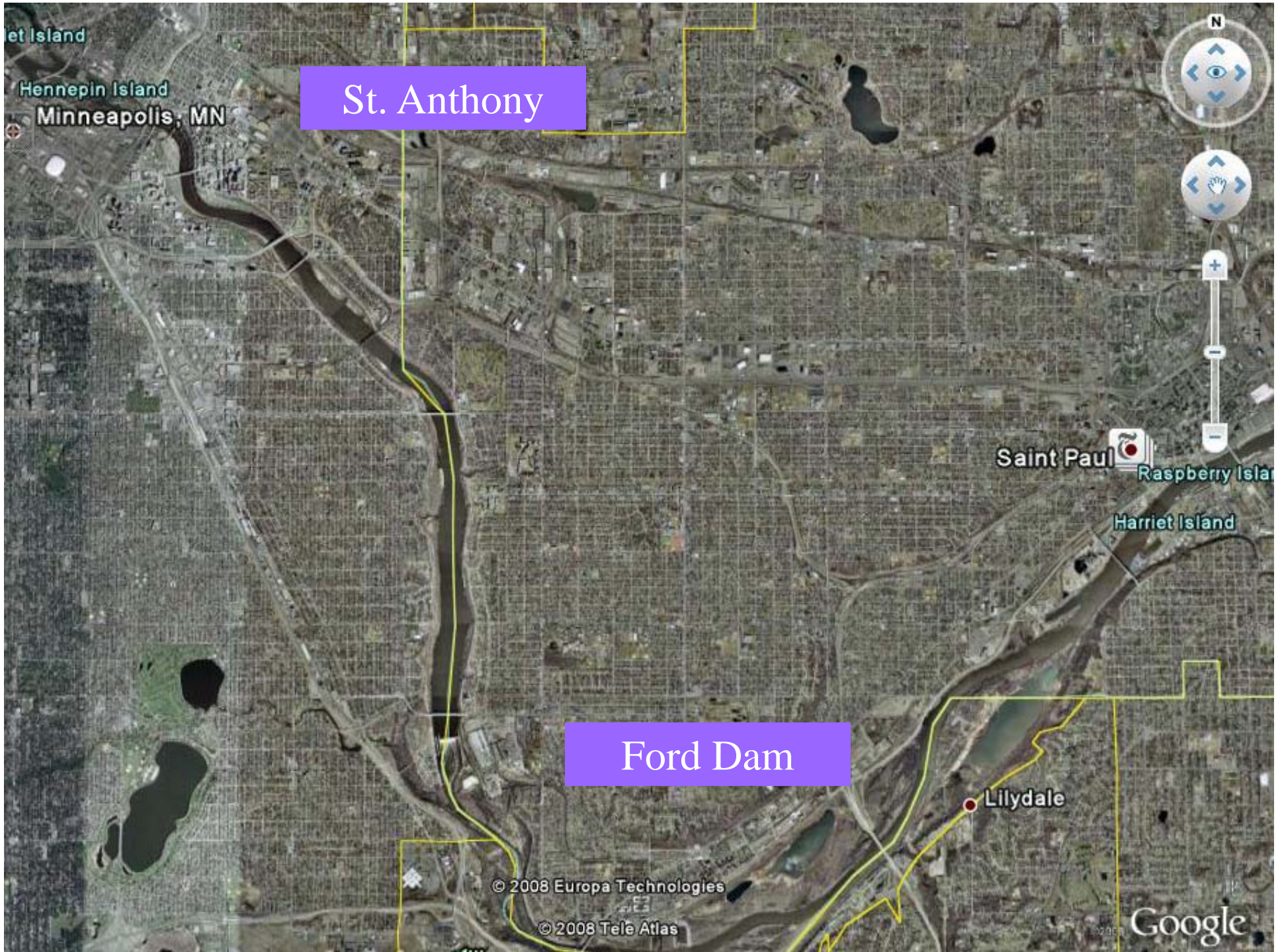
BIOPRODUCTS & BIOSYSTEMS ENGINEERING

UNIVERSITY OF MINNESOTA



Outline

- 1 Importance of gorge and falls
- 2 History
- 3 Motivation for study
- 4 Background: work on M.R.
- 5 Feasibility
- 6 Next steps



St. Anthony

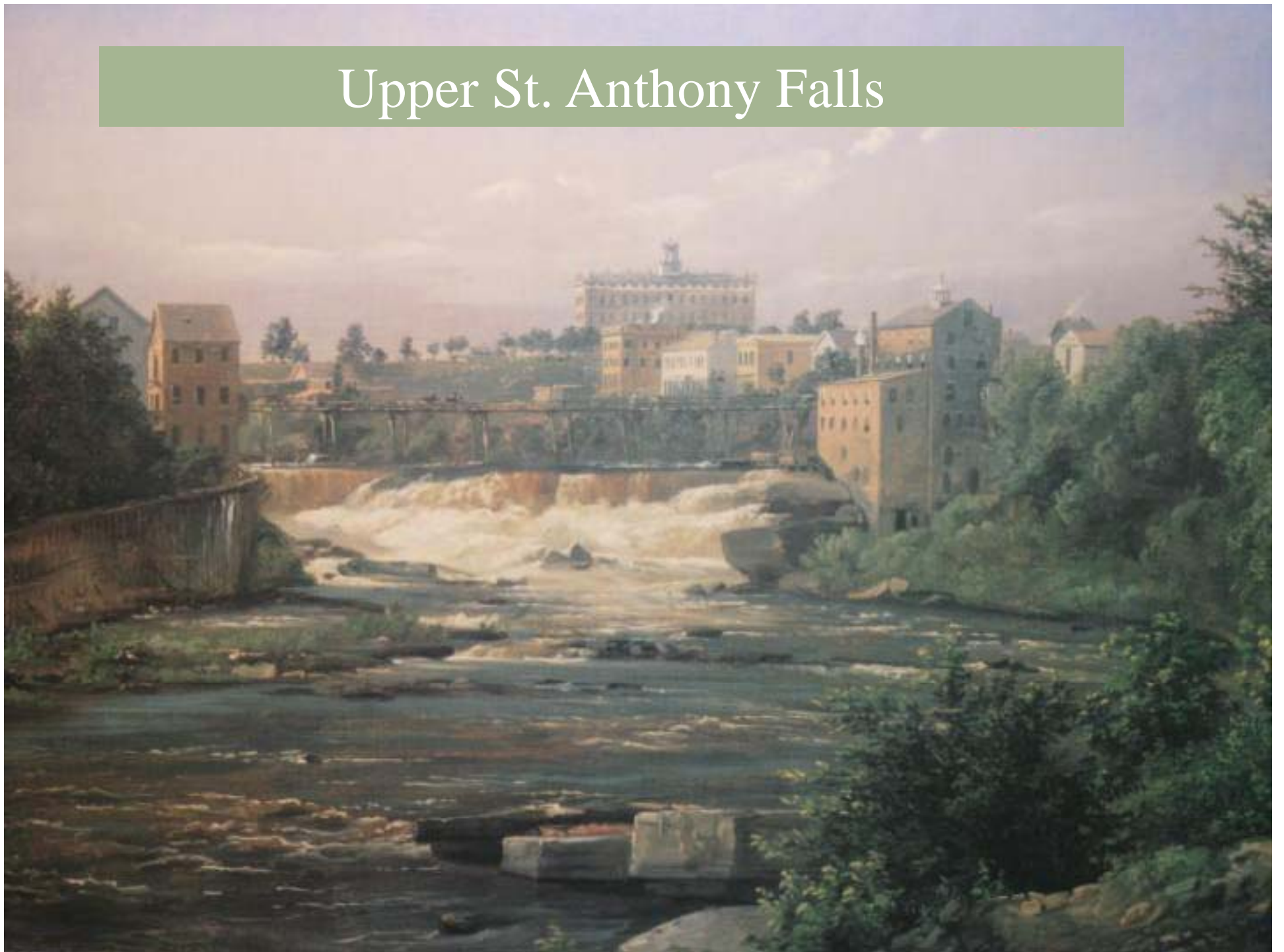
Ford Dam

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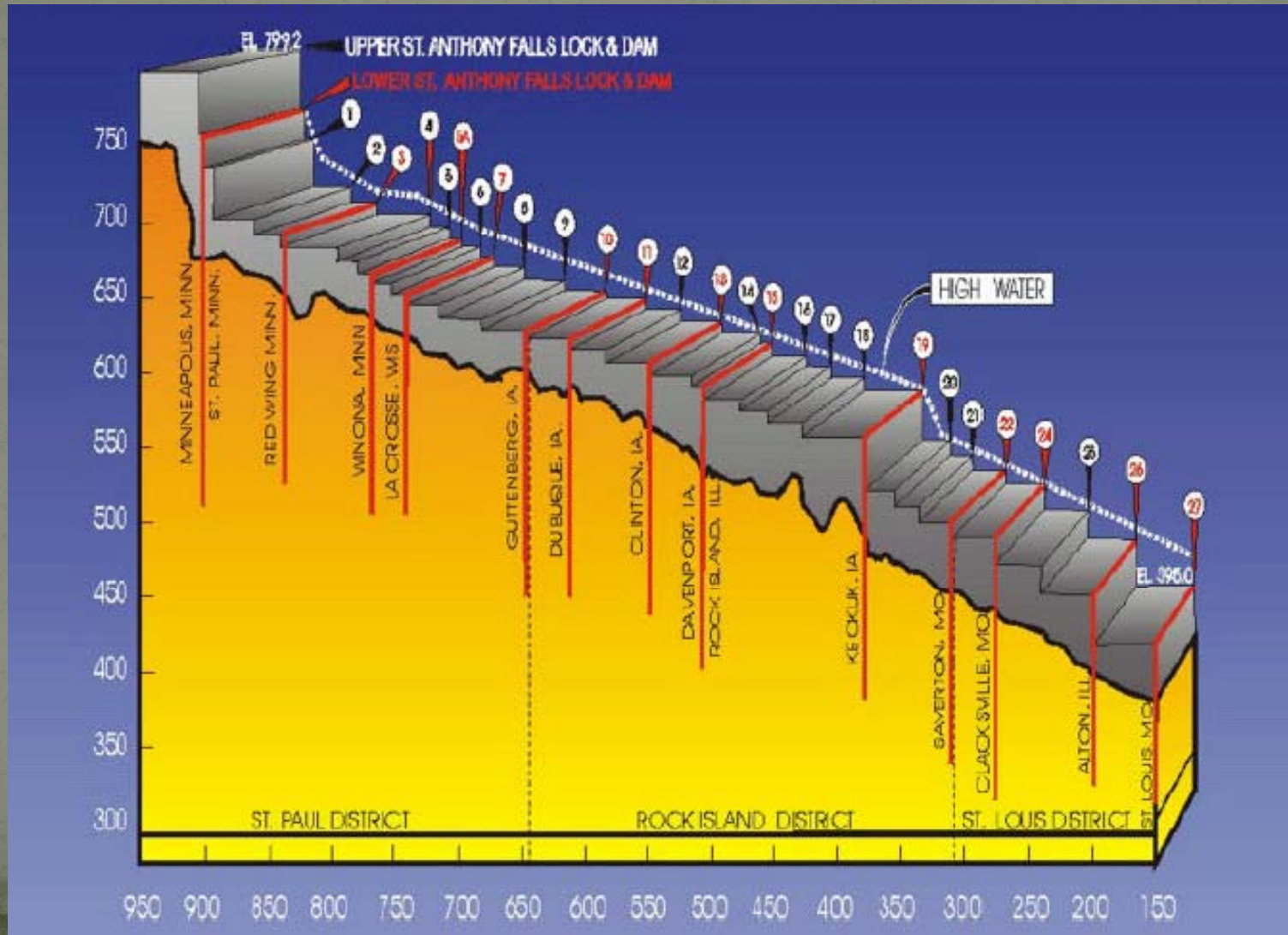
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Google

Upper St. Anthony Falls



High gradient for Mississippi



Potential fish and mussel species benefiting from rapids restoration



Darters of several species live in rapids habitat and also serve as hosts for several mussel species



Logperch are hosts to the rare snuffbox mussel



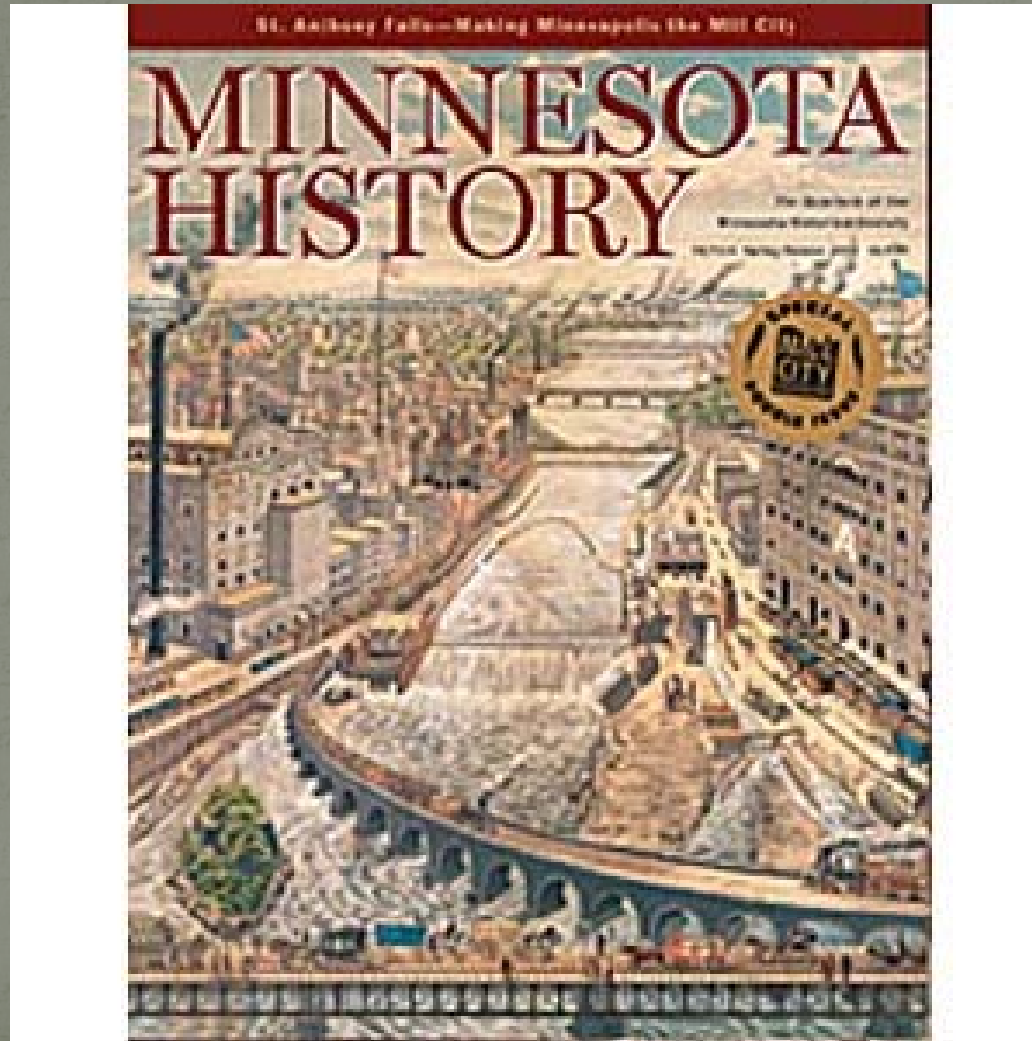
- Others- sturgeon & paddlefish
- Current species likely to benefit: walleye, smallmouth bass

Falls altered for saw mills



Rapids below St. Anthony Falls inundated by construction of the Ford Dam on the Mississippi River

Falls center of of Flour industry



River alteration for barges and hydropower: Ford Dam





Lower St. Anthony Dam-barge to Minneapolis

Image from the Metropolitan Design Center Image Bank.

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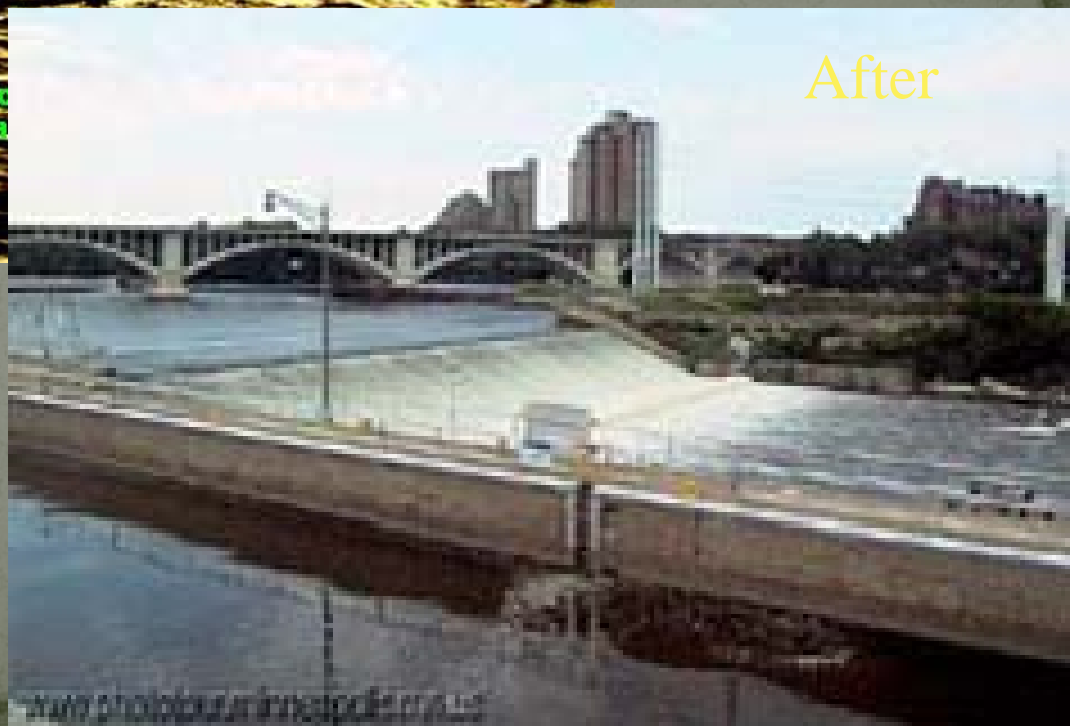
Please remember to use the credit line above.

before



Rapids below St. Anthony
construction of the Ford Dam

After



www.photoblog.it/stockphoto/

A new vision is needed

- Declining barge traffic, closure of upper harbor
- Economic benefits of barge traffic to Mnpls are questionable
- Conversion from industrial to commercial / recreational
- High cost of lock & dam maintenance and repair in long term infrastructure decay
- Valuation of ecological services
- Potential benefits; Ft. Snelling example

Dam removal vs. partial restoration

- Focus of this study on water level management at Ford Dam and Lower St. Anthony
- Plan for potential removal of Ford in long term (decades)
- Much can be gained by intermediate measures in short term (<10 years)

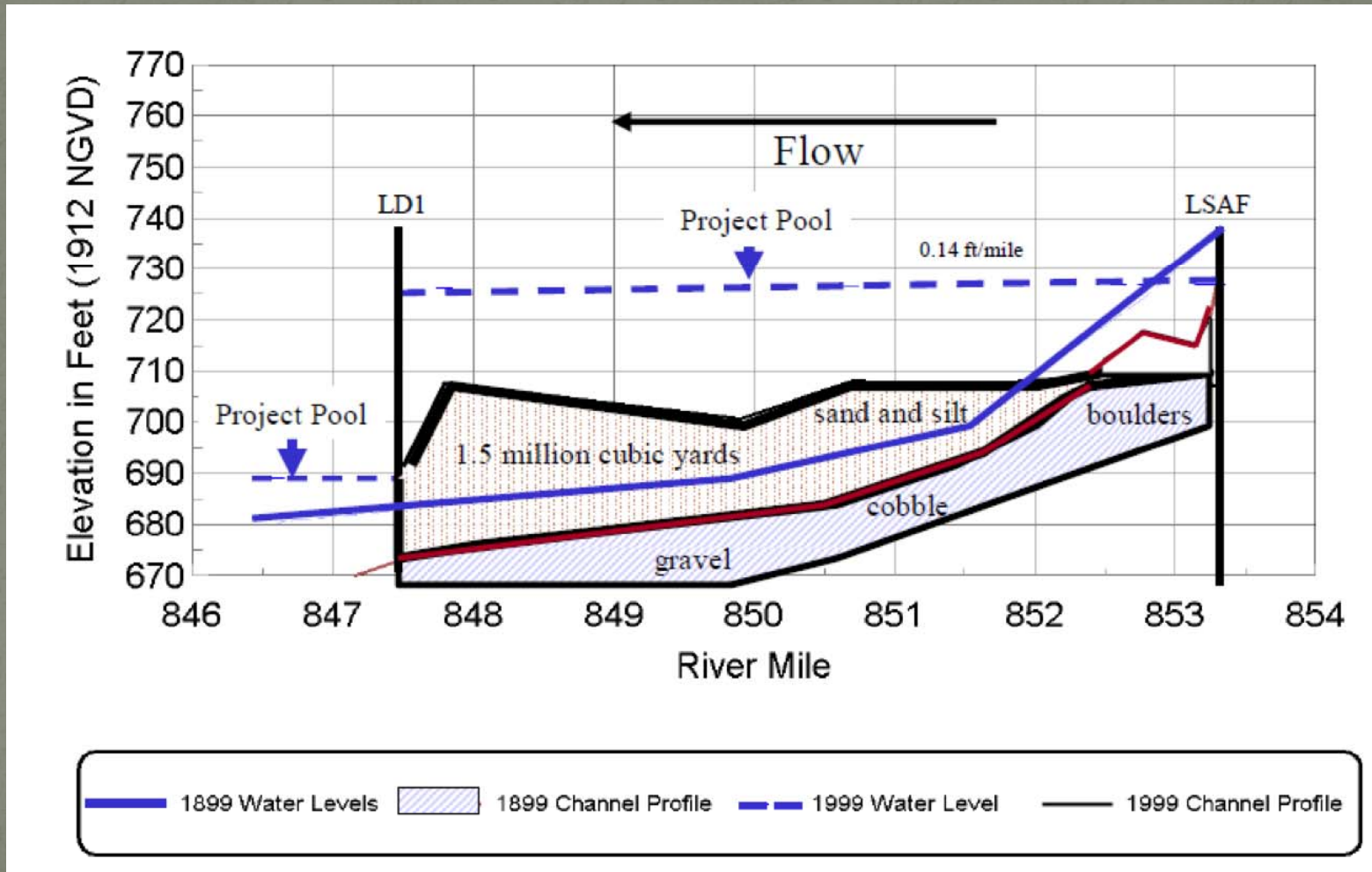
Feasibility approach - TEELOS

TEELOS categories	Explanation/examples
Technical	Physically possible?
Economic	Costs/benefits of project
Ecological	Species benefitted; invasive issues
Legal	Dams, barge operation, riparian rights
Operational	Logistical issues
Schedule	Timing of water level drawdown

Restoration actions categories

- Improve fish passage, reduce impacts at Ford Dam
- Water level management for water quality, habitat improvements and seasonal whitewater recreation
- Restore islands and floodplain habitats by use of dredge material and/or water level drawdown
- Improved public access
- St. Anthony Falls area – aesthetic, historic and cultural resources

Physical issues: sediment

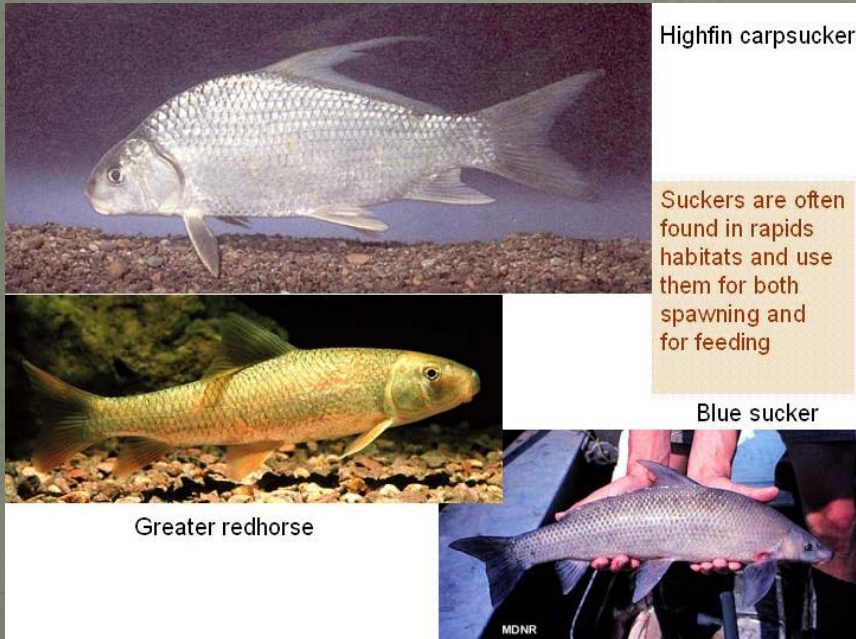


Island locations in gorge



Ecological issues

- Access to gravel/cobble spawning habitat
- Connectivity for:
 - Mussels
 - Fish



Feasibility– what can be done now? What would require dam removal?



- Dam removal
 - Full fish/mussel passage
 - Restoration of sediment / hydrologic regime
- Water level management
 - Seasonal rapids
 - Passage at high flows
 - Increased access to riparian zones
 - Cultural, historic, recreational features

Benefits of restoration

Ecological

- Restoration of a Minnesota natural landmark
- Improved habitat for fish, mussels, birds
- Fish passage and spawning grounds reestablished
- Improvements to water quality by flow level management ?

Recreation and aesthetics

- Parkland created by floodplain / islands (100s of acres) in the city
- Aesthetic attraction of falls and rapids
- Whitewater recreation in densely populated area
- Improved access to rivers for recreation, viewing
- Rock features – caves/caverns exposed, access to side waterfalls

Economic Benefits

- Riverfront development and enhanced property values
- Supports conversion towards residential/ recreational
 - Above the Falls plan
- Increased recreation/tourist traffic
- Decreased tax dollars spent on maintaining locks

COSTS

- Lost or reduced hydropower and barge traffic
- Loss of deep water lake-like environment

Lower St. Anthony, February '08



Recommendations

- More detailed scenario analysis (hydrologic, sediment transport, floodplain expansion, restoration, public access)
- Full valuation of ecological, recreational benefits
- Increase public awareness

Acknowledgements

- McKnight Foundation
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