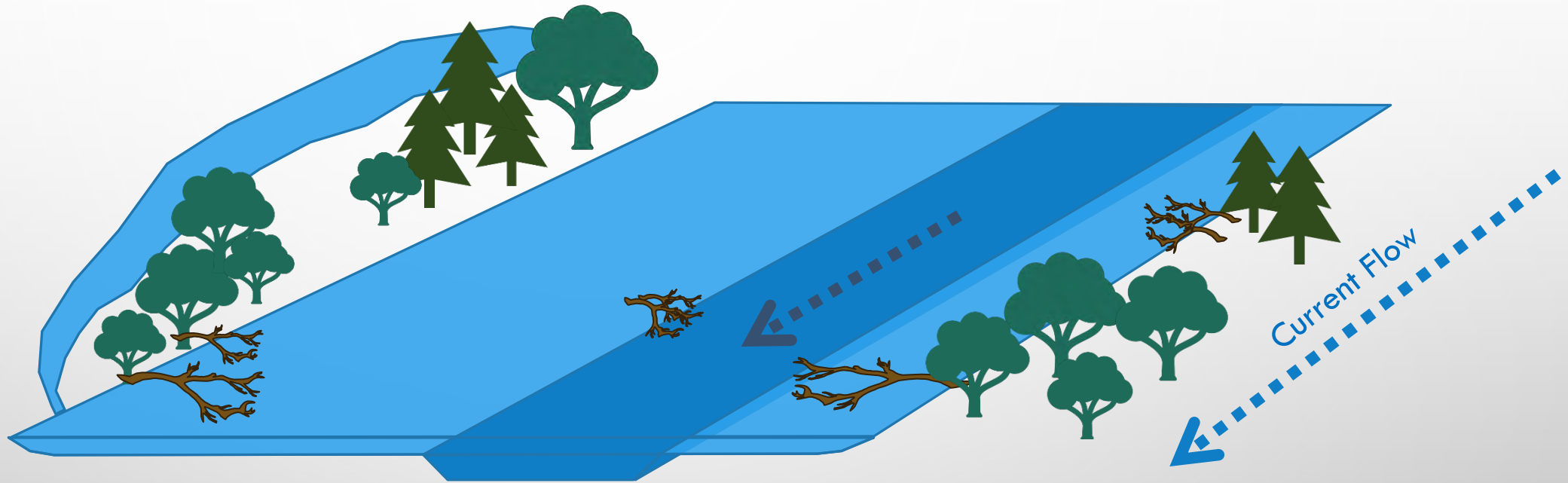


Part 2: Potential Impacts of Dredging on Aquatic Life in the Grand River

Dan O'Keefe, Ph.D.
Michigan Sea Grant
Michigan State University Extension

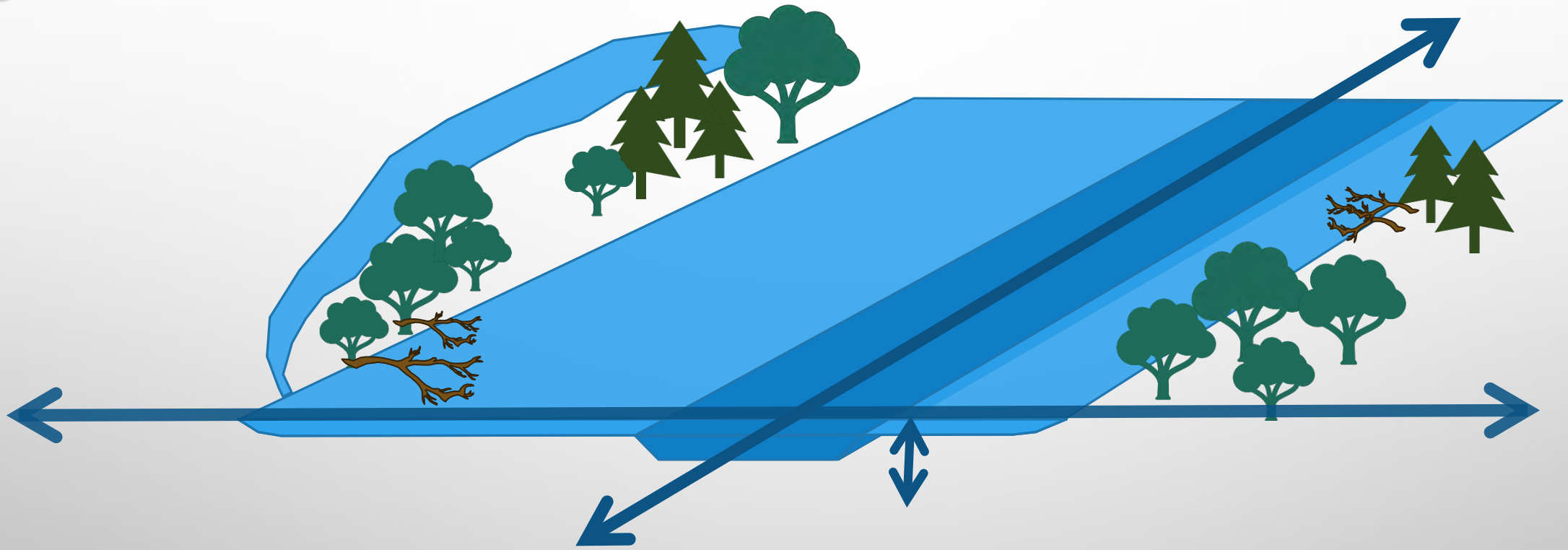


The Grand River Waterway is a river channelization project



River channelization involves straightening, widening and/or deepening of stream channels...and clearing or snagging operations (Mattingly et al. 1993)

The Four-Dimensional Nature of Rivers

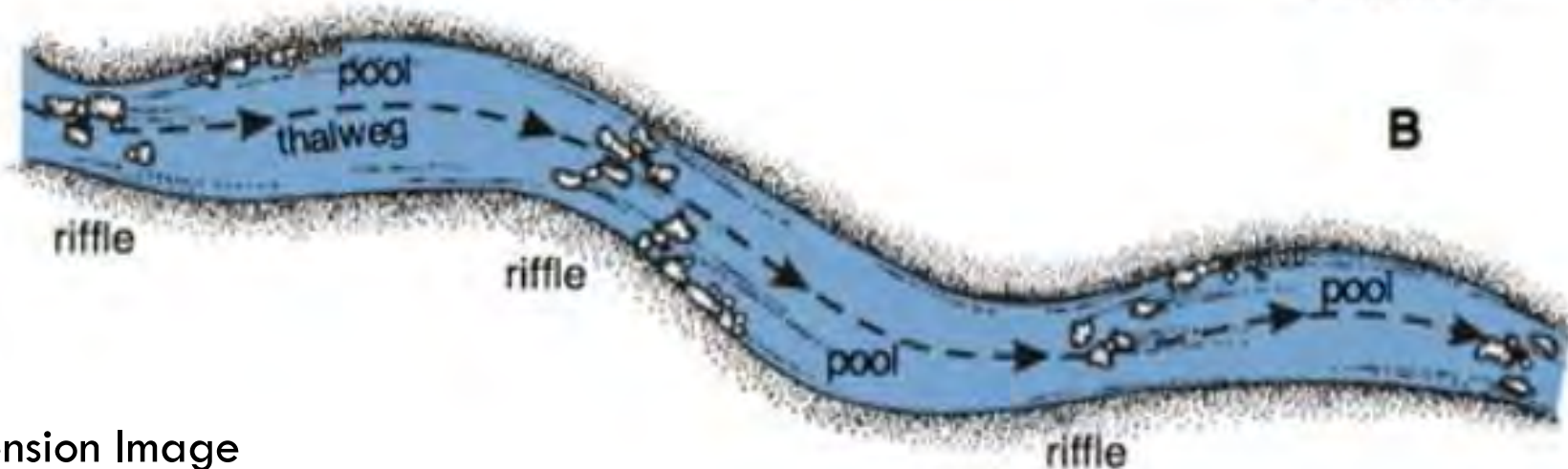
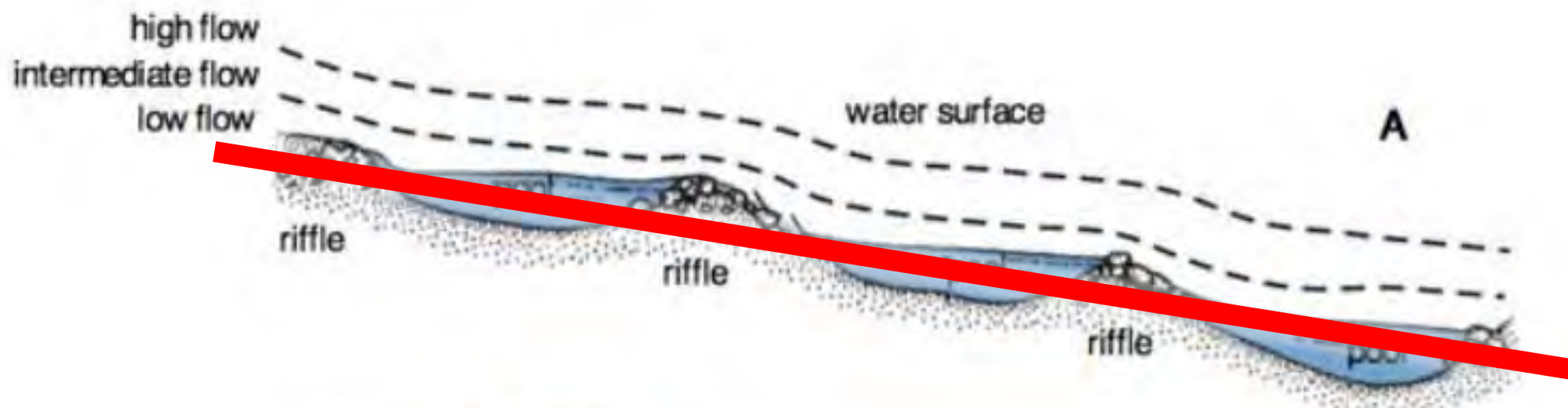


Vertical (depth)

Longitudinal (up and downstream)

Lateral (floodplains)

Temporal (through time) (Ward 1989)



NC State Extension Image



State Threatened
River Redhorse
Moxostoma carinatum



MDNR Image



MDNR Image



MDNR Image

MSU EXTENSION WORKING PAPER

- Literature review for Ottawa County Commissioners
- Intent was to identify potential impacts
- 41 sources cited, including:
 - 13 review papers on impacts of channelization
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Summary of Research Related to the Potential Physical and Biological Impacts of Dredging to Channelize the Grand River

A Working Paper, May 9, 2014 Version



Daniel M. O'Keefe, Ph.D.
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Introduction

The Grand River Waterway proposal is not a typical harbor dredging project, but rather a river channelization project that would remove roughly 50 acres of shallow habitat through dredging portions of the Grand River in Kent and Ottawa counties. The project seeks to create a 7-foot deep channel through a 22.5-mile stretch of the Grand River between Grand Rapids and Bass River State Recreation Area near Eastmanville.

The Grand River Waterway economic impact study stated that river channelization via dredging will "help return the river to its natural state" and that "increased recreational opportunities and improved water quality may generate up to 49,000 net new visitor days annually ... and an annual net new economic impact of up to \$5.7 million." Research suggests that dredging will not improve water quality. A more likely scenario is reduced water quality, increased erosion of private and public land, increased deposition of sand and silt in certain areas, and harm to fish and wildlife populations. This paper deals specifically with physical and biological impacts, but it is important to note that these have economic implications, as well.

The physical and biological impacts of the Grand River Waterway project would likely extend far beyond the 50

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RESEARCH ON PHYSICAL IMPACTS OF CHANNELIZATION AND BOAT TRAFFIC

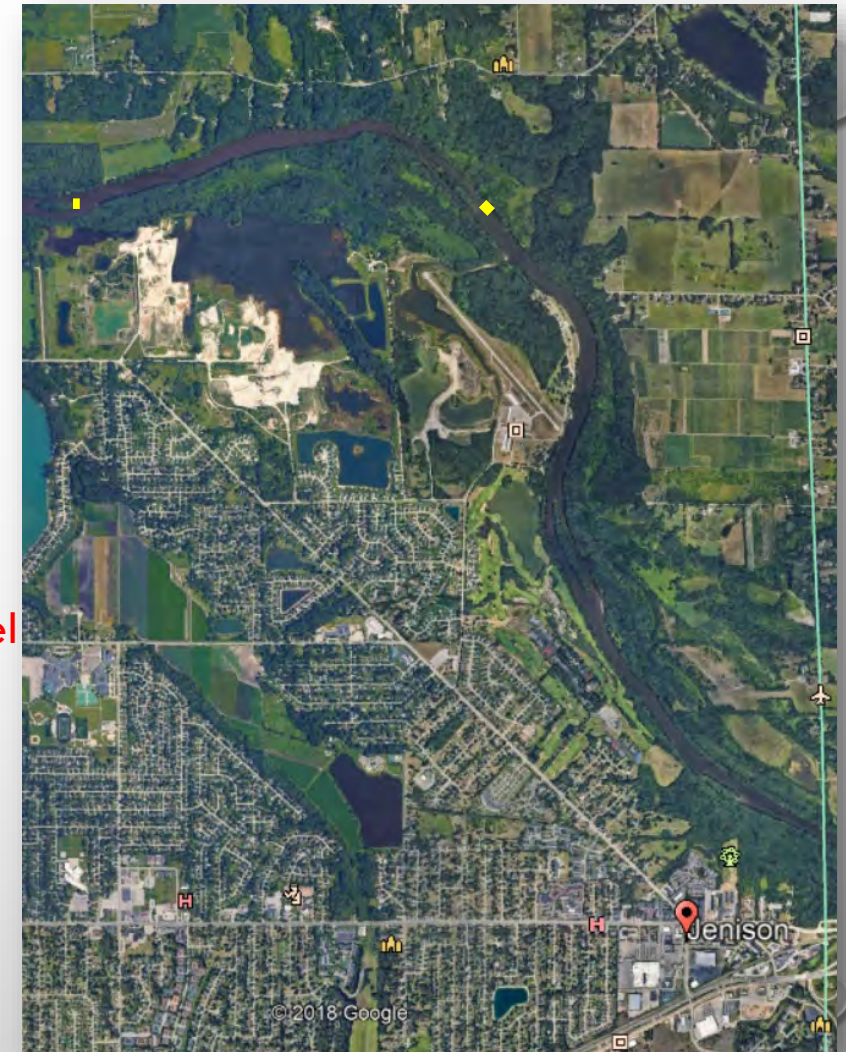
- Erosion after channelization dropped the bottom of the Homochitto River, Mississippi, by 15 feet and this led to development of a sand-filled floodplain over 3,000 feet wide
- Peak sediment load increased 7x after dredging to channelize River Main, Ireland
- Side channel areas were nearly eliminated by channelizing Missouri River, Nebraska
- Channelization eliminated riffles and pools in many Indiana streams
- Boat wakes generated 100x more power than natural waves on Waikato River, New Zealand, and led to increased erosion that generated 20x peak suspended sediment

RESEARCH ON BIOLOGICAL IMPACTS OF CHANNELIZATION

- 90% decline in benthic macroinvertebrates after channelization of River Moy
- Ratio of salmon and trout to other fish declined from 14:1 to 5:1 in River Boyne
- Mean largemouth bass weight was 8x higher in un-channelized sections of Luxapalila River
- Biomass of fish was 80% lower in channelized sections of Chariton River
- A study of 40 streams in Indiana found ~50% fewer sensitive fish species in channelized areas
- U.S. Army Corps 1978 Grand River feasibility study noted impacts to spawning fish
- DNR Wildlife Action Plan and Grand River Assessment state channelization as major threat

GRAND RIVER WATERWAY COORDINATED THESE STUDIES

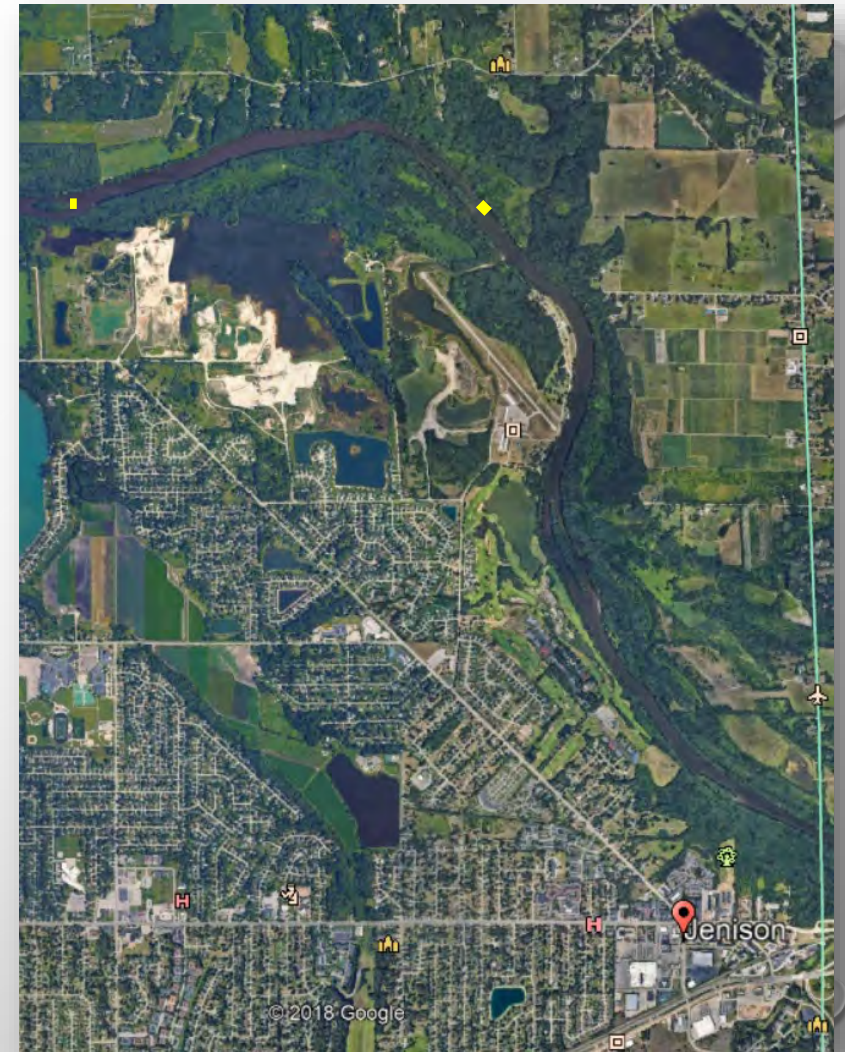
- Grand River Waterway Dredging Feasibility Study (Edgewater Resources 2017) – **Charts based on 7-foot channel**
- The Economic Benefits of the Grand River Waterway (Ecological Specialists 2018) – **\$5.7 M based on 7-foot channel**
- Unionid Surveys at Proposed Dredge Sites in Kent and Ottawa Counties, Michigan (Ecological Specialists 2018) – **Surveyed areas in path of 5-foot channel**
- 2018 Unionid Surveys at 5 Proposed Dredge Sites, Grand River, Kent County, Michigan (Badgett 2019) – **Did not include Ottawa County**
- Grand River Waterway Evaluation (GZA Consultants 2019) – **Critique of MSUE working paper**



The extent of mussel and substrate sampling conducted in 4.6 miles of the Grand River downstream from the Ottawa County Line is shown in bright yellow (~820 feet).

CONCLUSIONS SUMMARIZED BY GZA CONSULTANTS (Mackey et al. 2019)

- Ottawa County waters of the dredging project area are low-quality mussel habitat and mostly devoid of mussel life.
- Gravel bars are important spawning and foraging habitat for fish, but the only proposed dredge locations with gravel are in Kent County and not in Ottawa County.
- Woody debris and training walls provide important habitat, but proposed dredge plans do not include removal of any such structure.



The extent of mussel and substrate sampling conducted in 4.6 miles of the Grand River downstream from the Ottawa County Line is shown in bright yellow (~820 feet).

GROUND-TRUTHING GZA CONCLUSIONS

- Ottawa County waters of the dredging project area are low-quality mussel habitat and mostly devoid of mussel life.
- September 7, 2019 Joe Rathbun and Dr. Renee Mulcrone led sampling in Ottawa Co.
- Three sites sampled for mussels
- Live species of Special Concern at two sites
- One site had a diverse mussel community with seven living species and dead shells of state endangered Threehorn Wartyback



RARE MUSSELS FOUND IN PROJECT AREA (ECOANALYSTS 2019)

- Black Sandshell MI Endangered 1 Kent Co. dredge site
- Purple Wartback MI Threatened 1 Kent Co. dredge site
- Pink Heelsplitter MI Special Concern 3 Kent Co. dredge sites
- Deertoe MI Special Concern 5 Kent Co. dredge sites
- Snuffbox MI & US Endangered Dead shells at Kent Co. site
- Flutedshell MI Special Concern Dead shells at 3 Kent Co. sites



GROUND-TRUTHING GZA CONCLUSIONS

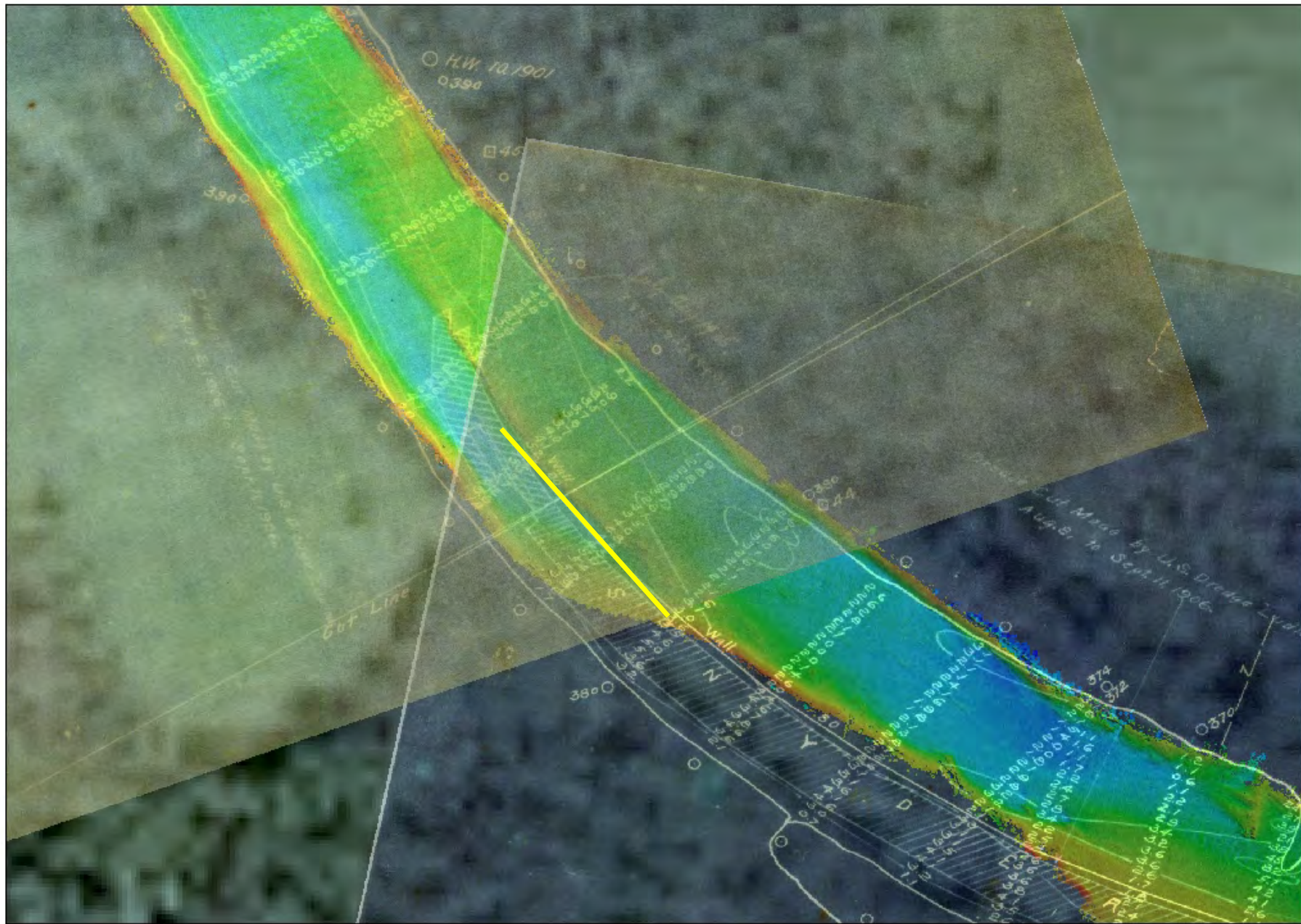
- Gravel bars are important spawning and foraging habitat for fish, but the only proposed dredge locations with gravel are in Kent County and not in Ottawa County.
- August 21, 2019 Grand Rapids Museum, Encompass Socio-Ecological Consulting, and MSU Extension visually surveyed substrate.
- Gavel, cobble, and boulders were noted within the project area in Ottawa County.
- One Ottawa County site that would be dredged to accommodate a 7-foot channel contained mostly gravel substrate



GROUND-TRUTHING GZA CONCLUSIONS

- Woody debris and training walls provide important habitat, but proposed dredge plans do not include removal of any such structure.
- August 21, 2019 Grand Rapids Museum, Encompass Socio-Ecological Consulting, and MSU Extension visually surveyed substrate.
- Training walls were visible in some locations.
- Woody debris was caught on a training wall remnant in the path of proposed dredging at one location.





0 0.05 0.1 0.2 Kilometers

0 0.0375 0.075 0.15 Miles



Image Credit:
P.J. Wampler and
K. Konsoer



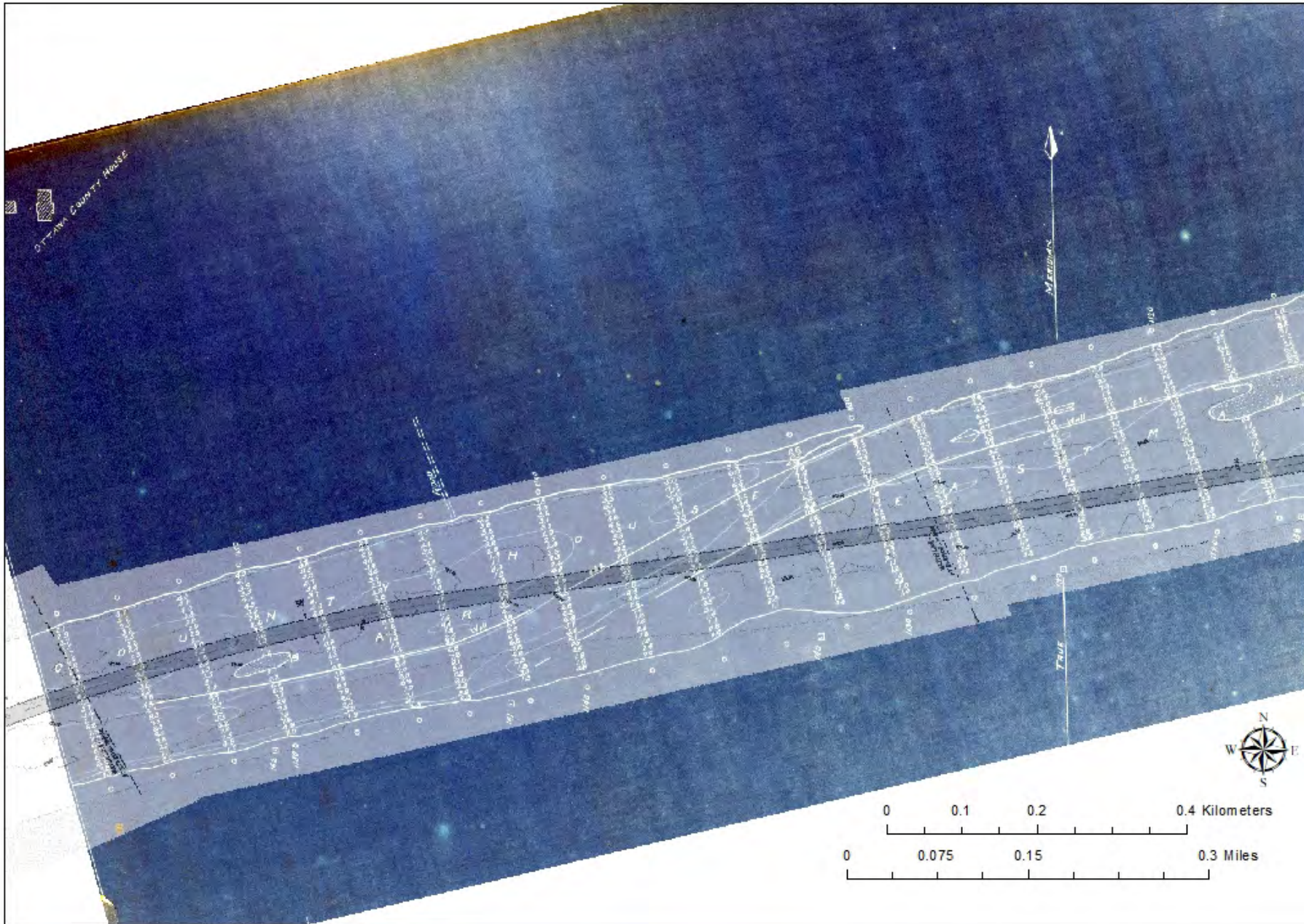


Image Credit:
P.J. Wampler and
K. Konsoer

CRITICISM OF MSUE WORKING PAPER FROM GZA CONSULTANTS (Mackey et al. 2019)

From GZA consultants:

“The source cited in the working paper examined the heavily channelized and impounded Missouri River, which is orders of magnitude longer than the Grand River and the proposed project area... the Missouri River is not comparable to the proposed Grand River project and cannot accurately be used to analyze the impact that may arise...”

From GZA consultants:

“Based on a review of the MSU working letter and readily available literature, GZA cannot accurately estimate the extent of impacts to biological life as a result of the proposed project. However, GZA questions whether a subset of claims within the MSU working letter are applicable to the proposed project due to the use of literature documenting effects of dredge projects orders of magnitude larger than the proposed project.”

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- Intent was to identify potential impacts – **Not to quantify magnitude of impacts**
- 41 sources cited, including:
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SOME CITED STUDIES INVOLVED SMALLER STREAMS, LESS DISTURBANCE

- Chariton River experienced an 80% loss of fish biomass and is shorter than Grand River (Congdon 1971)
- Several Indiana streams that experienced loss of sensitive fish species are smaller than Grand (Lau et al. 2006)
- Boat wake study that found wakes over 100x more powerful than river waves involved boats 18 feet long, as opposed to the 26-49 foot vessels that Grand River Waterway could accommodate (McConchie and Toleman 2003)



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BOTTOM LINE: CHANNELIZATION IS BAD FOR RIVERS

- Increased erosion after dredging
- Removal of large woody debris
- Reduced benthic macroinvertebrate density
- Harm to rare freshwater mussels (unionids)
- Damage to gamefish and other sensitive fish species
- Extent of damage from Grand River Waterway project is not precisely known





Questions?

The following groups formally oppose the Grand River Waterway project:

County Government

Ottawa County Board of Commissioners
Ottawa County Parks and Recreation Commission
Ottawa County Planning and Policy Committee
Ottawa County Planning Commission

Municipal Government

City of Ferrysburg
City of Grand Haven
City of Grandville
Crockery Township
Grand Haven Township
Robinson Township
Polkton Township
Park Township
Spring Lake Township
Village of Spring Lake

Tribal Government

Little Traverse Bay Bands of Odawa Indians
Pokagon Band of Potawatomi Indians

Businesses and Related Organizations

Aamazon Natural Resources Consulting, LLC
Grand Haven Chamber of Commerce
Grand Haven Area Convention and Visitors Bureau
Grand Lady Riverboat / Steamboat Park Campground
GR Paddling, LLC

Fishing and Conservation Clubs

Grand Haven Steelheaders
Grand Rapids Steelheaders
Izaak Walton League of America – Dwight Lydell Chapter
Lunker Hunter Spoonplugging Club of Grand Rapids
Michigan Muskie Alliance
Michigan Steelhead & Salmon Fisherman's Association
Michigan United Conservation Clubs
Schrems West Michigan Trout Unlimited
West Michigan Walleye Club

Other Organizations

American Rivers
Clean Water Action
Climate Reality Project – West Michigan Chapter
Friends of the Lower Grand River
Grand Rapids Audubon Club
Grand Rapids Public Museum
Grand River Watershed Arts and Music Council
Grand Valley State University Student Senate
Lakeshore Water Protectors
Michigan Environmental Council
Michigan League of Conservation Voters
Muskegon River Watershed Assembly
Owashtanong Islands Audubon Society
Progressive Women's Alliance of West Michigan PAC
Quiet Water Society
West Michigan Environmental Action Council



The following groups formally support the Grand River Waterway project:

Georgetown Township Finance Committee