

Cheboyganing Creek Intercounty Drain

Hearing of Necessity
September 20th, 2021
DOW Event Center





Drainage Board Members

- Department of Agricultural and Rural Development – Brady L. Harrington, P.E.
 - Saginaw County Public Works Commissioner – Brian J. Wendling
 - Bay County Drain Commissioner – Michael Rivard
 - Tuscola County Drain Commissioner – Robert J. Mantey



Agenda

- Drain Background/History of Drain
- Drainage District Review
- Engineering Review
 - Lower Reach of Drain
 - Upper Reach of Drain
 - Easement Review
- Conclusions and Estimate of Cost for Improvements



History of Drain

- Established in 1884
- Last major cleanout / reconstruction 1960-1962
- Approximately 15 miles in length
 - Outlet at Saginaw River
 - Upper end at Reese Road
- Land use primarily agricultural, some residential and commercial
- Practicability Hearing was held in 1998
 - Practicability was found and an Engineering Study was completed
- Hearing of Necessity held in 2000
 - Project to improve drain was found not necessary



2000 Engineering Study

- Hydrologic and Hydraulic Analysis
 - Elevation survey completed
 - 10-year design flow rates obtained
 - Lake Huron and Saginaw River water levels reviewed
 - Computer model of drain developed
- Findings
 - Flooding predicted near Portsmouth and Becker Roads
 - Flooding predicted between Wadsworth and M-15
 - Existing bridges adequate to convey 10-year
 - Sediment, erosion and obstructions in drain



2000 Engineering Study

- Engineering Analysis from 2000 Study
 - Dredge lower 4.5 miles between Saginaw River and Portsmouth Rd.
 - Reconstruct upper 10.5 miles from Portsmouth Rd. and M-15
 - Re-establish bottom width
 - Slope banks
 - Clear trees and log jams
 - Install erosion control structures
 - Install berms/dikes near Portsmouth



2000 Engineering Study

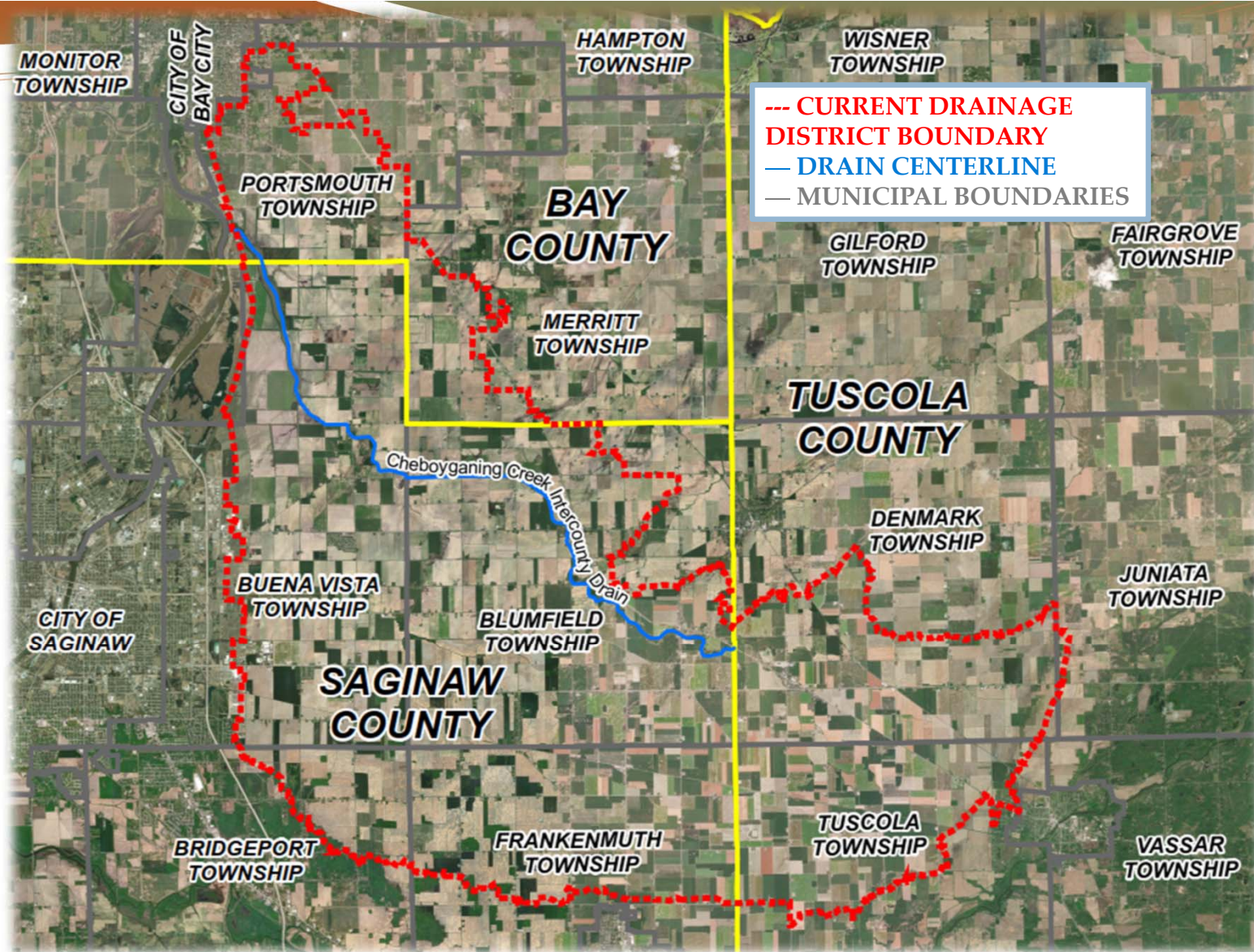
- Pump Station
 - A study was completed to analyze installing a pump station near the outlet of the Cheboyganing Creek
 - It was determined, at the time, constructing a new pump station was not practical



Drainage District

- What is the drainage district?
 - Lands that contributes storm water to drain
 - Drainage District serves as the special assessment district
- Recommending to update drainage district boundary to reflect current drainage patterns for Bay County. Saginaw and Tuscola Counties were revised in 2017.

Current Drainage District Map



Summary of Acreage in Drainage District

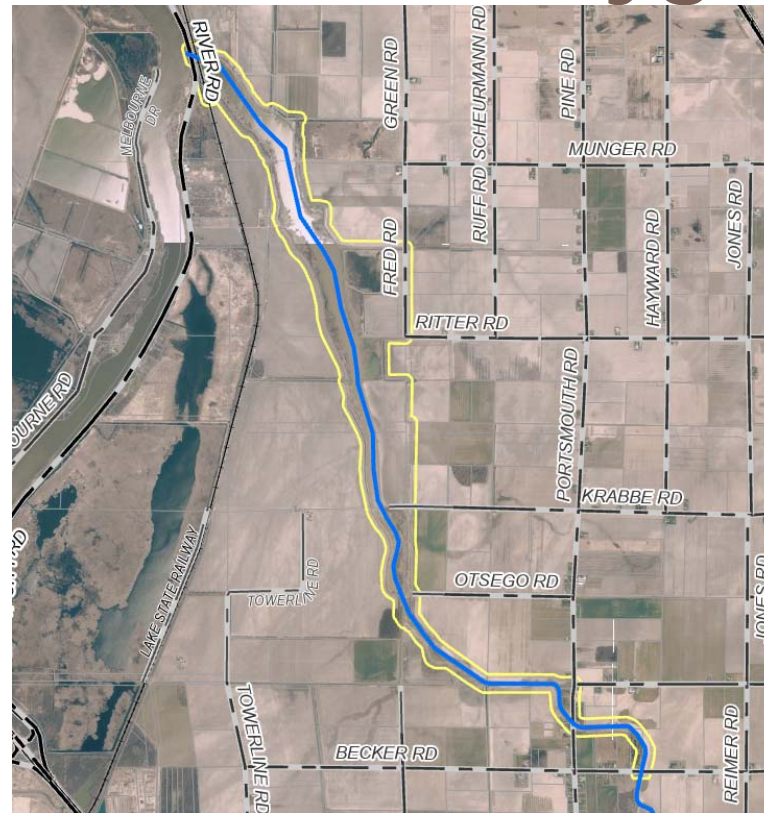
- Saginaw County 50,270 +/- Acres
- Tuscola County 17,300 +/- Acres
- Bay County 9,280 +/- Acres
- TOTAL DISTRICT ACRES 76,850 +/- Acres

- Length of Drain 80,340 Ft.
(15± Miles)



Lower Reach
Cheboyganing Creek
Intercounty Drain

Condition of Lower Cheboyganing Creek



Study Area from Outlet to Becker Road

Topographic and Drone Survey

- Survey began April 2020
- Bathymetric survey to collect cross sections
 - Collected near existing cross sections from 2000 study
- Established semi-permanent control
- Performed drone survey of drain corridor
 - Collected high resolution imagery May 2020
 - Created digital surface model



Drone Aerial



Topographic Survey

- Drafted plan, profile, and cross sections
- QL2 LiDAR data used to supplement ground topo
- Cross sections compared 2000 study to 2020 study
- Sediment level increases vary from 0 to 1 foot
- Substantial sediment in drain exists

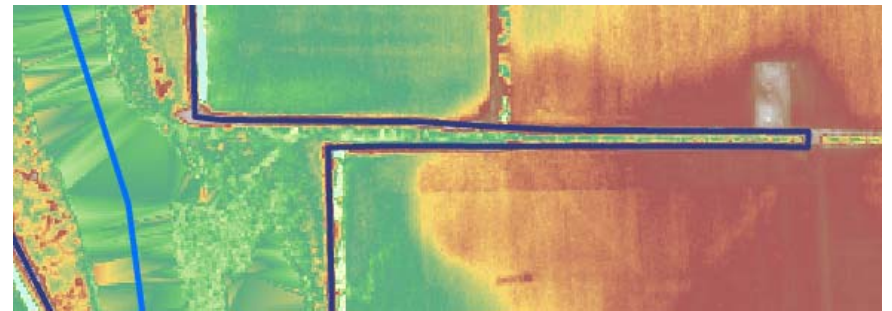
Drone Aerial Analysis

- Reviewed high resolution aerial
- Identified main features
 - Dike alignment
 - Locations of Seepage and Sloughing
 - Pumps, Field Tiles, Tributary Drains
 - Possible Regulated Wetlands



Drone Aerial Analysis – Dike Alignment

- Delineated Dikes on Cheyboyganing
 - Left Side – 9.8 miles
 - Right Side – 6.3 miles
- Tributary Drain Dikes Delineated
 - Countegan Intercounty Drain
 - Fitzhugh Intercounty Drain
 - McArthur Intercounty Drain
 - English Quarterline Drain
 - Weaver Drain
 - Lambert Drain



Drone Aerial Analysis

Seepage or Sloughing

- 20 areas where seepage was noticeable
- 10 areas of possible sloughing



Seepage behind dike

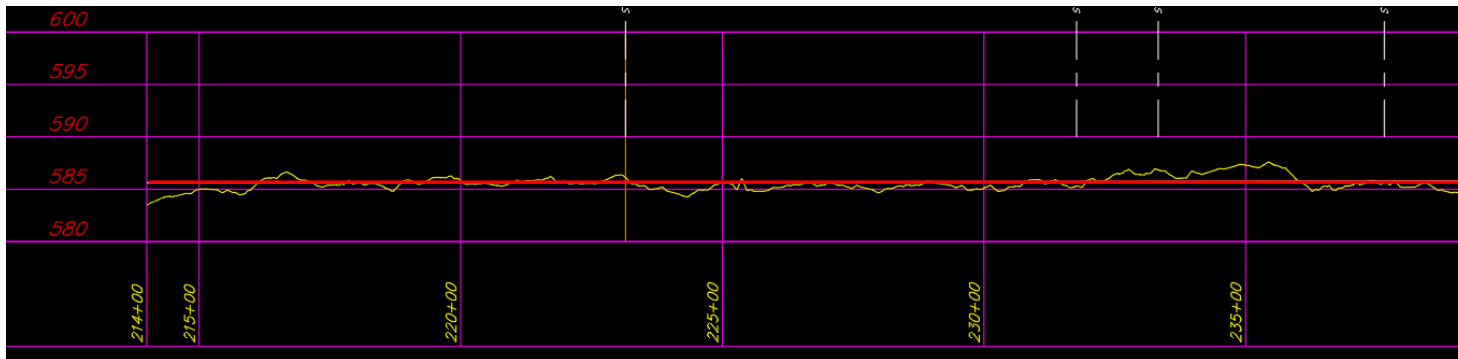


Saginaw Bay / River Backwater Analysis



Dike Level of Service

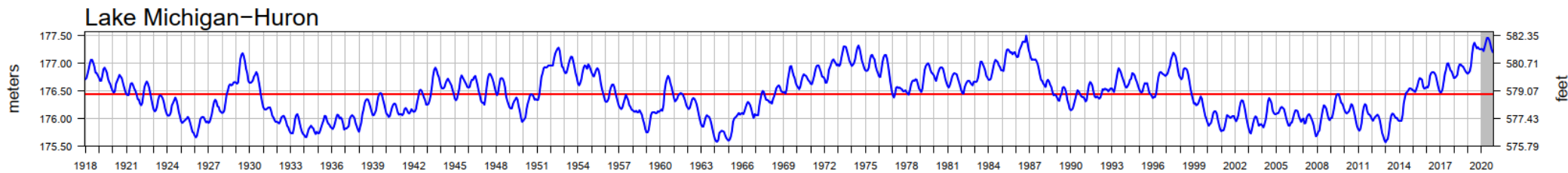
- Created best fit line on both dike alignments
- Elevations reviewed every 500 ft
- Estimated Level of Service ~ 585 ft



Best Fit Line Through Dike Profile

Backwater Analysis – Bay Level

- High in 1986 ~ 582.5 NAVD88
- Low in 2013 ~ 576.2 NAVD88



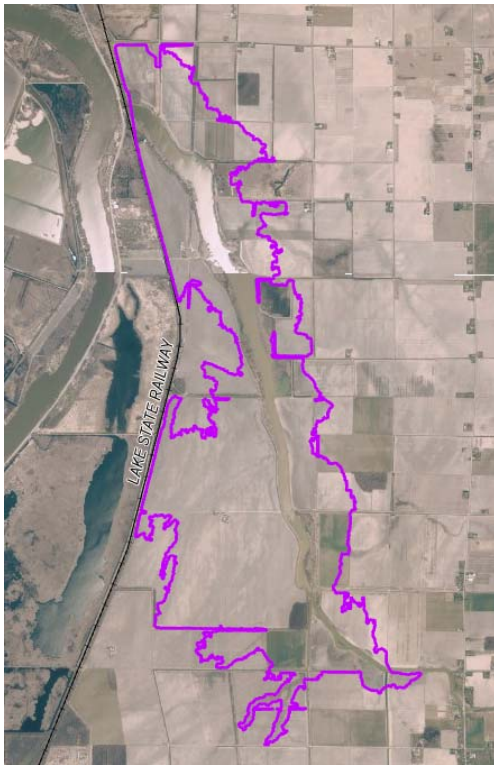
United States Army Corps of Engineers – Lake Huron Water Elevation



Backwater Analysis – Bay Level

- Observed Saginaw River sunny day water level used for analysis – 581.3
- Estimated level with wind runup – 583.3
- 2019 average – 581.3 NAVD88
- All time average - 578.9 NAVD88

Areas Protected by Dikes



Water Level Area = 581.3
Acres = 2,100



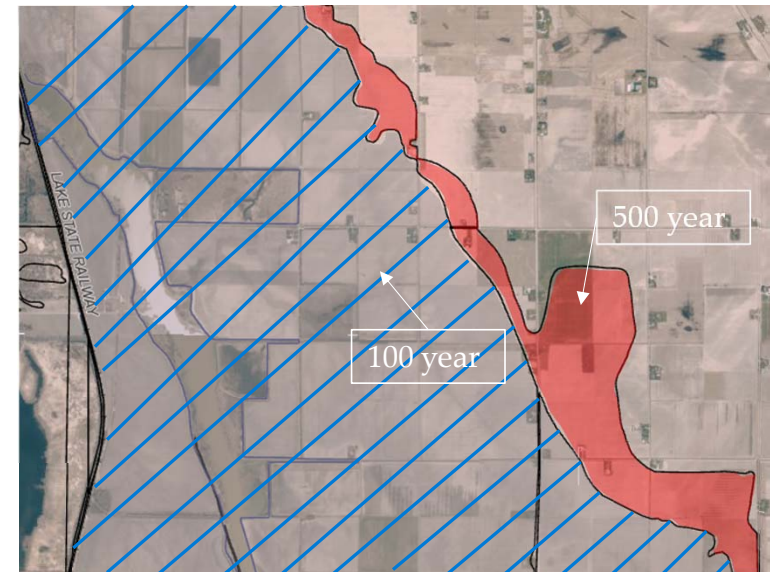
Level with Wind Run up= 583.3
Acres = 4,500



Flood Service Area = 585
Acres = 7,000

Backwater Analysis – Floodplain

- Reviewed Bay and Saginaw FEMA flood maps
- Saginaw River FIS study
 - 100 – year floodplain elevation – 585.9
 - 500 – year floodplain elevation – 587.0
- The dikes do not protect for the 100-year flood of the Saginaw River



FEMA 100-year vs 500-year floodplain

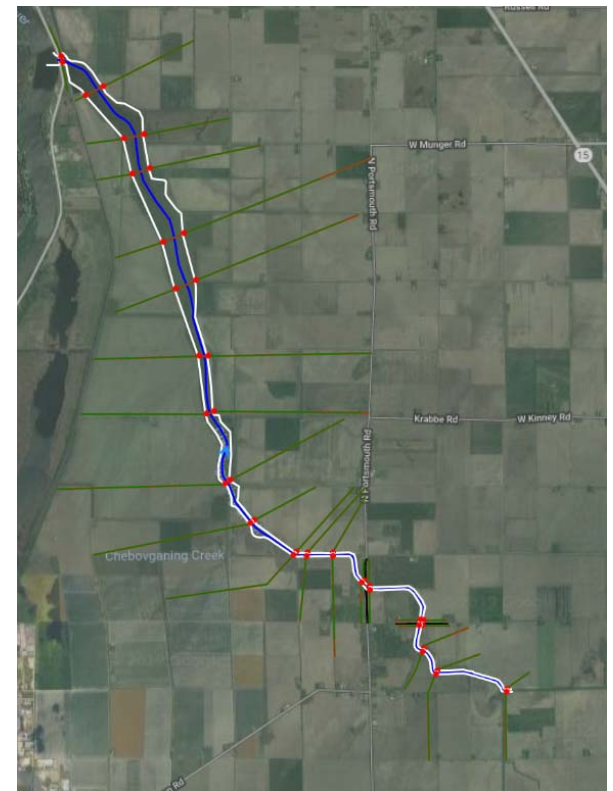


Base Line Modeling



Model Parameters

- HEC-RAS was used to model the Cheboyganing Creek downstream of Becker Road
- The drain outlet was modeled using the following “sunny day” Saginaw River conditions:
 - Long Term Average Water Level – 578.9 feet
 - All-Time High-Water Level – 582.4 feet
- Flow rates from EGLE were obtained for four locations on the creek.



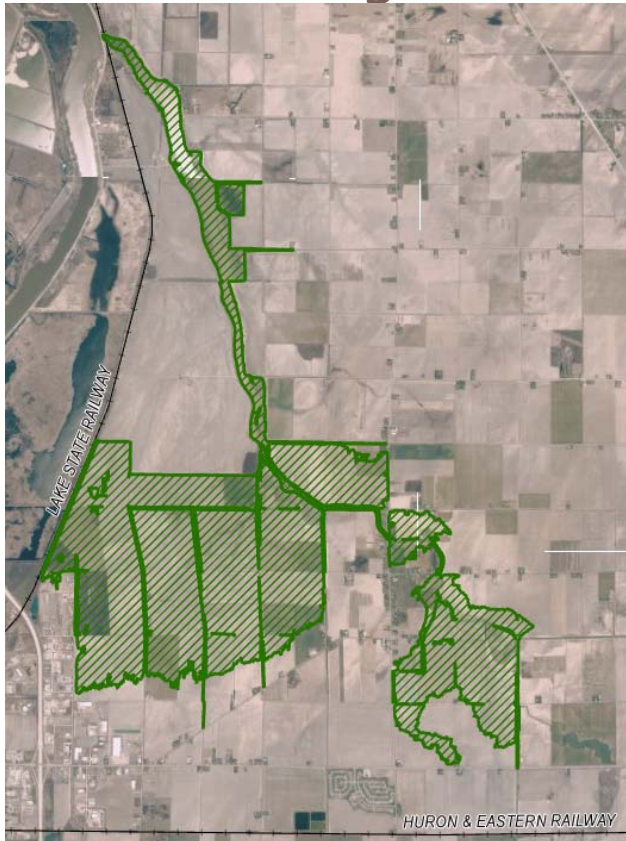
HEC-RAS Model extents



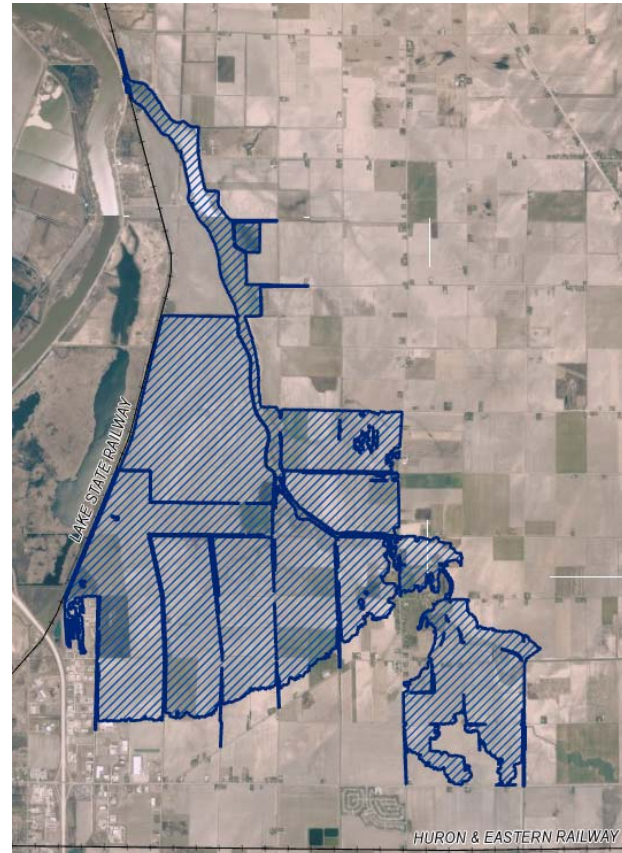
Preliminary Model Results

- The model was run for the 10-year flow rates and a flood map was generated in GeoHEC-RAS
 - Scenario 1
 - 10-year storm
 - River is at long time average (578.9 feet)
 - Water elevation @ Portsmouth Road – 584.76
 - 3,100 acres may flood
 - Scenario 2
 - 10-year storm
 - River is at record high (582.4 feet)
 - Water elevation @ Portsmouth Road – 585.16
 - 4,600 acres may flood

Preliminary Model Results



Scenario 1



Scenario 2



Upper Reach
Cheboyganing Creek
Intercounty Drain



2019 Inspection of the Drain

- 2019 Inspection
 - Visually inspected the upper 10.5 miles of the drain from Portsmouth Rd. to M-15.
 - Bank erosion, log jams and overgrowth of trees and brush in the drain right-of-way were observed

2019 Inspection of the Drain



2019 Inspection of the Drain



2019 Inspection of the Drain





Easement Review





Historical Rights of Way

- Reviewed historical Right-of-Way documents to determine where right-of-way is available and how wide it is
- Easements ranged from 1903 to 1959
- 128 Parcels were identified from historical Right-of-Way and Condemnation documents

Preliminary Conclusions

- Initial Dike Condition Assessment
 - Dike requires maintenance to address sloughing, seepage, low spots, and steep slopes
 - 1957 plans illustrate existing dike was enlarged with dredge material. Only shows dike on one side.
- Dike Service Level
 - Cheboyganing Creek dike elevation appears to have been intended to provide service for 10-year event
 - In most areas, the top of dike elevation is adequate
 - Some low spots exist on dike and inlet tributary drain dikes
 - Dike system appears to provide protection to approximately 7,000 acres at Elev. 585



Preliminary Conclusions

- Modeling
 - Various Saginaw River elevations were simulated
 - Out of bank flooding occurs near Portsmouth during 10-year event
 - Tributary Drains (McArthur and Weaver) appear to have low areas in dikes which result in additional flooding
- Upper Reach of Drain contains the following deficiencies:
 - Bank erosion
 - Log jams
 - Overgrowth of trees and brush



Preliminary Conclusions

- Initial opinion of areas to be evaluated for maintenance improvements
 - Maintenance, repairs, and/or reconstruction of dikes
 - Sediment removal
 - Vegetation control
 - Erosion control



Planning Level Cost Estimate

- Dike maintenance/improvement 16 miles (lower end of drain)
 - Dike repairs, realignments, & extensions
 - Wetland mitigation
 - Erosion Control
- Channel Maintenance 10 miles (upper end of drain)
 - Tree and debris removal
 - Erosion control
 - Sediment bar removal
- Estimated Cost: \$20 to \$30 Million
 - Includes construction, engineering, financing and legal costs



Public Testimony

- Fill out speaker cards
- State name and relation to proposed project
- Be specific, focus on necessity questions
- Leave copy of materials, if any, with Board



Next Steps, If Determined Necessary

- Final Engineering and Project Scoping
- Obtain Easements required for construction
- Coordination and Permitting with impacted utilities and governmental agencies:
 - EGLE, USACE, MDNR, MDOT, Townships, Road Commissions, Utility Companies
- Bid Letting phase



Next Steps, If Determined Not Necessary

- No further action on current petition
- Subsequent petitions may be filed
- Cost incurred to date will be assessed



Board Deliberation & Necessity Decision

- Decide if it is necessary to move forward with a project on the Cheboyganing Creek Intercounty Drain



Appeal

- Any person feeling aggrieved by the determination of necessity or no necessity for the project may institute an action in County Circuit Court within **10 days** after the determination by the Board.