

Four Lakes Task Force

Gladwin and Midland Counties' Delegated Authority
of the Four Lakes Special Assessment District

Community Information Session

January 25, 2022



Four Lakes Task Force

Informational Communications Meeting

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- This meeting is being held virtually to accommodate as many people as possible
- This is an information session. It is not a board meeting; no formal action will occur
- If you have questions, please send them to info@fourlakestaskforce.org
- At the end of the meeting, there will be time for public questions and comment



Agenda

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- ❑ Stabilization/Restoration Progress and Public Safety
 - Edenville Dam
 - Sanford Dam
 - Secord Dam and Smallwood Dam
- ❑ Stabilization and Public Safety
 - Purpose of Stabilization
 - Stabilization and Flooding
- ❑ Water Levels and Flowage Elevations
 - Definitions
 - Impact on Properties
 - Flood Studies
 - Establishing Spillway Capacity
 - Estimating Design Capacity
 - Modeling and Mapping
- ❑ Public Comment



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Stabilization/Restoration Progress



Post Dam Failure and Recovery (Stabilization)

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- ❑ After the May 19th Dam Failure
 - FERC Ordered Boyce to:
 - Draw down Secord and Smallwood Lakes for inspection and repairs.
 - FERC ordered debris removal on the Sanford Dam
 - EGLE ordered Boyce to stabilize the Edenville Dam and lower the water elevation on the Tobacco Dam
- ❑ After Boyce's non-compliance
 - ELGE took emergency action and assumed control of the Edenville Dam
 - The Counties took the Boyce properties, and FLTF began a recovery effort.

Restoration Progress – Secord and Smallwood

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- ❑ Majority of stabilization work has been completed (total investment \$2M)
 - Safety booms will be added this spring/summer
- ❑ Engineering for final restoration under way
 - Key improvements - new primary spillway gates, new auxiliary spillways and embankment enhancements
- ❑ EGLE permit applications for restoration have been submitted and are being reviewed by the state, completion of engineering is scheduled for this year



Secord Dam

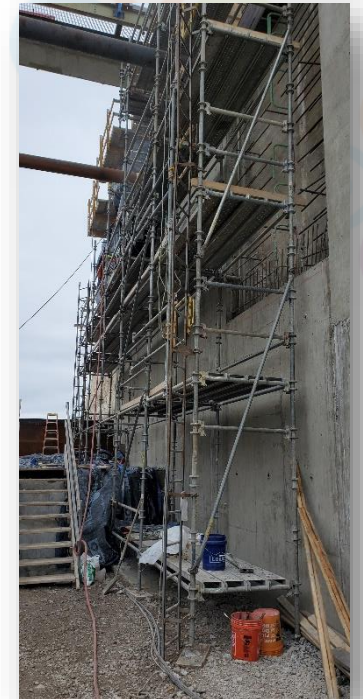


Smallwood Dam

Edenville Dam Stabilization Progress – Tobacco Side

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- ❑ EGLE emergency order to lower water and stabilize dam
 - ❑ Investment of \$4.5M (funding through NRCS and State)
 - ❑ Portions demolished, portions stabilized with concrete, tailrace area stabilized
 - ❑ Currently finishing “sister-walls”– expected to be completed this winter
 - ❑ Safety boom to be installed in spring/summer



Edenville Dam Stabilization Progress – Tittabawassee Side

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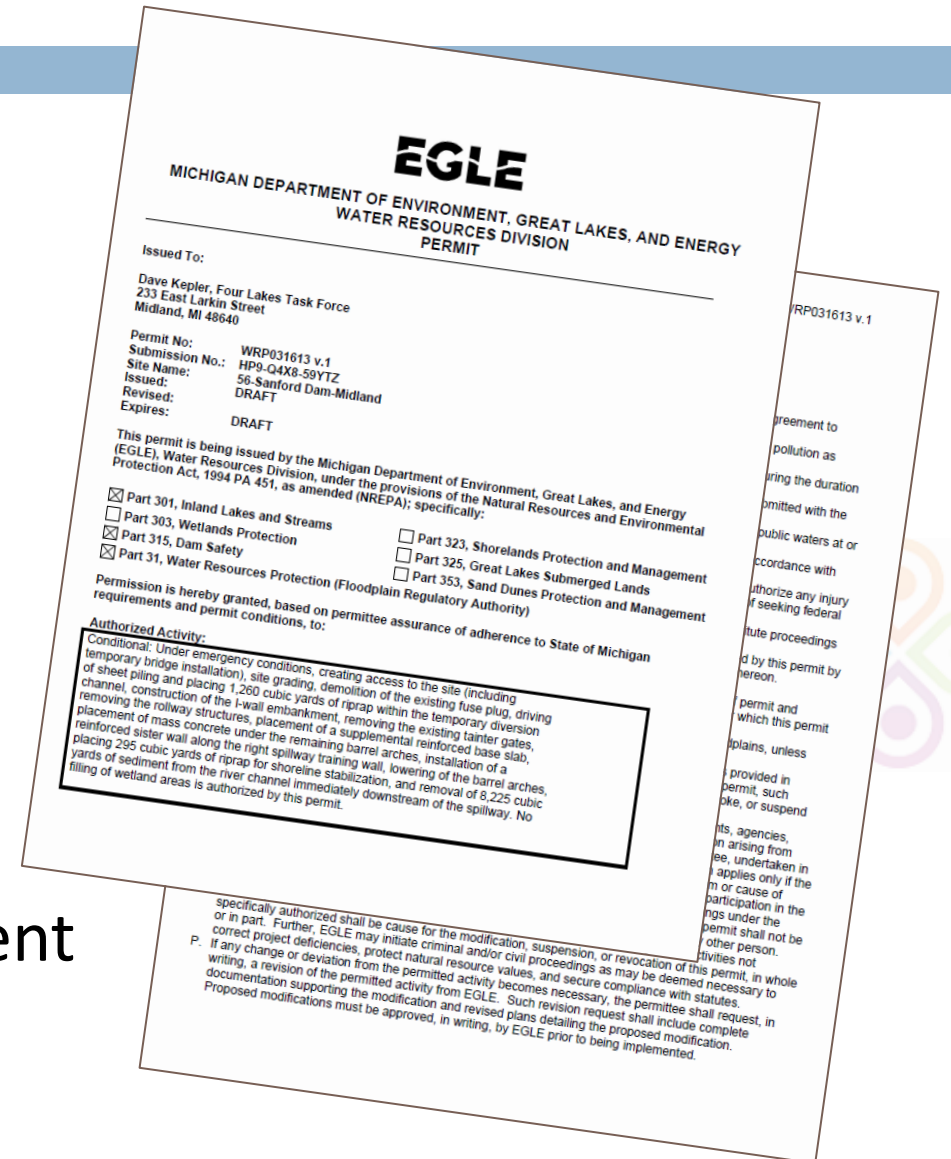
- ❑ EGLE emergency order to stabilize dam
 - Investment of \$7.4M (funding through NRCS and State)
- ❑ Embankment Stabilized between M-30 and Dam
- ❑ Former primary spillway demolished
- ❑ Tailrace and downstream river banks restored
- ❑ I-wall installed through breachway
- ❑ Currently working to grade and restore breachway
- ❑ Expected completion late Spring 2022



Sanford Dam EGLE Permit

- EGLE issues stabilization permit
- Scope of work:
 - Stabilize embankments that were breached
 - Stabilize and/or demolish portions of former primary spillway and remove Tainter gates
 - Restore the river to the pre-disaster course
- Schedule: Now through summer 2022

NOTE: Engineering for restoration is concurrent with interim stabilization construction



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Stabilization and Public Safety



Purpose of Interim Stabilization

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- The interim stabilization of these dams is being performed to minimize further damage and erosion downstream and bring the rivers back to their pre-disaster location
- These changes are being conducted in a way that allows the interim stabilization construction measures to be a foundation for the final dam and lake level restoration.
- It is expected that Edenville Phase II interim stabilization (Tittabawassee side) will be completed in early 2022, and the Sanford interim stabilization project will be completed later in 2022.

Stabilization Will Change Flood Stage

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- Stabilization of the Tittabawassee side of the Edenville Dam and the Sanford Dam will result in an increase in water elevation or flood stage upstream of the dams during runoff events when compared to the post-failure conditions
 - By comparing projected water elevations during a runoff event, water elevations will be higher with dam stabilization measures constructed in comparison to the failed dams remaining (do nothing)
 - Generally stated, the water elevations during runoff, while in the “interim stabilization period,” will be lower than when the lakes are fully restored to their normal lake elevation
- Stabilization of Secord, Smallwood & Tobacco side of Edenville
 - The scope of the interim stabilization efforts at Secord, Smallwood or Edenville (Tobacco side) do not require an increase in flood stage notice

Stabilization and Flooding

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- While the interim dam stabilization projects improve public safety ...
 - It is important that lakefront property owners stay aware and show caution on the lake bottoms and anticipate as dams are restored, flood stage upstream of the dam will increase from current failed dam condition
 - There is construction underway on the dams that will cause increased water elevation upstream of the dams, and in the lake bottom and flood prone area. Water elevations may change quickly with weather conditions
 - At no time is it appropriate or legal to place permanent infrastructure such as sheds, buildings, or permanent docks on the lake bottoms
- With or without dams
 - Flooding will still occur on properties at some frequency
 - Please use caution in flood prone areas

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Water Levels and Flowage Elevations



Water Levels (Elevations) Definitions

- **Normal Level (Part 307 of the Natural Resource and Environmental Protection Act):**
 - **"Normal level"** means the level or levels of the water of an inland lake that provide the most benefit to the public; that best protect the public health, safety, and welfare; that best preserve the natural resources of the state; and that best preserve and protect the value of property around the lake. A normal level shall be measured and described as an elevation based on **national geodetic vertical datum**
 - **Legal Level** = "Normal level" = "Shoreline"
 - **Vertical Datum** is the height above a benchmark, in the case of Four Lakes, it is the North American Vertical Datum of 1988 (NAVD88), which measures feet above the 1985 local mean sea level height value, at Father Point/Rimouski, Quebec, Canada.
- **Easement:** Any easement is a right or privilege by one to use the land of another for a specific purpose
- **Flowage Easement:** In the case of a flowage easement, this usually consists of the perpetual right, power, privilege and easement to overflow, flood and submerge the lands affected; reserving, however, to the fee owner of the lands all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights granted in the flowage easement
 - ***Four Lakes flowage easements were established in 1923 along with lake shorelines. These are now County easements and are a greater elevation than the shoreline on all Four Lakes.***

Regulatory Definitions

- **100-Year Floodplain (EGLE):** A river, stream, lake, or drain may on occasion overflow their banks and inundate adjacent land areas. The land that is inundated by water is defined as a floodplain. In Michigan, and nationally, the term floodplain has come to mean the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood which has a 1% chance of occurring any given year)
 - It is estimated that about 6% of Michigan's land is flood-prone, including about 200,000 buildings
- **National Flood Insurance Program (NFIP):** This Federal program makes flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.
- **Harmful interference:** Causing an increased stage or change in direction of flow of a river or stream that causes or is likely to cause damage to property, a threat to life, personal injury. EGLE MAKES THIS DETERMINATION WHEN APPLYING FOR A PART 31 FLOODPLAIN PERMIT
- **Inflow Design Flood (IDF):** The first step in evaluating and designing a dam to address hydrologic potential failure modes and reduce risks to the public. FLTF studies, models and submits. EGLE APPROVES, ALONG WITH THE DAM DESIGN WHEN APPLY FOR A PART 315 DAM SAFETY PERMIT
 - NOTE: Improving dam safety may change floodplains upstream and downstream

Impact on Properties – What Does It Mean?

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- Property owners have legal access to a lake (Part 307)
- The counties have a legal right to flood the lake/flow water at a certain elevation to create the Lakes, that may be on private property
- Dam Safety (Part 315) – restoration to protect from dam failures, and loss of life and property damage for flood frequencies between the 5,000-to-10,000-year storms
- 100-year floodplain (Part 31) governs changes in the floodplains that cause property impact



Flood Studies Inform All Work

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- **Four Lakes Task Force is working with hydrology and hydraulic experts**
 - **Hydrology:** The science dealing with the properties, distribution, and circulation of water on and below the earth's surface and in the atmosphere
 - **Hydraulic engineering:** Among the essential tasks to successfully design safe water-retaining reservoirs for hydroelectric power generation, flood retention, and water supply demands
- ✓ **Rainfall study for the entire region, including the Pine, Chippewa, Tittabawassee and Tobacco rivers**
 - **Probable Maximum Precipitation (PMP):** The theoretically greatest depth of precipitation for a given duration that is physically possible over a given area at a given time of year
- ✓ **Updated hydrology studies on the Four Lakes watershed for frequencies up to the Probable Maximum Flood**
 - **A Probable Maximum Flood (PMF)** is produced by extreme rainfall events occurring in conjunction with a conservatively selected set of hydrologic and watershed conditions to produce the largest flood that is reasonably possible and often governs spillway design for high hazard dams
- **Following FEMA guidelines selecting and accommodating Inflow Design Floods (IDF) for dam**
 - **Inflow Design Flood (IDF):** The flood flow above which the incremental increase in downstream water surface elevation due to failure of a dam or other water impounding structure is no longer considered to present an unacceptable threat to downstream life or property
 - Secord and Smallwood IDFs have been selected
 - Risk Assessments are being completed to verify Edenville and Sanford IDFs

Establishing Spillway Capacity

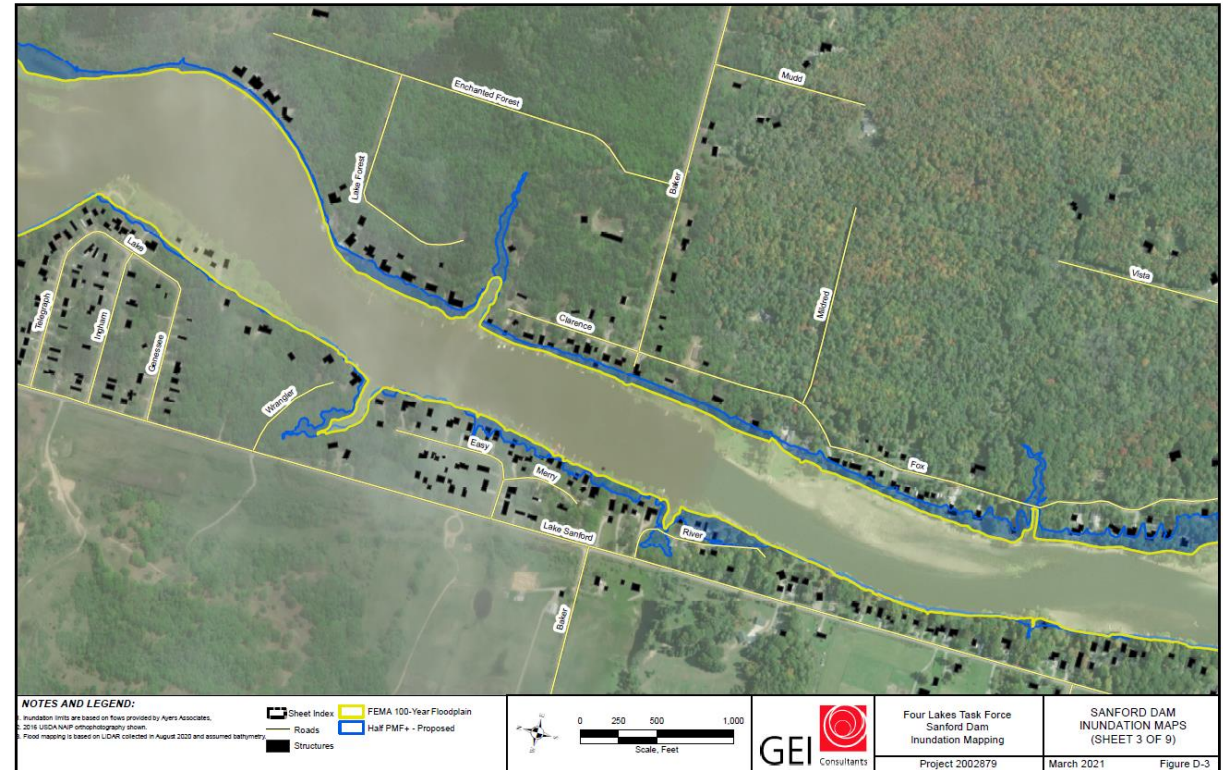
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Secord Dam and Smallwood Dam

- FLTF focus in 2021-2022:
 - Established the IDF in late 2021
 - Progress through 90% design by early 2022
 - Begin construction second half of 2022
- FLTF expects spillway capacity greater than 10,000-year flood frequency

Edenville Dam and Sanford Dam

- Interim Stabilization of Edenville and Sanford – budget of >\$20 million for design and construction in 2021-2022
- Sanford Dam difference between dam-in and dam-removed hydraulic profile and downstream impact will be used to determine the IDF with EGLE's concurrence
- Full reconstruction design engineering will start in 2022
- FLTF expects spillway capacity ~5,000-year flood frequency



Inundation models and maps are used to measure upstream and downstream impact at different flood frequencies

Estimated Design Capacity of Dams

Spillway Capacity Upgrades

- GEI developed 30% designs for rehabilitation of all FLTF projects
- Spillway capacity for all dams will be greater than EGLE requirements
- IDF selected using FEMA risk-informed decision-making procedure
- Results show that the recommendations are within our 30% dam designs



Estimated Design Capacity of Dams Stated in Flood Frequency

	Secord	Smallwood	Edenville	Sanford
Pre May 2020-Capacity	7,695	10,185	20,670	29,690
May 2021 Design Estimate	21,150	24,550	52,275	47,470
Current State Requirement	12,700	15,600	44,600	44,900
60% Design	17,500	25,500	TBD	TBD
Dam Design Estimate in Flood Frequency	~10,000 Years	~10,000 Years	~5,000 Years	~5,000 Years

These capacities will be updated as we conclude the hydraulic studies

Floodplain Modeling and Inundation Mapping

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- To help property owners understand the floodplain in their section of the lakes, floodplain modeling and mapping will be occurring on all Four Lakes, from Secord Dam to downstream of Sanford Dam
- Frequencies of modeling includes
 - 2-year storm through the 500-year storm
- Inundation maps are being created for
 - FLTF will be creating from Secord Dam to downstream of Sanford Dam
 - The USACE (Army Corp or Engineers) is modeling and mapping downstream of Sanford Dam
- This will be done in stages as the lakes are hydraulically linked
 - All the dams' capacity needs to be finalized to finish all the models
 - Expect it will take several years to finalize all modeling and mapping



Summary

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- There will be changes to the transitional water flow and elevations in the Four Lakes bottom lands and lake and river system, as the systems are stabilized and through restoration with construction, including temporary coffer damming
- FLTF is communicating to everyone now because of its importance going forward to:
 - Understand that there will be construction on all four dams in the coming years
 - Property owners and those who are along the lake must be aware that water levels will be rising
 - As the dams are restored and repaired, it should be anticipated that flood stages will increase and historically flood-prone and wet low areas will return
 - FLTF will provide updated inundation maps, this will take several years
- To restore the dams:
 - The design of the dm must have a very low probability of failing
 - Modeling of floodplains from the 2-year to the 10,000-year storms throughout the system will be needed to assess property impact
- FTLF is committed to communicate to property owners how floodplains relate to their property
- Overall, this will be a significantly safer system for floods of 100 years or greater

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Public Comment



Questions and Public Comment

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Ground rules:

1. Questions and public comment will be taken using the hand raise feature.
2. Because of time restrictions we will only allow individuals to make one comment. If time allows, we will give people additional opportunities at the end.
3. Any commenter who is disrespectful, slanders another, is in any way inappropriate or otherwise refuses to follow the protocol will be muted.

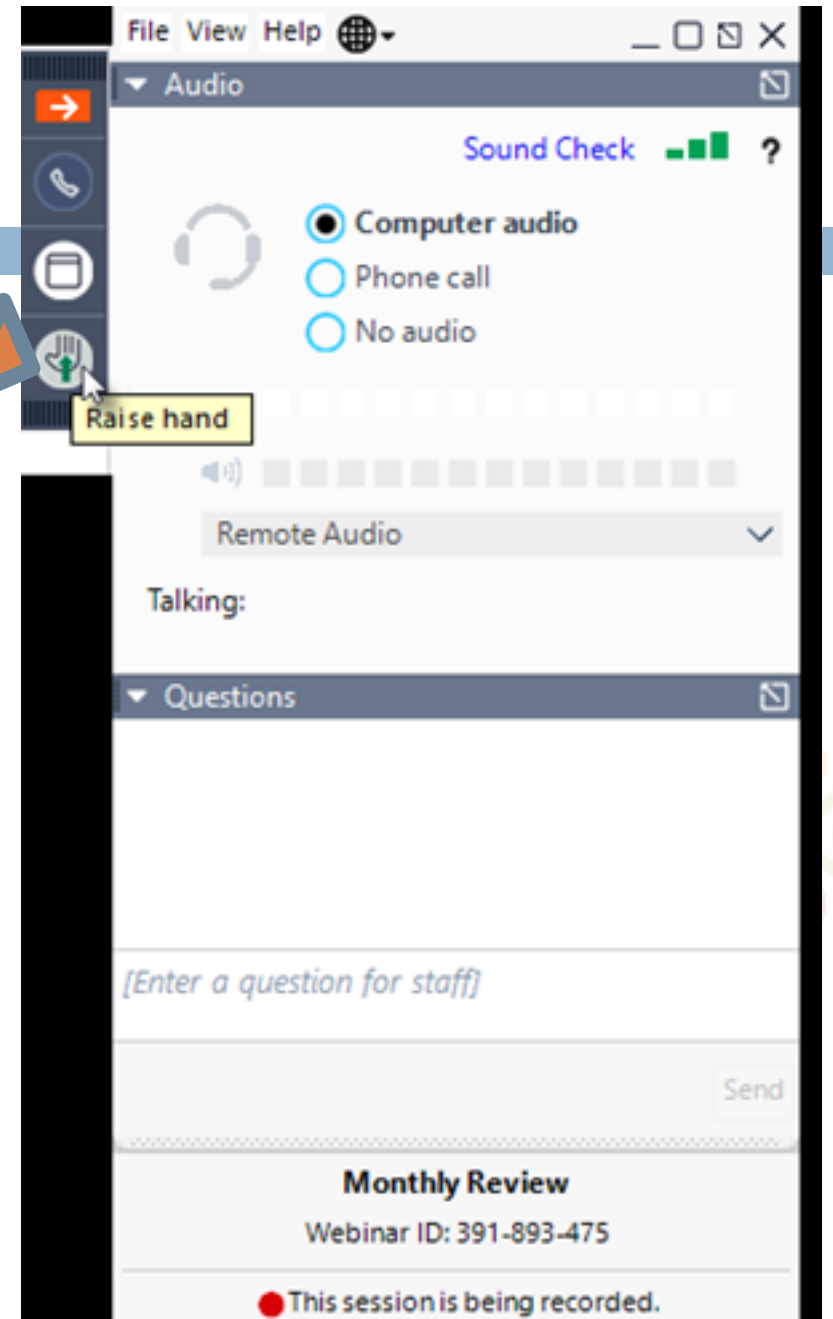
Please send questions to info@fourlakestaskforce.org

Public Comment

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To comment:

1. "Raise your hand" by clicking on the icon
2. Comments will be taken in the order received as determined by the GoTo Webinar platform
3. When it is your turn, your name will be called, and your microphone will be unmuted
4. **Please state your name and topic**
5. You have 2 minutes
6. A timer will indicate how much time you have left
7. Individuals running over their time will be asked to quickly conclude before their microphone is muted



Comment Timer

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Change Clock Type

Digital ▼

second changed successfully!

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TimeUp Reminder (Optional):

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Thank you for joining us!

