

Marsh Lake – Project History, Vegetative Response, Monitoring and Observations of Shorebirds, Muskrats & Waterfowl Harvest.

NATIONAL CONFERENCE ON ECOSYSTEM RESTORATION

ALBUQUERQUE, NEW MEXICO APRIL 18, 2024

B10-1



History of Marsh Lake & The Marsh Lake Project

1936 to 1939 - Dam construction and Pomme de Terre River re-routed.

State of MN operated project until 1950 when Army Corps of Engineers (Corps) assumed operation & maintenance.

1985 – Internal DNR discussions began to alter the Marsh Lake dam to facilitate drawdowns. However, there was no structured planning efforts and no Corps involvement.

1991 – Upper MN River Partnership formed from Corps leadership.

1995 – Corps requests DNR take part in habitat restoration study of Marsh Lake focused solely on dam modification. Not funded, so study did not occur.

History of Marsh Lake & The Marsh Lake Project (continued)

2000 – Interagency Marsh Lake Water Control Structure Agency Team formed. Corps & DNR funds used in this effort. Public meeting held (problem & solutions) & as planning progressed more divisions & stakeholders participated. Planning became more focused on the entire ecosystem, not just modifying the dam. Still internal debate-fish, wildlife or full river restoration.

2001 to 2003 – Internal DNR working group charged with developing a unified strategy for Marsh Lake. “Agreement in Principle” signed in 2003 by DNR Division Directors. Corps needed this to move forward.

2001 to 2003 – Corps conducts reconnaissance study of MN River basin. Marsh Lake recommended for a feasibility study and finding of federal interest in the Marsh Lake project.

History of Marsh Lake & The Marsh Lake Project (continued)

2004 to 2005 – Funding support requests from DNR commissioner to state members of congress.

2007 – Project Management Plan & Federal Cost Share Agreement signed – formal feasibility study begins.

2011 – Feasibility Report & Environmental Assessment was completed, and the Corp Chief recommends project approval to Congress.

2012 – MN Attorney General identifies legal need for a non-federal sponsor for the Marsh Lake project. State of MN cannot enter into agreements that legally indemnify another party (the federal government).

2014 - Joint Powers Agreement signed between Upper MN River Watershed District & the State of MN. District becomes the non-federal sponsor of the Marsh Lake Project.

History of Marsh Lake & The Marsh Lake Project (continued)

Funding for the project came from three primary sources: Legislative Citizen Commission on Minnesota Resources, Lessard-Sams Outdoor Heritage Council - 4.6 m & The Water Resources Reform and Development Act – 7.5 m. Partnerships were key in this aspect with DU being instrumental in Marsh Lake receiving federal funding.

2016 – Project work begins.

2019 – Project work is complete.



Shorebird Monitoring on Marsh Lake

Aspects of Shorebird Monitoring

1

Recruit &
Orient
Volunteers

2

Develop Data
Sheet

3

Identify
Monitoring
Points

4

Make
Observations

5

Summarize
Data

Recruitment & Orientation

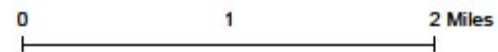
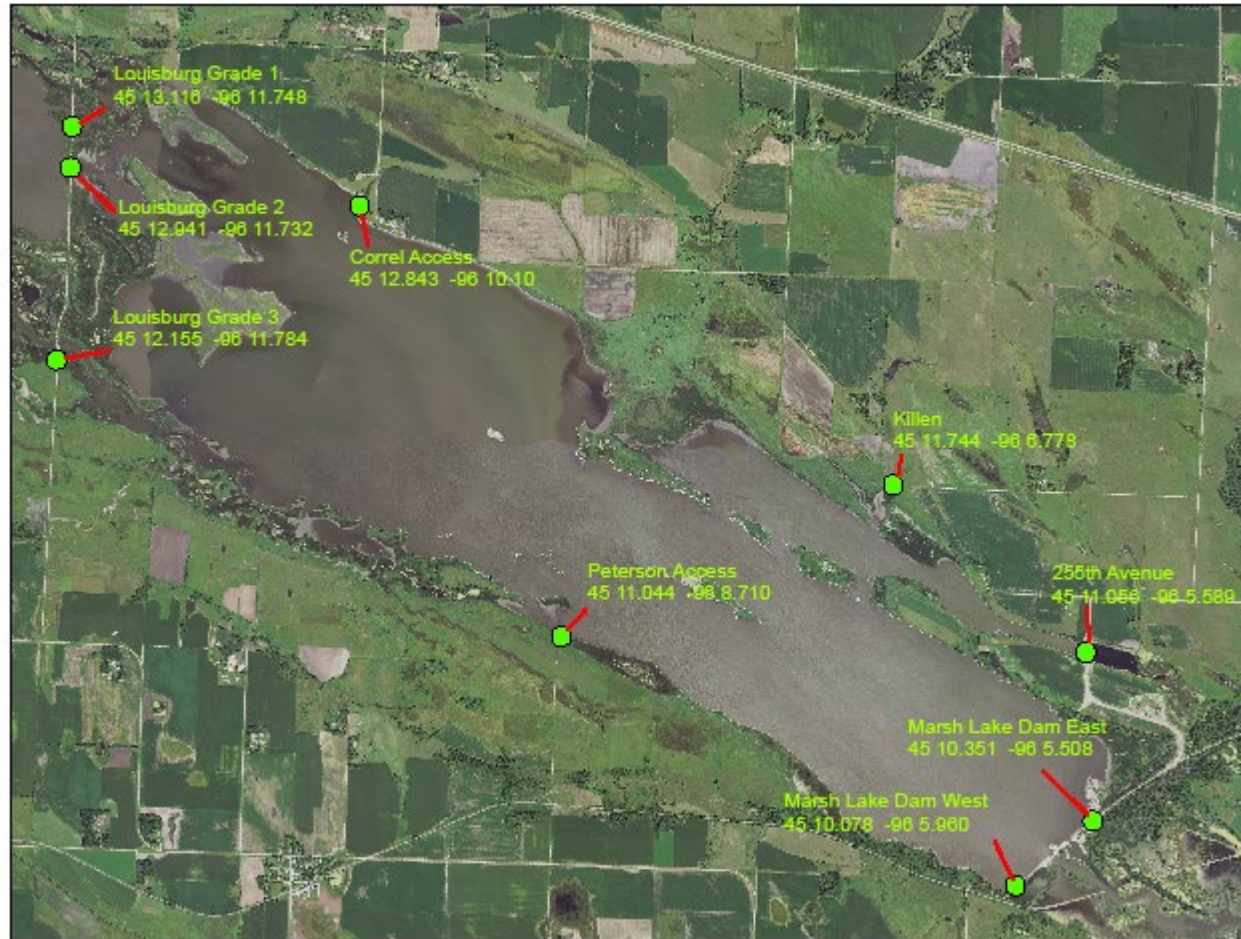
Used similar model that used volunteers in the past to monitor shorebirds and sharp-tailed grouse in this part of the state.

Recruited five volunteers, four of which provided data.

Provided volunteers with Marsh Lake project information, objectives of survey, survey directions, data sheets and maps. All this was completed via email.

Volunteers were asked to complete surveys as they were able.

Marsh Lake Shorebird Monitoring Points GPS Readings in Degrees Decimal Minutes



Walt Gessler
Date: 5/8/2020
2019 Color FSA

Shorebird Observation Results

In 2020, four observers made 19 observations on 12 separate days from eight out of nine observation points.

Observations were made in the months of May, July, August, September & October.

25 separate species of shorebirds were identified by the observers.

A total of 28,618 shorebirds were counted with the highest one-day total of 3,928 on August 19, 2020.

Unique observations included Peregrine Falcons and Merlins on more than one day and reports of large numbers of shorebirds to distant to identify or count.



Vegetation Monitoring & Changes

Changes in Vegetation 1991-2022

Vegetative changes are monitored via aerial photos and photo stations primarily for emergent vegetation along with point intercept sampling is used primarily for submergent vegetation.

305 GPS points are established lake wide to allow for repetition of points and consistent sampling. Not all points are able to be accessed on each survey.

Eight lake surveys have occurred between 2002 & 2023. Surveys also occurred in prior years.

Submergent plant abundance has dramatically decreased from 2002, going from 74% presence down to 1% presence in 2015. Post drawdown this has increased to 7% with Coontail becoming more prevalent along with Sago Pondweed.

Emergent plant abundance has changed from a baseline of 1,524 acres in 1991 to 1,023 acres in 2007 to our current 4,111 acres. This has produced some challenges for hunters by limiting access to some parts of the lake & the ability to reach vegetation sampling points.

Photo Stations

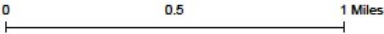
Photo stations provide a means to visually document change.

Eight photo stations were established with from one to four images taken from each station at different azimuths.

Images are taken at approximately the same time of the year under similar weather conditions using a cell phone camera.

Photo Station Map

Correl & Louisburg Grade Photo Stations



Walt Gessler
Date: 7/8/2020
2019 Color FSA

Cabin Site Photo Station @ 155 Degrees Azimuth

SEPTEMBER 10, 2019



SEPTEMBER 21, 2020



Peterson Access Photo Station @ 10 Degrees Azimuth

SEPTEMBER 10, 2019



SEPTEMBER 21, 2020



Changes in use
of Marsh Lake
by Muskrats



Reasons for Monitoring Muskrats

Research by Errington initially documented muskrats affecting wetland vegetation through their normal activity and rapid population increases.

Muskrats represent a keystone species or ecosystem engineer in prairie wetland ecosystems due to their ability to impact habitat conditions through their normal activities of feeding and house building.

Muskrats have a high reproductive potential (two to three litters/year).

The combination of their normal activities along with their high reproductive potential can produce significant changes in wetland vegetation to transition from closed emergent plant communities to hemi-marsh conditions.

Methods for Monitoring Muskrats

Muskrats are house builders. They will annually construct houses in the fall by cutting and piling vegetation. The number of houses observed is a good indicator of population change.

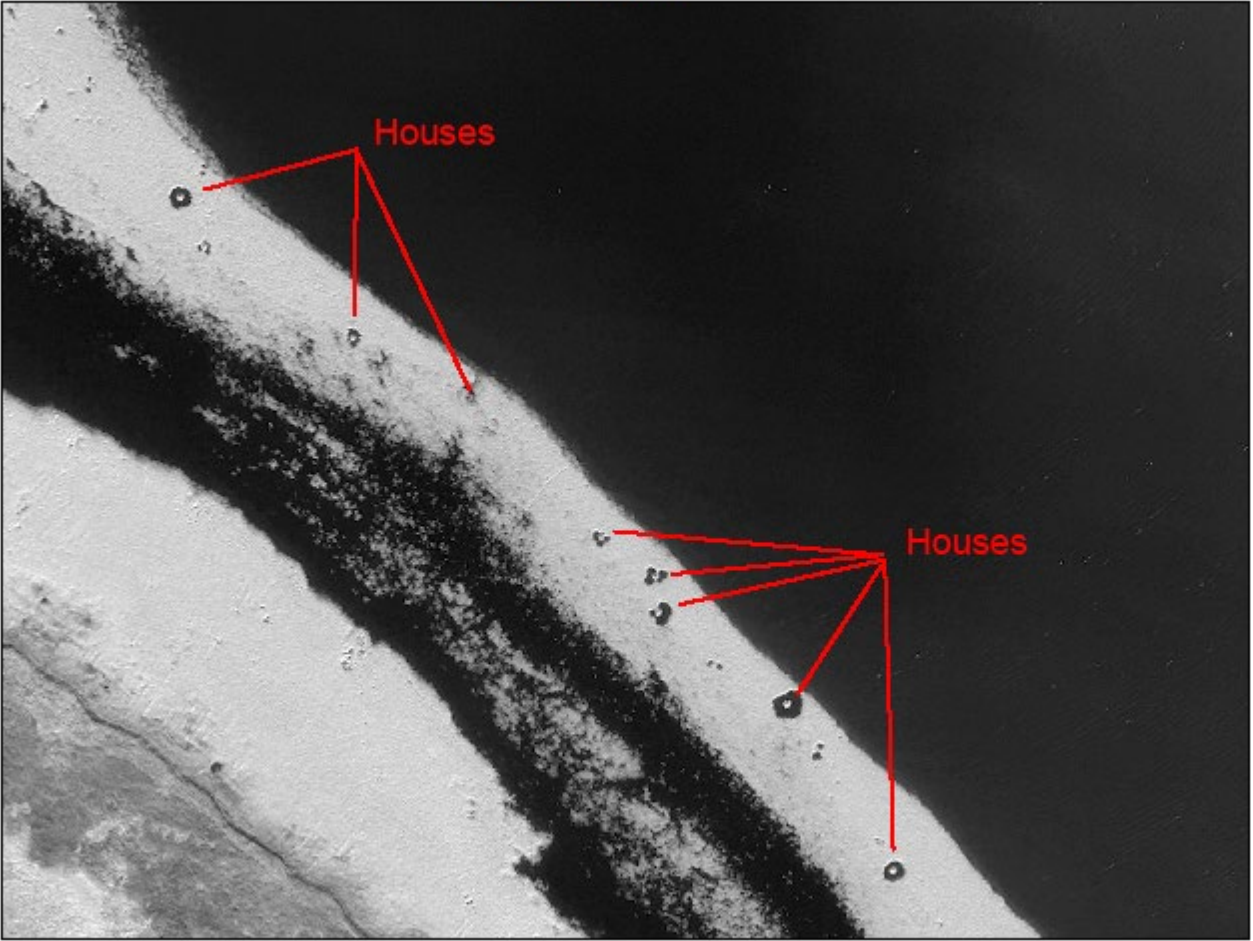
This house building activity is readily detectable by aerial imagery. November aerial imagery is best depending on snow cover.

We used November Pleiades Satellite imagery to detect changes in muskrat house numbers post drawdown.

Ground truthing was used to verify select observations that were easily accessible.



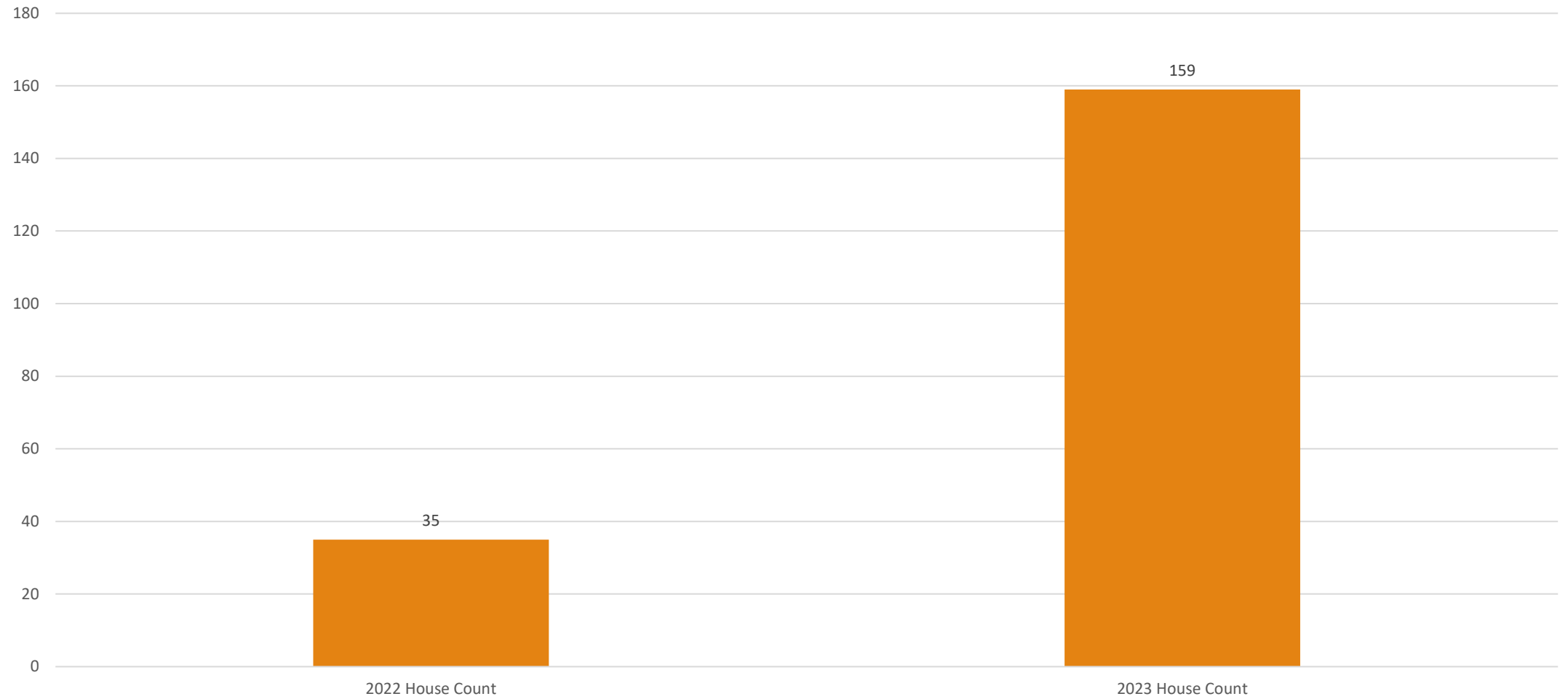
Pleiades-1A/1B Satellite Image
Muskrat House Signatures
November 2023



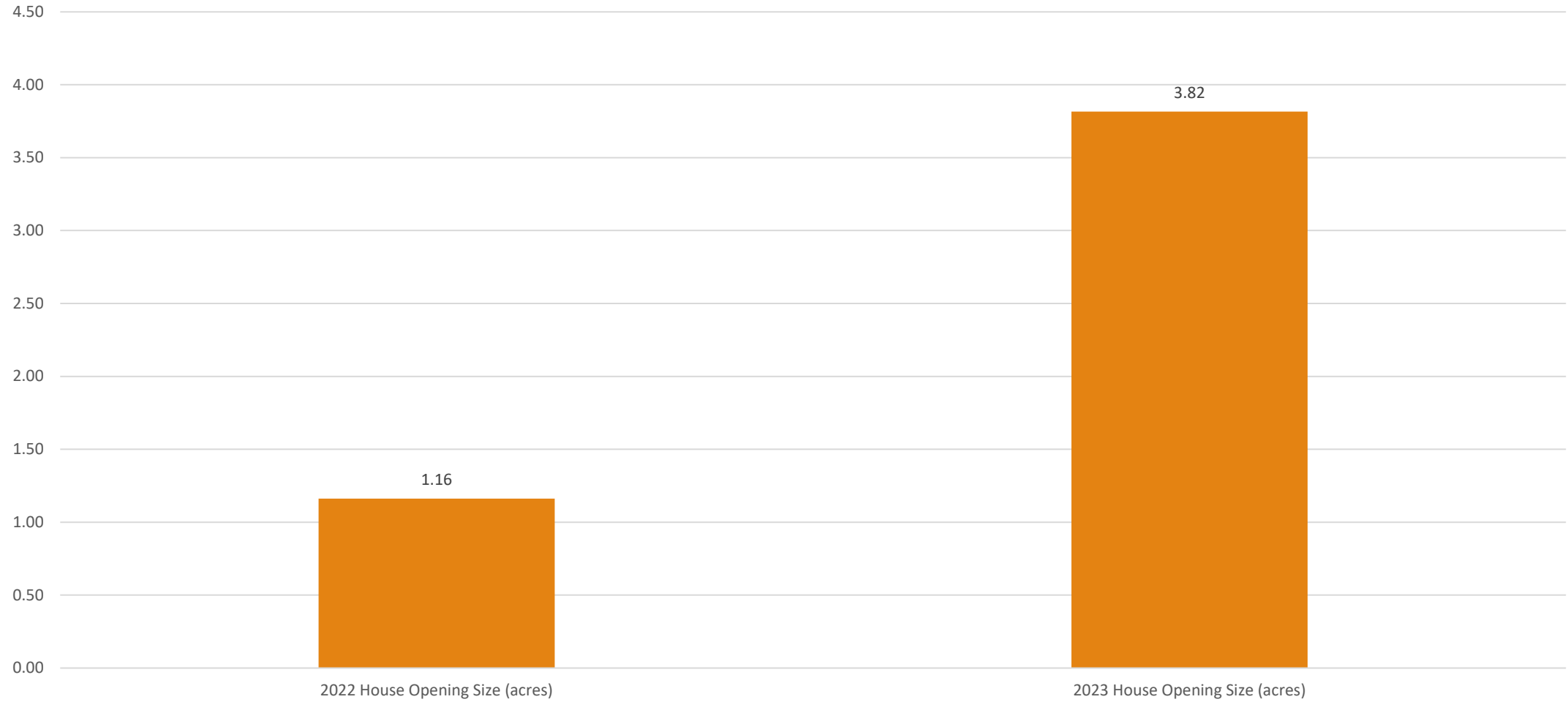
0 0.075 0.15 Miles

Walt Gessler
Date: 3/6/2024
November 2023 Pleiades Satellite Image

November 2022 & 2023 House Counts



November 2022 & 2023 Total Acres of Openings Created From House Building



Waterfowl Harvest Changes Pre & Post Drawdown.



Methods of Monitoring Waterfowl Harvest

Data from opening day waterfowl harvest have been taken for decades at Lac qui Parle Wildlife Management Area.

Information is collected by first counting vehicles at access points beginning at about sunrise.

Later in the morning, as waterfowl hunters return to the access points, hunters are interviewed and asked for the number of people in their party, and the number and species of waterfowl that were harvested.

Opening Day Waterfowl Season Car Count and Bag check Data



In Conclusion

Patience and persistence paid off across multiple careers to complete this project and partnerships were a key to success.

Working with enthusiastic and skilled birders provided good information, even during a pandemic, for shorebird use of the lake during drawdown conditions.

Project design provided the tools to improve habitat conditions and provide connectivity for a diverse group of both fish and wildlife species.

Continued vegetation monitoring shows a significant increase in emergent vegetation present on the lake and some increases in submergent vegetation. Patience and persistence will be important once again moving forward.

Muskrats are showing a steady increase in their population and may be moving Marsh Lake toward more hemi-marsh conditions. Pleiades Satellite imagery is a good tool for monitoring population changes.

Waterfowl and hunters continue to use Marsh Lake with a significant response by waterfowl immediately post drawdown.

Large amounts of emergent vegetation has produced access challenges for hunters to reach parts of the lake and for staff to reach vegetation sampling stations.

