

Lake Management Committee

Minutes

April 21, 2025

1) The meeting was called to order at 10:05 am

2) Attendance: Villavicencio, Hansen, Gehl, Seidel, Lincoln, Wheeler

Absent: Manegold

3) **Wakeboating:** The status/pace of bans throughout WI was reviewed, and then locally. Most bans have been up north till this year. Smaller shallower lakes banning more quickly. No current bills in WI legislature pertaining to this, DNR is not expected to act. Lakes At Stake/Last Wilderness Alliance discussed. Quick review of propeller boats effect on lakes as to mixing depth of motors/sediment. Options discussed to recommend to VB: Town Hall, survey of riparian owners with simple ban/no ban option, time control of wake activities (very unpopular.) The Committee voted unanimously to recommend a survey of riparian owners to the Village Board at May VB meeting. Hopefully executed end of May will discuss in early June meeting. We will also ask for the officer at landing to keep a log of types of boats coming on and whether they are riparian owners or not. We will ask Chief if citations can include the type of boat, specifically looking at wakeboats.

4) **Freshwater salinization:** We reviewed the data of rising chloride levels in SE WI lakes and wells. Sources discussed. The Codys reviewed Chenequa's annual salt use, number of plowable events and that salting only occurs on hills, intersections and curves, no straightaways. Brine pros and cons reviewed. The last Pine Lake chloride measurement was 2006. LMC voted and recommends 4 spot measurements, \$30 per test, between Fiedler/Gallun, Beaver lake input, a deep spot in middle of lake and outlet to North Lake, taking measurements now and again in fall. The need for all four spots twice a year will be reviewed going forward though we expect annual measurements over time. Funds from launch money. Newsletter blurb early winter to alert residents about checking their water softeners and minimizing salt use in winter recommended, balancing with the safety of our elderly residents.

5) **Invasive Species:** We reviewed historical data of Pine Lake chemical use from Solitude Lake Management. Mainly good news with less and less chemical being used over the last 10 years, rotating chemicals to avoid hybridization. We fight the same weeds as everybody else, Eurasian milfoil and curly leaf pondweed. Treatment recommendations are based on a pre-treatment weed survey by boat and a second weed survey conducted in fall to assess response. Spreadsheet of other lakes, their challenges and vendors shared. Range of approaches from zero chemicals/weedcutters to spot chemicals to annual chemical treatments. Cody shared his discussion with Heidi Bunk/DNR. DASH was discussed mainly as an option for small areas given cost. Will share a positive blurb in newsletter about trends in invasive species. Goals include preserving healthy native aquatic species.

6) **Aerators:** Winter safety and recent fatality on Pewaukee 1/25 discussed. Question of whether nearby aerator with unmarked open ice contributed. UTV with plow being used in Pewaukee case and Pine does

not allow motorized vehicles. Simple safety blurb planned in winter newsletter to residents who use the ice about unsafe ice near aerators and that owners of aerators mark their open ice. Fritz only saw 3 aerators this winter attached to boathouses not piers.

7) **LCCW 14 lakes concerns** reviewed from February LCCW meeting. Judy recommended we as a Committee ask for the top lake management concerns from riparian residents along with wakeboating survey. We agreed to add an open ended section for that.

8) The minutes of August 2024 were approved.

9) New business: Discuss spring/summer aerator use next meeting plus survey followup.

10) Meeting was adjourned 11:23 a.m.

11) Next meeting: early June after survey TBD.

Respectfully submitted,

Debbie Wheeler, Chair.

Lake Management Committee

Notes 6/6/25 No quorum

Present: Villavicencio, Hansen, Lincoln, Village Attorney, Wheeler. no quorum

Absent: Seidel, Gehl

- 1) **Wakeboats**: We reviewed current wakeboat litigation in the state, then survey as written. Plan is to send it out after week of July 4.
- 2) **Aerator use**: We discussed pros and cons of spring/summer/fall aerator use. Plan is blurb in Windword about sediment and proper siting of aerator plus link to DNR info sheet.
- 3) **Chloride**: Samples are pending at lab, 4 sites were chosen
- 4) **HQW**: High Quality Water designation from DNR/SEWRPC/EPA plus threats to. Reviewed the goals of this program. We don't have the highest scores: because of the amount of rip rap we have, because of when we treat for invasives (DNR/SERPC prefer April/May treatment, we treat in June) and because of lack of aquatic plant biodiversity.
- 5) **Boat lift covers**: We discussed boat lift covers with sides and DNR rules re boat shelters. Boat lift covers with sides are for wooden boats and boats of documented historical significance only. Plan is Windword blurb including DNR link.

Respectfully submitted,

Debbie Wheeler, Chair

Lake Management Committee Notes

August 2025 No quorum

- 1) Meeting called to order: 10:10 a.m.
- 2) Attendance: Villavicencio, Manegold, Lincoln, Wheeler
Absent: Hansen, Gehl, Seidel
- 3) **Wakeboats**: St Anthony Falls Study #2, a depth study. Reviewed and discussed implications for policy for wakeboats and non-wakeboats. Study recommends wakeboats operate in wakesurf mode in 20 feet or greater and that both types of boats operate slow-no-wake in 10 feet of water or less due to sediment/phosphorus kick-up
- 4) **Chloride**- results of 4 new samples, levels at which chloride is affecting biology of the lake, recommendations how/where/when to measure going forward, source reduction recommendations, best education venues discussed
- 5) **Lake chemistry/lake biology**: how/when these are affected by elevated chloride levels: plants, zooplankton, fish, amphibians
- 6) **Education**: What is venue for education if LMC recommends it to VB/PC? Discussed revivifying Village newsletter as a vehicle for education
- 7) New business: none
- 8) Adjournment: The meeting was adjourned at 11:30 a.m.
- 9) Next meeting: TBD

Respectfully submitted,

Debbie Wheeler, Chair

Lake Management Committee

August 2025

AGENDA

- 1) Meeting call to order
- 2) Attendance
- 3) Approval of minutes from and notes from non-quorum meeting.
- 4) Wakeboat study: St. Anthony Falls #2, a depth study
- 5) Chloride results
- 6) State-of-the-Lake presentation annually
- 6) Education recommendations to VB/PC where?
- 7) New Business
- 8) Adjourn
- 9) Next meeting



ST. ANTHONY FALLS LABORATORY

Engineering, Environmental and Geophysical Fluid Dynamics

SAFL Project Report No. 611

***A Field Study of Recreational Powerboat Hydrodynamics
and their Impacts on the Water Column and Lakebed.***

By:

Andrew Riesgraf, Jeffrey Marr, William Herb,

Matthew Lueker, Jessica Kozarek

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Prepared for:

St. Anthony Falls Laboratory

July 2025

Minneapolis, Minnesota

A depth study of non-wakeboats and wakeboats:

2 deck boats (O), 3 bow riders (i/o, stern drive) , 2 wakeboats (i v-drive)

In 2 modes: deck and bow riders: planing (21-25 mph), non- planing(7-9 mph)

Wakeboats: planing (21-25 mph) and surfing (11.6 mph)

Driven over Doppler acoustic bottom mounted velocity sensors at:

9, 14, 16, 27 feet

Checking for :

Bow and stern waves-These lift lake sediment

Transverse waves-These legate and entrain lake sediment

Prop wash-includes exhaust bubbles-elevate and entrains lake sediment

Multiple metrics:turbidity, temp, dissolved O₂, phosphorus, suspended solids (sediment), video, wave velocity, bubble depth over time

Table 2. Summary of the seven powerboats tested.

Boat Type	Manufacturer	Model	Year	Drive	Max Horsepower	Length (ft)	Beam (ft)	Dry Weight (lb)	Max Ballast (lb)	Trim Plate/ Hydrofoil	Wake Shaper
Deck	¹ Hurricane	SS 203	2016	Outboard	175	20.8	8.5	2600	No	No	No
Bowrider	¹ Cobalt	R5	2021	Inboard/Outboard	350	25.7	8.5	4880	No	No	No
Bowrider	¹ Cruisers Yachts	34 GLS	2022	Inboard/Outboard (twin)	760	35.8	11.7	14530	No	No	No
Wake	^{1,2} Nautique	Super Air G23 Paragon	2022	Inboard (V-drive)	600	23.0	8.5	7200	2200	Yes	Yes
Wake	^{1,2} Malibu	Wakesetter VLX	2019	Inboard (V-drive)	450	21.0	8.2	4200	3690	Yes	Yes
Deck	² Starcraft	Limited 2000	2021	Outboard	150	20.3	8.5	2715	No	No	No
Bowrider	² Sea Ray	SPX 190	2023	Inboard/Outboard	250	19.6	8.3	2675	No	No	No

1 - Fall 2022

1,2 - Fall 2022 and 2023

2 - Fall 2023

Table 6. The mean maximum bubble depth for all boats in planing mode (Condition 1), non-wakeboats in displacement mode (Condition 2), and wakeboats in semi-displacement mode (Condition 2). Bold values indicate statistical significance between conditions.

Boat	Type	Condition 1 Mean $\pm$ SD (ft)	Condition 2 Mean $\pm$ SD (ft)	Pooled <i>t</i>-test (<i>p</i>-value)
¹ Hurricane SS203	Deck	5.1 $\pm$ 0.3	5.6 $\pm$ 0.7	0.2384
² Starcraft Limited 2000	Deck	5.1 $\pm$ 0.8	5.7 $\pm$ 1.5	0.4629
² Sea Ray SPX190	Bowrider	5.3 $\pm$ 1.0	6.0 $\pm$ 1.2	0.3008
¹ Cobalt R5	Bowrider	9.9 $\pm$ 0.3	8.9 $\pm$ 0.6	0.021
¹ Cruisers Yachts GLS34	Bowrider	5.3 $\pm$ 0.3	9.8 $\pm$ 2.4	0.0028
^{1,2} Nautique G23 Paragon	Wake	7.6 $\pm$ 1.2	10.8 $\pm$ 1.4	< 0.0001
^{1,2} Malibu VLX Wakesetter	Wake	8.3 $\pm$ 0.7	11.2 $\pm$ 1.2	< 0.0001

1 - 2022

1,2 - 2022 and 2023

2 - 2023

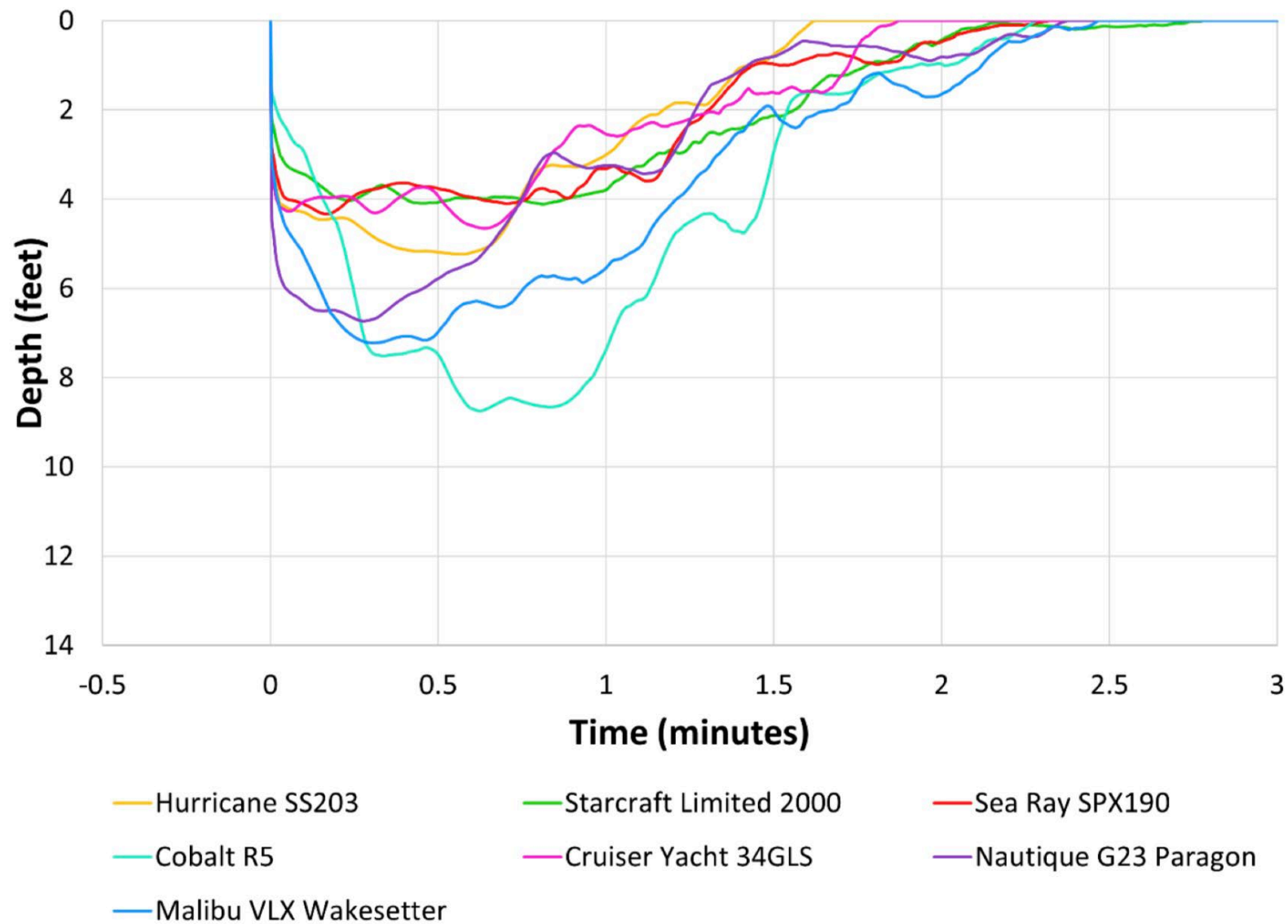
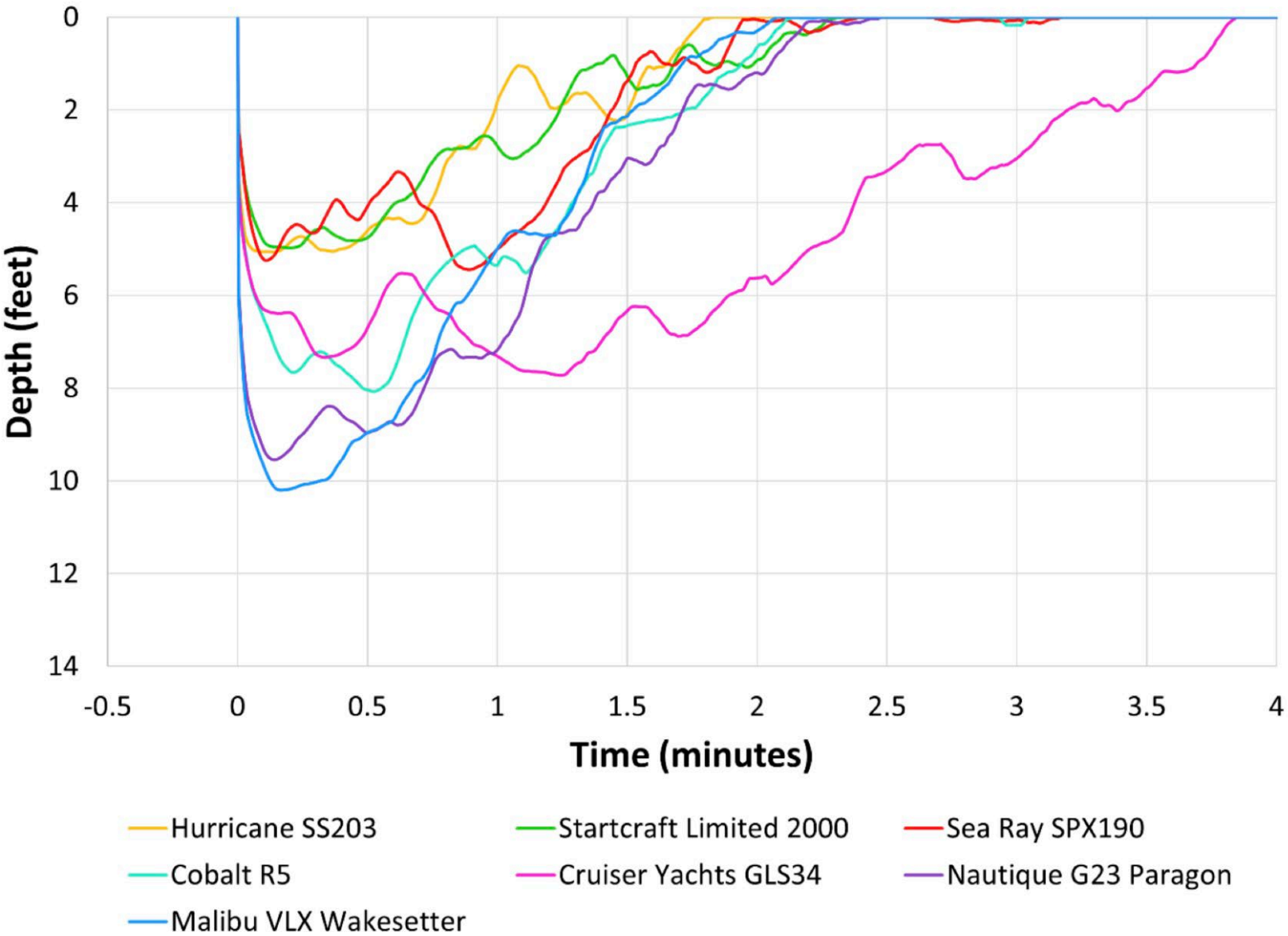


Figure 32. Mean bubble depth limit for the five passes made by the boats when operated in planing mode (Condition 1). The 2022 and 2023 data for the Nautique G23 Paragon and Malibu VLX Wakesetter are combined (n=10).

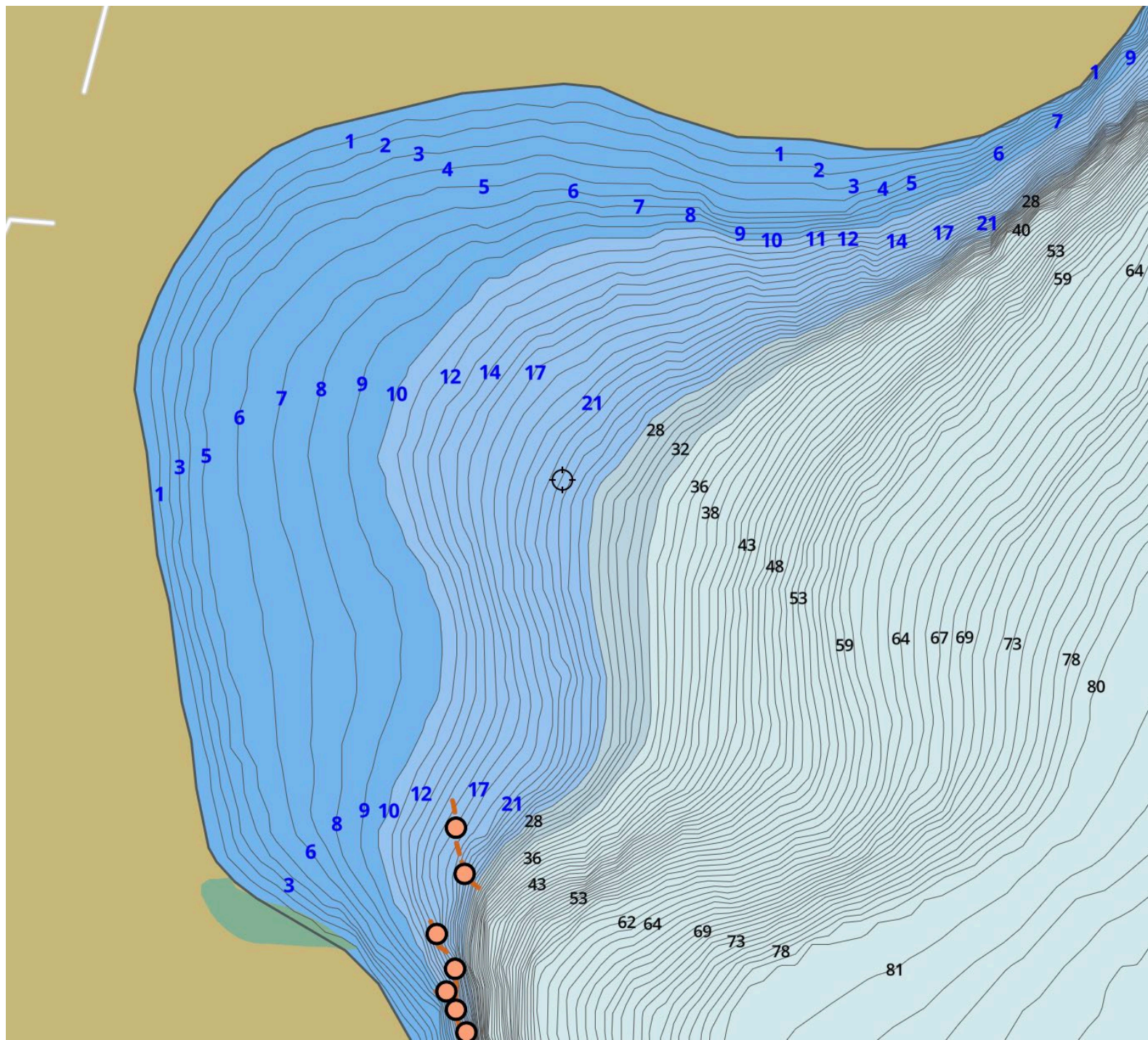


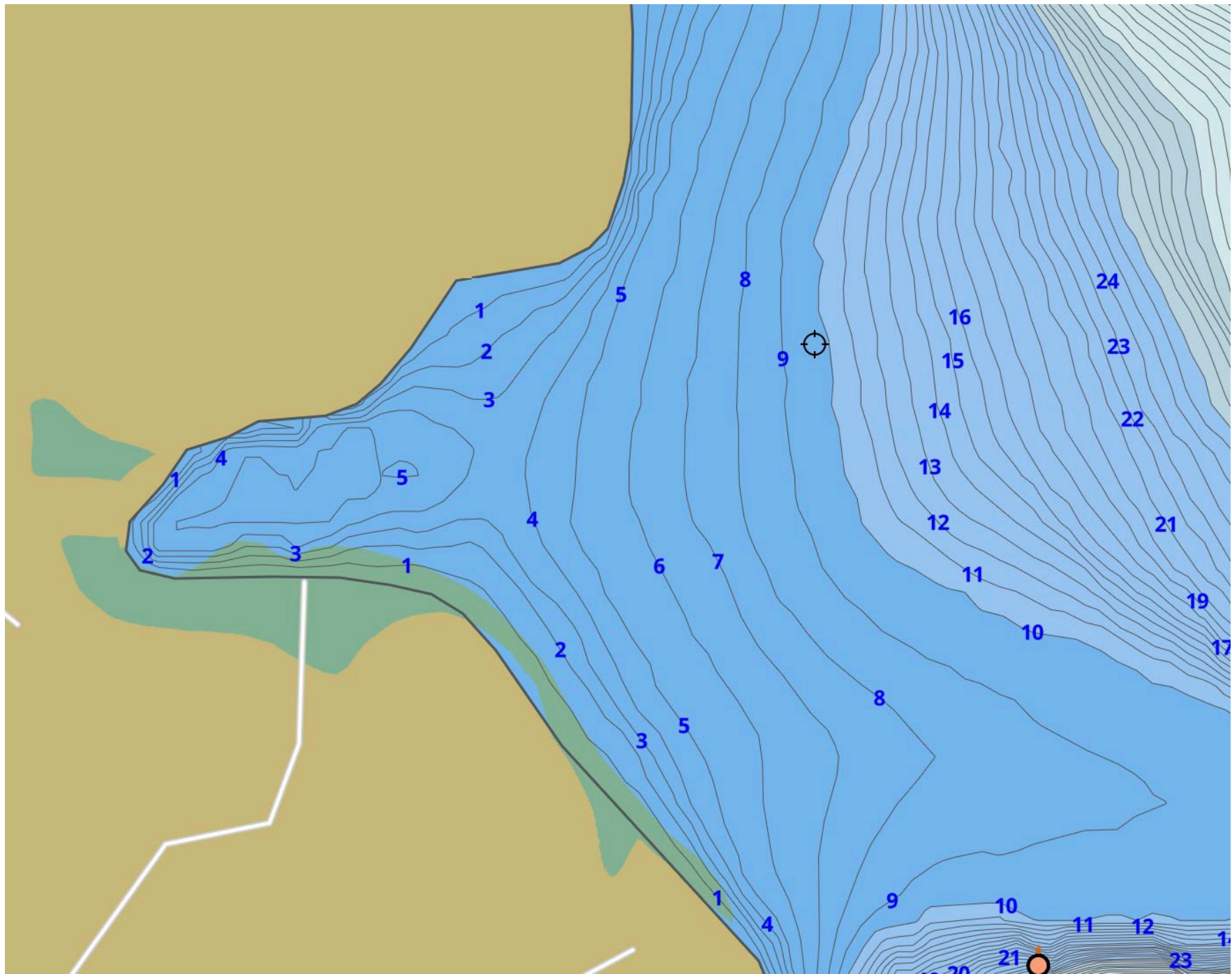
Recommendations:

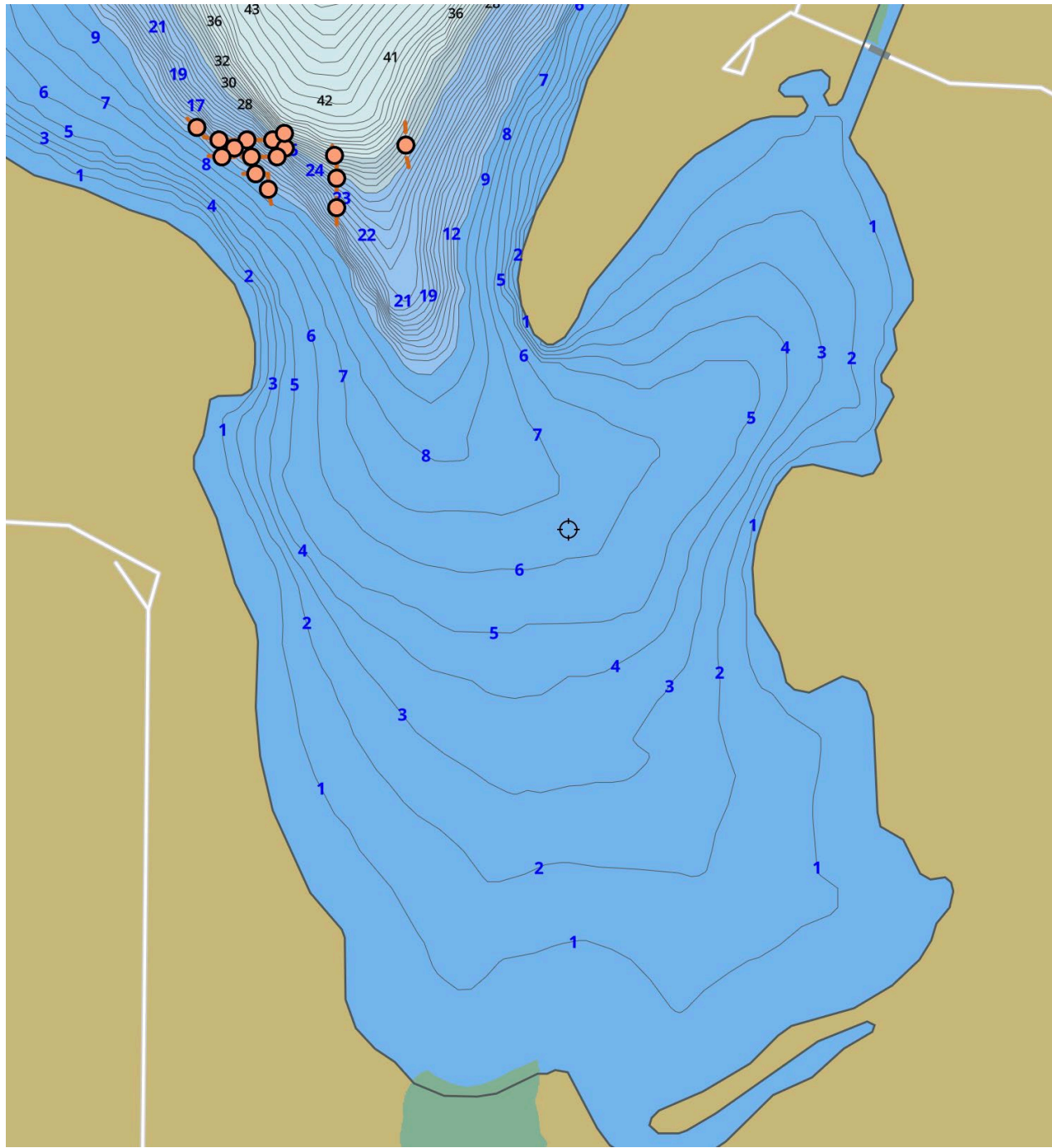
- 1) Recreational powerboats: since these boats suspend sediment majority less than 10 feet planing or cruising should be done in 10 feet of water or more. In less than 10 feet of water these boats should be slower than cruising to slow-no -wake.
- 2) Wakeboats: Since wakeboats surfing suspended sediment between 9-14 feet, surfing mode should be done in 20 feet of water or more. At higher speeds should be in at least 10 feet of water. Slow to slow-no-wake in less than 10 feet of water.
- 3) All boats can cut weeds, stay out of weed beds.

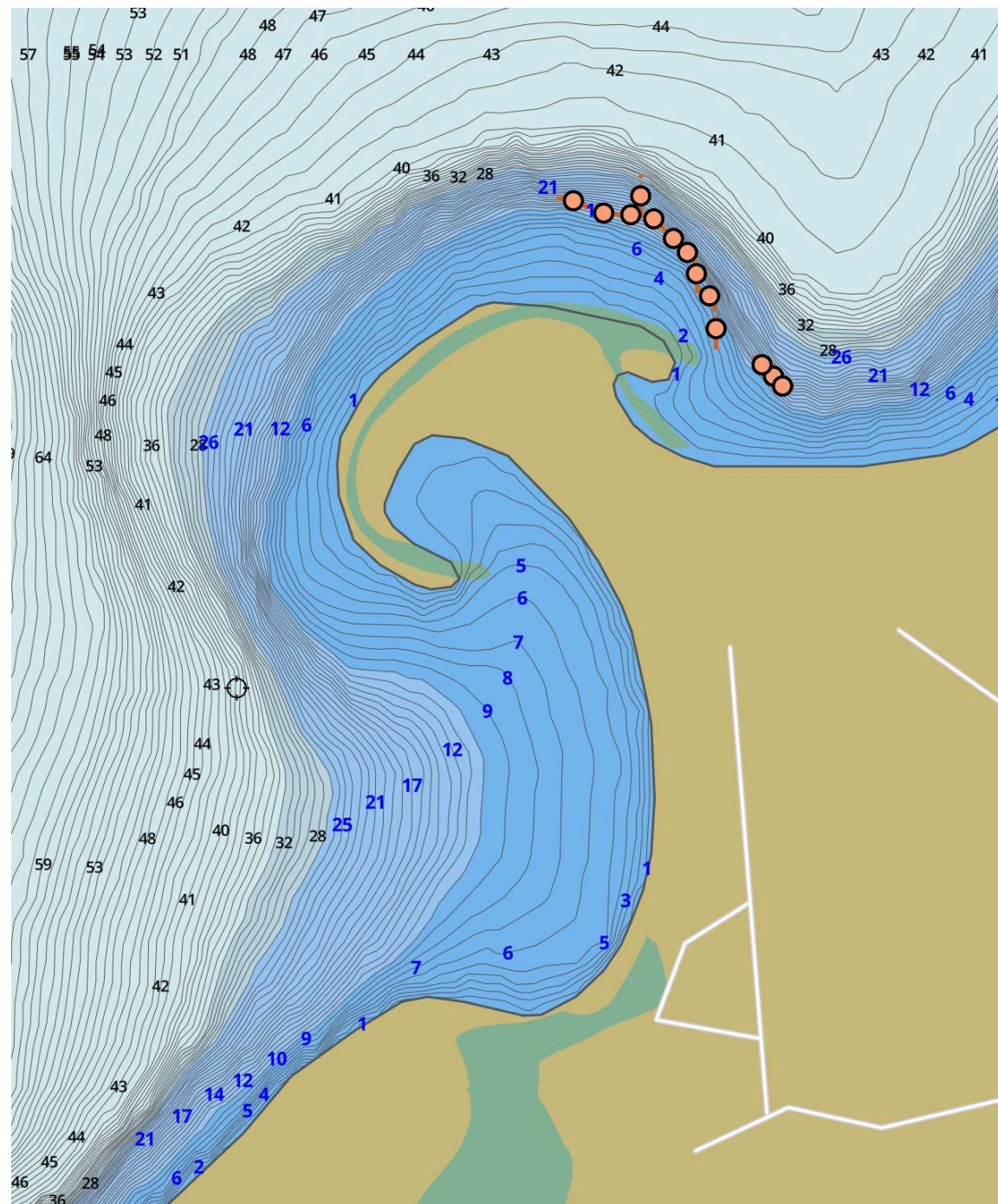
Some things to think about:

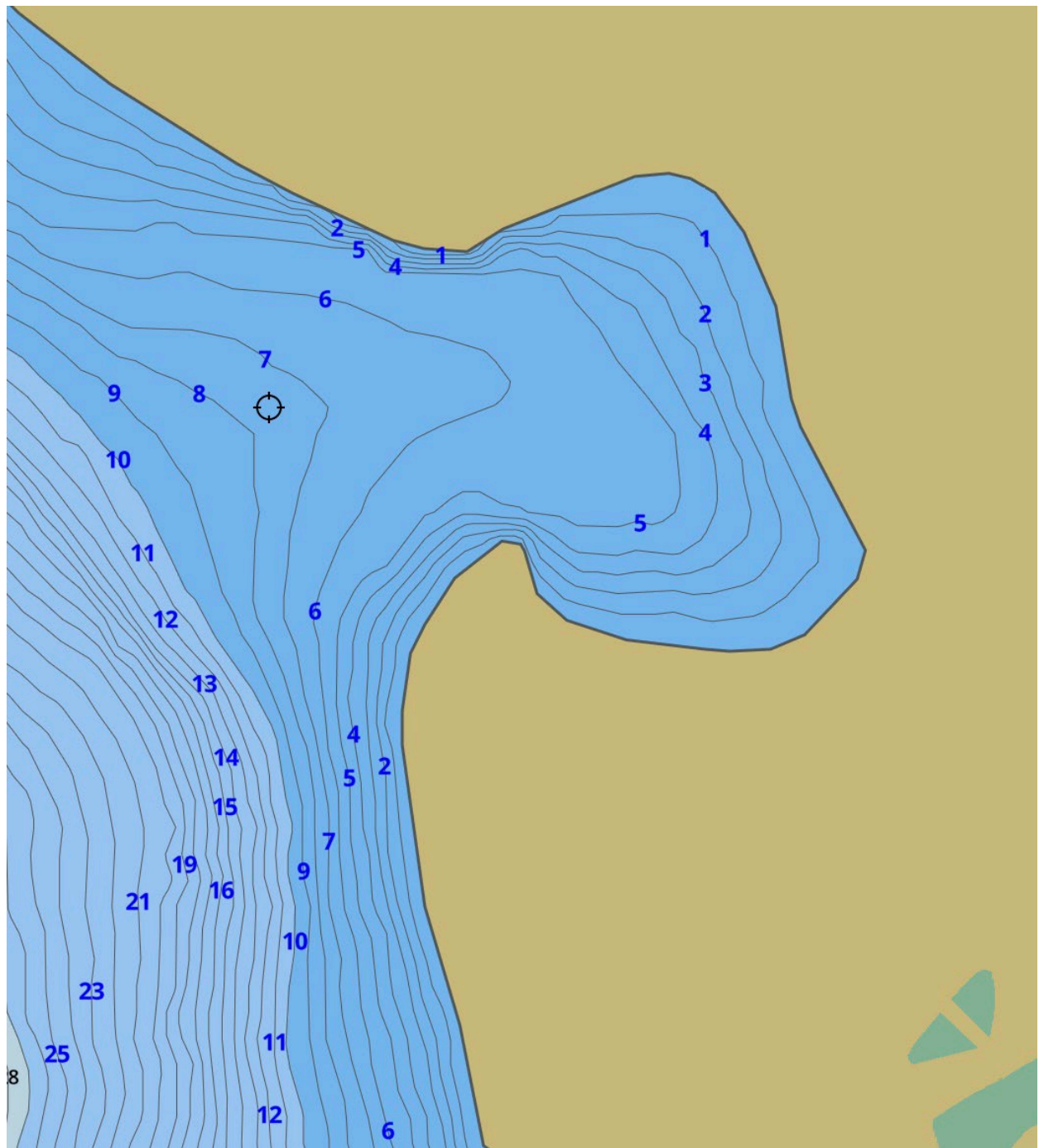
- 1) Is an ordinance for wakeboats surfing to stay out of the bays realistic and enforceable? They are all less than 20 foot depth.
- 2) Should all the bays be slow no wake given this study? SEWRPC expressed concern in 2014 report -before we had wakeboats-evidence of prop wash/scouring in the western bays
- 3) Where should waterskiing and tubing be happening?
- 4) If a state bill has distance from shore requirement >200 feet what is the implication for wakeboat traffic on Pine?
- 5) If folks are unhappy with weekend boat traffic, should we decrease speed limit on weekends-like Nagawicka does?











Pine Lake Chloride Results

Pine Lake 2025: 1-OUTFLOW: 54.1 mg/L (to NorthLake)

2-DEEP HOLE: 53.0 mg/L

3-STREAM INLET 60.5 mg/L (from Beaver Lake)

4-STORM DRAIN 52.9 mg/L

Residence Time: North Lake: .8 years

Beaver Lake: 2.6 years

Pine Lake: 5.2 years

Biologic Effects Occur At:

Background chloride levels: 15 mg/L...

Diatoms: 38 mg/L...

Daphnia: 40 mg/L...

Wetland Plants : 55 mg/L...

Fish Diversity: 110 mg/L...

Plankton: 185 mg/L...

WI Toxicity Thresholds:

Chronic: 395 mg/L (4d average max >395 once in 3 yrs)

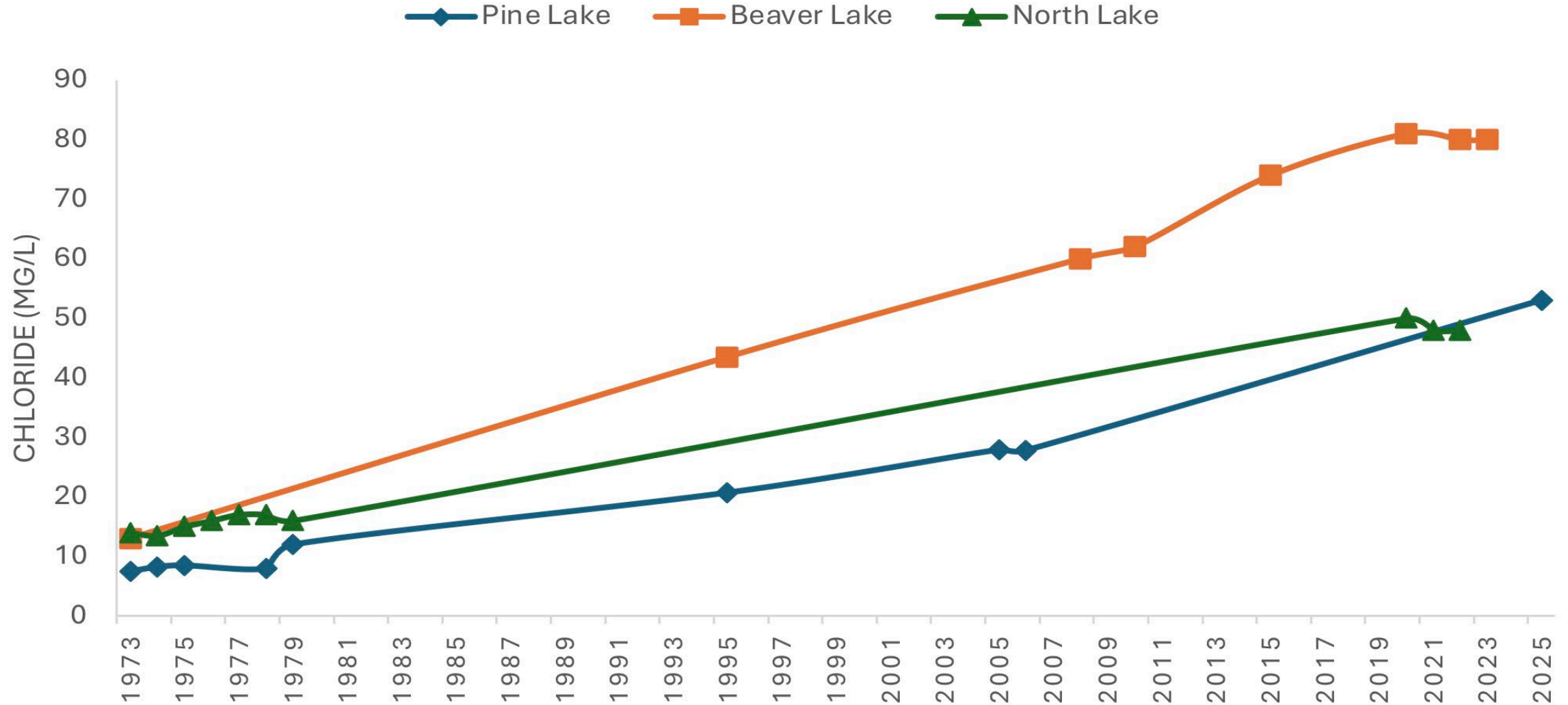
Acute: 757 mg/L (daily exceeds 757 1x/ 3years)
(2022: 35 lakes were over 1 or both of these thresholds)

EPA Toxicity Thresholds:

Chronic: 230 mg/L (4 day average exceeds 230)

Acute: 860 mg/L (1 hour average exceeds 860)

LAKE CHLORIDE LEVELS



Source: DNR SWIMS, SEWRPC, Lillie and Mason 1983, Birge and Juday

- 1) Where and how often should we monitor chloride annually now?
- 2) Anything else we can do municipally given we are approaching levels that affect the biology of the lake? (Operations Committee?)
- 3) Re educating residents about driveway, walkway salt use, water softener fertilizers, what is the best, most effective venue for that?
- 4) Should we be coordinating more with Beaver Lake and North Lake?

Lake chemistry and biology

To centralize our thinking:

- 1) Water quality chemistry-
- 2) Adding chloride to annual measurements; where, when
- 3) Fish surveys?
- 4) Fish stocking-
- 5) Aquatic invasive species-DNR, Waukesha County, Solitude Lake management. Last aquatic invasive survey was SEWRPC 2008

Here is Lake Beulah Management District 2021 example:

https://cdn.townweb.com/lbmd.org/wp-content/uploads/2025/07/Lake_Beulah_2022_APM_Final_Draft_2.pdf

Cost was \$15.5 k

Should we think about an annual “State-of-the-Lake” report culling all the data we have that year: water quality chemistries, chloride, aquatic Invasive species from SLM and report that annually to the Village Board, And thereby be reporting to the residents?

When should the next professional aquatic invasive species survey be done Hopefully chronicling native species and plant diversity as well?