

ZEBRA MUSSELS & AQUATIC VEGETATION



Hydrilla



Eurasian watermilfoil

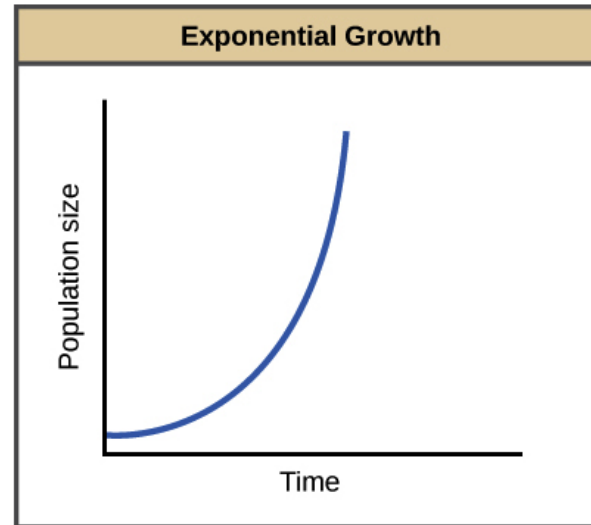
Highland Haven

Board of Alderman Meeting

9/20/2022

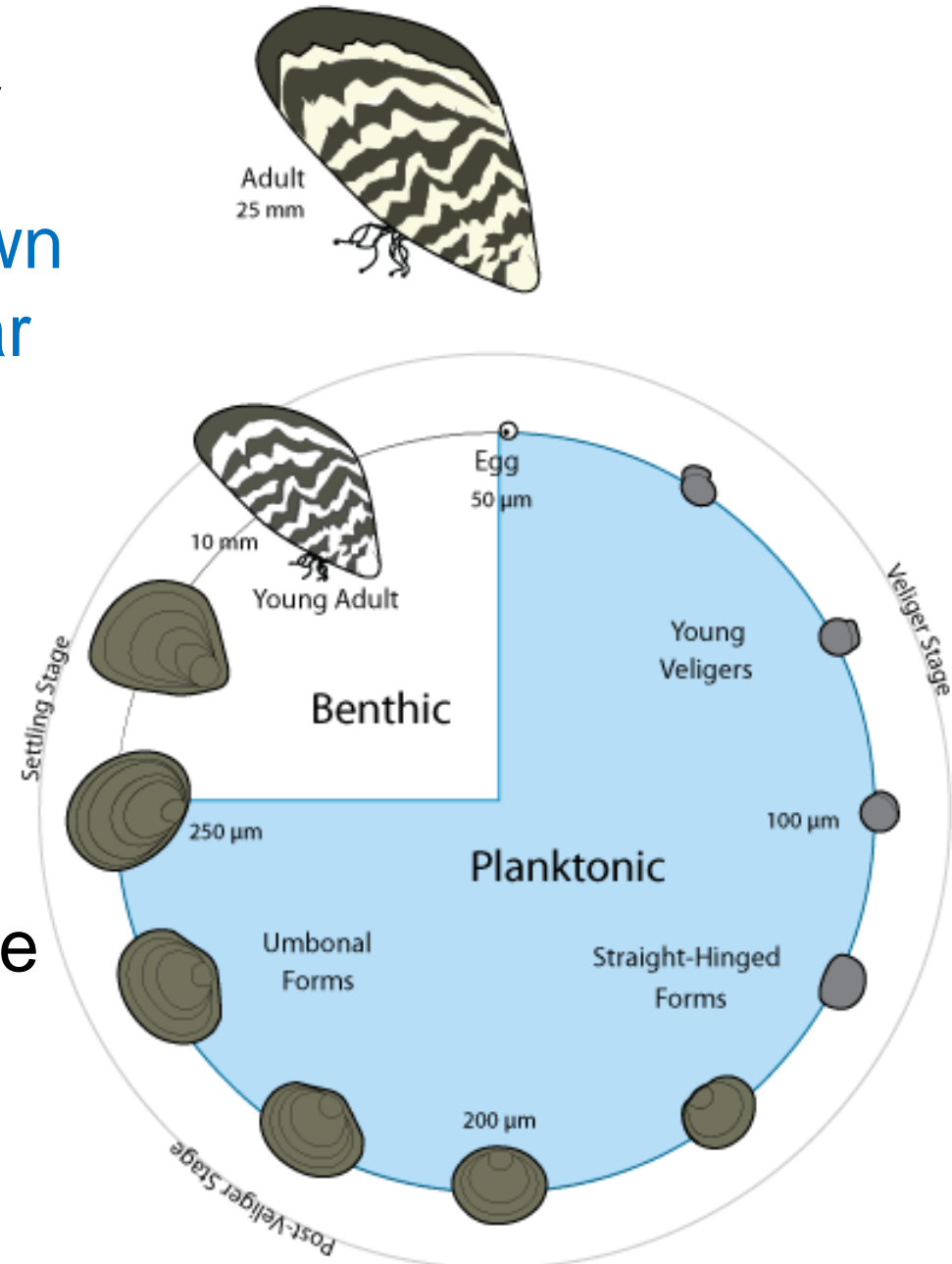
How can something so small have such a big impact?

- Growth rate
- Ability to attach to various substrates



Zebra mussel biology

- Females known to spawn up to 1 million eggs/year
- Larvae (veligers) are microscopic, free floating
- Juveniles settle, attach to hard surfaces in 3-4 weeks
- Become sexually mature in first year





(2) Length 108.86 μm

(1) Length 130.94 μm

Zebra mussel biology

- Max shell size: ~1.5 in
- Life span: ~1 year
- Survive out of water for ~7 days (77°F)
- Major spawning periods
 - Mid-Apr to mid-Jul
 - Mid-Sept to mid-Dec

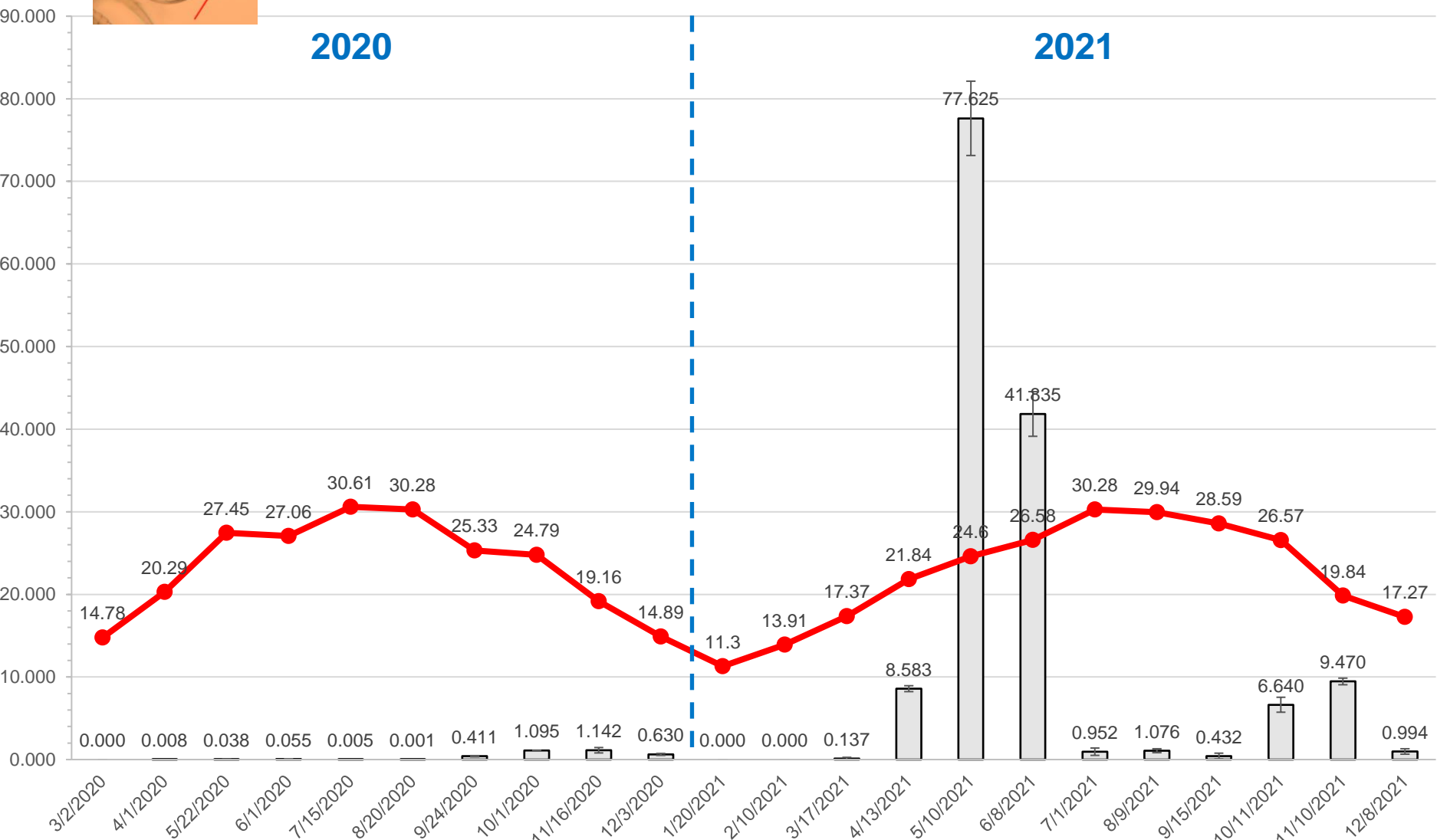




Lake LBJ near Granite Shoals

2020

2021



ZM Density (Veligers/L)

Date

Water Temp (C) @ 0.3 m

ZM population dynamics – Arterburn 2020

- Population and reproductive dynamics of zebra mussels (*Dreissena polymorpha*) in Texas Reservoirs: Predicting the sustainability of zebra mussel populations in warmer waters
- Studied lakes Texoma (2011-17), Ray Roberts (2013-17), Belton (2014-17)
- “Both total population and juvenile settlement densities across all three studied reservoirs suggested that zebra mussel population dynamics in Texas reservoirs are highly variable, and do not necessarily follow boom and bust population dynamics over the long-term. Instead, it is more likely that zebra mussel populations will follow irregular and unpredictable variations in density.”
- “The results of this study suggest that temperature, instead of limiting spread, facilitates mussel invasiveness by increasing the frequency of spawning and elevating growth rates reducing time to maturity. While severe disturbances such as flooding or surface hypoxia were associated with major mussel population declines, their biannual reproductive periods, rapid growth rates, and early maturity and spawning appeared to allow populations to recover within 1-2 years.”

HOW DO WE GET RID OF THEM?

Management, **not** eradication

www.lcra.org/zebramussels

Zebra Mussel FAQs for Homeowners

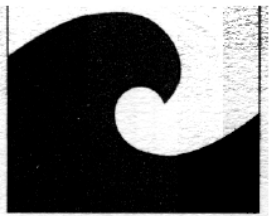
How can I maintain my private water system that withdraws water from one of the Highland Lakes or Lady Bird Lake?

This [technical paper](#) discusses a variety of methods to control zebra mussels in the offshore and onshore components of your residential water system. Examples include in-line filtration, desiccation, snaking and sand filters. The company that installed your water system also may be able to provide technical guidance on system maintenance.

Do copper intake screens prevent zebra mussel colonization water systems?

Screens made of copper, zinc or related alloys can help prevent zebra mussel colonization on the screens to a certain extent. Over time, the screens can become fouled or covered by various biofilms and other substances, and a greenish oxidized layer may appear. This fouling can reduce the screen's effectivity. Therefore, some degree of routine maintenance is still required.

Resources



Sea Grant

Coastal Resources
FACT SHEET
July 1993 - Revised 8/96

Cornell University



State University of New York

CONTROL OF ZEBRA MUSSELS IN RESIDENTIAL WATER SYSTEMS

Charles R. O'Neill, Jr.
New York Sea Grant Extension Specialist

AQUATIC VEGETATION



**Non-native
Hydrilla**



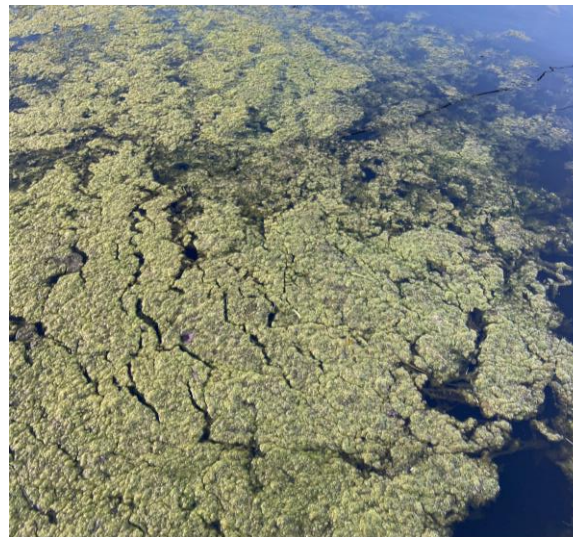
Southern Naiad



**Non-native
Eurasian watermilfoil**



Coontail



Filamentous algae



Chara

Factors influencing aquatic vegetation growth in 2022

- Dry year
- No Inks Dam releases in spring - line maintenance
- Zebra mussels
- The human element

Factors influencing aquatic vegetation growth in 2022

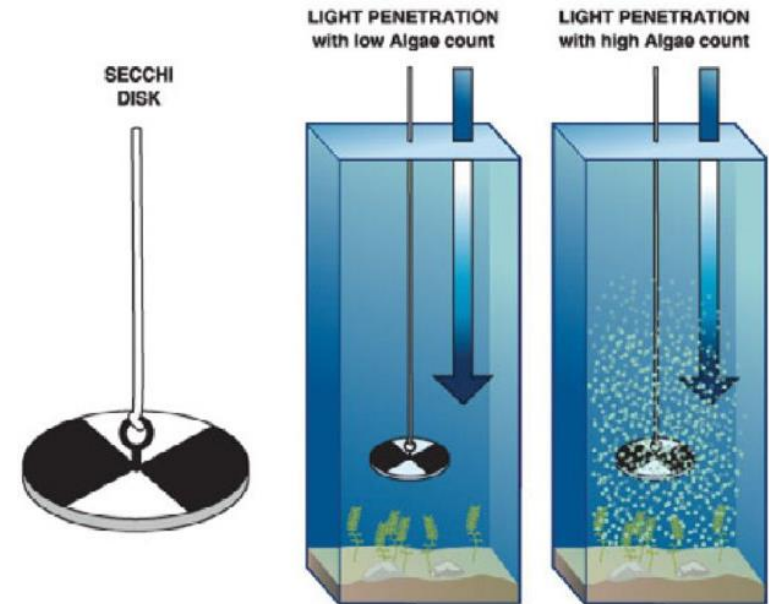
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Factors influencing aquatic vegetation growth in 2022

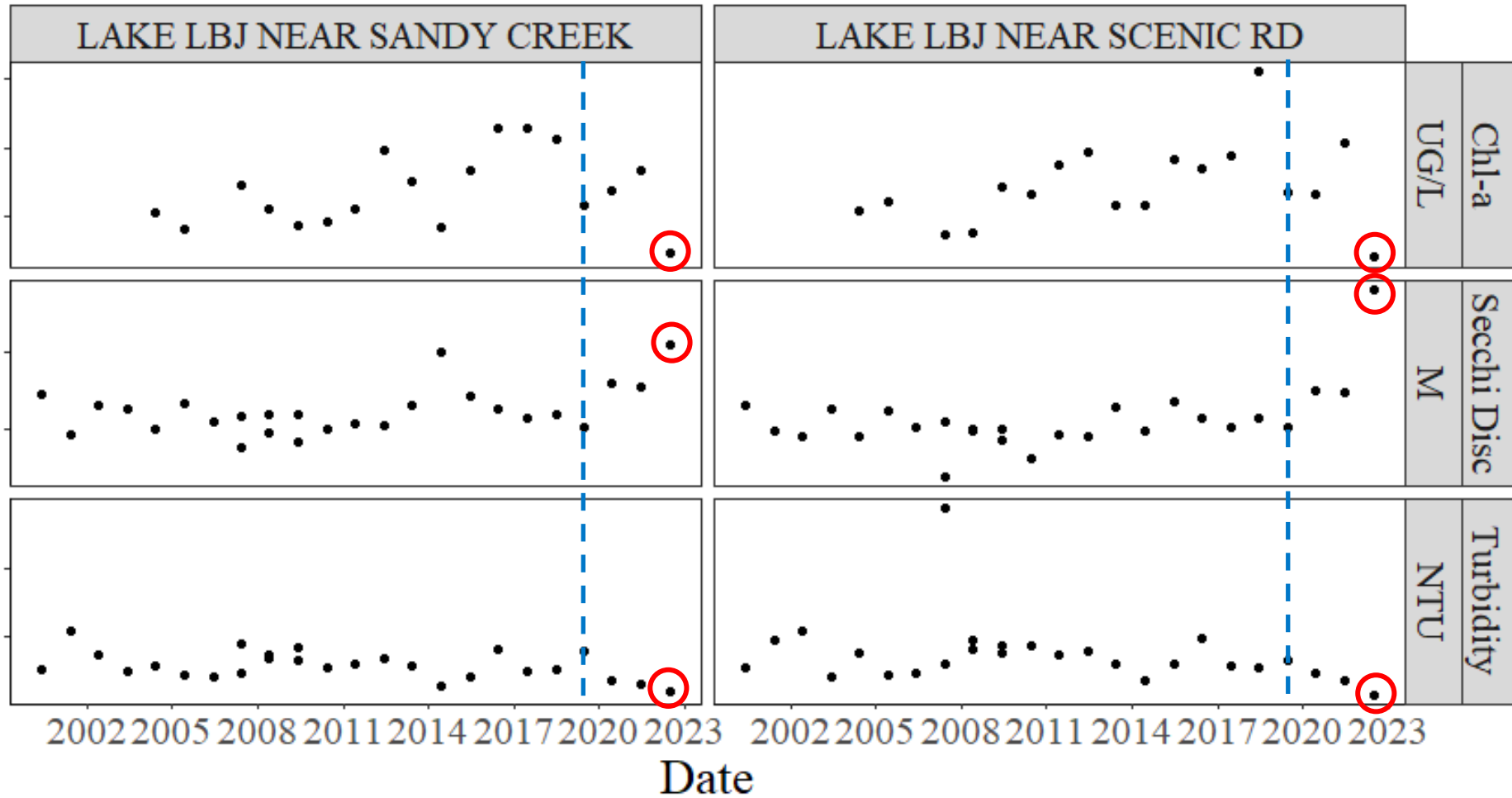
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- The human element

ECOLOGICAL IMPACTS

- Zebra mussels are filter feeders
- Plankton abundance & Water clarity are related

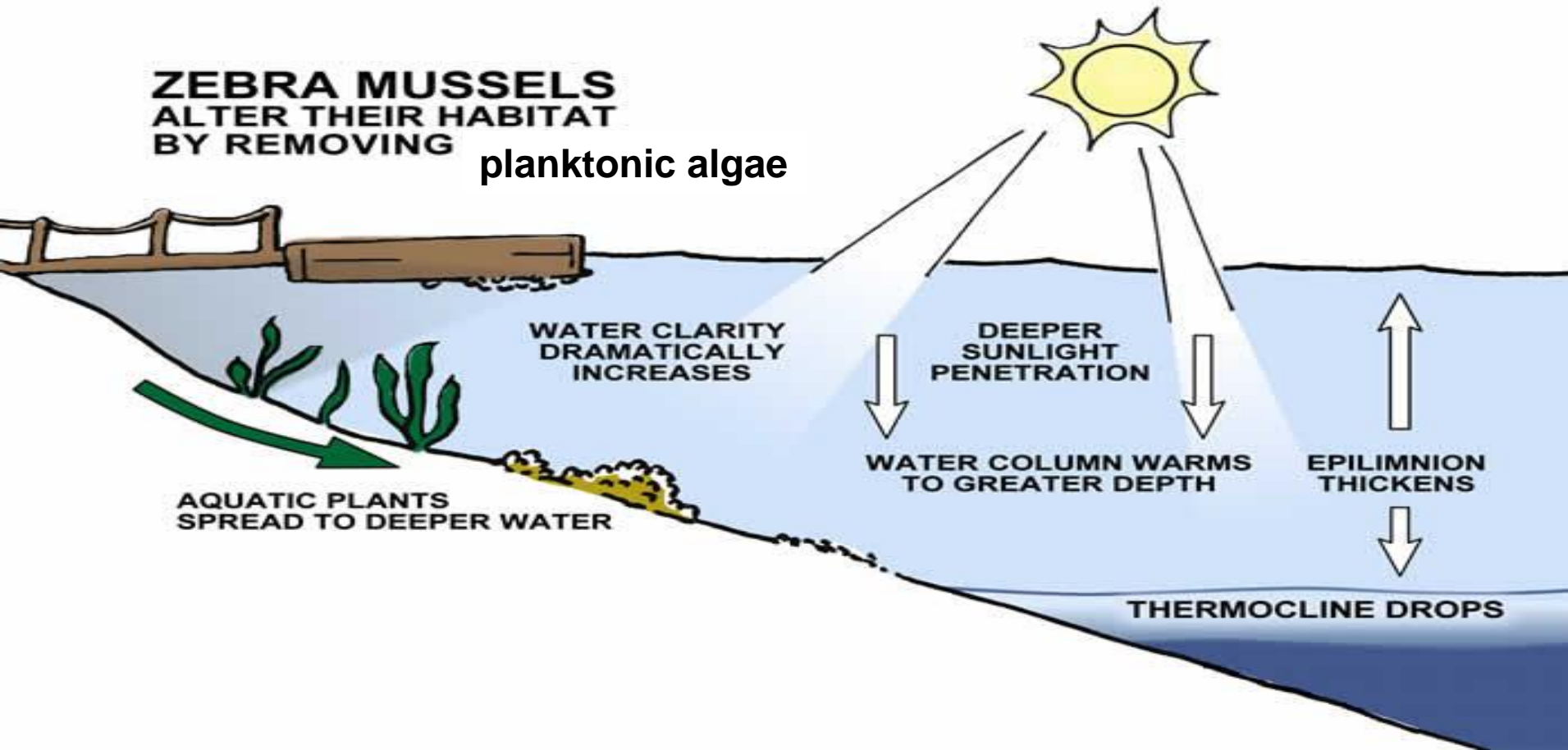


June



GTLT •

ECOLOGICAL IMPACTS - Vegetation



Factors influencing aquatic vegetation growth in 2022

- Dry year
- No Inks Dam releases in spring - line maintenance
- Zebra mussels
- The human element – nutrients & runoff





Landowner Education

- Reduce or eliminate use of fertilizers. If fertilizer is needed, choose OMRI-certified products.
- Use native plants along shorelines to filter/capture rainwater runoff.
- Properly dispose of pet waste (Keep out of waterways).
- Do not dump lawn clippings or leaves into storm drains or waterways.
- Have your septic system inspected and pumped every 3-5 years.



Managing nuisance aquatic vegetation

Physical



Chemical



Texas Administrative Code

TITLE 31

PART 2

CHAPTER 57

SUBCHAPTER L

RULE §57.932

NATURAL RESOURCES AND CONSERVATION

TEXAS PARKS AND WILDLIFE DEPARTMENT

FISHERIES

AQUATIC VEGETATION MANAGEMENT

State Aquatic Vegetation Plan

(4) Review by TPWD. Except as provided in paragraph (5) of this subsection, prior to undertaking any measures to control nuisance aquatic vegetation in a public body of surface water, a person operating under the state plan (exclusive of TPWD personnel or its contractors) shall provide to TPWD a treatment proposal, on a form included in the guidance document, no later than the 14th day before the measures are to begin. TPWD will review and may disapprove or amend any treatment proposal and will respond no later than the day before the proposed control measures are to begin. Where appropriate, TPWD will provide technical advice and recommendations regarding prevention of nuisance aquatic vegetation problems. The person submitting the treatment proposal shall have the burden of demonstrating compliance with the state plan.

www.lcra.org/waterweeds

Nuisance aquatic vegetation control options

The [Texas A&M Agrilife Extension AquaPlant diagnostics tool](#) provides guidance for plant identification and plant specific management. The tool also offers a list of professional applicators.

If you are planning to manually or chemically control any native or invasive plants that grow in public waterways, submit the following to the Texas Parks & Wildlife Department (TPWD) Inland Fisheries Management District Supervisor Patrick Ireland at Patrick.Ireland@tpwd.texas.gov and LCRA at waterweeds@lcra.org:

1. [Treatment proposal form](#)(Appendix C of the TPWD [aquatic vegetation management guidance document](#)) (.pdf)
2. Map of the proposed treatment area
3. Photographs of the plant and the problem it is causing

More information on the treatment proposal process can be found on the TPWD [Nuisance Aquatic Vegetation website](#).

Do not proceed without TPWD approval.

If using an herbicide, suggested active ingredients are Copper, Bispyribac, Diquat, Endothall, Fluridone, Imazamox and Flumioxazin. Depending on the chemical used, lake water in the vicinity of the treatment should not be used for irrigation, livestock consumption, or potable purposes for certain periods after treatment. See the product label and Section III.C.3. of the [TPWD aquatic vegetation management guidance document](#) for more information.

aquaplant.tamu.edu



AquaPlant

A Diagnostics Tool for Pond Plants and Algae

[HOME](#) [IDENTIFY A PLANT](#) [DO I NEED A PERMIT?](#) [FAQS](#) [GLOSSARY](#) [VIDEOS](#) [ONLINE COURSES](#) [GET HELP](#)

Identify a Plant



If you don't know the name of your plant, start here to compare photos and identify what type of plant is in your pond.

Manage a Plant



If you already know the name of the plant in your pond, start here to browse by name and find management options.

[Hire a Professional](#)

AquaPlant

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HOME IDENTIFY A PLANT DO I NEED A PERMIT? FAQs GLOSSARY VIDEOS ONLINE COURSES GET HELP

The active ingredients that have been successful in treating Eurasian watermilfoil include:

- Bispyribac (Rated: Good)
- Carfentrazone (Rated: Excellent)
- Copper Complexes (Rated: Good)
- Diquat (Rated: Excellent)
- Endothall (Rated: Excellent)
- Fluridone (Rated: Good)
- Flumioxazin (Rated: Good)
- Imazamox (Rated: Good)
- Penoxsulam (Rated: Excellent)
- Triclopyr (Rated: Excellent)
- 2,4-D (Rated: Excellent)
- Florpyrauxifen-benzyl

Always read the product label for directions and precautions, as the label is the law.

AquaPlant

A Diagnostics Tool for Pond Plants and Algae

HOME IDENTIFY A PLANT DO I NEED A PERMIT? FAQs GLOSSARY VIDEOS ONLINE COURSES GET HELP

The active ingredients that have been successful in treating hydrilla include:

- Bispyribac (Rated: Excellent)
- Copper Complexes (Rated: Good)
- Diquat (Rated: Good)
- Endothall (Rated: Good)
- Fluridone (Rated: Excellent)
- Flumioxazin (Rated: Good)
- Imazamox (Rated: Good)
- Penoxsulam (Rated: Excellent)
- Florpyrauxifen-benzyl

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In Summary

- Lake LBJ is experiencing an ecosystem shift
- Zebra mussels are here to stay – new normal
- Water clarity influences growth of plants and algae
- There is no permanent, set it and forget it solution
- A completed TPWD treatment proposal must be submitted & approved to manage aquatic vegetation in public waterways
- Land management directly influences water quality, aquatic vegetation & algae growth
- Its all about balance