Colorado River Alliance

River Resilience

Speaker Series

Spring 2026

COLORADO RIVER ALLIANCE

Adrienne Longenecker, CFRE

Executive Director

COLORADO RIVER ALLIANCE

Champion
the long-term vitality of the Texas Colorado River through youth education and community engagement

COLORADO RIVER ALLIANCE

Thank you to CRA Board of Directors!

Sally Allen
Bryan Beckworth
Mikah Berlingeri
Susan Bufkin
Hannah Dailey
Breck Harrison
Lindsey Holubec
Mickey Jamail
Hill Krause
Dan Martin
Tina O'Jibway
Hondo Powell
Wade Webster
Justin Westmoreland

COLORADO RIVER ALLIANCE

Thank you to CRA staff!

Christine Herlin

Development & Communications Director

Erica Castillo

Programs Director

Ella Burnett & Rachel Pierron

Program Coordinators

COLORADO RIVER ALLIANCE

Laura Bennett

Advocate for Mental Health, Under-resourced Communities, and Global Women's Issues

COLORADO RIVER ALLIANCE

Casey Williams

Aquatic Ecologist / Aquatic Plant Ecologist

BIO-WEST, Inc.

COLORADO RIVER ALLIANCE

Aquatic Plants of Lake Austin and Lady Bird Lake

River Resilience Speaker Series: What's in the Lake?
February 25, 2026

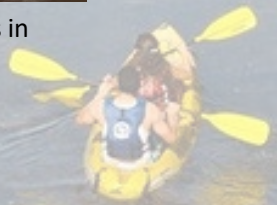
Casey R. Willams –Aquatic Plant Ecologist

My Adventures with Texas' Aquatic Plants

Mapping Texas wild-rice in the San Marcos River

Planting native aquatic plants in Comal Springs

Collecting rare aquatic plants in the Davis Mountains



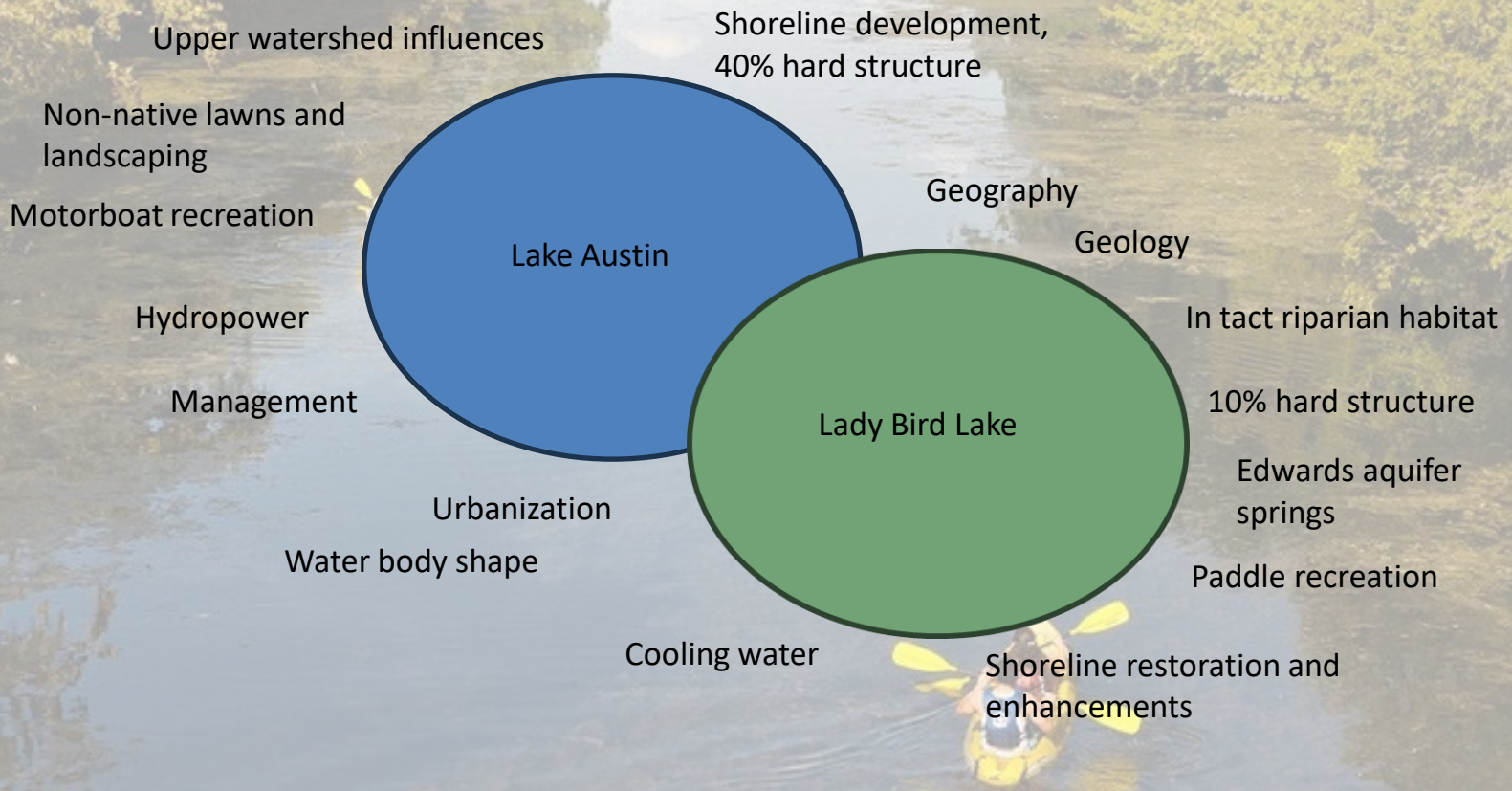
Some terminology for Limnology 101

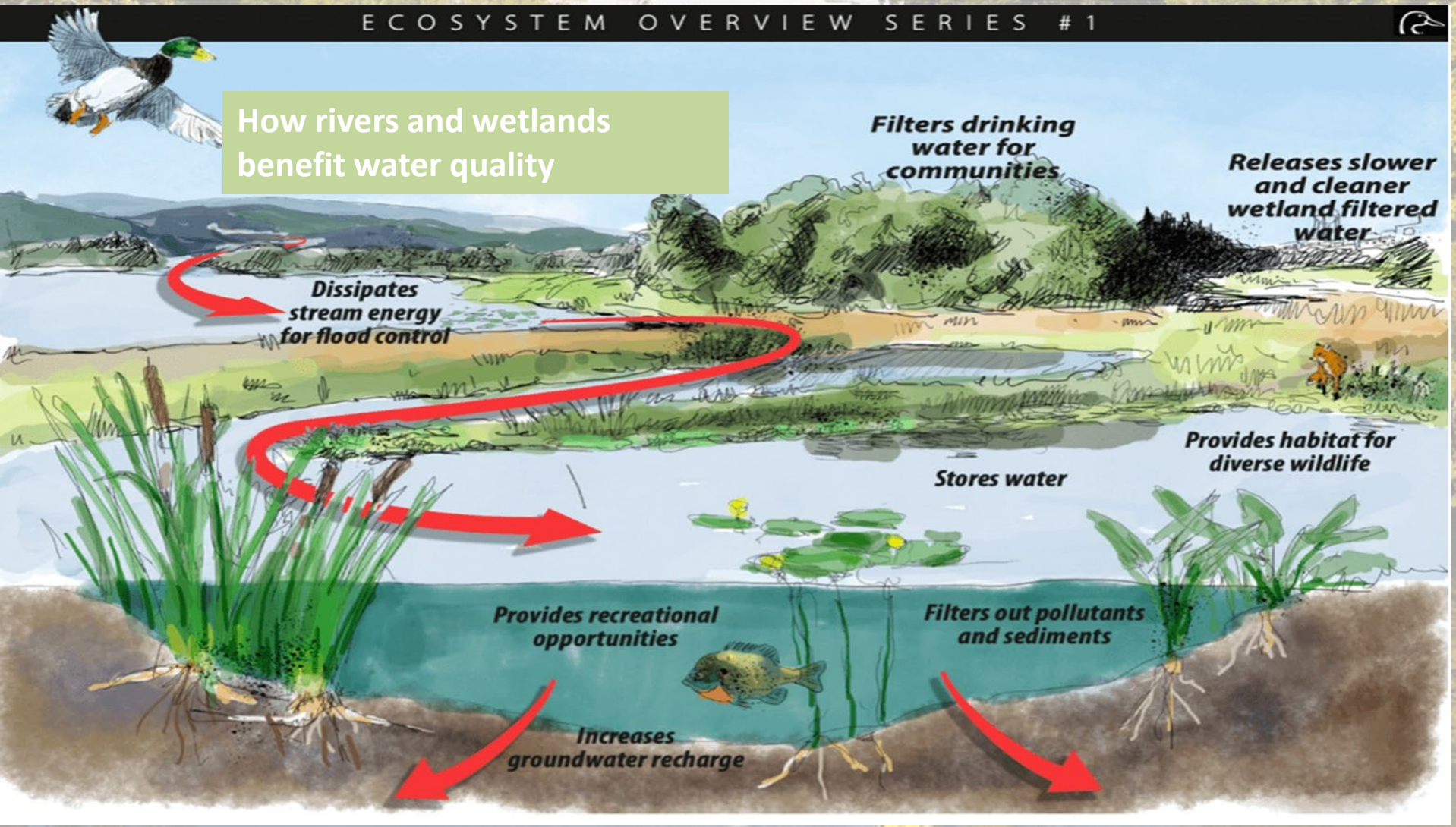
- Riparian – the habitats located adjacent to rivers and streams
- Lacustrine – the habitats located adjacent to lakes, reservoirs.
- Riverine- the habitat located in moving water
- Littoral – Shallow areas along the water edge of a river or lake
- Lotic – Moving water systems
- Lentic – Slow water systems
- Eutrophic – A water system rich in nutrients
- Mesotrophic – A water system with medium nutrient loading
- Oligotrophic – A water system poor in nutrients
- Autochthonous – Water system with self cycling nutrients
- Allochthonous- A water system receiving nutrients from outside of the system.

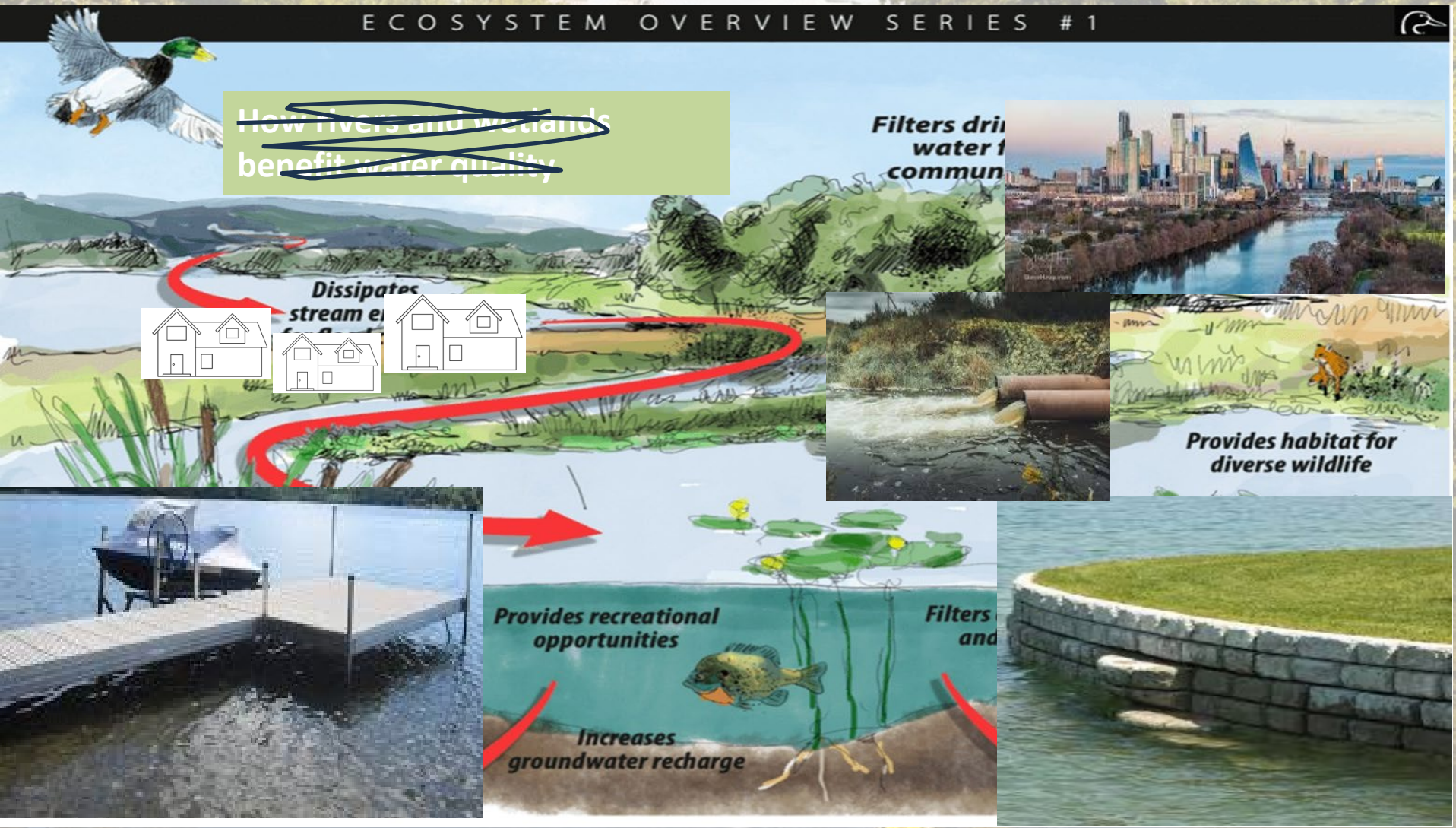
Are Lake Austin and Lady Bird a Lake?

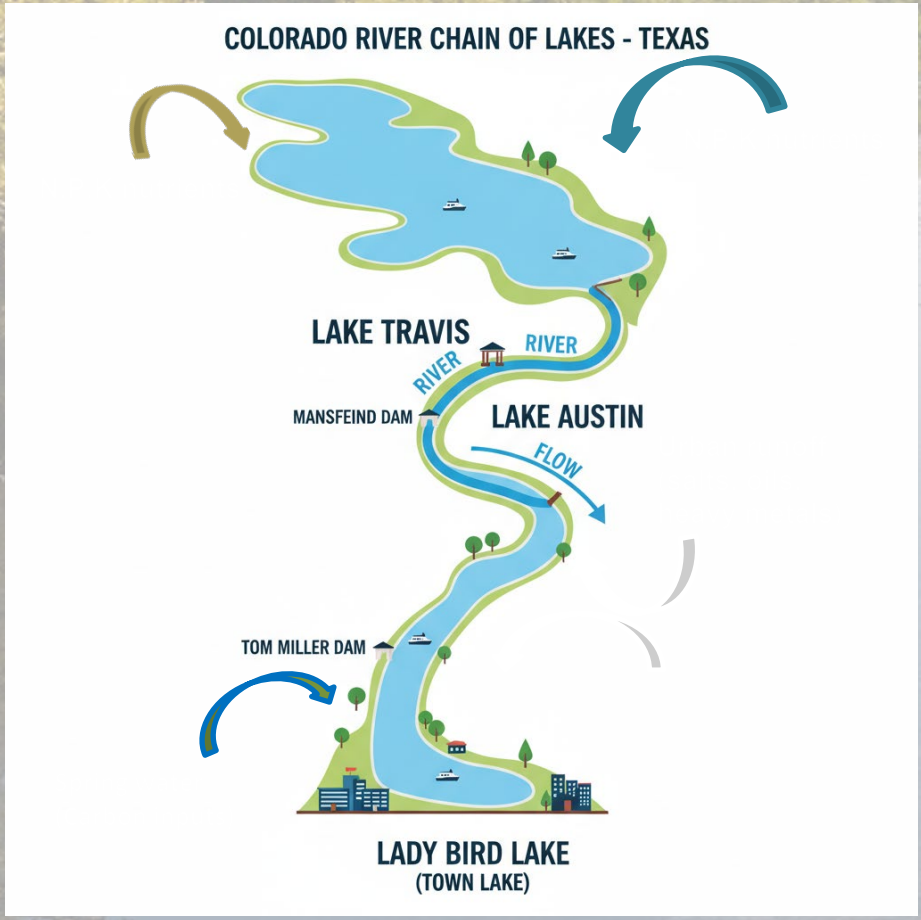
- A lake by hydrological definition is any lentic natural water body
- A reservoir is a manmade water body.
- Lake Austin and Lady Bird Lake are reservoirs but are pass through reservoirs
- Both are manmade water bodies but have lotic, riverine conditions
- Lakes have natural ecology and geology developed over thousands of years

Why are Lake Austin and Lady Bird Lake Different?




ECOSYSTEM OVERVIEW SERIES #1
How rivers and wetlands benefit water quality
Filters drinking water for communities
Releases slower and cleaner wetland filtered water
Dissipates stream energy for flood control
Provides habitat for diverse wildlife
Stores water
Provides recreational opportunities
Filters out pollutants and sediments
Increases groundwater recharge


ECOSYSTEM OVERVIEW SERIES #1
How rivers and wetlands benefit water quality
Filters dri
water f
commun
Dissipates
stream e
Provides habitat for diverse wildlife
Provides recreational opportunities
Filters
and
Increases groundwater recharge



an AI generated image

The trophic cascade of the watershed

- High nutrient inputs from a large water shed feeds into Lake Travis
- Lake Travis has little means to utilize or filter these nutrients
- Nutrients pass into the warmer, shallower waters of Lake Austin where they begin to be utilized by plant life.
- However, more nutrients and pollutants are added to Lake Austin from urban and landscape runoff
- These pass into Lady Bird Lake where uptake by plant life continues.
- Carbon is added via springs and more nutrients are added from urban runoff.
- Lady Bird Lake is extremely productive and efficient in its filtering capacity
- Filtered water exits into Colorado River

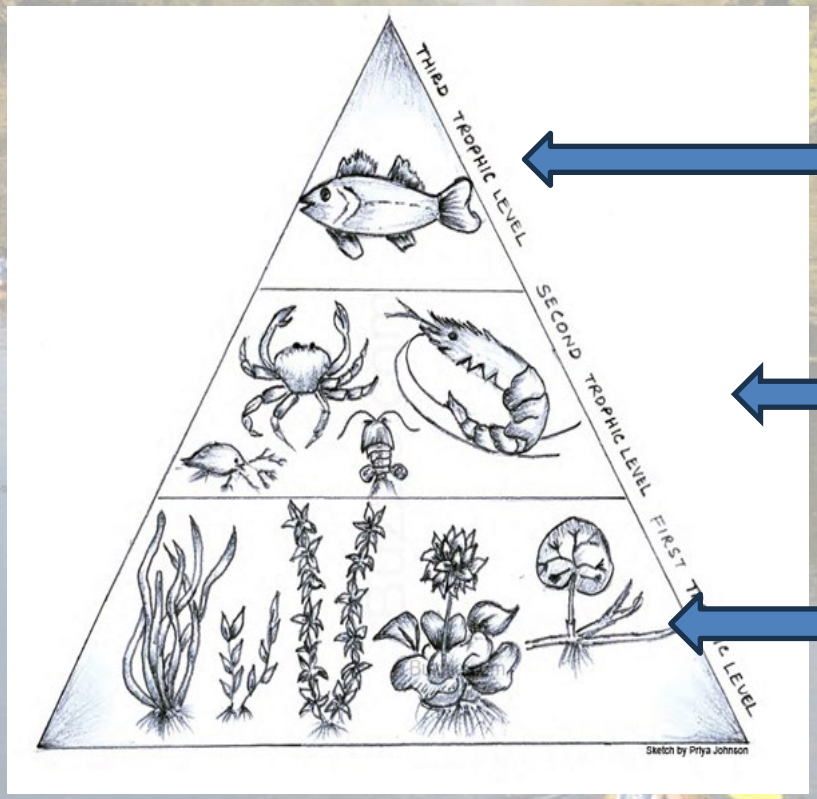
The Aquatic Plants

What do they do?

Ecology = Structure + Function

- Provide ecology to the system – "If you don't have aquatic plants, you have a swimming pool"
  me
- Clean and filter water (Phytoremediation)
- Regulate water temperature
- Provide habitat and nursery for aquatic organisms
- Stabilize shorelines and river /lake bottoms

Aquatic plants and the food chain



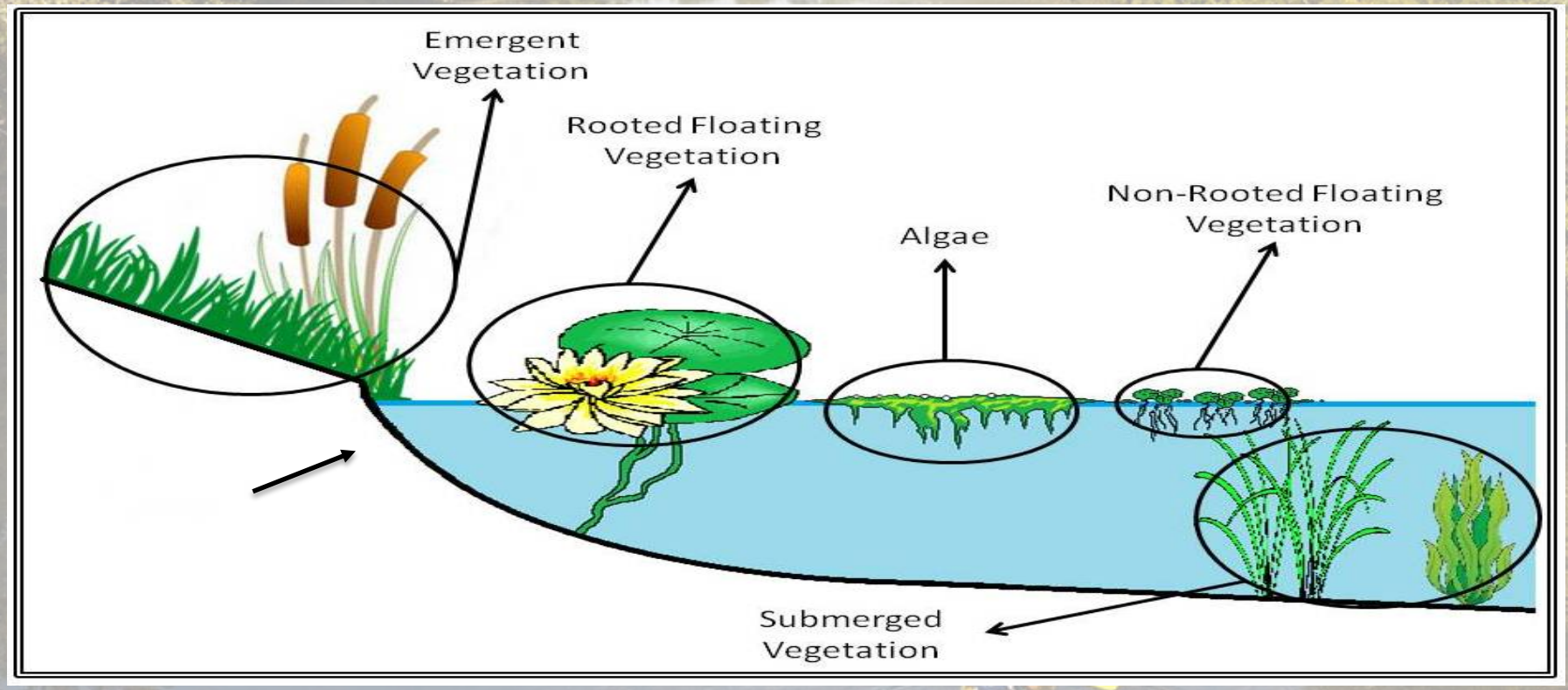
Fish, Birds, Otters, Snakes

Invertebrates

Plants

Beneficial bacteria and fungi

The growth forms of aquatic plants



Aquatic Plants found in Lake Austin and Lady Bird Lake

Native Emergent Plants – Cattails vs Bulrushes

- Cattails are native but indicative of high nutrient loading
- Cattails are very good at filtering and phytoremediation but can be a nuisance
- Bulrushes are indicators of proper nutrient balance in the sediment or water column.
- Bulrushes are better habitat for fish and other aquatic organisms
- Both are excellent for littoral stabilization and sediment capture

Plants as Environmental Indicators

Nitrogen vs Phosporus

Bulrush dominated

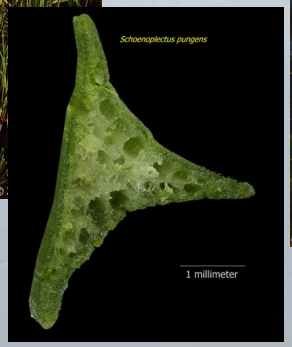
Cattail dominated

P > N

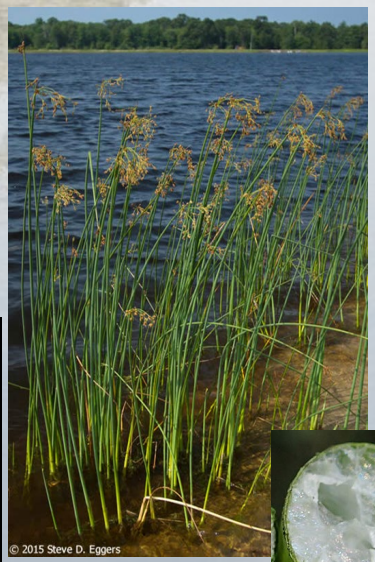
N>P
N=P

Aquatic Plant ID: The Bulrushes and Cattails
GENUS: SCHOENOPLECTUS VS. Typha

Three square bulrush
Schoenoplectus pungens



Sofstem bulrush
Schoenoplectus tabernaemontani



California bulrush
Schoenoplectus californicus

Cattail
Typha species

American Water willow
Justicia americana

1 to 2 ft tall blooms June to frost
Grows along littoral shelves,
shallow edges of banks. Excellent fish habitat

Arrowhead
Sagittaria platyphylla

1 to 2 ft tall blooms June to frost
Grows along littoral shelves,
shallow edges of banks, Can grow

submersed

Submersed growth form

Pickerelweed
June to frost
Pontedaria cordata
shelves,Native to Texas but introduced to the watershed

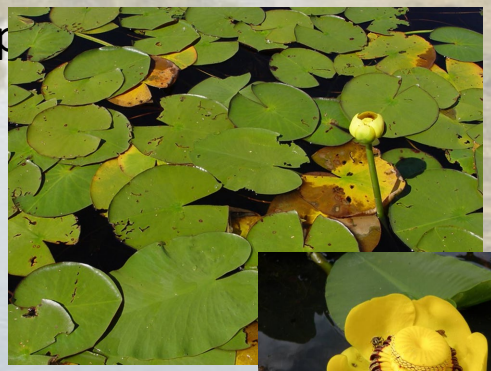
1 to 2 ft tall blooms

Grows along littoral,
shallow edges of banks

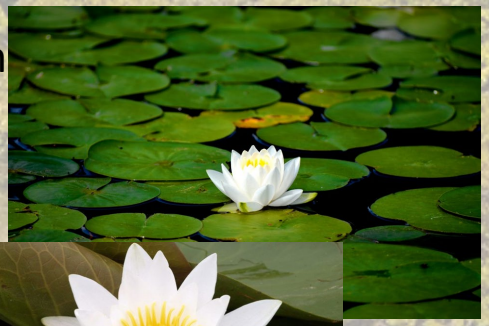
Native floating leaved plants – lookalikes

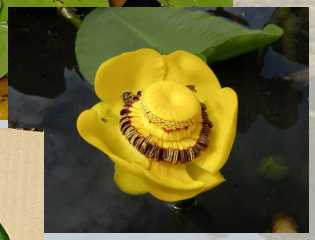
vs

Sp



Wh





Nelumbo lutea

Nuphar advena

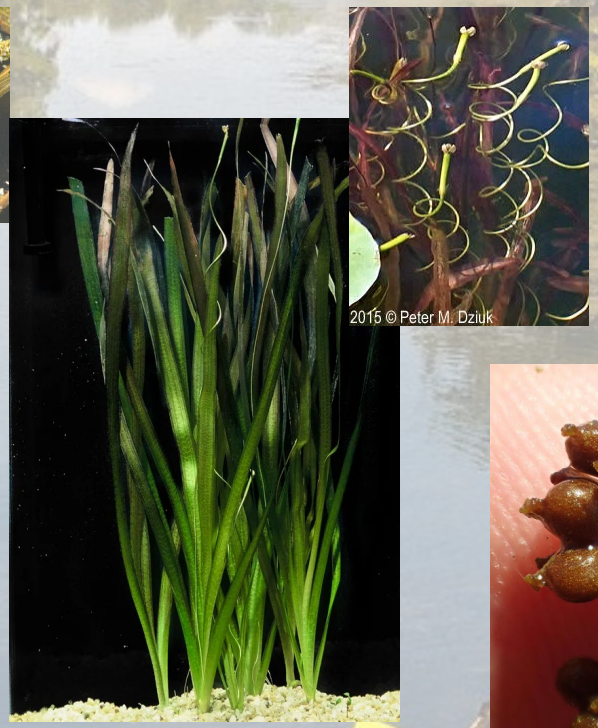
Nymphae odorata

Long leaf Pondweed
slack
Potamogeton nodosus

Deepwater (1’ to 5’) slow to
water

Native Submersed Plants

Illinois pondweed
Potamogeton illinoensis

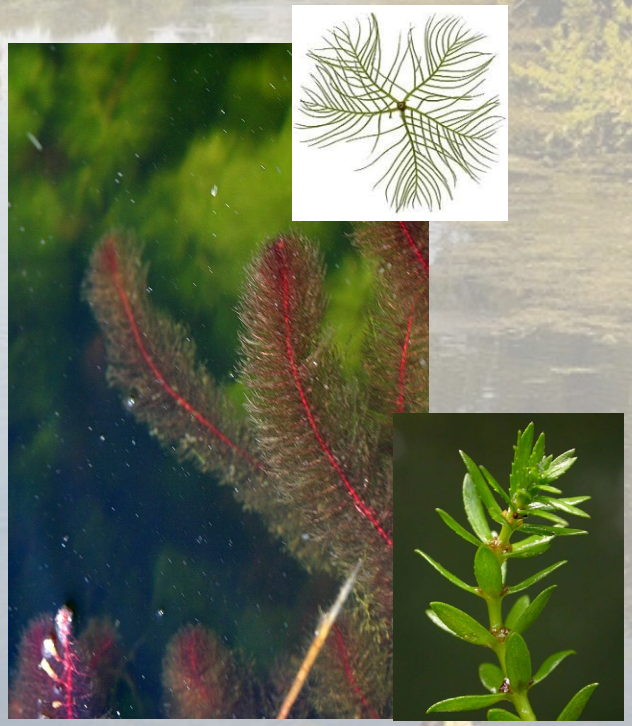


Eelgrass
Vallisneria americana

Sago pondweed
Stuckenia pectinata

Native Submersed Plants

Fanwort
Cabomba caroliniana



Two-leaved milfoil
Myriophyllum heterophyllum

Hornwort
Ceratophyllum demersum

Native Amphibious Plants

Red seed box
Ludwigia repens

Water star grass
Heteranthera dubia

Delta arrowhead
Sagittaria platyphylla

Native free-floating plants- its not algae

Duckweed
Lemna minor

Giant duckweed
Spirodela polyrihza

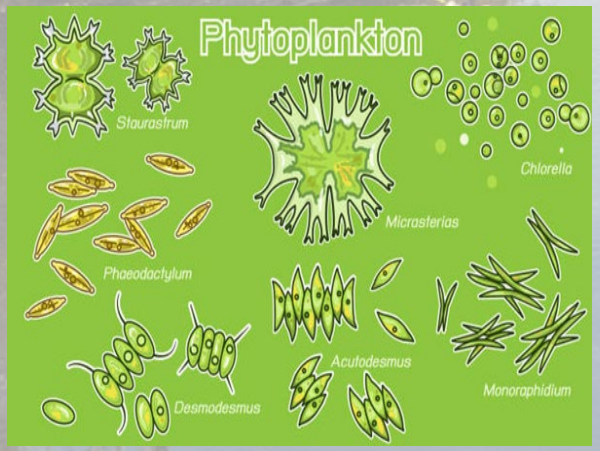
The Duckweeds and Mosquito ferns

Mosquito fern
Azolla filiculoides

Algae - Green algae

- Algae are very reactive to changes in nutrient levels, especially Phosphorus

Free floating, single celled algae



Diatoms

Stringy filamentous algae

Spirogyra

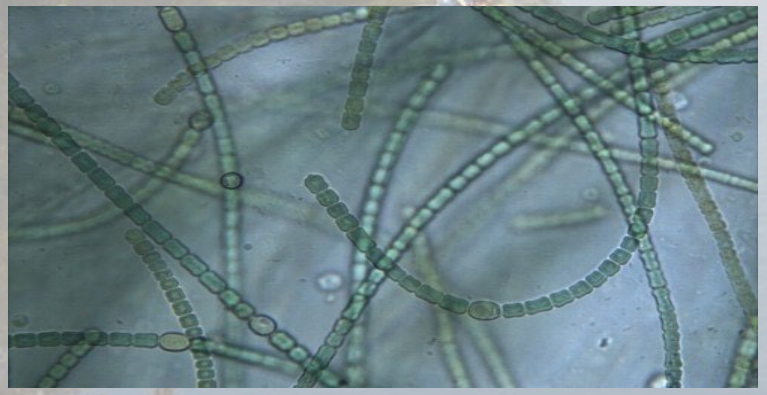
Plant like macro algae

Musk grass

What about harmful algae? HAB's

- It is thought Cyanobacteria produce toxins as a response to environmental stress
- Present naturally in the system but only recently problematic because of nutrient enrichment

Oily surface growth



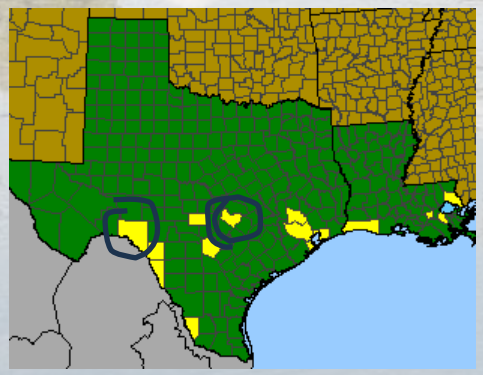
Blue green algae –Cyanobacteria are photosynthetic bacteria NOT true algae

Crusty surface growth

Freshwater Bryozoans- a simple animal

The Rare Plant of Lady Bird Lake

Correll's False Dragonhead - *Physostegia correllii*

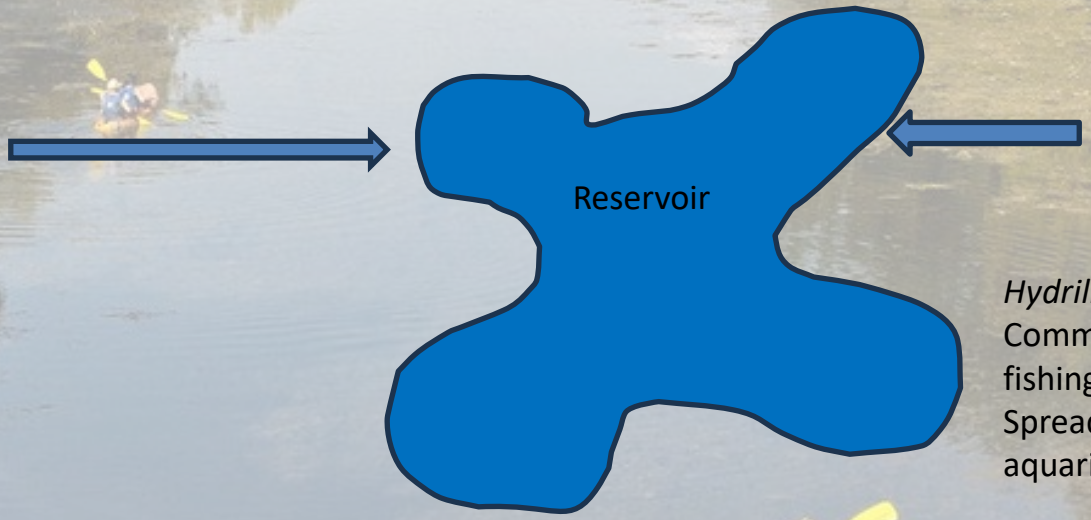


The Battle of Aquatic Native vs Invasive

- Native and Non-native aquatic plants share many of the same adaptations, life histories and niches.
- There are sometimes specific attributes among invasive plants that can give them an advantage
- Increasing evidence of ancient distributional regressions and expansions between North America and South America
- Native aquatic plants can be weedy too
- Studies have shown even native species can compete, mix or intermingle with invasive plants effectively under the right circumstances.
- **So what makes non native plants so problematic?**

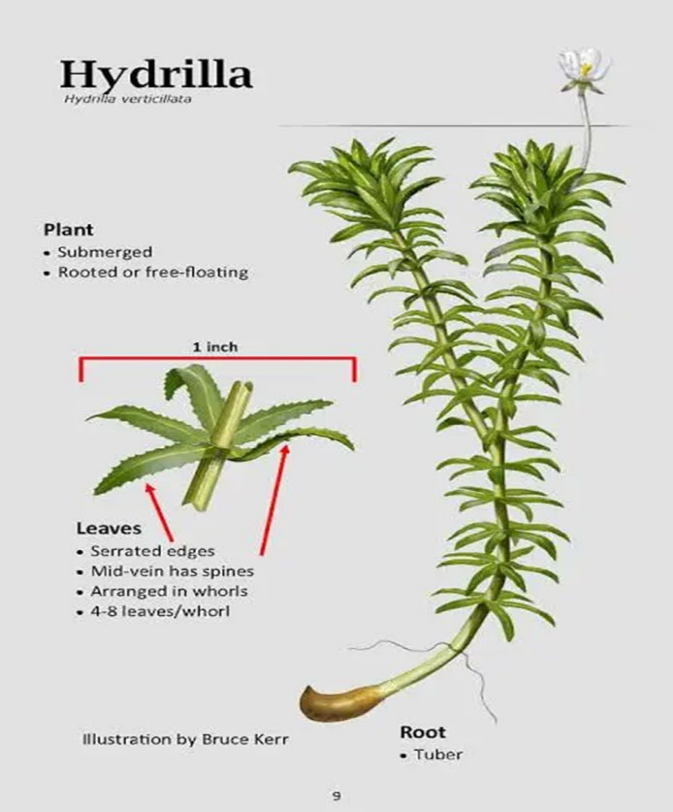
Resource pre-emption! I.e. Whoever gets there first wins!

Eelgrass
Vallisneria americana
Native, but uncommon
Generally, spread by waterfowl.



Hydrilla verticllata,
Common in reservoirs and fishing hot spots
Spread by boating, waterfowl, aquarium dumping

The Common Invasive Aquatic Plants



- Hydrilla has some physiological advantages
- Stores CO2 for long periods of time
- Drought tolerant tubers and cold hardy turions
- Physical structure produces dense growth that is the most un appealing habit

Disadvantages

- Clonal growth – history of sudden collapse syndrome
- Poorly developed root systems
- Susceptible to Allelopathy and competition from other plants – success with replacement initiatives

The Common Invasive Aquatic Plants

Eurasian watermilfoil
Myriophyllum spicatum

Non-native and widespread
Easily shatters and fragments

Two leaved milfoil
Myriophyllum heterophyllum

Native to alkaline waters of Texas

The Common Invasive Aquatic Plants

Water hyacinth *Pontederia crassipes*

The Common Invasive Aquatic Plants

Water lettuces *Pistia stratiotes*

The Common Invasive Aquatic Plants

Colocasia esculenta Elephant ear or Wild taro

Management and Control of Aquatic Invasive Plants

- Prevention – watercraft inspection, limiting runoff from ornamental ponds, prevent aquarium dumping, control sale of invasive species
- Biological control – Utilizing natural herbivores, viruses, pathogens to control the species.
- Chemical control – Use of herbicides to kill and control
- Mechanical control – Pulling, harvesting, dredging, cutting to remove or control growth

PUTTING NATIVE AQUATIC PLANTS TO USE

Establishing native aquatic plants in Lady Bird Lake for fish habitat - the Trail Conservancy

Implement Living Shoreline or Shorescaping designs

A paradigm shift in shoreline management

Bulkheads provide zero filtering capacity or ecology

Lasts 20 to 30 years before replacing

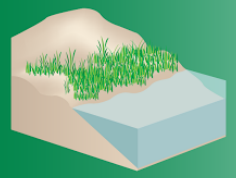
Living shorelines filter water, uptake nutrients provide habitat and stabilize banks

Utilize rain gardens around stormwater runoff and tributaries to control nutrient inputs

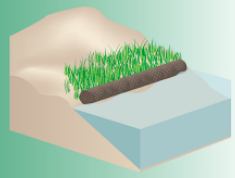
HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GREEN - SOFTER TECHNIQUES → **GRAY - HARDER TECHNIQUES**

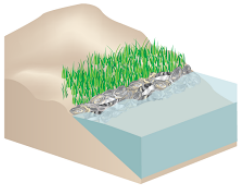
Living Shorelines



VEGETATION ONLY - Provides a buffer to upland areas and breaks small waves. Suitable for low wave energy environments.

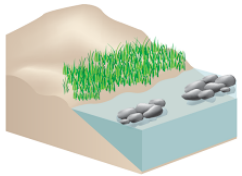


EDGING - Added structure holds the toe of existing or vegetated slope in place. Suitable for most areas except high wave energy environments.

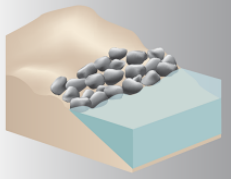


SILLS - Parallel to vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.

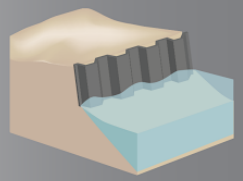
Coastal Structures



BREAKWATER - (vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



REVETMENT - Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with existing hardened shoreline structures.



BULKHEAD - Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for high energy settings and sites with existing hard shoreline structures.

How to Move Forward

- Form a homeowner CO-Op to manage shoreline properties concurrently, share ideas, receive funding
- Educate HOA's on native plant uses, different looks and designs
- Educate the city of Austin engineers on natural shoreline designs, shore scaping and native fish habitat installation by private homeowners.
- Support and encourage continued native aquatic plant introduction activities by CoA, LCRA and TPWD
- Advocate for your local creek, slough or canal via cleanups, Stream Teams, habitat restoration
- Prevent movement of invasive species

Adrienne Longenecker, CFRE

Executive Director

COLORADO RIVER ALLIANCE

Mission:
Champion
the long-term vitality of the Texas Colorado River through youth education and community engagement

COLORADO RIVER ALLIANCE

2025

YOUTH EDUCATION:

11,657 hours of immersive STEM education to **4,255** elementary and middle school students

COMMUNITY ENGAGEMENT:

9,808 pounds of trash removed by **1,049** volunteers

COLORADO RIVER ALLIANCE

Wilkerson Center

Mobile River

Lake Travis Cleanup

Who is repsonsible?

COLORADO RIVER ALLIANCE

Key entities to know when considering water quality and quantity of Lady Bird Lake and Lake Austin:

City of Austin: Watershed Protection

Texas Parks & Wildlife Department (TPWD)

Friends of Lake Austin

COLORADO RIVER ALLIANCE

Austin Watershed Protection

AustinTexas.gov/Watershed

Austin Watershed Protection protects lives, property and the environment of our community by reducing the impact of flooding, erosion, and water pollution.

Lake Austin Stakeholder Group to provide community-informed input on managing Lake Austin.

Apply by March 11, 2026, to be a part of this group.

Go to the stakeholder group application form.

2/24/26 Press Release:

Public Should Practice Caution Near Local Waterways Due to Algae

Texas Parks & Wildlife Department (TPWD)

Texas Parks and Wildlife Department (TPWD) coordinates closely with reservoir controlling authorities and local stakeholders to make recommendations, provide data, and review all treatment proposals for management of hydrilla to ensure consistency with the State Aquatic Vegetation Plan (TAC Title 31, Rule § 57.932). Reservoir controlling authorities are ultimately responsible for making the decision on whether any treatment of hydrilla will occur and the specific treatment methods to be used.

aquaticInvasives@tpwd.texas.gov

COLORADO RIVER ALLIANCE

Friends of the Lake Austin

Group of community members, many with residences on Lake Austin hired a biologist to conduct an independent survey of the lake. The fall 2025 survey revealed 38% of the lake had hydrilla in it. Those results were brought to the city, who then conducted a new survey resulting in similar results.

COLORADO RIVER ALLIANCE

What do all these groups have in common?

COLORADO RIVER ALLIANCE

Upcoming CRA Events:

Mobile River: STEM Girls' Day @ UT Austin

Saturday, February 28, 10:00 am

Amplify Austin Fundraising Day:

March 4-5

Community Creek Cleanup @ Onion Creek Metro Park

Saturday, March 7, 10am – 12pm

Mobile River: Touch-a-Truck @ Kingsland

Saturday, March 28, 11am – 2pm

Spring Cleanup @ Eastern Travis County Parks

Saturday, April 11, 9am – 11am

COLORADO RIVER ALLIANCE