6/1/2026

# Lake Chaffee Assessment on Aquatic Plant overgrowth in 2026

Prepared by Ben Scoular

My family and I have lived on Lake Chaffee for the past four years. It is a special place that has continued to foster my love for lakes and ponds. I have a have worked in the pond and lake management for the better part of a decade, with experience in mechanical treatment methods as opposed to the chemical side of treatments (though I am familiar with both). Through that work, I have attended industry conferences and workshops focused on aquatic plant management.

In 2025, I observed a significant increase in aquatic plant growth throughout the lake, particularly in the northeast cove near our home. While some seasonal growth is expected, the extent of overgrowth in 2025 was far greater than in previous years. Based on my professional experience, this level of growth raises concerns about the lake's long-term ecological health. My neighbors and I spent many hours removing large volumes of vegetation simply to maintain access for swimming and recreation. Without effective management, excessive plant growth can quickly degrade a healthy lake and limit its value to the community. This issue affects everyone who lives on, uses, and enjoys Lake Chaffee.

This report is based on information provided by the LCIA community website, Connecticut DEP recordings, historical background on the area, firsthand observations, and relevant professional input. I consulted with colleagues in environmental protection and lake management to help ensure the information is current and accurate. **This report is intended to be purely informational. Its purpose is to present facts about Lake Chaffee and explain the long-term effects that severe aquatic plant overgrowth can have on a healthy body of water.**

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# COMPREHENSIVE ECOLOGICAL STATUS & MITIGATION REPORT

**Location:** Lake Chaffee, Ashford, Windham County, CT

**Prepared For:** Community Environmental Review

**Date:** June 2026

Lake Chaffee represents a vital community asset, recreational engine, and local ecological area in Ashford, Connecticut. Recent operational data and observations aligned with historical baselines from the Connecticut Agricultural Experiment Station (CAES) emphasize a critical shift in the basin's macrophyte community. The submersed native waterweed *Elodea nuttallii* (Western Waterweed) has reached an advanced stage of colonization, blanketing a large portion of the lakebed.

Though *Elodea* is a native plant in the state of Connecticut, its unchecked hyper-proliferation within this specific body presents a significant issue regardless of its native status. It impairs recreational swimming, snags non-motorized watercraft, ruins fishing, and presents long-term challenges related to rapid basin siltation and oxygen-depletion cycles. This report provides physical, thermal, hydrological, and geographic facts about Lake Chaffee, as well as offering strategies to restore its ecological balance.

## 1. Lake Profile & Basic Facts

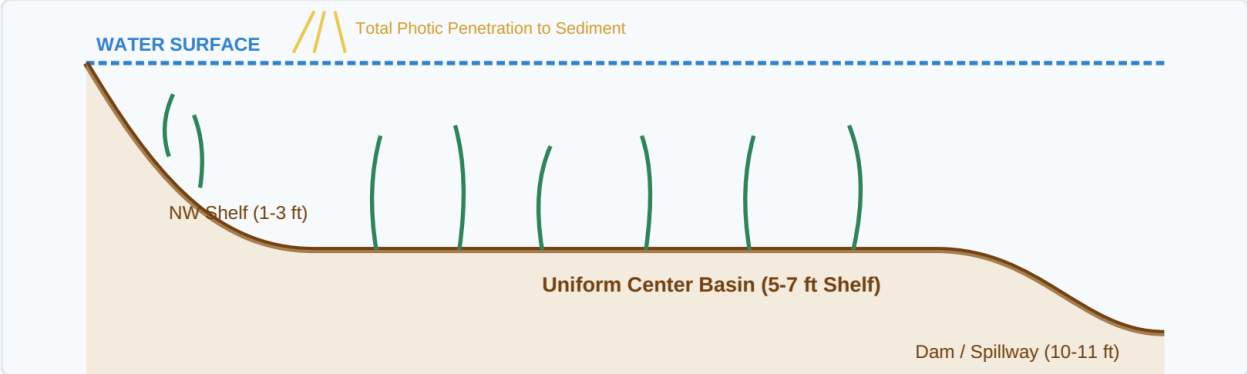
Lake Chaffee was man-made in 1934 by placing an earthen dam structure across Chaffee Brook. This action flooded what was naturally a low-lying wetland and swamp matrix, leaving behind a highly rich, organic layer of bottom sediment that functions as a continuous source of nutrients for weed growth.

- **Surface Water Footprint:** 54 acres.
- **Basin Depth Profile:** Characterized by an exceptionally shallow layout, presenting an **average depth of just 6 feet (1.8 meters)** and a maximum depth of 10 to 11 feet (3.0–3.4 meters).
- **Watershed Boundaries:** Spans a 284-acre land catchment area.
- **Access Mandates:** Maintained strictly for private residential use. Gasoline-powered engines are banned. This rule protects the water column from petroleum pollutants but prevents large-scale automated watercraft management.

## 2. Submerged Topography & Bathymetric Layout

The Connecticut Department of Energy and Environmental Protection (DEEP) restricts formal bathymetric contour surveys to public lakes featuring state-owned launch structures. Because

Lake Chaffee is completely private, an official state depth chart does not exist. However, spatial mapping cross-sections define a uniform, bowl-shaped floor geometry that shapes the plant ecosystem:




- **Northwestern Shallows (1–3 Feet):** A gently sloping perimeter characterized by heavily organic, thick silt muck. It supports heavy communities of floating-leaved plants like Yellow Water Lily (*Nuphar variegata*).
- **The Central Bed Plateau (5–7 Feet):** A massive, incredibly uniform central floor that makes up roughly 80% of Lake Chaffee's total footprint. Because the water is shallow, sunlight penetrates completely down to the mud layer across this entire plateau, acting as a massive greenhouse bed for *Elodea*.
- **The Dam Plunge Basin (10–11 Feet):** A narrow, localized trench adjacent to the southeastern 300-foot earthen dam and spillway. This is the only zone where water depth approaches double digits.

### 3. Hydro-Thermal Cycle Dynamics (Water Cycle)

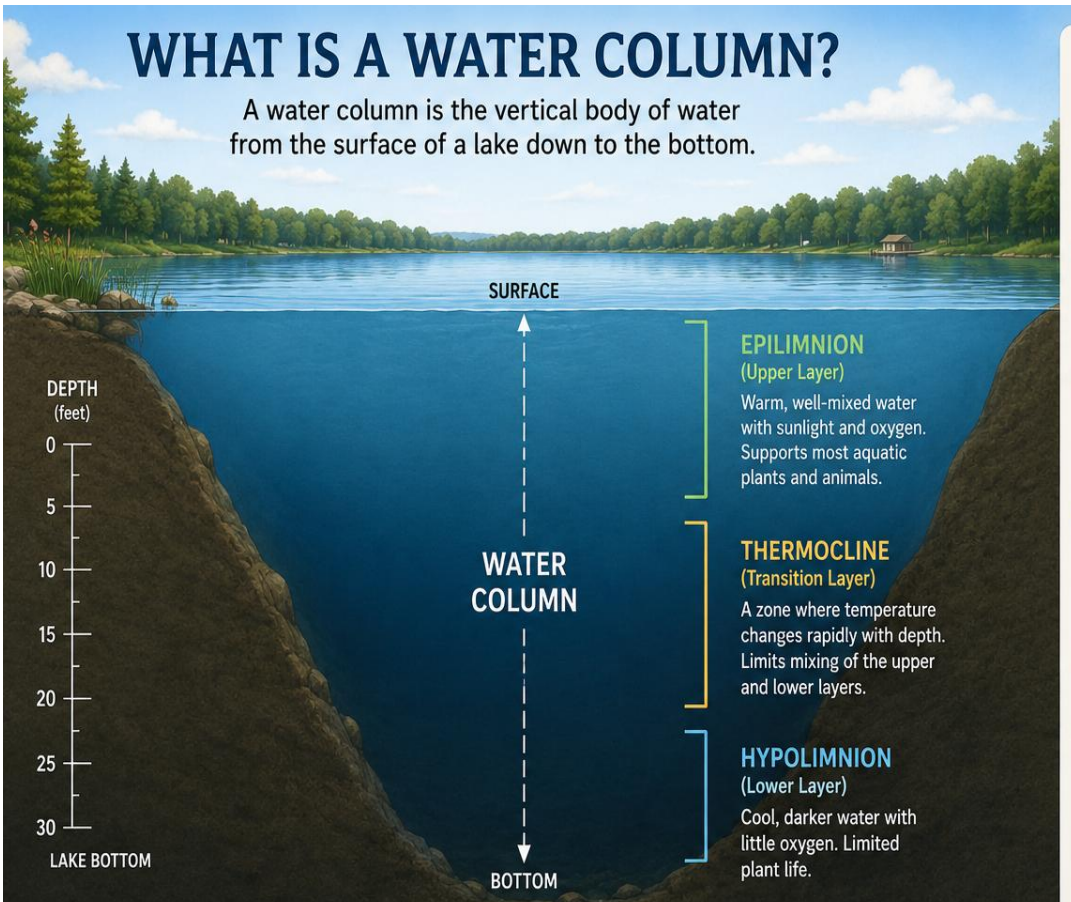
The ongoing expansion of waterweeds inside Lake Chaffee is directly tied to its unique thermal properties and hydrological water cycle.

#### A. Seasonal Temperature Metrics

Due to its shallow depth, Lake Chaffee lacks the volume to establish a permanent cold-water bottom layer (thermal stratification) in the summer. Instead, the water column stays thoroughly mixed from surface to sediment, maintaining an open, warm-water environment that accelerates plant cell growth. The illustration on the following page explains the reference of what a water column is how it relates to plant growth and sediment.

# WHAT IS A WATER COLUMN?

A water column is the vertical body of water from the surface of a lake down to the bottom.




## EPILIMNION
(Upper Layer)

Warm, well-mixed water with sunlight and oxygen. Supports most aquatic plants and animals.

## THERMOCLINE
(Transition Layer)

A zone where temperature changes rapidly with depth. Limits mixing of the upper and lower layers.

## HYPOLIMNION
(Lower Layer)

Cool, darker water with little oxygen. Limited plant life.

Understanding the water column helps us protect water quality, manage aquatic plants like Elodea, and maintain a healthy lake for recreation, wildlife, and our community.

## WHY THE WATER COLUMN MATTERS

The water column plays a critical role in a healthy lake.

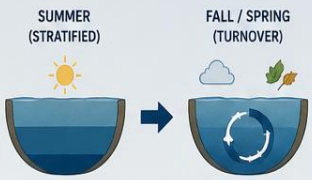
### OXYGEN
Oxygen levels change with depth and affect fish and other aquatic life.

### TEMPERATURE
Temperature stratification influences mixing, nutrients, and lake ecosystems.

### NUTRIENTS
Nutrients can build up in deeper water and may be released during turnover.

### HABITAT
Different layers provide habitat for different species throughout the year.

### TURNOVER
In spring and fall, the lake may mix from top to bottom, replenishing oxygen and redistributing nutrients.



The hydrology of Lake Chaffee acts as a natural nutrient trap due to its exceptionally long **water residence time of nearly 6 months**. It functions in a three-stage seasonal cycle:

1. **Inflow & Loading:** Spring rains and winter snowmelt sweep across the 284-acre watershed, collecting lawn clippings, soil runoff, and septic leaching from properties along the 8,400-foot shoreline.
2. **Stagnation & Concentration:** In summer, water movement stalls. High heat causes pure water to evaporate from the 54-acre surface. Because nutrients like phosphorus and nitrogen do not evaporate, they become heavily concentrated in the remaining water, feeding the *Elodea* beds.
3. **Outflow:** Overflow leaves the basin via a 10-foot spillway into Chaffee Brook, eventually joining the Mount Hope River.

| Season | Avg. Temperature Range | Ecological Process & Weed Interaction |
|---|---|---|
| **Winter (Dec–Feb)** | 32°F – 36°F (0°C – 2°C) | Ice sheets block ambient sunlight. *Elodea* creates specialized, hardy winter buds (turions) that hibernate safely in the dark sediment. |
| **Spring (Mar–May)** | 40°F – 62°F (4°C – 17°C) | Rapid thermal warmup occurs. Sunlight reaches the shallow plateau, triggering rapid germination before deeper Connecticut lakes wake up. |
| **Summer (Jun–Aug)** | 72°F – 78°F (22°C – 26°C) | Shallow coves frequently exceed 80°F. Plant metabolic rates peak, causing weed stems to grow up to several inches a day. |
| **Autumn (Sep–Nov)** | 65°F down to 42°F | Abrupt thermal drop-off. Massive plant beds die off simultaneously, triggering heavy decomposition and localized drops in dissolved oxygen. |

**The Balance: Native vs. Invasive Plants**

- **Limnological Benchmark:** Long-term state botanical datasets verify that while non-native shoreline invaders like Purple Loosestrife (*Lythrum salicaria*) hold localized positions along the banks, the interior open basin is dominated by three aggressive native plants: Eelgrass, Clasping-leaf Pondweed, and Western Waterweed (*Elodea*).
- **The Benefit of Native Plants:** When a lake is balanced, native aquatic plants are highly beneficial. They oxygenate the water column, absorb excess nutrients, and offer critical spawning and nursery grounds for local fish populations. Their growth is typically kept in check by natural biological controls, local climate cycles, and native herbivores, allowing for a diverse and stable underwater habitat.
- **The Threat of Invasive Plants:** Conversely, non-native invasive plants are introduced from other regions and lack these natural competitors and pests. As a result, they can rapidly outcompete native species, forming aggressive monocultures that choke out biodiversity, ruin recreational access, and severely degrade water quality.

**When Native Plants Become a Problem**

It is a common misconception that a plant cannot be harmful simply because it is native. Under certain conditions—such as human-altered environments, shallow water profiles, or high nutrient runoff (cultural eutrophication)—even native aquatic plants can become opportunistic and undergo hyper-proliferation.

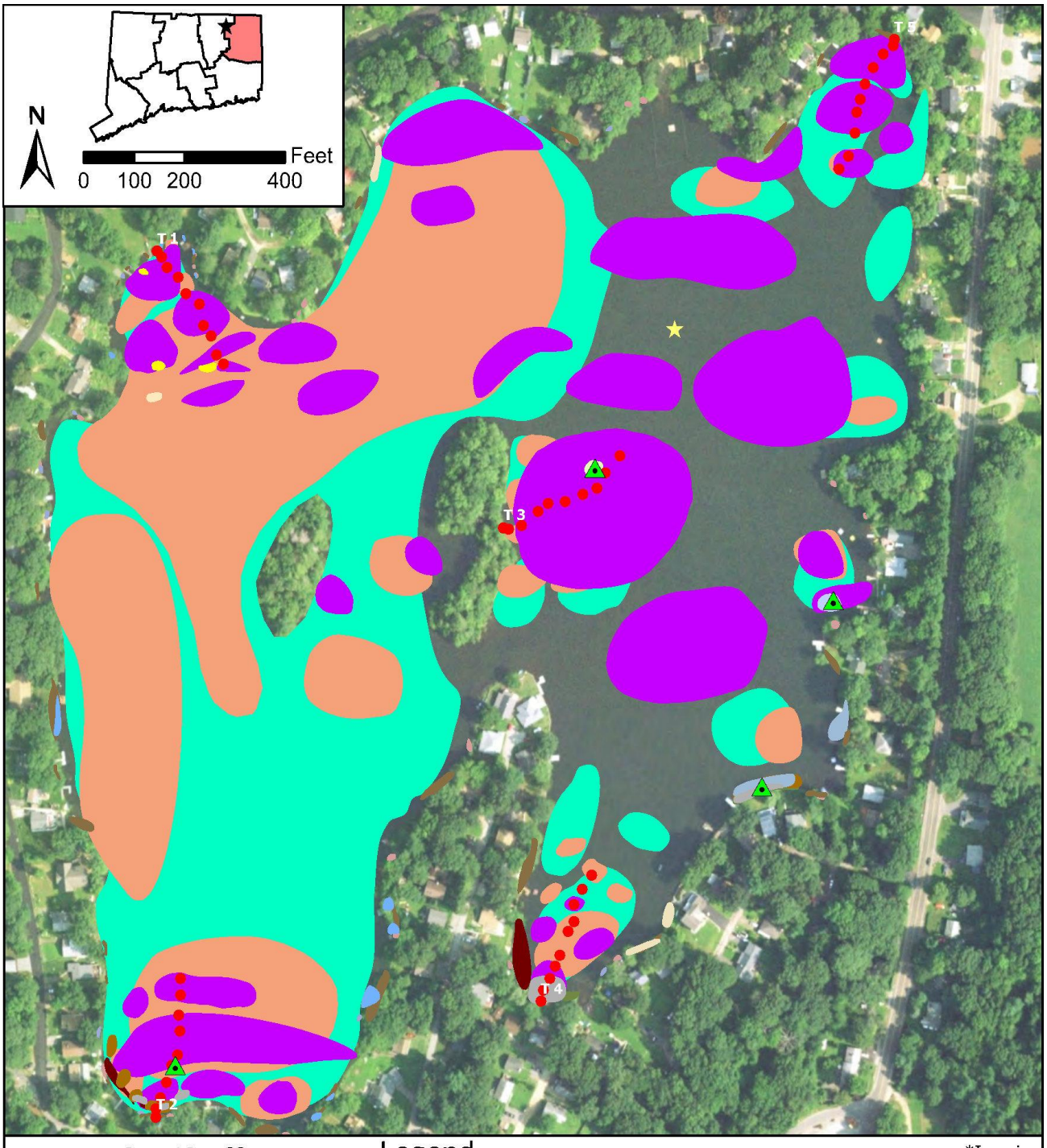
When native species grow completely unchecked, they can trigger the exact same ecological and recreational problems as invasive species:

- They can form dense surface mats that block sunlight from reaching the lower water column.
- They can severely restrict swimming, boating, and fishing.
- Their massive seasonal die-offs add enormous amounts of organic material to the lakebed, accelerating basin siltation (making the lake shallower) and depleting dissolved oxygen levels during decomposition, which stresses or kills aquatic life.

**Elodea vs. Hydrilla**

It is incredibly easy to confuse Elodea and Hydrilla at first glance. Both are submerged, freshwater aquatic plants with bright green, strap-like leaves that wrap around a central stem in clusters called **whorls**. However, telling them apart is highly important because native Elodea is a beneficial part of the ecosystem, whereas Hydrilla is an aggressive, highly destructive invasive species. The diagram below highlights exactly how their leaf structures and root systems differ.

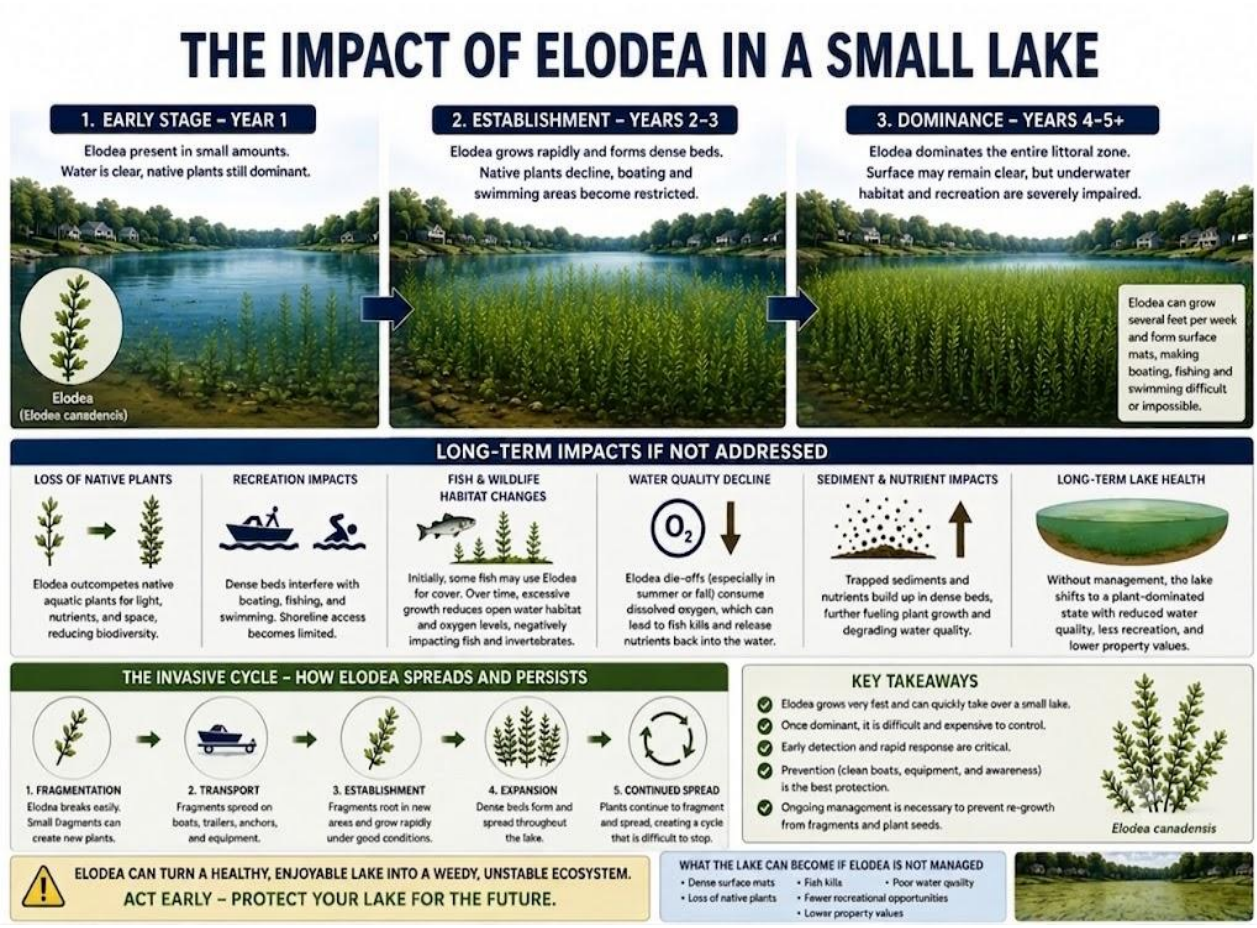
**Below is a map created in 2021 based on an aquatic plant survey conducted by the State of CT on Lake Chaffee:**

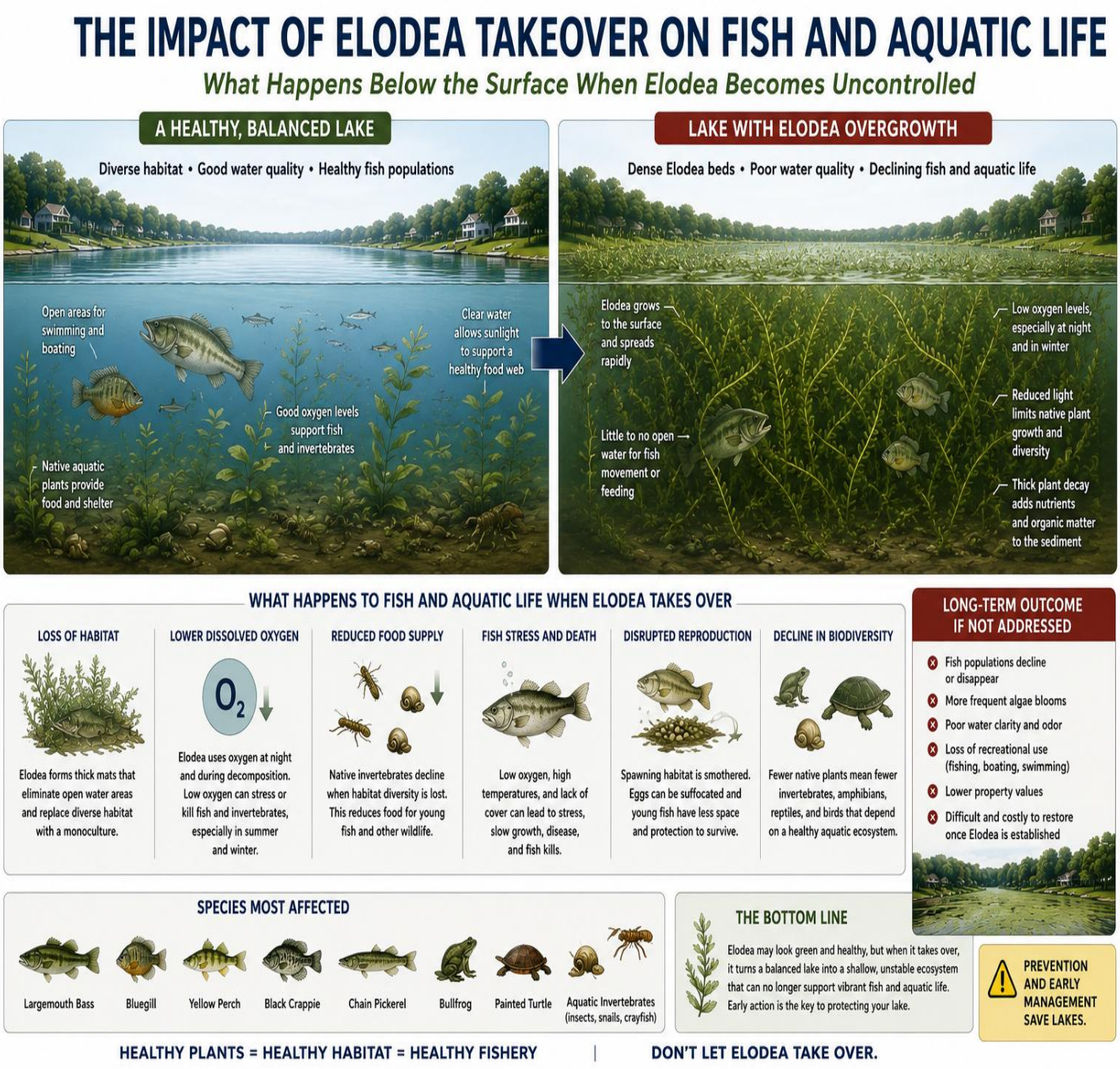


**4. The Elodea Takeover: Proliferation Mechanics**

The plant driving this ecological change is *Elodea nuttallii*. Unlike invasive species introduced from overseas, Western Waterweed is an opportunistic native plant. It capitalizes on human-altered, shallow, and nutrient-rich environments, using distinct survival traits to take over the lake:

- **Surface Mat Formation:** Individual weed columns grow from 4 inches up to 4 feet tall. In a lake where the average depth is 6 feet, these columns easily reach the surface, weaving into thick, dense mats that block sunlight from other native organisms.
- **Fragmentation Loop:** While banning gasoline engines avoids oil pollution, heavy use of kayaks, canoes, and rowboat paddles cut through the weed canopy. This creates thousands of plant fragments. Each fragment can float away, develop roots, and grow into a brand-new weed bed.
- **Accelerated Basin Siltation:** Every autumn, tons of dying weed biomass sink to the lake floor. As this material breaks down into thick muck, it makes the lake shallower over time. This creates an ongoing cycle, making the lake even more vulnerable to weed growth the following year.



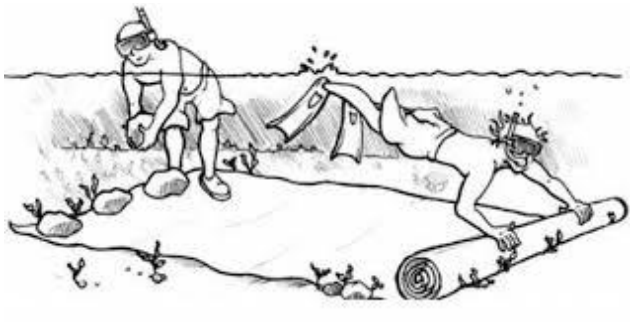



### 5. Comprehensive Mitigation Action Plan

To control the *Elodea* population without damaging Lake Chaffee's thriving fish populations (such as Largemouth Bass and Chain Pickerel), the community should consider and implement a coordinated, multi-step management plan:

**A. Immediate Action for Key Recreational Areas**

- **Benthic Barriers (Bottom Blankets):** Deploy heavy, gas-permeable geo-textile mats over the lakebed at Main Beach, West Beach, and the community boat launch in late spring. These mats block 100% of sunlight, naturally clearing swimming areas without using chemical herbicides.



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- **Diver-Assisted Suction Harvesting (DASH):** Instead of using mechanical harvesters that chop up plants, employ certified scuba teams using gentle suction hoses to pull *Elodea* out by its roots. This removes the entire plant instantly, preventing stray fragments from spreading the weed.


- **Herbicide Treatments:** When a small lake experiences severe *Elodea* overgrowth, chemical herbicide treatments are often evaluated as a large-scale management option to rapidly restore open water. Systemic herbicides, such as fluoridone, or contact herbicides, like diquat and endothall, are commonly utilized because they can effectively penetrate the dense waterweed mats. However, executing chemical treatments requires careful precision. If too much vegetation is killed simultaneously, the sudden mass of decaying organic matter will rapidly deplete the water's dissolved oxygen, potentially triggering catastrophic fish kills.

**B. Long-Term Source Control for the Watershed**

- **District Fertilizer Restrictions:** Pass a strict ordinance banning synthetic, phosphorus-heavy fertilizers on all residential lots inside the community. This cuts off the nutrient supply that fuels the summer weed growth.
- **Shoreline Buffer Planting:** Encourage waterfront property owners to plant native, deep-rooted shrubs and perennials along the shoreline to naturally filter stormwater before it runs into the lake.

**C. Long-Term Infrastructure Projects**

- **Repair the Dam:** Prioritize repairing the dam and spillway. This will allow managers to safely lower the lake level by 2 to 3 feet in late autumn, exposing weed roots to winter frosts and naturally thinning out the population.

## 6. Management Strategy Matrix

| Management Vector | Prescribed Action | Target Mechanism | Cost / Complexity |
|---|---|---|---|
| **Watershed Control** | Enforce a ban on phosphorus lawn fertilizers in the catchment area. | Reduces nutrient runoff during stagnant summer months. | Low / Easy |
| **Benthic Occlusion** | Install localized geo-textile mats at swimming beaches. | Blocks light to prevent weed growth in key swimming areas. | Medium / Moderate |
| **Targeted Harvesting** | Deploy Diver-Assisted Suction Harvesting (DASH) in boating lanes. | Remove weeds cleanly without creating fragments that spread the plant. | Medium / Moderate |
| **Infrastructure** | Repair the dam. | Restores winter-freezing cycles to control weeds across large areas. | High / Complex |

## Conclusion

Lake Chaffee's current aquatic plant problem reflects the interaction of shallow basin design, nutrient-rich sediments, prolonged water residence time, and seasonal warming patterns that together favor aggressive growth of *Elodea nuttallii*. Although this species is native to Connecticut, the report shows that native status alone does not prevent serious ecological and recreational impacts when growth becomes excessive. Dense plant beds now interfere with swimming, boating, and fishing, while repeated seasonal die-off contributes to oxygen stress, organic sediment buildup, and the long-term loss of lake depth and ecological resilience.

The findings in this report support a balanced management approach that combines immediate intervention in high-use recreational areas with long-term watershed and infrastructure improvements. Targeted controls such as benthic barriers and DASH can provide short-term relief where access is most important, while fertilizer restrictions, shoreline buffering, and dam repair offer more durable solutions to the underlying causes of overgrowth. Taken together, these strategies provide a practical framework for protecting Lake Chaffee as both a community resource and a functioning aquatic ecosystem. Continued inaction will allow the problem to intensify, whereas coordinated management can help preserve the lake's recreational value, ecological stability, and long-term health. Thank you to everyone throughout the community who has taken the time to address this issue and bring up the concern at meetings, community events and groups. This is truly a community wide effort. The biggest thank you goes to my neighbors Mike and Lynn Paine who have spent countless volunteer hours removing truck loads of plants from the lake to make it a more enjoyable place to spend time for everyone.

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