

# Tonkawa Springs Pond Remediation

*A **pond** is an area filled with water, either natural or artificial, that is smaller than a lake. Defining them to be less than 5 hectares (12 acres) in area, less than 5 meters (16 ft) deep, and with less than 30% emergent vegetation helps in distinguishing their ecology from that of lakes and wetlands.*

**The ponds of Tonkawa Springs have for many years both defined and graced our community with natural beauty and bio-diversity. They are part of our identity, part of our name!**

**All Ponds Age, but not all ponds need to become swamps.** Ponds, especially man-made ponds like ours, require periodic maintenance or they will become choked of oxygen ...and die. They will then become vermin- and mosquito-infested swamps, an eyesore which eventually have the inverse affect to a community which previously enjoyed them as an asset. **We are now at a decision point.**

# Eutrophication to Putrification

**Our Ponds Are Dying.** Some algae is healthy for a pond. However, aquatic weeds, while a natural part of aquatic systems, are growing unchecked due to high Phosphorus and/or Nitrogen levels in the water. The excess nutrients created over time by this process eventually cause **Pond Eutrophication** — **a process that depletes water of needed oxygen levels, effectively killing the pond and everything in it.** And in our case, because the elements that affect one pond are more or less the same across all of them, the entire neighborhood's eco-system of ponds is in danger.

# How Did This Happen?

**Eutrophication** happens primarily from three causes:

1. Leaves, grasses, and other organic material entering the pond and settling to the bottom to decompose.
2. Years of use (and over-use) of fertilizers, and street runoff.
3. Dead trees, limbs and other debris fall into the water and left unmanaged bond with weeds and muck to create new “shorelines”

All of these factors, when combined over a period of decades, literally choke and diminish ponds from above, below, and the sides, eventually killing them. This is the state of our ponds in Tonkawa Springs.

# Ponds are great. Ponds require effort and money.

**Ponds add value not just to individual pond property owners, but to an entire community**, especially when access is granted to all on any portion of it.

However, **ponds require continued, concerted maintenance**, especially across a system of ponds, such as ours. The most common maintenance costs associated with owning ponds include:

- Vegetation removal
- Water quality monitoring
- Flora and fauna health studies and treatment
- Remediation where necessary

Because real “pond maintenance” has at best been performed only in part, and only by a few residents across the years—and not as part of a coordinated community effort—we are now at a place where remediation IS necessary.

# Pond Remediation

## What the Experts Say:

Several potential solutions have been proposed from consultations with Texas A&M AgriLife Extension Service; Brushy Creek MUD; TCEQ; Aquatic Features, Inc; and Clear Water Supply in Colorado:

- To quickly change the appearance of the pond, rake as much of it off the surface as possible. Clear as much of the dense algae as possible
- Install an Aeration System
- Add Phoslock to remove unwanted algae growth (safe for fish)
- Add Beneficial Microbes (safe for fish)
- Treat with Copper Sulphate (safe for fish)

# The Tonkawa Springs Pond Remediation Plan

We have consulted extensively with Scott Smith, a renowned pond expert with Aquatic Features, Inc. Scott has performed an assessment of our ponds/pond system, and recommends as a baseline the following three actions to restore and maintain our ponds to health:

- **CLEAN** ponds of excess vegetation, weeds, logs, debris, etc...
  - This could be a resident-led, community wide project, but will require ongoing effort and some professional extraction and haul-off.
- **TREAT** with Phoslock to stunt vegetation growth
  - Currently being used in Lady Bird Lake with no negative consequences
  - Case study discussion to follow
  - Case study to be available on HOA website
- **AERATE** via submersed and/or surface aerators and fountains to add dissolved oxygen to the water
  - Maintains ideal oxygen levels throughout the waterbody's layers
  - Saturates bottom sediment with oxygen to reduce organic muck build up
  - Improves water clarity

# 1. Pond Clean-Up (Make it a party, bring the kids...)





## 2. Phoslock Treatment



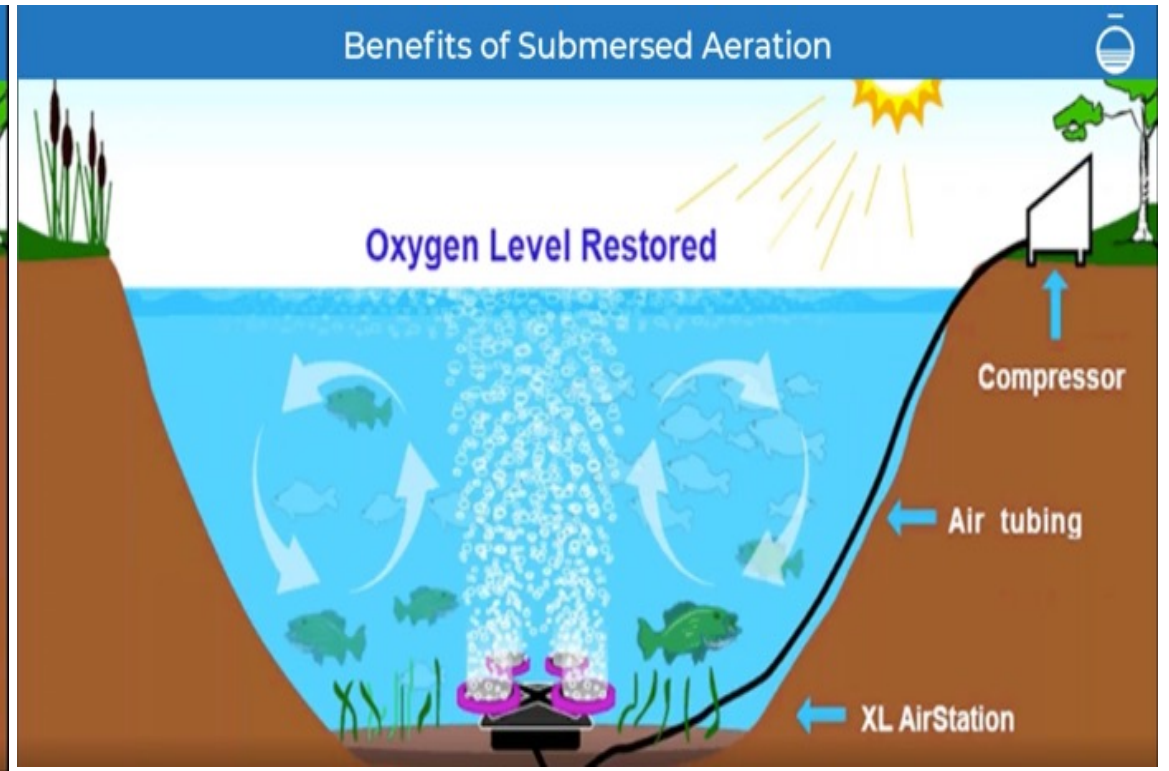
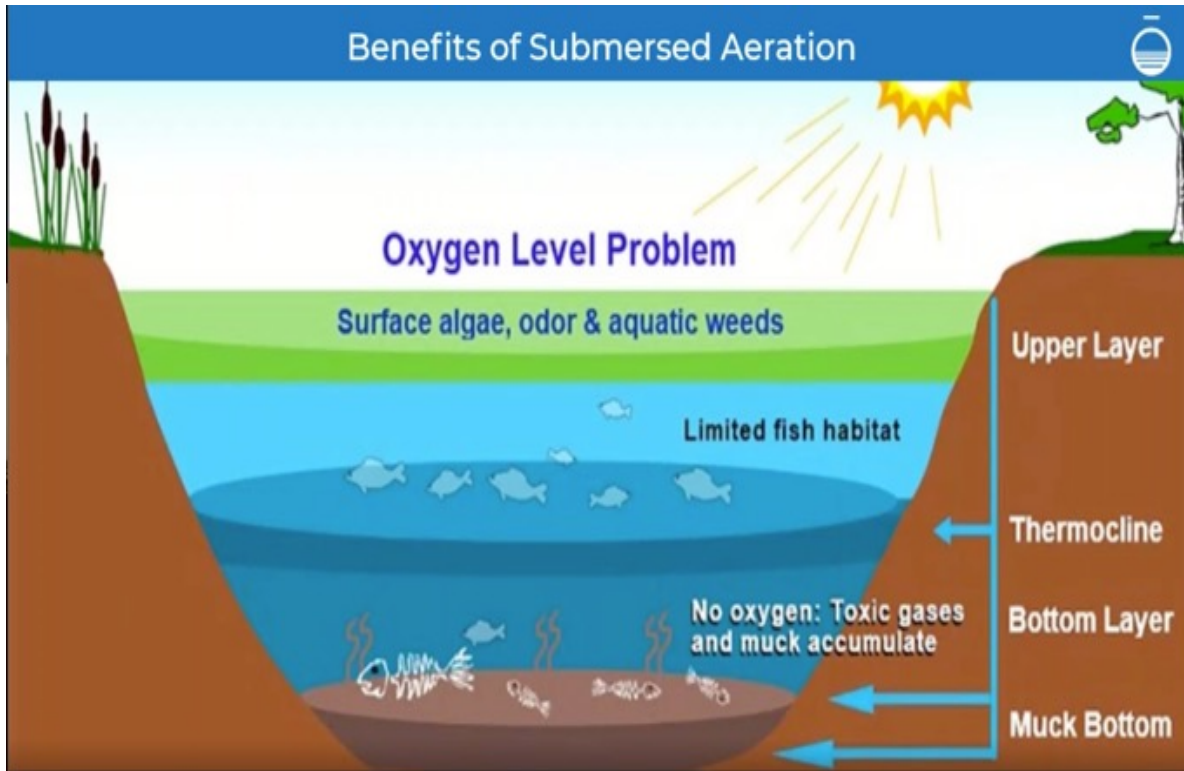
Aquatic Features Inc performed the Lady Bird Lake Restoration and Remediation of the toxic alga problem of 2021. **Phoslock – a natural solution that is harmless to fish and other aquatic life—was used to restore the balance of phosphorous and nutrients to combat Eutrophication in Lady Bird Lake.** Discussion of Scott’s involvement in Lady Bird Lake Restoration here: <https://vimeo.com/617232720>



# 3. Aeration

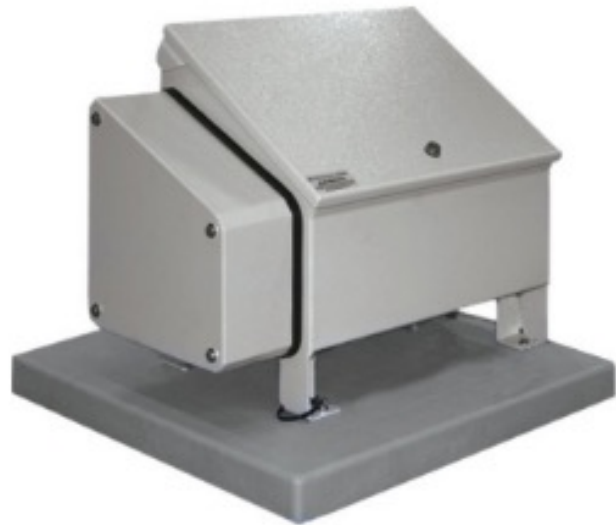
Before

After



# Submersed and Surface Aeration

Ponds 4 & 5 - Submersed aerators. Minimum depth of pond is 5' (year-round) to use this product.



Electricity is provided by HOA from tennis courts via quiet compressor near water. Compressor feeds air to submersed aerators via weighted air lines laid on bottom of pond.



Ponds 3, 6,7 - Surface aerators for ponds not deep enough for submersible aerators. Electricity provided by homeowners surrounding the pond in which they are installed. Provides many of the same benefits of submersed aerators.



# Pond Remediation. Who pays for it? Who benefits?

Obviously, homeowners directly on ponds accrue the most benefit, and appropriately will shoulder the most responsibility for maintenance of them. But, it cannot be denied that all homeowners benefit from the view of the ponds, the access to the Common Area on Pond 4 (see below), and the value they all bring to the neighborhood, just like the tennis courts. Except more.

**We implore you to not allow Tonkawa Springs to become Tonkawa Swamp.** Given the alternative of doing nothing, or doing too little too late, we are graced with the opportunity to TOGETHER preserve our single greatest geographic asset, one which is part of our identity, our beautiful water features...or being the people who presided over its further decline into what could easily become its single greatest deficit. **The time to act is now.**

**We are providing four different entry points** for the community to consider as appropriate for HOA involvement. A vote will be taken by the community on or before the last meeting of the year, in December. **In the mean time, we will provide multiple forums to take input from the community as well as to update everyone with progress reports, and also to meet Scott Smith from Aquatic Features, Inc.**

# Pond Remediation – A Scaled Approach

For the sake of this study, we have limited the scope of this proposal only to Ponds 3, 4, 5, 6, and 7, as shown in the diagram here.

These ponds run along “Beaver Creek”, and when subject to heavy rain, flow into one another and are therefore occasionally contiguous.

They are thus part of a separate eco-system from Ponds 8, 9, and 10, and to some degree from Ponds 1 & 2 because those ponds are primarily spring fed and separated from the others by a considerable expanse of dry creek bed.

(A larger map appears on next page)



Note: All ponds with property lines within the boundaries of Tonkawa Springs proper, including Ponds 8-10 and 1 & 2, may benefit from the same models and financial consideration as proposed in the following pages, depending on property owner input. These property owners are welcome to join in, but must meet minimum participation rates. (See attached Q&A.)







# Option A/Pond 4 only

Costs equally shared by 7 owners, including HOA

## Option A - Pond 4 only

Proposed Solution	Cost	
Cleanup	\$ 500	
Aeration - Generator and 3 submersible aerator discs	\$ 7,700	
Phoslock Application	\$ 2,082	
Annual electric paid by HOA	<u>\$ -</u>	\$ 360 HOA pays electric in perpetuity
Total	\$ 10,282	\$ 1,469 HOA and each household



# Option B/Ponds 4 & 5 only

Costs equally shared by 11 owners, including HOA

## Option B

Ponds 4 & 5 get economy of scale

Proposed Solution	Cost	
Cleanup	\$ 600	
Aeration - Larger generator and 4 submersible aerators	\$ 10,568	
Phoslock Application	\$ 2,500	
Annual electric paid by HOA	\$ -	\$ 360 HOA annually
Total	\$ 13,668	\$ 1,243 1/11th each household & HOA

# Option C/Ponds 3 – 7

HOA assumes 25%, balance equally shared by 31 owners, excluding HOA

## Option C

**Ponds 4 and 5 as shown above, PLUS 3, 6 & 7 with Surface Aerators**

<b>Proposed Solution</b>	<b>Cost</b>	
Cleanup (across all ponds, including haul-off)	\$ 2,000	
Aeration Ponds 4 & 5	\$ 10,568	
Phoslock Ponds 4 & 5	\$ 2,500	
Phoslock Pond 3	\$ 435	
Surface Aerator pond 3	\$ 2,700	
Phoslock Pond 6	\$ 2,175	
Surface Aerators pond 6 x 4	\$ 10,800	
Phoslock Pond 7	\$ 435	
Surface Aerators pond 7 x 1	\$ 2,700	
Annual electric paid by HOA (see note)	\$ -	\$ 360 HOA annually
<b>Total</b>	<b>\$ 34,313</b>	<b>\$ 8,578 HOA pays 25%</b>
		<b>\$830 Each household pays 1/30th of balance</b>

# Option D/Ponds 3 – 7

HOA assumes 50%, balance equally shared by 31 owners, excluding HOA

## Option D

**Ponds 4 and 5 as shown above, PLUS 3, 6 & 7 with Surface Aerators**

<b>Proposed Solution</b>	<b>Cost</b>	
Cleanup (across all ponds, including haul-off)	\$ 2,000	
Aeration Ponds 4 & 5	\$ 10,568	
Phoslock Ponds 4&5	\$ 2,500	
Phoslockk Pond 3	\$ 435	
Surface Aerators pond 3 x 1	\$ 2,700	
Phoslockk Pond 6	\$ 2,175	
Surface Aerators pond 6 x 4	\$ 10,800	
Phoslock Pond 7	\$ 435	
Surface Aerators pond 7 x 1	\$ 2,700	
Annual electric paid by HOA NOTE:	\$ -	\$ 360 HOA Ponds 3, 6 and 7 pay own electric
total	\$ 34,313	\$ 17,157 HOA pays 50%
		\$ 572 Each household pays 1/30th of balance