Aquatic Invasive Plant Control Pilot Project Using Ultraviolet Light

Nicole Cartwright
Executive Director
530.543.1501 x111
ncartwright@trcd.org
TahoeRCD.org

John Paoluccio
President, Inventive Resources, Inc.
209.545.1663
john@iriproducts.com
IRIproducts.com

UV Light Pilot Project

Funding & Partners

Together Creating a Legacy

Inventive Resources Inc.

Lakeside Marina & Beach Association, Tahoe Regional Planning Agency, Lahontan Water Quality Control Board

Inventive Resources, Inc. (IRI)

- John J. Paoluccio, President of IRI – Degree in Mechanical Engineering
- IRI has over 25 Patents / Patent Pending related to environmental products. Focus on clean air, clean water and clean environment.
- Civil, Mechanical, Agriculture and Physics Engineer

History / Accomplishments:

- 2002 - Cave wall algae/plant removal using UV light.
- 2017 - Patent awarded for our aquatic UV treatment system
- 2017 - Completed a UV granted pilot study in Lake Tahoe, CA.
- 2018 - Pilot Project treating a irrigation canal system using UV light.

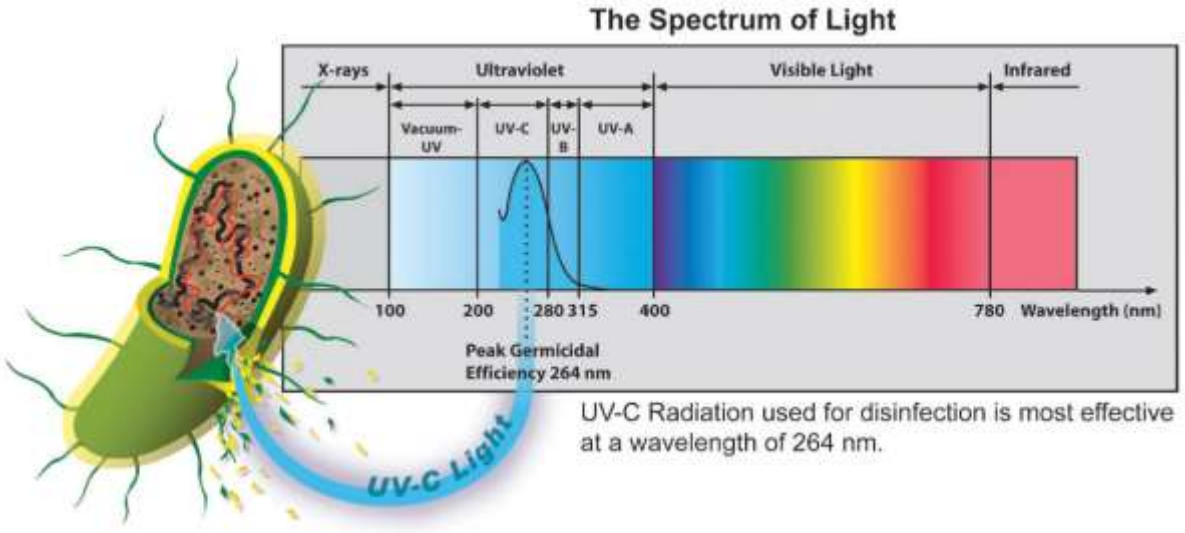
Our company has been studying the effects of UV light on plants for over a decade

Why Use UV-C Treatment

- Non-Chemical Treatment Method
  - Leaves Nothing Behind
  - Simply turn on/off
- Treat where you want – When you want
  - Treat plants near drinking water intake pipes
  - Anytime of year
  - No residual effects
  - Easily avoid native plants & sensitive areas
  - **<u>Treat plants when young, before they mature, drop seeds & fragment</u>**
- Cost Less than other non-chemical methods

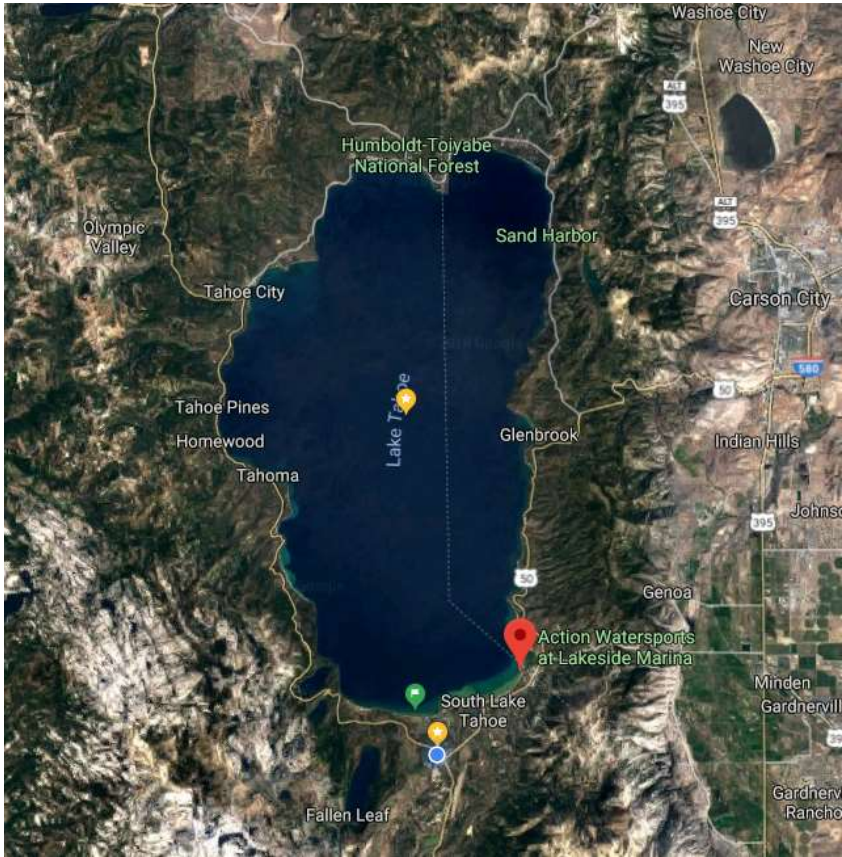
Pilot Project Description & Objectives

- Implement new potential tools to treat aquatic invasive plant infestations using ultraviolet-C (UVC) light (200-280nm wavelength)
- Laboratory studies showed sufficient results with exposure times from 5-15 minutes
- Evaluate potential impacts from the use of UVC light



UV Light Pilot Project

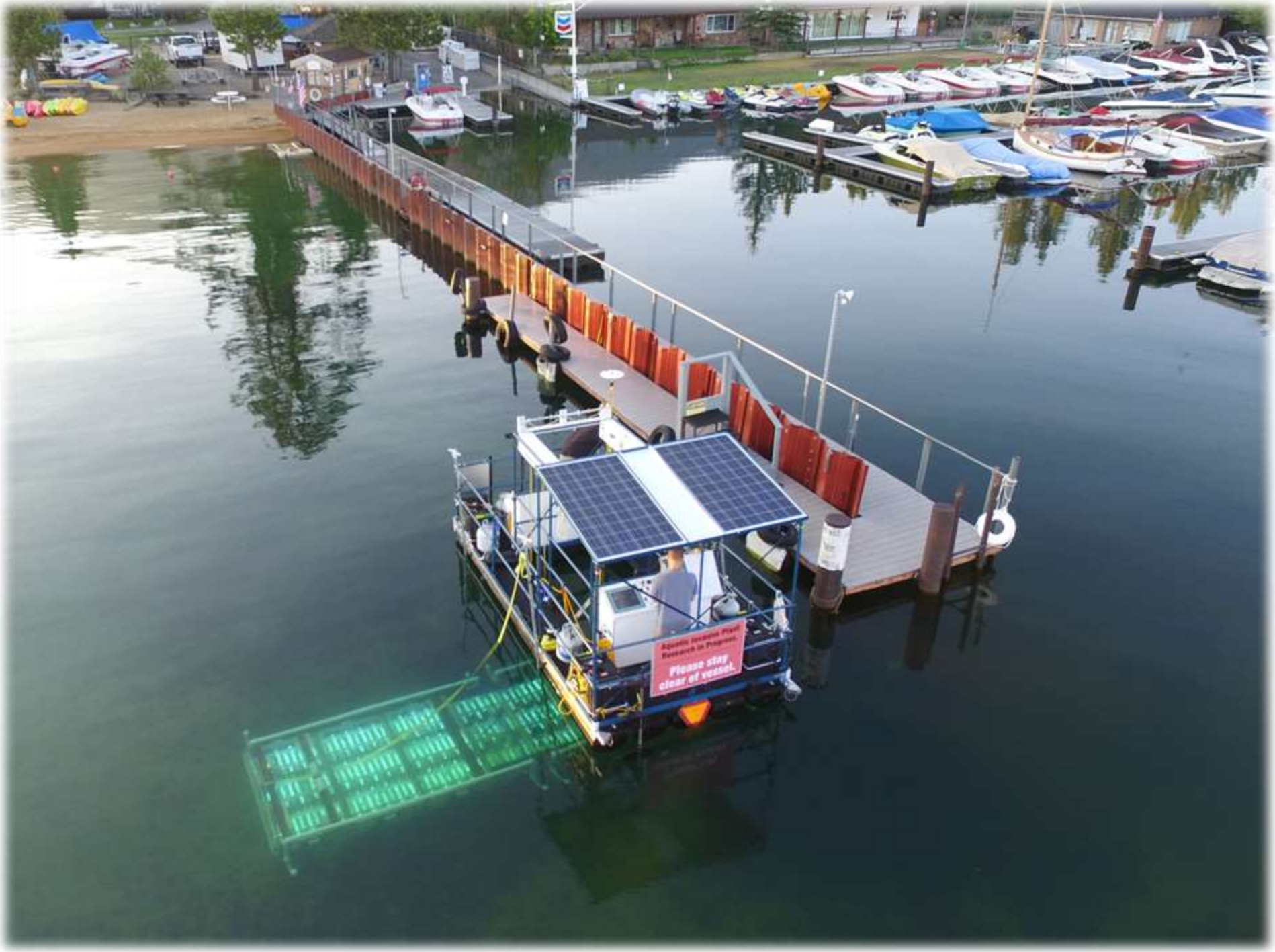
Location of UVC pilot project, Lakeside Marina and Swim Beach, South Lake Tahoe, California



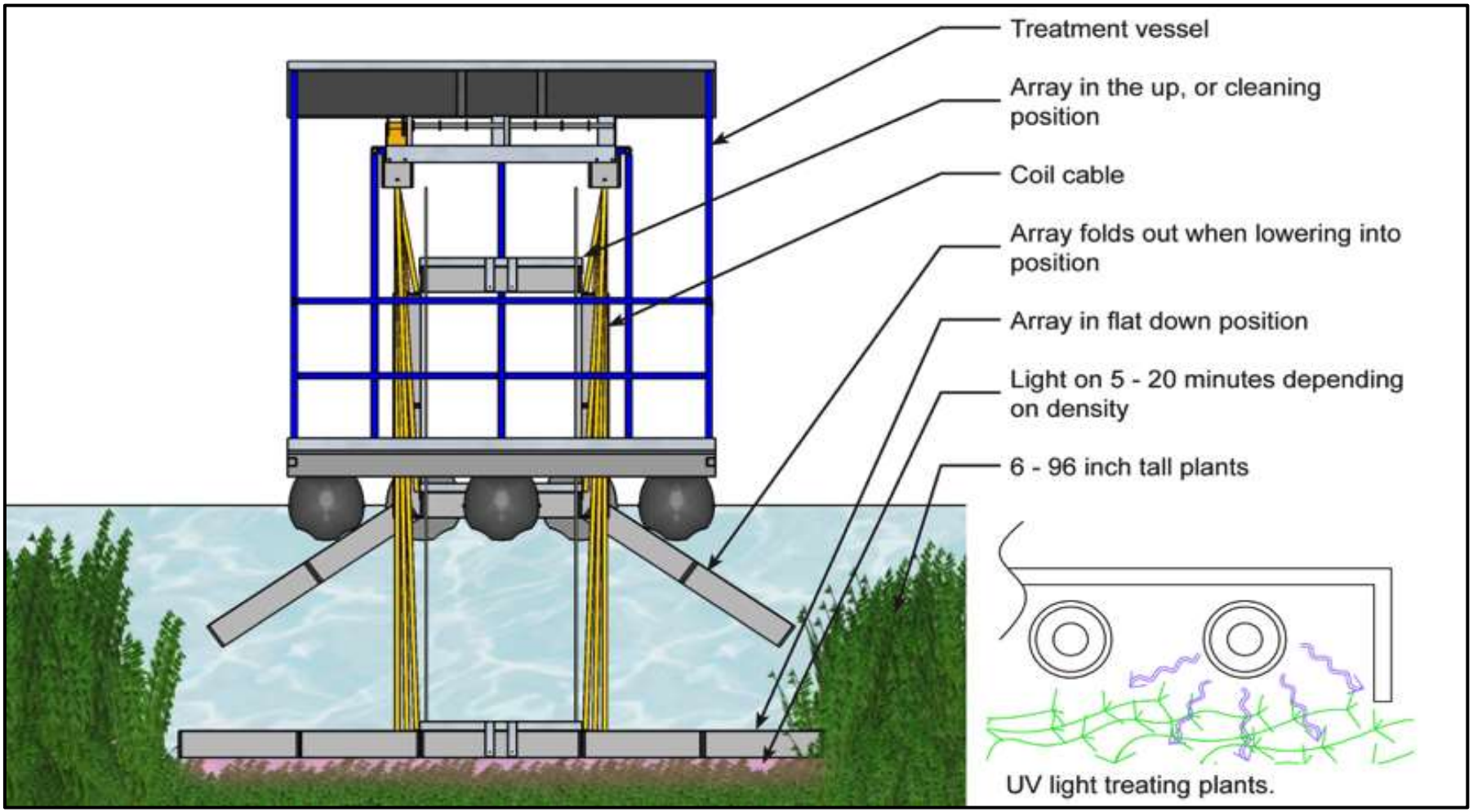
UV Light Pilot Project

Implementation

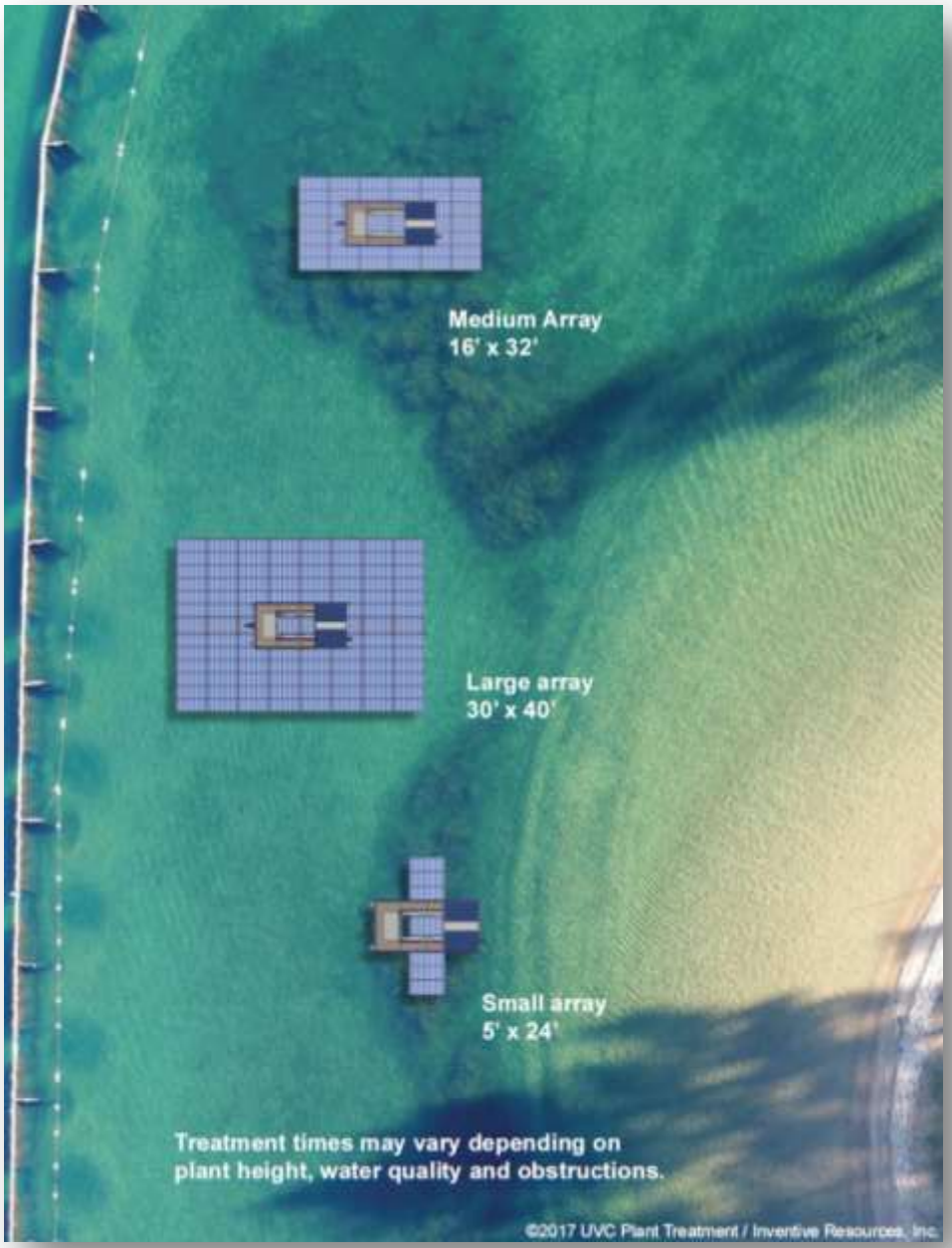
- IRI manufactured a vessel (8’ x 16’)
- UVC light array chamber (4’ x 8’ x 2’) with lowering mechanism
- Control center, cameras, camera monitors, fish deterrent, solar panels, and propane propulsion


Please stay
clear of vessel.

UV Light Pilot Project

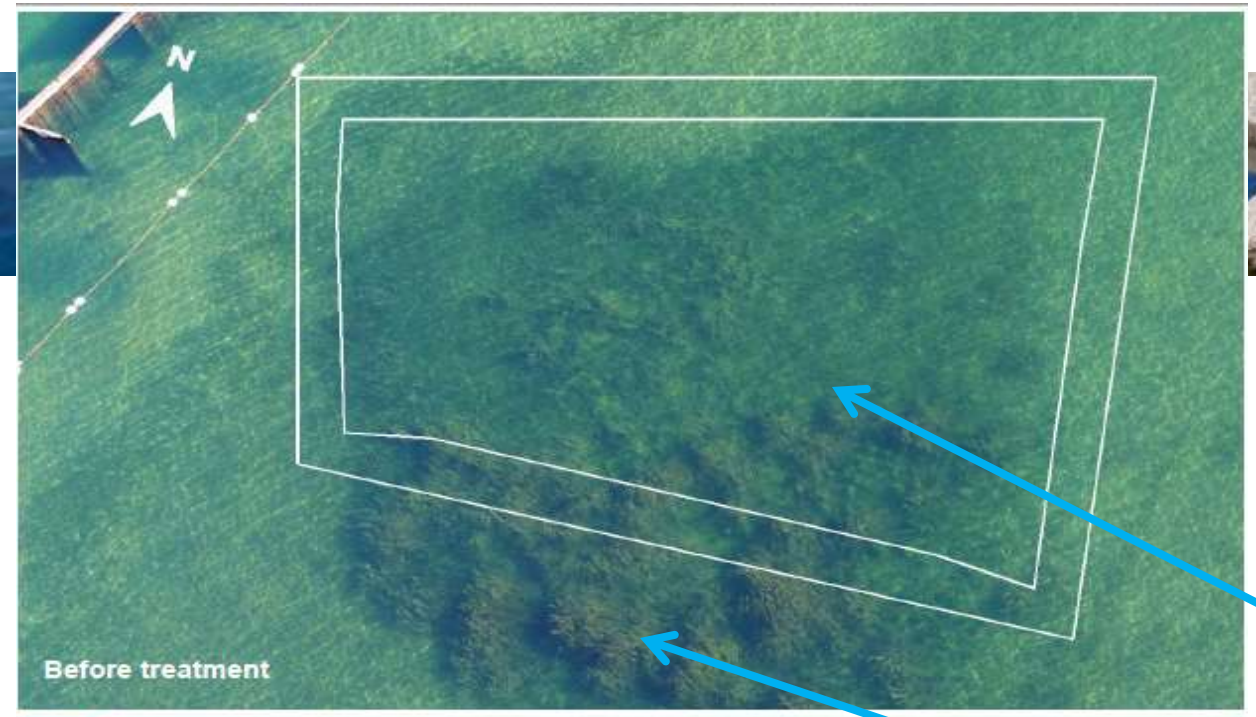


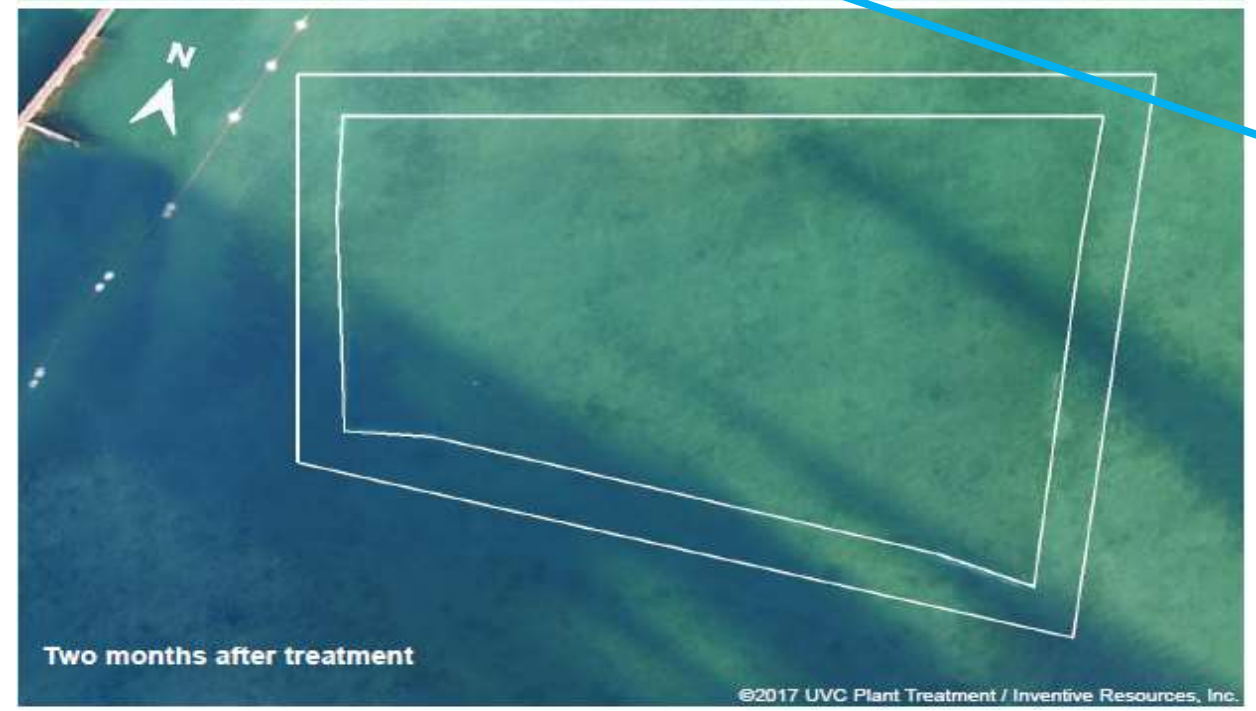
UV System – Scalable



- The UV Treatment vessel can be custom made to fit the need of your project.
- The treatment array can vary in size Small to Large.
- Power can be Diesel or Propane depending on the site requirements.
- Recommended (2) operators on the vessel.
- Open water treatment could be 1 acre per day with Large array option.


Treated
Untreated





TAHOE RCD
WE DO CONSERVATION

Beach Treatment

UV Treatment was conducted inside the white outlined border

Plants located outside of the border were removed by diver suction removal

Two months after treatment

All plants visibly gone, results matched hand removal area

UV Light Pilot Project

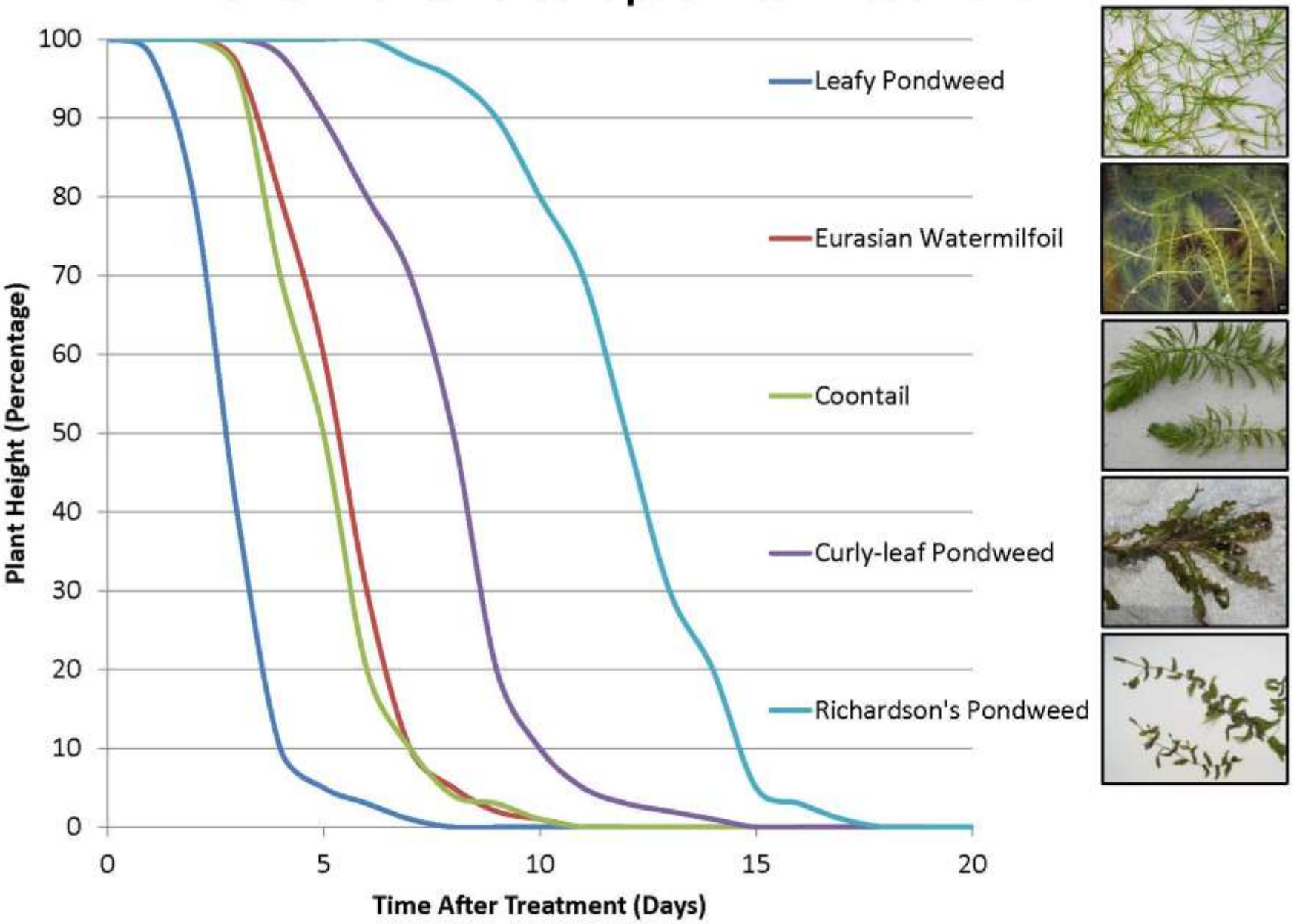
Before Treatment

Two Weeks After Treatment

Four Weeks After Treatment

Six Weeks After Treatment

Time For Plants To Collapse After Treatment



Monitoring

Questions we expect to answer are:

- **How far will UV light penetrate sediment on the lake bed?**
- How are macroinvertebrates impacted by UV light treatments?
- **How will UV light effect water temperature?**
- **What are the effects of this method on dissolved oxygen levels in the project area?**
- How will this method affect levels of plankton (phytoplankton or zooplankton) or periphyton in the project area?
- What are the regrowth rates for AIP treated with UV light?
- How successful is UVC light as a long-term AIP control method?
- **What are effects on fish? Do they avoid the UV exposure apparatus?**

UV Light Pilot Project

Initial Results & Lessons Learned

- **Treat plants early season**
- **Treatment array and vessel can vary in size**
- **1 acre/day with larger vessel**
- **Water clarity, weather, boat traffic, obstacles, plant height - all factors**
- **Short wavelength light is a proven method to eliminate one cell organisms**

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Irrigation Canal System