



Waterless Cleaning Systems

Invasive Species Prevention
Public Infrastructure



- Barriers to AIS Prevention Action
- Waterless Technology
- 3rd Party Research
- Digital Public Engagement Features
- Questions

Invasive Species Problem



**INVASIVE SPECIES
COST THE US ECONOMY**

**\$146+
BILLION/YEAR**

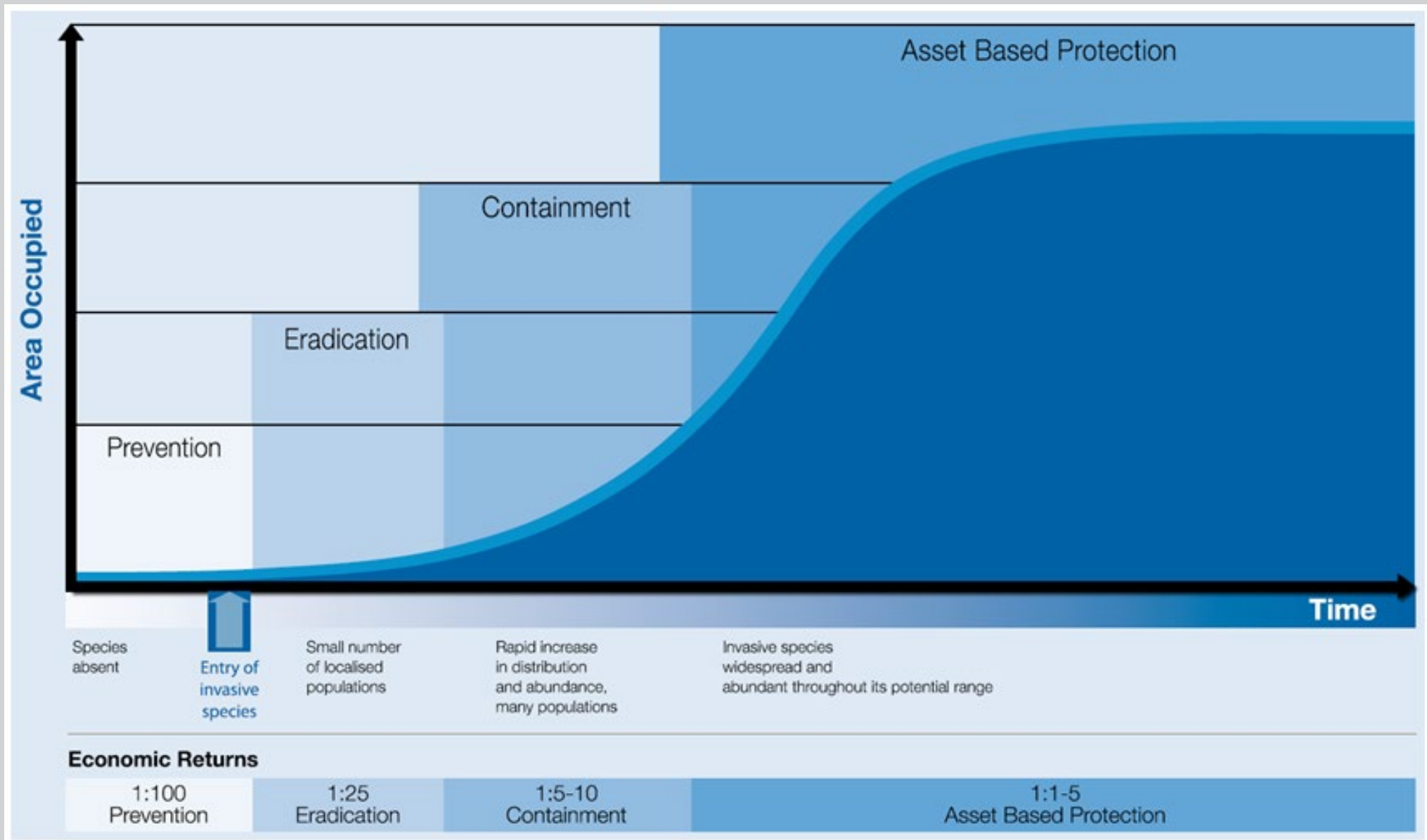


BOATERS NEED TOOLS



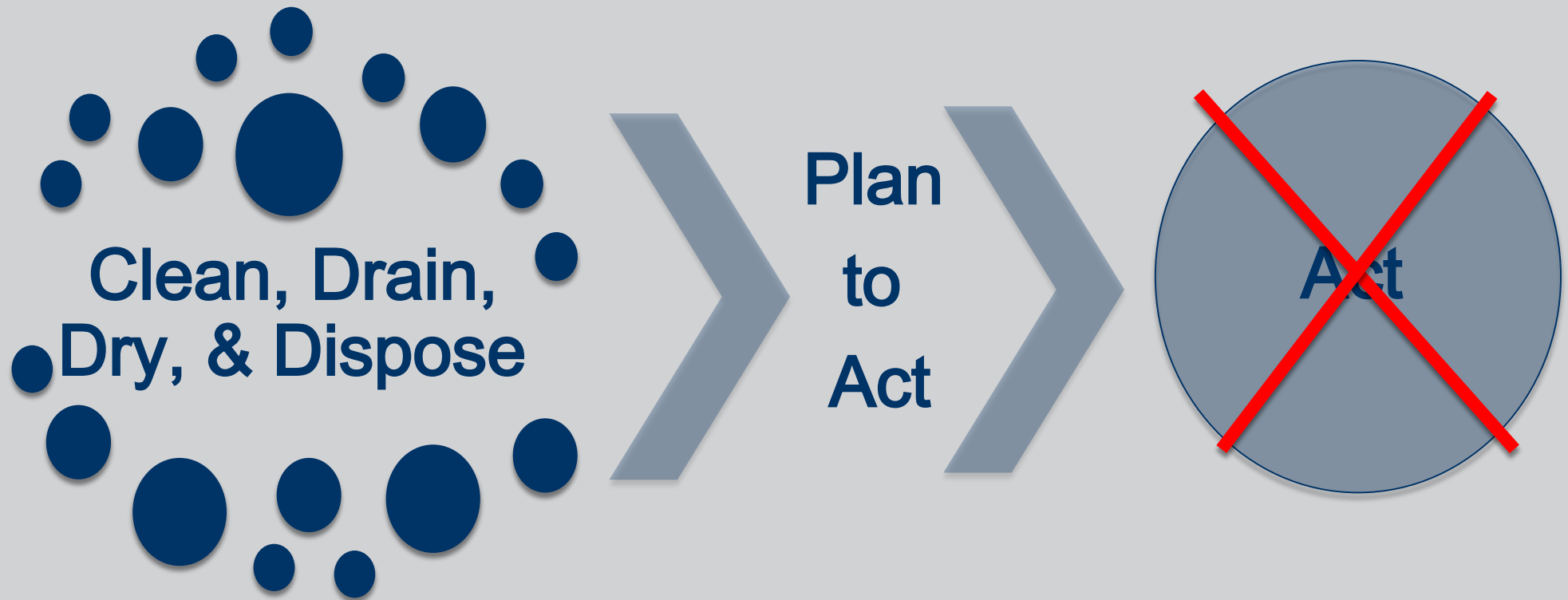
**EXISTING SOLUTIONS
ARE COSTLY AND
CANNOT SCALE**

Invasion Curve = Reality



“An ounce of prevention is worth a pound of cure.”

What people are doing

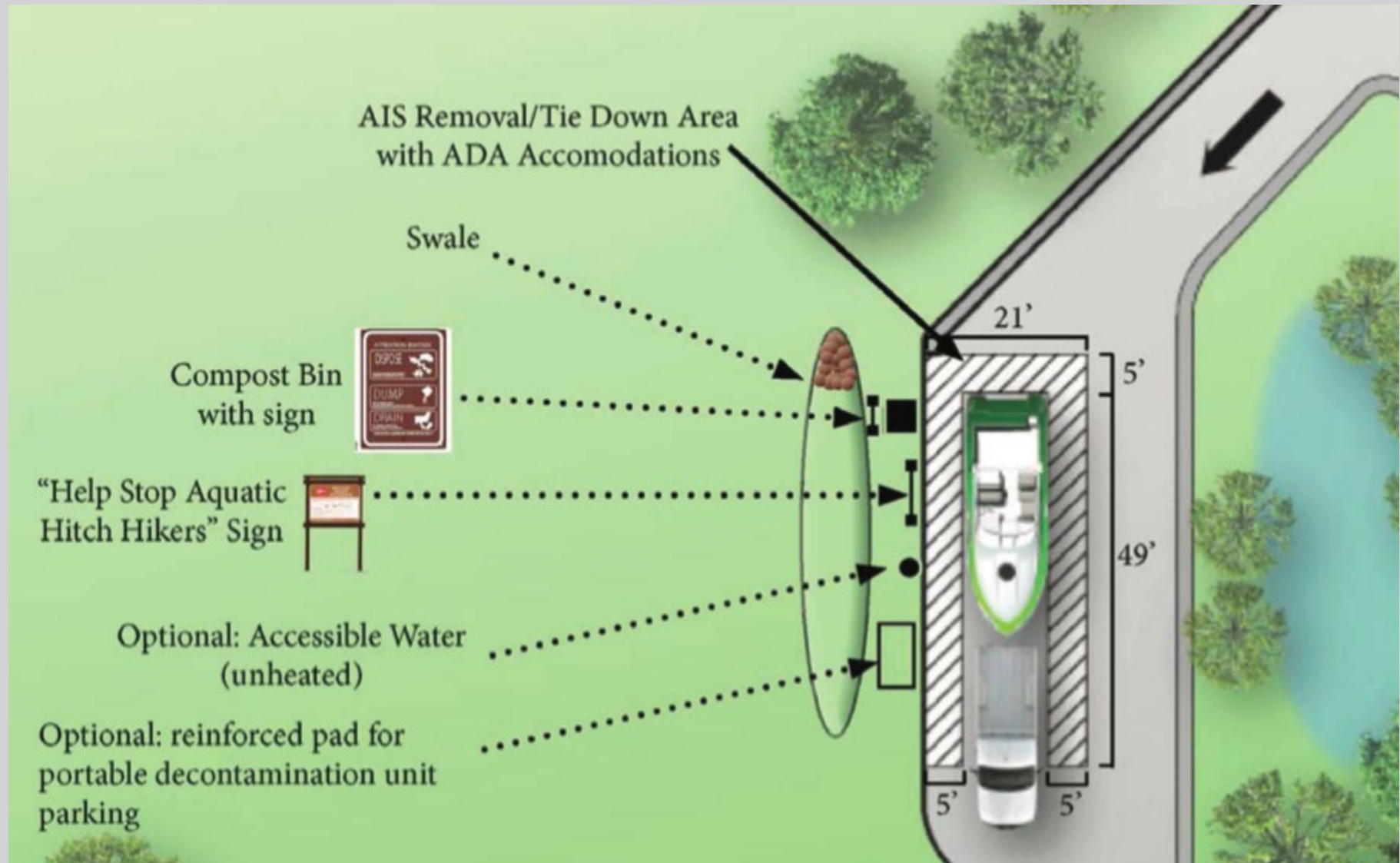


Dayboaters FAIL to take action



“Give ‘em the TOOLS”

SOBA's BMPs

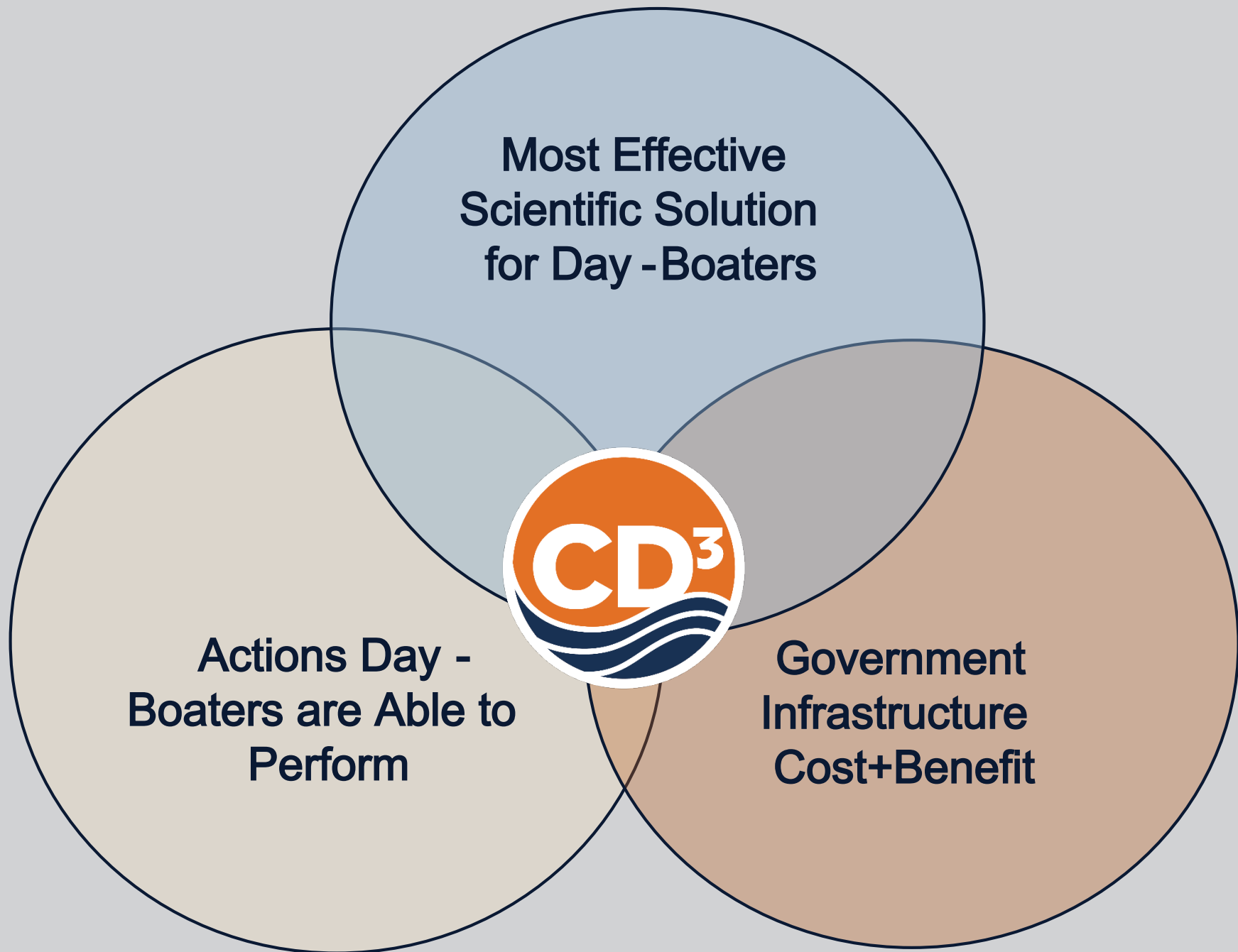


“Construction and Integration of Aquatic Invasive Species (AIS) Prevention Areas at Recreational Boating Facilities

Technology Development



How CD³ Approached Design



What can infrastructure do?



**EMPOWER
THE
PUBLIC**



**HELP STOP
THE SPREAD
OF AIS**

Everybody Likes a Clean Boat

Free-to-Use Waterless Tools



CD³ Systems Overview



**INTERNET
CONNECTED**

**TETHERED
TOOLS**

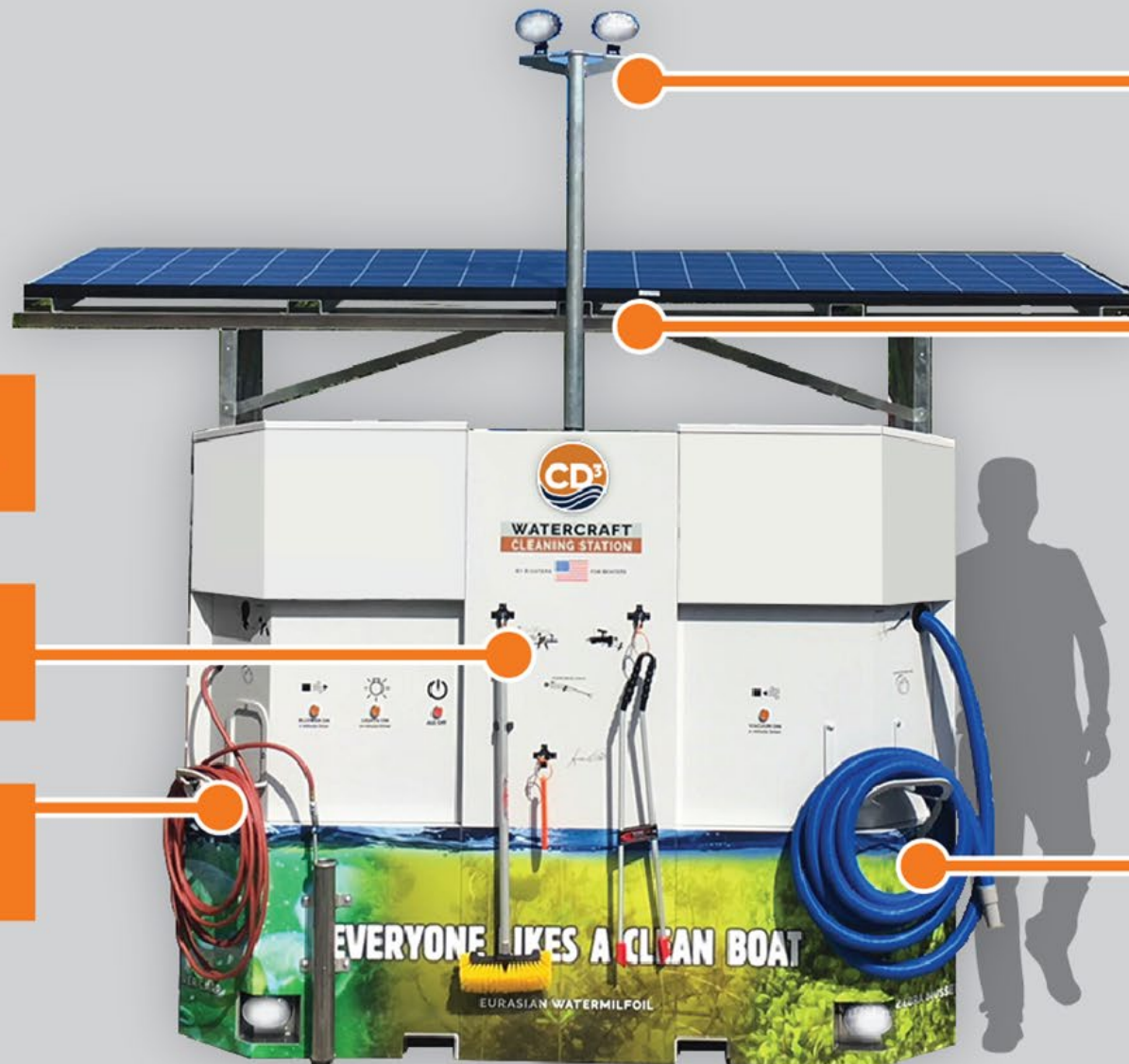
**AIR
BLOWER**

**TOP/BOTTOM
LED LIGHTS**

**OFF-GRID
SOLAR POWER**

**EDUCATIONAL
KIOSK AND
DECALS**

**WET/DRY
VACUUM**



Model Options



Outpost

Wayside

Model Options



Station

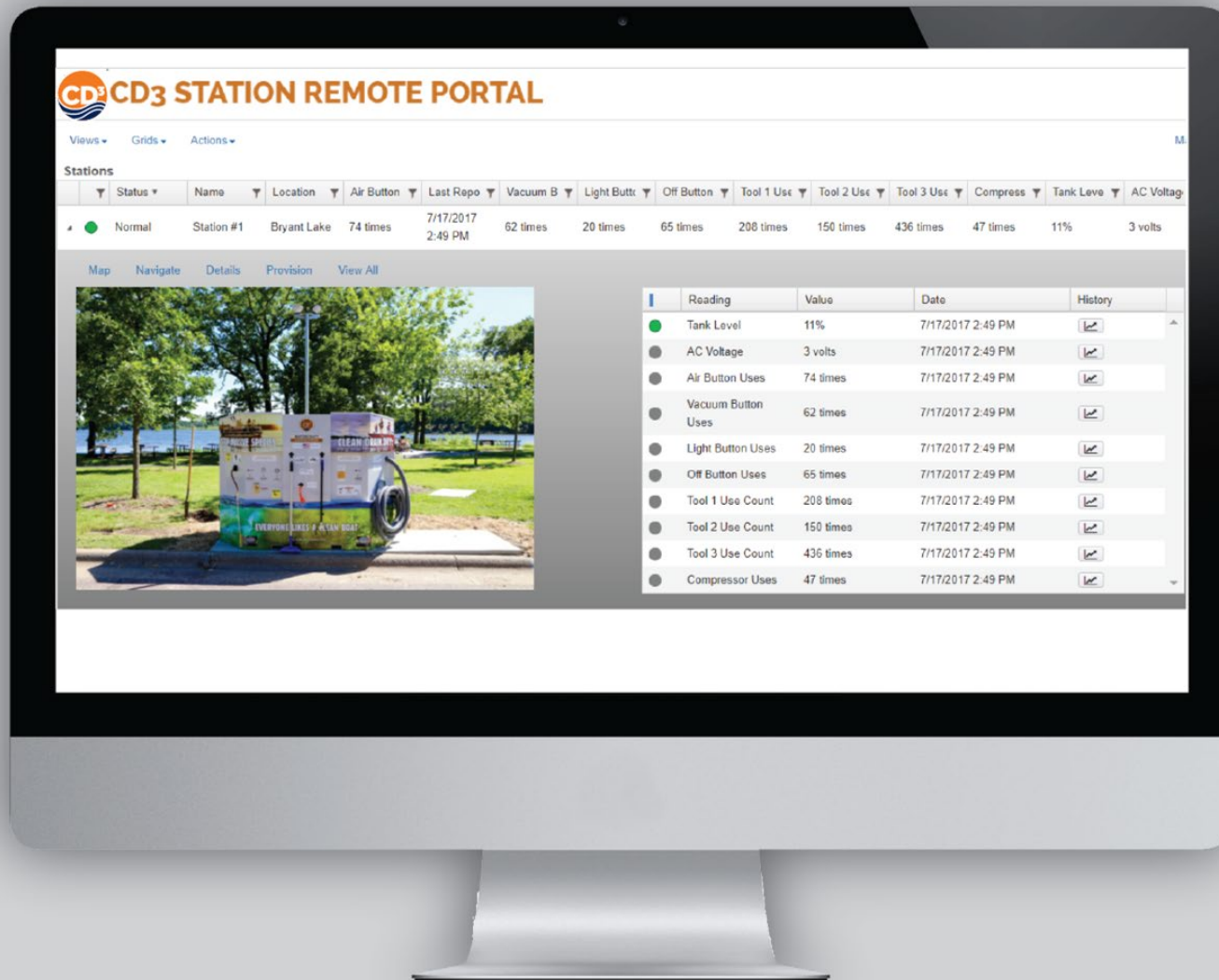


Trailer

Installation of Infrastructure

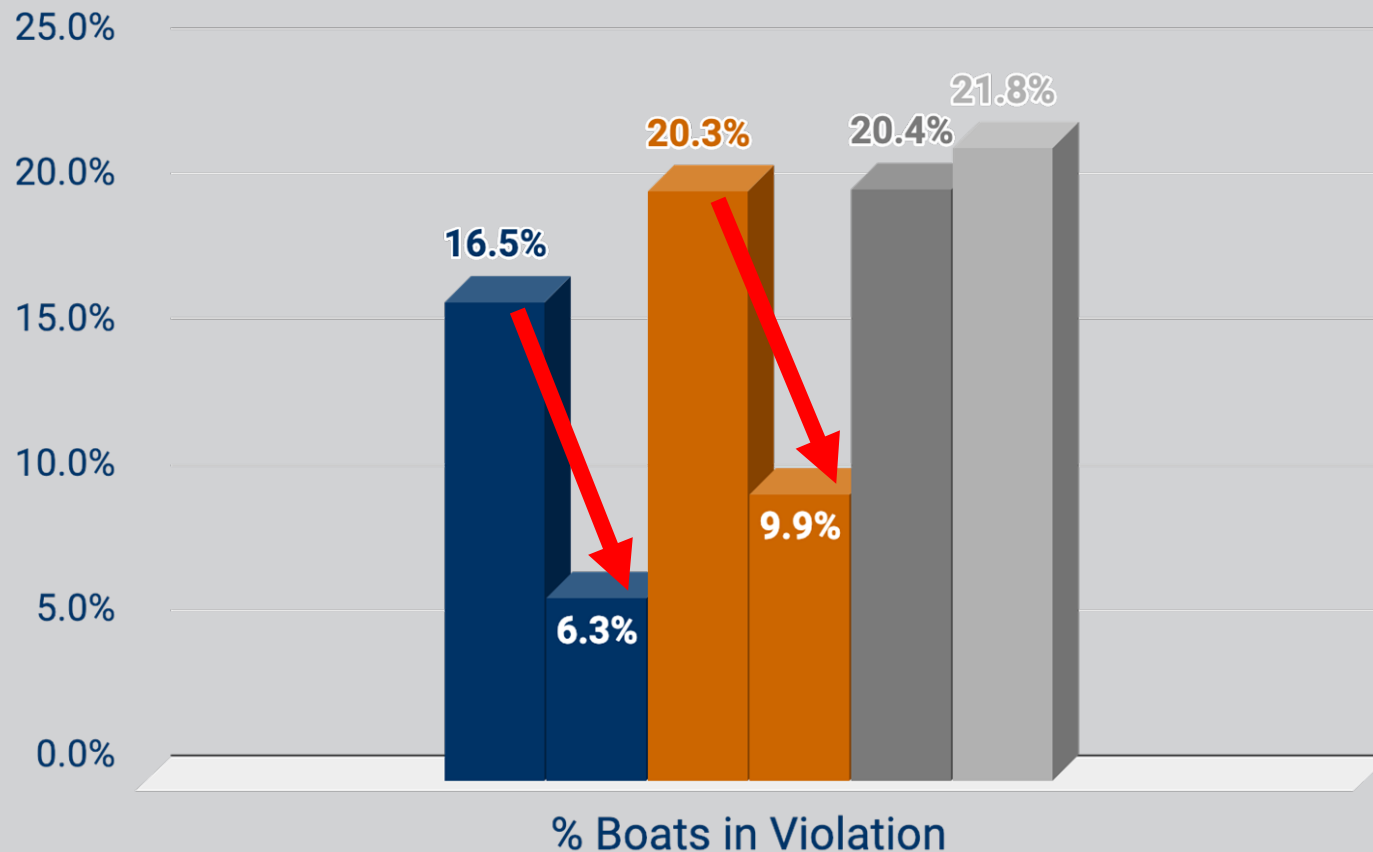


Online Data Platform



www.MyCD3Station.com

Real Results - 3 Years of Data



**CD³ SYSTEMS FACILITATE A
70% DECREASE
IN AIS VIOLATIONS**

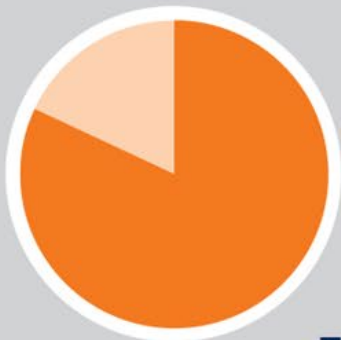
Public Use Research Data



**BOATERS USE CD3
EVEN WHEN
DNR INSPECTORS
ARE NOT PRESENT**



78%
RATED CD3 SYSTEMS AS
**'EASY' OR
'VERY EASY'**
TO USE



82%
SAID IT WAS
**'LIKELY' OR
'VERY LIKELY'**
THEY'D USE CD3 SYSTEMS AGAIN



678
**USES/MONTH/SYSTEM
IN '17-'18 PILOT**

Public Use Research Data



100%

**RESIDUAL H₂O
REMOVED FROM
LIVWELL**



**AUTOMATIC METRICS AND
MAINTENANCE ALERTS**



**LOW OPERATIONS AND
MAINTENANCE COSTS**

**DESIGNED TO REDUCE
THEFT AND VANDALISM**



Public Use: Online Tools



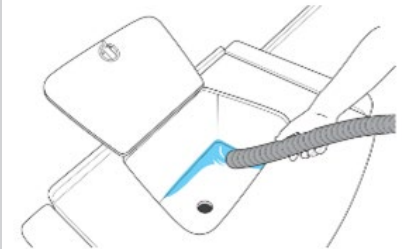
www.StopAIS.com



Clean off trailer



Suck out all water in boat



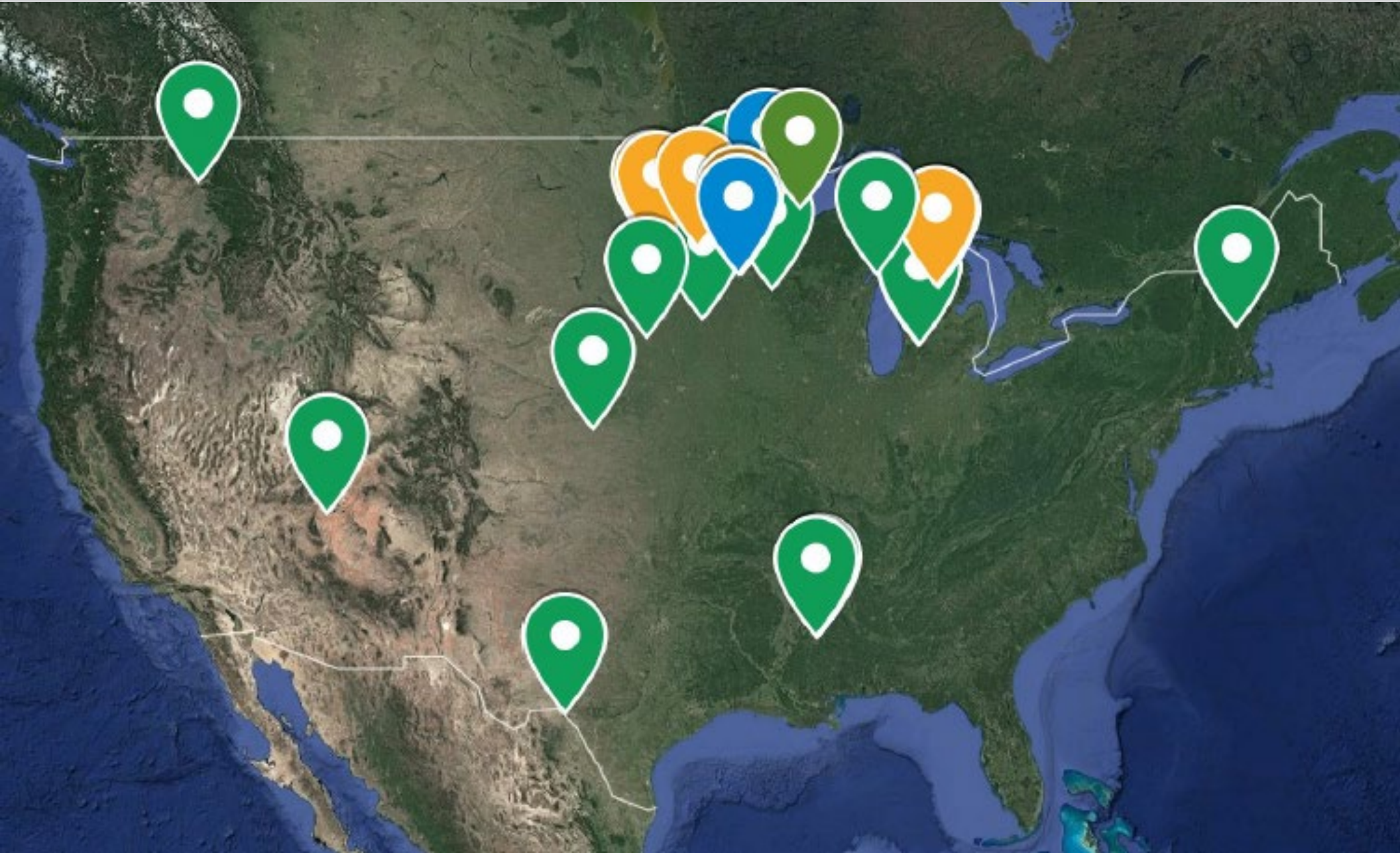
Check for zebra mussels



Public Use: LAKE WIFI



Locations in USA



Summary



Empowering the public to take ACTION

Science of Compliance



Plan
to
Act



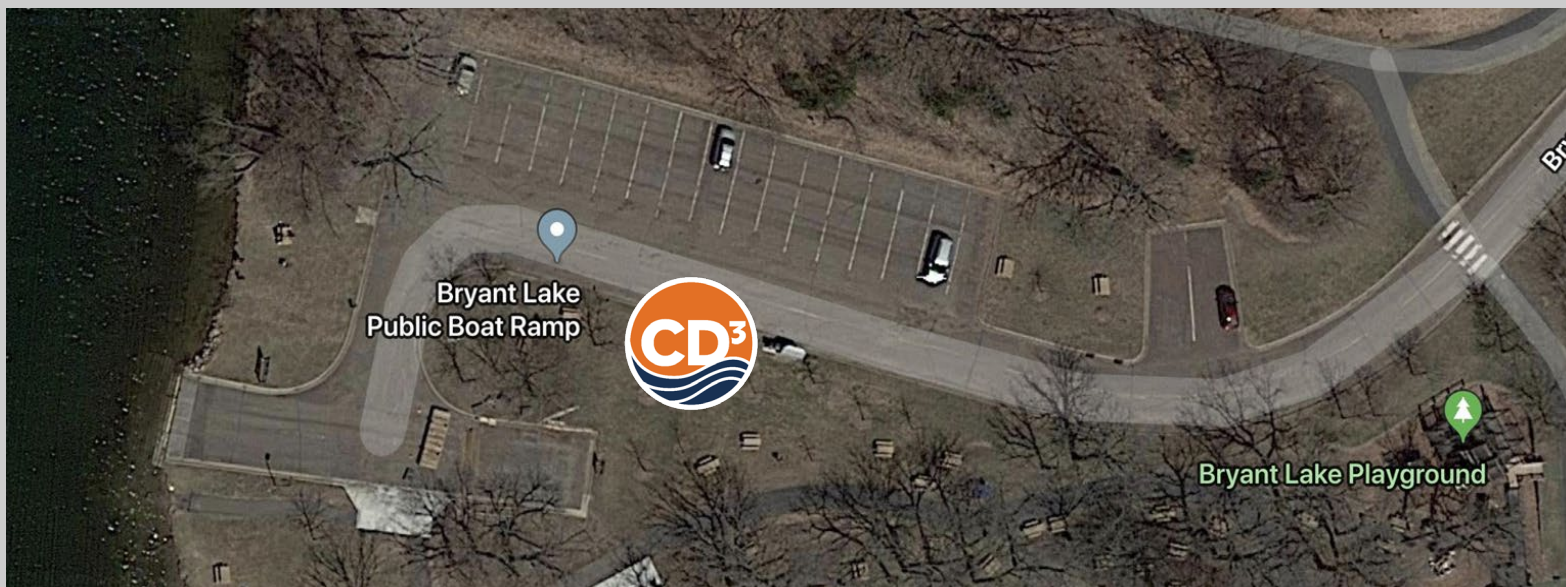
Everybody Likes a Clean Boat

Ed Rudberg, PhD., CEO

ed@cd3station.com

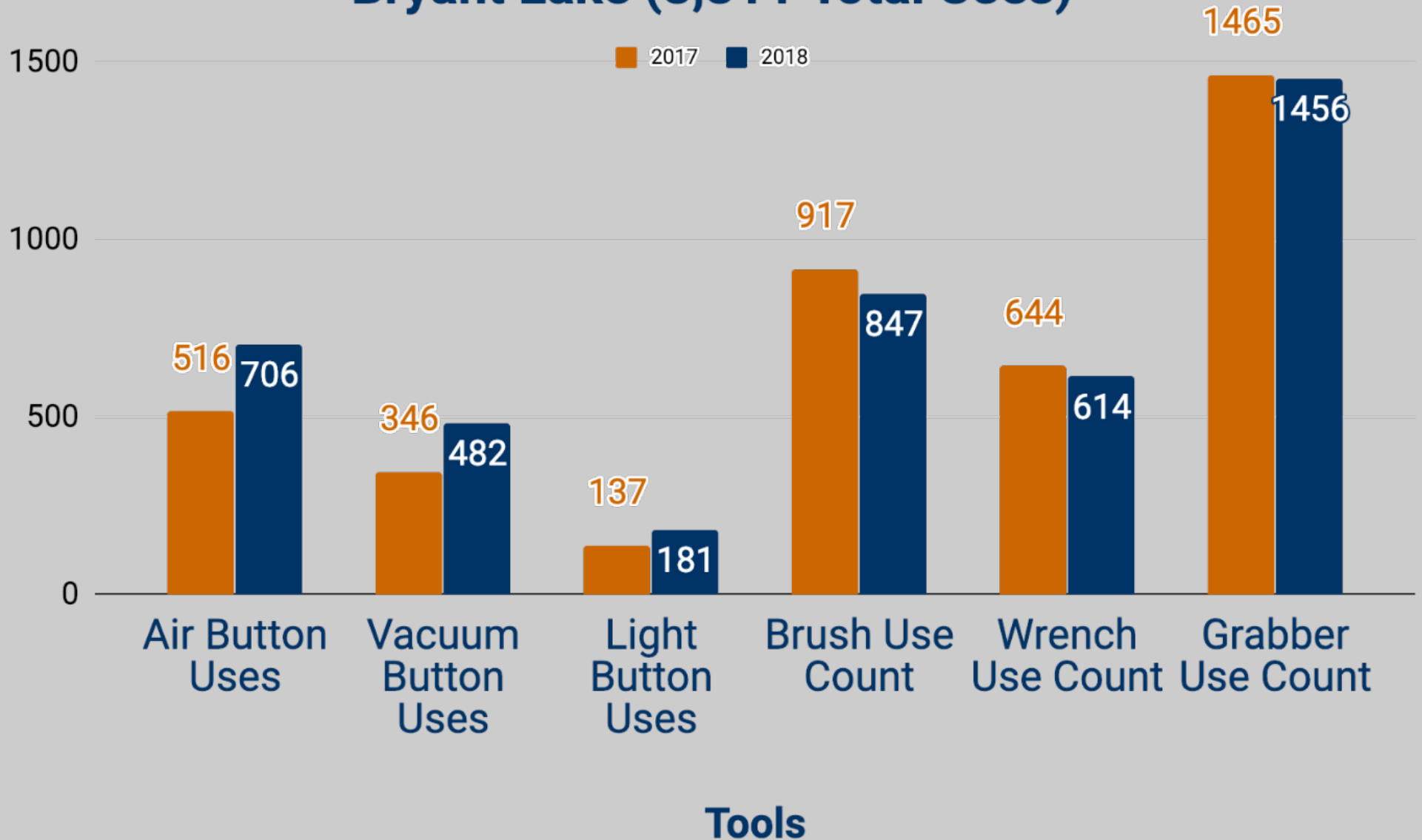
612-414-0961

www.cd3station.com



Bryant Lake

Bryant Lake (8,311 Total Uses)

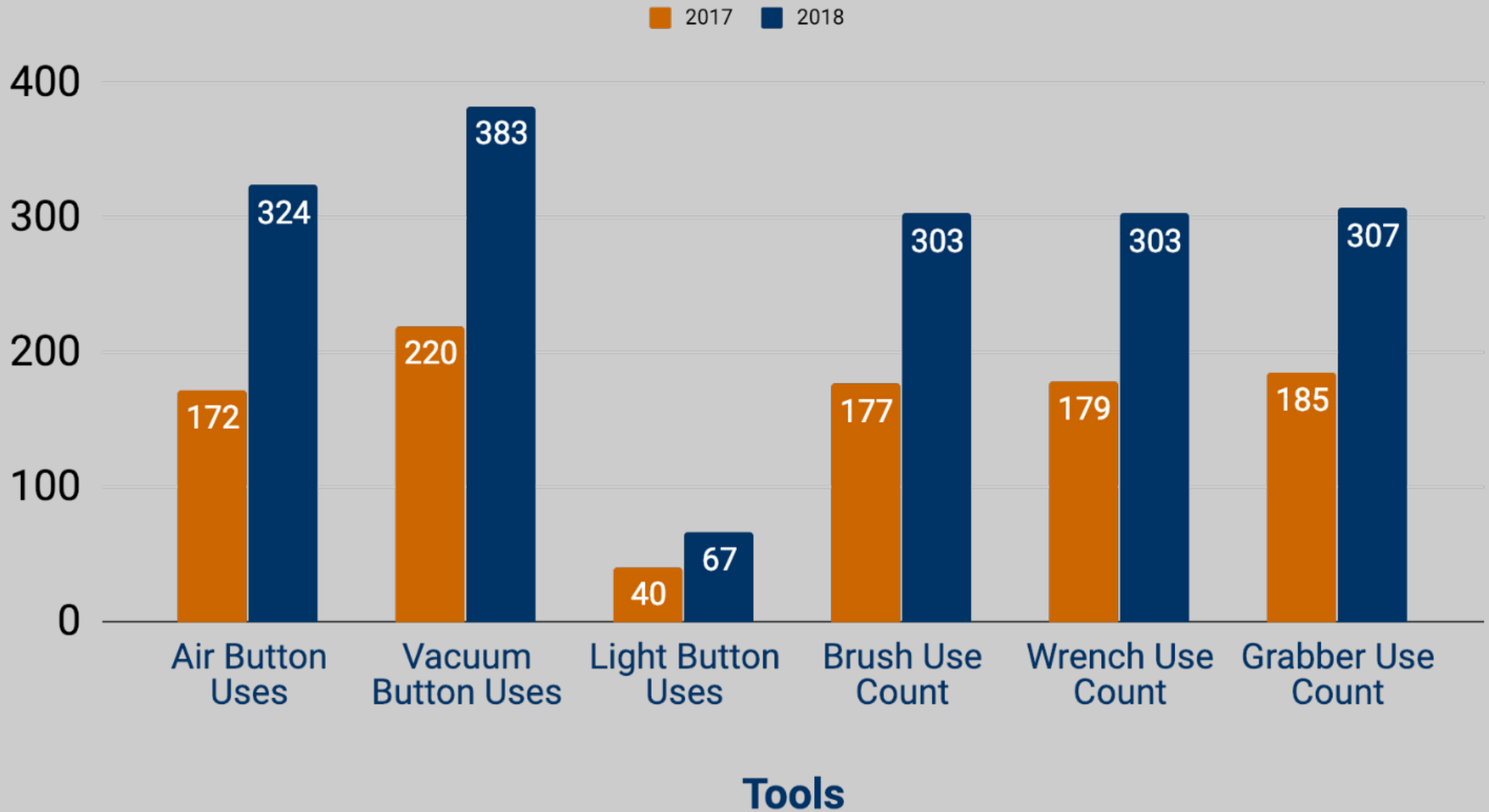


Results: Bryant

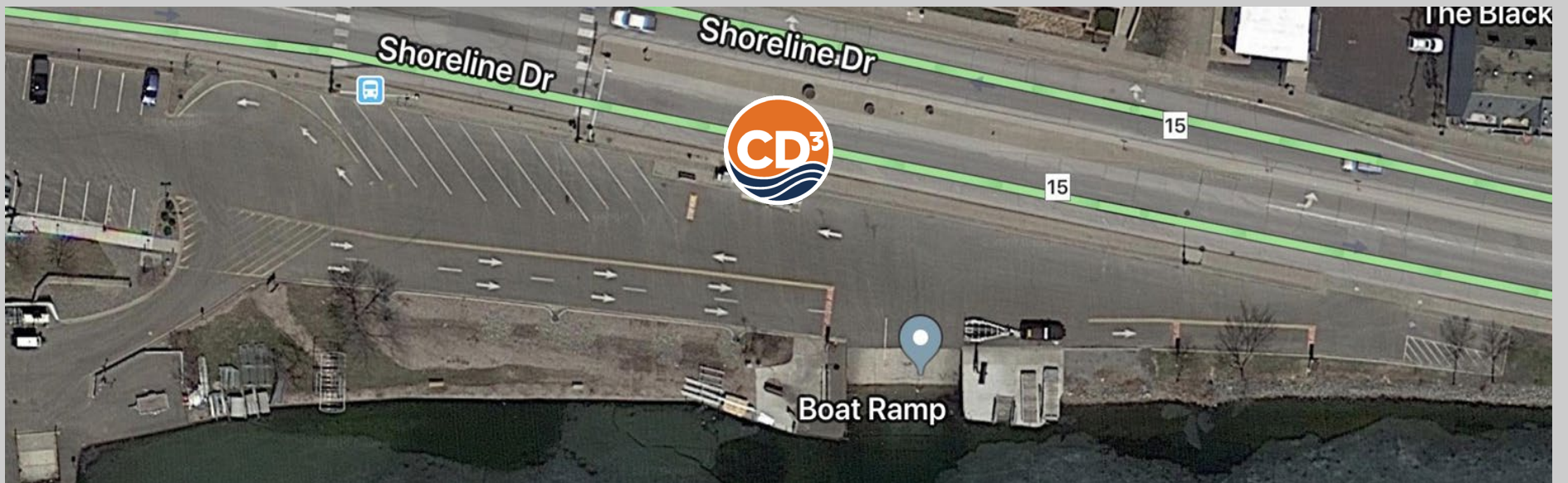


Pike Lake

Pike Lake (2,660 Total Uses)

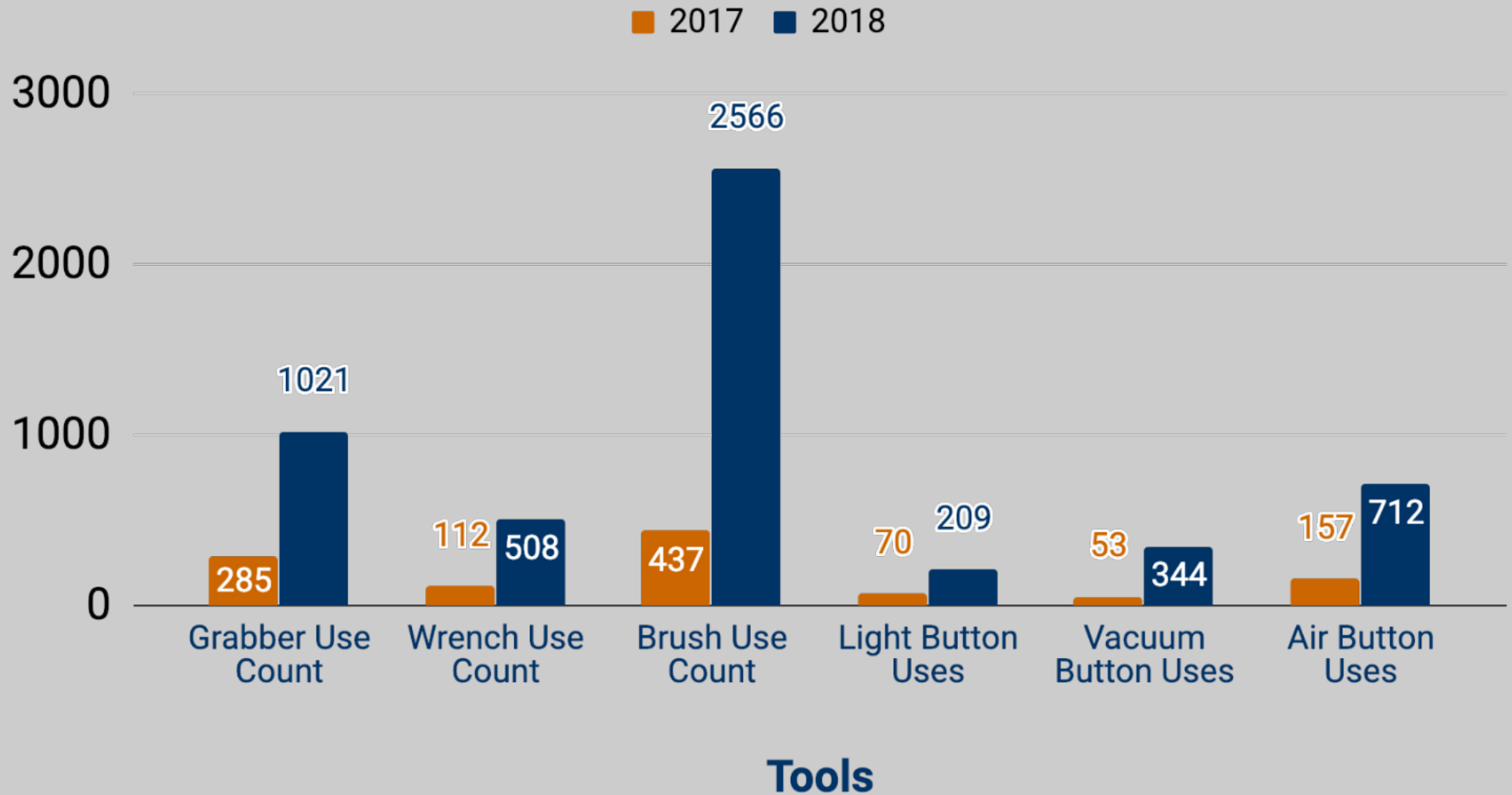


Results: Pike



Spring Bay

Spring Park (6,474 Total Uses)

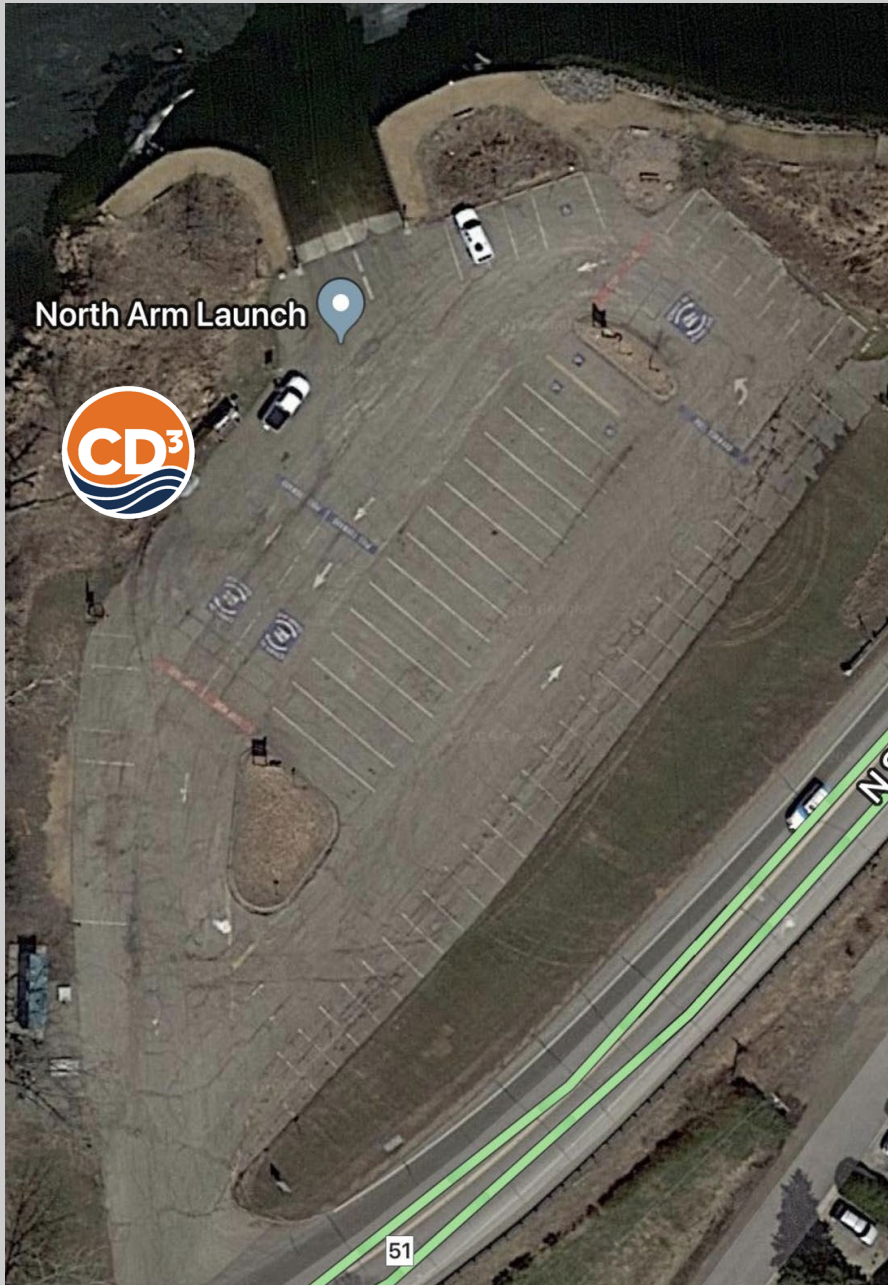


Results: Spring



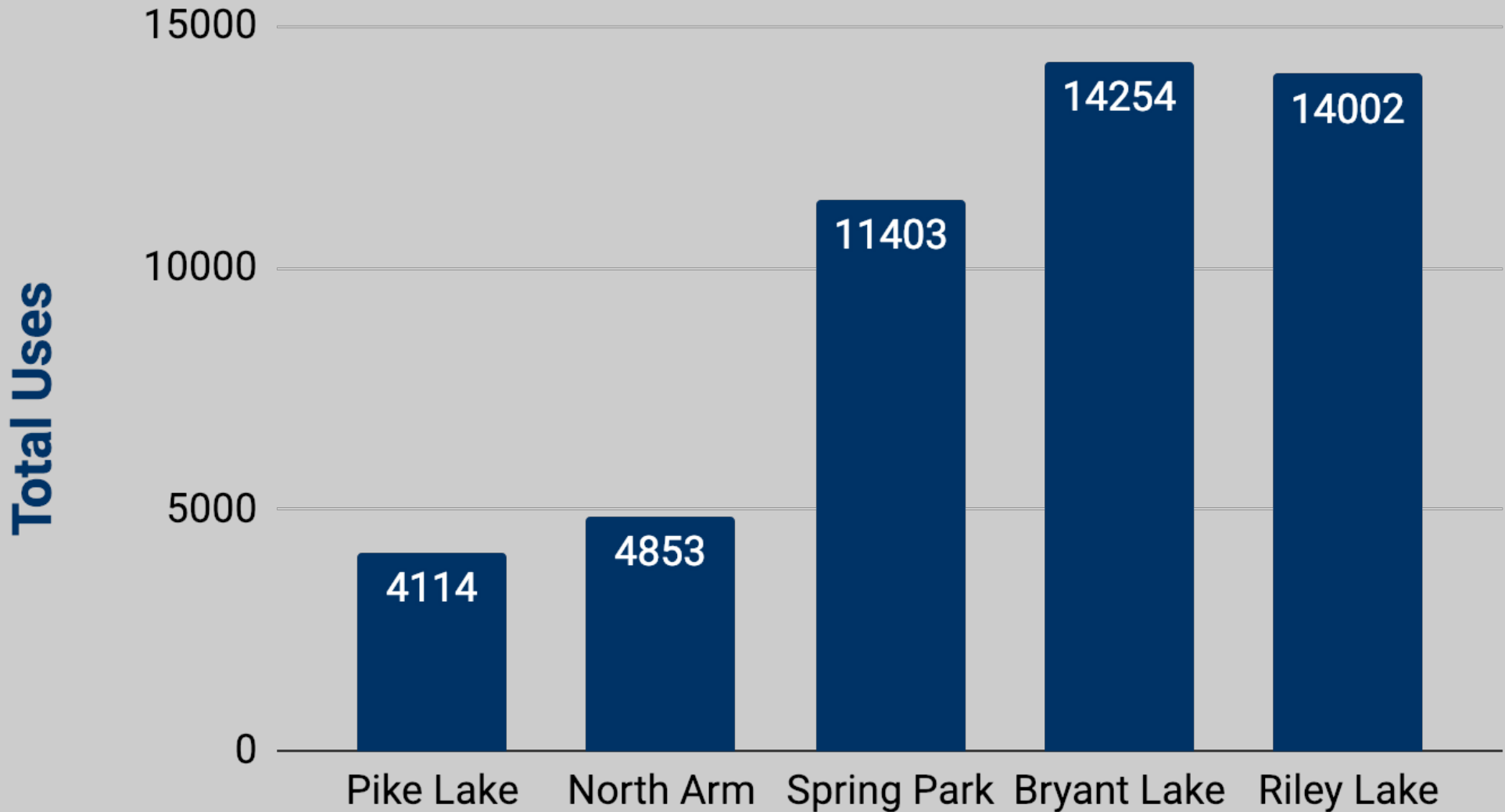
Lake Riley

Copyright 2018



North Arm Launch

Total Uses for 2017-2018 Pilot



28,487+ Uses

Over 2016-2018, discreet observation of the AIS prevention behaviors boaters taken at CD3 public accesses when Minnesota DNR inspectors were *not present*.

Three Rivers Park District:

500 hours observing watercraft use patterns around CD3 cleaning stations at Bryant Lake, Riley Lake, and Lake Minnetonka's launches at North Arm and Spring Park Bay.

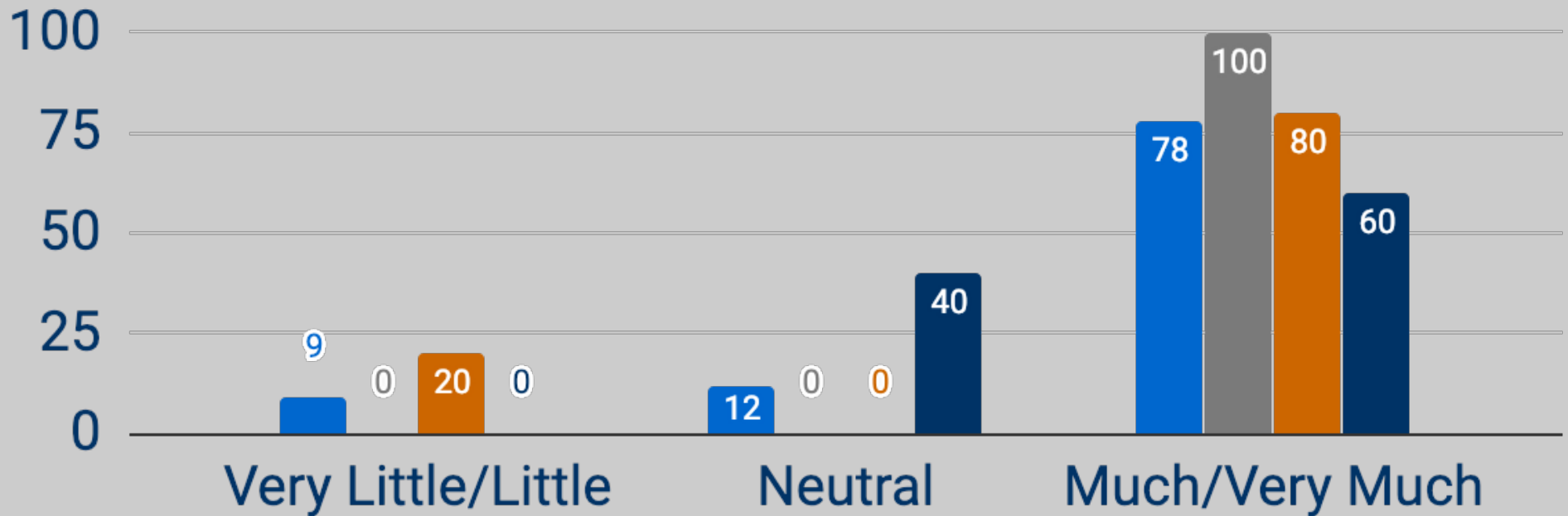
Minnesota Invasive Species Research Center (MAISRC)

Effectiveness of a CD3 vacuum for removing residual water from 3 boat types recreational boats by the public.

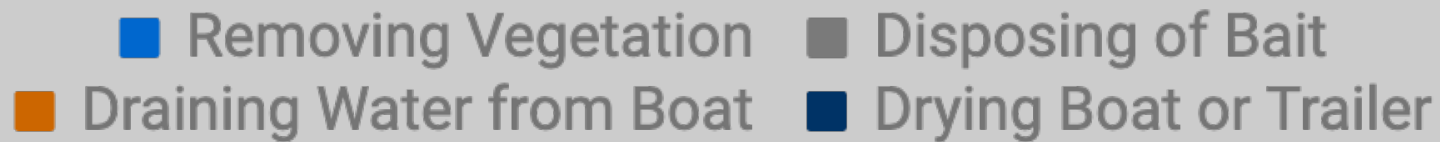


3rd Party Research

Percentage of Respondents



Tasks



*Source: Three Rivers Park District 2019 Survey



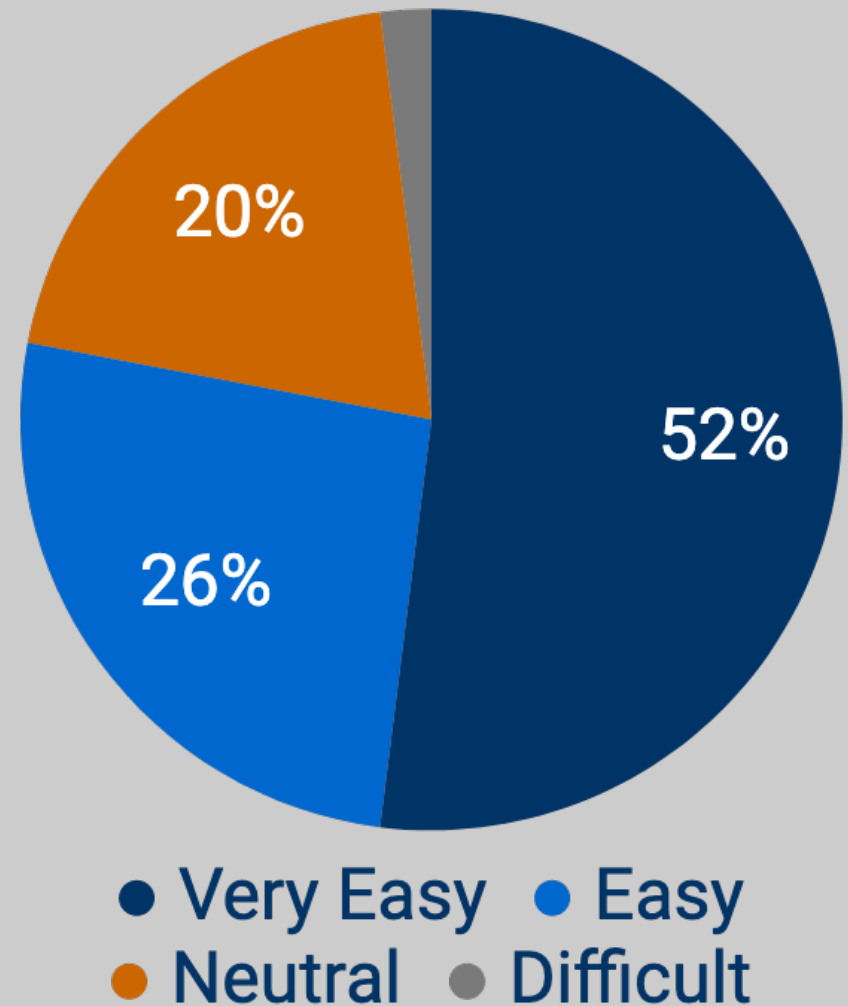
Helpfulness of CD3 in

What if anything was difficult?

- “Nothing” (plurality)
- “The vacuum sucked up my plug.”

What if anything was easy?

- “I find the entire station easy to use”
- “Everything”



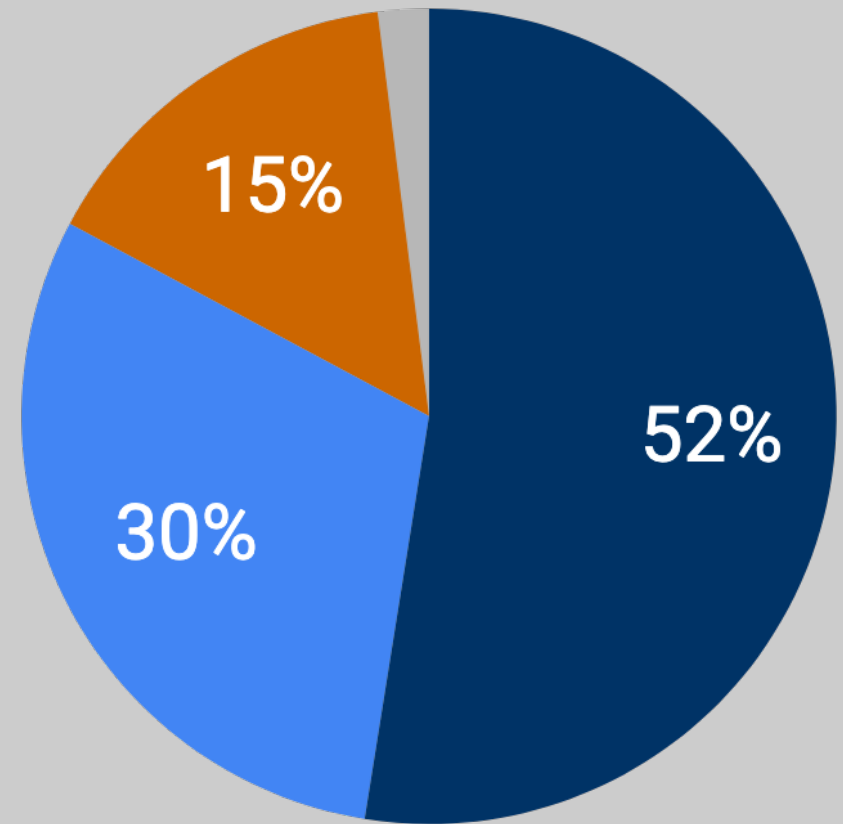
*Source: Three Rivers Park District 2019 Survey



Ease of Use of CD3

Likely to use:

- “Like to keep boat clean”
- “Easier than using your hands”
- “No reason not to”
- “Don’t want to spread AIS”

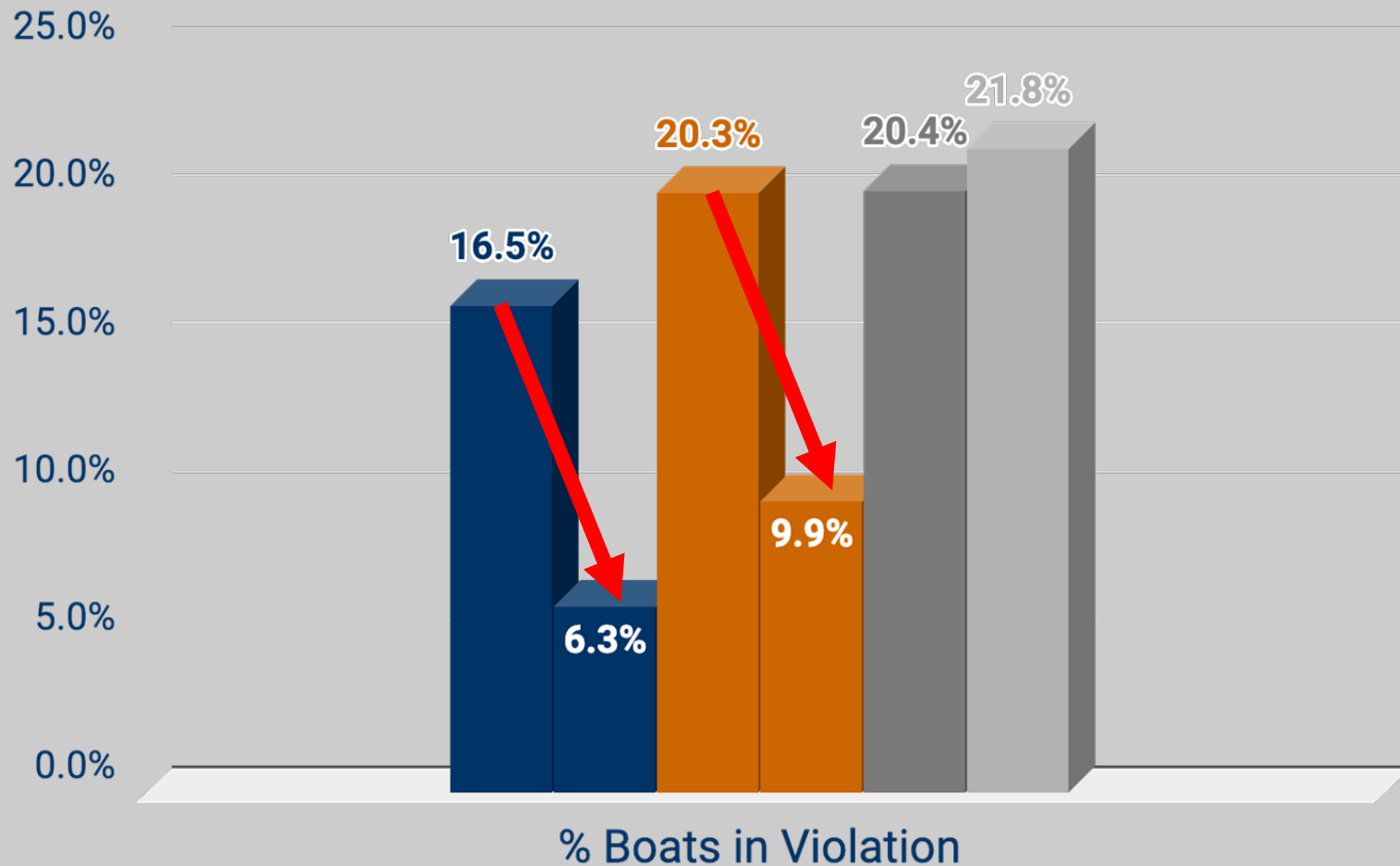


- Very Likely
- Likely
- Unsure
- Very Unlikely

*Source: Three Rivers Park District 2019 Survey



Future Use?



■ Spring Park (2017) ■ Spring Park (2018) ■ Long Lake (Traditional)
■ Long Lake (CD3 Station) ■ Weaver Lake (Traditional) ■ Surfside (Traditional)

*Source: Three Rivers Park District 2019 Survey



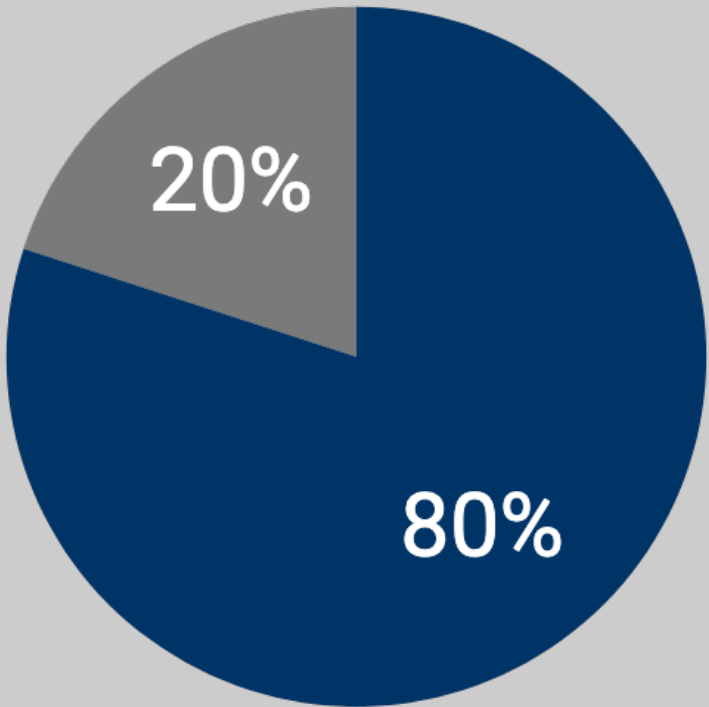
Violation Rates

**Average Percent Residual H2O
Removed from Livewell**



● Removed

**Average Percent Residual H2O
Removed from Bilge**



● Removed ● Remaining

*Source: MAISRC Research



Residual H2O Study

- CD3's need to be within 200' of launch
- Decrease in violation rates by 70+%
- Automatic metrics and maintenance alerts
- High tool use, varies by site
- Low Operations & Maintenance Costs
- No vandalism or tool theft
- High public approval on usefulness
- Public will use equipment again!



Key Takeaways

