

COUNTRY POND BRITTLE NAIAD

Mapping, Distribution and Management

Presented by

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PRESENTATION OVERVIEW

- Introduction to brittle naiad
 - Biology
 - Distribution
 - Why are we concerned?
- Brittle naiad in Country Pond and beyond
- Management options
- Next steps
- Questions/Discussion
 - *Please type questions into the Zoom chat feature, we will go through questions at the end of the talk*





HISTORY OF BRITTLE NAIAD IN COUNTRY POND

- First identified in Country Pond in 2021 when lake residents were Weed Watching and observed it and another naiad species
- Reported to NHDES for identification and verification
- Upon identification as brittle naiad, a state listed invasive, NHDES surveyed the pond by kayak and mapped the distribution of the brittle naiad

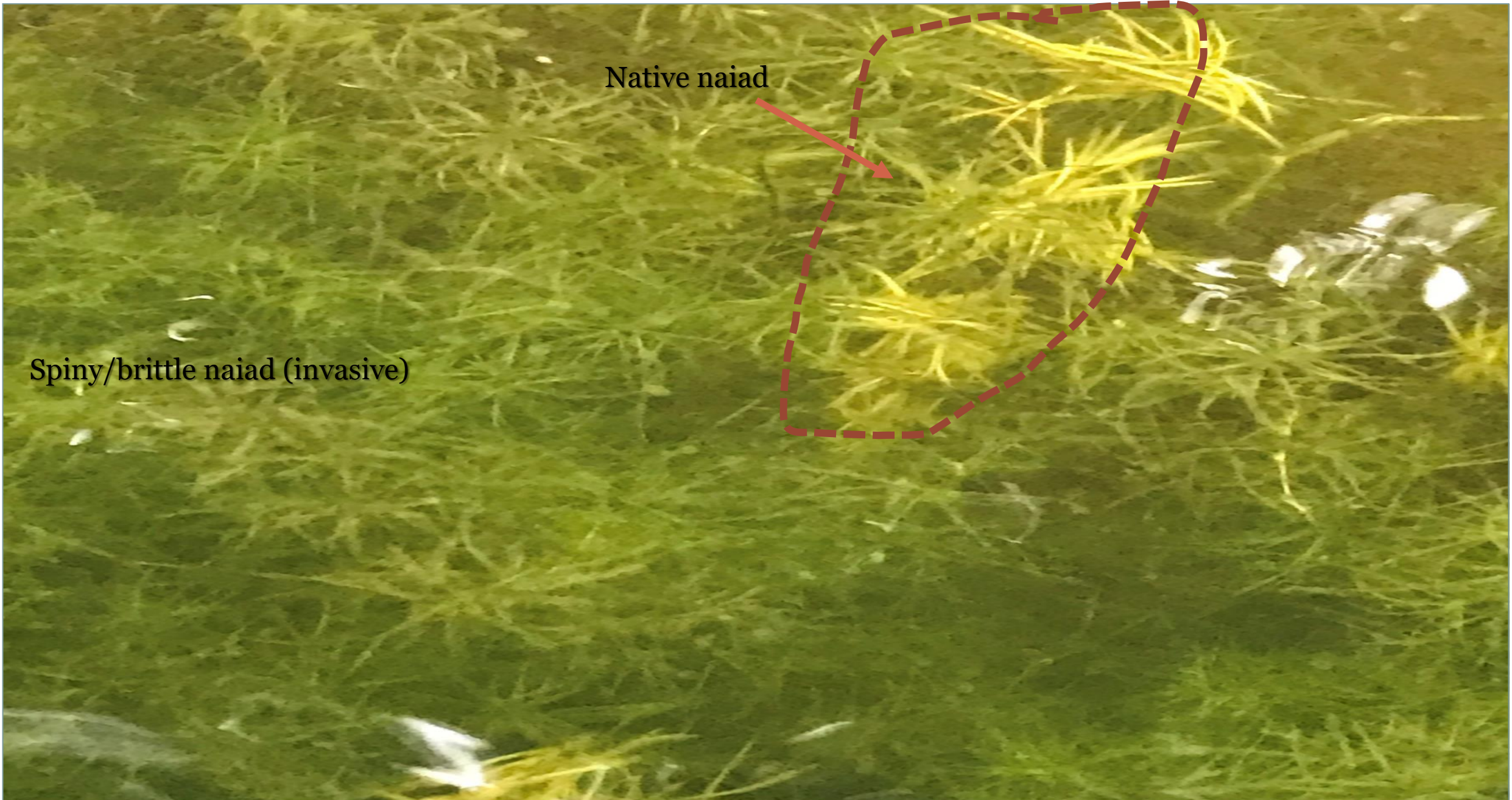
BRITTLE NAIAD OVERVIEW

- Also known as spiny naiad, minor naiad, bushy naiad, brittle water-nymph, European naiad, and other common names. Latin name is *Najas minor*.
- Annual plant
 - It will only spread by seed, not by vegetative growth
- Rooted plant, with stems/leaves wholly underwater (submersed)
- Generally a low-grower
 - Up to 3' tall, but usually 1-1.5 feet tall
- Often found in nearshore areas, less than 4' depths, though can grow deeper
- Plants start to grow in June when water temps approach 70°F
- Seeds form sometime in July, in axils of leaf (where leaf attaches to stem), and seed drop occurs in August
- Plants usually senesce (die back) by early September
- Several native naiad species that this can be confused with



Leaves often
“recurved” or
bent
backwards

Very
spiny/toothed
leaf edges



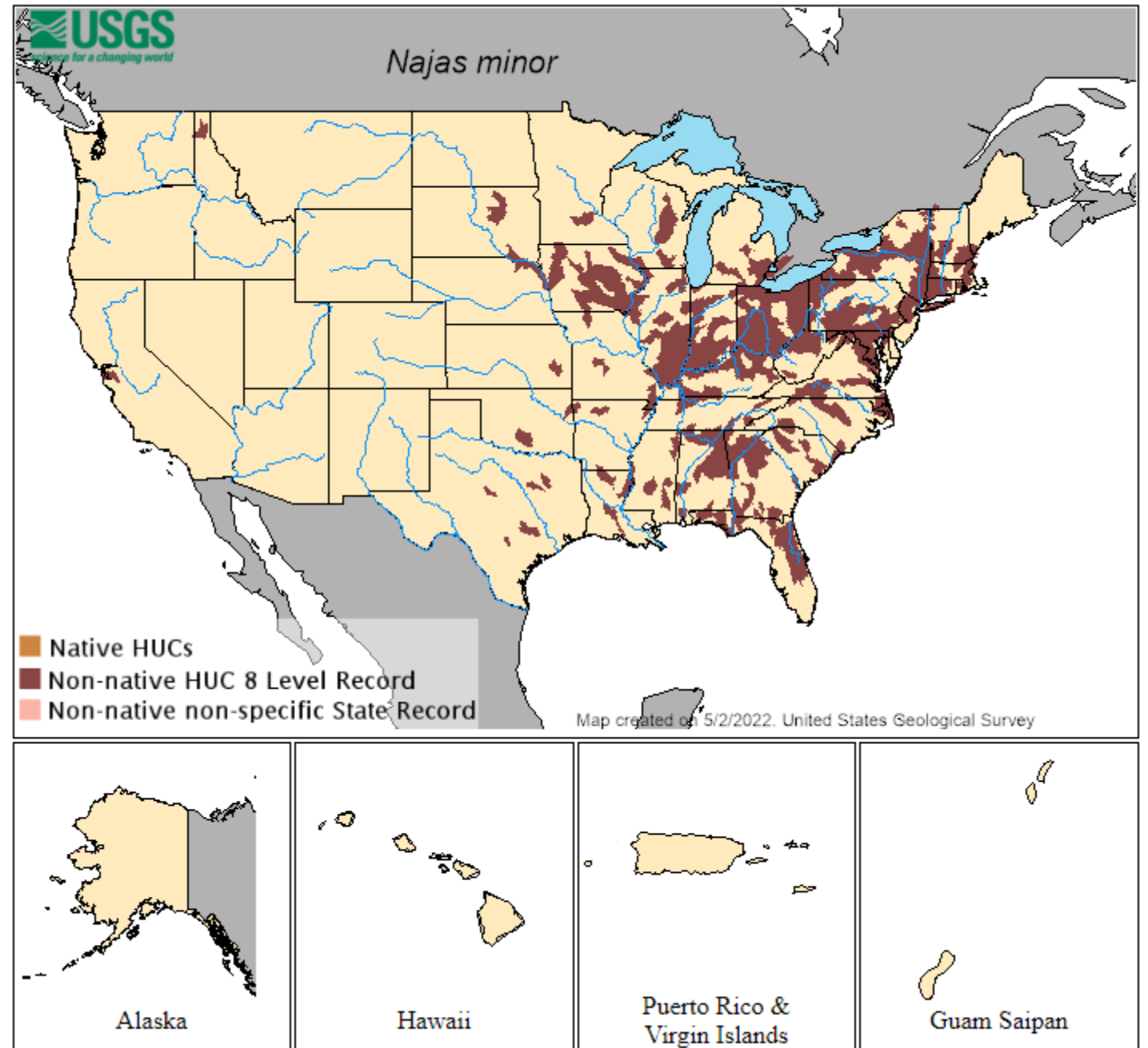
Native naiad

Spiny/brittle naiad (invasive)

DISTRIBUTION OF SPINY NAIAD

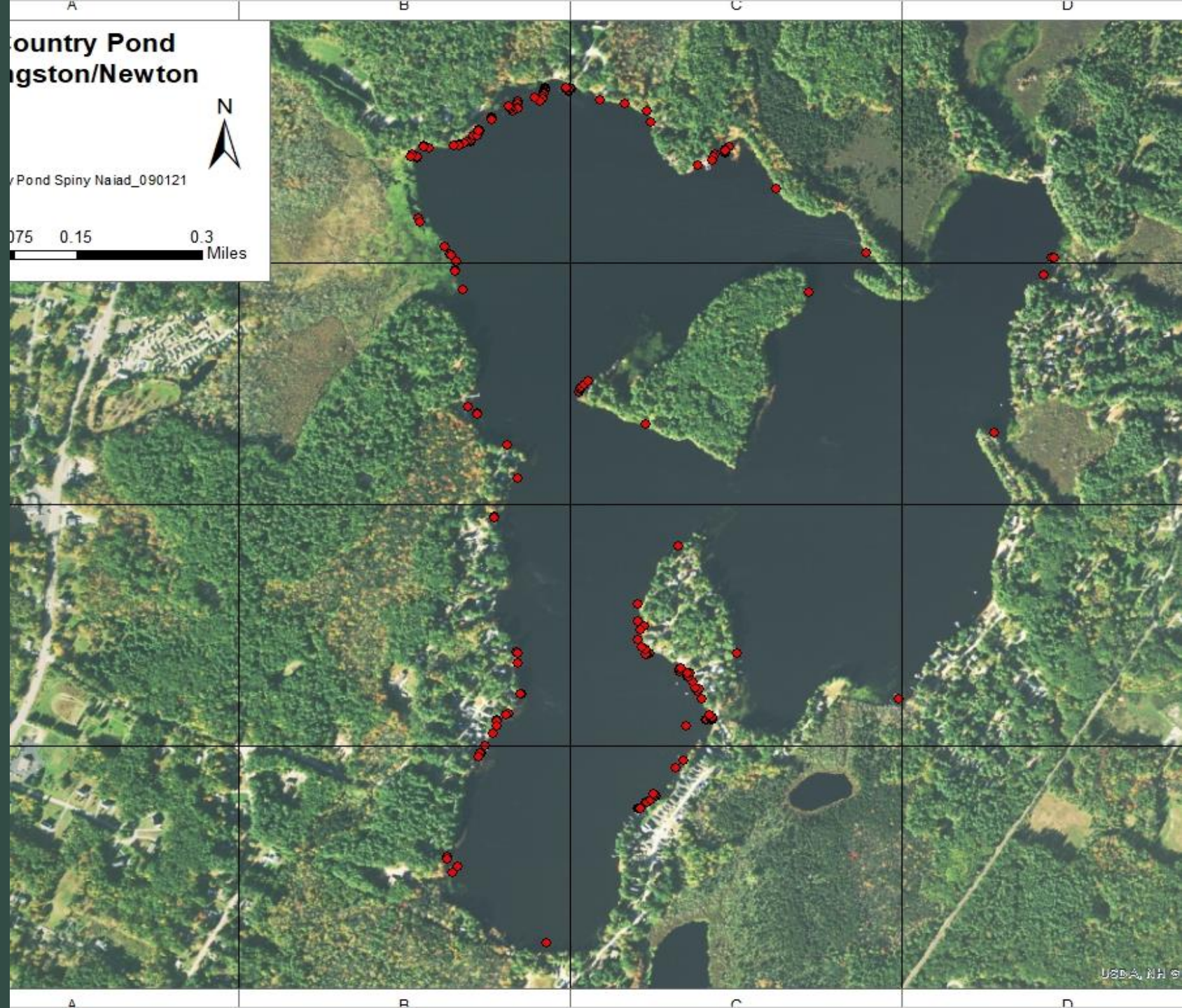
New Hampshire Populations

- In six waterbodies in NH
 - Two are actively managed
 - Milton Three Ponds System, Milton
 - Big Island Pond, Derry
 - Four are not managed because the plants come and go and have not reached high densities



BRITTLE NAIAD IN COUNTRY POND MAPPED IN SEPTEMBER 2021

*(RED DOTS SHOW
LOCATIONS OF
GROWTH, ONE DOT
CAN REPRESENT
SEVERAL PLANTS)*



WHY ARE WE CONCERNED

- New Hampshire has 29 plant species that are listed as aquatic invasive species
- We maintain this list to limit their impacts to state waters
 - Sale, purchase, propagation, transport and introduction are all prohibited
- Aquatic Invasive Species (AIS):
 - *Are non-native species that have the potential to cause ecological harm, economic harm, and/or harm to human health (from federal definition of AIS)*
 - Can displace/outcompete native species
 - Affect the designated uses of a waterbody (aquatic life use, primary contact recreation)
 - Can cause a waterbody to be listed on the federal impaired waters list

NOT TO BE CONFUSED
WITH ANOTHER NAIAD
IN COUNTRY POND...

- *Najas guadalupensis*, aka, southern naiad
- Much taller growth habit
- Has formed dense stands around shoreline areas of Country Pond (as observed in 2021)
- Plants 4-6 feet tall
- *Najas guadalupensis* is not a state-listed invasive, and it is not a plant we target for management





NAJAS MINOR
LEFT

The image shows two samples of the moss genus *Najas* against a teal background. The sample on the left, labeled *Najas minor*, consists of dark, tangled, and somewhat brittle-looking stems. The sample on the right, labeled *Najas guadalupensis*, shows more vibrant green stems with distinct, needle-like leaves. A white-bordered black box in the upper left contains the labels. A large, stylized white character is partially visible at the top of the frame.

NAJAS
GUADALUPENSIS
RIGHT

BRITTLE NAIAD MANAGEMENT OPTIONS

Physical

- Hand harvesting and/or diver-assisted suction harvesting
- Only certified Weed Control Divers are allowed to manage, *it is illegal for others to attempt management*
- Plants are brittle, so this has proven to be a challenging management option in other waterbodies

Chemical

- Aquatic herbicide treatment in July timeframe, when plants are up and growing but before seeds are formed
- Most herbicides are broad spectrum, so some native plants could be affected in the short-term
- Diquat is the aquatic herbicide that is recommended

No control

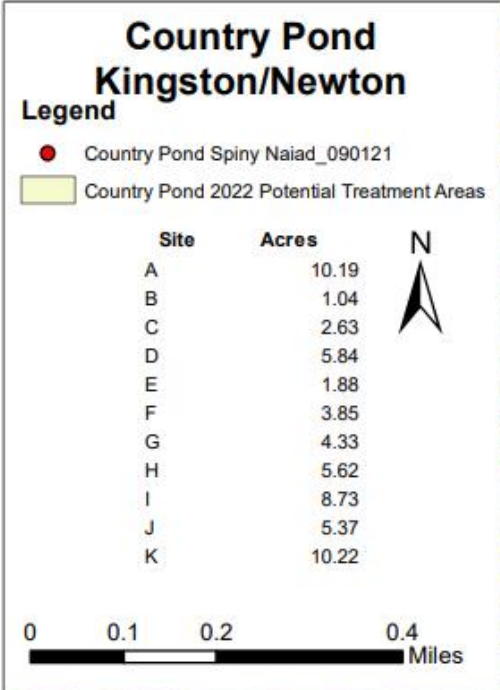
- No control actions are done, plant is allowed to reach whatever level of equilibrium is possible in the pond
- In other waterbodies the plant has boom and bust years, and that pattern may develop here

DIQUAT HERBICIDE

- Active ingredient: Diquat dibromide
- Liquid herbicide
- Applied by a licensed contractor, under a special aquatic permit
 - Applied by boat, herbicide is tank mixed on the boat with lake water, then delivered via a hose manifold via subsurface infection over treatment area
 - Sampling requirements following treatment (part of permit, done by an approved lab)
- Usually a one-day swim restriction on day of treatment
- Other uses may be restricted until herbicide concentration is below thresholds for irrigation/drinking/etc
 - If you draw off the lake and abut a treatment area you will want to avoid watering broad-leaf plants (vegetables, flowers) with lake water until herbicide concentration is below irrigation threshold
- Herbicide is quickly taken up by plants (hours), target plants usually controlled within 2-3 weeks, as they drop to bottom and decompose
- Herbicide is usually below detection limits within 2-5 days post treatment



HERBICIDE TREATMENT BID MAP



HERBICIDE TREATMENT BID NOTE

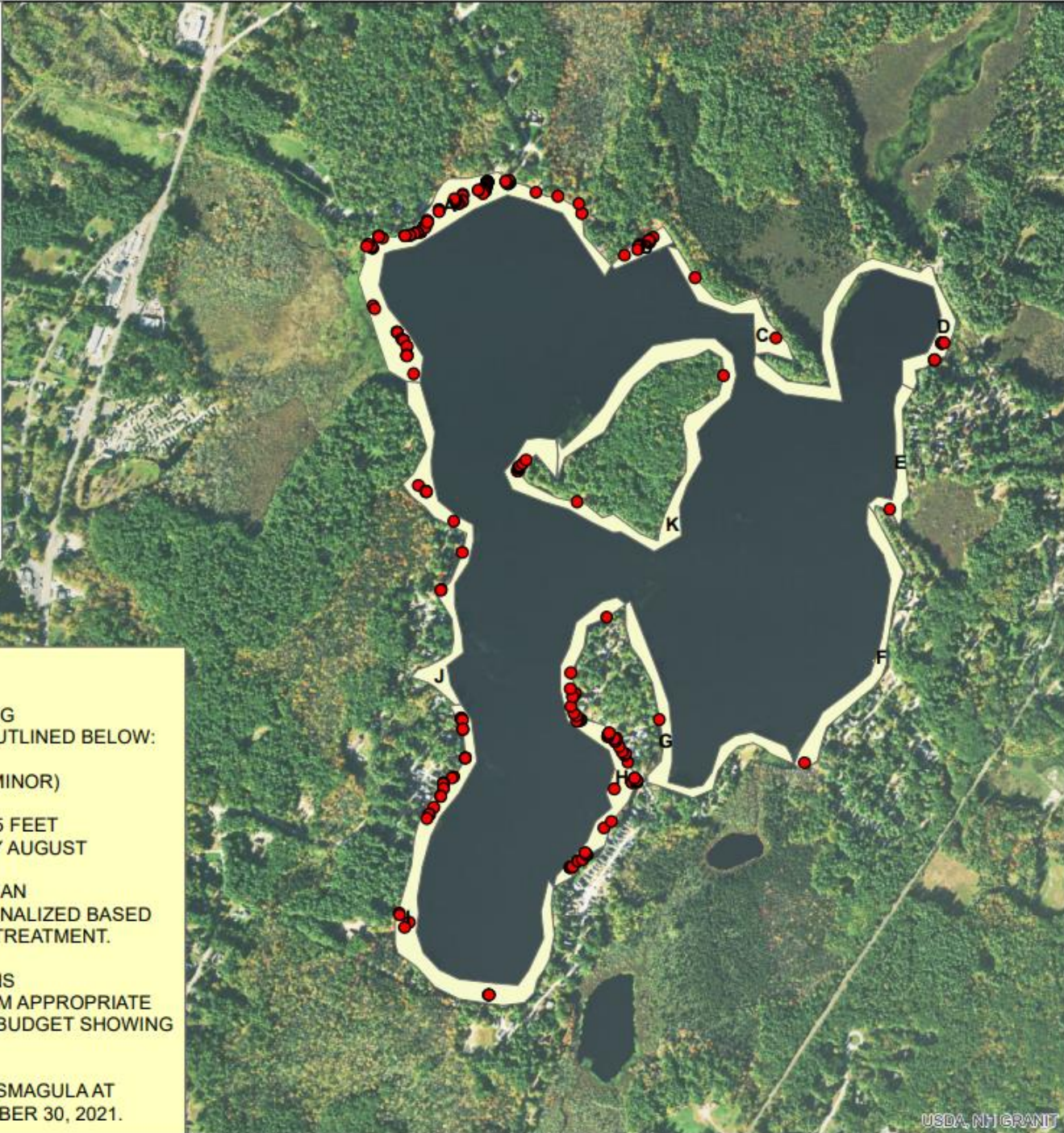
PLEASE PROVIDE A BID FOR PERFORMING
AN HERBICIDE TREATMENT IN 2022 AS OUTLINED BELOW:

TARGET SPECIES: SPINY NAIAD (NAJAS MINOR)
TREATMENT ACRES: UP TO 60 ACRES
MEAN DEPTH OF TREATMENT AREAS: 3.5 FEET
TREATMENT DETAIL: MID JULY OR EARLY AUGUST

TREATMENT AREAS MAY BE SMALLER THAN
THE FOOTPRINT SHOWN, AND WILL BE FINALIZED BASED
ON FIELD SURVEYS 3 WEEKS PRIOR TO TREATMENT.

PLEASE PROVIDE ANY PRODUCT OPTIONS
AND APPLICATION RATES THAT YOU DEEM APPROPRIATE
FOR THIS SITE, AS WELL AS A LINE-ITEM BUDGET SHOWING
PROJECTED COSTS.

BIDS ARE DUE AT NHDES, CARE OF AMY SMAGULA AT
AMY.SMAGULA@DES.NH.GOV BY NOVEMBER 30, 2021.



BRITTLE NAIAD MANAGEMENT IN OTHER STATES

- Not a really active management program for this species in other states
- It is present in other states, but because it is a generally low-grower, it is not one that has come to be an obvious problem in many waterbodies, necessitating management

PROGNOSIS FOR BRITTLE NAIAD IN COUNTRY POND

- Unfortunately, it's hard to say
 - It could come and go with boom and bust cycles
 - It could disappear
 - It could ring the pond in a few years in the shallows and be a low-growing understory in the lake
 - We don't have a lot of great examples of management from other states, and there is not much research on this plant species
- Management is not a guarantee
 - Has been a challenge to manage and reduce in the lakes we are managing
 - Both lakes are persisting in their management efforts, but we may scale back if we are not seeing measureable reductions in this plant
 - Eradication for any invasive species is not a given, and we rarely use that term
 - All invasive species usually require long-term management at some level, though usually infestations decline over time and minimal management is needed to sustain low densities/distributions (i.e., milfoils, fanwort, others).

TIMELINE AND FUNDING

- NHDES will take lead on planning and paying for the herbicide treatment in 2022, if it goes forward
- Funding is secured for 2022
 - Project cost is \$21,940 to treat up to 60 acres of brittle naiad in July
 - In the future it will be a cost share with local entities if additional management is needed/wanted (state grant funds between 25-50% of project costs)
- The permitting process has not yet begun
 - NHDES needs to sign contract with vendor to initiate permit application and planning process
 - A decision to treat needs to be made within a week to two to put the process in place, or we lose our window for 2022

QUESTIONS/DISCUSSION

1

Please type your questions
into the Zoom chat

2

We will go down the list of
questions and provide answers
to each question



THANK YOU!

Amy Smagula, NH Department of Environmental Services

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