Aquatic Invasive Species (AIS) in South Dakota

AIS Known to Exist in South Dakota

Fish	Plants	Invertebrates
Western mosquitofish	Brittle naiad	Rusty crayfish
European rudd	Curly pondweed	Red swamp crayfish
Common carp	Didymo (rock snot)	Asian clam
Grass carp	Eurasian water-milfoil	Red-rimmed melania
Bighead carp	Purple loosestrife	Zebra mussel
Silver carp	Flowering rush	New Zealand mud snail
Jack-Dempsey cichlid	Common reed	

AIS Fish

Invasive Carps

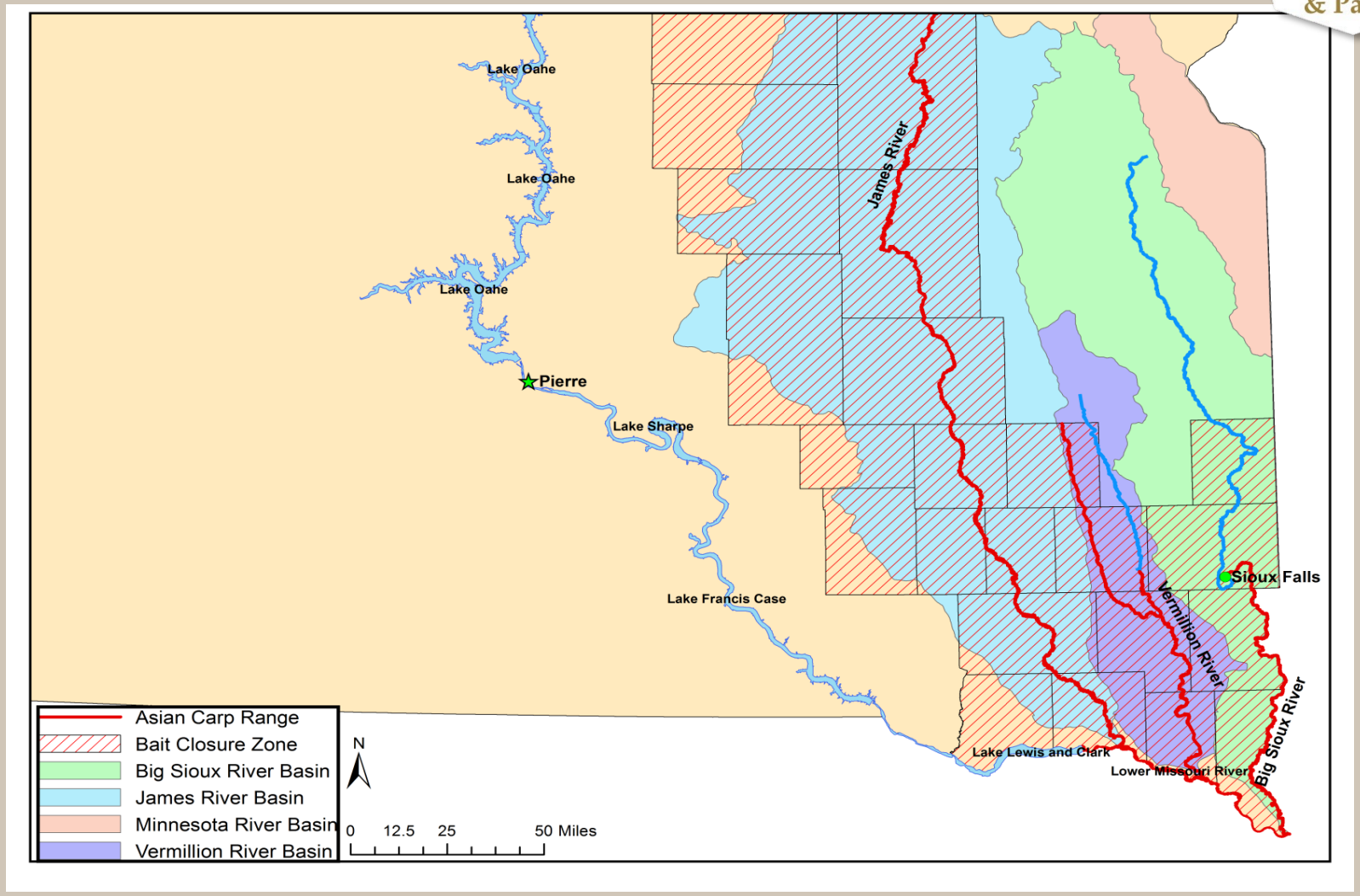
Silver Carp

- Maximum Size
  - 40”
  - 60 lbs
- Multiple spawns/year
- Feed on zooplankton

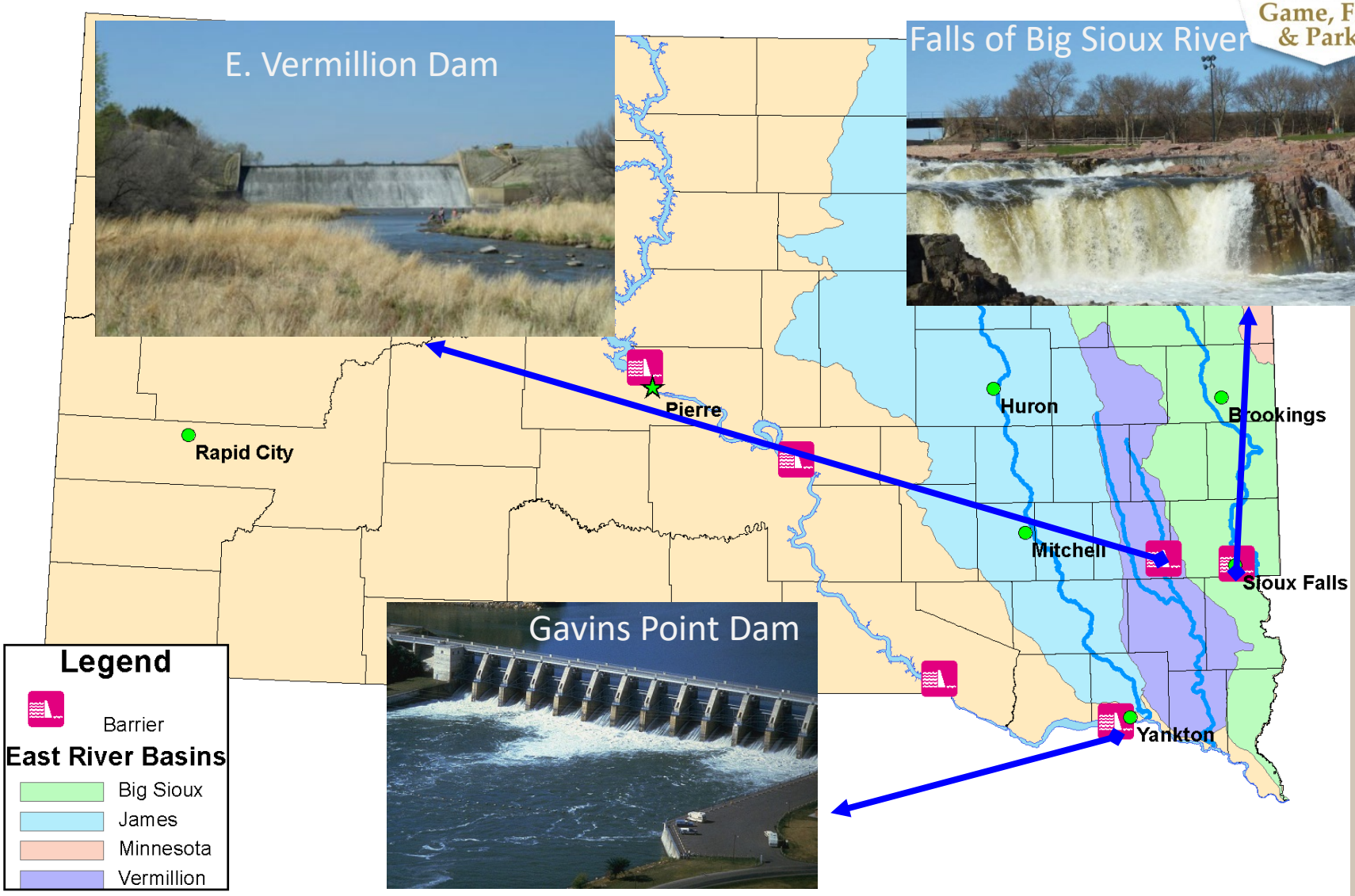
Bighead Carp

- Maximum Size
  - 55”
  - 90 lbs.
- Multiple spawns/year
- Feed on phytoplankton

Known Bigheaded Carp Range



What has limited their spread?



AIS Plants

AIS Plants

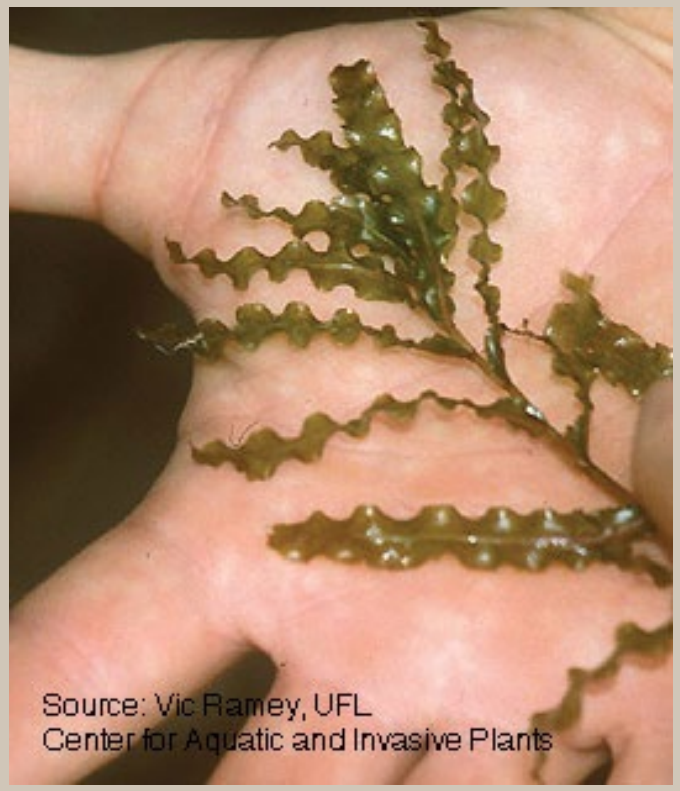
- Grow extremely fast
- Out-compete native plants
- Form dense mats
- Tangle in propellers
- Makes fishing difficult
- Decrease dissolved oxygen during decay

Eurasian watermilfoil

- Known Infested Waters
  - Lake Oahe
  - Lake Sharpe
  - Lake Francis Case
  - Lewis and Clark Lake

Curly-Leaf Pondweed

- Known Infested Waters:
  - Angostura Reservoir
  - Big Stone Lake
  - Blue Dog
  - Dakota
  - Herrick
  - Hurley
  - Canyon Lake
  - Lake Alice
  - Lake Mitchell
  - Lake Oahe
  - Lake Sharpe
  - Lewis and Clark
  - Nelson
  - Pickerel
  - Rapid Creek
  - Rahn
  - Roosevelt
  - Roy Lake
  - Sheridan Lake
  - Stockade Lake
  - Traverse
  - Yankton



AIS Invertebrates

Zebra Mussels

- Size
  - Up to 1.5”
- Color
  - Alternating dark and light bands
- Shape
  - Triangular or “D” shaped
  - Sharply pointed hinge
- Filter a quart of water/day

How do they spread?

- Larval stage called veligers
  - Microscopic
  - Transported in boats holding lake water
    - Ballast tanks (wakeboard boats)
    - Livewells
    - Bait buckets
  - Can survive up to 2 weeks without food

- Adults attach to hard surfaces
  - Boats, pontoons, docks, rocks etc.

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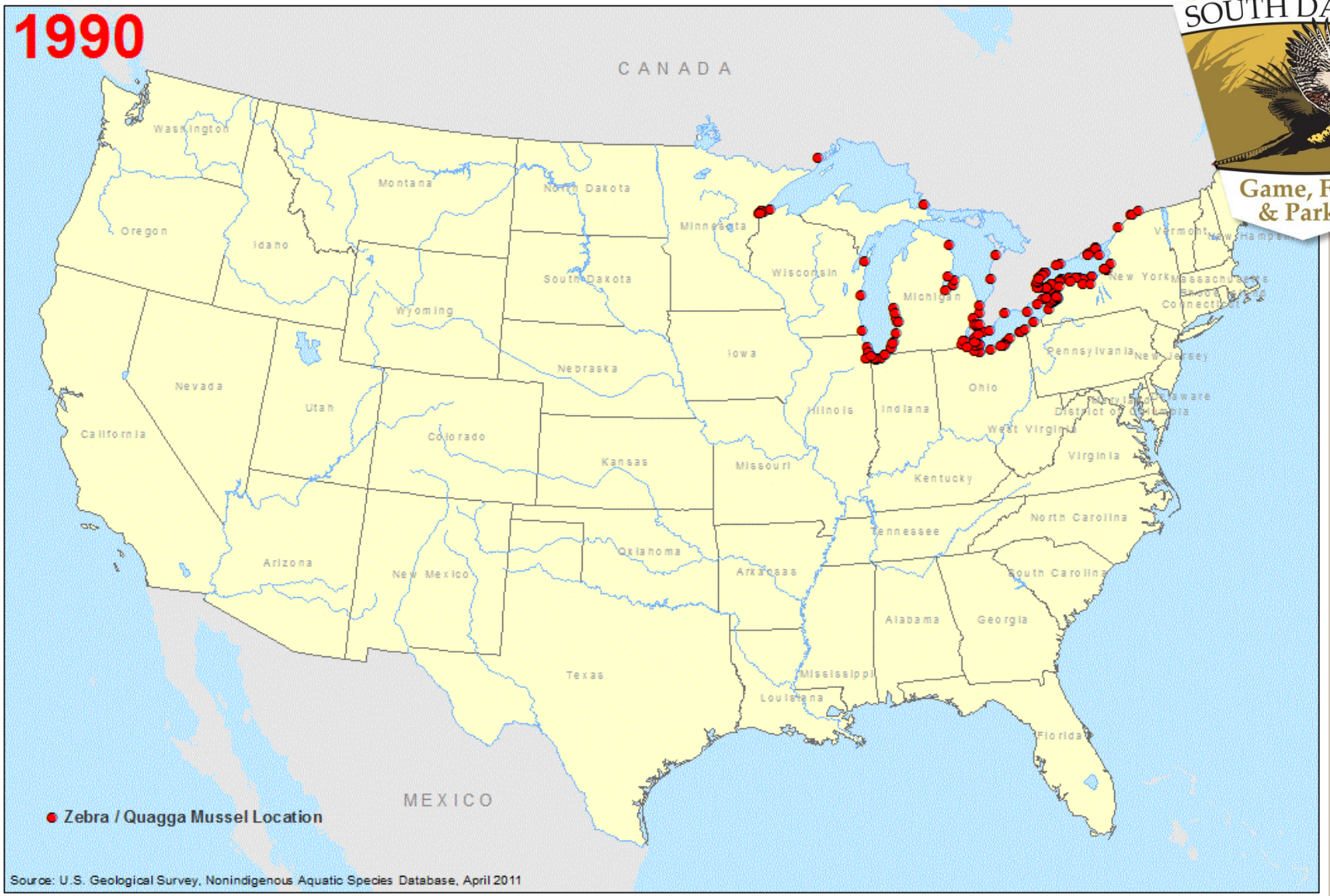

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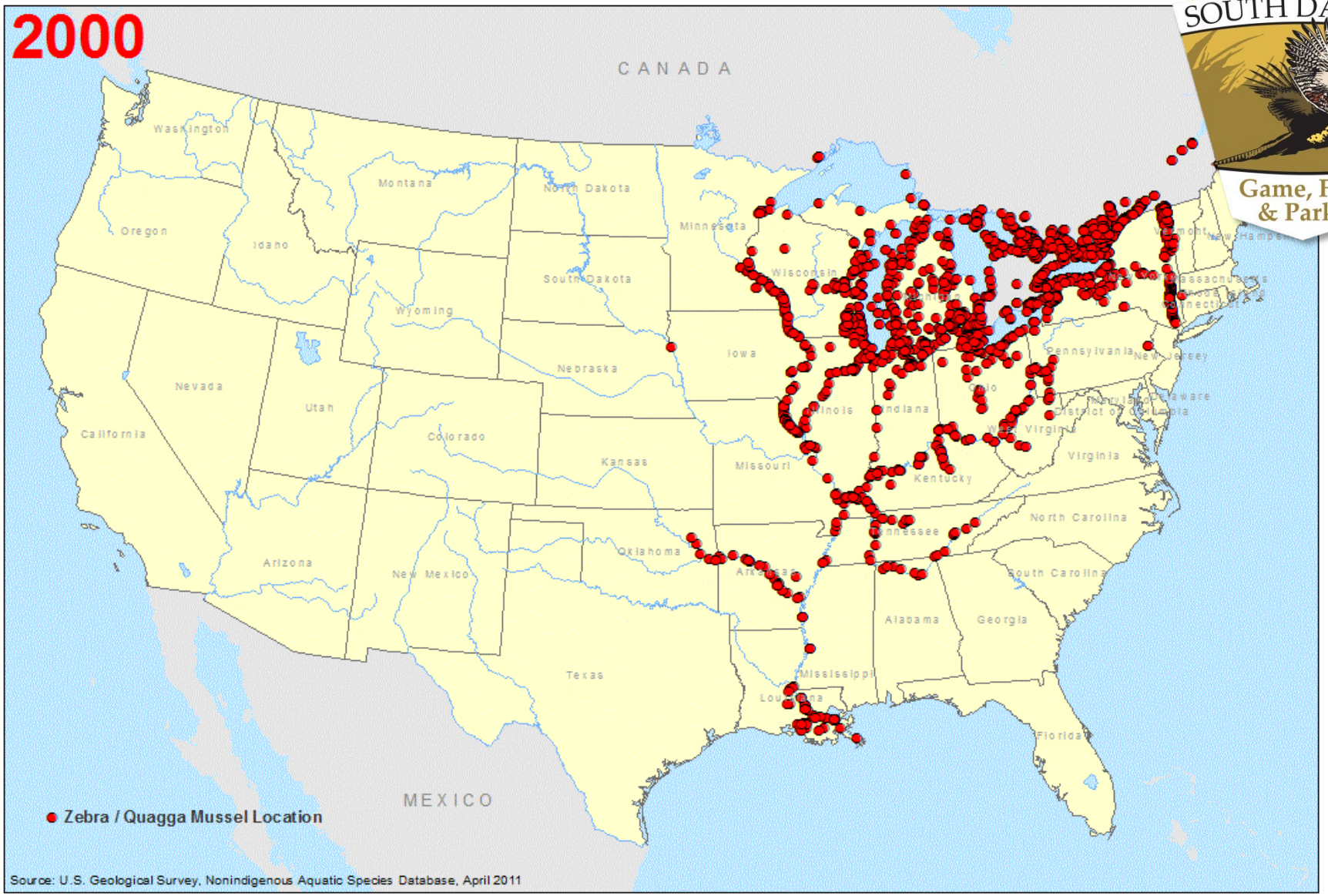

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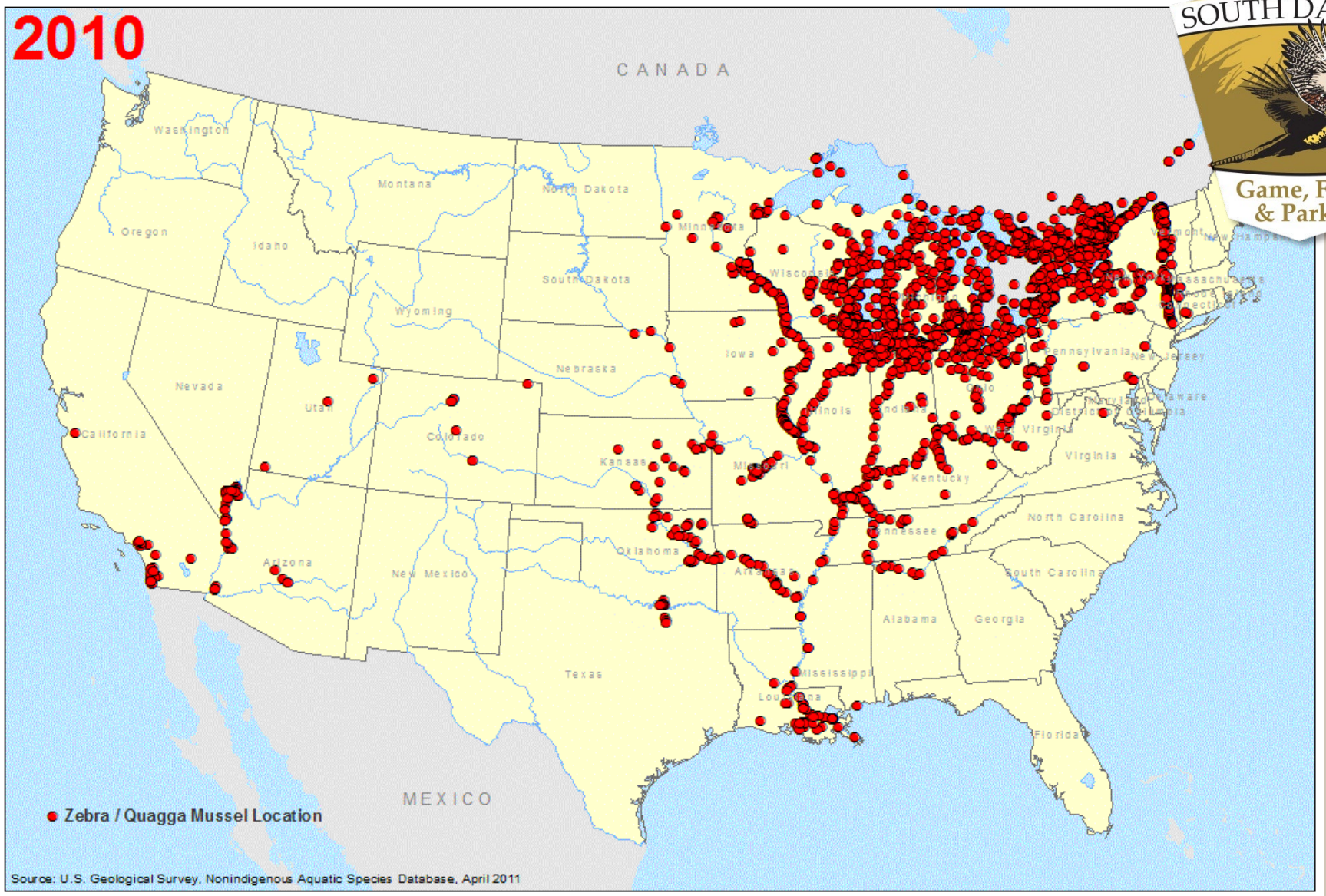

SOUTH DAKOTA
Game, Fish & Parks

2019

Zebra mussel occurrences
Quagga mussel occurrences
Zebra or Quagga mussel occurrences
Both species occurrences
Zebra/Quagga mussels eradicated
Zebra/Quagga mussels failed

Map produced by the U.S. Geological Survey
Nonindigenous Aquatic Species Database, January 28, 2019.

SOUTH DAKOTA
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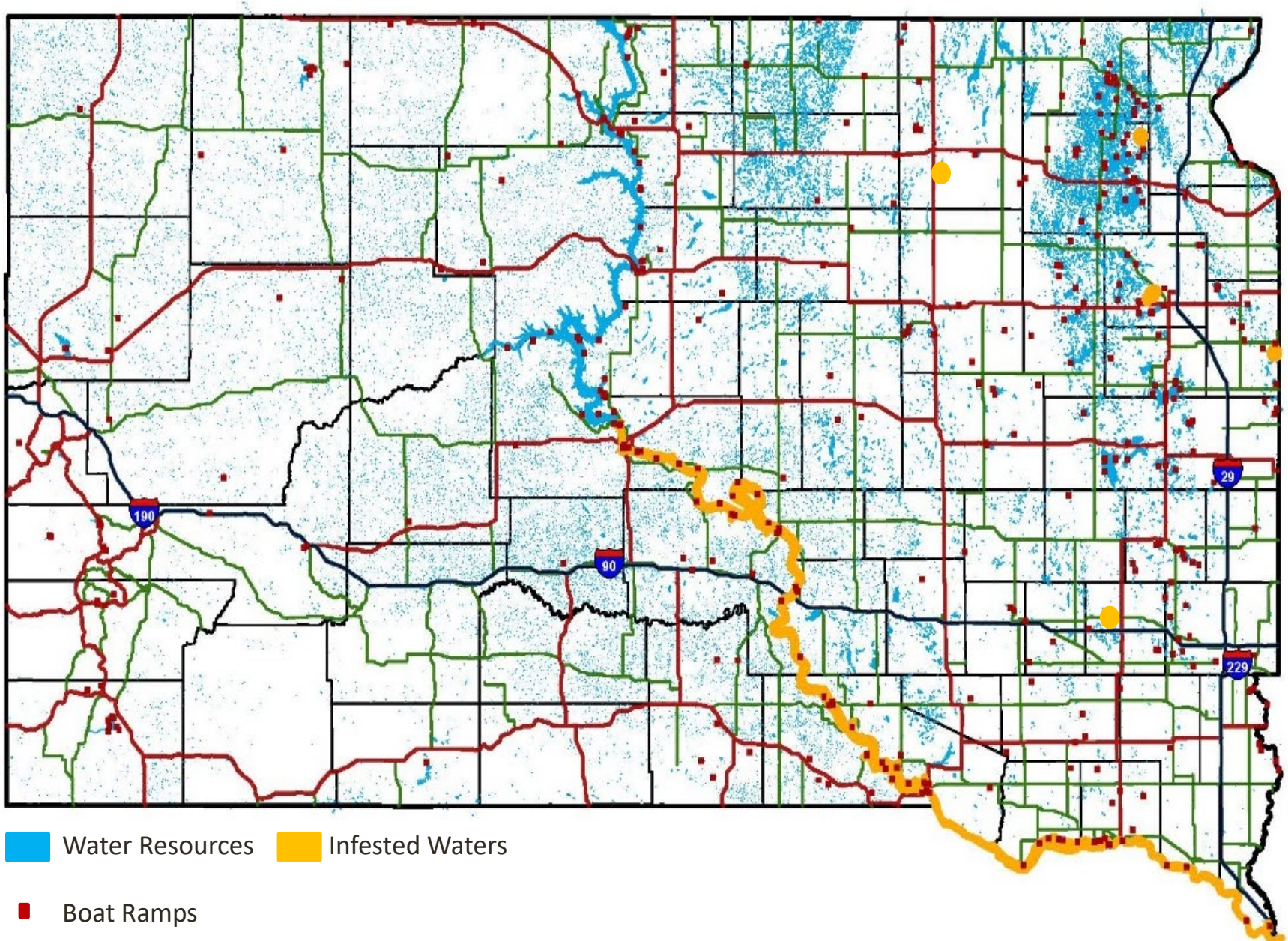
Known Infested Waters



Possible Ecosystem Impacts

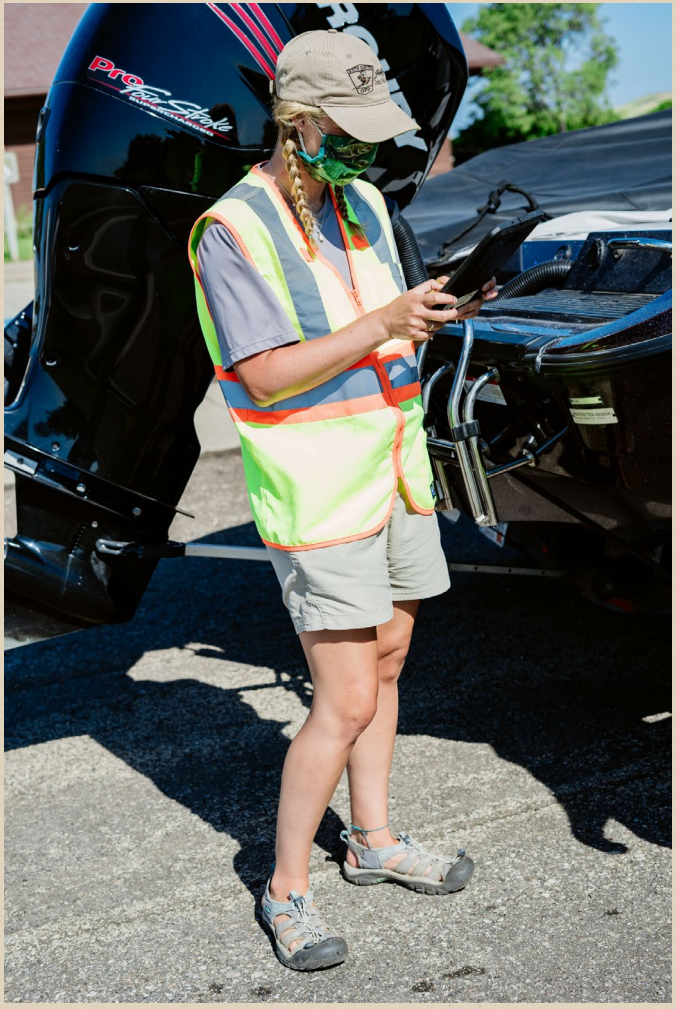
- Reduce native mussel populations
- Compete with native fish for plankton (food)
- Increase water clarity
- Change nutrient distributions
- Increase harmful algal blooms
- Fisheries impacts less clear

Zebra/Quagga Mussel Impacts

Primary Focus

Roles in AIS Management

- **Increasing awareness**
  - education and outreach
- **Changing behavior**
  - Education and outreach
  - Boater engagement
  - Regulations and enforcement
- **Monitoring**
  - Natural resource personnel
  - Citizen science
- **Rapid Response**
- **Mitigation**
  - Vegetation control
  - Addressing user impacts



Increasing Awareness

Target Audiences and Main Messages

Boat Anglers/Recreational Boaters

- Clean, Drain, Dry every time.

Shore Anglers

- Never move water when transporting your bait.
- Dry all equipment that is submerged in the water for considerable amount of time.

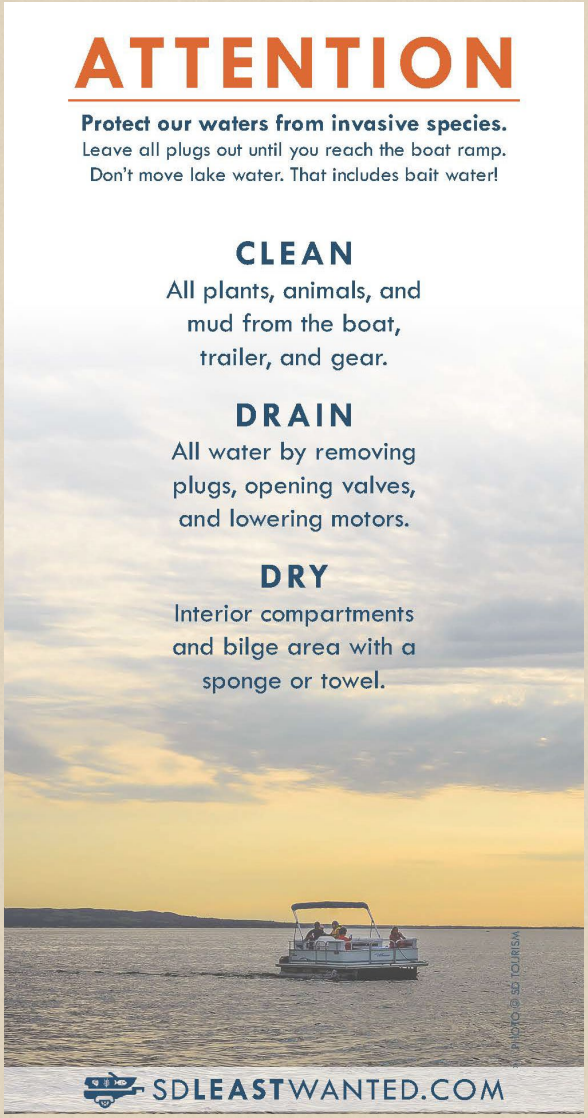
Increasing Awareness
Annual Marketing Campaign

Focus

- Increase awareness
- Public adoption of best practices
- Minimize transport of water and vegetation

Tools

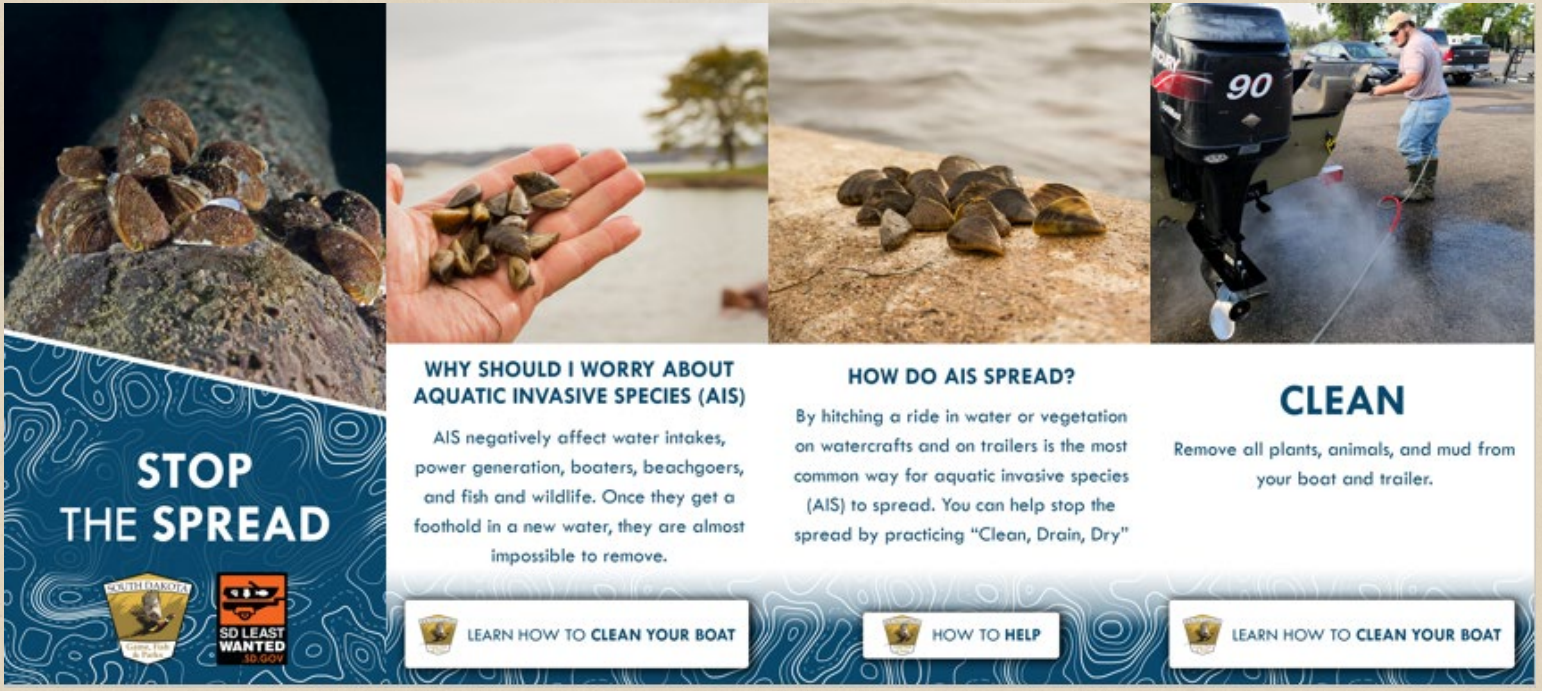
- Social media posts
- YouTube
- SDLeastwanted.sd.gov
- Watercraft inspections
- Lawrence and Shiller



Increasing Awareness
Annual Marketing Campaign

Gas Station TV

“Instant Experience”



Changing Behavior
Watercraft Inspection Stations

Authority to:

- Conduct roadside inspection stations
- Require boaters to stop at open inspection stations
- Conduct decontaminations when necessary
- Detain watercraft that cannot be immediately decontaminated

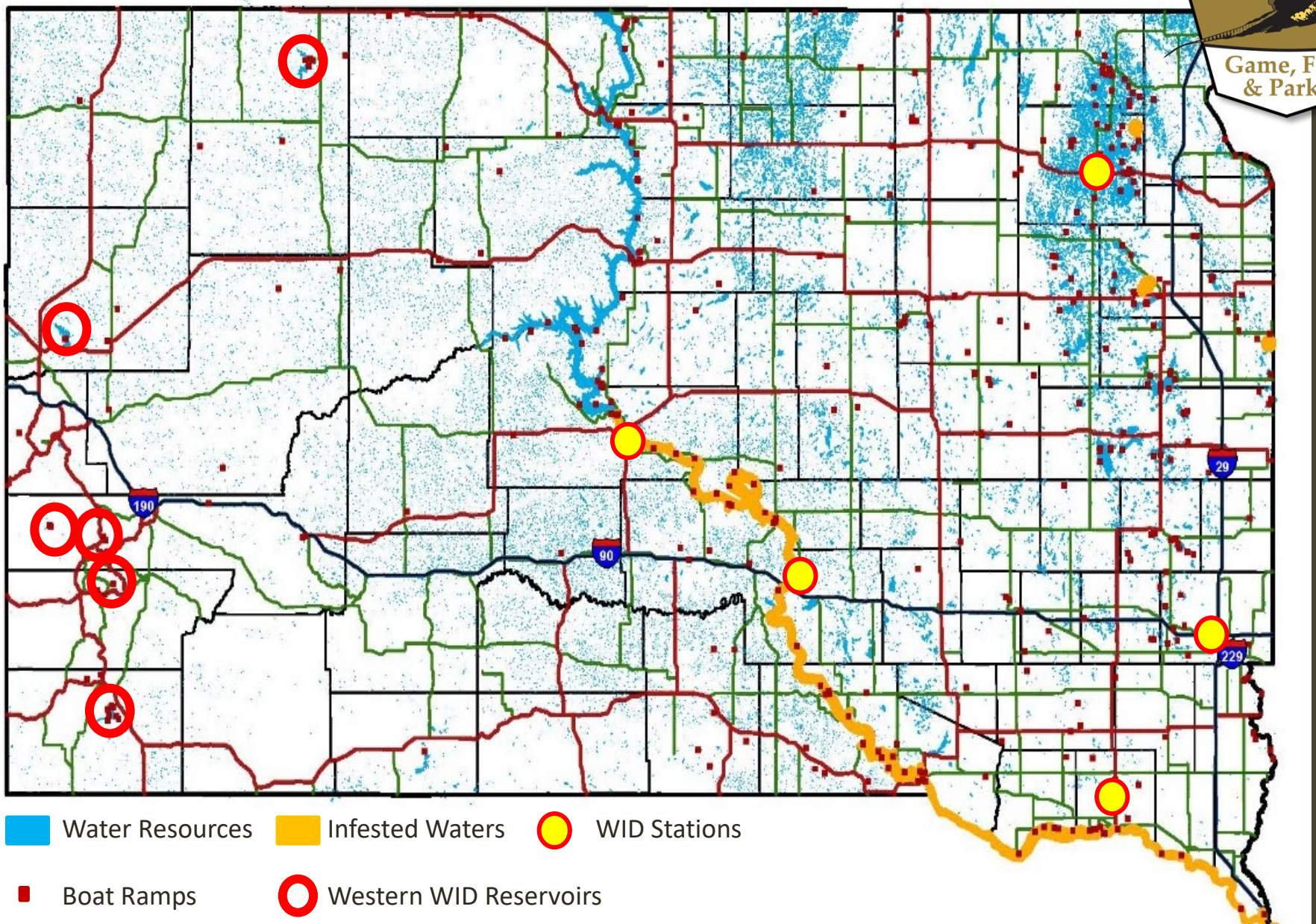
What Does the Inspection Process Include?

- **1-2-minute risk assessment and visual inspection**
  - Out-of-state or in an infested water within 30 days
  - Dirty, crusty, or slimy below the water line
  - Standing water in the boat or ballast tanks
  - Complex watercraft (multiple motors or compartments)

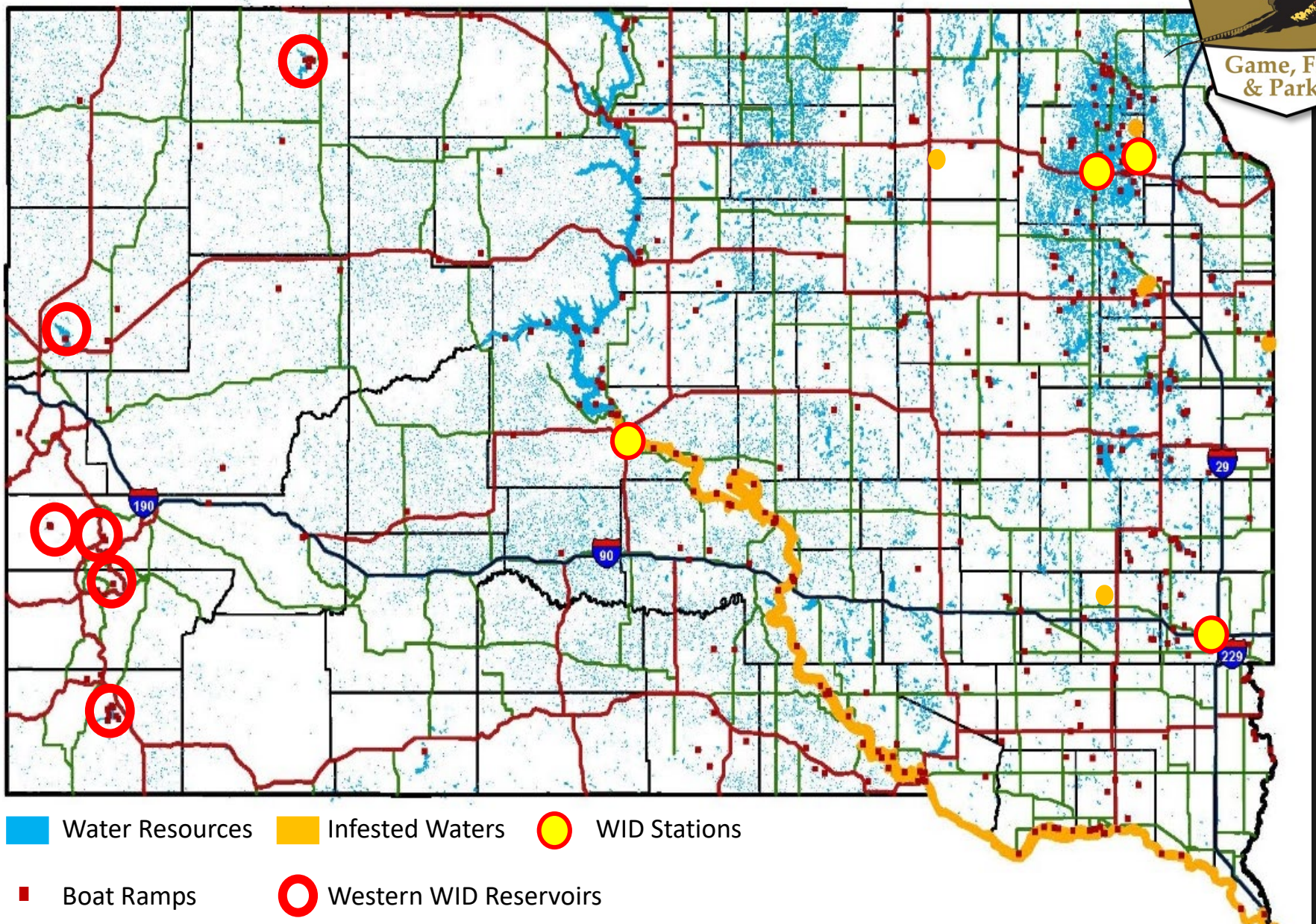
What Does the Inspection Process Include?

- **A more thorough (5-minute), high-risk inspection is required if:**
  - Two or more risk factors observed
- **Decontamination is required if a watercraft fails an inspection due to:**
  - Aquatic Invasive Species (AIS) found or suspected
  - Water cannot be completely drained – high risk waters

2020 WID Operations



2021 WID Operations



Watercraft Inspection Results

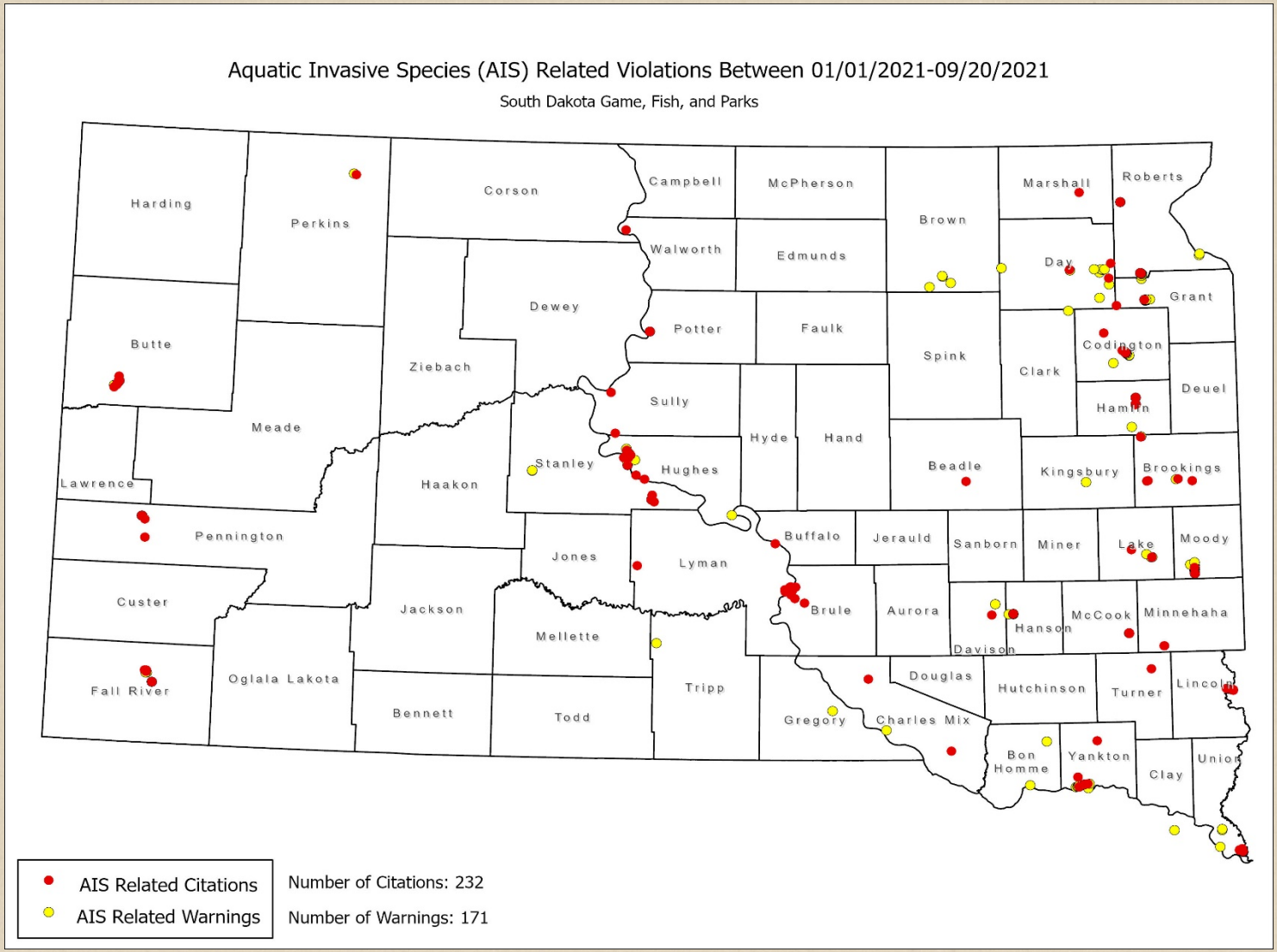
Common Violations/Corrections

- Boat Plugs
- Live Well Plugs
- Draining Outboard
- Jet Skis – (unaware of plugs)
- Wakeboard Boats (center plug)
- Vegetation on trailer

Inspections

- 2020 >9,000
- 2021 > 14,000

Changing Behavior
Regulation Enforcement



Monitoring

Mitigation

Mitigation
2018 Zebra Mussel Summit

Mitigation
2018 Zebra Mussel Summit

Mitigation
Lake Associations

SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

Protect Your Happy Place

"Zebra mussels in my lake...what's the big deal?"

Lake homeowners are among the groups most likely to be impacted by infestations of zebra mussels or other aquatic invasive species (AIS). Problems caused by zebra mussels for lake homeowners include:

- Damage to boats, motors, and docks
- Increases in toxic blue-green algae blooms
- Covering shorelines with razor sharp shells
- Fouling the taste and smell of drinking water
- Removing large amounts of food for native mussels, bait fish, and young sport fish

In addition to all the damage that could be caused to your local lake, zebra mussels are the most expensive invasive species to manage and mitigate. An estimated $1 billion is spent annually on reducing their impacts in the U.S. alone, with the greatest impact to water infrastructure (think hydropower, irrigation, domestic water supplies). Also, once zebra mussels become established in a lake, it is nearly impossible to eradicate them. This is why it is so important to prevent their spread to new waterbodies!

Larval zebra mussels, called veligers, easily spread in raw water. They are microscopic (smaller than the width of a human hair) and can survive up to a month in raw water! It is important to never transport fish or bait in water from lakes, rivers, or streams because this raw water can contain hundreds of zebra mussel veligers. A recent study at Lewis and Clark marina found a five-gallon bucket of water collected in late July contained an average of 900 zebra mussel veligers!

Additionally, invasive plants such as curly-leaf pondweed and Eurasian watermilfoil have been making their way into South Dakota waters. These invasive plants form dense mats that make it hard to swim, boat, or fish, outcompete native vegetation that is beneficial to fish and waterfowl, degrade water quality, and cause smelly windrows on shorelines when they decay. Aquatic invasive plants can spread when small fragments or seeds are transported between water bodies.

How You Can Help!

To help slow and prevent the spread of zebra mussels and other AIS, Game, Fish and Parks (GFP) is encouraging everyone to:

- Eliminate any water transferred between water bodies through bait buckets, boats, trailers, docks, or other water-based equipment.
- Self-inspect and, if necessary, decontaminate watercraft coming from infested waters.
- Make a conscious effort to educate themselves about how to reduce the risk of moving AIS.

KEEP ZEBRA MUSSELS OFF YOUR WATERCRAFT

Zebra mussels can cause significant problems for watercraft owners who leave their watercraft in infested water for long periods of time. As free-floating, juvenile zebra mussels develop and grow larger, they settle out and attach to hard surfaces. Any part of the boat that sits in infested water for multiple days is a potential landing spot for zebra mussels, including watercraft hulls and motors.

DECREASE COLONIZATION

There are two common methods watercraft owners have used to prevent zebra mussels from colonizing on their watercraft's hull:

1. Boat lifts can be used to keep the watercraft completely out of the water, when not in use.
   - » Utilizing a watercraft lift is the most effective way to prevent zebra mussel colonization because the watercraft is no longer exposed to the juvenile zebra mussels as they settle.
2. If your watercraft is not stored on a lift, anti-fouling products that effectively repel zebra mussels and prevent adults from attaching to a watercraft's hull can be applied.
   - » These can be copper based or more natural, environmentally friendly forms, like capsaicin (one of the chemicals that makes chili peppers hot). Many of these anti-fouling products last the full boating season, while others may need to be applied multiple times during the summer. Your local marine dealer may be able to provide some guidance on these products.

MINIMIZE DAMAGE

Juvenile zebra mussels can be sucked up into boat motors or internal compartments with lake or river water. Routine practices to minimize damage to vital internal components of watercraft include:

- » Pumping out as much water as possible from ballast tanks after each use.
- » Lowering outboard motors or lower units to allow them to completely drain before tilting them back up for transport or to keep them out of the water when on boat lifts.
- » Allow boat motors to reach normal operating temperatures during each trip.

Taking these precautions can help protect your watercraft from the damage of zebra mussel colonization and reduce the complexity of watercraft decontaminations. Also, taking steps to prevent zebra mussel colonization can help prevent the spread of this harmful invasive species to other waters.

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Partnering

- Outreach
- Mitigation Training
- Permitting
  - Aquatic pesticides
  - Temporary water rights
- Monitoring
- Funding

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