Aquatic Invasive Species Detection, Identification and Decontamination

California Invasive Plant Council
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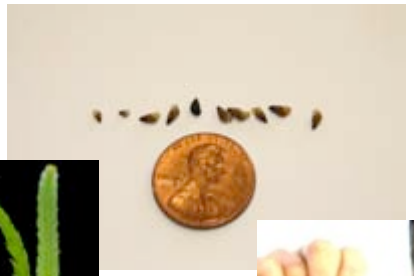
Invasive Species

Non-native *to the ecosystem whose introduction* ***causes*** *… economic or environmental* ***harm*** *(USDA NISIC)*

- Small subset of **exotic** species are invasive
- Invasive weeds cost > **$82 million** in California (Cal-IPC 2009)
  - Cost **~$123 billion** in US in 1999
- Diseases, predators, competitors
- Damage crops, infrastructure, physical environment
- Lack natural predators or diseases
- Favored by other ecosystem/climate changes

Aquatic Invasive Species

- Front line of defense
- First alert and quick response
- Some widespread in CA, some large scale control programs



Aquatic Invasive Species

QUAGGA and ZEBRA MUSSELS

- Identification
  - 2 Ear-shaped shells
  - Solid light to dark brown or banded
  - Attach to surface by threads
- Impacts
  - Clog water infrastructure
  - Filter feeding robs food from others
- Detection
  - Look on ropes and shaded surfaces under structures
  - Feel for individual, irregularly spaced bumps that feel like sandpaper on smooth surfaces. Mussels don't rub off, but rotate around the point of attachment.
  - Be careful as larger shells could be sharp!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Aquatic Invasive Species

Other, similar mussels:

- Pose threats
- Impacts in CA unknown

GOLDEN MUSSEL

FALSE DARK MUSSEL

Aquatic Invasive Species

Another similar species:

ASIAN CLAM

- Identification
  - Small, light or dark colored clam
  - Distinct ridges
  - Prominent hinge
  - No threads
- Impacts
  - Filter feeding robs food from others
  - Reproduces rapidly
  - Clogs water lines
- Detection
  - Likely to see dry shells if present

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http://thetimes-tribune.com/polopoly_fs/1.990459!/image/2204062185.jpg_gen/derivatives/landscape_490/2204062185.jpg

Aquatic Invasive Species

NEW ZEALAND MUDSNAIL

- Identification
  - Very small snail, 5-7 spirals
  - Grey, light/dark brown, black
- Impacts
  - A single animal can start new infestation
  - Out-competes natives for resources
  - Not a good nutritional food source for predators
  - Can pass through fishes undamaged
  - Survives out of water by sealing shell


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Jane and Michael Liu


Sabrina Drill

Aquatic Invasive Species

APPLE SNAIL

- Identification
  - 5-6 spirals
  - Big light brown, rounded snail
  - Large oval opening
  - Bright pink egg masses

- Impacts
  - Feeds heavily on aquatic plants
  - Agricultural pest (rice)
  - Rapid reproduction
  - Out-competes native species

Aquatic Invasive Species

RED SWAMP CRAYFISH

- Identification
  - Juveniles grey, adults red
  - Shell and claws bumpy
  - Shell up to 5” long
  - 4 pairs walking legs, 1 pair claws
  - 5 pairs other appendages
- Impacts
  - Agricultural pest (rice)
  - Females burrow
  - Contribute to erosion

CHINESE MITTEN CRAB

- Identification
  - Only freshwater crab in North America
  - Claws hairy (“mittens”)
  - Brown-orange, brown-green
  - Shell up to 3” long
  - Lives mostly in fresh, breeds in saltwater
- Impacts
  - Burrowing
  - Contributes to erosion and damage
  - Interfere with fishing and water delivery

Aquatic Invasive Species

AFRICAN CLAWED FROG

- Identification
  - Front feet 4 fingers (no webs)
  - Back feet webbed, 3 toes with claws
  - Flat body 2”- 5”+, small head
  - Only frog with claws
- Impacts
  - Eat, outcompete, spread disease to native species
  - Highly adaptable
  - Toxic skin
  - Claws, teeth → fierce predator

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BULLFROG

- Identification
  - 3.5”- 8” long, light to dark green
  - Back dark, spots/patterns
  - Belly yellow to cream
  - Very large tadpoles, 4+ inches
- Impacts
  - Widespread in CA
  - Eat, outcompete, spread disease to native species

Aquatic Invasive Species


STOP THE SPREAD!

What Can I Do to Help Prevent the Spread of Didymo?

Yosemite National Park

Invasive Species: Didymo a.k.a. "Rock Snot"

What Is Didymo? How Can I Identify It?

Early Stage

Then Forms Thick Clumps

Advanced Stage

Why is Park Staff Concerned about Didymo?

ROCK SNOT/DIDYMO

- Identification
  - Microscopic algae in cool streams and rivers
  - Brown, tan or whitish mats
  - Looks slimy, feels like wet cotton/wool

- Impacts
  - Dense mats smother and foul stream beds
  - Safety issue for anglers, waders
  - Moving to warmer conditions

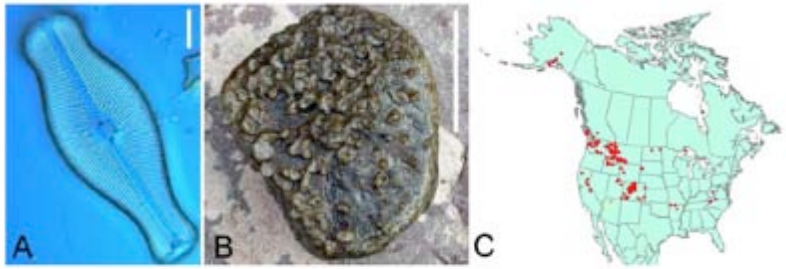


FIGURE 1. A. Image of *D. geminata* cell under the light microscope. Scale bar is equal to 10 microns. B. Cobble from stream showing typical growth habit. Scale bar is approximately 10 cm. C. Map showing the confirmed distribution records of *D. geminata* in North America.

US EPA , 2007

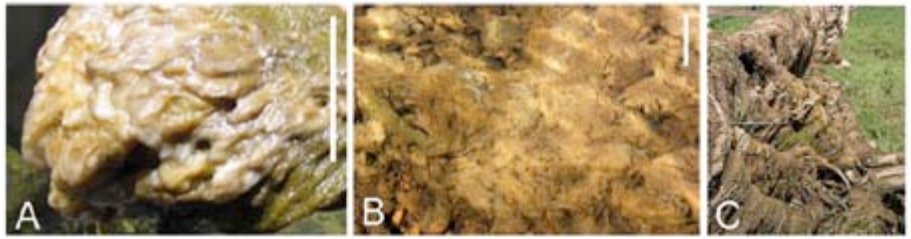


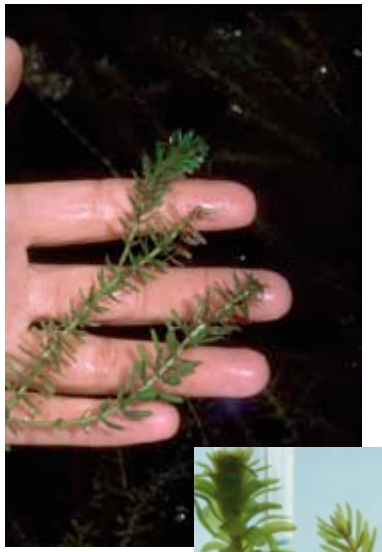
FIGURE 2. A. Stream cobble covered with *D. geminata* and stalks 5 cm thick. Scale bar equal to approximately 10 cm. B. Streambed covered with *D. geminata*. Note that rocks and cobbles are hardly visible. Scale bar equal to approx. 10 cm. C. Dried stalks on docks. (Images by Erica Shelby, Arkansas Department of Environmental Quality).

US EPA , 2007

Aquatic Invasive Species

HYDRILLA & BRAZILIAN EGERIA

Hydrilla



- Identification
  - Submerged
  - Long stems
  - Single white flowers
  - Leaves, smooth, narrow, have teeth on edges
  - Egeria bigger, leafier
- Impacts
  - Out-compete other plants
  - Can infest from pieces
  - Dense mats:
    - Reduce water flow
    - Block sunlight for other plants
    - Interfere with recreation,
    - irrigation, utilities, water supply
    - Eradicated in Lake Murray

Brazilian Egeria

Aquatic Invasive Species

SPONGEPLANT

- Identification
  - Mats float or root in mud
  - When blooming → single white flowers at water surface
  - Leaves smooth, round
  - Leaves with "spongy" patch on underside

- Impacts
  - Dense mats cover open water areas
  - Reduce habitat for fish and wildlife
  - Block sunlight for other plants
  - Interferes with navigation, recreation
  - Interferes with water flow, pumping and delivery

Aquatic Invasive Species

GIANT SALVINIA

- Impacts
  - Form dense, floating mats
  - Reduce habitat for fish & wildlife
  - Block sunlight for other plants
  - Interfere with navigation, recreation
  - Interfere with water flow, pumping, delivery

- Identification
  - Floating mats
  - No flowers (fern)
  - Leaves oval and may be folded
  - White “eggbeater” hairs on leaves

Decontamination BMPs

1. Freezing
2. Scrubbing
3. Drying
4. Hot water soak
5. Water pressure
6. TRACK Contaminated/Decontaminate Equipment
7. Plan site visits from uninfested to infested waters

Decontamination BMPs

1. **FREEZING**
   - Inspect gear onsite. Remove mud/sand, plant/animal remnants
   - Contain in bag or container onsite for transport to freezer offsite
   - Freeze at 32° F for minimum of 8 hours
   - Scrub frozen AIS and debris from gear while containing in plastic bag or container
   - Reseal bag or container with any remaining, frozen AIS inside, and throw in trash

Decontamination BMPs

2. SCRUBBING

- Inspect gear onsite. Remove mud/sand, plant/animal remnants
- Wear gloves and eye protection
- Scrub with stiff-bristled brush
- Preferably with warm water
- Preferably onsite
- If not onsite, contain gear in bags/containers for scrubbing offsite, scrub in bags to remove and retain any AIS and debris, seal bags and dispose in trash

Decontamination BMPs

3. DRYING

- Inspect gear onsite, and remove any mud/sand, plant/animal remnants
- If not drying onsite, contain gear for transport
- Allow gear, equipment, clothes and footwear to dry thoroughly
- Preferably in direct sunlight
- Dry times vary depending on conditions: anywhere from 5-30 days
- Clothing and some footwear may need to be put into clothes dryer on high for 30 minutes
- Collect and retain any AIS and debris, seal in bag and throw in trash