

Guidelines for Prevention of Introduction and Spread of Aquatic Threats by Cleaning and Disinfecting Fishing and Field Equipment

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There are three primary disease/invasive threats to aquatic species in Rocky Mountain National Park (RMNP).

Whirling Disease (WD)

- ◆ WD threatens trout populations.
- ◆ WD has been confirmed in several low elevation waters including Fall River, Roaring River, Colorado River, Timber Creek and Onahu Creek.
- ◆ WD is believed to be present in all low elevation waters in RMNP.
- ◆ Greenback cutthroat trout, a federally listed threatened species, is susceptible. In studies at the USFWS, National Fish Health Research Laboratory even a light exposure to WD resulted in mortality of over 25% of greenback cutthroat trout <1 year old.
- ◆ Colorado River cutthroat trout, the native trout of the westside of RMNP, also suffers mortality with exposure to WD.

Batrachochytrium dendrobatidis (Bd)

- ◆ Bd, often referred to as chytrid fungus, threatens RMNP amphibians.
- ◆ The boreal toad is declining in the park and is currently classified as endangered by the State of Colorado. The primary reason for decline of the boreal toad is believed to be mortality related to exposure to Bd.
- ◆ Bd does not appear to be lethal in tiger salamanders although it can cause mortality in chorus frogs and wood frogs.
- ◆ Bd has been confirmed in the North Fork of the Big Thompson Drainage (Lost Lake and Kettle Tarn), Fall River Drainage (Sheep Lakes) and Colorado River wetlands (near the Timber Creek Campground).
- ◆ Few areas in the park have been tested for Bd and it is likely present in other park waters.

New Zealand Mudsail (NZMS)

- ◆ NZMS were recently discovered in Boulder Creek, Eleven Mile Creek, and the South Platte River, CO. They are also known to be present in the Green River in Utah, and throughout Yellowstone National Park.
- ◆ NZMS are believed to negatively impact native invertebrates as well as trout populations.
- ◆ NZMS have not been identified in RMNP but the threat of introduction is considered high because of the proximity of known locations and park visitation. NZMS are also extremely small and may not be detected until they have been present in the system for an extended period of time. Although NZMS have not been confirmed in RMNP there is a chance they are already here.

Humans unwittingly assist the spread of these organisms by transferring them from one body of water to another on footwear, waders, nets, and other equipment. Help protect RMNP aquatic species by following the recommended prevention and disinfection procedures below. It is expected that park staff, cooperators and researchers working on approved projects will follow the guidelines below. Recreationalists (including park staff on their lieu days) are strongly encouraged to follow these guidelines.

Guidelines

1. Dedicate specific equipment to each separate site (lake) (**optional**). This may be possible for researchers who only work at one site in the park. If equipment is specific to a site and has not been used elsewhere guidelines under number 4 do not need to be followed. If equipment will be used at only one site this year but have previously been used in other areas, follow the guidelines under number 4 to disinfect equipment prior to beginning work this season. Note: if a sampling site has a wider geographic reach follow the recommendations under number 4.
2. Do not use felt wading soles (**highly recommended**).
3. When conducting surveys within a drainage start at the top of the drainage and work downstream (**highly recommended**). Aquatic threats are typically located in lower elevation areas and this will minimize the risk of spreading organisms upstream.
4. **Prior** to working in park waters clean and disinfect any equipment that has been in contact with soil and water (**required**). Examples include boots, waders, nets, etc. Equipment **also** needs to be cleaned and disinfected in the following situations; a) after a visit to any area where whirling disease, *B. dendrobatidis*, or New Zealand mudsnails are known to exist; b) when moving within a drainage to sites that are >4 kilometers (2.5 miles) apart; and 3) before visiting different drainages.

There are several steps and options to disinfect equipment. For either option each step is **required** to insure proper disinfection against all pathogens.

Disinfection options:

- a. **Required:** 1) Remove mud, snails, algae and other debris from nets, boots, waders and other equipment utilizing brushes, screwdrivers, or other tools, **and** 2) Wash all equipment and tools used to clean equipment with bleach solution. Soak equipment for 10 minutes in the 10% household bleach solution (5,000 ppm hypochlorite) **or** when sensitive equipment cannot be soaked disinfect equipment with a $\geq 50\%$ contact bleach solution; **and** 3) Freeze gear overnight **or** soak and/or agitate equipment for >10 minutes in 50% solutions of Formula 409 Antibacterial Version (household cleaner) **or** soak equipment for >one minute in >120°F water (dishwasher cycles will provide adequate heat). NOTE: Freezing gear overnight or longer is most effective.
- b. **Required:** 1) Remove mud, snails, algae and other debris from nets, boots, waders and other equipment utilizing brushes, screwdrivers, or other tools; **and** 2) Soak and or agitate gear and equipment in a solution of 4-6 oz. Sparquat per gallon for >10 minutes exposure. Sparquat is a quaternary ammonium disinfectant (benzalkonium chloride) that is also effective at inactivating whirling disease spores, **and** (**recommended**) 3) Freeze gear overnight **or** soak equipment for >one minute in >120°F water (dishwasher cycles will provide adequate heat). NOTE: Freezing gear overnight or longer is most effective.
- c. **Recommended:** Allow equipment to air dry, preferably in direct sunlight >84°F for >four hours.

If you believe that you are working with equipment that cannot sustain the rigors of some of these treatments, contact Mary Kay Watry, Biologist, Rocky Mountain National Park (970) 586-1285 for alternative recommendations.