

Whirling Disease in Banff National Park (BNP), Alberta

Direction for *Permitted Users* conducting water-related activities in BNP

Interim Direction

This information and permit conditions are to be added to Restricted Activity Permits, Development Permits or other tools used to permit researchers, contractors, partners, stakeholders, etc who are working in muddy or aquatic environments in BNP but not handling fish. If handling fish, there is a more rigorous protocol to be followed.

Approved by:



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The following document is intended to provide consistent direction, in the form of permitting conditions, for anyone who is conducting work in or near water bodies, ephemeral or otherwise, or involved in the use or transportation of surface waters in Banff National Park.

Background

In August 2016, Whirling Disease was detected in some waters in Banff National Park. This is the first documented case of this disease anywhere in Canada and Parks Canada is committed to reducing the spread of this disease, in part, by managing our work and the work performed by external proponents within Banff National Park. While there are no human health concerns, effects on native fish populations can be very significant with 90% mortality being reported in other jurisdictions. The parasite attacks juvenile fish and causes spinal deformity (whirling swimming pattern) and discoloration (blackened tails). Some species of fish, or individual fish, can be infected but show no visible symptoms at all.

Whirling Disease is a parasitic freshwater disease that affects most salmonids. Species of particular concern in Alberta include: Westslope Cutthroat Trout (federally and provincially listed as a

threatened species) Bull Trout (provincially listed as a *threatened* species), Rocky Mountain Whitefish, Rainbow Trout, Brook Trout, and Brown Trout. The disease is spread by a small parasite that goes through both spore and planktonic life stages, which infect both fish and aquatic tubifex worms.

The spore life-stage is incredibly small and hard to destroy. Spores that sink to the bottom of water bodies can remain viable in sediment for up to 30 years. The only effective means of killing the spores include hot water (90C) or 10 minutes soaking in effective detergents (quaternary ammonium-based cleaners); pro-longed freezing (7 days at -20°C) or complete desiccation (drying) for at least 24 hours (less if exposed to direct sunlight). Therefore, preventing the movement/transport of mud from infected water ways (where spores are most often found) is of critical importance.

The planktonic life-stage is called a triactinomyxon (TAM). These microscopic organisms float in the water column waiting to attach to a live fish and inject their lethal contents into the fish through its skin or gills. Although the TAM stage is more vulnerable to hot water, effective detergents, freezing or desiccation, it is a concern because it is often more mobile as it floats in the water column. For this reason, movement of water also needs to be prevented (e.g. water withdrawal permits for hydro-seeding, paving crews, etc).

HOW IS WHIRLING DISEASE SPREAD?

The disease is most often spread by (in descending order):

1. **Movement of fish** (fish stocking) or parts of fish (use of live or dead baitfish). All of these activities are illegal in Banff National Park.
2. **Movement of mud** that is laden with the resistant spore stage or infected tubifex worms. Likely vectors include dirty waders, boats, and construction equipment.
3. **Movement of water** that is transporting the planktonic life stage called a TAM

SIMPLIFIED PERMIT CONDITIONS:

If you have been issued a permit to conduct a) work in-stream, b) work in wet or muddy riparian areas, or soils that are seasonally wetted (ephemeral) or c) pumping or moving of surface water, you are required to follow these decontamination protocols:

1. **PREVENTION:** Do not allow equipment to enter a watercourse or wet riparian area, or to pump or transport water, unless the equipment has been properly decontaminated **before AND after** use in different waterbodies. The current extent of Whirling Disease in Alberta is not known, so your equipment may already be contaminated or may become contaminated during use. Never move equipment between water bodies without applying the following decontamination protocols.
2. **PRE-CLEAN:** When you leave a work area **remove all mud**. The most resistant life stage is the myxospore and these spores settle into the mud. By washing off all mud (in an area where the rinse water will not re-enter the watercourse, a storm water system, or sanitary sewer system) you can reduce the chances of spreading this disease.
3. **HOT WASH or DISSINFECT:** At an appropriate facility, where wastewater will not re-enter a watercourse (either through storm water or sanitary water treatment), wash or disinfect your equipment as follows:
 - a. **HOT WASH** – use a low pressure hot water wash system (e.g. Hotsy) to apply very hot water (90°C) across all equipment surfaces for at least 10 minutes. Appropriate PPE is required to prevent injury when using water at these temperatures*. For smaller items or in remote locations - boiling at 90°C for 10 minutes will also destroy the spores.

OR

 - b. **DISSINFECT** – For equipment that cannot withstand these temperatures, (e.g. glued fabrics such as inflatable watercraft, aqua-dams, Gore-Tex, etc.) use regular water to remove any residual mud and destroy the TAM stage. However, extra diligence must be taken, in disinfecting this equipment in order to destroy the spore stage. All equipment must be soaked, for at least 10 minutes, in an appropriate concentration of disinfectant* (see link to Table 1). Disposal of rinse water containing disinfectant may go into sanitary sewers (spores should be chemically destroyed) provided quantities are diluted enough not to impact your local wastewater treatment plant by killing bacteria. Contact your WWTP for approval if disposing of more than 45 gallons in any given day.
4. **DRY:** Allow all equipment to dry thoroughly (fully dry + 24 hours) before being used in each new waterbody. Drying is **ONLY** effective if every surface is completely dry. Again, this is why removal of **ALL** mud is so important, as it aids effective drying. Note - Freezing, for 7 or more days, will also kill spores and TAMs provided temperatures remain below -20°C .

Note – follow all manufactures MSDS and instructions for use of Personal Protective Equipment.

Table 1: Available QAC's and Manufacturer's Concentrations.

Note the list below is intended to aid you in application of these protocols, but should not be considered exhaustive or as an endorsement of these specific products or manufactures. Other products with Quaternary Ammonium Cations (QAC) as the active ingredient are also effective. Such chemicals are also known as quats.

Brand Name	Manufacturer	QAC Active Ingredient(s)	QAC Concentration (as supplied)
Quat Plus	Dustbane	n,n-dialkyl –n, n-dimethyl ammonium chloride	4.8%
Quat Plus M5	Dustbane	n,n-dialkyl –n, n-dimethyl ammonium chloride	7.7%
Vanguard	Dustbane	Didecyl dimethyl ammonium chloride n-alkyl; dimethyl benzyl ammonium chloride	2.88% 1.92%
Pinosan	Dustbane	Didecyl dimethyl ammonium chloride n-alkyl; dimethyl benzyl ammonium chloride	1.44% 0.96%
Quat 128	Sanicare	Didecyl dimethyl ammonium chloride Dimethyl benzyl ammonium chloride	5.07% 3.38%
SparQuat 256	Spartan Chemical	Dialkyl dimethyl ammonium chloride Alkyl dimethyl benzyl ammonium chloride	5-10% 5-10%