

## Whirling Disease in Banff National Park, Alberta.

# Direction for *Permitted Users* conducting water-related activities in Alberta.

*The following document is intended to provide consistent permit 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 the Bow River Watershed in the Province of Alberta.*

### Background

Whirling Disease is a parasitic freshwater disease that affects most members of the salmon family. In Banff that means native species such as Westslope Cutthroat Trout (federally and provincially listed as a *threatened* species) bull trout (provincially listed as a threatened species) and whitefish as well as introduced species such as rainbow trout, brook trout, and brown trout. The disease is spread by a small parasite that goes through both spore and planktonic life stages; and infects both fish and a small freshwater invertebrate that lives in the mud; called a tubifex worm.

The spore life-stage is incredibly small and hard to destroy – it sinks to the bottom of water bodies where it can persist in mud for up to 30 years. The only effective means of killing the spores include very hot water (90C) and 10 minutes soaking in effective detergents (Quat); pro-longed freezing (7 days) or complete desiccation (drying) for at least 24 hours (less if exposed to direct sunlight). Because of this, removal of mud (where spores are most often found) is of critical importance.

The planktonic life-stage is called a 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 readily destroyed with hot water, effective detergents, freezing or desiccation, it is a concern because it is often more mobile as it floats in the water column.

In August 2016, Whirling Disease was detected in some parts of Banff National Park. This is the first documented case of this disease anywhere in Canada. While there are no human health concerns, effects on native fish populations can be very significant; with up to 90% mortality. 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.

### HOW IS WHIRLING DISEASE SPREAD?

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

1. **Movements of fish** (fish stocking) or parts of fish (use of live or dead baitfish).
2. **Movements of mud** that is laden with the resistant spore stage or infected tubifex worms. Likely vectors include dirty waders, boats, construction equipment, ATV's or OHV's.
3. **Movements of water** that is transporting the planktonic life stage called a TAM.

*after*

## SIMPLIFIED PROTOCOLS FOR PERMITTED USERS

If you have been issued a permit to conduct a) work in-stream, b) work in wetted or muddy soils, 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 muddy soils (shorelines or any areas that flood seasonally), or to pump or transport water, unless the equipment has been properly decontaminated **before AND after** use. 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 the work area - remove all mud. The most resistant life stage is the mixospore, 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. **WASH and SOAK:** At an approved facility, where wastewater will not re-enter a watercourse (either directly, through storm water, or sanitary water treatment), re-wash and 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) 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. For equipment that cannot withstand these temperatures, (e.g. glued fabrics such as inflatable watercraft, aqua-dams, Gore-Tex, etc) apply hot water to remove any residual mud and destroy the TAM stage, but then be extra diligent with use of disinfectant, and drying (see below) to destroy the spore stage.
  - b. **SOAK** – all equipment in an appropriate concentration of disinfectant\* for at least 10 minutes (see link to Table 1). If the equipment is too large to soak (e.g backhoe), spray disinfectant and work to keep it wetted for at least 15 minutes. Any water tanks, should be filled with water mixed with the appropriate concentration of cleaner and then flushed slowly to disinfect any pumps and plumbing connections that cannot be soaked. 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 before being used anywhere else. If equipment is FULLY dried, desiccation can eliminate the TAM stage (within 1 hour) and can even destroy spores (within 2 hours in direct sunlight, and within 24 hours at room temperature). Note – drying **ONLY** works 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 zero.

*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%

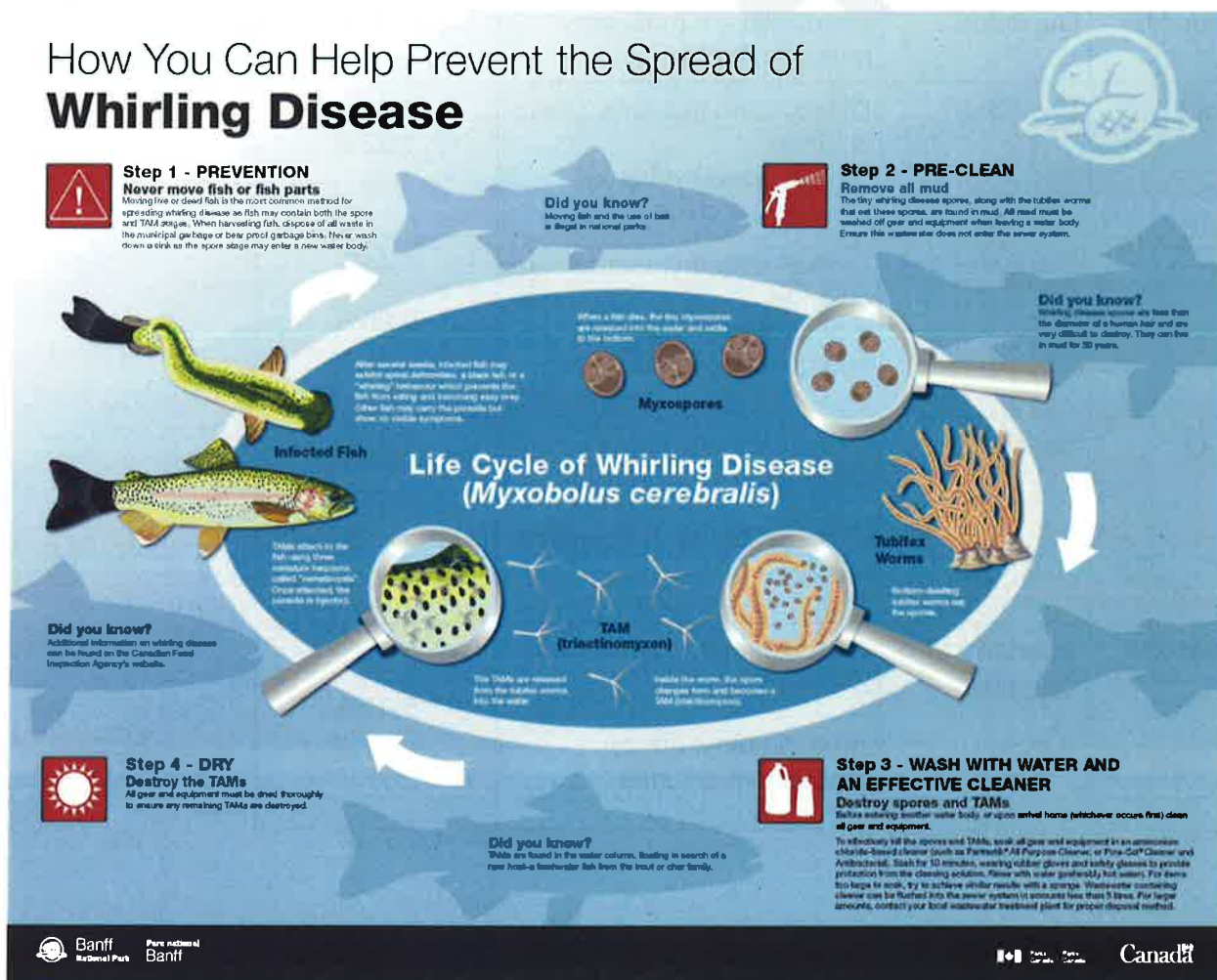
## FACT SHEET - HOW IS WHIRLING DISEASE SPREAD?

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

4. **Movements of fish** (fish stocking) or parts of fish (use of live or dead baitfish).
5. **Movements of mud** that is laden with the resistant spore stage or infected tubifex worms. Likely vectors include dirty waders, boats, construction equipment, ATV's or OHV's.
6. **Movements of water** that is transporting the planktonic life stage called a TAM.

The following figure provides information on the lifecycle of Whirling Disease which you may find helpful in better understanding this issue. Please note that the 4 simple steps we are asking the **public** to follow in cleaning their personal/recreational equipment are not considered adequate for any users obtaining a permit for their work (e.g construction, transportation/use of surface water, etc), although the steps are very similar.

### How You Can Help Prevent the Spread of Whirling Disease



**Note - If you are a fisheries professional or aquatic researcher you are required to follow the Interim Alberta and Parks Canada decontamination protocol found here: [XXXX link XXXX](#). Please contact your permit authorizer for further information.**