

# Whirling Disease Research



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## Whirling Disease Research Objectives

Colorado Parks and Wildlife (CPW) has made whirling disease research a high priority for more than 20 years as part of the agency's mission to conserve and perpetuate wildlife resources. When whirling disease first appeared in the state in the 1980s, CPW researchers started exhaustive projects to control the spread of whirling disease, limit the damage to fisheries and develop other solutions. The CPW work also includes cooperative investigations with researchers in other states to coordinate resources.

### Whirling Disease Background

Whirling disease is caused by a microscopic parasite that infects trout and salmon, resulting in severe deformities and death in young fish. The disease gets its name from the abnormal whirling or erratic tail chasing movements of some infected fish. Symptoms also may include a black tail in young fish and a deformed skull or spinal column in adult fish. There is no known cure for fish infected with the parasite.

### Impacts of Whirling Disease in Colorado

A shipment of trout from a private, out-of-state hatchery accidentally brought the parasite to Colorado in the 1980s. By the mid-1990s, whirling disease had spread throughout most of the state's major river drainages.

Whirling disease has impacted rainbow, brook and cutthroat trout populations throughout Colorado. and is known to occur in high mountain lakes above 12,000 feet. The parasite also infected most of the state's coldwater hatcheries, reducing production and fishing opportunities for anglers. Whirling disease doesn't infect humans and eating an infected fish isn't harmful.



## CPW Whirling Disease Studies

The cooperative investigations initiated by CPW have led to the development of several effective control strategies in CPW hatcheries, which stopped the spread of whirling disease through stocking operations. Research continues into protecting uninfected waterways and providing excellent fishing opportunities. These current CPW research projects have shown a great deal of promise:

### Trout Studies

CPW researchers developed rainbow trout strains that are resistant to whirling disease and are evaluating their uses in stocking operations. These strains of fish are able to survive exposure to the parasite. Some of these strains are now produced in CPW hatcheries for stocking. Current evaluations are focused on determining which varieties have the best growth, survival and value for anglers. There is ongoing work to optimize the usefulness of these rainbow trout strains in our state hatcheries.

Other disease resistant varieties of rainbow trout are being tested for their ability to reproduce and survive in the wild to re-establish and maintain natural self-sustaining populations. Several locations that were stocked with resistant strains already show evidence of natural reproduction and survival in rivers, including the Gunnison, Arkansas and Colorado. Additional sites are being stocked in coordination with further research and management activities.



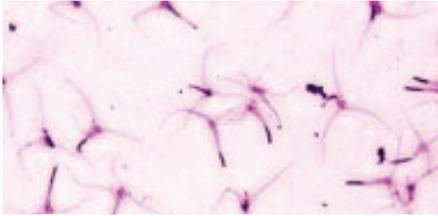
## Resistant Worm Studies

The complex life cycle of whirling disease poses challenges to controlling the spread. The parasite, *Myxobolus cerebralis*, starts life as a water-borne spore on the bottom of waterways. Small worms, *Tubifex tubifex*, eat the parasite spores and become infected. The parasite multiplies within the worms. The offspring are released into the water in a microscopic free-floating stage that attaches to fish, infecting them.

### Recent findings:

- Various lineages of worms have differences in susceptibility to whirling disease. Some of these worms are able to eat the whirling disease parasite without becoming infected. Transplanting resistant strains of worms to areas where the susceptible varieties exist may help reduce the level of infection in those areas.
- Studies in the Upper Colorado River Basin and Windy Gap Reservoir dating back to 1997 found four lineages of *T. tubifex*, including three with lesser or no susceptibility to the disease. Ongoing research found that those three lineages have become the dominant varieties in the reservoir while the most susceptible worm lineage has declined to less than 15 percent of the population. There's no known cause for the shift, but CPW researchers are continuing their work.

## Whirling Disease Life Cycle



Myxobolus cerebralis



Young rainbow trout



Infected adult brown trout

## Ongoing Prevention Strategies

CPW researchers worked with wildlife managers and other agencies to develop prevention strategies that are used successfully throughout Colorado to control the spread of whirling disease into additional waterways:

- Protocols to keep hatcheries disease free, including periodic testing and installation of ultraviolet lights at one hatchery to kill whirling disease spores.
- Policies to protect uninfected streams and rivers from receiving stocking fish from infected hatcheries.

## Whirling Disease In Colorado

