Yosemite National Park

National Park Service
U.S. Department of the Interior

Restoration of Sierra Nevada Yellow-legged Frogs: Experimental Fish Removal

"Certain of the lakes in the higher parts of the Yosemite contain large numbers of Yellow-legged Frogs in both the tadpole and adult conditions. It is a commonly repeated observation that frogs, in tadpole form at least, do not occur in lakes which are stocked with trout… the advent of fish in a lake sooner or later nearly or quite eliminates the frogs. It seems probable that the fish prey upon the tadpoles, so that few or none of the latter are able to reach the stage at which they transform. The frogs which live along the streams probably spawn in small temporary pools in the meadows which the trout cannot reach."
- Animal Life in the Yosemite by J. Grinnell and T.I. Storer, 1924

Why is the park doing non-native fish removal?

Lakes and streams above 4,000 feet in Yosemite National Park were naturally free of fish due to waterfalls and steep cascades that kept fish from moving upstream. As a result, wildlife in these high mountain lakes and streams evolved without fish.

Sierra Nevada yellow-legged frogs were once the most abundant amphibian in the mountain lakes of Yosemite National Park and the surrounding high country. Frogs were encountered by the hundreds on lake shores. Frog populations have now declined by over 95 percent, and more are lost each year. Surveys in 2005-2007 found that the species is in rapid decline and on a path towards extinction.

In 2007, with the support of park entrance fee funds, an experimental project to remove non-native fish from six remote sites began. This project was designed to inform future management actions aimed at recovering the frog and restoring habitat in the park.

Yosemite offers, and will continue to offer, high quality fishing opportunities in a wide variety of habitats. The sites for the current fish removal project were chosen in part because they were not popular among anglers, they were remote and fish could successfully be removed within two to three years.

How do non-native fish effect the ecosystem?

Non-native fish impact frogs by eating their tadpoles and eggs and competing with adult frogs for food. Insects that rely on ponds and streams for their early life stages, including mayflies and dragonflies, provide an important source of food for frogs. When these insects emerge from the aquatic environment, they provide an irreplaceable food source for other native wildlife such as birds and bats.

Stocking of non-native fish in the naturally fishless waters of Yosemite began in the late-1800s. Within in a few decades researchers noticed that frogs and fish were rarely found in the same lake or stream.

Although fish stocking in Yosemite ended in 1991, many lakes still contain fish. Fish have died out in some lakes because the habitat was unsuitable for reproduction. In these fishless lakes, researchers have found that native species, including frogs and invertebrates, such as stone flies, damselflies and mayflies, rapidly returned once fish were no longer present.

Where are non-native fish being removed?

Fish are currently being removed from the following sites in Yosemite:

- Site 1: Virginia Lake
- Site 2: Cold Mountain Area Lakes
- Site 3: Hutchings Lake
- Site 4: Bartlett Creek Lakelets
- Site 5: Middle & Tiny McCabe Lakes
- Site 6: Harriet Lake #2 (alternative site)

Note: These names may not appear on USGS maps.
These sites constitute only 5% of the lakes that contain fish in the park.
Detailed maps of these sites are available at wilderness permit offices in the park.

What else is having an impact on frogs?

Chytridiomycosis, a disease caused by the fungal pathogen *Batrachochytrium dendrobatidis* (amphibian chytrid fungus) was first identified in 1999. This disease has had a catastrophic impact on Sierra Nevada yellow-legged frog populations. However, some populations of frogs have been able to persist in Yosemite despite chytrid infection. These persistent populations are a topic of research currently supported by the National Science Foundation.

These topics, as well as other possible causes of amphibian declines, such as habitat loss, airborne contaminants, and climate change, are the subjects of ongoing research. The information obtained from this research will help inform future management actions to promote the recovery of the Sierra Nevada yellow- legged frog and the ecosystems of which they are a part.

How can I learn more?

The National Park Service is preparing a High Elevation Aquatic Management Plan and Environmental Assessment to guide how Yosemite will protect the park's diverse high-elevation aquatic environments. The plan will also address future actions that may be needed to restore native species, habitats and systems that have been disturbed by past or ongoing human activities. Here are ways to learn more about this plan and stay involved:

- **Attend a public meeting** to talk with project specialists and obtain more information on the plan. The 2 public meetings scheduled for this plan are:
  - **Open House: June 25, 2008 in the Valley Visitor Center Auditorium from 1:00-5:00pm**
  - **July 12, 2008 at Parson's Lodge in Tuolumne Meadows from 1:00-4:00pm**

- **Add your name to the park's planning list** and receive the *Planning Update* newsletter as well as other planning- related notices. You can also submit your email address to receive the park's periodic electronic newsletter.

- **The public scoping comment period for this plan will occur from June 23 through July 25, 2008.** Submit comments with your thoughts about this plan by any of the following means:

  Mail: Superintendent
  Attn: High Elevation Aquatic Resources Management Plan
  P.O. Box 577
  Yosemite, CA 95389
  Phone: 209/379- 1365; **Fax:** 209/379- 1294
  E- mail: Yose_Planning@nps.gov

- **Visit online:** www.nps.gov/yose/parkmgmt/aquatics.htm

Plan Timeline	
Public scoping	**June 23 – July 25, 2008**
Environmental Assessment anticipated for public comment	**Summer 2009**