

## Little Kern Golden Trout (*Oncorhynchus mykiss whitei*)

### Data: 1984 Revised Fishery Management Plan for the Little Kern Golden Trout

Partners: CDFG, FWS, Sequoia National Park, Sequoia Forest

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#### Little Kern Golden Trout Status:

The Little Kern Golden trout (LKGT) was proposed for federal listing as Threatened under the Endangered Species Act (ESA) on September 1, 1977 by the U. S. Fish and Wildlife Service (USFWS 1978). On April 13, 1978, the Director of the US Fish and Wildlife Service officially listed the LKGT as Threatened, and designated its Critical Habitat. It has the designation of species of Special Concern with the State, and has had a long history of recovery efforts. The California Department of Fish and Game (CDFG) prepared a management plan for the species in 1978 (Christenson 1978) and revised the plan in 1984 (Christenson 1984). This plan also serves as a recovery plan, but is badly out of date and needs to be revised. LKGT is managed as a Heritage Trout by CDFG.

(<http://www.dfg.ca.gov/fishing/html/WildAndHeritageTrout>)

#### Sportfishing Importance of the LKGT:

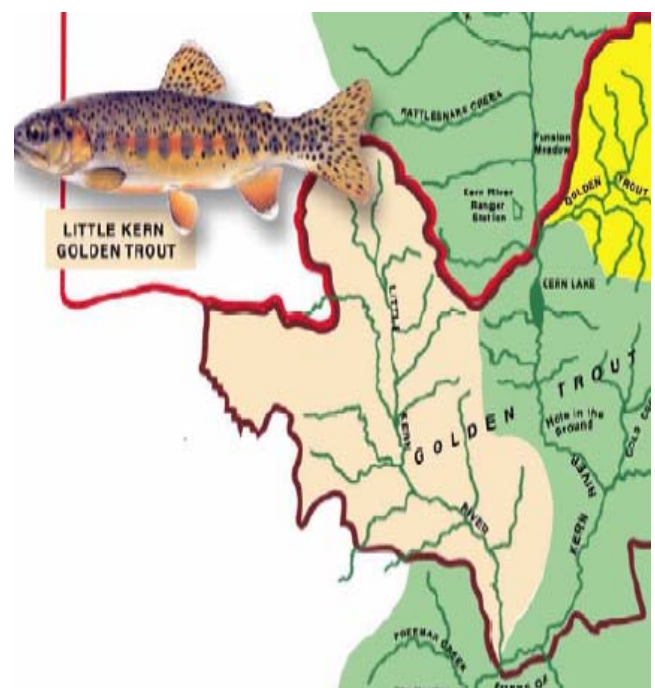
Although listed as threatened, the listing package included a special 4(d) Rule under the ESA that allowed the state to permit angling. LKGT are generally present in good numbers, found almost entirely within the designated Golden Trout Wilderness, and angling does not pose a threat to their continued existence. Many anglers seek out and enjoy these unique, colorful trout. There is a long history of anglers traveling to the Little Kern and enjoying fishing for LKGT as part of their backcountry experience. The California Heritage Trout Challenge, an angling recognition program established by CDFG, features opportunities for native trout angling and promotes angler and public awareness of native trout conservation issues. Many anglers are seeking the LKGT and the other two golden trout forms in pursuit of completing the Heritage Trout Challenge.

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#### Distribution of the Little Kern Golden Trout

The historic range of the Little Kern Golden trout includes waters in the Little Kern River drainage above the lowest fish migration barrier upstream of the confluence with the Kern River, (“Forks of the Kern”) in Tulare County, California (Figure 1).

Figure 1. Historic range of the Little Kern Golden Trout



There are approximately 100 miles of stream and 10 lakes in the Little Kern Basin. The LKGT population was estimated to consist of fewer than 5,000 trout. When restoration efforts began in 1975, LKGT were restricted to about ten miles of stream within the basin. Allozyme analysis of trout populations in the basin identified six populations as representing LKGT: Soda Spring Creek, Deadman Creek, Wet Meadows Creek, Willow and Sheep creeks, Fish Creek. In addition, one of the Crytes

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Lakes and Coyote Creek (Kern drainage) contained a population of LKGT transplanted from Rifle Creek.

chemical treatments, transplants, and supplementation with hatchery-produced LKGT from the KRPB.

#### **Summary of Management Actions**

Beginning in 1976, CDFG biologists began an effort to eliminate non-native trout and replace them with LKGT. The basin was divided into five subunits based on the location of the LKGT populations in Figure 2. The idea was to group recovered waters adjacent to the identified pure LKGT populations. Tributaries to the Little Kern River are generally steep and many natural barriers to upstream trout movement are present. However, numerous man-made barriers were constructed to facilitate the recovery effort. Rotenone and antimycin were used to systematically eliminate non-native or introgressed trout populations and LKGT from nearby streams were used to establish new LKGT populations in recovered streams. This process moved very slowly and carefully. Recovered streams were monitored to be sure chemical treatments were successful prior to stocking with LKGT.

Beginning in 1984, some local sportsmen's organizations expressed concern the recovery program was moving too slowly and insisted the CDFG accelerate their efforts. Beginning in 1985 the CDFG brought LKGT from the basin into Kern River Planting Base (KRPB), near Kernville, to establish several broodstocks. A building was constructed to isolate the LKGT from the catchable sized rainbow trout distributed to area waters from this facility. The five broodstock populations were marked with various fin clips for identification. LKGT were spawned and their offspring returned to selected recovery streams. The hatchery produced LKGT were never planted back in their original donor streams. By 1997, the entire basin had been restored to LKGT through a program of

#### **Advances in Genetic Analysis**

Over time, genetic analysis methodology had advanced from the use of protein allozymes to DNA for determining the relationships of trout populations. The pace of advancements in the technology of DNA analysis has also accelerated in recent years providing powerful new tools for characterizing trout genetics. The most current DNA analysis methods have shown there is non-native genetic material present in some LKGT populations within the basin. Analysis of LKGT samples in multiple parts of the Little Kern basin is underway and a comprehensive first look at LKGT genetic status using DNA should be completed by the end of 2007. This analysis will form the basis for a revised management/recovery plan. This DNA analysis shows there was contamination of the LKGT broodstock at KRPB in at least two years that artificial reproduction was used to accelerate the recovery efforts. In these cases, this included one or more rainbow trout being spawned with the LKGT. Based on planting records, it appears these contaminated fish are confined to relatively few waters in the basin, but will need to be removed. The total effort required to correct this problem is unclear, but will require a significant commitment of time, effort, and resources.

In hindsight, the KRPB facility was not a conservation hatchery and should not have been used for this purpose. In addition, the response by the CDFG to sportsmen's demands to accelerate the recovery program should have been met with a more conservative approach to restoration.

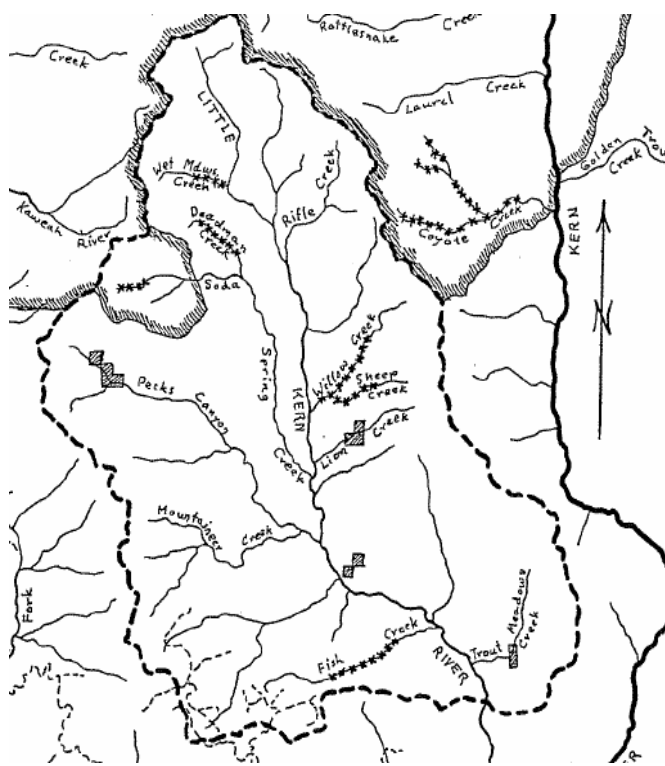
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Figure 2 - Distribution of LKGT (X's) at the beginning of the restoration program in 1975.



### Habitat Requirements of the LKGT

Little Kern River golden trout are generally restricted to small stream habitats with suitable spawning gravels, annual flows with oxygen levels greater than 5 ppm, and the provision of other life stage requirements typical of the area that provide food, cover, rearing habitat and protection from disturbances that degrade the water quality and stream bed. The majority of the Little Kern watershed has been designated as critical habitat for the LKGT by the U.S. Fish and Wildlife Service and lies within the boundary of the Golden Trout Wilderness.

### Obstacles, Concerns and Treats to the continued expansion and recovery of Little Kern Golden Trout:

#### Genetic Concerns:

Similar to the California golden trout, it is recognized that the most significant threat to the recovery and expansion of LKGT is from hybridization and introgression with non-native rainbow trout and possibly, other golden trout (Kern River rainbow and California golden trout). The three golden trout forms are subspecies of rainbow trout and all readily hybridize with the others. Hybridization with close relatives such as rainbow trout dilutes the fundamental genetic character of LKGT, resulting in a significant loss to the native genetic composition over time. Allowed to continue, further hybridization could result in eventual loss of the subspecies.

#### Non-native Fish Concerns:

The protection of the Little Kern critical habitat from the presence of non-native salmonids, or even contaminated versions of LKGT continues to be of concern. In the 1930's and 1940's, non-native rainbow, brown and brook trout were planted in the Little Kern basin by the CDFG and sportsmen in response to reports of poor angler success. In the 1950's CDFG biologists realized hybridization was occurring and fish stocking ceased. The issues of illegal fish stocking and education of anglers as to the need to manage these species without interference from "bait-bucket" biologists are on-going threats to the health of the Little Kern River native fish populations.

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#### Habitat degradation Concerns:

Due to the remoteness of most of the Little Kern River basin, the diversity of land uses is limited. The use with the highest impact, and that which has caused most of the habitat degradation, is grazing of domestic livestock. The impacts of grazing to LKGT habitats include the loss of pool habitat, sedimentation, reduced instream cover, riparian cover loss, loss of undercut streambanks, and stream channels becoming wider and shallower. Riparian and meadow habitat degradation occurs in some areas of the Little Kern watershed where livestock grazing is permitted. While these impacts may not lead to the extinction of the Little Kern golden trout, habitat degradation can have an impact on the size, numbers, physical condition, and structure of LKGT populations. In addition to trout, this degradation can impact other riparian and instream dependent species. Efforts undertaken to reduce impacts from grazing may take many years as recovery involves geologic processes.

Fire and drought may also pose threats to LKGT habitat. Recent changes in fire management and suppression methods may help reduce severity of future wild fires.

#### **Opportunities for Improvement of the status of Little Kern Golden Trout:**

Typically the actions fall within these categories:

- fish population surveys and analysis
- genetic analysis
- fish population manipulation (non-native removal, re-introduction, reducing hatchery impacts)
- habitat manipulation (barrier placement, limited instream structures, proper livestock grazing practices, including monitoring of utilization and streambank damage).
- regulatory actions ( fishing regulations, water use, land management)

#### Population Surveys, genetic analyses, and fish population manipulation:

Key actions will include:

Complete assessment of LKGT populations and genetic status
Conduct standardized surveys, genetic analyses and long term monitoring. Use current DNA methodology to identify hybridized LKGT populations. Use this information to revise the LKGT management/recovery plan. Revised plan will provide direction needed to eliminate introgressed trout populations and manage/restore LKGT in the basin. This revised management document will rely on recommendations developed by a genetics management plan for LKGT.

#### LKGT Habitat Manipulations:

Restoration of golden trout habitat will have to address both habitat quality issues and issues of spatial limitations. Current efforts to manage LKGT have been directed toward improving in-stream and meadow conditions and restoring limited stream fragments.

Primary Habitat Actions to be addressed:

Improve riparian and instream habitat for the restoration of LKGT populations.
Restore and improve altered channels and riparian habitats; water quality and sediment transfer as necessary.
Establish and maintain barriers to upstream fish migration needed for restoration efforts
Address public and private land management practices to improve habitat
Monitor and evaluate natural catastrophic impacts like fire and drought
Interagency cooperation to include improved fire management activities (water transfers) to reduce the possible introduction of harmful organisms.

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#### Expand Education and Outreach programs to garner public support for LKGT:

##### Priority Actions to be addressed:

Expand public education efforts regarding LKGT restoration efforts
Enforcement of State Fish & Game laws to protect Little Kern golden trout

#### Highest priority Actions for LKGT:

1. Complete the genetic analysis of trout samples collected from tributary streams to the Little Kern River and Coyote Creek. This analysis is being done by the University of California Davis Genomic Variation Laboratory and should be completed mid-2007.
2. Use the results of genetic analyses to develop a LKGT genetics management plan. This would contribute to a revised LKGT management/recovery plan
3. Implement the action items in the revised management plan. The plan should provide directions for the elimination of introgressed populations from the basin.
4. Monitor these populations as needed. A few of the drainages have road access and illegal stocking of non-native trout is a real concern. The genetic integrity of these populations needs to be checked on a regular basis.
5. Monitor fish populations (numbers, size, condition)
6. Continue public outreach efforts, including the consequences of illegal fish transplantation.
7. Continue enforcement of Fish and Game regulations, including efforts to prevent trout transplantation.
8. Monitor effectiveness and integrity of the barriers to upstream fish movement.

There are numerous barriers in the basin that are keys to a systematic recovery effort. All barriers need to be evaluated and effectiveness improved as needed.

9. Produce an annual (or as needed) backcountry user's brochure explaining the program and management action that may be occurring.
10. Coordinate management activities at least annually with land management agencies (U. S. Forest Service and National Park Service) and stakeholders.

#### References:

Christenson, D. P. 1978. A fishery management plan for Little Kern golden trout (*Oncorhynchus mykiss whitei*). Calif. Department of Fish and Game. Fresno, Calif. xx pp.

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