

# Native Brook Trout Restoration on Lynn Camp Prong Great Smoky Mountains National Park

## Progress Report



Trout Unlimited volunteer Charlie Chmielewski releasing native southern Appalachian brook trout into the restored section of Lynn Camp Prong. – NPS photo

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*Great Smoky Mountains National Park  
Resource Management & Science  
107 Park Headquarters Road  
Gatlinburg, Tennessee 37738*



### *Contact Info:*

*Stephen E. Moore  
Steve E Moore@nps.gov  
(865) 436-1250*

*Matt A. Kulp  
Matt\_Kulp@nps.gov  
(865) 436-1254*

## **INTRODUCTION**

Brook trout are the only salmonid (trout) native to the Southeastern United States. Brook trout have lost about 75% of their historic range due to past logging activities and the introduction of non-native trout that have expanded their range and displaced brook trout. In many streams, non-native rainbow were stocked upstream of natural barriers, thus preventing the native species from reclaiming lost range as the forest “healed” from past land management practices. Work in the 1970’s indicated that barriers protected approximately 40 miles of stream segments from upstream expansion by fish. Distribution surveys in the 1990’s show that six streams have lost between 0.4 km (0.25 mile) and 4.0 km (2.5 miles) of brook trout range in their headwaters. Water quality surveys from this period indicate increasing stream acidity due to acid deposition and increasing forest age. This information increases the urgency of restoring streams with more stable water quality at lower elevations. The Great Smoky Mountains National Park (GRSM) Fishery Management Plan (1993) indicates that brook trout restoration in carefully selected stream segments is one of the parks highest priorities. National Park Service (NPS) policies state that native species are to be restored where feasible and practical (NPS Management Policies 2006).

Today, brook trout are relegated to small headwater streams which are subject to acidification and already have pH declines of up to a full unit after rain events. Observed pH values after rain events are in the range (<5.5) known to produce stress and/or lead to mortality. Restoration of larger streams at mid to low elevations (i.e. <1,070 m or 3,500 ft) is necessary to prevent further headwater range loss, stabilize populations in the Park, and expand brook trout range. Restoration and population stabilization is also extremely important because brook trout south of the New River drainage in Virginia have been shown to be genetically distinct from northern strains of brook trout. For the reasons outlined above, the restoration of native brook trout populations is one of the highest priorities in the GRSM Fisheries Management Plan.

In September 2008, GRSM fisheries staff assisted by personnel from several agencies applied Fintrol<sup>®</sup> to approximately 12.8 km (8 miles) of Lynn Camp Prong to remove non-native rainbow as part of a native brook trout restoration project. Fintrol<sup>®</sup> was applied to all areas marked in red or green within the project area (Figure 1). The detoxification site was located at the base of the barrier cascade at 622 m. Project objectives 1 and 2 were fulfilled by the completion of these tasks.

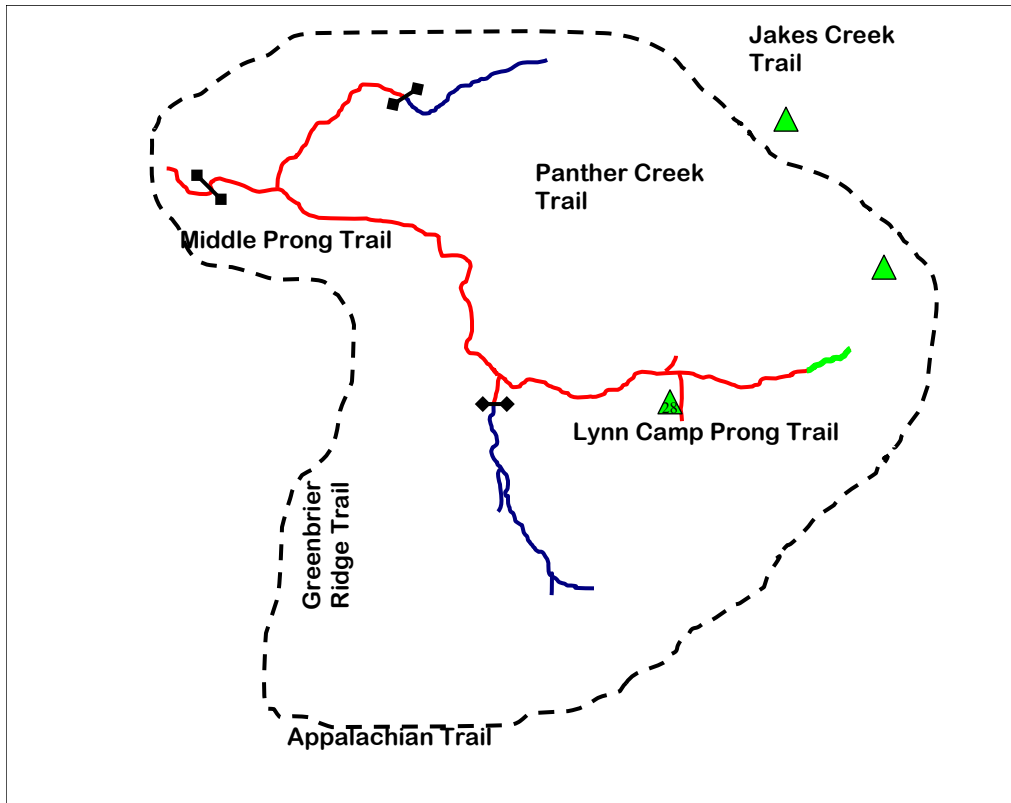


Figure 1.— Map of the Lynn Camp Prong project area, Great Smoky Mountains National Park, including barrier falls, trails and current brook trout distribution within the watershed. The location of the natural barrier at lower Lynn Camp Prong, Marks Creek, and lower Indian Flats Prong are indicated by dumbbell bars.

## Background

### Project Objectives:

1. In September 2008, remove non-native rainbow trout from segment of historic brook trout range using Fintrol<sup>®</sup> (antimycin).
2. Provide onsite training for state and federal biologists in the proper and safe application of Fintrol<sup>®</sup> in September 2008.
3. In 2009, validate removal success and restock the stream with native brook trout.
4. Provide recreational fishing opportunities once the brook trout population has expanded and stabilized. This will be determined through annual fish population monitoring activities.

### **Evaluation of the 2008 Treatment**

The Lynn Camp Prong project area was surveyed the first two weeks of June, 2009 to determine if the treatment in September had successfully removed all rainbow trout from the stream. The original survey plan was to sub-sample the treatment area to determine if all non-native rainbow trout had been removed. Project managers selected five areas to

resample because of difficulties in achieving complete eradication of non-native rainbow trout during treatment in September 2008. During this effort two adult rainbow trout were collected in Buckeye Cove. In the un-named tributary at 3,280 feet, two adult and one young-of-the-year (YOY) rainbow were collected. Three adult rainbow trout (2 males and 1 female) were collected in the main stream at site 57 (3,120 ft.). Twenty four rainbow trout (7 adults and 17 young of the year) were collected in Marks Creek sites 19, 20, 21 and 22. Based upon these results, project managers determined that the remainder of the 12.8 km of treatment area must be sampled to determine if rainbow trout were collected in other stream sections. This additional effort collected three additional rainbow trout, all adult males.

The exact reason these fish were not eliminated during treatment is not clear but appears to be related to slow stream flow ( $\geq 30$  min/100m) in headwater sections and the vertical drop in elevation between stations (about 12.2 – 15.2 m [40 to 50 ft] per station) in the area before and after station 57. Organic matter in a stream will bind the Fintrol<sup>®</sup> thus rendering it ineffective for the removal of non-native trout. Apparently, the slow flow times in these headwater reaches ( $\geq 30$  minutes/100 m) allowed the Fintrol<sup>®</sup> to bind with the organics in the stream thus decreasing the effective travel distance of the chemical. Similar results have been observed in other projects where water travel times per 100 m exceeded 30 minutes.

Given the results of the survey, the project managers decided to re-treat approximately 800 m of the two tributary streams, 500 m of Lynn Camp Prong above and below site 57 and 700 m of upper Marks Creek. These areas were treated in early July 2009. Once completed, the areas were re-surveyed and no rainbow trout were found.

#### *Aquatic Insect Surveys*

Samples were collected in Lynn Camp Prong watershed during winter, spring, and summer 2009 to complete 6 month, 9 month, and 1 year post-treatment sampling, respectively. Control and treatment sites were located within 1<sup>st</sup>-4<sup>th</sup> order stream segments as well as in 4<sup>th</sup> and 5<sup>th</sup> order potassium permanganate neutralization segments. Semi-quantitative kick seines and replicate quantitative Hess samples, 24-hour drift samples, and Hester-Dendy multi-plate samples were collected from each site during each season to maximize species collection potential for analysis of macroinvertebrate assemblage and successional trends. Laboratory processing of samples is ongoing and statistical analyses will be completed once all sample processing and specimen identification is accomplished. Although no statistically definitive results have been calculated, macroinvertebrates were observed in all sample types at each location during all field collections.

#### *Collection and Reintroduction of Brook Trout*

GRSM fishery staff aided by staff from the Tennessee Wildlife Resources Agency and volunteers from the Little River Chapter of Trout Unlimited collected about 1,800 native southern Appalachian brook trout and released them into the restored section on Lynn Camp Prong in July and September 2009 (Figures 2, 3, and 4).



Figure 2. GRSM fishery staff transferring brook trout from the hatchery truck tank to a bucket for preparation for transport to the release site.



Figure 3. Tennessee Wildlife Resources Agency staff and volunteers from the Little River Chapter of Trout Unlimited preparing brook trout for transportation to release sites.



Figure 4. Little River Chapter of Trout Unlimited volunteers load a cooler with brook trout for transportation to a release site.

#### *Acknowledgments*

Brook trout restoration projects can never be accomplished without the cooperative assistance of numerous agencies, NGO's, volunteer time and financial assistance. We wish to acknowledge the assistance of the Tennessee Wildlife Resources Agency, and volunteers from the Little River Chapter of Trout Unlimited for their assistance with the collection and reintroduction of brook trout. Between October 1, 2008 and October 1, 2009, agencies, NGO's, and volunteers donated roughly 314 hours of volunteer hours to the Lynn Camp Prong restoration effort with an estimated value of \$6,126.