

Evaluation of Apple Creek Rainbow Trout Fishery

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Background

A 1992 study by the Ohio Department of Natural Resources (ODNR, Division of Wildlife) rated Apple Creek as the third best candidate stream in Ohio for supporting trout. This designation was based on water temperature and quality, trout habitat suitability, and public access. Despite the designation, ODNR has not stocked trout in Apple Creek. Clear Fork Chapter of Trout Unlimited (TU) received permission from ODNR to privately stock 850 rainbow trout in Apple Creek (a one-mile stretch at Grosjean Park in Wooster) on March 19, 2005. An informal, volunteer fishing survey was conducted and found at least 794 catches over a 12-week period. An additional 450 rainbows were stocked in Apple Creek at the Park on October 29, 2005. At the time of this writing (February 12, 2006), fish from the second stocking are being caught by sports fishermen.

On October 5, 2005 I conducted an electrofishing survey of the stocked section of Apple Creek with several members of the local TU chapter. No rainbow trout were observed or captured in a 1.5-hour sampling period. Given the efficiency at which we were collecting other large-bodied species of fish, I believe that all of the trout have been removed from this section by fisherman, washed downstream, or otherwise perished during the summer. Other fish species caught included rainbow and banded darters, striped shiner, central stoneroller, creek chub, bluntnose minnow, rock bass, yellow bullhead, northern hogsucker, and white sucker. While the section of Apple Creek was relatively diverse and contained abundant darters and other indicators of good/fair water quality, white suckers represented a dominant portion of the biomass. This may be related to the extensive agricultural land use and subsequent nutrient inputs in the upstream portion of the watershed. While the Ohio Environmental Protection Agency (OEPA) found that Apple Creek was in warm-water habitat (WWH) attainment (OEPA 1996), their sampling was limited to the lower reaches of the stream. In August 2005 I sampled Apple Creek several miles upstream of the trout-stocking site at Grosjean Park (on OARDC/ATI property) and found a fish assemblage indicative of poor water quality (dominated by diseased creek chub, green sunfish, and white sucker).

Clear Fork TU Chapter has plans for future stockings of rainbow trout in 2006. What is needed is a scientific evaluation of the status and success of stocking efforts. To this end, I propose the following objectives:

Objectives

1. Evaluate habitat conditions for rainbow trout in Apple Creek.
 - The coldwater/warmwater habitat designation of Apple Creek (and its smaller tributaries) will be investigated.
 - If habitat conditions can be improved, I will make habitat and/or channel improvement or restoration recommendations.
2. Determine how upstream land use practices are affecting water quality.

- Specifically to include dissolved oxygen, turbidity, conductivity, pH, and temperature
 - Potentially to include measures of carbon and nitrogen.
3. Evaluate the macroinvertebrate food base of Apple Creek and determine to what extent land use practices may be affecting the invertebrate community.
 4. Evaluate population dynamics (e.g., growth rates and condition) of stocked rainbow trout in Apple Creek.
 5. Use a well-designed creel survey to determine the amount of fishing pressure and removal of trout in Apple Creek.

Methodology

Objectives 1-3 – Watershed scale processes

To understand how upstream landuse practices are affecting water quality and trout habitat at the Grosjean Park location, I will extensively sample the upstream watershed (minimum of 8-10 sites). Water quality will be determined as a composite of biological (fish and macroinvertebrate), habitat, and water chemistry condition. At each site, I will seasonally (spring, summer, autumn) sample fishes, macroinvertebrates, habitat, geomorphology, and some water chemistry parameters (e.g., dissolved oxygen, temperature, conductivity, pH, and turbidity). If funds were available, I would collect additional water quality parameters (e.g., carbon, nitrogen, phosphorus, and chlorophyll a concentrations). The additional water quality measures would help explain how agricultural practices, in particular, are affecting water quality.

I will compare assemblage structure and condition (health as related to incidence of parasitism and disease) of the fishes and macroinvertebrates to measured environmental variables using multivariate techniques (Williams et al. 2005). Of particular interest will be monitoring of thermal condition of sites upstream of Grosjean Park and assessing how water temperature (and its change throughout the year) affects assemblage structure. Assemblages of organisms can be used to assess whether coldwater conditions exist in the stream (Ohio EPA 2002).

Understanding how landuse practices are affecting instream habitat, geomorphology, and biological communities in Apple Creek will allow me to make predictions about how different restoration strategies (e.g., streambank stabilization, large wood addition) will affect the structure of assemblages, including trout (Morris et al. 2006).

Objectives 4-5 Populations dynamics of rainbow trout

The final two objectives will focus on population dynamics of trout in Apple Creek within and adjacent to Grosjean Park. I will conduct electrofishing surveys 1-2 times per year to understand how trout are using habitat in Apple Creek at Grosjean Park and immediately upstream and downstream of the area. To minimize deleterious effects of shocking (Sharber and Carothers 1988, Hollender and Carline 1994), I will supplement electrofishing with snorkeling surveys. I will make underwater observations of habitat use and make detailed measurements of microhabitats (Murphy and Willis 1996, Williams et al. 1999). For trout that are captured, I will evaluate their condition by comparing length, weight, and age (determined by scales; Murphy and Willis 1996).

Finally, I will conduct creel surveys of fishermen to evaluate fishing pressure, methods employed, and amount of trout removed from the stream. I will utilize a stratified two-stage design to sample both on weekdays and weekends at various times and locations (Murphy and Willis 1996). A survey instrument will be designed and administered to fishermen.

Deliverables

The major outcome of this work will be an evaluation of the stocking efforts in Apple Creek. I will make recommendations for future stocking efforts and management of the species in Apple Creek. I anticipate making recommendations as well for habitat improvement at the Grosjean Park site and in potential upstream areas.

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