DIET COMPOSITION OF RAINBOW AND BROWN TROUT IN THE GUADALUPE RIVER

Proposal submitted by:

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With the completion of Canyon Reservoir in 1969 there was the potential of creating a rainbow and brown trout fishery on the Guadalupe River. Since then both Trout Unlimited and Texas Parks and Wildlife Department have aggressively initiated stocking programs in the hopes of creating and managing a carry over trout fishery.

One tool available to those seeking a healthy fishery is a survey of the preferred food utilized by trout living in the river. Foraging dynamics of salmonids in the Guadalupe River have not been thoroughly investigated. To understand the potential of the Guadalupe River as an important carry over fishery, quantitative surveys of the benthic macroinvertebrate populations and rainbow and brown trout food preferences are conducted.

Presently, it is generally thought that most salmonids rely on a foraging strategy that revolves around the use of a home range (Bachman 1984; Gerking 1994) composed of a series of foraging sites (Gerking 1994). Within home ranges, territorial trout will obtain most of its food (Gerking 1994). The optimal trout habitat is one which provides the greatest access to benthic drift. Benthic drift, composed of aquatic organisms which release from the benthos and subsequently drift downstream (Gerking 1994), serve as the principle food source in many rivers where the salmonid foraging strategies have been studied (Jenkins 1969; Allan 1981; Gerking 1994). Benthic macroinveretebrtes make up the majority of the trout's diet (Jenkins 1969; Allan 1981; Gerking 1994) and are subject to predation by salmonids as they migrate to the surface of the water or are carried downstream by the current (Gerking 1994). Trout are able to take advantage of this and have subsequently evolved a foraging strategy that utilizes this aspect of the life history strategy of drifting aquatic fauna (Behnke 1992; Gerking 1994).

A review of the literature regarding the foraging dynamics of trout indicates that bottom dwelling, defined as aquatic organisms that live directly in, or slightly above the river bottom (Gerking 1994) constitutes a minor portion of the trout diet in clear streams (Jenkins 1969; Waters 1969; Jenkins *et al.* 1970; Allan 1981; Bachman 1984). Examination of the stomach contents of trout living in the Guadalupe River indicates that bottom dwelling macroinvertebrates comprises a substantial portion of the diet (Quinonez 1996).

Because of the insight gained from the prior study, a more comprehensive survey of both the benthic macroinvertebrate population and food preferences of trout found in the river is warranted. Consequently, it appears that the stocked trout in the Guadalupe River may be dependent on bottom dwelling organisms rather than on drifting macroinvertebrates. The objectives of this survey seek to provide a quantitative analysis of the benthic macroinvertebrate population with respect to spatial variation that is associated with existing stocking sites and assess the potential for other sites to serve as trout fisheries. In addition, a drift study will characterize fauna found in the water column. Further, gut analysis of trout taken from the river will provide data regarding food preferences. The results obtained from these samples will allow us to construct a stocking strategy based on food availability.

Methodology

I will conduct a survey of the benthic drift over twenty-four hour intervals throughout the year. This seasonal sampling will allow a quantitative evaluation of the drifting benthic macroinvertebrate population. Additionally, information obtained from drift sampling will also characterize the terrestrial insect population that is available for consumption throughout the year. Surber sampling, will be used to sample the river bottom, to quantify the dynamics of

bottom dwelling organisms. I will compare the survey of the benthic macroinvertebrate community with the findings from gut analysis obtained from fish taken from the Guadalupe River. Further, I will attempt to construct a database which incorporates the data obtained from Quinonez's (1996) survey and my own data. This may allow some conclusions about the preferred food and the sites along the river where the organisms are most abundant..

Analysis of stomach contents will also be used to compare food preferences between differing age classes of trout. Age determination will be based on otholith and scale analysis. By analyzing the type of bethnic macroinvertebrates found in each sampling location it may be possible to develop a predicative model that would be designed to release both adults and/or fingerlings at specific sites along the river. This would give the fish the greatest chance to "carry-over" and reproduce. By acquiring data on food preferences, placement of fish in the river can be optimized.

Further, by implementing a fin-clipping practice we will have opportunity to monitor the migratory behavior, if any, of the trout . This might allow a stocking procedure which focuses on placing trout in foraging sites where they are most likely to thrive. Understanding the dynamics of home sites may allow a stocking procedure to avoid over-stocking at sites where trout are already established. Another benefit of fin-clipping would be the estimation of survivorship of differing age classes of trout.

A stocking strategy, using the foraging practices of trout, may allow increased success in the future and possibly in part lead to a blue-ribbon trout fishery in the Guadalupe River.