

Alberta Conservation Association 2010/11 Project Summary Report

Project Name: *Trout Stocking Evaluation 2008 – 2010*

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Partnerships

Alberta Fish and Game Association – Morinville Chapter and Onoway Chapter
Alberta Student Temporary Employment Program
Alberta Sustainable Resource Development
Canada Summer Jobs
TD Friends of the Environment Foundation

Key Findings

- On average, 11% of the stocked rainbow trout survived until autumn.
- On average, catch rate was 0.36 fish/angler-hour and the size of harvested fish was 32 cm.
- High angler participation and satisfaction at stocked lakes.
- After reducing stocking by 80% at three lakes, there was no difference in anglers catch rate, participation and satisfaction.

Introduction

Stocking trout to create put-and-take fisheries is a popular management tool for providing recreational fisheries. In Alberta, both Alberta Sustainable Resource Development (ASRD) and Alberta Conservation Association (ACA) stock over three million harvestable-sized rainbow trout (*Oncorhynchus mykiss*) into 242 put-and-take lakes annually. Of the 242 lakes, ACA stocks 60 lakes with 131,000 trout. The conceptual rainbow trout stocking model is as follows: stocking trout creates populations, populations attract anglers, and stocking more trout will create better sport fisheries (Butler and Borgeson 1965). However, underlying assumptions of this conceptual model have seldom been tested (Hartzler 1988, Johnson et al. 1995). The goal of our study was to examine these underlying assumptions and use the results to optimize our stocking. Thus, the study was designed to answer four specific questions: (1) How successful is stocking in creating trout populations?; (2) How do these populations relate to sport fishery quality?; (3) How does sport fishery quality relate to angler satisfaction and participation?; and (4) Can stocking be optimized to maintain or improve angler satisfaction and participation?

Methods

We used roving creel surveys, fall gill netting, programmable trail cameras (effort cameras), and a social questionnaire at nine stocked lakes (June – August, 2008 – 2010) to answer the preceding four questions. During creel surveys, we interviewed anglers as they finished their angling trips and collected date, time of day, trip length and number of fish caught. We used trail cameras to collect photographs of anglers on each lake each day from 8 am to 9 pm (i.e., angling day). We validated camera counts by conducting angler counts (instantaneous counts) each hour as photographs were taken and used the mean number of anglers/hour captured by the camera and instantaneous counts to derive correction factors for camera counts.

We calculated estimates for number of anglers, angling effort (or participation), and harvest from angler interviews and trail camera data. We also interviewed anglers about their fishing experience and level of satisfaction related to their fishing trip. This information helped us understand angler motivations. We estimated angling effort and harvest using angler catch rates and angling trip data.

During the fall, we used three multi-mesh gill nets, set for approximately 24 h, in each lake to estimate the abundance and structure of the rainbow trout population; catches were standardized to 100 m² of net and 24 h. We measured lengths and weights of all fish and collected otoliths for age determination. We estimated fish density (fish/hour/hectare) using the total catch and a catchability coefficient (G. Sterling, ASRD, unpublished data).

To examine the possibility of an optimal stocking strategy, we reduced stocking densities by 80% at three lakes and reassessed angler satisfaction and participation in 2010.

Results

Question 1: How successful is Alberta's stocking in creating trout populations?

Of the 274,800 trout stocked during this study, anglers (n = 42,791) harvested 3.6% (n = 9,829), 0.4% died from hooking mortality (n = 1,209), and 4.1% survived to fall (n = 11,219) adding up to 11% of stocked fish; the remaining 89% cannot be accounted for and are assumed dead due to natural causes. We attempted to determine when and how these fish were lost by using short duration gill net sets and underwater videography. The catches in the gill nets were very low and highly variable, leading to inconclusive results; murky water conditions made videography impractical.

Question 2: How do these populations relate to sport fishery quality?

Stocked lakes with larger populations provided higher catch rates. Only one lake had a catch rate greater than 1 fish/angler-hour and the overall catch rate was 0.36 fish/angler-hour. The average size of harvested rainbow trout was 32 cm.

Question 3: How is the sport fishery quality related to angler satisfaction and participation?

The majority of anglers (69%, $n = 572$) reported they were satisfied (i.e., satisfied and very satisfied) with their overall angling experience at the stocked lakes. In general, 49% and 41% of anglers were satisfied with the size and number of fish captured, respectively. Anglers were consistently satisfied with their fishing experience when catch rates rose above 0.2 fish/angler-hour (Figure 1).

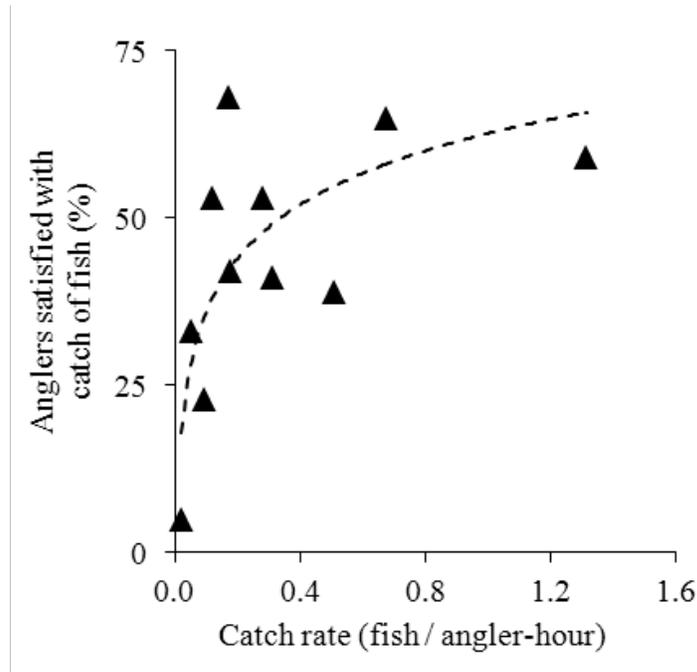


Figure 1. Relationship between total catch rate of rainbow trout and the proportion of anglers ($n = 572$) that are satisfied with their catch at stocked lakes in Alberta (2008 – 2010).

Angler participation was high at the stocked lakes. On average, each lake received 3,056 angler visits or 308 angler-hour/ha. Participation was unrelated to catch rate or to size of trout harvested. The majority of anglers (57%) stated that being “close to home” was their main reason for fishing the lakes (Figure 2).

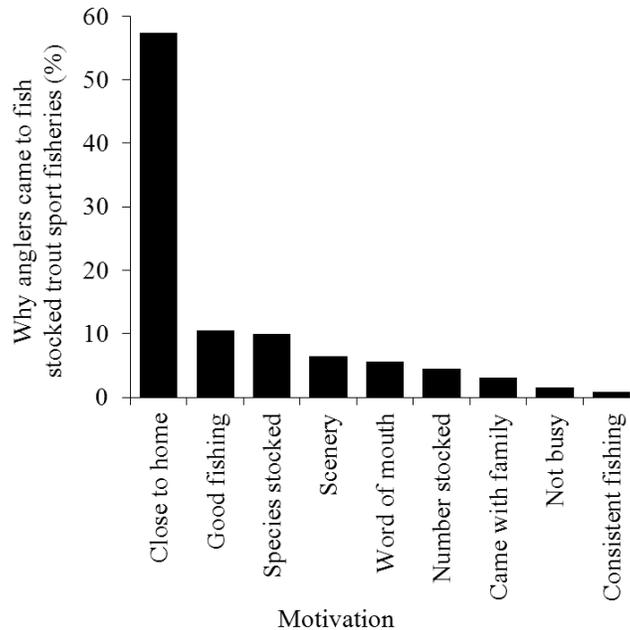


Figure 2. Relationship between total catch rate of rainbow trout and the proportion of anglers (n = 572) that were satisfied with their catch at stocked lakes in Alberta (2008 – 2010).

Question 4: Can stocking be optimized and still maintain or improve angler satisfaction and participation?

There was no difference between catch rates, satisfaction and participation at the 80% reduced-stocking lakes (Heritage, Salter’s and Star), compared to lakes with unchanged stocking rates. However, the cost averaged \$7.66/angler-hour at the lakes with the normal stocking rate, and averaged \$1.24/angler-hour under the reduced stocking strategy.

Conclusions

The assumptions of the conceptual model, mainly to stock more for better fishing and higher participation, were largely rejected. There was no difference in angler catch, participation and satisfaction after an 80% reduction in stocking rate. This suggests target-based goals may be more effective in managing trout stocking. Specifically, goals could be: 1) stock to achieve catch rates high enough to satisfy anglers (approximately 0.2 fish/angler-hour), and 2) attract angler participation at levels to match sustainable trout production. These goals could be achieved by developing a program that would assess the results of stocking (i.e., harvest, participation and satisfaction) in an organized fashion. Potential cost savings suggested by this study could be used to increase the number of lakes stocked near urban centers or to study techniques that improve the survival of stocked trout.

Communications

- Presented results and conclusions to ASRD biologists and managers.
- Notified local newspapers of project and field activities at project's lakes.
- Notified local RCMP of activities on lakes.
- Presented the project's goals and methodology to Alberta Fish and Game Association, Morinville and Onoway chapters.

Literature Cited

Butler, R.L., and D.P. Borgeson. 1965. California "catchable" trout fisheries. Fish Bulletin 127, California Department of Fish and Game.

Hartzler, J.R. 1988. Catchable trout fisheries: the need for assessment. Fisheries 13: 2-8.

Johnson, D.M., R.J. Behnke, D.V. Harpman, and R.G. Walsh. 1995. Economic benefits and costs of stocking catchable rainbow trout: a synthesis of economic analysis in Colorado. North American Journal of Fisheries Management 15: 26-32.

Miller, R.B., and R.C. Thomas. 1957. Alberta's 'pothole' trout fisheries. Transactions of the American Fisheries Society 86: 261-268.

Pictures



Hansen's Lake, a stocked rainbow trout sport fishery. (Photo: Bill Patterson)



Stocking rainbow trout from tanks on a truck to a lake using a plastic collapsible pipe. (Photo: Bill Patterson)



Alberta Conservation Association staff member, Brendan Ganton, setting a gill net at a stocked rainbow trout sport fishery. (Photo: Bill Patterson)