2023 Sport Fish Restoration Project Award – Research and Surveys

Project Title – Statewide Evaluation and Fishery Implementation of "Magnum" Hatchery Catchable Rainbow Trout

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Overview and Need

Catchable-sized hatchery trout (hereafter, "catchables") serve as an important component of many coldwater fisheries management programs throughout North America, including in Idaho. For example, in 2004 alone, nearly 60% of the ~80 million non-anadromous Rainbow Trout *Oncorhynchus mykiss* stocked by state and federal management agencies across the United States were released as catchables (>152 mm TL; Halverson 2008). While the overall number of trout stocked in the United States has declined since 1973, the total weight of stocked trout has increased (Halverson 2008), indicating that fisheries management agencies have shifted their stocking programs by providing anglers with fewer, larger trout. Due to their size, catchables provide immediate fisheries once they are stocked and are especially important for coldwater fisheries that cannot support wild trout populations or where wild trout catch rates are low. In many fisheries, stocking catchables allows resource managers to provide harvest opportunity to the public.

Idaho Department of Fish and Game (IDFG) hatcheries are integral to managing coldwater sportfishing opportunities in Idaho. IDFG's "resident" (non-anadromous) hatchery program consists of 10 hatcheries that raise up to 18 strains of salmonids for inland coldwater fisheries. In 2015, Idaho resident hatcheries stocked over 17 million fish, including about 1.5 million catchable-sized (200–350 mm total length; herein, catchables) Rainbow Trout *Oncorhynchus mykiss*. Producing catchables accounts for over 50% of the annual resident hatchery budget, and catchable Rainbow Trout are annually planted in approximately 290 waters throughout Idaho. Catchables are an important component of many fisheries management programs in coldwater habitats because they provide instantaneous fisheries once they are stocked. This is especially important in altered habitats such as impounded reservoirs, which typically do not support wild trout populations, and often do not provide adequate conditions over a sufficient time period for put-and-grow fisheries to develop (Trushenski et al. 2010).

IDFG has implemented a designated hatchery trout research program for decades, studying a variety of topics related to trout stocking. In recent years, IDFG hatchery trout studies have methodically investigated numerous factors affecting angler catch of hatchery catchables, including rearing density, grading, baffles, and environmental conditions. This has produced a wealth of information and several publications (see Cassinelli et al. 2016; Cassinelli and Meyer 2018; Meyer and Cassinelli 2020, Meyer et al. In Press). While these and many other factors have been shown to influence angler catch of stocked catchables, it became evident in these studies that the consistent, overriding factor influencing angler catch is fish size at stocking. This stirred interest in directly investigating whether stocking larger catchables might be beneficial for Idaho anglers. However, because IDFG hatcheries are essentially rearing fish at full capacity at each facility, growing catchables to a larger size in fixed-space rearing units naturally would result in fewer individuals to be stocked, which could reduce overall catch by recreational anglers.

Research Evaluations and Results

Optimizing the number and size of catchables caught by anglers required a cost-benefit analysis to weigh the expected increase in catch for larger fish against the reduction in fish production required to maintain equivalent feeding costs for larger fish compared to standard-sized catchables. Such programmatic assessments of catchable stocking programs are generally lacking (Jackson et al. 2004). To fill this information gap, we evaluated angler catch of two target sizes of catchable Rainbow Trout, one being the "standard" size of catchables at 254 mm and the other being a "magnum" size of catchables at 305 mm. Fish were stocked into numerous lentic and lotic systems with considerable site variability. In addition, feed expenditures associated with growing catchables at a production scale were compared

between the two target length groups to evaluate the relative cost effectiveness of stocking trout at both sizes.

We found that, although magnum catchables cost 31% more in feed expenditures than those reared to a smaller average size, catch (by anglers) of larger fish increased by 100% relative to smaller fish. Consequently, if target stocking size was changed from 254 to 305 mm and feed costs were held constant by reducing the total number of fish stocked, anglers would benefit by catching larger and more fish, despite the reduction in number of fish stocked. In fact, despite the increase in rearing costs associated with growing catchables to a larger size, it cost $0.54 less on average for every magnum caught by an angler than for every standard caught. This result-based outcome summarizes the effective programmatic benefit of producing and stocking larger catchables across a variety of lentic and lotic systems (Branigan et al. 2021).

Benefits to Anglers

Reductions in the number of fish stocked represented a major shift in management direction to a highly visible and popular management program. Many anglers track IDFG stocking schedules and numbers. There was natural hesitancy from many anglers to accept reductions in stocking rates. However, due to our Resident Fishery Research Program's "Tag, You're It!" statewide angler tag reporting system (Meyer and Schill 2014), we were able to implement an objective evaluation with broad geographic scope (Branigan et al. 2021) that unequivocally demonstrated a "have your cake and eat it too" scenario with better returns, lower cost per fish caught, and happier anglers. This was a very positive and well- supported message for Fishery Managers to share with constituents. IDFG altered their entire resident hatchery rearing program, adopting a policy to stock magnum catchables in most lentic and lotic waters in the state (excluding community ponds).Increases in license-funded production budgets have allowed for additional incremental increases in fish production, providing tangible benefits statewide to IDFG customers, including new anglers, for whom catchable programs are especially important.

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