

PROPOSAL FOR THE INTRODUCTION OF SPOTTAIL
SHINER (Notropis hudsonius) INTO ONDEIDA
NARROWS RESERVOIR

Bureau of Fisheries
Idaho Department of Fish and Game

November, 1985

PURPOSE

Annual sampling of fish populations in Oneida Narrows Reservoir indicate a substantial decline in forage fish numbers since the introduction of walleye in 1976. The mean number of yellow perch caught per gill net set has decreased from 112 in 1978-79 to 3 in 1983-84. Utah chub numbers have also declined and they have not been sampled since 1981.

If the developing walleye fishery is going to continue to be successful, it is essential that they have an adequate forage base. Therefore the Department of Fish and Game proposes the introduction of a new minnow species, the spottail shiner (Notropis hudsonius), into Oneida Narrows Reservoir.

DESCRIPTION OF ONEIDA NARROWS RESERVOIR

Oneida Narrows Reservoir was built by Utah Power and Light Co. in 1913 for the purpose of supplying electrical power. It is located on the Bear River in southeastern Idaho. Morphometric data for the reservoir are listed below in Table 1.

Table 1. Morphometric data for Oneida Narrows Reservoir

Spillway elevation	4,887 feet
Surface area	515 acres
Storage capacity	11,500 acre-feet
Mean depth	22 feet
Maximum depth	102 feet
Average discharge	850 cfs
Theoretical water exchange rate	7 days
Shoreline length	10.4 miles
Length	4.8 miles
Mean width	0.2 miles

The reservoir which was formed to provide hydroelectrical power is operated as a run of the river impoundment. Water level fluctuation is generally only a few feet although the reservoir can be drawn down 30 feet or more. Sediment deposition on the inlet of the reservoir has formed areas of shallow water where aquatic vegetation has become established. Shorelines along the length of the reservoir are fairly steep with a rock, gravel and sand substrate.

Fish species which have been in the reservoir include yellow perch, wall-eye, Utah sucker, common carp, Utah chub, mountain whitefish, bluegill, Channel catfish, redbside shiner and longnose dace.

Fish in Oneida Narrows Reservoir can move up the Bear River approximately 25 miles to the Cove Power Plant located southwest of Grace, Idaho. Fish migrating downstream past the dam could establish themselves in the lower portion of the Bear River drainage in Idaho and Utah. Species known to be in the Bear River in Utah include those found in the reservoir plus black bullhead, green sunfish, black crappie, largemouth bass, rainbow trout, sculpin sp., and recently the spottail shiner (Pettengille and Johnson, Utah Dept. of Natural Resources, pers. com.).

IMPACT OF SPOTTAIL SHINER INTRODUCTION

The introduction of spottail shiners into Oneida Narrows Reservoir should provide a beneficial forage fish for walleye while having a minimal impact on other fish populations. This species which is native to central Canada, northcentral and northeastern United States has been introduced into reservoirs on the Missouri River in South Dakota, North Dakota and Montana as well as waters in Colorado, Wyoming and recently into Utah Lake and Willard Bay in Utah. Spottail shiners have developed abundant populations in the Missouri River reservoirs where it is becoming one of the main forage fish and is heavily utilized by predators including walleye, northern pike, channel catfish and smallmouth bass. In Willard Bay, spottail shiners, which were introduced in 1981, have become established and may be the main factor in the improved size and condition of the walleye and other game fish.

SPOTTAIL SHINER LIFE HISTORY

Spottail shiners are generally found in large lakes and in large slow moving nonturbid rivers. They have been successfully introduced into reservoirs with fluctuating water levels and into smaller lakes and ponds. Although vegetative cover is important, they appear to do well in systems with a limited amount of vegetation such as the Missouri River impoundments, Willard Bay and Keyhole Reservoir, Wyoming. They are predominantly a schooling, shoreline oriented species, although young of the year spottail shiners may be found in open areas of lakes.

Spottail shiners are sexually mature at 1 year of age and a size of 2.6 inches. They spawn over gravel and sandy shores or in aquatic vegetation. Spawning time occurs from May through July depending upon location and water temperature. Fecundity averages about 1,800 eggs per female with a range of 100 to 2,600 eggs.

Spottail shiners grow to a maximum size of about five inches and to a maximum age of about four years. Females generally live longer and attain a larger size than males. Age 1 fish average 2.0-2.3 inches, Age 2 = 3.1-3.7 inches, Age 3 = 3.7-4.3 inches, and Age 4 = 4.1-4.5 inches.

Spottail shiners are opportunistic feeders, selecting whatever food is most abundant. Fry feed on algae and rotifers until 0.5 inches long then they start to switch to zooplankton. Adults feed on insects, zooplankton, water mites, algae, plant seed and fibers, as well as spottail shiner eggs and larvae. A food habit study of young of the year walleye, yellow perch, crappie and spottail shiner found only insignificant inter-specific competition for food. Even if there is some competition for food with walleye and yellow perch fry, the benefits to the larger juveniles and adults outweigh the disadvantages.

It is possible that once the spottail shiners have been introduced into Oneida Narrows Reservoir and become abundant, they may migrate into the Bear River system. However, according to life history studies of this species, they prefer lake or reservoir habitat, but have been found in large rivers with low turbidities. The Bear River is not a large river and it has high levels of turbidity due to irrigation returns, so it unlikely that they would establish significant populations in the river. In the event that they did establish a population in the river, they would probably be a beneficial forage fish for the game fish.

STOCKING PROCEDURE

Oneida Narrows Reservoir would require 1,000 to 2,000 adult spottail shiners released in late May or early June prior to their spawning. The fish would be released in the upper end of the reservoir. This should be repeated a second year. Sources for the fish include Lake Oahe in South Dakota. These fish would be trapped with the cooperation of the South Dakota fish and game agency. Department personnel would assist with trapping and sorting the fish to prevent contamination by other species. Fish would be transported to Idaho in a Department truck. Additional sources of spottail shiner include commercial bait fish dealers in Minnesota and Wisconsin. Utah and Montana have used commercial fish with varying degrees of success. Some shipments have been contaminated with other fish species and have had poor survival. If spottail shiners were purchased, a Department representative would have to supervise the sorting before shipping to prevent contamination by other species.

EVALUATION

The spottail shiner introduction will be evaluated in the Fisher Research Section's Dingell-Johnson project "Alternative Species for Lake and Reservoir Fisheries." Evaluation over at least five years will include:

1. Success of spottail spawning;
2. Yearly index to spottail abundance;
3. Changes in existing fish and zooplankton communities;
4. Growth and condition of walleye; and
5. Utilization of spottail by walleye and other species.

ALTERNATIVES

1. No introduction – By not introducing any additional forage fish into Oneida Narrows Reservoir, we will be preventing any benefits to the existing walleye population and fishery. It is likely that the fishery would continue at low levels with small fish.

2. Introduce other forage species – There does not appear to be any other nonnative forage species which has the favorable life history characteristics demonstrated by the spottail shiner and which has shown the success of the spottail shiner without having the potential to cause problems with existing fish populations. Additionally, the spottail shiner is already present in the lower Bear River system in Utah.

3. Increase the yellow perch population through stocking – Since the yellow perch is currently being used as the main forage base for walleye, populations could be increased by annually stocking yellow perch. The rapid decline in the yellow perch population in Oneida Narrows Reservoir after the introduction of walleye indicates that this would require a substantial annual effort of collecting and transporting yellow perch. Spottail shiner introductions would be a short term project and would provide a diversity of forage fish which would lead to a more balanced prey base. The juvenile spottail shiners would also provide additional forage for yellow perch, thereby improving yellow perch growth rates and improving the pan fishery.