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NEW DISTRIBUTION RECORDS AND NOTES ON THE LIFE HISTROY AND BEHAVIOR OF THE SAND ROLLER, PERCOPSIS TRANSMONTANA (EIGENMANN AND EIGENMAN).

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New Distribution Records and Notes on the Life History and Behavior of the Sand Roller, *Percopsis transmontana* (Eigenmann and Eigenmann)

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ABSTRACT

New distribution records are reported for the sand roller, *Percopsis transmontana* (Eigenmann and Eigenmann). Fish were collected in 1973 and 1974 at River Mile 383, 70 miles above the closest published record from the mainstem Columbia River. Specimens collected by hoop net ranged in size from 34-90 mm in water temperatures ranging from 2.5 to 20.5 C at depths to 3 meters. A gravid female was identified in late March. Observations on diel behavior are discussed.

INTRODUCTION

The sand roller, *Percopsis transmontana* (Eigenmann and Eigenmann), is one of two teleost species belonging to the family Percopsidae; a group of little known fishes possessing the characteristics of trout (adipose fin) and spinyrayed fishes (spines in front of dorsal and anal fins). This report extends the known distribution of sand rollers about 70 miles upstream in the mainstem Columbia River, south central Washington, and documents our observations on life history and behavior of the species.

P. transmontana is an endemic species apparently restricted to the Columbia River system. It occurs mainly in the lower Columbia River and

its tributaries (Schultz 1936, Miller 1959, McPhail 1967, Reimers and Bond 1967, Eddy 1969). In Oregon, sand rollers have been collected in the Willamette River primarily between Albany and Eugene (Dimick and Merryfield 1952) and in Rock Creek, a tributary of the Clackamas River (Reimers 1963). In Washington the species has been collected in Salmon Creek, Clark County, Lacamas Creek near the town of Vader (Harris, personal communication) and other locations in the Cowlitz River system (McPhail 1967, Reimers and Bond 1967). In the mainstem Columbia River sand rollers have been found at Horseshoe Island Slough, 25 miles above the river mouth (Reimers 1963), near the confluence of the Kalama River (McConnell and Snyder 1970), near Bonneville, the Dalles and McNary Dams (Harris, personal communication), at the mouth of, and immediately above, the Umatilla River (Eigenmann 1892, Jordan and Everman 1896, Harris, personal communication) and at the mouth of the Walla Walla River near Wallula, Washington (Pratt and Whitt 1952). Additionally, sand rollers have been collected from the Yakima River near Prosser (Harris, personal communication) and Yakima, and from an irrigation canal that empties into the Yakima River near Ellensburg, Washington, (Patten et al. 1970). In the Snake River, sand rollers have been collected at the outlet near Hood Park (Montgomery, personal communication). In Idaho, the species has been collected in the Clearwater River 4-6 miles above its confluence with the Snake River, and at the mouth of Hatwai Creek (Pratt and Whitt 1952).

MATERIALS AND METHODS

During the past few years, several fishing methods have been used in nuclear power plant site assessment studies to survey fish populations

in the Hanford reach of the Columbia River (Figure 1). These included gill nets, trammel nets, beach seines, hoop nets, minnow traps, trotlines, electroshocker and various types of trawls. However, most of the gear is selective for certain species and sizes of fish and only hoop nets were effective in collecting sand rollers. Hoop nets were set from April 1973 to June 1974 between River Miles 378-383, approximately 10 miles below Priest Rapids Dam (Figure 1). The area is a deep channel with no islands and has a maximum depth of 10 meters. The bottom consists mainly of boulders and large rock over 10 cm in diameter. During the spring and fall of 1974, hoop nets were also set periodically between River Miles 348-352. In this area the river is shallower, wider, and has islands, sloughs and backwater areas. Thus, it has a greater habitat diversity than the upriver collecting sites. The bottom varies from sand to boulders and is often cemented as outcroppings of upper Ringold-type material.

Hoop nets were set parallel to the current in depths ranging from 0.67-6 meters and left in the water almost continuously. They were checked every 1-3 days and rotated among various locations on both sides of the river. Nets were composed of two 61 cm diameter tunnels, each 3 meters long and set so that the mouth of one tunnel faced the mouth of the second. Each tunnel was supported by 6 hoops with throats attached on the first and third hoop. The two tunnels were connected with a 61 cm high, 6 meter long lead. Mesh size of the throats, netting surrounding the hoops and connecting lead was 1.25 cm (square mesh).

Water temperature, depth and bottom type were recorded during collecting periods. Captured fish were identified to species, enumerated, measured to the nearest mm (fork length) and preserved in 5% formalin.

On the evening of 8 March 1975, SCUBA observations in the upper end of McNary Pool (RM 338) near Richland, Washington, provided additional information on the nocturnal distribution and habits of the species.

RESULTS AND DISCUSSION

The uppermost occurrence of sand rollers in the mainstem Columbia River system is implied from collections in the Yakima River, assuming an upriver dispersal that carried the fish at least to the mouth of this tributary. However, to our knowledge, the species has never been reported in the Columbia River above the confluence of the Walla Walla River at River Mile 314.

We collected 15 sand rollers by hoop nets from July 1973 through February 1974 between River Mile 378-386. This is the furthest upriver occurrence ever reported for this species on the mainstem Columbia River (Figure 1). Peak abundance occured in August and December. Although hoop nets were set at this site from March through June in 1973 and 1974, no sand rollers were collected. This differs from collections in the lower Columbia River where peak abundance occurred in April (McConnell and Snyder 1970) and the Yakima River where peak abundance occured in January and March (Patten et al. 1970). Our fish ranged in size from 34-87 mm with a mean of 67 mm (fork length). All specimens were collected over a rock bottom. Four sand rollers were collected in September 1974

and one each in November 1974 and May 1975 between River Mile 348-352. These fish ranged in size from 62-90 mm (mean fork length=79 mm) and occured both over rock and sand bottom. Water temperatures at collection ranged from 2.5 to 20.5 C. Water depths extended to 3 meters but sand rollers were mainly caught at depths of 1-2 meters.

Sand rollers have been collected in other parts of the species range by beach seine (Reimers 1963, Montgomery, personal communication), electroshocker (Pratt and Whitt 1952, Patten et al. 1970) seine and electroshocker (Reimers and Bond 1967), purse seine (McConnell and Snyder 1970) and in fish traps and ladders at dams (Pratt and Whitt 1952). However, our collections were obtained only with hoop nets with one exception. We collected a few sand rollers from the traveling screens of a water intake structure at Columbia River Mile 380. Three of these were gravid females taken in late March 1974, suggesting that spawning takes place during the spring.

Seven species were caught in nets with sand rollers. These included, in order of abundance, redside shiner (*Richardsonius balteatus*), northern squawfish (*Ptychocheilus oregonensis*), largescale sucker (*Catostomus macrocheilus*), prickly sculpin (*Cottus asper*), threespine stickleback (*Gasterosteus aculeatus microcephalus*), bluegill (*Lepomis macrochirus*), and Pacific lamprey (*Entosphenus tridentatus*). Other species collected by hoop nets in similar habitats and depths included white sturgeon (*Acipenser transmontanus*), bridgelip sucker (*Catostomus columbianus*), black crappie (*Pomoxis nigromaculatus*), Piute sculpin (*Cottus beldingi*), chiselmouth (*Acrocheilus alutaceus*), carp (*Cyprinus carpio*), peamouth

chub (Mylocheilus caurinus), leopard dace (Rhinichthys falcatus), speckled dace (R. osculus), channel catfish (Ictalurus punctatus), yellow bullhead (I. natalis), yellow perch (Perca flavescens), and chinook salmon (Oncorhynchus tshawytscha).

On one occasion, a squawfish taken in the hoop net ate a sand roller. Whether this is a natural occurence or a result of both species confined in the net is unknown but squawfish, a piscivorous species, are potential predators of sand rollers.

Reimers and Bond (1967) found sand rollers among roots and under banks during the day and on sandy bottoms at night, suggesting a diel activity pattern. Our SCUBA observations at River Mile 338 indicate that sand rollers can be particularly abundant on sandy flats at night. Numerous sand rollers were observed in shallow depressions at depths of about 4 meters. Water temperature was 4.4 C. The fish were not congregated, but were spaced about 1 meter apart. They remained motionless on the bottom but when prodded with a gloved finger, they moved to a new depression. The sand roller's cryptic daytime behavior (Reimers and Bond 1967) may be the primary reason why so little is known about life history of the species and its distribution. Our observations suggest that nocturnal observations may be helpful in understanding the biology of this species.

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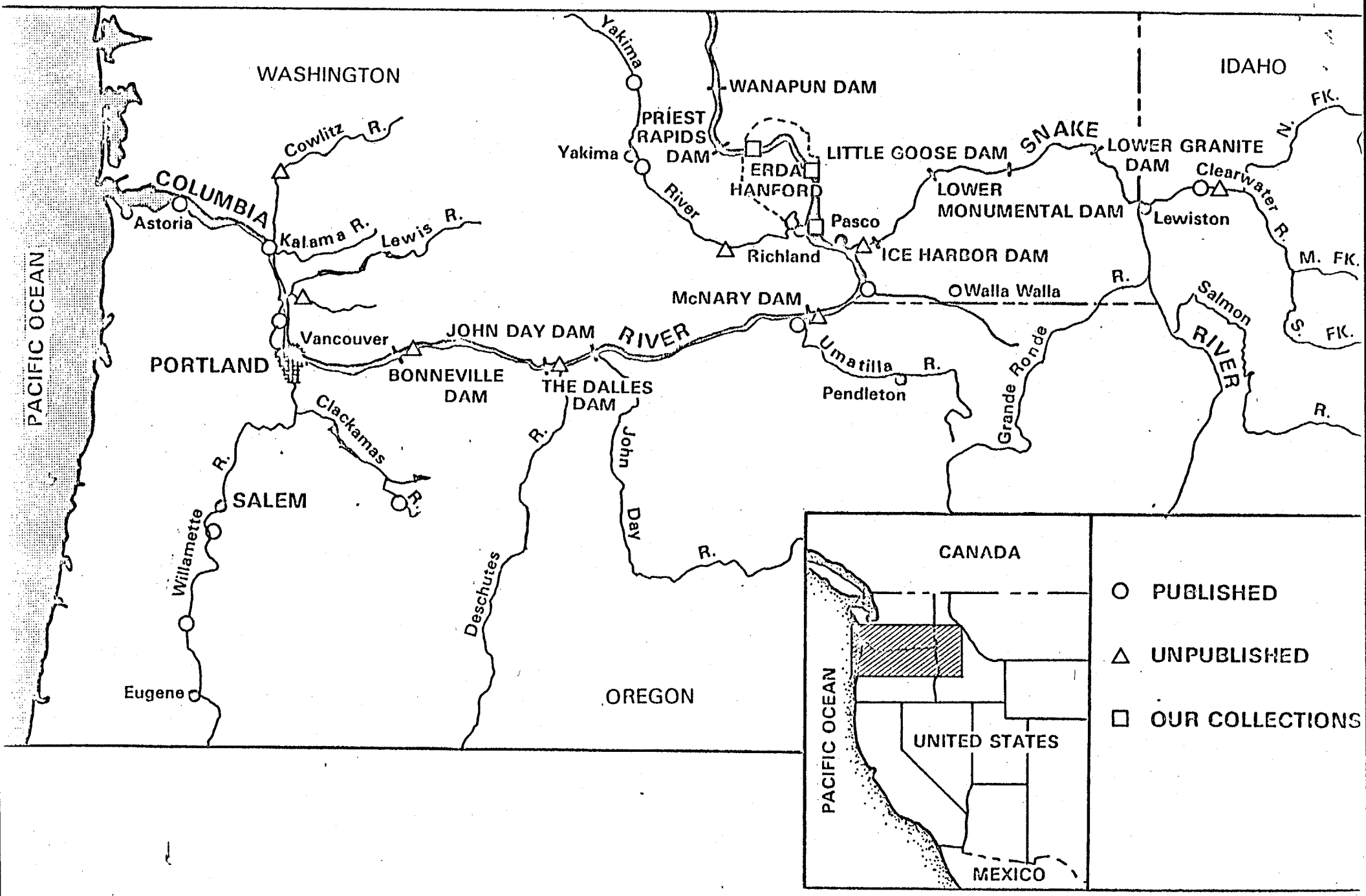

Figure 1. Distribution of the sand roller Percopsis transmontana in the Columbia River system.