

Seasonally Dependent Movement of Lake Trout between Two Northern Idaho Lakes

JACOB A. VENARD*¹ AND DENNIS L. SCARNECCHIA

Department of Fish and Wildlife,
University of Idaho, Moscow, Idaho 83844, USA

Abstract.—The diel and seasonal movements of lake trout *Salvelinus namaycush* between Upper Priest Lake and Priest Lake, Idaho, were studied in 2000. Gill nets were used to capture and detect fish movements between the lakes. Lake trout were caught in the outlet of Upper Priest Lake and in the Thorofare (the narrow channel connecting the two lakes) primarily in the spring and fall, when water temperatures were cool. No lake trout were caught when the water temperature exceeded 15°C. Lake trout were primarily caught at night (94%). Multiple regression analysis indicated that nighttime lake trout catch per unit effort (CPUE) was significantly higher at lower lake surface water temperatures than at higher temperatures ($P < 0.01$). Daytime lake trout CPUE was significantly higher at low Priest Lake surface temperature than high temperature and at high Thorofare depth than at low depth ($P < 0.01$). Nighttime CPUE was significantly higher than daytime CPUE ($P < 0.01$). These results indicate that warm summer water temperatures function as a natural thermal barrier to movement between the lakes in July and August, and that it may be necessary to block lake trout movements between the two lakes at other times to effectively control the population in Upper Priest Lake.

The introduction of nonnative fishes into aquatic ecosystems can have detrimental consequences for native fish species and other biota (Kohler and Courtenay 1986; Dunham et al. 2004). In the Priest Lake system of northern Idaho, the effects of competition between native bull trout *Salvelinus confluentus* and introduced lake trout *S. namaycush* are of particular concern (Fredericks 1999). The two species are top piscivores and can have similar food habits and growth rates (Donald and Alger 1993). Studies have also indicated that these species have similar thermal tolerances and prefer temperatures below 15°C (Bjornn 1957; Martin 1957; Snucins and Gunn 1995). In Priest Lake, Bjornn (1957) found both species at depths of 12–

* Corresponding author: jvenard@meridianenv.com

¹ Present address: Meridian Environmental, 1900 North Northlake Way, Suite 211, Seattle, Washington 98103, USA

Received February 20, 2004; accepted August 27, 2004
Published online May 16, 2005

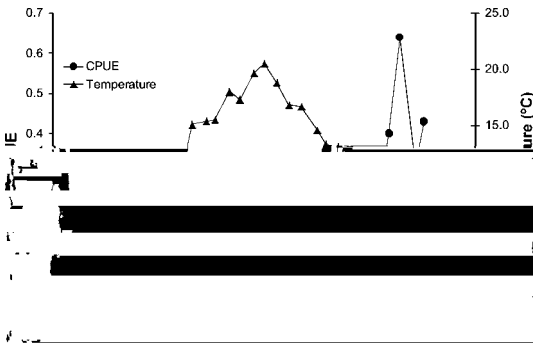


FIGURE 1.—Lake trout weekly nighttime CPUE (fish/h per 100-m² area of gill net) measured at the outlet of Upper Priest Lake, Idaho (April 21–June 21, 2000), and in the Thorofare (the connection between Priest Lake and Upper Priest Lake; June 27–November 8, 2000). Thorofare temperature is also shown.

sume until water temperature fell below 15°C in September (Figure 1). The pattern of greater movement in cooler water and reduced movement in warmer water is similar to results reported elsewhere. Martin (1957) reported that lake trout occupied all depths in Red Rock Lake, Ontario, before summer stratification. As the epilimnial water warmed and the surface temperature reached 14–15°C, the fish remained in deeper and cooler water. Later in the fall, when surface temperature dropped below 15°

- Herschy, R. W. 1995. Stream flow measurement, 2nd edition. Elsevier Applied Science, Barking, UK.
- Kennedy, W. A. 1941. The migration of fish from a shallow to a deep lake in spring and early summer. *Transactions of the American Fisheries Society* 70: 391–396.
- Kleinbaum, D. G., L. L. Kupper, K. E. Muller, and A. Nizam. 1998. Applied regression analysis and other multivariable methods, 3rd edition. Duxbury Press, Pacific Grove, California.
- Kohler, C. C., and W. R. Courtenay, Jr. 1986. American Fisheries Society position on introductions of aquatic organisms: a philosophical perspective. *Fisheries* 11(2):39–42.
- Loftus, K. H. 1958. Studies on river-spawning populations of lake trout in eastern Lake Superior. *Transactions of the American Fisheries Society* 87:259–277.
- Martin, N. V. 7(t321(Fisherietudi))-256(7f)-23riehe)-29rieake