UPSTREAM MIGRATION OF PACIFIC LAMPREYS IN THE JOHN DAY RIVER: BEHAVIOR, TIMING, AND HABITAT USE

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Introduction

Pacific lamprey (*Lampetra tridentata*) populations in the Columbia River Basin (CRB) are believed to have declined dramatically compared to their populations prior to human development (Close et al., 1995). Little is known about the biology and life history of this Agnathan in the CRB. Identification of the biological and ecological factors that may limit lamprey production is critical to population assessment and recovery efforts. The USGS is using radio telemetry to study Pacific lamprey migration behavior, timing, and habitat usage in the John Day River Basin (JDRB). Assessment of over-wintering and spawning habitat usage in the JDRB will be helpful in establishing goals for recovery projects in other sub-basins of the CRB. Specifically, this study will support the lamprey restoration efforts of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in the Umatilla River Basin (Jackson et al., 2000), a drainage with similar geomorphology to the JDRB. Data on adult habitat usage will complement ongoing larval habitat studies by the CTUIR and provide a complete picture of habitat needs for all of the fluvial life stages of the Pacific lamprey in the JDRB.

Materials and Methods

Pacific lampreys were captured after sunset in the John Day River, OR at Tumwater Falls (riverkilometer (RKM) 16.9) using dip nets. Forty-two

lampreys were surgically implanted with radio transmitters and released at the capture site. Movements of lampreys tagged by USGS at Tumwater Falls, as well as some tagged by National Marine Fisheries Service (NMFS) at Bonneville Dam in July, 2000, were followed in the John Day River by three methods: 1) Five fixed-site receivers were used to observe timing of movements past key points and to limit the aerial search area, 2) Aerial telemetry was used to find general positions of tagged lampreys over large portions of the basin and to observe whether over-wintering behavior had been initiated, and 3) Terrestrial telemetry was used to find accurate locations of lampreys for determination of over-wintering habitat use. Preliminary habitat data were recorded for each over-wintering position at the time of location. Temporal habitat characteristics (water depth, flow, and temperature) were measured at each lamprey position and substrate characteristics of the immediate area surrounding the location were qualitatively described.

Results and Discussion

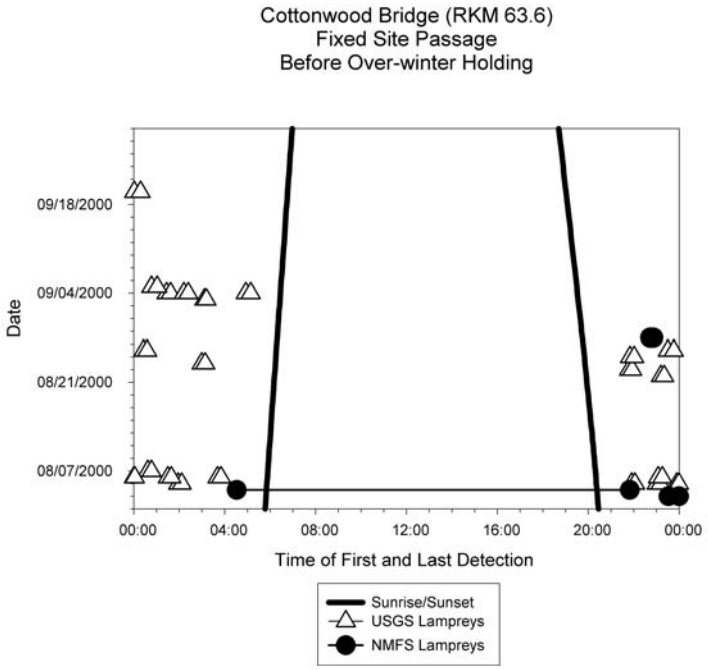

Figure 1

Movement past fixed receivers was exclusively between sunset and sunrise, with one lamprey holding position in front of a receiver during daylight hours as shown in a representative figure (Figure 1). Most over-winter holding was initiated by mid-September, 2000 and continued until mid-March, 2001, when 19 lampreys resumed upstream migration as shown in a representative figure (Figure 2).

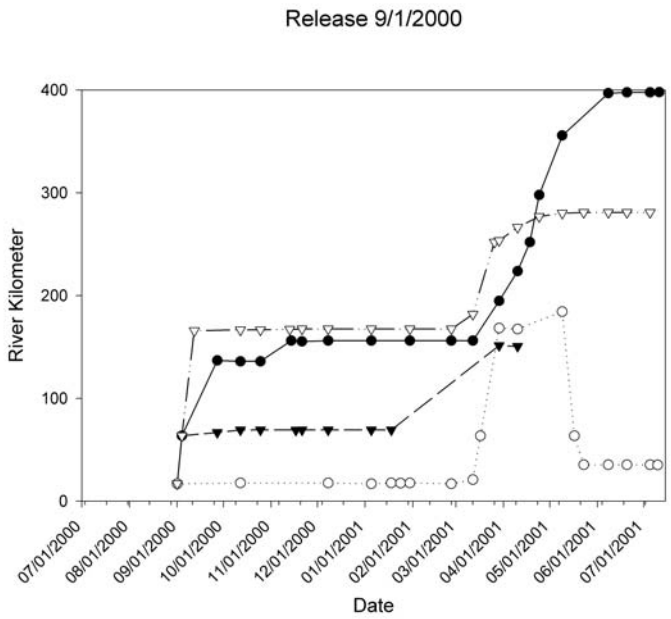

Figure 2

Thirty-five over-wintering lampreys were chosen for more accurate locations from the ground or by boat. Individuals over-wintered under boulders in riffles/glides. Substrate was dominantly boulders (>25.4 cm) at 30 locations and dominantly cobbles (5.1 to 25.4 cm) at 1 location. Four locations were too deep to observe substrate. Upstream migration ceased in May, 2001 (Figure 2), perhaps indicating spawning activity when river temperatures reached levels associated with spawning activity in laboratory studies. Five lampreys tagged by NMFS were found in proximity to USGS-tagged lampreys and behaved similarly. Future tasks for this project will be to verify over-wintering behavior observed in 2000-2001 by collecting migration behavior data over multiple

seasons, and to describe over-wintering and spawning habitat usage by adult Pacific lampreys.

Acknowledgements

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References

Close, D.A., M. Fitzpatrick, H. Li, B. Parker, D. Hatch, and G. James. 1995. Status report of the Pacific lamprey (*Lampetra tridentata*) in the Columbia River Basin. Report (Contract 95BI39067) to Bonneville Power Administration, Portland, Oregon.

Jackson, A.D., P.D. Kissner, D.R. Hatch, B.L. Parker, M.S. Fitzpatrick, D.A. Close, and H. Li. 2000. Pacific Lamprey Research and Restoration. Annual Report 1996 (Contract 9402600) to Bonneville Power Administration. Portland, Oregon.