

# **A Description of Pacific Lamprey Life History, Physical Habitat and Water Quality Criteria, and Their Current Status Downstream of the Hells Canyon Complex**

## **(E.3.1-3, Chapter 4)**

John W. Anderson

AFS Certified Fisheries Scientist

Cold Stream Consulting, P.O. Box 575 Baker City, OR 97814

Contracted by the

**Oregon and Idaho Bureau of Land Management**

November 9, 2002

### **I. Introduction**

This study summarizes information about Pacific lamprey gathered from relevant peer-reviewed literature and includes other collected data regarding fish passage at Columbia and Snake River hydroelectric projects. The report describes the life history, distribution, and habitat and water quality requirements of Pacific lamprey. *“Historically, Pacific lamprey (Lampetra tridentata) have been of little concern throughout the Pacific Northwest region, and information about these primitive fish is scarce and difficult to obtain.”* (Page 2, Paragraph 1)

### **II. Conclusions**

1. *“... the small amount of reference materials and data that do exist indicate the following:*

*1. Of the various species of lamprey established within the Northwest, only the Pacific lamprey (Lampetra tridentata) is found within the Snake River Basin.*

*2. Historical distribution of Pacific lamprey throughout the Northwest was similar to that of Pacific salmon. Specifically, within the Snake River Basin, these fish were observed at least as far upstream as Lower Salmon Falls. Hells Canyon Dam is currently the upstream terminus of migration within the Snake River.*

*3. Pacific lamprey tend to migrate upstream from late spring through late fall, overwinter, and then spawn in tributary streams during the following spring. Water temperatures during spawning are generally increasing from about 10 to 15 °C. This process is similar to what has been observed for steelhead.*

*4. Physical habitat where spawning has been observed consists of fines and gravel substrate, at depths up to 4.0 m with water velocities from 0.5 to 1.0 m/s. Pool tailouts, riffles, and glides have all been identified as spawning areas; these habitats are similar to steelhead habitat.*

*5. Given their life history, Pacific lamprey probably used the mainstem Snake River primarily as a migration corridor (as do steelhead, spring/summer chinook, and*

*sockeye salmon). There is no evidence that Pacific lamprey used or use the mainstem Snake River for spawning or rearing.*

*6. Pacific lampreys are poor swimmers; adults have difficulty successfully migrating upstream through fish passage facilities associated with dams. Fallback rates are very high (up to 50%). Access to suitable habitat apparently has a greater effect on regional distribution of the species than distance from the ocean.*

*7. Ammocoetes spend 4 to 6 years burrowing into fine stream sediments and filter feeding on algae, diatoms, and detritus. These juveniles seem to prefer cooler water (16.0 to 21.8 °C) but have been collected when water temperatures were as high as 25 °C.*

*8. Juvenile lamprey migrate downstream after completing metamorphosis, or during its final stages, in late fall through spring. Little information exists on the time they spend in the estuary before they enter the ocean; however, it is at this time that lamprey become parasitic feeders.*

*9. While parasitic, Pacific lamprey are not associated with a specific host. And though lamprey and salmon arose concurrently within the Columbia River Basin, lampreys are not considered significant predators on Pacific salmon.*

*10. Passage and spawning data, used for assessing trends in population status, are virtually nonexistent for Pacific lamprey. Neither adult nor juvenile passage data have historically been collected specifically for Pacific lamprey. When these data were collected, methods and resulting data have been inconsistent.*

*11. Spawning surveys and juvenile density estimates have only recently been attempted and only on a limited basis. The current baseline will be useful in the future; however, data concerning the status and distribution of these fish within the Snake River Basin are significantly lacking.” (Page 8-9, Paragraphs 3-14)*

**Response:** The BLM agrees with these study findings. Additional information is available that was not discussed. There is no discussion of Pacific lamprey’s fidelity to their natal streams. The possibility of the Columbia River Tribes developing Pacific lamprey hatcheries was felt to be impractical due to data obtained from sea lamprey behavior in the Great Lakes, where they have low fidelity to their spawning streams (USFWS 2000).

### **III. Study Adequacy**

The study is adequate to meet the stated study goals. However, it does not provide specific information concerning Pacific lamprey use of tributaries in the relicensing study area. It does not address their homing ability. It does not discuss the loss of marine-derived nutrients that Pacific lamprey provided to the streams and landscape.

## **IV. BLM Conclusions and Recommendations**

### Conclusions

The study provides a synthesis of some of what is known about Pacific lamprey in the Columbia Basin. Information concerning Pacific lamprey fidelity to natal streams was not mentioned. This information is needed in order to develop PM&E measures. If they have high fidelity to natal streams, they could be bred in hatcheries where they would return to create brood stock. If they do not have high fidelity to natal streams, it may be possible to capture wild fish at Bonneville dam and transport them above the Hells Canyon Complex where they would successfully reproduce.

No actual field studies were undertaken by IPC to determine the distribution of Pacific lamprey in the Snake River tributaries that are part of the relicensing study area below Hells Canyon Dam.

### Recommendations

The Applicant should consider Pacific lamprey restoration as a high priority. They are an anadromous fish that serves as a food source for salmonids and other species.

IPC should continue acquiring information about Pacific Lamprey that may be using the relicensing study area tributaries below the Hells Canyon Dam. As part of the relicensing mitigation measures, the Applicant should be encouraged to work with Columbia River anadromous fish agencies and tribes to restore Pacific lamprey. The potential for the species to become listed is real, and the ramifications should not be taken lightly.

The study points out the value of Pacific lamprey as a prey base for many species. Stocking of Pacific lamprey within and above the HCC would be of value to bull trout and other species as a prey and nutrient source. It is known that adults have great difficulty in ascending the Columbia and Snake rivers dam fishladders. The possibility of transporting adults from Bonneville Dam into the watershed above the HCC should be considered as a PM&E measure. This approach may have real possibilities, if as some literature indicates, Pacific lamprey do not return to the stream where they originated.