Miller Lake Lamprey Monitoring

10/24/08

Introduction

The Miller Lake lamprey, *Lampetra* (*Entosphenus*) *minimus*, is the world's smallest predatory lamprey, reaching a size of only 3-6", and is endemic to the Klamath Basin. It is also one of the few species to have "recovered" from extinction. Miller Lake was chemically treated with toxaphene by the Oregon Fish Commission on September 16, 1958 to eliminate Tui Chub (*Siphateles bicolor*) and a population of unidentified lamprey. The Miller Lake lamprey was later discovered to have been a unique species, apparently restricted in range to the Miller Lake drainage (a small disjunct tributary to the Upper Williamson River), and was scientifically described by Bond and Kan (1973) fifteen years subsequent to its presumed extirpation.

In 1992, researchers from Oregon State University tentatively identified a small lamprey caught during fish surveys of the Upper Williamson River as a Miller Lake lamprey, and in 1996 US Forest Service personnel collected two small lampreys in the lower reaches of Miller Creek. Concern for the tenuous status and apparently low abundance of this unique species, once thought extinct, prompted consideration of emergency listing under the federal Endangered Species Act. The immediate need to list was avoided by extensive surveys by US Fish and Wildlife and Oregon State University, which found relatively numerous populations in Miller Creek, the Upper Williamson River drainage and the Upper Sycan River drainage above Sycan Marsh (Lorion et al. 2000). Unfortunately, the species could not be found in Miller Lake itself, which was isolated from the surviving Miller Creek population by a lamprey barrier installed in 1959 as part of the original eradication in order to prevent recolonization of the lake.

The Miller Lake Lamprey Conservation Plan, adopted by the Oregon Department of Fish and Wildlife Commission June 2005, identified barrier removal as a major step in conservation of this species. The man made concrete barrier constructed at the falls was successfully removed October 2005.

Monitoring of Current Lamprey population in Miller Creek/Miller Lake

The objectives of the survey are 1) to determine current distribution of Miller Lake lamprey in Miller Creek and 2) develop a baseline dataset as reference for monitoring of distribution and relative abundance.

This report contains sampling efforts conducted by Stewart Reid, USFWS and Stephanie Gunckel, ODFW August 24-26, 2004 and efforts conducted October 16, 2008 by Terry Smith, Fremont-Winema National Forest, Brian Benjamin, ODFW, Shannon Hurn, ODFW, Roger Smith, ODFW.

Miller Lake Lamprey Distribution Survey

August 24 – 26, 2004

Methods

Twelve sites were selected according to historical (pre- 1958) observations of lamprey, ease of access, and relative spatial distribution. Suitable lamprey microhabitats at each site were sampled using a backpack model Ab-P2 larval lamprey electroshocker (Engineering Technical Services, University of Wisconsin, Madison). The unit was programmed to deliver 3 pulses per second (125 volts DC) at a 25% duty cycle with a 3:1 burst pulse train to draw larvae from the substrate. Each site was sampled a minimum of 5 minutes.

Results and Discussion

Miller Lake lamprey were present at sites 9, 10, and 11, representing 3.36 miles of the lower unconstrained reaches of Miller Creek (Table 1, Figure 1). Lamprey were not detected further downstream at site 12, which consisted primarily of beaver ponds. Although the stream substrate appeared suitable at this site, low flow may have made this site uninhabitable by filter-feeding ammocetes. Lamprey were not detected upstream of Site 9, which was the upper end of low-gradient habitat. This stream reach was generally constrained, high gradient, and dominated by boulder and cobble substrate. Depositional microhabitats where lamprey ammocetes would be expected were rare. Site 7 included lower portions of Howlock Creek and Miller Creek up to the barrier. Miller Lake lamprey were noted to be present at this site prior to 1958.

Lamprey were not detected upstream of the barrier or in Miller Lake at sites 1 – 6 (Table 1, Figure 1). Sites 1, 3, and 4 included lake shore habitat, where substrate consisted of soft sand and sediment, apparently suitable for lamprey. Site 4 was located at the Miller Lake boat ramp, the sight of an unconfirmed report of lamprey in 2004. Intensive sampling at this site only detected large insects, trout, and leeches, the latter of which could have been misidentified as a small lamprey. Evening, Tipsoo and Miller Creeks above the barrier appeared to have excellent habitat for both adult and juvenile lamprey, although none were detected.

Table 1. Site description, total effort and Catch per unit effort (in electroshocking minutes) of Miller Lake lamprey (2004). Site numbers are sequential from upstream to downstream and correspond to those displayed in Figure 1.

Site	Description	Effort (minutes of shocking)	Total Lamprey Catch	C.P.U.E
1	Evening Creek and Miller Lake shore	21.72	0	0
2	Tipsoo Creek	6.13	0	0
3	Miller Lake shore at Swim Beach	31.25	0	0
4	Miller Lake Shore at Boat Ramp	20.54	0	0
5	Miller Creek below outlet of Miller Lake	22.45	0	0
6	Miller Creek immediately above the barrier	5.12	0	0
7	Mouth of Howlock Creek and Miller Creek upstream to the barrier	36.35	0	0
8	Miller Creek	24.33	0	0

9	Miller Creek, upper end of low gradient	25.12	15	0.60
10	Miller Creek at Little Bridge	10.83	~ 200	18.47
11	Miller Creek	15.02	51	3.40
12	Miller Creek, beaver ponds	18.63	0	0

Miller Lake Lamprey Distribution Survey
October16, 2008

Upper limits as documented in the 2008 survey have increased. Fish were documented upstream to Latitude N43°11.03.7, W 121°52.28.1. This location is approximately 300 feet upstream of the culvert.

Methods:
Sampling site 10 was selected to document continued presence of lamprey as well as test the settings on the electro shockers and determine effectiveness in capturing lamprey. The Smith Root LR24 shockers was adjusted as per direction from S.Gunckel,
Primary Channel-
Pulse Type=Burst
Cycle Frequency=1Hz
Burst Frequency=4Hz
Duty=33% (set to equal pulse width of 82ms)Volts=approximately 125v

Secondary Channel-
Pulse Type=Standard
Frequency=30Hz
Duty=12%
Voltage=approximately125V

The Smith Root 12B was adjusted to as low as possible. A short duration charge was sent into the water. The sampler would then wait for lamprey to swim up before giving another quick charge. Both shockers seemed effective in capturing lamprey.

Site 10 Miller Creek Little Bridge (N 43°10.17.3, W 121°50m 41.6sec)
UTM 10 4780298N 593877E
13 minutes of elapsed electro shocking time. C.P.U.E= 1.9
A total of 25 lamprey were captured in 13 minutes of sampling. The catch consisted of 9 lamprey over 100mm in length and16 lamprey under 100 mm were enumerated at this site. Fish were ammocetes, with out eyes but under going metamorphosis as

demonstrated by redness in bucal area as well as along gill slits. Evidence of the presence of adult lamprey was confirmed by a recent un- healed scar on the caudal area of a brook trout. At least two year classes of ammocetes were captured with the smaller being approximately 60 mm in length. Water temperature was 4° C.

Site 9 Miller Creek, upper end of low gradient (N43°10.59.7, W21°.52m 20.7sec) UTM 10 4781582N 591645E
25 minutes elapsed time of electro-shocking. C.P.U.E= 0.12
A total of three sub adult lamprey were enumerated. Additionally 5 brook trout and one brown trout were captured. One brook trout has evidence of recent lamprey parasitism as evidenced by the un-healed lamprey scar in the caudal area.

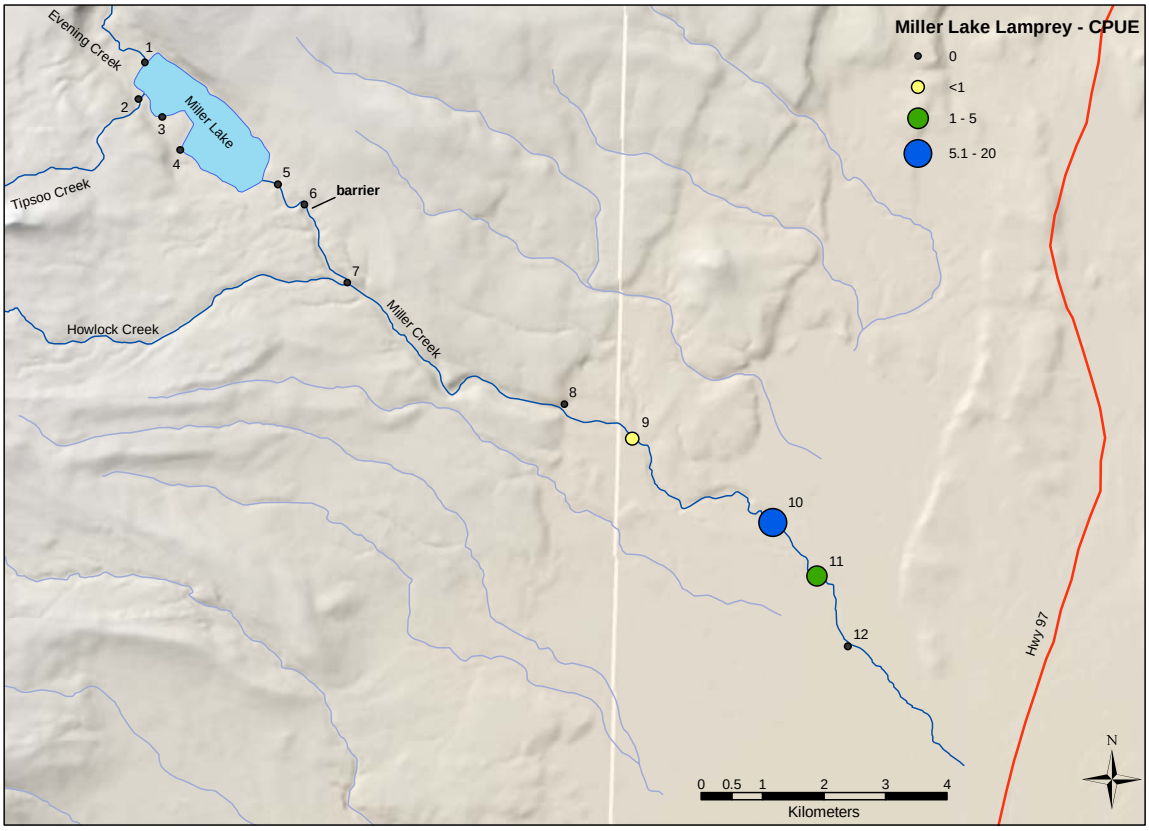
Site 8 Miller Creek (N43°11.03.7,W121°52m 28.1)
Upper limit UTM 10 4781755N 591532E
25 minutes elapsed time C.P.U.E =0.04
One lamprey was enumerated in this reach. Trout were observed but not captured.

Site 5 Miller Creek below outlet of Miller Lake
FS road 9772-000 road crossing culvert UTM 10 4785292N 586179E
50 minutes of elapsed electro shocking time captured no fish

Site Zero, Miller Lake
A trap net was set by William Tinniswood and Roger Smith 15 October 2008 and allowed to fish until 10 am on 16 October 2008. A total of 75 adult brown trout were captured with no evidence of parasitism from lamprey.

Table 1. Site Description, total effort and Catch per Unit effort (in electro shocking minutes of Miller lake lamprey, 2008 survey.

Site	Description	Effort (min. of shocking)	Total Lamprey	CPUE
Site 5	Miller Creek below outlet	50	0	0.0
Site 8	Miller Creek	25	1	0.04
Site 9	Miller Creek Upper end of low Gradient	25	3	0.12
Site 10	Miller Creek Little Bridge	13	25	1.9


Miller Lake Lamprey - CPUE
0
<1
1 - 5
5.1 - 20
Evening Creek
Miller Lake
Tipsoo Creek
Howlock Creek
Miller Creek
barrier
1
2
3
4
5
6
7
8
9
10
11
12
Hwy 97
0 0.5 1 2 3 4
Kilometers
N