

ANNUAL PROGRESS REPORT

PROJECT TITLE: Native Trout Studies
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Prepared by: Alan Hemmingsen
and
Steve Starcevich

Oregon Department of Fish and Wildlife
Fish Division
P.O. Box 59
Portland, Oregon 97207

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Native Trout Studies

- I. **Summary:** We developed a proposal for studies to better describe 1) the seasonal movements and locations of adult westslope cutthroat trout in the mainstem John Day River subbasin, and 2) the characteristics of habitats associated with these locations. We radio-tagged a total of 41 adult cutthroat trout, including six from Deardorff Creek, 18 from Roberts Creek, and 17 from Rail Creek to initiate efforts to describe their seasonal movements. We began to measure the characteristics of habitats used by these fish. In August, we helped survey Vinegar Creek (Middle Fork John Day River subbasin) for the presence of bull trout. Vinegar Creek was thought to no longer support bull trout, but these surveys led to the discovery of one.

- II. **Background:** Native Trout Studies is an ongoing project within the Oregon Department of Fish and Wildlife (ODFW) intended to further the understanding of the biology of Oregon's native trout. Project personnel also provide technical assistance to ODFW staff and managers as needed. In recent years, the project has been primarily involved with studies of the biology of native bull trout *Salvelinus confluentus*, westslope cutthroat trout *Oncorhynchus clarki lewisi*, and rainbow trout *O. mykiss* trout within the John Day Basin (Hemmingsen 2000a; 2000b). Radio telemetry used in these studies, designed to be exploratory rather than definitive, showed some evidence for movements by westslope cutthroat trout in the upper mainstem John Day subbasin that were more extensive than previously thought. With more tags stratified spatially and temporally, we can better identify seasonal locations of fish and, therefore, the habitats associated with these locations. This may help prioritize the restoration and management of increasingly fragmented habitats. Also, description of movements at the population level enhances our understanding of life histories of westslope cutthroat in Oregon. During FY 2000, we designed studies to gather this information in the upper mainstem John Day River subbasin. We also continued studies of bull trout in the Middle Fork John Day River subbasin that were initiated in FY 1999.

Recent budget shortfalls within the Oregon Department of Fish and Wildlife impacted the Native Trout Project in FY 2000. The position of project leader was vacant from March 1999 through April 2000, which included the first seven months of this report period. Since additional responsibilities consequently fell to other project personnel, we were unable to complete all of our objectives.

- III. **Objectives:**
 - A. Prepare a draft report on the distribution, density, and population size of bull trout in streams of the Middle Fork John Day River subbasin.
 - B. Develop a proposal to describe the characteristics of habitats used seasonally by westslope cutthroat trout based on their locations defined by telemetry.
 - C. Initiate studies to determine the habitats associated with seasonal locations of westslope cutthroat trout in the upper mainstem John Day River subbasin.

- D. Assist with coordinated, multi-agency investigations of bull trout in the Middle Fork John Day River subbasin.

IV. **Procedures:**

Objective A.

This objective was intended to present additional results from the multi-agency investigations of bull trout in the Middle Fork John Day River subbasin conducted in 1999 (Hemmingsen 2000b). Results were given to the ODFW district biologist in John Day and progress was made towards the draft report. However, since additional analysis remains, a final report will be completed in FY 2001.

Objective B.

We developed a proposal to describe the habitats used seasonally (fall 2000 through winter 2001) by adult westslope cutthroat trout in the upper mainstem John Day River subbasin (Starceovich 2000). The proposal has two primary objectives: 1) describe the seasonal differences in habitats associated with westslope cutthroat trout in the headwaters of the John Day River, and 2) determine whether the spatial distribution of habitat influences these associations. Radio telemetry will be used to determine the seasonal locations of westslope cutthroat trout larger than 200 mm. Habitats associated with these locations will be described at channel unit, reach, and valley segment scales. A total of 100 cutthroat trout will be given radio transmitters implanted surgically during three periods: late summer 2000, winter 2000-2001, and summer 2001. Tagged fish will represent two streams, and each fish will be located weekly from streamside telemetry. Stream habitat variables will be measured at each re-location of a tagged fish. Because of the scope of the proposed study, it will be undertaken as a graduate research project through Oregon State University.

The study area comprises the upper mainstem John Day River and two of its tributaries, Rail Creek and Roberts Creek. The privately owned mainstem section is mainly alluvial valley with sparse riparian vegetation and little shade. The tributaries have relatively steep valley slopes vegetated primarily by coniferous forest; riparian vegetation consists of mature conifers as well as deciduous trees and shrubs. This study area was selected for several reasons. First, it differs geologically, climatically, and in elevation from the Intermountain Region where most inland cutthroat trout research has taken place. Consequently, cutthroat trout life history adaptations in the John Day Basin may differ from those in the central range, where most inland cutthroat trout research has taken place. Second, ODFW Native Trout Project activities are ongoing in this area, and preliminary inferences from recent studies suggest that cutthroat trout movement may be common. Third, this area appears to provide some of the best habitat within the range of cutthroat trout in the John Day Basin. Lastly, cooperation from private landowners provides good access to streams.

Objective C.

In order to describe seasonal habitat associations and movements (Objective B), cutthroat trout were captured by fly-fishing and surgically implanted (inter-peritoneal) with radio transmitters that have expected battery lives of either 280 (3.6 g) or 400 (6.5 g) days. Since we wanted the weight of the transmitter to be less than 4% of the weight of the fish, we chose cutthroat trout that were at least 20 cm fork length. Each radio-

tagged fish was also identified with a 14-mm passive integrated transponder (PIT) tag at 125 KHz (Avid) placed in the peritoneal cavity during surgery. Only fish with phenotypic characteristics reported to describe westslope cutthroat trout were selected for implantation of radio tags. There is evidence that hybrids of cutthroat trout and rainbow trout exist in some streams of the mainstem John Day river subbasin, including Roberts Creek (Hemmingsen 2000b, Appendix A). To validate our assessment of phenotypic characters, we also collected samples of caudal fin tissue from each tagged fish. These samples were stored in ethanol for future determination of genetic characteristics by DNA analysis. Habitats inventories were made at the unit scale according to the methods of Moore et al. (1999).

Objective D.

We assisted with investigations of bull trout in the Middle Fork John Day River subbasin, which continued efforts that began in 1999 (Hemmingsen 2000a). As in that year, sampling activities were coordinated by ODFW biologists at the John Day district office with the assistance of biologists from the U.S. Forest Service, Oregon Department of Transportation, volunteers from the public and Native Trout Project personnel. The investigations in FY 2000 consisted of sampling Vinegar Creek for the presence of bull trout. Vinegar Creek reportedly did not contain bull trout, although they were present historically (Buchanan et al. 1997). Sampling was conducted according to an interim protocol developed by the Western Division American Fisheries Society (WDAFS) Bull Trout Committee to determine bull trout occurrence (Peterson et al. 2000). This protocol is designed to detect rare species and will be revised as new data become available.

The protocol establishes sampling intensity based on estimated sampling efficiencies that are habitat specific, and on expectations derived from documented bull trout densities. Habitat characteristics expected to occur in Vinegar Creek suggested that 22 sample units 50 m long were needed to detect bull trout with 80% confidence. These sample units were randomly selected from all possible units existing throughout the length of Vinegar Creek. Map coordinates of the selected units were used to locate sampling sites in the field using GPS.

At each GPS location, a sample reach was measured upstream for 50 m and constrained with blocking nets. We captured bull trout by electrofishing three passes between blocking nets, moving upstream only, or until a bull trout was captured. All captured fish were anesthetized and measured. At 10-m intervals starting at the downstream net, we measured: 1) the wetted and bank-full width of the stream; 2) depth at three locations; 3) type and amount of large wood; and 4) substrate composition.

V. **Findings:**

Objective C.

We radio-tagged 41 cutthroat trout from three streams of the upper mainstem John Day River subbasin. This total included six from Deardorff Creek, 18 from Roberts Creek, and 17 from Rail Creek with fork length between 20 and 32 cm (Table 1). Implanted transmitters had 280 (n=28) or 400 (n=13) expected days duration and ranged from 1.6 to 3.9% (mean=2.9%) of the body weight of their hosts. Cutthroat trout from Deardorff Creek were tagged because this stream was originally chosen to be one of our study streams. However, many fish subsequently captured in Deardorff Creek displayed

phenotypic characters suggestive of hybrids. Because of the difficulty in capturing pure westslope cutthroat trout, we abandoned Deardorff Creek and substituted Rail Creek instead. Several of the fish shown in Table 1 were captured and tagged after the ending date of this contract period (30 September). They are included here as a convenience of data management. Habitat inventories at the unit scale were conducted throughout eight km of Deardorff Creek during August.

Objective D.

We surveyed Vinegar Creek for the presence bull trout during August. After 22 randomly selected sample units were surveyed, with no bull trout detected, we evaluated stream gradient and the amount of large wood. Since the amount of large wood exceeded protocol standards, nine additional sample units were surveyed as required by protocol guidelines. In the 29th sample unit at 1,650 m elevation, we captured one bull trout 235 mm fork length. Although adherence to the protocol lead to finding rare bull trout, it was quite labor intensive. At the request of the (WDAFS) Bull Trout Committee, we submitted copies of all data and a critique of the methods. These will be incorporated into a future revision of the protocol.

VI. **References:**

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- Hemmingsen, A.R. 2000a. Native trout studies. Oregon Department of Fish and Wildlife, Fish Research Project F-136-R-11, Annual Progress Report, Portland.
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- Moore, K. M. S., K. K. Jones, and J. M. Dambacher. Methods for stream habitat survey. Oregon Department of Fish and Wildlife Information Report 97-4, Portland, OR.
- Peterson, J., J. Dunham, P. Howell, S. Bonar, R. Thurow. 2000. Interim protocol for determining bull trout presence. American Fisheries Society, Western Division.
- Starcevich, S. 2000. Seasonal variability of westslope cutthroat trout habitat associations and movement patterns in headwater tributaries of the John Day River. Master's research proposal, Oregon State University.

VII. **Plans for 2000-01:**

- A. Prepare a report on the distribution and population characteristics of bull trout in streams of the Middle Fork John Day River subbasin.
- B. Prepare an updated report of the status of westslope cutthroat trout in Oregon (presently Hemmingsen 2000b, Appendix A).
- C. Radio tag 60 westslope cutthroat trout in Roberts Creek and Rail Creek of the upper mainstem John Day River subbasin and monitor their movements

(Starcevich 2000). Continue to monitor movements of cutthroat trout tagged in 2000.

- D. Determine characteristics of habitats associated seasonally with radio-tagged westslope cutthroat trout.
- E. Continue to assist with coordinated, multi-agency investigations of bull trout in the Middle Fork John Day River subbasin. These investigations may include surveys for the presence of bull trout in streams that historically contained them.

VIII. A total of \$143,682 was spent on "Native Trout Studies" during FY 2000

IX. **Acknowledgements:**

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Table 1. Characteristics of cutthroat trout of the upper John Day subbasin implanted with radio transmitters during 2000.

Location, Date tagged	FL (cm)	W (g)	Transmitter		
			Ratio ^a	Duration (d)	Frequency (MHz)
Deardorff Cr:					
25 Aug	27.3	234	0.0278	400	151.501
25 Aug	27.1	224	0.0161	280	151.002
28 Aug	21.7	108	0.0333	280	151.013
28 Aug	27.8	254	0.0256	400	151.551
28 Aug	23.5	158	0.0228	280	151.282
29 Aug	31.9	404	0.0161	400	151.774
Roberts Cr:					
31 Aug	27.0	222	0.0293	400	151.731
31 Aug	24.9	206	0.0175	280	150.271
31 Aug	22.9	144	0.0250	280	150.052
31 Aug	20.4	100	0.0360	280	151.170
03 Sep	23.1	130	0.0277	280	150.815
03 Sep	26.0	214	0.0304	400	151.521
03 Sep	21.4	100	0.0360	280	150.412
03 Sep	24.4	156	0.0231	280	150.844
04 Sep	21.9	126	0.0286	280	150.783
04 Sep	23.0	148	0.0243	280	151.132
04 Sep	24.3	164	0.0396	400	151.292
04 Sep	24.0	172	0.0209	280	151.083
04 Sep	22.4	130	0.0277	280	150.962
04 Sep	21.9	122	0.0295	280	150.835
09 Sep	23.3	144	0.0250	280	150.252
09 Sep	23.6	148	0.0243	280	151.191
05 Oct	25.2	--	--	400	151.763
06 Oct	20.8	92	0.0391	280	151.043
Rail Cr:					
09 Oct	26.5	218	0.0298	400	151.753
09 Oct	26.7	204	0.0176	280	150.052
09 Oct	22.5	118	0.0305	280	151.101
13 Oct	23.4	156	0.0231	280	151.020
13 Oct	22.2	120	0.0300	280	151.121
13 Oct	20.8	96	0.0375	280	150.211
17 Oct	29.8	314	0.0207	400	151.541
17 Oct	23.2	128	0.0281	280	150.861
18 Oct	26.4	202	0.0322	400	151.253
18 Oct	23.9	156	0.0231	280	150.802
18 Oct	19.9	92	0.0391	280	150.922
18 Oct	20.8	94	0.0383	280	151.033
19 Oct	21.8	106	0.0340	280	150.032
19 Oct	26.8	214	0.0304	400	151.743
19 Oct	26.9	232	0.0280	400	151.182
19 Oct	22.0	96	0.0375	280	150.633
27 Oct	26.0	174	0.0374	400	151.551

^a Transmitter weight : fish weight ratio.