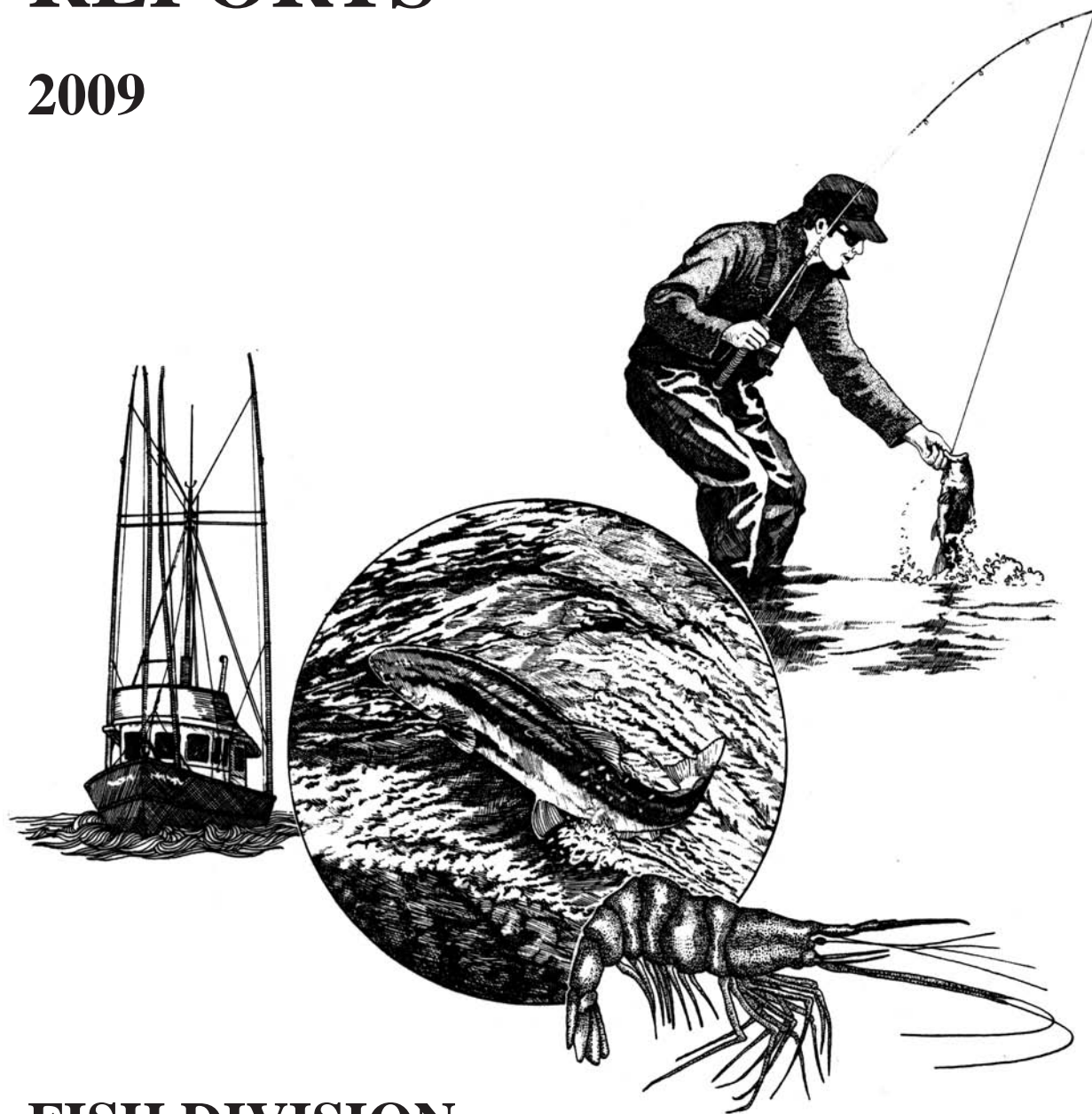


# PROGRESS REPORTS

2009



**FISH DIVISION**  
**Oregon Department of Fish and Wildlife**

2009 Foskett Spring Speckled Dace Investigations

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ANNUAL PROGRESS REPORT

FISH RESEARCH PROJECT  
OREGON

PROJECT TITLE: Foskett Spring Speckled Dace Investigations

PROJECT NUMBERS: Contract 13420-08-J814

PROJECT PERIOD: 28 August 2008 - 31 December 2014



*Photograph showing the encroachment of aquatic vegetation on open water habitat at the Foskett Spring spring pool.*

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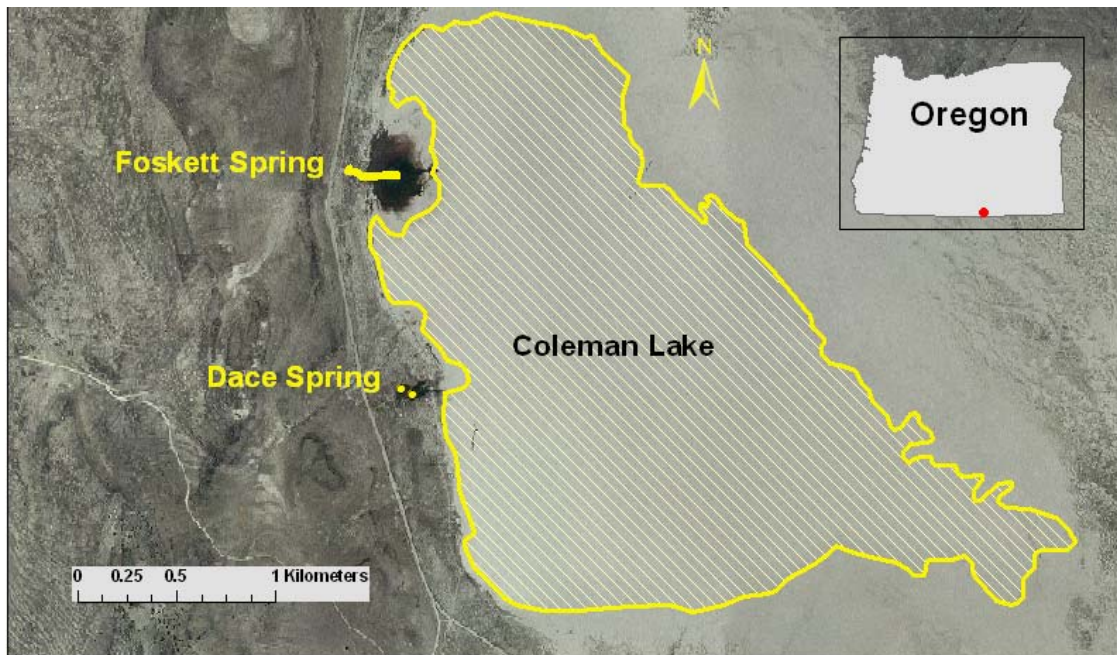
This project was financed with funds administered by the U.S. Fish and Wildlife Service.

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## INTRODUCTION

Speckled dace (*Rhinichthys osculus*) are geographically widespread throughout the western United States and occur in many isolated subbasins and interior drainages in south-central Oregon. The Foscett Spring speckled dace (*R. osculus* ssp.) is represented by a single population that inhabits Foscett Spring (Figure 1) on the west side of Coleman Lake (Warner Lakes subbasin) in Lake County, Oregon. Foscett speckled dace was listed as threatened under the federal Endangered Species Act in 1985 (U.S. Fish and Wildlife Service 1985). The Foscett speckled dace became isolated in Foscett Spring at the end of the Pluvial period (~9,000-10,000 years ago). Foscett Spring is a natural spring that rises from a springhead pool, flows through a narrow spring brook into a series of shallow marshes, and then disappears into the soil of the normally dry Coleman Lake (Figure 1). A second population in Dace Spring, located approximately 0.8 kilometer south of Foscett Spring, was established from an introduction of 100 fish from Foscett Spring in 1979-1980 (Williams et al. 1990); however recent surveys have failed to document their continued existence at this location. In 1987, the U.S. Bureau of Land Management (BLM) acquired, through exchange, the 65 hectare parcel of land containing Foscett and Dace Springs. Both sites were fenced to exclude livestock.



**Figure 1.** Map showing the location Foscett and Dace Springs in the Warner Valley of Oregon.

The Recovery Plan for the threatened and rare native fishes of the Warner Basin and Alkali Subbasin states that Foscett speckled dace will probably not be delisted in the near future because of its extremely isolated range and potential for degradation of its habitat from localized events (USFWS 1997). The primary recovery objective for this species is long-term persistence through preservation of its native ecosystem. The plan

further states that the conservation and long term sustainability of this species will be met when: 1) long-term protection of its habitat, including spring source aquifers, springpools and outflow channels, and surrounding lands is assured; 2) long-term habitat management guidelines are developed and implemented to ensure the continued persistence of important habitat features and guidelines include monitoring of current habitat and investigation for and evaluation of new spring habitats; and 3) research into life-history, genetics, population trends, habitat use and preference, and other important parameters is conducted to assist in further developing or refining criteria 1) and 2), above. Actions needed to meet these criteria include protecting the fish population and its habitat, conserving genetic diversity of the fish population, ensuring adequate water supplies are available, monitoring of the dace population and habitat conditions, and evaluating long-term effects of climatic trends on recovery of this fish population.

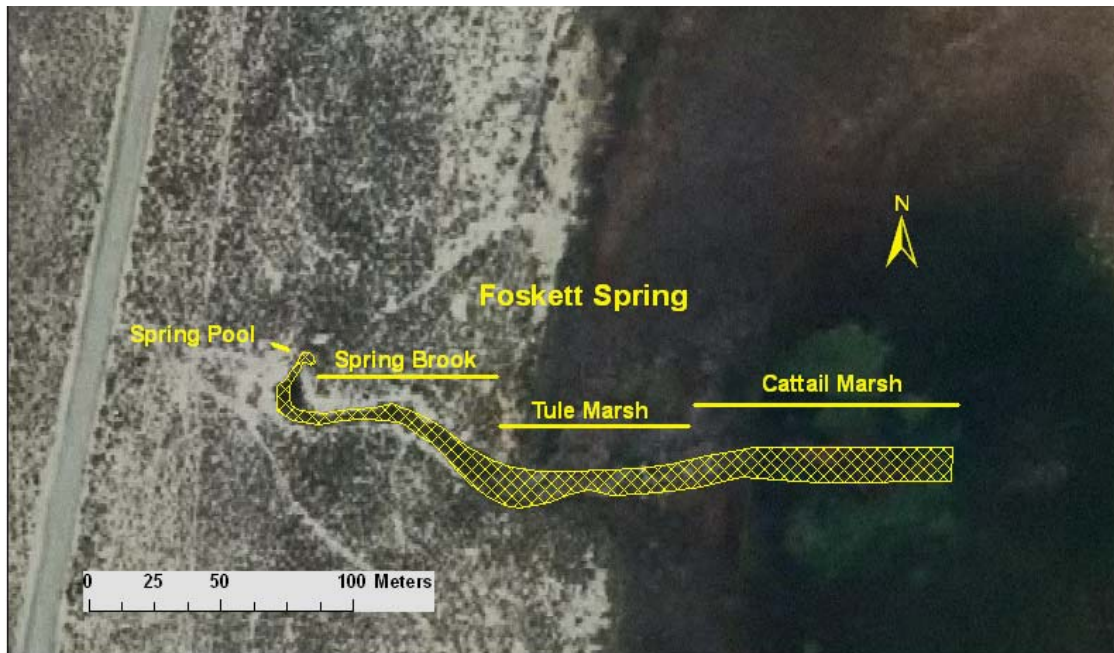
The purpose of this investigation was to determine the status of the federally listed Foskett Spring speckled dace and its habitat. This report updates a monitoring program initiated in 2005 by ODFW (Scheerer and Jacobs 2005) by providing results of monitoring conducted in 2009. Specifically, this monitoring program calls for biannual estimates of population abundance, assessments of distribution and demographic parameters and assessments of physical habitat conditions.

## METHODS

The ODFW's Native Fish Investigations Project used baited minnow traps to obtain a mark-recapture population estimate of Foskett Spring speckled dace. We fished baited traps during the day for ~3-4 hours. We marked all fish captured with a partial caudal fin clip and returned them to the water. Fish were returned to the approximate location where they were captured. The following day, we again fished the traps and recorded the total number of marked and unmarked fish captured. We estimated population abundance using single-sample mark-recapture procedures (Ricker 1975). We calculated 95% confidence intervals using a Poisson approximation (Ricker 1975). Population estimates were stratified by the four distinct habitat elements of the spring (Figure 2). We measured total length (TL) on a sample of 110 fish collected at the site. Water temperature (°C) in the spring pool was recorded using a Hobo<sup>®</sup> recording thermometer at 5-hour intervals.

## RESULTS

We obtained a population estimate of 2,830 (95% CI: 2,202-3,633) speckled dace at Foskett Spring on 5 August 2009. This estimate was not significantly different from the 2005 estimate of 3,147 fish and the 2007 estimate of 2,879 fish ( $p < 0.05$ ) (Table 1). Approximately equal numbers of dace ( $\hat{N} = 1,111$  and 1,062) were located in the spring brook and tule marsh, respectively. Lower numbers of dace were found in the spring pool ( $\hat{N} = 247$ ) and the cattail marsh ( $\hat{N} = 158$ ). The 2005, 2007, and 2009 abundance estimates at Foskett Spring were significantly lower than the 1997 estimate.



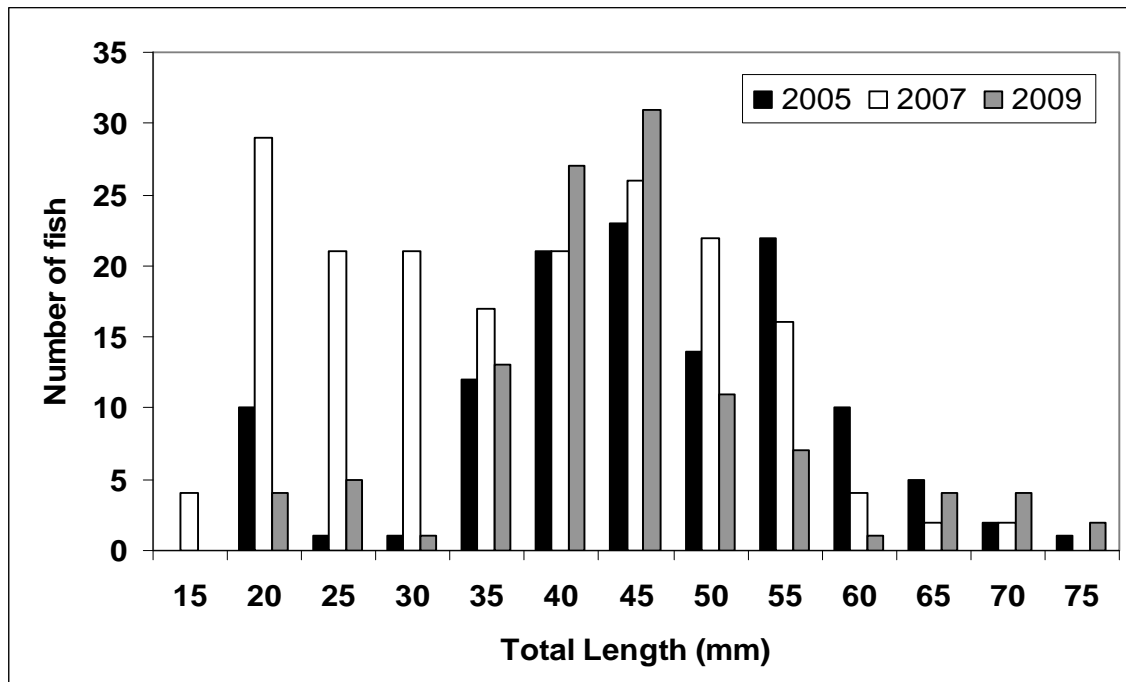
**Figure 2.** Map showing the extent of distinct habitat areas at Foscett Spring.

**Table 1.** Mark-recapture population estimate details for Foscett Spring speckled dace, 1997, 2005, 2007, and 2009.

Location	2009	2007	2005	1997
Spring Pool	247 (122 - 463)	1,418 (1,003 - 1,997)	1,627 (1,157 - 2,281)	204 (90 - 317)
Spring brook	1,111 (774 - 1,587)	719 (486 - 1,057)	755 (514 - 1,102)	702 (321 - 1,082)
Tule Marsh	1,062 (649 - 1,707)	273 (146 - 488)	425 (283- 636)	not sampled
Cattail Marsh	158 (57 - 310)	422 (275 - 641)	353 (156-695)	26,881 (13,158 - 40,605)
Entire Site	2,830 (2,202-3,633)	2,984 (2,403 - 3,702)	3,147 (2,535 - 3,905)	27,787 (14,057 - 41,516)

In 1997, ODFW obtained mark-recapture population estimates at both Foscett and Dace springs (Dambacher et al. 1997). The Foscett Spring estimate was 27,787 fish (95% CI: 14,057-41,516). The majority of the fish (97%) were found in the downstream open water pool located outside the cattle enclosure (location of the current cattail marsh). In 2005 and 2007, ODFW obtained population estimates of 3,147 (95% CI: 2,535-3,905) and 2,879 (95% CI: 2,319-3,573) dace, respectively. In 2009, BLM and USFWS completed a restoration project and created two spring-fed pools at Dace Spring for the purpose of establishing a refuge population at that location.

The 2009 abundance estimate includes dace ranging from 18-76 mm TL. Length-frequency analysis suggests the presence of multiple age-classes, with two apparent peaks (Figure 3). The presence of fish  $\leq 25$ mm in all three sampling years suggests that successful reproduction occurs annually.



**Figure 3.** Length-frequency histogram for Foskett Spring speckled dace, 2005, 2007, and 2009.

The spring temperatures measured in Foskett Spring from 14 August 2007 through 16 August 2009 were a constant 18.2°C, similar to temperatures recorded previously (Scheerer and Jacobs 2007). Habitat conditions were similar to those observed in 2007, except that the open water area of the spring pool was reduced by approximately 50% due to expansion of the rooted aquatic macrophytes at the site.

## DISCUSSION

The population of the federally listed Foskett speckled dace was monitored in 2009 and appears to be healthy and near carrying capacity. Examination of length-frequency data suggests that multiple age-classes are present. Presence of young-of-the-year fish ( $\leq 25$  mm) provides evidence of recent recruitment. Foskett Spring is fenced to exclude cattle and dace were the only fish species found to be present. The fish appeared to be in good condition with no obvious external parasites.

Habitat, although limited, was in good condition. Encroachment by aquatic macrophytes may be limiting population abundance. The decline in abundance of Foskett speckled dace since 1997 is probably due to the reduction in open water habitat. Exclusion of cattle improves water quality, yet may be responsible for the reduction of open water habitats at these locations. If increasing the carrying capacity of this



population is a goal, then restoration efforts to increase open water habitats at these springs is advised. Restoration of Dace Springs was completed in 2009 (Figure 4). The proposed future introduction of Foskett speckled dace at this location should reduce the risk of extinction and aid in recovery of this species.



**Figure 4.** One of the two spring-fed ponds constructed at Dace Springs in 2009.

Future monitoring of the Foskett Spring speckled dace population and its spring habitat, including monitoring of the restoration site, to track fluctuations in abundance and the quantity and quality of available habitat should be part of a long-term management plan for this fish species. Ideally, population estimates will be obtained and habitat conditions will be evaluated every two years. We recommend that future investigations also include the collection of key life history information including population age structure, age and size at maturity, longevity, and spawning timing and duration.

#### **ACKNOWLEDGEMENTS**

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