U.S. Fish and Wildlife Service

Final Post-delisting Monitoring Plan

for the

Foskett Speckled Dace
(*Rhinichthys osculus* ssp.)

Photo: Alan Mauer, US Fish and Wildlife Service

Prepared by:

U.S. Fish and Wildlife Service
Bend Field Office
Bend, Oregon

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1. Introduction

The U.S. Fish and Wildlife Service (Service) has determined that the Foskett speckled dace has met recovery criteria as outlined in the species' final recovery plan (U.S. Fish and Wildlife Service 1998, pp. 41-42). As a result, the Service published a proposed rule to remove (i.e., delist) the Foskett speckled dace from the Federal List of Endangered and Threatened Wildlife (U.S. Fish and Wildlife Service 2018, entire); the final rule is near publication at this time. Section 4(g)(1) of the Endangered Species Act of 1973 (Act), as amended, requires the Service to implement a system, in cooperation with the States, to monitor for no fewer than 5 years the status of all species that have recovered and been removed from the List of Threatened and Endangered Wildlife and Plants (50 CFR 17.11 and 17.12). Section 4(g) of the Act explicitly requires cooperation with the States in development and implementation of post-delisting monitoring programs, but the Service remains responsible for compliance with section 4(g) and therefore, must remain actively engaged in all phases of the monitoring program.

The Service also seeks active participation of other entities that are expected to assume responsibilities for the species' conservation after delisting or have natural resources management mandates. In keeping with that mandate, the Service developed this post-delisting monitoring (PDM) plan in cooperation with the Oregon Department of Fish and Wildlife (ODFW) and the Lakeview District Bureau of Land Management (BLM).

Post-delisting monitoring is a requirement of the Act (16 U.S.C. 1531 *et seq*.) for those species that have been delisted due to recovery. A PDM plan outlines the monitoring needed to verify that a species delisted due to recovery remains secure from extinction after the protections of the Act no longer apply. The goals of this PDM plan are to: 1) outline the monitoring plan for both species abundance and threats; and 2) identify when there are no longer concerns for Foskett speckled dace and the requirements in the PDM plan have been fulfilled.

The purpose of post-delisting monitoring is to verify that the Foskett speckled dace remains secure from the risk of extinction after it has been removed from the protections of the Act. The Service prepared this PDM plan, in coordination with the ODFW and BLM, based largely on monitoring methods refined by these agencies during the recovery of the species (Scheerer et al. 2015, p. 4). This PDM plan is designed to detect both substantial changes in habitat occupied by Foskett speckled dace, as well as declines in population abundance. It meets the minimum requirement set forth by the Act because it monitors the status of Foskett speckled dace over a 5-year period.

Sustained recovery of Foskett speckled dace will likely require regular habitat maintenance and enhancement. In recognition of these needs, BLM, ODFW and the Service developed and entered into the Foskett Speckled Dace Cooperative Management Plan (CMP) (U.S. Fish and Wildlife Service 2015, entire). Monitoring and management described by the CMP will be implemented concurrently with the PDM, and continue following the conclusion of the PDM.

2. Public Review and Comment

On January 4, 2018, we announced the availability of the draft PDM plan for public review and comment in association with the proposed rule to delist the species (U.S. Fish and Wildlife Service 2018). In addition, the draft PDM plan was peer reviewed by four experts familiar with Foskett speckled dace ecology. After the comment period, we reviewed each comment received and prepared responses to substantive comments (see **APPENDIX 1**). One comment we received generated a discussion that led us to conclude, in part because of the CMP which will continue following the PDM period, that reducing the duration of the PDM from 9 years to 5 years would be an adequate monitoring period to ensure the species remains secure once delisted.

3. Roles of PDM Cooperators

The Bend Field Office is the Service's lead for developing and implementing the PDM plan. With the cooperation and assistance of the ODFW and BLM, the Bend Field Office will be responsible to ensure that the monitoring requirements outlined in this PDM plan are met, including the completion of the final report.

The role of the Bend Field Office is to:

- prepare a draft PDM plan for public comment and peer review;
- consider and incorporate, as appropriate, public and peer review comments into a final plan;
- distribute the final PDM plan to all cooperators;
- request funding for the ODFW's sampling and data analysis;
- determine budget requirements to carry out the monitoring; and,
- coordinate and convene an annual meeting, and other meetings as necessary, to discuss monitoring results and management activities.

The role of the ODFW is to:

- assist the Service in preparing the PDM plan;
- conduct scheduled monitoring of Foskett speckled dace abundance and distribution to determine both population status and response to changes in habitat enhancement;
- compile all population and abundance sampling results;
- notify the Bend Field Office of any actions that may significantly affect Foskett speckled dace;
- prepare and distribute progress reports to all cooperators, and a final report at the end of the PDM period; and,
- participate in the annual coordination meeting and any other meetings or conference calls necessary to discuss monitoring results and management activities.

The role of the BLM is to:

- assist the Service in preparing the PDM plan;
- continue to implement habitat enhancement activities;
- monitor the extent and persistence of habitat enhancement;

- notify the Bend Field Office of any actions that may significantly affect Foskett speckled dace or its habitat; and,
- participate in coordination meetings, and any other meetings or conference calls necessary to discuss monitoring results and management activities.

4. Summary of Species' Status at Delisting

A. Demographic Parameters

1. Taxonomic Classification

At the time of listing, the Foskett speckled dace was considered to be an undescribed subspecies of *Rhinichthys osculus* (Girard 1857, p. 27). *R. osculus* (speckled dace) have a large geographic range throughout major drainages in the western United States; populations show high degrees of endemism and exhibit large differences in morphological traits (Pfrender et al. 2004, p. 491). Pfrender et al. (2004, p. 491) stated that our understanding of the relationships among populations in this complex is limited, and there is no clear consensus regarding the number of distinct evolutionary lineages within *R. osculus.* Foskett speckled dace can be distinguished from other speckled dace by external characteristics, such as a much reduced lateral line with about 15 scales with pores; about 65 lateral line scales; a large eye; the dorsal fin is positioned well behind the pelvic fin but before the beginning of the anal fin; and, barbels are present on most individuals (Carl Bond, Oregon State University, pers. comm. 1990; cited in U.S. Fish and Wildlife Service 1998). However, Bond did not provide a formal description or a scientific name for this subspecies, nor was his work peer reviewed.

Genetic investigations by Ardren et al. (2010, entire) provided information regarding the evolutionary relationship of Foskett speckled dace to other Warner Basin and Goose Lake Basin speckled dace. Additional analysis of the morphometrics of several dace in Oregon's Great Basin region, including Foskett speckled dace, was conducted by Hoekzema (2013, entire). Hoekzema (2013, pp. 45-47) and Hoekzema and Sidlauskas (2014, p. 248) concluded that evidence of genetic isolation, distinct morphology, and the unique habitat at Foskett Spring qualifies Foskett speckled dace for consideration as an evolutionarily significant unit on a unique evolutionary path.

2. Spatial Distribution and Habitat Conditions

Foskett speckled dace are only known to occur in two habitats: Foskett Spring, where the species occurred historically, and Dace Spring, a population founded by introduction (Figure 1). Foskett Spring is a small, natural thermal artesian spring that rises from a springhead pool that flows through a narrow, shallow spring brook into a series of shallow marshes, and then disappears into the soil of the normally dry Coleman Lake (Scheerer et al. 2016, p. 1; Sammel and Craig 1981, p. 113). Foskett Spring is a cool-water thermal spring with temperatures recorded at a constant 64.8 degrees Fahrenheit (°F) (18.2 degrees Celsius (°C)) (Scheerer and Jacobs 2009, p. 5). The spring water is clear, and the water flow rate is consistently less than 0.5 cubic feet (ft^3) per second (0.01 cubic meters (m^3) per second). The springhead pool has a loose sandy bottom and is heavily vegetated with aquatic plants. The ODFW estimated approximately 864 square yards (yds^2) (722 square meters (m^2)) of wetland habitat are associated with the Foskett Spring

area, including the spring pool, spring brook, tule marsh, cattail marsh, and sedge marsh (Scheerer and Jacobs 2005, p. 6). Foskett speckled dace occur in all the wetland habitats associated with the spring. The fish use overhanging bank edges, grass, exposed grass roots, and filamentous algae as cover. In 1987, the BLM acquired the property containing both Foskett and Dace springs and the surrounding 161 acres (ac) (65 hectares (ha)), of which approximately 69 ac (28 ha) were fenced to exclude cattle from the two springs.

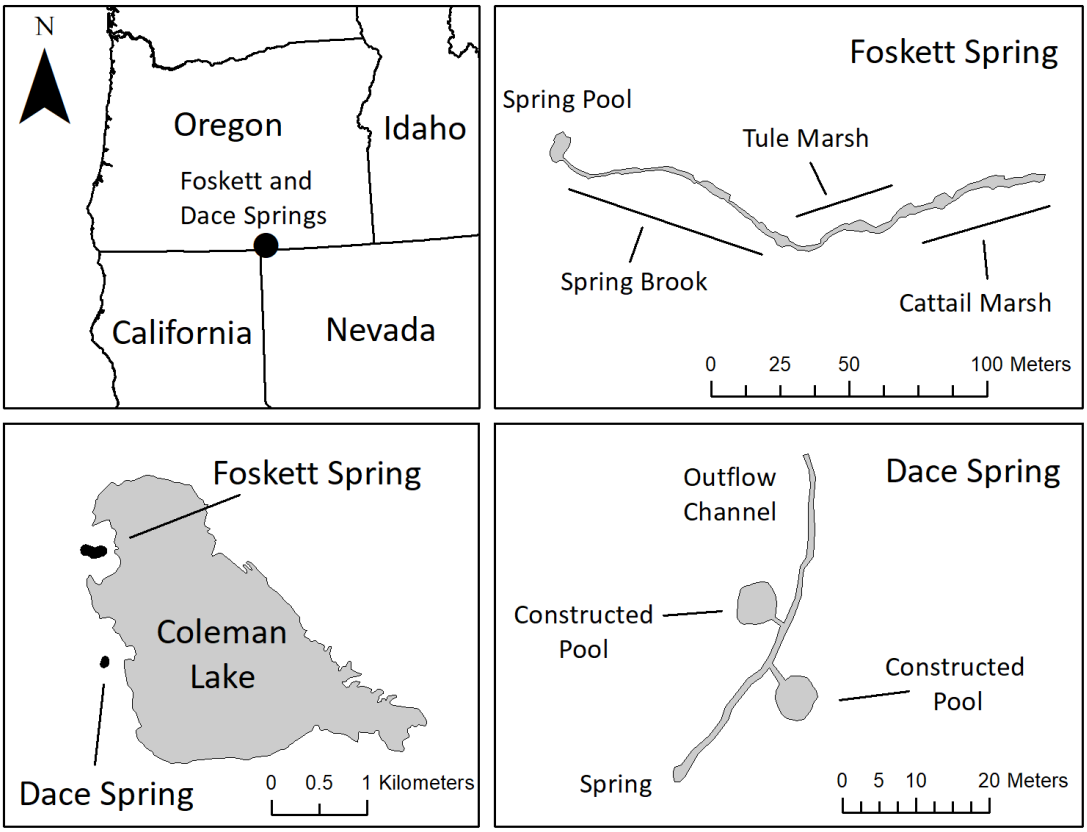

Figure 1. Map of the location and description of habitats of Foskett and Dace springs. **Upper left panel:** location of Foskett and Dace Springs in southeast Oregon. **Bottom left panel:** location of Foskett and Dace springs relative to Coleman Lake. **Upper right panel:** Foskett Spring and habitat areas. **Bottom right panel:** Dace Spring and habitat areas.

Dace Spring is a small habitat located approximately 0.8 kilometers (0.5 miles) south of Foskett Spring. Translocations from Foskett Spring were initiated in 1979 (Dambacher *et al.* 1997, p. 4).

In 2005, 2007, and 2009, the ODFW considered Foskett speckled dace habitat to be in good condition, but limited in extent. They noted that encroachment by aquatic plants may be limiting the population and that a decline in abundance of Foskett speckled dace since 1997 was probably due to the reduction in open-water habitat (Scheerer and Jacobs 2005, p. 7; 2007, p. 9; and 2009, p. 5). Deeper water with moderate vegetative cover would presumably be better habitat, judging from the habitats used by other speckled dace, although Dambacher *et al.* (1997, p. 7) noted that past habitat management to increase open-water had been unsuccessful due to eventual sediment infilling and regrowth of aquatic plants. To increase the amount of suitable habitat, the BLM and the Service worked together in 2009, constructing two ponds connected to the outlet channel of

Dace Spring. To address the encroachment by aquatic vegetation at Foskett Spring, in 2013, the BLM reduced vegetation biomass by implementing a controlled burn in the surrounding marshes. In 2013 and 2014, the BLM hand-excavated 11 pools and increased the open-water habitat around Foskett Spring by 196 yds^2 (164 m^2) (Scheerer et al. 2014, p. 9). The response of Foskett speckled dace to this habitat enhancement was substantial but relatively short-lived (see *Abundance, Population Trends, and Demographics* below).

The BLM initiated baseline water quality and vegetation monitoring at Foskett and Dace springs in 1987. Data collected on September 28, 1988, documented that the two springs had similar water chemistry, temperature, and turbidity (Williams *et al*. 1990, p. 244). In 2013, the BLM reconfigured the inlet and outlet to the two ponds at Dace Spring, allowing greater water flow and improving water quality (Scheerer *et al*. 2013, p. 8).

3. Abundance, Population Trends, and Demographics

The population of Foskett speckled dace has been monitored regularly by the ODFW since 2005, and, while variable, appears to be resilient (*i.e.*, capable of withstanding natural variation in habitat conditions and weather as well as random events). General observations made during these surveys included the presence of multiple age-classes and the presence of young-of-the-year, which indicates that breeding is occurring and young are surviving for multiple years. Bond (1974) visually estimated the population in Foskett Spring to be between 1,500 and 2,000 individuals in 1974. In 1997, the ODFW obtained mark-recapture population estimates at both Foskett and Dace springs (Dambacher *et al*. 1997, p. 5). The Foskett Spring estimate was 27,787 fish, and the majority of the fish (97 percent) occurred in an open-water pool located in the marsh outside of the existing Foskett Spring cattle exclosure. Since 1997, population estimates have varied from 751 to 24,888 individuals (**APPENDIX 2**). The data were obtained using the Lincoln-Petersen model (1997–2012), and a combination of state-space model (2015-2017) and Huggins closed-capture model (2011-2014) from 2011-2017. At Foskett Spring, only the state-space model was used in 2015 and 2017. Estimates were not calculated by habitat type using the Huggins model in 2011 because length-frequency data were not available for each habitat location (Scheerer *et al*. 2013, p. 5; Scheerer *et al*. 2014, p. 6; Scheerer *et al*. 2015, pp. 4–7; Scheerer *et al*. 2016, p. 6; Scheerer *et al.* 2017, p. 4).

Different models have been used to estimate abundance through time to provide the most accurate and robust estimates. Prior to 2011, the estimates were obtained by the ODFW using a Lincoln-Petersen model, which underestimated abundance by approximately 48 percent, compared to the Huggins closed-capture model used in 2011-2014 (Scheerer et al. 2014, pp. 4-7). In 2014, they also added a state space model to estimate the abundance of dace in the spring pool and marsh habitats of Foskett Spring, which allows the estimator to vary capture probabilities for different sized fish and habitats. The ODFW examined the parameter estimates for the best approximating capture probability model (Peterson *et al*. 2015, pp. 495-496) and selected the best analysis while attempting to minimize stress due to handling of the fish.

Abundance declined substantially from 1997 through 2012, a period when aquatic plants substantially expanded into open-water habitats (Scheerer *et al*. 2016, p. 9). The ODFW attributed the higher population estimates from 2013 through 2015 to habitat management that increased open-water (see below); during these years most fish were located in these maintained

habitats (Scheerer *et al*. 2016, p. 9). The population decline documented in 2016 in Foskett Spring was likely a result of vegetation regrowth into the excavated areas (Scheerer *et al.* 2016, pp. 6-9). As a result of the vegetation regrowth and population decline in 2016, and consistent with the CMP, the BLM conducted an extensive habitat enhancement project in 2017. The project entailed excavating approximately 300 yds^2 (251 m^2) of vegetation and accumulated sediment in the Foskett Spring pool, stream, and portions of the wetland, resulting in a significant increase in open-water habitat. Prior to initiating this enhancement project in 2017, the ODFW conducted a population survey that estimated 4,279 dace in Foskett Spring, a moderate increase in the estimate from the prior year (1,830) (Scheerer *et al.* 2017, p. 5). As noted previously, and as illustrated in **APPENDIX 2**, the variability in abundance is not uncommon for dace species and appears, based on observations by ODFW biologists, to be driven in part by the availability of open-water habitat. Given information gained from prior habitat enhancement actions at Foskett and Dace springs, we anticipate the extensive habitat enhancement work conducted by the BLM in 2017 will support abundance commensurate with available habitat in coming years.

No Foskett speckled dace were documented in Dace Spring in the 1970s. In 1979 and 1980, individuals were translocated from Foskett Spring to Dace Spring (Williams *et al.* 1990, p. 243; see *PDM Implementation Schedule* below). Although an estimated 300 fish were documented in 1986 (Williams *et al.* 1990, p. 243), this initial effort failed to establish a sub-population at Dace Spring due to a lack of successful recruitment (Dambacher *et al.* 1997, no pagination). Only 19 fish were observed in 1997, and subsequent surveys failed to locate individuals in Dace Springs (Scheerer and Jacobs 2005, p. 2). In 2009, two pools were created at Dace Spring to increase open-water habitat and additional individuals were moved to the spring. Although recruitment was documented, algal blooms and periods of low dissolved oxygen resulted in low survival (Scheerer *et al.* 2012, p. 8). Habitat enhancement by the BLM in 2013 improved water quality, and recruitment was documented in 2014 and 2015 (Scheerer *et al*. 2014, p. 6; Scheerer *et al*. 2015, p. 5). The two constructed pools at Dace Spring are currently providing additional habitat and may continue to serve as a refuge for Foskett speckled dace. **APPENDIX 3** summarizes population estimates, translocations, and habitat management at Dace Spring (Williams *et al.* 1990, p. 243; Dambacher *et al*. 1997, no pagination; Scheerer and Jacobs 2005, p. 2; Scheerer *et al*. 2012, p. 1; Scheerer et al. 2013, pp. 2, 8; Scheerer *at al*. 2014, pp. 6, 9; Scheerer *et al*. 2015, p. 5; Scheerer *et al*. 2016, p. 6; Scheerer *et. al.* 2017, p. 6; Monzyk *et al*. 2018, p. 10).

B. Residual Threats

The primary remaining threat is the loss of open-water habitat due to the encroachment of aquatic vegetation. Because this threat is pervasive and recurrent, Foskett speckled dace are considered a conservation reliant species, requiring active management to address this threat. In addition to monitoring the primary threat of loss of open-water habitat, the PDM plan and CMP are also designed to monitor for potential threats such as catastrophic stochastic events, introduction of nonnative species, and pollution.

C. Legal and/or Management Commitments for Post-Delisting Conservation

The Foskett Speckled Dace (*Rhinichthys osculus* ssp.) CMP, completed and approved by the BLM, ODFW, and the Service, outlined conservation and management commitments made by

the participants (U.S. Fish and Wildlife Service 2015, p. 3). Actions identified in the CMP include: 1) protect and manage Foskett speckled dace habitat; 2) monitor the habitat and the Foskett speckled dace populations; 3) enhance the habitat when needed; and 4) implement the emergency contingency plan as needed to address potential threats from introduction of nonnative species, pollutants, or other unforeseen threats.

The ODFW has mandates to protect native fish listed as sensitive according to the Oregon's Sensitive Species Rule (OAR 635-100-0040) in their natural habitat.

The BLM's Land and Resource Management Plan (2003, entire) requires the BLM to manage public land for the maintenance, restoration, or enhancement of populations and habitats of Special Status Species. Once delisted, Foskett speckled dace may be considered as a Special Status Species, as it meets the criteria for BLM Sensitive Species. The BLM Land and Resource Management Plan may not reflect current Sensitive Status Species criteria; however, new Special Status Species lists and criteria are updated and transmitted to the BLM Districts approximately every 3 years.

5. Monitoring Methods

A. Procedures for Monitoring

The ODFW, in cooperation with BLM and the Service, will determine the abundance and distribution of Foskett speckled dace in Foskett and Dace springs to assess status and response to changes in habitat. The ODFW will monitor the population abundance using techniques described in Scheerer *et al.* (2016).

The BLM will monitor habitat to assess change in open-water habitat and extent of vegetation. Monitoring will quantify changes in open-water habitat before and after habitat enhancement projects, and track trends in vegetative growth. Aerial remote sensing may aid in accurately mapping changes in the quantity of open-water habitat surface area.

B. Data Consistency Between Sampling Periods

The sampling protocol and statistical analysis developed by the ODFW since 2012 will be used to assure consistency of the data collected (Scheerer *et al.* 2012 entire, Scheerer *et al.* 2016 entire). However, as technologies develop, different statistical analyses may be preferred. New techniques and estimators may be utilized, if they account for variability in capture probability observed in different size fish and habitats. Any additional techniques or methods should prioritize accuracy and minimize stress and handling of fish.

In addition, habitat measurements made by the BLM will be used to assess change in open-water habitat and extent of vegetation over time. The BLM will develop repeatable techniques to measure the surface area of available habitat to ensure long-term habitat monitoring and consistency with previous surveys.

C. Frequency and Duration of Monitoring

Monitoring under the PDM plan is planned over a 5-year period (see *PDM Implementation Schedule*, below). Fish monitoring will be conducted on years 1, 3, and 5. As noted above, this is a reduction in frequency and duration over what was in the draft PDM plan made available for public comment. This reduction was due in part from comments by the ODFW who noted that consecutive-year monitoring may constitute unnecessary handling of the fish with some risk to individuals, and also the fact that the CMP, which includes population monitoring, will be implemented during and following completion of the PDM period. Monitoring may be increased during the PDM period, depending on information needs and availability of funding. In addition, the BLM will conduct quarterly site visits to Foskett and Dace Springs to assess habitat condition and monitor potential threats. Service personnel will attend as needed or when available.

6. Monitoring Triggers and Responses, PDM Implementation, and Conclusion

Effective PDM implementation requires timely evaluation of changes in the status of Foskett speckled dace. The following trigger values will enable the Service and its cooperators to initiate a response to population declines or new threats before Foskett speckled dace abundance declines to critical levels. Conversely, it is also important to identify criteria under which there is no new concern for the status of Foskett speckled dace and to support conclusion of the PDM. The following triggers and responses described below are based on the information to be collected during the PDM period and provide a structured process for evaluating the status of the species during PDM. Dace Spring (fish and habitat) will also be monitored but because the sustained recovery isn't dependent on the long-term viability of this refuge, we did not develop associated triggers and responses.

If any of the conditions described in these triggers occurs, the Service, with input from the ODFW and BLM, may initiate a formal status review to assess changes in threats to the species, its abundance, productivity, survival, and distribution to determine whether a proposal for relisting is appropriate. In the event this status review reveals that the Foskett speckled dace is threatened (i.e., likely to become endangered in the foreseeable future throughout all or a significant portion of its range) or endangered, then the species may be promptly proposed for relisting under the Act in accordance with procedures in section 4(b)(5) of the Act. Likewise, if the best available information indicates an emergency that poses a significant risk to the well-being of the Foskett speckled dace, then the Service may exercise its emergency listing authority under section 4(b)(7) accordingly.

A. Triggers and Responses

Trigger: Estimated population abundance at Foskett Spring declines to ≤500 adult Foskett speckled dace during a single sampling event.

Response: Foskett speckled dace was not listed due to a lack of abundance. The fact that it is a narrow endemic contributed to the concerns for listing the species, but the reason for listing was based on threats to the habitat. However, population abundance is an effective measure of habitat quality and quantity, as population abundance quickly responds to changes in habitat. Based on past abundance estimates, the population can withstand fluctuations as low as an estimated 750 adult Foskett speckled dace and rapidly rebound to thousands of individuals. A decline in estimated population abundance to ≤500 adults at Foskett Spring would be demonstrative of an overall decline in habitat quality or quantity, or the result of another threat, and cause for immediate action. The Service, BLM, and ODFW should investigate the cause of the decline, including consideration of habitat changes, substantial anthropogenic influence, stochastic events, nonnative species, or other significant evidence. The purpose of this assessment will be to determine if Foskett speckled dace warrant expanded monitoring, additional research, additional habitat protection, or relisting as an endangered or threatened species under the Act.

Trigger: Vegetative growth, sedimentation, or similar processes create conditions which threaten the long-term survival of the species at Foskett Spring.

Response: Foskett speckled dace will be reliant on regular habitat management and enhancement to maintain open-water habitat long-term. The Service, BLM, and ODFW have monitored the habitat quantity and quality, including water quality, quantity, and extent, as well as the quantity and quality of surrounding vegetation while the species was listed, and identified instances when enhancement was needed. Due to the relative complexity of these habitats, managers will need to identify trends (e.g., expansion of vegetation into an area), specific instances of habitat change (e.g., vegetative growth in a channel isolating open-water habitats), and other conditions that identify when habitat maintenance is necessary. Significant declines in population abundance have identified the need for habitat enhancement previously, but ideally active management would occur prior to decline.

Trigger: Nonnative species invade or are introduced, or vandalism or pollution impact the population or habitat at Foskett Spring.

Response: In the time since the species was listed, there were no known introductions of nonnative species, or acts of vandalism or signs that pollution had caused an impact to Foskett speckled dace. In one instance between 2014 and 2015, a gate was found open near the springs with livestock (cattle) inside the exclosure, but damage to the springs appeared inconsequential. While the risk of any of these residual threats is low, the potential impact is high due to the restricted range of Foskett speckled dace. The refuge habitat at Dace Spring mitigates some of these threats and demonstrates the importance of that habitat. The CMP includes an emergency contingency plan that should be followed should the introduction of nonnative species, vandalism, or pollution take place.

B. PDM Implementation Schedule

To maintain open-water habitat, to ensure that the population continues to be relatively abundant, and to mitigate for potential future risks, the responsible parties propose to monitor the fish population and habitat and implement the emergency contingency plan as needed (Table 1). All parties will meet annually to discuss accomplishments and plan future actions.

Table 1. Monitoring schedule for years 1 through 5 post delisting.

	Year				
Action items	1	2	3	4	5
Abundance Survey	X		X		X
Habitat Quantity Estimate	X		X		X
Habitat Quality Survey	X		X		X
Quarterly Site Visits	X	X	X	X	X

C. Conclusion of the PDM period

At the end of the planned PDM period, the Service will work with BLM and ODFW to conduct a final review, as well as summarize the results in the PDM plan final report. Any relisting decision by the Service will require evaluating the status of Foskett speckled dace relative to the Act's five listing factors (section 4(a)(1)). The PDM plan and CMP for the Foskett speckled dace will provide guidance to ensure the species remains secure without the protections of the Act. Potential outcomes include, but may not be limited to:

1. PDM indicates that the species remains secure without the Act's protections. The PDM will be concluded at the end of year 5, and monitoring and habitat enhancement will continue through the CMP.

2. PDM indicates that the species may be less secure than anticipated at the time of delisting, but information does not indicate that the species meets the definition of threatened or endangered. The duration of the PDM may be extended and additional monitoring or management planned and implemented.

3. PDM yields substantial information indicating threats are causing a decline in the species' status since delisting, such that listing the species as threatened or endangered may be warranted. In addition to further monitoring and management activities discussed above, the Service should initiate a formal status review under section 4 of the Act to assess changes in the threats to the species. The purpose of this review is to determine whether a proposal for relisting Foskett speckled dace as a protected species under section 4 of the Act is warranted.

4. PDM documents a decline in the species' probability of persistence, such that the species once again meets the definition of a threatened or endangered species under the Act. If the PDM reveals that Foskett speckled dace is threatened (i.e., likely to become endangered in the foreseeable future throughout all or a significant portion of its range) or

endangered, then the species should be promptly proposed for relisting under the Act in accordance with procedures in section 4(b)(5). Likewise, if the best available information indicates an emergency that poses a significant risk to the well-being of the species, then the Service should exercise its emergency listing authority under section 4(b)(7).

7. Data Compilation, Reporting, and Responsibilities

The ODFW will prepare annual reports summarizing the activities, data collected, significant findings, and the results of each component of the PDM plan. The BLM will submit monitoring data to the ODFW for inclusion in the annual report. Annual reports must be prepared in a timely manner (within 6 months of the end of the field season) to ensure that adequate data are being collected, to allow evaluation of the efficacy of the monitoring programs and their modification, if necessary, and to allow periodic assessment of the status of the species. Each report will comment on the status of Foskett speckled dace relative to the thresholds and residual threats defined in the PDM plan. These reports will be distributed to all cooperators.

At the end of the 5-year PDM period, the Service will work with the ODFW to prepare a final report summarizing the results of the monitoring effort. The report will be made available to the public by fall of the following year. The final report will include a discussion of whether monitoring under the PDM plan should continue beyond the 5-year period for any reason. If there is no indication that the Foskett speckled dace has declined significantly during the 5-year monitoring period and no reason to believe that it will decline in the foreseeable future, then monitoring under the PDM plan can be concluded at that time. Monitoring and habitat enhancement will continue following the conclusion of the PDM period as necessary to maintain the habitat needs of the species (via the CMP).

8. Estimated Funding Requirements and Sources

The Service and BLM will assist the ODFW by providing funds for monitoring the population. The BLM will fund staff time and materials for monitoring habitat conditions and habitat enhancement progress. The BLM biologist and ODFW District Biologist will conduct work in-kind. The ODFW research will require funding for population estimates. Current cost is approximately $15,000 per sample effort (**APPENDIX 4**). Additional monitoring, beyond what is called for in the PDM plan, may continue at the discretion of the Service or its collaborators, dependent upon available funding and resources.

Anti-Deficiency Act disclaimer: Post-delisting monitoring is a cooperative effort among the Service; State, Tribal, and foreign governments; other Federal agencies; and other non-governmental partners under the Act. Although the Act authorizes expenditures of both recovery funds and section 6 grants to the states to plan and implement PDM, Congress has not allocated nor earmarked any special funds for this purpose. To the extent feasible, the Service intends to provide funding for PDM efforts through the annual appropriations process, if funds are available. Nonetheless, nothing in this PDM plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act (31 U.S.C. § 1341) or any other law or regulation.

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Personal Communications

Monzyk, F.R. 2018. Pers. Comm Email on December 12, 2018, 9:25 AM, from Fred Monzyk to Alan Mauer describing the results of population sampling of Foskett speckled dace at Dace Spring during the summer of 2018.

Post-delisting Monitoring Plan
for the
Foskett Speckled Dace
(*Rhynichthys osculus* ssp.)

Approved:

Paul Henson — 5/1/19

State Supervisor
Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service

Date

Acting
Regional Director
Pacific Region
U.S. Fish and Wildlife Service

5/6/19

Date

APPENDIX 1. Peer Review and Public Comments on the draft Post Delisting Monitoring Plan

Section 4(b)(5)(A)(ii) of the Act states that the Secretary must give actual notice of a proposed regulation under section 4(a) to the State agency in each State in which the species is believed to occur, and invite the comments of such agency. Section 4(i) of the Act directs that the Secretary will submit to the State agency a written justification for his or her failure to adopt regulations consistent with the agency's comments or petition. We solicited and received comments from the Oregon Department of Fish and Wildlife (ODFW). The ODFW supports the delisting and has delisted Foskett speckled dace from their State endangered species list.

Comment: One peer reviewer commented that the proposed rule defines foreseeable future as 30 years. As such, the 9-year duration of the Cooperative Management Plan (CMP) does not match the identified need for monitoring, and after it concludes, it is possible that Factor D, inadequacy of existing regulatory protection, would again threaten Foskett speckled dace.

Our Response: We think the commenter is confusing the CMP with the PDM plan. Although initially we scheduled a 9-year duration in the draft PDM plan reviewed by the commenter, the PDM will be in place for 5 years after delisting, at a minimum. However the CMP does not have a termination date and will proceed well into the foreseeable future. We used the period of 30 years to define the "reasonably foreseeable future" over which we conducted our analysis of the threats to the species. The PDM plan will be used to detect if those threats re-occur in the near future, up through 5 years. Long-term, it will be the responsibility of the BLM and the ODFW to monitor and manage the species, and the strategy for this is detailed in the CMP, which does not have a termination date. Consequently, we find that conservation measures, along with existing State and Federal regulatory mechanisms, are adequate to address these specific threats, including Factor D, absent protections under the Act.

During our review of this comment on the draft PDM plan, this comment led to a discussion of the duration and frequency of population abundance monitoring to ensure that the species would remain secure once delisted. Foskett and Dace springs will likely require regular enhancement to maintain open-water habitat. Since the CMP is ongoing and recognizes the need for occasional population abundance monitoring in response to changes in habitat, we concluded that a PDM duration of 5 years was more appropriate to verify that removal of protection from the Act did not cause a deterioration of the status of the species.

Comment: One peer reviewer stated that the CMP conflates the concept of effective population size (N_e) with census population size (N_c), that would indicate a low population size for Foskett speckled dace. The reviewer stated an effective population size of 500 or higher for Foskett speckled dace would require a sustained census population size of at least 2,500 to 3,500 individuals. The reviewer also stated that this threshold of 500 should be corrected in the CMP, and genetic studies should calculate N_e as part of the proposed monitoring.

Our Response: We think the commenter is confusing the CMP with the PDM plan. We appreciate the comment and have revised the final PDM plan to clarify the 500 fish threshold for triggering management action refers to reproducing adults (N_e) not individuals (N_c).

Comment: Several peer reviewers commented on the draft PDM plan. Comments included such suggestions as: 1) monitoring groundwater in and around the vicinity of Foskett and Dace springs; 2) monitoring of surface water quality; 3) monitoring of water levels; 4) monitoring of the extent of water; and 5) monitoring of climatic conditions. In addition, one commenter suggested a plan to evaluate stability of habitat conditions, sensitivity to climate or drought, and ultimately vulnerability.

Our Response: The PDM plan is designed to monitor those threats identified at the time of listing and any additional threats we have identified during the species' 5-year status reviews. We appreciate the suggestions from peer reviewers and as a result we identified where quantitative monitoring would ensure consistent implementation of the PDM plan.

APPENDIX 2. Foskett Spring Population Estimates With 95 Percent Confidence Intervals, By Habitat Type.

		Habitat Type or Location					
Model	Yr[1]	Spring Pool	Spring brook	Tule marsh	Cattail marsh	Entire site[2]	Management
Lincoln-Petersen	1997	204 (90–317)	702 (1,157–2,281)	no sample	26,881 (13,158–40,605)	27,787 (14,057–41,516)	none
	2005	1,627 (1,157–2,284)	755 (514–1,102)	425 (283–636)	353 (156–695)	3,147 (2,535–3,905)	none
	2007	1,418 (1,003–1,997)	719 (486–1,057)	273 (146–488)	422 (275–641)	2,984 (2,403–3,702)	none
	2009	247 (122–463)	1,111 (774–1,587)	1,062 (649–1,707)	158 (57–310)	2,830 (2,202–3,633)	none
	2011	322 (260–399)	262 (148–449)	301 (142–579)	0	751 (616–915)	none
	2012	404 (354–472)	409 (357–481)	220 (159–357)	0	988 (898–1,098)	Controlled burn
Huggins	2011	NA[3]	NA	NA	NA	1,728 (1,269–2,475)	none
	2012	633 (509–912)	589 (498–1024)	625 (442–933)	0	1,848 (1,489–2,503)	Controlled burn
	2013	2,579 (1,985–3,340)	638 (566–747)	6,891 (5,845–8,302)	3,033 (2,500–3,777)	13,142 (1,157–2,284)	Pool excavation and hand excavation of spring brook and marshes

		Habitat Type or Location					
Model	Yr[1]	Spring Pool	Spring brook	Tule marsh	Cattail marsh	Entire site[2]	Management
	2014	2,843 (2,010–3,243)	7,571 (2,422–13,892)	11,595 (7,891–12,682)	2,936 (1,757–7,002)	24,888 (19,250–35,510)	Pool excavation and hand excavation of spring brook and marshes
State-space	2015	698 (520–2,284)	11,941 (5,465–15,632)	3,662 (2,158–6,565)	38 (8–111)	16,340 (10,980–21,577)	none
	2016	138 (122–226)	656 (609–1240)	1,021 (926–1245)	14 (12–19)	1,830 (1,694–2,144)	none
	2017	925	1,032	2,322	___[1]	4,279 3,878-4,782	Mechanical excavation to deepen the open-water pools and channels

[1] Note that there are two population estimates (*i.e.* Lincoln-Petersen and Huggins) for 2011 and 2012.

[2] Site estimate totals were calculated from the total number of marked and recaptured fish and are not the sum of the estimates for the habitat types.

[3] No estimates were calculated; see (Scheerer *et al*. 2015, pp. 4-7).

[1] The cattail marsh habitat was too shallow to survey in 2017.

APPENDIX 3. Dace Spring Population Estimates, Translocations, and Management.

Year	Population estimate	Number translocated	Habitat management
Pre-1979	0	none	none
1979	no estimate	50	none
1980	no estimate	50	none
1986	300[1]	none	none
1997	<20[1]	none	none
2005	0	none	none
2009	no estimate	none	construction of 2 pools
2010	no estimate	49	none
2011	34 (11–36)	75	none
2012	13[2]	none	none
2013	34 (17–62)	200	construction of flow through channels
2014	552 (527–694)	324	none
2015	876 (692–1,637)	none	none
2016	1,964 (1,333–4,256)	none	none
2017	15,729[3] 3,470-58,479	none	none
2018	1,924 1,890- 1,968	none	none

[1] No confidence interval calculated.

[2] In 2012, there were a known total of 13 individuals.

[3] The very large 2017 estimate lacked precision (reflected in the large 95 percent confidence interval) due to a likely biased estimator of capture probabilities used for small fish that year (F. Monzyk, Oregon Department of Fish and Wildlife, pers. comm. 2018).

Appendix 4. Proposed Budget for the Foskett Speckled Dace Post-Delisting Monitoring Plan.

	Year 1	Year 2	Year 3	Year 4	Year 5
Biologist time	$10,314		$11,371		$12,537
Services and supplies	$1,193		$1,316		$1,451
Subtotal	$11,507		$12,687		$13,988
Indirect (23.98%)	$2,759		$3,042		$3,354
Totals	$14,266		$15,729		$17,342

Note: Estimate includes a 5 percent per year increase and 23.98 percent indirect cost.