

2024 Annual Summary of Activities
Pahrump Poolfish Safe Harbor Agreement

by

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The following report is an annual summary of activities under Enhancement of Survival Permit # TE17874C-0 issued to the Las Vegas Valley Water District (LVVWD) by the U.S. Fish and Wildlife Service (USFWS). This permit was granted in 2017 under the Safe Harbor Agreement for Pahrump poolfish at the 180-acre Springs Preserve (Enrolled Property) in Clark County, Nevada. The agreement and permit expire in 2032 but can be renewed for an additional 15 years.

Executive Summary

From July 2022 to July 2023, the estimated population increased from 133 to 804 Pahrump poolfish in the North Fork refugium ponds, a 504% increase. In 2024, minor changes in sampling design were instituted (i.e., increased the number of fine mesh minnow traps from approximately 9% to 50% of traps). The population was estimated to be 757 fish, a slight decrease (6%), but well within the margin of error. Ultimately, the population remains 498% higher than in July 2022.

Methods

In prior years, each pond had 11 traps deployed: 10 regular mesh and one fine mesh Gee minnow traps for a total of 20 regular mesh and two fine mesh traps. In 2024, however, the Upstream Pond received six fine mesh and five regular mesh traps, whereas the Downstream Pond received five fine mesh traps and six regular mesh traps. Thus, a total of 22 traps (11 fine mesh and 11 regular mesh minnow traps) were deployed in the ponds in 2024. The change in trap mesh size was instituted to improve data on recruitment (i.e., the number/proportion of immature fish < 30 mm in length) in the two ponds. As in prior years, a regular mesh trap was deployed in the pond's settling basin.

Population Estimate

The Nevada Department of Wildlife (NDOW) conducted the July 2024 survey with the assistance of the Southern Nevada Water Authority (SNWA), USFWS, and Springs Preserve colleagues:

- On July 24, 2024, a total of 566 adult Pahrump poolfish were captured and marked in the two ponds following previously established trapping protocols. Of these fish, 323 adults were captured and marked in the Upstream Pond (Pond NF-1b) and 243 adults in the Downstream Pond (Pond NF-1a). There were an additional 23 immature fish (< 30 mm) captured; 15 in the Upstream Pond and 8 in the Downstream Pond.
- On July 31, 2024, a total of 629 adult Pahrump poolfish were captured in the two ponds during the recapture session. For the Upstream Pond, 353 adult fish were captured, of which 289 were recaptures; whereas, in the Downstream Pond 276 fish were captured, of which 185 were recaptures.

Population estimates and 95% Confidence intervals (CI) for years 2018–2024 for the two ponds are presented below (**Tables 1–2**). The adult population for the refugium ponds was estimated to be 757 fish, a 6% decrease but well within the margin of error. The population remains 498% higher than in July 2022.

Table 1. Downstream Pond: Population estimates and 95% Confidence Intervals (CI) of adult Pahrump poolfish captured in North Fork Pond 1a in 2018–2024 at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

Year	No. Surveys	Population Size Estimate	95% CI
2018	3	134	63–310
2019	2	65	46–96
2020	3	93	41–232
2021	3	31	21–50
2022	2	29	18–50
2023	2	331	277–397
2024	2	362	314–419

Table 2. Upstream Pond: Population estimates and 95% Confidence Intervals (CI) of adult Pahrump poolfish captured in North Fork Pond 1b in 2018–2024 at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

Year	No. Surveys	Population Size Estimate	95% CI
2018	2	252	215–295
2019	2	99	74–136
2020	2	98	72–137
2021	3	67	49–94
2022	2	104	77–142
2023	2	473	412–544
2024	2	395	352–443

Population estimates for adult Pahrump poolfish continue to be slightly higher in the Upstream Pond. One or more causative agents may be involved. The main physical differences between the two ponds are enumerated below. Whether or not one or more of these factors plays a role remains to be ascertained. The Downstream Pond has:

1. Mechanical aeration via bubblers.
2. Skimmers that were primarily designed to remove floating debris, such as cottonwood leaves.
3. Greater water depth.
4. Bottom drains connected to a settling basin for the removal of fine particulate matter.

In addition to population estimates, all adult and immature fish were measured in both ponds on July 24, 2024 to create size-frequency histograms for the Springs Preserve populations (**Fig. 1–3**). Typically, only a small sample of the fish captured are measured. Measuring all the fish increased the accuracy of the size-frequency histograms.

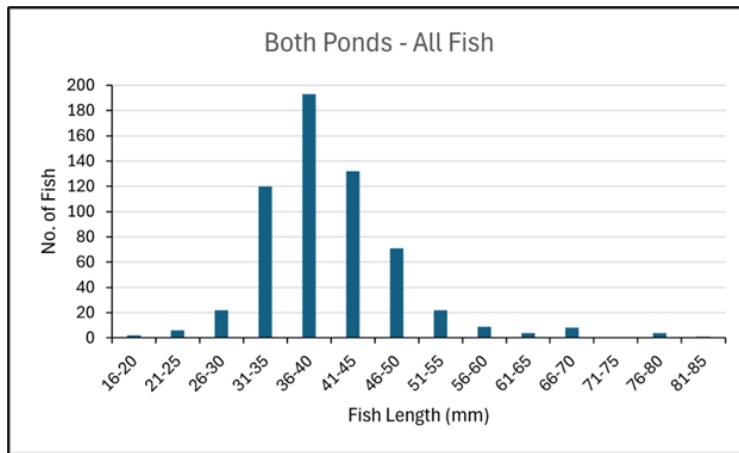


Fig. 1. Pahrump poolfish size-frequency histogram of total length for adult and immature fish captured on July 24, 2024, in the combined Upstream and Downstream ponds at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

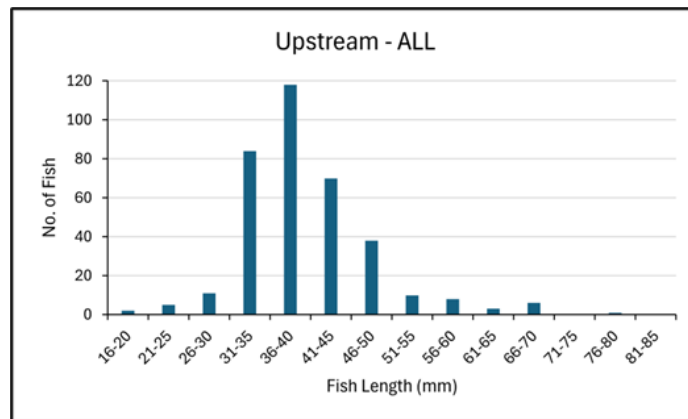


Fig. 2. Pahrump poolfish size-frequency histogram of total length for adults and immature fish captured (n = 369) on July 24, 2024, in the Upstream refugium pond at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

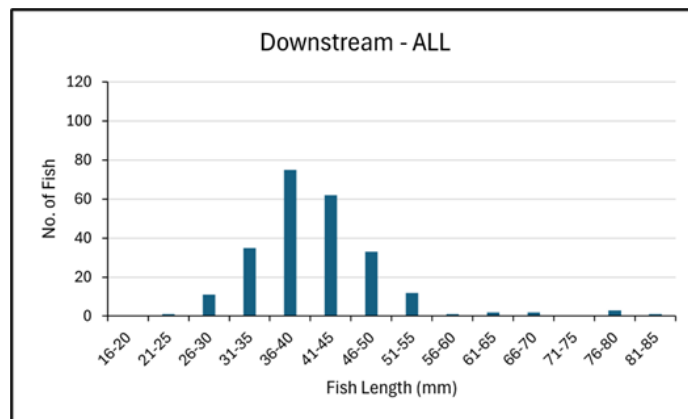


Fig. 3. Pahrump poolfish size-frequency histogram of total length for adults and immature fish captured (n = 288) on July 24, 2024, in the Downstream refugium pond at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

Operation and Maintenance

Stonewort continues to be removed as part of regular pond maintenance.

Environmental Conditions

Since September 18, 2019, water quality measurements have been collected every 15 minutes by a submerged In-Situ sonde (i.e., datalogger) with probes for water temperature, pH, and conductivity. A dissolved oxygen probe was added in 2024. The dissolved oxygen in the ponds is remarkably high and fluctuates anywhere from 93% to 102% daily, with higher daytime oxygen levels because of photosynthesis by algae (**Fig. 4**). This high baseline level of oxygenation is maintained mechanically by bubblers in the Downstream Pond, as well as passively from the waterfalls in both ponds.

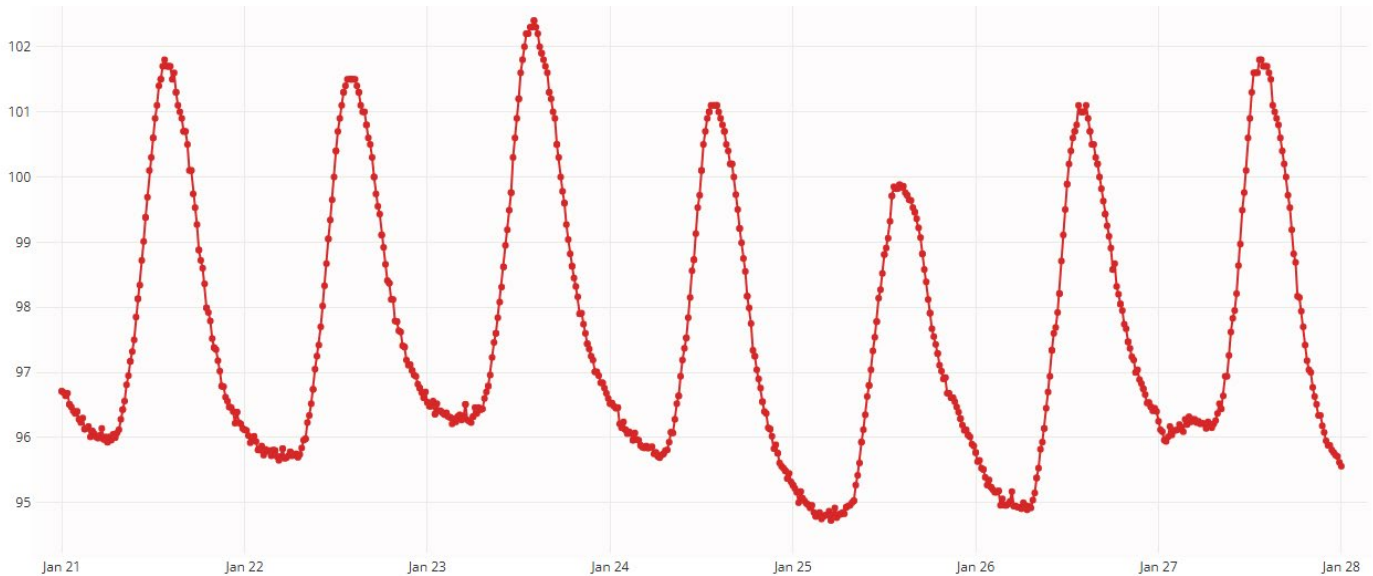


Fig. 4. Example of percent dissolved oxygen recorded every 15 minutes from January 21 to 27, 2025 by a sonde in the Downstream Pond at the Springs Preserve, Las Vegas, Clark County, Nevada, USA.

Unfortunately, after five years of use, the sonde malfunctioned during a software update and no data was collected from approximately August 20 to September 10, 2024, which included a period of record high air temperatures. In addition to the aforementioned malfunction, satellite connectivity issues plagued the sonde during the summer of 2024; consequently, the sonde was replaced in November 2024.

Education

Information about the Pahrump poolfish is shared on the Springs Preserve [website](#). Guests visiting the ponds can read interpretive panels about the history of the Pahrump poolfish and the threats the species faces. Natural history and conservation messaging for the Pahrump poolfish were shared during program offerings. Other public education outreach efforts from Springs Preserve were offered online through social media platforms, and included:

- [Tree trimming - Instagram - March 11, 2024](#)

In addition, an article was published in the Pipeline, a Las Vegas Valley Water District newsletter:

- Restoration efforts hit record numbers – Pipeline Employee News – October 7, 2024 (**Appendix I**)

Mortalities

Two dead Pahrump poolfish were observed in May 2024. On May 21, 2024, one partially decayed fish was found floating in the pond with no obvious signs of disease or trauma. On May 28, 2024, another fish was found dead in a pump pre-filter, without obvious signs of disease or trauma. As far as can be ascertained, both fish likely died of natural causes at the end of the winter dormancy period. Decay and/or scavenging likely did not occur given the low water temperatures. Both mortalities were previously reported to USFWS.

Acknowledgments

The conservation of the federally endangered Pahrump poolfish at the Springs Preserve would not be possible without our agency partners, with special thanks to James Harter at the USFWS and Kevin Guadalupe at NDOW. As always, this project is supported by Katrina Smith at the Springs Preserve, as well as Aaron Ambos, Audrey Bennett, and Cindy (Nguyen) Soriano at SNWA. Thanks to SNWA Hydrologists Grant Kornrumpf for troubleshooting and continuing to perform maintenance of the In-Situ water quality probe twice a month.

Restoration efforts hit record numbers

While the Springs Preserve is popularly known as a cultural destination, it is also a sanctuary for the federally endangered Pahrump poolfish and state-protected relict leopard frogs. Both species are making a comeback by leaps and bounds, thanks to preservation efforts by staff biologists working with the Nevada Department of Wildlife.

Pahrump poolfish numbers now total 757, based on counts of their populations in the Preserve's Upstream and Downstream ponds. After biologists started removing invasive macroalgae (called "Stonewort") from the ponds in May 2022, the poolfish numbers jumped by more than 500 percent just a year later!

In addition, the number of relict leopard frogs documented in the Cienega doubled between 2023 and 2024. This year there were 15 relict leopard frog egg masses counted, which means healthy newly transformed frog numbers expected for this year's count.

By establishing a safe haven for both species at the Preserve, visitors can learn about the lives of the poolfish and relict leopard frogs who call Cottonwood Grove home. The Springs Preserve, in partnership with the Southern Nevada Water Authority, continues to work to protect native and endangered species and educate our community about our desert ecosystem.

