

5-YEAR REVIEW

Hiko White River Springfish

(*Crenichthys baileyi grandis*)

and

White River Springfish

(*Crenichthys baileyi baileyi*)



Hiko White River springfish photo by U.S. Fish and Wildlife Service

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GENERAL INFORMATION

Species: Hiko White River springfish (*Crenichthys baileyi grandis*) and White River springfish (*Crenichthys baileyi baileyi*)

Date listed: September 27, 1985

FR citation(s): 50 FR 39123

Classification: Endangered

BACKGROUND

This five-year status review summarizes changes in recovery status for both the White River springfish (*C. b. baileyi*) and the Hiko White River springfish (*C. b. grandis*). To avoid confusion between names, the generic term “springfish” will be used when referring to the species level; White River springfish will be used when referring to the subspecies *C. b. baileyi*; and Hiko White River springfish will be used when referring to the subspecies *C. b. grandis*.

The White River springfish and Hiko White River springfish are small-bodied fish (Goodeidae: Empetrichthyinae) endemic to spring systems in Pahranaagat Valley, Lincoln County, Nevada. Both subspecies are adaptable and can inhabit water of high temperature (79 – 99 °F) and low dissolved oxygen levels (0.7 – 3.3 O₂ parts per million) for at least short periods of time (Sumner and Sargent 1940, Hubbs and Hettler 1964). They are omnivorous and opportunistic feeders though may be primarily herbivorous (Williams and Williams 1982, Hobbs 1998). Introductions of nonnative species are their primary threat and have negatively affected them through competition and predation throughout their range (Deacon et al. 1964, Deacon and Minckley 1979, Courtenay et al 1985, Tuttle et al. 1990).

Most recent status review

The status of the Hiko White River springfish and White River springfish was last reviewed in 2012 through a 5-year review (Service 2012).

FR Notice citation announcing this status review

86 FR 27462. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 66 Species in California and Nevada. Published on January 27, 2021.

ASSESSMENT

Information acquired since the last status review

This 5-year review was conducted by the U.S. Fish and Wildlife Service’s (Service) Southern Nevada Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on January 27, 2020. We also contacted State agencies, Federal agencies, local agencies, and species experts, to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

Since the Service’s 2012 5-year review for Hiko White River springfish and White River springfish, limited new information has become available. New information received has been in the form of population monitoring updates, including nonnative species removal reports,

provided by the Nevada Department of Wildlife (NDOW). Additionally, a single genetics paper was published that discussed taxonomy. We did not receive any substantial comments from the public in response to our Federal Register Notice announcing this 5-year review. The results of the monitoring reports indicate that both subspecies remain in their historical habitats and this information does not alter our understanding of their current distribution.

Abundance and Distribution

Hiko White River springfish

Hiko White River springfish are found in three aquatic systems: Crystal Springs, Hiko Spring, and Blue Link Spring. They are native only to Hiko and Crystal Springs, while Blue Link Spring serves as a refuge population outside the historic range of the species. The NDOW has conducted population surveys at all locations since the Service's 2012 5-year review. Below is a summary of current conditions at occupied sites.

- a. Hiko Spring – The population at Hiko Spring has remained suppressed since the early 2000s (Figure 1). This coincides with the establishment of red swamp crayfish (*Procambarus clarkii*) at Hiko Spring. Prior to the invasion of crayfish, the population was larger and more stable with population estimates typically exceeding 2,000 individuals. In 2020, NDOW conducted a mark-recapture survey that estimated 310 individuals with a 95% confidence interval of 113 to 775 individuals (NDOW 2020a).
- b. Crystal Springs – The population at Crystal Springs has increased since the removal of convict cichlid (*Amatitlania nigrofasciata*) from the springheads. This removal effort is one of the most substantial recovery efforts taken since the last review of the species and serves as a model for future removals in Pahrangat Valley (NDOW 2019). Future population monitoring will be important to understanding how Hiko White River springfish respond to the removal of convict cichlids. In 2020, NDOW conducted mark-recapture surveys at the north and south springpools of Crystal Springs (NDOW 2020b, Figure 2). At the north springpool, the population was estimated at 1,344 individuals with a 95% confidence interval of 932 to 2,023 individuals. At the South springpool, the population was estimated at 1,948 individuals with a 95% confidence interval of 892 to 5,311 individuals.
- c. Blue Link Spring – Population estimates for Blue Link Spring have been consistently high in recent years, though a flood event in 2021 resulted in a large portion of the artificial spring being filled in with sediment. Post-flood, 350 springfish were salvaged and translocated to Crystal Springs by NDOW (K. Guadalupe pers. comm.). Subsequently, hand excavation was required to increase open water habitat and depth of the springpool. Few springfish were encountered during hand excavation, which may be due to springfish reducing their activity levels due to low water temperatures. We anticipate that additional work using heavy equipment will be needed in the future to restore function to this system. Currently, we do not have an accurate estimate of the Hiko White River springfish population post-flood.

White River springfish

White River springfish are found in a single system, Ash Springs. Habitat at Ash Springs consists primarily of private land with a small parcel of land managed by the Bureau of Land Management (BLM). The BLM managed portion was used extensively for recreation before a closure notice was put in place in 2013.

- a. Ash Springs – The NDOW conducts annual snorkel surveys of Ash Springs to enumerate the White River springfish population. This involves snorkeling designated transects (Figure 3) and recording visual encounters of springfish to gain trend information on the population size. The most recent survey was conducted in August 2018, which resulted in a count of 2,060 individuals (NDOW 2018, Figure 4).

Taxonomy

Campbell and Pillar (2017) examined the phylogenetics of the subfamily Empetrichthyinae using genetic sequences of both mitochondrial and nuclear data. Their results challenged the designation of subspecies for both Hiko White River springfish and White River springfish, suggesting that *Crenichthys baileyi* contains two species versus the currently accepted single species with five subspecies. This new information has not resulted in taxonomic changes for either subspecies.

Threats

The primary threat for Hiko White River springfish and White River springfish is predation and competition from nonnative aquatic species. Secondly, habitat modification for agriculture and recreation has reduced the amount of available habitat for springfish.

Predation

Predation and competition from nonnative aquatic species have been implicated in the decline or extirpation of White River springfish populations. The original population of Hiko White River springfish was extirpated from Hiko Spring and its outflow stream following the introduction of nonnative fish. The Hiko White River springfish population at Crystal Springs declined precipitously following introduction of nonnative fish species. Nonnative species known to occur in Ash, Crystal, or Hiko Springs, include shortfin mollies (*Poecilia sphenops*), sailfin mollies (*Poecilia latipinna*), mosquitofish (*Gambusia affinis*), convict cichlids, carp (*Cyprinus carpio*), bullfrogs (*Lithobates catesbeianus*), and red swamp crayfish.

Since the Service's 2012 review, efforts to remove nonnative species at Crystal Springs appear to have improved the status of Hiko White River springfish. In 2019, NDOW conducted two rotenone treatments to remove nonnative fish species. These efforts appear to have been successful in removing convict cichlids and common carp from the springheads of Crystal Springs. Post-monitoring of this site showed an initial increase in the Hiko White River springfish population.

Habitat modification for agriculture

Although historical usage of Ash, Hiko, and Crystal Springs is not fully understood, habitat manipulation for agricultural purposes has been a longstanding practice (Service 1985, Courtney et al. 1985). The first manipulation of these springs for agriculture occurred before European settlement of Pahrnagat Valley by the Pahrnagat Indians (Courtney et al. 1985). More recent manipulations have occurred following the settlement of Pahrnagat Valley in 1865. Spring modifications, including the impoundment, diversion, and piping of spring outflows for agricultural uses, and the elimination or reduction of aquatic vegetation has resulted in a loss of available habitat for the Pahrnagat Valley springfishes and invertebrate food sources (Service 1985).

Habitat modification for recreation

The majority of White River springfish habitat at Ash Springs is on private land, with a smaller portion managed by the BLM's Ely District and Caliente Field Offices (Service 1985). The BLM has historically managed Ash Springs for recreational usage, including swimming and bathing.

In the 1990s, BLM implemented developments for recreational use at Ash Springs due to public demand (BLM 2019), including a manmade soaker pool adjacent to Ash Springs, dirt parking, lot, double vault toilet, trash cans, picnic tables, a fire ring, cooking grills, sitting benches, and an informational kiosk (BLM 2019). By the early 2010s, recreational use had reached a point where there were obvious visual impacts to Ash Springs and the surrounding area, including increased turbidity, bank trampling, destruction of vegetation, and trash (Service 2012, NDOW 2012, BLM 2018). To address these impacts and reopen the area to public recreation, the BLM plans to implement the Ash Springs Recreation Site Improvements Project. This project includes four main actions: (1) fence construction; (2) construction to repair an existing manmade soaker pool; (3) improved parking and picnic areas; and (4) construction of an access road. After the site is developed, the BLM would maintain and manage the site, and reopen it for recreational use. The project is anticipated to improve conditions for the White River springfish in the BLM portion of Ash Springs.

CONCLUSION

After reviewing the best available scientific information, we conclude that the Hiko White River springfish and the White River springfish remain as endangered species. The evaluation of threats affecting these species under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the species in our 2012 5-year review remains an accurate reflection of the current status of these species.

RECOMMENDATIONS FOR FUTURE ACTIONS

- Continue working with private landowners to foster positive working relationships and develop conservation agreements that facilitate recovery actions to improve the springpool habitat of Crystal and Hiko Springs. Habitat improvement projects may include efforts to eradicate nonnative aquatic species, nonnative vegetation removal/treatment, and changes in agricultural management.

- Continue nonnative species control and eradication. Regularly analyze the effectiveness of removal efforts and adapt to new methods as they are identified.
- Reevaluate taxonomy as new information becomes available.

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date _____

LITERATURE

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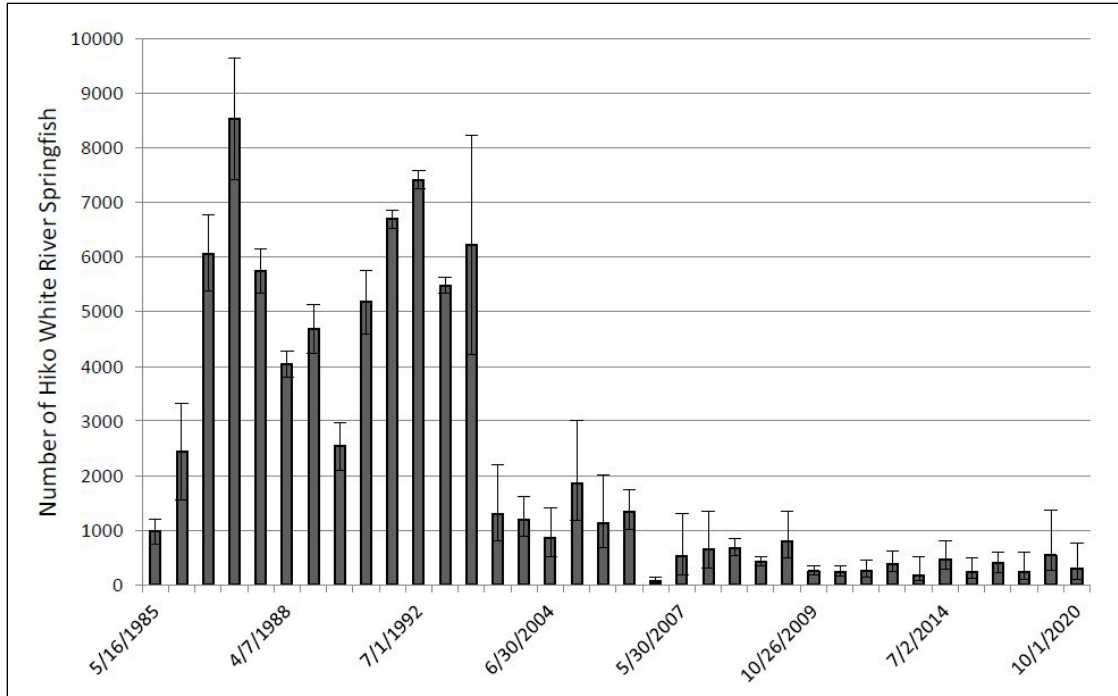


Figure 1. Hiko White River Springfish Population Estimates at Hiko Spring, 1985 - 2020 (NDOW 2020b).

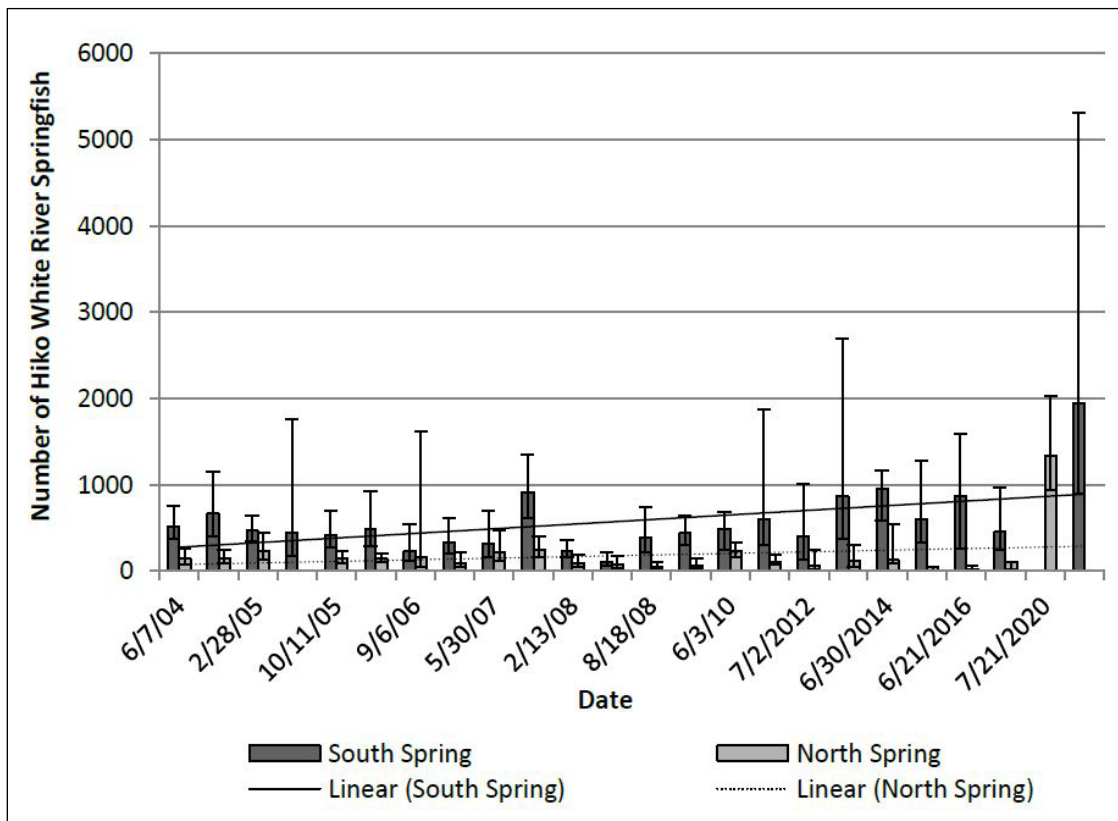


Figure 2. Hiko White River Springfish Population Estimates at Crystal Spring, 2004 - 2020 (NDOW 2020a).

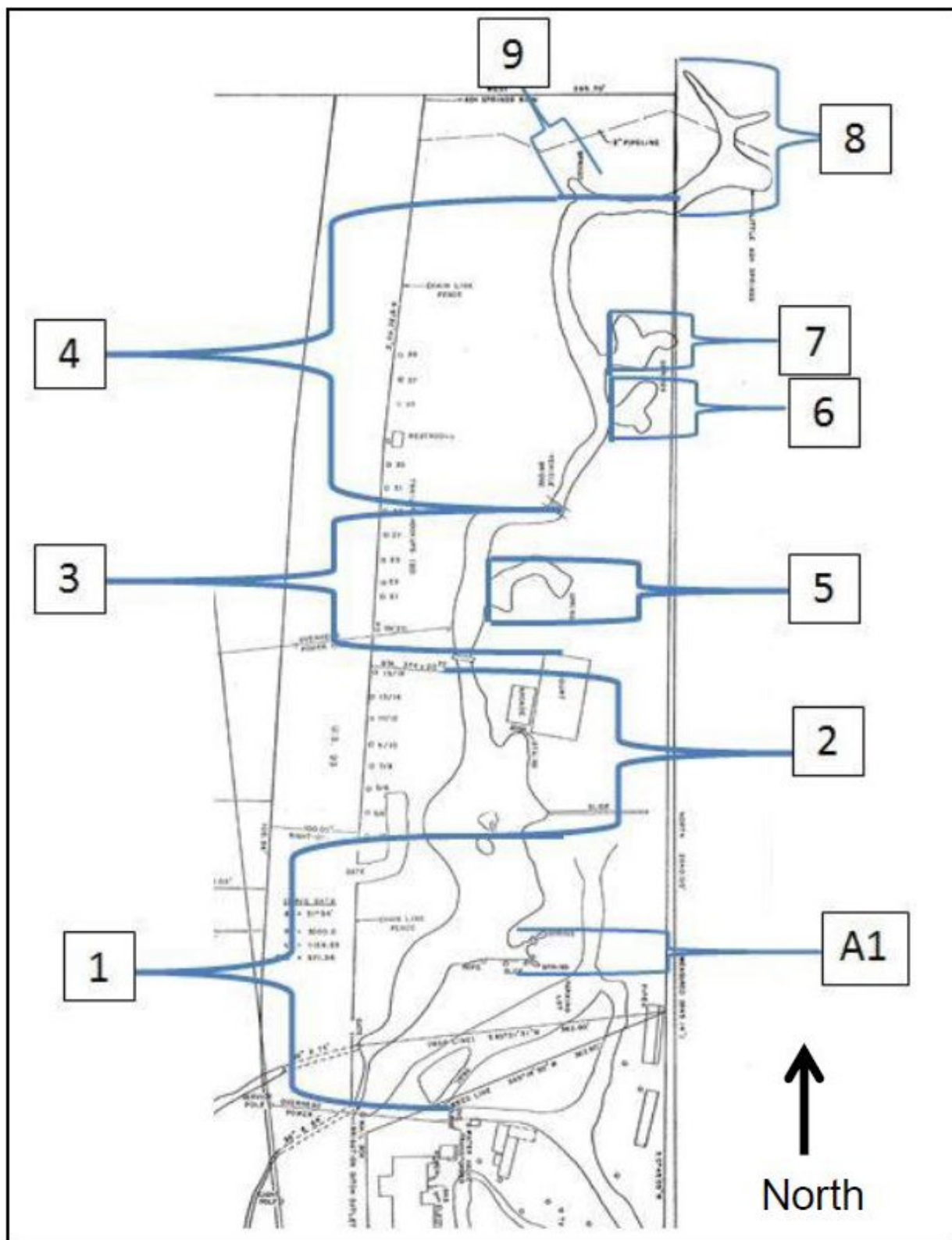


Figure 1. Ash Spring snorkel transects 2012-2018 (NDOW 2018).

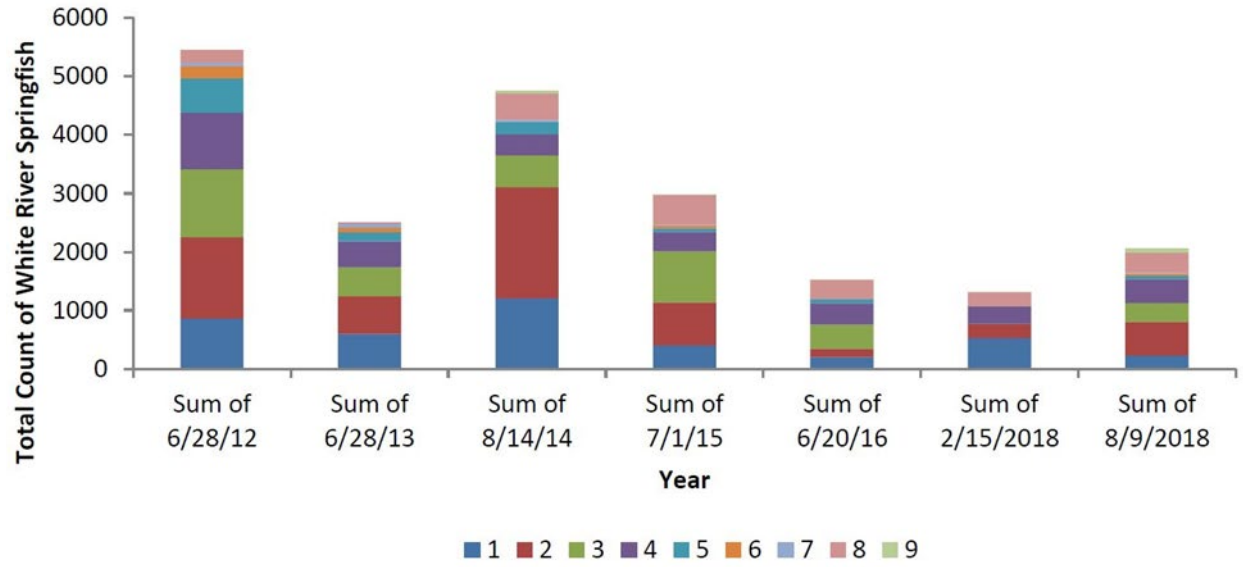


Figure 2. White River Springfish counts at Ash Spring, 2012-2018 (NDOW 2018).