

Fish Renovation Project Final Report - Summary

July 2007

Summary

The purpose of this project was to remove exotic green sunfish, large-mouth bass, and western mosquitofish from the pond and the natural channel at Rattlesnake Springs, a detached unit of Carlsbad Caverns National Park. This project required assistance from federal, state, and local agencies to complete. To accomplish the exotic fish removal, we drained the pond and used seines and minnow traps to remove fish from the pond and natural channel. We separated the native and exotic fish, held the native fish in aerated tanks, and released the exotic fish in the Pecos River. After removing all the fish we could find over the course of 5 days, we allowed the pond to refill. The pond required three days to refill to the level prior to the project, at which time we reintroduced the roundnose minnow (1,054 total) and greenthroat darters (216 total) to the pond. While the pond was drained, the park also completed needed maintenance work on the pond and irrigation ditches.

Previous Efforts

In March 1991, the park, NM Dept. of Game and Fish (NMDGF), and US Fish and Wildlife Service (USFWS) tried draining the pond before they added the rotenone (a piscicide) to kill the exotic green sunfish (the only exotic species in the pond at the time). They were unable to drain the pond adequately because the flow from the springs was too great. When they applied the rotenone, it did not kill all the green sunfish. Some of the fish went to where the water wells up and stayed there until the rotenone had left the system. Over the following 15 years, efforts were made to remove exotic fish with gill nets and minnow traps. Each year less roundnose minnows and greenthroat darters were found, but increasing numbers of bass and sunfish were found. The native species appeared to be more common in the natural channel and the irrigation ditch than the pond. Greenthroat darters had not been trapped at Rattlesnake Springs since 2002.

In 2006, low flows decreased the level of the pond and dried up the irrigation ditch during the summer. In July 2006, NMDGF and USFWS personnel came to the park to assist with a fish survey and to plan a fish removal project. During the survey, green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), roundnose minnow (*Dionda episcopa*) and western mosquitofish (*Gambusia affinis*) were found. The western mosquitofish was a new species (exotic) for the park and was only found in the natural channel. The greenthroat darter (*Etheostoma lepidium*) was not found, but excessive vegetation in the natural channel limited the survey in that area.

The planned fish removal project was postponed until 2007 because the spring flows increased sooner than the project could be implemented. For the current project, it was understood that the spring flow would prohibit completely drying the pond, but we could attempt have the ponded area be as small as possible to more effectively remove any fish from those areas.

Current Effort

This project took place in June 2007 to utilize low spring flows to our advantage. Two weeks prior to draining the pond, excess vegetation was removed from the natural channel. The removed vegetation consisted primarily of watercress (non-native) and was removed from

approximately 1,000 feet of the natural channel. One week prior to the project, NMDGF Biologist Brian Lang arrived to tentatively identify the crayfish species found at Rattlesnake Springs. Only 3 specimens were located and the species was thought to be native (later to be determined exotic). While seining for crayfish in the natural channel just below the weir, one greenthroat darter was found.

The week prior to draining the pond, the gate for the irrigation ditch (to Washington Ranch) was fully opened to allow the pond level to drop somewhat. The park had already been sending extra water down the irrigation ditch for approximately 1 ½ months prior to the project start date.

On June 25 the pond draining commenced by fully opening the gate to the natural channel. An engine pump from the Whites City Volunteer Fire Department (WCVFD) and a 4" trash pump from Guadalupe Mountains National Park (GUMO) were also utilized to drain the pond. This was a more daunting task than originally thought because the flows of the springs tripled once the pond was lowered to about half of its original volume.

Additional pumps were delivered on June 26 (6" diesel pump and a 3" gasoline pump). Using 10" of total pump intake capacity (the 6" and 4" pumps), we were able to drain the pond until it was a small pool approximately 15' long, 5' wide and 18" at the deepest point. Using a 6" pump we were usually able to maintain that size of a pool and we could drop it somewhat using an additional 4" pump, but we were limited by the length of the intake hoses. The flow from the springs was very high and we attempted to channel the water to one low spot (hand dug) near the east wall where the pumps operated.

On June 25, personnel from Carlsbad Caverns National Park (CAVE), NM Dept. of Game and Fish (Roswell and Sante Fe offices), US Fish and Wildlife Service (USFWS), WCVFD, and several Youth Conservation Corps (YCC) interns arrived to assist with the pond draining and fish removal efforts. The fish were removed from the pond using trammel nets. The following days, fish were removed from the pond using seines. Four species were found: roundnose minnow, greenthroat darter, large-mouth bass, and green sunfish. All fish were sorted and placed in appropriate holding tanks.

Holding tanks were brought to the park by NMDGF. One was set up for holding half of the native fish; the other was set up for transporting fish out of the park. The WCVFD loaned the park a folding water tank for holding the other half of the native fish.

There is a pool of water west of pond (connected to the pond by a culvert) and from it 21 green sunfish were caught in minnow traps the first day. This pool dried up completely as the pond was drained.

Fish were removed from the natural channel with minnow traps (every day), electro-shocking (days 1 and 2), and seining (days 1 and 2). All 5 species were found: roundnose minnow, greenthroat darter, western mosquitofish, large-mouth bass, and green sunfish. They were sorted and placed in appropriate holding tanks.

As the water drained out of the irrigation ditch on the first day, two park staff were assisted by YCC interns to remove fish from the ditch. Roundnose minnow, large-mouth bass, and green sunfish were removed and sorted into the appropriate holding tanks. The irrigation ditch remained dry for the remainder of the project.

At the end of the first and second days, NMDGF took the large-mouth bass and green sunfish and released them in the Pecos River at 10-Mile dam.

Crayfish were captured and sorted (>150 individuals) according to those that were thought to be the native species and those that were obviously not native. The crayfish were held in aquariums and in the folding tank until they were positively identified to be the non-native species by Brian Lang. NMDGF took the non-native crayfish to the children's fishing pond in Roswell.

Rio Grande leopard frogs (*Rana berlandieri*) and Rio Grande cooters (*Pseudemys gorzugi*) were found in the pond and the irrigation ditch during the project. They were taken to the natural channel and released.

It was challenging to move around within the pond because many locations in the pond had muck that was very slippery, sticky, smelly and knee-deep. In spite of this, by Friday noon, multiple seine hauls recovered no additional fish. In addition, no fish were seen after careful observation by multiple people. The water in Rattlesnake Springs is very clear and clears within minutes of a disturbance that stirs up the sediment.

In addition to removing the fish from the pond, the following maintenance work was completed by the park maintenance staff and the YCC interns: repaired damaged sections of the irrigation ditch, replaced faulty head gates and port gates, sealed off corner of irrigation ditch by residence, replaced staff gage on side of springbox, removed sediment from pond, removed sediment from irrigation ditch, and removed planks to springbox (planks to be replaced later).

The pond was allowed to refill beginning Friday June 29. It filled quickly until it was approximately 1/3 full and then rate of the spring flows slowed. Due to the slow refill rate, water did not flow down the irrigation ditch to Washington Ranch until Sunday night.

On July 2, all of the held-over fish (roundnose minnow and greenthroat darter) were re-examined individually to verify species, and then released into the pond.

Total number of fish removed from Rattlesnake Springs (pond, west pool, natural channel, and irrigation ditch) during week of June 25:

83 largemouth bass

74 green sunfish

1,054 roundnose minnow (returned to pond)

216 greenthroat darter (returned to pond)

>100 western mosquitofish

On July 3, Shawn Denny returned to collect the holding tanks and take the non-native crayfish. During a walk around the pond, 5 small green sunfish were observed swimming around. These

fish were not seen during observations the previous four days. Follow-up work with minnow-traps has enabled us to determine that the fish are indeed coming up the irrigation ditch from Washington Ranch. The park will now begin looking into the feasibility of a fish barrier. In the interim, we are trapping the sunfish to keep the population at a minimum.

Since the project has been completed we have observed the native fish swimming freely in the pond. We did not see the natives often when the pond contained the bass and sunfish. Rio Grande leopard frogs and egg masses from the frogs have been observed in the pond. The Rio Grande cooters have also returned to the pond. In general, it appears the project successfully reduced the predation pressure on the native species. In the future, it is hoped that we can find a suitable location for a fish barrier and eliminate the predation pressure from exotic fish.

Carlsbad Caverns National Park greatly appreciates the assistance it received from park staff, Guadalupe Mountains National Park, NM Department of Game and Fish, US Fish and Wildlife Service, Whites City Volunteer Fire Department, and the Youth Conservation Corps. Not only staff and expertise was loaned to the park, but also equipment necessary to ensure a successful operation. The park also thanks Washington Ranch for their understanding and cooperation during the project.

Things to consider in future efforts

One location that was extremely difficult to remove fish from was the springbox in the pond. Future efforts should take this into account and devise an effective method to get the fish out of the springbox.

There were other locations that we did not drain and remove fish from during the week of June 25th, but did immediately following that week: the stilling chambers (by weirs) need to be drained and fish removed from those areas, and the section of channel between the natural channel gate and the natural channel weir.

The park needs to withhold from irrigating the week prior to and the week or two following a project like this. Unfortunately, this was overlooked for this project.

The pond draining could begin a few days earlier and the water could be run down the irrigation ditch to Washington Ranch (with proper location of pumps and sufficient intake hose).

Arrangements should be made in advance for equipment that will dredge a greater portion of the pond.

A detailed final report for this project is available in the Resources Stewardship and Science Biology Branch office at Carlsbad Caverns National Park.