ARIZONA GAME AND FISH DEPARTMENT

Mineral Creek--Big Box Dam Reservoir Survey, April 11-12, 2007

Report prepared by Anthony Robinson, AZGFD, Research Branch

Introduction

Mineral Creek is a tributary to the Gila River in Pinal County Arizona. Mineral Creek is impounded by Big Box Dam just upstream of ASARCO Ray Mine (Figure 1). Immediately above the impoundment, the watershed divides into Devils Canyon to the west and Mineral Creek to the east (this portion of Mineral Creek is referred to as upper Mineral Creek). Upper Mineral Creek and its tributaries originate in Gila County on Tonto National Forest and drain the Pinal Mountains and the Dripping Springs Mountains. However perennial flow (approximately 8 km in length) within Mineral Creek begins on Government Springs Ranch. The portion of Mineral Creek from the impoundment upstream approximately 0.9 km is intermittent. Upper

Mineral Creek was designated as critical habitat for the Gila chub *Gila intermedia* when it was listed as endangered in 2005.

Five fish species have been documented in the streams above Big Box Dam. Fish species reported in Devils Canyon include green sunfish (2002 and 2006) and fathead minnow (2002). Fish species reported in upper Mineral Creek during 1993 include two natives (longfin dace *Agosia chrysogaster* and Gila chub), and three nonnatives (fathead minnow *Pimephales promelas*, green sunfish *Lepomis cyanellus*, and mosquitofish *Gambusia affinis* (Andrews and King 1997). Gila chub, longfin dace, and green sunfish were observed by Arizona Game and Fish Department biologists in Mineral Creek during 2000, but during May and September 2002 and March 2006 surveys no fish were found. The stream was assumed to be fishless, and longfin dace from Aravaipa Creek were stocked during August (149 fish) and October (140 fish) 2006. During the October 2006 stocking, numerous young-of-year longfin dace were observed, indicating that the fish stocked during August had reproduced. During a visual survey on February 26, 2007, green sunfish and longfin dace were observed in the lower portion of upper Mineral Creek. No fish were captured during a fish survey of the reservoir above Big Box Dam on February 26, 2007, but that was likely because of the short duration (2 h) of gill net and hoop net sets; a few dead fathead minnow were observed in the reservoir.

Methods

On Wednesday April 11-12, 2007 Arizona Game and Fish Department (AZGFD) biologists Codey Carter, Curtis Gill, Cori Carveth, and a representative from SWCA Inc., sampled the reservoir behind Big Box Dam on Mineral Creek, Pinal County. The AZGFD and SWCA biologists were escorted through the ASARCO Ray Mine Complex by a mine employee.

The reservoir was approximately 32 ft deep. The crew sampled the reservoir using six 150' x 6' experimental gill nets set at dispersed locations around the reservoir. Nets were set perpendicular to shore, with the small-mesh end attached to shore. The crew set nets at approximately 3:00pm on April 11, 2007, and pulled and checked the nets beginning at 9:00am on April 12, 2007. The crew also electroshocked the entire shoreline of the reservoir, in two 900 second efforts, using a canoe electrofisher. The canoe was outfitted with a Smith-Root 2.5 GPP electrofishing unit, a 30 cm diameter spherical cathode suspended from a bow-mounted boom, and 12 x 334 cm anodized aluminum strips that were permanently affixed to each side of the canoe such that they would be mostly submerged when the canoe was loaded. The electrofisher was operated continuously for each 900 second effort.

Results

Green sunfish and fathead minnow were the only species of fish captured. Sixty-four fathead minnow (mean catch-per-unit effort = 0.59 fish/hr, standard deviation = 1.37) and 243 green sunfish (mean catch-per-unit effort = 2.25±3.07 fish/hr) were captured in gill nets. Twelve fathead minnow (mean catch-per-unit effort = 24.0±23.94 fish/hr) and 86 green sunfish (mean catch-per-unit effort = 172.0±124.45 fish/hr) were captured by electrofishing.

Green sunfish were noted in Mineral Creek, just upstream of the reservoir during a February 26, 2007 survey; no fish were captured in the reservoir during that survey, likely because nets were set for too short of duration (2 hours), but a few dead fathead minnow were found. During the

February survey, Mineral Creek was dry for approximately 0.9 km of the stream immediately upstream from the reservoir, after which a perennial portion was encountered. It is likely that green sunfish migrated upstream from the reservoir into Mineral Creek during flooding events or spring runoff.

Recommendations

Green sunfish are reported to negatively impact Gila chub populations (Dudley and Matter 2000). Therefore, it is recommended that green sunfish and fathead minnow be removed from the system above Big Box Dam before any attempt to reintroduce Gila chub is made. The reservoir could be renovated using rotenone. It will also be necessary to renovate Devils Canyon, and the portion of Mineral Creek that has green sunfish; rotenone and/or antimycin should be used to renovate the streams. With regard to the later, it will be necessary to survey all perennial water within Mineral Creek prior to chemical renovation to determine the distribution of green sunfish in the stream. Communication with ASARCO Ray Mine, Tonto National Forest, U.S. Fish and Wildlife Service, Arizona State Land Department, SWCA Inc., and Government Springs Ranch should be initiated as soon as possible to discuss the reservoir and stream renovation and stocking of Gila chub into Mineral Creek. Consideration should also be given to stocking federally threatened loach minnow *Tiaroga cobitis* and spikedace *Meda fulgida* as habitat in Mineral Creek appears suitable for those species as well.

References

Andrews, B. J., and K. A. King. 1997. Environmental contaminants in sediment and fish of Mineral Creek and the middle Gila River, Arizona. U. S. Fish and Wildlife Service, Ecological Services Office, Phoenix.

Dudley, R. K., and W. J. Matter. 2000. Effects of small green sunfish (Lepomis cyanellus) on recruitment of Gila chub (Gila intermedia) in Sabino Creek, Arizona. The Southwestern Naturalist 45:24-29.

Photographs of upper Mineral Creek (left) and Big Box Dam impoundment (right).

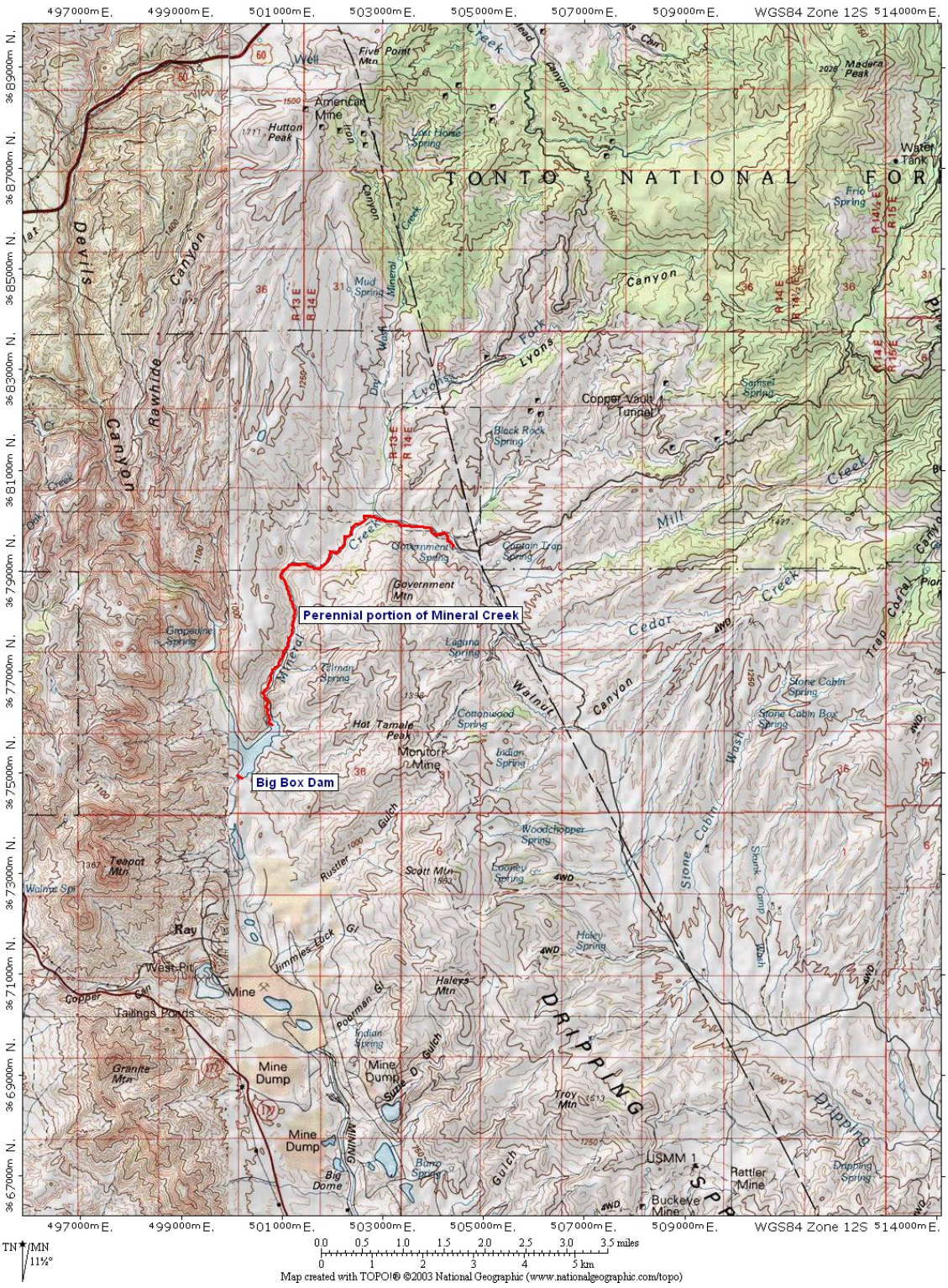

Figure 1. Map showing the impoundment above Big Box Dam and upper Mineral Creek, with the perennial portion in red.

Victoria Boyne

From: ResolutionProjectRecord
Subject: FW: AGFD survey reports
Attachments: Mineral Creek Drainage Native Fish Restoration Plan Outline (2).doc; Mineral Creek Fish Survey April 21-22 2008.pdf; Mineral Creek Survey 04-12-07.doc; MineralCreekandMineralCreekDrainageStockTankSurveysDuring2013_DRAFT_20141229.docx; Devils Canyon Stream Survey 2002.pdf; Mineral and Devils 2009 Surveys 20100222.pdf; Arnett-Telegraph July 23 2008 1-year post-stocking monitoring.pdf

From: Natalie Robb [mailto:NRobb@azgfd.gov]
Sent: Monday, January 22, 2018 11:58 AM
To: Eleanor Gladding <Egladding@swca.com>; Jeffery Johnson <jeffjohnson@swca.com>
Cc: Dana Warnecke <DWarnecke@azgfd.gov>
Subject: AGFD survey reports

Eleanor and Jeff,

Here are stream survey reports for Mineral Creek, Devil's Canyon, and Arnett Creek. See you on Thursday,

Thanks,
Natalie

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