Mineral Creek and Mineral Creek Drainage Stock Tank Surveys During 2013

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ACKNOWLEDGMENTS

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INTRODUCTION

Gila Chub *Gila intermedia* was federally listed as endangered with critical habitat in 2005 (Federal Register 2005). Upper Mineral Creek, the watershed immediately upstream of the ASARCO Ray Mine Big Box Dam, was designated as critical habitat for Gila Chub at the time of listing. According to Robinson (2008a) Gila Chub were last documented in upper Mineral Creek in 2000, subsequent surveys completed in 2002, 2006, and 2008 did not detect Gila Chub (Robinson 2008a). After the survey in 2006, Mineral Creek was assumed to be fishless and personnel from Arizona Game and Fish Department (AGFD) stocked Longfin Dace *Agosia chrysogaster* from Aravaipa Creek (149 fish in August 2006 and 140 fish in October 2006) into upper Mineral Creek, downstream of Government Springs Ranch (Robinson 2008a).

Robinson (2008a) recommended repatriation of Gila Chub into upper Mineral Creek, as well as performing additional surveys of Mineral Creek drainage; namely the 650 meter reach between ASARCO Big Box Dam and the ASARCO Ray Mine tunnel, as well as Devils Canyon drainage, to ascertain the possibility of Gila Chub existing outside upper Mineral Creek (Robinson 2008a). Robinson (2008a) asserted Mineral Creek lineage chub would be the preferred lineage for repatriation into upper Mineral Creek, should the species be found within the drainage.

Robinson et al. (2010) conducted fish surveys in Mineral Creek from Big Box Dam to ASARCO Ray Mine tunnel, in Devils Canyon and in Rawhide Canyon, a sub-drainage of Devils Canyon and did not detect Gila Chub or any native fish species (Robinson et al. 2010). However, nonnative Green Sunfish Lepomis cyanellus, Fathead Minnow Pimephales promelas, and Western Mosquitofish Gambusia affinis were detected (Robinson et al. 2010). Stream surveys conducted by Crowder and Robinson (2011) of a 1 km section in upper Rawhide Canyon and a 1 km survey of perennial water in Devils Canyon only detected Green Sunfish in Devils Canyon. These nonnative species were previously documented in Devils Canyon (Schwemm 2002; AGFD unpublished data) and Mineral Creek, below Big Box Dam (Andrews and King 1997). Robinson et al. (2010) suggested nonnative fish species within Devils Canyon and lower Mineral Creek likely originated from: 1) upstream migration from the Gila River to Mineral Creek prior to the construction of the ASARCO Big Box Dam, 2) illegal stockings or 3) downstream migration into Devils Canyon from stock tanks within the watershed. In 2008, Robinson (2008b) performed aerial helicopter surveys to identify perennial stock tanks within the Devils Canyon drainage and recommended surveys in wetted tanks within the Devils Canyon drainage be surveyed prior to any renovation effort to restore Gila Chub to the Devils Canyon, Big Box Dam reservoir and lower Mineral Creek (Robinson 2008b). Crowder and Robinson (2011) surveys of stock tanks within Devils Canyon drainage detected fish in two stock tanks (Western Mosquitofish in East Fork tank as well as Western Mosquitofish and Bluegill Lepomis macrochirus in Headquarter tank; first recorded occurrence of Bluegill in the Devils Canyon drainage (Crowder and Robinson 2011). Additionally, Crowder and Robinson (2011) recommended stock tanks in the Mineral Creek drainage and Devils Canyon drainage (Iron Flat Tank, Tank 23, Tank 32) should be surveyed for the presence of nonnative fish.

The objectives of the surveys conducted in 2013 were to 1) complete the inventory of perennial waters in the Devils Canyon and Mineral Creek drainages and document the presence of fish and aquatic species within stock tanks; 2) survey Mineral Creek to determine persistence of Longfin

Dace, document occurrence of Gila Chub, and evaluate the suitability of habitat in Mineral Creek for the reintroduction of Gila Chub and other native species. The inventory of perennial waters in Devils Canyon and Mineral Creek drainage would aid in determining the relative distribution of the nonnative fishes throughout the watershed, as well as the source population for the nonnative fish (i.e. stock ponds). These data would be useful in determining project scale for repatriation of Gila Chub in upper Mineral Creek and Devils Canyon.

STUDY SITE

Mineral Creek is a tributary to the Gila River in Pinal County Arizona on the southwestern edge of the Pinal Mountains (Figure 1). Mineral Creek is impounded by Big Box Dam (constructed in 1971; Robinson 2008a) upstream of ASARCO Ray Mine. A 650 meter portion of Mineral Creek flows between Big Box Dam and a tunnel entrance, through which the stream flows below ASARCO Ray Mine. Immediately upstream of the reservoir created by Big Box Dam, the watershed divides into Devils Canyon to the west and Mineral Creek to the east. This portion of Mineral Creek is designated critical habitat for Gila Chub and is known as upper Mineral Creek. Upper Mineral Creek and Devils Canyon drainages encompass 234 km², with elevations ranging from 2381 m to 670 m.

Devils Canyon runs in a southerly direction, bisecting US Highway 60 in the uppermost 5.6 km of the canyon. Devils Canyon has five main sub-tributaries; four minor tributaries entering from the west are Rancho Rio Creek, Hackberry Creek, Oak Creek, and an unnamed drainage. The largest tributary, Rawhide Canyon, enters from the east and runs in a northeast-to-south direction, converging with Devils Canyon about 3.1 km upstream of Devils Canyon and Mineral Creek confluence.

Mineral Creek runs in a northeasterly-to-southwesterly direction, and has seven sub-tributaries. Walnut Canyon and Cedar Creek converge and enter Mineral Creek about 1.1 km upstream Government Springs Ranch Headquarters. An unnamed drainage enters Mineral Creek from the east less than 400 m downstream of Government Springs Ranch Headquarters. The largest tributary, Lyons Canyon, flows in a southwesterly direction. The Lyons Canyon and Mineral Creek confluence, 2 km downstream of Government Springs Ranch Headquarters, is where perennial water begins in Mineral Creek. Downstream of Government Springs Ranch property boundary, three remaining sub-tributaries (Tillman Wash, Potters Wash, and Hot Tamale Wash), enter Mineral Creek from the east.

Mineral Creek and Devils Canyon drainage is comprised of <1% U.S. Bureau of Land Management land (1.82 km²), 4.92% private land (11.51 km²), 35.50% State Trust land (83.01 km²), and 58.80% U.S. Forest Service land (137.6 km²). Perennial water in upper Mineral Creek lies primarily on State Trust Land with about 500 m of perennial on Government Springs Ranch (Figures 1 and 2).

METHODS

Stock Tank Surveys

Using topographical maps and software (TOPO!4[®]), as well as aerial images (Google Earth[®]) we identified, catalogued, and enumerated stock tanks within the Mineral Creek drainage. Using these data, as well as the stock tanks identified by Robinson (2008b) but not surveyed by Crowder

and Robinson (2011), an aerial flight via helicopter was performed on June 8, 2012 to inventory wet stock tanks that would need to be investigated by ground surveyors at a later date.

Crowder and Robinson (2011) found the use of bag seines pulled through stock tanks was an effective way to survey stock tanks for aquatic vertebrates. Therefore, AGFD personnel used identical methodology as described in Crowder and Robinson (2011) report to survey stock tanks on May 28 and 29, 2013. Stock tanks were surveyed using bag seines (9 m wide, 1.2 m high with 6 mm mesh), dip nets (Duraframe Dipnet® electro intermediate hex trap net, 37 cm wide at the base, 12 cm wide at the apex and 41 cm long with 3mm mesh and 1.5 m pole), and straight seines (4.3 m wide, 1.2 m high with 6 mm mesh). Ropes (~ 45 m long each) were attached to the bag seine brails to enable the surveyors to pull the seine across entire breadth of the tank. The bag seine was pulled through a different portion or area of each stock tank a minimum of three times, unless 1) the stock tank was dry, 2) the entire tank could be seined in one or two hauls, or 3) water in the tank was shallow or minimal enough to use a dip net.

Data recorded for each sampling effort included: site name, site location (GPS coordinates), date, time, participants, effort (length and width of area surveyed via bag seine or dip net sweep), species captured, and number of individuals. Additionally, area of tank was extrapolated using 'Area Calculation' tool in Garmin® GPS units.

Stream Surveys

A 5.3 km reach of upper Mineral Creek, downstream of the Government Springs Ranch property boundary to the lower waterfall (Figure 2) was traversed on May 29, 2013. Surveyors used a Smith-Root LR24 backpack electrofisher with one probe and rattail to sample six 100-m stream reaches. The reaches were shocked in an upstream direction and fish were captured using dip nets (specifications provided above). Data recorded for each effort included: site name, site location, species captured, number of fish of each species captured, and seconds electrofished. Pools within the canyon bound or 'The Box' in the uppermost 1.6 km of the surveyed reach were sampled with Promar® collapsible minnow traps (0.46 m long x 0.3 m wide, with 2 mm mesh) baited with Gravy Train® dry dog food. Nets were set between 6 and 8 hours during daylight. Data recorded for each trap included: date and time net was set and pulled, GPS location, species captured and numbers of individuals captured.

The captured fish were not categorized by size class but were identified and released alive back into the stream. Water quality characteristics in upper Mineral Creek were measured. Using an EXTECH Instruments Inc., ExStik EC500 meter and consisted of conductivity (μ S), salinity (mg/L), total dissolved solids (mg/L), pH, and water temperature (°C).

Habitat assessment

AGFD personnel surveyed all perennial water within upper Mineral Creek. Coordinates for the lower and upper ends of each major mesohabitat type (pools, runs, riffles, and cascades) were recorded in a Garmin GPSmap 78S unit and a notebook. Habitat type, length, dominant substrate type was also recorded in a notebook. Depth (m), width (m), and length (m) of all the pools encountered within the surveyed reach were visually estimated and recorded.

RESULTS

Stock Tank Surveys

Forty stock tanks were identified and catalogued in Mineral Creek or Devils Canyon drainage for aerial confirmation of wet-dry status (Table 1). Three stock tanks (Iron Flat Tank, Tank 23, and Tank 32) were identified but not surveyed by Crowder and Robinson (2011) and were added to the list for aerial confirmation. One stock tank (T 022) in Devils Canyon drainage was not identified during the Robinson (2008b) aerial survey or Crowder and Robinson (2011) surveys and was added to the list for aerial confirmation. Using similar methods described in Robinson (2008b), Program Staff and a U.S. Bureau of Reclamation (BOR) pilot performed an aerial survey in a BOR helicopter over the Mineral Creek drainage and portions of Devils Canyon drainage on June 8, 2012. Of the 40 stock tanks identified; only six held water (Sixty-Six Ranch Tank, T 001, T 002, T 022, Tank 23, and a previously unidentified tank, dubbed 'T 560' inflight). Three 'tanks' (T 009, T 023, and T 026) were not visually confirmed during the flight, owing to either the location did not hold water or what appeared to be a 'tank' or depression on aerial images was not located during the flight.

AGFD personnel visited the wetted stock tanks on May 28 and 29, 2013, documenting no fish species were detected during surveys. Leopard frog *Lithobates* spp. were detected at Tank 23 and a leopard frog *Lithobates* spp. and a Sonoran Whipsnake *Masticophis bilineatus* were encountered at T 560 (Table 1).

Two sites were not surveyed. The first (T 017; Figure 1 and Table 1) is a settling ponds from the sewage treatment for the Oaks Mobile Home and RV Park (G. Paez, Landowner, personal communication June 7, 2011). Mr. Paez confirmed Tiger Salamanders *Ambystoma tigrinum* were in the settling ponds, and no additional aquatic vertebrate species were present. Further, Mr. Paez stated that he did not want the public or individuals accessing the settling ponds. The final unsurveyed tank (T 019) is on private land and aerial images from Google Earth® indicate the pond was dry in September 2010.

Stream Surveys

No Gila Chub were captured or detected in Mineral Creek during sampling on May 29, 2013. Longfin Dace were the only fish species captured during the electrofishing and minnow trap sampling. A total of 2276 Longfin Dace were captured in all six 100-m electrofishing reaches with EF2 having the highest number of Longfin Dace captured (n=863; Figure 2, Table 3). A total of 1176 Longfin Dace were captured in the 11 minnow traps (Table 2). Mean catch rates were 2924.7 \pm 726.9 fish/h for electrofishing and 13.4 \pm 1.99 fish/h for minnow traps (Table 2). Longfin Dace of all size classes were observed throughout the perennial section, including downstream of Government Springs Ranch property boundary (i.e., the original stocking location; Robinson 2008a). Anecdotally, the health and body condition of Longfin Dace captured and handled appeared average; one Longfin Dace was observed with a fungal growth on its tail, otherwise all other fish appeared healthy. The measured water quality levels for upper Mineral Creek (Table 6) are characteristic of drainages within the Gila River basin. One Black-tailed Rattlesnake *Crotalus molossus*, several adult Canyon Treefrog *Hyla arenicolor* and one Sonoran Mud Turtle *Kinosternon sonoriense* were observed while surveying in upper Mineral Creek.

Habitat assessment

Mesohabitat for riffle, run, pool, and cascades in upper Mineral Creek (Table 5) between the small waterfall (elev. 685 m) above Big Box Dam reservoir to the downstream property boundary of Government Springs Ranch (elev. 831 m) is composed of nearly equal percentage riffle, and run (26%, 29%, respectively) with pools comprising 37% of the habitat. Cascades comprised 6% of the habitat type and dry stretches were only 2% of the reach. Additionally, habitat length was dominated by run (43%) with riffle and pool (27% and 25% respectively) nearly equal in length, with cascades forming 2.7% (136 m) of the surveyed reach (Table 4). Pools averaged 0.76 m deep with a max depth of one pool estimated at 2.5 m. About 106 m of dry streambed segments were identified within the 5.3 km reach. Two of the dry segments were downstream of Tillman Wash (Figure 2) and the remainders were all less than 500 m downstream of the Government Springs Ranch property boundary. Stream gradient over the 5.3 km reach was calculated at 2.75%. Substrate composition percentage within the surveyed reach and mesohabitats was not evaluated; however data regarding dominant substrate type by habitat were recorded. Pools primarily consisted of bedrock with pebble, gravel, and cobble present on the pool bottom and margins (Figures 3 and 4). Pebble, cobble, gravel, and boulders were recorded in riffles, runs, and cascades with tree roots composing some of the stream bed as well.

DISCUSSION

No fish were detected during stock tanks surveys in the Mineral Creek or Devils Canyon drainages during surveys in 2013. Nonnative fish have only been detected in two known stock tanks, (East Fork Tank and Headquarter Tank), within the Devils Canyon drainage (Crowder and Robinson 2011; Figure 1), although these stock tanks have not been revisited to determine if the fish are still present.

Longfin Dace are still present and distributed throughout the surveyed reach in upper Mineral Robinson (2008a) detected Longfin Dace throughout upper Mineral Creek during Creek. electrofishing surveys in all but 382 m of the 6.9 km reach between Big Box Dam reservoir and Lyons Canyon. Robinson (2008a) reported Longfin Dace catch rates generally increased moving upstream. Our survey data showed similar results, with the exception of the second electrofishing reach where the highest number of fish (n=863) were captured. Nonetheless, distribution and abundance of Longfin Dace throughout upper Mineral Creek, despite segments that experience drying provides evidence that water quality and conditions are conducive for persistence, reproduction, and movement. No Gila Chub were captured or observed during surveys in upper Mineral Creek. Robinson (2008b), Robinson et al. (2009), and Crowder and Robinson (2011) postulated that Gila Chub were extirpated from upper Mineral Creek as they have not been detected in any monitoring or survey events since they were last captured in 2000 (Robinson 2008b). However, we now contend that under the definition of *extinct* as adopted by American Fisheries Society (Jelks et al. 2008) in which a taxon of which no living individual has been documented in its natural habitat for 50 or more years, upper Mineral Creek should be considered occupied by Gila Chub as they were last documented in 2000 (Robinson 2008a). Additionally, based on our assessment, pools are the most common habitat feature (37%), followed by runs and riffles (29% and 26%) within upper Mineral Creek. Although Gila Chub are considered habitat generalist (Schultz and Bonar 2006), adults in canyon-bound streams will utilize habitats roughly in proportion to their availability, and occupy runs, pools, and riffles (Griffith and Tiersch 1989,

Dudley and Matter 2000, Schultz and Bonar 2006). Therefore we find the proportion and distribution of available habitat for Gila Chub to be significant enough to support Gila Chub.

RECOMMENDATIONS

Efforts to reestablish Gila Chub into upper Mineral Creek and in suitable portions of Devils Canyon should be continued. Following recommendations from Robinson et al. (2010) in coordination with the Gila Chub Recovery Team, the best choice of lineage would be Hotsprings Canyon or the Blue River on the San Carlos Apache Reservation. The series of small natural waterfalls that Robinson (2008a) identified in upper Mineral Creek act as a barrier in preventing nonnative fish from moving into Mineral Creek from Big Box Dam reservoir (Robinson 2008a); therefore Gila Chub should be introduced concurrent with project development and eradication of nonnative fish from Devils Canyon and Mineral Creek downstream of the waterfalls. Further, we concur with the Robinson (2008a) recommendation to evaluate the potential of introducing additional native fish species into Mineral Creek, to replicate historic Gila River basin fish assemblages. Additionally, East Fork Tank and Headquarter Tank in Devils Canyon drainage should be surveyed to determine if fish are still present in the tanks, and additional sampling techniques in Headquarter Tank should be performed in order to determine if other fish species are present (i.e., catfish Ictaluridae, or sunfish Centrarchidae).

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Figure 1: Map of Mineral Creek and Devils Canyon, Pinal and Gila counties, upstream of ASARCO Ray Mine, Arizona. Land ownership within the drainages is shown as well as stock tank locations that were inventoried via helicopter on June 8, 2012 and by ground surveys on May 28-29, 2013 as well as and Crowder and Robinson (2011) report. Critical habitat for Gila Chub within Mineral Creek is also indicated.

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Figure 2: Map depicting upper Mineral Creek landownership and extent of stream survey conducted on May 29, 2013. The lower waterfall was the terminus of the survey, the private property and State Trust Land border upstream of MT40 was the beginning of survey reach. Sampling method, effort, and location shown by label (i.e., EF1-EF6 is electrofishing reaches and MT were set minnow traps). EF start and end of each 100-m reach displayed.



TANK NAME	UTM	UTM	UTM	DATE	GEAR/COMMENTS	SPECIES DETECTED/
	ZONE	EASTING	NORTHING	VISITED		COMMENTS
TANK 23	12S	501051	3682713	MAY 28, 2013	BAG SEINE	LISP
Т 560	12 S	502746	3682593	MAY 28, 2013	BAG SEINE	LISP, MABI
T 022	12S	495996	3688137	MAY 29, 2013	BAG SEINE	NONE
SIXTY-SIX RANCH TANK	12 S	501807	3680663	MAY 28, 2013	BAG SEINE	NONE
T 001	12S	508089	3676749	MAY 28, 2013	BAG SEINE	NONE
T 002	12 S	499859	3685777	MAY 29, 2013	VISUAL	NONE
HALE TANK	12S	506233	3680892	JUNE 8, 2012	DRY	-
LUNN TANK	12 S	509265	3683550	JUNE 8, 2012	DRY	-
DRY LAKE TANK	12S	507960	3680770	JUNE 8, 2012	DRY	-
RED POINT TANK	12 S	507880	3679942	JUNE 8, 2012	DRY	-
LUND PASTURE TANK	12S	508284	3682793	JUNE 8, 2012	DRY	-
COTTONWOOD TANK	12S	507438	3683482	JUNE 8, 2012	DRY	-
ROAD TANK	12S	511419	3682715	JUNE 8, 2012	DRY	-
FORK TANK	12 S	512148	3681326	JUNE 8, 2012	DRY	-
CEDAR CREEK TANK	12S	512821	3679976	JUNE 8, 2012	DRY	-
SWITCHBACK TANK	12 S	510208	3679259	JUNE 8, 2012	DRY	-
TANK	12S	501916	3678636	JUNE 8, 2012	DRY	-
T 003	12 S	499875	3684738	JUNE 8, 2012	DRY	-
T 004	12S	499725	3682094	JUNE 8, 2012	DRY	-
T 005	12 S	501455	3679953	JUNE 8, 2012	DRY	-
T 006	12S	500042	3678877	JUNE 8, 2012	DRY	-
T 007	12S	502521	3681091	JUNE 8, 2012	DRY	-
T 008	12S	508002	3680935	JUNE 8, 2012	DRY	-
T 010	12 S	504577	3685483	JUNE 8, 2012	DRY	-
T 011	12S	507237	3684976	JUNE 8, 2012	DRY	-
T 012	12S	497456	3683541	JUNE 8, 2012	DRY	-
T 013	12S	499170	3685904	JUNE 8, 2012	DRY	-
T 014	12S	508089	3681640	JUNE 8, 2012	DRY	
T 015	12S	495801	3678696	JUNE 8, 2012	DRY	-
T 016	12S	497800	3678245	JUNE 8, 2012	DRY	-

Table 1. Stock tank locations in Mineral Creek drainage, Arizona, and methods of survey during 2013. GPS Coordinates are NAD83. Species Codes are as follows: *Lithobates* species LISP, and *Masticophis bilineatus* MABI.

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THE OAKS MOBILE HOME AND RV PONDS	12S	500300	3689845	MAY 17, 2011	PRIVATE TANK – NOT SURVEYED	
T 020	12S	494867	3680528	JUNE 8, 2012	DRY	-
T 021	12S	497330	3685520	JUNE 8, 2012	DRY	-
T 024	12S	503710	3676637	JUNE 8, 2012	DRY	-
T 025	12S	503224	3688425	JUNE 8, 2012	DRY	-
T023	12S	503856	3677201	JUNE 8, 2012	NOT VISUALLY CONFIRMED	-
T 026	12S	507696	3680304	JUNE 8, 2012	NOT VISUALLY CONFIRMED	-
T 009	12S	507930	3680434	JUNE 8, 2012	NOT VISUALLY CONFIRMED	-
T 019	12S	501127	3689153		PRIVATE TANK- NOT SURVEYED	AERIAL IMAGES SHOW DRY IN SEPT. 2010

Methods and effort	Statistic	Longfin Dace
Minnow Trap		
11	#Ind.	1176
	Mean #Ind/h	13.4
	SE	(1.99)
Electrofishing		
6	#Ind.	2276
	Mean #Ind/h	2924
	SE	(726.9)

Table 2. Summary of fish captured in minnow traps and electrofishing showing the number of individuals (Ind) captured and the mean and standard error of the mean catch rate (number captured/h) for Longfin Dace in Mineral Creek, Arizona on May 29, 2013.

Table 3. Summary graph of Longfin Dace captured in each electrofishing reach (EF 1-EF6) during sampling in Mineral Creek, Arizona on May 29, 2013.



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Table 4. Mesohabitat type with length (m) and percent total length downstream of Government Springs Ranch private boundary to waterfall above Big Box Dam Reservoir in upper Mineral Creek, May 29, 2013.

		Habitat Type					
Stat.	Riffle	Run	Pool	Cascade	Dry	Total	
Length	1331	2101	1223	136	106	4897	
%	27%	43%	25%	2.7%	2%		

Table 5. Mesohabitat type by percent composition for Government Springs Ranch private boundary to the waterfall above Big Box Dam Reservoir in upper Mineral Creek, May 29, 2013.

	Habitat Type						
Stat.	Riffle	Run	Pool	Cascade	Dry	Total	
Number	78	88	113	17	6	302	
%	26%	29%	37%	6%	2%		

Table 6: Water quality characteristics measured in upper Mineral Creek, Pinal County, Arizona, downstream of Government Springs Ranch property boundary. Taken on May 29, 2013 when AGFD personnel performed fish monitoring and habitat assessment.

	Date
Characteristic	5/29/2013
Time (hh:mm)	08:20
Water temperature (°C)	18.3
pH	8.05
Dissolved oxygen (mg/L)	-
Total dissolved solids (mg/L)	487
Salinity (ppm)	347
Conductivity (µS)	698

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 <<u>Egladding@swca.com</u>>; Jeffery Johnson <<u>jeffjohnson@swca.com</u>>
Cc: Dana Warnecke <<u>DWarnecke@azgfd.gov</u>>
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

Natalie Robb Field Supervisor Tonto Sector Mesa Region 928-255-8904 nrobb@azgfd.gov