FISHES OF ARAVAIPA CREEK

GRAHAM AND PINAL COUNTIES, ARIZONA

LITERATURE REVIEW

AND HISTORY OF RESEARCH AND MONITORING

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EXECUTIVE SUMMARY

PURPOSE: To summarize the history of fish monitoring and research in Aravaipa Creek, Graham and Pinal Counties, Arizona, and review associated literature. To relate this knowledge to conservation and management efforts in Aravaipa Canyon and assess the value of monitoring in relation to those efforts.

RESULTS: Aravaipa Creek is an important resource for conservation of native fish, retains 7 native species and has relatively low incidence of nonnative fishes. It is the most extensively studied native fish community in the Gila River basin. Research and monitoring have been occurring since 1943. Since 1963, Arizona State University has focused substantial research and monitoring effort on Aravaipa Creek. This has assisted conservation efforts by The Nature Conservancy, Bureau of Land Management, and other organizations. Long-term monitoring is being continued by the University of Arizona.

Monitoring constitutes 48% of all fish sampling in Aravaipa Creek. The long-term monitoring data set of 41 years is the longest such effort for native fish in Arizona and the Gila River basin. Monitoring intensity is variable, with an average of 3 monitoring events per year. Monitoring shows that the native fish community continues to be robust despite substantial changes in human uses, but also shows a gradual and increasing invasion and spread by nonnative fishes, indicating instability that may result in long-term negative change. Analyses of long-term data reveal sensitivity of native fish to human and natural changes that reduce the heterogeneity of the aquatic environment or alter the natural hydrograph. Short-lived native fish show positive responses to flooding, while nonnative fish show negative responses, indicating that natural flooding patterns are critical to maintenance of the native fish community. Long-term trends in fish community composition in the upper and canyon reaches of Aravaipa Creek show shifts in relative abundance of native species. The lower reach fluctuates in a cyclical manner, but shows long-term declines in spikedace. Differences in trends and other factors indicate changes in the lower reach are being driven by different factors than in the canyon and upper reaches. Lower reach changes appear to be associated with increasing presence of nonnative fish.

CONCLUSIONS: Research and monitoring on fish have been important tools in conservation and management of Aravaipa Canyon. The extensive knowledge of the fishes of Aravaipa Creek has supported conservation efforts such as land acquisition and has steered management actions, such as fish barrier construction. Knowledge gained in Aravaipa Creek has provided valuable assistance in conservation efforts for native fish throughout the Gila River basin and elsewhere. Long-term data on the fish community of Aravaipa Creek indicate that control and removal of nonnatives and prevention or reversal of activities that lower habitat heterogeneity should be the highest priority for management.

RECOMMENDATIONS: Continue long-term biannual monitoring using protocols consistent with, and supplemental to, those for the 40-year existing data set. Evaluate increasing the intensity of monitoring, including increased sampling events consistent with the 40-year data set, as well as short-term efforts using alternative methodologies to answer other questions. Provide for improved long-term storage and retrieval of all Aravaipa Creek fish sampling data with periodic summary reports.

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INTRODUCTION

This report reviews the history and current status of monitoring and research, and the resulting literature, on fishes of Aravaipa Creek, Graham and Pinal Counties, Arizona. One of the premier remnants of the imperiled Gila River basin fish fauna, Aravaipa Creek has been the focus of significant study over the past 60 years. This report summarizes this work and discusses its contribution to native fish conservation and land management efforts. Recommendations are made regarding the need for future monitoring and study.

AREA DESCRIPTION

Aravaipa Creek is located in southeastern Arizona, near the towns of Dudleyville and Mammoth. It flows north, then west, to join the San Pedro River about 12 miles upstream of the confluence with the Gila River (Figure 1). The watershed is of moderate size (541 square miles) and although the stream is 55 miles long, perennial surface flow is presently confined to approximately 21 miles in the lower portion of the watershed (JE Fuller Hydrology and Geomorphology 2000). Elevation at the confluence with the San Pedro River is 2150 feet above mean sea level and the upper end of perennial flow is at about 3300 feet, with yearly and seasonal variation. Perennial flow begins as the creek turns west, leaving a wide upper valley and entering a narrow steep walled canyon. Depending upon the year and season, perennial flow may be found up to 27 miles, from above the canyon to the confluence with the San Pedro River. However, in most years, flow disappears into alluvial deposits after the valley bottom widens about 6 miles upstream of the San Pedro River. For detailed geographical, geological, and biological information on Aravaipa Creek, see Minckley (1981) and for hydrographical and geomorphological information, see JE Fuller Hydrology and Geomorphology (2000).

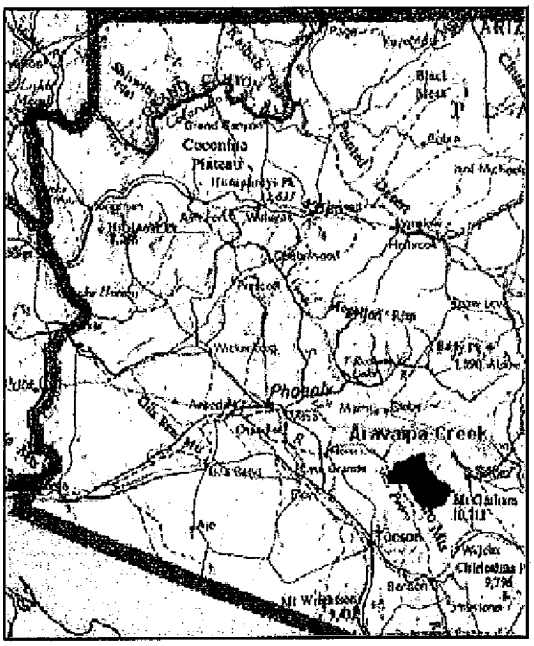
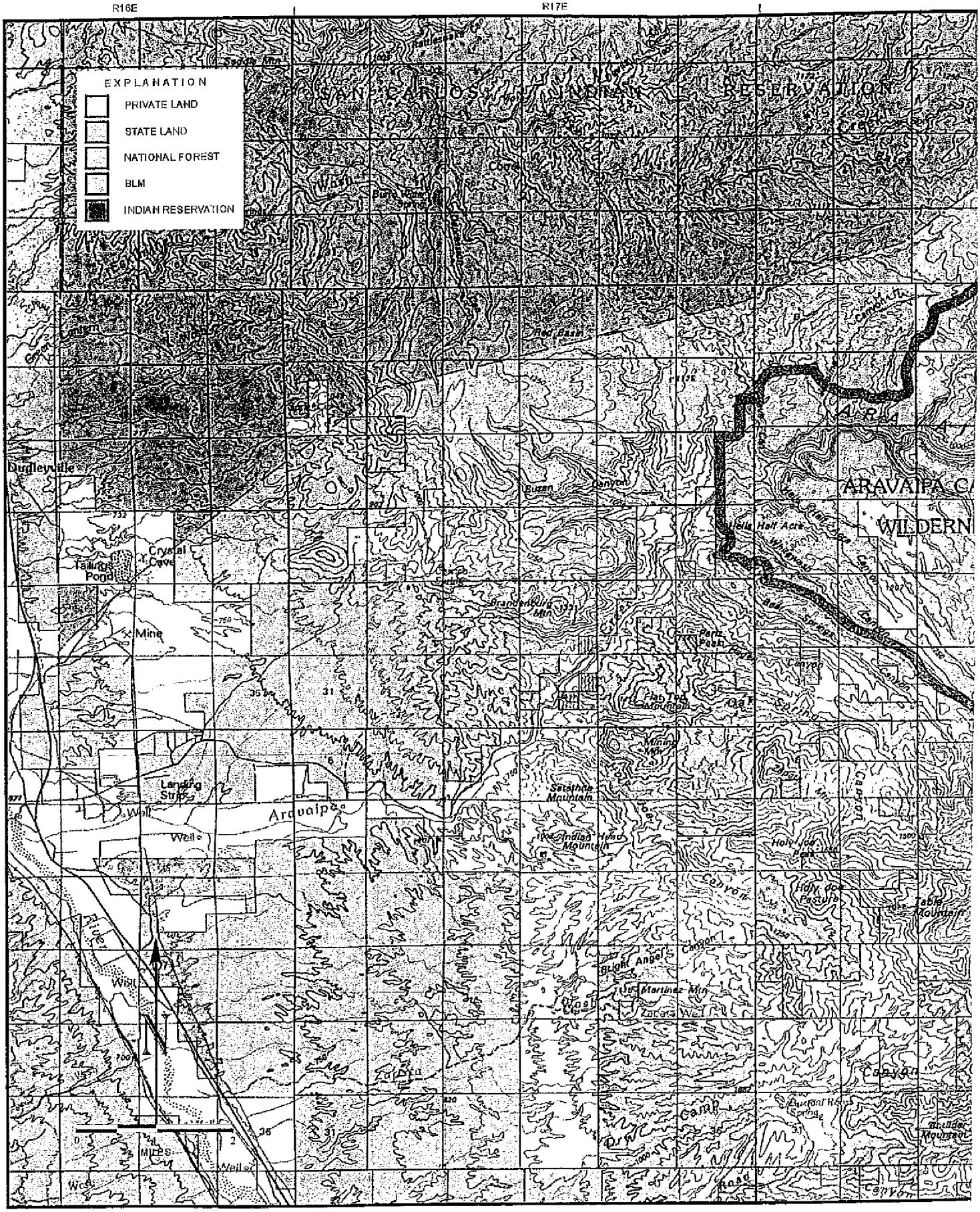


Figure 1. Location of Aravaipa Creek Watershed

Land ownership in the Aravaipa watershed is mixed (Figure 2). Upper watershed areas are on the Coronado National Forest. Private lands dominate the upper valley bottom and include many holdings along the perennial areas outside of the narrow core canyon. Tablelands on either side of the canyon are under the control of the Bureau of Land Management (BLM), as is the core portion of the canyon, which is a designated Wilderness. Substantial valley bottom areas in the upper and lower canyon are owned by The Nature Conservancy (TNC) as the Aravaipa Preserve. Allotted lands of San Carlos Apache Tribal members are located along about 1.5 miles of the lower stream.


R16E
R17E
EXPLANATION
PRIVATE LAND
STATE LAND
NATIONAL FOREST
BLM
INDIAN RESERVATION
SAN CARLOS INDIAN RESERVATION
Dudleyville
Crystal Cave
Tailings Pond
Mine
Landing Strip
Well
Arcuaipa
Wells
Red Basin
Buzzen Canyon
Brandenburg Mtn
Flat Top Mountain
Mining Mtn
Satellite Mountain
Indian Head Mountain
Holy Joe Peak
Holy Joe Pasture
Table Mountain
Bright Angel
Martinez Mtn
Zaragoza Well
Camp
Shoulder Mountain
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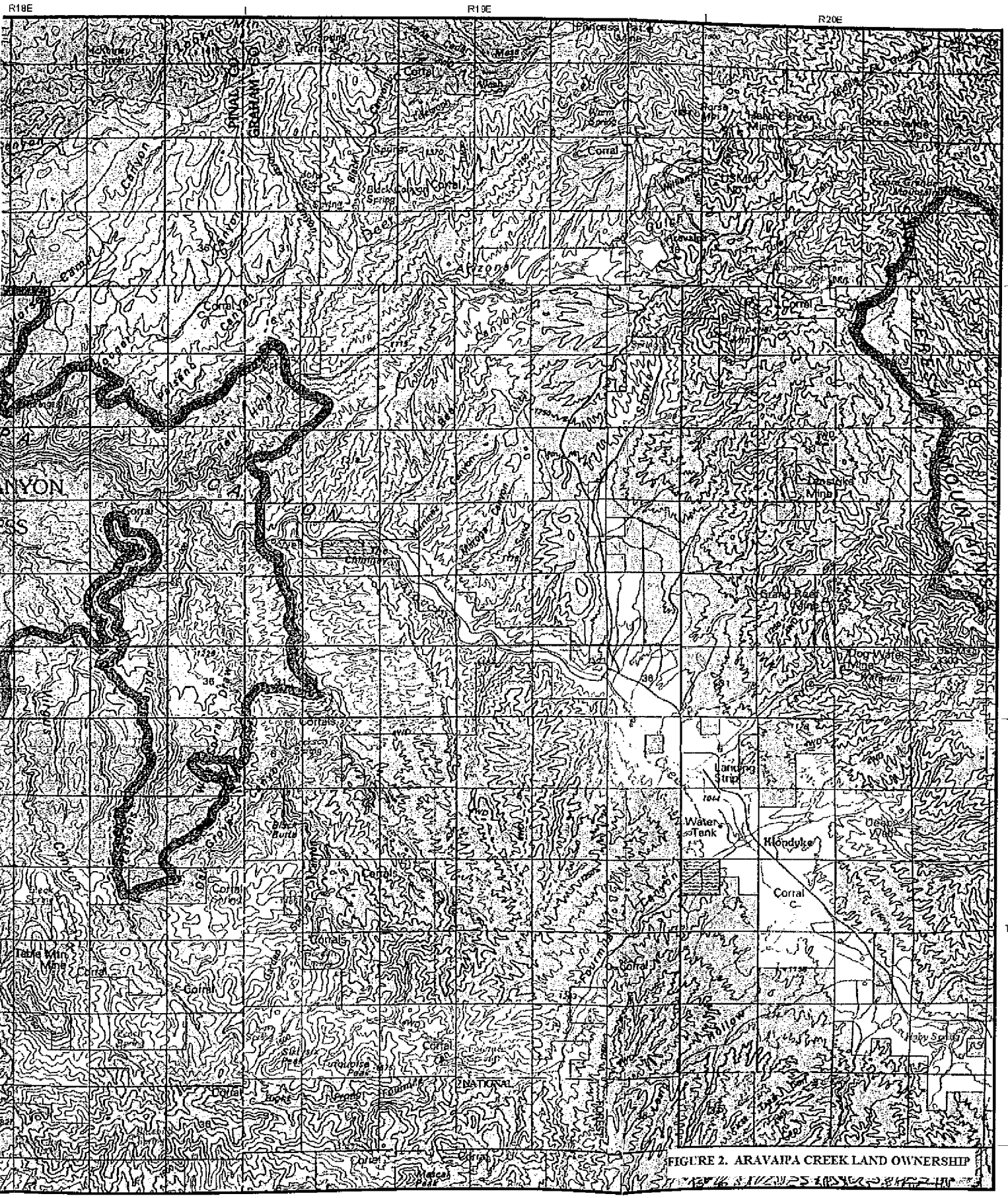

FIGURE 2. ARAVAIPA CREEK LAND OWNERSHIP

The gradient of Aravaipa Creek is generally less than 1.0% (JE Fuller Hydrology and Geomorphology 2000). Valley bottom width in the area of perennial flow ranges from 200 to 1200 feet, widening to 4000 feet near the lower end. In the canyon in 1976, mean stream width was 24 feet, mean depth 4 inches, and mean maximum depth 2 feet (Minckley 1981). Below the canyon, they were 32 feet, 3 inches, and 13 inches. Aquatic habitat was predominantly riffle, with some pools and rapids. In 1999, two transects within and one above the canyon measured stream widths of 12.5-21.5 feet and mean depths of 6-12 inches (JE Fuller Hydrology and Geomorphology 2000). Qualitative observations concluded that the aquatic habitat had essentially the same composition as in 1976, with riffles highly predominant. Predominant substrate material in 1999 was gravel.

Aravaipa Creek has a typical desert monsoonal hydrograph, with peaks of flow (discharge) in winter and again in the late summer. Based on a 50-year period of record, the mean monthly discharge of Aravaipa Creek ranges from 12 cubic feet per second (cfs) in June to 64 cfs in February (U.S. Geological Survey 2004). Flow has dropped as low as 1.9 cfs (June 1939). Like most desert streams, and due to the size of its watershed, Aravaipa Creek experiences substantial floods. The largest flow on record was in 1983, reaching an instantaneous peak flow of 70,800 cfs. The most recent large flood, in 1993, was an estimated 10+ year flood event with an instantaneous discharge of 13,000 cfs.

Base flow in Aravaipa Creek comes primarily from subsurface upwelling shortly upstream from the upper end of the inner canyon. However, some tributaries contribute to the mainstream and have areas of perennial water. These include Deer Creek, Turkey Creek, and Oak Grove Canyon.

METHODS

A literature search was conducted to identify all published literature addressing fishes, general aquatic resources, or hydrology of Aravaipa Creek. Literature on riparian vegetation and aquatic amphibians and reptiles was not included. The numerous documents associated with BLM efforts to obtain and protect instream flows rights in Aravaipa Creek also were not included. While protection of flows is an important aquatic resource issue and will benefit native fish, the details of water rights acquisition are not pertinent to native fish management and were considered to be outside of the scope of this review.

Literature sources searched included the library collections at Arizona State University (ASU), University of Arizona (UofA), and Northern Arizona State University. Published literature was searched using the abstracting services of Agricola, Aquatic Sciences and Fisheries Abstracts, Biological and Agricultural Index, BIOSIS, Ecology Abstracts, Fish and Fisheries Worldwide, and Zoological Record. In addition, Internet searches were made using Google.com.
A substantial amount of the material on Aravaipa Creek is gray literature. Our personal collections of memos, letters, emails, notes, data sheets, and other unpublished materials on Aravaipa Creek, covering the past 15-20 years, was used. Substantial material was obtained from the U.S. Fish and Wildlife Service (FWS) Ecological Services Office in Phoenix, which

made its files available. The Arizona Game and Fish Department (AGFD) Nongame Branch and Tucson Region 5 Office provided their agency's sampling data through the Nongame Native Fish database and limited sampling information of others through the Scientific Collecting Permit database (both current only through 1999). Biologists with BLM in Safford and Tucson provided additional information from their files, and the U.S. Bureau of Reclamation (USBR) provided fish barrier monitoring data. The Arizona Nature Conservancy provided information they possessed, including the data from Williams and Siebert's work on fish movement. They also provided locations for early site names. The literature collection and files of the late Dr. W.L. Minckley at Arizona State University were made available to us and yielded substantial data and documents. Information on early work and collectors was provided by a variety of biologists and others involved in southwestern fishes.

The SONFISHES database was used to identify all sampling events at Aravaipa Creek that resulted in deposition of museum specimens (Arizona State University 2002, Unmack 2002a). For some sampling events there are both documents (published or gray) and museum specimens. For those, documents were used preferentially because of their more complete information. All entries for Aravaipa Creek from SONFISHES are located in Appendix 3. This database includes all known museum records for fishes from Aravaipa Creek, records from primary literature, and data from AGFD.

Fish data for Aravaipa Creek has conventionally been subdivided into three reaches based on topography (Minckley 1981, Meffe and Minckley 1987). Our analysis follows that convention. The reaches are identified in Table 1 and shown in Figures 3, 4, and 5, along with all site names used by various efforts to describe fish sampling locations within those reaches.

The SONFISHES database, summary tables of Minckley's long-term data set (Minckley 2000), and a collection of various literature and documents were used to construct a history of Aravaipa Creek fish sampling efforts, by lower, middle, and upper reach. The literature and documents used for specific sampling events are listed in Appendix 1.

Drafts of the sampling chronology, lists of studies, literature, funding, and conservation actions were reviewed by a number of people presently or historically involved with Aravaipa Creek fishes, to help identify missing documents or gaps in information.

TABLE 1
STANDARD REACH DEFINITIONS FOR ARAVAIPA CREEK FISH SAMPLING

REACH NAMES	LOCATION DEFINITION	STANDARD SAMPLING SITES WITHIN THE REACH	OTHER SAMPLING SITE NAMES WITHIN REACH
eastern east end upper above canyon reach I (Minckley unpub.) reach III (Williams 1991a)	"headwaters to above Turkey Creek confluence (not including Turkey Creek site)"Minckley (1990); "above and not including the mouth of Turkey Creek" (Minckley 2000).	TNC guest house (Pecan grove) The Chimney (or Chimney Rock) stations 14-16 (Barber and Minckley 1966) stations 24-27 (Minckley 1972-73, Schreiber 1975) stations 7-9 (Minckley and Karp 1986) stations 1-2 (Velasco 1997) sites 1-2 (Reinthal unpub.)	west of Klondyke near headwaters (near source) E. boundary of USFS/TNC properties (prob. meant BLM/TNC boundary) School House Tapia diversion Salazar Ranch Bear Canyon Crossing Goat Cave Crossing Bill's Crossing (last crossing above Wilderness) Bill Salazar's house Wilderness area (WA) parking lot above Turkey Creek east end gauge (BLM) head of box canyon NW of Klondyke
middle canyon within canyon within gorge reach 2 (Minckley unpub.) reach II (Williams 1991a)	"from Turkey Creek confluence (including Turkey Creek site) to Wagner Ranch" (Minckley 1990, Minckley 2000) including "wilderness" subdivision by Velaso (1993a) and AGFD (Bettaso et al. 1995) -- areas within designed Wilderness boundaries	Turkey Creek* (station 13) Hell Hole (Deer Creek or Old Deer Creek) Horse Camp Painted Cave Wagner Ranch* (Coleman Ranch) stations 8-13 (Barber and Minckley 1966) stations 9-21 (Minckley 1972-73, Schreiber 1975) stations 4-6 (Minckley and Karp 1986) stations 3-4 (Velasco 1997) sites 3-6 (Reinthal unpub.)	mouth of Turkey Creek west of Turkey Creek TNC/BLM wilderness boundary western visitors entrance to Wilderness upper (or east) boundary of Wilderness or primitive area Parsons Canyon Paisano Canyon Booger Canyon Virgus Canyon Javelina Canyon warm springs area of Aravaipa** Hell's Half Acre Canyon
western west end lower below canyon reach 3 (Minckley unpub.) reach I (Williams 1991a)	"Wood's Ranch to San Pedro River" (Minckley 1990) or "to near mouth" (Minckley 2000)	White's Ranch (Jeb, Jay, or Peggy White's house) Sycamore tree (now fish barriers, upper and lower) stations 1-7 (Barber and Minckley 1966) stations 1-8 (Minckley 1972-73, Schreiber 1975) stations 1-3 (Minckley and Karp 1986) stations 5-6 (Velasco 1997) sites 7-9 (Reinthal unpub.)	Wood's Ranch (Panorama Ranch) west end gauge (BLM) La Jolla Ranch (TNC headquarters, West Car Ranch) Brandenburg Wash or road Holy Joe Ranch diversion Dr. Geldmacher's ponds Aravaipa Farms or Ranch USGS gauge Newton Ranch end of paved road Highway 77 (Winkleman-Mammoth road) junction with San Pedro River NE of Mammoth ENE of Feldman

* The Turkey Creek and Wagner Ranch sites are included in the middle reach by Arizona State University and others. In 1992-95 sampling data AGFD also includes them as middle, but their 1999-2000 data are reported with the Turkey Creek site included in the upper reach and the Wagner Ranch site included in the lower reach.
** This was the description of a University of Arizona 1972 sampling site and apparently refers to near Painted Cave Canyon, where there are warm springs.

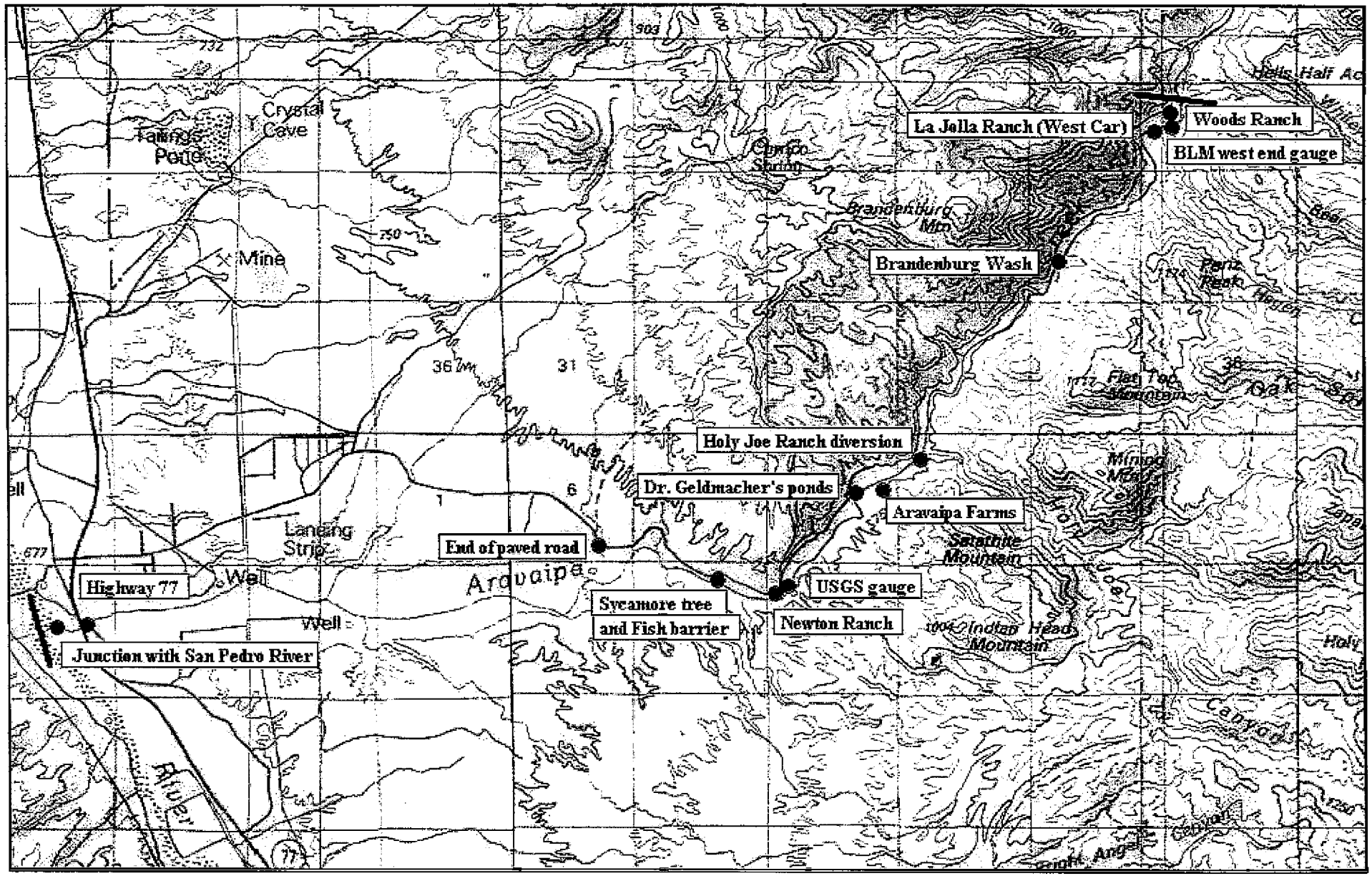

Figure 3. Lower (West) Reach of Aravaipa Creek
with Fish Sampling Site Names

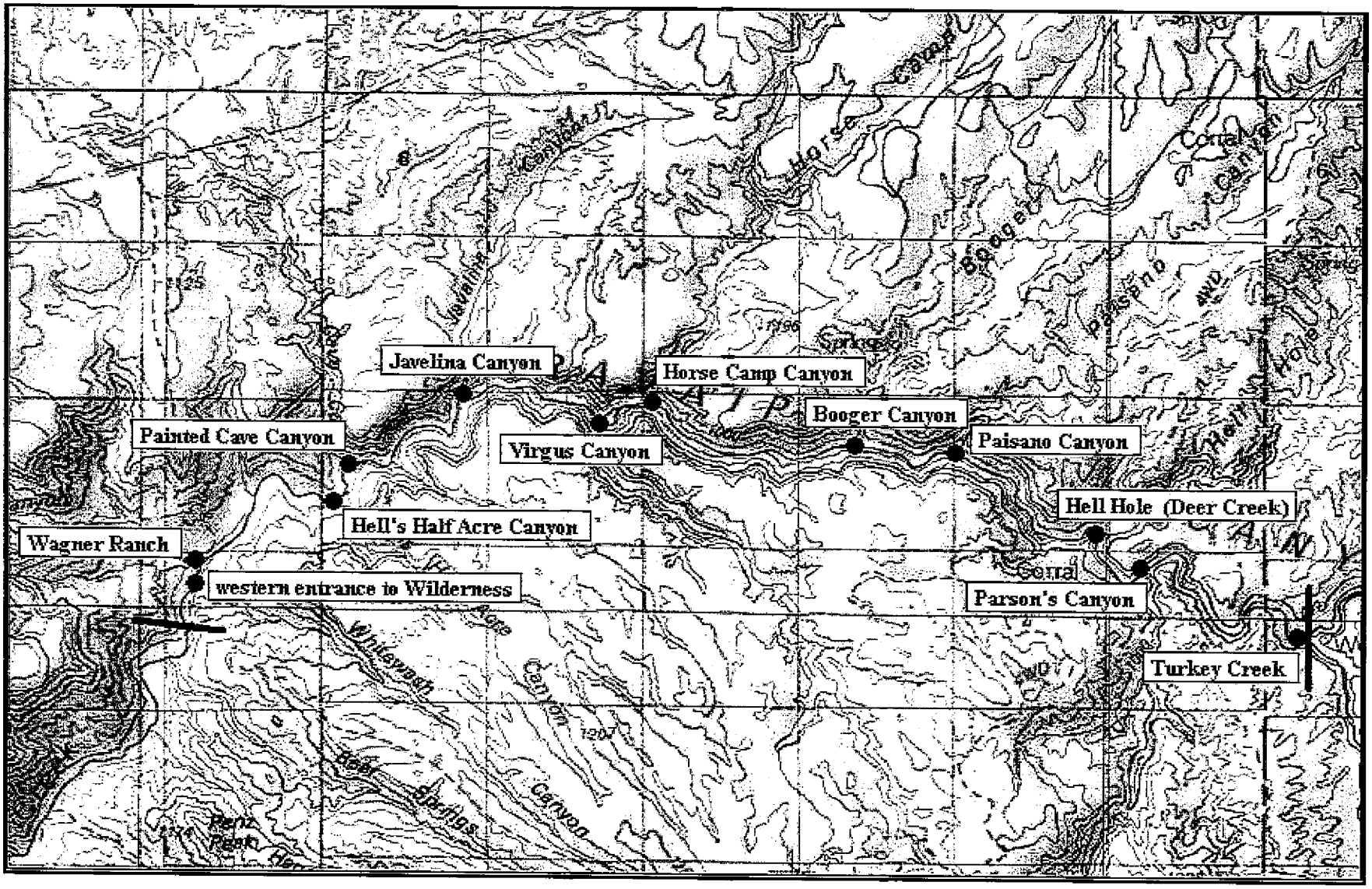

Figure 4. Middle (Canyon) Reach of Aravaipa Creek with Fish Sampling Site Names

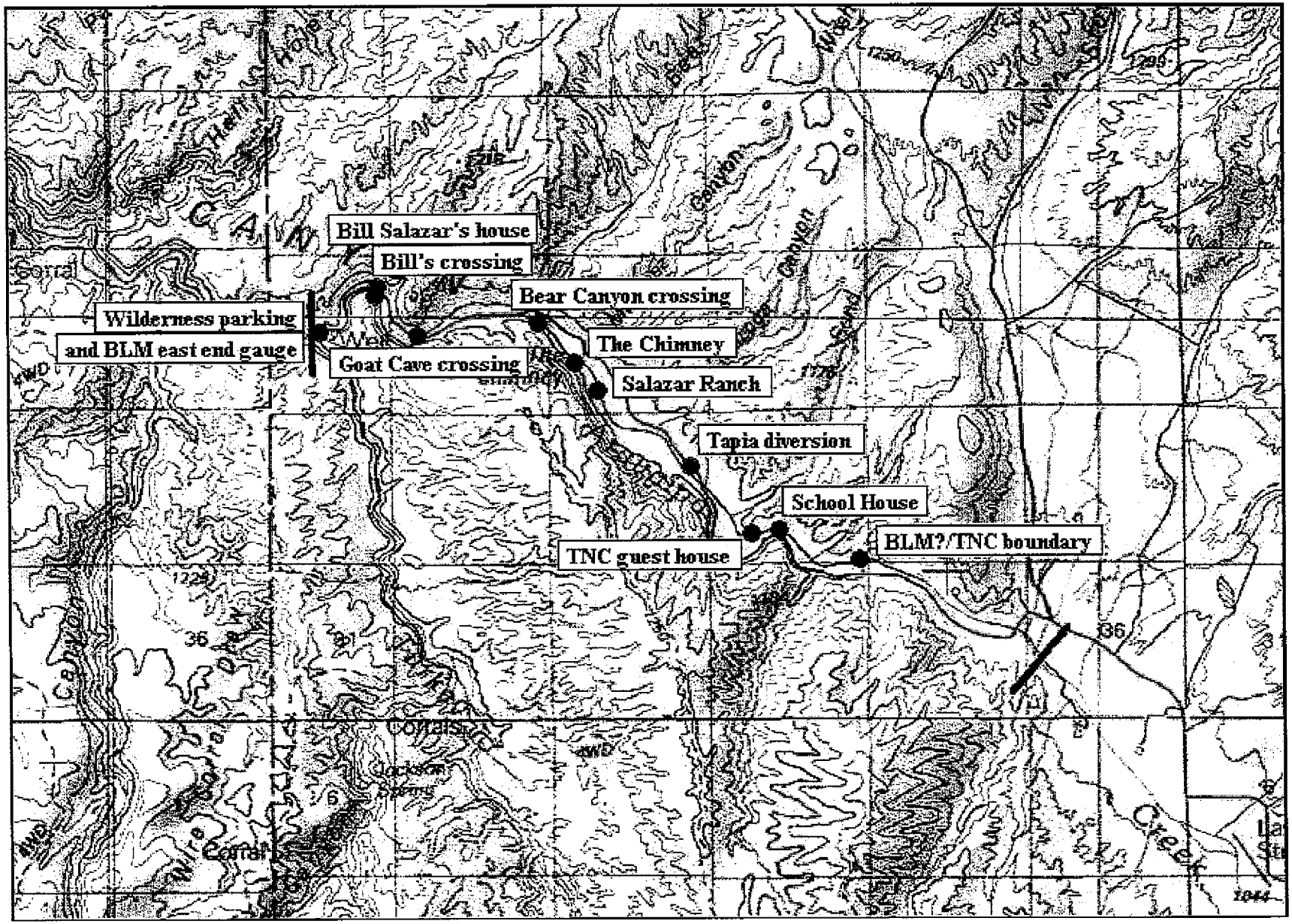

Figure 5. Upper (East) Reach of Aravaipa Creek
with Fish Sampling Site Names

HISTORICAL CHANGES AND HUMAN ACTIVITIES

Historical information on Aravaipa Creek has been reviewed by Cooke and Reeves (1976) from an erosional perspective, Minckley (1981) from an ecological perspective, Hadley et al. (1991) from an ethnoecological perspective, and JE Fuller Hydrology and Geomorphology (2000) from a hydrological and geomorphological perspective. Syntheses of early descriptions of Arizona places and natural resources that contain information on Aravaipa Creek include Dobyns (1981), Davis (1986), Bahre (1991), Tellman et al. (1997).

The Aravaipa Creek area supported extensive Native American occupation by Hohokam, Mogollon, and Salado cultures. When Spaniards arrived in the 1500's, the area was occupied by agricultural Pima and Sobaipuri, but disruption of those cultures in the mid-1700's by European-caused changes, resulted in occupation of the area being taken over by Apache (Hadley et al. 1991). European settlement of the area did not become significant until the mid-1800's when Camp Grant was set up near the confluence of Aravaipa Creek and the San Pedro River, and later moved to the upper Aravaipa Valley. In this period, several accounts of travelers through the area contain descriptions of Aravaipa Creek, including Hutton (1853), Parke (1857), Leach (1858), and Bell (1869).

Ecologically, Aravaipa Creek remains generally similar to the stream in the 1800's. The greatest change has been loss of extensive cienega in the lower end of the upper valley, between Klondyke and the canyon (Minckley 1981, Hendrickson and Minckley 1984). Leopold (1951) is one of the earliest pieces of literature discussing change, where he briefly mentions the loss of the cienega in upper Aravaipa Creek as part of a larger discussion of vegetation changes throughout the southwest.

Early accounts indicate that the lower reach of Aravaipa Creek, near the San Pedro River, was often dry (Bourke 1980). However, the marshy area at the confluence of the two streams was such a source of malaria that a convalescence camp for soldiers from Camp Grant had to be established away from the river bottom (Hastings 1959).

The first documented era of ecological change in Aravaipa Creek accompanied European settlement, with ranches, farms, and mines established throughout the valley bottom and watershed. This resulted in the loss of the cienega, a downstream migration of the origin of perennial flow, extirpation of beaver, and changes in species composition, abundance and distribution of riparian vegetation (Minckley 1981, Hadley et al. 1991). Gradual drying of springs and tributary streams has also been reported.

A second era of ecological change along Aravaipa Creek occurred in the 1960's, when human population along Aravaipa Creek was declining. Hadley et al. (1991) report that local residents say prior to 1963 flooding, the creek had always been unincised and stable with a predominantly sandy bottom and large pools. The stream bed was commonly used as a roadway for horses and wagons with only one problematic drop-off in the canyon. Trucks were also driven through and in 1964 W.L. Minckley drove a 1955 Chevy through the canyon without difficulty. By the early

1970's downcutting and lateral cutting was occurring in areas, gravel was becoming a major proportion of the substrate, and deep holes were filling in. In the 1983 flood, substantial sediment was moved through and out of Aravaipa Creek, leaving a substrate of larger average size, ranging from gravel to boulder. These changes are related to earlier agricultural and road practices, long-term watershed alteration, and flood cycles (JE Fuller Hydrology and Geomorphology 2000).

At present, irrigated agriculture still occurs along the perennial portion of the stream, although much reduced from that of the mid-1900's. Livestock grazing occurs on much of the private and BLM lands, but is primarily cattle, with some horses and sheep. The large-scale goat ranching of the 1920-30's no longer occurs. Ranchette subdivision is increasing and a substantial proportion of the private parcels on the lower (west) end of Aravaipa Creek are second homes (Pinal County Assessor at http://apps.co.pinal.az.us/Assessor). At least one bed-and-breakfast operation is present. Recreational use of the canyon is heavy, with vehicle-oriented picnicking, camping and general recreation along the east and west ends, and hiking and backpacking through the canyon. High clearance and 4-wheel drive roads limit access on the tablelands, but hunting, camping, and hiking occur at moderate levels. BLM maintains a ranger station on the west end.

FISHES OF ARAVAIPA CREEK

The perennial portion of the stream, plus a few tributaries, are presently the only known locations for native fishes in the Aravaipa watershed. The historical presence of perennial water in a larger portion of the upper reach has already been discussed and would have furnished a larger area and diversity of habitats for fish occupation than at present. Today, the presence of perennial water in a flowing, unregulated stream is a rare occurrence in the Gila River basin. The presence of an intact, or relatively intact, native fish assemblage is an even rarer occurrence, and Aravaipa Creek has both. Robust populations of seven native fish persist in Aravaipa Creek (see Table 2) making it one of the premier native fish habitats in the Gila River basin (Williams et al. 1985) and in Arizona.

In addition to seven native fishes presently found in Aravaipa Creek, five other native fishes have been recorded from the San Pedro River (Jackson et al. 1987) and may have once been present in Aravaipa Creek (Barber and Minckley 1966) (see Table 3). However, Colorado squawfish, and razorback and flannelmouth suckers disappeared from the river before 1900, much earlier than the first Aravaipa Creek fish sampling. Because of the lack of early fish records, it cannot be conclusively known whether those three species ever used Aravaipa Creek. As larger-bodied species they may have been limited to the lower portion of Aravaipa Creek, moving in and out during periods of connection with the San Pedro River, or using it for spawning or larval and juvenile habitat, such as flannelmouth sucker presently does in the Grand Canyon area (Otis 1994).

Desert pupfish and Gila topminnow survived in the San Pedro basin until the 1950's and 1970's, respectively, but only in very localized areas. Historical cienega conditions above the canyon in Aravaipa Creek would have provided extensive habitat for both topminnow and pupfish, but that

habitat disappeared before the first documentation of Aravaipa fishes. It is also likely that suitable habitat occurred in floodplain marshes and backwaters that were drained and filled for agricultural uses. Specimens from lower Aravaipa Creek sent to the University of Michigan in 1943 contained a Gila topminnow, however, it was assumed to be an accidental contaminant from an accompanying shipment of Gila topminnow specimens from Tanque Verde Creek, near Tucson (Simon et al. 1943). Unsuccessful efforts to reintroduce Gila topminnow are discussed later in the history of conservation actions.

TABLE 2
EXTANT NATIVE FISHES
OF ARAVAIPA CREEK

FAMILY	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS*
Cyprinidae	longfin dace	*Agosia chrysogaster*	2
Cyprinidae	speckled dace	*Rhinichthys osculus*	2
Cyprinidae	spikedace	*Meda fulgida*	T
Cyprinidae	loach minnow	*Tiaroga cobitis*	T
Cyprinidae	roundtail chub	*Gila robusta*	PE
Catastomidae	desert sucker	*Pantosteus clarki*	2
Catastomidae	Sonora sucker	*Catostomus insignis*	2

TABLE 3
EXTIRPATED PROBABLE NATIVE FISHES
OF ARAVAIPA CREEK

FAMILY	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS*
Cyprinidae	Colorado squawfish	*Ptychocheilus lucius*	E
Catostomidae	razorback sucker	*Xyrauchen texanus*	E
Catostomidae	flannelmouth sucker	*Catostomus latipinnis*	2
Poeciliidae	Gila topminnow	*Poeciliopsis occidentalis*	E
Cyprinodontidae	desert pupfish	*Cyprinodon macularius*	E

*E = endangered; T= threatened; PE = petitioned for endangered; 2 = formerly on the FWS category 2 list, which contained those species for which indication existed that Federal listing might be warranted, but for which sufficient information was not yet available to make that determination. That list was abandoned by the USFWS in 1996.

As with all streams of the southwest, nonnative fish have been introduced or spread in Aravaipa Creek. Nine species of nonnative fish have been recorded from Aravaipa Canyon (see Table 4). Five of those species are known to have become established, with reproducing, self-sustaining populations. Three others are found only as isolated individuals and it is not known if they are reproducing in Aravaipa Creek or are being periodically introduced through unauthorized stocking, escape from stock tanks and residential ponds, or upstream migration from the San Pedro River. One has been found only in off-channel ponds.

Although Aravaipa Creek presently has fewer species and numbers of nonnatives than most streams in the Gila River basin, the number of species continues to rise. In 1981, Minckley

(page 201) was able to say "No alien fish species has yet established a reproducing population for more than a year or two." Twenty-three years later at least five have done so. In 1981, only three species, green sunfish, largemouth bass, and yellow bullhead were found in the mainstream of Aravaipa Creek. Black bullhead and mosquitofish were present in stock tanks and ponds, but not the stream. Now four of those are routinely found in the mainstream (although bass are not common), and three additional species have invaded (fathead minnow, red shiner, and common carp). Channel catfish have only been found in ponds alongside the stream and have not yet been documented in the creek.

TABLE 4
NONNATIVE FISHES OF ARAVAIPA CREEK[1]

FAMILY	COMMON NAME	SCIENTIFIC NAME	ESTABLISHED	YEAR FIRST RECORDED IN STREAM
Centrarchidae	Green sunfish	*Lepomis cyanellus*	Y	1963
Centrarchidae	Largemouth bass	*Micropterus salmoides*	?	1963
Ictaluridae	Yellow bullhead	*Ameiurus natalis*	Y	1963[2]
Ictaluridae	Black bullhead	*Ameiurus melas*	N	1966[2]
Poeciliidae	Western mosquitofish	*Gambusia affinis*	Y	1981
Cyprinidae	Fathead minnow	*Pimephales promelas*	Y	1983
Cyprinidae	Common carp	*Cyprinus carpio*	?	1988
Cyprinidae	Red shiner	*Cyprinella lutrensis*	Y	1990
Ictaluridae	Channel catfish	*Ictalurus punctatus*	N	1991 - in pond[3]

[1] In October 1989, smallmouth bass *Micropterus dolomieui* were recorded in Aravaipa Creek at Bear Canyon crossing and Tapia diversion. They were identified during the October Fish Count by inexperienced volunteers and no specimens were taken. Smallmouth bass have never been otherwise recorded from Aravaipa Creek or the entire San Pedro River basin. Discussions with two people involved in that survey revealed no additional information and they believe it may have been misidentified young largemouth bass. Minckley did not consider this record valid, nor do we.

[2] Barber and Minckley (1966) record black bullhead from a pond alongside Aravaipa Creek in the lower reach. Their specimens are in the ASU museum (#3454) and are recorded in Minckley's handwriting as *A. natalis* with a correction to *A. melas*. However, in 1981 Minckley does not list black bullhead as present in the Aravaipa watershed, but says that yellow bullhead were recorded in 1966 by Barber and Minckley from a pond adjacent to the creek. The 1981 report is apparently in error. Minckley's long-term data set records yellow bullhead from the mainstream as early as 1963 in the lower reach, with sporadic records from then until 1985, when their numbers rapidly increased. No other black bullhead were collected until fall 1990, when 1 was taken in the stream in the lower reach. The only other black bullhead records are 7 specimens from Geldmacher's Pond in October 1991.

[3] The AGFD Scientific Collecting Permit Database shows a record of 2 channel catfish from April 5, 1996 by W.L. Minckley. The data sheets and summary in Minckley's records for the "Sycamore tree" site show the original notation of 2 juvenile "*Ictalus*" beside which someone, apparently later, wrote "*Ictalurus punctatus.*" The typed summary says "*Ictalurus punctatus*" with "*punctatus*" scratched out and "*natalis.*" entered by Minckley's hand (Minckley 1996). The only known valid channel catfish record in the Aravaipa basin is in 1991 from Geldmacher's pond.

Because of the large proportion of the stream under conservation-oriented management, the unregulated flow, the relatively intact native fish community, and the relative paucity of nonnative fish species, Aravaipa Creek is often called the "crown jewel" of native fish in

Arizona. Aravaipa Creek is an irreplaceable and highly valuable native fish resource. However, it is only one of several, with others having more remaining native fish species or longer occupied stream length (see Table 5).

TABLE 5
REMNANT NATIVE FISH COMMUNITIES IN THE GILA RIVER BASIN
RETAINING FIVE OR MORE NATIVE SPECIES
(not including species extirpated and then reintroduced)

STREAM	NO. OF NATIVE FISH SPECIES REMAINING	NO. OF NATIVE FISHES COMMONLY FOUND DURING ROUTINE SAMPLING [1]	APPROX. LENGTH OF WATER OCCUPIED BY NATIVE FISHES ASSEMBLAGE (miles)
Gila River, upper (NM) (inc. East and West Forks)	8	7	120
Eagle Creek	8	6	40
Aravaipa Creek	7	7	20
Fossil Creek	6	5	15
White River (inc. East & North Forks)	6	4*	40
Verde River, upper (above Verde Valley)	6	3	40
San Francisco & Tularosa Rivers	5	5	125
Blue River (inc. Campbell & Dry Blue)	5	5	60
Black River (upper) (inc. East Fork)	5	5	35
Bonita Creek	5	5	35
Hot Springs and Bass Canyons	5	5	15
Redfield Canyon	5	4	15
Sonoita Creek (below Patagonia Dam)	5	4	10
Verde River, Verde Valley to Horseshoe Reservoir	5	4	80
Cherry Creek	5	4	40
Canyon Creek	5	4*	45
Tonto and Rye Creeks	5	3	45

[1] Some species may be found only in local areas within the total reach, but are common in those locations.
* Recent sampling records are unavailable outside of the White Mountain Apache Tribe.

Only two Gila basin streams retain more native fish species than Aravaipa Creek; the upper Gila River in New Mexico (including West and East Forks) and Eagle Creek in eastern Arizona. Both have longer stream lengths over which the native fish are found, however, one species in the Gila River and two in Eagle Creek are extremely rare. Three other streams retain six original native fishes, and an additional eleven streams retain five native species each. What sets

Aravaipa Creek apart is not just the number of extant native fish species, but also that all of the species are still commonly found and form a significant component of the native fish community. In addition, the relative lack of well-established nonnative fishes, the relatively unaltered stream condition, the high level of protection, and the extensive data available on the stream and its fishes support a greater degree of native-fish-friendly conditions than found in most other streams.

HISTORY OF FISH SAMPLING AND MONITORING

Fish in Aravaipa Creek have been sampled more frequently and over a longer term than any other native fish community in the Gila River basin. Nonnative sport fish, and to a lesser extent native trouts (as sport fish), have been frequently and continuously monitored since game and fish agencies were established in the early 1900's; however, native fish management in the basin was virtually nonexistent until the late 1970's or early 1980's (Rinne and Janisch 1995). Even academic studies, such as those ongoing in Aravaipa Creek, were rare and usually of short duration.

Several other long-term data sets exist for Gila River basin native fishes, such as for the upper Gila River in New Mexico from 1988 to present (Propst 2002, J. Stefferud, pers. com. June 2004), Eagle Creek from 1987 to present (Marsh et al. 1990, P. Marsh, pers. com. June 2004), upper San Pedro River from 1990 to present (Stefferud and Stefferud 2003), Redrock Canyon and San Rafael Valley springs from 1988 to present (Stefferud and Stefferud 1993, Stefferud and Stefferud unpub. data), and upper Verde River from 1994 to present (Rinne et al. 1999). But, the longest of those has only been underway for 17 years, as compared to 41 years of monitoring at Aravaipa Creek.

Tables 6-9 depict the sampling history of Aravaipa Creek, separated by lower, middle, and upper reaches, and tributaries and isolated waters. Data sources for these tables are shown in Appendices 1 and 2. There are undoubtedly other sampling events unrecorded, or for which records were not found (e.g. fish for taxonomic and genetic studies and not accessioned as museum specimens). However, most would be one-time events, mainly to obtain fish specimens for a specific study, and would not substantially alter the total picture of the sampling and monitoring history in Aravaipa Creek.

Mainstem Aravaipa Creek Sampling

Local residents of the 1880's and early 1900's, and Native Americans before that, ate fish from Aravaipa Creek. Colorado squawfish and razorback sucker remains were excavated from trash middens at Quibuiri, a Sobaipuri settlement on the upper San Pedro River north of Fairbank (Miller 1961, Minckley 1987). European settlers caught and ate the plentiful and easily caught larger-bodied species of fish, which they called as "suckers" or "catfish" (desert and Sonora sucker) and "mudfish" or "Aravaipa trout" (roundtail chub) (Hadley et al. 1991). Smaller-bodied fish were called "minnow." They were caught only as bait and a 1930's commercial effort seined and transported thousands of Aravaipa Creek minnows to San Carlos Lake to sell as bait

(Hadley et al. 1991). No records to species resulted from pre-1940's uses of Aravaipa fishes. The first recorded fish sampling in Aravaipa Creek was in October 1943, by James R. Simon of the Naval Training School of the University of Arizona and two students John R. Hendrickson, and Marvin H. Frost, Jr. (see Appendix 1). Their sample locations were on the lower end of Aravaipa Creek and were described as "11-14 miles ENE of the Winkleman-Feldman road." Feldman was located on the east side of the San Pedro River about 2 miles north of Aravaipa Creek, near what is now known as Cook's Lake (Barnes 1988). Hendrickson, Simon, and Frost recorded all seven of the native fishes that are still present. Interestingly, John Hendrickson is the uncle of Dean Hendrickson who participated in Aravaipa Creek work in the 1980's and 90's, as a student at ASU and later as an employee of AGFD.

In 1949, W.I. Follett, of the California Academy of Sciences, sampled lower Aravaipa Creek "12 6/10 miles from Winkleman." His specimens, deposited at Cornell, indicate a co-collector R.C. Snyder. Snyder's identity could not be determined, but he made a collection by himself in May and deposited it at UofA, indicating a possible affiliation. Follett and Snyder obtained all seven native fish species.

Also sampling Aravaipa Creek in 1949 was R.J. Hock, from the UofA. His museum specimens give his location only as Aravaipa Creek, Pinal County. He collected longfin dace and desert sucker.

LEGEND FOR TABLES 6-9	
*indicates that ASU data exist for this year in Minckley's annual data set, but the month of sampling is unknown. *Blue italic font indicates data from the ASU SONFISHES or AGFD permit databases* Black regular font indicates data from a document	
	Yellow highlight indicates the ASU/UA biannual long-term sampling/monitoring.
	Purple highlight indicates monitoring under the October (Fall) Fish Count.
	Green highlight indicates monitoring of BLM and TNC lands (performed by ASU, AGFD, TNC, and BLM).
	Blue highlight indicates monitoring specifically for the fish barriers.
ACVF = Arizona Conservation Voters Habitat Fund ASU = Arizona State University BLM = U.S. Bureau of Land Management BR = U.S. Bureau of Reclamation FWS = U.S. Fish and Wildlife Service GF = Arizona Game and Fish Department Multi = multiple entities NMSU = New Mexico State University	OFC = October (or Fall) Fish Count Smith. = U.S. National Museum, Smithsonian TUL = Tulane University UA = University of Arizona UMMZ = University of Michigan Museum of Zoology UNLV = University of Nevada, Las Vegas USFS = U.S. Forest Service
Codes used following the initials of the sampling entity (following a slash) indicate the following sampling purposes: BM = barrier monitoring M = monitoring RS = search for red shiner No initials after the slash indicates that sampling was for research, administrative studies, or other purposes.	

TABLE 6
CHRONOLOGY OF SAMPLING EVENTS -- ARAVAIPA CREEK, LOWER
(Wood's Ranch to San Pedro River)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1943										UA		
1944												
1945												
1946												
1947												
1948												
1949		*UA*			*Carnell*					*UA*		
1950												
1951												
1952					*UA*							
1953												
1954												
1955										*UA*		
1956												
1957												*UA*
1958												*UA*
1959			*UA*	*UA*		*UA*						*UA*
1960												
1961										*UA*		
1962												
1963				*ASU*						*ASU*		
1964				ASU/M *ASU*		*ASU*		*ASU*		*ASU*	*ASU* ASU	*ASU*
1965		*ASU*		ASU/M	*UA*		*ASU*			ASU/M		
1966						ASU *ASU*	ASU *ASU*	ASU *ASU*	ASU	ASU *ASU*	ASU *UA* *ASU*	ASU *ASU*
1967	ASU	ASU *ASU*	ASU	ASU	ASU	ASU	ASU		*ASU*			
1968												
1969				*ASU UNLV*								
1970	*				*UA*							
1971						*TUL*						
1972				ASU/M *ASU*	ASU/M							
1973									*ASU*			
1974											ASU/M	
1975				ASU/M						ASU/M		
1976			ASU/M							ASU/M *ASU*		
1977		*ASU*		ASU/M ASU			*ASU*		*ASU*	ASU/M	ASU	ASU *ASU*
1978	ASU *ASU*	ASU	ASU *ASU*	ASU/M ASU	ASU *ASU*	ASU *ASU*	ASU *ASU*	ASU *ASU*	ASU *ASU*	ASU/M ASU	ASU	
1979		ASU	ASU/M *ASU*	ASU	ASU	ASU	ASU		*ASU*		*ASU/M*	
1980	*ASU*		ASU/M							ASU/M		

TABLE 6
CHRONOLOGY OF SAMPLING EVENTS -- ARAVAIPA CREEK, LOWER
(Wood's Ranch to San Pedro River)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1981				ASU/M						ASU/M		
1982												
1983				ASU/M *ASU*						ASU/M		
1984			ASU/M							ASU/M		
1985			ASU/M		FWS					ASU/M		
1986				ASU/M						ASU/M		
1987			ASU/M ASU	*ASU* ASU	ASU	ASU	ASU	ASU		ASU/M		
1988				ASU/M			*ASU*			ASU/M [redacted]		
1989		ASU	ASU	ASU/M ASU	ASU	ASU	ASU	ASU	ASU	ASU/M ASU	*GF* ASU [redacted]	
1990	ASU	ASU	ASU/M ASU			ASU			[redacted]	ASU/M Multi/RS		
1991		ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M *GF*	ASU/M	ASU/M
1992	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	GF/M	GF/M		ASU/M	GF/M	GF/M
1993	ASU/M	GF/M	GF/M	ASU/M	GF/M	GF/M	ASU/M *GF*	GF/M		ASU/M GF/RS	GF/M	
1994				ASU/M GF/M	GF	ASU/M				ASU/M		
1995				ASU/M				*ASU*		ASU/M	GF/RS	
1996				ASU/M						ASU/M		
1997				ASU/M						BLM & TNC/M	ASU/M *ASU*	
1998				ASU/M			GF/RS	*ASU*		ASU/M		
1999				ASU/M						ASU/M GF, TNC, & BLM/M	*ASU*	*ACVF*
2000			ASU	ASU/M ASU						ASU/M	GF/M	
2001				ASU/M			[redacted]				ASU/M	
2002				ASU/M			UA	GF		UA/M [redacted]		
2003				UA/M					UA/M	[redacted]		
2004				UA/M					[redacted]	UA/M		

TABLE 7
CHRONOLOGY OF SAMPLING EVENTS --ARAVAIPA CREEK, MIDDLE
(Turkey Creek confluence to Wagner Ranch)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1950					UMMZ							
1951												
1952												
1953			*UA*									
1954		*UA*										
1955		*UA*										
1956			*UA*									
1957			*UA*			*UA*						
1958												
1959												
1960			*UA*	*UA*								
1961												
1962												
1963												
1964				*ASU*							*ASU*	*ASU*
1965		*ASU*		ASU/M	*ASU*					ASU/M		
1966		*ASU*				*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU
1967	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU* ASU	*ASU*				
1968												
1969	*											
1970				ASU/M						ASU/M		
1971												
1972		ASU/M		ASU/M *ASU*	ASU/M *ASU*					ASU/M		
1973				ASU/M	ASU/M				ASU/M *ASU*	ASU/M	*ASU*	
1974				ASU/M						ASU/M	ASU/M *ASU*	
1975				ASU/M						ASU/M *ASU*	*ASU*	
1976	*ASU*		ASU/M *GF*							ASU/M *ASU*	*ASU*	
1977							*ASU*		*ASU*			
1978	ASU	ASU	ASU	ASU/M ASU			ASU		ASU	ASU/M ASU	ASU	
1979		ASU	ASU/M	ASU		ASU				ASU/M		
1980				ASU/M						ASU/M		
1981				ASU/M						ASU/M		
1982				ASU/M						ASU/M		
1983				ASU/M					*ASU*	ASU/M GF		

TABLE 7
CHRONOLOGY OF SAMPLING EVENTS --ARAVAIPA CREEK, MIDDLE
(Turkey Creek confluence to Wagner Ranch)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1984			ASU/M							ASU/M		
1985					FWS					ASU/M		
1986	*											
1987			*ASU*	ASU/M	ASU					ASU/M		
1988			ASU/M						*GF*	ASU/M		
1989		ASU	ASU	ASU/M ASU	ASU	ASU	ASU	ASU	ASU	ASU/M ASU GF	ASU	ASU
1990	ASU	ASU	ASU	ASU/M		ASU			[redacted]	ASU/M Multi/RS	GF/RS	
1991		ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M
1992	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	GF/M	GF/M		ASU/M	GF/M	GF/M
1993	ASU/M		GF/M	ASU/M	GF/M	GF/M		GF/M		ASU/M GF/RS		GF/M
1994				ASU/M GF/M		ASU/M				ASU/M		
1995	*ASU*			ASU/M						ASU/M		
1996				ASU/M						ASU/M		
1997				ASU/M						ASU/M BLM & TNC/M		
1998	*ASU*			ASU/M		GF/RS	GF, TNC/RS			ASU/M		
1999				ASU/M						ASU/M GF, TNC & BLM/M		
2000				ASU/M						ASU/M	GF/M	
2001				ASU/M							ASU/M	
2002			UA	ASU/M				UA		UA/M		
2003				UA/M		UA			UA/M			
2004				UA/M						UA/M		

TABLE 8
CHRONOLOGY OF SAMPLING EVENTS
ARAVAIPA CREEK, UPPER
(Headwaters to above Turkey Creek confluence)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1960					*UA*							
1961												
1962												
1963												
1964											*ASU*	*ASU*
1965				*ASU/M*	*ASU*					*ASU/M*		
1966			*ASU*			*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*
1967	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*	*ASU*		*ASU*	
1968												
1969					*ASU*							
1970	#											
1971												
1972				ASU/M	ASU/M							
1973				ASU/M	ASU/M				ASU/M *ASU*			
1974											ASU/M *ASU*	
1975	ASU			ASU ASU/M			ASU			ASU ASU/M		
1976	ASU		ASU/M *GF*						ASU	ASU/M ASU	ASU	
1977		*ASU*	FWS GF	*ASU*			*ASU*		*ASU* ASU	*ASU* ASU	ASU	*ASU* ASU
1978	*ASU* ASU	*ASU* ASU	*ASU* ASU	ASU/M ASU	ASU	*ASU* ASU	ASU	*ASU* ASU	*ASU*	ASU/M	ASU	
1979			ASU/M	ASU		ASU					ASU/M	
1980	*				NMSU							
1981			NMSU	ASU/M			NMSU	NMSU			ASU/M	
1982		ASU/M							ASU/M			USFS
1983	*ASU*			ASU/M USFS				USFS	ASU/M			
1984		USFS	ASU/M				USFS		USFS		ASU/M	
1985										ASU/M		
1986				ASU/M	USFS						ASU/M	
1987				ASU/M				*ASU*		ASU/M		
1988				ASU/M					[redacted] *GF*	ASU/M		
1989			ASU	ASU/M ASU				ASU		ASU/M *GF* [redacted]		

TABLE 8
CHRONOLOGY OF SAMPLING EVENTS
ARAVAIPA CREEK, UPPER
(Headwaters to above Turkey Creek confluence)

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1990		*ASU*	ASU	ASU/M		ASU			[illegible]	ASU/M	GF/RS	
1991		ASU/M GF	ASU/M	ASU/M	ASU/M	ASU/M *ASU*	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M
1992	ASU/M	ASU/M	ASU/M	ASU/M	ASU/M *TNC/ Smith*	ASU/M	GF/M	GF/M		ASU/M	GF/M	GF/M
1993	ASU/M	GF/M	GF/M	ASU/M	GF/M	GF/M	ASU/M	GF/M		ASU/M GF/RS	GF/M	
1994				ASU/M GFM		ASU/M				ASU/M		
1995				ASU/M						ASU/M		
1996	*ACVF*			ASU/M						ASU/M	*BLM*	
1997				ASUM		*GF*				ASU/M BLM & TNC/M FWS		
1998	*ASU*			ASU/M		GF/RS	GF, TNC/RS			ASU/M		
1999				ASU/M						ASU/M GF, TNC & BLM/M		
2000			ASU	ASU/M ASU						ASU/M	GF/M	
2001				ASU/M							ASU/M	
2002			UA	ASU/M		UA		UA	GF UA	UA/M		
2003				UA/M		UA			UA/M			
2004				UA/M						UA/M		

From March through June 1950, Robert R. and Fran H. Miller and their children, and Howard E. Winn, from the University of Michigan, made a fish collecting trip through the lower Colorado River basin in Arizona, California, Baja California, and Sonora (Miller et al. 1991). One of their stops was upper Aravaipa Creek near the confluence with Turkey Creek and "near the head of box canyon NW of Klondyke flood tributary," where they collected all seven fish species.

The UofA became interested in Aravaipa Creek in the early 1950's and several students and staff made collections. Robert A. Jantzen, later the Director of AGFD and then FWS, collected longfin dace and loach minnow from lower Aravaipa Creek in 1952, apparently as a student. Charles H. Lowe, a longtime professor at the UofA and his student Wallace G. Heath, collected in lower and middle Aravaipa Creek from 1953-60 (Barber and Minckley 1966). Records show that some of Lowe's trips were a class effort, indicating that use of students to sample Aravaipa Creek is a 50-year tradition.

In 1963, Wendell L. Minckley arrived at Arizona State University as an Assistant Professor of Zoology (Collins et al. 2002). He and his students began to sample Aravaipa Creek in 1963, as part of classwork and studies. Minckley began to accumulate a long-term monitoring data set for Aravaipa Creek through repeated standardized sampling. As seen in Tables 6-8, ASU sampling in upper, middle, and lower Aravaipa Creek has occurred frequently from 1963 to 2002. Following Minckey's death in 2001, long-term monitoring is being continued at the UofA, by one of the authors (Reinthal).

Post-1963 fish sampling in Aravaipa Creek can be divided into seven categories; 1) sampling for specific studies, 2) ASU/UofA long-term monitoring, 3) October (Fall) Fish Count, 4) post-1990 TNC/BLM monitoring, 5) monitoring of the fish barriers, 6) searches specifically for red shiner, and 7) miscellaneous.

1. Specific studies. Sampling for studies will be discussed in the later section on Research History. As you will note in Tables 6-8, there are several periods of intensive sampling. Those generally represent specific study designs.

2. ASU/UofA long-term monitoring. Sampling events for the long-term ASU monitoring data set are highlighted in yellow on Tables 6-8. Based on parameters such as season, sampling methodology, location, and personnel, Minckley identified 66 sampling events (he referred to them as "Trips") that he included in his long-term monitoring data for Aravaipa Creek (Minckley 2001). These were distributed between spring and autumn sampling periods and included upper, middle, and lower reach stations. The earliest event in the set was in the lower reach in spring 1964. Upper and middle reach monitoring began in spring 1965, along with continuation on the lower reach. There was then a hiatus of six years in the upper and lower reach data set and of four years in the middle reach data set, although other sampling was ongoing during the period.

In 1972, Minckley produced his first monitoring report on Aravaipa Creek fishes, with a survey of water quality factors, for BLM and The Defenders of Wildlife (DOW) (Minckley 1972). Their commissioning this work was probably in response to the 1969 establishment of the BLM

Aravaipa Primitive Area and DOW acquisition of preserve lands. Minckley and his student Donald Schreiber also monitored fish in 1973 and 1974, the results of which Minckley (1981) cites as reports to the two organizations (Minckley 1973, Schreiber 1975). The 1973 report recommends building twice a year monitoring of Aravaipa Creek fishes into conservation plans.

Beginning in 1975 through present, the ASU monitoring (including recent UofA continuance) in the upper reach of Aravaipa Creek occurred each spring and autumn, with the exception of three years (1977 1980, and 1985). In the middle reach, the monitoring occurred each spring and autumn from 1970 through the present, with the exception of four years (1971, 1977, 1985, and 1986). In the lower reach, monitoring occurred each spring and autumn from 1975 through the present, with the exception of one year (1982). Monitoring in 1985 in the upper and middle reaches was conducted and was submitted as a report to BLM and the George Whittell Trust for Aravaipa Canyon in 1986 (Minckley and Karp 1986), but Minckley did not include these data in his long-term monitoring data set, for reasons not specified.

Thus, the ASU monitoring of Aravaipa Creek fishes spans a 41 year period, with data from 35 of those years. There has been almost-continuous monitoring of the middle reach over the last 35 years and over the upper and lower reaches for the last 30 years. There is no data-set of this magnitude for any other Arizona or Gila River basin fishes.

3. October (Fall) Fish Count. In 1988, AGFD and FWS initiated a monitoring effort as part of the October (or Fall) Fish Count. The Fish Count was an attempt to mimic the highly successful Christmas bird count, which uses volunteers to gather extensive long-term data. However, technical difficulties of fish sampling and permitting requirements doomed the Fish Count, which lasted only until 1994. On Aravaipa Creek, October Fish Count efforts were undertaken in the upper and lower reaches in 1988-90 by volunteers along with biologists and students from AGFD, FWS, BLM, TNC, and ASU. The middle reach was included only in 1990. These sampling events are highlighted in purple on Tables 6-8.

4. Post-1990 TNC/BLM monitoring. This category consists of monitoring conducted in response to post-1990 concerns about red shiner invasion. It was initiated and funded by TNC and BLM and carried out by them or by AGFD or ASU. These sampling events are highlighted in green on Tables 6-8. Increased monitoring was recommended by the Desert Fishes Recovery Team, a FWS advisory group, as part of their strategy to deal with the red shiner invasion (Desert Fishes Recovery Team 1990).

According to TNC, the TNC/BLM phase of monitoring began with monthly sampling in November 1990 (Brunson and Gori 2001). This apparently refers to the red shiner searches throughout the stream by AGFD, TNC, BLM, ASU, and FWS personnel on October 20 and November 6, 1990. No record of monitoring in December 1990 or January 1991 was found.

In February 1991, a multi-agency group met to discuss management of Aravaipa Creek. A monitoring proposal had been submitted by ASU and a draft Memorandum of Understanding was prepared for signature by FWS, BLM, BR, AGFD, and TNC. The MOU would have

provided for cooperative funding of ASU monitoring, among other things. That MOU was never signed, but monitoring began in February 1991 by ASU under contract to TNC (Velasco 1993a). This spanned 17 months (Feb. 1991-June 1992), and included upper and lower reaches monthly and all reaches quarterly. It was combined with the ASU long-term monitoring efforts in April and October.

In October 1991, TNC and BLM entered a 5-year cooperative agreement to fund monitoring. Under the agreement, eight months of ASU monitoring was funded. Monthly monitoring was assumed by AGFD in July 1992 under the agreement. Their work continued through 1993, with no sampling in September 1992 and 1993 in upper and lower reaches, February and July 1993 in the middle reach, and December 1993 in all reaches. In addition, ASU long-term monitoring was incorporated so AGFD did not sample in October 1992 and 1993 and April 1992.

According to Brunson and Gori (2001), quarterly monitoring was conducted in 1994. The only records found, apart from the standard spring-fall ASU effort, were AGFD monitoring in April (in addition to the standard ASU sampling) and ASU monitoring in June.

Following this period of intensive monitoring, the effort fell back to the long-term ASU biannual monitoring until autumn 1997. For three of the next four years additional autumn monitoring was conducted by BLM, TNC and AGFD. None of the three agencies have conducted monitoring in Aravaipa Creek since 2000, but they assist in the ASU/UofA monitoring and are presently providing funding.

In January 1999, a meeting was held among various parties interested in management of Aravaipa Creek. A draft monitoring plan was tendered by BLM. The group recommended that monitoring be initiated to supplement, but not replace, the ongoing ASU effort. This additional monitoring would occur once a year in the autumn at fixed sites using sampling protocols set up by the Central Arizona Project nonnative management program (Clarkson 1996). The purpose would be to document status and distribution of the fish community with an emphasis on red shiner. Apparently this proposal was not adopted. However BLM and TNC are presently working jointly on a monitoring plan and protocol for Aravaipa Creek (H. Blasius, BLM, pers. com. March 3, 2004).

5. Monitoring of the fish barriers. In 2001, two barriers to upstream fish movement were completed in lower Aravaipa Creek to prevent additional nonnative fish invasions. These barriers were required by a 1994 biological opinion from the FWS to the USBR, under the Endangered Species Act (U.S.Fish and Wildlife Service 1994). In a revision of that biological opinion, the Bureau of Reclamation committed to 100 years of monitoring in the vicinity of the Aravaipa Creek barriers (U.S.Fish and Wildlife Service 2001b). Barrier monitoring efforts are highlighted on Table 6 in blue and occurred in 2001, 2002, 2003, and 2004, with no detection of novel species or significant changes in fish distribution.

6. Searches specifically for red shiner. After invasion of red shiner into Aravaipa Creek in 1990, intensive sampling efforts occurred to document its invasion and spread. These were not

monitoring efforts, but instead targeted habitat with the highest likelihood for presence of red shiner. These occurred in October 1990, October 1993, November 1995, and July 1998 in the lower reach, October and November 1990, October 1993, and June and July 1998 in the middle reach, and November 1990, October 1993, and June and July 1998 in the upper reach. They were coordinated by ASU, AGFD, TNC, and BLM and also included FWS, USBR, and UofA.

7. Miscellaneous. Some sampling has occurred in Aravaipa Creek for reasons that do not appear to be connected to specific studies or to monitoring. These efforts include a few isolated events for unknown reasons as well as two sampling events for youth education. These last two were in January 1996 and December 1999 and were conducted by Robert Beatson with the Arizona League of Conservation Voters.

Tributary and Isolated Waters Sampling

In addition to mainstem Aravaipa Creek, there has been infrequent sampling of tributaries and isolated waters of the basin (see Table 9). In 1972, Minckley and his ASU class sampled lower Hell Hole Canyon and found only longfin dace. They also sampled Oak Grove and Turkey Creeks where they found longfin and speckled dace, and desert and Sonora sucker. Other Minckley classes sampled Virgus Canyon in 1974 and 1975, finding Sonora sucker and green sunfish, leading to concerns that the sunfish might be moving down into Aravaipa Creek from stock tanks in the watershed. Turkey Creek was again sampled in 1991, when Jeff Simms (BLM) found longfin and specked dace, loach minnow, desert and Sonora sucker, and roundtail chub. He revisited Turkey Creek, along with its tributary Oak Grove, in 1995 and found all of those except loach minnow. In 1995, Simms sampled Deer Creek and found loach minnow at least 1.75 miles above the mouth, as well as speckled and longfin dace and desert sucker.

Floodplain ponds have been built and maintained at several ranches along Aravaipa Canyon, for various reasons, including raising nonnative fish for sport and food. In 1965, Barber and Minckley included one shortly below White's Ranch in their study. They found green sunfish, black bullhead, and Sonora sucker. In 1991, AGFD sampled ponds along lower Aravaipa Creek on the Geldmacher (or Holy Joe) Ranch and at the Rubin Ranch. They found green sunfish, mosquitofish, Sonora sucker, largemouth bass, yellow and black bullhead, and channel catfish.

Stock tanks are common throughout the watershed of Aravaipa Creek and are often stocked with nonnative fish. In 1975 Donald Schreiber, a Minckley student, sampled the Virgus Canyon Rim Rock pool and found green sunfish. Concern about stock tanks in the watershed feeding nonnative fish into Aravaipa Creek resulted in a 1987 survey of stock tanks by AGFD, which found fish (green sunfish) in only two tanks (Rim Rock and Four Mile) (Bagley 1987).

As Tables 6-8 illustrate, Aravaipa Creek is heavily sampled and there is substantial knowledge of the fishes of Aravaipa Creek. However, unlike the mainstem, the tributary streams are sampled infrequently and the extent to which they support native fish on a long-term basis, and the distribution of that use, is poorly known.

TABLE 9
CHRONOLOGY OF SAMPLING EVENTS
ARAVAIPA CREEK TRIBUTARIES AND MISCELLANEOUS WATERS

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1965		streamside pond near White's			streamside pond near White's							
1966												
1967												
1968												
1969												
1970												
1971												
1972					ASU/ Hell Hole Oak Grove Turkey							
1973												
1974										*ASU/ Virgus*		
1975	*ASU/RimRock pool (Virgus)*											
1976										*ASU/ Virgus*		
1977												
1978												
1979												
1980												
1981												
1982												
1983												
1984												
1985												
1986												
1987						GF/stock tanks	GF/stock tanks					
1988												
1989												
1990												
1991										BLM/ Turkey	GF/ Geldmacher & *Robins ponds*	
1992												
1993												
1994												
1995			BLM/ Turkey				BLM/ Deer & Oak Grove					
1996												
1997												
1998												
1999												
2000												

TABLE 9
CHRONOLOGY OF SAMPLING EVENTS
ARAVAIPA CREEK TRIBUTARIES AND MISCELLANEOUS WATERS

YEAR	MONTH											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
2001												
2002												
2003												
2004												

Sampling Funding

Fish sampling and monitoring in Aravaipa Creek has been funded by a variety of entities over 40 years (Table 10). These were identified in acknowledgments and contract numbers in various reports, but dollar figures are not available for many projects, so are not included in Table 10. A large proportion were self-funded, with staff, vehicles, and equipment provided by the organization doing the sampling and those are not included in Table 10. This is particularly true of ASU long-term monitoring, which was largely unfunded by any outside entity, with the exception of some grants in early years and TNC funding of the 1991-92 monitoring. Long-term ASU monitoring with little funding was made possible by use of University resources and students sampling labor. This served a dual purpose of providing students with exposure and training on native fishes while accomplishing a labor-intensive effort over a long period of time at little expense. Use of students in Aravaipa Creek sampling began in the 1950's with Lowe's UofA classes (see SONFISHES) and was continued by Minckley at ASU. The first record found for ASU use of classes was in 1972 (Minckley 1972), although it was likely occurring unrecorded earlier, as use of students was not considered as unusual and in need of noting. Minckley's field notes, which may contain such information, were not examined. Use of students continued through 2003, when it was ended due to concerns by AGFD.

In addition to student labor, sampling efforts were often staffed by biologists from a variety of agencies who came to help. This was particularly true during the early 1990's when concern over the red shiner invasion was at its peak. Table 10 shows only the entities that provided monetary support, with the exception of AGFD, where matching funds for Federal grants are normally provided by in-kind contributions of staff time and equipment.

With the exception of the October or Fall Fish Count, administration of which was funded by the FWS through a Section 6 grant to AGFD, money for monitoring of Aravaipa Creek has been primarily provided by DOW, TNC, and BLM.

TABLE 10
FUNDING SOURCES FOR ARAVAIPA CREEK SAMPLING
(not including time, vehicles, and equipment used by agencies and organizations in their own sampling

FUNDING ENTITY	PROJECT	MONITORING?
Arizona State University	Barber and Minckley's work 1963-67	Y
	Rinne 1976	
	Mpoame and Rinne 1983	
	Hendrickson and Minckley 1984	
	Meffe and Minckley 1987	
	Douglas et al. 1994	
	Williams 1991a	
American Museum of Natural History	Barber and Minckley's work 1963-67	Y
Defenders of Wildlife (Whittell Trust)	Minckley 1972	Y
	Minckley 1973 (31-W-WL-7-20)	Y
	Ellingson 1980	
	Schreiber and Minckley 1981	
	Adar 1985	
	Minckley and Karp 1986	Y
	Minckley and Meffe 1987	
	Bagley 1987	
U.S. Bureau of Land Management	Minckley 1972	Y
	Minckley 1973	Y
	Schreiber 1975	Y
	Siebert 1980 (YA-512-CT6-98)	
	Minckley 1981 (YA-512-CT6-98)	
	Schreiber and Minckley 1981	
	Clarkson and Minckley 1985 (YA-512-CT6-98)	
	Minckley and Karp 1986	
	Meffe and Minckley 1987	
	Bagley 1987	
	Williams 1991a	
	Velasco 1993 and 1997	Y
	Bettaso et al. 1995	Y
	Voeltz and Davidson 2002 (A950A40006)	Y
	Reinthal in progress	Y

TABLE 10
FUNDING SOURCES FOR ARAVAIPA CREEK SAMPLING
(not including time, vehicles, and equipment used by agencies and organizations in their own sampling

FUNDING ENTITY	PROJECT	MONITORING?
The Nature Conservancy	Rinne 1976	
	Meffe and Minckley 1987	
	Hardy et al. 1990	
	Williams 1991a	
	Bettaso et al. 1995 (AZFO121394-1)	Y
	Velasco 1993 and 1997 (AZFO-053091-1)	Y
Sport Fishing Institute	Barber and Minckley's work 1963-67	Y
	Rinne 1976	
	Meffe and Minckley 1987	
African-American Institute	Mpoame and Rinne 1983	
U.S. Fish and Wildlife Service	Ginnelly 1977	
	Turner and Tafaneili 1983	
	Hendrickson and Minckley 1984	
	Meffe and Minckley 1987	
	Marsh et al. 1989 and Abarca 1989	
	October Fish Count (Sheldon and Hendrickson 1988, Corman et al. 1989, Young 1994, Young and Lopez 1995)	Y
	Williams 1991a	
	Vives 1995	
Arizona Game and Fish Department	Ginnelly 1977 (Federal Aid match)	
	Bagley 1987	
	Meffe and Minckley 1987	
	Marsh et al. 1989 and Abarca 1989(Section 6 in-kind match)	
	October Fish Count (Sheldon and Hendrickson 1988, Corman et al. 1989, Young 1994, Young and Lopez 1995) (Section 6 in-kind match)	Y
	Vives 1995 (Section 6 in-kind match)	
	Bettaso et al. 1995	Y
	Voeltz and Davidson 2002	Y
National Science Foundation	Douglas et al. 1994	
	Eby et al. 2003	

TABLE 10
FUNDING SOURCES FOR ARAVAIPA CREEK SAMPLING
(not including time, vehicles, and equipment used by agencies and organizations in their own sampling

FUNDING ENTITY	PROJECT	MONITORING?
U.S. Forest Service	Rinne 1985, 1989,1991, 1992 Rinne and Kroeger 1988	
	Meffe and Minckley 1987	
	Moody, Odem, and Neary 1998	
U.S. Bureau of Reclamation	Matter 1991	
	Bagley and Marsh 1995	
	Remington 2002	
Nat'l Council of Science & Technology of MX	Abarca 1989	
U.S. Bureau of Reclamation/Fish and Wildlife Service Central Arizona Project Nonnative fish management and native fish recovery program	JB Fuller Hydrology and Geomorphology	
	Childs 2004	

HISTORY OF FISH RESEARCH AND STUDIES

Numerous studies have been conducted on the fishes of Aravaipa Creek, from basic descriptive work applicable only to Aravaipa Creek to complex analyses of community variation over time that inform a wide range of biological thought. Table 11 lists all research or studies of fishes or hydrology and fluvial geomorphology of Aravaipa Creek for which citable results could be found. This does not include reports of monitoring activities, which were discussed in an earlier section of this report.

The majority of the studies of Aravaipa Creek fishes have been done at ASU. Minckley found Aravaipa Creek to be an outstanding natural laboratory and directed not only a significant effort of his own, but that of many of his students, toward understanding the Aravaipa Creek fish community and its habitat. Summary studies of Aravaipa Creek include Minckley's detailed 1981 report as well as part of a more region-wide analysis (Minckley 1985).

TABLE 11
RESEARCH AND STUDIES RELATING TO ARAVAIPA CREEK FISHES

GENERAL TOPIC	SPECIFIC TOPIC	PUBLICATION OF DATA AND RESULTS
Summaries/syntheses	Aravaipa Creek southwestern aquatic habitats	Minckley 1981 Minckley 1985
General fish studies	fishes of Aravaipa Creek biology of spikedace biology of longfin dace flooding effects on fish thermal tolerances	Barber and Minckley 1966 Barber et al. 1970 Minckley and Barber 1971 Meffe and Minckley 1987 Minckley and Meffe 1987 Carveth and Widmer in-progress at University of Arizona Coop. Research Unit
Fish reproduction	longfin dace loach minnow spikedace & loach minnow captive propagation loach minnow artificial propagation	Kepner 1982 Vives and Minckley 1990 Vives 1995 Childs 2004
Fish food habits	all Aravaipa fishes spikedace spikedace, loach minnow, and red shiner desert & Sonora sucker	Schreiber 1978 Schreiber and Minckley 1981 Barber and Minckley 1983 Abarca 1989 Marsh et al. 1989 Clarkson 1982 Clarkson and Minckley 1988
Fish movement	roundtail chub, desert & Sonora sucker larval fish drift	Siebert 1980 Williams 1991a Remington 2002
Fish parasites		Mpoame 1981 Mpoame 1982 Mpoame and Rinne 1983
Fish habitat	general overview methods spikedace loach minnow all Aravaipa fishes role of woody debris relationship of stream discharge	Deacon and Minckley 1974 Rinne 1985 Rinne and Kroeger 1988 Rinne 1991 Rinne 1989 Rinne 1992 Minckley and Rinne 1985 Velasco 1997
Fish taxonomy	genus *Gila* roundtail chub, desert & Sonora sucker spikedace spikedace, loach minnow, & longfin dace longfin dace	Rinne 1969 Rinne 1976 DeMarais 1986 DeMarais 1992 Minckley and DeMarais 2000 Dowling and Marsh 1999 Uyeno and Miller 1973 Anderson and Hendrickson 1994 Tibbets 1993 Hendrickson 1987a Tibbets 1998

TABLE 11
RESEARCH AND STUDIES RELATING TO ARAVAIPA CREEK FISHES

GENERAL TOPIC	SPECIFIC TOPIC	PUBLICATION OF DATA AND RESULTS
Fish status review	spikedace and loach minnow roundtail chub spikedace, loach minnow, & roundtail chub longfin & speckled dace, desert & Sonora sucker	Stefferud 1983b Stefferud 1983a Voeltz 2002 Desert Fishes Team 2003 Desert Fishes Team 2004
Fish population ecology	fragmentation community dynamics	Tibbets and Dowling 1996 Eby et al. 2003
Nonnative fishes and their control	redshiner/spikedace/loach minnow interactions potential for invasion via Central AZ Project barrier efficacy	Marsh et al. 1989 Douglas et al. 1994 Matter 1991 U.S.Fish and Wildlife Service 2001a Bagley and Marsh 1995
Invertebrates	general drift	Bruns 1977 Bruns and Minckley 1980 Holanov 1984
Water pollution	metals in fish	King and Martinez 1998 Mofin et al. 2003 Reinthal – in progress
Hydrology/ geomorphology	ground water hydrologic cycle flood events bankfull determinations overview and barrier design overview of hydrology and geomorphology	Gould and Wilson 1976 Adar 1984 Adar 1985 Adar et al. 1988 Ellingson 1980 Fuller and Roberts 1985 Roberts 1987 Moody et al. 1998 Moody 1999 Cullinan 1990 JE Fuller Hydrology and Geomorphology 2000
Instream flow needs	fish recreation	Turner and Tafanelli 1983 Hardy et al. 1990 Moore et al. 1990

Early Taxonomy and Zoogeography

The purpose of early sampling of Aravaipa Creek was simply to document what species were found where. Specimens of Aravaipa Creek fishes placed into museum collections from 1943 to 1950 contributed to various taxonomic and zoogeographic studies of the seven native fishes and the lower Colorado River basin. Those specimens continue to contribute to such studies today. Recent taxonomic and genetics work that may have used those specimens are discussed later.

Although the stream is not specifically mentioned in either paper, the 1950 sampling of Aravaipa Creek contributed to studies at the University of Michigan that culminated in such important work as a key to larval native fishes of the lower Colorado River Basin (Winn and Miller 1954)

and Robert R. Miller's seminal 1961 paper on the human-caused changes to the fish fauna of that basin (Miller 1961).

Basic Descriptive Biology

Barber and Minckley (1966) mention work in the 1950's by Charles Lowe and Wallace Heath at the UofA on Aravaipa Creek, with special reference to thermal ecology of fishes. They state that the results of this research are "soon to be published elsewhere." Lowe and Heath produced a paper on thermal tolerances of desert pupfish and a Masters thesis on that subject for Gila topminnow (Heath 1962, Lowe and Heath 1969), but neither of those species were in Aravaipa Creek in the 1950's. There is no indication the Aravaipa work was ever published.

The first identifiable research on Aravaipa Creek was in the 1960's by William Barber and W.L. Minckley at ASU. The sampling for their work can be seen in Tables 6-8 in 1964-1967. That work resulted in the first description of Aravaipa Creek and its native fishes (Barber and Minckley 1966). It also resulted in the first descriptions of the biology of the spikedace and longfin dace and a description of the feeding ecology of spikedace (Barber et al. 1970, Minckley and Barber 1971, Barber and Minckley 1983).

Defining the food type and needs of native fish is important in understanding and conserving those species. Donald Schreiber completed a Masters thesis on the feeding habits of all of the fishes of Aravaipa Creek based on sampling there in 1975-76 (Schreiber 1978). Additional work was conducted by another Minckley student, Robert Clarkson (Clarkson 1982). He concentrated on the two suckers, Sonora and desert, and their hybrids in Aravaipa and Bonita Creeks. Both published their results in conjunction with Minckley (Schreiber and Minckley 1981, Clarkson and Minckley 1988).

Minckley student Dale Bruns described the species, distribution, and variability of aquatic invertebrates in Aravaipa Creek (Bruns 1977, Bruns and Minckley 1980). A student at the UofA also worked on invertebrates in Aravaipa Creek and produced a Masters thesis regarding drift movement (Holanov 1984).

Many other Minckley students also worked on Aravaipa Creek. Darrell Siebert produced a Masters Thesis on movement of fishes in Aravaipa Creek (Siebert 1980). His sampling can be seen in Tables 6 and 8 in 1978-79. He concluded that the larger-bodied fishes of Aravaipa Creek (i.e. Sonora sucker, desert sucker, and roundtail chub) demonstrated predictable movements to occupy Aravaipa Canyon in summer and again to occupy reaches outside of the canyon, both up and downstream, in winter. Spring and autumn were the periods for these migrations. Caryl Williams followed up on this work in 1989-90 in an ASU Masters thesis (Williams 1991a). Her work was initiated in response to concerns over effects of proposed fish barriers on Aravaipa Creek fish movement. Using both her own and Siebert's data, Williams was unable to reveal a seasonal component to the pattern of movement, although larger fish seemed to travel toward the canyon (both from up and downstream) throughout the year. She attributed this to a tendency for the larger fish to seek greater heterogeneity (i.e., deeper, cooler water and greater permanence of

habitat) to be found in that hard-bottomed, constrained area, as opposed to greater variability and less heterogeneity in the more alluvial reaches up and downstream.

Working on lower Colorado River basin fishes, Mbida Mpoame completed a PhD Dissertation on fish parasites (Mpoame 1981). He published a subset of these data from Aravaipa Creek, identifying ten parasitic species in seven fish species (Mpoame 1982), as well as more broadly based work (Mpoame and Rinne 1983).

William Kepner worked in Aravaipa Creek to define the reproductive biology of longfin dace, a common Aravaipa species (Kepner 1982). He found that longfin dace are capable of spawning on a year-long basis, but the peak reproductive activity occurs in spring and late summer. His sampling activity can be seen in Tables 6 and 8 in 1978.

An example of the benefits of frequent, regular sampling is illustrated by a serendipitous discovery during the October Fish Count at Aravaipa Creek in 1988. Two loach minnow nests were found in a stream reach temporarily dried by an irrigation diversion. This is the first, and to date only, documentation of autumn spawning in the wild by loach minnow (Vives and Minckley 1990).

Research is currently underway on thermal tolerances of spikedace and loach minnow, using fish from Aravaipa Creek and elsewhere. This work is being conducted at the UofA Cooperative Fish and Wildlife Research Unit by students Cori Carveth and Ann Widmer.

Habitat Relationships

As early as the 1970's, the information gathered in Aravaipa Creek was used to elucidate relationships between fishes and their habitats (Deacon and Minckley 1974). This became the focus of more of the Aravaipa Creek research in the 1980's, reflecting increasing knowledge and concern regarding the status of native fishes and effects of human activities. Work oriented toward describing the habitats used by these fishes resulted in several publications on habitat of spikedace and loach minnow in Aravaipa Creek (Rinne 1985, Rinne and Kroeger 1988, Rinne 1989, Rinne 1991, Rinne 1992). Sampling events for these data can be seen on Table 8 in 1982-85. In another habitat-related study, Aravaipa Creek and its relatively intact native riparian vegetation furnished information used to examine the historical role of large woody debris in low desert streams (Minckley and Rinne 1985).

Other studies examined the role of flooding and natural hydrograph retention in the persistence and stability of fishes in Aravaipa Creek and its role in native-nonnative interactions (Meffe and Minckley 1987, Minckley and Meffe 1987). These studies provided a basis for the understanding that although flooding is not a solution to nonnative fish invasion, there are differing responses to flooding by natives and nonnatives. Flooding may result in depression of some nonnative populations. This work helped illuminate the importance of natural, free-flowing hydrographs to the conservation of native fishes.

The relationship between hydrology and fish populations was the subject of a Masters study by Tony Velasco at ASU (Velasco 1997). He used the ASU long-term monitoring data set, along with the monthly monitoring during the 1991-92 period to analyze the relationship between variance in stream discharge and fish populations. Velasco found that habitat heterogeneity in Aravaipa Creek is maintained by the annual cycles of discharge variance (i.e. magnitude, duration and frequency of flood events) and that short-lived species in Aravaipa Creek (i.e., spikedace, loach minnow, speckled dace, and longfin dace) have strong positive responses to flooding.

Nonnative Invasions

The adverse effects of nonnative fishes on native fishes began to get serious recognition in the late 1980's. One of the first studies attempted to determine relationships between red shiner and spikedace and loach minnow (Marsh et al. 1989). Aravaipa Creek had not yet been invaded by red shiner and was one of the control streams. Although this study did not provide definitive results regarding the mechanism of red shiner displacement of spikedace, it yielded substantial theoretical insights that have been valuable to management (Douglas et al. 1994). To better define red shiner and spikedace interactions, Francisco Abarca, an ASU student, completed a Masters thesis on potential competitive overlap in food between the two species (Abarca 1989). Again Aravaipa Creek served as a control, and food overlap was found to be low.

The potential for red shiner or other novel nonnative fish invasion of Aravaipa Creek came up in the late 1980's in the context of the Central Arizona Project, a interbasin water transfer bringing Colorado River water into the central Gila River basin. The CAP canal interfaces with the Gila River and several interconnected canals downstream of Aravaipa Creek raising concerns about possible species transference. The USBR commissioned a study of five possible fish species whose potential spread into Aravaipa Creek might be encouraged by CAP (Matter 1991). Although that study did not find much basis for concern, additional analysis by the FWS concluded substantial basis for concern (U.S.Fish and Wildlife Service 1994, U.S.Fish and Wildlife Service 2001a, U.S.Fish and Wildlife Service 2001b).

Formulation of possible management to exclude or reduce nonnative species in Aravaipa Creek led to other studies. Three were related to the construction of fish barriers on the lower reach (see later section on conservation actions). William's fish movement study has already been mentioned. A review of the swimming ability of potential Aravaipa Creek non-native fish invaders was conducted to assess their ability to overcome a barrier (Bagley and Marsh 1995). A third study, conducted by ASU student Rachael Remington, was commissioned to define concerns about loss of drifting larval fish over the barrier. Her sampling efforts are seen on Table 6 in March and April 2000. She found little basis for concern, with larval drift at the barrier sites low compared to upstream collections and indications that larvae drift only short distances (Remington 2002).

Human Perturbations

As the problems of past and potential future human changes to the Aravaipa Canyon environment gained greater recognition and definition, studies were initiated to deal with specific issues.

Concerns about surface and ground-water pollution from mine wastes along the banks of Aravaipa Creek near Klondyke resulted in some studies. The tailings remain from lead, zinc, copper and gold mines that operated in the area from the late 1800's to the 1950's (Minckley 1981, Hadley et al. 1991). Efforts to assess and remediate this problem began in 1992, but no action has yet been taken. Various reports and assessments have been prepared by the Arizona Department of Environmental Quality, but did not include fish sampling data, so are not discussed here.

In October 1997, the FWS sampled fish in upper Aravaipa Creek and found high levels of arsenic and cadmium (King and Martinez 1998). They also found contamination in all 14 fish samples of desert and Sonora sucker and yellow bullhead from TNC property on upper Aravaipa Creek. Lead concentrations in all but one of these samples exceeded the National Contaminant Biomonitoring Program 85th percentile. However, these samples were muscle tissue that has a low bioaccumulation rate and potentially toxic lead levels in whole body fish are unknown. While they conclude that lead is unlikely to be affecting fish health and reproduction, further analysis of liver and kidney tissues are suggested.

Morphin et al. (2003) use ratios of lead isotopes (Pb206, Pb207, and Pb208) to identify sources of lead contamination from the Aravaipa watershed. Each mine tailings has a unique isotopic signature and that signature from the Klondyke mine tailings most closely matches those found in Aravaipa Creek stream sediments. However, recent analyses (Reinthal et al. unpub. data) of lead in fish livers from the TNC property on upper Aravaipa Creek indicate levels in certain species (highest in Sonora sucker) that would result in reproductive failure (levels greater than 50 mg/g lead in liver). Furthermore, signatures of isotopic ratios in fish livers link contamination to the Grand Reef/Laurel Canyon mines rather than the previously implicated Klondyke mines. This indicates that lead may be entering the Aravaipa Creek food web by methods of deposition other than runoff from the Klondyke mines.

Concerns regarding effects of surface and groundwater manipulations by humans on Aravaipa Creek and its fishes have resulted in studies to determine the amount and source of water. Some are part of larger attempts to describe Arizona's water resources, such as a map of ground water conditions (Gould and Wilson 1976), or the long-term discharge measurement gauges of the U.S. Geological Survey (USGS). In the late 1970's The Defenders of Wildlife, having recently acquired substantial holdings along Aravaipa Creek, initiated inquiries into the nature of the water supplies and the effects of diversion and groundwater pumping on future stream flows. Charles Ellingson (1980) completed a Masters thesis at the UofA concluding that surface flow in Aravaipa Creek resulted from groundwater forced to the surface by bedrock constriction and that recharge of the aquifer was equal to discharge, so that no diminution of stream flow should be

expected under conditions current at the time. In 1984-88, Eilon Adar at the UofA worked on groundwater issues in Aravaipa Creek and discusses the potential for changes in streamflow based on groundwater pumping (Adar 1984, 1985, Adar et al. 1988).

Other aspects of hydrology also have been studied. Moderate to extreme floods tend to receive inordinate attention due to the damage they may cause to human interests in the canyon, but they are also important factors in determining the availability and distribution of habitat used by fishes within a stream. As noted earlier, studies have shown they may play an important role in the native/nonnative fish composition. The 1983 flood in Aravaipa Creek is the largest on record, but there is disagreement over the peak flow of that event. The flood demolished the USGS gauging station so the peak flow has been estimated based on other methods. While USGS estimates 70,800 cfs, an analysis using alternative modeling estimates between 17,600 and 23,000 cfs (Fuller and Roberts 1987). The same work at the UofA also reconstructed paleohydrological flood events of Aravaipa Creek (Roberts 1987).

Moderate level flows are the prime determiners of the shape of the stream channel. Aravaipa Creek was included in a study to determine return intervals for bankfull flows in streams of southern and central Arizona (Moody et al. 1998, Moody 1999).

More legalistic aspects of streamflow resulted in two studies that attempted to predict fish responses to altered flows and thereby support establishment of minimum instream flow recommendations. The first of these was conducted for FWS by Paul Turner and Robert Tafanelli of New Mexico State University in the upper reach of Aravaipa Creek (Turner and Tafanelli 1983). This sampling can be seen in Table 8 in May 1980 and March, July, and August 1981. The second, conducted for TNC by Thomas Hardy used fish data from the earlier study (Hardy et al. 1990). In contrast to studies to identify minimum stream flows required for native fish, a study on the effects of altered flows on recreational use in Aravaipa Canyon identified differing needs (Moore et al. 1990). Although not directly related to fish, 33.6% of the study's survey respondents identified observation and identification of fish as a strongly desired attribute of the Aravaipa Creek experience.

A variety of BLM and TNC documents exist regarding amounts and timing of stream flow, which were used in efforts to obtain instream flow water rights in Aravaipa Creek. These will not be addressed here.

Beginning in the 1960's, concerns arose about changes in the stream channel in upper Aravaipa Creek. Minckley believed that channelization in the upper reach had created an ongoing incision process (Barber and Minckley 1966, Desert Fishes Recovery Team 1990). In addition, plans for fish barriers on the lower end raised hydrological and geomorphological questions. As a result, the FWS prepared a report summarizing information on Aravaipa Creek hydrology (Cullinan 1990). In a further attempt to define hydrologic and geomorphologic conditions at Aravaipa Creek, the FWS and BR funded, through the Central Arizona Project native fish recovery program, an evaluation of trends in surface water, groundwater, and channel geomorphology (JE Fuller Hydrology and Geomorphology 2000). The report concludes that wet conditions over the

previous 21 years resulted in increased surface flow in the 1990's, that groundwater conditions were in a nearly steady-state condition, immediate threats to water supplies were low, and there was no indication of a trend of change in channel geomorphology.

Taxonomy and Genetics

Taxonomic and genetics studies using fishes from Aravaipa Creek have occurred over many years. The first are undoubtedly various works at the University of Michigan, and fishes from Aravaipa Creek figured prominently in taxonomic works at ASU over the years. The first work identifable as Aravaipa-related was by John Rinne in 1969 on the genus *Gila* as a Masters thesis at ASU (Rinne 1969, Rinne 1976). As with most taxonomic and genetic work, it is not possible to identify specific sampling events in Aravaipa Creek. Taxonomists and geneticists have deposited museum specimens from Aravaipa Creek, but their work also relies heavily on existing museum material and live specimens are often taken only in one or two brief sampling events that are too minor to be documented in their description of methods.

In 1986, another Minckley student took up the complex taxonomic questions of the genus *Gila* and allied species. Bruce DeMarais completed both a Masters and PhD at ASU on this issue (DeMarais 1986, DeMarais 1992). Although materials used spanned a large geographic range, DeMarais sampled *Gila robusta* in Aravaipa Creek. This work has resulted in contributions to the wider understanding of the role of introgressive hybridization in evolution of certain fishes (Dowling and DeMarais 1993). It also contributed to the redefinition of species within the *Gila robusta* complex (Minckley and DeMarais 2000).

The morphology and classification of longfin dace was the subject of a PhD Dissertation by Minckley student Dean Hendrickson (Hendrickson 1987a). His study was range-wide and found that two distinct morphological forms existed, one in the Gila, Bill Williams, Sonoyta, and de la Concepcion River basins, including Aravaipa Creek, and another in the Willcox Playa, Rio Yaqui, Fuerte, Maya, and Sinaloa basins. Later, he and a colleague examined morphologic variation in spikedace within the Gila River basin, where it is endemic (Anderson and Hendrickson 1994). They found that there was significant differences between the four remnant populations of spikedace, with Aravaipa Creek and the Verde River at the extremes and Eagle Creek and the upper Gila River (NM) intermediate.

In 1993, Alana Tibbets completed a Masters thesis at ASU on genetics of spikedace, loach minnow, and longfin dace (Tibbets 1993). Aravaipa Creek was the most divergent of the upper Gila River samples for all three species (Tibbets and Dowling 1996). She followed this up with a PhD Dissertation on longfin dace genetics and evolution (Tibbets 1998). Her conclusions support those of Hendrickson and Anderson, indicating a substantial degree of separation between populations within the Gila River basin (including Aravaipa Creek) in spikedace and loach minnow, and to a lesser, and different, degree longfin dace. She concludes that spikedace and loach minnow populations represent evolutionarily independent lineages, which argues for increased attention to, and protection of, Aravaipa Creek.

It is anticipated that the fishes from Aravaipa Creek will be an important genetic reservoir as populations around Arizona and the Gila River basin are disappearing with alarming regularity. The taxonomic work on Aravaipa Creek fishes will help define that importance and how it can be used in conservation of those species.

Status Reviews of Fish Species

Information from Aravaipa Creek has been included in several status reviews for native Gila River basin fishes. In preparation for proposed Federal listing, status reviews were conducted for spikedace and loach minnow (Stefferud 1983a, Stefferud 1983b). Roundtail and headwater chub distribution, abundance, and threats to them were assessed by Voeltz (2002) under funding by the joint USBR/FWS Central Arizona Project Nonnative Management and Native Fish Recovery Programs. Reports on status of Aravaipa fishes were also made at several meetings of the Desert Fishes Council, a professional society dedicated to conservation of fishes of arid lands. In 1973, (LaBounty 1973) reported on the status of spikedace and loach minnow and noted that loach minnow was "not abundant" in Aravaipa Creek in fall 1972. He also reported that spikedace had not been collected in Aravaipa Creek since 1963, but this was in error, as Minckley collected it there in 1965-69, 1970, and 1972-73. The same year, McNatt (1973) reported that loach minnow numbers were down and that all seven species have shown "extreme fluctuations over a 13-year period of study." McNatt was an ASU student and was presumably basing his conclusion on the long-term ASU monitoring data.

By 1978, Minckley reported to Desert Fishes Council for Aravaipa Creek that "native fish in that stream are in excellent condition, despite low discharges, with *Meda fulgida* (surprisingly) being the most abundant species in many habitats" (Minckley 1977). But by 1998, it was reported that red shiner were again present and that yellow bullhead and green sunfish were established and increasing (Stefferud et al. 1998).

Conservation Action Investigations

Conservation actions to protect and recover native fishes raise questions that may not be answerable by basic research. Applied research studies with a species-wide focus, but addressing Aravaipa Creek as one component, have been conducted for several native fishes. The need for holding native fish in captivity for refuge and repatriation stock, has long been recognized (Desert Fishes Recovery Team 1990). In 1993, the FWS funded a study of spikedace and loach minnow artificial propagation (Vives 1995). Fish for that work were taken from Aravaipa Creek (Arizona Game and Fish Department 1995). Unfortunately, the effort was unsuccessful in getting either species to breed in captivity. Loach minnow from Aravaipa Creek were the subject of a captive propagation study by AGFD, funded through the joint USBR/FWS Central Arizona Project Nonnative Management and Native Fish Recovery Program (Childs 2004). This project succeeded in breeding both loach minnow and speckled dace, although there are unsolved problems in long-term holding and maintenance of populations. A similar project for spikedace was conducted at the University of New Mexico, but worked with fish from the upper Gila River (Parmenter and Platania 2004).

Community Composition and Ecological Theory

One of the benefits of long-term data on a single system, such as Aravaipa Creek, is that as the basic biological data accumulates it lends itself to syntheses that address larger ecological issues with application beyond the local system. Tibbets and Dowling (1996) used genetic data on spikedace, loach minnow, longfin dace, including data from Aravaipa Creek, to examine the question of effects of habitat fragmentation. The long-term data set from Aravaipa Creek has been subjected to extensive analysis directed at understanding the inherent variability of the system in order to increase the ability to detect and predict response to human and natural disturbances (Velasco 1997, Eby et al. 2003). These will be discussed in the following section summarizing monitoring and sampling conclusions and benefits.

SUMMARY OF THE MONITORING EFFORT AND ITS RESULTS

Although sampling in Aravaipa Creek occurred sporadically through the 1940's and 50's, the "modern" period of Aravaipa Creek sampling, and the long-term monitoring data set, began in the early 1960's. Following the lead of Minckley, we use 1964 through the present (2004). Data used are found in Appendix 2.

In a "normal" year, there are 5 months during which at least one sampling of Aravaipa Creek fishes occurs (mode number of months per year with sampling events). That reflects all sampling events, for whatever purpose and by a variety of collectors. However, intensity of sampling efforts varies greatly year to year, from no sampling to sampling year-round. The range in number of sampling events per year is 0-17, with an average of 6.5 and a mode of 6. This variation reflects initiation and completion of specific studies and the intense monitoring in the early 1990's in response to red shiner invasion. Figure 6 illustrates how sampling varies over time.

Three periods of heavy sampling have occurred. The first was in the 1960's, from the Barber and Minckley studies. The second occurred in the late 1970's and early 80's, and was the work of several Minckley students, including Kepner and Siebert. The third spanned from 1989 to 1993, and had two components; Williams' sampling in 1989-90, and the monthly monitoring of 1991-93. Except for 2002, when Carveth and Widmer's UofA work increased sampling intensity, the 1994 to present period has seen below average sampling intensity in Aravaipa Creek. That reflects the lack of specific studies as well as the reduction in monitoring.

Monitoring is a subset of the total sampling and makes up 48% of the fish sampling events in Aravaipa Creek. While less variable than total sampling, monitoring also has substantial variability (see Figure 7), with an average of 3.1 monitoring events per year, a mode of 3, and a range of 0-11. Because a monthly basis is used to enumerate sampling events, this analysis slightly overestimates the number of monitoring events. In some years the reaches were sampled during different months (i.e. upper reach in October and lower reach in November) resulting in them being counted as two events. Nevertheless, the pattern is clear. In the late 1960's,

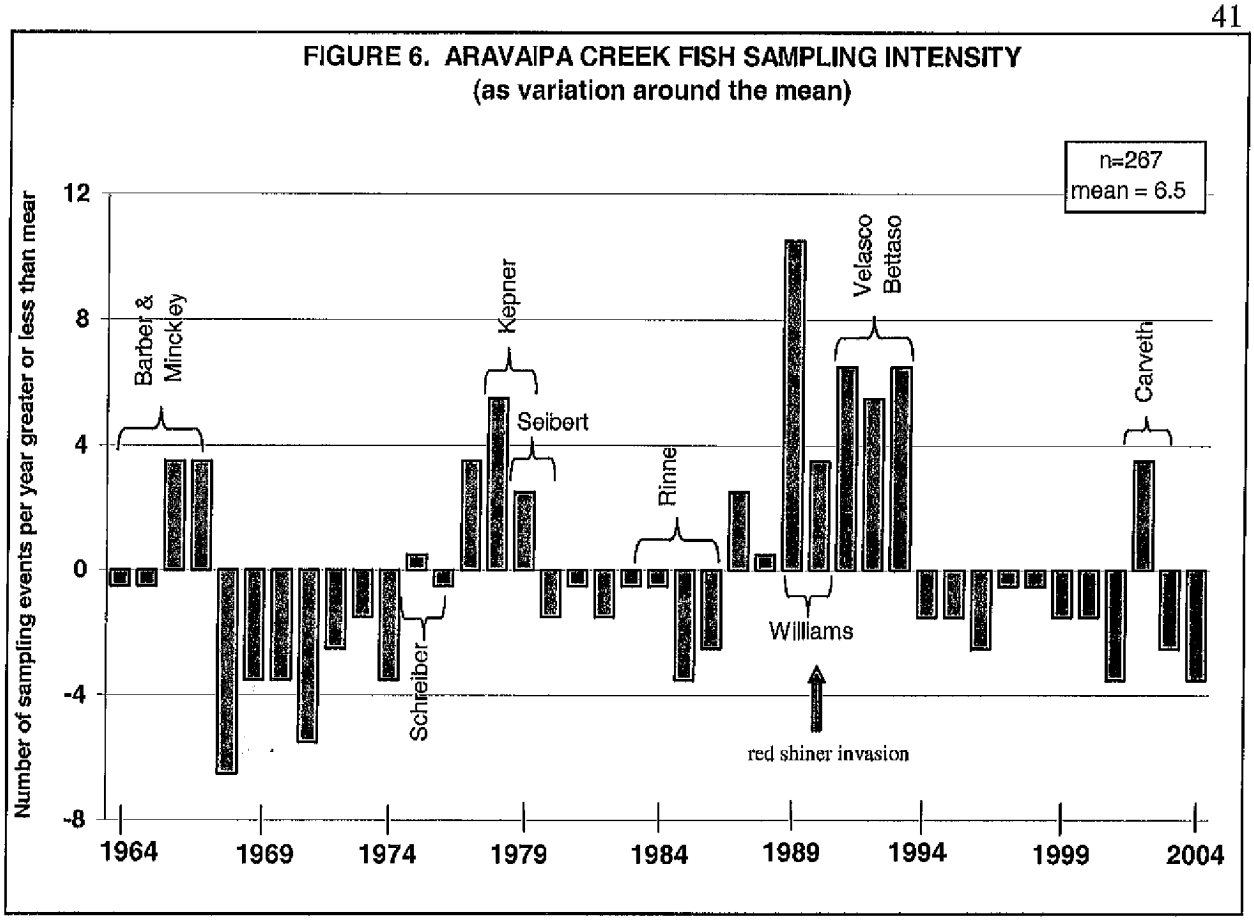
FIGURE 6. ARAVAIPA CREEK FISH SAMPLING INTENSITY
(as variation around the mean)
n=267
mean = 6.5
Number of sampling events per year greater or less than mear
12
8
4
0
-4
-8
Barber & Minckley
Kepner
Seibert
Schreiber
Rinne
Williams
Velasco
Bettaso
Carveth
red shiner invasion
1964
1969
1974
1979
1984
1989
1994
1999
2004

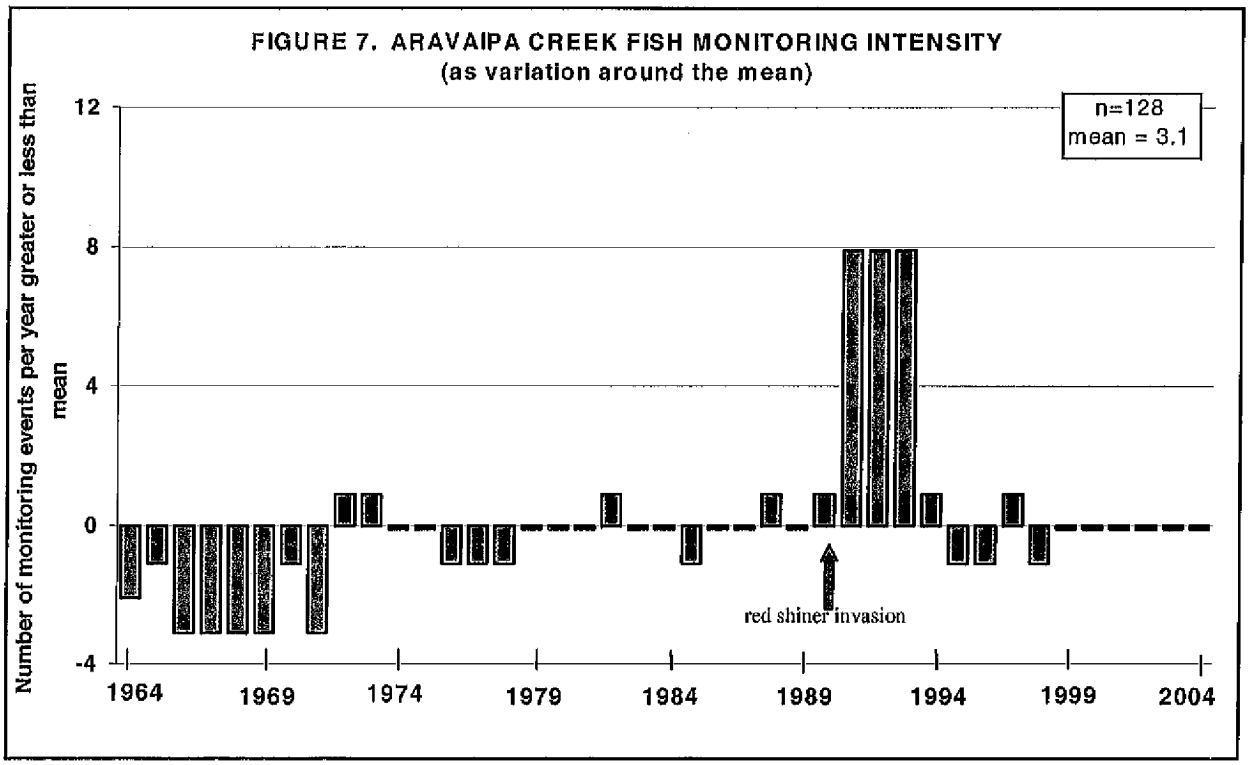
FIGURE 7. ARAVAIPA CREEK FISH MONITORING INTENSITY
(as variation around the mean)
n=128
mean = 3.1
Number of monitoring events per year greater or less than mean
12
8
4
0
-4
red shiner invasion
1964
1969
1974
1979
1984
1989
1994
1999
2004

monitoring was sporadic, with no sampling specifically for monitoring during 1966-69. From 1970 to 1990, with the exception of 1971, all years had a minimum of 2 sampling events (the spring and autumn ASU long-term data collection) and a maximum of 4. From 1990 through 1993, monitoring to define the red shiner invasion resulted in 11 sampling events per year. In 1994, the biannual sampling pattern of the ASU effort resumed, continued from 2002 to present by Peter Reinthal at UofA, with a minimum of 2 and a maximum of 4 monitoring events each year.

What has 40 years of fish monitoring in Aravaipa Creek told us? At the most basic level it has given us two very important pieces of information. First, that the native fish in Aravaipa Creek generally have continued to persist in relatively substantial numbers, and second, that nonnative fish have slowly, but steadily, continued to gain ground.

The first piece of information could be seen by some as an indication that the monitoring is a waste of effort because it in essence shows that *nothing* has happened (i.e. the native fish are still doing well). It is human nature to want monitoring to show that *something* is happening. However, given that trends in native fish in the Gila River basin are downward in almost every other location (Desert Fishes Team 2003, Desert Fishes Team 2004), a monitoring outcome that demonstrates a different situation in Aravaipa Creek is not only worthwhile, but provides invaluable scientific information for management of Aravaipa Creek and conservation of native fishes throughout their range. It indicates that the human caused changes and the variation in climate and hydrology experienced in Aravaipa Creek over the past century, have not yet been of sufficient influence to cause the substantial declines of native fishes seen elsewhere. This does not mean that finer-scale changes in the fish community have not occurred nor that the status quo will be maintained in the future.

The second piece of information provides warning of an increasingly ominous situation. Additional nonnative species have become established and nonnatives are more common in samples, with numbers and range creeping upward. This, Minckley believed, is an indication of undetected ecological change that has tipped the balance, allowing the non-natives that have been available nearby for decades to finally colonize Aravaipa Creek. This may represent the same type of time-lagged invasion as recently described between the Gila River basin as a whole and the adjacent Rio Yaqui basin (Unmack and Fagan 2004). The knowledge that nonnative species are expanding in Aravaipa Creek has led to several management actions to control such expansions (see history of conservation actions).

Basic conclusions such as those above, can be drawn from Aravaipa Creek monitoring data on a gross scale, however, more in-depth analyses are needed to identify finer-scale changes. The ongoing monitoring program provides opportunity to continue to refine the fine-scale analysis., and allows for standardization of techniques to obtain comparable data and avoid a haphazard approach.

In 1981, Minckley had 15 years of monitoring data and experience with fishes of Aravaipa Creek. Based on that, and historic sampling information, he concluded that "patterns of

abundance of fishes within the stream have been remarkably consistent since the 1940's," with longfin dace most abundant in the lower reach, speckled dace most abundant in the upper reach and rare in the lower, loach minnow common in the upper reach, and the remaining four species (Sonora sucker, desert sucker, roundtail chub, and spikedace) most abundant within the gorge, but also common downstream. He also found that although biomass of fishes in Aravaipa Creek is "spectacularly high at some times of year" there was substantial variability between stream segments and over time. He also found that no nonnative fishes had yet established reproducing populations within the creek itself.

By 2001, Minckley had 37 years of data and experience on fishes of Aravaipa Creek, from which he made a number of conclusions in an unpublished manuscript he was working on just before his death (Minckley 2001). He found that patterns of increased red shiner presence are associated with low relative abundance of spikedace and desert sucker in the lower reach of Aravaipa Creek. Analysis of responses to flooding showed upward population responses in short-lived fish species, with the 1983 flood increasing average relative abundance of spikedace by a factor of 10. Conversely, periods of low flows decreased relative abundance of spikedace. Relative abundance of speckled dace also increased in response to flooding, while there was a decrease in loach minnow. Abundance of spikedace and longfin dace were inversely correlated. The three longer-lived species showed only negligible shifts in relative abundance.

Velasco (1997) used Minckley's long-term monitoring data (1964-1990) to examine patterns of variation within native fish populations of Aravaipa Creek, particularly in relation to variation in streamflow (discharge). He supplemented this with additional monitoring during 1991-93 to serve two purposes; providing data for his study, and monthly monitoring of Aravaipa Creek fishes during initial years of red shiner invasion. He concluded that much of the variation seen in the long-term data set was explained by variation in spatial distribution of habitat, which was, in turn, explained by variation in stream discharge. He reported no long-term trends, either up or down, in native fish populations in Aravaipa Creek. Short-term trends were noted in some species, with strong positive responses to flooding in short-lived species.

Velasco's findings led him to believe that the remarkably large fish biomass supported by Aravaipa Creek (Minckley 1981), is probably a result of the high level of habitat heterogeneity, which in turn is created by the highly variable, and unregulated, stream discharge hydrograph. He concludes that naturally-occurring disturbance patterns are a driving element of the Aravaipa Creek ecosystem. Because human activities (water diversion, channelization, etc.) tend to alter natural disturbance patterns and increase hydrographic and habitat homogeneity, Velasco concluded that the influence of ongoing human activities on Aravaipa Creek should be of concern.

A wider focus and more comprehensive analysis of the long-term data set was applied by Eby et al. (2003). Their analysis was based on the monitoring over 30 years in the canyon reach (1970-2000) and 25 years in the lower and upper reaches (1975-2000). Of the changes detected in the Aravaipa Creek fish community, one of the most striking is the decline in species richness in the lower reach in recent years. This is due to increasing rarity of spikedace in this reach and a

corresponding increase in nonnative fish. However, the lower reach does not show a long-term directional trend, but rather cyclical fluctuation, with the native fish community in the 1990's becoming similar to that of the 1970's, with a high abundance of longfin dace and lowered occurrence of spikedace. In contrast, they found long-term trends in the canyon and upper reaches. The upper reach had the greatest change, while the canyon reach had slightly less. These changes included a shift from dominance by longfin dace with few spikedace, to a more evenly distributed species group.

These changes led Eby et al. to conclude that variability of fish populations in Aravaipa Creek is influenced by different factors during different periods. Alterations in base flow during the early 1980's were a strong influence on the Aravaipa Creek fish community, but more recent changes are more likely associated with the presence of nonnative fishes. Like Velasco, they also speculate that changes in stream channel, hydrology, and climate patterns may have decreased the variability of flow and thereby decreased habitat heterogeneity. This, together with an increase in the downstream connection with the San Pedro River, may have increased likelihood of nonnative fish establishment. In years of high flow variability, nonnatives decreased as a proportion of the fish community, while increasing in years of low flow variability.

Of particular importance to management is the conclusion by Eby et al. that the deviation of the changes in lower reach community composition from those of the upper and canyon reaches, indicates that the driving factor in the lower reach is presently different from that of the canyon and upper reaches. Earlier changes had been similar among reaches. This means that management strategies for the lower reach need to be different from those in the upper two reaches. The point of divergence of the lower from the canyon and upper reaches is 1990, the year with the highest proportion of nonnative species and of the first appearance of red shiner. Based on this finding, control and removal of nonnatives and alteration of the habitat factors that promote their increase should be the highest priority for management in the lower reach.

Eby et al. and Velasco both pointed out the importance of habitat heterogeneity and naturally-occurring disturbance patterns in maintenance of the Aravaipa Creek native fish community and depression of non-native fish abundance. During the present period of major drought, the lack of large flood events decreases habitat heterogeneity thus fostering declines in native fish abundance while at the same time lessening controls on nonnative fish abundance. This may be a critical period for Aravaipa Creek native fish. While there is nothing management can do to alleviate the drought and lack of flooding, conclusions from monitoring data point to the need to halt or reverse human activities that result in loss of habitat heterogeneity (such as channelization, streambank alteration, input of fine sediment, etc.) while taking strong measures to control or remove nonnatives now present and prevent invasions by any novel nonnative species.

HISTORY OF CONSERVATION AND MANAGEMENT ACTIONS RELATING TO NATIVE FISH

Aravaipa Creek has been the beneficiary of many and varied conservation actions, a substantial portion of which are related to the stream and its fishes. Conservation of stream ecosystems is particularly difficult because a stream is a product of its watershed and on-site conservation measures can be easily overwhelmed or negated by activities or conditions in the watershed, particularly upstream. As a result, standard conservation methods, such as acquiring and protecting parcels of real estate, are not necessarily successful at protecting and enhancing stream ecosystems and their fishes. Fortunately watershed perturbation and human uses upstream of the TNC preserve and BLM Wilderness are, at least at present, relatively moderate. Many past uses (e.g. mining) that had substantial effects downstream, are now absent. This has allowed on-site conservation to benefit the aquatic ecosystem. This may not remain the situation, as upstream and downstream uses are changing (e.g. increasing subdivision of agricultural lands) and could affect basic preserve characteristics such as streamflow (e.g. upstream groundwater pumping).

Conservation actions in Aravaipa Canyon benefiting native fish fall into several broad categories.

Research and Monitoring

Conservation and management of native fishes in Aravaipa Creek began with research sampling that identified the stream as supporting an important native fish community. When local residents, environmental organizations, and the BLM began to seriously move toward protection of Aravaipa Canyon in the 1970's, already substantial knowledge of the fish community was an important part of their belief that the Canyon was deserving of protection efforts.

Long-term monitoring of native fishes, as well as short-term efforts aimed at specific issues such as red shiner invasion or fish barriers, have given us an understanding of the native fish community of Aravaipa Creek that is exceptional in the southwest. No equivalent data exist for any other fish communities in the Gila River basin. This information has informed and guided all conservation actions in the canyon.

Land Acquisition and Management for Conservation Purposes

Hadley et al. (1991) describe early conservation efforts based primarily on scenic resources and recreational use. As early as the 1940's there were calls for a preserve of some sort at Aravaipa Canyon. These concerns helped turn back U.S. Army Corps of Engineers proposals to construct several dams on the stream. Efforts to designate the area a National Park did not succeed.

A proposal for a dude ranch, complete with dams to create trout fishing waters, was thwarted in 1951 by purchase of the Wagner Ranch at the downstream canyon mouth by a conservation

oriented buyer. His efforts to control hunting, fishing, and access were aimed at conservation of Aravaipa Canyon.

In 1970, TNC made their first purchase of land within Aravaipa Canyon, in the west end. In 1972, DOW purchased land on the east end and over the next two decades substantial lands on the east and west ends were acquired, now totaling 7,000 acres (http://nature.org/wherewework/northamerica/states/arizona/preserves). DOW managed their lands and those of TNC as the George Whittell Wildlife Preserve at Aravaipa Canyon until 1988, when TNC took over management, which they continue to the present. In addition, TNC has acted as intermediary in the sale of additional lands to conservation-minded buyers, with TNC holding conservation easements. While land acquisition and management has been the primary contribution of DOW and TNC to conservation in Aravaipa Canyon, they have also conducted educational and collaborative efforts with local landowners and assisted and supported research, protection and recovery for native fish.

In 1969, BLM designated the Aravaipa Primitive Area, which encompassed the core canyon of Aravaipa Creek. The Primitive Area was expanded and formally designated as Wilderness in 1984. It includes 19,410 acres and approximately 11 miles of Aravaipa Creek. In 1986, BLM acquired extensive areas of the watershed on the north and south tablelands.

Land acquisition within Aravaipa Canyon has been driven primarily by aesthetics, recreation, and terrestrial wildlife. In many preserves, lack of information and inherent lack of visibility often result in disinterest and indifferent management for fish, unless they are of value for sport fishing. Thanks to the extensive information being gathered on Aravaipa Creek fishes, the charismatic presence of Dr. W.L. Minckley, and perceptive staff at DOW and TNC, management of preserve lands on Aravaipa Creek have always had a strong orientation toward protection and recovery of native fishes (Williams 1991b).

Management of Land Uses to Ameliorate Adverse Impacts

A century of European settlement of the valleys and canyon of Aravaipa Creek resulted in many land uses with ongoing adverse impacts to the stream and its fishes. As part of conservation activities associated with the DOW and TNC preserve and BLM Wilderness, actions were taken to scale back or alter such activities and to prevent additional adverse activities.

Efforts to prevent damming of Aravaipa Creek and development of a nonnative trout fishery were mentioned above. Hunting, trapping, and predator removal were prohibited on DOW/TNC preserve lands. While this had little effect on the native fish, it denoted a tone of natural ecosystem restoration and management that was conducive to native fish conservation. Livestock grazing was removed from the BLM Wilderness and from most of the DOW/TNC preserve lands, although the extent and intent of this has varied over time. Irrigated agriculture has been substantially scaled back, along with diversion of stream waters.

Roads, which in early years often followed or used the creek bed, had a significant impact on the stream and its fishes. Over the past 40 years, numerous efforts were made to improve roads, reduce their contribution to sediment and erosion, close portions, and reroute portions out of the riparian zone. These access improvements have often benefited fishes. Some efforts to remove localized road impacts have occurred specifically as conservation measures for native fish, such as bridge installation on the west end near the base of Brandenburg Mountain to replace a road section based on fill blasted from an adjacent cliff. Fill erosion during high flood events created up and downstream channel changes and required repeated reconstruction using heavy machinery in the channel. Adverse road impacts still exist on the stream and fish, particularly on the east end where multiple unprotected stream crossings exist (USFWS 1993, 1996).

Some conservation actions may also increase possible recreational impacts to native fish, although educational benefits may be gained. The DOW/TNC preserves and BLM Wilderness enhanced the growing reputation of Aravaipa Canyon as a scenic wonder and desirable camping and hiking spot. Bank compaction, riparian vegetation destruction, informal road and trail development, and pollution have been noted in areas as a result of recreational use in certain areas (USBR 1998). To minimize impacts in the canyon, BLM issues permits to 50 people per day to hike through the Aravaipa Wilderness, with a 3 day limit on stay (https://www.az.blm.gov/sfo/aravaipa). Management of recreational impacts on BLM and TNC lands are ongoing, and include parking areas, signs, restrooms, etc. Uncontrolled recreation on unfenced areas of the San Carlos Apache lands is an increasing concern.

Formal Federal and State Listing and Protection of Fishes

When protective efforts began in Aravaipa Canyon, none of its native fish were protected by Federal law, and only minimally by State law. By 1982, roundtail chub, spikedace, and loach minnow were listed by the State of Arizona as "species whose continued presence in Arizona could be in jeopardy in the foreseeable future" (Arizona Game and Fish Commission 1982). No habitat protection was provided, but regulations prohibited take of the species. In 1994, the Arizona Game and Fish Commission made roundtail chub a sport species and established angling regulations for its take. This was intended to increase public support for conservation of that species, allow use of sportfishing funds for its management, and preclude Federal listing of the species (Arizona Game and Fish Department 2002).

In 1985, Desert Fishes Council and American Fisheries Society petitioned for Federal listing of spikedace, and in 1986, spikedace and loach minnow were listed as threatened under the Endangered Species Act. Recovery plans for both were completed in 1991 (Marsh 1991a and 1991b). Aravaipa Creek was proposed as critical habitat for the two species in 1985, but that proposal was not finalized until 1994 (Federal Register 50(117):25380-25398 and 59(45):10898-10915). Following overturn of the 1994 designation by the courts, Aravaipa Creek was again designated critical habitat for both species in 2000 (Federal Register 65(80):24328-24372). That designation has again been overturned by the courts. Although efforts at obtaining Federal habitat protection for spikedace and loach minnow in Aravaipa Creek have been unsuccessful, it is clear the stream is considered highly important for conservation of the two species.

Roundtail chub was petitioned for Federal listing as endangered in 2003, however the FWS has indicated it will not evaluate that petition or provide protection to roundtail chub in the near future (U.S.Fish and Wildlife Service 2003).

State and Federal listing of three of the seven native fishes of Aravaipa Creek has not directly contributed to conservation of Aravaipa Canyon., but has enhanced awareness of native fish by Federal and private management entities and contributed to their willingness to take conservation actions. In addition, through section 7 of the Endangered Species Act, modification and mitigation of human actions with adverse effects on the fishes has occurred. To date, there have been five formal and five informal consultations on Federal actions in Aravaipa Canyon that would affect spikedace and loach minnow (see Table 12). Two others, of large scope, have addressed fish barriers in Aravaipa Canyon.

TABLE 12
ARAVAIPA CREEK SECTION 7 (ESA) CONSULTATION HISTORY

DATE	ACTIVITY	BIOLOGICAL OPINION FINDING	FEDERAL AGENCY	CONSULTATION NUMBER (FWS)
July 10, 1987	Eradication of exotic fish in Aravaipa watershed	beneficial effect	BLM	2-21-87-I-88
October 20, 1993	Flood control & repair (rip-rap) at White's house	non-jeopardy	NRCS	2-21-93-F-140
October 20, 1993	Flood control and repair (rip-rap) at TNC house (upper reach)	non-jeopardy	NRCS	2-21-93-F-166
April 20, 1994	Transportation & delivery of Central AZ Project water to the Gila River basin in AZ and NM	jeopardy	USBR	2-21-90-F-119
January 17, 1995	Fencing for riparian enhancement at Barassi property by Partner's for Wildlife Program	not likely to adversely affect	FWS	2-21-95-I-110
February 15, 1995	Aravaipa Creek road repair	non-jeopardy	FEMA & BLM	2-21-94-F-090
October 3, 1995	Fencing for riparian enhancement at Gorman-Hedrick property by Partner's for Wildlife Prog.	not likely to adversely affect	FWS	2-21-95-I-535
November 7, 1996	Road repair and bridge placement on lower Aravaipa Creek	non-jeopardy	FEMA & BLM	2-21-94-F-090
July 31, 1998	Temporary barrier on upper Aravaipa Creek, Partner's for Wildlife funding to TNC	non-jeopardy	FWS	2-22-98-F-347
March 9, 1999	Prescribed fire in Aravaipa watershed	not likely to adversely affect	BLM	2–21-99-I-143
April 17, 2001	Transportation & delivery of Central AZ Project water to the Gila River basin in AZ and NM	non-jeopardy	USBR	2-21-90-F-119a
December 31, 2001	Informal consultation on the East Aravaipa trailhead, Graham County, AZ	not likely to adversely affect	BLM	2-21-02-I-041

BLM = U.S. Bureau of Land Management
FEMA = Federal Emergency Management Agency
FWS = U.S. Fish and Wildlife Service
NRCS = U.S. Natural Resources Conservation Service
TNC = The Nature Conservancy
USBR = U.S. Bureau of Reclamation

Riparian Vegetation Restoration

Restoration of riparian vegetation in Aravaipa Canyon has been primarily passive. Fencing projects (listed in Table 12), were funded by FWS for private lands to remove livestock grazing and allow riparian vegetation to recover. Removal of livestock grazing from BLM and TNC lands has also allowed riparian vegetation restoration. TNC and others have allowed former fields and pastures to regenerate in natural vegetation. In addition, TNC has done proactive restoration by removal of nonnative vegetation (citrus and tamarisk) on their lands.

Riparian vegetation management also includes the policies of BLM and TNC not to remove downed woody debris and debris windrows from the riparian area. Such removal continues on private lands and along county road easements. Woody debris plays a significant role in forming fish habitat and in determining the rate and pattern of movement of water through the channel and its removal is generally undesirable for ecological health (Minckley and Rinne 1985).

Streamflow Restoration and Protection

As mentioned earlier, proposals for dams within Aravaipa Canyon have been averted by land acquisition and wilderness designation. Both BLM and TNC have applied for, and received, instream flow water rights in Aravaipa Creek. This was an important step in providing the necessary underpinnings for conservation of Aravaipa Creek and its native fishes.

Irrigation diversion, via ditch or pump, has been common in Aravaipa Creek. Several of these diversions were on lands acquired by DOW and TNC. Many of those diversion have now ended and the waters now remain in the stream channel. This has provided for a more constant, and larger, base flow in Aravaipa Creek (JE Fuller Hydrology and Geomorphology 2000).

Increasing groundwater pumping in the upper and lower canyons and in the upper valley above the canyon is of concern for preservation of future streamflow.

Reintroduction of Native Fish

Management of native fish in Aravaipa Creek has mostly been indirect through management of human and human-related activities that affect the stream and its fishes. The only direct management of native fish is the attempted reintroduction of Gila topminnow into the Aravaipa Creek system (Minckley 1969). The first of these occurred in 1965 in a marshy area adjacent to the creek near the former White Ranch in the center of the northeast quarter of section 34, township 6 south, range 17 east (Minckley 1972). They survived there for at least 3 years, with some individuals caught from the adjacent stream channel. In 1966, another stocking was made into the stream downstream from Stowe Gulch in the northwest quarter of the northwest quarter of section 35, township six south, range nineteen east (Minckley 1972). They survived in this location for at least 4 years, although apparently only in small numbers. Stock for both of these locations was from Monkey Spring in the Santa Cruz River basin (Minckley and Brooks 1985).

A third attempt to reestablish Gila topminnow took place in 1977. The location of this stocking is unclear, with Minckley and Brooks (1985) simply recording it as Graham County and citing AGFD records. They also record it as being stocked with fish from Monkey Spring. However, AGFD reports the stocking as having occurred in the "upper Klondyke area of Aravaipa Creek" with fish from Boyce-Thompson Arboretum (Voeltz and Davidson 2002). Gila topminnow in Boyce-Thompson were a mixed stock, with a strong base of Monkey Spring.

Recently, efforts are underway to establish Gila topminnow into springs and perennial stream sections in southern portions of the Aravaipa Creek watershed. This effort began in 2001 and paperwork for the stocking is still in progress. Three sites are being considered in middle to upper Oak Grove Canyon, including the stream in the vicinity of, and including, Jackson Spring (BLM land), upper Oak Grove Canyon including an unnamed spring (BLM), and Parsons Grove Spring (TNC and BLM). Another three sites are being considered in the Virgus Canyon drainage including the Virgus Canyon/Sycamore Creek confluence (BLM), Bleak Springs (TNC), and Cement Tank Spring (TNC).

Nonnative Fish Removal and Control

As discussed earlier, concerns arose in the 1970's that stock tanks in the watershed were feeding nonnative fish into mainstream Aravaipa Creek. At that time nonnative fish were not reproducing in the mainstream and it was thought that immediate action to remove them from all stock tanks might prevent their establishment in the stream. The first documented management discussion of this apparently occurred in an April 1986 meeting of the Desert Fishes Recovery Team. A letter was sent to the FWS Regional Director with a recommendation that all stock tanks in the watershed be surveyed (Desert Fishes Recovery Team 1986). The recommendation and a proposal to chemically remove nonnative fish found in stock tanks were discussed at the October 13, 1986 and April 1-2, 1987 meetings of the Team.

A 1987 stock tank survey found two tanks with green sunfish (Bagley 1987). After preparation of an environmental assessment and consultation with the FWS, the one tank on BLM land (Rim Rock) was pumped to lower the water level and treated with chlorine on August 4-5, 1987 (Hendrickson 1987b). The other tank was located on private land and AGFD was working to obtain permission to renovate that tank also. That renovation never occurred (D. Hendrickson, Univ. of Texas, pers. com. July 14, 2004), but the tank was dry in summer 2003 (M. Haberstich, TNC, pers. com. July 12, 2004). Two other stock tanks are presently known to harbor nonnative fishes (ibid.).

Concerns about nonnative fish in Aravaipa Creek led to two administrative actions by the State of Arizona to control the threat. In 1986, they denied a permit to the owner of the Holy Joe Ranch in lower Aravaipa Creek, to stock fathead minnow (*Pimephales promelas*), largemouth bass, channel catfish, and tilapia (*Tilapia* sp.) into streamside ponds (Campbell 1988). Then in 1998, the Arizona Game and Fish Commission closed Aravaipa Creek to fishing (Commission Order 40, effective January 1, 1998). The closure reduces the likelihood of unauthorized

stocking of nonnative sport fish into the basin and incidental introduction of nonnative bait fish.

One result of the controversy over the 1986 proposed stocking of nonnative fish in ponds at Holy Joe Ranch was a proposal to construct a fish barrier on Aravaipa Creek on lands donated by the ranch owner, located upstream of his ponds. This fit into concerns about nonnative species present in the San Pedro River, particularly red shiner, and their potential to move upstream into Aravaipa Creek. The lead in the barrier effort came from TNC, but involved AGFD and FWS. In 1988, the Desert Fishes Council sent a resolution to TNC, BLM AGFD, and USBR, expressing concern about red shiner invasion of Aravaipa Creek and recommending a fish barrier be constructed. In 1989, the FWS funded a $10,000 feasibility study by AGFD for a barriers on Aravaipa Creek, but funds were reprogrammed within AGFD and the study was never produced. Because of the potential for a barrier on Aravaipa Creek to serve as mitigation for wetland losses in connection with the Central Arizona Project or for mitigation for the Pima Lateral Canal water deliveries, in 1989 BR became involved in the barrier effort.

The discovery of red shiner invasion in fall 1990 lent impetus to the barrier efforts and plans began to be made to construct a temporary barrier in an upstream location to prevent red shiner from invading the entire system. The Desert Fishes Recovery Team considered possible chemical renovation of Aravaipa Creek, but did not recommend immediate renovation (Desert Fishes Recovery Team 1990). They did recommend construction of three barriers, one at the lower end, a temporary one near Turkey Creek, and a third somewhere in the middle. This was in concert with the 1991 spikedace and loach minnow recovery plans, which called for barriers on Aravaipa Creek. In January 1991 the Desert Fishes Council sent a resolution urging immediate action to "determine the most acceptable means of restoring and maintaining the integrity of the natural ecosystem of Aravaipa Creek" including genetic studies, captive propagation of native fishes, prevention of further nonnative invasion, and reestablishment of a native fish community in the adjacent San Pedro River.

In April 1994, the FWS issued a biological opinion to USBR regarding the potential for introduction and spread of nonnative fishes through the Central Arizona Project. One of the mitigation measures required was construction of a pair of fish barriers on lower Aravaipa Creek. However, opposition had arisen among local landowners due to a variety of factors including the flood damage of 1993 and general anti-Federal sentiments. Substantial controversy continued through the final construction, including public meetings, letters to congressional representatives, and newspaper accounts. The paired fish barriers were completed in April 2001 and monitoring indicates they are functioning successfully.

In 1998, FWS provided TNC with funding to construct the temporary earthen upper barrier that had been under consideration since 1990. In 1992 the Desert Fishes Recovery Team recommended putting the barrier on hold for several reasons including the apparent disappearance of red shiner (Desert Fishes Recovery Team 1991). Following reappearance of red shiner in 1997, the Team recommended the temporary barrier be built (Desert Fishes Recovery Team 1997). TNC constructed that barrier in September 1998. It was reconstructed

after several flood events and after the lower barriers were complete it was allowed to gradually wash away.

CONCLUSIONS

Aravaipa Creek is very important in the conservation of native southwestern fishes. Much of our knowledge of Gila River basin fishes, their life history, ecology, habitat, and conservation needs, comes from work at Aravaipa Creek. Many things learned there have also been valuable in understanding desert stream ecosystems in general and have helped guide conservation efforts for native fishes throughout the desert southwest.

The concentrated work on Aravaipa Creek has allowed us to build a picture of a desert stream ecosystem that is unparalleled. Eight master's theses and one PhD dissertation have been done on fishes of Aravaipa Creek and another is in progress, not including those taxonomic and genetic studies using Aravaipa fishes. One thesis and one dissertation were done on aquatic invertebrates. Twenty publications in scientific journals have been generated, at least ten agency reports, and Aravaipa work has contributed to at least three book chapters.

Monitoring comprises a large part of the work that has occurred on Aravaipa Creek fishes. When monitoring began 40 years ago there was probably little expectation that it would become the most important tool in defining status and variation of the fish community. Long-term data sets often begin for a specific short-term reason, such as the research of Barber and Minckley, and are simply continued without a well defined plan for future use of the data. Such was the case in Aravaipa Creek. Like many investments in the future, it is only after a number of years that the complete value of the data set begins to become apparent. Although a good plan is desirable at the outset, it is impossible to foresee in the beginning of such a long-term program all the possible uses for the data at the end of a several decades. There is no way Minckley could have foreseen what Eby and Fagan could do with the Aravaipa Creek data 40 years later.

Monitoring has been identified as a need for native southwestern fishes for decades. In 1971, the Desert Fishes Council recommended regular monitoring of threatened or potentially threatened desert fish populations (Desert Fishes Council 1971). Recovery plans for spikedace and loach minnow populations call for monitoring all populations, (Marsh 1991a and 1991b), as does the draft conservation agreement for roundtail chub (Utah Division of Wildlife Resources 2004), and recent status reports on Gila River basin fishes by the Desert Fishes Team (Desert Fishes Recovery Team 1986, Desert Fishes Team 2003 and 2004).

Although monitoring had already been underway for decades in Aravaipa Creek, it was the 1990 discovery of red shiner in Aravaipa Creek that spurred recommendations for increased monitoring. The Desert Fishes Recovery Team recommended immediate increases in system-wide monitoring to once a month from March to October and less often during winter (Desert Fishes Recovery Team 1990). In February 1992, the Team recommended that monthly monitoring be continued for one or more years and that a long-term monitoring plan be put in place (Desert Fishes Recovery Team 1992a, and 1992b). The monthly monitoring that occurred

in response to these recommendations lapsed in late 1993, and the Team again reiterated its recommendation for regular monitoring and a monitoring strategy in December 1997 (Desert Fishes Recovery Team 1997). That recommendation was repeated in June 1998 for intense monitoring (Desert Fishes Recovery Team 1998). And, in January 1999, monitoring was identified as the most important action needed at that time in Aravaipa Creek (Desert Fishes Recovery Team 1999).

In addition to the Recovery Team, meetings of biologists from concerned organizations met in February 1991 and January 1999 to discuss monitoring Aravaipa Creek (Collazo 1991, Stefferud 1999). Both groups recommended continuation of monitoring.

Monitoring yields substantial benefits to conservation and management of Aravaipa Creek. By providing knowledge that a relatively intact native fish community exists in Aravaipa Creek, it helped identify the need for protection of the area. It provided much of the information on distribution and abundance of fish to identify lands and waters important for acquisition and protection. Monitoring information helps define human activities that adversely impacting the stream and fish, such as irrigation diversion and channelization, so that management action can be implemented. Monitoring information was used to help obtain Federal listing of some fish and plan a recovery program.

From a management standpoint, one of the most important contributions of monitoring has been the identification of nonnative fish invasions and establishment. It was the ASU long-term sampling that first documented the appearances of the nine nonnative fishes recorded from Aravaipa Canyon. It was monitoring that provided information on the ebb and flow of green sunfish indicating they were being fed into the creek from stock tanks in the watershed (U.S.Bureau of Land Management 1987). That identification led to removal of sunfish from one of the stock tanks. Monitoring has defined patterns by which nonnatives first appear as isolated individuals, then young appear, followed by increasing relative abundance of the species. Without the long-term monitoring, knowledge of when, how, and where nonnative fish came to Aravaipa Creek and patterns of colonization, would be unknown. Colonization patterns revealed by the monitoring provide information important in management, such as the apparent vulnerability of nonnative fishes to population reduction by flooding. That knowledge identifies protection of a natural hydrograph as a high priority management goal as well as predicting the effectiveness of fish barriers. By monitoring Aravaipa Creek fishes on a regular and standardized basis, we gain the opportunity to respond to changes before they become a crisis situation.

Knowledge about nonnative invasions gained by monitoring identified the need for fish barriers in Aravaipa Creek. Timely action on that knowledge would have allowed for barrier installation in time to prevent the 1990 invasion of red shiner. But barrier efforts were not initiated until 1988 and no funding was available. Information from the 1990 monitoring that red shiner had gained access to Aravaipa Creek was still not sufficient to result in barrier installation. Monitoring information gave reassurance that there was still time, as the red shiner invasion appeared to have been unsuccessful. In 1994, barrier efforts gained momentum as a result of

adoption as a mitigation measure for the Central Arizona Project (U.S.Fish and Wildlife Service 1994) and the barriers were to have been completed by October 1997. In autumn 1997, monitoring again detected red shiner in Aravaipa Creek. But barrier installation was delayed and did not occur until April 2001, too late to prevent the second wave of red shiner invasion, but still valuable for prevention other species from moving upstream into Aravaipa Creek. The monitoring gave us the information needed to take management action to prevent red shiner invasion, but the inability of the management entities to take the needed action in a timely manner resulted in failure to use that information effectively.

Long-term monitoring is important to adaptive management efforts. Such efforts require an understanding of what does and does not constitute directional change within the context of an intrinsically variable system and what factors influence that change. "Communities can be highly variable over a few years, but remain fairly constant over the long term. Evaluating measures and examining the variability associated with long-term change is useful because it increases our understanding of and our ability to predict response to disturbances." (Eby et al. 2003:1566). The long-term monitoring data on Aravaipa Creek enables us to detect trends in the fish community and identify natural disturbance regimes associated with streamflow and increasing nonnative fish as factors influencing those trends. This identifies, as high priority, those management actions that retain or increase aquatic habitat heterogeneity and that remove or control nonnative fish.

RECOMMENDATIONS

Based on this analysis, we recommend monitoring be continued in Aravaipa Creek on a long-term basis. The highest priority should be to continue biannual, spring-autumn monitoring at locations with methods consistent with the ASU/UofA existing data set. Contrary to concerns of AGFD expressed during recent permit discussions, there is nothing in the monitoring history, data, or literature that would indicate adverse impacts to the fish (individually or community-wide) from monitoring. Increased monitoring intensity, as recommended by the Desert Fishes Recovery Team and others, should be considered under the long-term effort and should use those locations and protocols so the data are comparable. This may be quarterly sampling or may be in the form of a year of monthly sampling on a periodic basis (e.g. once every 10 years).

Locations and protocols for the ASU/UofA long-term monitoring need to be clearly spelled out in one document. Additions, such as electrofishing, should be clearly identified as not part of the original protocol, and data from those additions segregated.

The recommendation of the January 12, 1999 meeting on Aravaipa Creek monitoring, to supplement, but not to replace or alter, the long-term ASU/Uof A monitoring, should be implemented. This monitoring should be tailored to meet other, short-term monitoring needs, such as the distribution and abundance of red shiner. Sampling locations and methods can then be targeted toward those specific needs.

In response to recent concerns regarding possible adverse effects of sampling on Aravaipa Creek fishes, voucher specimens for future monitoring work should be minimized. A complete series of voucher specimens should be taken once every five to ten years, with vouchers between that limited to any novel species or specimen encountered and any incidental mortalities. This does not include specimens taken for studies or research.

Data gathering for this report showed clearly that there is a need for a better way to store and report the data from Aravaipa Creek monitoring. No agency or organization had all of the data in one place. Previously, Minckley was the major repository of the data, however his untimely death left records difficult to locate. In his 1990 monitoring proposal, Minckley suggested that AGFD might be the appropriate repository for all the Aravaipa Creek monitoring data. However, AGFD does not enter data of other entities into the Nongame Native Fish database and were unable to retrieve hard copies of non-AGFD monitoring data. In addition, they discard paper copies of data after computer entry, so that any information other than fish numbers is not available (R. Bettaso and K. Young, AGFD, pers. com. May 29, 2004). Although it would seem appropriate for all of the involved agencies to keep full copies of all Aravaipa Creek monitoring data, more permanent provisions should be made for storing the data and auxiliary information in one location, including retention of raw data and field notes.

Reporting of Aravaipa Creek monitoring data is currently via email to interested parties a short time after the sampling. This is a continuation of the practice started in 1991 to distribute the original data immediately after it was acquired, although earlier distribution was via hard mail. The email system appears to work well. However, with the exception of Velasco's 1993 report and the two AGFD reports (Bettaso et al. 1995 and Voeltz and Davidson 2002) there has been no attempt to provide formal periodic reports of the Aravaipa Creek monitoring data. A 5-year report with basic data and a brief summary would be valuable. As the most heavily invested entities in the monitoring effort, responsibility for production and dissemination of a 5-year report might be best handled by BLM or TNC. Periodic in-depth analyses should also be included in the monitoring program.

Perhaps most importantly, organizations with management responsibility and authority for Aravaipa Creek should put in place a mechanism for acting on information gained from monitoring in a timely manner. Without such a mechanism, monitoring efforts, although still valuable for information and research, lose much of their value as a management tool.

In addition to monitoring, the agencies and organizations should continue to encourage research on Aravaipa Creek fishes. The long history of theses, dissertations, and publications on Aravaipa Creek and its fishes should not end with the death of W.L. Minckley. Research at Aravaipa Creek should continue to support and promote conservation of southwestern native fishes. While we know much about the fishes of Aravaipa Creek, we cannot rest on past work, nor can we predict future trends. Given its uniqueness and importance, it is our obligation and responsibility to continue monitoring and research to insure long-term survival of the Aravaipa Creek aquatic fauna.

REFERENCES

Abarca, F.J. 1989. Potential overlap of food habits between spikedace (*Meda fulgida*) and red shiner (*Cyprinella lutrensis*). MS Thesis. Arizona State University, Tempe, AZ.

Abarca, F.J. 1990. Letter from Arizona Game and Fish Department to W.L. Minckley (AZ State University) transmitting sampling data for Aravaipa Creek and the San Pedro River for September 29, 1990. Arizona Game and Fish Department, Phoenix, AZ.

Abarca, F.J. 1991. Letter of October 18, 1991 to R.A. Fortuno re sampling data for October 11-12, 1991 in Dr. Gelmacher's ponds, Aravaipa Canyon, Arizona. Arizona Game and Fish Department, Phoenix, AZ.

Adar, E.M. 1984. Quantification of aquifer recharge distribution using environmental isotopes and regional hydrochemistry. PhD Dissertation. University of Arizona, Tucson, AZ.

Adar, E.M. 1985. The hydrology project at Aravaipa Valley: summary and recommendations. Defenders of Wildlife, Tucson, AZ.

Adar, E.M., S.P. Neuman, and D.A. Woolhiser. 1988. Estimation of spatial recharge distribution using environmental isotopes and hydrochemical data. I. Mathematical model and application to synthetic data. II. Application to Aravaipa Valley in southern Arizona, USA. Journal of Hydrology 97:251-302.

Anderson, A.A. and D.A. Hendrickson. 1994. Geographic variation in morphology of spikedace, Meda fulgida, in Arizona and New Mexico. The Southwestern Naturalist 39(2):148-155.

Arizona Game and Fish Commission. 1982. Threatened native wildlife in Arizona. Arizona Game and Fish Department Publication, Phoenix, AZ.

Arizona Game and Fish Department. 1995. Final performance report to U.S. Fish and Wildlife Service for Section 6 project E5-6, Job number 31 (FCN5596), segment 2 of 2: survey, monitor and reintroduce threatened and endangered species; spikedace and loach minnow propagation. Arizona Game and Fish Department, Phoenix, AZ.

Arizona Game and Fish Department. 2002. Letter of August 21, 2002 to U.S. Fish and Wildlife Service re candidate status for roundtail and headwater chub. Arizona Game and Fish Department, Phoenix, AZ.

Arizona Game and Fish Department. 2004. Scientific collecting permit database entries for Aravaipa Creek 1985-1999. Arizona Game and Fish Department, Phoenix, AZ.

Arizona State University. 2002. SONFISHES: Lower Colorado River fish database. www.peter.unmack.net/gis/fish/colorado (abbrev.) [accessed: 2004].

Bagley, B.E. 1987. A survey for exotic fish in the Aravaipa watershed. Arizona Game and Fish Department, Phoenix, AZ.

Bagley, B.E. and P.C. Marsh. 1995. Swimming ability of non-native fishes and their potential interaction with exotic fish exclusion structures (EFES) at Aravaipa Creek, Arizona. U.S. Bureau of Reclamation, Phoenix, AZ.

Bahre, C.J. 1991. A legacy of change. Historic human impact on vegetation in the Arizona borderlands. University of Arizona Press, Tucson, AZ.

Barber, W.E. and W.L. Minckley. 1966. Fishes of Aravaipa Creek, Graham and Pinal Counties, Arizona. The Southwestern Naturalist 11(3):313-324.

Barber, W.E. and W.L. Minckley. 1983. Feeding ecology of a southwestern Cyprinid fish, the spikedace, *Meda fulgida* Girard. The Southwestern Naturalist 28(1):33-40.

Barber, W.E., D.C. Williams, and W.L. Minckley. 1970. Biology of the Gila spikedace, *Meda fulgida*, in Arizona. Copeia 1970(1):9-18.

Barnes, W.C. 1988. Arizona place names. University of Arizona Press, Tucson, AZ.

Bell, W.A. 1869. New tracks in North America. Volumes 1 and 2. Chapman and Hall, London, England.

Bestgen, K.R. 1985. Results of identification of collections of larval fish made in the upper Salt and Gila Rivers, Arizona. U.S. Fish and Wildlife Service, Albuquerque, NM.

Bettaso, R.H. 1992a. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek Monitoring Data. December 15, 1992. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1992b. Memo to Dave Gori (The Nature Conservancy) re Aravaipa Creek Monitoring Data. December 8, 1992. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1992c. Memo to Dave Gori (The Nature Conservancy) re Aravaipa Creek Monitoring. August 21, 1992. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1992d. Memo to Dave Gori (The Nature Conservancy) re July 11-12, 1992 Aravaipa sampling. August 4, 1992. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1993a. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek monitoring data. July 15, 1993. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1993b. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek monitoring data. June 30, 1993. Arizona State University, Phoenix, AZ.

Bettaso, R.H. 1993c. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek monitoring data. March 1, 1993. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1993d. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek monitoring data. March 31, 1993. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1993e. Memo to Dave Gori (The Nature Conservancy) and Jeff Simms (Bureau of Land Management) re Aravaipa Creek monitoring data. November 17, 1993. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 1995. Memo to distribution list re Aravaipa Creek red shiner survey: summary report. December 6, 1995. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H. 2000. Email to interested parties re November 2000 Aravaipa fish summary. December 18, 2000. Arizona Game and Fish Department, Phoenix, AZ.

Bettaso, R.H., D.B. Dorum, and K.L. Young. 1995. Results of the 1992-1994 Aravaipa Creek fish monitoring project. Arizona Game and Fish Department, Technical Report 73, Phoenix, AZ.

Blasius, H.B. 1998a. Memo to W.L. Minckley (Arizona State University) re Aravaipa Creek sampling/monitoring (with field data sheets). June 19, 1998. Arizona Game and Fish Department, Tucson, AZ.

Blasius, H.B. 1998b. Memorandum to Dave Gori (The Nature Conservancy) re Aravaipa Creek survey. July 20, 1998. Arizona Game and Fish Department, Tucson, AZ.

Bourke, J.G. 1980. On the border with Crook. Time-Life Books, Inc.,

Brown, M. 1990. Internal Memo; Arizona Game and Fish Department: Aravaipa Creek sampling for red shiner. Arizona Game and Fish Department, Phoenix, AZ.

Brown, M. 1991. Memo re fish surveys, February 21, 1991. Arizona Game and Fish Department, Phoenix, AZ.

Bruns, D.A. 1977. Distribution and abundance of benthic invertebrates in a Sonoran desert stream. Arizona State University, MS thesis, Tempe, AZ.

Bruns, D.A. and W.L. Minckley. 1980. Distribution and abundance of benthic invertebrates in a Sonoran Desert stream. Journal of Arid Environments 3:117-131.

Brunson, E. and D.F. Gori. 2001. Letter of February 22, 2001 to Sally Stefferud (Fish and Wildlife Service), Rob Clarkson (Bureau of Reclamation) and Paul Marsh (Arizona State University) transmitting proposal for analysis of Aravaipa Creek fish data. The Arizona Nature Conservancy, Tucson, AZ.

Campbell, D. 1988. Memo of January 11, 1988 to involved parties, re Aravaipa Creek Coop (Holy Joe Ranch land gift). The Arizona Nature Conservancy, Tucson, AZ.

Carveth, C. 2004. Email of August 14, 2004 to S. Stefferud re Aravaipa Creek sampling information. University of Arizona, Tucson, AZ.

Childs, M.R. 2004. Development of propagation techniques for loach minnow. Final report to U.S. Bureau of Reclamation, September 30, 2004. Arizona Game and Fish Department, Phoenix, AZ.

Clarkson, R.W. 1982. Morphology and feeding behavior of hybrids between *Catostomus insignis* and *Pantosteus clarki* (Catostomidae). MS thesis. Arizona State University, Tempe, AZ.

Clarkson, R.W. 1996. Long-term monitoring plan for fish populations in selected waters of the Gila River basin, Arizona. U.S. Bureau of Reclamation, Phoenix, AZ.

Clarkson, R.W. 2001. Aravaipa Creek fish collection forms, July 5, 2001. U.S. Bureau of Reclamation, Phoenix, AZ.

Clarkson, R.W. 2002. Aravaipa Creek fish collection forms, October 4, 2002. U.S. Bureau of Reclamation, Phoenix, AZ.

Clarkson, R.W. 2003. Aravaipa Creek fish collection forms, October 15, 2003. U.S. Bureau of Reclamation, Phoenix, AZ.

Clarkson, R.W. and W.L. Minckley. 1988. Morphology and foods of Arizona Catostomid fishes: *Catostomus insignis*, *Pantosteus clarki*, and their putative hybrids. Copeia 1988(2):422-433.

Collazo, T. 1991. Memo of February 20, 1991 to Stefferud, Simms, Dahlem, Brown, Abarca, Minckley, and Jakle re minutes of February 12 meeting on Aravaipa fish protection and revised memorandum of understanding. The Arizona Nature Conservancy, Tucson, AZ.

Collins, J.P., J.E. Deacon, T.E. Dowling, and P.C. Marsh. 2002. Obituary, Wendell Lee Minckley 1935-2001. Copeia 2002(1):258-262.

Cooke, R.U. and R.W. Reeves. 1976. Arroyos and environmental change in the American South-west. Clarendon Press, Oxford, England.

Corman, T.E., M. Brown, and F.J. Abarca. 1989. Report of the 1989 October Fish Count. Arizona Game and Fish Department, Phoenix, AZ.

Cullinan, S. 1990. Hydrology of Aravaipa Creek. U.S. Fish and Wildlife Service, Albuquerque, NM.

Davis, G.P., Jr. 1986. Man and wildlife in Arizona. Arizona Game and Fish Department, Phoenix, AZ.

Deacon, J.E. and W.L. Minckley. 1974. Desert fishes. Pp. 385-488 *in:* W.L. Minckley ed. Desert Biology, Volume II. Academic Press, New York, NY.

DeMarais, B.D. 1986. Morphological variation in *Gila* (Pisces: Cyprinidae) and geologic history: lower Colorado River basin. M.S. thesis. Arizona State University, Tempe, AZ.

DeMarais, B.D. 1992. Genetic relationships among fishes allied to the genus *Gila* (Teleostei: Cyprinidae) from the American southwest. PhD Dissertation. Arizona State University, Tempe, AZ.

Desert Fishes Council. 1971. How can the Desert Fishes Council become more effective? Proceedings of the Desert Fishes Council 3:41-42.

Desert Fishes Recovery Team. 1986. Minutes of the Desert Fishes Recovery Team, April 17-18, 1986. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1990. Minutes of the Desert Fishes Recovery Team, November 7-8, 1990. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1991. Minutes of the February 5-6, 1991 meeting. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1992a. Letter to U.S. Fish and Wildlife Service Regional Director, March 10, 1992. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1992b. Minutes of the February 5-6, 1992 meeting. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1997. Minutes of the Deceber 19, 1997 meeting. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1998. Minutes of the June 16, 1998 meeting. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Recovery Team. 1999. Minutes of the January 14, 1999 meeting. U.S. Fish and Wildlife Service, Phoenix, AZ.

Desert Fishes Team. 2003. Status of Federal and State-listed warm water fishes of the Gila River basin, with recommendations for management. Report 1. Desert Fishes Team, Phoenix, AZ.

Desert Fishes Team. 2004. Status of unlisted native fishes of the Gila River basin, with recommendations for management. Report 2. Desert Fishes Team, Phoenix, AZ.

Dobyns, H.F. 1981. From fire to flood: historic human destruction of Sonoran Desert riverine oasis. Ballena Press Anthropological Papers No. 20,

Douglas, M.E., P.C. Marsh, and W.L. Minckley. 1994. Indigenous fishes of western North America and the hypothesis of competitive displacement: *Meda fulgida* (Cyprinidae) as a case study. Copeia 1994(1):9-19.

Dowling, T.E. and B.D. DeMarais. 1993. Evolutionary significance of introgessive hybridization in cyprinid fishes. Nature 362:444-446.

Dowling, T.E. and P.C. Marsh. 1999. Comparative genetics of native fishes in Salt River Project canals and in upper Salt River system: roundtail chub, desert sucker, and Sonora sucker. Report to U.S. Bureau of Reclamation for contract #98-FG-32-0020, Phoenix, AZ.

Eby, L.A., W.F. Fagan, and W.L. Minckley. 2003. Variability and dynamics of a desert stream community. Ecological Applications 13(6):1566-1579.

Ellingson, C.T. 1980. The hydrology of Aravaipa Creek, southeastern Arizona. MS thesis. University of Arizona, Tucson, AZ.

Fuller, J.E. and L. Roberts. 1985. A paleohydrologic reconstruction of the October 1983 flood discharge of Aravaipa Creek. Report to the U.S. Bureau of Reclamation, Safford, AZ.

Ginnelly, G. 1977. Statewide Fisheries Investigations. Statewide survey of aquaitc resources. Federal Aid Project F-7-R-19, Job VI, Segment 1 of continuing. Arizona Game and Fish Department, Phoenix, AZ.

Gori, D.F. 1998. Memo to Heidi Blasius (Arizona Game and Fish Department) re Aravaipa shiner survey, July 6-7, 1998. July 10, 1998. The Nature Conservancy, Tucson, AZ.

Gori, D.F. and J.R. Simms. 1997. Memo to interested parties re monitoring data: Aravaipa Creek, 16-17 October 1997. The Nature Conservancy, Tucson, AZ.

Gould, J.A. and R.P. Wilson. 1976. Map showing ground-water conditions in the Aravaipa Valley area, Graham and Pinal Counties, Arizona -- 1975. Open file report 76-107, Water Resources Investigations, US Geological Survey, Tucson, AZ.

Hadley, D., P. Warshall, and D. Bufkin. 1991. Environmental change in Aravaipa, 1870-1970. An ethnoecological survey. Bureau of Land Management, Cultural Resources Series No. 7, Phoenix, AZ.

Hardy, T.B., B. Bartz, and W. Carter. 1990. Instream flow recommendations for the fishes of Aravaipa Creek, Arizona. Twelve-Nine, Inc., Logan, UT.

Hastings, J.R. 1959. Vegetation change and arroyo cutting in southeastern Arizona. University of Arizona, Arid Lands Program Paper No. 3, Tucson, AZ.

Heath, W.G. 1962. Maximum temperature tolerance as a function of constant temperature acclimation in the Gila topminnow (*Poeciliopsis occidentalis*). PhD Dissertation. University of Arizona, Tucson, AZ.

Hendrickson, D.A. 1987a. Geographic variation in morphology of *Agosia chrysogaster*, a Sonoran desert cyprinid fish. PhD Dissertation. Arizona State University, Tempe, AZ.

Hendrickson, D.A. 1987b. Memo - update on nongame fish activities, August 26, 1987. Arizona Game and Fish Department, Phoenix, AZ.

Hendrickson, D.A. and W.L. Minckley. 1984. Cienegas -- vanishing climax communities of the American southwest. Desert Plants 6(3):131-175.

Holanov, S.H. 1984. The effects of current speed and food on non-catastrophic drift with reference to the ecology of Aravaipa Creek, Arizona. PhD Dissertation. University of Arizona, Tucson, AZ.

Hutton, N.H. 1853. Engineers report -- El Paso and Fort Yuma wagon road. *in* Records of the Office of the Secretary of the Interior relating to wagon roads, 1857-1881. National Archives film microcopies, no. M95, roll 3., Washington D.C. (as cited in Minckley 1981)

Jackson, W., T. Martinez, P.E. Cuplin, W.L. Minckley, B. Shelby, P. Summers, D. McGlothlin, and B. Van Haveren. 1987. Assessment of water conditions and management opportunities in support of riparian values: BLM San Pedro River properties, Arizona. Project completion report. USDI Bureau of Land Mangement, Denver, CO.

JE Fuller Hydrology and Geomorphology, I. 2000. Aravaipa Canyon Geohydrology Assessment. U.S. Fish and Wildlife Service, Phoenix, AZ.

Johnson, J.E. 1977. Letter to files, Gila topminnow survey, Arizona, 15-19 March, 1977. U.S. Fish and Wildlife Service, Albuquerque, NM.

Kepner, W.G. 1982. Reproductive biology of longfin dace (*Agosia chrysogaster*) in a Sonoran Desert stream, Arizona. MS thesis. Arizona State University, Tempe, AZ.

King, K.A. and M. Martinez. 1998. Metals in fish collected from Aravaipa Creek, Arizona, October 1997. U.S. Fish and Wildlife Service, Phoenix, AZ.

King, K.A., M. Martinez, and M. Haberstich. 1997. Table 1. Aravaipa Creek: relative fish abundance, October 28, 1997. U.S. Fish and Wildlife Service, Phoenix, AZ.

LaBounty, J.F. 1973. Status of the spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*). Proceedings of the Desert Fishes Council 5th:107.

Leach, J.B. 1858. Itinerary of the El Paso and Fort Yuma wagon road expedition. National Archives film microcopies, No. M95, roll 3., Washington, D.C. (as cited in Minckley 1981)

Leopold, L.B. 1951. Vegetation of southwestern watersheds in the nineteenth century. The Geographical Review 41:295-316.

Lowe, C.H. and W.G. Heath. 1969. Behavioral and physiological responses to temperatures in the desert pupfish, *Cyprinodon macularius*. Physiological Zoology 42:53-59.

Marsh, P.C. 1991a. Loach minnow *Tiaroga cobitis* recovery plan. U.S. Fish and Wildlife Service, Albuquerque, NM.

Marsh, P.C. 1991b. Spikedace *Meda fulgida* recovery plan. U.S. Fish and Wildlife Service, Albuquerque, NM.

Marsh, P.C., F.J. Abarca, M.E. Douglas, and W.L. Minckley. 1989. Spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*) relative to introduced red shiner (*Cyprinella lutrensis*). Arizona Game and Fish Department, Phoenix, AZ.

Marsh, P.C., J.E. Brooks, D.A. Hendrickson, and W.L. Minckley. 1990. Fishes of Eagle Creek, Arizona, with records for threatened spikedace and loach minnow (Cyprinidae). Journal of the Arizona-Nevada Academy of Science 23(2):107-116.

Matter, W.J. 1991. Potential for transfer of non-native fish in Central Arizona Project canal waters to the Gila River system. Bureau of Reclamation, Phoenix, AZ.

McNatt, R.M. 1973. Status of the native Arizona fishes of Aravaipa Creek. Proceedings of the Desert Fishes Council X:116-117.

Meffe, G.K. and W.L. Minckley. 1987. Persistence and stability of fish and invertebrate assemblages in a repeatedly disturbed Sonoran desert stream. The American Midland Naturalist 117(1):177-191.

Miller, R.R. 1950. Field notes for Aravaipa Creek, May 10-11, 1950. University of Michigan Museum of Zoology, Ann Arbor, Michigan.

Miller, R.R. 1961. Man and the changing fish fauna of the American southwest. Papers of the Michigan Academy of Science, Arts, and Letters XLVI:365-404.

Miller, R.R., C. Hubbs, and F.H. Miller. 1991. Icthyological exploration of the American west: the Hubbs-Miller era, 1915-1950. Pp. 19-40 *in:* W.L. Minckley and J.E. Deacon, eds. Battle against extinction; Native fish management in the American West. University of Arizona Press, Tucson, AZ.

Minckley, W.L. 1969. Attempted re-establishment of the Gila topminnow within its former range. Copeia 1969(1):193-194.

Minckley, W.L. 1972. A survey of selected physico-chemical and biologic parameters of Aravaipa Creek, Arizona. A report to The Defenders of Wildlife and the U.S. Bureau of Land Management, Safford, Arizona. Arizona State University, Tempe, AZ.

Minckley, W.L. 1973. 1973 survey of fishes of Aravaipa Creek, Graham and Pinal counties, AZ. Arizona State University, Tempe, AZ.

Minckley, W.L. 1977. Sonoran Desert, United States; area report. Proceedings of the Desert Fishes Council IX:352-353.

Minckley, W.L. 1981. Ecological studies of Aravaipa Creek, central Arizona, relative to past, present, and future uses. With 1982 addendum. USDI Bureau of Land Management, Safford, AZ.

Minckley, W.L. 1985. Native fishes and natural aquatic habitats in U.S. Fish and Wildlife Service Region II west of the continental divide. Arizona State University, Tempe, AZ.

Minckley, W.L. 1987. Fishes and aquatic habitats of the upper San Pedro River system, Arizona and Sonora. U.S. Bureau of Land Management, Denver, CO.

Minckley, W.L. 1990. Summary of red shiner survey, lower Aravaipa Creek, October 1990 with tabulation of Minckley's pre-1991 data on Aravaipa Creek spikedace and loach minnow. Arizona State University, Tempe, AZ.

Minckley, W.L. 1992. 10-11 October 1992, Arizona, Pinal Co., Aravaipa Creek at lower three stations (Wood's Ranch, Jay White Ranch, and "Sycamore Tree)." Notes taken from hard drive of his computer, May 2004. Arizona State University, Tempe, AZ.

Minckley, W.L. 1995. Data for Aravaipa Creek fish count, sampling dates: October 7-8, 1995. Arizona State University, Tempe, AZ.

Minckley, W.L. 1996. Data for Aravaipa Creek fish count, sampling dates: April 5-6, 1996. With field data sheets. Arizona State University, Tempe, AZ.

Minckley, W.L. 1998. Letter of May 19, 1998 with results of Aravaipa Creek sampling. Arizona State University, Tempe, AZ.

Minckley, W.L. 2000. Summary tables for sampling, Aravaipa Creek, Arizona (unpublished). Combined annual collections in number of fish taken; seasonal samples and annual samples. Arizona State University, Tempe, AZ.

Minckley, W.L. 2001. Untitled manuscript regarding long-term monitoring studies in Aravaipa Creek. Arizona State University, Tempe, AZ.

Minckley, W.L. and W.E. Barber. 1971. Some aspects of the biology of the longfin dace, a cyprinid fish characteristic of streams in the Sonoran desert. The Southwestern Naturalist 15(4):459-464.

Minckley, W.L. and J.E. Brooks. 1985. Transplantations of native Arizona fishes: records through 1980. Journal of the Arizona-Nevada Academy of Science 20(2):73-89.

Minckley, W.L. and B.D. DeMarais. 2000. Taxonomy of chubs (Teleostei, Cyprinidae, Genus *Gila*) in the American southwest with comments on conservation. Copeia 2000(1):251-256.

Minckley, W.L. and C.A. Karp. 1986. Aravaipa Creek fishes: October 1985. Arizona State University, Tempe, AZ.

Minckley, W.L. and G.K. Meffe. 1987. Differential selection by flooding in stream fish communities of the arid American southwest. Pp. 93-104 *in:* W.J. Matthews and D.C. Heins, eds. Community and evolutionary ecology of North American stream fishes. University of Oklahoma Press, Norman, OK.

Minckley, W.L. and J.N. Rinne. 1985. Large woody debris in hot-desert streams: an historical review. Desert Plants 7(3):142-153.

Minckley, W.L. and R. Timmons. 1993. Memo to interested parties re monitoring data: Aravaipa Creek, 6-8 July, 1993. July 10, 1993. Arizona State University, Tempe, AZ.

Minckley, W.L., A.L. Velasco, and C.R. Reimus. 1993. Memo to interested parties re monitoring data: Aravaipa Creek, 23 January and 7 February 1993. February 25, 1993. Arizona State University, Tempe, AZ.

Minckley, W.L., A.L. Velasco, and R. Timmons. 1994. Memo to interested parties re monitoring data: Aravaipa Creek, 25-26 June 1994. June 27, 1994. Arizona State University, Tempe, AZ.

Moody, T.O. 1999. Regional relationships for bankfull stage in natural channels of central and southern Arizona. Final Report. Northern Arizona University, Flagstaff, AZ.

Moody, T.O., W. Odem, and D.G. Neary. 1998. Return intervals for bankfull discharge in ephemeral and perennial streams of central and southern Arizona. Pp. 25-28 *in:* G.J. Gottfried ed. Hydrology and water resources in Arizona and the southwest. Hydrology Section, Arizona-Nevada Academy of Science, Glendale, AZ.

Moore, S.D., M.E. Wilkosz, and S.K. Brickler. 1990. The recreational impact of reducing the "laughing waters" of Aravaipa Creek, Arizona. Rivers 1(1):43-50.

Morfin, O., M.H. Conklin, T.L. Corley, J.B. Hiskey, J. Ruiz, and J.T. Chesley. 2003. The use of Pb isotopes, total metals analysis and total metals ratios to characterize Pb transport and fate in an interrupted stream, Aravaipa Creek, SE Arizona. Hydrometallurgy 2003, Proceedings of the 5th International Symposium in honor of Professor Ian Ritchie. C.A. Young, A.M. Alfantazi, C.G. Anderson, A. James, D.B. Dreising, and B. Harris (eds.) The Minerals, Metals, and Materials Society, Warrendale, PA.

Mpoame, M. 1981. Parasites of some fishes native to Arizona and New Mexico with ecological notes. PhD Dissertation. Arizona State University, Tempe, AZ.

Mpoame, M. 1982. Ecological notes on parasites of fishes from Aravaipa Creek, Arizona. Journal of the Arizona-Nevada Academy of Science 17:45-51.

Mpoame, M. and J.N. Rinne. 1983. Parasites of some fishes native to Arizona and New Mexico. The Southwestern Naturalist 28(4):399-405.

Otis, E.O., IV. 1994. Distribution, abundance, and composition of fishes in Bright Angel and Kanab Creeks, Grand Canyon National Park, Arizona. University of Arizona. MS thesis, Tucson, AZ.

Parke, J.G. 1857. Report of explorations for railroad routes. *in* Explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean. U.S. 33rd Congress, 2nd Session, Senate Ex. Doc. 78, Vol. 7.

Parmenter, H.L. and S.P. Platania. 2004. Captive propagation and rearing of spikedace, *Meda fulgida*. Final report to U.S. Bureau of Reclamation, Phoenix, AZ.

Propst, D.L. 2002. Systematic investigations of warmwater fish communities. FW-17-RD completion report. 1 July 1997-30 June 2002. Report to U.S. Fish and Wildlife Service. New Mexico Department of Game and Fish, Santa Fe, NM.

Reinthal, P.N. 2002. Email of November 5, 2002 to interested parties re Aravaipa, Fall 2002. University of Arizona, Tucson, AZ.

Reinthal, P.N. 2003a. Email to interested parties re Aravaipa fish sampling April 5-6, 2003. University of Arizona, Tucson, AZ.

Reinthal, P.N. 2003b. Email of October 7, 2003 to interested parties re Fall 2003 Aravaipa. University of Arizona, Tucson, AZ.

Reinthal, P.N. 2004a. Aravaipa Spring 2004. Unpublished data. University of Arizona, Tucson, AZ.

Reinthal, P.N. 2004b. Aravaipa Fall 2004. Unpublished data. University of Arizona, Tucson, AZ.

Remington, R.K. 2002. Larval fish drift of Aravaipa Creek. MS Thesis. Arizona State University, Tempe, AZ.

Rinne, J.N. 1969. Cyprinid fishes of the genus *Gila* from the lower Colorado River basin. MS Thesis. Arizona State University, Tempe, AZ.

Rinne, J.N. 1976. Cyprinid fishes of the genus *Gila* from the lower Colorado River basin. The Wasmann Journal of Biology 34(1):65-107.

Rinne, J.N. 1985. Physical habitat evaluation of small stream fishes: point vs. transect, observation vs. capture methodologies. Journal of Freshwater Ecology 3(1):121-131.

Rinne, J.N. 1989. Physical habitat use by loach minnow, *Tiaroga cobitis* (Pisces: Cyprinidae), in southwestern desert streams. The Southwestern Naturalist 34(1):109-117.

Rinne, J.N. 1991. Habitat use by spikedace, *Meda fulgida* (Pisces: Cyprinidae) in southwestern streams with reference to probable habitat competition by red shiner, *Notropis lutrensis* (Pisces: Cyprinidae). The Southwestern Naturalist 36(1):7-13.

Rinne, J.N. 1992. Physical habitat utilization of fish in a Sonoran Desert stream, Arizona, southwestern United States. Ecology of Freshwater Fish 1:35-41.

Rinne, J.N., P. Boucher, D. Miller, A. Telles, J. Monzingo, R. Pope, B.P. Deason, C. Gatton, and B. Merhege. 1999. Comparative fish community structure in two southwestern desert rivers. Proceedings of the symposium on interactions of native-nonnative fishes, July 13-14, 1999, Las Vegas, NV. U.S. Fish and Wildlife Service, Albuquerque, NM.

Rinne, J.N. and J. Janisch. 1995. Coldwater fish stocking and native fishes in Arizona: past, present, and future. American Fisheries Society Symposium 15:397-406.

Rinne, J.N. and E. Kroeger. 1988. Physical habitat used by spikedace, *Meda fulgida*, in Aravaipa Creek, Arizona. Proceedings of the Western Association of Fish and Wildlife Agencies Agenda 68:1-10.

Roberts, L.K. 1987. Paleohydrologic reconstruction, hydraulics, and frequency-magnitude relationships of large flood events along Aravaipa Creek. MS thesis. University of Arizona, Tucson, AZ.

Schreiber, D.C. 1975. 1974 survey of fishes of Aravaipa Creek, Graham and Pinal counties, Arizona. University of Arizona, Tempe, AZ.

Schreiber, D.C. 1978. Feeding interrelationships of fishes of Aravaipa Creek, Arizona. MS thesis. Arizona State University, Tempe, AZ.

Schreiber, D.C. and W.L. Minckley. 1981. Feeding interrelations of native fishes in a Sonoran Desert stream. Great Basin Naturalist 41(4):409-426.

Sheldon, D.L. and D.A. Hendrickson. 1988. Report of the 1988 October Fish Count. Arizona Game and Fish Department, Phoenix, AZ.

Siebert, D.J. 1980. Movements of fishes in Aravaipa Creek, Arizona. MS Thesis. Arizona State University, Tempe, AZ.

Simms, J.R. 1995a. Field notes, data sheets, and maps of Turkey Creek (Aravaipa basin) sampling, March 13, 1995. U.S. Bureau of Land Management, Tucson, AZ.

Simms, J.R. 1995b. File report on fishery inventory of Oak Grove Canyon, Graham Co. and Deer Creek, Pinal Co. July 1995. U.S. Bureau of Land Management, Tucson, AZ.

Simon, J.R., R.R. Miller, and M.H. Frost, Jr. 1943. Correspondence between the three authors regarding fish specimens from Aravaipa Creek and Tanque Verde Creek, with information on other streams. August 20, 1943, Nov. 2, 1943, Jan. 2, 1944, and Feb. 24, 1944. From collection of University of Michigan Museum of Zoology, Ann Arbor, MI.

Stefferud, J.A. and S.E. Stefferud. 1993. The status of Gila topminnow, and results of monitoring of the fish community in Redrock Canyon, Coronado National Forest, Santa Cruz County, Arizona, 1979-present. Proceedings of the Desert Fishes Council 25:16-17.

Stefferud, J.A. and S.E. Stefferud. 2003. Systematic investigations of warm-water fish assemblages in San Pedro and Babocomari Rivers, San Pedro Riparian National Conservation Area, Arizona, 1990-2003. Report to U.S. Bureau of Land Management, Sierra Vista, AZ.

Stefferud, J.A., K.L. Young, R.W. Clarkson, C.O. Minckley, J.R. Simms, and A. Sillas. 1998. Lower Colorado River area report. Proceedings of the Desert Fishes Council 30:42-44.

Stefferud, S.E. 1983a. Status report for *Meda fulgida* Girard (spikedace). U.S. Fish and Wildlife Service, Albuquerque, NM.

Stefferud, S.E. 1983b. Status report for *Tiaroga cobitis* Girard (loach minnow). U.S. Fish and Wildlife Service, Albuquerque, NM.

Stefferud, S.E. 1999. Notes, agenda, and draft monitoring plan from January 12, 1999 meeting on Aravaipa Creek monitoring. U.S. Fish and Wildlife Service, Phoenix, AZ.

Tellman, B., R. Yarde, and M.G. Wallace. 1997. Arizona's changing rivers: how people have affected the rivers. University of Arizona, Tucson, AZ.

Tibbets, C.A. 1993. Patterns of genetic variation in three cyprinid fishes native to the American southwest. MS thesis. Arizona State University, Tempe, AZ.

Tibbets, C.A. 1998. Evolutionary genetiics of *Agosia chrysogaster*. PhD Dissertation. Arizona State University, Tempe, AZ.

Tibbets, C.A. and T.E. Dowling. 1996. Effects of intrinsic and extrinsic factors on population fragmentation in three species of North American minnow (Teleostei:Cyprinidae). Evolution 59(3):1280-1292.

Turner, P.R. and R.J. Tafanelli. 1983. Evaluation of the instream flow requirements of the native fishes of Aravaipa Creek, Arizona by the incremental methodology. U.S. Fish and Wildlife Service, Albuquerque, NM.

U.S. Bureau of Land Management. 1987. Environmental assessment for acquired lands exotic fish removal. U.S. Bureau of Land Management, Safford, AZ.

U.S. Bureau of Reclamation. 1988. Final environmental assessment: construction of fish barriers on Aravaipa Creek. November 1998. U. S. Bureau of Reclamation, Phoenix, AZ

U.S. Fish and Wildlife Service. 1993. Memorandum of July 30, 1993 from State Supervisor to Regional Director re unregulated activities adversely affecting listed fish in Arizona. U.S. Fish and Wildlife Service, Phoenix, AZ.

U.S. Fish and Wildlife Service. 1994. Final biological opinion on the transportation and delivery of Central Arizona Project water to the Gila River Basin (Hassayampa, Agua Fria, Salt, Verde, San Pedro, middle and upper Gila Rivers, and associated tributaries) in Arizona and New Mexico. 2-21-90-F-119. April 30, 1994, amended June 22, 1995, May 6, 1998, July 24, 1998, November 4, 1999, and June 3, 2000. U.S. Fish and Wildlife Service, Albuquerque, NM.

U.S. Fish and Wildlife Service. 2001a. Background information on the Central Arizona Project and nonnative aquatic species in the Gila River Basin (excluding the Santa Cruz River Subbasin). U.S. Fish and Wildlife Service, Phoenix, AZ.

U.S. Fish and Wildlife Service. 2001b. Revised biological opinion on transportation and delivery of Central Arizona Project water to the Gila River basin (Hassayampa, Agua Fria, Salt, Verde, San Pedro, middle and upper Gila Rivers and associated tributaries) in Arizona and New Mexico and its potential to introduce and spread nonnative aquatic species. 2-21-90-F-119a. April 17, 2001. U.S. Fish and Wildlife Service, Phoenix, AZ.

U.S. Fish and Wildlife Service. 2003. Letter of June 4, 2003 to the Center for Biological Diversity regarding petition of April 2, 2003 for listing of roundtail and headwater chub. U.S. Fish and Wildlife Service, Albuquerque, NM.

U.S. Geological Survey. 2004. Monthly streamflow statistics for the nation: USGS 09473000 Aravaipa Creek near Mammoth. http://nwis.waterdata.usgs.gov/nwis/monthly/

Unmack, P.J. 1998. Email of November 2, 1998 to interested parties re Aravaipa results. Arizona State University, Tempe, AZ.

Unmack, P.J. 1999a. Email of April 20, 1999 to interested parties re Aravaipa results April 9-11, 1999. Arizona State University, Tempe, AZ.

Unmack, P.J. 1999b. Email to interested parties re Aravaipa results October 22-23, 1999. Arizona State University, Tempe, AZ.

Unmack, P.J. 2000. Email of October 23, 2000 to interested parties re Aravaipa results, October 21, 2000. Arizona State University, Tempe, AZ.

Unmack, P.J. 2001a. Email of April 30, 2001 to interested parties re Aravaipa results April 14-15, 2001. Arizona State University, Tempe, AZ.

Unmack, P.J. 2001b. Email of November 8, 2001 to interested parties re Aravaipa results November 2-4, 2001. Arizona State University, Tempe, AZ.

Unmack, P.J. 2002a. Arizona State University GIS manual for use with the lower Colorado Basin fish database.

Unmack, P.J. 2002b. Email of April 23, 2002 to interested parties re Aravaipa Creek - April 13-14, 2002. Arizona State University, Tempe, AZ.

Unmack, P.J., and W.F. Fagan. 2004. Convergence of differentially invaded systems toward invader-dominance: time-lagged invasions as a predictor in desert fish communities. Biological Invasions 6:233-143.

Utah Division of Wildlife Resources. 2004. Draft range-wide conservation agreement for roundtail chub *Gila robusta*, bluehead sucker *Catostomus discobolus*, and flannelmouth sucker *Catostomus latipinnis*. Utah Department of Natural Resources, Salt Lake City, UT.

Uyeno, T. and R.R. Miller. 1973. Chromosomes and the evolution of Plagopterin fishes (Cyprinidae) of the Colorado River system. Copeia 1973(4):776-782.

Velasco, A.L. 1993a. Fish population sampling: Aravaipa Creek, Graham and Pinal Counties, Arizona, 1991-1992. The Nature Conservancy, Tucson, AZ.

Velasco, A.L. 1993b. Trip report for Anthony Velasco, Aravaipa Creek east end, 22-24 October 1993. October 25, 1993. Arizona State University, Tempe, AZ.

Velasco, A.L. 1997. Fish population response to variance in stream discharge, Aravaipa Creek, Arizona. MS Thesis. Arizona State University, Phoenix, AZ.

Vives, S.P. 1995. Spikedace and loach minnow artificial propagation, final report. Arizona Game and Fish Department, Phoenix, AZ.

Vives, S.P. and W.L. Minckley. 1990. Autumn spawning and other reproductive notes on loach minnow, a threatened cyprinid fish of the American southwest. The Southwestern Naturalist 35(4):451-454.

Voeltz, J.B. 2002. Roundtail chub (*Gila robusta*) status survey of the lower Colorado River basin. Arizona Game and Fish Department, Phoenix, AZ.

Voeltz, J.B. and R.F. Davidson. 2002. Aravaipa Creek fish monitoring and survey results from 1999 and 2000. Arizona Game and Fish Department, Phoenix, AZ.

Weedman, D.A. 1999a. Email of December 6, 1999 to interested parties re Aravaipa data summary. Arizona Game and Fish Department, Phoenix, AZ.

Weedman, D.A. 1999b. Summary of monitoring of Aravaipa Creek October 18-20, 1999. Unpublished report. Arizona Game and Fish Department, Phoenix, AZ.

Williams, C.M. 1991a. Fish movement relative to physical environment in a Sonoran desert stream. MS Thesis. Arizona State University, Tempe, AZ.

Williams, J.E. 1991b. Preserves and refuges for native western fishes: History and management. Pp. 171-189 *in:* W.L. Minckley and J.E. Deacon, eds. Battle against extinction: Native fish management in the American west. University of Arizona, Tucson, AZ.

Williams, J.E., D.B. Bowman, J.E. Brooks, A.A. Echelle, R.J. Edwards, D.A. Hendrickson, and J.J. Landye. 1985. Endangered aquatic ecosystems in North American deserts with a list of vanishing fishes of the region. Journal of the Arizona-Nevada Academy of Science 20(1):1-62.

Winn, H.E. and R.R. Miller. 1954. Native postlarval fishes of the lower Colorado River basin, with a key to their identification. California Fish and Game 40(3):273-285.

Young, K.L. 1994. Fall Fish Count Summary 1988-1993. Arizona Game and Fish Department, Phoenix, AZ.

Young, K.L. and M.A. Lopez. 1995. Fall fish count summary 1988-1994. Arizona Game and Fish Department, Technical Report 81, Phoenix, AZ.

APPENDICES

APPENDIX 1

DOCUMENTS USED IN ARAVAIPA CREEK SAMPLING HISTORY (for sampling not listed below, see SONFISHES database in Appendix 3)			
SOURCE	SAMPLING DATE	COLLECTOR[1]	STREAM REACH[2]
Simon et al. 1943	1943, Oct. 31	Simon, Hendrickson, and Frost (UA)	L
Miller 1950	1950, May 10-11	Miller (UMMZ)	M
Minckley 2000	1963-2002 (spring & fall)	Minckley et al. (ASU)	L, M, U
Barber and Minckley 1966	1943, October 31 1950, May 10-11 1953-60 1963, April 10 1964, April 17-18; Nov. 6; Dec. 21-23 1965, Feb.27, July 22 1965, Feb. 27-28; May 1	Simon (UA) Miller (UMMZ) Lowe and Heath (UA Arnold (ASU) Minckley and Barber (ASU) Minckley and Barber (ASU) Minckley and Barber (ASU)	L M L, M, U L L, M, U floodplain pond L, M
Barber et al. 1970	1966, June July, Aug, Sept., Oct., Nov., Dec. 1967, Jan, Feb., Mar., April, May, June, July	Barber, Williams, Minckley (ASU) Barber, Williams, Minckley (ASU)	L, M, U L, M, U
Minckley 1972	1972, April 22-May 6	Minckley (ASU)	L, M, U, T
Minckley 1973	1973, April-May; Sept.	Minckley (ASU)	M, U
Schreiber 1975	1975, Nov. 9-11	Schreiber, Minckley (ASU)	L, M, U
Schreiber 1978	1975, Jan 9-10; April 18-19; July 11-12; Oct. 24-25 1976, Jan. 30-31	Schreiber (ASU)	U
Johnson 1977 Ginnelly 1977	1977, March 18	Johnson (FWS), Minckley (ASU), Ginnelly (GF)	U
Kepner 1982	1977, Sept., Oct., Nov., Dec. 1978, Jan., Feb., Mar., April, May, June, July, Aug.	Kepner (ASU)	L, U
Siebert 1980 (plus data printout)	1978, Jan., Feb., Mar., April, June, July, Aug., Sept., Oct., Nov. 1979, Feb., Mar., April, May, June, July	Siebert (ASU)	L, M, U
Turner and Tafanelli 1983	1980, May 14 1981, March 4, July 21, August 26	Turner, Tafanelli (NMSU)	U
Rinne 1985 Rinne and Kroeger 1988 Rinne 1989 Rinne 1991 Rinne 1992	1982, Dec. 1983, April, August 1984, Feb., July, Sept 1985, May	Rinne, Kroeger (USFS)	U
Bestgen 1985	1985, May 19-24	Bestgen et al. (FWS)	L
Minckley and Karp 1986	1985, Oct. 18-20	Minckley, Karp (ASU)	
Abarca 1989	1987, Mar., April, May, June, July, Aug. 1989, August	Abarca (ASU)	L

DOCUMENTS USED IN ARAVAIPA CREEK SAMPLING HISTORY
(for sampling not listed below, see SONFISHES database in Appendix 3)

SOURCE	SAMPLING DATE	COLLECTOR[1]	STREAM REACH[2]
Marsh et al. 1989	1987, May 20-22	Marsh, Minckley, Douglas (ASU)	L, M
Bagley 1987	1987, July-August	Bagley (GF)	stock tanks
Sheldon and Hendrickson 1988	1988, Sept 24-25; Oct. 4	Multiple parties (OFC)	U, L
Williams 1991a (plus data printout)	1989, Feb., Mar., April, May, June, July, Aug., Sept., Oct., Nov., Dec. 1990, Jan., Feb., Mar., June	Williams (ASU)	L, M, U
Corman et al. 1989	1989, Oct. 7, Nov. 19	Multiple parties (OFC)	U, L
Young 1994 Abarca 1990	1990, Sept. 29-30	Multiple parties (OFC)	L, M, U
Minckley 1990	1990, Oct. 20	Minckley (ASU)	L, M, U
Brown 1990	1990, Nov., 6	Brown, Lupke, Snell (AGFD, TNC)	M, U
Brown 1991	1991, Feb.	Brown (GF)	U
Velasco 1993a	1991, Feb. 9-10, Mar. 9-10, April 12-14, May 10-12, June 7-9, July 12-14, Aug. 9-11, Sept. 13-15, Oct. 12-13, Nov. 9-10, Dec. 9-21 1992, Jan 17-19, Feb. 8-9, Mar. 13-15, April 11-12, May 18-20, June 12-13,	Velasco, Minckley (ASU)	L, M, U
Young and Lopez 1995	1991, Oct. 4	Simms, Bammann (BLM)	T
Abarca 1991	1991, Oct. 11-12	Abarca et al. (GF)	floodplain ponds
Bettaso et al. 1995 Bettaso 1992a Bettaso 1992b Bettaso 1992c Bettaso 1992d	1992, July 11-12, Aug. 10-12, Nov. 10-12, Dec. 8-10	Bettaso et al. (GF)	L, M, U
Minckley 1992 Minckley 2000	1992, Oct. 10-11	Minckley (ASU)	L, M, U
Minckley et al. 1993	1993, Jan. 23, Feb. 7	Minckley et al. (ASU)	L, M, U
Bettaso et al. 1995 Bettaso 1993a Bettaso 1993b Bettaso 1993c Bettaso 1993d Bettaso 1993e Velasco 1993b	1993, Feb. 16-17, Mar. 9-11, May 19-21, June 15-16, Aug., Oct. 23-24, Nov.	Bettaso et al. (GF)	L, U (Feb.) L, M, U
Minckley and Timmons 1993	1993, July 6-8	Minckley et al. (ASU)	L, U
Bettaso et al. 1995	1994, April 4-7	Bettaso et al. (GF)	L, M, U

DOCUMENTS USED IN ARAVAIPA CREEK SAMPLING HISTORY (for sampling not listed below, see SONFISHES database in Appendix 3)			
SOURCE	SAMPLING DATE	COLLECTOR[1]	STREAM REACH[2]
Arizona Game and Fish Department 1995	1994, May	Arizona Game and Fish	L
Minckley et al. 1994	1994, June 25-26	Minckley et al. (ASU)	L, M, U
Simms 1995a	1995, Mar. 13	Simms, Robles (BLM)	T
Simms 1995b	1995, Oct.	Simms, Robles (BLM)	T
Minckley 1995	1995, Oct. 7-8	Minckley et al. (ASU)	L, M, U
Bettaso 1995	1995, Nov. 13-14	Bettaso et al. (GF)	L
AGFD 2004 Beatson pers com., July 14, 2004	1996, Jan. 5	Beatson (ACVF)	U
Minckley 1996	1996, April 5-6	Minckley et al. (ASU)	L, M, U
Minckley 2000	1996, Oct. 19	Minckley et al. (ASU)	L, M, U
AGFD 2004	1996, Nov. 14	Simms (BLM)	U
Gori and Simms 1997	1997, Oct. 16-17	Gori, Simms (TNC, BLM)	L, M, U
King et al. 1997	1997, Oct. 28	King, Martinez (FWS)	U
Minckley 1998	1998, April 10-11	Minckley et al (ASU)	L, M, U
Blasius 1998a	1998, June 9-10	Blasius (GF)	M, U
Gori 1998, Blasius 1998b	1998, July 6-7	Blasius, Gori (GF, TNC)	L, M, U
Unmack 1998	1998, Oct./Nov.	Minckley, Unmack (ASU)	L, M, U
Unmack 1999a	1999, April 9-11	Minckley, Unmack (ASU)	L, M, U
Voeltz and Davidson 2002 Weedman 1999a Weedman 1999b	1999, Oct. 18-20	Weedman et al. (GF)	L, M, U
Unmack 1999b	1999, Oct. 22-23	Minckley, Unmack (ASU)	L, M, U
AGFD 2004 Beatson pers com., July 14, 2004	1999, Dec. 20	Beatson (ACVF)	L
Remington 2002	2000, March-April	Remington (ASU)	L
Unmack 2000	2000, Oct. 21	Minckley, Unmack	L, M, U
Bettaso 2000	2000, Nov. 27-29	Bettaso et al. (GF)	L, M, U
Unmack 2001a	2001, April 14-15	Minckley, Unmack (ASU)	L, M, U
Clarkson 2001	2001, July 5	Clarkson (BR)	L

DOCUMENTS USED IN ARAVAIPA CREEK SAMPLING HISTORY
(for sampling not listed below, see SONFISHES database in Appendix 3)

SOURCE	SAMPLING DATE	COLLECTOR[1]	STREAM REACH[2]
Unmack 2001b	2001, Nov. 2-4	Minckley, Unmack (ASU)	L, M, U
Unmack 2002b	2002, April 13-14	Unmack, Reinthal (ASU, UA)	L, M, U
Childs 2004	2002, August 22 2002, September 3, 8	Childs (GF) Widmer, et al. (UA)	L U
Clarkson 2002	2002, Oct. 4	Clarkson (BR)	L
Reinthal 2002	2002, Oct. 18-21	Reinthal et al. (UA)	L, M, U
Carveth 2004	2002, Mar. 14, 21 2002, July 9, 22 2002, Aug. 9, 13, 19 2003, April 16 2003, June 23, 29	Carveth et al. (UA)	M,U L,M,U L,M,U L M,U
Reinthal 2003a	2003, April 5-4	Reinthal et al. (UA)	L, M, U
Reinthal 2003b	2003, Sept. 27-28	Reinthal et al. (UA)	L, M, U
Clarkson 2003	2003, Oct. 15	Clarkson (BR)	L
Reinthal 2004a	2004, April 16-18	Reinthal et al. (UA)	L, M, U
Clarkson 2004 (unpub. data)	2004, Sept. 28	Clarkson (BR)	L
Reinthal 2004b	2004, Oct 1-3	Reinthal et al. (UA)	L, M, U

[1] ACVF = Arizona Conservation Voters Habitat Fund
ASU = Arizona State University
BLM = U.S. Bureau of Land Management
BR = U.S. Bureau of Reclamation
FWS = U.S. Fish and Wildlife Service
GF = Arizona Game and Fish Department
NMSU = New Mexico State University
OFC = October (or Fall) Fish Count
TNC = The Nature Conservancy
UA = University of Arizona
USFS = U.S. Forest Service

[2] L= lower reach; M= middle reach; U=upper reach; T=tributary (see definitions in Methods section of text)

APPENDIX 2

ARAVAIPA CREEK SAMPLING EVENTS SUMMARY 1964-2004

YEAR	# OF MONTHS WITH SAMPLING EVENTS	NUMBER OF SAMPLING EVENTS[1]														
		TOTAL #	# PER COLLECTOR												# FOR MONITOR-ING[2]	# FOR RED SHINER SEARCH
			ASU	UA	MISC UNIV.	AGFD	OFC	FWS	USFS	BLM	TNC	BR	ACVF	MULT		
1964	6	6	6												1	
1965	5	6	5	1											2	
1966	9	10	9	1												
1967	10	10	10													
1968	0	0														
1969	2	3	2		1											
1970	3	3	2		1										2	
1971	1	1			1											
1972	4	4	4												4	
1973	5	5	5												4	
1974	3	3	3												3	
1975	5	7	7												3	
1976	5	6	5				1								2	
1977	8	10	8				1		1						2	
1978	11	12	12												2	
1979	9	9	9												3	
1980	5	5	4		1										3	
1981	6	6	3		3										3	
1982	5	5	4							1					4	
1983	5	6	4							2					3	
1984	6	6	3							3					3	
1985	3	3	2						1						2	
1986	4	4	3							1					3	
1987	7	9	9												3	
1988	5	7	4				1	2							4	
1989	11	17	13				2	2							3	
1990	8	10	7				1	1						1	4	2
1991	11	13	11				2								11	
1992	11	12	7		1		4								11	
1993	11	13	4				9								11	1
1994	4	5	3				2								4	
1995	5	5	4				1								2	1
1996	4	4	2								1			1	2	
1997	4	6	3				1		1		0.5	0.5			4	
1998	6	6	4				1.5					0.5			2	2
1999	4	5	3				0.33				0.33	0.33		1	3	
2000	4	5	4				1								3	
2001	3	3	2										1		3	
2002	7	10	1	6			2						1		3	
2003	4	4		3									1		3	
2004	3	3		2									1			
TOTAL	232	267	191	13	8	29.8	5	3	7	1.8	1.3	4	2	1	128	6

ARAVAIPA CREEK SAMPLING EVENTS SUMMARY 1964-2004

YEAR	# OF MONTHS WITH SAMPLING EVENTS	NUMBER OF SAMPLING EVENTS[1]														
		TOTAL #	# PER COLLECTOR												# FOR MONITOR -ING[2]	# FOR RED SHINER SEARCH
			ASU	UA	MISC UNIV.	AGFD	OFC	FWS	USFS	BLM	TNC	BR	ACVF	MULT		
percent of sampling events per collector			72%	5%	3%	11%	2%	1%	3%	0.7%	0%	1%	1%	0.4%		
average number of sampling events per year per collector			4.7	0.3	0.2	0.7	0.1	0.1	0.2	0.0	0.0	0.1	0.0	0.0		
mode number of sampling events per year per collector			4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
median number of sampling events per year per collector			4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

5.7 average number of months per year in which there has been sampling
5.0 mode of months per year in which there has been sampling
5.0 median of months per year in which there has been sampling
6.5 average number of sampling events per year
6.0 mode of number of sampling events per year
6.0 median of number of sampling events per year

monitoring and red shiner search as percent of sampling events	48%	2.2%
average monitoring events per year	3.1	
mode of sampling events per year	3.0	
median of sampling events per year	3.0	

See Appendix 1 for abbreviation definintions.

[1]If there was a SONFISHES record and a document record for the same entity in the same month, it was considered as one event. However, if the same entity had a monitoring event (from a document but not from SONFISHES) and a non-monitoring event in the same month, those were counted as two events.

Years with a #, meaning that there is data in Minckley's table, but no document or SONFISHES record, it was counted as one event total per year for each reach with a # – but only if there were no events for ASU in other reaches (assuming that data for the # reach was probably taken in the same month as data for a documented reach.

[2]May overestimate number of events due to double count if an ASU monitoring in one reach was recorded in one month and another reach in a separate month.

APPENDIX 3

ARIZONA STATE UNIVERSITY
SONFISHES DATABASE ENTRIES FOR ARAVAIPA CREEK

RECORD NUMBER	GENUS	SPECIES	COUNTY	DATE	NUMBER of SPECIMENS	COLLECTOR	CATALOG NUMBER	CITATION	LOCALITY	COMMENTS	SOURCE	NATIVE or NOT	YEAR
7764	Agosia	chrysogaster	Pinal	5	47	Heath WG	UAZ95-43	-	Aravaipa Creek	-	UAZ	native	0
7945	Agosia	chrysogaster	Pinal	5	1	Heath WG	UAZ95-183	-	Aravaipa Creek ~2400 feet	-	UAZ	native	0
7913	Agosia	chrysogaster	Pinal	5	0	-	UAZ95-144	-	Aravaipa Creek 2500 feet	-	UAZ	native	0
7930	Agosia	chrysogaster	Pinal	5	0	Heath WG	UAZ95-171	-	Aravaipa Creek 2600 feet	-	UAZ	native	0
693	Agosia	chrysogaster	Pinal	10311943	625	Simon Frost Hendrickson	UMMZ141720	Barber & Minckley 1966	Aravaipa Creek Aravaipa Canyon about 11 mi ENE Feldman 11-14 mi ENE Winkleman - Feldman Rd	ID RR Miller 32-64 mm Orig NoZ141720	UMMZ prim lit	native	1943
7835	Agosia	chrysogaster	Pinal	31101943	5	Simon J Hendrickson J	UAZ95-87	-	Arivaipa Creek 11-14 miles ENE Winkleman-Feldman road	-	UAZ	native	1943
25433	Agosia	chrysogaster	Pinal	26051949	-	WI Follett & RC Snyder	CORU18205	-	Aravaipa Cr. 12.6 mi from Winkleman on Mammoth Rd.	-	CORU	native	1949
7853	Agosia	chrysogaster	Pinal	15101949	1	Hock RJ	UAZ95-100	-	Aravaipa Creek	-	UAZ	native	1949
7620	Agosia	chrysogaster	Pinal	26051949	9	Follett WI Snyder RC	CORNU18205	-	Aravaipa Creek 12 6/10 miles from Winkleman	orig F49-10 ident EC Raney	CU	native	1949
8333	Agosia	chrysogaster	Graham	5001950	0	R R Miller	UMMZ162753	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	UMMZ prim lit	native	1950
281	Agosia	chrysogaster	Graham	5101950	172	RR & FH Miller & HE Winn	UMMZ162751	-	Aravaipa Creek near head of box canyon NW of Klondyke flood trib San Pedro River drainage	6-23 mm Original number M50-81 (strainers) ID by RR Miller & HE Winn	UMMZ	native	1950
7862	Agosia	chrysogaster	Pinal	10031952	0	Jantzen RA	UAZ95-111	-	Aravaipa Creek 6 miles from jct with San Pedro River	-	UAZ	native	1952

RECORD NUMBER	GENUS	SPECIES	COUNTY	DATE	NUMBER of SPECIMENS	COLLECTOR	CATALOG NUMBER	CITATION	LOCALITY	COMMENTS	SOURCE	NATIVE or NOT	YEAR
7864	Agosia	chrysogaster	Pinal	10051952	1	Jantzen RA	UAZ95-112	-	Aravaipa Creek Wilkinson Ranch	-	UAZ	native	1952
7871	Agosia	chrysogaster	Pinal	22031953	0	Lowe CH	UAZ95-115	-	Aravaipa Creek 10 miles NE jct 77 and Aravaipa road Coleman Ranch	-	UAZ	native	1953
7886	Agosia	chrysogaster	Pinal	27021954	0	Lowe CH	UAZ95-127	-	Aravaipa Creek Coleman Ranch 2650 feet	-	UAZ	native	1954
7782	Agosia	chrysogaster	Pinal	10031956	1	Zoo233	UAZ95-50	-	Aravaipa Creek Woods Ranch	-	UAZ	native	1956
7793	Agosia	chrysogaster	Pinal	15121957	9	Heath WG	UAZ95-56	-	Aravaipa Creek	-	UAZ	native	1957
7922	Agosia	chrysogaster	Pinal	15121957	0	Heath WG	UAZ95-147	-	Aravaipa Creek	-	UAZ	native	1957
7919	Agosia	chrysogaster	Pinal	17031957	0	-	UAZ95-145	-	Aravaipa Creek 2600 feet	-	UAZ	native	1957
7932	Agosia	chrysogaster	Pinal	14121958	0	Heath WG	UAZ95-172	-	Aravaipa Creek 2600 feet	-	UAZ	native	1958
7928	Agosia	chrysogaster	Pinal	23121958	0	Tremor Thomas	UAZ95-149	-	Aravaipa Creek Wood Brothers Ranch 2600 feet	-	UAZ	native	1958
7946	Agosia	chrysogaster	Pinal	23121959	0	Heath WG	UAZ95-184	-	Aravaipa Creek	-	UAZ	native	1959
7786	Agosia	chrysogaster	Pinal	27061959	29	Heath WG	UAZ95-52	-	Aravaipa Creek	-	UAZ	native	1959
7943	Agosia	chrysogaster	Pinal	26061959	17	Heath WG	UAZ95-182	-	Aravaipa Creek ~2600 feet	-	UAZ	native	1959
7808	Agosia	chrysogaster	Pinal	25041959	0	Heath WG	UAZ95-71	-	Aravaipa Creek 2600 feet	-	UAZ	native	1959
7814	Agosia	chrysogaster	Pinal	7031959	0	-	UAZ95-74	-	Aravaipa Creek Woods Ranch	-	UAZ	native	1959
7973	Agosia	chrysogaster	Pinal	16101960	16	Heath WG	UAZ95-207	-	Aravaipa Creek 12 miles E highway by road ~2500 feet	-	UAZ	native	1960
7964	Agosia	chrysogaster	Pinal	20031960	0	Heath WG	UAZ95-196	-	Aravaipa Creek 2800 feet	-	UAZ	native	1960
7965	Agosia	chrysogaster	Pinal	4041960	0	Heath WG	UAZ95-197	-	Aravaipa Creek 5/10 mile W Wildhorse Creek	-	UAZ	native	1960
8271	Agosia	chrysogaster	Pinal	4101963	0	E T Arnold	ASU	Barber & Minckley 1966	Aravaipa Creek Center E 1/2 Sec 9 T7S R16E	Station 1	ASU prim lit	native	1963

RECORD NUMBER	GENUS	SPECIES	COUNTY	DATE	NUMBER of SPECIMENS	COLLECTOR	CATALOG NUMBER	CITATION	LOCALITY	COMMENTS	SOURCE	NATIVE or NOT	YEAR
4582	Agosia	chrysogaster	Pinal	17041964	305	Minckley WL Wick A	ASU671	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964	ASU	native	1964
4583	Agosia	chrysogaster	Pinal	17041964	74	Minckley WL Wick A	ASU672	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964	ASU	native	1964
4572	Agosia	chrysogaster	Pinal	17041964	46	Minckley WL Wick A	ASU661	-	Aravaipa Creek 2 miles east turnoff from Highway 77 Aravaipa Canyon road	-	ASU	native	1964
4573	Agosia	chrysogaster	Pinal	17041964	208	Minckley WL Wick A	ASU662	-	Aravaipa Creek Aravaipa Canyon Road end121/2 miles from Highway 77	-	ASU	native	1964
4566	Agosia	chrysogaster	Pinal	10081964	17	Arnold ET	ASU411	-	Aravaipa Creek at Highway 77	-	ASU	native	1964
8276	Agosia	chrysogaster	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center NE 1/4 NW 1/4 Sec 8 T7S R17E	Station 3	ASU prim lit	native	1964
8312	Agosia	chrysogaster	Pinal	12231964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center NE1/4 Sec 17 T6S R18E	Station 9	ASU prim lit	native	1964
8285	Agosia	chrysogaster	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8291	Agosia	chrysogaster	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8338	Agosia	chrysogaster	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	ASU prim lit	native	1964
8301	Agosia	chrysogaster	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1964
8274	Agosia	chrysogaster	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek NE 1/4 NW 1/4 Sec 8 T7S R17E	Station 3	ASU prim lit	native	1964

RECORD NUMBER	GENUS	SPECIES	COUNTY	DATE	NUMBER of SPECIMENS	COLLECTOR	CATALOG NUMBER	CITATION	LOCALITY	COMMENTS	SOURCE	NATIVE or NOT	YEAR
7697	Agosia	chrysogaster	Pinal	14101964	6	Thomson DA Russell F	UAZ64-60	-	Aravaipa Creek near Wood Ranch 2600 feet	-	UAZ	native	1964
2183	Agosia	chrysogaster	Graham	22111964	75	Barber WE Gardner L	ASU1621	-	Aravaipa Creek NW 1/4 SW 1/4 S27 T6S R19E	-	ASU	native	1964
8349	Agosia	chrysogaster	Pinal	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek NW1/4 SW1/4 Sec 21 T6S R19E	Station 15	ASU prim lit	native	1964
4610	Agosia	chrysogaster	Pinal	22121964	0	Barber WE Gardner L	ASU1623	-	Aravaipa Creek S24 T6S R18E	-	ASU	native	1964
8272	Agosia	chrysogaster	Pinal	6111964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE 1/4 NE 1/4 Sec 11 T7S R16E	Station 2	ASU prim lit	native	1964
8344	Agosia	chrysogaster	Pinal	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 NW1/4 Sec 20 T6S R19E	Station 14	ASU prim lit	native	1964
8319	Agosia	chrysogaster	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 Sec 24 T6S R18E	Station 11	ASU prim lit	native	1964
8315	Agosia	chrysogaster	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 NE1/4 Sec 15 T6S R18E	Station 10	ASU prim lit	native	1964
8281	Agosia	chrysogaster	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 SW1/4 Sec 26 T6S R17E	Station 5	ASU prim lit	native	1964
4601	Agosia	chrysogaster	Pinal	6111964	139	Barber WE Gardner L	ASU1597	-	Aravaipa Creek T6S R17E boundary S13 24	-	ASU	native	1964
4606	Agosia	chrysogaster	Pinal	6111964	51	Barber WE Gardner L	ASU1602	-	Aravaipa Creek T6S R17E S24-NW 1/4 SW 1/4	-	ASU	native	1964
4609	Agosia	chrysogaster	Pinal	6111964	27	Barber WE Gardner L	ASU1605	-	Aravaipa Creek T6S R17E S24-NW 1/4 SW 1/4	-	ASU	native	1964
4613	Agosia	chrysogaster	Pinal	23121964	19	Barber WE Gardner L	ASU1626	-	Aravaipa Creek T6S R18E center S18	-	ASU	native	1964
2181	Agosia	chrysogaster	Graham	21111964	54	Barber WE Gardner L	ASU1619	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S21	-	ASU	native	1964

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2177	Agosia	chrysogaster	Graham	21111964	40	Barber WE Gardner L	ASU1615	-	Aravaipa Creek T6S R19E SE 1/4 NW 1/4 S20	-	ASU	native	1964
2172	Agosia	chrysogaster	Graham	21111964	78	Barber WE Gardner L	ASU1610	-	Aravaipa Creek T6S R19E SW 1/4 NE 1/4 S19	-	ASU	native	1964
2168	Agosia	chrysogaster	Graham	21111964	304	Barber WE Gardner L	ASU1606	-	Aravaipa Creek T6S R19E SW 1/4 SW 1/4 S27	-	ASU	native	1964
4598	Agosia	chrysogaster	Pinal	6111964	360	Barber WE Gardner L	ASU1594	-	Aravaipa Creek T7S R17E S8 NE 1/4 NW 1/4	-	ASU	native	1964
8352	Agosia	chrysogaster	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek W1/2 Sec 27 T6S R19E	Station 16	ASU prim lit	native	1964
8305	Agosia	chrysogaster	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1965
7710	Agosia	chrysogaster	Pinal	8051965	0	Adams GF	UAZ65-90	-	Aravaipa Creek E Brandenburg Peak at Wood Ranch Road	-	UAZ	native	1965
8325	Agosia	chrysogaster	Pinal	5011965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek E1/2 Sec 24 T6S R18E	Station 12	ASU prim lit	native	1965
4627	Agosia	chrysogaster	Pinal	1051965	104	Barber WE	ASU1799	-	Aravaipa Creek S24 T6S R18E	includes WEB-65-3 4	ASU	native	1965
8308	Agosia	chrysogaster	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 NW1/4 Sec 17 T6S R18E	Station 8	ASU prim lit	native	1965
4857	Agosia	chrysogaster	Pinal	4061966	0	Barber WE	ASU6124	-	Aravaipa Creek E 1/2 S24 T6S R18E	1300 hrs	ASU	native	1966
4859	Agosia	chrysogaster	Pinal	7081966	0	Barber WE	ASU6126	-	Aravaipa Creek E 1/2 S24 T6S R18E	1330 hrs	ASU	native	1966
4882	Agosia	chrysogaster	Pinal	4061966	0	Barber WE	ASU6149	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T65 R18E	-	ASU	native	1966
4872	Agosia	chrysogaster	Pinal	4061966	0	Barber WE	ASU6139	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1400 hrs	ASU	native	1966

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4867	Agosia	chrysogaster	Pinal	10071966	0	Barber WE	ASU6134	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	0700 hrs	ASU	native	1966
4870	Agosia	chrysogaster	Pinal	11111966	0	Barber WE	ASU6137	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1330-1515 hrs	ASU	native	1966
4871	Agosia	chrysogaster	Pinal	25061966	0	Barber WE	ASU6138	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1215 hrs	ASU	native	1966
4875	Agosia	chrysogaster	Pinal	25061966	0	Barber WE	ASU6142	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1815 hrs	ASU	native	1966
4879	Agosia	chrysogaster	Pinal	25061966	0	Barber WE	ASU6146	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1100 hrs	ASU	native	1966
4880	Agosia	chrysogaster	Pinal	25061966	0	Barber WE	ASU6147	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1615 hrs	ASU	native	1966
4860	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6127	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	2215 hrs	ASU	native	1966
4861	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6128	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1815 hrs	ASU	native	1966
4862	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6129	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	2215 hrs	ASU	native	1966
4865	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6132	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	0600 hrs	ASU	native	1966
4866	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6133	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	2215 hrs	ASU	native	1966
4874	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6141	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	0815 hrs	ASU	native	1966
4876	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6143	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1615 hrs	ASU	native	1966

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4877	Agosia	chrysogaster	Pinal	26061966	0	Barber WE	ASU6144	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	0940 hrs	ASU	native	1966
4883	Agosia	chrysogaster	Pinal	4061966	0	Barber WE	ASU6150	-	Aravaipa Creek NE 1/4 SE 1/4S24 T65 R18E	-	ASU	native	1966
4887	Agosia	chrysogaster	Pinal	4061966	0	Barber WE	ASU6154	-	Aravaipa Creek NE 1/4SE 1/4 S24 T65 R18E	-	ASU	native	1966
2553	Agosia	chrysogaster	Graham	17091966	0	Barber WE	ASU5962	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1210 hrs	ASU	native	1966
2551	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5960	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1445 hrs	ASU	native	1966
2552	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5961	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1445 hrs	ASU	native	1966
2577	Agosia	chrysogaster	Graham	4061966	0	Barber WE	ASU6111	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	0500 hrs	ASU	native	1966
2579	Agosia	chrysogaster	Graham	7081966	0	Barber WE	ASU6113	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1430 hrs	ASU	native	1966
2578	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU6112	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1700 hrs	ASU	native	1966
2580	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU6114	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	0500 hrs	ASU	native	1966
2563	Agosia	chrysogaster	Graham	10071966	0	Barber WE	ASU6097	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1200 hrs	ASU	native	1966
2564	Agosia	chrysogaster	Graham	10071966	0	Barber WE	ASU6098	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1200 hrs	ASU	native	1966
2572	Agosia	chrysogaster	Graham	10071966	0	Barber WE	ASU6106	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1200 hrs	ASU	native	1966

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2560	Agosia	chrysogaster	Graham	17091966	0	Barber WE	ASU6094	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1830 hrs	ASU	native	1966
2562	Agosia	chrysogaster	Graham	17091966	0	Barber WE	ASU6096	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1630-1830 hrs	ASU	native	1966
2561	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU6095	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1630 hrs	ASU	native	1966
2565	Agosia	chrysogaster	Graham	29071966	0	Barber WE	ASU6099	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1200 hrs	ASU	native	1966
2567	Agosia	chrysogaster	Graham	29071966	0	Barber WE	ASU6101	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1200 hrs	ASU	native	1966
2496	Agosia	chrysogaster	Graham	2111966	0	Barber WE	ASU5035	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2492	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5031	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2495	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5034	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2497	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5036	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2491	Agosia	chrysogaster	Graham	10031966	0	Barber WE	ASU5030	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2543	Agosia	chrysogaster	Graham	10121966	0	Barber WE	ASU5952	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	0920-1015 hrs	ASU	native	1966
2489	Agosia	chrysogaster	Graham	14011966	0	Barber WE	ASU5028	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2485	Agosia	chrysogaster	Graham	17091966	0	Barber WE	ASU5024	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966

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2478	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5017	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2487	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5026	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2494	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5033	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2482	Agosia	chrysogaster	Graham	28081966	0	Barber WE	ASU5021	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
2517	Agosia	chrysogaster	Graham	28081966	0	Barber WE	ASU5056	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1966
4896	Agosia	chrysogaster	Pinal	10121966	0	Barber WE	ASU6163	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1230-1430 hrs	ASU	native	1966
4897	Agosia	chrysogaster	Pinal	10121966	0	Barber WE	ASU6164	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1230-1430 hrs	ASU	native	1966
4892	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6159	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1300 hrs	ASU	native	1966
4894	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6161	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1400 hrs	ASU	native	1966
4898	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6165	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1040 hrs	ASU	native	1966
4899	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6166	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	0945 hrs	ASU	native	1966
4900	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6167	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1545 hrs	ASU	native	1966
4901	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6168	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1400 hrs	ASU	native	1966

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4902	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6169	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	0945 hrs	ASU	native	1966
4903	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6170	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1300 hrs	ASU	native	1966
4904	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6171	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1300 hrs	ASU	native	1966
4907	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6174	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1545 hrs	ASU	native	1966
4911	Agosia	chrysogaster	Pinal	14081966	0	Barber WE	ASU6178	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1400 hrs	ASU	native	1966
4893	Agosia	chrysogaster	Pinal	15101966	0	Barber WE	ASU6160	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1500 hrs	ASU	native	1966
4908	Agosia	chrysogaster	Pinal	10121966	0	Barber WE	ASU6175	-	Aravaipa Creek SW 1/4 NW 1/4 S26 T6S R17E	1045-1200 hrs	ASU	native	1966
2540	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5949	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2541	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5950	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1145 hrs	ASU	native	1966
2542	Agosia	chrysogaster	Graham	6081966	0	Barber WE	ASU5951	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1145 hrs	ASU	native	1966
2532	Agosia	chrysogaster	Graham	10071966	0	Barber WE	ASU5941	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2527	Agosia	chrysogaster	Graham	11111966	0	Barber WE	ASU5936	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1125-1205 hrs	ASU	native	1966
2533	Agosia	chrysogaster	Graham	11111966	0	Barber WE	ASU5942	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1125-1205	ASU	native	1966
2530	Agosia	chrysogaster	Graham	17091966	0	Barber WE	ASU5939	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2520	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5929	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2537	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5946	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1245 hrs	ASU	native	1966

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2538	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5947	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1245 hrs	ASU	native	1966
2539	Agosia	chrysogaster	Graham	23071966	0	Barber WE	ASU5948	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1245 hrs	ASU	native	1966
2529	Agosia	chrysogaster	Graham	28081966	0	Barber WE	ASU5938	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
7721	Agosia	chrysogaster	Pinal	5111966	6	Thomson D	UAZ66-134	-	lower Aravaipa Creek above Panorama (= Wood) Ranch	-	UAZ	native	1966
4855	Agosia	chrysogaster	Pinal	11031967	0	Barber WE	ASU6122	-	Aravaipa Creek E 1/2 S24 T6S R18E	1050-1120 hrs	ASU	native	1967
4854	Agosia	chrysogaster	Pinal	14011967	0	Barber WE	ASU6121	-	Aravaipa Creek E 1/2 S24 T6S R18E	1345 hrs	ASU	native	1967
4856	Agosia	chrysogaster	Pinal	30051967	0	Barber WE	ASU6123	-	Aravaipa Creek E 1/2 S24 T6S R18E	1445 hrs	ASU	native	1967
4863	Agosia	chrysogaster	Pinal	11031967	0	Barber WE	ASU6130	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1700-1715 hrs	ASU	native	1967
4864	Agosia	chrysogaster	Pinal	12021967	0	Barber WE	ASU6131	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1030 hrs	ASU	native	1967
4878	Agosia	chrysogaster	Pinal	12041967	0	Barber WE	ASU6145	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1815 hrs	ASU	native	1967
4881	Agosia	chrysogaster	Pinal	12041967	0	Barber WE	ASU6148	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1815 hrs	ASU	native	1967
4868	Agosia	chrysogaster	Pinal	30051967	0	Barber WE	ASU6135	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1345 hrs	ASU	native	1967
2547	Agosia	chrysogaster	Graham	10031967	0	Barber WE	ASU5956	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	2100-2130 hrs	ASU	native	1967
2548	Agosia	chrysogaster	Graham	11021967	0	Barber WE	ASU5957	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1530 hrs	ASU	native	1967
2549	Agosia	chrysogaster	Graham	11021967	0	Barber WE	ASU5958	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1700 hrs	ASU	native	1967

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2544	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU5953	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1100-1130 hrs	ASU	native	1967
2545	Agosia	chrysogaster	Graham	14011967	0	Barber WE	ASU5954	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1200-1330 hrs	ASU	native	1967
2546	Agosia	chrysogaster	Graham	14011967	0	Barber WE	ASU5955	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1200-1230 hrs	ASU	native	1967
2550	Agosia	chrysogaster	Graham	29071967	0	Barber WE	ASU5959	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	1115 hrs	ASU	native	1967
2465	Agosia	chrysogaster	Graham	30091967	0	Rinne JN Rinne M	ASU4711	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	-	ASU	native	1967
2555	Agosia	chrysogaster	Graham	9111967	0	Barber WE	ASU5964	-	Aravaipa Creek NW 1/4 SW 1/4 S35 T6S R19E	0815-0930 hrs	ASU	native	1967
2581	Agosia	chrysogaster	Graham	9011967	0	Barber WE	ASU6115	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	0500 hrs	ASU	native	1967
2582	Agosia	chrysogaster	Graham	21081967	0	Barber WE	ASU6116	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
2583	Agosia	chrysogaster	Graham	30051967	0	Barber WE	ASU6117	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1500 hrs	ASU	native	1967
2566	Agosia	chrysogaster	Graham	5051967	0	Barber WE	ASU6100	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0900 hrs	ASU	native	1967
2570	Agosia	chrysogaster	Graham	5051967	0	Barber WE	ASU6104	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0900 hrs	ASU	native	1967
2559	Agosia	chrysogaster	Graham	11031967	0	Barber WE	ASU6093	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0845 hrs	ASU	native	1967
2556	Agosia	chrysogaster	Graham	12021967	0	Barber WE	ASU6091	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1600 hrs	ASU	native	1967

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2557	Agosia	chrysogaster	Graham	12021967	0	Barber WE	ASU6092	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1230 hrs	ASU	native	1967
2569	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU6103	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0830 hrs	ASU	native	1967
2576	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU6110	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0830 hrs	ASU	native	1967
2571	Agosia	chrysogaster	Graham	21081967	0	Barber WE	ASU6105	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1967
2568	Agosia	chrysogaster	Graham	30051967	0	Barber WE	ASU6102	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	1610 hrs	ASU	native	1967
2460	Agosia	chrysogaster	Graham	30091967	0	Rinne JN Rinne M	ASU4706	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1967
4873	Agosia	chrysogaster	Pinal	20081967	0	Barber WE	ASU6140	-	Aravaipa Creek sta 11- NE 1/4SE 1/4 S24 T6S R18E	-	ASU	native	1967
2498	Agosia	chrysogaster	Graham	2021967	0	Barber WE	ASU5037	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2486	Agosia	chrysogaster	Graham	5051967	0	Barber WE	ASU5025	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2493	Agosia	chrysogaster	Graham	5051967	0	Barber WE	ASU5032	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2488	Agosia	chrysogaster	Graham	10031967	0	Barber WE	ASU5027	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2479	Agosia	chrysogaster	Graham	11021967	0	Barber WE	ASU5018	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2480	Agosia	chrysogaster	Graham	11021967	0	Barber WE	ASU5019	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967

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2518	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU5091	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2519	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU5092	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2499	Agosia	chrysogaster	Graham	14011967	0	Barber WE	ASU5038	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2481	Agosia	chrysogaster	Graham	21081967	0	Barber WE	ASU5020	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2483	Agosia	chrysogaster	Graham	29061967	0	Barber WE	ASU5022	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2490	Agosia	chrysogaster	Graham	29061967	0	Barber WE	ASU5029	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2484	Agosia	chrysogaster	Graham	29071967	0	Barber WE	ASU5023	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2500	Agosia	chrysogaster	Graham	31051967	0	Barber WE	ASU5039	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
4909	Agosia	chrysogaster	Pinal	9021967	0	Barber WE	ASU6176	-	Aravaipa Creek SW 1/4 NW 1/4 S26 T6S R17E	1015-1130 hrs	ASU	native	1967
4910	Agosia	chrysogaster	Pinal	9021967	0	Barber WE	ASU6177	-	Aravaipa Creek SW 1/4 NW 1/4 S26 T6S R17E	0815-0930 hrs	ASU	native	1967
2531	Agosia	chrysogaster	Graham	5051967	0	Barber WE	ASU5940	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2534	Agosia	chrysogaster	Graham	9021967	0	Barber WE	ASU5943	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1355 hrs	ASU	native	1967
2526	Agosia	chrysogaster	Graham	10031967	0	Barber WE	ASU5935	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2535	Agosia	chrysogaster	Graham	10031967	0	Barber WE	ASU5944	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1830 hrs	ASU	native	1967
2536	Agosia	chrysogaster	Graham	11021967	0	Barber WE	ASU5945	-	Aravaipa Creek SW 1/4 S27 T6S R19E	1355 hrs	ASU	native	1967

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2525	Agosia	chrysogaster	Graham	13041967	0	Barber WE	ASU5934	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2528	Agosia	chrysogaster	Graham	17091967	0	Barber WE	ASU5937	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2522	Agosia	chrysogaster	Graham	29061967	0	Barber WE	ASU5931	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2523	Agosia	chrysogaster	Graham	29061967	0	Barber WE	ASU5932	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2521	Agosia	chrysogaster	Graham	29071967	0	Barber WE	ASU5930	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2524	Agosia	chrysogaster	Graham	30051967	0	Barber WE	ASU5933	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
4891	Agosia	chrysogaster	Pinal	9021967	0	Barber WE	ASU6158	-	Aravaipa Creek SW 1/4NW 1/4 S24 T6S R17E	400 hrs	ASU	native	1967
2470	Agosia	chrysogaster	Graham	30091967	0	Rinne JN Rinne M	ASU4720	-	Aravaipa Creek W 1/2 S27 T6S R19E	-	ASU	native	1967
2452	Agosia	chrysogaster	Graham	29051969	0	Minckley WL	ASU4664	-	Aravaipa Creek at Salazar Ranch just above Turkey Creek	-	ASU	native	1969
4813	Agosia	chrysogaster	Pinal	20041969	0	Deacon JE Minckley WL	ASU4042	-	Aravaipa Creek at Woods Ranch	orig UNLV F1939	ASU	native	1969
20572	Agosia	chrysogaster	Pinal	20041969	-	JEDeacon	UNLV1939	-	Lower Aravaipa Cr SW Sec26 T6S R17E	-	UNLV	native	1969
7728	Agosia	chrysogaster	Pinal	8051970	0	Findley LT	UAZ70-61	-	Aravaipa Creek near Wood Ranch	-	UAZ	native	1970
17959	Agosia	chrysogaster	Pinal	14061971	210	Suttkus Clemmer & Caruso	TU71105	-	Aravaipa Creek 2.2 mi. NE of Mammoth.	-	TU	native	1971
4997	Agosia	chrysogaster	Pinal	30041972	0	class	ASU6655	-	Aravaipa Creek center E 1/2 NW 1/4 S15 T6S R18E	-	ASU	native	1972
4966	Agosia	chrysogaster	Pinal	22041972	0	class	ASU6624	-	Aravaipa Creek center N 1/2 S26 T6S R17E	-	ASU	native	1972
4987	Agosia	chrysogaster	Pinal	6051972	0	class	ASU6645	-	Aravaipa Creek center NW 1/4 S16 T6S R18E	-	ASU	native	1972
4988	Agosia	chrysogaster	Pinal	6051972	0	class	ASU6646	-	Aravaipa Creek center NW 1/4 S16 T6S R18E	-	ASU	native	1972

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4989	Agosia	chrysogaster	Pinal	6051972	0	class	ASU6647	-	Aravaipa Creek center NW 1/4 S16 T6S R18E	-	ASU	native	1972
4957	Agosia	chrysogaster	Pinal	22041972	0	class	ASU6615	-	Aravaipa Creek center SE 1/4 SE 1/4 S4 T7S R17E	-	ASU	native	1972
7745	Agosia	chrysogaster	Pinal	27121972	0	Peacock D	UAZ72-54	-	Aravaipa Creek Javelina Canyon	-	UAZ	native	1972
4953	Agosia	chrysogaster	Pinal	22041972	0	class	ASU6611	-	Aravaipa Creek NE 1/4 NW 1/4 S8 T7S R17E	-	ASU	native	1972
4958	Agosia	chrysogaster	Pinal	22041972	0	class	ASU6616	-	Aravaipa Creek NE 1/4 S34 T6S R17E	-	ASU	native	1972
10664	Agosia	chrysogaster	Pinal	22041972	20	Zoology 414	ASU13810	-	Aravaipa Creek Ruane Ranch	-	ASU	native	1972
10665	Agosia	chrysogaster	Pinal	22041972	10	Zoology 414	ASU13811	-	Aravaipa Creek Ruane Ranch	-	ASU	native	1972
4969	Agosia	chrysogaster	Pinal	23041972	0	class	ASU6627	-	Aravaipa Creek SE 1/4 SW 1/4 S23 T6S R17E	-	ASU	native	1972
4973	Agosia	chrysogaster	Pinal	21041972	0	class	ASU6631	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	-	ASU	native	1972
7744	Agosia	chrysogaster	Pinal	27121972	1	Peacock D	UAZ72-53	-	Aravaipa Creek warm springs area	-	UAZ	native	1972
5040	Agosia	chrysogaster	Pinal	10091973	0	McNatt RM	ASU7106	-	Aravaipa Creek 1/2 way between Booger Horse Camp Canyons	-	ASU	native	1973
5041	Agosia	chrysogaster	Pinal	10091973	0	McNatt RM	ASU7107	-	Aravaipa Creek 3/4 mile below first road crossing	-	ASU	native	1973
5001	Agosia	chrysogaster	Pinal	10091973	0	McNatt RM	ASU6698	-	Aravaipa Creek at Hell Hole Canyon	-	ASU	native	1973
5004	Agosia	chrysogaster	Pinal	9091973	0	McNatt RM	ASU6701	-	Aravaipa Creek at mouth Turkey Creek	-	ASU	native	1973
3055	Agosia	chrysogaster	Pinal	11091973	0	McNatt RM	ASU7091	-	Aravaipa Creek at mouth Virgus Canyon	-	ASU	native	1973

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5033	Agosia	chrysogaster	Pinal	11091973	0	McNatt RM	ASU7099	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1973
4947	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6320	-	Aravaipa Creek at Turkey Creek SE 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1974
4938	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6309	-	Aravaipa Creek center N 1/2 S24 T6S R18E	-	ASU	native	1974
4922	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6293	-	Aravaipa Creek center NE 1/4 NE 1/4 S34 T6S R19E	-	ASU	native	1974
4923	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6294	-	Aravaipa Creek center NE 1/4 NE 1/4 S34 T6S R19E	-	ASU	native	1974
4924	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6295	-	Aravaipa Creek center NE 1/4 NE 1/4 S34 T6S R19E	-	ASU	native	1974
4918	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6289	-	Aravaipa Creek center NW 1/4 SW 1/4 S21 T6S R19E	-	ASU	native	1974
4930	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6301	-	Aravaipa Creek center S 1/2-NE 1/4 S24 T6S R18E	-	ASU	native	1974
2596	Agosia	chrysogaster	Graham	9111974	0	class	ASU6326	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
2598	Agosia	chrysogaster	Graham	9111974	0	class	ASU6328	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
2603	Agosia	chrysogaster	Graham	9111974	0	class	ASU6751	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
4916	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6287	-	Aravaipa Creek E 1/2-S24 T6S R18E	-	ASU	native	1974
2591	Agosia	chrysogaster	Graham	9111974	0	class	ASU6321	-	Aravaipa Creek NE 1/4 NW 1/4 S35 T6S R19E	-	ASU	native	1974

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2592	Agosia	chrysogaster	Graham	9111974	0	class	ASU6322	-	Aravaipa Creek NE 1/4 NW 1/4 S35 T6S R19E	-	ASU	native	1974
4943	Agosia	chrysogaster	Pinal	10111974	0	class	ASU6316	-	Aravaipa Creek NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	native	1974
4932	Agosia	chrysogaster	Pinal	9111974	0	class	ASU6303	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1974
60931	Agosia	chrysogaster	Graham	10011975	63	Schreiber D	ASU17729	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60938	Agosia	chrysogaster	Graham	10011975	50	Schreiber D	ASU17736	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60944	Agosia	chrysogaster	Graham	10011975	49	Schreiber D	ASU17742	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60965	Agosia	chrysogaster	Graham	19011975	5	Schreiber D	ASU17763	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60954	Agosia	chrysogaster	Graham	24-25101975	38	Schreiber D	ASU17752	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975

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5015	Agosia	chrysogaster	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7012	-	Aravaipa Creek 1/2 mile north Horse Camp Canyon SE1/4 NW1/4 S6 T6S R18E	-	ASU	native	1976
2638	Agosia	chrysogaster	Graham	23101976	0	Minckley WL	ASU6999	-	Aravaipa Creek 200 yards west Turkey Creek NE 1/4 SW 1/4 S19 T6S R19E	-	ASU	native	1976
3049	Agosia	chrysogaster	Pinal	25101976	0	Minckley WL	ASU7016	-	Aravaipa Creek above Woods Diversion NE1/4 SE1/4 S24 T6S R17E	-	ASU	native	1976
5126	Agosia	chrysogaster	Pinal	11111976	0	Minckley WL	ASU7572	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1976
2762	Agosia	chrysogaster	Graham	11111976	0	Minckley WL	ASU7564	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1976
10647	Agosia	chrysogaster	Graham	17031976	2	Ginnely Frantz Silvey	ASU13793	-	Aravaipa Creek at confluence Turkey Creek 200 yds below BLM boundary	-	ASU	native	1976
5009	Agosia	chrysogaster	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7006	-	Aravaipa Creek at mouth Hell Hole Canyon NE1/4 SW1/4 S14 T6S R18E	-	ASU	native	1976
5020	Agosia	chrysogaster	Pinal	25101976	0	Minckley WL	ASU7024	-	Aravaipa Creek below Jeb Whites Ranch SW1/4 SE1/4 S34 T6S R17E	-	ASU	native	1976
2634	Agosia	chrysogaster	Graham	23101976	0	Minckley WL	ASU6995	-	Aravaipa Creek NE 1/4 SW 1/4 S20 T6S R19E	-	ASU	native	1976
2630	Agosia	chrysogaster	Graham	23101976	0	Minckley WL	ASU6991	-	Aravaipa Creek NE 1/4 SW 1/4 S28 T6S R19E mouth Maroga Canyon	-	ASU	native	1976
5026	Agosia	chrysogaster	Pinal	25101976	0	Minckley WL	ASU7030	-	Aravaipa Creek NE1/4 NW1/4 S8 T7S R17E	-	ASU	native	1976

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60956	Agosia	chrysogaster	Graham	30-31011976	42	Schreiber D	ASU17754	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1976
2625	Agosia	chrysogaster	Graham	23101976	0	Minckley WL	ASU6986	-	Aravaipa Creek SW 1/4 SE 1/4 S35 T6S R19E	-	ASU	native	1976
10644	Agosia	chrysogaster	Graham	17031976	12	Ginnely Frantz Silvey	ASU13790	-	Turkey Creek 250 yds above confluence Aravaipa Creek	-	ASU	native	1976
5083	Agosia	chrysogaster	Pinal	19071977	0	Siebert DJ	ASU7310	-	Aravaipa Creek 1/2 mile above Javalina Canyon	-	ASU	native	1977
5115	Agosia	chrysogaster	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7440	-	Aravaipa Creek 1/2 way between Javalina and Virgus canyons	-	ASU	native	1977
7639	Agosia	chrysogaster	Graham	7071977	3	Starnes WC Starnes LB	UAIC8789-01	-	Aravaipa Creek 10 miles west Klondyke	ident BH Bauer	UAIC	native	1977
2755	Agosia	chrysogaster	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7425	-	Aravaipa Creek 3090-ft contour	-	ASU	native	1977
2748	Agosia	chrysogaster	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7418	-	Aravaipa Creek 3150-ft contour	-	ASU	native	1977
2739	Agosia	chrysogaster	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7409	-	Aravaipa Creek 3220-ft contour	-	ASU	native	1977
5135	Agosia	chrysogaster	Pinal	4121977	0	Clarkson RW Kepner WG	ASU7650	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5057	Agosia	chrysogaster	Pinal	15021977	0	Minckley WL	ASU7194	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5075	Agosia	chrysogaster	Pinal	17071977	0	Siebert DJ	ASU7304	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5098	Agosia	chrysogaster	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7401	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5045	Agosia	chrysogaster	Pinal	24041977	0	Minckley WL	ASU7170	-	Aravaipa Creek at 2320-ft contour	-	ASU	native	1977
5139	Agosia	chrysogaster	Pinal	3121977	0	Clarkson RW Burton S	ASU7664	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977

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5062	Agosia	chrysogaster	Pinal	17071977	0	Siebert DJ	ASU7280	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5102	Agosia	chrysogaster	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7405	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5047	Agosia	chrysogaster	Pinal	15021977	0	Minckley WL	ASU7184	-	Aravaipa Creek at 2475-ft contour	-	ASU	native	1977
5131	Agosia	chrysogaster	Pinal	4121977	0	Clarkson RW Kepner WG	ASU7646	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5055	Agosia	chrysogaster	Pinal	15021977	0	Minckley WL	ASU7192	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5068	Agosia	chrysogaster	Pinal	16071977	0	Siebert DJ	ASU7290	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
5108	Agosia	chrysogaster	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7430	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
2728	Agosia	chrysogaster	Graham	16071977	0	Siebert D	ASU7296	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2685	Agosia	chrysogaster	Graham	19021977	0	Minckley WL	ASU7206	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2770	Agosia	chrysogaster	Graham	20101977	0	Kepner WG Siebert DJ	ASU7577	-	Aravaipa Creek at 3128-ft contour	-	ASU	native	1977
2802	Agosia	chrysogaster	Graham	3121977	0	Clarkson RW Kepner WG	ASU7640	-	Aravaipa Creek at 3150-ft contour	-	ASU	native	1977
2805	Agosia	chrysogaster	Graham	3121977	0	Clarkson RW Kepner WG	ASU7643	-	Aravaipa Creek at 3150-ft contour	-	ASU	native	1977
2717	Agosia	chrysogaster	Graham	16071977	0	Siebert D	ASU7274	-	Aravaipa Creek at 3150-ft contour	-	ASU	native	1977
2724	Agosia	chrysogaster	Graham	16071977	0	Siebert D	ASU7286	-	Aravaipa Creek at 3170-ft contour	-	ASU	native	1977
2671	Agosia	chrysogaster	Graham	23041977	0	Minckley WL	ASU7166	-	Aravaipa Creek at 3170-ft contour	-	ASU	native	1977
2676	Agosia	chrysogaster	Graham	19021977	0	Minckley WL	ASU7197	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1977
2721	Agosia	chrysogaster	Graham	16071977	0	Siebert D	ASU7278	-	Aravaipa Creek at 3330-ft contour	-	ASU	native	1977
5091	Agosia	chrysogaster	Pinal	20071977	0	Siebert DJ	ASU7318	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5121	Agosia	chrysogaster	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7446	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5095	Agosia	chrysogaster	Pinal	19071977	0	Siebert DJ	ASU7322	-	Aravaipa Creek at Parsons Canyon	-	ASU	native	1977

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2644	Agosia	chrysogaster	Graham	23041977	0	Siebert D	ASU7116	-	Aravaipa Creek near source	-	ASU	native	1977
2879	Agosia	chrysogaster	Graham	18021978	0	class	ASU7776	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1978
2889	Agosia	chrysogaster	Graham	18021978	0	class	ASU7786	-	Aravaipa Creek at 3150-ft contour	-	ASU	native	1978
2886	Agosia	chrysogaster	Graham	18021978	0	class	ASU7783	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1978
2892	Agosia	chrysogaster	Graham	18021978	0	class	ASU7789	-	Aravaipa Creek at 3300-ft contour	-	ASU	native	1978
2970	Agosia	chrysogaster	Graham	1978	0	Kepner WG Engard R	ASU8599	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
2971	Agosia	chrysogaster	Graham	1978	0	Kepner WG	ASU8601	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
2968	Agosia	chrysogaster	Graham	17011978	0	Kepner WG Porzer LM	ASU8575	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
2969	Agosia	chrysogaster	Graham	17011978	0	Kepner WG Porzer LM	ASU8597	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
2973	Agosia	chrysogaster	Graham	19081978	0	Kepner WG	ASU8604	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
2974	Agosia	chrysogaster	Graham	23091978	0	Kepner WG	ASU8606	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	native	1978
5147	Agosia	chrysogaster	Pinal	28031978	0	Kepner WG Siebert DJ	ASU8595	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105	ASU	native	1978
5150	Agosia	chrysogaster	Pinal	18061978	0	Kepner WG Engard R	ASU8600	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5152	Agosia	chrysogaster	Pinal	20081978	0	Kepner WG Porzer LM	ASU8605	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5149	Agosia	chrysogaster	Pinal	21051978	0	Kepner WG Porzer LM	ASU8598	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978

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5144	Agosia	chrysogaster	Pinal	22011978	0	Kepner WG Engard R	ASU8592	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5145	Agosia	chrysogaster	Pinal	22011978	0	Kepner WG Porzer LM	ASU8593	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5151	Agosia	chrysogaster	Pinal	23071978	0	Kepner WG Porzer LM	ASU8603	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5153	Agosia	chrysogaster	Pinal	24091978	0	Kepner WG Porzer LM	ASU8607	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5146	Agosia	chrysogaster	Pinal	26031978	0	Kepner WG Siebert DJ	ASU8594	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
5148	Agosia	chrysogaster	Pinal	28031978	0	Kepner WG Porzer LM	ASU8596	-	Aravaipa Creek T7S R17E NE 1/4 NW 1/4 S8	elev 2310	ASU	native	1978
3036	Agosia	chrysogaster	Pinal	16041983	1	Hendrickson DA class	ASU11695	-	Aravaipa Creek	30-60 mm several tuberculate	ASU	native	1983
51807	Agosia	chrysogaster	Pinal	30101983	27	-	-	-	ARAVAIPA CREEK 0.25 MI ABOVE HORSE CAMP CANYON	T06SR18ES16 NW4 325506 1103055	AZGF	native	1983
5188	Agosia	chrysogaster	Pinal	15091983	8	Karp K	ASU10617	-	Aravaipa Creek between Paisano and Hell Hole canyons	-	ASU	native	1983
51795	Agosia	chrysogaster	Pinal	29101983	1	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW PAISANO CANYON	T06SR18ES15 SW4 NE4 325451 1102918	AZGF	native	1983
51800	Agosia	chrysogaster	Pinal	30101983	4	-	-	-	ARAVAIPA CREEK MOUTH OF VIRGUS CANYON	T06SR18ES17 NE4 325500 1103118	AZGF	native	1983
51634	Agosia	chrysogaster	Graham	29101983	152	-	-	-	ARAVAIPA CREEK PRIMITIVE AREA	T06SR19ES20 SE4NE4 325357 1102518	AZGF	native	1983

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51663	Agosia	chrysogaster	Pinal	30101983	2	-	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NE4 NW4 NW4 325409 1103357	AZGF	native	1983
3023	Agosia	chrysogaster	Graham	24051985	0	Parkin DL	ASU11124	-	Aravaipa Creek at western visitors entrance to wilderness area	-	ASU	native	1985
5196	Agosia	chrysogaster	Pinal	27031987	0	Karp K	ASU11176	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1987
5204	Agosia	chrysogaster	Pinal	1041987	0	Karp K	ASU11184	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1987
9788	Agosia	chrysogaster	Graham	10081987	7	Young KL Abarca F	ASU14803	-	upper Aravaipa Creek T6S R19E S 21 28	30-60 mm SL	ASU	native	1987
51646	Agosia	chrysogaster	Graham	24091988	14	ALV TM DB JP CW DP	-	-	ARAVAIPA CREEK	T06SR19ES19 NE4 NE4 325400 1102608	AZGF	native	1988
51484	Agosia	chrysogaster	Graham	24091988	12	MRC & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW CHIMNEY UPSTREAM	T06SR19ES21 SW4 NW4 325342 1102456	AZGF	native	1988
51635	Agosia	chrysogaster	Graham	24091988	58	FTA & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW TO 225M ABOVE BEAR CANYON	T06SR19ES20 SE4NE4 325357 1102510	AZGF	native	1988
51477	Agosia	chrysogaster	Pinal	25091988	55	DAH DSK & ASU W.SOC.	-	-	ARAVAIPA CREEK IMMEDIATELY BELOW TAPIA DIVERSION	T06SR19ES28 NE4 SE4 325307 1102419	AZGF	native	1988
51626	Agosia	chrysogaster	Graham	24091988	25	SN SV GN MD MG WM +	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 NE4 SW4 325353 1102625	AZGF	native	1988
51546	Agosia	chrysogaster	Pinal	4101988	16	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	native	1988

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46171	Agosia	chrysogaster	Graham	7101989	50	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK 100 M BELOW TAPIA DIVERSION	T6SR19ES28N E4SE4	AZGF	native	1989
46178	Agosia	chrysogaster	Graham	7101989	52	DAH ET AL.	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1989
51485	Agosia	chrysogaster	Graham	7101989	130	DAH ET AL.	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4 SW4 325342 1102458	AZGF	native	1989
46198	Agosia	chrysogaster	Graham	7101989	120	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK EAST OF BEAR CANYON CROSSING	T6SR19ES20N E4SE4	AZGF	native	1989
51366	Agosia	chrysogaster	Pinal	19111989	52	TC CB CH NK SK	-	-	ARAVAIPA CREEK HOLY JOE RANCH - DIVERSION DOWNSTREAM	T07SR17ES04 325120 1103625	AZGF	native	1989
51569	Agosia	chrysogaster	Graham	7101989	4	DAH ET. AL.	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1989
51309	Agosia	chrysogaster	Pinal	18111989	85	TC CB CH NK SK	-	-	ARAVAIPA CREEK SYCAMORE TREE DOWNSTREAM ABOUT 300 m	T07SR17ES08 NW4 325032 1103728	AZGF	native	1989
61345	Agosia	chrysogaster	Graham	8041989	28	Dowling et al	ASU17111	-	Aravaipa Creek upper end	Tibbet CA PHD Diss AF in dissertation	ASU	native	1989
51554	Agosia	chrysogaster	Pinal	18111989	86	TC CB CH NK SK	-	-	ARAVAIPA CREEK WOODS DIVERSION UPSTREAM TO 1ST TRAIL X-ING	T06SR17ES24 NW4 SW4 325347 1103402	AZGF	native	1989
46179	Agosia	chrysogaster	Graham	30091990	32	TC PR MB FA	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1990
51301	Agosia	chrysogaster	Pinal	29091990	107	-	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1990
51437	Agosia	chrysogaster	Pinal	29091990	7	-	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1990

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51555	Agosia	chrysogaster	Pinal	29091990	23	-	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 325347 1103402	AZGF	native	1990
9646	Agosia	chrysogaster	Pinal	20101990	200	Minckley WL	ASU14549	-	lower Aravaipa Creek stations 1-7	10-55 mm stations combined	ASU	native	1990
9160	Agosia	chrysogaster	Graham	7111990	50	-	ASU12804	-	upper Aravaipa Creek below confluence Turkey Creek	-	ASU	native	1990
9159	Agosia	chrysogaster	Graham	7111990	4	-	ASU12803	-	upper Aravaipa Creek Between Bills Crossing & next crossing upstream	-	ASU	native	1990
9162	Agosia	chrysogaster	Graham	8111990	37	-	ASU12806	-	upper Aravaipa Creek near headwaters	-	ASU	native	1990
47118	Agosia	chrysogaster	Graham	4101991	10	J SIMMS A BAMMANN	-	-	TURKEY CREEK	T6SR19ES30N E4 NE4	AZGF	native	1991
47119	Agosia	chrysogaster	Graham	4101991	26	J SIMMS A BAMMANN	-	-	TURKEY CREEK	T6SR19ES30S E4 NE4	AZGF	native	1991
51486	Agosia	chrysogaster	Graham	9121992	54	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
51488	Agosia	chrysogaster	Graham	11081992	113	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
46192	Agosia	chrysogaster	Graham	11111992	156	DFG EB DW BR MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T6SR19ES21	AZGF	native	1992
51375	Agosia	chrysogaster	Graham	9121992	200	KLY RHB DBD JS EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
51376	Agosia	chrysogaster	Graham	10081992	696	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992

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49026	Agosia	chrysogaster	Graham	11111992	181	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1992
51716	Agosia	chrysogaster	Pinal	11081992	60	AV MW JS SD JY	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1992
49040	Agosia	chrysogaster	Pinal	11111992	99	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1992
51809	Agosia	chrysogaster	Pinal	11081992	46	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1992
49053	Agosia	chrysogaster	Pinal	11111992	138	RHB DBD JRS ALF	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1992
51756	Agosia	chrysogaster	Pinal	11081992	14	AV MW JS SD JY	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1992
49066	Agosia	chrysogaster	Pinal	12111992	51	RHB DBD ALF DFG	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1992
51302	Agosia	chrysogaster	Pinal	10121992	423	RHB DBD JRS BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES 8NW4 325032 1103728	AZGF	native	1992
51304	Agosia	chrysogaster	Pinal	12081992	545	AV MW JS SD JY	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES 8NW4 325032 1103728	AZGF	native	1992
51570	Agosia	chrysogaster	Graham	11081992	21	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
49093	Agosia	chrysogaster	Graham	10111992	37	RHB JS	-	-	ARAVAIPA CREEK TURKEY CREEK STATION	-	AZGF	native	1992
51665	Agosia	chrysogaster	Pinal	10121992	79	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992

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51666	Agosia	chrysogaster	Pinal	12081992	164	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992
49100	Agosia	chrysogaster	Pinal	12111992	484	RHB DBD ALF DFG	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1992
11726	Agosia	chrysogaster	Pinal	9021992	1	Velasco A Minckley WL class	ASU16287	-	Aravaipa Creek west end	-	ASU	native	1992
51439	Agosia	chrysogaster	Pinal	10121992	306	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1992
51440	Agosia	chrysogaster	Pinal	12081992	271	AV MW JS SD JY	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1992
49111	Agosia	chrysogaster	Pinal	12111992	196	-	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	native	1992
51487	Agosia	chrysogaster	Graham	9031993	74	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51491	Agosia	chrysogaster	Graham	15061993	87	CEP ALF EB MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51540	Agosia	chrysogaster	Graham	17021993	17	DAW JS EB XR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325343 1102458	AZGF	native	1993
49019	Agosia	chrysogaster	Graham	18081993	483	DBD MMS JTT JVB DFG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	-	AZGF	native	1993
51489	Agosia	chrysogaster	Graham	19051993	314	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993

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51490	Agosia	chrysogaster	Graham	29111993	607	RHB EEB DAW AWM	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51374	Agosia	chrysogaster	Graham	9031993	131	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51377	Agosia	chrysogaster	Graham	16061993	67	CEP ALF EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51380	Agosia	chrysogaster	Graham	17021993	74	DAW JS EB XR	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
49033	Agosia	chrysogaster	Graham	18081993	479	RHB DBD MMS CEP DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1993
51379	Agosia	chrysogaster	Graham	20051993	216	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51378	Agosia	chrysogaster	Graham	29111993	991	DBD MAL DTG MTF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51717	Agosia	chrysogaster	Pinal	10031993	2	RHB DBD DAW BR	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
49041	Agosia	chrysogaster	Pinal	19081993	82	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1993
51719	Agosia	chrysogaster	Pinal	20051993	17	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51718	Agosia	chrysogaster	Pinal	30111993	618	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993

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51808	Agosia	chrysogaster	Pinal	10031993	5	RHB DBD DAW BR AV	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
49054	Agosia	chrysogaster	Pinal	19081993	48	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1993
51806	Agosia	chrysogaster	Pinal	30111993	142	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51755	Agosia	chrysogaster	Pinal	10031993	8	RHB DBD DAW	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
49067	Agosia	chrysogaster	Pinal	20081993	96	RHB DBD MMS CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1993
51753	Agosia	chrysogaster	Pinal	21051993	26	ALF RHB BMR CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
51307	Agosia	chrysogaster	Pinal	1121993	3965	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51305	Agosia	chrysogaster	Pinal	10031993	314	KLY JS DG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51306	Agosia	chrysogaster	Pinal	15061993	1268	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51303	Agosia	chrysogaster	Pinal	16021993	83	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
49078	Agosia	chrysogaster	Pinal	19081993	1940	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	native	1993
51308	Agosia	chrysogaster	Pinal	20051993	1423	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1993

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51572	Agosia	chrysogaster	Graham	9031993	53	RHB DBD KLY DAW BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51574	Agosia	chrysogaster	Graham	15061993	116	CEP ALF EB MF	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
49086	Agosia	chrysogaster	Graham	18081993	200	RHB.EEB BMR MTF	-	-	ARAVAIPA CREEK TURKEY CREEK	-	AZGF	native	1993
51571	Agosia	chrysogaster	Graham	19051993	84	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51573	Agosia	chrysogaster	Graham	29111993	363	BPD JRS BMR SBZ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51661	Agosia	chrysogaster	Pinal	1121993	768	BPD DBD DAW MAL	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51664	Agosia	chrysogaster	Pinal	10031993	5	KLY JS DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51660	Agosia	chrysogaster	Pinal	16061993	123	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
49101	Agosia	chrysogaster	Pinal	20081993	306	BMR JTT D_J	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1993
51662	Agosia	chrysogaster	Pinal	21051993	115	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51435	Agosia	chrysogaster	Pinal	1121993	1412	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993

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51438	Agosia	chrysogaster	Pinal	11031993	153	DBD KLY RHB DAW	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51434	Agosia	chrysogaster	Pinal	15061993	650	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51432	Agosia	chrysogaster	Pinal	16021993	61	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
49112	Agosia	chrysogaster	Pinal	19081993	738	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	native	1993
51436	Agosia	chrysogaster	Pinal	20051993	149	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51483	Agosia	chrysogaster	Graham	5041994	398	SBZ EB LG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1994
51373	Agosia	chrysogaster	Graham	5041994	195	MAL DFG ML BH MM	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1994
51715	Agosia	chrysogaster	Pinal	6041994	241	DBD SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1994
51805	Agosia	chrysogaster	Pinal	6041994	25	DBD SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1994
51754	Agosia	chrysogaster	Pinal	7041994	52	DBD MAL SBZ ZSH MEM	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1994

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51300	Agosia	chrysogaster	Pinal	6041994	3449	MAL DFG JNY AWM BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 SW4NW4 325032 1103728	AZGF	native	1994
51568	Agosia	chrysogaster	Graham	5041994	256	DBD AWM JNY ZSH	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102836	AZGF	native	1994
51659	Agosia	chrysogaster	Pinal	7041994	414	DFG JNY AWM ML BH	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1994
51433	Agosia	chrysogaster	Graham	7041994	555	MAL DBD SBZ JNY AWM	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR19ES27 NE4SW4 325249 1103457	AZGF	native	1994
11962	Agosia	chrysogaster	Pinal	27071995	5	Simms JR Womack JD	ASU16524	-	Deer Creek (Hell Hole) tributary to Aravaipa Creek T6S R18E S13 S1/2 SW 1/4	-	ASU	native	1995
11967	Agosia	chrysogaster	Graham	26071995	2	Simms JR Womack JD	ASU16529						1995
51372	Agosia	chrysogaster	Graham	11061997	-	HAYES PORATH DAW	-	-	ARAVAIPA CREEK E BOUNDARY OF USFS/TNC PROPERTIES UPSTR 0.5 MI	T06SR19ES27 SE4 SW4 325242 1102330	AZGF	native	1997
60925	Agosia	chrysogaster	Pinal	11041999	107	D Brown et al	ASU17723	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	mostly very small	ASU	native	1999
8279	Ameiurus	melas	Pinal	2271965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 34 T6S R17E	Station 4	ASU prim lit	introduced	1965
4790	Ameiurus	melas	Pinal	15101966	2	Barber WE	ASU3454	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	introduced	1966

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51547	Ameiurus	natalis	Pinal	4101988	42	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	introduced	1988
51367	Ameiurus	natalis	Pinal	19111989	15	TC CB CH NK SK	-	-	ARAVAIPA CREEK HOLY JOE RANCH - DIVERSION DOWNSTREAM	T07SR17ES04 325120 1103625	AZGF	introduced	1989
51556	Ameiurus	natalis	Pinal	18111989	5	TC CB CH NK SK	-	-	ARAVAIPA CREEK WOODS DIVERSION UPSTREAM TO 1ST TRAIL X-ING	T06SR17ES24 NW4 SW4 325347 1103402	AZGF	introduced	1989
61635	Ameiurus	natalis	Pinal	prob around 1990-3	1	C Reimus et al	ASU17608	-	Aravaipa Creek lower end at Wagner Ranch (?) T6S R17E S13 SW 1/4	-	ASU	introduced	1990
51441	Ameiurus	natalis	Pinal	29091990	18	-	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	introduced	1990
9169	Ameiurus	natalis	Pinal	29091990	1	-	ASU12813	-	Aravaipa Creek Woods Ranch	-	ASU	introduced	1990
51557	Ameiurus	natalis	Pinal	29091990	38	-	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 325347 1103402	AZGF	introduced	1990
9649	Ameiurus	natalis	Pinal	20101990	2	Minckley WL	ASU14552	-	lower Aravaipa Creek stations 1-7	85-115 mm stations combined	ASU	introduced	1990
60825	Ameiurus	natalis	Pinal	10111991	12	Reimus C et al	ASU17623	-	Aravaipa Co lower end Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1991
10428	Ameiurus	natalis	Pinal	13041991	2	Velasco AA Simms J	ASU13574	-	Aravaipa Creek below J White Ranch	-	ASU	introduced	1991
46206	Ameiurus	natalis	Pinal	12101991	5	DAW JSP	-	-	ARAVAIPA CREEK JOEL RUBINS POND	T7SR17E	AZGF	introduced	1991
46215	Ameiurus	natalis	Pinal	11101991	18	DAW JSP FA	-	-	ARAVAIPA CREEK LARGE POND AT DR. GELDMACHERS	T7SR17E	AZGF	introduced	1991

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60832	Ameiurus	natalis	Pinal	10111991	12	Reimus C et al	ASU17630	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1991
60811	Ameiurus	natalis	Pinal	10111991	2	Reimus C et al	ASU17609	-	Aravaipa Creek lower end Whites Ranch T6S R17E S26 NW 1/4	-	ASU	introduced	1991
11588	Ameiurus	natalis	Pinal	21121991	2	Velasco AA	ASU16149	-	Aravaipa Creek Sycamore tree	-	ASU	introduced	1991
11586	Ameiurus	natalis	Pinal	21121991	1	Velasco AA	ASU16147	-	Aravaipa Creek Wagner Ranch	-	ASU	introduced	1991
9760	Ameiurus	natalis	Pinal	15081991	17	Velasco AA Childs M	ASU14761	-	Aravaipa Creek west end	20-75 mm SL miscellaneous from stomachs	ASU	introduced	1991
9741	Ameiurus	natalis	Pinal	14071991	1	Velasco AA Reimus C	ASU14724	-	Aravaipa Creek west end at Whites Ranch	55 mm SL	ASU	introduced	1991
9740	Ameiurus	natalis	Pinal	9061991	1	Reimus C Velasco AA	ASU14723	-	Aravaipa Creek west end Wagner Ranch	150 mm SL	ASU	introduced	1991
9277	Ameiurus	natalis	Pinal	12101991	1	AZGF	ASU12938	-	Joel Rubens pond in lower Aravaipa Canyon T7S R17E	-	ASU	introduced	1991
9935	Ameiurus	natalis	Pinal	10081991	97	Reimus C Jackle M	ASU15112	-	west end Aravaipa Creek	15-150 mm SL	ASU	introduced	1991
9729	Ameiurus	natalis	Pinal	15091991	7	Reimus C Velasco AA	ASU14712	-	west end Aravaipa Creek	40-85 mm SL	ASU	introduced	1991
9828	Ameiurus	natalis	Pinal	11051991	12	Velasco AA	ASU14844	-	west end Aravaipa Creek & in Canyon	100-180 mm SL	ASU	introduced	1991
9757	Ameiurus	natalis	Pinal	9021992	8	Velasco AA	ASU14758	-	Aravaipa Creek at Wagner Ranch Station	455 mm SL	ASU	introduced	1992
51810	Ameiurus	natalis	Pinal	11081992	3	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	introduced	1992
49055	Ameiurus	natalis	Pinal	11111992	3	RHB DBD JRS ALF	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	introduced	1992

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51757	Ameiurus	natalis	Pinal	11081992	1	AV MW JS SD JY	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	introduced	1992
51311	Ameiurus	natalis	Pinal	12081992	3	AV MW JS SD JY	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES 8NW4 325032 1103728	AZGF	introduced	1992
51670	Ameiurus	natalis	Pinal	12081992	11	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	introduced	1992
11587	Ameiurus	natalis	Pinal	19011992	1	Velasco AA	ASU16148	-	Aravaipa Creek Wagner Ranch	-	ASU	introduced	1992
11727	Ameiurus	natalis	Pinal	9021992	7	Velasco A Minckley WL class	ASU16288	-	Aravaipa Creek west end	-	ASU	introduced	1992
51442	Ameiurus	natalis	Pinal	12081992	19	AV MW JS SD JY	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	introduced	1992
49113	Ameiurus	natalis	Pinal	12111992	6	-	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	introduced	1992
9310	Ameiurus	natalis	Pinal	12071992	6	Bettaso R	ASU12971	-	Aravaipa Creek Whites Ranch T16N R16E	-	ASU	introduced	1992
9309	Ameiurus	natalis	Graham	12071992	2	Bettaso R	ASU12970	-	east end Aravaipa Creek	-	ASU	introduced	1992
10284	Ameiurus	natalis	Pinal	18041993	1	Norris SM Velasco AA	ASU15639	-	Aravaipa Creek below Highway 77	SMN 12-93	ASU	introduced	1993
49068	Ameiurus	natalis	Pinal	20081993	5	RHB DBD MMS CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	introduced	1993
51312	Ameiurus	natalis	Pinal	1121993	1	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	introduced	1993
49079	Ameiurus	natalis	Pinal	19081993	3	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	introduced	1993
51313	Ameiurus	natalis	Pinal	20051993	1	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	introduced	1993

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11593	Ameiurus	natalis	Pinal	23101993	5	Reimus C	ASU16154	-	Aravaipa Creek Sycamore tree station to ~3 miles below 23101993	-	ASU	introduced	1993
51669	Ameiurus	natalis	Pinal	1121993	1	BPD DBD DAW MAL	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	introduced	1993
49102	Ameiurus	natalis	Pinal	20081993	3	BMR JTT D_J	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	introduced	1993
51668	Ameiurus	natalis	Pinal	21051993	1	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	introduced	1993
49114	Ameiurus	natalis	Pinal	19081993	3	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	introduced	1993
51310	Ameiurus	natalis	Pinal	6041994	8	MAL DFG JNY AWM BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 SW4NW4 325032 1103728	AZGF	introduced	1994
51667	Ameiurus	natalis	Pinal	7041994	3	DFG JNY AWM ML BH	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	introduced	1994
12059	Ameiurus	natalis	Pinal	7101995	2	Sowka P class	ASU16621	-	Aravaipa Creek 1/2 way between Horse Camp and Painted Cave	-	ASU	introduced	1995
12056	Ameiurus	natalis	Pinal	7101995	1	Sowka P Zoology 410 class	ASU16618	-	Aravaipa Creek 1/4 between Hell Hole and Horse Camp	-	ASU	introduced	1995
11953	Ameiurus	natalis	Pinal	27081995	1	Jahrke ED	ASU16515	-	Aravaipa Creek between Woods Ranch and Aravaipa Ranch 6 sites	-	ASU	introduced	1995
61630	Ameiurus	natalis	Pinal	9111997	3	P Unmack M Baltzly	ASU17603	-	Aravaipa Creek lower end at TNC-BLM wild Boundery T6S R17E S13 SW 1/4	PU 97-143	ASU	introduced	1997

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61629	Ameiurus	natalis	Pinal	1111997	9	B Bagley et al	ASU17602	-	Aravaipa Creek mid section at Havalina Canyon confluence T6S R18E S18 NE 1/4	-	ASU	introduced	1997
40139	Ameiurus	natalis	Graham	16101997	2	Jeff Sims (BLM)	ASU17097	-	At Turkey Creek confluence and below Brandenburg (Whites Ranch)	(all in single jar 1 fish from each site) also collected on the 17th	ASU	introduced	1997
60814	Ameiurus	natalis	Pinal	1111998	1	Unmack P et al	ASU17612	-	Aravaipa Creek lower end Whites Ranch T6S R17E S26 NW 1/4	-	ASU	introduced	1998
61626	Ameiurus	natalis	Pinal	31101998	1	M Baltzly et al	ASU17599	-	Aravaipa Creek mid section at Virgus Canyon confluence T6S R18E S17 NE1/4	-	ASU	introduced	1998
60820	Ameiurus	natalis	Pinal	8081998	110	Unmack P Baltzly M	ASU17618	-	Aravaipa lower end a short distance above Sycamore Tee T7S R17E S8 NE 1/4	-	ASU	introduced	1998
60927	Ameiurus	natalis	Pinal	11041999	4	D Brown et al	ASU17725	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1999
51539	Catostomidae	-	Graham	19051993	218	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51431	Catostomidae	-	Graham	20051993	112	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51752	Catostomidae	-	Pinal	20051993	612	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993

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51841	Catostomidae	-	Pinal	20051993	118	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51780	Catostomidae	-	Pinal	21051993	47	ALF RHB BMR CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
51348	Catostomidae	-	Pinal	15061993	275	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51349	Catostomidae	-	Pinal	20051993	12	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1993
51625	Catostomidae	-	Graham	19051993	114	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51713	Catostomidae	-	Pinal	16061993	140	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51714	Catostomidae	-	Pinal	21051993	101	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51476	Catostomidae	-	Pinal	15061993	62	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
60929	Catostomidae	-	Pinal	11041999	104	D Brown et al	ASU17727	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	native	1999
4578	Catostomidae	hybrid	Pinal	17041964	1	Minckley WL Wick A	ASU667	-	Aravaipa Creek Aravaipa Canyon Road end 12 1/2 miles from Highway 77	Catostomus insignis X Pantosteus clarki	ASU	native	1964

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8289	Catostomidae	hybrid	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6 Catostomus insignis X Pantosteus clarki	ASU prim lit	native	1964
8324	Catostomidae	hybrid	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 Sec 24 T6S R18E	Station 11 Catostomus insignis X Pantosteus c clarki	ASU prim lit	native	1964
4605	Catostomidae	hybrid	Pinal	6111964	1	Barber WE Gardner L	ASU1601	-	Aravaipa Creek T6S R17E boundary S13 24	Catostomus insignis X Pantosteus c clarki	ASU	native	1964
2171	Catostomidae	hybrid	Graham	21111964	1	Barber WE Gardner L	ASU1609	-	Aravaipa Creek T6S R19E SW 1/4 SW 1/4 S27	Catostomus insignis X Pantosteus c clarki	ASU	native	1964
8355	Catostomidae	hybrid	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek W1/2 Sec 27 T6S R19E	Station 16 Catostomus insignis X Pantosteus c clarki	ASU prim lit	native	1964
4724	Catostomidae	hybrid	Pinal	25061966	3	Barber WE	ASU3299	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	Catostomus insignis X Pantosteus c clarki	ASU	native	1966
2419	Catostomidae	hybrid	Graham	13041967	1	Barber WE	ASU3386	-	Aravaipa Creek edge S20 21 T6S R19E	Catostomus insignis X Pantosteus c clarki	ASU	native	1967
2422	Catostomidae	hybrid	Graham	29071967	1	Barber WE	ASU3389	-	Aravaipa Creek edge S20 21 T6S R19E	Catostomus insignis X Pantosteus c clarki	ASU	native	1967
2405	Catostomidae	hybrid	Graham	11021967	1	Barber WE	ASU3372	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	Catostomus insignis X Pantosteus clarki	ASU	native	1967

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2370	Catostomidae	hybrid	Graham	11021967	3	Barber WE	ASU3337	-	Aravaipa Creek SW 1/4 S27 T6S R19E	Catostomus insignis X Pantosteus clarki	ASU	native	1967
2768	Catostomidae	hybrid	Graham	11111976	0	Minckley WL	ASU7570	-	Aravaipa Creek at 3090-ft contour	Catostomus insignis X Pantosteus c clarki	ASU	native	1976
5117	Catostomidae	hybrid	Pinal	23091977	1	Clarkson RW Siebert DJ	ASU7442	-	Aravaipa Creek 1/2 way between Javalina and Virgus canyons	Catostomus insignis X Pantosteus c clarki	ASU	native	1977
2810	Catostomidae	hybrid	Graham	3121977	0	Clarkson RW Burton S	ASU7656	-	Aravaipa Creek at 3090-ft contour	Catostomus insignis X Pantosteus c clarki	ASU	native	1977
2512	Catostomidae	larvae	Graham	10031967	0	Barber WE	ASU5051	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
2507	Catostomidae	larvae	Graham	13041967	0	Barber WE	ASU5046	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
2508	Catostomidae	larvae	Graham	14011967	0	Barber WE	ASU5047	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
7766	Catostomus	insignis	Pinal	5	7	Heath WG	UAZ95-43	-	Aravaipa Creek	-	UAZ	native	0
691	Catostomus	insignis	Pinal	10311943	42	Simon Frost Hendrickson	UMMZ141718	Barber & Minckley 1966	Aravaipa Creek Aravaipa Canyon about 11 mi ENE Feldman 11-14 mi ENE Winkleman - Feldman Rd	ID RR Miller 43-252 mm Orig NoZ141718	UMMZ prim lit	native	1943
7849	Catostomus	insignis	Pinal	26051949	0	Follett WI	UAZ95-98	-	Aravaipa Creek 10 9/10 miles above Winkleman-Mammoth road	-	UAZ	native	1949
7625	Catostomus	insignis	Pinal	26051949	1	Follett WI Snyder RC	CORNU18209	-	Aravaipa Creek 12 6/10 miles from Winkleman	orig F49-10 ident RE Jenkins	CU	native	1949

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8335	Catostomus	insignis	Graham	5001950	0	R R Miller	UMMZ162753	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	UMMZ prim lit	native	1950
280	Catostomus	insignis	Graham	5101950	27	RR & FH Miller & HE Winn	UMMZ162749	-	Aravaipa Creek near head of box canyon NW of Klondyke flood trib San Pedro River drainage	15-21 mm Original number M50-81 (strainers) ID by RR Miller & HE Winn	UMMZ	native	1950
7794	Catostomus	insignis	Pinal	15121957	1	Heath WG	UAZ95-56	-	Aravaipa Creek	-	UAZ	native	1957
7914	Catostomus	insignis	Pinal	17031957	0	-	UAZ95-145	-	Aravaipa Creek 2600 feet	-	UAZ	native	1957
7784	Catostomus	insignis	Pinal	27061959	17	Heath WG	UAZ95-52	-	Aravaipa Creek	-	UAZ	native	1959
7942	Catostomus	insignis	Pinal	26061959	5	Heath WG	UAZ95-182	-	Aravaipa Creek ~2600 feet	-	UAZ	native	1959
7977	Catostomus	insignis	Pinal	16101960	2	Heath WG	UAZ95-207	-	Aravaipa Creek 12 miles E highway by road ~2500 feet	-	UAZ	native	1960
7969	Catostomus	insignis	Graham	3041960	3	Heath WG	UAZ95-200	-	Aravaipa Creek at Turkey Creek	-	UAZ	native	1960
4579	Catostomus	insignis	Pinal	17041964	58	Minckley WL Wick A	ASU668	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964	ASU	native	1964
4591	Catostomus	insignis	Pinal	17041964	1	Minckley WL Wick A	ASU1236	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel	ASU	native	1964
4592	Catostomus	insignis	Pinal	17041964	1	Minckley WL Wick A	ASU1237	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel	ASU	native	1964
4593	Catostomus	insignis	Pinal	17041964	1	Minckley WL Wick A	ASU1238	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel male	ASU	native	1964
4594	Catostomus	insignis	Pinal	17041964	1	Minckley WL Wick A	ASU1239	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel female	ASU	native	1964

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4570	Catostomus	insignis	Pinal	17041964	1	Minckley WL Wick A	ASU659	-	Aravaipa Creek 2 miles east turnoff from Highway 77 Aravaipa Canyon road	-	ASU	native	1964
4571	Catostomus	insignis	Pinal	17041964	34	Minckley WL Wick A	ASU660	-	Aravaipa Creek 2 miles east turnoff from Highway 77 Aravaipa Canyon road	-	ASU	native	1964
4577	Catostomus	insignis	Pinal	17041964	29	Minckley WL Wick A	ASU666	-	Aravaipa Creek Aravaipa Canyon Road end121/2 miles from Highway 77	-	ASU	native	1964
8313	Catostomus	insignis	Pinal	12231964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center NE1/4 Sec 17 T6S R18E	Station 9	ASU prim lit	native	1964
8287	Catostomus	insignis	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8292	Catostomus	insignis	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8341	Catostomus	insignis	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	ASU prim lit	native	1964
8302	Catostomus	insignis	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1964
8351	Catostomus	insignis	Pinal	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek NW1/4 SW1/4 Sec 21 T6S R19E	Station 15	ASU prim lit	native	1964
8347	Catostomus	insignis	Pinal	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 NW1/4 Sec 20 T6S R19E	Station 14	ASU prim lit	native	1964
8322	Catostomus	insignis	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 Sec 24 T6S R18E	Station 11	ASU prim lit	native	1964

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8317	Catostomus	insignis	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 NE1/4 Sec 15 T6S R18E	Station 10	ASU prim lit	native	1964
8282	Catostomus	insignis	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 SW1/4 Sec 26 T6S R17E	Station 5	ASU prim lit	native	1964
4604	Catostomus	insignis	Pinal	6111964	39	Barber WE Gardner L	ASU1600	-	Aravaipa Creek T6S R17E boundary S13 24	-	ASU	native	1964
4608	Catostomus	insignis	Pinal	6111964	6	Barber WE Gardner L	ASU1604	-	Aravaipa Creek T6S R17E S24-NW 1/4 SW 1/4	-	ASU	native	1964
4615	Catostomus	insignis	Pinal	23121964	1	Barber WE Gardner L	ASU1628	-	Aravaipa Creek T6S R18E center S18	-	ASU	native	1964
2169	Catostomus	insignis	Graham	1111964	4	Barber WE Gardner L	ASU1607	-	Aravaipa Creek T6S R19E SW 1/4 SW 1/4 S27	-	ASU	native	1964
4599	Catostomus	insignis	Pinal	6111964	7	Barber WE Gardner L	ASU1595	-	Aravaipa Creek T7S R17E S8 NE 1/4 NW 1/4	-	ASU	native	1964
8277	Catostomus	insignis	Pinal	2271965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 34 T6S R17E	Station 4	ASU prim lit	native	1965
8306	Catostomus	insignis	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1965
7706	Catostomus	insignis	Pinal	8051965	1	Adams GF	UAZ65-90	-	Aravaipa Creek E Brandenburg Peak at Wood Ranch Road	-	UAZ	native	1965
8328	Catostomus	insignis	Pinal	5011965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek E1/2 Sec 24 T6S R18E	Station 12	ASU prim lit	native	1965
8310	Catostomus	insignis	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek E1/4 NW1/4 Sec 17 T6S R18E	Station 8	ASU prim lit	native	1965
4629	Catostomus	insignis	Pinal	1051965	64	Barber WE	ASU1801	-	Aravaipa Creek S24 T6S R18E	includes WEB-65-3 4	ASU	native	1965
4619	Catostomus	insignis	Pinal	27021965	6	Barber WE Koehn RK	ASU1632	-	Aravaipa Creek streamside reservoir T6S R17E S34	-	ASU	native	1965

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4623	Catostomus	insignis	Pinal	27021965	4	Barber WE Koehn RK	ASU1636	-	Aravaipa Creek T6S R17E boundary S13 24	-	ASU	native	1965
2410	Catostomus	insignis	Graham	17091966	10	Barber WE	ASU3377	-	Aravaipa Creek edge S20 21 T6S R19E	-	ASU	native	1966
2413	Catostomus	insignis	Graham	18091966	1	Barber WE	ASU3380	-	Aravaipa Creek edge S20 21 T6S R19E	-	ASU	native	1966
2408	Catostomus	insignis	Graham	23071966	2	Barber WE	ASU3375	-	Aravaipa Creek edge S20 21 T6S R19E	-	ASU	native	1966
2386	Catostomus	insignis	Graham	1111966	11	Barber WE	ASU3353	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1966
2380	Catostomus	insignis	Graham	6081966	12	Barber WE	ASU3347	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1966
2384	Catostomus	insignis	Graham	11091966	2	Barber WE	ASU3351	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1966
2382	Catostomus	insignis	Graham	28081966	6	Barber WE	ASU3349	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1966
2378	Catostomus	insignis	Graham	23071966	7	Barber WE	ASU3345	-	Aravaipa Creek edge S27-34 T6S R19E	-	ASU	native	1966
4805	Catostomus	insignis	Pinal	9021966	10	Barber WE	ASU3469	-	Aravaipa Creek NE 1/4 SE 1/4 S13 T6S R17E	-	ASU	native	1966
4802	Catostomus	insignis	Pinal	15101966	16	Barber WE	ASU3466	-	Aravaipa Creek NE 1/4 SE 1/4 S13 T6S R17E	-	ASU	native	1966
4889	Catostomus	insignis	Pinal	25061966	0	Barber WE	ASU6156	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S 18E	-	ASU	native	1966
4721	Catostomus	insignis	Pinal	4061966	5	Barber WE	ASU3296	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1966
4886	Catostomus	insignis	Pinal	4061966	0	Barber WE	ASU6153	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1030 hrs	ASU	native	1966
4723	Catostomus	insignis	Pinal	25061966	9	Barber WE	ASU3298	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1966
4799	Catostomus	insignis	Pinal	10121966	2	Barber WE	ASU3463	-	Aravaipa Creek NW 1/4 NE 1/4 S8 T7S R17E	-	ASU	native	1966

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4794	Catostomus	insignis	Pinal	14081966	6	Barber WE	ASU3458	-	Aravaipa Creek NW 1/4 NE 1/4 S8 T7S R17E	-	ASU	native	1966
4796	Catostomus	insignis	Pinal	15101966	5	Barber WE	ASU3460	-	Aravaipa Creek NW 1/4 NE 1/4 S8 T7S R17E	-	ASU	native	1966
4779	Catostomus	insignis	Pinal	9071966	15	Barber WE	ASU3433	-	Aravaipa Creek NW 1/4 NW 1/4 S24 -BM 2991 R18E T6S	-	ASU	native	1966
2345	Catostomus	insignis	Graham	10071966	5	Barber WE	ASU3312	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1966
2347	Catostomus	insignis	Graham	23071966	1	Barber WE	ASU3314	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1966
4792	Catostomus	insignis	Pinal	10121966	6	Barber WE	ASU3456	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1966
4787	Catostomus	insignis	Pinal	14081966	4	Barber WE	ASU3451	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1966
4789	Catostomus	insignis	Pinal	15101966	20	Barber WE	ASU3453	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1966
4764	Catostomus	insignis	Pinal	4061966	17	Barber WE	ASU3418	-	Aravaipa Creek SW 1/4 NE 1/4 S19 T6S R19E	-	ASU	native	1966
4767	Catostomus	insignis	Pinal	28081966	30	Barber WE	ASU3421	-	Aravaipa Creek SW 1/4 NE 1/4 S19 T6S R19E	-	ASU	native	1966
2398	Catostomus	insignis	Graham	7081966	5	Barber WE	ASU3365	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1966
2399	Catostomus	insignis	Graham	17091966	11	Barber WE	ASU3366	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1966
4905	Catostomus	insignis	Pinal	14081966	0	Barber WE	ASU6172	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1545 hrs	ASU	native	1966
4754	Catostomus	insignis	Pinal	10121966	3	Barber WE	ASU3408	-	Aravaipa Creek SW 1/4 S26 T6S R17E	-	ASU	native	1966
4752	Catostomus	insignis	Pinal	14081966	4	Barber WE	ASU3406	-	Aravaipa Creek SW 1/4 S26 T6S R17E	-	ASU	native	1966
2360	Catostomus	insignis	Graham	10071966	17	Barber WE	ASU3327	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966

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2368	Catostomus	insignis	Graham	11111966	13	Barber WE	ASU3335	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2362	Catostomus	insignis	Graham	23071966	10	Barber WE	ASU3329	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
2365	Catostomus	insignis	Graham	28081966	4	Barber WE	ASU3332	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1966
4829	Catostomus	insignis	Pinal	26061966	0	Barber WE	ASU4693	-	Aravaipa CreekSW 1/4 NE 1/4 S15 T6S R18E	-	ASU	native	1966
7718	Catostomus	insignis	Pinal	5111966	0	Thomson D	UAZ66-134	-	lower Aravaipa Creek above Panorama (= Wood) Ranch	-	UAZ	native	1966
8509	Catostomus	insignis	Pinal	7001966	31	Amin O	ASU	Amin 1969b	lower Aravaipa Creek just above White Ranch	collected 07001966-01001967	ASU prim lit	native	1966
4822	Catostomus	insignis	Pinal	30091967	0	Rinne M Rinne JN	ASU4602	-	Aravaipa Creek	-	ASU	native	1967
2417	Catostomus	insignis	Graham	13041967	1	Barber WE	ASU3384	-	Aravaipa Creek edge S20 21 T6S R19E	-	ASU	native	1967
2420	Catostomus	insignis	Graham	29071967	2	Barber WE	ASU3387	-	Aravaipa Creek edge S20 21 T6S R19E	-	ASU	native	1967
2393	Catostomus	insignis	Graham	13041967	16	Barber WE	ASU3360	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1967
4746	Catostomus	insignis	Pinal	4051967	2	Barber WE	ASU3400	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4740	Catostomus	insignis	Pinal	11031967	1	Barber WE	ASU3394	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4743	Catostomus	insignis	Pinal	12041967	6	Barber WE	ASU3397	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4738	Catostomus	insignis	Pinal	14011967	1	Barber WE	ASU3392	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4748	Catostomus	insignis	Pinal	29061967	4	Barber WE	ASU3402	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967

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4747	Catostomus	insignis	Pinal	30051967	1	Barber WE	ASU3401	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4734	Catostomus	insignis	Pinal	11031967	2	Barber WE	ASU3309	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
4730	Catostomus	insignis	Pinal	14011967	5	Barber WE	ASU3305	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
4809	Catostomus	insignis	Pinal	21081967	2	Barber WE	ASU3535	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
4728	Catostomus	insignis	Pinal	29071967	1	Barber WE	ASU3303	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
4726	Catostomus	insignis	Pinal	30051967	4	Barber WE	ASU3301	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
2356	Catostomus	insignis	Graham	5051967	1	Barber WE	ASU3323	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2352	Catostomus	insignis	Graham	11031967	4	Barber WE	ASU3319	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2349	Catostomus	insignis	Graham	12021967	45	Barber WE	ASU3316	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2358	Catostomus	insignis	Graham	29071967	1	Barber WE	ASU3325	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2441	Catostomus	insignis	Graham	21081967	1	Barber WE	ASU3532	-	Aravaipa Creek NW 1/4 S20 T6S R19E	-	ASU	native	1967
4793	Catostomus	insignis	Pinal	9021967	126	Barber WE	ASU3457	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1967
2463	Catostomus	insignis	Graham	30091967	0	Rinne JN Rinne M	ASU4709	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	-	ASU	native	1967
4778	Catostomus	insignis	Pinal	11031967	7	Barber WE	ASU3432	-	Aravaipa Creek SE 1/4 NW 1/4 S15 T6S R18E	-	ASU	native	1967
4775	Catostomus	insignis	Pinal	12021967	1	Barber WE	ASU3429	-	Aravaipa Creek SE 1/4 NW 1/4 S15 T6S R18E	-	ASU	native	1967

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2458	Catostomus	insignis	Graham	30091967	0	Rinne JN Rinne M	ASU4704	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1967
4761	Catostomus	insignis	Pinal	3051967	4	Barber WE	ASU3415	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4758	Catostomus	insignis	Pinal	12021967	1	Barber WE	ASU3412	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4762	Catostomus	insignis	Pinal	30051967	4	Barber WE	ASU3416	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4782	Catostomus	insignis	Pinal	11031967	5	Barber WE	ASU3446	-	Aravaipa Creek SW 1/4 NE 1/4 S14 T6S R18E	-	ASU	native	1967
4772	Catostomus	insignis	Pinal	11021967	1	Barber WE	ASU3426	-	Aravaipa Creek SW 1/4 NE 1/4 S19 T6S R19E	-	ASU	native	1967
4770	Catostomus	insignis	Pinal	14011967	1	Barber WE	ASU3424	-	Aravaipa Creek SW 1/4 NE 1/4 S19 T6S R19E	-	ASU	native	1967
2558	Catostomus	insignis	Graham	11021967	0	Barber WE	ASU6092	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	1230 hrs	ASU	native	1967
2516	Catostomus	insignis	Graham	13041967	0	Barber WE	ASU5055	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	-	ASU	native	1967
2403	Catostomus	insignis	Graham	11021967	5	Barber WE	ASU3370	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
2406	Catostomus	insignis	Graham	11031967	3	Barber WE	ASU3373	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
2431	Catostomus	insignis	Graham	12041967	1	Barber WE	ASU3442	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
2402	Catostomus	insignis	Graham	14011967	7	Barber WE	ASU3369	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967

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2434	Catostomus	insignis	Graham	21081967	14	Barber WE	ASU3525	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
2430	Catostomus	insignis	Graham	29071967	11	Barber WE	ASU3441	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
4755	Catostomus	insignis	Pinal	9021967	7	Barber WE	ASU3409	-	Aravaipa Creek SW 1/4 S26 T6S R17E	-	ASU	native	1967
2427	Catostomus	insignis	Graham	5051967	16	Barber WE	ASU3438	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2373	Catostomus	insignis	Graham	10031967	3	Barber WE	ASU3340	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2424	Catostomus	insignis	Graham	13041967	4	Barber WE	ASU3435	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2375	Catostomus	insignis	Graham	29051967	41	Barber WE	ASU3342	-	Aravaipa Creek SW 1/4 S27 T6S R19E	3 spec to Jay Schnell 2/24/76	ASU	native	1967
2377	Catostomus	insignis	Graham	30051967	1	Barber WE	ASU3344	-	Aravaipa Creek SW 1/4 S27 T6S R19E	-	ASU	native	1967
2451	Catostomus	insignis	Graham	29051969	0	Minckley WL	ASU4663	-	Aravaipa Creek at Salazar Ranch just above Turkey Creek	-	ASU	native	1969
4817	Catostomus	insignis	Pinal	20041969	0	Deacon JE Minckley WL	ASU4300	-	Aravaipa Creek at Woods Ranch	orig UNLV F1941	ASU	native	1969
20575	Catostomus	insignis	Pinal	20041969	-	JEDeacon	UNLV1941	-	Lower Aravaipa Cr SW Sec26 T6S R17E	-	UNLV	native	1969
20577	Catostomus	insignis	Pinal	20041969	-	JEDeacon	UNLV1943	-	Lower Aravaipa Cr SW Sec26 T6S R17E	-	UNLV	native	1969
7727	Catostomus	insignis	Pinal	8051970	1	Findley LT	UAZ70-61	-	Aravaipa Creek near Wood Ranch	-	UAZ	native	1970
17956	Catostomus	insignis	Pinal	14061971	82	Suttkus Clemmer & Caruso	TU71102	-	Aravaipa Creek 2.2 mi. NE of Mammoth.	-	TU	native	1971
5212	Catostomus	insignis	Pinal	22041972	0	class	ASU11344	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1972
4965	Catostomus	insignis	Pinal	22041972	0	class	ASU6623	-	Aravaipa Creek center N 1/2 S26 T6S R17E	-	ASU	native	1972
4956	Catostomus	insignis	Pinal	22041972	0	class	ASU6614	-	Aravaipa Creek center SE 1/4 SE 1/4 S4 T7S R17E	-	ASU	native	1972

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4979	Catostomus	insignis	Pinal	6051972	0	class	ASU6637	-	Aravaipa Creek Hells Half Acre Canyon center NE 1/4 S8 T6S R18E	-	ASU	native	1972
4971	Catostomus	insignis	Pinal	23041972	0	class	ASU6629	-	Aravaipa Creek SE 1/4 SW 1/4 S23 T6S R17E	-	ASU	native	1972
4976	Catostomus	insignis	Pinal	21041972	0	class	ASU6634	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	-	ASU	native	1972
5029	Catostomus	insignis	Pinal	11091973	0	McNatt RM	ASU7094	-	Aravaipa Creek 1/2 mile above Painted Cave Canyon	-	ASU	native	1973
5036	Catostomus	insignis	Pinal	10091973	0	McNatt RM	ASU7102	-	Aravaipa Creek 1/2 way between Booger Horse Camp Canyons	-	ASU	native	1973
3053	Catostomus	insignis	Pinal	11091973	0	McNatt RM	ASU7089	-	Aravaipa Creek at mouth Virgus Canyon	-	ASU	native	1973
4935	Catostomus	insignis	Pinal	9111974	0	class	ASU6306	-	Aravaipa Creek center N 1/2 S24 T6S R18E	-	ASU	native	1974
4936	Catostomus	insignis	Pinal	9111974	0	class	ASU6307	-	Aravaipa Creek center N 1/2 S24 T6S R18E	-	ASU	native	1974
4927	Catostomus	insignis	Pinal	9111974	0	class	ASU6298	-	Aravaipa Creek center S 1/2-NE 1/4 S24 T6S R18E	-	ASU	native	1974
2595	Catostomus	insignis	Graham	9111974	0	class	ASU6325	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
2602	Catostomus	insignis	Graham	9111974	0	class	ASU6750	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
4913	Catostomus	insignis	Pinal	9111974	0	class	ASU6284	-	Aravaipa Creek E 1/2 S24 T6S R18E	-	ASU	native	1974
4941	Catostomus	insignis	Pinal	10111974	0	class	ASU6314	-	Aravaipa Creek NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	native	1974

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2590	Catostomus	insignis	Graham	9111974	0	class	ASU6312	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1974
4946	Catostomus	insignis	Pinal	10111974	0	class	ASU6319	-	Virgus Canyon NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	native	1974
60936	Catostomus	insignis	Graham	10011975	22	Schreiber D	ASU17734	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60937	Catostomus	insignis	Graham	10011975	3	Schreiber D	ASU17735	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60943	Catostomus	insignis	Graham	10011975	5	Schreiber D	ASU17741	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60949	Catostomus	insignis	Graham	24-25101975	17	Schreiber D	ASU17747	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
5013	Catostomus	insignis	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7010	-	Aravaipa Creek 1/2 mile north Horse Camp Canyon SE1/4 NW1/4 S6 T6S R18E	-	ASU	native	1976
2636	Catostomus	insignis	Graham	23101976	0	Minckley WL	ASU6997	-	Aravaipa Creek 200 yards west Turkey Creek NE 1/4 SW 1/4 S19 T6S R19E	-	ASU	native	1976

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3047	Catostomus	insignis	Pinal	25101976	0	Minckley WL	ASU7014	-	Aravaipa Creek above Woods Diversion NE1/4 SE1/4 S24 T6S R17E	-	ASU	native	1976
2767	Catostomus	insignis	Graham	11111976	0	Minckley WL	ASU7569	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1976
5007	Catostomus	insignis	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7004	-	Aravaipa Creek at mouth Hell Hole Canyon NE1/4 SW1/4 S14 T6S R18E	-	ASU	native	1976
5018	Catostomus	insignis	Pinal	25101976	0	Minckley WL	ASU7022	-	Aravaipa Creek below Jeb Whites Ranch SW1/4 SE1/4 S34 T6S R17E	-	ASU	native	1976
2628	Catostomus	insignis	Graham	23101976	0	Minckley WL	ASU6989	-	Aravaipa Creek NE 1/4 SW 1/4 S28 T6S R19E mouth Maroga Canyon	-	ASU	native	1976
5024	Catostomus	insignis	Pinal	25101976	0	Minckley WL	ASU7028	-	Aravaipa Creek NE1/4 NW1/4 S8 T7S R17E	-	ASU	native	1976
60962	Catostomus	insignis	Graham	30-31011976	16	Schreiber D	ASU17760	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1976
2623	Catostomus	insignis	Graham	23101976	0	Minckley WL	ASU6984	-	Aravaipa Creek SW 1/4 SE 1/4 S35 T6S R19E	-	ASU	native	1976
10643	Catostomus	insignis	Graham	17031976	2	Ginnely Frantz Silvey	ASU13789	-	Turkey Creek 250 yds above confluence Aravaipa Creek	-	ASU	native	1976
5082	Catostomus	insignis	Pinal	19071977	0	Siebert DJ	ASU7309	-	Aravaipa Creek 1/2 mile above Javalina Canyon	-	ASU	native	1977

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5119	Catostomus	insignis	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7444	-	Aravaipa Creek 1/2 way between Javalina and Virgus canyons	-	ASU	native	1977
2756	Catostomus	insignis	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7426	-	Aravaipa Creek 3090-ft contour	-	ASU	native	1977
2745	Catostomus	insignis	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7415	-	Aravaipa Creek 3150-ft contour	-	ASU	native	1977
2743	Catostomus	insignis	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7413	-	Aravaipa Creek 3220-ft contour	-	ASU	native	1977
5073	Catostomus	insignis	Pinal	17071977	0	Siebert DJ	ASU7302	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5140	Catostomus	insignis	Pinal	3121977	0	Clarkson RW Burton S	ASU7665	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5063	Catostomus	insignis	Pinal	17071977	0	Siebert DJ	ASU7281	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5101	Catostomus	insignis	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7404	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5060	Catostomus	insignis	Pinal	15021977	0	Minckley WL	ASU7215	-	Aravaipa Creek at 2475-ft contour	-	ASU	native	1977
5133	Catostomus	insignis	Pinal	4121977	0	Clarkson RW Kepner WG	ASU7648	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5056	Catostomus	insignis	Pinal	15021977	0	Minckley WL	ASU7193	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5070	Catostomus	insignis	Pinal	16071977	0	Siebert DJ	ASU7292	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
5109	Catostomus	insignis	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7431	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
2809	Catostomus	insignis	Graham	3121977	0	Clarkson RW Burton S	ASU7654	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2814	Catostomus	insignis	Graham	3121977	0	Clarkson RW Burton S	ASU7660	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2727	Catostomus	insignis	Graham	16071977	0	Siebert D	ASU7295	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2804	Catostomus	insignis	Graham	3121977	0	Clarkson RW Kepner WG	ASU7642	-	Aravaipa Creek at 3150-ft contour	-	ASU	native	1977
2723	Catostomus	insignis	Graham	16071977	0	Siebert D	ASU7285	-	Aravaipa Creek at 3170-ft contour	-	ASU	native	1977
2680	Catostomus	insignis	Graham	19021977	0	Minckley WL	ASU7201	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1977

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5087	Catostomus	insignis	Pinal	20071977	0	Siebert DJ	ASU7314	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5120	Catostomus	insignis	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7445	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5114	Catostomus	insignis	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7439	-	Aravaipa Creek at Parsons Canyon	-	ASU	native	1977
5043	Catostomus	insignis	Pinal	24041977	0	Minckley WL	ASU7147	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1977
2646	Catostomus	insignis	Graham	23041977	0	Siebert D	ASU7118	-	Aravaipa Creek near source	-	ASU	native	1977
2884	Catostomus	insignis	Graham	18021978	0	class	ASU7781	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1978
7805	Catostomus	insignis	Pinal	15011980	2	Dye N Minckley B	UAZ95-64	-	Aravaipa Creek at Wood Ranch	-	UAZ	native	1980
51814	Catostomus	insignis	Pinal	30101983	26	-	-	-	ARAVAIPA CREEK 0.25 MI ABOVE HORSE CAMP CANYON	T06SR18ES16 NW4 325506 1103055	AZGF	native	1983
5191	Catostomus	insignis	Pinal	15091983	0	Karp K	ASU10620	-	Aravaipa Creek between Paisano and Hell Hole canyons	-	ASU	native	1983
51842	Catostomus	insignis	Pinal	30101983	1	-	-	-	ARAVAIPA CREEK CA. 0.25 MI ABOVE JAVALINA CANYON	T06SR18ES07 SE4 SE4 SE4 325511 1103203	AZGF	native	1983
51721	Catostomus	insignis	Pinal	29101983	13	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW HELL HOLE	T06SR18ES14 S2 S2 325425 1102759	AZGF	native	1983
51796	Catostomus	insignis	Pinal	29101983	10	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW PAISANO CANYON	T06SR18ES15 SW4 NE4 325451 1102918	AZGF	native	1983
51801	Catostomus	insignis	Pinal	30101983	2	-	-	-	ARAVAIPA CREEK MOUTH OF VIRGUS CANYON	T06SR18ES17 NE4 325500 1103118	AZGF	native	1983

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51636	Catostomus	insignis	Graham	29101983	29	-	-	-	ARAVAIPA CREEK PRIMITIVE AREA	T06SR19ES20 SE4NE4 325357 1102518	AZGF	native	1983
51675	Catostomus	insignis	Pinal	30101983	14	-	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NE4 NW4 NW4 325409 1103357	AZGF	native	1983
3020	Catostomus	insignis	Graham	24051985	0	Parkin DL	ASU11116	-	Aravaipa Creek at western visitors entrance to wilderness area.	-	ASU	native	1985
5199	Catostomus	insignis	Pinal	27031987	0	Karp K	ASU11179	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1987
51647	Catostomus	insignis	Graham	24091988	40	ALV TM DB JP CW DP	-	-	ARAVAIPA CREEK	T06SR19ES19 NE4 NE4 325400 1102608	AZGF	native	1988
51493	Catostomus	insignis	Graham	24091988	10	MRC & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW CHIMNEY UPSTREAM	T06SR19ES21 SW4 NW4 325342 1102456	AZGF	native	1988
51637	Catostomus	insignis	Graham	24091988	4	FTA & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW TO 225M ABOVE BEAR CANYON	T06SR19ES20 SE4NE4 325357 1102510	AZGF	native	1988
51478	Catostomus	insignis	Pinal	25091988	7	DAH DSK & ASU W.SOC.	-	-	ARAVAIPA CREEK IMMEDIATELY BELOW TAPIA DIVERSION	T06SR19ES28 NE4 SE4 325307 1102419	AZGF	native	1988
51627	Catostomus	insignis	Graham	24091988	19	SN SV GN MD MG WM +	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 NE4 SW4 325353 1102625	AZGF	native	1988
51548	Catostomus	insignis	Pinal	4101988	32	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	native	1988

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46172	Catostomus	insignis	Graham	7101989	40	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK 100 M BELOW TAPIA DIVERSION	T6SR19ES28N E4SE4	AZGF	native	1989
46180	Catostomus	insignis	Graham	7101989	64	DAH ET AL.	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1989
51494	Catostomus	insignis	Graham	7101989	84	DAH ET AL.	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4 SW4 325342 1102458	AZGF	native	1989
46199	Catostomus	insignis	Graham	7101989	34	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK EAST OF BEAR CANYON CROSSING	T6SR19ES20N E4SE4	AZGF	native	1989
51368	Catostomus	insignis	Pinal	19111989	8	TC CB CH NK SK	-	-	ARAVAIPA CREEK HOLY JOE RANCH - DIVERSION DOWNSTREAM	T07SR17ES04 325120 1103625	AZGF	native	1989
51576	Catostomus	insignis	Graham	7101989	679	DAH ET. AL.	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1989
51323	Catostomus	insignis	Pinal	18111989	3	TC CB CH NK SK	-	-	ARAVAIPA CREEK SYCAMORE TREE DOWNSTREAM ABOUT 300 m	T07SR17ES08 NW4 325032 1103728	AZGF	native	1989
51558	Catostomus	insignis	Pinal	18111989	13	TC CB CH NK SK	-	-	ARAVAIPA CREEK WOODS DIVERSION UPSTREAM TO 1ST TRAIL X-ING	T06SR17ES24 NW4 SW4 325347 1103402	AZGF	native	1989
46181	Catostomus	insignis	Graham	30091990	34	TC PR MB FA	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1990
51315	Catostomus	insignis	Pinal	29091990	3	-	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1990
51577	Catostomus	insignis	Graham	30091990	12	-	-	-	ARAVAIPA CREEK TURKEY CREEK (EAST END GAUGE)	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1990

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51448	Catostomus	insignis	Pinal	29091990	5	-	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1990
51559	Catostomus	insignis	Pinal	29091990	6	-	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 325347 1103402	AZGF	native	1990
46207	Catostomus	insignis	Pinal	12101991	6	DAW JSP	-	-	ARAVAIPA CREEK JOEL RUBINS POND	T7SR17E	AZGF	native	1991
46212	Catostomus	insignis	Pinal	11101991	42	DAW JSP FA	-	-	ARAVAIPA CREEK LARGE POND AT DR. GELDMACHERS	T7SR17E	AZGF	native	1991
47120	Catostomus	insignis	Graham	4101991	2	J SIMMS A BAMMANN	-	-	TURKEY CREEK	T6SR19ES30S E4 NE4	AZGF	native	1991
47121	Catostomus	insignis	Graham	4101991	9	J SIMMS A BAMMANN	-	-	TURKEY CREEK	T6SR19ES30N E4 NE4	AZGF	native	1991
51496	Catostomus	insignis	Graham	9121992	1	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
51497	Catostomus	insignis	Graham	11081992	4	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
46193	Catostomus	insignis	Graham	11111992	13	DFG EB DW BR MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T6SR19ES21	AZGF	native	1992
51384	Catostomus	insignis	Graham	9121992	6	KLY RHB DBD JS EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
51385	Catostomus	insignis	Graham	10081992	128	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
49027	Catostomus	insignis	Graham	11111992	17	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1992
51723	Catostomus	insignis	Pinal	11081992	36	AV MW JS SD JY	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1992

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49042	Catostomus	insignis	Pinal	11111992	31	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1992
51816	Catostomus	insignis	Pinal	11081992	31	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1992
49056	Catostomus	insignis	Pinal	11111992	20	RHB DBD JRS ALF	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1992
11710	Catostomus	insignis	Graham Pinal	51992	4	Velasco AA	ASU16271	-	Aravaipa Creek in Aravaipa Canyon	-	ASU	native	1992
51761	Catostomus	insignis	Pinal	11081992	7	AV MW JS SD JY	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1992
49069	Catostomus	insignis	Pinal	12111992	8	RHB DBD ALF DFG	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1992
51317	Catostomus	insignis	Pinal	10121992	9	RHB DBD JRS BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES 8NW4 325032 1103728	AZGF	native	1992
51316	Catostomus	insignis	Pinal	12081992	67	AV MW JS SD JY	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES 8NW4 325032 1103728	AZGF	native	1992
51578	Catostomus	insignis	Graham	9121992	2	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
51579	Catostomus	insignis	Graham	11081992	10	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
49094	Catostomus	insignis	Graham	10111992	13	RHB JS	-	-	ARAVAIPA CREEK TURKEY CREEK STATION	-	AZGF	native	1992
51678	Catostomus	insignis	Pinal	10121992	5	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992

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51677	Catostomus	insignis	Pinal	12081992	27	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992
49103	Catostomus	insignis	Pinal	12111992	17	RHB DBD ALF DFG	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1992
51450	Catostomus	insignis	Pinal	10121992	21	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1992
51451	Catostomus	insignis	Pinal	12081992	64	AV MW JS SD JY	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1992
49115	Catostomus	insignis	Pinal	12111992	55	-	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	native	1992
51495	Catostomus	insignis	Graham	9031993	1	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51500	Catostomus	insignis	Graham	15061993	32	CEP ALF EB MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51541	Catostomus	insignis	Graham	17021993	1	DAW JS EB XR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325343 1102458	AZGF	native	1993
49020	Catostomus	insignis	Graham	18081993	28	DBD MMS JTT JVB DFG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	-	AZGF	native	1993
51498	Catostomus	insignis	Graham	19051993	44	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51499	Catostomus	insignis	Graham	29111993	13	RHB EEB DAW AWM	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993

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51383	Catostomus	insignis	Graham	9031993	11	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51388	Catostomus	insignis	Graham	16061993	52	CEP ALF EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51389	Catostomus	insignis	Graham	17021993	6	DAW JS EB XR	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
49034	Catostomus	insignis	Graham	18081993	122	RHB DBD MMS CEP DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1993
51387	Catostomus	insignis	Graham	20051993	34	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51386	Catostomus	insignis	Graham	29111993	41	DBD MAL DTG MTF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51722	Catostomus	insignis	Pinal	10031993	2	RHB DBD DAW BR	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
49043	Catostomus	insignis	Pinal	19081993	28	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1993
51725	Catostomus	insignis	Pinal	20051993	25	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51724	Catostomus	insignis	Pinal	30111993	16	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51815	Catostomus	insignis	Pinal	10031993	7	RHB DBD DAW BR AV	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993

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49057	Catostomus	insignis	Pinal	19081993	36	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1993
51813	Catostomus	insignis	Pinal	20051993	39	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51812	Catostomus	insignis	Pinal	30111993	20	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51760	Catostomus	insignis	Pinal	10031993	11	RHB DBD DAW	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
49070	Catostomus	insignis	Pinal	20081993	68	RHB DBD MMS CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1993
51758	Catostomus	insignis	Pinal	21051993	8	ALF RHB BMR CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
51322	Catostomus	insignis	Pinal	1121993	370	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51318	Catostomus	insignis	Pinal	10031993	3	KLY JS DG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51320	Catostomus	insignis	Pinal	15061993	128	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51319	Catostomus	insignis	Pinal	16021993	3	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
49080	Catostomus	insignis	Pinal	19081993	660	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	native	1993
51321	Catostomus	insignis	Pinal	20051993	26	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1993

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51580	Catostomus	insignis	Graham	9031993	8	RHB DBD KLY DAW BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51583	Catostomus	insignis	Graham	15061993	20	CEP ALF EB MF	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
49087	Catostomus	insignis	Graham	18081993	36	RHB.EEB BMR MTF	-	-	ARAVAIPA CREEK TURKEY CREEK	-	AZGF	native	1993
51581	Catostomus	insignis	Graham	19051993	11	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51582	Catostomus	insignis	Graham	29111993	28	BPD JRS BMR SBZ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51674	Catostomus	insignis	Pinal	1121993	169	BPD DBD DAW MAL	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51676	Catostomus	insignis	Pinal	10031993	20	KLY JS DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51672	Catostomus	insignis	Pinal	16061993	27	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
49104	Catostomus	insignis	Pinal	20081993	109	BMR JTT D_J	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1993
51673	Catostomus	insignis	Pinal	21051993	23	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51446	Catostomus	insignis	Pinal	1121993	39	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993

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51449	Catostomus	insignis	Pinal	11031993	7	DBD KLY RHB DAW	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51445	Catostomus	insignis	Pinal	15061993	95	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51443	Catostomus	insignis	Pinal	16021993	6	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
49116	Catostomus	insignis	Pinal	19081993	178	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	native	1993
51447	Catostomus	insignis	Pinal	20051993	9	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51492	Catostomus	insignis	Graham	5041994	21	SBZ EB LG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1994
51382	Catostomus	insignis	Graham	5041994	31	MAL DFG ML BH MM	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1994
51720	Catostomus	insignis	Pinal	6041994	8	DBD SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1994
51811	Catostomus	insignis	Pinal	6041994	17	DBD SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1994
51759	Catostomus	insignis	Pinal	7041994	26	DBD MAL SBZ ZSH MEM	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1994

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51314	Catostomus	insignis	Pinal	6041994	133	MAL DFG JNY AWM BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 SW4NW4 325032 1103728	AZGF	native	1994
51575	Catostomus	insignis	Graham	5041994	48	DBD AWM JNY ZSH	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102836	AZGF	native	1994
51671	Catostomus	insignis	Pinal	7041994	50	DFG JNY AWM ML BH	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1994
51444	Catostomus	insignis	Graham	7041994	25	MAL DBD SBZ JNY AWM	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR19ES27 NE4SW4 325249 1103457	AZGF	native	1994
11966	Catostomus	insignis	Graham	26071995	3	Simms JR Womack JD	ASU16528						1995
51381	Catostomus	insignis	Graham	11061997	-	HAYES PORATH DAW	-	-	ARAVAIPA CREEK E BOUNDARY OF USFS/TNC PROPERTIES UPSTR 0.5 MI	T06SR19ES27 SE4 SW4 325242 1102330	AZGF	native	1997
2351	Composite	larvae	Graham	12021967	0	Barber WE	ASU3318	-	Aravaipa Creek NW 1/4 S20 R19E T6S	mixed larval collection	ASU	native	1967
9168	Cyprinella	lutrensis	Pinal	29091990	1	-	ASU12812	-	lower Aravaipa Creek at Brandenberg Wash	-	ASU	introduced	1990
9648	Cyprinella	lutrensis	Pinal	20101990	30	Minckley WL	ASU14551	-	lower Aravaipa Creek stations 1-7	30-50 mm stations combined	ASU	introduced	1990
9161	Cyprinella	lutrensis	Graham	7111990	2	-	ASU12805	-	upper Aravaipa Creek below Confluence Turkey Creek	-	ASU	introduced	1990
9158	Cyprinella	lutrensis	Graham	7111990	1	-	ASU12802	-	upper Aravaipa Creek Between Bills Crossing & next crossing upstream	-	ASU	introduced	1990

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9163	Cyprinella	lutrensis	Graham	9111990	2	-	ASU12807	-	upper Aravaipa Creek between second and third crossing above Bills Crossing	-	ASU	introduced	1990
9696	Cyprinella	lutrensis	Pinal	10021991	1	Minckley WL	ASU14643	-	Aravaipa Creek old sycamore to illegal diversion	40 mm SL	ASU	introduced	1991
9965	Cyprinella	lutrensis	Pinal	21991	1	Stefferud JA	ASU15170	-	west end Aravaipa Creek 100 m below Crossing at Whites Ranch	-	ASU	introduced	1991
61632	Cyprinella	lutrensis	Pinal	9111997	19	P Unmack M Baltzly	ASU17605	-	Aravaipa Creek lower end at TNC-BLM wild Boundery T6S R17E S13 SW 1/4	PU 97-143	ASU	introduced	1997
60830	Cyprinella	lutrensis	Pinal	9111997	10	Unmack P Baltzly M Burtons	ASU17628	-	Aravaipa Creek lower end near end of paved road T7S R17E S11 NW 1/4	PU 97 142	ASU	introduced	1997
40140	Cyprinella	lutrensis	Graham	16101997	6	Jeff Sims (BLM)	ASU17098	-	At Turkey Creek confluence and below Brandenburg (Whites Ranch)	(all in single jar 2 at T.Ck. 4 at Brandenburg) also collected on the 17th	ASU	introduced	1997
60818	Cyprinella	lutrensis	Pinal	41998	33	Unmack P et al	ASU17616	-	Aravaipa Creek lower end a short distance above Sycamore Tree T7S R17E S8 NE 1/4	-	ASU	introduced	1998
61633	Cyprinella	lutrensis	Pinal	1111998	2	D Brown et al (?)	ASU17606	-	Aravaipa Creek lower end at TNC-BLM wild Boundery T6S R17E S13 SW 1/4	-	ASU	introduced	1998

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60813	Cyprinella	lutrensis	Pinal	1111998	12	Unmack P et al	ASU17611	-	Aravaipa Creek lower end Whites Ranch T6S R17E S26 NW 1/4	-	ASU	introduced	1998
61623	Cyprinella	lutrensis	Pinal	10041998	1	M Baltzly et al	ASU17596	-	Aravaipa Creek mid section at Booger Canyon confluence T6S R18E S15 NW 1/4	-	ASU	introduced	1998
61621	Cyprinella	lutrensis	Pinal	31101998	1	M Baltzly et al	ASU17594	-	Aravaipa Creek mid section at Parsons Canyon confluence T6S R18E S24 NW 1/4	-	ASU	introduced	1998
61625	Cyprinella	lutrensis	Pinal	41998	3	P Unmack et al	ASU17598	-	Aravaipa Creek mid section at Virgus Canyon confluence T6S R18E S17 NE1/4	-	ASU	introduced	1998
61619	Cyprinella	lutrensis	Graham	31101998	1	P Unmack et al	ASU17592	-	Aravaipa Creek upper end at Chimney Rock T6S R19E S27 SW 1/4	-	ASU	introduced	1998
60823	Cyprinella	lutrensis	Pinal	8081998	2	Unmack P Baltzly M	ASU17621	-	Aravaipa lower end a short distance above Sycamore Tee T7S R17E S8 NE 1/4	-	ASU	introduced	1998
60810	Cyprinella	lutrensis	Pinal	18/20101999	44	AGFD Nongame	ASU17264	-	Aravaipa Creek	Field Tag # DAW001	ASU	introduced	1999
60924	Cyprinella	lutrensis	Pinal	11041999	23	D Brown et al	ASU17722	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1999

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4832	Cyprinidae	hybrid	Pinal	26061966	0	Barber WE	ASU4696	-	Aravaipa Creek SW 1/4 NE 1/4 S15 T6S R18E	Campostoma ornatum X Gila robusta? specimen id checked by WLM unclear as to exactly what it is!	ASU	native	1966
2503	Cyprinidae	larvae	Graham	11111966	0	Barber WE	ASU5042	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1966
4895	Cyprinidae	larvae	Pinal	15101966	0	Barber WE	ASU6162	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1200-1300 hrs misc larvae	ASU	native	1966
4858	Cyprinidae	larvae	Pinal	11031967	0	Barber WE	ASU6125	-	Aravaipa Creek E 1/2 S24 T6S R18E	misc cypriniform larvae1050 hrs	ASU	native	1967
2423	Cyprinidae	larvae	Graham	29071967	0	Barber WE	ASU3390	-	Aravaipa Creek edge S20 21 T6S R19E	misc larvae	ASU	native	1967
2390	Cyprinidae	larvae	Graham	11021967	85	Barber WE	ASU3357	-	Aravaipa Creek edge S27 34 T6S R19E	mixed larval collection	ASU	native	1967
4741	Cyprinidae	larvae	Pinal	11031967	23	Barber WE	ASU3395	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	misc larvae	ASU	native	1967
4750	Cyprinidae	larvae	Pinal	29061967	9	Barber WE	ASU3404	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	misc larvae	ASU	native	1967
2354	Cyprinidae	larvae	Graham	11031967	221	Barber WE	ASU3321	-	Aravaipa Creek NW 1/4 S20 R19E T6S	mixed larval collection	ASU	native	1967
2554	Cyprinidae	larvae	Graham	13041967	0	Barber WE	ASU5963	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	misc larvae 1100-1130 hrs	ASU	native	1967
2584	Cyprinidae	larvae	Graham	26031967	0	Barber WE	ASU6118	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1200 hours misc larvae	ASU	native	1967
2585	Cyprinidae	larvae	Graham	26031967	0	Barber WE	ASU6119	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1230 hours misc larvae	ASU	native	1967

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2586	Cyprinidae	larvae	Graham	26031967	0	Barber WE	ASU6120	-	Aravaipa Creek SE 1/4 NW 1/4 S19 T6S R19E	1130 hours misc larvae	ASU	native	1967
2575	Cyprinidae	larvae	Graham	25031967	0	Barber WE	ASU6109	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0830 hours misc larvae	ASU	native	1967
4784	Cyprinidae	larvae	Pinal	11031967	149	Barber WE	ASU3448	-	Aravaipa Creek SW 1/4 NE 1/4 S14 T6S R18E	misc larvae	ASU	native	1967
4774	Cyprinidae	larvae	Pinal	30051967	0	Barber WE	ASU3428	-	Aravaipa Creek SW 1/4 NE 1/4 S19 T6S R19E	misc larvae	ASU	native	1967
2510	Cyprinidae	larvae	Graham	10031967	0	Barber WE	ASU5049	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
2502	Cyprinidae	larvae	Graham	14011967	0	Barber WE	ASU5041	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
2511	Cyprinidae	larvae	Graham	29071967	0	Barber WE	ASU5050	-	Aravaipa Creek SW 1/4 NE 1/4 S35 T6S R19E	misc larvae	ASU	native	1967
2433	Cyprinidae	larvae	Graham	12041967	27	Barber WE	ASU3444	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	misc larvae	ASU	native	1967
2374	Cyprinidae	larvae	Graham	10031967	50	Barber WE	ASU3341	-	Aravaipa Creek SW 1/4 S27 T6S R19E	mixed larvae	ASU	native	1967
2426	Cyprinidae	larvae	Graham	29071967	27	Barber WE	ASU3437	-	Aravaipa Creek SW 1/4 S27 T6S R19E	misc larvae	ASU	native	1967
4978	Cyprinidae	larvae	Pinal	21041972	0	class	ASU6636	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	Tiaroga or Rhinichthys	ASU	native	1972
11709	Cyprinidae	larvae	Graham Pinal	51992	2	Velasco AA	ASU16270	-	Aravaipa Creek in Aravaipa Canyon	larvae	ASU	native	1992
9761	Cyprinus	carpio	Pinal	25111989	1	Williams C M	ASU14762	-	Aravaipa Creek T6S R17E S34 SW 1/4	130 mm SL	ASU	introduced	1989
4808	Gambusia	affinis	Pinal	14081966	1	Barber WE	ASU3472	-	Aravaipa Creek at junction with San Pedro	-	ASU	introduced	1966
5203	Gambusia	affinis	Pinal	1041987	0	Karp K	ASU11183	-	Aravaipa Creek at Woods Ranch	-	ASU	introduced	1987

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51549	Gambusia	affinis	Pinal	4101988	11	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	introduced	1988
51359	Gambusia	affinis	Pinal	19111989	58	TC CB CH NK SK	-	-	ARAVAIPA CREEK HOLY JOE RANCH - DIVERSION DOWNSTREAM	T07SR17ES04 325120 1103625	AZGF	introduced	1989
51326	Gambusia	affinis	Pinal	18111989	89	TC CB CH NK SK	-	-	ARAVAIPA CREEK SYCAMORE TREE DOWNSTREAM ABOUT 300 m	T07SR17ES08 NW4 325032 1103728	AZGF	introduced	1989
51324	Gambusia	affinis	Pinal	29091990	1	-	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	introduced	1990
9647	Gambusia	affinis	Pinal	20101990	200	Minckley WL	ASU14550	-	lower Aravaipa Creek stations 1-7	5-50 mm stations combined	ASU	introduced	1990
60824	Gambusia	affinis	Pinal	10111991	20	Reimus C et al	ASU17622	-	Aravaipa Co lower end Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1991
60828	Gambusia	affinis	Pinal	13101991	1	McKenzie M J	ASU17626	-	Aravaipa Creek lower end Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1991
9316	Gambusia	affinis	Pinal	11101991	9	AZGF	ASU12977	-	Geldmachers large pond lower Aravaipa Canyon T7S R17E	-	ASU	introduced	1991
9217	Gambusia	affinis	Pinal	11101991	35	AZGF	ASU12875	-	Geldmachers pond Holy Joe Ranch T7S R17E	-	ASU	introduced	1991
9932	Gambusia	affinis	Pinal	10081991	50	Reimus C Jackle M	ASU15109	-	west end Aravaipa Creek	20-45 mm SL	ASU	introduced	1991
9930	Gambusia	affinis	Pinal	11101991	1	Reimus C	ASU15107	-	west end Aravaipa Creek	15-40 mm SL	ASU	introduced	1991
9931	Gambusia	affinis	Pinal	13071991	62	Velasco AA	ASU15108	-	west end Aravaipa Creek	20-45 mm SL	ASU	introduced	1991
9933	Gambusia	affinis	Pinal	15091991	29	Reimus C Velasco T	ASU15110	-	west end Aravaipa Creek	10-40 mm SL	ASU	introduced	1991

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11590	Gambusia	affinis	Pinal	1031992	6	Velasco AA	ASU16151	-	Aravaipa Creek above guest house near Woods Ranch	-	ASU	introduced	1992
11589	Gambusia	affinis	Pinal	19011992	4	Velasco AA	ASU16150	-	Aravaipa Creek Sycamore tree	-	ASU	introduced	1992
11728	Gambusia	affinis	Pinal	9021992	59	Velasco A Minckley WL class	ASU16289	-	Aravaipa Creek west end	-	ASU	introduced	1992
51453	Gambusia	affinis	Pinal	10121992	2	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	introduced	1992
9311	Gambusia	affinis	Pinal	12071992	2	Bettaso R	ASU12972	-	Aravaipa Creek Whites Ranch T16N R16E	-	ASU	introduced	1992
51325	Gambusia	affinis	Pinal	1121993	9	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	introduced	1993
49081	Gambusia	affinis	Pinal	19081993	26	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	introduced	1993
11591	Gambusia	affinis	Pinal	23101993	201	Reimus C	ASU16152	-	Aravaipa Creek Sycamore tree station to ~3 miles below 23101993	-	ASU	introduced	1993
51452	Gambusia	affinis	Pinal	1121993	1	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	introduced	1993
40134	Gambusia	affinis	Pinal	16101994	156	Knowles et al.	ASU16859	-	Aravaipa Creek at Sycamore tree	-	ASU	introduced	1994
60829	Gambusia	affinis	Pinal	9111997	2	Unmack P Baltzly M Burtons	ASU17627	-	Aravaipa Creek lower end near end of paved road T7S R17E S11 NW 1/4	PU 97 142	ASU	introduced	1997
60815	Gambusia	affinis	Pinal	41998	6	Unmack P et al	ASU17613	-	Aravaipa Creek lower end a short distance above Sycamore Tree T7S R17E S8 NE 1/4	-	ASU	introduced	1998

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60821	Gambusia	affinis	Pinal	8081998	2	Unmack P Baltzly M	ASU17619	-	Aravaipa lower end a short distance above Sycamore Tee T7S R17E S8 NE 1/4	-	ASU	introduced	1998
60926	Gambusia	affinis	Pinal	11041999	14	D Brown et al	ASU17724	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1999
2996	Gila	intermedia	Graham	17051983	0	DeMarais BD	ASU10411	-	upper Bonita Creek	155 mm female	ASU	native	1983
694	Gila	robusta	Pinal	10311943	61	Simon Frost Hendrickson	UMMZ141721	Barber & Minckley 1966	Aravaipa Creek Aravaipa Canyon about 11 mi ENE Feldman 11-14 mi ENE Winkleman - Feldman Rd	ID RR Miller 41-204 mm Orig NoZ141721 intergrade intermedia x robusta 5 additional specimens returned	UMMZ prim lit	native	1943
7837	Gila	robusta	Pinal	31101943	0	Simon J Hendrickson J	UAZ95-87	-	Arivaipa Creek 11-14 miles ENE Winkleman-Feldman road	-	UAZ	native	1943
25432	Gila	robusta	Pinal	26051949	-	WI Follett & RC Snyder	CORU18204	-	Aravaipa Cr. 12.6 mi from Winkleman on Mammoth Rd.	-	CORU	native	1949
7623	Gila	robusta	Pinal	26051949	1	Follett WI Snyder RC	CORNU18204	-	Aravaipa Creek 12 6/10 miles from Winkleman	orig F49-10 ident EC Raney	CU	native	1949
8332	Gila	robusta	Graham	5001950	0	R R Miller	UMMZ162753	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	UMMZ prim lit	native	1950
7867	Gila	robusta	Pinal	22031953	0	Lowe CH	UAZ95-115	-	Aravaipa Creek 10 miles NE jct 77 and Aravaipa road Coleman Ranch	-	UAZ	native	1953
7899	Gila	robusta	Pinal	26021955	0	-	UAZ95-134	-	Aravaipa Creek 2650 feet	-	UAZ	native	1955
7918	Gila	robusta	Pinal	17031957	0	-	UAZ95-145	-	Aravaipa Creek 2600 feet	-	UAZ	native	1957

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7816	Gila	robusta	Pinal	7031959	1	-	UAZ95-74.	-	Aravaipa Creek Woods Ranch	-	UAZ	native	1959
7976	Gila	robusta	Pinal	16101960	16	Heath WG	UAZ95-207	-	Aravaipa Creek 12 miles E highway by road ~2500 feet	-	UAZ	native	1960
7967	Gila	robusta	Pinal	3041960	1	Heath WG	UAZ95-199	-	Aravaipa Creek at old Deer Creek	-	UAZ	native	1960
7992	Gila	robusta	Pinal	15041964	1	-	UAZ95-219	-	Aravaipa Creek ~2 miles W Wood Ranch	-	UAZ	native	1964
4581	Gila	robusta	Pinal	17041964	39	Minckley WL Wick A	ASU670	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964	ASU	native	1964
4587	Gila	robusta	Pinal	17041964	1	Minckley WL Wick A	ASU1232	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel male124 mm	ASU	native	1964
4588	Gila	robusta	Pinal	17041964	1	Minckley WL Wick A	ASU1233	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel female107 mm	ASU	native	1964
4589	Gila	robusta	Pinal	17041964	1	Minckley WL Wick A	ASU1234	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 ripe female138 mm skel	ASU	native	1964
4590	Gila	robusta	Pinal	17041964	1	Minckley WL Wick A	ASU1235	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont18041964 female129 mm skel	ASU	native	1964
4597	Gila	robusta	Pinal	17041964	1	Minckley WL Wick A	ASU1434	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964 skel male117 mm	ASU	native	1964
4575	Gila	robusta	Pinal	17041964	2	Minckley WL Wick A	ASU664	-	Aravaipa Creek Aravaipa Canyon Road end121/2 miles from Highway 77	-	ASU	native	1964

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8284	Gila	robusta	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8290	Gila	robusta	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8337	Gila	robusta	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	ASU prim lit	native	1964
8300	Gila	robusta	Pinal	11061964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1964
4612	Gila	robusta	Pinal	22121964	2	Barber WE Gardner L	ASU1625	-	Aravaipa Creek S24 T6S R18E	-	ASU	native	1964
8280	Gila	robusta	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 SW1/4 Sec 26 T6S R17E	Station 5	ASU prim lit	native	1964
4602	Gila	robusta	Pinal	6111964	2	Barber WE Gardner L	ASU1598	-	Aravaipa Creek T6S R17E boundary S13 24	-	ASU	native	1964
8304	Gila	robusta	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center SW1/4 NW1/4 Sec 24 T6S R17E	Station 7	ASU prim lit	native	1965
7708	Gila	robusta	Pinal	8051965	0	Adams GF	UAZ65-90	-	Aravaipa Creek E Brandenburg Peak at Wood Ranch Road	-	UAZ	native	1965
8326	Gila	robusta	Pinal	5011965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek E1/2 Sec 24 T6S R18E	Station 12	ASU prim lit	native	1965
4624	Gila	robusta	Pinal	1051965	3	Barber WE	ASU1796	-	Aravaipa Creek S24 T6S R18E	includes WEB-65-3 4	ASU	native	1965
4621	Gila	robusta	Pinal	27021965	6	Barber WE Koehn RK	ASU1634	-	Aravaipa Creek T6S R17E boundary S13 24	-	ASU	native	1965
4709	Gila	robusta	Pinal	4061966	6	Barber WE	ASU3106	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1966
4708	Gila	robusta	Pinal	11111966	4	Barber WE	ASU3097	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1966

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4720	Gila	robusta	Pinal	15101966	0	Barber WE	ASU3117	-	Aravaipa Creek NE 1/4 SE 1/4 S13 R17E T6S	-	ASU	native	1966
4706	Gila	robusta	Pinal	10121966	2	Barber WE	ASU3095	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1966
4705	Gila	robusta	Pinal	15101966	7	Barber WE	ASU3094	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1966
2334	Gila	robusta	Graham	17091966	2	Barber WE	ASU3100	-	Aravaipa Creek SW 1/4 1/4 S19 R19E T6S	-	ASU	native	1966
2333	Gila	robusta	Graham	7081966	1	Barber WE	ASU3099	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1966
7722	Gila	robusta	Pinal	5111966	1	Thomson D	UAZ66-134	-	lower Aravaipa Creek above Panorama (= Wood) Ranch	-	UAZ	native	1966
4823	Gila	robusta	Pinal	30091967	0	Rinne M Rinne JN	ASU4603	-	Aravaipa Creek	-	ASU	native	1967
4704	Gila	robusta	Pinal	3051967	8	Barber WE	ASU3093	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4702	Gila	robusta	Pinal	11031967	4	Barber WE	ASU3091	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	2 spec to Jay Schnell 2241976	ASU	native	1967
4701	Gila	robusta	Pinal	12021967	3	Barber WE	ASU3090	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4703	Gila	robusta	Pinal	12041967	2	Barber WE	ASU3092	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4700	Gila	robusta	Pinal	14011967	3	Barber WE	ASU3089	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4710	Gila	robusta	Pinal	11061967	2	Barber WE	ASU3107	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4711	Gila	robusta	Pinal	12041967	2	Barber WE	ASU3108	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967

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4713	Gila	robusta	Pinal	29071967	2	Barber WE	ASU3110	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4712	Gila	robusta	Pinal	30051967	1	Barber WE	ASU3109	-	Aravaipa Creek NE 1/4 NW 1/4 S24 T6S R18E	-	ASU	native	1967
4707	Gila	robusta	Pinal	9021967	7	Barber WE	ASU3096	-	Aravaipa Creek NW 1/4 S24 T6S R17E	-	ASU	native	1967
4719	Gila	robusta	Pinal	11031967	2	Barber WE	ASU3116	-	Aravaipa Creek SE 1/4 NW 1/4 S15 T6S R18E	-	ASU	native	1967
4716	Gila	robusta	Pinal	3051967	2	Barber WE	ASU3113	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4715	Gila	robusta	Pinal	11031967	1	Barber WE	ASU3112	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4714	Gila	robusta	Pinal	12021967	0	Barber WE	ASU3111	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4717	Gila	robusta	Pinal	30051967	1	Barber WE	ASU3114	-	Aravaipa Creek SE 1/4 SE 1/4 S14 T6S R18E	-	ASU	native	1967
4718	Gila	robusta	Pinal	11031967	2	Barber WE	ASU3115	-	Aravaipa Creek SW 1/4 NE 1/4 S14 T6S R18E	-	ASU	native	1967
2335	Gila	robusta	Graham	11021967	1	Barber WE	ASU3101	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2336	Gila	robusta	Graham	11031967	1	Barber WE	ASU3102	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2337	Gila	robusta	Graham	12041967	2	Barber WE	ASU3103	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2339	Gila	robusta	Graham	21081967	7	Barber WE	ASU3105	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967

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2332	Gila	robusta	Graham	30051967	2	Barber WE	ASU3098	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2338	Gila	robusta	Graham	39071967	2	Barber WE	ASU3104	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
4812	Gila	robusta	Pinal	20041969	0	Deacon JE Minckley WL	ASU3902 ASU4054	-	Aravaipa Creek at Woods Ranch	orig UNLV F1940	ASU	native	1969
20574	Gila	robusta	Pinal	20041969	-	JEDeacon	UNLV1940	-	Lower Aravaipa Cr SW Sec26 T6S R17E	-	UNLV	native	1969
17958	Gila	robusta	Pinal	14061971	1	Suttkus Clemmer & Caruso	TU71104	-	Aravaipa Creek 2.2 mi. NE of Mammoth.	-	TU	native	1971
5210	Gila	robusta	Pinal	22041972	0	class	ASU11342	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1972
4981	Gila	robusta	Pinal	6051972	0	class	ASU6639	-	Aravaipa Creek Hells Half Acre Canyon center NE 1/4 S8 T6S R18E	-	ASU	native	1972
4974	Gila	robusta	Pinal	21041972	0	class	ASU6632	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	-	ASU	native	1972
5030	Gila	robusta	Pinal	11091973	0	McNatt RM	ASU7095	-	Aravaipa Creek 1/2 mile above Painted Cave Canyon	-	ASU	native	1973
5038	Gila	robusta	Pinal	10091973	0	McNatt RM	ASU7104	-	Aravaipa Creek 1/2 way between Booger Horse Camp Canyons	-	ASU	native	1973
5002	Gila	robusta	Pinal	10091973	0	McNatt RM	ASU6699	-	Aravaipa Creek at Hell Hole Canyon	-	ASU	native	1973
5003	Gila	robusta	Pinal	9091973	0	McNatt RM	ASU6700	-	Aravaipa Creek at mouth Turkey Creek	-	ASU	native	1973
3056	Gila	robusta	Pinal	11091973	0	McNatt RM	ASU7092	-	Aravaipa Creek at mouth Virgus Canyon	-	ASU	native	1973
5034	Gila	robusta	Pinal	11091973	0	McNatt RM	ASU7100	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1973
4929	Gila	robusta	Pinal	9111974	0	class	ASU6300	-	Aravaipa Creek center S 1/2-NE 1/4 S24 T6S R18E	-	ASU	native	1974

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2605	Gila	robusta	Graham	9111974	0	class	ASU6753	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
4914	Gila	robusta	Pinal	9111974	0	class	ASU6285	-	Aravaipa Creek E 1/2 S24 T6S R18E	-	ASU	native	1974
4942	Gila	robusta	Pinal	10111974	0	class	ASU6315	-	Aravaipa Creek NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	native	1974
60953	Gila	robusta	Graham	24-25101975	2	Schreiber D	ASU17751	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
2639	Gila	robusta	Graham	23101976	0	Minckley WL	ASU7000	-	Aravaipa Creek 200 yards west Turkey Creek NE 1/4 SW 1/4 S19 T6S R19E	-	ASU	native	1976
2766	Gila	robusta	Graham	11111976	0	Minckley WL	ASU7568	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1976
5021	Gila	robusta	Pinal	25101976	0	Minckley WL	ASU7025	-	Aravaipa Creek below Jeb Whites Ranch SW1/4 SE1/4 S34 T6S R17E	-	ASU	native	1976
60960	Gila	robusta	Graham	30-31011976	1	Schreiber D	ASU17758	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1976
5085	Gila	robusta	Pinal	19071977	0	Siebert DJ	ASU7312	-	Aravaipa Creek 1/2 mile above Javalina Canyon	-	ASU	native	1977
5116	Gila	robusta	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7441	-	Aravaipa Creek 1/2 way between Javalina and Virgus canyons	-	ASU	native	1977
2751	Gila	robusta	Graham	16091977	0	Clarkson RW Siebert DJ	ASU74121	-	Aravaipa Creek 3090-ft contour	-	ASU	native	1977

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5064	Gila	robusta	Pinal	17071977	0	Siebert DJ	ASU7282	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5103	Gila	robusta	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7406	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5049	Gila	robusta	Pinal	15021977	0	Minckley WL	ASU7186	-	Aravaipa Creek at 2475-ft contour	-	ASU	native	1977
5130	Gila	robusta	Pinal	4121977	0	Clarkson RW Kepner WG	ASU7645	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5053	Gila	robusta	Pinal	15021977	0	Minckley WL	ASU7190	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5069	Gila	robusta	Pinal	16071977	0	Siebert DJ	ASU7291	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
5106	Gila	robusta	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7428	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
2807	Gila	robusta	Graham	3121977	0	Clarkson RW Burton S	ASU7652	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2816	Gila	robusta	Graham	3121977	0	Clarkson RW Burton S	ASU7662	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2726	Gila	robusta	Graham	16071977	0	Siebert D	ASU7294	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2678	Gila	robusta	Graham	19021977	0	Minckley WL	ASU7199	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1977
2681	Gila	robusta	Graham	19021977	0	Minckley WL	ASU7202	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1977
5090	Gila	robusta	Pinal	20071977	0	Siebert DJ	ASU7317	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5125	Gila	robusta	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7450	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5094	Gila	robusta	Pinal	19071977	0	Siebert DJ	ASU7321	-	Aravaipa Creek at Parsons Canyon	-	ASU	native	1977
5077	Gila	robusta	Pinal	19071977	0	Siebert DJ	ASU7305	-	Aravaipa Creek between Horse Camp and Paisano canyons	-	ASU	native	1977
7804	Gila	robusta	Pinal	15011980	3	Dye N Minckley B	UAZ95-64	-	Aravaipa Creek at Wood Ranch	-	UAZ	native	1980
3039	Gila	robusta	Pinal	22041983	1	Hendrickson DA class	ASU11698	-	Aravaipa Creek	~70-170 mm several tuberculate	ASU	native	1983

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51820	Gila	robusta	Pinal	30101983	7	-	-	-	ARAVAIPA CREEK 0.25 MI ABOVE HORSE CAMP CANYON	T06SR18ES16 NW4 325506 1103055	AZGF	native	1983
5158	Gila	robusta	Pinal	16041983	0	class Hendrickson D	ASU10315	-	Aravaipa Creek at Woods Ranch	Skeleton152 mm	ASU	native	1983
5159	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10316	-	Aravaipa Creek at Woods Ranch	skel 124 mm	ASU	native	1983
5160	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10317	-	Aravaipa Creek at Woods Ranch	skel 140 mm	ASU	native	1983
5161	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10318	-	Aravaipa Creek at Woods Ranch	skel 156 mm	ASU	native	1983
5162	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10319	-	Aravaipa Creek at Woods Ranch	skel 156 mm	ASU	native	1983
5163	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10320	-	Aravaipa Creek at Woods Ranch	skel 129 mm	ASU	native	1983
5164	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10321	-	Aravaipa Creek at Woods Ranch	skel 87 mm	ASU	native	1983
5165	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10322	-	Aravaipa Creek at Woods Ranch	skel 165 mm	ASU	native	1983
5166	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10323	-	Aravaipa Creek at Woods Ranch	skel 195 mm	ASU	native	1983
5167	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10324	-	Aravaipa Creek at Woods Ranch	skel 146 mm	ASU	native	1983
5168	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10325	-	Aravaipa Creek at Woods Ranch	skel	ASU	native	1983
5169	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10326	-	Aravaipa Creek at Woods Ranch	skel	ASU	native	1983
5170	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10327	-	Aravaipa Creek at Woods Ranch	skel	ASU	native	1983
5171	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10328	-	Aravaipa Creek at Woods Ranch	skel 155 mm male	ASU	native	1983
5172	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10329	-	Aravaipa Creek at Woods Ranch	skel 170 mm male	ASU	native	1983
5173	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10330	-	Aravaipa Creek at Woods Ranch	skel	ASU	native	1983
5174	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10331	-	Aravaipa Creek at Woods Ranch	skel 170 mm male	ASU	native	1983
5175	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10332	-	Aravaipa Creek at Woods Ranch	skel 200 mm female	ASU	native	1983

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5176	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10333	-	Aravaipa Creek at Woods Ranch	skel 154 mm female	ASU	native	1983
5177	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10334	-	Aravaipa Creek at Woods Ranch	skel 133 mm female	ASU	native	1983
5178	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10334	-	Aravaipa Creek at Woods Ranch	skel 141 mm male	ASU	native	1983
5179	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10336	-	Aravaipa Creek at Woods Ranch	skel 156 mm female	ASU	native	1983
5180	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10337	-	Aravaipa Creek at Woods Ranch	skel 125 mm female	ASU	native	1983
5181	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10338	-	Aravaipa Creek at Woods Ranch	skel 155 mm male	ASU	native	1983
5182	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10339	-	Aravaipa Creek at Woods Ranch	skel 126 mm male	ASU	native	1983
5183	Gila	robusta	Pinal	16041983	0	Hendrickson DA class	ASU10340	-	Aravaipa Creek at Woods Ranch	skel 190 mm male	ASU	native	1983
5190	Gila	robusta	Pinal	15091983	6	Karp K	ASU10619	-	Aravaipa Creek between Paisano and Hell Hole canyons	-	ASU	native	1983
51727	Gila	robusta	Pinal	29101983	9	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW HELL HOLE	T06SR18ES14 S2 S2 325425 1102759	AZGF	native	1983
51797	Gila	robusta	Pinal	29101983	17	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW PAISANO CANYON	T06SR18ES15 SW4 NE4 325451 1102918	AZGF	native	1983
51802	Gila	robusta	Pinal	30101983	6	-	-	-	ARAVAIPA CREEK MOUTH OF VIRGUS CANYON	T06SR18ES17 NE4 325500 1103118	AZGF	native	1983
51638	Gila	robusta	Graham	29101983	10	-	-	-	ARAVAIPA CREEK PRIMITIVE AREA	T06SR19ES20 SE4NE4 325357 1102518	AZGF	native	1983
51683	Gila	robusta	Pinal	30101983	17	-	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NE4 NW4 NW4 325409 1103357	AZGF	native	1983

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5201	Gila	robusta	Pinal	27031987	0	Karp K	ASU11181	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1987
9789	Gila	robusta	Graham	10081987	1	Young KL Abarca F	ASU14804	-	upper Aravaipa Creek T6S R19E S 21 28	40 mm SL	ASU	native	1987
51648	Gila	robusta	Graham	24091988	9	ALV TM DB JP CW DP	-	-	ARAVAIPA CREEK	T06SR19ES19 NE4 NE4 325400 1102608	AZGF	native	1988
9036	Gila	robusta	Pinal	6071988	2	Abarca F Young KL	ASU12636	-	Aravaipa Creek ~1/2 mile above Woods Ranch	130 & 160 mm SL	ASU	native	1988
51502	Gila	robusta	Graham	24091988	4	MRC & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW CHIMNEY UPSTREAM	T06SR19ES21 SW4 NW4 325342 1102456	AZGF	native	1988
51628	Gila	robusta	Graham	24091988	6	SN SV GN MD MG WM +	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 NE4 SW4 325353 1102625	AZGF	native	1988
51550	Gila	robusta	Pinal	4101988	11	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	native	1988
46173	Gila	robusta	Graham	7101989	5	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK 100 M BELOW TAPIA DIVERSION	T6SR19ES28N E4SE4	AZGF	native	1989
46182	Gila	robusta	Graham	7101989	14	DAH ET AL.	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1989
51503	Gila	robusta	Graham	7101989	6	DAH ET AL.	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4 SW4 325342 1102458	AZGF	native	1989
46200	Gila	robusta	Graham	7101989	21	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK EAST OF BEAR CANYON CROSSING	T6SR19ES20N E4SE4	AZGF	native	1989
51585	Gila	robusta	Graham	7101989	12	DAH ET. AL.	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1989

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51560	Gila	robusta	Pinal	18111989	3	TC CB CH NK SK	-	-	ARAVAIPA CREEK WOODS DIVERSION UPSTREAM TO 1ST TRAIL X-ING	T06SR17ES24 NW4 SW4 325347 1103402	AZGF	native	1989
46183	Gila	robusta	Graham	30091990	17	TC PR MB FA	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1990
51586	Gila	robusta	Graham	30091990	7	-	-	-	ARAVAIPA CREEK TURKEY CREEK (EAST END GAUGE)	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1990
51561	Gila	robusta	Pinal	29091990	2	-	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 325347 1103402	AZGF	native	1990
9643	Gila	robusta	Pinal	20101990	6	Minckley WL	ASU14546	-	lower Aravaipa Creek stations 1-7	12-30 mm stations combined	ASU	native	1990
47122	Gila	robusta	Graham	4101991	4	J SIMMS A BAMMANN	-	-	TURKEY CREEK	T6SR19ES30S E4 NE4	AZGF	native	1991
11430	Gila	robusta	Graham	18051992	20	Anderson A Anderson D Brunsong E Colazzo T	ASU15985	-	Aravaipa Creek above Wilderness area T6S R19E NE 1/4 S19	-	ASU	native	1992
51504	Gila	robusta	Graham	11081992	2	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
51392	Gila	robusta	Graham	9121992	1	KLY RHB DBD JS EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
51393	Gila	robusta	Graham	10081992	22	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
49028	Gila	robusta	Graham	11111992	17	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1992
51728	Gila	robusta	Pinal	11081992	16	AV MW JS SD JY	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1992

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49044	Gila	robusta	Pinal	11111992	2	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1992
51822	Gila	robusta	Pinal	11081992	4	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1992
51765	Gila	robusta	Pinal	11081992	8	AV MW JS SD JY	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1992
49071	Gila	robusta	Pinal	12111992	5	RHB DBD ALF DFG	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1992
51587	Gila	robusta	Graham	9121992	2	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
51588	Gila	robusta	Graham	11081992	9	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
49095	Gila	robusta	Graham	10111992	21	RHB JS	-	-	ARAVAIPA CREEK TURKEY CREEK STATION	-	AZGF	native	1992
51684	Gila	robusta	Pinal	12081992	10	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992
49021	Gila	robusta	Graham	18081993	4	DBD MMS JTT JVB DFG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	-	AZGF	native	1993
51505	Gila	robusta	Graham	19051993	2	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
49035	Gila	robusta	Graham	18081993	14	RHB DBD MMS CEP DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1993
51395	Gila	robusta	Graham	20051993	7	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993

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51394	Gila	robusta	Graham	29111993	7	DBD MAL DTG MTF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51729	Gila	robusta	Pinal	10031993	2	RHB DBD DAW BR	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
49045	Gila	robusta	Pinal	19081993	7	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1993
51731	Gila	robusta	Pinal	20051993	12	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51730	Gila	robusta	Pinal	30111993	1	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51821	Gila	robusta	Pinal	10031993	8	RHB DBD DAW BR AV	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
49058	Gila	robusta	Pinal	19081993	16	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1993
51819	Gila	robusta	Pinal	20051993	6	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51818	Gila	robusta	Pinal	30111993	8	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51764	Gila	robusta	Pinal	10031993	9	RHB DBD DAW	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
49072	Gila	robusta	Pinal	20081993	31	RHB DBD MMS CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1993

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51762	Gila	robusta	Pinal	21051993	14	ALF RHB BMR CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
51589	Gila	robusta	Graham	9031993	8	RHB DBD KLY DAW BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51592	Gila	robusta	Graham	15061993	25	CEP ALF EB MF	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
49088	Gila	robusta	Graham	18081993	6	RHB.EEB BMR MTF	-	-	ARAVAIPA CREEK TURKEY CREEK	-	AZGF	native	1993
51590	Gila	robusta	Graham	19051993	26	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51591	Gila	robusta	Graham	29111993	14	BPD JRS BMR SBZ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51681	Gila	robusta	Pinal	1121993	15	BPD DBD DAW MAL	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51685	Gila	robusta	Pinal	10031993	2	KLY JS DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51680	Gila	robusta	Pinal	16061993	1	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
49105	Gila	robusta	Pinal	20081993	2	BMR JTT D_J	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1993
51682	Gila	robusta	Pinal	21051993	6	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993

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51501	Gila	robusta	Graham	5041994	9	SBZ EB LG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1994
51391	Gila	robusta	Graham	5041994	4	MAL DFG ML BH MM	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1994
51726	Gila	robusta	Pinal	6041994	17	DBD SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1994
51817	Gila	robusta	Pinal	6041994	9	DBD SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1994
51763	Gila	robusta	Pinal	7041994	18	DBD MAL SBZ ZSH MEM	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1994
51584	Gila	robusta	Graham	5041994	25	DBD AWM JNY ZSH	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102836	AZGF	native	1994
51679	Gila	robusta	Pinal	7041994	17	DFG JNY AWM ML BH	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1994
11578	Gila	robusta	Graham	13031995	1	Simms JR	ASU16139	-	Turkey Creek 1/2 mile above confluence Aravaipa Creek	-	ASU	native	1995
11575	Gila	robusta	Graham	13031995	2	Simms JR	ASU16136	-	Turkey Creek near cliff dwelling	-	ASU	native	1995
51390	Gila	robusta	Graham	11061997	-	HAYES PORATH DAW	-	-	ARAVAIPA CREEK E BOUNDARY OF USFS/TNC PROPERTIES UPSTR 0.5 MI	T06SR19ES27 SE4 SW4 325242 1102330	AZGF	native	1997

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60822	Gila	robusta	Pinal	8081998	1	Unmack P Baltzly M	ASU17620	-	Aravaipa lower end a short distance above Sycamore Tee T7S R17E S8 NE 1/4	-	ASU	native	1998
46217	Ictalurus	punctatus	Pinal	11101991	6	DAW JSP FA	-	-	ARAVAIPA CREEK LARGE POND AT DR. GELDMACHERS	T7SR17E	AZGF	introduced	1991
8278	Lepomis	cyanellus	Pinal	2271965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 34 T6S R17E	Station 4	ASU prim lit	introduced	1965
4620	Lepomis	cyanellus	Pinal	27021965	3	Barber WE Koehn RK	ASU1633	-	Aravaipa Creek streamside reservoir T6S R17E S34	-	ASU	introduced	1965
4807	Lepomis	cyanellus	Pinal	14081966	1	Barber WE	ASU3471	-	Aravaipa Creek at junction with San Pedro	-	ASU	introduced	1966
4803	Lepomis	cyanellus	Pinal	15101966	5	Barber WE	ASU3467	-	Aravaipa Creek NE 1/4 SE 1/4 S13 T6S R17E	-	ASU	introduced	1966
4912	Lepomis	cyanellus	Pinal	14081966	0	Barber WE	ASU6179	-	Aravaipa Creek SW 1/4 NW 1/4 S24 T6S R17E	1400 hrs	ASU	introduced	1966
4733	Lepomis	cyanellus	Pinal	12021967	1	Barber WE	ASU3308	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	introduced	1967
4963	Lepomis	cyanellus	Pinal	22041972	0	class	ASU6621	-	Aravaipa Creek center N 1/2 S26 T6S R17E	-	ASU	introduced	1972
2606	Lepomis	cyanellus	Graham	9111974	0	class	ASU6754	-	Aravaipa Creek center S19 T6S R19E	-	ASU	introduced	1974
4944	Lepomis	cyanellus	Pinal	10111974	0	class	ASU6317	-	Aravaipa Creek NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	introduced	1974
4948	Lepomis	cyanellus	Pinal	10111974	0	class	ASU6331	-	Virgus Canyon NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	introduced	1974

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60850	Lepomis	cyanellus	Pinal	15011975	1	Schreiber D	ASU17648	-	Virgus Canyon Rim Rock Pool taken out of pool below Northeast tank	-	ASU	introduced	1975
3052	Lepomis	cyanellus	Pinal	25101976	0	Minckley WL	ASU7014	-	Aravaipa Creek above Woods Diversion NE1/4 SE1/4 S24 T6S R17E	-	ASU	introduced	1976
5017	Lepomis	cyanellus	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7020	-	pools in Virgus Canyon SE1/4 NW1/4 S17 T6S R18E	-	ASU	introduced	1976
5048	Lepomis	cyanellus	Pinal	15021977	0	Minckley WL	ASU7185	-	Aravaipa Creek at 2475-ft contour	-	ASU	introduced	1977
5137	Lepomis	cyanellus	Pinal	4121977	0	Clarkson RW	ASU7655	-	Aravaipa Creek at 2480-ft contour	-	ASU	introduced	1977
5066	Lepomis	cyanellus	Pinal	16071977	0	Siebert DJ	ASU7288	-	Aravaipa Creek at 2850-ft contour	-	ASU	introduced	1977
5080	Lepomis	cyanellus	Pinal	19071977	0	Siebert DJ	ASU7307	-	Aravaipa Creek at Horse Camp Canyon	-	ASU	introduced	1977
2972	Lepomis	cyanellus	Graham	18061978	0	Kepner WG	ASU8602	-	Aravaipa Creek T6S R19E NW 1/4 SW 1/4 S20	elev 3105 ft	ASU	introduced	1978
3035	Lepomis	cyanellus	Pinal	16041983	1	Hendrickson DA class	ASU11694	-	Aravaipa Creek	111 mm	ASU	introduced	1983
5185	Lepomis	cyanellus	Pinal	15091983	5	Karp K	ASU10614	-	Aravaipa Creek at Virgus Canyon	-	ASU	introduced	1983
5198	Lepomis	cyanellus	Pinal	27031987	0	Karp K	ASU11178	-	Aravaipa Creek at Paisano Canyon	-	ASU	introduced	1987
5202	Lepomis	cyanellus	Pinal	1041987	0	Karp K	ASU11182	-	Aravaipa Creek at Woods Ranch	-	ASU	introduced	1987
10602	Lepomis	cyanellus	Graham	24061987	4	Bagley B	ASU13748	-	Four Mile Ranch Tank T7S R19E S26	-	ASU	introduced	1987
51649	Lepomis	cyanellus	Graham	24091988	6	ALV TM DB JP CW DP	-	-	ARAVAIPA CREEK	T06SR19ES19 NE4 NE4 325400 1102608	AZGF	introduced	1988

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51629	Lepomis	cyanellus	Graham	24091988	10	SN SV GN MD MG WM +	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 NE4 SW4 325353 1102625	AZGF	introduced	1988
51551	Lepomis	cyanellus	Pinal	4101988	38	BEB KLY	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 SW4 NW4 NW4 325345 1103405	AZGF	introduced	1988
51370	Lepomis	cyanellus	Pinal	19111989	9	TC CB CH NK SK	-	-	ARAVAIPA CREEK HOLY JOE RANCH - DIVERSION DOWNSTREAM	T07SR17ES04 325120 1103625	AZGF	introduced	1989
51593	Lepomis	cyanellus	Graham	7101989	2	DAH ET. AL.	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	introduced	1989
51562	Lepomis	cyanellus	Pinal	18111989	5	TC CB CH NK SK	-	-	ARAVAIPA CREEK WOODS DIVERSION UPSTREAM TO 1ST TRAIL X-ING	T06SR17ES24 NW4 SW4 325347 1103402	AZGF	introduced	1989
61634	Lepomis	cyanellus	Pinal	prob around 1990-3	2	C Reimus et al	ASU17607	-	Aravaipa Creek lower end at Wagner Ranch (?) T6S R17E S13 SW 1/4	-	ASU	introduced	1990
51328	Lepomis	cyanellus	Pinal	29091990	1	-	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	introduced	1990
51454	Lepomis	cyanellus	Pinal	29091990	11	-	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	introduced	1990
51563	Lepomis	cyanellus	Pinal	29091990	13	-	-	-	ARAVAIPA CREEK WOODS RANCH	T06SR17ES24 325347 1103402	AZGF	introduced	1990
9650	Lepomis	cyanellus	Pinal	20101990	74	Minckley WL	ASU14553	-	lower Aravaipa Creek stations 1-7	20-120 mm stations combined	ASU	introduced	1990
9745	Lepomis	cyanellus	Pinal	10021991	2	Minckley WL	ASU14728	-	Aravaipa Creek 100 m below crossing at Whites Ranch	50 mm SL	ASU	introduced	1991

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9738	Lepomis	cyanellus	Pinal	14071991	1	Velasco AA	ASU14721	-	Aravaipa Creek at west end Gage	100 mm SL	ASU	introduced	1991
46209	Lepomis	cyanellus	Pinal	12101991	10	DAW JSP	-	-	ARAVAIPA CREEK JOEL RUBINS POND	T7SR17E	AZGF	introduced	1991
60827	Lepomis	cyanellus	Pinal	10111991	36	Reimus C et al	ASU17625	-	Aravaipa Creek lower end Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1991
60812	Lepomis	cyanellus	Pinal	10111991	2	Reimus C et al	ASU17610	-	Aravaipa Creek lower end Whites Ranch T6S R17E S26 NW 1/4	-	ASU	introduced	1991
9744	Lepomis	cyanellus	Pinal	10081991	15	Joekle M Reimus C	ASU14727	-	Aravaipa Creek west end at Whites Ranch	45-90 mm SL	ASU	introduced	1991
9317	Lepomis	cyanellus	Pinal	11101991	42	AZGF	ASU12978	-	Geldmachers large pond lower Aravaipa Canyon T7S R17E	-	ASU	introduced	1991
10044	Lepomis	cyanellus	Pinal	11101991	4	AZGF	ASU12979	-	Geldmachers large pond lower Aravaipa Canyon T7S R17E	-	ASU	introduced	1991
9276	Lepomis	cyanellus	Pinal	11101991	38	AZGF	ASU12937	-	Geldmachers small pond T7S R17E	-	ASU	introduced	1991
9734	Lepomis	cyanellus	Pinal	12051991	1	Velasco AA	ASU14717	-	west end Aravaipa Creek	-	ASU	introduced	1991
9737	Lepomis	cyanellus	Pinal	13071991	2	Velasco AA	ASU14720	-	west end Aravaipa Creek	35 mm SL	ASU	introduced	1991
9730	Lepomis	cyanellus	Pinal	15091991	3	Reimus C Velasco AA	ASU14713	-	west end Aravaipa Creek	55-125 mm SL	ASU	introduced	1991
9382	Lepomis	cyanellus	Pinal	10031991	1	Velasco AA Childs M	ASU13109	-	west end Aravaipa Creek about 200 m below Whites Ranch	-	ASU	introduced	1991
51823	Lepomis	cyanellus	Pinal	11081992	6	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	introduced	1992
49059	Lepomis	cyanellus	Pinal	11111992	2	RHB DBD JRS ALF	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	introduced	1992
11712	Lepomis	cyanellus	Graham Pinal	51992	6	Velasco AA	ASU16273	-	Aravaipa Creek in Aravaipa Canyon	-	ASU	introduced	1992

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51686	Lepomis	cyanellus	Pinal	12081992	1	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	introduced	1992
11729	Lepomis	cyanellus	Pinal	9021992	5	Velasco A Minckley WL class	ASU16290	-	Aravaipa Creek west end	-	ASU	introduced	1992
49117	Lepomis	cyanellus	Pinal	12111992	3	-	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	introduced	1992
9934	Lepomis	cyanellus	Pinal	9021992	1	Velasco AA	ASU15111	-	west end Aravaipa Creek	60 mm SL	ASU	introduced	1992
49082	Lepomis	cyanellus	Pinal	19081993	3	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	introduced	1993
11594	Lepomis	cyanellus	Pinal	23101993	12	Reimus C	ASU16155	-	Aravaipa Creek Sycamore tree station to ~3 miles below 23101993	-	ASU	introduced	1993
51327	Lepomis	cyanellus	Pinal	6041994	2	MAL DFG JNY AWM BR	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 SW4NW4 325032 1103728	AZGF	introduced	1994
12057	Lepomis	cyanellus	Pinal	7101995	4	Sowka P Zoology 410 class	ASU16619	-	Aravaipa Creek	-	ASU	introduced	1995
12058	Lepomis	cyanellus	Pinal	7101995	30	Sowka P Zoology 410 class	ASU16620	-	Aravaipa Creek 1/2 way between Horse Camp and Painted Cave	-	ASU	introduced	1995
61631	Lepomis	cyanellus	Pinal	9111997	9	P Unmack M Baltzly	ASU17604	-	Aravaipa Creek lower end at TNC-BLM wild Boundery T6S R17E S13 SW 1/4	PU 97-143	ASU	introduced	1997
61628	Lepomis	cyanellus	Pinal	1111997	19	B Bagley et al	ASU17601	-	Aravaipa Creek mid section at Havalina Canyon confluence T6S R18E S18 NE 1/4	-	ASU	introduced	1997

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60817	Lepomis	cyanellus	Pinal	41998	13	Unmack P et al	ASU17615	-	Aravaipa Creek lower end a short distance above Sycamore Tree T7S R17E S8 NE 1/4	-	ASU	introduced	1998
61622	Lepomis	cyanellus	Pinal	41998	3	P Unmack et al	ASU17595	-	Aravaipa Creek mid section at Booger Canyon confluence T6S R18E S15 NW 1/4	-	ASU	introduced	1998
61624	Lepomis	cyanellus	Pinal	41998	1	P Unmack et al	ASU17597	-	Aravaipa Creek mid section at Virgus Canyon confluence T6S R18E S17 NE1/4	-	ASU	introduced	1998
61627	Lepomis	cyanellus	Pinal	31101998	21	M Baltzly et al	ASU17600	-	Aravaipa Creek mid section at Virgus Canyon confluence T6S R18E S17 NE1/4	-	ASU	introduced	1998
60819	Lepomis	cyanellus	Pinal	8081998	12	Unmack P Baltzly M	ASU17617	-	Aravaipa lower end a short distance above Sycamore Tee T7S R17E S8 NE 1/4	-	ASU	introduced	1998
60928	Lepomis	cyanellus	Pinal	11041999	2	D Brown et al	ASU17726	-	Aravaipa Creek lower end at Sycamore Tree T7S R17E S6 SE 1/4	-	ASU	introduced	1999
7765	Meda	fulgida	Pinal	5	29	Heath WG	UAZ95-43	-	Aravaipa Creek	-	UAZ	native	0
695	Meda	fulgida	Pinal	10311943	62	Simon Frost Hendrickson	UMMZ141722	-	Aravaipa Creek Aravaipa Canyon about 11 mi ENE Feldman 11-14 mi ENE Winkleman - Feldman Rd	ID CL Hubbs 35-60 mm Orig No Z141722 3additional specimens returned	UMMZ	native	1943
7834	Meda	fulgida	Pinal	31101943	1	Simon J Hendrickson J	UAZ95-87	-	Arivaipa Creek 11-14 miles ENE Winkleman-Feldman road	-	UAZ	native	1943

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7846	Meda	fulgida	Pinal	22021949	1	Snyder	UAZ95-95	-	Aravaipa Creek 12 miles E Winkleman Road	-	UAZ	native	1949
8334	Meda	fulgida	Graham	5001950	0	R R Miller	UMMZ162753	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	UMMZ prim lit	native	1950
282	Meda	fulgida	Graham	5101950	20	RR & FH Miller & HE Winn	UMMZ162752	-	Aravaipa Creek near head of box canyon NW of Klondyke flood trib San Pedro River drainage	11-21 mm Original number M50-81 (strainers) ID by RR Miller & HE Winn stored in vial	UMMZ	native	1950
7870	Meda	fulgida	Pinal	22031953	0	Lowe CH	UAZ95-115	-	Aravaipa Creek 10 miles NE jct 77 and Aravaipa road Coleman Ranch	-	UAZ	native	1953
5157	Meda	fulgida	Pinal	22031953	3	Lowe CH class	ASU10142	-	Aravaipa Creek elev 2650	-	ASU	native	1953
7888	Meda	fulgida	Pinal	27021954	0	Lowe CH	UAZ95-127	-	Aravaipa Creek Coleman Ranch 2650 feet	-	UAZ	native	1954
7781	Meda	fulgida	Pinal	10031956	9	Zoo233	UAZ95-50	-	Aravaipa Creek Woods Ranch	-	UAZ	native	1956
7923	Meda	fulgida	Pinal	15121957	0	Heath WG	UAZ95-147	-	Aravaipa Creek	-	UAZ	native	1957
7916	Meda	fulgida	Pinal	17031957	0	-	UAZ95-145	-	Aravaipa Creek 2600 feet	-	UAZ	native	1957
7931	Meda	fulgida	Pinal	14121958	0	Heath WG	UAZ95-172	-	Aravaipa Creek 2600 feet	-	UAZ	native	1958
7925	Meda	fulgida	Pinal	23121958	0	Tremor Thomas	UAZ95-149	-	Aravaipa Creek Wood Brothers Ranch 2600 feet	-	UAZ	native	1958
7788	Meda	fulgida	Pinal	27061959	28	Heath WG	UAZ95-52	-	Aravaipa Creek	-	UAZ	native	1959
7944	Meda	fulgida	Pinal	26061959	15	Heath WG	UAZ95-182	-	Aravaipa Creek ~2600 feet	-	UAZ	native	1959
7815	Meda	fulgida	Pinal	7031959	0	-	UAZ95-74	-	Aravaipa Creek Woods Ranch	-	UAZ	native	1959
7974	Meda	fulgida	Pinal	16101960	1	Heath WG	UAZ95-207	-	Aravaipa Creek 12 miles E highway by road ~2500 feet	-	UAZ	native	1960

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4584	Meda	fulgida	Pinal	17041964	12	Minckley WL Wick A	ASU673	-	Aravaipa Creek 10 miles east Aravaipa Canyon Road from Highway 77	coll cont 18041964	ASU	native	1964
4574	Meda	fulgida	Pinal	17041964	13	Minckley WL Wick A	ASU663	-	Aravaipa Creek Aravaipa Canyon Road end121/2 miles from Highway 77	-	ASU	native	1964
8286	Meda	fulgida	Pinal	4171964	0	W L Minckley	ASU	Barber & Minckley 1966	Aravaipa Creek Center SE1/4 Sec 23 T6S R17E	Station 6	ASU prim lit	native	1964
8340	Meda	fulgida	Graham	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek Center Sec 19 T6S R19E	Station 13	ASU prim lit	native	1964
4611	Meda	fulgida	Pinal	22121964	2	Barber WE Gardner L	ASU1624	-	Aravaipa Creek S24 T6S R18E	-	ASU	native	1964
8346	Meda	fulgida	Pinal	12211964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 NW1/4 Sec 20 T6S R19E	Station 14	ASU prim lit	native	1964
8321	Meda	fulgida	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 Sec 24 T6S R18E	Station 11	ASU prim lit	native	1964
8316	Meda	fulgida	Pinal	12221964	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SW1/4 NE1/4 Sec 15 T6S R18E	Station 10	ASU prim lit	native	1964
4614	Meda	fulgida	Pinal	23121964	9	Barber WE Gardner L	ASU1627	-	Aravaipa Creek T6S R18E center S18	-	ASU	native	1964
4617	Meda	fulgida	Pinal	22121964	37	Barber WE	ASU1630	-	Aravaipa Creek T6S R18E S8 16 17	-	ASU	native	1964
2179	Meda	fulgida	Graham	21111964	1	Barber WE Gardner L	ASU1617	-	Aravaipa Creek T6S R19E SE 1/4 NW 1/4 S20	-	ASU	native	1964
2175	Meda	fulgida	Graham	21111964	13	Barber WE Gardner L	ASU1613	-	Aravaipa Creek T6S R19E SW 1/4 NE 1/4 S19	-	ASU	native	1964
7709	Meda	fulgida	Pinal	8051965	3	Adams GF	UAZ65-90	-	Aravaipa Creek E Brandenburg Peak at Wood Ranch Road	-	UAZ	native	1965
8327	Meda	fulgida	Pinal	5011965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek E1/2 Sec 24 T6S R18E	Station 12	ASU prim lit	native	1965

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4625	Meda	fulgida	Pinal	1051965	22	Barber WE	ASU1797	-	Aravaipa Creek S24 T6S R18E	includes WEB-65-3 4	ASU	native	1965
8309	Meda	fulgida	Pinal	11021965	0	W E Barber	ASU	Barber & Minckley 1966	Aravaipa Creek SE1/4 NW1/4 Sec 17 T6S R18E	Station 8	ASU prim lit	native	1965
2289	Meda	fulgida	Graham	17091966	8	Barber WE	ASU3010	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1966
2288	Meda	fulgida	Graham	23071966	2	Barber WE	ASU3009	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1966
2308	Meda	fulgida	Graham	4061966	31	Barber WE	ASU3052	-	Aravaipa Creek edge S27 34 R19E T6S	-	ASU	native	1966
2305	Meda	fulgida	Graham	6081966	4	Barber WE	ASU3039	-	Aravaipa Creek edge S27 34 R19E T6S	-	ASU	native	1966
2306	Meda	fulgida	Graham	28081966	4	Barber WE	ASU3040	-	Aravaipa Creek edge S27 34 R19E T6S	-	ASU	native	1966
2314	Meda	fulgida	Pinal	4061966	100	Barber WE	ASU3061	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1966
2316	Meda	fulgida	Pinal	11111966	79	Barber WE	ASU3063	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1966
2315	Meda	fulgida	Pinal	25061966	330	Barber WE	ASU3062	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1966
4677	Meda	fulgida	Pinal	9071966	13	Barber WE	ASU3042	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1966
4678	Meda	fulgida	Pinal	10081966	7	Barber WE	ASU3043	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1966
4679	Meda	fulgida	Pinal	17091966	19	Barber WE	ASU3044	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1966
4688	Meda	fulgida	Pinal	15101966	77	Barber WE	ASU3059	-	Aravaipa Creek NE 1/4 SE 1/4 S13 R17E T6S	-	ASU	native	1966
4890	Meda	fulgida	Pinal	25061966	0	Barber WE	ASU6157	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	1615 hrs	ASU	native	1966

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4888	Meda	fulgida	Pinal	25061966	0	Barber WE	ASU6155	-	Aravaipa Creek NE 1/4SE 1/4 S24 T6S R18E	-	ASU	native	1966
4696	Meda	fulgida	Pinal	10121966	2	Barber WE	ASU3084	-	Aravaipa Creek NW 1/4 NE 1/4 S8 R17E T6S	-	ASU	native	1966
4694	Meda	fulgida	Pinal	14081966	5	Barber WE	ASU3082	-	Aravaipa Creek NW 1/4 NE 1/4 S8 R17E T6S	-	ASU	native	1966
4695	Meda	fulgida	Pinal	15101966	3	Barber WE	ASU3083	-	Aravaipa Creek NW 1/4 NE 1/4 S8 R17E T6S	-	ASU	native	1966
4687	Meda	fulgida	Pinal	9071966	8	Barber WE	ASU3058	-	Aravaipa Creek NW 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1966
2296	Meda	fulgida	Graham	23071966	5	Barber WE	ASU3017	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1966
4698	Meda	fulgida	Pinal	10121966	53	Barber WE	ASU3086	-	Aravaipa Creek NW 1/4 S24 R17E T6S	-	ASU	native	1966
4697	Meda	fulgida	Pinal	14081966	52	Barber WE	ASU3085	-	Aravaipa Creek NW 1/4 S24 R17E T6S	-	ASU	native	1966
4672	Meda	fulgida	Pinal	6081966	43	Barber WE	ASU3034	-	Aravaipa Creek SE 1/4 SE 1/4 S14 R18E T6S	-	ASU	native	1966
2309	Meda	fulgida	Graham	23071966	67	Barber WE	ASU3053	-	Aravaipa Creek SW 1/4 NE 1/4 S19 R19E T6S	-	ASU	native	1966
2310	Meda	fulgida	Graham	28081966	118	Barber WE	ASU3054	-	Aravaipa Creek SW 1/4 NE 1/4 S19 R19E T6S	-	ASU	native	1966
2321	Meda	fulgida	Graham	4061966	30	Barber WE	ASU3068	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1966
2322	Meda	fulgida	Graham	6081966	38	Barber WE	ASU3069	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1966
2323	Meda	fulgida	Graham	11021966	112	Barber WE	ASU3070	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1966

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4692	Meda	fulgida	Pinal	10121966	11	Barber WE	ASU3080	-	Aravaipa Creek SW 1/4 S26 R17E T6S	-	ASU	native	1966
4690	Meda	fulgida	Pinal	14081966	24	Barber WE	ASU3078	-	Aravaipa Creek SW 1/4 S26 R17E T6S	-	ASU	native	1966
4691	Meda	fulgida	Pinal	15101966	31	Barber WE	ASU3079	-	Aravaipa Creek SW 1/4 S26 R17E T6S	-	ASU	native	1966
2331	Meda	fulgida	Graham	10071966	2	Barber WE	ASU3088	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1966
2280	Meda	fulgida	Graham	17091966	5	Barber WE	ASU3001	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1966
2278	Meda	fulgida	Graham	23071966	3	Barber WE	ASU2999	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1966
2279	Meda	fulgida	Graham	28081966	7	Barber WE	ASU3000	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1966
7720	Meda	fulgida	Pinal	5111966	0	Thomson D	UAZ66-134	-	lower Aravaipa Creek above Panorama (= Wood) Ranch	-	UAZ	native	1966
4824	Meda	fulgida	Pinal	30091967	0	Rinne M Rinne JN	ASU4604	-	Aravaipa Creek	-	ASU	native	1967
2292	Meda	fulgida	Graham	10031967	11	Barber WE	ASU3013	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2291	Meda	fulgida	Graham	11021967	14	Barber WE	ASU3012	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2293	Meda	fulgida	Graham	13041967	7	Barber WE	ASU3014	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2290	Meda	fulgida	Graham	14011967	6	Barber WE	ASU3011	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2294	Meda	fulgida	Graham	29061967	18	Barber WE	ASU3015	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2295	Meda	fulgida	Graham	29071967	24	Barber WE	ASU3016	-	Aravaipa Creek edge S20 21 R19E T6S	-	ASU	native	1967
2307	Meda	fulgida	Graham	30051967	1	Barber WE	ASU3041	-	Aravaipa Creek edge S27 34 R19E T6S	-	ASU	native	1967
2439	Meda	fulgida	Graham	21081967	2	Barber WE	ASU3530	-	Aravaipa Creek edge S27 34 T6S R19E	-	ASU	native	1967
2320	Meda	fulgida	Pinal	9071967	23	Barber WE	ASU3067	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1967

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2317	Meda	fulgida	Pinal	11031967	38	Barber WE	ASU3064	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1967
2319	Meda	fulgida	Pinal	29061967	59	Barber WE	ASU3066	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1967
2318	Meda	fulgida	Pinal	30051967	45	Barber WE	ASU3065	-	Aravaipa Creek NE 1/4 NE 1/4 S24 R18E T6S	-	ASU	native	1967
4684	Meda	fulgida	Pinal	3051967	17	Barber WE	ASU3049	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4685	Meda	fulgida	Pinal	4051967	44	Barber WE	ASU3050	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4682	Meda	fulgida	Pinal	11031967	36	Barber WE	ASU3047	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4681	Meda	fulgida	Pinal	12021967	30	Barber WE	ASU3046	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4683	Meda	fulgida	Pinal	12041967	58	Barber WE	ASU3048	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4680	Meda	fulgida	Pinal	14011967	59	Barber WE	ASU3045	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4686	Meda	fulgida	Pinal	30051967	31	Barber WE	ASU3051	-	Aravaipa Creek NE 1/4 NW 1/4 S24 R18E T6S	-	ASU	native	1967
4689	Meda	fulgida	Pinal	9021967	79	Barber WE	ASU3060	-	Aravaipa Creek NE 1/4 SE 1/4 S13 R17E T6S	-	ASU	native	1967
4669	Meda	fulgida	Pinal	12021967	42	Barber WE	ASU3031	-	Aravaipa Creek NE 1/4 SE 1/4 S14 R19E T6S	-	ASU	native	1967
4670	Meda	fulgida	Pinal	12041967	32	Barber WE	ASU3032	-	Aravaipa Creek NE 1/4 SE 1/4 S14 R19E T6S	-	ASU	native	1967

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4668	Meda	fulgida	Pinal	14011967	36	Barber WE	ASU3030	-	Aravaipa Creek NE 1/4 SE 1/4 S14 R19E T6S	-	ASU	native	1967
4671	Meda	fulgida	Pinal	29071967	44	Barber WE	ASU3033	-	Aravaipa Creek NE 1/4 SE 1/4 S14 R19E T6S	-	ASU	native	1967
4811	Meda	fulgida	Pinal	21081967	22	Barber WE	ASU3537	-	Aravaipa Creek NE 1/4 SE 1/4 S24 T6S R18E	-	ASU	native	1967
2300	Meda	fulgida	Graham	5051967	19	Barber WE	ASU3021	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2303	Meda	fulgida	Graham	10071967	33	Barber WE	ASU3024	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2298	Meda	fulgida	Graham	11031967	18	Barber WE	ASU3019	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2297	Meda	fulgida	Graham	12021967	30	Barber WE	ASU3018	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2299	Meda	fulgida	Graham	13041967	24	Barber WE	ASU3020	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2302	Meda	fulgida	Graham	29061967	9	Barber WE	ASU3023	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2304	Meda	fulgida	Graham	29071967	17	Barber WE	ASU3025	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
2301	Meda	fulgida	Graham	30051967	4	Barber WE	ASU3022	-	Aravaipa Creek NW 1/4 S20 R19E T6S	-	ASU	native	1967
4699	Meda	fulgida	Pinal	9021967	12	Barber WE	ASU3087	-	Aravaipa Creek NW 1/4 S24 R17E T6S	-	ASU	native	1967
2467	Meda	fulgida	Graham	30091967	0	Rinne JN Rinne M	ASU4713	-	Aravaipa Creek NW 1/4 SW 1/4 S21 T6S R19E	-	ASU	native	1967
4667	Meda	fulgida	Pinal	11031967	75	Barber WE	ASU3029	-	Aravaipa Creek SE 1/4 NW 1/4 S15 R18E T6S	-	ASU	native	1967
4666	Meda	fulgida	Pinal	12021967	55	Barber WE	ASU3027	-	Aravaipa Creek SE 1/4 NW 1/4 S15 R18E T6S	-	ASU	native	1967
2573	Meda	fulgida	Graham	5051967	0	Barber WE	ASU6107	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	0945 hrs	ASU	native	1967

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2462	Meda	fulgida	Graham	30091967	0	Rinne JN Rinne M	ASU4708	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1967
4675	Meda	fulgida	Pinal	3051967	26	Barber WE	ASU3037	-	Aravaipa Creek SE 1/4 SE 1/4 S14 R18E T6S	-	ASU	native	1967
4674	Meda	fulgida	Pinal	11031967	60	Barber WE	ASU3036	-	Aravaipa Creek SE 1/4 SE 1/4 S14 R18E T6S	-	ASU	native	1967
4673	Meda	fulgida	Pinal	12021967	82	Barber WE	ASU3035	-	Aravaipa Creek SE 1/4 SE 1/4 S14 R18E T6S	-	ASU	native	1967
4676	Meda	fulgida	Pinal	30051967	37	Barber WE	ASU3038	-	Aravaipa Creek SE 1/4 SE 1/4 S14 R18E T6S	-	ASU	native	1967
4665	Meda	fulgida	Pinal	11031967	61	Barber WE	ASU3027	-	Aravaipa Creek SW 1/4 NE 1/4 S14 R18E T6S	-	ASU	native	1967
4664	Meda	fulgida	Pinal	12021967	70	Barber WE	ASU3026	-	Aravaipa Creek SW 1/4 NE 1/4 S14 R18E T6S	-	ASU	native	1967
2312	Meda	fulgida	Graham	11021967	53	Barber WE	ASU3056	-	Aravaipa Creek SW 1/4 NE 1/4 S19 R19E T6S	-	ASU	native	1967
2311	Meda	fulgida	Graham	14011967	21	Barber WE	ASU3055	-	Aravaipa Creek SW 1/4 NE 1/4 S19 R19E T6S	-	ASU	native	1967
2313	Meda	fulgida	Graham	30051967	6	Barber WE	ASU3057	-	Aravaipa Creek SW 1/4 NE 1/4 S19 R19E T6S	-	ASU	native	1967
2328	Meda	fulgida	Graham	5051967	13	Barber WE	ASU3075	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2325	Meda	fulgida	Graham	11021967	54	Barber WE	ASU3072	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2326	Meda	fulgida	Graham	11041967	30	Barber WE	ASU3073	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967

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2327	Meda	fulgida	Graham	12041967	30	Barber WE	ASU3074	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2324	Meda	fulgida	Graham	14011967	106	Barber WE	ASU3071	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2330	Meda	fulgida	Graham	29071967	31	Barber WE	ASU3077	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	four specimens to J Schnell 2/76	ASU	native	1967
2329	Meda	fulgida	Graham	30051967	20	Barber WE	ASU3076	-	Aravaipa Creek SW 1/4 NW 1/4 S19 R19E T6S	-	ASU	native	1967
2437	Meda	fulgida	Graham	21081967	0	Barber WE	ASU3528	-	Aravaipa Creek SW 1/4 NW 1/4 S19 T6S R19E	-	ASU	native	1967
4693	Meda	fulgida	Pinal	9021967	27	Barber WE	ASU3081	-	Aravaipa Creek SW 1/4 S26 R17E T6S	-	ASU	native	1967
2284	Meda	fulgida	Graham	5051967	7	Barber WE	ASU3005	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2282	Meda	fulgida	Graham	10031967	10	Barber WE	ASU3003	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2281	Meda	fulgida	Graham	11021967	9	Barber WE	ASU3002	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2283	Meda	fulgida	Graham	13041967	13	Barber WE	ASU3004	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2286	Meda	fulgida	Graham	29061967	31	Barber WE	ASU3007	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2287	Meda	fulgida	Graham	29071967	27	Barber WE	ASU3008	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2285	Meda	fulgida	Graham	30051967	28	Barber WE	ASU3006	-	Aravaipa Creek SW 1/4 S27 R19E T6S	-	ASU	native	1967
2471	Meda	fulgida	Graham	30091967	0	Rinne JN Rinne M	ASU4721	-	Aravaipa Creek W 1/2 S27 T6S R19E	-	ASU	native	1967
2449	Meda	fulgida	Graham	29051969	0	Minckley WL	ASU4661	-	Aravaipa Creek at Salazar Ranch just above Turkey Creek	-	ASU	native	1969
4815	Meda	fulgida	Pinal	20041969	0	Deacon JE Minckley WL	ASU4046	-	Aravaipa Creek at Woods Ranch	orig UNLV F1938	ASU	native	1969
20571	Meda	fulgida	Pinal	20041969	-	JEDeacon	UNLV1938	-	Lower Aravaipa Cr SW Sec26 T6S R17E	-	UNLV	native	1969

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7730	Meda	fulgida	Pinal	8051970	44	Findley LT	UAZ70-61	-	Aravaipa Creek near Wood Ranch	-	UAZ	native	1970
17960	Meda	fulgida	Pinal	14061971	256	Suttkus Clemmer & Caruso	TU71106	-	Aravaipa Creek 2.2 mi. NE of Mammoth.	-	TU	native	1971
4962	Meda	fulgida	Pinal	22041972	0	class	ASU6620	-	Aravaipa Creek center N 1/2 S26 T6S R17E	-	ASU	native	1972
4954	Meda	fulgida	Pinal	22041972	0	class	ASU6612	-	Aravaipa Creek center SE 1/4 SE 1/4 S4 T7S R17E	-	ASU	native	1972
4983	Meda	fulgida	Pinal	6051972	0	class	ASU6641	-	Aravaipa Creek MAINSTREAM-STA 13-SE 1/4SW 1/4S8 T6S R18E	-	ASU	native	1972
4967	Meda	fulgida	Pinal	23041972	0	class	ASU6625	-	Aravaipa Creek SE 1/4 SW 1/4 S23 T6S R17E	-	ASU	native	1972
5031	Meda	fulgida	Pinal	11091973	0	McNatt RM	ASU7097	-	Aravaipa Creek 1/2 mile above Painted Cave Canyon	-	ASU	native	1973
5039	Meda	fulgida	Pinal	10091973	0	McNatt RM	ASU7105	-	Aravaipa Creek 1/2 way between Booger Horse Camp Canyons	-	ASU	native	1973
4999	Meda	fulgida	Pinal	10091973	0	McNatt RM	ASU6696	-	Aravaipa Creek at Hell Hole Canyon	-	ASU	native	1973
5005	Meda	fulgida	Pinal	9091973	0	McNatt RM	ASU6702	-	Aravaipa Creek at mouth Turkey Creek	-	ASU	native	1973
3054	Meda	fulgida	Pinal	11091973	0	McNatt RM	ASU7090	-	Aravaipa Creek at mouth Virgus Canyon	-	ASU	native	1973
5032	Meda	fulgida	Pinal	11091973	0	McNatt RM	ASU7098	-	Aravaipa Creek at Woods Ranch	-	ASU	native	1973
4939	Meda	fulgida	Pinal	9111974	0	class	ASU6310	-	Aravaipa Creek center N 1/2 S24 T6S R18E	-	ASU	native	1974
4931	Meda	fulgida	Pinal	9111974	0	class	ASU6302	-	Aravaipa Creek center S 1/2-NE 1/4 S24 T6S R18E	-	ASU	native	1974

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2599	Meda	fulgida	Graham	9111974	0	class	ASU6329	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
2604	Meda	fulgida	Graham	9111974	0	class	ASU6752	-	Aravaipa Creek center S19 T6S R19E	-	ASU	native	1974
4917	Meda	fulgida	Pinal	9111974	0	class	ASU6288	-	Aravaipa Creek E 1/2-S24 T6S R18E	-	ASU	native	1974
4945	Meda	fulgida	Pinal	10111974	0	class	ASU6318	-	Aravaipa Creek NW 1/4 NE 1/4 S17 T6S R18E	-	ASU	native	1974
4933	Meda	fulgida	Pinal	9111974	0	class	ASU6304	-	Aravaipa Creek SE 1/4 NW 1/4 S20 T6S R19E	-	ASU	native	1974
60933	Meda	fulgida	Graham	10011975	2	Schreiber D	ASU17731	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60940	Meda	fulgida	Graham	10011975	27	Schreiber D	ASU17738	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60946	Meda	fulgida	Graham	10011975	40	Schreiber D	ASU17744	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975
60951	Meda	fulgida	Graham	24-25101975	38	Schreiber D	ASU17749	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1975

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5016	Meda	fulgida	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7013	-	Aravaipa Creek 1/2 mile north Horse Camp Canyon SE1/4 NW1/4 S6 T6S R18E	-	ASU	native	1976
2640	Meda	fulgida	Graham	23101976	0	Minckley WL	ASU7001	-	Aravaipa Creek 200 yards west Turkey Creek NE 1/4 SW 1/4 S19 T6S R19E	-	ASU	native	1976
3050	Meda	fulgida	Pinal	25101976	0	Minckley WL	ASU7017	-	Aravaipa Creek above Woods Diversion NE1/4 SE1/4 S24 T6S R17E	-	ASU	native	1976
5127	Meda	fulgida	Pinal	11111976	0	Minckley WL	ASU7573	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1976
2765	Meda	fulgida	Graham	11111976	0	Minckley WL	ASU7567	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1976
10648	Meda	fulgida	Graham	17031976	3	Ginnely Frantz Silvey	ASU13794	-	Aravaipa Creek at confluence Turkey Creek 200 yds below BLM boundary	-	ASU	native	1976
5010	Meda	fulgida	Pinal	24101976	0	Kepner WG Siebert DJ	ASU7007	-	Aravaipa Creek at mouth Hell Hole Canyon NE1/4 SW1/4 S14 T6S R18E	-	ASU	native	1976
5022	Meda	fulgida	Pinal	25101976	0	Minckley WL	ASU7026	-	Aravaipa Creek below Jeb Whites Ranch SW1/4 SE1/4 S34 T6S R17E	-	ASU	native	1976
60958	Meda	fulgida	Graham	30-31011976	20	Schreiber D	ASU17756	-	Aravaipa Creek station 13 confluence of Turkey Creek T6S R19E S19	material from Schreiber MSC 1978 and Schreiber and Minckley 1981 GBN	ASU	native	1976
5084	Meda	fulgida	Pinal	19071977	0	Siebert DJ	ASU7311	-	Aravaipa Creek 1/2 mile above Javalina Canyon	-	ASU	native	1977

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7638	Meda	fulgida	Graham	7071977	4	Starnes WC Starnes LB	UAIC8789-02	-	Aravaipa Creek 10 miles west Klondyke	ident BH Bauer	UAIC	native	1977
2752	Meda	fulgida	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7422	-	Aravaipa Creek 3090-ft contour	-	ASU	native	1977
2749	Meda	fulgida	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7419	-	Aravaipa Creek 3150-ft contour	-	ASU	native	1977
2740	Meda	fulgida	Graham	16091977	0	Clarkson RW Siebert DJ	ASU7410	-	Aravaipa Creek 3220-ft contour	-	ASU	native	1977
5072	Meda	fulgida	Pinal	17071977	0	Siebert DJ	ASU7301	-	Aravaipa Creek at 2300-ft contour	-	ASU	native	1977
5061	Meda	fulgida	Pinal	17071977	0	Siebert DJ	ASU7279	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5105	Meda	fulgida	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7408	-	Aravaipa Creek at 2400-ft contour	-	ASU	native	1977
5050	Meda	fulgida	Pinal	15021977	0	Minckley WL	ASU7187	-	Aravaipa Creek at 2475-ft contour	-	ASU	native	1977
5132	Meda	fulgida	Pinal	4121977	0	Clarkson RW Kepner WG	ASU7647	-	Aravaipa Creek at 2480-ft contour	-	ASU	native	1977
5067	Meda	fulgida	Pinal	16071977	0	Siebert DJ	ASU7289	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
5107	Meda	fulgida	Pinal	17091977	0	Clarkson RW Siebert DJ	ASU7429	-	Aravaipa Creek at 2850-ft contour	-	ASU	native	1977
2808	Meda	fulgida	Graham	3121977	0	Clarkson RW Burton S	ASU7653	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2813	Meda	fulgida	Graham	3121977	0	Clarkson RW Burton S	ASU7659	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2731	Meda	fulgida	Graham	16071977	0	Siebert D	ASU7299	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2684	Meda	fulgida	Graham	19021977	0	Minckley WL	ASU7205	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1977
2772	Meda	fulgida	Graham	20101977	0	Kepner WG Siebert DJ	ASU7579	-	Aravaipa Creek at 3128-ft contour	-	ASU	native	1977
2677	Meda	fulgida	Graham	19021977	0	Minckley WL	ASU7198	-	Aravaipa Creek at 3200-ft contour	-	ASU	native	1977
5092	Meda	fulgida	Pinal	20071977	0	Siebert DJ	ASU7319	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5123	Meda	fulgida	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7448	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1977
5097	Meda	fulgida	Pinal	19071977	0	Siebert DJ	ASU7324	-	Aravaipa Creek at Parsons Canyon	-	ASU	native	1977

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5111	Meda	fulgida	Pinal	23091977	0	Clarkson RW Siebert DJ	ASU7434	-	Aravaipa Creek at Parsons Canyon	-	ASU	native	1977
5078	Meda	fulgida	Pinal	19071977	0	Siebert DJ	ASU7305	-	Aravaipa Creek between Horse Camp and Paisano canyons	-	ASU	native	1977
2643	Meda	fulgida	Graham	23041977	0	Siebert D	ASU7115	-	Aravaipa Creek near source	-	ASU	native	1977
2883	Meda	fulgida	Graham	18021978	0	class	ASU7780	-	Aravaipa Creek at 3090-ft contour	-	ASU	native	1978
3037	Meda	fulgida	Pinal	16041983	1	Hendrickson DA class	ASU11696	-	Aravaipa Creek	~45 mm	ASU	native	1983
12185	Meda	fulgida	Graham	17011983	3	Rinne Rogers Smith	TNHC21789	-	Aravaipa Creek	-	TNHC	native	1983
51827	Meda	fulgida	Pinal	30101983	22	-	-	-	ARAVAIPA CREEK 0.25 MI ABOVE HORSE CAMP CANYON	T06SR18ES16 NW4 325506 1103055	AZGF	native	1983
5187	Meda	fulgida	Pinal	15091983	57	Karp K	ASU10616	-	Aravaipa Creek between Paisano and Hell Hole canyons	-	ASU	native	1983
51843	Meda	fulgida	Pinal	30101983	1	-	-	-	ARAVAIPA CREEK CA. 0.25 MI ABOVE JAVALINA CANYON	T06SR18ES07 SE4 SE4 SE4 325511 1103203	AZGF	native	1983
51733	Meda	fulgida	Pinal	29101983	10	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW HELL HOLE	T06SR18ES14 S2 S2 325425 1102759	AZGF	native	1983
51798	Meda	fulgida	Pinal	29101983	27	-	-	-	ARAVAIPA CREEK CA. 0.5 MI BELOW PAISANO CANYON	T06SR18ES15 SW4 NE4 325451 1102918	AZGF	native	1983
51803	Meda	fulgida	Pinal	30101983	30	-	-	-	ARAVAIPA CREEK MOUTH OF VIRGUS CANYON	T06SR18ES17 NE4 325500 1103118	AZGF	native	1983

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51639	Meda	fulgida	Graham	29101983	55	-	-	-	ARAVAIPA CREEK PRIMITIVE AREA	T06SR19ES20 SE4NE4 325357 1102518	AZGF	native	1983
51691	Meda	fulgida	Pinal	30101983	73	-	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NE4 NW4 NW4 325409 1103357	AZGF	native	1983
3022	Meda	fulgida	Graham	24051985	0	Parkin DL	ASU11123	-	Aravaipa Creek at western visitors entrance to wilderness area	-	ASU	native	1985
5197	Meda	fulgida	Pinal	27031987	0	Karp K	ASU11177	-	Aravaipa Creek at Paisano Canyon	-	ASU	native	1987
9790	Meda	fulgida	Graham	10081987	1	Young KL Abarca F	ASU14805	-	upper Aravaipa Creek T6S R19E S 21 28	45 mm SL	ASU	native	1987
51650	Meda	fulgida	Graham	24091988	74	ALV TM DB JP CW DP	-	-	ARAVAIPA CREEK	T06SR19ES19 NE4 NE4 325400 1102608	AZGF	native	1988
51507	Meda	fulgida	Graham	24091988	59	MRC & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW CHIMNEY UPSTREAM	T06SR19ES21 SW4 NW4 325342 1102456	AZGF	native	1988
51640	Meda	fulgida	Graham	24091988	143	FTA & ASU WILDLIFE	-	-	ARAVAIPA CREEK 100M BELOW TO 225M ABOVE BEAR CANYON	T06SR19ES20 SE4NE4 325357 1102510	AZGF	native	1988
51479	Meda	fulgida	Pinal	25091988	114	DAH DSK & ASU W.SOC.	-	-	ARAVAIPA CREEK IMMEDIATELY BELOW TAPIA DIVERSION	T06SR19ES28 NE4 SE4 325307 1102419	AZGF	native	1988
51630	Meda	fulgida	Graham	24091988	136	SN SV GN MD MG WM +	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 NE4 SW4 325353 1102625	AZGF	native	1988
46174	Meda	fulgida	Graham	7101989	5	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK 100 M BELOW TAPIA DIVERSION	T6SR19ES28N E4SE4	AZGF	native	1989

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46184	Meda	fulgida	Graham	7101989	154	DAH ET AL.	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1989
51508	Meda	fulgida	Graham	7101989	184	DAH ET AL.	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4 SW4 325342 1102458	AZGF	native	1989
46201	Meda	fulgida	Graham	7101989	118	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK EAST OF BEAR CANYON CROSSING	T6SR19ES20N E4SE4	AZGF	native	1989
51595	Meda	fulgida	Graham	7101989	48	DAH ET. AL.	-	-	ARAVAIPA CREEK MOUTH OF TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1989
46185	Meda	fulgida	Graham	30091990	10	TC PR MB FA	-	-	ARAVAIPA CREEK BILLS CROSSING	T6SR19ES19N E4 NE4	AZGF	native	1990
51596	Meda	fulgida	Graham	30091990	44	-	-	-	ARAVAIPA CREEK TURKEY CREEK (EAST END GAUGE)	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1990
9644	Meda	fulgida	Pinal	20101990	1	Minckley WL	ASU14547	-	lower Aravaipa Creek stations 1-7	20 mm stations combined	ASU	native	1990
61369	Meda	fulgida	Graham	21061991	33	Minckley Dowling Tibbets	ASU17135	-	Aravaipa Creek upper end	Tibbets MS thesis	ASU	native	1991
51510	Meda	fulgida	Graham	9121992	177	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
51511	Meda	fulgida	Graham	11081992	219	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1992
46194	Meda	fulgida	Graham	11111992	366	DFG EB DW BR MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T6SR19ES21	AZGF	native	1992
51399	Meda	fulgida	Graham	9121992	134	KLY RHB DBD JS EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992

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51400	Meda	fulgida	Graham	10081992	147	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1992
49029	Meda	fulgida	Graham	11111992	225	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1992
51734	Meda	fulgida	Pinal	11081992	270	AV MW JS SD JY	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1992
49046	Meda	fulgida	Pinal	11111992	166	RHB DBD KLY JRS DFG	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1992
51829	Meda	fulgida	Pinal	11081992	45	AV MW JS SD JY	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1992
49060	Meda	fulgida	Pinal	11111992	92	RHB DBD JRS ALF	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1992
11711	Meda	fulgida	Graham Pinal	51992	3	Velasco AA	ASU16272	-	Aravaipa Creek in Aravaipa Canyon	-	ASU	native	1992
51769	Meda	fulgida	Pinal	11081992	26	AV MW JS SD JY	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1992
51597	Meda	fulgida	Graham	9121992	175	KY RB DD JS EB MF BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
51598	Meda	fulgida	Graham	11081992	171	RB MW JY SD JS AH DG	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1992
49096	Meda	fulgida	Graham	10111992	320	RHB JS	-	-	ARAVAIPA CREEK TURKEY CREEK STATION	-	AZGF	native	1992
51694	Meda	fulgida	Pinal	10121992	2	RHB DBD JRS BR	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992

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51693	Meda	fulgida	Pinal	12081992	9	RB AH DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1992
51509	Meda	fulgida	Graham	9031993	133	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51514	Meda	fulgida	Graham	15061993	177	CEP ALF EB MF	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51542	Meda	fulgida	Graham	17021993	130	DAW JS EB XR	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325343 1102458	AZGF	native	1993
49022	Meda	fulgida	Graham	18081993	1185	DBD MMS JTT JVB DFG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	-	AZGF	native	1993
51512	Meda	fulgida	Graham	19051993	211	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51513	Meda	fulgida	Graham	29111993	207	RHB EEB DAW AWM	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1993
51398	Meda	fulgida	Graham	9031993	50	RHB DBD KLY DAW	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51403	Meda	fulgida	Graham	16061993	120	CEP ALF EB MF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51404	Meda	fulgida	Graham	17021993	100	DAW JS EB XR	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
49036	Meda	fulgida	Graham	18081993	704	RHB DBD MMS CEP DFG	-	-	ARAVAIPA CREEK GUEST HOUSE	-	AZGF	native	1993

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51402	Meda	fulgida	Graham	20051993	128	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51401	Meda	fulgida	Graham	29111993	738	DBD MAL DTG MTF	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1993
51735	Meda	fulgida	Pinal	10031993	176	RHB DBD DAW BR	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
49047	Meda	fulgida	Pinal	19081993	481	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HELL HOLE	-	AZGF	native	1993
51737	Meda	fulgida	Pinal	20051993	182	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51736	Meda	fulgida	Pinal	30111993	154	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1993
51828	Meda	fulgida	Pinal	10031993	40	RHB DBD DAW BR AV	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
49061	Meda	fulgida	Pinal	19081993	333	DBD CEP DFG EEB JVB	-	-	ARAVAIPA CREEK HORSE CAMP	-	AZGF	native	1993
51826	Meda	fulgida	Pinal	20051993	81	DBD RHB MMS SMJ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51825	Meda	fulgida	Pinal	30111993	346	DBD MAL DFG AWM SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1993
51768	Meda	fulgida	Pinal	10031993	9	RHB DBD DAW	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993

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49073	Meda	fulgida	Pinal	20081993	337	RHB DBD MMS CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	-	AZGF	native	1993
51766	Meda	fulgida	Pinal	21051993	74	ALF RHB BMR CEP	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1993
51331	Meda	fulgida	Pinal	15061993	10	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
51329	Meda	fulgida	Pinal	16021993	1	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES08 NW4 325032 1103728	AZGF	native	1993
49083	Meda	fulgida	Pinal	19081993	2	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK SYCAMORE TREE	-	AZGF	native	1993
51330	Meda	fulgida	Pinal	20051993	6	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK SYCAMORE TREE	T07SR17ES8N W4 325032 1103728	AZGF	native	1993
51600	Meda	fulgida	Graham	9031993	311	RHB DBD KLY DAW BR	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51602	Meda	fulgida	Graham	15061993	284	CEP ALF EB MF	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
49089	Meda	fulgida	Graham	18081993	705	RHB.EEB BMR MTF	-	-	ARAVAIPA CREEK TURKEY CREEK	-	AZGF	native	1993
51599	Meda	fulgida	Graham	19051993	134	DBD BPD RHB MMS SMJ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51601	Meda	fulgida	Graham	29111993	412	BPD JRS BMR SBZ	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102632	AZGF	native	1993
51689	Meda	fulgida	Pinal	1121993	105	BPD DBD DAW MAL	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993

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51692	Meda	fulgida	Pinal	10031993	7	KLY JS DG	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51688	Meda	fulgida	Pinal	16061993	116	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
49106	Meda	fulgida	Pinal	20081993	320	BMR JTT D_J	-	-	ARAVAIPA CREEK WAGNER RANCH	-	AZGF	native	1993
51690	Meda	fulgida	Pinal	21051993	1	DBD BPD MMS SMJ	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1993
51458	Meda	fulgida	Pinal	1121993	2	JRS RHB SBZ AWM DFG	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51457	Meda	fulgida	Pinal	15061993	91	DBD MMS SMJ BR DMS	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51455	Meda	fulgida	Pinal	16021993	1	RBH DBD ALF DG(TNC)	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
49118	Meda	fulgida	Pinal	19081993	22	RHB MMS BMR DFG	-	-	ARAVAIPA CREEK WHITES RANCH	-	AZGF	native	1993
51459	Meda	fulgida	Pinal	20051993	5	ALF BPD BMR CEP	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR17ES26 NE4SW4 325249 1103457	AZGF	native	1993
51506	Meda	fulgida	Graham	5041994	677	SBZ EB LG	-	-	ARAVAIPA CREEK CHIMNEY ROCK	T06SR19ES21 NW4SW4 325342 1102458	AZGF	native	1994
51397	Meda	fulgida	Graham	5041994	271	MAL DFG ML BH MM	-	-	ARAVAIPA CREEK GUEST HOUSE	T06SR19ES27 SE4SW4 325242 1102330	AZGF	native	1994

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51732	Meda	fulgida	Pinal	6041994	503	DBD SBZ	-	-	ARAVAIPA CREEK HELL HOLE	T06SR18ES14 SE4SE4 325425 1102759	AZGF	native	1994
51824	Meda	fulgida	Pinal	6041994	262	DBD SBZ	-	-	ARAVAIPA CREEK HORSE CAMP	T06SR18ES16 NW4NW4 325506 1103055	AZGF	native	1994
51767	Meda	fulgida	Pinal	7041994	140	DBD MAL SBZ ZSH MEM	-	-	ARAVAIPA CREEK PAINTED CAVE	T06SR18ES18 SW4NW4 325446 1103256	AZGF	native	1994
51594	Meda	fulgida	Graham	5041994	478	DBD AWM JNY ZSH	-	-	ARAVAIPA CREEK TURKEY CREEK	T06SR19ES19 SE4NW4 325350 1102836	AZGF	native	1994
51687	Meda	fulgida	Pinal	7041994	132	DFG JNY AWM ML BH	-	-	ARAVAIPA CREEK WAGNER RANCH	T06SR17ES24 NW4NW4 325409 1103357	AZGF	native	1994
51456	Meda	fulgida	Graham	7041994	12	MAL DBD SBZ JNY AWM	-	-	ARAVAIPA CREEK WHITES RANCH	T06SR19ES27 NE4SW4 325249 1103457	AZGF	native	1994
51396	Meda	fulgida	Graham	11061997	-	HAYES PORATH DAW	-	-	ARAVAIPA CREEK E BOUNDARY OF USFS/TNC PROPERTIES UPSTR 0.5 MI	T06SR19ES27 SE4 SW4 325242 1102330	AZGF	native	1997
46175	Micropterus	dolomieui	Graham	7101989	3	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK 100 M BELOW TAPIA DIVERSION	T6SR19ES28N E4SE4	AZGF	introduced	1989
46202	Micropterus	dolomieui	Graham	7101989	15	EEP DRV SDH ET AL	-	-	ARAVAIPA CREEK EAST OF BEAR CANYON CROSSING	T6SR19ES20N E4SE4	AZGF	introduced	1989
5143	Micropterus	salmoides	Pinal	17081978	0	Siebert DJ	ASU7987	-	Aravaipa Creek 1 km below Woods Ranch	-	ASU	introduced	1978
5154	Micropterus	salmoides	Pinal	29091979	30	Siebert DJ	ASU10051	-	Aravaipa Creek 500 m above Horse Camp canyon	-	ASU	introduced	1979