

**SAN JUAN RIVER  
RAZORBACK SUCKER *Xyrauchen texanus* &  
COLORADO PIKEMINNOW *Ptychocheilus lucius*  
POPULATION AUGMENTATION: 2014**

**Final Report**



Photo by USFWS

Submitted By:

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To:

The San Juan River Basin Recovery Implementation Program  
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## EXECUTIVE SUMMARY

### Razorback Sucker:

- **6,170** Razorback Suckers were stocked during 2014 augmentation efforts
  - Several stocking sites on the San Juan River were used between River Mile (RM) 93.0 (Montezuma Creek, UT) upstream to RM 196.0 (Verde del Rio Park, Bloomfield, NM)
  - One site on the Animas River in Farmington, NM was used
    - Animas River Mile (A-RM) 5.0 (Berg Park)
  - An experimental stocking study was implemented
    - Hard vs. soft- release comparison
    - Source of Fish and Location of Stocking comparison
  - Sixth year of eight year augmentation plan
    - 90,658 fish stocked during this eight-year effort
      - 99.4% of the eight-year augmentation target (91,200) have been stocked from 2009 to 2014

### Sources of Razorback Sucker:

- **2,015** fish stocked from Ouray National Fish Hatchery (NFH)-Grand Valley Unit
  - All Razorback Suckers stocked from Ouray NFH were hard-released in support of the Source/Location stocking study
  - All Ouray NFH fish stocked in 2014 were 2013 Year Class (YC)
- **4,155** fish stocked from Navajo Agricultural Products Industry (NAPI) ponds
  - 9,000 fish stocked into ponds in April 2014 for grow-out
    - 46.2% return rate
  - Mean TL= 368 mm, Range 215-530 mm
    - Fish stocked at multiple locations between RM 166.6 (PNM Sluiceway and Nenahnezad Fish Ladder) upstream to 196.0, at RM 93.0, and at A-RM 5.0
    - 1,559 passively harvested fish used in the hard vs. soft-release study
      - 784 soft-released / 775 hard-released

- 1,692 actively harvested fish used in support of Source/Location study
  - 544 passively harvested fish were stocked upstream of the PNM Weir (RM 168.3, Hatch Bros. Trading Post) as part of a separate study to record downstream dispersal over the PNM weir
  - Remaining passively harvested fish released at Nenahnezad Fish Ladder independent of any study
- All NAPI fish stocked in 2014 were 2011 YC produced at Southwestern Native Aquatic Resources and Recovery Center (SNARRC)
- All Razorback Suckers stocked in 2014 were PIT tagged and measured for Total Length (mm)
- Adaptive management 2015-2016
  - Effects of hard vs. soft-releases, source, and stocking location being investigated
  - Revised Razorback Sucker augmentation plan to be completed in 2015
  - Exploring potential of stocking the Animas River above A-RM 5.0

## **EXECUTIVE SUMMARY (continued)**

### **Colorado Pikeminnow:**

- A total of **393,442** Colorado Pikeminnows were stocked into the San Juan River Basin in 2014
  - November 6<sup>th</sup>
    - PNM Sluiceway, Fruitland, NM (RM 166.6)
      - 94,091 fish soft-released and acclimatized 24 hours
      - Average 60 mm TL, 2014 YC
    - Boyd Park, Farmington, NM (A-RM 1.0)
      - 94,090 fish soft-released and acclimatized 24 hours
      - Average 60 mm TL, 2014 YC
    - Berg Park, Farmington, NM (A-RM 5.0)
      - 102,630 hard-released
      - Average 45 mm TL, 2014 YC
    - Verde del Rio Park, Bloomfield, NM (RM 196.0)
      - 102,631 hard-released
      - Average 45 mm TL, 2014 YC
  - 98.4% of annual stocking target fulfilled
- Fifth year of Phase II (2010-2020) Colorado Pikeminnow augmentation
  - All Colorado Pikeminnows provided by SNARRC
- In 2015 SNARRC will continue to follow Phase II production
  - $\geq 400,000$  age-0 Colorado Pikeminnows produced and stocked annually

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## **INTRODUCTION**

The San Juan River Basin Recovery Implementation Program (SJRIP) has supported various augmentation efforts for Razorback Sucker (*Xyrauchen texanus*) and Colorado Pikeminnow (*Ptychocheilus lucius*) for over 20 years. Previous augmentation reports discuss in detail those efforts. Currently, the SJRIP is engaged in an eight-year augmentation effort (2009-2016) for Razorback Sucker ([Ryden 2003a](#) & [Ryden 2005](#)) and a Phase II augmentation plan for Colorado Pikeminnow ([Furr 2010](#)). This report will detail just the specific efforts undertaken for both species in 2014 in accordance to their respective augmentation plans. Razorback Sucker will occasionally be referred to as **RBS** and Colorado Pikeminnow as **CPM** throughout this document; especially when quoting other documents that use those abbreviations.

### **Relationship To The Recovery Program**

The main objective for augmentation is to facilitate the establishment of self-sustaining populations of Colorado Pikeminnow and Razorback Sucker, with the eventual goal of recovering (i.e., delisting) these species in the San Juan River Basin ([Ryden 1997](#), [SJRIP 2014](#)). Augmentation is intended to increase overall population numbers, provide opportunities for research (e.g., movement studies, habitat and spawning site preferences), add genetic diversity to the existing gene pool, and contribute to the persistence of a spawning adult population.

The SJRIP Long-Range Plan (LRP) ([SJRIP 2014](#)) identifies the need to implement and assess the augmentation of Colorado Pikeminnow and Razorback Sucker populations in the San Juan River Basin (Basin). There are numerous documents that provide the necessary guidance for the efforts to fulfill the goals, actions, and tasks defined in the 2014 LRP ([Ryden 2003a](#), [Ryden 2003b](#), [Ryden 2005a](#), [Ryden 2005b](#), [Furr 2010](#), [Furr & Davis 2009a](#), [Furr & Davis 2009b](#)). The requirements of the augmentation program for the Basin's Colorado Pikeminnow and Razorback Sucker populations are specified in the 2014 LRP under the following goals, actions, and tasks:

- **Goal 1.1 - Establish a Genetically and Demographically Viable, Self-Sustaining CPM and RBS Populations.**
  - **Action 1.1.1** Develop plans for rearing and stocking CPM and RBS.
    - **Task 1.1.1.1** Review and update augmentation plan for CPM and adjust stocking goals as scheduled.
    - **Task 1.1.1.2** Review and update augmentation plan for RBS and adjust stocking goals as needed.
  - **Action 1.1.2** Produce, rear, and stock sufficient numbers of CPM to meet stocking goals of augmentation plan.
    - **Task 1.1.2.2** Stock at least 400,000 age-0 (50–55 mm TL) CPM annually into the San Juan River.

At least 400,000 age-0 (50–55 mm TL) CPM will be released annually from the SNARRC into the San Juan River and will continue until stocking targets are modified by the SJRRIP (see Task 1.1.1.1).
    - **Task 1.1.2.3** Opportunistically stock available CPM in excess of those described above.
  - **Action 1.1.3** Produce, rear, and stock sufficient numbers of RBS to meet stocking goals of augmentation plan.
    - **Task 1.1.3.2** Rear and stock hatchery-reared RBS from three NAPI grow-out ponds (3,000-3,500 fish per pond, > 200 mm TL).
    - **Task 1.1.3.4** Stock at least 91,200 RBS (> 300 mm TL) during eight year stocking period or 11,400 per year.

At least 91,200 RBS (> 300 mm TL) will be harvested annually from grow-out ponds and/or supplemental hatchery facilities and stocked into the SJR over an 8-year period or 11,400 per year. A 2005 addendum to the stocking plan specified the eight-year stocking period to begin when the production program was at full implementation, estimated to start no later than 2007. Time frame for current 8-year stocking plan is 2009-2016 (see Task 1.1.1.2).
    - **Task 1.1.3.5** Opportunistically stock available RBS in excess of the 11,400 described above.
    - **Task 1.1.3.6** Produce 2,000-4,000 RBS per year (>300 mm TL) at Horsethief Canyon Native Fish Facility (HCNFF), at Ouray NFH at Grand Junction, CO

- **Goal 1.2 - Identify and Implement Strategies for Improving the RBS and CPM Augmentation Program and Genetic Integrity.**
  - **Action 1.2.1** Implement methods to evaluate status and success of stocked RBS and CPM.
    - **Task 1.2.1.2** Identify, describe, and implement strategies for improving survival and retention of stocked razorback sucker and Colorado pikeminnow, including acclimation prior to stocking, size of fish stocked, time and location of stocking, physiological conditioning, and predator avoidance.
  
- **Goal 1.3 - Support Operations and Maintenance of Facilities to Support RBS and CPM Stocking Programs.**
  - **Action 1.3.1.** Support Production and Grow-out Facilities.
    - **Task 1.3.1.1** Support operation and maintenance of hatchery facilities at SNARRC for CPM and RBS production.
    - **Task 1.3.1.3** Operate and maintain Navajo Agricultural Products Industry (NAPI) grow-out ponds for RBS production.
    - **Task 1.3.1.4** Support operation and maintenance of Horse Thief Canyon Fish Rearing Ponds.

Ouray National Fish Hatchery's (Ouray NFH) - Grand Valley Unit (GVU) and the Navajo Agricultural Products Industry (NAPI) grow-out ponds, operated by Navajo Nation Department of Fish and Wildlife (NNDFW), provided all Razorback Suckers stocked into the San Juan River in 2014. Razorback Suckers used for grow-out at NAPI were produced at, reared to >200 mm TL, and delivered to the ponds by the U.S. Fish and Wildlife Service's Southwestern Native Aquatic Resources and Recovery Center (SNARRC). All Colorado Pikeminnow were produced and delivered by SNARRC.

Stocking of fish reared at USFWS hatcheries in the Southwest Region are subject to Regional Policy No. 03-06, "Stocking of fish and other aquatic species". This policy applies to production, transport, and stocking for USFWS hatchery production and incorporates guidance and requirements from USFWS Fish Health Policy (713 FWM 1-5), Policy for Controlled Propagation of Species Listed under the Endangered Species Act (Federal Register 65:183), and goals and objectives of the

USFWS's Strategic Plan for the Fisheries Program. The USFWS's Fish and Wildlife Conservation Offices are the primary conduit for satisfaction of policy requirements and ensure compliance with needs relative to fish health, stocking requests and priorities, deviation from approved stocking requests, pre-stocking treatments (e.g. nonnative fish removal from stocking sites), and applicable environmental regulation. NMFWCO is the pertinent field office for processing of SJRIP stocking requests.

### **Objectives for RBS & CPM Augmentation 2014**

- 1) Obtain, rear, harvest, and stock Razorback Suckers to fulfill the tasks and objectives outlined in the current versions of the Razorback Sucker augmentation plan addendum ([Ryden 2003a](#)) and the SJRIP Long-range plan.
- 2) Support two experimental stocking studies: 1) Hard vs. soft-releases: using passively harvested RBS from NAPI, 2) Source of Fish and Location of Stocking comparison: using RBS actively harvested from NAPI ponds and RBS produced at Ouray NFH-GVU.
- 3) Coordinate with SNARRC to procure and release age-0 Colorado Pikeminnows according to guidelines set forth in *Augmentation of Colorado pikeminnow (Ptychocheilus lucius) in the San Juan River Phase II, 2010-2020 (Draft Augmentation Plan)* ([Furr 2010](#)) and *Stocking plan and protocol for the augmentation of Colorado pikeminnow (Ptychocheilus lucius) in the San Juan River* ([Furr and Davis 2009a](#)).

## STOCKINGS

### Razorback Sucker:

#### Ouray NFH-GVU 2014 Stockings

Ouray NFH-GVU began delivering Razorback Suckers in 2013 as part of its annual commitment to the SJRIP Augmentation Program. Current production at Ouray NFH-GVU allows for 2,000-4,000 Razorback Suckers to be available for stocking into the Basin annually.

In 2014, Ouray NFH-GVU stocked 2,015 Razorback Suckers at three locations on the San Juan River and at one location on the Animas River. These fish were considered a partial fulfillment of the annual stocking goal of 11,400 (>300mm TL) fish; however, these fish were also used to support the Source of Fish and Location of Stocking study (Table 1). These stockings followed the Source of Fish and Location of Stocking protocols using standard hard-release methods. Details on this study and the hard-soft release study are in Cheek (2015, in preparation).

**Table 1- Summary of NAPI and Ouray NFH-GVU Razorback Suckers Source of Fish and Location of Stocking releases into the San Juan River, 2014. (NAPI Ponds: Hidden Pond= HP, East Avocet= EA, West Avocet= WA)**

Date	Site, River Mile	# of fish	Year Class	Mean TL (mm)	Range TL (mm)	Source (release type)
Oct. 6	Verde del Rio Park RM 196.0	613	2013	378	290-464	Ouray (Hard)
Oct. 7	Verde del Rio Park RM 196.0	94	2011	376	305-446	NAPI-HP (Hard)
Oct. 7	Montezuma Creek, UT RM 93	400	2011	381	280-486	NAPI-HP (Hard)
Oct. 8	Berg Park A-RM 5.0	562	2011	377	305-500	NAPI-EA (Hard)
Oct. 8	Berg Park A-RM 5.0	622	2013	385	290-471	Ouray (Hard)
Oct. 9	Verde del Rio Park RM 196.0	236	2011	383	300-490	NAPI-WA (Hard)
Oct. 9	PNM weir/ Nenahnezad Fish Ladder RM 166.6	400	2011	385	300-500	NAPI-WA (Hard)
Oct. 14	Montezuma Creek, UT RM 93	411	2013	377	377-489	Ouray (Hard)
Oct. 14	PNM weir/ Nenahnezad Fish Ladder RM 166.6	369	2013	375	308-446	Ouray (Hard)
<b>Total Stocked for Source/Location Stocking Study</b>		<b>3707</b>	1692 stocked form NAPI, 2015 stocked from Ouray			

## NAPI Ponds 2014 Stockings

A total of 4,155 Razorback Suckers were stocked from the NAPI ponds into the San Juan and Animas rivers in 2014 (Table 2). There was a 46.2% return rate from the original 9,000 fish stocked into the ponds. Passive harvests occurred from 4-23 September, 2014. These fish were considered a partial fulfillment of the annual stocking goal of 11,400 (>300mm TL) fish; however, they were also used to support both the hard vs. soft-release study and a separate study to evaluate downstream dispersal over PNM weir (Chris Cheek, personal communication). Passively harvested fish were stocked at three locations: PNM Sluiceway (RM 166.6, soft-releases), PNM weir/Nenahnezad Fish Ladder (RM 166.6, hard-releases), and the Hatch Bros. Trading Post (Rm 168.3). Razorback Suckers from passive harvest not used as part of these studies were hard-released at the PNM weir/Nenahnezad Fish Ladder.

Actively harvested fish from NAPI ponds were considered a partial fulfillment of the annual stocking goal of 11,400 (>300mm TL) fish; however, they were also used to support the Source of Fish and Location of Stocking study (Table 1). Active harvest at Hidden Pond, East Avocet, and West Avocet occurred on October 7, 8 and 9, 2014; respectively. Details on this study and the hard verses soft release study can be found in Cheek (2015, in preparation).

**Table 2- Summary of 2014 NAPI pond harvest results as reported to NMFWCO by NNDFW.**

Pond	Harvest Type	Number Recorded	Mean TL (mm)	Range TL (mm)	Mean WT (g)
East Avocet	Passive	917	355	255-530	474
	Active	562	377	305-500	555*
West Avocet	Passive	767	365	300-510	505
	Active	636	384	300-500	532*
Hidden Pond	Passive	779	358	215-500	505
	Active	494	380	280-486	599*
<b>Total</b>		<b>4,155</b>			

\*indicates mean WT's were calculated from a subset of fish harvested (n=100).

Razorback Suckers with errors in their recorded data were removed from the SJRIP Access database (Scott Durst, personal communication) and so may be represented in this report but will not be

accounted for in other program documents. These fish are, however, included when calculating the 2014 annual augmentation totals ([Appendix B](#)).

### **Colorado Pikeminnow:**

On November 6, 2014 personnel from SNARRC and NMFWCO released 393,442 age-0 (2014 YC) Colorado Pikeminnows. Two soft-release locations were used: PNM Sluiceway (RM 166.6) received 94,091 fish, and Boyd Park in Farmington, NM (A-RM 1.0) received 94,090 fish. Two hard-release locations were also used: Verde del Rio Park (RM 196) received 102,631 fish, and Berg Park (A-RM 5.0) (Table 3). Fish stocked using soft-releases were held and monitored within enclosures for 24 hours. No anomalies, or recordable mortality events, occurred during that period. Flow in the San Juan River (USGS 09355500 San Juan River near Archuleta, NM gauge) was measured at 350 cubic feet per second (cfs), and flows in the Animas River (USGS 09364500 Animas River at Farmington, NM gauge) were recorded as between 480-510 cfs during the soft-release period (6-7 November). Variation in flow was nominal and not considered to be a complicating factor affecting the soft-releases. All Colorado Pikeminnows stocked into the San Juan River in 2014 were produced and reared at SNARRC under a separate agreement with the Bureau of Reclamation.

**Table 3- Colorado Pikeminnow stockings in the San Juan River 2014.**

Date	Age/Year Class	# of Fish	TL (mm)	Release Site River Mile	Release Type (soft vs. hard)
Nov. 6	0/2014	94,091	60	166.6	Soft
Nov. 6	0/2014	94,090	60	A-RM 1.0	Soft
Nov. 6	0/2014	102,631	45	196.0	Hard
Nov. 6	0/2014	102,630	45	A-RM 5.0	Hard
<b>Total Stocked</b>		<b>393,442</b>			

In accordance with stocking protocols, Colorado Pikeminnows were tempered in the hauling tank for at least one hour and to within 1°C of the measured river temperature. Temperatures were verified to be within 1°C at all locations and fish were off-loaded into the soft-release enclosures or directly into the rivers.

Due to the limited access, time, and operations at the PNM Sluiceway, no pre-stocking fish community sampling could be conducted. Seining was conducted within the Boyd Park enclosure to

record any fish present. One native Flannelmouth Sucker, *Catostomus latipinnis* (TL=82 mm); one nonnative White Sucker, *Catostomus commersonii* (TL=192 mm); and one nonnative Largemouth Bass, *Micropterus salmoides* (TL=116 mm) were collected. Nonnative fishes were removed from the enclosure while the native Flannelmouth Sucker was returned to the enclosure.

## **CONCLUSION**

A total of 6,170 Razorback Suckers and 393,442 Colorado Pikeminnows were stocked in 2014. No anomalies, fish health issues, or substantial mortalities were witnessed during soft-releases for either species. Although the annual stocking target of 11,400 Razorback Suckers was not met in 2014, by year six (2014) of the eight-year augmentation plan 99.4% of the stocking target (91,200) has been fulfilled. Barring catastrophic losses at both NAPI ponds and Ouray NFH-GVU in 2015, it is expected that the overall eight-year augmentation goal of 91,200 Razorback Suckers will be fulfilled in 2015. The SJRIP is currently assessing new annual augmentation targets and will make revisions to the augmentation plan for Razorback Sucker in 2015. Since 2010, a total of 1,654,934 Age-0 Colorado Pikeminnow have been stocked into the San Juan Basin. Although numbers of Colorado Pikeminnow stocked annually has varied among years, the Program is on track to meet targeted stocking numbers for the ten-year augmentation period.

In 2014, sub-adult and adult fish community monitoring upstream of PNM weir (RM 166.6) resulted in the collection of 16 Razorback Suckers. Stocking records indicated that all 16 of these fish were stocked above the PNM weir (SJRIP PIT tag database). A more expansive range of stocking locations in the San Juan and Animas Rivers may facilitate both an upstream range expansion and a more longitudinally uniform population density for this species. Areas of the Animas River as far upstream as Durango, CO, are being investigated for suitability as release sites. Annual stockings of Razorback Suckers will continue to be accomplished in autumn, preferably after the end of irrigation and field sampling seasons, in an attempt to lessen entrainment and post-stocking sampling disturbance. The stocking comparison studies for Razorback Sucker implemented in 2014 will help guide management decisions with regards to soft vs. hard-releases, stocking source, and stocking location. As recapture data are made available, the effect these variables have on 'establishment' of fish in the river will hopefully become clearer.

During 2014 sub-adult and adult fish community monitoring two adult Colorado Pikeminnows were recaptured in the San Juan River near the Animas River confluence, between RM 179-180 (SJRIIP PIT tag database). One of these fish was passed upstream through the Nenahnezad Fish Ladder (RM 166.6) on 13 June, 2012 with a recorded TL of 295 mm. There were no other records for this fish until its recapture on 10 September, 2014 when it was 525 mm TL. The other Colorado Pikeminnow had a first encounter history of July 17, 2013 when it was captured and tagged at RM 159.4 (just upstream of Hogback Diversion) at 360 mm TL. It is unknown how this fish bypassed PNM weir without detection (i.e. no record of it moving through the fish ladder), but when it was recaptured in 2014, upstream of RM 179, it was 448 mm TL. Although the exact movement up and downstream of the PNM weir for these fish cannot be ascertained from the data, they were clearly able to gain access to the upper San Juan River (upstream of RM 166.6), and once there they may have remained for at least one over-winter period. If so, this could indicate that appropriate habitats, riverine conditions (specifically temperature), and food resources are available in the upper portion of the San Juan River Basin for Colorado Pikeminnows to recruit from sub-adult to adult size classes. Moreover, it suggests that larger fish are actively seeking out these upstream habitats when access is available to them (Osmundson et al. 1998). By stocking young-of year Colorado Pikeminnows upstream of PNM weir it is presumed that these fish will “imprint” to the upper San Juan and Animas rivers; eventually returning as adults to spawn (Irving and Modde 2000, Tyus 1992). In concert with the efforts to increase range and retention for Razorback Sucker higher in the Basin, upstream areas of the Animas River are being investigated for suitability as release sites for Colorado Pikeminnow.

As the effects of augmentation on the populations of Razorback Sucker and Colorado Pikeminnow, and on the San Juan River fish community as a whole, are better understood, management decisions will invariably be reconfigured to address these new data. Due to the stochastic nature of the San Juan River, an adaptive management approach can best respond to the myriad of issues that may arise during augmentation efforts. Stocking protocols, augmentation targets, sources of fishes, and stocking locations will continue to be investigated and evaluated in order to initiate appropriate changes to the Augmentation Program in order to expedite recovery.

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**Appendix A. Razorback Sucker stocked from hatcheries into the San Juan River 2014. Fish stocked in support of the Source of Fish and Location of Stocking study.**

<u>Date</u>	<u>Species</u>	<u>Year Class</u>	<u># of Fish</u>	<u>Mean TL mm</u>	<u>Tag type</u>	<u>Stocking Location</u>	<u>Release Type</u>	<u>Source/Age</u>
Oct. 6	Xyr tex	2013	<b>613</b>	378	134.2 kHz PIT	RM 196.0	Hard	Ouray NFH-GVU
Oct. 8	Xyr tex	2013	<b>622</b>	385	134.2 kHz PIT	A-RM 5.0	Hard	Ouray NFH-GVU
Oct. 14	Xyr tex	2013	<b>411</b>	377	134.2 kHz PIT	RM 93	Hard	Ouray NFH-GVU
Oct. 14	Xyr tex	2013	<b>369</b>	375	134.2 kHz PIT	RM 166.6	Hard	Ouray NFH-GVU

**2014 Hatchery RBS Stocking Total = 2,015**

**Appendix B. Yearly summary of Razorback Sucker stocked into the San Juan River, 1994-2014**

<b>Year</b>	<b>Total number of Razorback Sucker stocked (Sizes of fish stocked)</b>
<b>Experimental Stocking Study: 1994-1996 (n= 942 fish stocked)</b>	
1994	<b>688</b> (Mean TL =251 mm; Range = 100-446 mm TL)
1995	<b>16</b> (Mean TL = 424 mm; Range = 397-482 mm TL)
1996	<b>238</b> (Mean TL = 336 mm; Range = 204-434 mm TL)
<b>Five-Year Augmentation Effort: 1997-2001 (n= 5,890 fish stocked)</b>	
1997	<b>2,883</b> (Mean TL = 192 mm; Range = 104-412 mm TL)
1998	<b>1,275</b> (Mean TL = 250 mm; Range = 185-470 mm TL)
1999	<b>0</b> N/A
2000	<b>1,044</b> (Mean TL = 214 mm; Range = 111-523 mm TL)
2001	<b>688</b> (Mean TL = 410 mm; Range = 288-560 mm TL)
<b>Interim Stocking Years: 2002-2008 (n= 41,093 fish stocked)</b>	
2002	<b>140</b> (Mean TL = 319 mm; Range = 110-470 mm TL)
2003	<b>887</b> (Mean TL = 327 mm; Range = 100-495 mm TL)
2004	<b>2,979</b> (Mean TL = 353 mm; Range = 225-559 mm TL)
2005	<b>1,993</b> (Mean TL = 355 mm; Range = 223-534 mm TL)
2006	<b>13,764*</b> /18,793 (Mean TL = 265 mm; Range = 68-537 mm TL)
2007	<b>16,906**</b> /22,836 (Mean TL = 268 mm; Range = 110-573 mm TL)
2008	<b>4,424</b> (Mean TL = 307 mm; Range = 225-390 mm TL)
<p>*18,793 total RBS stocked but 5,029 fish either had no PIT tag or an error in recording PIT tag number.  **22,836 total RBS stocked but 5,930 fish either had no PIT tag or an error in recording PIT tag number.  These untagged fish are not counted in the total fish stocked (n=) from 2002-2008.</p>	

**Appendix B. - continued**

<b>Year</b>	<b>Total number of Razorback Sucker stocked (Sizes of fish stocked)</b>
<b>Eight-year Augmentation Effort: 2009-2016 (n= 90,539 fish recorded as stocked in the SJRIP database, to date)</b>	
2009	<b>8,316*</b> (Mean TL = 412 mm; Range = 136-560 mm TL)
2010	<b>28,419</b> (Mean TL = 417 mm; Range = 222-575 mm TL)
2011	<b>18,782</b> (Mean TL = 363 mm; Range = 208-540 mm TL)
2012	<b>13,516**1</b> (Mean TL = 378 mm; Range = 102-581 mm TL)
2013	<b>15,341</b> (Mean TL = 377 mm; Range = 222-582 mm TL)
2014	<b>6,165</b> (Mean TL = 377 mm; Range = 215-530 mm TL)
<b>TOTAL: 1994-2014</b>	<b>138,464</b>
<p>* 4,021 Razorback Suckers stocked in Feb. 2010 are part of the 2009 stocking effort but are tallied in the 2010 stocking totals.  ** 2,295 Razorback Suckers stocked on Nov. 14, 2012 not included in totals due to high observed mortality.  NOTE: All reported numbers for Razorback Sucker stocked 2000-2014 have been reconciled with the SJRIP database to discount fish with PIT tag record errors. Previous reports included all fish stocked regardless of PIT tag status.</p>	

**Appendix 1- Colorado Pikeminnow stocked into the San Juan River under the Phase I augmentation plan (2002-summer 2010).**

Dates	Number Stocked & (Age-Class)	Stocked at River Mile(s)	Mean Total Length (mm)	Range of Total Lengths (mm)	Responsible Agency
<b>2002: 210,418 total fish stocked</b>					
10/24/2002	105,209 (0)	180.2	51	32-127	USFWS-CRFP
10/24/2002	105,209 (0)	158.6	51	32-127	USFWS-CRFP
<b>2003: 176,933 total fish stocked</b>					
11/06/2003	155,764 (0)	180.2-170.5 & 158.6-148.5	58	38-100	USFWS-CRFP
11/06/2003	20,164 (0)	188.4-180.7 & 163.7-159.2	58	Unknown	BIO-WEST
11/06/2003	1,005 (1)	180.2	180	125-280	CDOW-Mumma
<b>2004: 281,219 total fish stocked</b>					
06/09/2004	1,219 (2)	180.2	218	144-278	CDOW-Mumma
10/21/2004	30,000 (0)	178.6-169.5 & 163.7-159.2	50	Unknown	BIO-WEST
10/21/2004 & 10/28/2004	250,000 (0)	180.2-170.5 & 158.6-148.5	50	35-116	USFWS-CRFP & BIO-WEST
<b>2005: 306,811 total fish stocked</b>					
07/07/2005	500 (1)	180.2	201	114-256	USFWS-Dexter
07/07/2005	1,491 (2)	180.2	204	121-281	CDOW-Mumma
10/20/2005	20,000 (0)	175.8, 167.5 & 167.4	55	32-151	BIO-WEST
10/20/2005 & 11/03/2005	282,270 (0)	180.2-170.5 & 158.6-148.5	55	32-151	USFWS-CRFP
11/10/2005	2,550 (2)	180.2	167	115-252	CDOW-Mumma
<b>2006: 326,547 total fish stocked</b>					
07/13/2006	3,247 (2)	180.2	200	119-278	CDOW-Mumma
07/13/2006	279 (3)	180.2	216	155-276	CDOW-Mumma
07/20/2006	3,986 (2)	180.2	211	117-297	CDOW-Mumma
08/03/2006	1,722 (5)	147.9	410	333-518	USFWS/AZG&F
09/06/2006	259 (5)	147.9	428	389-461	USFWS/AZG&F
10/03/2006	3,200 (1)	158.6	163	119-199	USFWS-Dexter
10/19/2006 & 11/02/2006	313,854 (0)	180.2-170.5 & 158.6-148.5	57	36-111	USFWS-CRFP
<b>2007: 479,226 total fish stocked</b>					
04/18/2007	1,590 (1)	134.5	176	137-228	SNARRC & NMFWCO
10/03/2007	81,974 (0)	134.5	~55	Unknown	SNARRC & NMFWCO
10/03/2007	1,666 (1)	134.5	~178	147-208	SNARRC & NMFWCO
11/07/2007	199,717 (0)	180.2-170.5	58	38-146	USFWS-CRFP
11/14/2007	194,279 (0)	166.6	55	41-157	USFWS-CRFP
<b>2008: 275,091 total fish stocked</b>					
4/15/2008	2,057 (2)	134.9	209	Unknown	SNARRC & NMFWCO
10/21/2008	2,800 (2)	134.3	299	Unknown	SNARRC & NMFWCO
11/06/2008	270,234 (0)	166.6	55	Unknown	SNARRC & NMFWCO
<b>2009: 476,942 total fish stocked</b>					
3/17/2009	1,442 (3)	133.5	240	Unknown	SNARRC & NMFWCO
3/17/2009	1,500 (3)	133.5	240	Unknown	SNARRC & NMFWCO
10/26/2009	4,000 (2+)	133.5	325	Unknown	SNARRC & NMFWCO
10/26/2009	1,000 (2+)	133.3	325	Unknown	SNARRC & NMFWCO
11/09/2009	468,000 (0)	166.6	55	~50-60	SNARRC & NMFWCO
11/09/2009	1,000 (2+)	180.2	325	Unknown	SNARRC & NMFWCO
<b>2010: 353 total fish stocked</b>					
7/28/2010	353 (2)	181	306	240-356	SNARRC & NMFWCO
<b>Total number of fish stocked from 2002-2010 = 2,533,540</b>					

USFWS= U.S. Fish & Wildlife Service; CRFP = Colorado River Fishery Project, Grand Junction, Colorado; BIO-WEST = BIO-WEST, Inc., Logan, Utah; CDOW-Mumma = Colorado Division of Wildlife, J.W. Mumma Native Species Hatchery, Alamosa, Colorado; SNARRC = Southwest Native Aquatic Resources and Recovery Center, Dexter, NM; AZG&F = Arizona Game and Fish Department, Bubbling Ponds Hatchery, Sedona, AZ; NMFWCO= New Mexico Fish & Wildlife Conservation Office, Albuquerque, NM. ~ indicates estimates

**Appendix 2- Colorado Pikeminnow stocked into the San Juan River under the Phase II augmentation plan, 2010-2020.**

Dates	Number Stocked & (Age-Class)	Stocked at River Mile(s)	Mean Total Length (mm)	Range of Total Lengths (mm)	Responsible Agency
<b>2010: Stocking postponed until Spring 2011</b>					
<b>2011: 645,051 total fish stocked</b>					
May 17	182,412 (1)	166.6	85	Unknown	SNARRC & NMFWCO
May 18	32,308 (1)	A-RM 1.0	121	Unknown	SNARRC & NMFWCO
May 18	3,743 (2)	A-RM 1.0	247	160-363	SNARRC & NMFWCO
Nov 2	268,350 (0)	166.6	70	Unknown	SNARRC & NMFWCO
Nov 2	158,238 (0)	A-RM 1.0	60	Unknown	SNARRC & NMFWCO
<b>2012: 395,640 total fish stocked</b>					
Nov 13	316,000 (0)	A-RM 1.0	na	50-65	SNARRC & NMFWCO
Nov 13	79,640 (0)	196.1	65	Unknown	SNARRC & NMFWCO
<b>2013: 439,264 total fish stocked</b>					
Oct. 28	331,388 (0)	166.6	na	52-58	SNARRC & NMFWCO
Oct. 28	107,876 (0)	A-RM 1.0	na	52-58	SNARRC & NMFWCO
<b>2014: 393,442 total fish stocked</b>					
Nov. 6	94,091 (0)	166.6	60	Unknown	SNARRC & NMFWCO
Nov. 6	94,090 (0)	A-RM 1.0	60	Unknown	SNARRC & NMFWCO
Nov. 6	102,631 (0)	196	45	Unknown	SNARRC & NMFWCO
Nov. 6	102,630 (0)	A-RM 5.0	45	Unknown	SNARRC & NMFWCO
<b>Total number of fish stocked from Fall 2010-2020 = 1,873,397</b>					

SNARRC = Southwest Native Aquatic Resources and Recovery Center, Dexter, NM; NMFWCO= New Mexico Fish & Wildlife Conservation Office, Albuquerque, NM. A-RM= Animas River Mile;

**Appendix 3- Summary of Colorado Pikeminnow stocked into the San Juan River, 1996-2010 (Phase I).**

Year Stocked	Number Stocked	Stocked at River Mile(s)	Mean Total Length (mm)	Range of Total Lengths (mm)	Age-Class & (Year-Class) of Fish Being Stocked	Type of Stocking	Entity/Agency Responsible for Stocking
1996	100,000	148.0 & 52.0	55	25-85	Age-0 (1996)	Experimental	UDWR
1997	116,878	148.0 & 52.0	45	35-55	Age-0 (1997)	Experimental	UDWR
1997	49	180.2	644	550-753	Age-16 (1981)	Opportunistic	USFWS
1998	10,571	148.0	24	18-28	Age-0 (1998)	Experimental	UDWR
1999	500,000	158.6	"Larvae"	Unspecified	Age-0 (1999)	Experimental	UDWR
2000	105,000	141.9	"Larvae"	Unspecified	Age-0 (2000)	Experimental	UDWR
2001	148	180.2	540	442-641	Age-10 (1991)	Opportunistic	USFWS
2002	210,418	180.2 & 158.6	51	32-127	Age-0 (2002)	Augmentation	USFWS
2003	175,928	180.2-170.5 & 158.6-148.5 (a) 188.4-180.7 & 163.7-159.2 (b)	58	38-100	Age-0 (2003)	Augmentation	USFWS (a) & BIO-WEST (b)
2003	1,005	180.2	180	125-280	Age-1 (2002)	Opportunistic	CDOW
2004	280,000	180.2-170.5 & 158.6-148.5	50	35-116	Age-0 (2004)	Augmentation	USFWS & BIO-WEST
2004	1,219	180.2	218	144-278	Age-2 (2002)	Opportunistic	CDOW
2005	302,270	180.2-170.5 & 158.6-148.5	55	32-151	Age-0 (2005)	Augmentation	USFWS & BIO-WEST
2005	500	180.2	201	114-256	Age-1 (2004)	Opportunistic	USFWS
2005	4,041	180.2	181	115-281	Age-2 (2003)	Opportunistic	CDOW
2006	313,854	180.2-170.5 & 158.6-148.5	57	36-111	Age-0 (2006)	Augmentation	USFWS
2006	3,200	158.6	163	119-199	Age-1 (2005)	Augmentation	USFWS
2006	7,233	180.2	207	117-297	Age-2 (2004)	Opportunistic	CDOW
2006	279	180.2	216	155-276	Age-3 (2003)	Opportunistic	CDOW
2006	1,981	147.9	411	333-518	Age-5 (2001)	Opportunistic	AZG&FD, USFWS & BIA
2007	475,970	180.2-170.5, 166.6 & 134.5	58	37-157	Age-0 (2007)	Augmentation	USFWS
2007	3,256	134.5	176	137-228	Age-1 (2006)	Augmentation	USFWS
2008	2,057	134.9	209	Unspecified	Age-2 (2006)	Augmentation	USFWS
2008	2,800	134.3/133.5	299	Unspecified	Age-2 (2006)	Augmentation	USFWS
2008	270,234	166.6	55	Unspecified	Age-0 (2008)	Augmentation	USFWS
2009	2,942	133.5	240	Unspecified	Age-3 (2006)	Augmentation	USFWS
2009	5,000	133.5/133.3	325	Unspecified	Age-2 (2007)	Augmentation	USFWS
2009	468,000	166.6	55	~50-60	Age-0 (2009)	Augmentation	USFWS
2009	1,000	180.2	325	Unspecified	Age-2(2007)	Augmentation	USFWS
2010	353	181	306	240-356	Age-2 (2008)	Opportunistic	USFWS

**Appendix 4- Summary of Colorado Pikeminnow stocked into the San Juan River, 2010-2020 (Phase II).**

Year Stocked	Number Stocked	Stocked at River Mile(s)	Mean Total Length (mm)	Range of Total Lengths (mm)	Age-Class & (Year-Class) of Fish Being Stocked	Type of Stocking	Entity/Agency Responsible for Stocking
2011	214,720	166.6/A-RM 1.0	85/121	Unspecified	Age-1 (2010)	Rescheduled 2010 Augmentation	USFWS
2011	3,743	A-RM 1.0	247	160-363	Age-2 (2009)	Rescheduled 2010 Augmentation	USFWS
2011	426,588	166.6/A-RM 1.0	70/60	Unspecified	Age-0 (2011)	Augmentation	USFWS
2012	395,640	196.1/A-RM 1.0	50/57/65	Unspecified	Age-0 (2012)	Augmentation	USFWS
2013	439,264	166.6/A-RM 1.0	Unspecified	52-58	Age-0 (2013)	Augmentation	USFWS
2014	393,442	196/166.6 A-RMs 1.0/5.0	45/60	Unspecified	Age-0 (2014)	Augmentation	USFWS