

**SAN JUAN RIVER  
RAZORBACK SUCKER *Xyrauchen texanus* &  
COLORADO PIKEMINNOW *Ptychocheilus lucius*  
POPULATION AUGMENTATION: 2015**

**Final Report**



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Submitted By:

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To:

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

### **Razorback Sucker:**

- **5,208** Razorback Suckers were stocked during 2015 augmentation efforts
  - Several stocking sites on the San Juan River were used between River Mile (RM) 93.0 (Montezuma Creek, UT) and RM 196.0 (Verde del Rio Park, Bloomfield, NM)
    - One site on the Animas River was used, Animas River Mile (A-RM) 4.0 (Berg Park, Farmington, NM)
  - A second year of an experimental stocking study was conducted
    - Hard vs. soft- release comparison
    - Source of Fish and Location of Stocking comparison
  - Seventh year of eight year augmentation plan
    - 95,747 fish stocked during this eight-year effort
  - A revised Razorback Sucker augmentation plan is being finalized to guide stockings beginning in 2017
- All Razorback Suckers stocked in 2015 were PIT tagged and measured for Total Length

### **Colorado Pikeminnow:**

- A total of **402,087** Colorado Pikeminnows were stocked into the San Juan River Basin in 2015
  - November 3<sup>rd</sup>
    - Verde del Rio Park, Bloomfield, NM (RM 196.0)
      - 125,800 hard-released
    - PNM Sluiceway, Fruitland, NM (RM 166.6)
      - 149,787 fish soft-released and acclimatized 24 hours
    - Berg Park, Farmington, NM (A-RM 5.0)
      - 126,500 hard-released
    - Fish were 50-70 mm TL, 2015 YC

- Sixth year of Phase II (2010-2020) Colorado Pikeminnow augmentation
  - All Colorado Pikeminnows provided by Southwestern Native ARRC
- In 2016 Southwestern Native ARRC 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 (2010-2020) augmentation plan for Colorado Pikeminnow (Furr 2010). This report will detail the specific efforts undertaken for both species in 2015 in accordance to their respective augmentation plans. Razorback Sucker will occasionally be referred to as **RBS** and Colorado Pikeminnow as **CPM** throughout this document.

### **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 2015) 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 2015 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 2015 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 needed.
    - **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.
    - **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 into 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.
    - **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 RBS per year (>300 mm TL) at Horsethief Canyon Native Fish Facility (HCNFF), part of the larger Ouray National Fish Hatchery – Grand Valley Unit (ONFH-GVU) in 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** Support operation and maintenance of 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 for RBS production.

Ouray National Fish Hatchery - Grand Valley Unit (Ouray NFH-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 2015. 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 (Southwestern Native ARRC). All Colorado Pikeminnow used for population augmentation were produced and delivered by Southwestern Native ARRC.

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 2015**

- 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 ONFH-GVU.
- 3) Coordinate with Southwestern Native ARRC 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 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 2015 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 2015, Ouray NFH-GVU stocked 2,160 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.

**Table 1- Summary of NAPI and Ouray NFH-GVU Razorback Suckers Source of Fish and Location of Stocking releases into the San Juan River, 2015. (NAPI Ponds: Hidden Pond= HP, East Avocet= EA)**

Date	Site, River Mile	# of fish	Year Class	Mean TL (mm)	Range TL (mm)	Source (release type)
Oct. 27	Berg Park A-RM 4.0	846	2014	344	225-450	NAPI-EA (Hard)
Oct. 27	Verde del Rio Park RM 196.0	878	2014	342	212-440	NAPI-EA (Hard)
Oct. 27	Verde del Rio Park RM 196.0	605	2013	403	310-487	Ouray (Hard)
Oct. 28	Montezuma Creek, UT RM 93	502	2014	331	195-475	NAPI-HP (Hard)
Oct. 28	PNM weir/ Nenahnezad Fish Ladder RM 166.6	243	2014	331	195-475	NAPI-HP (Hard)
Oct. 29	Boyd Park A-RM 1.0	689	2013	339	234-421	Ouray (Hard)
Nov. 3	Montezuma Creek, UT RM 93	380	2013	401	347-467	Ouray (Hard)
Nov. 3	PNM weir/ Nenahnezad Fish Ladder RM 166.6	486	2013	387	287-464	Ouray (Hard)
<b>Total Stocked for Source/Location Stocking Study</b>		<b>4,629</b>	2,469 stocked form NAPI; 2,160 stocked from Ouray			

## NAPI Ponds 2015 Stockings

A total of 3,048 Razorback Suckers were stocked from two NAPI ponds into the San Juan and Animas rivers in 2015 (Table 2). There was a 43.5% return rate from the original 7,000 fish stocked into the ponds. Passive harvests occurred from 8-24 September, 2015. These fish were considered a partial fulfillment of the annual stocking goal of 11,400 (>300mm TL) fish as well as used to support the Hard vs. Soft-Release study. Passively harvested fish (n=579) were stocked at two locations: PNM Sluiceway (RM 166.6, soft-releases), PNM weir/Nenahnezad Fish Ladder (RM 166.6, hard-releases). The average TL of fish used in this study was 325 mm, with a range of 197-447 mm (Table 3). Actively harvested fish (n=2,496) contributed toward the annual stocking goal and were stocked under the protocols developed for the Source of Fish and Location of Stocking study.

**Table 2- Summary of 2015 NAPI pond harvest results.**

Pond	Harvest Type	Number Recorded	Mean TL (mm)	Range TL (mm)
East Avocet	Passive	138	331	245-431
	Active	1724	343	212-450
Hidden Pond	Passive	441	358	215-500
	Active	745	333	195-475
<b>Total</b>		<b>3,048</b>		

**Table 3- Summary NAPI Passive Harvests, fish used for Soft vs. Hard Release comparison.**

Date	Site, River Mile	# of fish	Year Class	Mean TL (mm)	Range TL (mm)	Source (release type)
Sep. 8-24	PNM weir/ Nenahnezad Fish Ladder RM 166.6	579	2014	325	197-447	NAPI (n= 296 Soft, 283 Hard)

A total of 5,208 Razorback Sucker were stocked and recorded in the SJRIP Access database from all sources in 2015. Fish that may have been stocked, but had errors in their recorded data, were removed from the SJRIP Access database (Scott Durst, personal communication) and are not represented in this report.

## Colorado Pikeminnow:

On November 3, 2015 personnel from Southwestern Native ARRC and NMFWCO released 402,087 age-0 (2015 YC) Colorado Pikeminnows. A total of 149,787 Colorado Pikeminnow were soft released at the PNM Sluiceway (RM 166.6). An additional 252,300 fish were hard-released at two locations, Verde del Rio Park (RM 196) and Berg Park (A-RM 4.0; Table 4). Two sub-sites were used to stock fish at the Verde del Rio Park site. Approximately half of the fish were stocked into a side channel, while the other half were stocked into the mainstem river. Fish stocked using soft-release methods at the PNM Sluiceway 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 418 cubic feet per second (cfs), and flow in the Animas River (USGS 09364500 Animas River at Farmington, NM gauge) was 368 cfs. All Colorado Pikeminnows stocked into the San Juan River in 2015 were produced and reared at Southwestern Native ARRC.

**Table 4- Colorado Pikeminnow stockings in the San Juan River 2015.**

Date	Age/Year Class	# of Fish	TL Range (mm)	Release Site River Mile	Release Type (soft vs. hard)
Nov. 3	0/2015	149,787	50-70	166.6	Soft
Nov. 3	0/2015	126,500	50-70	A-RM 4.0	Hard
Nov. 3	0/2015	125,800	50-70	196.0	Hard
<b>Total Stocked</b>		<b>402,087</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 enclosure 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.

## **CONCLUSION**

A total of 5,208 Razorback Suckers and 402,087 Colorado Pikeminnows were stocked in 2015. 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 2015, by year seven of the eight-year augmentation plan 105% of the overall stocking target of 91,200 fish has been fulfilled, with 95,747 total fish stocked from 2009-2015. A new augmentation plan for Razorback Sucker has been drafted and is in the process of being finalized. Since 2010, a total of 2,057,021 Age-0 Colorado Pikeminnow have been stocked into the San Juan Basin. Another 218,463  $\geq$ age-1 Colorado Pikeminnow have also been stocked, for an overall total of 2,275,484 fish. Although numbers of Colorado Pikeminnow stocked annually has varied slightly among years, the SJRIP is on track to meet targeted stocking numbers for the eleven-year augmentation period (2010-2020).

In 2015, sub-adult and adult fish community monitoring upstream of PNM weir (RM 166.6) resulted in the collection of 7 Razorback Suckers. Stocking records indicated that 6 of these fish were stocked above the PNM weir with the remaining fish being stocked at the PNM weir. Another 34 Razorback Sucker were moved through the PNM Fish Ladder (RM 166.6) between February 14 and June 22, 2015 (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. 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 were replicated again in 2015, and are planned to be conducted in 2016. Information from these studies will help guide future 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. The results of these studies will be summarized and presented in a separate report.

During 2015 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 180-178 on September 10, 2015 (SJRIP PIT tag database). One of these fish was stocked in the Animas River at

Boyd Park (A-RM 1.0) on May 18, 2011 at a total length of 208 mm. At its time of collection in 2015, it measured 585 mm TL. No other capture records exist for this fish. The other Colorado Pikeminnow's first encounter history was on June 23, 2012 when it was captured by backpack electrofishing in the Chaco River near its confluence with the San Juan River (RM 153) and was PIT tagged. At this time it measured 241 mm TL. When it was again collected between river miles 180-179 it measured 476 mm TL. It is unknown how this fish moved above PNM weir without detection (i.e. no record of it moving through the fish ladder). Although the exact movement up and downstream of the PNM weir for these fish cannot be ascertained from the current data (unanalyzed remote PIT tag antennae data may indicate detections), they were clearly able to gain, or retain, access to the upper San Juan River (i.e., upstream of the PNM weir, RM 166.6). Once there they may have remained for one or more over-winter periods and, 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 juvenile to adult size classes. It also suggests that larger fish are actively seeking out these upstream habitats when access is available to them (Osmundson et al. 1998 ). Furthermore, two adult, and one sub-adult, Colorado Pikeminnows moved through the PNM Fish Ladder between May 2 and June 30, 2015. By stocking young-of year Colorado Pikeminnow upstream of PNM weir it is anticipated 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).

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 2015. 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. 27	Xyr tex	2013	<b>605</b>	378	134.2 kHz PIT	RM 196.0	Hard	Ouray NFH-GVU
Oct. 29	Xyr tex	2013	<b>689</b>	385	134.2 kHz PIT	A-RM 1.0	Hard	Ouray NFH-GVU
Nov. 03	Xyr tex	2013	<b>486</b>	387	134.2 kHz PIT	RM 166.6	Hard	Ouray NFH-GVU
Nov. 03	Xyr tex	2013	<b>380</b>	401	134.2 kHz PIT	RM 93	Hard	Ouray NFH-GVU

**2015 Hatchery RBS Stocking Total = 2,160**

**Appendix B. Yearly summary of Razorback Sucker stocked into the San Juan River, 1994-2015.**

<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= 95,747 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)
2015	<b>5,208</b> (Mean TL = 352 mm; Range = 195-487 mm TL)
<b>TOTAL: 1994-2015</b>	<b>143,672</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 4.0	45	Unknown	SNARRC & NMFWCO
<b>2015: 402,087 total fish stocked</b>					
Nov. 3	149,787 (0)	166.6	na	50-70	SNARRC & NMFWCO
Nov. 3	125,800 (0)	196	na	50-70	SNARRC & NMFWCO
Nov. 3	126,500 (0)	A-RM 4.0	na	50-70	SNARRC & NMFWCO
<b>Total number of fish stocked from Fall 2010-2020 = 2,275,484</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 1.0/4.0	45/60	Unspecified	Age-0 (2014)	Augmentation	USFWS
2015	402,087	196/166.6 A-RM 4.0	Unspecified	50-70	Age-0 (2015)	Augmentation	USFWS