

**AUGMENTATION OF
COLORADO PIKEMINNOW
(*Ptychocheilus lucius*)
IN THE SAN JUAN RIVER: 2008**

Interim Progress Final Report



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EXECUTIVE SUMMARY

- 2,055,011 Colorado pikeminnow were stocked into the San Juan River 2002-2008
 - 2,028,440 age 0 Colorado pikeminnow stocked / 2,050,000 target
 - Under target by 1.05%
 - 27,571 age 1+ Colorado pikeminnow stocked / 9,000 target
 - Over target by 206.3%

- A total of 275,091 Colorado pikeminnow were stocked into the San Juan River in 2008
 - 270,234 age 0 Colorado pikeminnow stocked / 300,000 target
 - Under target by 10%
 - 2008 year class
 - 4,857 age 1+ Colorado pikeminnow stocked / 3,000 target
 - Over target by 61%
 - 2006 year class

- All age 0 Colorado pikeminnow were soft released in Fall
 - Stocked November 6 in the PNM sluiceway (RM 166.6)
 - Acclimatized for 22 hours
 - Total Length = 50-60 mm

- All age 1+ Colorado pikeminnow released in Spring were soft released
 - Stocked April 15 at river mile 134.9
 - Acclimatized for 21 hours
 - Mean total length = 209 mm

- SJRIP-Biology Committee requests change in Age 1+ stocking protocols in May

- Age 1+ Colorado pikeminnow released in Fall were divided into two groups identifiable by their Passive Integrated Transponder (PIT) tag numbers
 - Stocked October 21
 - Control group of 1,400 fish hard released at river mile 133.5
 - Treatment group of 1,400 fish soft released at river mile 134.3
 - Acclimatized for 18 hours
 - Mean total length = 299 mm

- Future stockings of age 1+ Colorado pikeminnow will include Control and Treatment groups; continue to soft release all age-0 Colorado pikeminnow

- No opportunistically obtained Colorado pikeminnow were stocked in 2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
TABLE OF CONTENTS	ii
LIST OF TABLES	ii
INTRODUCTION	1
Relationship To The Recovery Program.....	3
Objectives	4
METHODS	4
RESULTS	6
DISCUSSION	7
LITERATURE CITED	9
APPENDIX (Information on Colorado pikeminnow stocked from 1996-2007)	11
Table A-1 Colorado pikeminnow stocked into the San Juan River under the 2003 augmentation plan	11
Table A-2 A summary of Colorado pikeminnow that were stocked into the San JuanRiver, 1996-2007	12

LIST OF TABLES

Table 1 Colorado pikeminnow stockings in the San Juan River 2008	7
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INTRODUCTION

Colorado pikeminnow *Ptychocheilus lucius* is a federally-listed endangered fish native to the San Juan River. Colorado pikeminnow were first listed as endangered in 1967 by the United States Fish and Wildlife Service (USFWS) and then given full protection under the Endangered Species Act of 1973. In 1996, experimental stocking of Colorado pikeminnow into the San Juan River was undertaken by the Utah Division of Wildlife Resources (UDWR) Moab field station. The purposes of this effort were to evaluate dispersal and retention of stocked juvenile Colorado pikeminnow, and to determine the availability, use, and selection of habitats by early life stages. Between 1996 and 2000, approximately 832,449 larval and age-0 Colorado pikeminnow were stocked into the San Juan River by UDWR (Ryden 2003). In addition, 197 adult Colorado pikeminnow were stocked into the San Juan River, 49 in 1997 and 148 in 2001 (Ryden 2003). In subsequent years, several hundred of those experimentally released Colorado pikeminnow were recaptured during either seining or electrofishing efforts (Ryden 2008a). Nine individual Colorado pikeminnow stocked in 1996 and 1997 have been documented as having recruited into the San Juan River's adult Colorado pikeminnow population (Jackson 2003, 2004). Captures of larval Colorado pikeminnow in 2004 and again in 2007, confirm that a small, but reproducing population of Colorado pikeminnow is still extant in the San Juan River (Brandenburg and Farrington 2008). Data suggests that stocked hatchery-reared Colorado pikeminnow can survive in the San Juan River and provide a viable method of supplementing the numbers and expanding the range of the wild San Juan River Colorado pikeminnow population. (Ryden 2008b, Davis and Furr 2008)

An *Augmentation Plan For Colorado Pikeminnow In The San Juan River* (Ryden 2003) was finalized in 2003. This plan provided the necessary guidance for an eight-year augmentation effort. The Colorado pikeminnow augmentation plan calls for age-0 Colorado pikeminnow to be stocked each fall 2002-2009 ($\geq 250,000$ in fall 2002 and $\geq 300,000$ each fall 2003-2009). An addendum to this augmentation plan called for 3,000 age-1+ Colorado pikeminnow to be stocked annually, beginning in 2006 (Ryden 2005).

Several lots of Colorado pikeminnow were obtained over the last five years from various sources and stocked into the San Juan River. These lots of fish became available to the San Juan River Basin Recovery Implementation Program (SJRIP) because they were fish that were excess to augmentation efforts occurring elsewhere in the Colorado River basin. While not specified in the revised augmentation plan, the opportunistic stocking of these fish was approved by the SJRIP Biology Committee (SJRIP-BC). These lots of opportunistically-stocked fish ranged from age-1 to age-5 and came from three different hatcheries: the Colorado Division of Wildlife's Mumma Native Species Hatchery, Dexter National Fish Hatchery and Technology Center (Dexter NFH&TC), and the Arizona Game and Fish Department's Bubbling Ponds Hatchery.

Experimental soft releases by Golden et al. (2006) indicated that short term survivability and retention was improved by allowing Colorado pikeminnow to acclimatize to riverine conditions for up to 7 days prior to release into the mainstem. Beginning with the April 2007 soft release of 1,590 age-2 (2005 year class) Colorado pikeminnow by the USFWS's New Mexico Fish & Wildlife Conservation Office (NMFWCO) all subsequent age 1+ Colorado pikeminnow stockings utilized a soft release approach. At the May 2008 meeting the SJRIP-BC decided that future releases of age 1+ Colorado pikeminnow should incorporate a study design with a control group (fish released under typical hard release methods) and a treatment group (fish released under the soft release approach) to better quantify the effect of acclimatization. All age-0 Colorado pikeminnow would continue to be soft released. This new protocol for age-1+ Colorado pikeminnow was first implemented on October 21, 2008 and will be the standard for future releases unless further modifications are made.

Relationship To The Recovery Program

The need for artificial propagation and augmentation of this species in the San Juan River is necessary for several reasons, most important of which is to expand the size of the existing Colorado pikeminnow population (Ryden 2003). While augmentation increases overall population numbers, it also provides opportunities for research (i.e., movement studies, habitat and spawning site preferences), adds genetic diversity to the existing gene pool, and fulfills specific recovery actions (SJRIP 2008). Subsequent data collection may identify factors limiting successful recruitment of this species in the San Juan River.

Goal 2.1 in the 2008 revision of the SJRIP Long Range Plan (LRP) identifies the need to “Establish a Genetically and Demographically Viable, Self-Sustaining Colorado Pikeminnow Population” in the San Juan River. Actions 2.1.1 – 2.1.4 address the tasks to achieve Goal 2.1 (SJRIP 2008).

Goal 2.1—Establish a Genetically and Demographically Viable, Self-Sustaining Colorado Pikeminnow Population.

Action 2.1.1 Develop plans for rearing and stocking Colorado pikeminnow.

Action 2.1.2 Produce, rear, and stock sufficient numbers of Colorado pikeminnow to meet stocking goals of augmentation plan.

Action 2.1.3 Monitor status and success of stocked Colorado pikeminnow.

Action 2.1.4 Evaluate factors limiting Colorado pikeminnow population recovery.

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. New Mexico FWCO is the pertinent field office for processing of SJRIP stocking requests.

Objectives for Augmentation Fiscal Year 2008

- 1.) Coordinate with Dexter National Fish Hatchery to procure and stock fish according to guidelines set forth in *An Augmentation Plan For Colorado Pikeminnow In The San Juan River* (Ryden 2003).
- 2.) Create a stocking plan and protocols for Colorado pikeminnow in the San Juan River to facilitate achieving SJRIP-LRP Goal 2.1 (Furr and Davis 2009).

METHODS

Age-0 and age-1+ Colorado pikeminnow fingerlings were produced and reared at Dexter NFH&TC under a separate workplan. The age-1+ fish were delivered to the San Juan River in two groups for spring and fall stocking. All age-0 fish were delivered in a single group for fall stocking.

The spring soft release of age-1+ Colorado pikeminnow occurred on April 15, 2008 at RM 134.5. This site had previously been used for soft releases because it encompasses various habitat types, flow velocities, and it is easily accessible by the hatchery truck. Block nets were positioned on the upstream and downstream ends of a low velocity secondary channel prior to stocking. The enclosure was sampled by backpack electrofishing (Smith-Root model LR-20) to assess the native fish community. In accordance to stocking and nonnative fish control protocols non-native fishes are removed and sacrificed, while remaining native fish are returned to the habitats from which they were collected. Native piscivorous fish of sufficient size to pose a threat are placed back into the river outside the enclosure boundaries. Water quality was measured

and recorded prior to releasing fish into the enclosure. Fish were tempered in the hauling tank to within 1-2° Celsius (C), transferred into the enclosure, and left overnight to acclimatize. After acclimatization, sampling by seine was conducted to confirm the continued presence of Colorado pikeminnow within the enclosure. After sampling the block nets were removed and fish were allowed to disperse. All age-1+ fish stocked were implanted with PIT-tags prior to delivery.

The fall releases of age-1+ Colorado pikeminnow occurred on October 21, 2008. A soft release site was identified and prepared at RM 134.3. Block nets were placed across the inlet of a side channel with another block net placed approximately 85 meters downstream within the side channel. The enclosure was sampled by seine to assess the native fish community and remove nonnative and piscivorous fish. Fish did not require tempering upon arrival and were transported to the enclosure via water filled buckets. A hard release site was identified at RM 133.5 that allowed the fish to be released directly from the truck into the river. The fish were PIT tagged and hauled as two distinct lots from Dexter NFH&TC. Each lot was either soft released using the experimental protocols or hard released using standard stocking protocols. The protocol under which each lot was stocked was noted in their PIT tag databases for future comparison with recapture data.

The fall soft release of age-0 Colorado pikeminnow occurred on November 6, 2008 utilizing the Public Service Company of New Mexico (PNM) river-water intake return sluiceway located at RM 166.6. Prior to stocking, block nets were placed across the mouth of the backwater that the PNM sluiceway becomes when not in use (i.e. where the sluiceway return channel connects back to the mainstem San Juan River). Sampling by seine was conducted to document the presence of the native fish community and remove any nonnative fish present within the PNM sluiceway. Water quality was measured and recorded at 10:00. Fish were tempered in the stocking truck by using the onboard refrigeration unit to chill the water the within 1-2°C prior to transfer into the enclosure. Following the acclimatization period the block nets were removed and fish allowed to disperse.

RESULTS

On April 15, 2008 2,057 age-2 (2006 year class) Colorado pikeminnow, averaging 209 mm total length (TL), were soft released at RM 134.9 (Table 1). Total acclimatization enclosure area was approximately 220 m² (55 m x 4 m), with a temporary holding density of 9.35 fish/m². Sampling within the enclosure prior to stocking resulted in the capture of one adult channel catfish *Ictalurus punctatus* (413 TL), one juvenile speckled dace *Rhinichthys osculus* (57mm TL), one juvenile bluehead sucker *Catostomus discobolus* (145mm TL), and one Colorado pikeminnow (43mm TL).

Post-acclimatization sampling by seine within the enclosure on April 16, 2008 resulted in the capture of numerous (n > 50) Colorado pikeminnow and an adult channel catfish (400 mm TL). The channel catfish had consumed a stocked Colorado pikeminnow (174 mm TL), 43.5% of its own body length. The depredated Colorado pikeminnow PIT tag number was recorded and a note made in the PIT tag database.

On October 21, 2008 two separate groups of 1,400 age-2 (2006 year class) Colorado pikeminnow, approximately 300 mm TL, were soft and hard released at RM 134.5 and RM 133.5, respectively (Table 1). A total of 2,800 age-2 Colorado pikeminnow were stocked in the fall of 2008. Total acclimatization enclosure area was approximately 425 m² (85 m x 5 m), exceeding the recommended minimum area of 280 m² by 145 m² (Furr and Davis, 2009). Sampling within the enclosure prior to stocking Colorado pikeminnow resulted in the capture of one flannelmouth sucker *Catostomus latipinnis* (85 mm TL), one red shiner *Cyprinella lutrensis*, and two speckled dace.

Post-acclimatization sampling by seine within the enclosure on October 22, 2008 resulted in the capture of no fish. Fish in the 300 mm TL range were seen swimming within the enclosure and it is assumed that these fish were the stocked Colorado pikeminnow. Deposition of sand at the downstream block net may have allowed fish to swim under the lead line. It is unknown if, when, or how many fish might have left the enclosure prior to dismantling.

On November 6, 2008 a total of 270,234 age-0 (2008 year class) Colorado pikeminnow, ranging from 50-60 mm TL, were stocked at RM 166.6 (Table 1). Fish were acclimatized in the PNM river-water intake return sluiceway. Total acclimatization enclosure area was approximately 390 m² (65 m x 6 m), more than twice the recommended area to temporarily hold age-0 fish at a density of ≤ 2000 fish/m² (Furr and Davis, 2009). Sampling by seine prior to stocking resulted in the capture of seven young-of-year common carp *Cyprinus carpio* and two Colorado pikeminnow (170 and 180 mm TL). A PIT tag reader was not available, therefore, ascertaining a stocking or capture history for these fish was unattainable.

Table 1 – Colorado pikeminnow stockings in the San Juan River 2008

Date	Age/Year Class	# of Fish	Release Site River Mile	Release Type (soft vs. hard)
April 15	2 / 2006	2,057	134.9	Soft
October 21	2 / 2006	1,400	134.3	Soft
October 21	2 / 2006	1,400	133.5	Hard
November 6	0 / 2008	270,234	166.6	Soft
Total Stocked		275,091		

DISCUSSION

Augmentation efforts for 2008 fell short of SJRIP-LRP Task 2.1.2.2 - Annually stock $\geq 300,000$ age-0 Colorado pikeminnow, by $\sim 30,000$ fish (10%). Task 2.1.2.3 - Annually stock 3,000 age-1 Colorado pikeminnow, was exceeded by 1,857 fish (61%). No opportunistically acquired Colorado pikeminnow were stocked in 2008. A total of 275,091 Colorado pikeminnow of all year classes were stocked into the San Juan River in 2008.

Although $\sim 30,000$ less age-0 fish were stocked in 2008 than requested, the 175,970 extra age-0 fish stocked in 2007 helps to offset this shortfall within the overall scope of the augmentation effort. It is reasonable to expect that future stockings of age-0 fish will have some variability in the numbers produced, reared, and stocked. Environmental conditions (water quality, temperature, etc.) along with intraspecific competition and

predation/cannibalization in the grow-out ponds are just a few factors that increase unpredictability of survival within any single year class of Colorado pikeminnow produced in a hatchery. Moreover, the shortfall in the age-0 fish was partially compensated for by the 1,857 additional age-1+ fish stocked in 2008.

By comparing stocking numbers across the entire augmentation effort, the SJRIP is currently short of its augmentation target of 2,050,000 age-0 Colorado pikeminnow by 21,560 fish (1.05%). Conversely, the SJRIP is currently 18,517 (206.3%) above its augmentation target of 9,000 age-1+ Colorado pikeminnow with a total of 27,571 age-1+ fish stocked. If survival of age-0 Colorado pikeminnow can be expected to be low then the slight deficit in overall numbers of age-0 fish stocked might be ameliorated by the surfeit of age-1+ Colorado pikeminnow stocked to date.

We believe that the Colorado pikeminnow captured during pre-stocking sampling at RM 134.9 was soft released at this same site the previous fall, and had remained there over the winter months. Due to its small size, this fish was also removed from the enclosure to lessen the potential of cannibalization by the larger Colorado pikeminnow to be stocked. Future soft release efforts will ensure that a PIT tag reader is available to record recapture data if Colorado pikeminnow ≥ 150 mm TL are encountered during pre-stocking fish community sampling.

Augmentation for both age-0 and age-1+ Colorado pikeminnow will continue in 2009 following current protocols. Recapture data analysis of spatial and temporal distributions along with conditions factor, growth, and survival curves and will be utilized in the determination of the efficacy of 'soft' versus 'hard' release methodologies. Information and reports from ongoing management activities will be examined to help guide the augmentation strategies under the adaptive management approach.

LITERATURE CITED

- Brandenburg, W. H., and M. A. Farrington. 2008. Colorado pikeminnow and razorback sucker larval fish survey in the San Juan River during 2007. Prepared by American Southwest Ichthyological Researchers L.L.C. for the San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque. 58 pp.
- Davis, J. E., and D. W. Furr. 2008. Non-native species monitoring and control in the upper San Juan River, New Mexico: 2007. U.S. Fish and Wildlife Service, Albuquerque, NM. 38 pp.
- Furr, D. W and J.E. Davis. 2009. Stocking Plan and Protocol for the Augmentation of Colorado pikeminnow (*Ptychocheilus lucius*) in the San Juan River. Draft for the U.S. Fish and Wildlife Service, Albuquerque, NM. 9 pp.
- Golden, M. E., P. B. Holden, and B. Albrecht. 2006. Retention, growth, and habitat use of stocked Colorado Pikeminnow Stocked as Age-0 Fish in the San Juan River from 2002-2005: Final Summary Report. San Juan River Basin Recovery Implementation Program, United States Fish and Wildlife Service, Albuquerque, NM. 129 pp. + appendices
- Jackson, J. A. 2003. Nonnative control in the lower San Juan River: 2002. Interim Progress Report (Draft dated 31 March 2003). Utah Division of Wildlife Resources, Moab, UT. 16 pp. + Appendix.
- Jackson, J. A. 2004. Nonnative control in the lower San Juan River: 2003. Interim Progress Report (Draft dated 31 March 2004). Utah Division of Wildlife Resources, Moab, UT. 19 pp. + Appendix.
- Ryden, D. W. 2003. An augmentation plan for Colorado pikeminnow in the San Juan River. U. S. Fish and Wildlife Service, Grand Junction, CO. 63 pp. + appendices.
- Ryden, D. W. 2004. Augmentation of Colorado pikeminnow in the San Juan River: 2002-2003. Interim Progress Report. U. S. Fish and Wildlife Service, Grand Junction, CO. 13 pp.
- Ryden, D. W. 2005. An augmentation plan for Colorado pikeminnow in the San Juan River. Addendum # 1: Stocking age-1 fish to supplement ongoing augmentation efforts. U. S. Fish and Wildlife Service, Grand Junction, CO. 3 pp.
- Ryden, D.W. 2008a. Augmentation of Colorado pikeminnow in the San Juan River: 2007. Interim Progress Report. U.S. Fish and Wildlife Service, Grand Junction, CO. 6 pp + Appendix.

Ryden, D.W. 2008b. Long term monitoring of sub-adult and adult large-bodied fishes in the SanJuan River: 2007. Final report for the SJRIP, U.S. Fish and Wildlife Service, Albuquerque, NM. 55 pp.

San Juan River Basin Recovery Implementation Program. 2008. Long-range plan. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 124 pp.

APPENDIX

Table A-1. Colorado pikeminnow stocked into the San Juan River under the 2003 augmentation plan.

Dates	Number Stocked & (Age-Class)	River Miles Stocked At	Mean Total Length (in mm)	Range Of Total Lengths (in mm)	Responsible Agency ^a
2002: 210,418 total fish stocked					
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
2003: 176,933 total fish stocked					
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	CDO-Mumma
2004: 281,219 total fish stocked					
06/09/2004	1,219 (2)	180.2	218	144-278	CDO-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
2005: 306,811 total fish stocked					
07/07/2005	500 (1)	180.2	201	114-256	USFWS-Dexter
07/07/2005	1,491 (2)	180.2	204	121-281	CDO-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	CDO-Mumma
2006: 326,547 total fish stocked					
07/13/2006	3,247 (2)	180.2	200	119-278	CDO-Mumma
07/13/2006	279 (3)	180.2	216	155-276	CDO-Mumma
07/20/2006	3,986 (2)	180.2	211	117-297	CDO-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
2007: 479,226 total fish stocked					
04/18/2007	1,590 (1)	134.5	176	137-228	USFWS-Dexter, NMFWCO
10/03/2007	81,974 (0)	134.5	Unknown	Unknown	USFWS-Dexter, NMFWCO
10/03/2007	1,666 (1)	134.5	Unknown	147-208	USFWS-Dexter, USFWS-NMFRO
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
2008: 275,091 total fish stocked					
4/15/2008	2,057 (2)	134.9	209	Unknown	USFWS-Dexter, & NMFWCO
10/21/2008	2,800 (2)	134.3	299	Unknown	USFWS-Dexter, & NMFWCO
11/06/2008	270,234 (0)	133.5	55	Unknown	USFWS-Dexter, & NMFWCO
Total number of fish stocked from 2002-2008 = 2,028,440					

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

Table A-2. A summary of Colorado pikeminnow that were stocked into the San Juan River, 1996-2008.

Year Stocked	Number Stocked	River Mile(s) Stocked At	Mean Total Length (in mm)	Range Of Total Lengths (in 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