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09/14/01 01:17 PM

To: AHobbes@state.nm.us, Dennis\_Coleman@fws.gov  
cc:  
Subject: ZBS Report

Amber and Dennis,

Attached is a draft of the Zuni Bluehead Sucker Report (MSWord file). It's a little rough, but it has most of the data from the 2000 field season. I'd still like to go back and put in some things like sex ratios, etc. In the report I have several graphs of size class distributions. I've had to delete these in order to send them electronically (too large).

Amber: Three questions:

- 1) There is also a section on previous surveys and I'd like to include a table from your recent paper, just a background with which to compare current numbers. You'll see the section in there.
- 2) Do you think the current report could be modified and be made suitable for publication, as a status update on the species, and perhaps include some more of Dr. Dowling's genetic data?
- 3) If yes, would you be interested in being a co-author and helping me whip it into shape for publication?

Thanks to both of you for your help and patience. Sorry this report took way too long to get out, but I've been unbelievably swamped....

Sincerely,

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- 2000 ZBS Report without graphs.doc

**Zuni Bluehead Sucker  
Field Survey Report  
2000 Field Season**

**Draft Final Report**

**Submitted by:**

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## **Introduction**

The Zuni Bluehead sucker (*Catostomus discobulus yarrowi*) may be one of the most endangered fishes in the Southwestern United States. It is listed as threatened by the New Mexico Department of Game and Fish and is considered a species of concern by the U.S. Fish and Wildlife Service. It is also protected by the Pueblo of Zuni by proclamation. Once fairly widespread in tributaries of the Upper Little Colorado River, especially the Zuni River, the species currently inhabits less than 10% of its probable historic range (Propst 1999).

The Zuni Bluehead Sucker has historically been considered a distinct subspecies of the bluehead sucker (*Catostomus discobulus*), though its precise origin has been somewhat disputed. While *C. discobulus* is endemic to the tributaries of the Upper Little Colorado River (Propst and Hobbes 1996) the origin of the *yarrowi* subspecies is less clear, and some researchers (e.g. Smith 1966) believe it to be hybrid of the Rio Grande sucker (*Catostomus plebeius*) and the bluehead sucker. Other researchers (Crabtree and Buth 1987) have provided genetic evidence that other bluehead suckers in the Little Colorado River drainage are genetically separable from *yarrowi*. Genetic research on the species is being conducted by several workers, and their findings will have great implications for conservation. If the fish is indeed considered distinct species or subspecies in its New Mexico and Arizona populations, the New Mexico population in particular is severely restricted in both population numbers and range.

In an attempt to track populations, several agencies have been cooperating conduction surveys of the fish. In 2000 we conducted the most comprehensive surveys of the fish to date, both time-wise and geographically. Participants in the inventories were Amber Hobbs from the New Mexico Department of Game and Fish, Mary McAfee and Patrick McCarthy from The Nature Conservancy, David Mikesic from the Navajo Natural Heritage Program, Dave Weedman from the Arizona Game and Fish Department, and Nelson Luna and Steven Albert from the Zuni Fish and Wildlife Department.

## **Ecology of the Zuni Bluehead Sucker**

The bluehead sucker is a relatively small fish, generally smaller than 200 mm, and is found most commonly in low velocity, moderately deep pools with algae growing on coarse rock or cobble substrate (Propst et al 2001). Where erosion and sedimentation are moderate to heavy, these factors can lead to a decline in the fish by covering these algae feeding areas. Other researchers (Swift-Miller 1999) have reported a negative correlation between level of sedimentation and populations of the Rio Grande sucker (*Catostomus plebeius*). The fish, especially fry, are also susceptible to predators such as green sunfish (*Lepomis cyanellis*) and bullfrogs (*Rana catesbeiana*). Reproduction occurs in the spring and most individuals are mature by age 2 (Propst et al. 2001), when they reach a length of approximately 50-80 mm.

In the 1960's several chemical treatments were made to streams in which Zuni bluehead suckers were present, including the headwaters of the Rio Nutria. The purpose of the treatments was ostensibly to remove non-native fish, but sucker populations were also impacted. However, dispersal from upstream reaches replenished stocks (Propst 1999).

Several reservoirs constructed in the 20th century on the Rio Nutria and Rio Pescado have also likely led to the decline of the fish. These man-made lakes have slowed the flow of water, nearly eliminating the large flushing flows that kept the river cobbled and relatively free of sediment for much of the year. In addition, they have changed once perennial rivers into intermittent streams and blocked the genetic and reproductive interchange between upper reach and lower reach fish populations.

### **Summary of Previous Surveys**

Stream shocking surveys on the Zuni Reservation and on Nature Conservancy Land were conducted from 1990-1995. Surveys found the fish mainly in the Rio Nutria drainage from the mouth of Nutria Canyon upstream; however distribution was uneven and patchy (Propst et al. 2001) with the larger populations persisting in bigger pools where water remained through the summer and water temperatures remained relatively cool.

In 1994 and 1995 surveys were conducted at five sites along the Upper Rio Nutria: Tampico Spring, Agua Remora, The Silva Property, Rio Nutria/Tampico Confluence and Nutria Box; and five additional sites along the Rio Nutria Tampico. Numbers of fish collected and size classes are summarized below (from Propst et al. 2001)

*Insert Page 167 of Propst et al with permission....*

Low numbers of fish (<10) were found at the confluence of the Rio Nutria and Rio Pescado during surveys in 1992, 1994, and 1995. However these fish were all fairly large adults and no reproduction was evident. Surveys in 2000 failed to find any fish at this reach.

## **2000 Inventories**

### **Methods**

In 2000 we conducted the most extensive surveys of this species to date. We sampled fish in 7 locations in Arizona and New Mexico and collected fish for genetic analysis. Areas surveyed included portions of the Rio Nutria on the Zuni Reservation (Fig. 1), the Rio Nutria and Tampico Creek on Nature Conservancy Land (Figure 1) on April 17, The Zuni River below the confluence of the Rio Nutria and Rio Pescado on the Zuni Reservation (Figure 2) on April 17, Kin le Chee Creek and Scattered Willow Creek on the Navajo Reservation (Figure 3) on April 18, and the Rio Nutria Box Canyon on the Zuni Reservation (Figure 1) on April 19. One site

that has been surveyed in the past, Agua Remora and the Upper Rio Nutria, were not surveyed in 2000 as they are on private land and the permission of the land owner was not obtained.

We used battery powered backpack shockers to bring fish to the surface, and hand-nets to capture them. Fish were kept in 5-gallon plastic buckets until data was taken. Data taken included weight, standard length (*definition?*), total length (tip of tail fins to nose), sex (if known) and reproductive status (if known).

### Genetic Analysis

In an effort to describe the genetic differences between the Arizona and New Mexico populations of bluehead suckers, several fish at each site were collected for analysis. These were submitted to Dr. Thomas Dowling of Arizona State University. Early indications from mitochondrial DNA analysis indicate at least three forms of the fish exist in the Little Colorado River Basin: *Pantosteus discobulus*, *Pantosteus plebeius*, and a third form, likely a hybrid of these two. Dowling concludes that both hybridization and natural evolutionary functions (e.g. genetic drift) are factors in defining the different genotypes of the fish. Whether or not the fish will taxonomically be considered distinct subspecies or even species is a matter for taxonomists to decide. Whatever the final decision, the results will have far reaching consequences for this species, which is already at low numbers across its range.

### Literature Cited

Propst, D.L. 1999. Threatened and Endangered Fishes of New Mexico. Technical Report No. 1. New Mexico Department of Game and Fish, Santa Fe, New Mexico.

Propst, D.L., Hobbes, A.L., and Stroh, T.L. 2001. Distribution and notes on the biology of Zuni bluehead sucker, *Catostomus discobulus yarrowi*, in New Mexico. *Southwestern Naturalist* 46(2):158:170.

Swift-Miller, S.M. B.M. Johnson, R. T. Muth, and D. Langlois. 1999. Factors affecting the diet and abundance of northern populations of the Rio Grande sucker (*Catostomus plebeius*) in Hot Creek, Colorado. *Southwestern Naturalist* 44:42-48.

**Table 1. Zuni Bluehead Suckers captured at Tampico Draw Pool, 17 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
142	122	16.0	M
65	54	3.5	
104	89	10.5	
105	92	13.0	
106	92	11.5	
Avg = 87	Avg = 74.83	Avg = 9.08	

In addition to the fish collected live, there were approximately 100 dead fish in the large pool in the bedrock immediately upstream from the location where the survey began (the access point). The pool was small and probably had iced over completely.

**Figure 1. Length Frequency of Zuni bluehead suckers at Tampico Draw pool, 17 April 2000.**

**Table 2. Zuni Bluehead Suckers captured at Rio Nutria Below Confluence with Tampico Draw Pool, 17 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
102	95	18.0	
122	102	17.5	
101	87	17.0	
98	82	13.5	
142	122	25.0	M
AFU	87	AFU	
103	98	11.0	
112	95	15.0	
113	93	14.5	
99	86	11.5	
66	51	2.2	
50	42	1.3	
52	43	1.6	
134	118	24.5	
80	69	6.0	
51	42	0.9	
57	46	2.1	
55	46	1.0	
91	79	9.0	
81	68	7.0	
53	43	2.0	
57	46	1.8	
60	51	2.2	
95	83	9.0	
93	74		F
178	158	81	
200	179	96	
187	163	68	
174	154	69	F
179	156	80	Fg
152	128	40	F
143	124	41	
170	151	63	F
190	176	120	

122	115	23	
120	107	21	F
202	180	120	
100	84	13	
87	76	7	
87	75	6	
84	71	6	
106	92	9	
93	77	15	
56	47		
64	53		
52	43		
79	66		
91	75		
58	48		
51	42		
93	76	8	
AFU	--		
61	52		
58	47		
59	50		
118	94	14	
58	47		
97	84	12	
74	61	4	
56	47		
55	45		
73	61		
58	46		
53	44		
37	30		
52	43		
53	44		
143	127	34	
75	63		
127	109	23	
136	118	25	M
120	104	17	
108	94	14	F
145	126	31	M
111	97	16	
106	92	13	
114	100	17	
130	111	28	M
125	108	23	
144	123	38	M
87	74		
89	71	7	

112	95		
77	63		
104	83	15	
106	90	12	
153	131	38	
105	89	12	
184	160	89	F
112	97	15	
99	85	11	
109	93	16	
114	97	15	
101	85	12	
145	126	33	
122	107	20	M
117	93	17	
104	88	13	
152	138	49	F
108	95	66	
72	64	5	
90	76	15	
126	109	7	
117	100	26	
106	92	15	
107	92	15	
72	63	5	
88	72	8	
135	115	22	
52	44	7	
95	83	16	
112	95	20	
127	106	13	
105	88	15	
107	88	24	
125	107		
103	89	46	
161	142		
56	47		
52	44		
54	45		
53	43		
58	47		
51	42		
61	52		
60	48		
AVG = 95.88	AVG = 81.6	AVG = 23.4	

Figure 2. Length Frequency of Zuni bluehead suckers at

Rio Nutria below confluence with Tampico Draw, 17 April 2000.

**Table 3. Zuni Bluehead Suckers captured at Rio Nutria Above Confluence with Tampico Draw, 17 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
134	110	25	
133	119	31	
142	115	33	Mt
178	144	82	Mt
197	165	95	Fg
122	98	20	M
69	54	3.5	
139	114	33	F
104	84	14	
151	125	34	F
97	78	9	
122	99	21	
59	48		
61	50	2	
112	91	17	
57	46		
66	53		
93	75	8	
62	52	25	
62	50	21.5	
112	99	24	
123	105		
135	112		
119	101		
52	42		
52	43		
69	59		
50	41		
47	38		
47	39		
50	40		
53	44		
58	49		
52	43		
58	47		
135	110	29	F
186	157	81	F
112	92	19	M
160	133	53	F
149	123	34	Mt

185	153	68	F
140	113	30	Mt
170	138	51	F
175	142	67	F
103.31	85.18	34.4	

**Figure 3. Length Frequency of Zuni bluehead suckers at Rio Nutria above confluence with Tampico Draw, 17 April 2000.**

**Table 4. Bluehead Suckers captured at Kin Li Chee Creek, near Black Soil Springs, 18 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
186	160	78	F
134	115	21	
122	106	18	
130	113	23	M
135	120	28	
110	94	10	
141	119	36	
131	113	27	
131	114	23	
110	95	14	
86	74	12	
83	68	6.5	
107	92	14	
76	64	6	
67	54	3.5	
95	79	9.5	
76	63	5.5	
106.67	91.28	18.61	

N=18

**Figure 4. Length Frequency of Zuni bluehead suckers at Kin Li Chee Creek, near Black Soil Springs, 18 April 2000.**

**Table 5. Bluehead Suckers captured at Kin Li Chee Creek, near Bear Canyon, 18 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
115	99	18	F
120	103	20	
178	154	62	F

N=3

122	106	25	Mr
110	94	17	F
103	88	13	Mr
103	84	11	Mr
95	79	10	Mtr
80	65	5	
70	58	4	
64	57	3	
64	52	2.5	
134	116	29	F
107	92	15	
110	96	16	Mtr
111	98	18	
98	83	12	Mtr
104	86	12.5	Mr
121	105	19.5	F
101	87	11.5	
101	84	12	Mr
98	85	11.5	
84	70	7	
85	71	6.5	
94	77	9.5	
80	66	6	
73	62		
74	61	5	
69	55	4	
85	71	7.5	
70	55	4.5	
114	98	17.5	
127	109	25.5	Mtr
120	100	22	Mtr
100	87	11.5	Mr
95	79	9.5	Mr
106	90	14.5	Mr
121	103	21	F
106	92	14.5	Mtr
83	68		
70	59	4.5	
82	70	6.5	
65	54	3.5	
64	54	3.5	
102	85	13	Mt
55	45	1.5	
71	57	4	
54	44	3.5	
85	71	7	
85	73	7.5	
90	77	8.5	

*N=48*

84	72	6.5	
70	58	3.5	
54	44		
91.38	77.24	11.89	

N = 4

**Figure 5. Length Frequency of Zuni bluehead suckers at Kin Li Chee Creek near Bear Canyon, 18 April 2000.**

**Table 6. Bluehead Suckers captured at Kin Li Chee Creek, at Scattered Willow Canyon, 18 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
75	60	4.5	
62	50	2.5	
74	59	4	
72	58	4	
72	61	4.2	
158	130	46	
109	88	16	
84	68	6	
55	48	1.4	
141	117	32.5	
78	62	4.2	
51	40	0.9	
87	71	6.8	
66	54	2.5	
55	45	1.2	
80	69	4.6	
79	64	4.3	
100	80	9.9	
90	74	7.6	
68	55	3	
67	59	6.2	
69	54	2.7	
98	80	8.3	
80	64	4.8	
78	61	4.5	
82	67	5	
122	102	18.5	F
70	56	3.5	
50	39	1	
55	42	1.4	
61	49	2.0	
87	70	5.8	

N = 32

93	75	7.6	
76	60	4	
71	58	3.3	
72	59	4.1	
63	43	1	
71	58	3.2	
83	69	5.1	
83	65	4.9	
86	70	6.1	
156	130	39.5	F
84	69	5	
80	65	4.8	
85	69	6.3	
79	65	4.8	
84	69	6.1	
60	48	2.3	
39	30	2	
68	55	3	
101	81	12.5	F
72	58	3.5	
62	41	1.4	
80	68	5.2	
62	50	2.8	
54	43	1.7	
63	48	2	
95	74	8.2	
84	68	6.3	
66	54	3	
78	62	4.6	
60	47	2	
70	57	3.3	
62	49	2.2	
60	49	2.2	
72	59	4	
77	61	4.6	
75	60	4	
95	77	7.8	M
72	60	3.7	
78	63	4.6	
70	58	3.4	
87	70	6	
60	49	2.4	
64	52	2.6	
69	52	3.4	
72	59	4.2	
69	55	3.3	
69	56	3.1	
63	52	2.8	

65	51	1.8	
63	50	2.1	
75	60	3.8	
75	61	4.5	
69	51	3	
80	64	5.2	
66	52	2.7	
70	56	3.6	
62	49	2.4	
59	46	2	
105	88	12.5	
60	48	2.5	
81	63	4.6	
69	55	3.1	
81	55	4.5	
73	61	4	
62	49	2.2	
65	51	2.3	
52	43	0.8	
70	55	3.2	
52	41	0.9	
66	52	2.8	
77	63	5.4	
86	68	6.4	
66	53	3.2	
62	48	2.0	
83	67	5.5	
83	68	5.6	
53	41	1.7	
63	51	2.8	
86	71	6.2	
75.21	60.5	5.2	

**Figure 6. Length Frequency of Zuni bluehead suckers at Kin Li Chee Creek at Scattered Willow Canyon 18 April 2000.**

**Table 7. Bluehead Suckers captured at Rio Nutria Box Canyon at The Mouth of Nutria Canyon, 19 April 2000**

Total Length, mm	Standard Length, mm	Weight, g	Sex, if Known
102	85	17.5	F
132	109	25.5	F
85	68	7	
71	58	4.2	
49	39		
90	70	8	Mtr

86	69	8.8	F
90	73	8.6	Mtr
120	97	15.5	F
72	60	4.6	
75	60	5.6	M
93	71	9.8	Mtr
107	88	15.5	Mtr
71	58	4.4	
145	118	38	Mt
131	110	26.5	Mt
110	89	15	Mtr
113	93	16	M
110	89	16	Fg
95	85	14.4	F
78	62	6.5	
86	71	9	
92	74	10	
131	109	25	Mtr
80	65	6.8	Mt
107	87	14	Mtr
124	102	23	Fg
102	83	15	Fg
109	90	17	Fg
140	121	34.5	Mtr
74	58	5	
89	71	7.4	Mtr
68	53	3.6	
101	82	13	Mtr
104	85	13.5	Mtr
136	112	31.5	Fg
122	100	19.5	Mtr
105	90	15	F
105	93	17.5	Mt
100	81	12.5	Fg
95	77	11	Fg
64	50	2.8	
92	75	10.5	Mt
127	102	24	Mt
96	78	12	F
90	72	10	Fg
101	83	12	Mt
124	102	22	F
47	39		
71	57	3.8	
113	103	14.5	Mt
53	44		
103	84	11.5	Mt
77	61	4.6	

134	111	30	Fg
98	79	11.5	Mtr
100	83	11	Mtr
70	58	3.6	
83	67	6.8	Fg
81	67	6.6	
102	84	13	M
100	82	11.5	Mt
90	72	10	Mt
51	41		
85	70	6.2	
94.65	77.56	13.3	

**Figure 7. Length Frequency of Zuni bluehead suckers at  
Rio Nutria Box Canyon at the Mouth of Nutria Canyon, 19 April 2000.**