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New Mexico Game and Fish
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Project Title: Levels and patterns of morphological and molecular variation in the Zuni bluehead sucker

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We have initiated morphological studies on samples provided. This work is summarized in the attached pages, which describe localities, characters examined to date, and some of the summary statistics. Historical material is obtained from several museums (nominally including Arizona State University; The Museum of Southwestern Biology, Tulane University, and The University of Michigan) to provide additional perspective on observed variation. DNA extractions from recent collections are expected to be completed within the next couple of weeks, and their characterization with markers described in the proposal will be initiated at that time. We expect to complete this work on schedule, not later than June 2007.

Zuni Bluehead Sucker **Preliminary Data**

Acquisition

Morphometrics & Meristics **n= 137**
2006

Specimens from the following localities have been analyzed for selected morphometric and meristic characters:
Animas River, Black Soil Wash, Kinlichee Creek, Nutrioso Creek, Rio Nutria, Tsaile Creek, Wheatfields Creek, and Whiskey Creek. Data are stored in a MS Access ® database.

Characters measured (Roman text), counted (*italicized text*), or categorized (underlined text) are included in the following table:

Character	Code	Description
Total Length	TL	
Standard Length	SL	
Fork Length	FL	
Head Length	HL	Tip of snout to back of opercular membrane
Head Depth	HD	Occiput to isthmus
Head Width	HW	Widest point when opercles are flat
Width of Lower Jaw	W of LJ	
Depth of Lower Lip Fork	D of LLF	Distance between base of lower jaw and fork of lower lip
Width of Isthmus	Isth	Between ventral corners of gill apertures
Depth of Caudal Peduncle	D of CP	At narrowest point
Right Lateral Line Scales	RLLS	
Left Lateral Line Scales	LLLS	
Scales Below Right Lateral Line	SBRLL	
Scales Below Left Lateral Line	SBLLL	
Scales Above Right Lateral Line	SARLL	
Scales Above Left Lateral Line	SALLL	
Predorsal Scales	PDS	Left of midline from occiput to dorsal fin base
Circumpeduncular Scales	CPS	Narrowest dorso-ventral point on caudal peduncle
Dorsal Rays	DR	
Anal Rays	AR	
Right Pectoral Rays	RP1R	
Left Pectoral Rays	LP1R	
Right Pelvic Rays	RP2R	
Left Pelvic Rays	LP2R	
External Gill Rakers	EGR	Upper Limb + Lower Limb
Internal Gill Rakers	IGR	Upper Limb + Lower Limb
Vertebrae	VERT	
Pelvic Axillary Process	PAP	Presence or absence
Upper Lip Characteristics	U lip	Values 0,1,2 for papillation of anterior margin (0=smooth, 1=intermediate, 2=papillose)
Lower Lip Characteristics	L Lip	Values 0,1,2 for papillation of lower lip (0=smooth, 1=lightly, 2=greatly papillose)
Shape of Lower Jaw	LJ Shape	Values 0,1,2 (0=flat, 1=intermediate, 2=rounded)

Only exploratory data analysis has been performed; results are attached.

Locality	n	Mean SL (mm)	SD SL (mm)	Min SL (mm)	Max SL (mm)	Mean HL	SD HL	Mean HD	SD HD	Mean HW	SD HW	Mean Isth	SD Isth	Mean D of CP	SD D of CP	Mean W of LJ	SD W of LJ
Animas River	1	141		141	141	4.579		7.246		6.528		10.368		13.365		14.952	
Black Soil Wash	25	74.09	15.86	41.23	98.56	4.168	0.165	6.656	0.279	6.361	0.17	10.971	0.679	13.214	0.721	18.02	1.523
Kinlichee Creek	23	67.08	8.339	44.57	82.69	4.129	0.112	6.528	0.228	6.068	0.143	10.656	0.834	12.968	0.561	19.272	1.704
Nutrioso Creek	38	86.18	14.06	59.79	117.36	4.205	0.167	7.132	0.29	6.281	0.284	11.94	1.044	11.855	0.567	16.837	0.997
Rio Nutria	10	90.25	14.27	72.88	122.2	4.181	0.202	6.575	0.253	6.218	0.296	11.704	2.51	12.386	0.592	17.355	1.365
Tsaile Creek	9	108.87	38.09	68.34	174	4.479	0.243	7.205	0.339	6.49	0.319	11.487	0.823	13.356	0.608	15.934	0.824
Wheatfields Creek	11	91.864	16.47	76.87	133.72	4.419	0.102	7.134	0.13	6.638	0.162	10.839	0.852	13.878	0.491	16.477	1.153
Whiskey Creek	20	96.106	32.04	35.64	186	4.421	0.191	7.003	0.299	6.513	0.139	12.201	0.903	13.145	0.551	16.586	0.819

Ratios are those used for Zuni sucker by Sublette et al. 1990, “The Fishes of New Mexico.”-

Head size index[1]-

Locality	n	SL/D of CP mean	SL/D of CP stdev	SE	SL/W of LJ mean	SL/W of LJ stdev	SE	mean	stdev
Animas River	1	13.365	-	-	14.952	-	-	216.595	-
Black Soil Wash	25	13.254	0.709	0.142	18.019	1.523	0.305	176.861	16.553
Kinlichee Creek	23	12.968	0.561	0.117	19.272	1.704	0.355	163.665	10.059
Nutrioso Creek	38	11.855	0.567	0.092	16.837	0.997	0.162	189.080	21.890
Rio Nutria	10	12.386	0.593	0.188	17.356	1.365	0.432	171.691	21.181
Tsaile Creek	8	13.356	0.609	0.215	15.934	0.824	0.291	209.426	17.953
Wheatfields Creek	11	13.878	0.491	0.148	16.477	1.152	0.347	209.318	9.059
Whiskey Creek	20	13.098	0.524	0.117	16.586	0.819	0.183	201.896	16.133

[1] Head size index is calculated as the product of standard length-standardized measurements of head length, depth, and width.