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# FINAL REPORT

## **2004 FRESHWATER MUSSEL SURVEY OF THE BIG PINEY RIVER AND ROUBIDOUX CREEK, PULASKI COUNTY, MISSOURI.**

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## **ACKNOWLEDGEMENTS**

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## **INTRODUCTION/BACKGROUND**

Native freshwater mussels are an ecologically important group of aquatic mollusks. This group is of particular concern to conservation biologists because many species are classified as species of conservation concern (SCC). The freshwater mussel community of the Big Piney River and Roubidoux Creek, on and in the vicinity of Fort Leonard Wood, was previously surveyed by Sternburg et al. (1998). The present project was a resurvey of the area to determine the current status of the mussel community, so that appropriate measures can be taken to preserve and protect that community.

## **SCOPE/OBJECTIVES:**

We re-surveyed 42 sites on the Big Piney River and 13 sites on Roubidoux Creek using a sampling protocol similar to that of the 1993-95 survey (Sternburg et al. 1998). The survey recorded both SCC and other freshwater mussels, with emphasis on the former. For the purposes of this document, SCC were defined as “any species listed as threatened or endangered under federal or state jurisdiction, species proposed as candidates for listing, and other species deemed “rare” at the state, regional, or national level.”

## **METHODS:**

The sites were located according to topographic maps provided by MDC. At each site, the banks were visually surveyed for dead shell, which was identified to species. Live mussels were sought by wading and snorkeling. All live mussels encountered were identified, counted, and returned to the substrate. Shell length was recorded for all living and fresh-dead T&E species encountered. Each site was searched for at least 1 person-

hour. If live mussels were found within that time, the search continued at that site until least 1 additional person-hour has passed without locating additional species.

UTM coordinates, sampling method, time spent searching, amount of area sampled and site description (bank condition, vegetative cover, water depth, substrate compaction, and substrate particle size) were recorded for each site.

## **RESULTS:**

The quantitative results are presented in Tables 1-6. The species assemblage appeared similar to that reported by Sternberg et al. (1998). We found two species live that were previously recorded only as dead shell- these were *Obliquaria reflexa* in the Big Piney, and *Pyganondon grandis* in Roubidoux Creek (Table 1). Live individuals of SCC were found at 4 sites, and dead shells at several other sites. We also found a live juvenile Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) (Figure 10). Missouri status of the Eastern hellbender is S1 (state endangered), and it was the subject of a recent status assessment by USFWS.

The most abundant mussel species in the Big Piney was *Actinonaias ligamentina*, which accounted for 42% of live specimens, followed by *Amblema plicata* and *Pleurobema coccineum* (16.5% and 12.9%, respectively) (Table 3). The most abundant species in Roubidoux Creek was *Lampsilis siliquoidea* (66.8% of live specimens) followed by *Lampsilis cardium* and *Pyganondon grandis* (9.2 and 6.9%, respectively) (Table 5).

Details of results at each site are presented in Tables 2 and 4. The sites listed below were of particular interest, either because of the occurrence of SCC (*Cumberlandia monodonta*, *Alasmidonta marginata*, and *Ligumia recta*, either live or dead), because of evidence of recent change, particularly mass mortality, or because of high abundance or diversity of live mussels. Each entry below gives the GIS coordinates, the date visited, the gage height and flow at the nearest USGS gaging station, substrate composition, and observations of species.

BPM02—mussel bed : UTM: X<sub>1</sub>: 582880 Y<sub>1</sub>: 4170420. July 7, 2004. Stage was 2.83 ft. and discharge was 205.8493 cfs at gage # 06930000. The wetted width of the site was 60m. Substrate consisted of: 35% fine gravel, 25% coarse gravel, 20% pebble, and 20% cobble. A mussel bed was located on the right half of the river with overhanging trees. Nine species were found live. 232 mussels were found in two hours and thirty minutes.

BPM03 – spectaclecase: UTM: X<sub>1</sub>: 582703 Y<sub>1</sub>: 4170596. July 7, 2004. Stage was 2.86 ft. and discharge was 214.3 cfs at gage # 06930000. The wetted width of the site was 10m. Substrate consisted of: 45% sand, 10% fine gravel, 10% coarse gravel, 5% pebble, 5% cobble, and 25% boulder. One intact fresh shell of *Cumberlandia monodonta* was found on the left buried in gravel.

BPM05 – mass mortality: UTM: X<sub>1</sub>: 582810 Y<sub>1</sub>: 4172257. July 8, 2004. Stage was 2.8 ft. and discharge was 197.5172 cfs at gage # 06930000. The wetted width of the site was 20m. Substrate consisted of: 10% sand, 40% fine gravel, 20% coarse gravel, 20% pebble, and 10% cobble. The Big Piney River had changed course since the previous survey, and the dead shell found on the right gravel bar was evidence of this. The shells were intact, weathered, and buried in the gravel, and appeared to have dried up when the river changed course. On the left was a cornfield, and the river was cutting away at the left bank. Two live *Cyclonaias tuberculata* were found approximately six inches from the gravel bar edge. *See Figures 1-3.*

BPM06—shell bed: UTM: X<sub>1</sub>: 582597 Y<sub>1</sub>: 4172774. July 12, 2004. Stage was 2.65 ft. and discharge was 181.3173 cfs at gage # 06930000. The wetted width of the site was 40m. Substrate consisted of: 10% sand, 10% fine gravel, 20% coarse gravel, and 60% pebble. There was a 10m by 20m wetted reach with numerous dead shells. The live mussels were found along the right and upstream of the dead shells. There was a farm field located upstream on the left and right banks. *See Figure 4.*

BPM15- shell of black sandshell: UTM: X<sub>1</sub>: 581381 Y<sub>1</sub>: 4175954. The gage height was 2.64 ft. and the discharge was 178.6778 cfs. The wetted width of the site was 10m. Substrate consisted of: 40% fine gravel, 50% coarse gravel, and 10% coarse gravel. One valve of *Ligumia recta* was found toward the downstream left area.

BPM21- live elktoe, shell of spectaclecase: UTM: X<sub>1</sub>: 583055 Y<sub>1</sub>: 4176849. The gage height was 2.62 ft. and the discharge was 173.4508 cfs. The wetted widths of the site were, facing upstream, approximately 5m on right of the island and 10m on the left. Substrate consisted of the following: 5% sand, 25% fine gravel, 25% coarse gravel, 15% pebble, 10% cobble, and 20% boulder. Two live *Alasmidonta marginata* and one dead shell *Cumberlandia monodonta* were found. Looking upstream, the *Alasmidonta marginata* were found about two feet from the right, downstream end bank of the island. *Cumberlandia monodonta* dead shell was found near the downstream end of the boulders located on the right bank of the river. See pictures BPM21. *See Figures 5-7.*

BPM24 – live spectaclecase: UTM: X<sub>1</sub>: 583995 Y<sub>1</sub>: 4176596 just downstream of Happy Hollow. The gage height was 2.67 ft. and the discharge was 168.2935. The wetted widths were 3m on right and 10m on the left of the island. Substrate consisted of: 10% fine gravel, 10% coarse gravel, 10% pebble, 20% cobble, and 50% boulder. Fifteen *Cumberlandia monodonta* were found live and twenty-one dead shells were found. They were all found on the left bank in boulders. The live and dead were between the crevices of the boulders. See pictures BPM24. *See Figures 8, 9.*

BPM35- live black sandshell: UTM: X<sub>1</sub>: 583298 Y<sub>1</sub>: 4180342. The gage height was 2.14 ft. and the discharge was 228.4429 cfs. The wetted width was 105m. Substrate consisted of: 30% silt, 30% sand, 10% coarse gravel, 10% pebble, and 20% cobble. One live *Ligumia recta* was found along the left in a mussel bed.

BPM36- shell of black sandshell: UTM: X<sub>1</sub>:586171 Y<sub>1</sub>: 4180617. The gage height was 2.14 ft. and the discharge was 228.4429 cfs. The wetted width was 40m. Substrate

consisted of: 5% sand, 45% coarse gravel, 25% pebble, and 25% cobble. One dead shell of *Ligumia recta* was found in the lower left side of the search area.

BPM37- shell of black sandshell, spectaclecase: UTM: X<sub>1</sub>: 586435 Y<sub>1</sub>: 4180571 at Spring Creek confluence. The gage height was 2.18 ft. and the discharge was 238.5414 cfs. The wetted width was 30m. Substrate consisted of: 25% sand, 30% coarse gravel, 25% pebble, and 20% cobble. One dead shell of *Cumberlandia monodonta* was found just downstream of Spring Creek on the left on a gravel bar. *Ligumia recta* shell was found in the middle in a riffle.

BPM40- shell of spectaclecase: UTM: X<sub>1</sub>: 586459 Y<sub>1</sub>: 4181151. The gage height was 2.24 ft. and the discharge was 254.1802 cfs. The wetted width was 20m. Substrate consisted of: 5% silt, 5% sand, 10% fine gravel, 10% coarse gravel, 25% pebble, 35% cobble, and 10% boulder. One dead shell of *Cumberlandia monodonta* was found on the left and assumed to have washed down.

BPM41-live hellbender, shell of spectaclecase: UTM: X<sub>1</sub>: 581772 Y<sub>1</sub>: 4181519. The gage height was 2.28 ft. and the discharge was 264.9365 cfs. The wetted width was 30m. Substrate consisted of: 5% sand, 5% fine gravel, 80% cobble, and 10% boulder. One dead shell of *Cumberlandia monodonta* was found on the right under a boulder with a hellbender. X<sub>1</sub>: 581875 Y<sub>1</sub>: 4181668 were exact UTM of hellbender and *Cumberlandia monodonta* dead shell. *See Figure 10.*

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**Table 1. Freshwater mussel species recorded from Big Piney River (B) and Roubidoux Creek (R), MO. L=live specimens D=dead only (BL=Big Piney Live, etc)**

SCIENTIFIC NAME <sup>1</sup>		COMMON NAME	Oesch 1984	Warren 1993	Buchanan unpublished	Sternberg et al. 1998	Present Study
<b>Family Margaritiferidae</b>							
<i>Cumberlandia monodonta</i>	G2G3:S3	Spectaclecase			B	BL RD	BL --
<b>Family Unionidae</b>							
<i>Actinonaias ligamentina</i>		Mucket	B	B	B	BL RD	BL RD
<i>Alasmidonta marginata</i>	G4:S2?	Elktoe		B,R	B	BL RL	BL --
<i>Alasmidonta viridis</i>		Slippershell mussel		B,R			
<i>Amblema plicata</i>		Threeridge		R	B	BL RD	BL RD
<i>Cyclonaias tuberculata</i>		Purple wartyBLck			B	BL RD	BL --
<i>Elliptio dilatata</i>		Spike	B	B,R	B	BL RL	BL RL
<i>Fusconaia sp.</i> <sup>2</sup>		Ozark/Wabash pigtoe	B,R	B,R	B	BL RL	BL RL
<i>Lampsilis cardium</i>		Plain pocketbook	B	B,R	B	BL RL	BL RL
<i>Lampsilis siliquoidea</i> (=radiata)		Fatmucket or eastern lampmussel		B,R		BL RL	BL RL
<i>Lampsilis reeviana brittsi</i>		Northern broken-ray	B	B,R	B	BL RL	BL RL
<i>Lampsilis reeviana brevicula</i>		Ozark broken-ray	B			BL	BL
<i>Lampsilis teres</i>		Yellow sandshell				BD	--
<i>Lasmigona costata</i>		Fluted-shell	B	B		BL	--
<i>Leptodea fragilis</i>		Fragile papershell			B	BD	--
<i>Ligumia recta</i>	G5: S1S2	Black sandshell	B			BL	BL
<i>Ligumia subrostrata</i>		Pondmussel	B	B		BL	BD
<i>Obliquaria reflexa</i>		Threehorn wartyback				BD	BL*
<i>Pleurobema coccineum</i>		Round pigtoe	R	B	B	BL RL	BL RD
<i>Potamilus alatus</i>		Pink heelsplitter	B			BL RD	BL
<i>Ptychobranchnus occidentalis</i> <sup>3</sup>	G3G4: S2S3	Ouachita kidneyshell				<sup>2</sup> BD	--
<i>Pyganodon</i> (=Anodonta) <i>grandis</i>		Giant floater	B	R	B	BL -	BL RL**
<i>Quadrula metanevra</i>		Monkeyface	B			BL RL	BL RD
<i>Quadrula pustulosa</i>		Pimpleback				BL	BL
<i>Strophitus undulatus</i>		Squawfoot	B	B,R	B	BD -	BL RD
<i>Tritogonia verrucosa</i>		Pistolgrip				BL RD	BL RD
<i>Utterbackia imbecillis</i>		Paper pondshell				BL -	BD RD
<i>Venustaconcha ellipsiformis</i>		Ellipse	B	B,R	B	BL RL	BL RL
<b>Family Corbiculaceae</b>							
<i>Corbicula fluminea</i> (non-native)		Asiatic clam				BL RL	BL RL

<sup>1</sup> Nomenclature follows that of Turgeon et al. (1988) with modifications as suggested by Williams et al. (1992).

Nomenclature used by Oesch (1984) is included in parentheses for cross-referencing.

<sup>2</sup> Identity of *Fusconaia* species in these rivers is questionable. Morphology is more similar to *Fusconaia ozarkensis* than *F. flava*.

<sup>3</sup> Probable misidentification. *Ptychobranchnus occidentalis* probably does not occur anywhere in the Missouri River system.

\* New live record for Big Piney River.

\*\*New live record for Roubidoux Creek.

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Table 2. Species and numbers of freshwater mussels observed at each study site on the Big Piney River, Pulaski and Pelps counties, MO, between June 2004 and July 2004. Site numbers shown in italics are on or adjacent to Fort Leonard Wood (i.e sites BPM7-BPM34) Numbers = live specimens X=dead shell only

SCIENTIFIC NAME <sup>1</sup>	COMMON NAME <sup>1</sup>	BPM1	BPM2	BPM3	BPM4	BPM5	BPM6	BPM7	BPM8	BPM9	BPM10	BPM11	BPM12	BPM13	BPM14	BPM15	BPM16	BPM17	BPM18	BPM19	BPM20	
<i>Actinonaias ligamentina</i>	Mucket	X	139	1	X	X	5	X	X	X		X	X	2	X	X	X	X	X	X	X	
<i>Alasmidonta marginata</i>	Elktoe																					
<i>Amblema plicata</i>	Threeridge		9	X		X	X						X		X		X		X	X		
<i>Cumberlandia monodonta</i>	Spectaclecase			X																		
<i>Cyclonaias tuberculata</i>	Purple wartyback		3	X		2	8															
<i>Elliptio dilatata</i>	Spike		11	X			X								X	X						
<i>Fusconaia sp.</i> <sup>2</sup>	Ozark/Wabash pigtoe		12				X	X														
<i>Lampsilis cardium</i>	Plain pocketbook		4		X											X			X			
<i>Lampsilis reeviana</i>	Northern broken-ray	1	17	X	X		1	1							X				X		X	
<i>Lampsilis siliquoidea</i> (=radiata)	Fatmucket																					
<i>Lampsilis teres</i>	Yellow sandshell																					
<i>Lasmigona costata</i>	Fluted-shell																					
<i>Leptodea fragilis</i>	Fragile papershell																					
<i>Ligumia recta</i>	Black sandshell															X						
<i>Ligumia subrostrata</i>	Pondmussel																			X		
<i>Obliquaria reflexa</i>	Threehorn wartyback																					
<i>Pleurobema coccineum</i>	Round pigtoe		18	X	X	X	2								X							
<i>Potamilus alatus</i>	Pink heelsplitter														X							
<i>Ptychobranthus occidentalis</i> <sup>3</sup>	Ouachita kidneyshell																					
<i>Pyganodon</i> (=Anodonta) <i>grandis</i>	Giant floater																					
<i>Quadrula metanevra</i>	Monkeyface		19			X	1			X												
<i>Quadrula pustulosa</i>	Pimpleback						X															
<i>Strophitus undulatus</i>	Squawfoot																					
<i>Tritogonia verrucosa</i>	Pistolgrip			X		X				X					X							
<i>Utterbackia</i> (=Anodonta) <i>imbecillis</i>	Paper pondshell																					
<i>Venustaconcha ellipsiformis</i>	Ellipse						X	X						X	X	X						
<i>Corbicula fluminea</i> (introduced)	Asiatic clam	A			A	A	A	A		X		X		X	X	A	X	A	A		X	
<b>Total Number of Species per site</b>		3	9	8	5	7	11	5	1	4	0	2	2	3	8	6	3	2	5	3	3	
<b>Site Description</b>		downstream	on left	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle	in middle
<b>water width, m</b>		20	60	10	30	20	40	60	30	10	10	25	35	15	25	10	120	30	10,15	40	100	

<sup>1</sup> Nomenclature follows that of Turgeon et al. (1988) with modifications as suggested by Williams et al. (1992).  
<sup>2</sup> Nomenclature used by Oesch (1984) is included in parentheses for cross-referencing.  
<sup>3</sup> Identity of *Fusconaia* species in these rivers is questionable. Morphology is more similar to *Fusconaia ozarkensis* than *F. flava*.  
<sup>3</sup> Probable misidentification. *Ptychobranthus occidentalis* probably does not occur anywhere in the Missouri River system.

BPM21	BPM22	BPM23	BPM24	BPM25	BPM26	BPM27	BPM28A	BPM28B	BPM28C	BPM28D	BPM29	BPM30	BPM31	BPM32	BPM33	BPM34	BPM35	BPM36	BPM37	BPM38	BPM39	BPM40	BPM41	BPM42
44	X	10	4	X	X		1	X	X	X	7	12	1	X	25	2	34	14	19	X		32	3	2
2																								
X			X				X				3	5		X	8	10	97	3	3	X		1		X
X			15																X			X	1	
			X					X		X		1		X	2	X	6	X	4			X	1	X
1			X								X				X	X	1	X	X			1	1	X
			X					X			X				X							4	1	X
5		2		X			2	X			X	1	X	1	4	1	2	X	1	X		1	X	X
18		1	X				2	X	1			X			4		2	1	X			11	6	
												X				1								
																	1	X	X					
																			1					
5		2	2	X			X	X	X		X	4	X		1	X	50	9	10			5		1
X					2		X				X	1			X	X	4		X				X	
						7		1						6										1
															2	1	X	1	2			2		X
											X				1	X	7	1	X			X	X	
1		1									X						1							
											1	1		X		X	1				X			X
															X									
															X						X		3	2
A	A	A		X	X	A		A	A	A	A	A	X	A	A	A	A	A	A	A		A	A	A

11	2	6	8	4	4	1	7	6	5	3	9	12	5	6	12	14	14	12	13	5	0	12	11	10
----	---	---	---	---	---	---	---	---	---	---	---	----	---	---	----	----	----	----	----	---	---	----	----	----

of river	nd shell on	along left	nd bould	ell on left	right; un	50 river	and on rig	shell throu	left, live	ad shell; tr	vegetation	und on rig	backwat	below est	middle	gate road	nd along	along low	Creek, be	ad shell d	none	ower left	er found	nd upper
5,10	100	25	3,10	100	110	100	40	30	30	30	40	40	10	25	60	35	105	40	30	3	60	20	30	40

Table 3. Summary of freshwater mussels found in the Big Piney River, Pulaski and Phelps counties, MO, between June 2004 and July 2004

SCIENTIFIC NAME <sup>1</sup>	COMMON NAME <sup>1</sup>	Sites on or adjacent to Fort Leonard Wood					All Big Piney sites				
		N live specimens	% of total live specimens	N sites found live or dead	N sites found live	% sites found live	N live specimens	% of total live specimens	N sites found live or dead	N sites found live	% sites found live
<i>Actinonaias ligamentina</i>	Mucket	106	47.5	29	10	35.7	357	42.3	42	19	45.2
<i>Alasmidonta marginata</i>	Elktoe	2	0.9	1	1	3.6	2	0.2	1	1	2.4
<i>Amblema plicata</i>	Threeridge	16	7.2	13	4	14.3	139	16.5	23	9	21.4
<i>Cumberlandia monodonta</i>	Spectaclecase	15	6.7	2	1	3.6	16	1.9	6	2	4.8
<i>Cyclonaias tuberculata</i>	Purple wartyback	3	1.3	7	2	7.1	26	3.1	15	7	16.7
<i>Elliptio dilatata</i>	Spike	1	0.4	6	1	3.6	15	1.8	15	5	11.9
<i>Fusconaia ozarkensis</i> <sup>2</sup>	Ozark/Wabash pigtoe	0	0.0	4	0	~	17	2.0	10	3	7.1
<i>Lampsilis cardium</i>	Plain pocketbook	15	6.7	13	7	25.0	24	2.8	22	11	26.2
<i>Lampsilis reeviana</i>	Northern broken-ray	27	12.1	12	6	21.4	66	7.8	22	13	31.0
<i>Lampsilis siliquoidea</i> (=radiata)	Fatmucket	0	0.0	2	1	3.6	1	0.1	2	1	2.4
<i>Lampsilis teres</i>	Yellow sandshell	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Lasmigona costata</i>	Fluted-shell	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Leptodea fragilis</i>	Fragile papershell	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Ligumia recta</i>	Black sandshell	0	0.0	1	0	0.0	1	0.1	4	1	2.4
<i>Ligumia subrostrata</i>	Pondmussel	0	0.0	1	0	0.0	0	0.0	1	0	0.0
<i>Obliquaria reflexa</i>	Threehorn wartyback	0	0.0	0	0	0.0	1	0.1	1	1	2.4
<i>Pleurobema coccineum</i>	Round pigtoe	14	6.3	13	5	17.9	109	12.9	23	12	28.6
<i>Potamilus alatus</i>	Pink heelsplitter	3	1.3	8	2	7.1	7	0.8	11	3	7.1
<i>Ptychobranthus occidentalis</i> <sup>3</sup>	Ouachita kidneyshell	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Pyganodon</i> (=Anodonta) <i>grandis</i>	Giant floater	14	6.3	3	3	10.7	15	1.8	4	4	9.5
<i>Quadrula metanevra</i>	Monkeyface	2	0.9	3	2	7.1	28	3.3	11	7	16.7
<i>Quadrula pustulosa</i>	Pimpleback	1	0.4	3	1	3.6	9	1.1	9	3	7.1
<i>Strophitus undulatus</i>	Squawfoot	2	0.9	3	2	7.1	3	0.4	4	3	7.1
<i>Tritogonia verrucosa</i>	Pistolgrip	2	0.9	6	2	7.1	3	0.4	11	3	7.1
<i>Utterbackia</i> (=Anodonta) <i>imbecillis</i>	Paper pondshell	0	0.0	1	0	0.0	0	0.0	0	0	0.0
<i>Venustaconcha ellipsiformis</i>	Ellipse	0	0.0	5	0	0.0	5	0.6	9	2	4.8
<i>Corbicula fluminea</i> (introduced)	Asiatic clam	A	A	24	16	57.1	A	A	34	26	61.9
Total Number of Species	27 + clam	16	~	22	17	~	20	~	22	21	~
Total Number of Specimens		223	~	~	~	~	844	~	~	~	~
Total Number of Sites		~	~	28	28	~	~	~	42	42	~

<sup>1</sup> Nomenclature follows that of Turgeon et al. (1988) with modifications as suggested by Williams et al. (1992).

Nomenclature used by Oesch (1984) is included in parentheses for cross-referencing.

<sup>2</sup> Identity of *Fusconaia* species in these rivers is questionable. Morphology is more similar to *Fusconaia ozarkensis* than *F. flava*.

<sup>3</sup> Probable misidentification. *Ptychobranthus occidentalis* probably does not occur anywhere in the Missouri River system.

**Table 4. Species and numbers of freshwater mussels observed at each study site on Roubidoux Creek, between June 2004 and July 2004.**

**Site numbers shown in italics are on or adjacent to Fort Leonard Wood (i.e sites RM-3 - RM-13)**

**Numbers = live specimens, X=dead shell only, A=live but not enumerated**

SCIENTIFIC NAME <sup>1</sup>	COMMON NAME <sup>1</sup>	RM - 1	RM - 2	RM - 3	RM - 4	RM - 5	RM - 6	RM - 7	RM - 8	RM - 9	RM - 10	RM - 11	RM - 12	RM - 13
<i>Actinonaias ligamentina</i>	Mucket													
<i>Alasmidonta marginata</i>	Elktoe													
<i>Amblema plicata</i>	Threeridge					X	X	X	X			X		
<i>Cumberlandia monodonta</i>	Spectaclecase													
<i>Cyclonaias tuberculata</i>	Purple wartyback													
<i>Elliptio dilatata</i>	Spike					5		X	7	1		X		
<i>Fusconaia sp.</i> <sup>2</sup>	Ozark/Wabash pigtoe								5					
<i>Lampsilis cardium</i>	Plain pocketbook		X		X	4	6	6	3	1		X		
<i>Lampsilis reeviana</i>	Northern broken-ray	1	1		3	1	2	1	X	2			X	
<i>Lampsilis siliquoidea (=radiata)</i>	Fatmucket		53		2	14	20	15	X	41		X		
<i>Pleurobema coccineum</i>	Round pigtoe				X				X					
<i>Potamilus alatus</i>	Pink heelsplitter													
<i>Quadrula metanevra</i>	Monkeyface							X						
<i>Tritogonia verrucosa</i>	Pistolgrip											X		
<i>Pyganodon grandis</i>	Giant floater	13								2				
<i>Strophitus undulatus</i>	Squawfoot											X		
<i>Utterbackia imbecillis</i>	Paper pondshell						X							
<i>Venustaconcha ellipsiformis</i>	Ellipse		X					7	1					
<i>Corbicula fluminea</i> (introduced)	Asiatic clam	X	X		X	X	A	A	A	A	X	X	X	X
<b>Total Number of Species</b>	19 + clam	3	5	0	5	6	6	8	9	6	2	7	2	1
<b>Site Description</b>		upstream	found arc	none fou	found do	found alc	found alc	found alc	found alc	found in	dead she	dead she	dead cla	dead clar
<b>wetted width, m</b>		30	20	5	5	20	30	20	10	5,20	10	10	3	15

<sup>1</sup> Nomenclature follows that of Turgeon et al. (1988) with modifications as suggested by Williams et al. (1992).

Nomenclature used by Oesch (1984) is included in parentheses for cross-referencing.

<sup>2</sup> Identity of *Fusconaia* species in these rivers is questionable. Morphology is more similar to *Fusconaia ozarkensis* than *F. flava*.

Table 5. Summary of freshwater mussels found in Roubidoux Creek, Pulaski and Texas counties, MO, between June 2004 and July 2004.

SCIENTIFIC NAME <sup>1</sup>	COMMON NAME <sup>1</sup>	Sites on or adjacent to Fort Leonard Wood					All Roubidoux Creek sites				
		N live specimens	% of total live specimens	N sites found live or dead	N sites found live	% sites found live	N live specimens	% of total live specimens	N sites found live or dead	N sites found live	% sites found live
<i>Actinonaias ligamentina</i>	Mucket	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Alasmidonta marginata</i>	Elktoe	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Amblema plicata</i>	Threeridge	0	0.0	5	0	0.0	0	0.0	5	0	0.0
<i>Cumberlandia monodonta</i>	Spectaclecase	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Cyclonaias tuberculata</i>	Purple wartyback	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Elliptio dilatata</i>	Spike	13	8.7	5	3	27.3	13	6.0	5	3	23.1
<i>Fusconaia sp.</i> <sup>2</sup>	Ozark/Wabash pigtoe	5	3.4	1	1	9.1	5	2.3	1	1	7.7
<i>Lampsilis cardium</i>	Plain pocketbook	20	13.4	7	5	45.5	20	9.2	9	5	38.5
<i>Lampsilis reeviana</i>	Northern broken-ray	9	6.0	7	5	45.5	11	5.1	9	7	53.8
<i>Lampsilis siliquioidea</i> (=radiata)	Fatmucket	92	61.7	7	5	45.5	145	66.8	8	6	46.2
<i>Pleurobema coccineum</i>	Round pigtoe	0	0.0	2	0	0.0	0	0.0	2	0	0.0
<i>Potamilus alatus</i>	Pink heelsplitter	0	0.0	0	0	0.0	0	0.0	0	0	0.0
<i>Quadrula metanevra</i>	Monkeyface	0	0.0	1	0	0.0	0	0.0	1	0	0.0
<i>Tritogonia verrucosa</i>	Pistolgrip	0	0.0	1	0	0.0	0	0.0	1	0	0.0
<i>Pyganodon grandis</i>	Giant floater	2	1.3	1	1	9.1	15	6.9	2	2	15.4
<i>Strophitus undulatus</i>	Squawfoot	0	0.0	1	0	0.0	0	0.0	1	0	0.0
<i>Utterbackia imbecillis</i>	Paper pondshell	0	0.0	1	0	0.0	0	0.0	1	0	0.0
<i>Venustaconcha ellipsiformis</i>	Ellipse	8	5.4	2	2	18.2	8	3.7	3	2	15.4
<i>Corbicula fluminea</i> (introduced)	Asiatic clam	A	~	10	4	~	A	~	12	4	~
Total Number of Species	19+ clam	8	~	15	8	~	8	~	15	8	~
Total Number of Specimens		149	~	~	~	~	217	~	~	~	~
Total Number of Sites		~	~	11	11	~	~	~	13	13	~

<sup>1</sup> Nomenclature follows that of Turgeon et al. (1988) with modifications as suggested by Williams et al. (1992).

Nomenclature used by Oesch (1984) is included in parentheses for cross-referencing.

<sup>2</sup> Identity of *Fusconaia* species in these rivers is questionable. Morphology is more similar to *Fusconaia ozarkensis* than *F. flava*.

**Table 6. Globally and state-listed freshwater mussels found during surveys of FLW, Big Piney River, and Roubidoux Creek in Pulaski, Phelps, and Texas counties, between June 2004 and July 2004.**

		STATUS						
SCIENTIFIC NAME	COMMON NAME	GLOBAL STATE	T	R	S	DATE OBS.	COMMENTS	
<i>Alasmidonta marginata</i>	Elktoe	G4 S2?	35N	10W	29	7/14/2004	Big Piney River; BPM 21; two live specimens	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	34N	10W	5	7/7/2004	Big Piney River; BPM 02; one shell	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	34N	10W	5	7/7/2004	Big Piney River; BPM 03; one shell	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	35N	10W	29	7/14/2004	Big Piney River; BPM 21; one shell	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	35N	10W	29	6/29/2004	Big Piney River; BPM 24; fifteen live specimens	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	35N	10W	10	6/24/2004	Big Piney River at Spring Creek; BPM 37; one shell	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	35N	10W	10	6/23/2004	Big Piney River, BPM 40; one shell	
<i>Cumberlandia monodonta</i>	Spectaclecase	G2G3 S3	35N	10W	7	6/23/2004	Big Piney River; BPM 41; one live specimen	
<i>Ligumia recta</i>	Black sandshell	G5 S1S2	35N	10W	30	7/13/2004	Big Piney River; BPM 15; one shell	
<i>Ligumia recta</i>	Black sandshell	G5 S1S2	35N	10W	8	6/24/2004	Big Piney River; BPM 35; one live specimen	
<i>Ligumia recta</i>	Black sandshell	G5 S1S2	35N	10W	10	6/24/2004	Big Piney River; BPM 36; one shell	
<i>Ligumia recta</i>	Black sandshell	G5 S1S2	35N	10W	10	6/24/2004	Big Piney River; BPM 37; one shell	

**FIGURES**



Figure 1. Site BPM05. The river channel has changed course and left many mussels stranded.





Figure 2. Site BPM05. Example of dead mussel in situ.



Figure 3. Site BPM05. View of present channel, point bar and eroding cut bank.





Figure 4. Site BPM06. Extensive deposit of dead shell in channel.



Figure 5. Site BPM21. Relatively abundant live mussels were found at this site, including live elktoe.





Figure 6. Site BPM21. Live catch.



Figure 7. Site BPM21. Two live elktoe.





Figure 8. Site BPM 24. Fifteen live spectaclecase and twenty-one dead shells were found.



Figure 9. Site BPM 24. Live individuals all appeared to be old.





Figure 10. Site BPM41. Live juvenile hellbender. A rare find!

End.