



Freshwater Mussel Surveys in the Navigational Pools of the Allegheny River

2005 – 2007

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Pennsylvania Natural Heritage Program/
Western Pennsylvania Conservancy



Introduction



- Approximately 300 species of freshwater mussels are found in North America
- Provide community services
- Over two-thirds of NA mussels are considered imperiled



Freshwater Mussel Surveys - Introduction - Allegheny River: 2005-2007

- Historically nearly 40 species of native mussels in the lower Allegheny River
- Dams constructed from 1927-1938
- Few surveys have occurred since that time
- Improving water quality
- Rare mussel species occur in the upper portions of the Allegheny basin
- Dams provide a barrier to migration
- Sand and gravel dredging

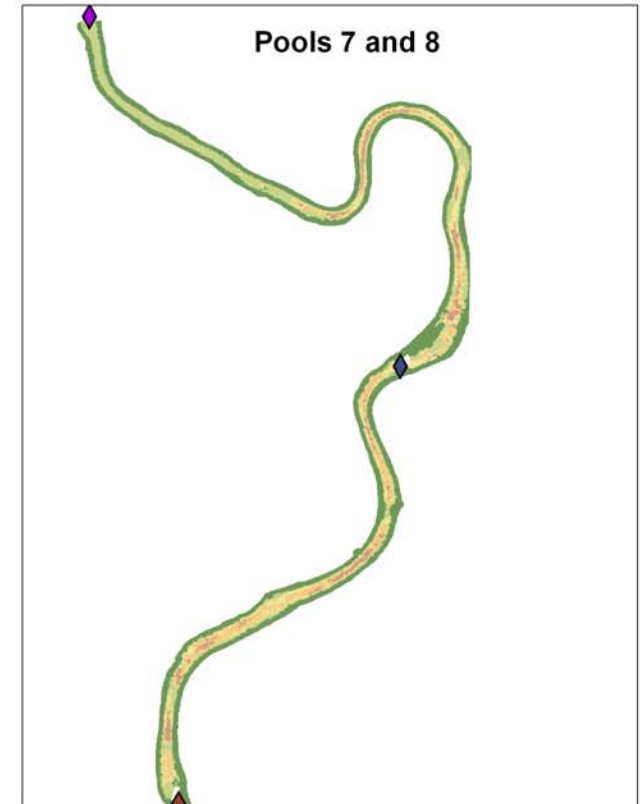
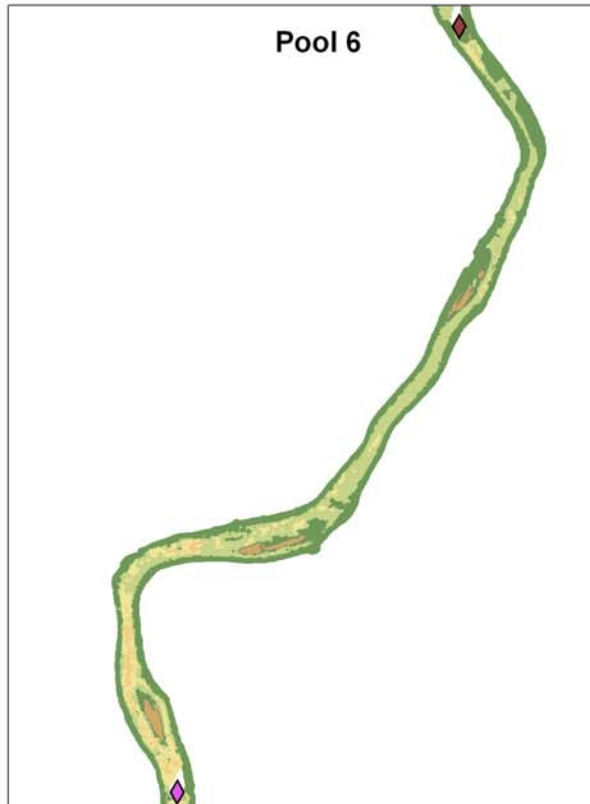
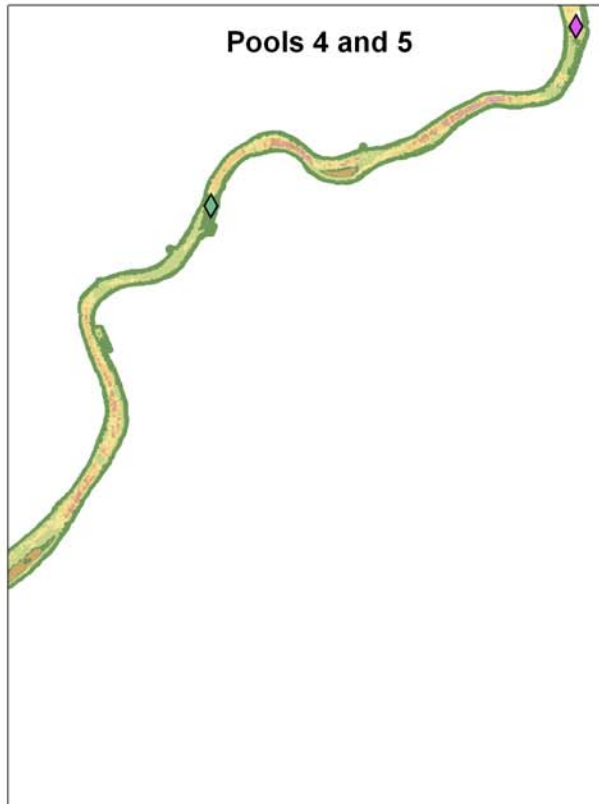


Freshwater Mussel Surveys - **Methods** - Allegheny River: 2005-2007

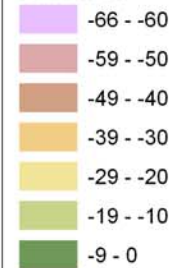
- Ohio River Valley Ecosystem Team (ORVET) (2004) protocol
- Scuba dive team pairs
- 100-meter transects perpendicular to flow divided into 10-m segments
- Minimum 10 minute search time in each segment
- Substrate assessment and depth of each segment
- 2006 surveys in areas permitted for dredging
- 2007 surveys in areas with shallow depths
- Bathymetry work completed by Eric Chapman, Eli Long and others (WPC) in 2007



Allegheny River Bathymetry



Elevation



Dam



Freshwater Mussel Surveys - Results- Allegheny River: 2005-2007

Pool	4	5	6	7	8	Total All Pools
No. Transects	6	8	31	10	20	75
Species Richness (Live)						
Max	3	8	10	10	10	
Mean	1.8	5.5	6.2	5.1	4.2	
SE Mean	0.3	0.8	0.4	1.2	0.9	
<i>Pool Total</i>	6	10	17	11	13	21
Abundance (Live)						
Max	5	208	262	463	492	
Mean	2.8	62.4	69.3	115.0	133.3	
SE Mean	0.6	23.9	11.7	174.1	39.7	
<i>Pool Total</i>	17	426	2145	1150	2665	6403

Freshwater Mussel Surveys - Results - Allegheny River: 2005-2007

Species	G Rank	S Rank	Pool Presence Incl. Dead
<i>A. ligamentina</i>	G5	S5	4 5 6 7 8
<i>A. marginata</i>	G4	S4	6 7 8
* <i>A. plicata</i>	G5	S2 S3	7
<i>E. dilatata</i>	G5	S4	4 5 6 7 8
<i>E. t. rangiana</i>	G2 T2	S2	8
<i>D. polymorpha</i>	Invasive	Invasive	5 6
<i>F. flava</i>	G5	S2	5 6 7 8
<i>F. subrotunda</i>	G3	S1	4 6
<i>L. cardium</i>	G5	S4	5 6 7 8
<i>L. fasciola</i>	G5	S4	8
<i>L. ovata</i>	G5	S3 S4	6 7 8
<i>L. siliquioidea</i>	G5	S4	4 5 6 7 8
<i>L. costata</i>	G5	S4	5 6 7 8

Species	G Rank	S Rank	Pool Presence Incl. Dead
<i>L. fragilis</i>	G5	S2	4 5 6 7 8
<i>L. recta</i>	G5	S3 S4	4 5 6 7 8
<i>P. clava</i>	G2	S1 S2	7
<i>P. sintoxia</i>	G4	S2	5 6
<i>P. alatus</i>	G5	S2	4 5 6 7
* <i>P. ohioensis</i>	G5	SNR	4
<i>P. fasciolaris</i>	G4 G5	S4	6
<i>P. grandis</i>	G5	S4	4 6
<i>S. ambigua</i>	G3	S1	5 6
<i>S. undulatus</i>	G5	S4 S5	6 8
<i>V. fabalis</i>	G1 G2	S1 S2	6 7 8
* <i>Villosa iris</i>	G5	S1	6

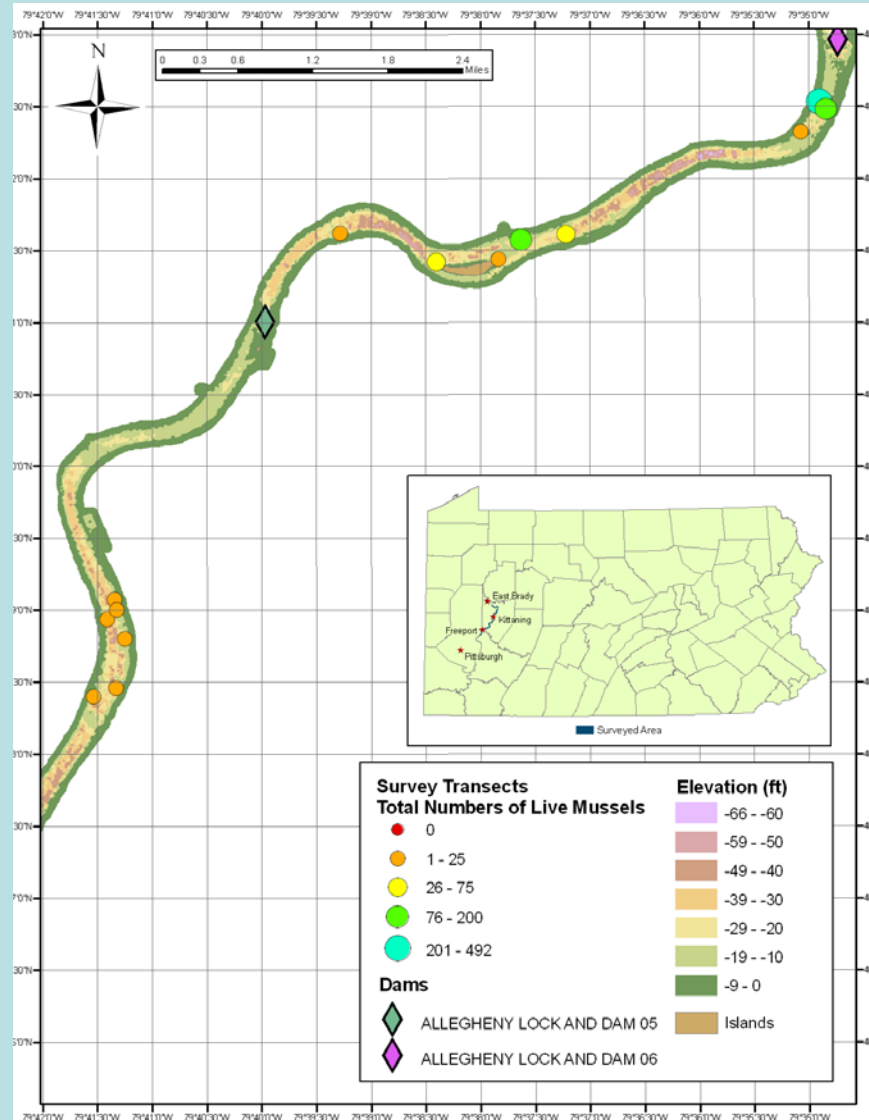
* Only found as dead shells

Key to Global and State Ranks

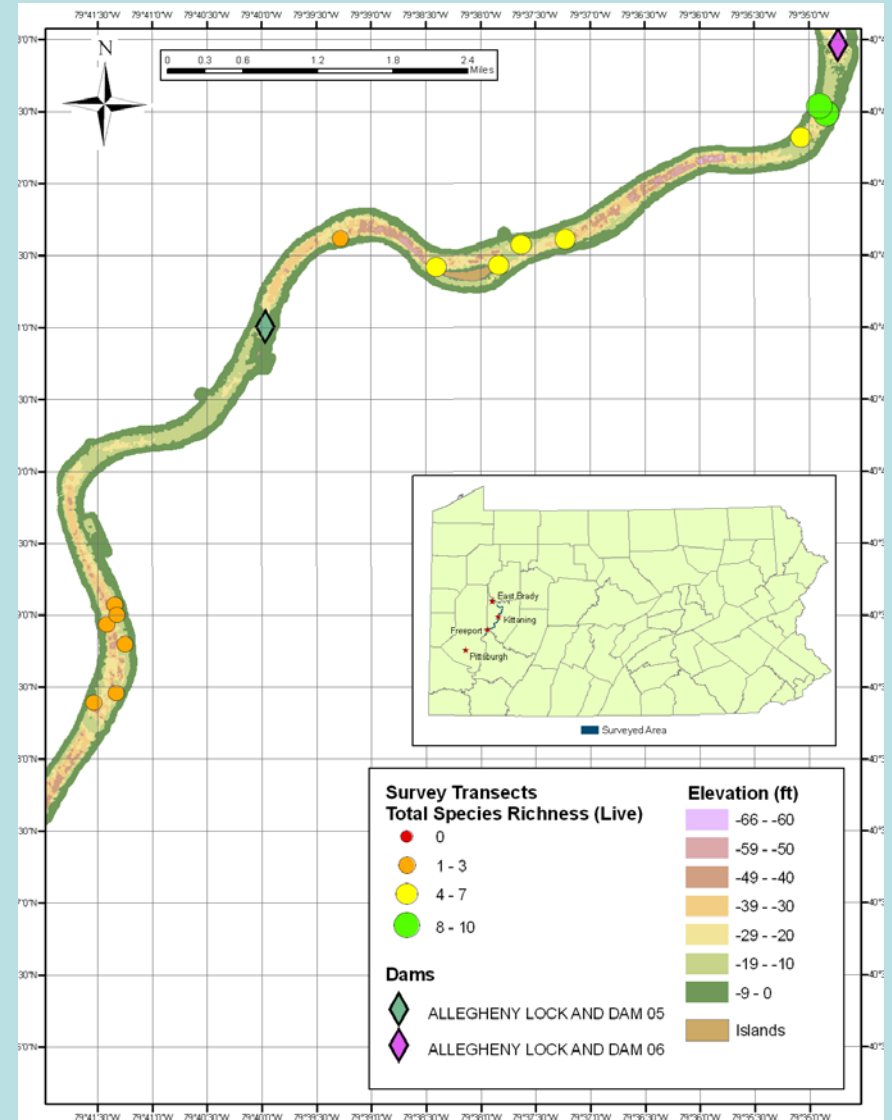
G5=Secure, G4=Apparently Secure, G3=Vulnerable, G2=Imperiled, G1=Critically Imperiled
 S5=Secure, S4=Apparently Secure, S3=Vulnerable, S2=Imperiled, S1=Critically Imperiled



Transects in Pools 4 and 5

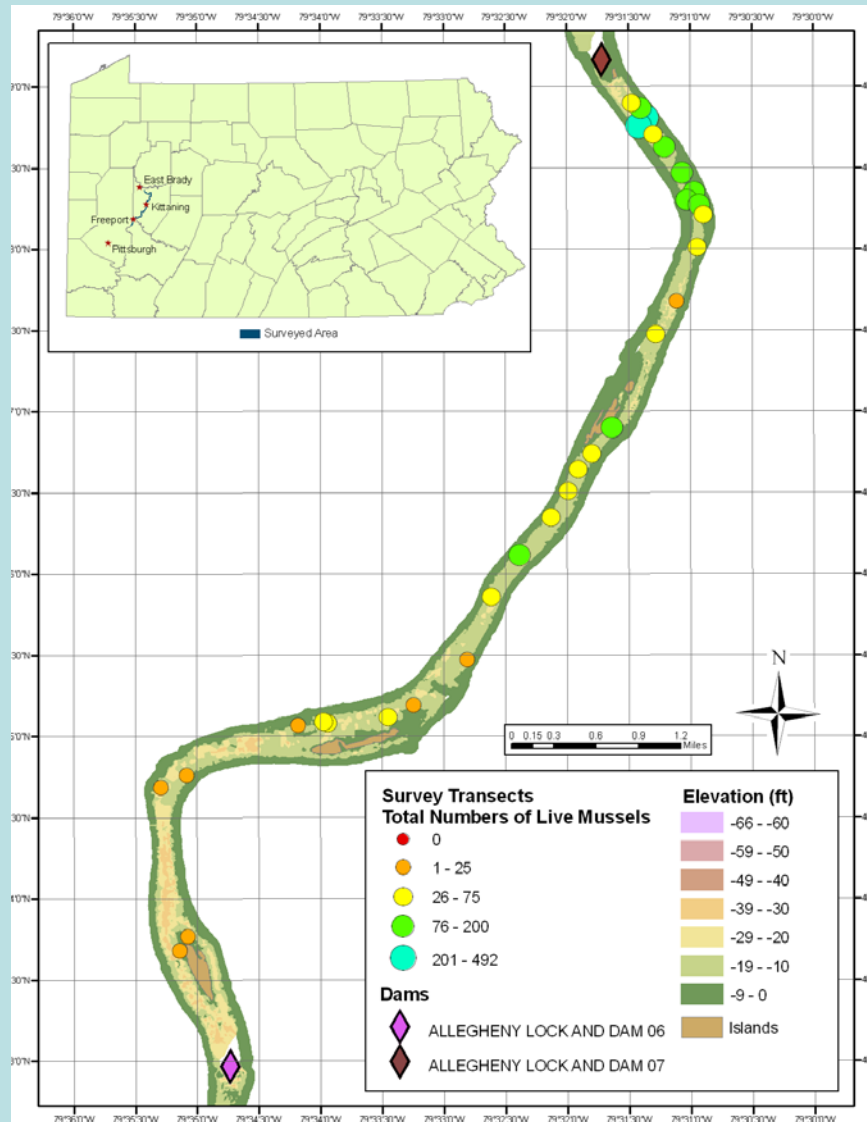


Total Number of Live Mussels

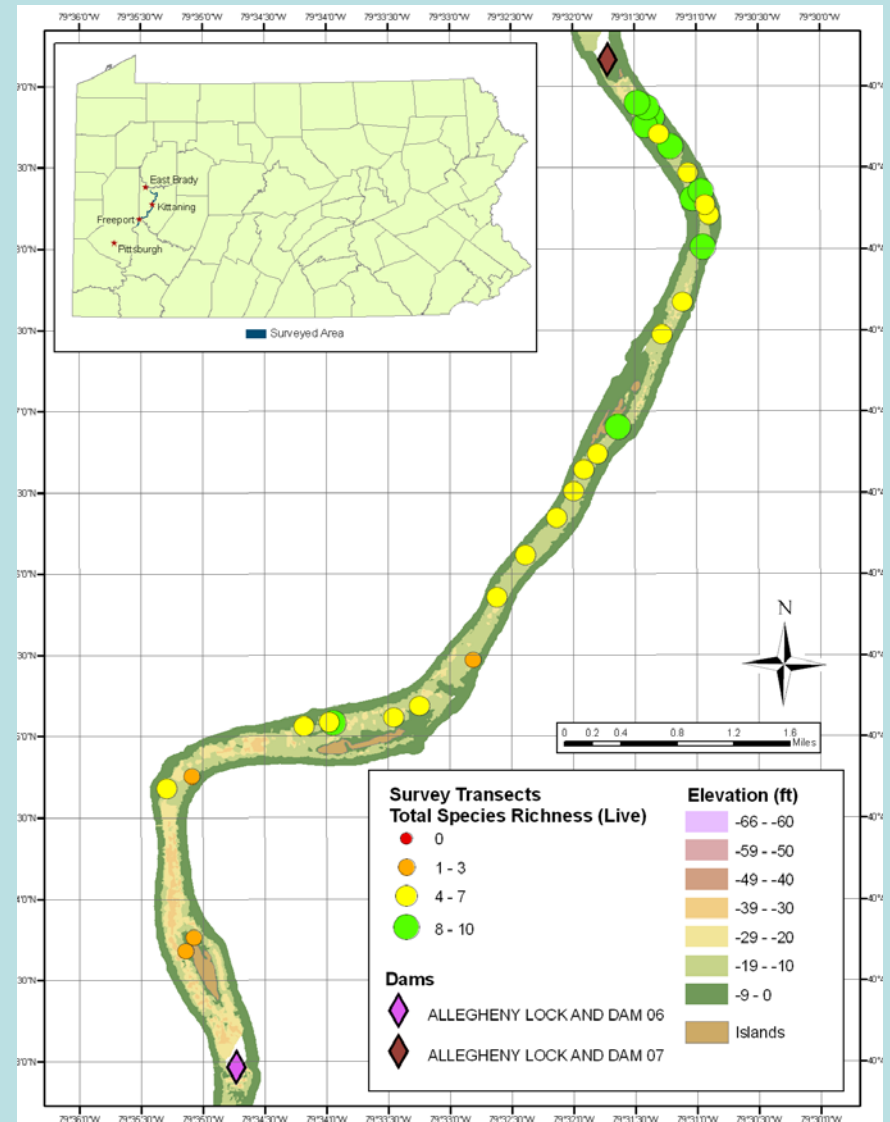


Species Richness

Transects in Pool 6

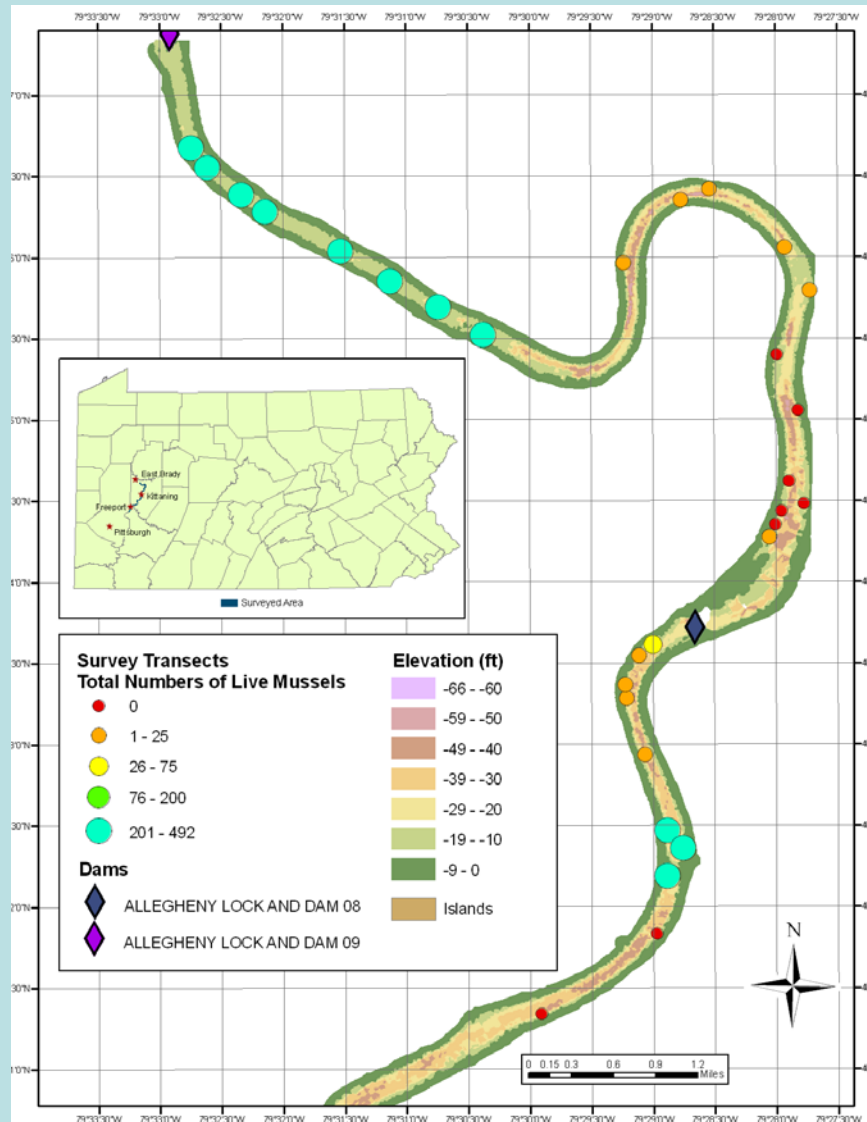


Total Number of Live Mussels

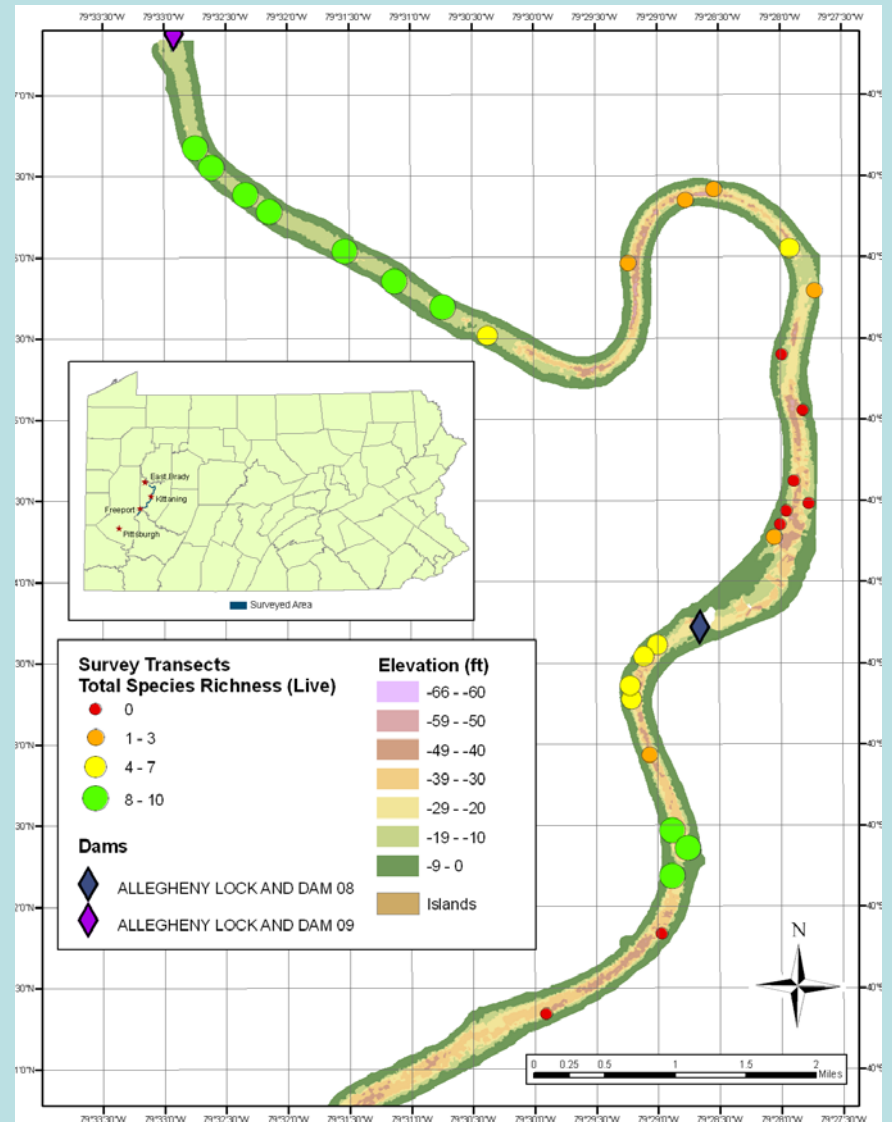


Species Richness

Transects in Pools 7 and 8

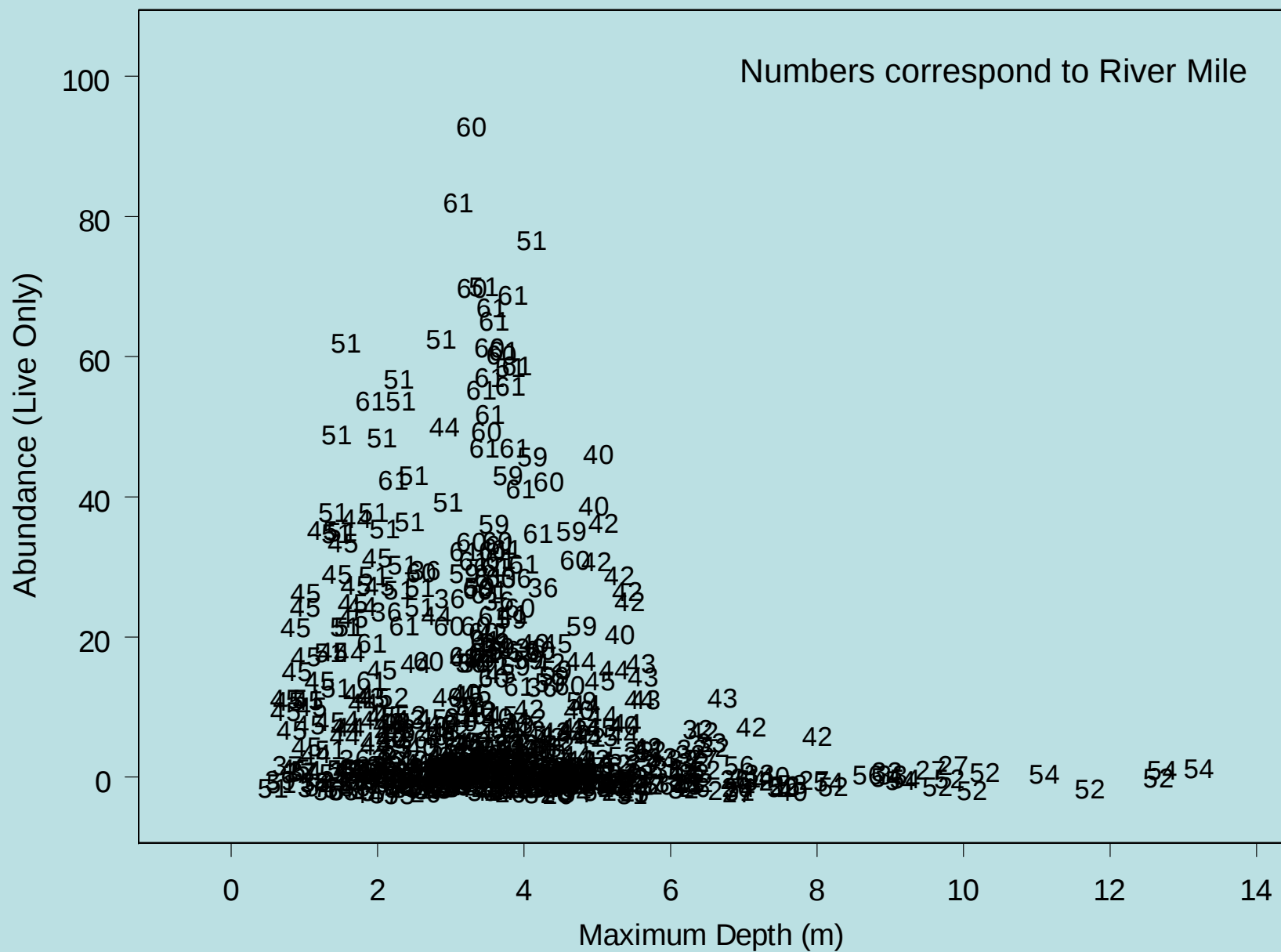


Total Number of Live Mussels

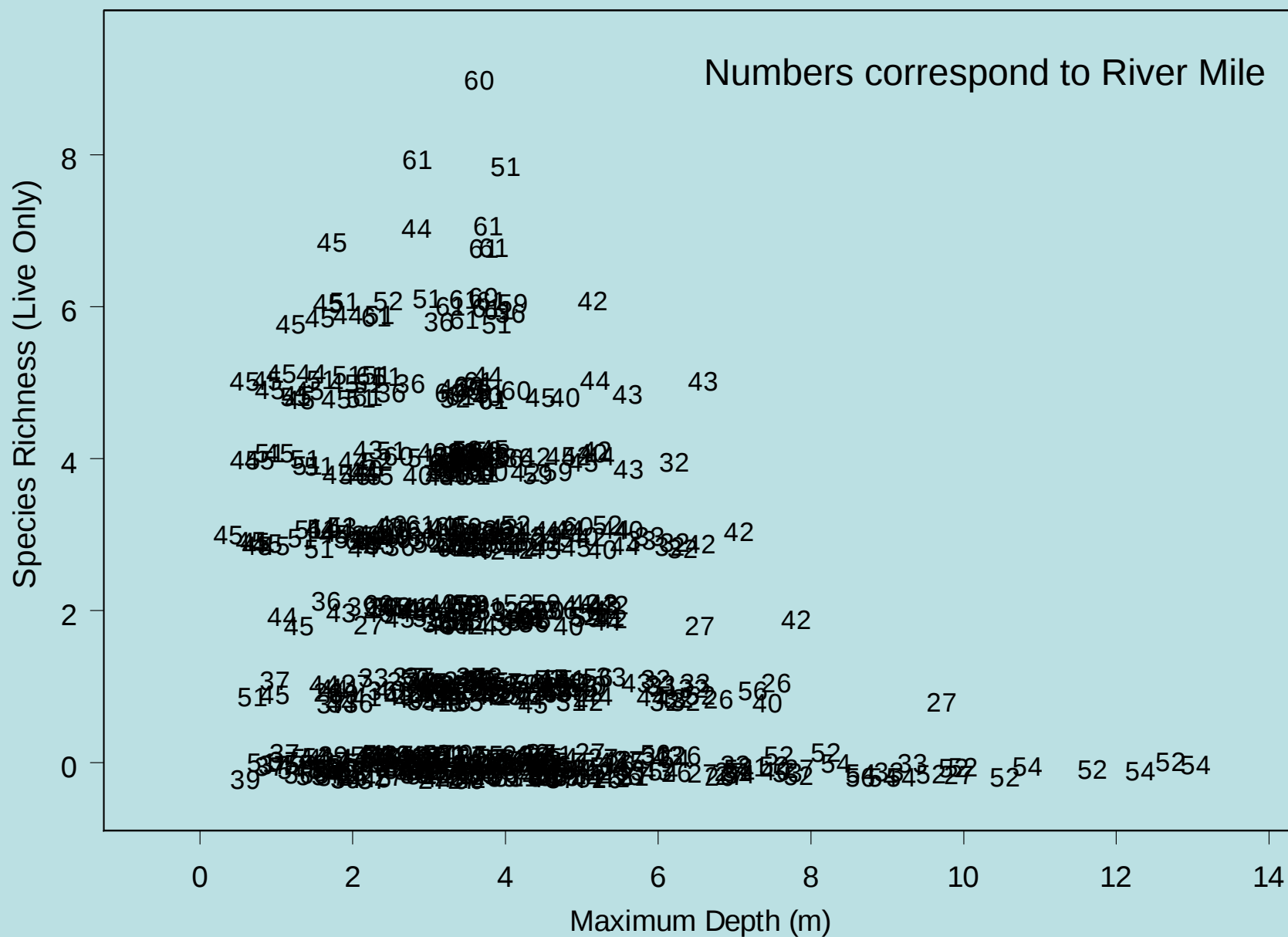


Species Richness

Total Abundance for each 10-m segment by Maximum Depth

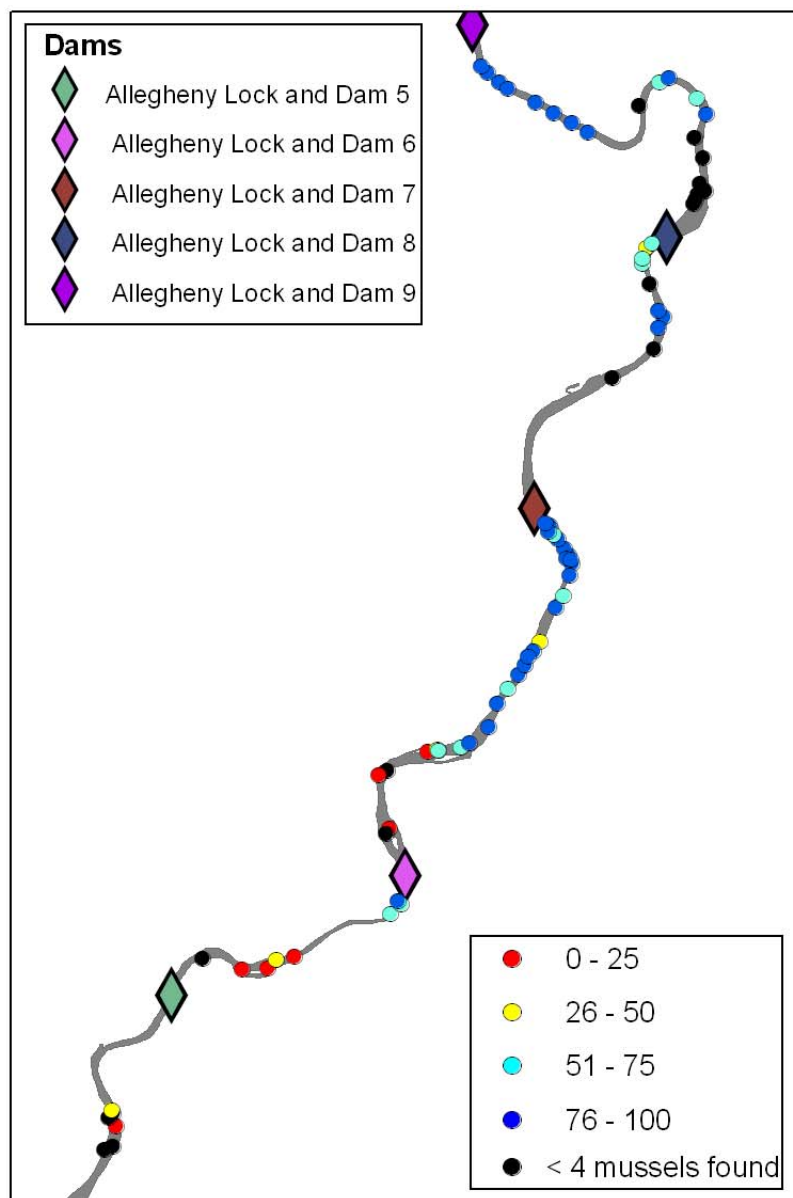


Species Richness for each 10-m Segment by Maximum Depth

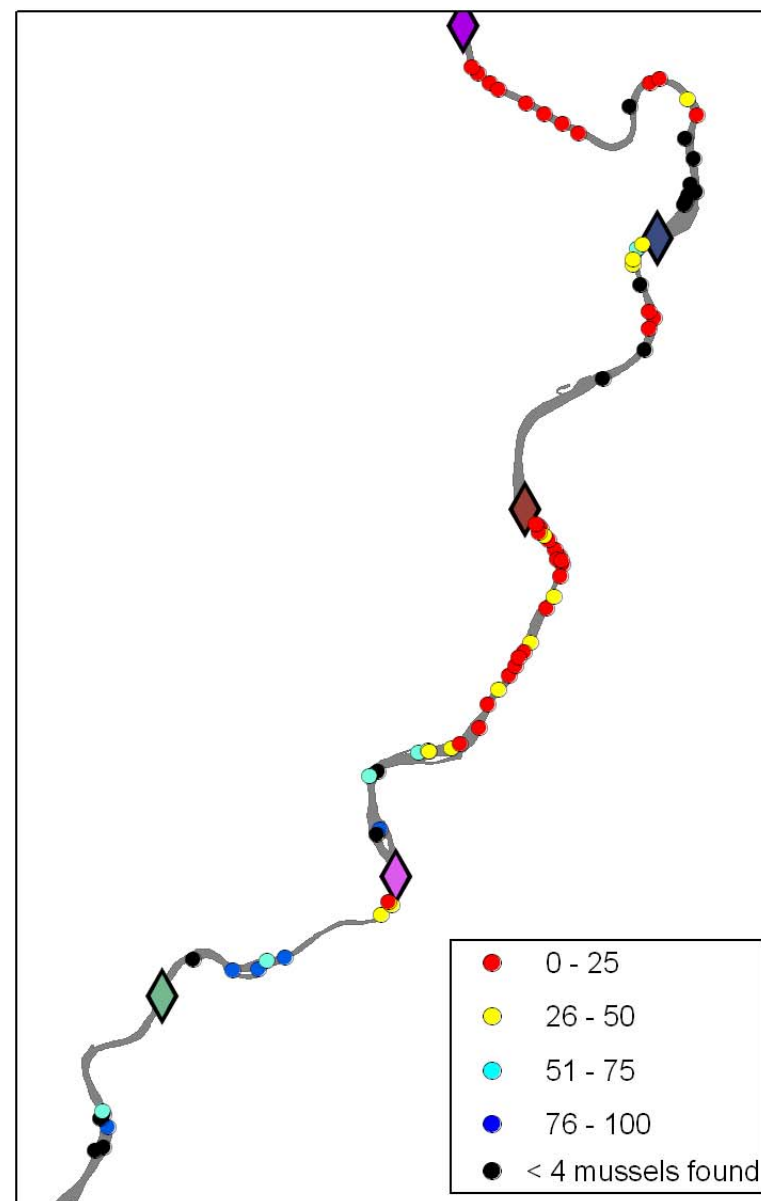


Pennsylvania Natural Heritage Program (PNHP) 5-Mar-07		Riverine	Facultative	Primarily
Scientific Name	Common Name	(lotic)	Riverine	lentic
<i>Actinonaias ligamentina</i>	Mucket	X	(x)	
<i>Alasmidonta marginata</i>	Elktoe	X		
<i>Amblema plicata</i>	Three-ridge		X	
<i>Elliptio dilatata</i>	Spike	X		
<i>Epioblasma torulosa rangiana</i>	Northern Riffleshell	X		
<i>Fusconaia flava</i>	Wabash Pigtoe		X	
<i>Fusconaia subrotunda</i>	Long-solid	X		
<i>Lampsilis cardium</i>	Plain Pocketbook		X	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	X		
<i>Lampsilis ovata</i>	Pocketbook	X		
<i>Lampsilis siliquoidea</i>	Fatmucket		X	
<i>Lasmigona costata</i>	Fluted-shell		X	
<i>Leptodea fragilis</i>	Fragile Papershell		X	
<i>Ligumia recta</i>	Black Sandshell	X		
<i>Pleurobema clava</i>	Clubshell	X		
<i>Pleurobema sintoxia</i>	Round Pigtoe	X		
<i>Potamilus alatus</i>	Pink Heelsplitter		X	
<i>Potamilus ohioensis</i>	Pink Papershell		X	
<i>Ptychobranhus fasciolaris</i>	Kidneyshell	X		
<i>Pyganodon grandis</i>	Giant Floater			X
<i>Simpsonaias ambigua</i>	Salamander Mussel		X	
<i>Strophitus undulatus</i>	Creeper		X	
<i>Villosa fabalis</i>	Rayed Bean Mussel	X		
<i>Villosa iris</i>	Rainbow Mussel	X		
Total Number of Species		14	10	1

Charles Bier and
Robert Anderson



Percent Riverine Mussels



Percent Facultative/Lentic Mussels

Freshwater Mussel Surveys - Discussion - Allegheny River: 2005-2007

- Higher abundance and species richness in shallow areas
- Areas that were dredged were deep and had only silt, boulder, and bedrock substrate
- Preliminary statistical analysis results indicate that percent silt, cobble and maximum dept are significant predictors of abundance and species richness



Acknowledgements

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