Appendix Q
Biological Data Analyses for Alternative 2

Table Q-1. Summary of benthic macroinvertebrate metrics calculated for each sample collected October 1999.

Pool	Transect	Individuals	Taxa	Chironomid Genera	Oligochaete Genera	% Oligochaete	% Dominance	% Hexagenia	% Corbicula
8	Dredged	116	8	1	5	71.6	59.5	13.8	1.7
8	Dredged	76	7	2	5	89.5	76.3	6.6	0.0
8	Dredged	17	7	2	2	23.5	41.2	17.6	41.2
8	Pipeline	57	10	5	3	52.6	35.1	29.8	7.0
8	Pipeline	46	8	1	4	52.2	34.8	34.8	8.7
8	Pipeline	36	9	3	3	30.6	52.8	52.8	5.6
8	Control	56	8	2	4	51.8	30.4	25.0	14.3
8	Control	No data - inadvertently combined with first Control sample							
8	Control	No data - inadvertently combined with first Control sample							
7	Dredged	27	2	0	1	7.4	92.6	92.6	0.0
7	Dredged	37	11	6	1	13.5	56.8	56.8	2.7
7	Dredged	35	8	2	3	31.4	54.3	54.3	5.7
7	Pipeline	8	4	0	0	0.0	5.0	5.0	0.0
7	Pipeline	19	4	0	2	26.3	52.6	52.6	21.1
7	Pipeline	19	7	1	1	15.8	31.6	31.6	26.3
7	Control	21	7	2	1	23.8	47.6	47.6	9.5
7	Control	49	13	5	3	24.5	38.8	6.1	38.8
7	Control	34	7	0	1	5.9	61.8	14.7	61.8
4	Dredged	12	3	0	0	0.0	58.3	58.3	0.0
4	Dredged	23	4	2	0	0.0	73.9	73.9	0.0
4	Dredged	26	3	0	0	0.0	92.3	3.8	0.0
4	Pipeline	10	3	1	0	0.0	80.0	0.0	0.0
4	Pipeline	34	7	0	3	20.6	70.6	2.9	70.6
4	Pipeline	36	6	0	1	2.8	77.8	8.3	77.8
4	Control	35	11	4	3	11.4	25.7	25.7	25.7
4	Control	42	10	4	3	14.3	31.0	31.0	31.0
4	Control	26	5	1	2	19.2	57.7	19.2	57

Table Q-2. Summary of native mussel data collected in 300 ft long diving transects, October 1999.

Position	Transect	Number of Mussels	Number of Species	Species (count)	Average Length (mm) (min - max)
Pool 4 RM 26.1	Dredged	0	0	---	---
Pool 4 RM 26.2	Relatively Undredged	0	0	---	---
Pool 4 RM 26.3	Pipeline	1	1	Fragile papershell (1)	145 (NA)
Pool 7 RM 46.7	Dredged	1	1	Mucket (1)	132 (NA)
Pool 7 RM 46.8	Relatively Undredged	5	2	Spike (4) Mucket (1)	102 (78 - 124)
Pool 7 RM 47.1	Pipeline	9	4	Fluted shell (2) Spike (5) Mucket (1) Fat Mucket (1)	116 (98 - 150)
Pool 8 RM 54.4	Dredged	0	0	---	---
Pool 8 RM 54.6	Relatively Undredged	0	0	---	---
Pool 8 RM 54.7	Pipeline	0	0	---	---

Table Q-3. Fish species-habitat associations for Allegheny and Ohio River fishes determined by Canonical Correspondence analysis (Normandeau Associates 1997).

Margin-lacustrine – Most suitable habitat conditions along the river margin in the lacustrine setting characteristics of the lower reaches of a navigation pool, as well as in flooded tributary mouths and embayments.			
Species	**Lifestage**	**Species**	**Lifestage**
Bowin	A		
Margin-generalist – Habitat descriptions indicate an association with near-shore areas of rivers and lakes. Cases within this group all share an association with shallow water, usually with some type of cover, and have either wide tolerances for different substrates or key on specific substrates that may be patchily distributed in real navigation pools. The group includes many cases for which emergent or submergent aquatic vegetation is an important habitat condition.			
Species	**Lifestage**	**Species**	**Lifestage**
longnose gar	S E	shortnose gar	S E J A
spotted gar	S E J A	bowfin	S E J
northern pike	S E J A	muskellunge	S E J A
grass pickerel	S E J A	gizzard shad	S E
goldfish	S E	common carp	S E
golden shiner	S E J	central stoneroller	J A
creek chub	S E J A	redfin shiner	S E J A
emerald shiner	S E	river shiner	S E
spottail shiner	S E J	brook silverside	S
banded killifish	S E	green sunfish	S E J
pumpkinseed	S E J	bluegill	S E
redear sunfish	S E J A	longear sunfish	S E J A
orangespotted sunfish	S E J A	warmouth	S E J
rock bass	S E J	spotted bass	S E
largemouth bass	S E J	smallmouth bass	S E

S = spawning, E = early life history, J = juvenile, A = adult

Table Q-3. Fish species-habitat associations for Allegheny and Ohio River fishes determined by Canonical Correspondence analysis (Normandeau Associates 1997) (cont'd).

Species	Lifestage	Species	Lifestage
logperch	E		
Margin-riverine – These show an association with the near-shore river margin and with riverine conditions. Suitable habitat conditions would be encountered in shallow river margins in tailwaters below navigation dams.			
Species	**Lifestage**	**Species**	**Lifestage**
bigeye chub	S E J A	orangethroat darter	S E J A
General-riverine – These are associated with conditions typical of upstream areas in navigation pools, particularly tailwaters. Generally the habitat description for these cases indicate a tolerance for both shallow and deep water, as long as current velocity remains moderate to strong and substrates are either coarse or are swept free of silt.			
Species	**Lifestage**	**Species**	**Lifestage**
speckled chub	J A	central stoneroller	S E
striped shiner	S E J A	common shiner	S E J A
rosyface shiner	S E J A	silver shiner	S E J
spotted sucker	S E	stonecat	A
banded darter	S E J A	variegate darter	S E J A
tippecanoe darter	S E J A	fantail darter	S E J A
greenside darter	S E J A	blackside darter	S E
channel darter	S	gilt darter	S E
sauger	S E	walleye	S E
Channel-riverine – Habitat descriptions for these are indicative of conditions found in the main channels of large, deep rivers. Many are the spawning and early-life stages of obligate riverine species which were negatively impacted by the navigation system and for which suitable habitat conditions are now largely confined to tailwaters.			
Species	**Lifestage**	**Species**	**Lifestage**
shovelnose sturgeon	S E	lake sturgeon	S
paddlefish	S	skipjack herring	S E

S = spawning, E = early life history, J = juvenile, A = adult

Table Q-3. Fish species-habitat associations for Allegheny and Ohio River fishes determined by Canonical Correspondence analysis (Normandeau Associates 1997) (cont'd).

Species	Lifestage	Species	Lifestage
river chub	S E J A	speckled chub	S E
blue sucker	S E	northern hog sucker	S E
river redhorse	S E	golden redhorse	S E J
silver redhorse	S E	shorthead redhorse	S E
black redhorse	S E	stonecat	S E J
mountain madtom	S E J A	trout-perch	S E
white bass	S	gilt darter	J A
sharpnose darter	S E J A	river darter	S E J A
longhead darter	S E J A	rainbow darter	S E J A
bluebreast darter	S E J A		
Channel-generalist – This group includes some pelagic fishes which may not relate to substrate at all but which tolerate faster current than members of the channel-lacustrine group, and do not require the coarse substrates described as important for some members of the channel-riverine group.			
Species	**Lifestage**	**Species**	**Lifestage**
lake sturgeon	E	shovelnose sturgeon	J A
skipjack herring	J A	mooneye	S
goldeye	S	silver redhorse	J A
river redhorse	J A	black redhorse	J A
blue sucker	J A		
Channel-lacustrine – This group has an association with deeper channel areas within the downstream lacustrine portions of navigation pools. This group includes both pelagic, free-swimming forms and benthic forms.			
Species	**Lifestage**	**Species**	**Lifestage**
lake sturgeon	J A	mooneye	E J A
goldeye	E J A	silver chub	S E
black buffalo	S E J A	smallmouth buffalo	S E J A

S = spawning, E = early life history, J = juvenile, A = adult

Table Q-3. Fish species-habitat associations for Allegheny and Ohio River fishes determined by Canonical Correspondence analysis (Normandeau Associates 1997) (cont'd).

Species	Lifestage	Species	Lifestage
emerald shiner	J A	river shiner	J A
blue catfish	J A	white bass	E J A
walleye	J A		
General-lacustrine – These generally prefer slow-moving water and may occupy both shallow, near-shore areas and deeper channels. Many species in this group are often successful in reservoir environments and historically have benefited from construction of impoundments within their range.			
Species	**Lifestage**	**Species**	**Lifestage**
paddlefish	E J A	gizzard shad	J A
American eel	J A	silver chub	J A
channel shiner	J A	spottail shiner	A
river carpsuckier	S E J A	quillback	S E J A
spotgted sucker	J A	golden redhorse	A
white catfish	J A	black bullhead	J A
yellow bullhead	J A	brown bullhead	J A
channel catfish	J A	brook silverside	E
warmouth	A	largemouth bass	A
black crappie	S E J A	white crappie	J A
logperch	A	yellow perch	J A
sauger	J A	freshwater drum	S E J A
Generalist-opportunist – Descriptions of habitat preferences indicate broad tolerances for a variety of habitat conditions, i.e., "generalist". Most fishes in this group are widely distributed and thrive in a variety of circumstances. Habitat requirements for some members of the group, i.e., "opportunists" emphasize a specific habitat condition or set of conditions as important, often a specific type of cover or substrate.			
Species	**Lifestage**	**Species**	**Lifestage**
longnose gar	J A	golden shiner	A

S = spawning, E = early life history, J = juvenile, A = adult

Table Q-3. Fish species-habitat associations for Allegheny and Ohio River fishes determined by Canonical Correspondence analysis (Normandeau Associates 1997) (cont'd).

Species	Lifestage	Species	Lifestage
common carp	J A	goldfish	J A
bullhead minnow	S E J A	fathead minnow	S E J A
bluntnose minnow	S E J A	channel shiner	S E
ghost shiner	S E J A	sand shiner	S E J A
silver shiner	A	spotfin shiner	S E J A
highfin carpsucker	S E J A	shorthead redhorse	J A
northern hog sucker	J A	white sucker	S E J A
black bullhead	S E	yellow bullhead	S E
brown bullhead	S E	white catfish	S E
channel catfish	S E	blue catfish	S E
flathead catfish	S E J A	trout-perch	J A
brook silverside	J A	banded killifish	J A
green sunfish	A	pumpkinseed	A
bluegill	J A	white crappie	S E
smallmouth bass	J A	spotted bass	J A
rock bass	A	yellow perch	S E
logperch	S J	channel darter	E J A
johnny darter	S E J A	blackside darter	J A
eastern sand darter	S E J A		

S = spawning, E = early life history, J = juvenile, A = adult

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area.

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Margin-lacustrine				
Bowfin adult				
Unsuitable	76.57	16.71	62.58	18.22
Poor	2.37		1.52	0.02
Below Average	4.35		9.52	0.01
Average			4.52	
Above Average			0.07	
High Quality			3.54	
Margin-generalist				
Bowfin spawning				
Unsuitable	82.10	16.71	72.00	18.22
Poor	0.03		0.05	0.02
Below Average	1.16		1.67	0.01
Average			1.07	
Above Average			3.41	
High Quality			3.56	
Central Stoneroller adult				
Unsuitable	76.48	16.68	62.56	18.22
Poor	1.97		4.20	0.02
Below Average	4.84	0.03	11.52	0.01
Average			0.03	
Above Average				
High Quality			3.44	
Smallmouth bass spawning				
Unsuitable	73.12	16.68	57.52	18.23
Poor	1.09		2.24	
Below Average	7.75	0.03	11.95	0.02
Average	1.33		2.47	0.01
Above Average			0.49	
High Quality			7.07	
Largemouth bass spawning				
Unsuitable	76.82	16.68	64.26	18.23
Poor	0.37		0.43	
Below Average	5.67	0.03	8.09	0.02
Average	0.43		0.82	0.01
Above Average			0.17	
High Quality			7.99	

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area (cont'd).

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Margin-riverine				
Bigeye chub spawning				
Unsuitable	80.21	16.40	68.32	17.94
Poor	0.60		0.60	
Below Average	2.68		8.92	
Average	0.11		4.23	
Above Average				
High Quality				
Bigeye chub adult				
Unsuitable	76.84	16.71	66.18	18.25
Poor	1.41		0.58	
Below Average	4.83		10.72	
Average	0.21		0.83	
Above Average				
High Quality			3.44	
General-riverine				
Central stoneroller spawning				
Unsuitable	82.31	16.71	72.69	18.24
Poor	0.77		0.33	
Below Average	0.21		5.29	
Average			3.44	
Above Average				
High Quality				
Channel darter spawning				
Unsuitable	71.86	16.71	56.93	18.24
Poor	0.88		2.93	
Below Average	8.30		16.46	
Average	2.25		5.43	
Above Average				
High Quality				
Walleye spawning				
Unsuitable	62.24	16.37	54.77	17.86
Poor	4.64	0.22	4.16	0.08
Below Average	15.03	0.13	14.75	0.31
Average	1.29		4.02	
Above Average	0.09		0.28	
High Quality			3.78	

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area (cont'd).

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Channel-riverine				
River chub spawning				
Unsuitable	55.37	12.23	55.05	17.05
Poor	11.01	3.17	2.65	0.03
Below Average	10.98	1.28	15.41	0.80
Average	5.92	0.03	7.60	0.37
Above Average			0.33	
High Quality			0.73	
River chub adult				
Unsuitable	55.37	12.23	55.05	22.18
Poor	11.01	3.17	2.65	0.03
Below Average	10.98	1.28	15.41	0.85
Average	5.92	0.03	7.60	0.59
Above Average			0.33	
High Quality			0.73	
River redhorse spawning				
Unsuitable			74.41	17.89
Poor				
Below Average			1.29	0.06
Average			5.95	0.30
Above Average			0.10	
High Quality				
Golden redhorse spawning				
Unsuitable	72.06	16.39	74.41	23.03
Poor	5.55	0.28	1.25	0.11
Below Average	5.68	0.03	2.64	0.51
Average			3.44	
Above Average				
High Quality				
Channel-generalist				
River redhorse adult				
Unsuitable	3.27	0.30	11.42	1.80
Poor	3.80	0.31	5.57	1.73
Below Average	52.05	11.63	34.79	10.07
Average	23.82	4.48	24.31	3.88
Above Average	0.11		0.97	
High Quality	0.24		4.68	0.77

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area (cont'd).

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Channel-lacustrine				
Walleye adult				
Unsuitable	2.12	0.27	1.74	1.77
Poor	1.44		1.29	0.03
Below Average	11.46	0.34	16.41	1.68
Average	67.06	16.11	42.52	10.60
Above Average	0.48		1.72	0.00
High Quality	0.73		18.08	4.15
General-lacustrine				
Channel catfish adult				
Unsuitable	0.18		0.46	0.01
Poor	3.82		6.65	0.02
Below Average	73.00	16.64	52.97	13.72
Average	4.07	0.01	4.51	0.01
Above Average	2.22	0.07	13.72	4.49
High Quality			3.44	
Golden redhorse adult				
Unsuitable	3.01	0.27	10.84	2.84
Poor	1.61	0.10	9.38	0.13
Below Average	54.19	9.92	37.79	15.51
Average	24.48	6.43	23.75	5.17
Above Average				
High Quality				
Largemouth bass adult				
Unsuitable	9.13	0.32	2.40	0.37
Poor	38.02	9.86	12.31	9.14
Below Average	29.37	6.53	41.81	8.23
Average	6.77	0.01	16.03	0.49
Above Average			2.04	0.01
High Quality			7.17	0.00

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area (cont'd).

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Channel-lacustrine				
Walleye adult				
Unsuitable	2.12	0.27	1.74	1.77
Poor	1.44		1.29	0.03
Below Average	11.46	0.34	16.41	1.68
Average	67.06	16.11	42.52	10.60
Above Average	0.48		1.72	0.00
High Quality	0.73		18.08	4.15
General-lacustrine				
Channel catfish adult				
Unsuitable	0.18		0.46	0.01
Poor	3.82		6.65	0.02
Below Average	73.00	16.64	52.97	13.72
Average	4.07	0.01	4.51	0.01
Above Average	2.22	0.07	13.72	4.49
High Quality			3.44	
Golden redhorse adult				
Unsuitable	3.01	0.27	10.84	2.84
Poor	1.61	0.10	9.38	0.13
Below Average	54.19	9.92	37.79	15.51
Average	24.48	6.43	23.75	5.17
Above Average				
High Quality				
Largemouth bass adult				
Unsuitable	9.13	0.32	2.40	0.37
Poor	38.02	9.86	12.31	9.14
Below Average	29.37	6.53	41.81	8.23
Average	6.77	0.01	16.03	0.49
Above Average			2.04	0.01
High Quality			7.17	0.00

Table Q-4. Fish species-habitat association model results for selected study area species (based on ARCS-GIS data, Normandeau Associates 1998), summarizing and linking fish habitat requirements/preferences with the percentage of total pool area within ("Permitted") and outside ("Protected") of the permitted area (cont'd).

	Pool 5		Pool 6	
	Protected	**Permitted**	**Protected**	**Permitted**
Generalist-opportunist				
Channel catfish spawning				
Unsuitable	66.39	16.58	44.76	17.89
Poor	10.47	0.13	21.60	0.20
Below Average	6.42	0.01	11.91	0.15
Average			0.04	
Above Average				
High Quality			3.44	
Smallmouth bass adult				
Unsuitable	2.72	0.27	2.48	1.77
Poor	25.89	6.43	7.81	7.32
Below Average	33.80	8.91	37.35	7.77
Average	17.73	1.10	21.29	1.31
Above Average	2.20		4.45	
High Quality	0.96		8.36	0.08
Channel darter adult				
Unsuitable	54.79	12.44	42.23	17.18
Poor	10.09	3.26	7.27	0.14
Below Average	13.22	1.00	20.08	0.85
Average	3.71		11.37	0.08
Above Average	0.88		0.69	
High Quality	0.59		0.12	

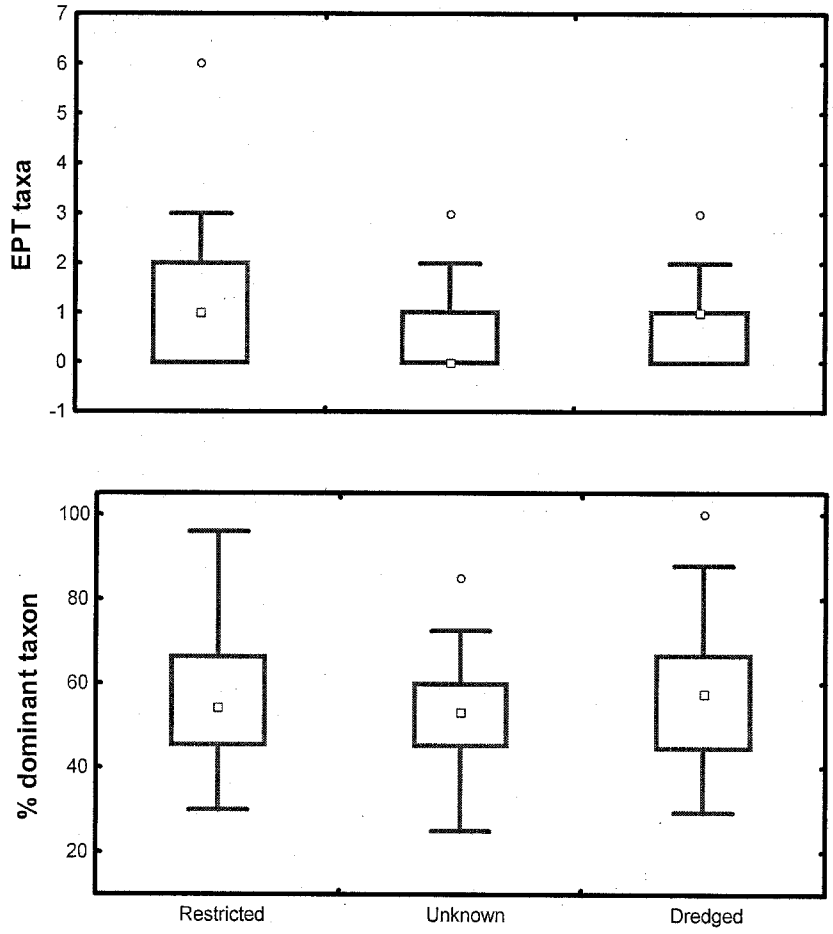


Figure Q-1. Sensitive mayfly, stonefly and caddisfly taxa (EPT), and percent dominant taxon metric results for dredged, non-dredged (restricted) and unknown portions of the study area.

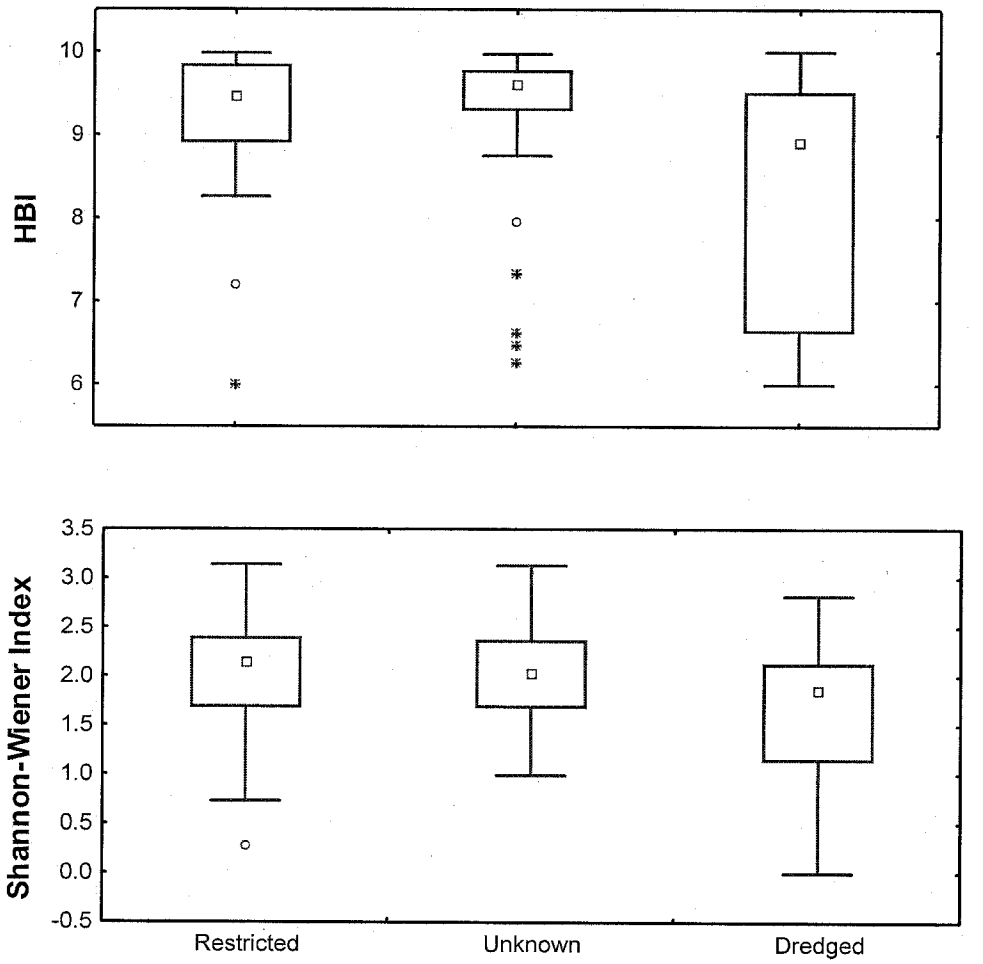


Figure Q-2. Hilsenhoff Biotic Index and diversity index results for dredged, non-dredged (restricted) and unknown portions of the study area.

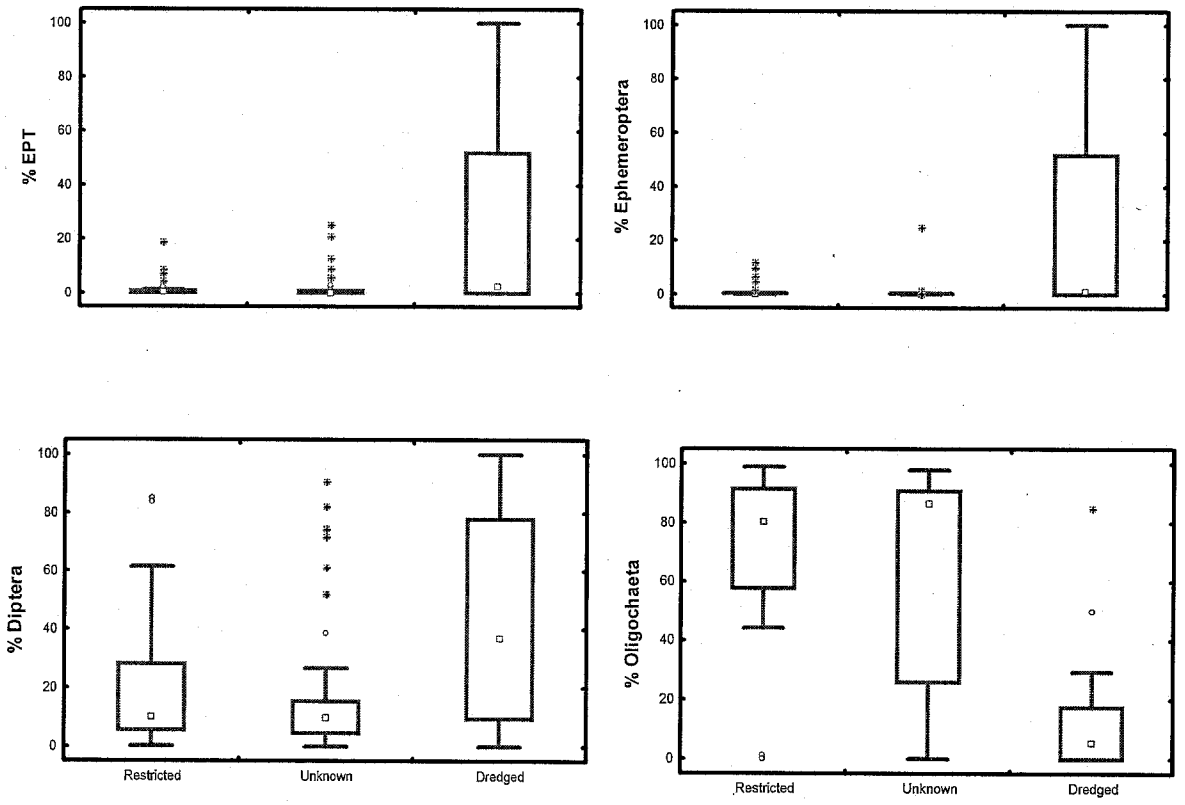


Figure Q-3. Benthic macroinvertebrate composition metrics for dredged, non-dredged (restricted), and unknown portions of the study area.

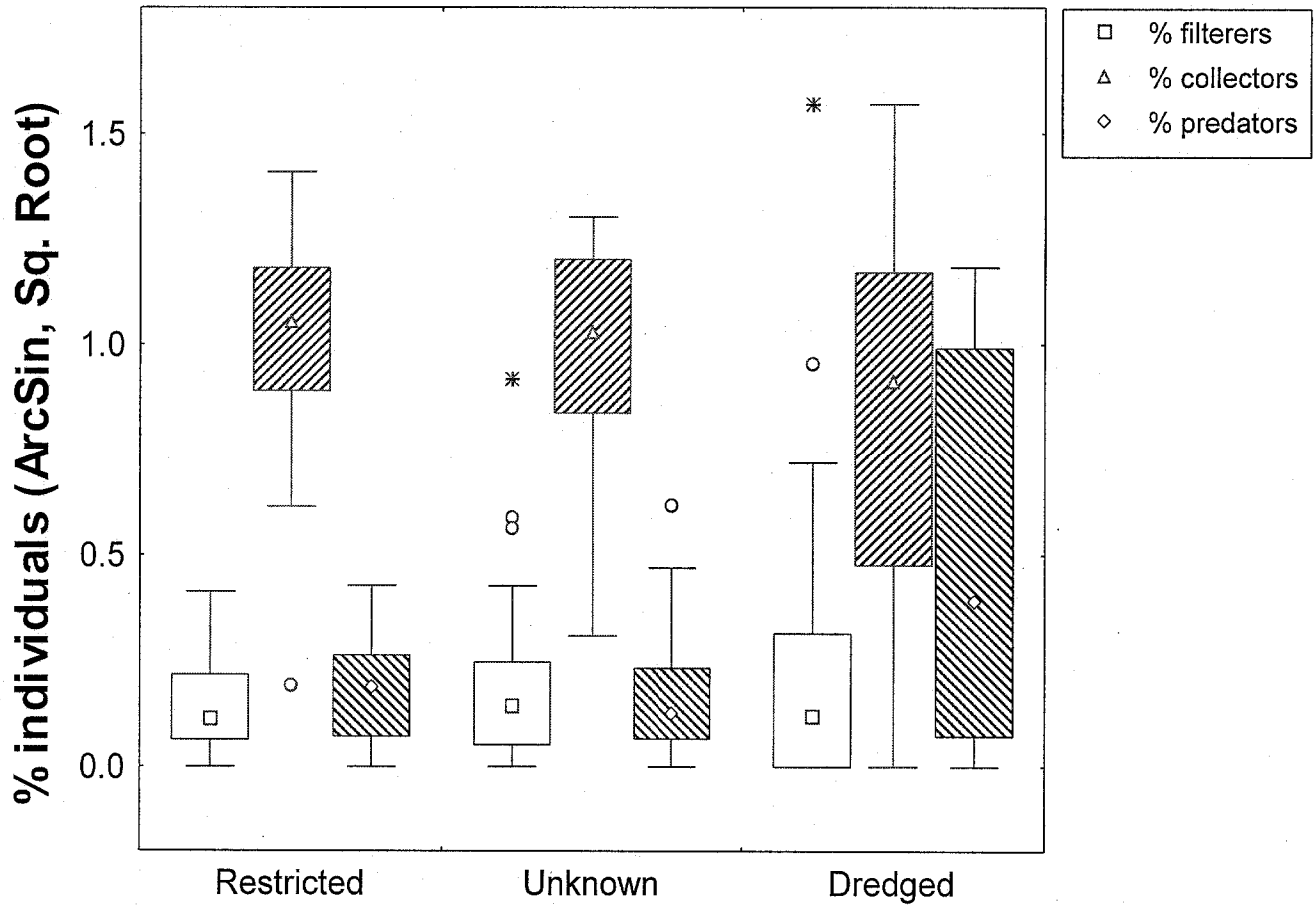


Figure Q-4. Benthic macroinvertebrate functional feeding group comparisons of dredged, nondredged (restricted), and unknown portions of the study area.

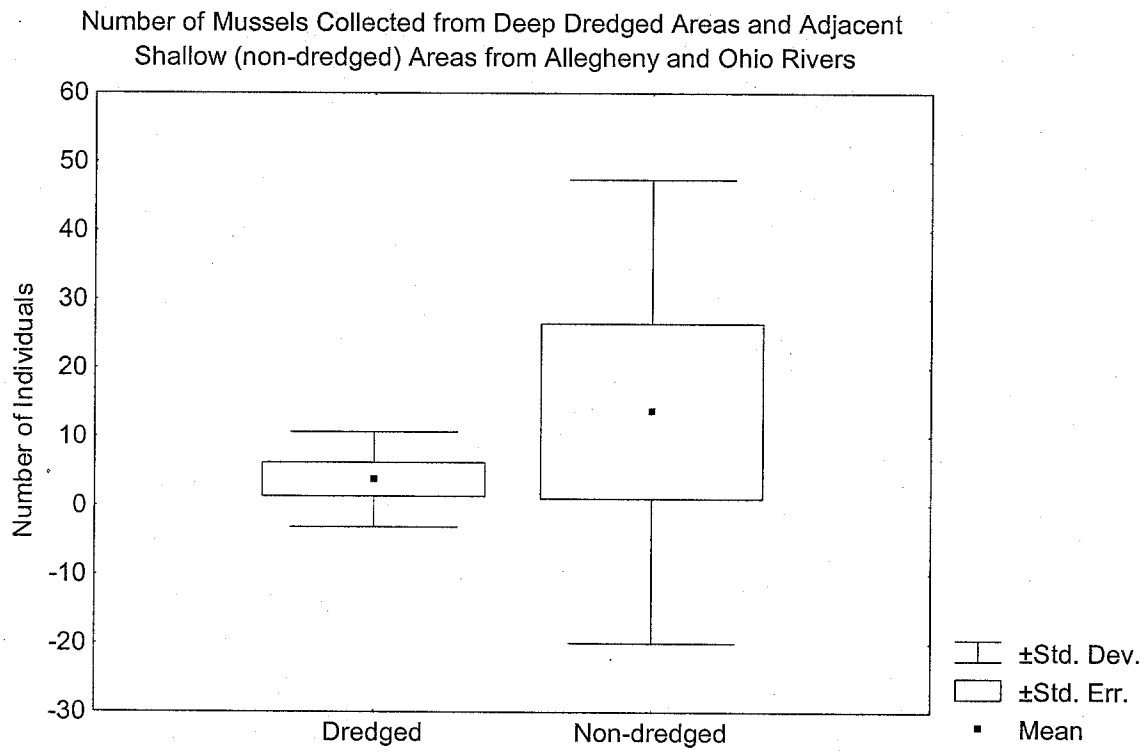


Figure Q-5. Number of mussels collected from deep dredged areas and adjacent shallow areas of the Allegheny and Ohio Rivers (Tetra Tech 1999).

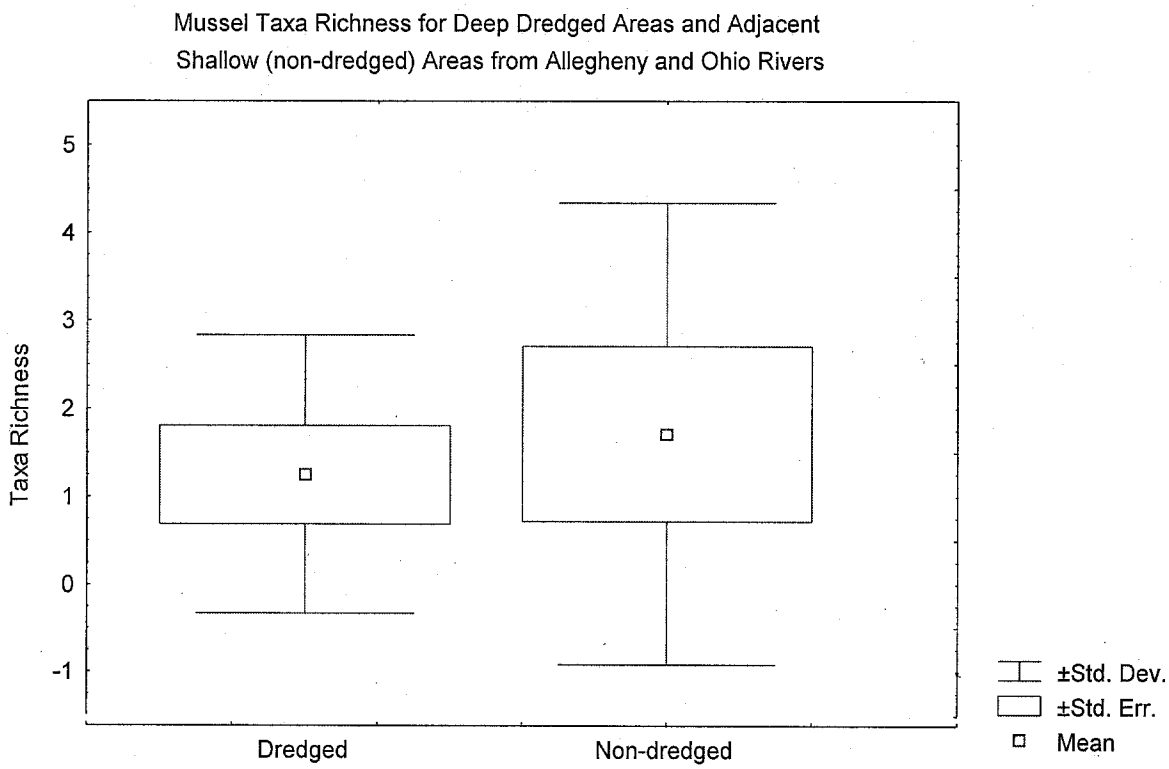


Figure Q-6. Mussel taxa richness for deep dredged areas and adjacent shallow areas of the Allegheny and Ohio Rivers (Tetra Tech 1999).

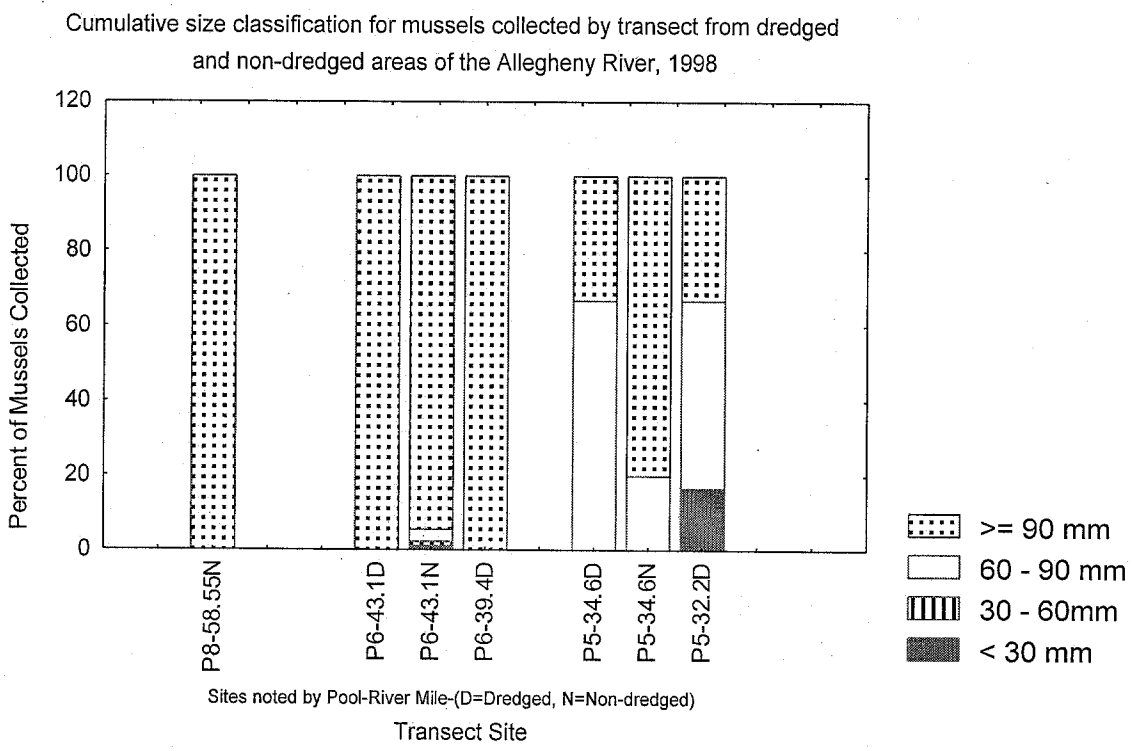
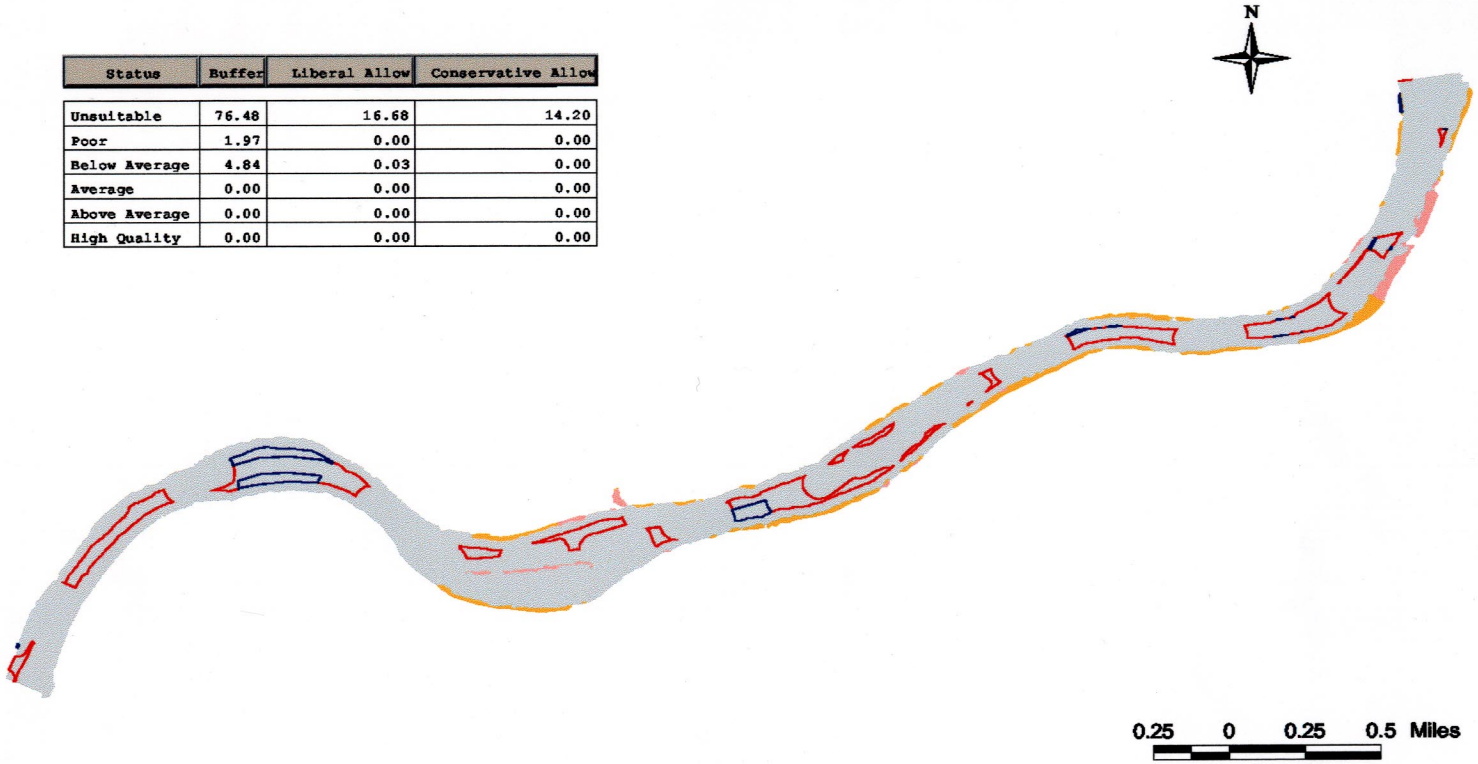


Figure Q-7. Cumulative size classification for mussels collected by transect from dredged and adjacent shallow areas of the Allegheny River (Tetra Tech 1999).

Status	Buffer	Liberal Allow	Conservative Allow
Unsuitable	76.48	16.68	14.20
Poor	1.97	0.00	0.00
Below Average	4.84	0.03	0.00
Average	0.00	0.00	0.00
Above Average	0.00	0.00	0.00
High Quality	0.00	0.00	0.00



LEGEND

Permittable Under Conservative Dredging Constraints

Permittable Under Liberal Dredging Constraints (Combine with Conservative Areas)

Habitat Quality

Unsuitable

Poor

Below Average

Average

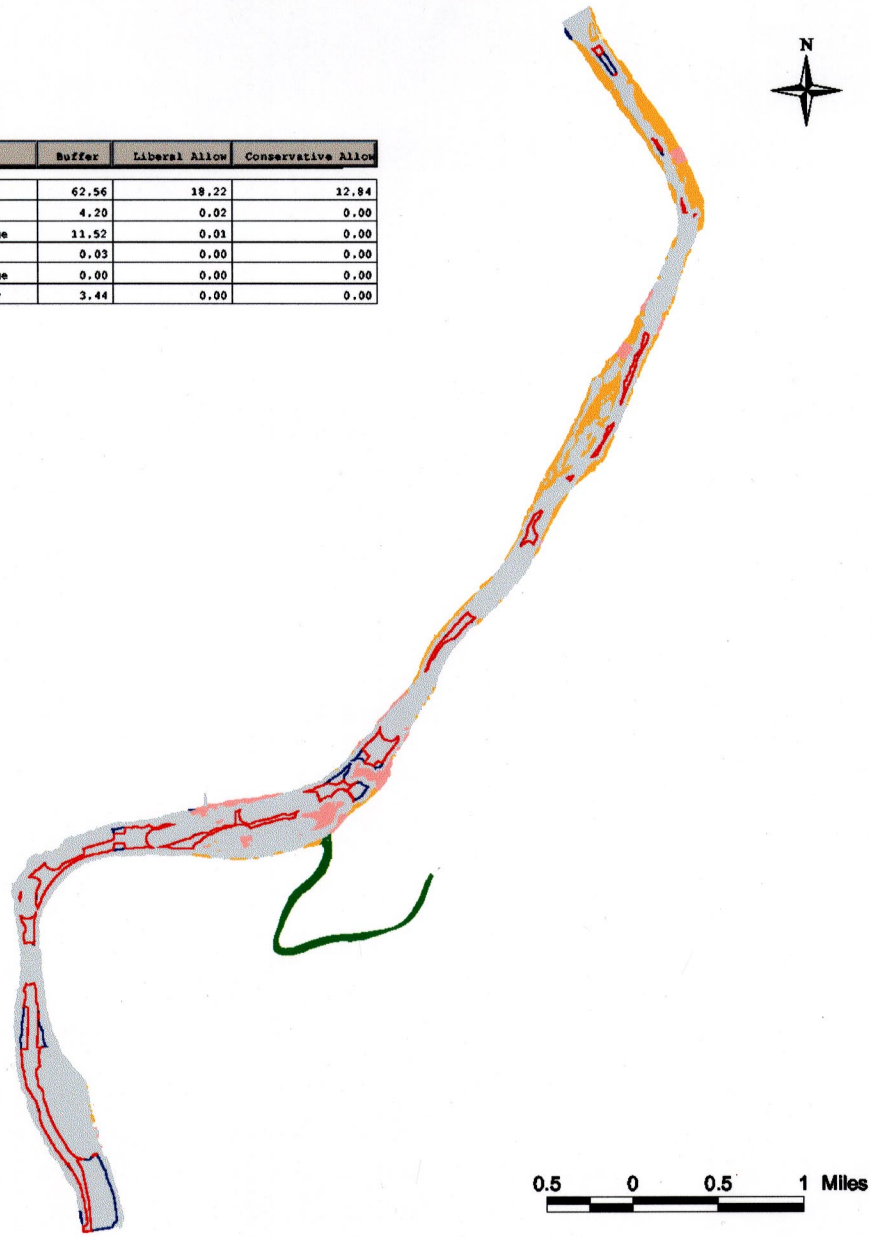
Above Average

High Quality

Allegheny River Pool 5
Central Stoneroller Adult

Figure Q-8

Status	Buffer	Liberal Allow	Conservative Allow
Unsuitable	62.56	18.22	12.84
Poor	4.20	0.02	0.00
Below Average	11.52	0.01	0.00
Average	0.03	0.00	0.00
Above Average	0.00	0.00	0.00
High Quality	3.44	0.00	0.00



LEGEND

Permittable Under Conservative Dredging Constraints

Permittable Under Liberal Dredging Constraints (Combine with Conservative Areas)

Habitat Quality

Unsuitable

Poor

Below Average

Average

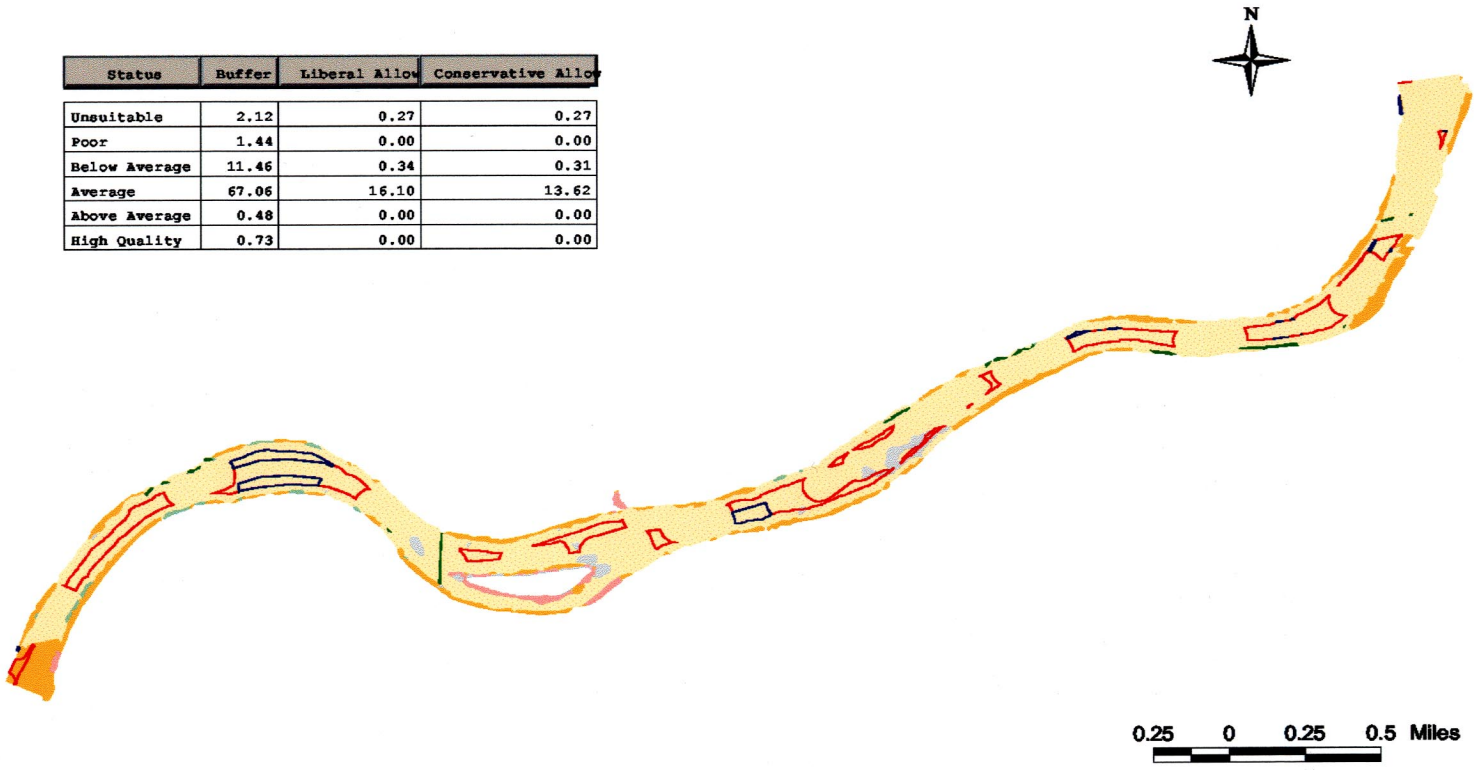
Above Average

High Quality

Allegheny River Pool 6
Central Stoneroller Adult

Figure Q-9

Status	Buffer	Liberal Allow	Conservative Allow
Unsuitable	2.12	0.27	0.27
Poor	1.44	0.00	0.00
Below Average	11.46	0.34	0.31
Average	67.06	16.10	13.62
Above Average	0.48	0.00	0.00
High Quality	0.73	0.00	0.00



LEGEND

Permittable Under Conservative Dredging Constraints

Permittable Under Liberal Dredging Constraints (Combine with Conservative Areas)

Habitat Quality

Unsuitable

Poor

Below Average

Average

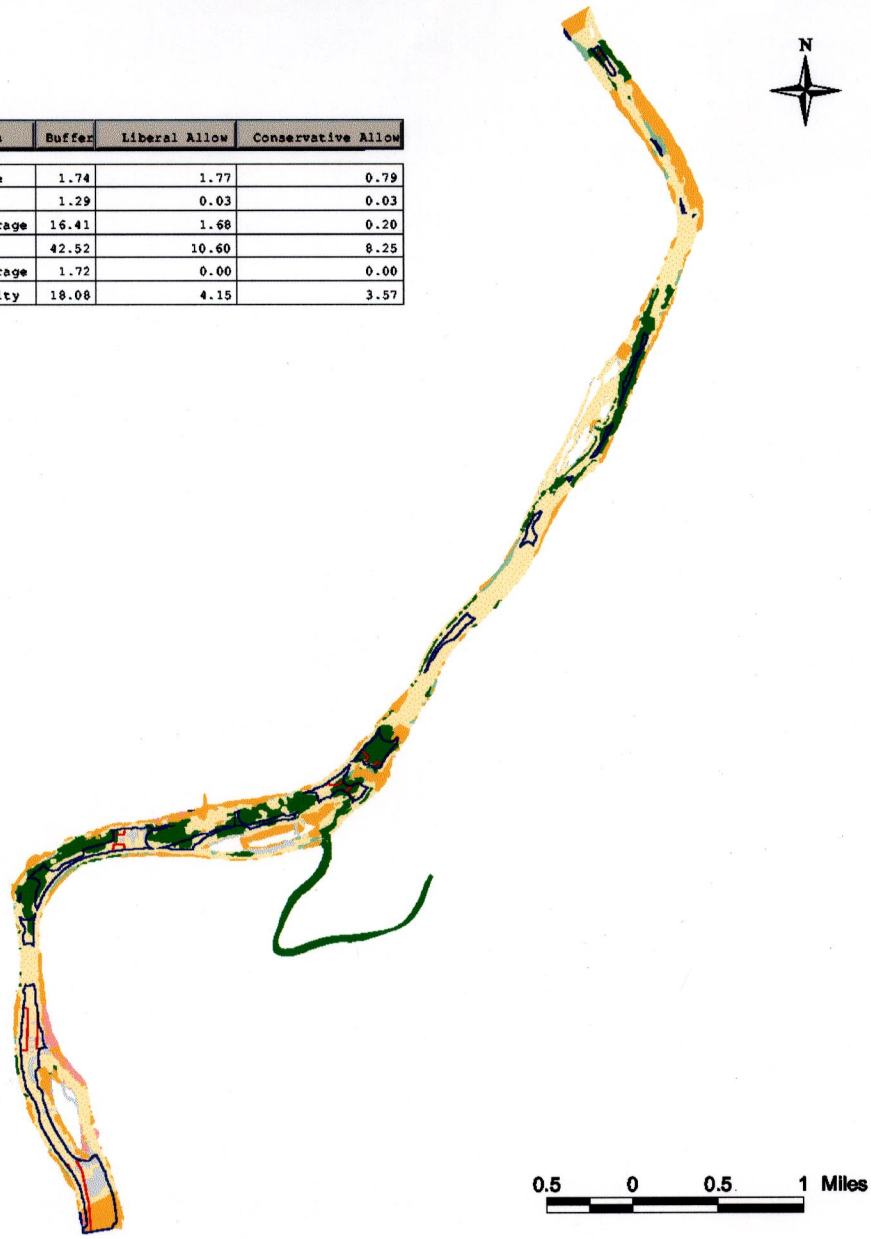
Above Average

High Quality

Allegheny River Pool 5
Walleye Adult

Figure Q-10

Status	Buffer	Liberal Allow	Conservative Allow
Unsuitable	1.74	1.77	0.79
Poor	1.29	0.03	0.03
Below Average	16.41	1.68	0.20
Average	42.52	10.60	8.25
Above Average	1.72	0.00	0.00
High Quality	18.08	4.15	3.57



LEGEND

Permittable Under Conservative Dredging Constraints

Permittable Under Liberal Dredging Constraints (Combine with Conservative Areas)

Habitat Quality

Unsuitable

Poor

Below Average

Average

Above Average

High Quality

Allegheny River Pool 6
Walleye Adult

Figure Q-11

McLaren Hart, Inc.

TETRA TECH, INC

BRAILING VS DIVING SURVEY
ALLEGHENY RIVER – POOLS 5 & 8
AUGUST 4TH & 5TH, 1999

PARTICIPATING GROUPS:
TETRA TECH, MCLAREN HART
GLACIAL S&G, PIONEER MID-ATLANTIC
PADEP, USFWS, USGS, USACOE

ALLEGHENY RIVER – POOL 8 – AUGUST 4, 1999
MILE POINT **58.3** – 200FT OFF RIGHT DESCENDING SHORE
TRANSECT 200FT IN LENGTH PARALLEL TO SHORE EXTENDING DOWNRIVER
WATER TEMP 84°F – SECCHI DISK 7FT – PARTLY CLOUDY, LOW 80°S
WAYPOINT #157

BOTTOM SUBSTRATE - COBBLE, BOULDERS (DENSILY PACKED), WITH INTERSPERSED GRAVEL

BRAILING

RESULTS –	SPIKE	*Elliptio dilatata*	1
		TOTAL LIVE MUSSELS –	1

DIVING SURVEY

RESULTS –	SPIKE	*Elliptio dilatata*	27
	Lengths (mm):	93, 103, 105, 105, 112, 120, 122, 110, 110, 104, 92, 110, 90, 86, 108, 122, 120, 119, 93, 102, 92, 112, 121, 103, 110, 102, 102	
	MUCKET	*Actinonaias ligamentina*	34
	Lengths (mm):	150, 150, 130, 150, 110, 132, 160, 109, 141, 125, 128, 133, 120, 160, 110, 118, 126, 145, 140, 135, 140, 150, 130, 125, 140, 130, 130, 152, 131, 125, 125, 142, 133, 128	
	FLUTED-SHELL	*Lasmigona costata*	3
	Lengths (mm):	105, 100, 106	
	FAT MUCKET	*Lampsilis siliquoidea*	3
	Lengths (mm):	120, 135, 130	
		TOTAL LIVE MUSSELS –	67
	ADDITIONAL RELICT TAXA		
	PLAIN POCKETBOOK	*Lampsilis cardium,*	125mm
	KIDNEYSHELL	*Ptychobranchus fasciolaris,*	90mm
	SQUAWFOOT	*Strophitus undulatus,*	65mm

McLaren Hart, Inc.

TETRA TECH, INC

BRAILING VS DIVING SURVEY
ALLEGHENY RIVER – POOLS 5 & 8
AUGUST 4TH & 5TH, 1999

PARTICIPATING GROUPS:
TETRA TECH, MCLAREN HART
GLACIAL S&G, PIONEER MID-ATLANTIC
PADEP, USFWS, USGS, USACOE

ALLEGHENY RIVER – POOL 5 – AUGUST 5, 1999
MILE POINT **33.2** – 200FT OFF RIGHT DESCENDING SHORE
TRANSECT 200FT IN LENGTH PARALLEL TO SHORE EXTENDING DOWNRIVER
WATER TEMP 83°F – SECCHI DISK 6FT 4IN – OVERCAST, CLOUDY, 70°S
WAYPOINT #158

BOTTOM SUBSTRATE – COBBLE, GRAVEL

BRAILING

RESULTS – NO MUSSELS COLLECTED

TOTAL LIVE MUSSELS – 0

DIVING SURVEY

RESULTS –

SPIKE	*Elliptio dilatata*	43
Lengths (mm): 126, 87, 116, 114, 115, 81, 107, 114, 117, 112, 108, 114, 119, 78, 104, 110, 113, 110, 113, 111, 104, 107, 104, 125, 111, 106, 113, 120, 107, 120, 120, 105, 127, 126, 117, 121, 98, 105, 102, 112, 125, 122, 109		
MUCKET	*Actinonaias ligamentina*	5
Lengths (mm): 125, 119, 146, 124, 108		
FLUTED-SHELL	*Lasmigona costata*	8
Lengths (mm): 121, 108, 134, 126, 124, 132, 120, 86		
FAT MUCKET	*Lampsilis siliquoidea*	9
Lengths (mm): 138, 110, 127, 135, 123, 130, 136, 125, 119		
WABASH PIGTOE	*Fusconaia flava*	8
Lengths (mm): 194, 102, 97, 95, 84, 85, 86, 50		
FRAGILE PAPERSHELL	*Leptodea fragilis*	9
Lengths (mm): 108, 80, 79, 90, 87, 66, 65, 65, 43		
SALAMANDER MUSSEL	*Simpsonaias ambigua*	11
Lengths (mm): 42, 52, 46, 47, 40, 47, 40, 43, 42, 43, 36		
PINK HEELSPLITTER	*Potamilus alatus*	2
Lengths (mm): 88, 83		

TOTAL LIVE MUSSELS – 95

ADDITIONAL RELICT TAXA

PLAIN POCKETBOOK *Lampsilis cardium*

McLaren Hart, Inc.

TETRA TECH, INC

BRAILING VS DIVING SURVEY
ALLEGHENY RIVER – POOLS 5 & 8
AUGUST 4TH & 5TH, 1999

PARTICIPATING GROUPS:
TETRA TECH, MCLAREN HART
GLACIAL S&G, PIONEER MID-ATLANTIC
PADEP, USFWS, USGS, USACOE

ALLEGHENY RIVER – POOL 5 – AUGUST 5, 1999
MILE POINT **32.4** – 200FT OFF LEFT DESCENDING SHORE AT MURPHY ISLAND
TRANSECT 200FT IN LENGTH PARALLEL TO SHORE EXTENDING DOWNRIVER
WATER TEMP 83°F – SECCHI DISK 6FT 4IN – OVERCAST, CLOUDY, 70°S
WAYPOINT #160

BOTTOM SUBSTRATE – SAND, SILT, WITH INCREASING GRAVEL

BRAILING

RESULTS –	WABASH PIGTOE Lengths (mm): 86	*Fusconaia flava*	1
		TOTAL LIVE MUSSELS –	1

DIVING SURVEY

RESULTS –	SPIKE Lengths (mm): 109, 115, 110, 115, 100, 95	*Elliptio dilatata*	6
	MUCKET Lengths (mm): 102, 96	*Actinonaias ligamentina*	2
	FLUTED-SHELL Lengths (mm): 121	*Lasmigona costata*	1
	FAT MUCKET Lengths (mm): 131, 93	*Lampsilis siliquoidea*	2
	WABASH PIGTOE Lengths (mm): 91, 92, 86, 87, 100, 87, 91, 85, 74, 97, 95, 82, 84, 92, 83, 84, 88, 87	*Fusconaia flava*	18
	SALAMANDER MUSSEL Lengths (mm): 47	*Simpsonaias ambigua*	1
	GIANT FLOATER Lengths (mm): 110	*Anodonta grandis*	1
		TOTAL LIVE MUSSELS –	31

ADDITIONAL RELICT TAXA

FRAGILE PAPERSHELL	*Leptodea fragilis*
BLACK SANDSHELL	*Ligumia recta*
OHIO HEELSPLITTER (C.F.)	

McLaren Hart, Inc.

TETRA TECH, INC

BRAILING VS DIVING SURVEY
ALLEGHENY RIVER – POOLS 5 & 8
AUGUST 4TH & 5TH, 1999

PARTICIPATING GROUPS:
TETRA TECH, MCLAREN HART
GLACIAL S&G, PIONEER MID-ATLANTIC
PADEP, USFWS, USGS, USACOE

ALLEGHENY RIVER – POOL 5 – AUGUST 5, 1999
MILE POINT **32.9** – 200FT OFF LEFT DESCENDING SHORE
TRANSECT 200FT IN LENGTH PARALLEL TO SHORE EXTENDING DOWNRIVER
WATER TEMP 83°F – SECCHI DISK 6FT 4IN – OVERCAST, CLOUDY, 70°S
WAYPOINT #159

BOTTOM SUBSTRATE – SAND, SILT

BRAILING

RESULTS – NO MUSSELS COLLECTED

TOTAL LIVE MUSSELS – 0

DIVING SURVEY

RESULTS –	FAT MUCKET Lengths (mm): 126	*Lampsilis siliquoidea*	1
	FRAGILE PAPERSHELL Lengths (mm): 85	*Leptodea fragilis*	1
		TOTAL LIVE MUSSELS –	2

COMMENTS:
TRANSECT LENGTH FOR THE DIVING SURVEY WAS REDUCED TO APPROXIMATELY 100FT IN LENGTH DUE TO LARGE SUBMERGED TREE AND DEBRIS WHICH CAUSED AN UNSAFE DIVING CONDITION, THEREFORE THE DIVE AT THIS LOCATION WAS DISCONTINUED.

BRAILING TRANSECT MAINTAINED A 200FT LENGTH