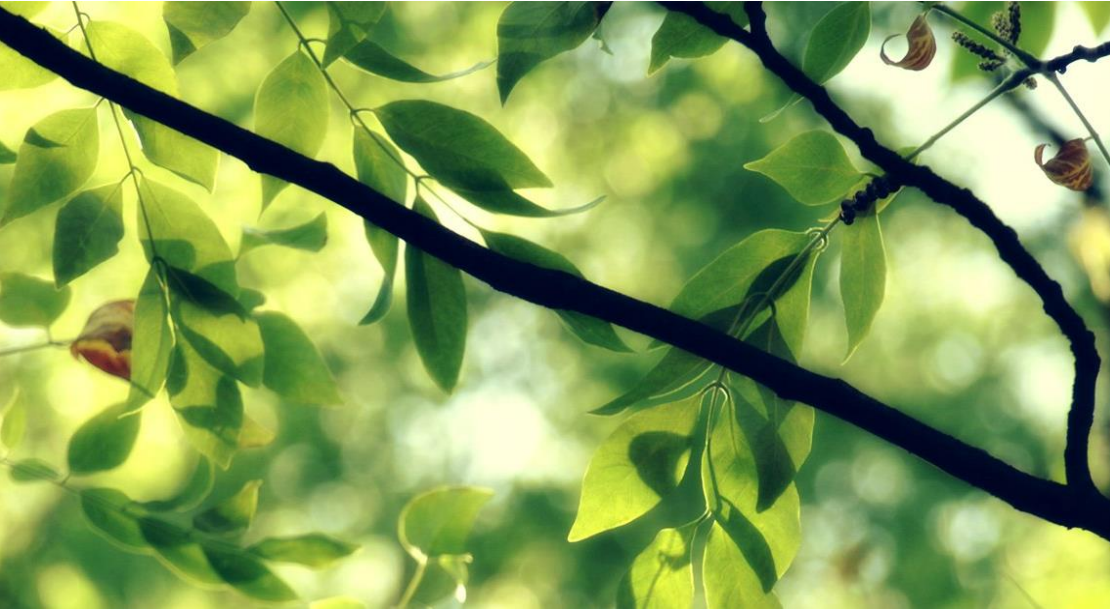


Prairie Street over Maple River

A Project with Threatened & Endangered Species



Bridge Conference
March 23, 2016

Doug Hyland, President – Village of Muir
Connie Houk, P.E., Project Engineer – Prein&Newhof
Tom Estrem, Project Scientist - Cardno

Prein&Newhof

New two-lane
bridge to
replace the
existing
structure
spanning the
Maple River
just south of
the Village's
central
business
district





- Rehabilitate the old bridge
- Convert to a non-motorized trail
- Restore it's historical appearance





State Endangered Mussels

Potentially Federally Endangered Mussels

- West VA protocol
- Group 2 Stream
- Section 10 – no federal funds



PHASE 1 SURVEY

Took place during
PE phase

USF&WL

MDNR

Deeply involved

Gave approval for
every step





- Transect Lines
- Inventoried the River
- Identified each and every Mussel found
- No moving of any mussels
- Federal Species were found



Worked closely
and constantly
with:

- MDEQ
- MDNR Fisheries
- US Fish & Wildlife
- Owner
- MDOT Local Bridge Program





Alternate Alignments were evaluated to minimize impacts to the mussels

Bypass alignment was selected

Allowed traffic to be maintained on the existing bridge during construction





PHASE 2 SURVEY

was included in
the Local Agency
Bridge contract



General Permitting Requirements

- Michigan requires Scientific Collectors Permit and Threatened and Endangered Species Permit
 - Allows collection and potential relocation of all mussel species except Federally listed species (~38 species)
 - Permits issued by MDNR and assigned to Individuals
 - Annual renewal and reporting
- Federal Collectors Permit and Relocation Permit
 - Much more difficult to obtain and limited number of individuals with permit
 - There are Four (4) Federally Listed Mussel Species in MI
 - Northern Riffleshell - Snuffbox
 - Clubshell - Rayed Bean



Endangered Species Resources

- Visit the Michigan Natural Features Inventory (MNFI) website to search for species in your project area or contract for site specific inquiry
 - <http://mnfi.anr.msu.edu>
- If a species occurs in your project sites drainage area it could potentially be at your site...



Site Specific Requirements

- Site contained total of 21 species, 7 were state listed species
- Site contained the Federally Endangered Snuffbox Mussel (*Epioblasma triquetra*)- Presence confirmed during phase 1 and 2 sampling
- Due to high quality of mussel community at site only those areas with direct streambed disturbance and associated buffer areas required mussel relocation
- USFWS coordination for Federal species



Coordination

- Completed Section 10 draft Habitat Conservation Plan (HCP)
 - Accepted HCP required to receive an Incidental Take Permit (ITP) for federally listed species
 - HCP completed when federal dollars are not involved
 - Section 7 Biological Assessment (BA) required for federally funded projects
- Due to USFWS staff changes and potential construction delays, authorization was granted to complete a relocation, with the exception of Snuffbox, in the project area
 - If Snuffbox were found in Area of Direct Impact (ADI) of potential scour areas the HCP would need to be finalized and Incidental take permit issued.



Area of Direct Impact (ADI): Pier 2

- Size of area was limited due to thoughtful pier placement and use of crane for construction
- ADI was Pier 2 cofferdam footprint, 14 ft wide by 75 ft long (1,050 ft²)
- Also need to remove from associated buffer areas:
 - Upstream 5 meters
 - Downstream 10 meters
 - Lateral 5 meters
 - Total buffer area = 406 m² or 4,371 ft²
- Total Search Area associated with Pier 2 = 5,421 ft²



Additional Impact Area: Abutment A

- Also searched southern bank along Abutment A where rip rap would be placed along waters edge. Cleared mussels from scour potential area.
 - 87 ft long x 8 ft wide = 696 ft²



Maple River

Legend

- Snuffbox Locations
- Area of Direct Impact
- Abutment A Buffer
- Lateral Buffers
- Upstream Buffer
- Downstream Buffer
- Bridge Location

Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

←←← FLOW



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Project No. 14X208400

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Date: 8/11/2015

hof

Relocation Effort Scope

- Collect and relocate all mussels located within Pier 2 ADI and associated buffer zones and Abutment A buffer zone.
- All Snuffbox collected needed to be recorded and a Passive Integrated Transponder (PIT tag) and shellfish tag applied. Snuffbox to be returned to point collected and position marked with a GPS unit capable of sub-meter accuracy.
- If Snuffbox were found within the ADI and potential scour area an Incidental Take Permit would need to be acquired.
- Salvaged mussels to be moved upstream to suitable/similar habitat

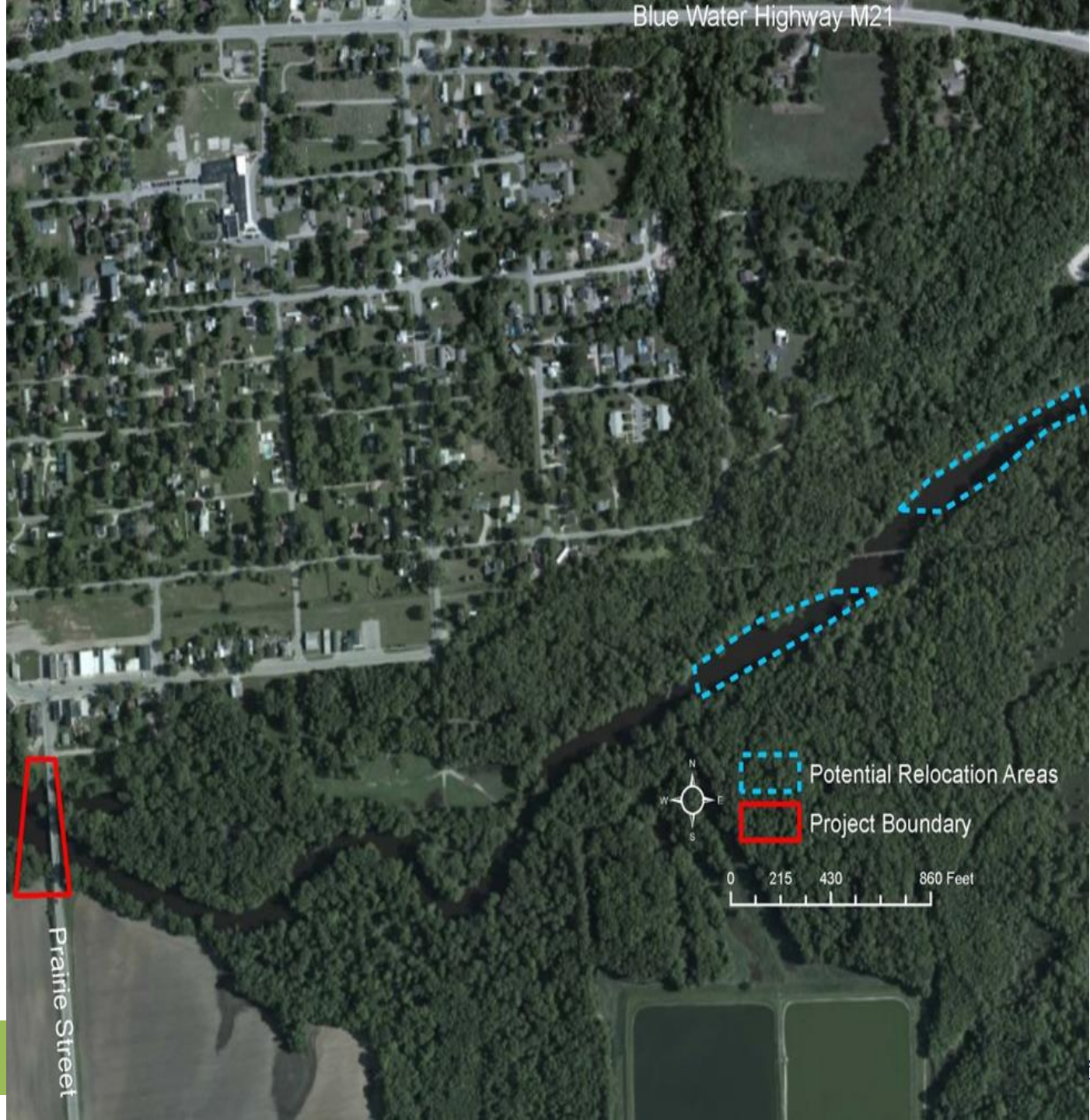


Relocation Site

- Requirements
 - Agency communication indicated needed to be upstream of sewer outfall
 - Contain similar and suitable habitat: substrate composition, water depth, current, comparable mussel community
 - Area to be greater than or equal to salvage area
- Specific relocation site chosen during relocation effort



Blue Water Highway M21



Potential Relocation Areas
Project Boundary

0 215 430 860 Feet





Legend

 Mussel Relocation Site

Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Getmapping, Aergrid, IGN, IGP, swisstopo, and the GIS User Community

Relocation Site

- Initial 20 minute qualitative survey



Scientific Name	Common Name	Quantity
<i>Actinonaias ligamentina</i>	Mucket	1
<i>Amblema plicata</i>	Threeridge	19
<i>Elliptio dilatata</i>	Spike	1
<i>Fusconaia flava</i>	Wabash Pigtoe	8
<i>Lampsilis cardium</i>	Plain Pocketbook	7
<i>Lampsilis radiata luteola</i>	Fat Mucket	3
<i>Lasmigonia costata</i>	Fluted Shell	1
<i>Ligumia recta</i>	Black Sandshell	3
<i>Pyganodon grandis</i>	Giant Floater	4
<i>Quadrula pustulosa</i>	Pimpleback	5
<i>Quadrula quadrula</i>	Mapleleaf	6
<i>Strophitus undulatus</i>	Creeper	1
	Total Individuals	59
	Total Species	12

Prairie Street Bridge Relocation Effort

- Important to note site conditions need to be suitable and within accepted range of parameters:
 - Visibility \geq 20 inches
 - Current needs to be workable
 - Water levels acceptable: sometimes have a defined flow threshold
- Area of Direct Impact marked by surveyors prior to effort
 - Very helpful
- Help your mussel contractors out especially if there are people working at the site. **Communication**





DEEPER BELOW
DEEPER BOTTOM

Prairie Street Bridge Relocation Effort

- Salvage process
 - Crew of 4 people: 3 divers actively searching and 1 malacologist on boat to record catch
 - Utilized cell search method-cells delineated by chains laid on the bottom
 - Worked within specific zones to document where mussels were collected
 - Divers worked as unit moving in an upstream direction
 - Make one pass, bring mussels to boat for ID and complete another pass until 0 individuals collected or less than 4 individuals
 - To clear an area took generally 3-5 passes
 - Total effort took three days

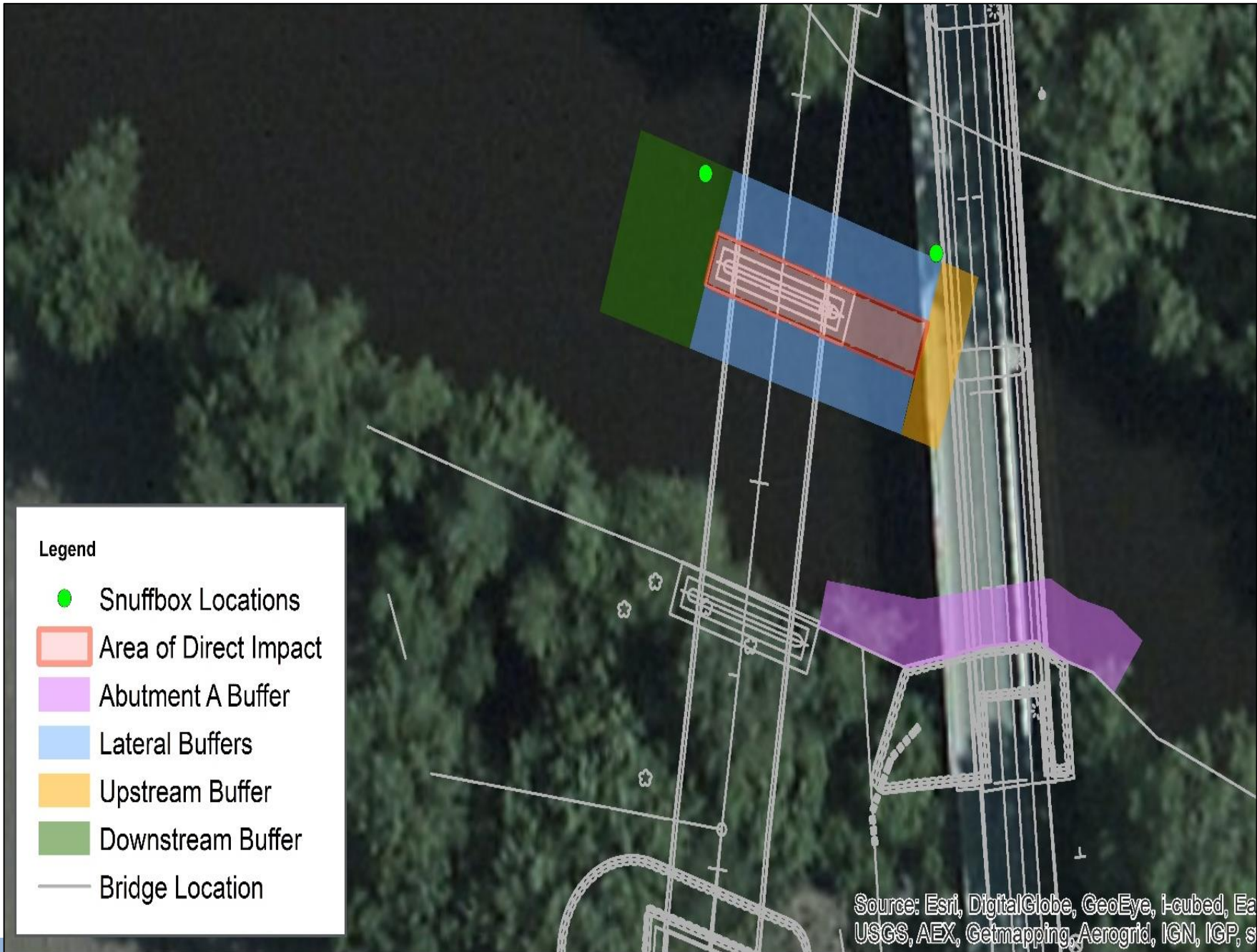


Total Mussels Relocated from ADI and Associated Buffers

Scientific Name	Common Name	Individuals	Relative Frequency (% total)
<i>Actinonaias ligamentina</i>	Mucket	38	3.51
<i>Alasmidonta marginata</i>	Elktoe (SC)	8	0.74
<i>Alasmidonta viridis</i>	Slippershell (T)	3	0.28
<i>Amblema plicata</i>	Threeridge	83	7.66
<i>Anodontooides ferussacianus</i>	Cylindrical Papershell	3	0.28
<i>Cyclonaias tuberculatus</i>	Purple Wartyback (T)	2	0.18
<i>Elliptio dilatata</i>	Spike	48	4.43
<i>Epioblasma triquetra</i>	Snuffbox (FE)	2	0.18
<i>Fusconaia flava</i>	Wabash Pigtoe	143	13.19
<i>Lampsilis cardium</i>	Plain Pocketbook	245	22.60
<i>Lampsilis radiata luteola</i>	Fat Mucket	15	1.38
<i>Lasmigonia costata</i>	Fluted Shell	21	1.94
<i>Leptodea fragilis</i>	Fragile Papershell	1	0.09
<i>Ligumia recta</i>	Black Sandshell (EN)	5	0.46
<i>Pleurobema sintoxia</i>	Round Pigtoe (SC)	79	7.29
<i>Pyganodon grandis</i>	Giant Floater	11	1.01
<i>Quadrula pustulosa</i>	Pimpleback	152	14.02
<i>Quadrula quadrula</i>	Mapleleaf	172	15.87
<i>Strophitus undulatus</i>	Creeper	46	4.24
<i>Utterbackia imbecillis</i>	Paper Pondshell (SC)	1	0.09
<i>Venustaconcha ellipsiformis</i>	Ellipse (SC)	6	0.55
SC=Special Concern T=Threatened EN=Endangered FE=Federal Endangered	Total Individuals	1084	
	Total Species	21	



Scientific Name	Common Name	ADI	UPS Buffer	DNS Buffer	N-LT Buffer	S-LT Buffer	South Shoreline
<i>Actinonaias ligamentina</i>	Mucket	9	10	8	1	10	-
<i>Alasmidonta marginata</i>	Elktoe	1	3	2	1	1	-
<i>Alasmidonta viridis</i>	Slippershell	2	-	-	-	1	-
<i>Amblema plicata</i>	Threeridge	27	8	26	3	19	-
<i>Anodontoides ferussacianus</i>	Cylindrical Papershell	1	-	-	1	1	-
<i>Cyclonaias tuberculatus</i>	Purple Wartback	1	-	-	-	1	-
<i>Elliptio dilatata</i>	Spike	10	7	8	7	16	-
<i>Epioblasma triquetra</i>	Snuffbox	-	1	-	1	-	-
<i>Fusconaia flava</i>	Wabash Pigtoe	39	16	47	13	28	-
<i>Lampsilis cardium</i>	Plain Pocketbook	49	21	64	38	73	-
<i>Lampsilis radiata luteola</i>	Fat Mucket	8	1	-	2	2	2
<i>Lasmigonia costata</i>	Fluted Shell	4	7	4	3	3	-
<i>Leptodea fragilis</i>	Fragile Papershell	1	-	-	-	-	-
<i>Ligumia recta</i>	Black Sandshell	1	-	-	-	4	-
<i>Pleurobema sintoxia</i>	Round Pigtoe	22	4	20	6	27	-
<i>Pyganodon grandis</i>	Giant Floater	2	2	5	-	1	1
<i>Quadrula pustulosa</i>	Pimpleback	52	11	49	9	30	1
<i>Quadrula quadrula</i>	Mapleleaf	70	12	53	3	34	-
<i>Strophitus undulatus</i>	Creeper	8	8	10	4	16	-
<i>Utterbackia imbecillis</i>	Paper Pondshell	1	-	-	-	-	-
<i>Venustaconcha ellipsiformis</i>	Ellipse	-	2	2	2	-	-
	Total Individuals	308	113	298	94	267	4
	Total Species	19	15	13	15	17	3



Legend

- Snuffbox Locations
- ▭ Area of Direct Impact
- ▭ Abutment A Buffer
- ▭ Lateral Buffers
- ▭ Upstream Buffer
- ▭ Downstream Buffer
- Bridge Location

Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar, CNES, Airphoto, USDA, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, etc.

Summary-General Notes

- Inquire about listed species at your site: desktop review
- If you have endangered species **plan ahead:**
 - If you have federally endangered species plan on at least six months to obtain necessary permits...potentially longer depending on project
- Help your contractor out:
 - ADI extents
 - Construction Schedule
 - Site monitoring
- Don't assume there is nothing there, often times you will be surprised.



Questions & Answers



Thank you

