

2016 St. Regis River Freshwater Mussel Restoration Hogansburg Dam Removal Stranded Mussel Relocation Plan

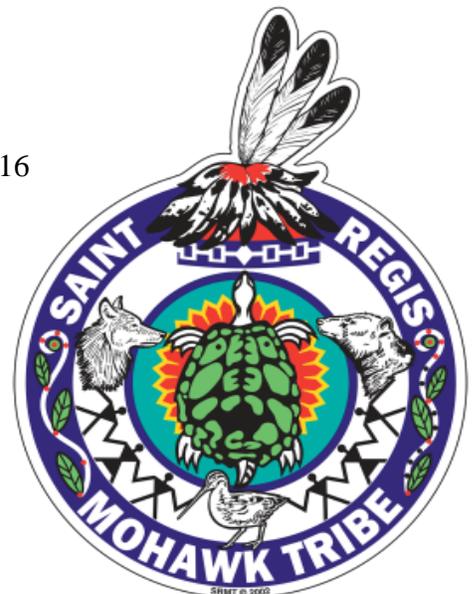
Prepared for:
SRMT Environment Division Staff,
U.S. Environmental Protection Agency Region 5, and
New York State Department of Conservation

Part of:
Freshwater Mussel Restoration in the St. Regis River GL-00E01943

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Introduction

Field reconnaissance, pre-construction mussel surveys, and mussel habitat substrate investigations were conducted June 13-24th, 2016 by SRMT Environment Division staff. Field surveys were conducted in accordance with Quality Assurance Project Plan (QAPP) drafted and submitted to USEPA on June 12th, 2016 (Jock 2016), with USEPA Region 2 approval granted via e-mail on June 15, 2016.

SRMT placed high vis pink survey markers and tape in the field on Monday, June 13th, 2016 at each 300-m segments SRU01-SRU16 (left and right banks), observed muskrat middens, and tributary/wetlands (SRU17 and SRU18) for investigation. These survey markers will stay in place until the end of the impoundment drawdown and dam demolition to assist field crew and volunteers to identify Freshwater Mussel Segments consistently identified in the QAPP and throughout this Relocation Plan (Figure 1).

SRMT completed 35/40 proposed areas for sampling (87.5% completeness) as identified in the QAPP (Jock 2016). Investigative surveys areas completed included both right and left banks for SRU01-SRU16 (n=32), SRU18 (bank to bank), and Relocation Pool #1 (SRU22) and Relocation Pool #3 (SRU24). SRU17 (bank to bank) time search survey was conducted at same time as SRU01L due to close proximity and very shallow water depths (i.e. limited snorkeler access). Individual field data sheets with species present and habitat substrate exist for each of the surveyed areas (will be included in Final Report to USEPA, but on file at SRMT for field decision use during drawdown and mussel relocation daily activity planning).

In 8-working days, 11-species and 6,406 live mussels were collected in the project area. Species collected included *Strophitus undulatus*, *Ligumia recta*, *Lampsilis cariosa*, *Elliptio complanata*, *Alasmidonta marginata*, *Alasmidonta undulatus*, *Lampsilis radiata*, *Pyganodon cataracta*, *Lampsilis ovata*, *Pyganodon grandis*, and *Anodontoidea ferussacianus*. Of the 6,406 live mussels collected, 95.7 % were *E. complanata*. Of the 11 species, four are Species of Greatest Conservation Need (SGCN): *A. marginata*, *L. cariosa*, *L. ovata*, and *L. recta* (Table 1).

During the 2 weeks of mussel surveys, river discharge according to USGS 0426900 at Brasher Center, NY dropped from 950 cfs to a low of 340 cfs.

Surveys of Relocation Pools (#1 and #3) were conducted on June 24th, 2016 targeted to determine if similar habitat exists in upstream un-impacted areas to further refine relocation strategy and efforts during drawdown and dam demolition. Survey of Relocation Pool #2 was not possible to access via boat due to rock outcroppings. This does not preclude it as a potential viable Relocation Pool option with suitable habitat, however due to limited access, it will be excluded for purposes of a timely Relocation Plan. Relocation efforts described below are proposed with every effort made to conduct consistent to relocation protocols outlined in Piette 2005, Clayton et al., 2015, and USFWS and VDGIF 2015 (Guidelines in the States of Wisconsin, West Virginia, and Virginia, respectively).

Relocation Pools

Relocation Pools were selected to be suitable transplant sites due to close proximity to collection area, and also upstream in an un-impacted area of construction and/or water level drawdown impacts. They have similar or better water quality, substrate, and fish fauna to

collection site(s) and are not influenced by detrimental factors to unionids (i.e. dredging, point discharge, etc.). They also have verified existing mussel population with similar species composition.

Relocation Pool #3 will be the primary relocation area for the majority of stranded SGCN in the project area (i.e. SRU00-SRU18 and any stranded mussel found near uninhabited islands further upstream). Relocation Pool #3 covers a vast stretch of sandy bottom identified not to have been affected by the test drawdown in 2015 (Figure 2). During mussel survey investigations on June 24th, 2016 live *L. cariosa*, *L. recta*, *S. undulatus*, and *E. complanata* (in low densities) were collected thus indicating suitable habitat for those species. In addition, there is documented suitable habitat (boulders with patches of sand) in faster flow areas just downstream of this identified sandy Relocation Pool near/adjacent the abandoned bridge in Helena (Nevin Road Bridge). This area under the abandoned bridge was investigated by SRMT consultants in 2013 and found 7-living species present here including SGCN species *A. marginata*, *L. cariosa*, *L. ovata*, and *L. recta* with a high abundance of *A. marginata* (n=28), thus indicating good quality habitat for this species relocation (Harper et al. 2015).

The secondary relocation area will utilize Relocation Pool #1. With pending water level drop, it is anticipated this pool may only be accessible by shore. If so, private property access will need to be granted prior to use. Shoreline access via private property of this area will be investigated during week 2 of the drawdown. This Relocation Pool was investigated bank to bank on June 23rd, 2016. It includes a variety of suitable habitat substrate for all SGCN species of interest. On the right bank, habitat comprises of 60% gravel/cobble, 30% boulder, and 10% silt where live *A. marginata* was found. In the mid-channel, habitat substrate consisted of 95% sandy bottom material where live *L. recta* and *L. cariosa* was found. The left bank comprises of silt/sand/debris suitable for other mussel species.

An additional area (SRU16R) was identified during mussel surveys and habitat investigations as a potential relocation area for *L. cariosa* and *L. recta* for any stranded mussels of those species that prefer sandy substrate collected on the left side of the island in the same segment area (i.e. SRU16L). Water depths and velocities on the right side (when looking upstream) of the island indicate this area may continue to be a deeper 'chute' during river reestablishment after drawdown and dam removal, and may not be affected. Therefore, for facilitated relocation of any stranded mussels from anticipated sandbar on opposite side of island (as identified during 2015 test drawdown), relocation to this deeper channel (consisting of clay banks on the island shoreline and 100% sand in the channel) may be a utilized relocation area for nearby mussels species of interest. In addition, this area is accessible by the road by a steep walking path, and SRMT Environment Division staff may be able to access it in a timely and safe manner without boat access (however kayaking, boat pickup, wading/swimming will be necessary to access the sandbar). Boat access at a nearby private property (Danny LaShomb) will be contacted for potential access from shore (on the left bank, when looking upstream).

Access points for coordination and consideration for all salvage and relocation operations:

1. Boat launch by Mohawk School – Adjacent SRU01R-SRU02R
2. Tsionkwanati:io – Adjacent to SRU01L and SRU17
3. Neil Laughing's Ballfield – Adjacent to SRU08R
4. Buck White's Cornfields – Adjacent SRU10L
5. Nevin Road – Adjacent SRU10R
6. Nevin Road – Adjacent SRU16R
7. Danny LaShomb's Property – Adjacent SRU15L
8. Unidentified private landowner – Adjacent Relocation Pool #1
9. Leon Dishaw property – Adjacent Relocation Pool #3

Figure 1. Survey segments and Relocation Pools for St. Regis River Freshwater Mussel Pre-construction Surveys and Relocation

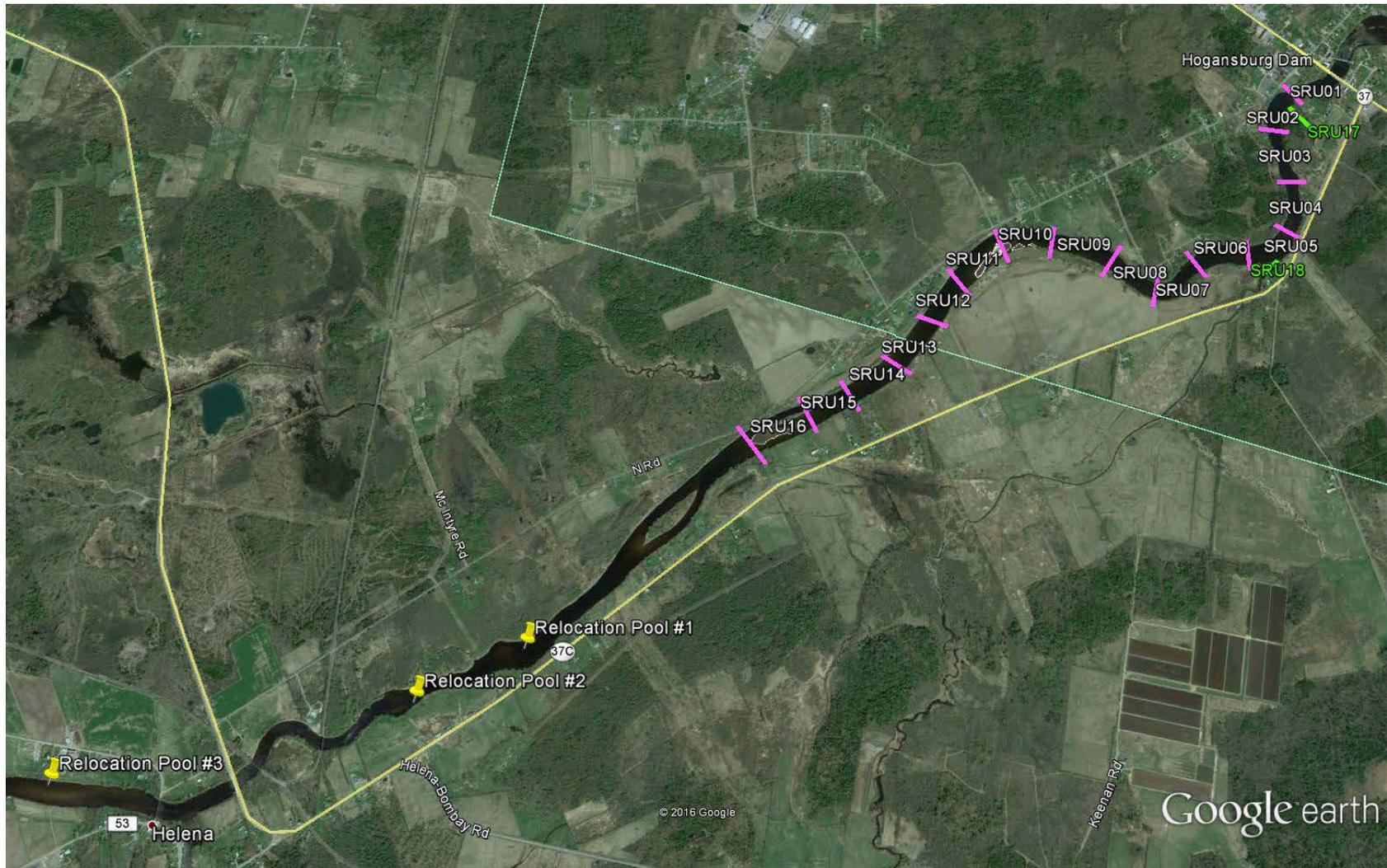


Table 1. Freshwater mussel species occurring in (and near) the St. Regis River and their conservation status (Table modified from Harper et al., 2015). Species (n=11) highlighted in bold text were found during June 14-24th, 2016 surveys.

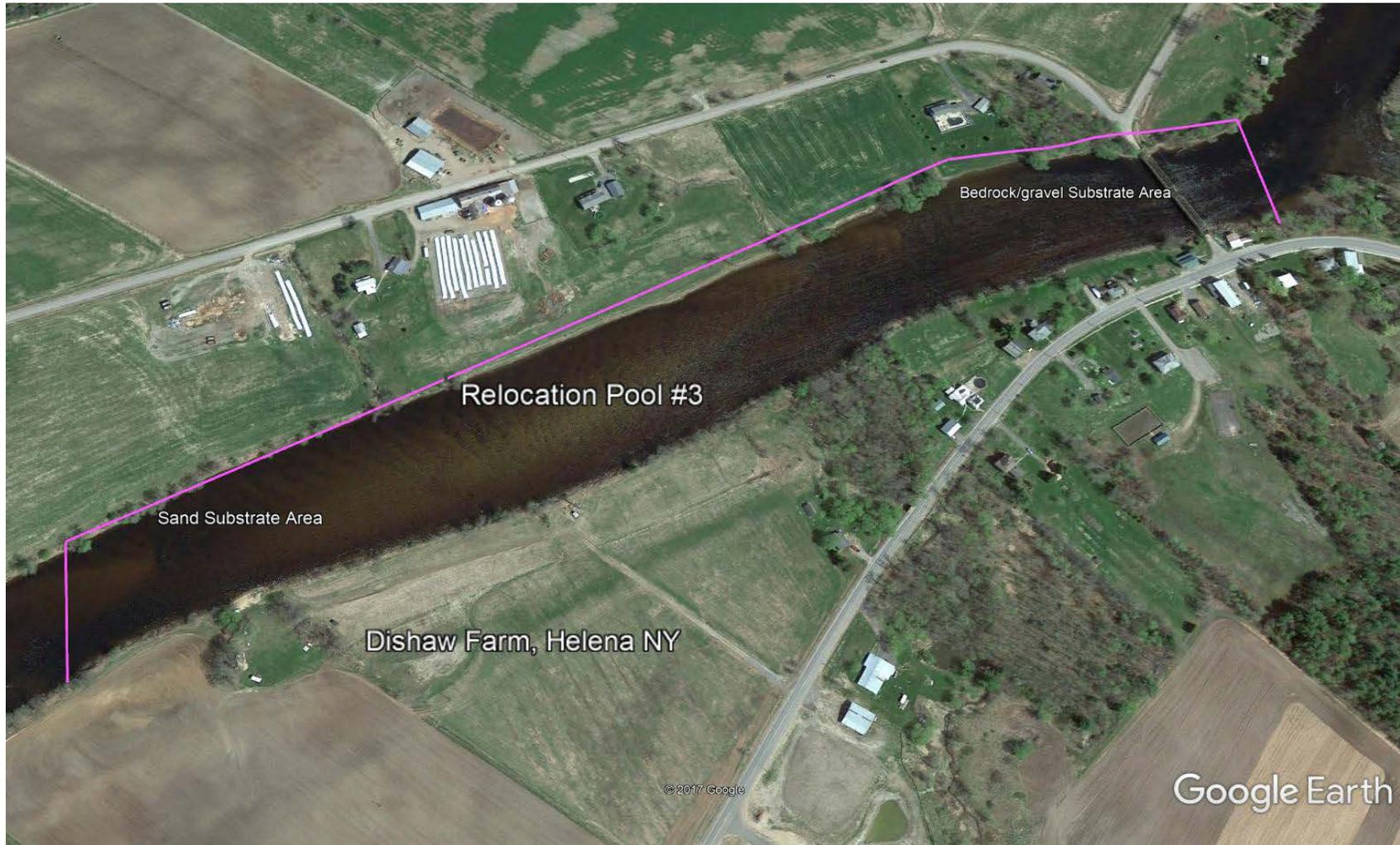
	Scientific Name	Common Name	New York Status ³	Species of Greatest Conservation Need (SGCN) in New York ⁴	Species of New England Conservation Concern (Therres, 1999)	COSEWIC ⁵	Ontario Status ⁶	Quebec Status ⁷	SARA Status ⁸
1	<i>Actinonaias ligamentina</i> ¹	Mucket		✓					
2	<i>Alasmidonta marginata</i>	Elktoe		✓	✓			*9	
3	<i>Alasmidonta undulata</i>	Triangle Floater							
4	<i>Alasmidonta varicosa</i>	Brook Floater	T	✓ (HP)	✓	SC			SC
5	<i>Anodontoides ferussacianus</i>	Cylindrical papershell							
6	<i>Elliptio complanata</i>	Eastern elliptio							
7	<i>Lampsilis cariosa</i>	Yellow lampmussel		✓	✓	SC			SC
8	<i>Lampsilis ovata</i>	Pocketbook		✓					
9	<i>Lampsilis radiata</i>	Eastern lampmussel							
10	<i>Lasmigona compressa</i>	Creek heelsplitter							
11	<i>Lasmigona costata</i>	Fluted shell							
12	<i>Leptodea fragilis</i>	Fragile papershell						*9	
13	<i>Leptodea ochracea</i>	Tidewater mucket		✓ (HP)	✓				
14	<i>Ligumia recta</i>	Black sandshell		✓ (HP)					
15	<i>Ligumia nasuta</i>	Eastern pondmussel		✓	✓	E	E		E
16	<i>Margaritifera margaritifera</i>	Eastern pearlshell		✓					
17	<i>Obovaria olivaria</i> ²	Hickorynut				E	E	*9	
18	<i>Potamilus alatus</i>	Pink heelsplitter		✓				*9	
19	<i>Pyganodon cataracta</i>	Eastern floater							
20	<i>Pyganodon grandis</i>	Giant floater							
21	<i>Strophitus undulatus</i>	Creper							
22	<i>Villosa iris</i>	Rainbow		✓ (HP)		E	T		E
Totals			1	11	5	5 (3 E, 2 SC)	3 (2 E, 1 T)	4 *likely	4 (2E, 2 SC)

E=Endangered, T = Threatened, SC = Special Concern, HP= high priority
COSEWIC = Committee and the Status of Endangered Wildlife in Canada

Notes:

1. This species previously reported as occurring in the AOC but further research indicates it is not known to occur in the AOC.
2. This species is considered historical (SH) in New York State.
3. New York Status: <http://www.dec.ny.gov/animals/7494.html>
4. SGCN Status: http://www.dec.ny.gov/docs/wildlife_pdf/sgnc2015list.pdf
5. COSEWIC October 2014 Status: http://www.cosewic.gc.ca/eng/sct0/rpt/csar_fall_2014_e.pdf
6. Ontario Status: <https://www.ontario.ca/environment-and-energy/species-risk-ontario-list>
7. Quebec Status: <http://www3.mffp.gouv.qc.ca/faune/especies/menacees/liste.asp>
8. SARA Status: http://www.registrelep-sararegistry.gc.ca/species/schedules_e.cfm?id=1
9. *Listed as “likely” to be designated threatened or vulnerable

Figure 2. Relocation Pool #3 (and associated riffle area downstream by abandoned bridge) will be primary relocation destination for all species



SRMT Staff, Teams, and Schedule

The relocation team is responsible for relocation and monitoring efforts. The team provides personnel and equipment needed to complete relocation and monitoring. Sufficient staff must be available to ensure safety and quality of work and minimize stress to the mussels during all phases of the relocation effort.

Jessica L. Jock will be primary contact and Project Manager for Mussel Relocation as identified in QAPP. Jessica Raspitha will be the contact for all volunteer activities, coordination, communication, and safety. All safety will be consistent with Appendix C. Safety Plan and Procedures- Wading and Snorkeling as outlined in QAPP (Jock 2016).

Jessica J. will also function as the Quality Assurance (QA) leader to ensure all relocation and monitoring protocols are followed, and determine if corrective actions are needed. Jay Wilkins will assist as part of the QA team, when available. The QA team be responsible for supervising and assisting monitoring design and setup, and accuracy in data recording and species identification. The QA team will also observe collection, handling, species identification, placement procedures, and monitor air and water temperatures and river discharge during the relocation effort. The QA team will check collection areas to ensure an acceptable percentage of mussels salvaged from impact areas (e.g. 90%). The QA Team will also inspect the transplant area to ensure the mussels are distributed properly throughout the transplant site and positioned correctly in the substrate. Replanting team will consist of staff involved in June 13-24th, 2016 mussel surveys and already trained and familiar with snorkeling safety and mussel hand-planting techniques.

Tony David, Water Resources Program and Hogansburg Dam Removal Project Manager will communicate daily with Jessica J. on water drawdown and dam removal/construction activities. Any changes in field conditions and/or construction activities may warrant a change to proposed activities below. As Water Resources Program Manager, Tony D. will also delegate appropriate Water Program Staff to assist with mussel relocation efforts of stranded mussels as needed and outlined below. Jessica J. will communicate and coordinate with ACR staff and Program Manager, Barb Tarbell.

SRMT staff Dakota Tarbell (Water Program), Jim Snyder (Water Program), Jay Wilkins (Env. Specialist), Angello Johnson (ACR), and Teio Skidders (ACR) were trained on how to identify and differentiate SGCN species of interest for this project by Dr. Mark Erickson. They will be the primary SRMT staff delegated (in order of appearance) to lead river monitoring teams and efforts during Mussel Relocation June 28th-July 8th, 2016. Other assisting field crew members include Dylan Herne, James Costello, Tyler Spillane all of the Water Program, and Aaron Adams (ACR), Vaughn Adams (ACR), and Craig Arquette (Env. Specialist).

Proposed Activities:

June 27, 2016 - Begin gradual drawdown of impoundment. Proposed to remove 2 stop logs (in height) for a proposed 12” drawdown.

June 28, 2016 - SRMT team of **Dakota Tabell, Jim Snyder, and Tyler Spillane** conduct

nearshore monitoring on impoundment (SRU01-SRU03) with focus on SRU17 and SRU18 tributary draining. Keep photographic log, as necessary and follow the Relocation Strategy below for any stranded mussels. Record all stranded and collected mussels on the field data sheet below. **Jay Wilkins** to assist with Floating mussel boxes (n=3) anchoring and field instruction. SGCN species to be held in floating fish box until June 30th, when replanting will occur.

GEAR: chest waders, small boat/motor, viewscope, buckets and mesh bags, floating mussel boxes, field log notebook and Field binder with Field Data Sheets (Appendix A), and field safety equipment (consistent with Appendix C in QAPP (Jock 2016).

- June 29, 2016 - Proposed to remove an additional 2-stop logs for an additional 12” drawdown (2’ total). Same nearshore monitoring activity by same team as proposed on June 28th, but to expand further upstream to SRU06). Same gear, same documentation, same efforts to hold SGCN species until June 30th.
- June 30, 2016 - Kick-off meeting and Safety Meeting at 8:30am at SRMT Environment. A minimum of 2-teams (3 if available) for river survey, stranded mussel identification, and relocation. 1-boat/per team.
Team #1 – Jessica L. Jock and Jay Wilkins (small AOC boat)
Team #2 – Dakota Tarbell, Jim Snyder, and Tyler Spillane (canoe(s))
Team #3 - Angello Johnson & Teio Skidders/Aaron & Vaughn Adams
- Conduct a full project area (SRU01-SRU18) monitoring search in morning. Hold a morning safety meeting and discuss access/launch locations for each team. In afternoon, a team of snorkelers will “replant” SGCN species collected thus far in Relocation Pool #3 (upstream in Helena). Qualified snorkelers to replant include: Jessica L. Jock, Jay Wilkins, Angello Johnson, and Craig Arquette.
- July 1, 2016 - Repeat same effort as conducted the day before, as needed, if needed. Revise relocation plan for week of July 5th-8th based on lessons learned, volunteer teams and/ or field conditions of pending weather or other.
- July 5, 2016 - Proposed to remove 2-additional stop logs for a 3’ total water drawdown.
- July 6-7, 2016 - Jessica Raspitha to assign river segment areas for targeted volunteer efforts. Assign 2-community volunteers to 1-SRMT Environment Division staff member. Anticipated areas include lead a team of volunteers adjacent shoreline access areas (i.e. SRU01, SRU08, SRU10, and SRU16). Assemble a SRMT staff snorkeling replanting team for each afternoon.

- July 7, 2016 - Remove final stop logs for ~4' water drawdown.
- July 7-8, 2016 - Conduct river monitoring, documentation, collection, and replanting as needed. Coordinate with all SRMT Environment Division staff for assistance as needed. Jessica Raspitha to assist staff coordination with Community Volunteer Teams.
- July 11-14, 2016- Continue river monitoring for stranded mussels, mussel collection, relocation documentation, and replanting. Conduct an initial mortality assessment swim-over upon relocation completion.
- July 18th, 2016 - Dam demolition to commence.
- July 18-29th, 2016 - Transfer efforts to monitoring impoundment area of affect for stranded mussels until drawdown complete.
- August 2016 - Conduct a 1-month swim-over to monitor for any mussel mortality.

Proposed Relocation Strategy

E. complanata is widespread throughout all adjacent rivers (with the exception of the main Stem St. Lawrence River due to invasive zebra mussels). Even though it is widespread, its high abundance and presence indicates it is a species of focus for relocation to prevent high species mortality. Considering its high abundance, and ability to occupy varying water depths and substrate, it is not desirable to relocate to targeted Relocation Pools, which may cause overcrowding to other Species of Greatest Conservation Need (SGCN). Therefore relocation strategy for *E. complanata* is to relocate to nearby adjacent deeper waters. The strategy for all stranded *E. complanata* will include salvage, record (i.e. count), and place back in adjacent nearby deeper waters (i.e. not anticipated to be affected by impoundment drawdown and/or dam demolition if possible). Placement will be distributed evenly (by boat or wader) at the surface of the water or substrate. Any *E. complanata* in the immediate footprint of the dam and impoundment will be moved upstream to a deeper reach of the river, above SRU01. If possible and feasible based on staff and boat availability, any *E. complanata* in the immediate footprint and impoundment will be moved upstream of SRU03. SRU03 is the upper limits of the footprint of the project impoundment as identified in the QAPP (Jock 2016).

Based on engineering predictions, and use of a gradual water level drawdown, it is not anticipated a large slug of sediment will move during drawdown and/or construction. Therefore, it is hypothesized that any *E. complanata* placed in deeper adjacent water in the stream where they are found between SRU01-SRU16 will be un-impacted throughout the construction period, with an anticipated high rate of survivability.

All other species when salvaged from nearshores, banks, and sandy shoals during monitoring activities will be collected, recorded, transported by buckets of water and temporarily stored in a floating mussel box until organized replanting teams are coordinated to Relocation Pools. Time out of substrate in floating mussel boxes will not be more than 48-hours.

The mussels will be maintained in water at ambient temperature during holding and transport. SGCN species will be evenly distributed and hand-placed in a natural position (i.e. anterior end down) in the substrate in designated Relocation Pools. The transplant area will be inspected following relocation to ensure unionids are properly distributed. This replanting organization is outlined in schedule of activity above with teams.

Figure 3. Floating mussel box



Mussel Mortality Assessment in Relocation Pool:

Relocation of stranded and stressed mussels is proposed during the drawdown as a proactive measure to mitigate unintended harm to local unionid populations. Relocation success has been reported as high as >97% at some sites (Cope et al., 2003), in comparison to a 77-95% mussel mortality (Cooper 2011; Doyle et al., 2005) by a ‘do nothing’ or ‘no action’ approach during dam removal. While proactive measures are proposed for mussel survivability, it is assumed there will be some mortality due to stress related conditions experienced by some mussels prior to intervention (i.e. extended periods in stranded pools of warm water and/or stranded on shore out of water).

To monitor success/failure of relocated mussels an initial (immediately following conclusion of replanting salvaged mussels) and a 1-month swim over assessment will be conducted in the Relocation Pool(s). Assessment of mortality upon completion of the initial relocation and a one month swim-over to monitor and retrieve fresh-dead mussels and observe mussel movement, behavior, and mussels’ general condition is a recommended method to assess success/failure of relocated mussels (Piette 2005).

Monitoring of species survival that were transported and replanted in Relocation Pools will take place approximately 1-month (August) post transport and replanting, but to be conducted no later than October 1, 2016. This is consistent with mussel survey period of May 1 to October 1 outlined in West Virginia Mussel Survey Protocols (Clayton et al. 2015).

Methods of monitoring will include a swim over using visual inspection via snorkeling. Documentation of any freshly-dead mussels will be recorded via underwater photographs and collection and count of all dead mussels observed in-situ. Photographs will be uploaded, labeled, and saved. Details and mortality count will be documented in the field log notebook, and reported in the final report *St. Regis River Freshwater Mussel Restoration*. Photographs that best depict observed mussel behavior and mortality observations during assessment will be included in the report.

The post-relocation mortality assessment will be conducted by the same QA Team (Jessica L. Jock and Jay Wilkins) as outlined above during salvage and relocation operations. They are the most familiar with the pre- and post-conditions of the Relocation Pool and mussel densities and placement from both the 2016 mussel survey and relocation field activities. The swim over will start at the most upstream extent of the area of replanting, with the 2-staff parallel to each other spaced at 1/3 and 2/3 of the river width, and float downstream with the current, moving in a zig-zag pattern to visually observe and cover the full area of replanting. There is no time limit to this effort, and will be considered complete when 90% of the area has been visually inspected. A figure depicting the area covered during this assessment will be included in the report.

References:

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- Jock, J.L. 2016. Quality assurance project plan for St. Regis River freshwater mussel restoration. Hogansburg dam removal pre-construction mussel surveys and mussel relocation site investigations. Prepared by Saint Regis Mohawk Tribe Environment Division (SRMTED) for U.S. Environmental Protection Agency (USEPA). GL-00E01943. 41 pp.
- Piette, Randal R. 2005. Guidelines for sampling freshwater mussels in wadeable streams. Wisconsin Department of Natural Resources, Fisheries and Aquatic Sciences Research Program. March 2005. Repot NO. 0092-01-09. 50 pp.
- U.S. Fish and Wildlife Services [USFWS] and Virginia Department of Game and Inland Fisheries [VDGIF]. 2015. Draft freshwater mussel guidelines for Virginia. Last updated June 22, 2015. 9 pp.

APPENDIX A. FIELD DATA SHEET (Part 1)

ST. REGIS RIVER MUSSEL SALVAGE

Sheet ____ of ____

Date (MM/DD/YY): _____ Time: _____ Team Leader: _____

Crew/Volunteers: _____

Location ID¹ _____

St. Regis Mohawk Tribe St. Regis River Mussel Salvage Data Sheet

Page ____ of ____

Form completed by: _____

Form verified by: _____

Site description:

	Species	Total QUANTITY (#) ²	Salvage Location and Notes
1	<i>Elliptio complanata</i>		
2	<i>Lampsilis cariosa</i>		
3	<i>Lampsilis radiata</i>		
4	<i>Ligumia recta</i>		
5	<i>Strophitus undulatus</i>		
6	<i>Alasmidonta marginata</i>		
7	<i>Alasmidonta undulatus</i>		
8	<i>Pyganodon cataracta</i>		
9	Unknown Species		
9	TOTAL COUNT		

1. Segment and side of bank where individual(s) were removed. See Figure 1. Riverbank determined when looking upstream.
2. Number of individuals removed at a particular location.

Species	100	200	300	400	500	600	700	800	900	1000
<i>E. complanata</i>										
	10	20	30	40	50	60	70	80	90	100
	10	20	30	40	50	60	70	80	90	100
<i>L. cariosa</i>										

APPENDIX A. FIELD DATA SHEET (Part 2)

ST. REGIS RIVER MUSSEL RELOCATION

Sheet ____ of ____

Date (MM/DD/YY): _____ Time: _____ Team Leader: _____

Replanting Crew _____

Location ID _____

St. Regis Mohawk Tribe St. Regis River Mussel Relocation Data Sheet

Page ____ of ____

Form completed by:

Form verified by:

Site description:

	Species	QUANTITY	Relocation Placement and Notes
1	<i>Lampsilis cariosa</i>		
2	<i>Lampsilis radiata</i>		
3	<i>Lampsilis ovata</i>		
4	<i>Ligumia recta</i>		
5	<i>Strophitus undulatus</i>		
6	<i>Alasmidonta marginata</i>		
7	<i>Alasmidonta undulatus</i>		
8	<i>Pyganodon grandis</i>		
9	<i>Pyganodon cataracta</i>		
10	<i>Anodontoides ferussacianus</i>		
11	<i>Elliptio complanata</i>		