The Tait Station Dam Removal Project: A Public Partnership and Mitigation Success Story

October 2, 2018

Ohio Transportation Engineering Conference (OTEC)
Greater Columbus Convention Center
Room: B233-235
Columbus, Ohio
Why ODOT Involvement

- ODOT stream mitigation need in the Lower Great Miami Watershed
- Tait Station Dam identified as a candidate for removal
- Cost-benefit analysis showed dam removal costs cheaper than in-lieu fee by >$500,000.00
- ODOT’s full delivery mitigation task order utilized
Why should Tait Station be removed?

- Barrier to aquatic life and recreational boating
- Maintenance liability for Miami Conservancy District (MCD)
- Significant large woody debris disposal and costs
- Public health & safety hazard
Project Background

- Tait Station c. 1935 (Dayton Power and Light)
- Dam was constructed to provide cooling water intake source to support power plant production
- Power plant decommissioned in 1983
- Ownership of dam transferred to Miami Conservancy District in 1990
  - MCD’s “Mistake by the Intake”
- Planning and grant applications to remove the dam started in 2014 (MCD)
- Dam no longer provides any beneficial public use.
- Dam does NOT provide any flood control purpose
ODOT has stream mitigation need in this watershed (2,678 LF for the BUT-73/177 Improvement Project)

- Tait Station Dam has become a barrier to aquatic and recreational uses of the GMR
- Aquatic and recreational impairments have been noted by numerous public agencies (Ohio EPA, 1995 and 2010)
- Maintenance liability to Miami Conservancy District (MCD, 2015)
- Large Woody Debris disposal and costs have increased
- Public Health and Safety Hazard
  - Recent fatalities on similar low head dams in Hamilton and Miamisburg.
  
  *Note: These are also in process of being removed*
Project Goal:
- To remove the Tait Station Dam and its associated infrastructure such that ecological lift is fully and functionally returned to the GMR within the area of the river channel (formerly) pooled under the influence of the Tait Station Dam.

Project Objectives:
- Demonstrate that the Project will provide over >2,678 LF of stream mitigation credits to satisfy ODOT’s current mitigation need in the Lower GMR Watershed
- Meet or exceed Ohio EPA’s use attainment status (WWH) for the GMR within the Project limits
- Improve water quality by reestablishment of riffle/pool complexes within Project limits
- Improve river ecology by rehabilitation of aquatic habitat for macroinvertebrates, fish, and unionid mussel species
- Restore habitat features and riparian buffers, to the degree practicable, by reestablishment of floodplain connectivity and/or adjacent wetlands
Project Objectives (Continued):

- Provide education and outreach opportunities for stakeholders to improve public awareness regarding the value of the GMR and its aquatic resources.
- Obviate maintenance needs for Project stakeholders, namely MCD.
- Eliminate a clear and present threat to public safety for those who enjoy recreational use of the GMR.
- Protect existing transportation infrastructure and other known utilities near Tait Station Dam.
Project Partnership –

No one can do it alone!

- **ODOT** – Project Funding, Design, Permitting, Engineering and Construction
- **MCD** – Technical Support, Background Data, Site Access, Funding and Resolutions
- **City of Dayton, Department of Water** – Utility Coordination, Utility Relocation
- **DP&L** – Utility Coordination, Site Access, Transmission Tower Access for webcam
- **University of Dayton** - Monitoring
Potential Mitigation Credits
Project Update (September 2018)

- Design Complete (Nov 2017)
- All Permits Received (Dec 2017)
- 9,471 Stream Mitigation Credits received (Jan 2018)
  - ILF Market value of $2.65M
- Total Project Cost is ~$1.75M
- Pooled Mitigation – Extra Credits
- Construction / Restoration (July 2018) IN PROGRESS

### Table 1 – Revised Estimated Stream Mitigation Credits

<table>
<thead>
<tr>
<th>Mitigation Project (Credits)</th>
<th>Ohio EPA RM (Start / Stop)</th>
<th>Credit Unit (LF)</th>
<th>Credit Ratio</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1, Activity Level 2 (active work zone)</td>
<td>(77.45 - 77.75)</td>
<td>1,584</td>
<td>1.50 : 1</td>
<td>2,376</td>
</tr>
<tr>
<td>Type 1, Activity Level 4 (pool reduction only)</td>
<td>(77.75 - 79.50)</td>
<td>9,460</td>
<td>0.75 : 1</td>
<td>7,095</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>9,471</td>
</tr>
</tbody>
</table>
Permitting and NEPA Compliance

- Ecological and Waterway Permitting
  - Corps – Section 404 Permit (Dec 2017)
  - USFWS – Section 7 Coordination (March 2017)
  - OHPO – Section 106 Coordination (Jan 2016)
  - NEPA C-1 Categorical Exclusion (July 2017)
  - Floodplain Coordination (March 2017)
  - Ohio EPA - Contaminated Sediments (Feb 2017)
  - Ohio EPA NPDES CGP (May 2018)
Tait Station Dam
HEC-RAS Model Combination of:
- Existing models (FEMA HEC-2),
- Additional field surveys
- Calibrated with 20 additional cross sections and a longitudinal profile

Figure 2. HEC-RAS profile showing select water surface profiles for the Full Dam and the Dam Removed with Grade Control. Results show that the dam pool extends upstream to near the Third Street Bridge.
Modeling and Design

Tait Station Dam
Modeling and Design

Table 2: Riffle dimensions and ODOT rock type quantities for each section of the riffle

<table>
<thead>
<tr>
<th>Riffle</th>
<th>L (ft)</th>
<th>W (ft)</th>
<th>Size</th>
<th>d85</th>
<th>d50</th>
<th>Qty (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glide Stone</td>
<td>14</td>
<td>460</td>
<td>ODOT C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crest Stone</td>
<td>6</td>
<td>460</td>
<td>ODOT B</td>
<td></td>
<td></td>
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<tr>
<td>Habitat Enhancement</td>
<td>3</td>
<td>460</td>
<td>ODOT A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run Stone</td>
<td>76</td>
<td>460</td>
<td>ODOT C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Trench</td>
<td>3</td>
<td>460</td>
<td>ODOT C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riffle Dimensions</td>
<td>90</td>
<td>460</td>
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</tbody>
</table>
Modeling and Design

Special considerations

- Scour model suggests very little change between full dam, existing dam and dam removed conditions
- Water main located upstream of dam
Additional Concerns

- Mussel beds / Mussel salvage
- Changes since original (2016-17) Surveys
- Asbestos
- N&S Railroad
- Legacy DP&L Intake Structures
Construction – Stop Log Removal
Construction – Sediment Dredging
Construction – North Bank Reestablishment
Construction – Mussel Salvage
Construction – Causeway
Before and After
The annual mitigation monitoring services are expected to include the following major subtasks to be performed by ODOT (Cardno):

- **Hydrology and Physical Habitat Monitoring Locations:**
  - Ten (10) monitoring stations shall be established within the proposed project area, with one taken every 1,000 linear feet upstream of the dam location.
  - Data collected at each monitoring station shall include assessments of hydrology and physical habitat (Qualitative Habitat Evaluation Index [QHEI] scores).

- **Biological Monitoring Locations:**
  - Two (2) monitoring stations shall be established within the proposed project area, one taken immediately above the dam removal at River Mile (RM) 77.5 and the other at the U.S. Route 35/Washington Street Bridge at RM 79.5.
  - Data collected at each monitoring station shall include assessments of biology (Index of Biotic Integrity [IBI] and Modified Index of Well Being [MIwb] scores) for boat sites.
# Mitigation Monitoring

## Table 3. Ohio EPA Biological Condition of GMR - Upstream of Tait Station Dam (RM 76.6)

<table>
<thead>
<tr>
<th>Year</th>
<th>USGS RM</th>
<th>Narrative Location (OEPA RM&lt;sup&gt;i&lt;/sup&gt;)</th>
<th>Lat / Long</th>
<th>QHEI</th>
<th>IBI / MIwb</th>
<th>ICI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>76.7</td>
<td>Ust. Tait Dam; Impounded (77.65&lt;sup&gt;1,2&lt;/sup&gt;)</td>
<td>39.731289-84.199856</td>
<td>44.0</td>
<td>38 / 8.9</td>
<td>n/a</td>
</tr>
<tr>
<td>1995</td>
<td>77.2</td>
<td>Ust. I-75 / adj. Carillon Blvd; Impounded (78.1)</td>
<td>39.72930-84.20930</td>
<td>42.5</td>
<td>42 / 8.3</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Summarized from “Biological and Water Quality Study of the Middle and Lower Great Miami River and Selected Tributaries, Volume 1” Ohio EPA, 1997. Red font indicates MWH.  
<sup>i</sup>Note: OEPA RM<sub>s</sub> presented in 1995 study are consistently off by a factor of 0.9 compared to USGS RM & FEMA FIS.  
<sup>1</sup>Note: The OEPA station previously identified as RM 77.1, ust. Tait Dam, is in fact located at RM 77.65 (aka USGS RM 76.7)
Mitigation Monitoring

- **Monitoring Frequency:** Annually for five (5) Consecutive Years
  - Biological monitoring must be performed between June 15 and September 30 during Years 1, 3, and 5.
  - **Note:** Year 1 for biological monitoring purposes shall be the same year the Tait Station Dam has been removed.
- **Monitoring Reports:** Five (5) annual post-construction monitoring reports shall be prepared in accordance with RGL 08-03 and provided to ODOT no later than November 30th of each year. Monitoring reports are due to the Corps by December 31st beginning the year after the Tait Station Dam has been removed, to document net increases in aquatic resource functions and services.
Mitigation Monitoring – QHEI v IBI v MIwb

[Graphs showing IBI, MIwb, and ICI values for different locations and years.]
By the end of the 5-YR monitoring period,

- The restored segment of the Tait Station Dam Pool of the Great Miami River shall achieve full attainment of Warmwater Habitat (WWH) status.
- QHEI scores shall achieve a minimum average of greater than or equal to 60.0, indicative of WWH.
- Two (2) IBI scores upstream of the dam shall be no less than 45.0, indicative of WWH.
- Two (2) MI(wb) scores upstream of the dam shall be no less than 8.5, indicative of WWH.
- Project shall use only Ohio native, non-woody species to seed disturbed riparian areas along the Great Miami River. A minimum of 80% relative aerial coverage of native species, including volunteer native vegetation, shall be established.
- The restored floodplain benches inside the Miami Conservancy District levees, between the dam removal site and the upstream Interstate 75 bridge over the Great Miami River, shall have no more than 10% relative aerial coverage of invasive species.
- Post-construction monitoring shall include data to ensure the authorized activity results in net increases in aquatic resource functions and services as compared to pre-construction data.
Questions

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