Tittabawassee River, Saginaw River & Bay Site

Segments 4 & 5
EPA's Proposed Cleanup Options

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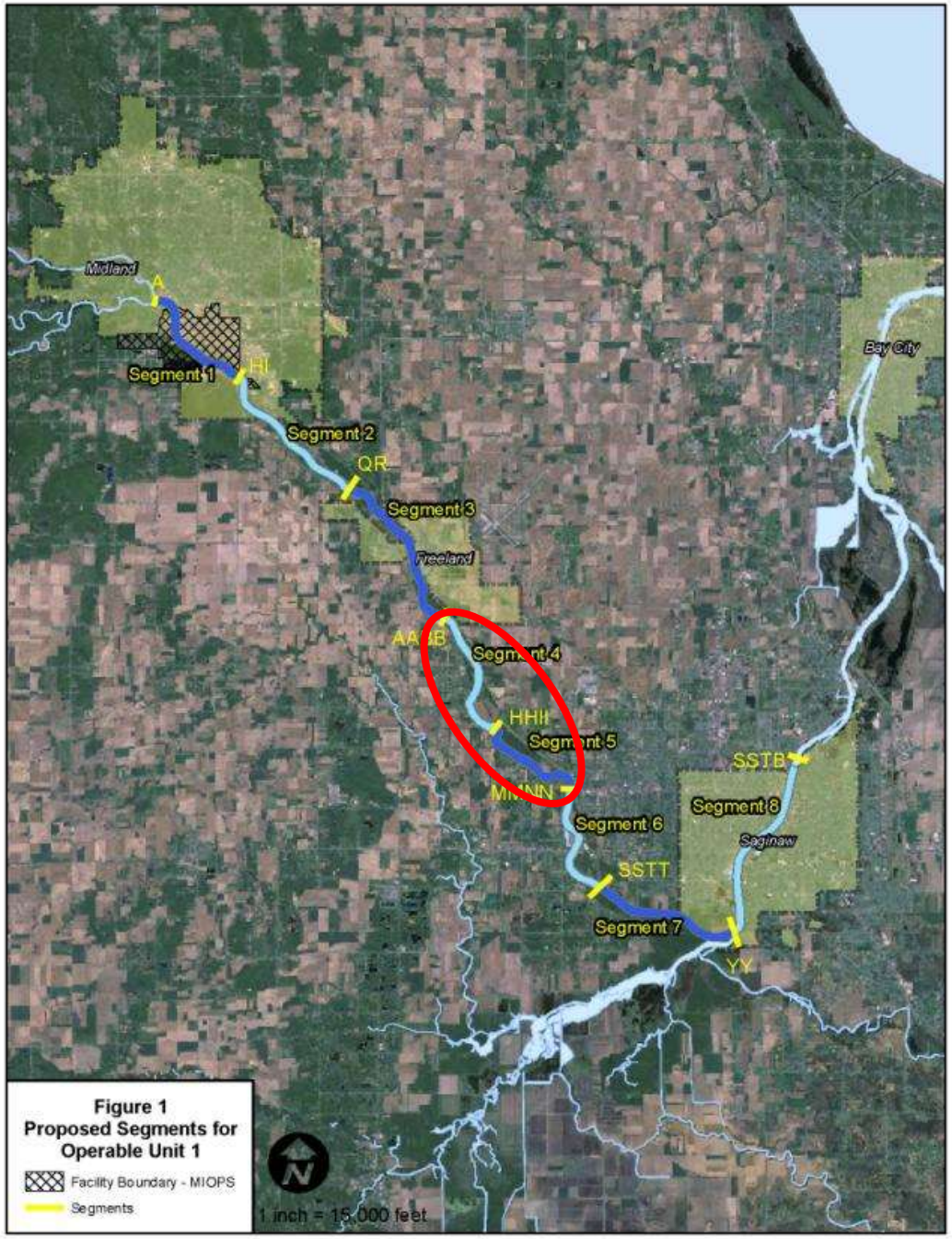
CAG Meeting September 19, 2016

Segments 4 & 5

- Part of larger TRSR&B site
- Starts ~ 11.5 miles downstream of Tridge
- Cleanup options are proposed by EPA for
  - 16 Bank Management Areas (BMAs)
  - 2 Sediment Management Areas (SMAs)
- Cleanup expected to begin in 2017

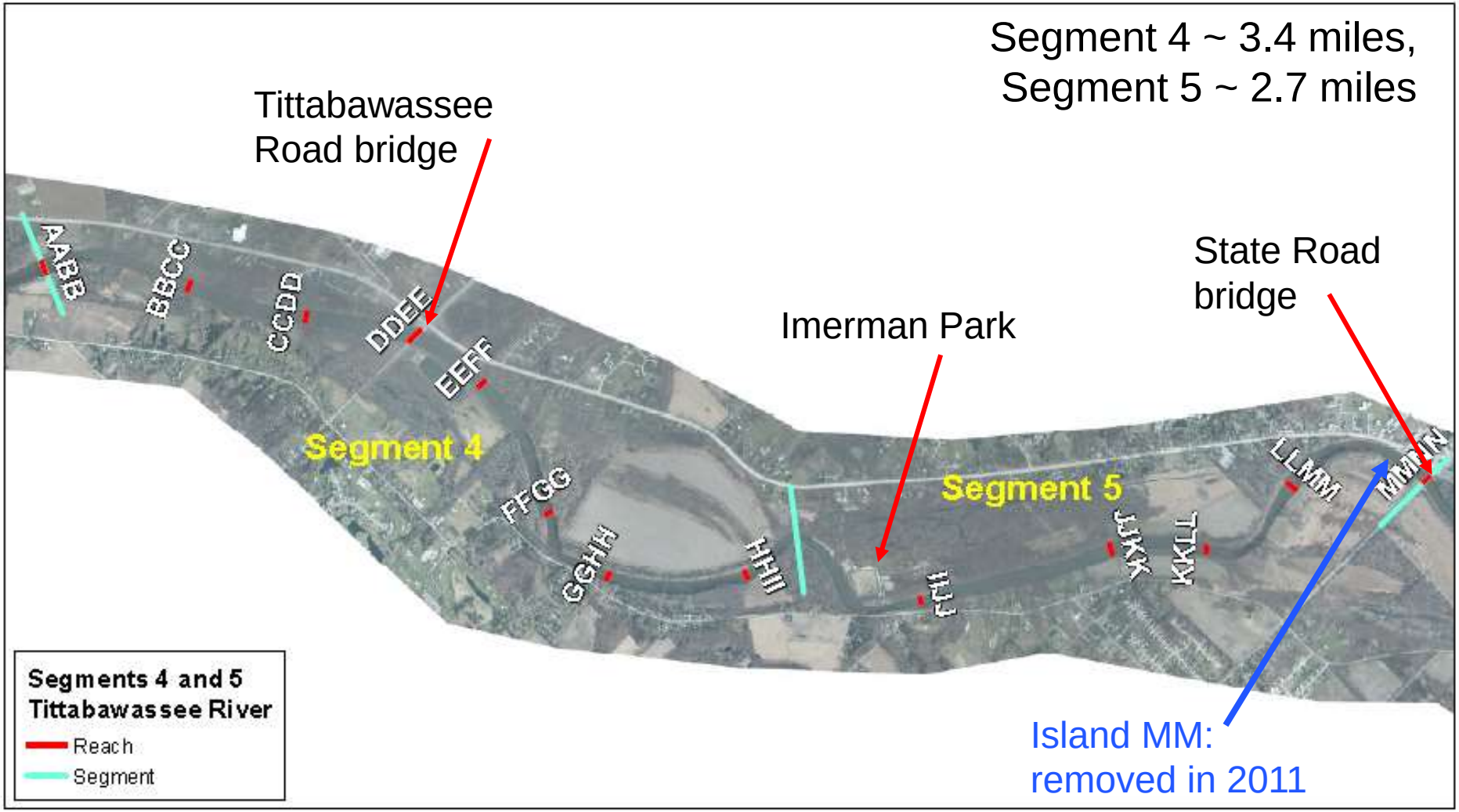


EPA's Proposed Options

- Bank Management Areas
  - BMAs 4-1 through 4-6 and 5-1 through 5-10 → stabilize riverbanks
- Sediment Management Areas
  - SMA 5-1 → combination of removal, capping, and monitored natural recovery (MNR)
  - SMA 5-2 → capping

Segments 4 & 5

Use along river includes residential, undeveloped, agricultural, and recreational areas



Segments 4 & 5 Investigations

Extensive investigations within Segments 4 & 5:

- Chemical sampling and analysis
- Physical properties
- Stability evaluations
- Biological evaluations

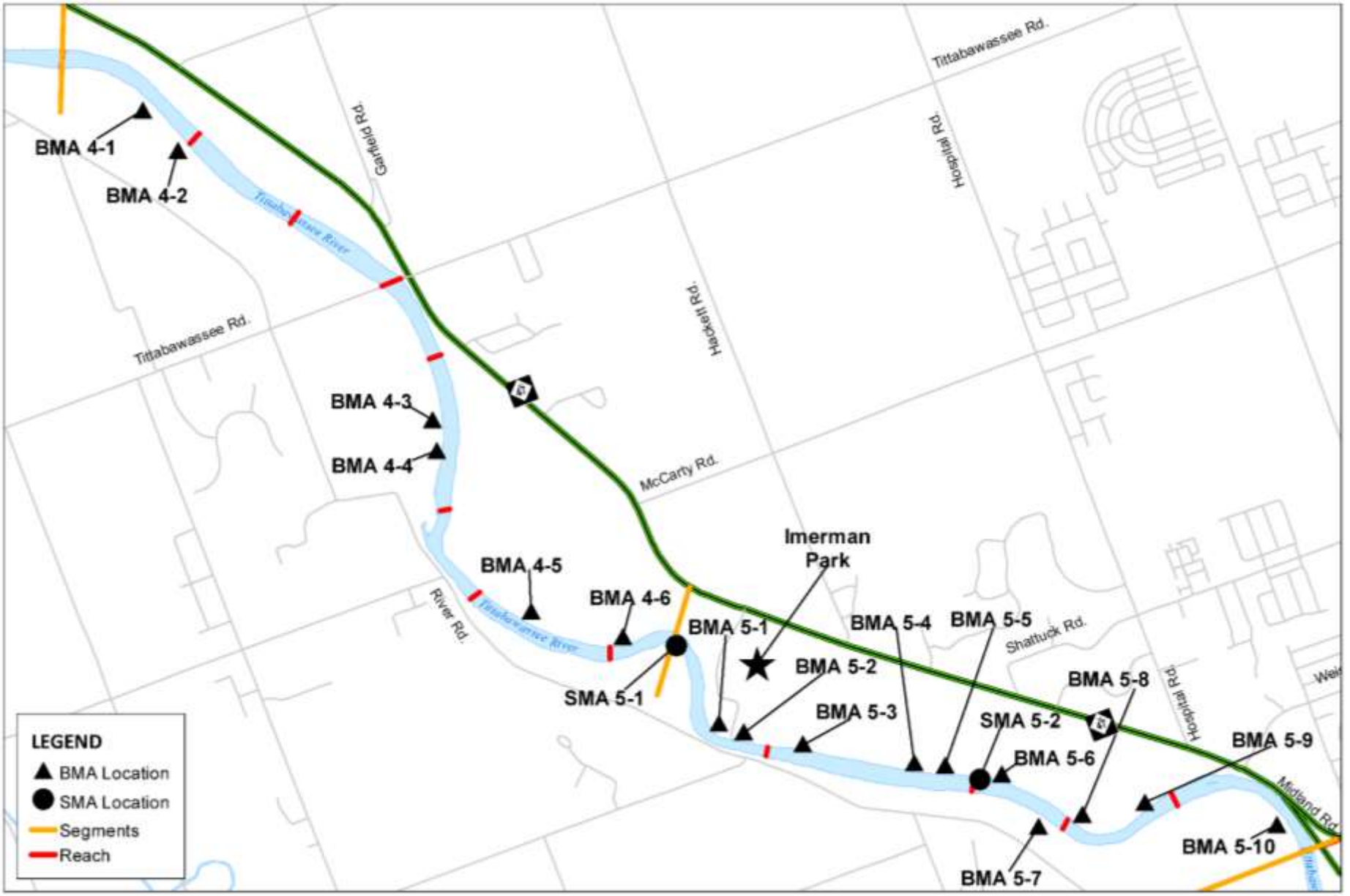
Segments 4 & 5 Key Findings

- Dioxins/furans identified as key driver for Segments 4 & 5 sediment and bank soil
- Dioxins/furans are not evenly distributed within Segments 4 & 5
- Riverbank and sediment erosion varies
- Specific areas have been identified that will need cleanup

Segments 4 & 5 Management Areas

- BMAs
  - 16 currently identified
  - Range between 150 – 650 feet
  - About 1.1 miles total
- SMAs
  - 2 currently identified
  - Each about 0.7 acres
- Evaluations are ongoing
  - More areas may be identified

Segments 4 & 5 Management Areas (cont.)



Why Clean Up?

- Contaminated sediment deposits and riverbanks
  - Potential sources of dioxins/furans to the overall river system if they erode

- If these sources erode they may contribute to:
  - Bioaccumulation in fish
  - Downstream movement of contaminants

BMA CLEANUP OPTIONS

BMA Technologies

- **BMA Alternative 1: Stabilization** relies on natural and engineered approaches to reduce or prevent riverbank erosion. Native vegetation is always a key component.

- **BMA Alternative 2: Removal** involves the removal and off-site disposal of the targeted bank deposit using heavy equipment.

Riverbank Stabilization – Major Advantages/Limitations

- Advantages
  - Less disruption during construction
  - Less change to property and riverbank shape
  - Improves habitat quality
  - Cost effective

- Limitations
  - More short-term maintenance needed
  - Contaminants remain in place
  - Long-term monitoring required and possibly maintenance

Bank Stabilization

Banks after 1 – 3 growing seasons

Riverbank Removal – Major Advantages/Limitations

- Advantages
  - Least uncertainty about long-term performance
  - Flexibility for future land use
- Limitations
  - Significant disruption during construction
  - Removes existing habitat
  - Significantly changes riverbank shape and structure
  - May cause unintended changes in other banks
  - Implementation usually more costly and complex

Bank Removal

Bank Removal and Disposal

Recommended BMA Options

- All BMAs → stabilize riverbanks
- Major considerations
  - Expected land owner/ community acceptance
  - Trade offs related to short and long-term effects
  - Potential impact on adjacent areas
  - Access and ability to assure long-term O&M
  - Cost effectiveness

SMA CLEANUP OPTIONS

SMA Technologies

- **MNR** relies on monitoring of natural processes to maintain or reduce contaminant levels and risks over time.

- **Capping** involves placing clean material like sand or gravel over contaminated sediment or letting geocell material fill naturally to isolate and stabilize the underlying sediment. Caps are designed to prevent erosion.

- **Removal** involves taking sediment out of the river in wet or dry conditions using heavy equipment. Water is managed, and the sediment is disposed in an approved location.

Segments 4 & 5 SMA Alternatives

- Each individual technology is an alternative for SMA 5-2
- Technologies were combined to create alternatives for SMA 5-1

SMA	Alt 1	Alt 2	Alt 3	Alt 4
5-1	MNR	Cap & MNR	Remove & MNR	Remove, Cap & MNR
5-2	MNR	Cap	Remove	---

MNR – Major Advantages/Limitations

- Advantages
  - Non-invasive
    - Protects existing habitat
    - No construction or infrastructure
  - Low implementation cost

- Limitations
  - Contaminants remain in place
  - Can be slower in reducing risks compared to active approaches
  - Long-term monitoring required

Capping – Major Advantages/Limitations

- Advantages
  - Rapid risk reduction
  - Less infrastructure/disruption during construction
  - Can improve habitat quality
  - Cost effective

- Limitations
  - Contaminants remain in place
  - Long-term monitoring required and possibly maintenance

Sediment Capping – Sand/Stone

Sediment Capping – CCS

Dredging/Removal – Major Advantages/Limitations

- Advantages
  - Removes contaminants from river
  - Least uncertainty about long-term performance, if low residual levels achieved
  - Rapid risk reduction, if low residuals levels achieved

- Limitations
  - Significant infrastructure/disruption during construction
  - Residuals and resuspension
  - Implementation more costly and complex

Sediment Removal – Wet

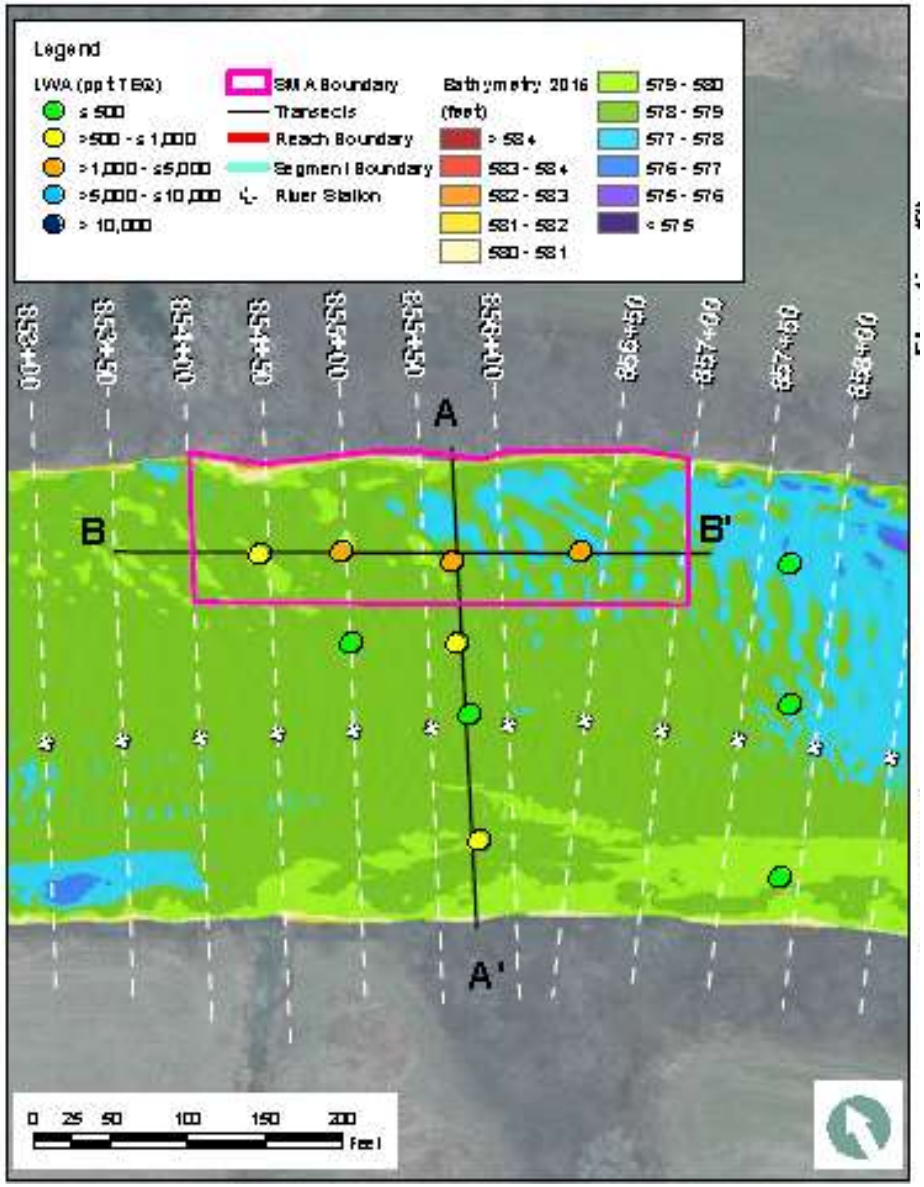
Sediment Removal – Dry

Recommended SMA Options

- Recommended Options
  - SMA 5-1 → Alt 4: combo of remove, cap and MNR
  - SMA 5-2 → Alt 2: cap (likely CCS cap)

- Major considerations
  - Contaminant depth and profile
  - Stability evaluations
  - Adjacent work needed
  - Implementation challenges
    - Access and staging availability
    - Water depth/construction issues

SMA 5-2, ~ 0.7 acres

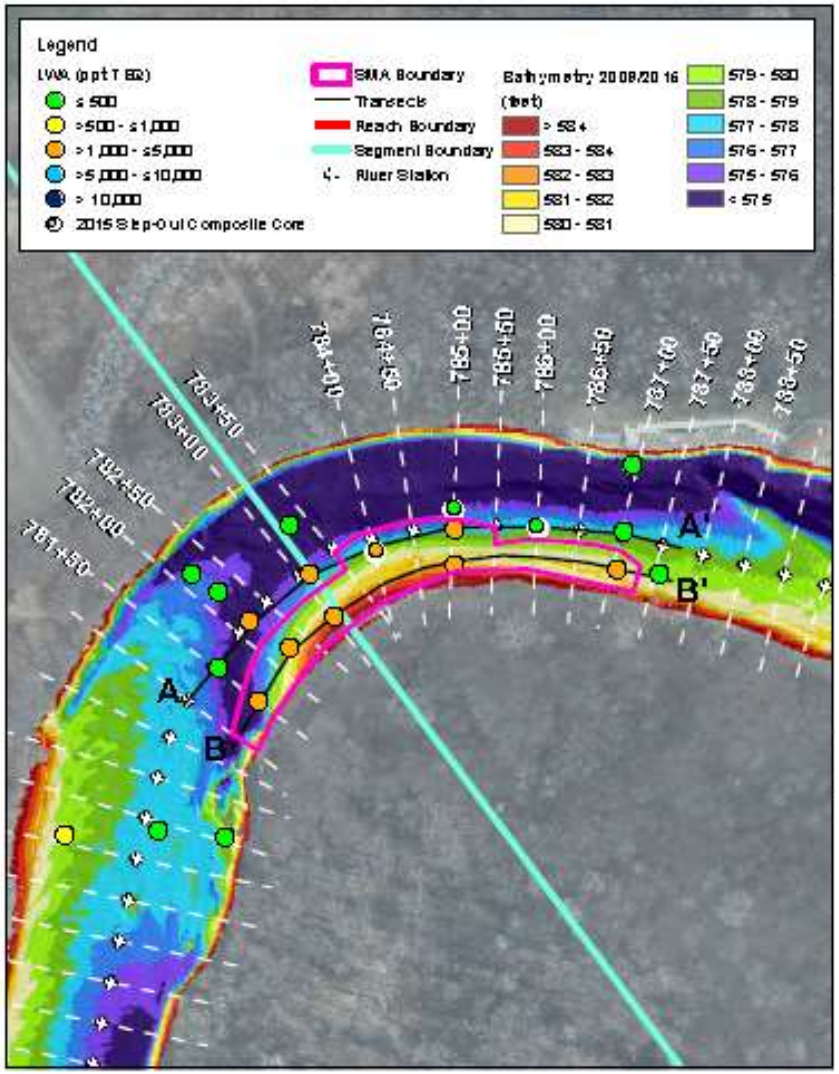


- Directly adjacent to BMA 5-6
- TEQ deposit is buried below 1.0 to 1.7 ft
- Relatively stable area
- Road: ~ 1,700-ft through a sparsely wooded area

BMAs 5-4 thru 5-9 and SMA 5-2

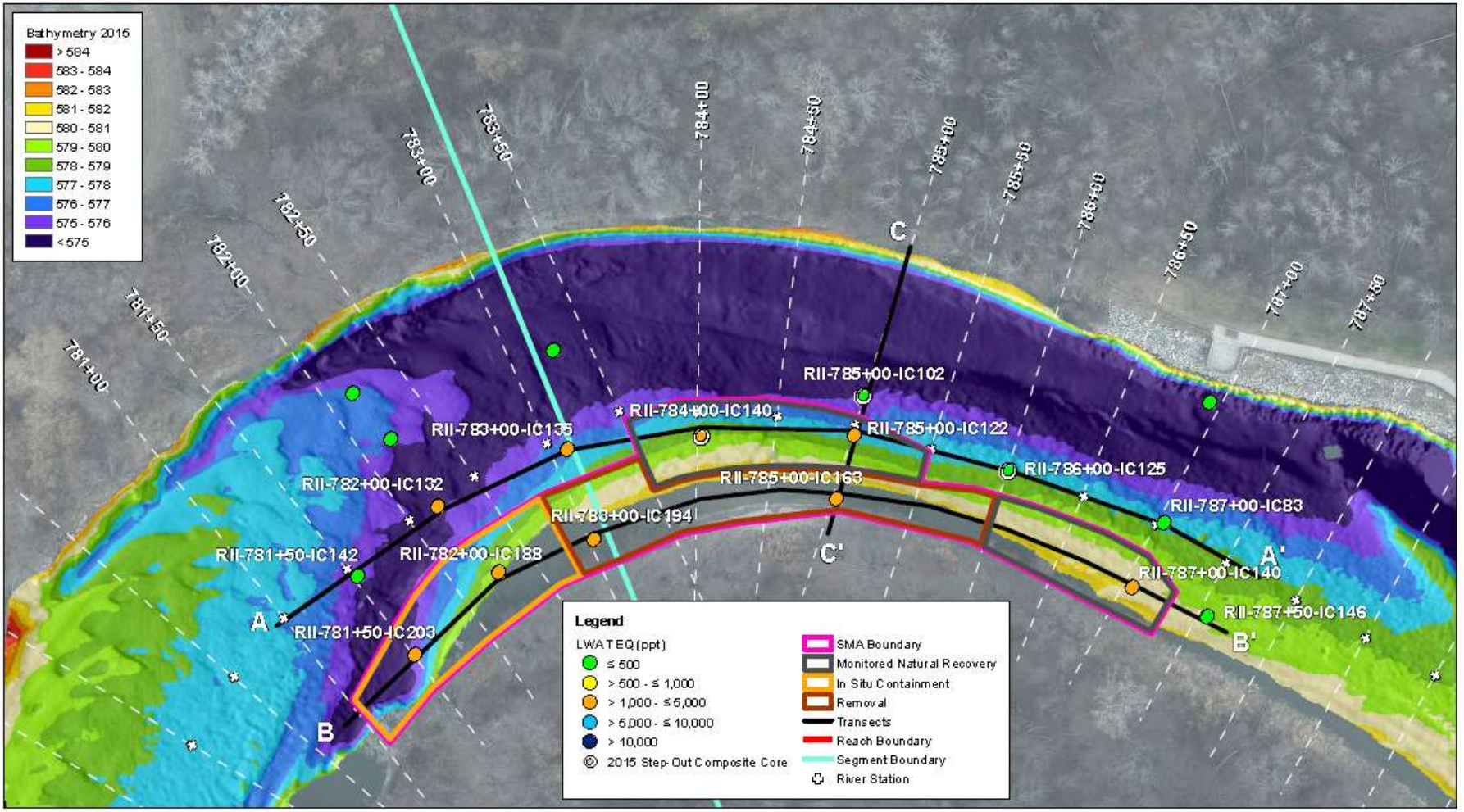
BMA and SMA locations approximate

SMA 5-1, ~ 0.7 acres



- Not near other work
- TEQ deposit depth varies
  - Some close to surface
  - Mid-channel and downstream is buried below > 2 – 4 ft
- Upstream end has deep water
- Road: ~ 1,400-ft through an existing open field, and ~ 650-ft through a wooded area

Conceptual SMA 5-1 Combined Remedy



BMA 4-6 and SMA 5-1

SELECTING THE FINAL CLEANUP PLAN

EPA Policy Statements on Remedy Selection… (2005 Guidance)

- There is **no presumptive remedy** for any contaminated sediment site, regardless of the contaminant or level of risk

- Both in-place and removal approaches may reach acceptable levels of effectiveness and permanence, depending on site conditions

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EPA's Evaluation Criteria

- Effectiveness
  - Overall protection
  - ARAR compliance
  - Reduction on TMV
  - Short-term effectiveness
  - Long-term effectiveness and permanence
- Implementability
  - Technical and administrative feasibility
  - Availability of materials and services
  - Owner/ community acceptance
- Cost

Estimated Response Costs

- Cost of recommended options
  - Bank ~ $3,400,000
  - Sediment ~ $1,800,000 – 2,600,000

- Total ~ $5,200,000 – 6,000,000

    - Previous cost – Island MM was $520,000

Recommended Alternatives

Recommended alternatives – best balance of effectiveness, implementability and cost

- Provides long-term effectiveness and permanence
- Minimizes short-term effects
- Can be built and are reliable to maintain

Public Comment Period

- Public comment period for 45 days
  - September 22 to November 6
- Submit comments
  - Orally – at the public meeting
    - Wednesday, Oct. 19, 6:30 p.m.
    - Arrowwood Elementary School, 5410 Seidel Rd., Saginaw
  - Written – submit here or via mail
  - Email to russell.diane@epa.gov

Next Steps

- EPA and MDEQ will review and respond to public comments
  - The plan may change based on comments
- EPA will finalize the plan
- Dow will design the remedies
  - Working with affected property owners
- EPA expects Dow to implement this work beginning in 2017

Project Area		2014	2015	2016	2017	2018
Segment 2		First season of construction	Finish construction			
TR Floodplain		Propose cleanup plan to public Finalize cleanup plan	First season of construction	Second season of construction	Third season of construction	Fourth season of construction
Segment 3		Develop cleanup plan	Propose cleanup plan to public Finalize cleanup plan	First/only season of construction		
Segments 4 & 5				Propose cleanup plan to public Finalize cleanup plan	First season of construction	Second season of construction

END