EIGHTEENMILE CREEK BUI 3 & 5 REMOVAL CRITERIA REVISIONS

National AOC Workshop
Cleveland, OH
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Overview

- Site Background

- Why do we need new criteria?

- How did we make realistic criteria?

- Helpful suggestions and final thoughts

Site background

- Watershed is completely within Niagara County
- Pollution track down shows ‘Creek Corridor’ is the source area of pollution

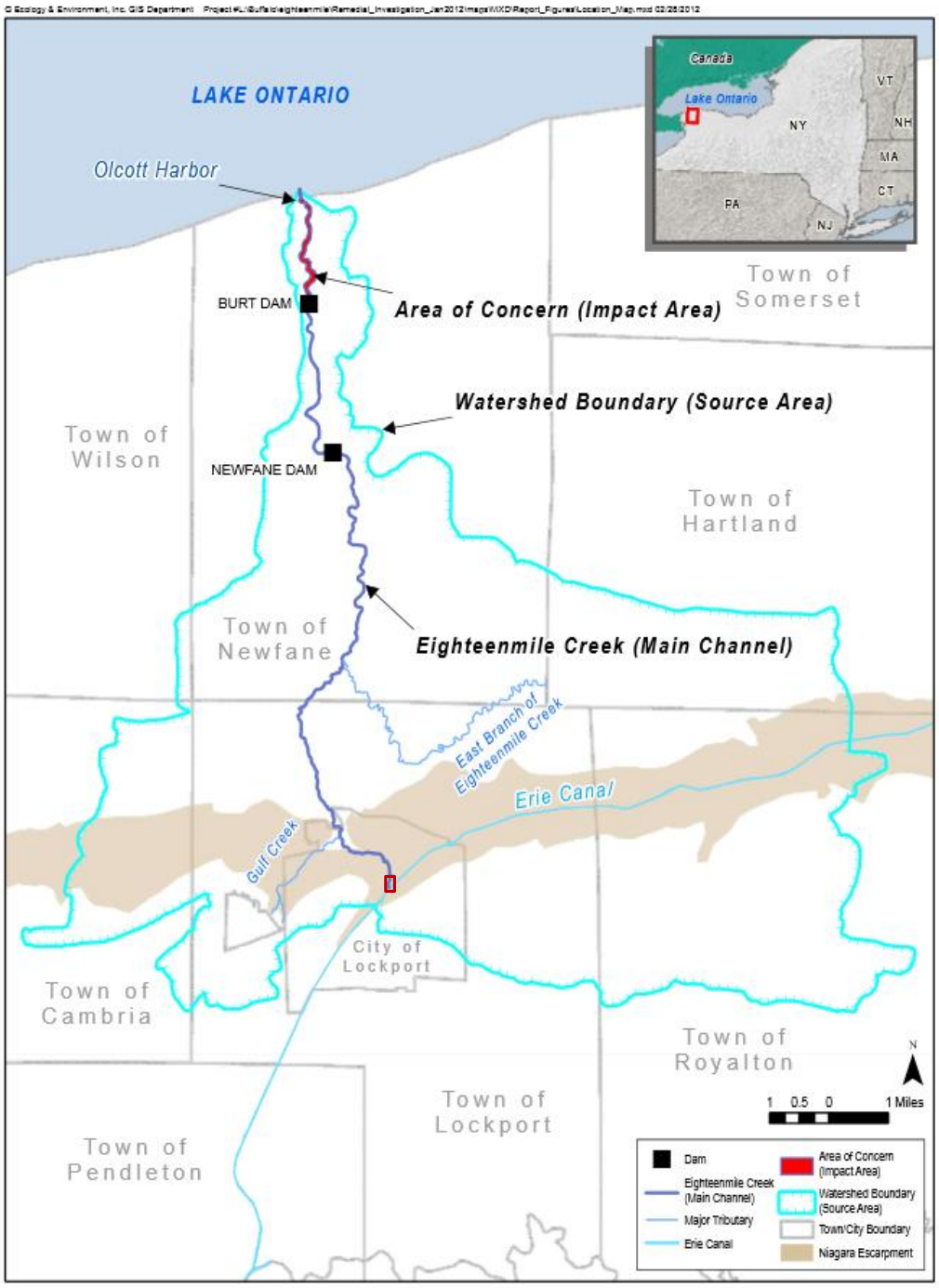


Figure 1 Eighteenmile Creek AOC Project Area and Watershed Boundaries

Site background

- Fishing destination
- Current BUIs
  - 1. Restrictions on fish and wildlife consumption
  - 3. Degradation of fish and wildlife populations
  - 5. Bird or animal deformities/reproductive problems
  - 6. Degradation of benthos
  - 7. Restrictions on dredging

Why do we need new criteria?

- Management action lists
- Current criteria not feasible
- Outdated

Why do we need new criteria?

- BUI 3.

1. Fish and wildlife diversity, abundance, and condition are statistically similar to diversity, abundance and condition of populations at non- AOC control sites; AND

2. PCB levels in bottom-dwelling fish do not exceed the critical PCB tissue concentration for effects on fish (440 micrograms per kilogram [µg/kg] of weight; Dyer et al. 2000).

- BUI 5.

1.No reports of wildlife population deformities or reproductive problems from wildlife officials above expected natural background levels; **AND**

2. Contaminant levels in bottom-dwelling fish do not exceed the level established for the protection of fish-eating wildlife (NYSDEC Fish Flesh Criteria); **OR**

3. In the absence of fish data, the toxicity of sediment-associated contaminants does not exceed levels associated with adverse effects on wildlife (NYSDEC Fish & Wildlife Bioaccumulation Sediment Criteria).

How did we make new criteria?

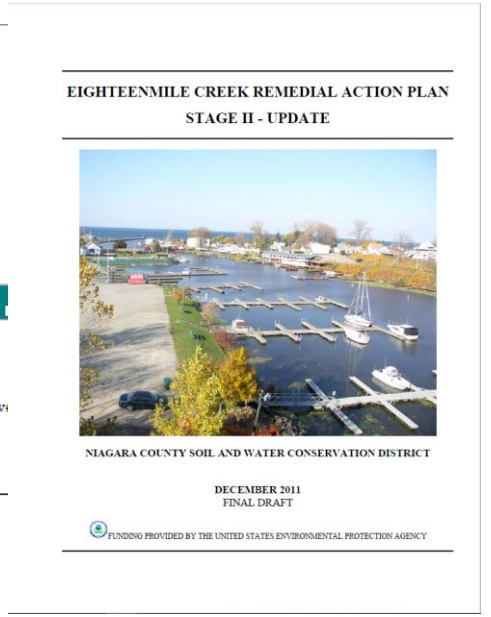
- Discuss changes with RAC
- Dissect old criteria and run through the SMART (Specific, Measurable, Attainable, Relevant and Timebound) filter

	A	B	C	D	E	F	G	H	I	J	K	L
1		BUI #	Removal Criteria	Does this have specific criteria? Specific species to be assessed, or what needs to be achieved?	Does this have a measurable target or reference site?	What is the measurable target?	What media needs to be sampled?	Is this BUI achievable? Can we reach the target?	What is needed to complete this BUI?	When can we expect to remove this part of the BUI?	Are reference areas able to meet this goal?	Comments
4	3	Degradation of Fish and Wildlife Populations Impaired Populations: Fish and insufficient data for Mammal populations. NOT impaired: birds and amphibs	Fish and wildlife diversity, abundance, and condition are statistically similar to diversity, abundance, and condition of populations at non-AOC control sites; AND	It's not a clear-cut specific number, but there is a specific criteria to be statistically similar to a control site	Specific targets would be species diversity and abundance across 1 or more sites. Species condition is an obscure target that would be difficult to measure	Species condition, diversity and abundance of EMC compared to a reference site (usually Oak Orchard Creek).	Abundance and diversity in EMC and a reference site should be measured for: fish, mammals, reptiles, amphibians and birds. Condition will vary by species caught.	Abundance and diversity can be measureable and achieved, although they are not specific. Condition is not specific and can vary greatly based on spcies captured.	Fish and other wildlife population, diversity, abundance and condition surveys. If a species is not comparable to a reference site, other actions would be needed to determine why. Any habitat restoration?	?	N/A	Abundance and diversity can be somewhat specific when comparing to a non AOC site. Condition would have to be assessed during the fish and wildlife survey and would vary by species.
5			PCB levels in bottom-dwelling fish do not exceed the critical PCB tissue concentration for effects on fish (440 micrograms per kilogram wet weight; Dyer et al. 2000).	Yes, 440 micrograms per kilogram	Yes	440 micrograms per kilogram	Catfish or bullhead	Not sure	sediment remediation	After sediment remediation- 2025+	Not sure	Scott George Comments: The removal criteria for BUI #3 has two parts - both of which have to be met as currently stated. The second part, should not be part of this BUI. PCB levels generally do not directly affect fish populations (see Henry 2015, https://doi.org/10.3109/10408444.2015.1038438), so tying an evaluation of fish populations to PCB concentrations doesn't follow. You could argue that this second criteria is aimed at fish-eating wildlife where PCB effects are more likely - but this is already addressed under BUI #5 (Bird/Animal Deformities or Reproductive Problems). Eliminating this second criteria of BUI #3 would not ignore elevated PCB concentrations in fish - but rather let the appropriate BUIs (#1 and #5) address it.
6		**IJC Listing Guideline:** When wildlife survey data confirm the presence of deformities (e.g. cross-bill syndrome) or other reproductive problems (e.g. egg-shell thinning) in sentinel wildlife species. **Bird/Animal**	No reports of wildlife population deformities or reproductive problems from wildlife officials above expected natural background levels; **AND**	No	No	Reports of deformities or reproductive problems	"Wildlife"	Unknown; what constitutes a background level? Bullhead have been found to have higher rates of tumors, but not severe tumors. Other than mink what other wildlife would have tumors? Deformities and reproductive problems: mink, birds, amphibians	sediment remediation	Unknown	Yes?	Unknown background levels. Who is going to report other deformities? Are we looking for specific wildlife? E&E 2009 indicated "There were no observations of deformed or obviously sick or diseased individuals at either of the creeks"
7			Contaminant levels in bottom-dwelling fish do not exceed the level established for the protection of fish-eating wildlife (NYSDEC Fish Flesh Criteria); **OR** http://www.dec.ny.gov/docs/wildlife_pdf/niagarabiotscontsmproj.pdf	Yes, the values are in the NYSDEC Fish Flesh Criteria http://www.dec.ny.gov/docs/wi	Yes	Fish flesh criteria	Catfish or bullhead - assumed to be selected due to previous sampling	David: PCB concentrations in AOC fish are much higher than the Oak Orchard Creek reference site. August 2007 analysis of brown bullheads in Eighteenmile Creek and Oak Orchard Creek reported average concentrations of 3.2 ppm and 0.187 ppm, respectively. While AOC concentrations were an order of magnitude higher than Oak Orchard, both exceeded the NYSDEC Fish	sediment remediation	After sediment remediation-	Oak Orchard Creek hasn't met	May not be attainable. From MI Wildlife Report https://www.michigan.gov/documents/deq/wrd-swas-wildlife-BUI2015_528802_7.pdf - Evaluate observational data on reproductive or developmental effects in wildlife living in the AOC. - Compare tissue contaminant levels in egg, young,

How did we make new criteria?

- Talk with Technical Review Lead (TRL) and other partners
- Incorporate previous studies

Beneficial Use Impairment	Status	Removal Criteria	Studies already Completed	Links to Previous Studies	
3. Degradation of Fish and Wildlife Populations	Impaired	Fish and wildlife diversity, abundance, and condition are statistically similar to diversity, abundance, and condition of populations at non-AOC control sites; AND	**E&E 2009**– A Beneficial Use Impairment study compared fish, bird, mammal, and amphibian population abundance and condition to a non-AOC control Site, Oak Orchard. •Fish- (**No Impairment**) Diversity and condition was highly similar between creeks. A minor difference between creeks was observed in catch per unit effort (abundance measure), but this difference was likely due to a difference in sampling efforts between creeks in August 2007. •Birds- (**No Impairment**) Bird diversity and abundance between creek were very similar. Some minor differences in species between creeks were observed, likely due to differences in ripariain habitats. •Mammals- (**Limited data-No Suggested Impairment**) Lower abundance of mammal species was observed at Eighteenmile compared with Oak Orchard Creek, may be due to an artifact of sampling, limited data. •Amphibians- (**No Impairment**) Similar number of amphibian species and abundance observed between Eighteenmile Creek and Oak Orchard.	E&E 2009	Mink Surv Fish contaminant study and population assessment.


EIGHTEENMILE CREEK REMEDIAL ACTION PLAN
STAGE II - UPDATE

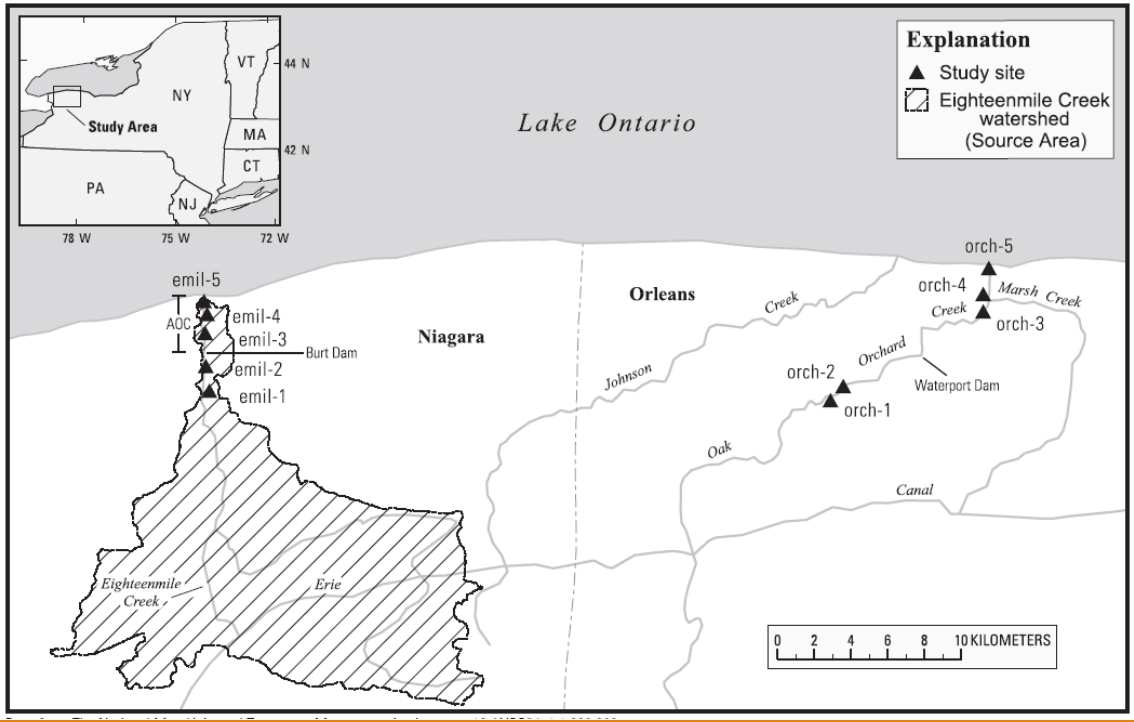
NIAGARA COUNTY SOIL AND WATER CONSERVATION DISTRICT

DECEMBER 2011
FINAL DRAFT

FUNDING PROVIDED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

How did we make new criteria?

- Based on direct field measurements (when possible)
- Indirect measurements for birds and mammals
- Use of reference locations



How did we make new criteria?

- BUI 3. Fish and Wildlife Populations

1. Fish community metrics (e.g., diversity, abundance, biomass, and condition) are similar to reference site(s); **AND**

2. Benthic macroinvertebrate community composition is within the range expected and similar to reference site condition; **AND**

3. PCB concentrations in fish tissue and other prey are below thresholds likely to result in acute toxicity to fish or piscivorous wildlife (birds and mammals).

- BUI 5. Bird or Animal Deformities/Reproduction

1. PCB concentrations in fish tissue from comparable functional feeding groups are similar to reference site(s); **OR**

2. PCB concentrations in fish and other prey are below tissue concentrations known to cause deformities or reproductive impairment in piscivorous wildlife.

Unchanged

Use indicator species for birds and mammals

Modeling to determine impairment

Helpful suggestions/final thoughts

- Write final summary to track changes
- Designate a note taker (or multiple)
- Keep TRL and partners involved early

BUI # 5 Bird/Animal Deformities or Reproductive Problems		
Current Criteria	**Proposed Criteria**	**Discussion**
1) No reports of wildlife population deformities or reproductive problems from wildlife officials above expected natural background levels; AND	1) None – *Remove Criterion*	Question for group: did we agree to delete this criterion? IJC listing/delisting guidelines emphasizes BUI confirmation through survey data and appropriate control/reference comparisons. We may be able to argue this criterion is currently being met.
2) Contaminant levels in bottom-dwelling fish do not exceed the level established for the protection of fish-eating wildlife (NYSDEC Fish Flesh Criteria); OR	2) PCB concentrations in fish tissue from comparable functional feeding groups are statistically similar to reference site(s); OR	• Current strategy: compare PCB tissue concentrations to numerical criteria designed to protect piscivorous wildlife. Proposed strategy: compare AOC fish tissue concentrations to fish tissue concentrations from suitable reference sites. The NYSDEC Fish Flesh Criteria (0.11mg/kg for PCBs) may not be attainable under regional conditions, i.e. Oak Orchard and Lake Ontario (?) fish may exceed this value. Alternatively, comparing AOC fish to fish from a suitable reference site is consistent with the AOC Program goal of meeting regional conditions. • Expand from just "bottom-dwelling fish" to "comparable functional feeding groups". This allows for a more complete assessment of fish tissue concentrations consistent with historic and future fish collection strategies, while still acknowledging the tendency of bottom-dwelling fish to accumulate greater amounts of PCBs • Emphasis on PCBs as these are the primary site COCs which bioaccumulate
3) In the absence of fish data, the toxicity of sediment-associated contaminants does not exceed levels associated with adverse effects on wildlife (NYSDEC Fish & Wildlife Bioaccumulation Sediment Criteria).	3) PCB concentrations in fish and other prey are below tissue concentrations known to cause deformities or reproductive impairment in piscivorous wildlife.	• Current criteria references NYSDEC Fish & Wildlife Bioaccumulation Sediment Criteria for protection of wildlife (0.014 mg/kg for 1% organic carbon). This sediment value is based on equilibrium partitioning using an ambient water quality criterion for PCBs (TOGS 1.1.1). This criterion may not be realistic and Superfund may not remediate to this level. As an example of sediment remedial goals in other AOCs; the remedial goal for total PCBs in the Buffalo River is 0.20 mg/kg (surface weighted average concentration). This is greater than ten times higher than the current sediment criteria for BUI #5 in 18mile. • I need some suggestions for additional justification for the proposed criterion. Based on laboratory and field studies throughout the Great Lakes (Bush and Bohr 2015), Toxicity Reference Values (TRVs) for PCBs have been determined in wildlife species including colonial nesting birds, and mink/otter. A TRV is the concentration of a contaminant in fish estimated to cause adverse effects on reproduction and/or development in wildlife species.

Contact Information

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