Where form meets function:
A practical approach to replicating streambank inventories to reach a wider audience

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Project Goals:

1.) Develop standardized process for assessing streambank erosion and resulting phosphorus and sediment loading by HUC12 within the Upper Fox & Wolf Basin to aid in EPA Nine Key Element Planning and identify priority locations for future restoration projects.

2.) Pilot the methods in four subwatershes.

Project Overview:

The Fox and Wolf River Basin has been a source of significant nutrient loading to the Winnebago Pool Lakes for decades. As part of TMDL implementation, EPA Nine Key Element Plans are being developed for HUC12 subwatersheds throughout the Basin. To address pollutant sources, streambank erosion and subsequent loading need to be understood.

In collaboration with project partners, GEI combined principles from NRCS and the Rosgen Stream Classification systems to develop and test new methods to assess streambank erosion and calculate loading by HUC12.

This pilot project tested the new methods on four HUC12 subwatersheds. A series of weighted overlay models were created to classify erosion potential for each HUC12. Modeled results were used in site selection of ~12% of the total watershed stream miles to be surveyed. Field efforts mapped streambank erosion, assessed habitat quality, and locations of invasive species. Data collected from these representative stream reaches were then extrapolated across each watershed to estimate nutrient loading from streambank erosion for each watershed as a whole. The load estimate results provide an opportunity for comparison of the existing TMDL targets along with identifying future restoration project locations to reduce nutrient loading.

Objectives:

A Complete a desktop review to select representative stream segments for each of the four pilot HUC12 subwatersheds prior to fieldwork. Conduct field work.

B Estimate total phosphorus and sediment loss and loading from streambank erosion.

C Identify and prioritize areas for potential streambank and habitat restoration.

D Incorporate results into the draft EPA Nine Key Element Plan for the four HUC12 subwatersheds to better guide implementation.

E To maximize available resources and minimize costs, develop a template that can be used to complete future streambank inventories for the remaining HUC12 subwatersheds located within the WWRA.

Process:

SOP #1
Desktop Review

Step 1: Review Desktop Data
Step 2: Classify stream segments
Step 3: Select Representative Stream Sites

Weighted overlay model developed for desktop stream classification is based on:
• Land Use
• Slope
• K Factor

Data for the desktop review should include:
• Wetlands and soils
• Contours
• Parcels & access
• Orthophotos
• Geology

SOP #2
Field Surveys

Field data collection:
• Bank Height
• Thalweg
• Soil Texture
• Lateral Recession
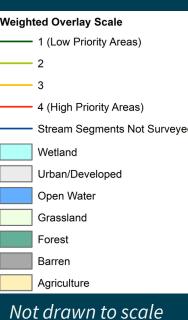• Erosion Type
• Point Source Features
• Qualitative Habitat Information

SOP #3
Data Analysis & Processing

Extrapolation and estimation:
• Sediment Loss & Load
• Phosphorous Loss & Load

Preliminary Results:
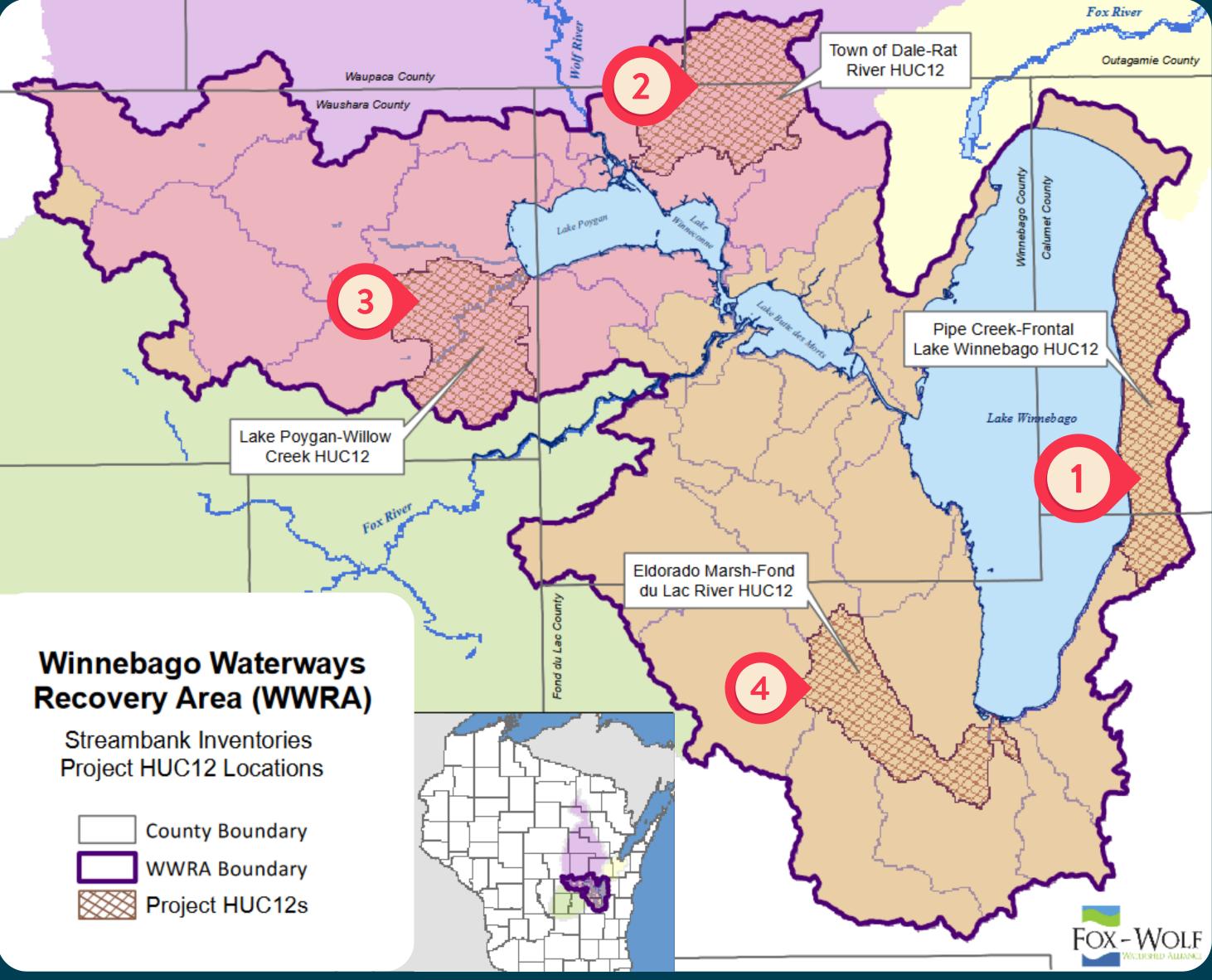
Results are under review. Preliminary estimates for sediment and phosphorus loss and load from stream bank erosion in the Rat River Subwatershed are provided below as an example.

RAT RIVER HUC12	SEDIMENT (TONS/YEAR)		TOTAL PHOSPHORUS (POUNDS/YEAR)	
	LOSS	LOAD	LOSS	LOAD
Stream Order 1	2,749 - 4,586	2,076-4,381	1,429-1,907	1,079-2,278
Stream Order 2	482-1,028	383-1,019	337-719	267-713
Stream Order 5	0	0	0	0
Watershed Total	3,231-5,614	2,459-5,400	1,766-2,626	1,346-2,991

Project Locations:

Pilot HUC12 Subwatersheds
Stream segments selected for field surveys

Weighted Overlay Scale
1 (Low Priority Areas)
2
3
4 (High Priority Areas)
Stream Segments Not Surveyed
Wetland
Urban/Developed
Open Water
Grassland
Forest
Barren
Agriculture

Not drawn to scale

Winnebago Waterways Recovery Area (WWRA)
Streambank Inventories Project HUC12 Locations

County Boundary
WWRA Boundary
Project HUC12s

Town of Dale-Rat River HUC12
Pipe Creek-Frontal Lake Winnebago HUC12
Lake Poygan-Willow Creek HUC12
Eldorado Marsh-Fond du Lac River HUC12