RESILIENT STREAM RESTORATION DESIGN

URBAN STORMWATER WG AND CLIMATE RESILIENCY WG

OCTOBER 19, 2021

SUMMARY OF CSN MEMO 3 DISCUSSION

STREAM CORRIDOR AND SHORELINE PRACTICES

- Most "online", w/ large CDA
- Designed to withstand floods, not really reduce them

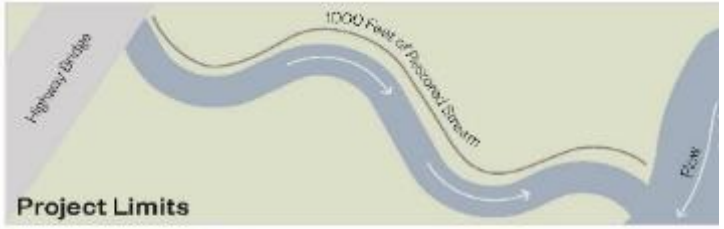
- Vulnerabilities:
  - Structural elements of restorations
  - Increased erosion

Figure 7. Examples of vulnerable design elements for stream restoration practices.

		
Structural Flanking	**Bank Erosion**	**Headcuts**

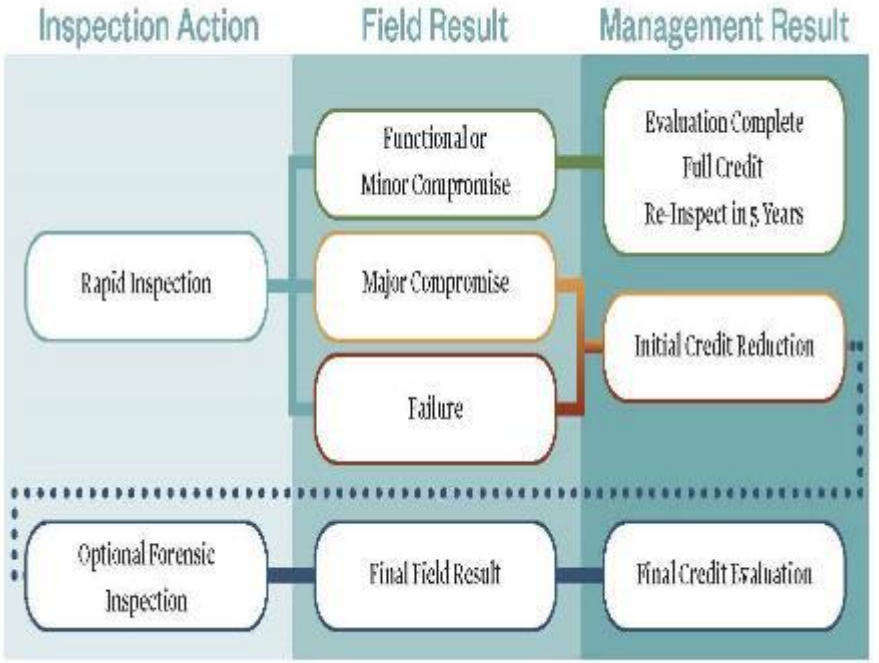
STREAM RESTORATION VULNERABILITIES

- Inaccurate predictions regarding design parameters (width, depth, meander radii, etc.)
- Poor reference site selection
- Design principles have shifted – impacts of climate change are still not well understood



Defining Loss of Pollutant Reduction Function for Protocol 1	
Criteria for Loss	**Key Visual Indicators**
Evidence of bank or bed instability such that the project delivers more sediment downstream than designed,	• Severe bank undercutting (bare earth exposed) • Incising bed (bed erosion evident) • Flanking or downstream scour of channel structures • Failure or collapse of bank armoring practices

Status	% Failing *
Functioning	**0 to 10% of reach**
Showing Major Compromise	**20 to 40% of reach**
Project Failure	**50% or more of reach**



STREAM RESTORATION WATER QUALITY PERFORMANCE

- Little to no research on pollutant removal changes
- Theoretically there is potential for increased load reductions from prevented sediment and floodplain restoration practices
- Gains could be offset by a single extreme storm event.

TODAY'S PROMPT

If we expect to see a 15-20% increase in the 100 year, 24-hour storm by 2070, what is the impact on:

- Reach sediment loading in the absence of any restoration
- How the higher flows would influence overall project design and feasibility
- Prospects for floodplain reconnection
- The implications for more armoring
- Project longevity and possible sediment/nutrient remobilization

SCOTT AND WARD PRESENTATIONS

MORNING DISCUSSION

Resilient Stream Restoration:

- What are the priority design and maintenance concerns?
- What are the key research questions?
- Is there a need for a STAC workshop, or similar, on the subject?

Projected IDF Curves:

- What comes next in terms of new GCMs, dealing with Atlas 14 updates, and improving temporal resolution?
- Are there high priority next steps for improving the projected IDF curves?

FINAL WRAP-UP

- David will populate with a few priority initiatives and recommendations that emerge from the two days and tee them up for discussion