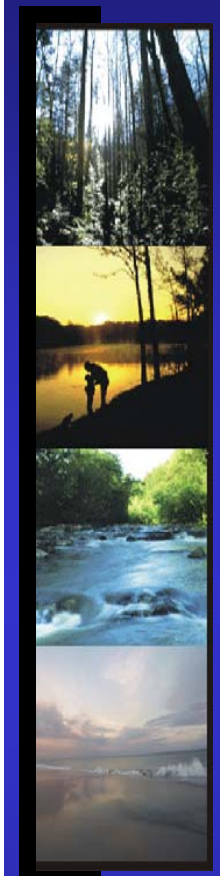

Historical Drivers for Goals and Success Criteria for Stream and Wetland Mitigation

Overview of Concepts, Mechanisms, and Opportunities for Improved Development and Tailoring

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➢ Historical Drivers for the Setting of Goals and Success Criteria for Wetland Mitigation Projects.

- Origins in USACE 1987 Wetland Delineation Manual and USACE 1993 Wilmington District Compensatory Hardwood Mitigation Guidelines
- Focuses on hydroperiod (continuous length of time during growing season that the water table is within 1 foot of surface) and vegetative density and composition.
- Reference sites

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➢ Historical Drivers for the Setting of Goals and Success Criteria for Stream Projects.

- 2003 Inter-agency Stream Guidelines (Part of SAP Reading Material).
- Focuses on physical stability of stream channels, floodplain connection and riparian vegetation density/composition.
- Stream riparian vegetation density criterion adopted directly from wetland vegetation criterion.

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➢ Historical Drivers for the Setting of Goals and Success Criteria for Stream Projects.

- Biological and biogeochemical endpoints referred to within guidelines, but historical emphasis has been on the physical condition of the stream channel and riparian condition as indicators of future potential given typical 5 year timeframes of evaluation.

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➢ Historical Process for Development

- EEP consultants have typically been developers of initial project level goals statements as part of design efforts.

- EEP Planners identify Problems, Stressors, Assets, and Opportunities within watershed planning areas and may identify candidate projects within those areas, but have not typically developed an initial set of project level goals.

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➢ Historical Process for Development

- Other staff review project level design documents, but historically were not the actual developers of the goals statements, but rather commented on those developed by consulting and design providers.

➢ Historical Challenges or Issues with Goal Setting.

- Goals and objectives get intermingled.
- Too “boilerplate” – lacking specificity.
- Sometimes detached from watershed planning/watershed context.
- Scaling
- Disproportionate for potential
- Clarity of linkages between functional loss, replacement and validation.

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Concepts, Mechanisms, and Opportunities for Improving the Development and Tailoring of Project Goals.

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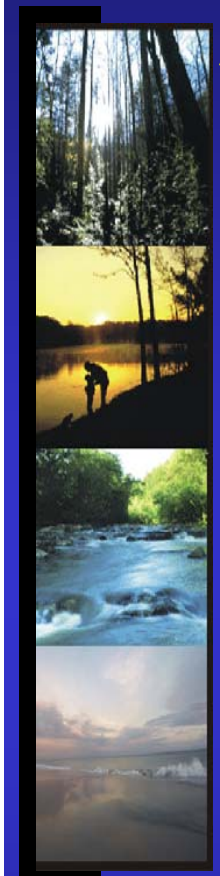
Conceptual Overview of Linkages in the Development and Validation of Project Goals



CAUSES

Watershed and Project Stressors

EFFECTS

Ecological Services (Functions) Requiring Replacement

RESPONSE

Project Goals

(Ends)

REMEDY

Project Objectives (Means/Methods)

ASSESSMENT

Indicators and Criteria

VALIDATION

Measurement System (Monitored Parameters)

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Proposed Structure to Better Elucidate Linkages

Example Structure for Reach Level Goals/Success for Development in Planning and/or Design Phase
Scenario- (Stream (PI)/Riv-Wetland, Piedmont, Pasture, Rural, Low Gradient Watershed)

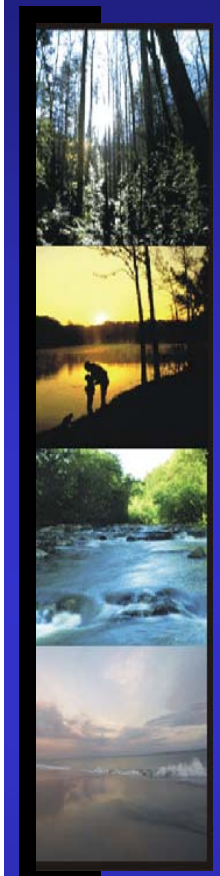
		1	2	3	4	5	6	7	8	9	10
1.0 Causes (Watershed and Project Stressors)											
1.1	Mechanical channel degradation and widening by livestock										
1.2	Systemic Sedimentation										
1.3	Buffer deforestation										
1.4	Relocation of channel features to unnatural valley location and alignment										
1.5	Riparian compaction										
1.6	Disconnection of wetland hydrologic features										
1.7	Mechanical destruction and compaction of wetland vegetation and soils										
1.8	Livestock derived eutrophication										
1.9	Promotion of invasive, non-native vegetation biomass and seed sources										
2.0 Effects (Functions Lost Needing Replacement)											
2.1	Transport of watershed sediments in equilibrium	1	2	3	4	6	5	7	9		
2.2	Management and dissipation of flood flows	1	4	3	5	6	7	2			
2.3	Treatment of lateral overland flow	3	4	5	6	7	8	9			
2.4	Treatment of groundwater	3	1	5	4	6	7	9	8		
2.5	Provision of instream habitat	1	2	4	3						
2.6	Provision of wetland habitat	7	3	4	6	5	9				
2.7	Provision of riparian buffer habitat	3	9								
2.8	Processing of organic matter inputs	1	2	3	7	6	8	9			
2.9	Temporary Sediment Storage	4	1	3	5	6	7				
3.0 Response (Project Goals -Ends)											
3.1	Improve hydrologic-floodplain connectivity/interaction	2	1	4	7	6	5	9			
3.2	Better manage/attenuate storm flows	2									
3.3	Reduce water quality stressors in the near term	9	1	3							
3.4	Provide for long-term uplift in water quality functions	4	8								
3.5	Improve instream and wetland aquatic habitat in the near term	5									
3.6	Provide for greater overall instream and wetland habitat complexity/quality in the long term	6	7								
3.7	Improve and maintain riparian buffer habitat	7									

Proposed Structure to Better Elucidate Linkages

Example Structure for Project Level Goals/Success for Development in Planning and/or Design Phase
Scenario- (Stream (PI)/Wetland, Piedmont, Pasture, Rural, Low Gradient Watershed)

			1	2	3	4	5	6	7	8	9	10
4.0		**Remedy (Project Objectives – Means / Method)**										
	4.1	Implement a dynamically stable, reference-based restoration of the project streams dimension, pattern and profile.	1	2	5	4	3					
	4.2	Strategically install stream structures and plantings designed to maintain vertical stability, lateral stability and habitat to the stream channel	5	3								
	4.3	Provide a sustainable and functional bankfull floodplain feature	1	2	4	5	7					
	4.4	Restore the hydrologic connection of adjacent riverine wetlands	5	6								
	4.5	Install, augment and maintain appropriate riparian buffer and riverine wetland community types with sufficient density and vigor to support native, successional schemes.	7	6	4	5						
	4.6	Provide sustainable livestock exclusion from the channel and riparian zone via fencing of the projects conservation easement and through off-site needs/BMP support	3	4								
	4.7	Decommission a livestock waste pond that represents a risk to the projects resources	3	4								
5.0		**Assessment (Success Indicators)**										
	5.1	Maintenance of overall vertical stability	1	2	3							
	5.2	Low proportions of localized downcut/headcut proportions	3	1	2							
	5.3	Low proportions of mid or transverse channel bars	1	6								
	5.4	Maintenance of a distinctive and diverse profile (Maintenance of distinct facets)	2	1	6							
	5.5	Low BHR distributions	1	2	3							
	5.6	Maintenance of lateral stability	1	2	3	6						
	5.7	Proportions of active bank erosion	1	2	3	6						
	5.8	XSA distributions	1	2	3	6						
	5.9	ER distributions	1	2	3	6						
	5.10	Overbank frequency	3	4	1	2						
	5.11	Appropriate substrate distributions	1	6								
	5.12	Viable bedform distributions	2	1	6							
	5.13	Woody stem density	5	6	4							
	5.14	Diversity of Woody stems	2	1	5	6	4					
	5.15	Stem vigor	5	6	4							
	5.16	Wetland Hydrology	4	5	6							
	5.17	Water quality stressor reduction	6	7								

Stages within Overview Needed for Goals Development



CAUSES

Watershed and Project Stressors

EFFECTS

Ecological Services (Functions) Requiring Replacement

Initial Phase of Goals Development

As part of watershed planning at the watershed scale and at the project scale where projects sites are identified

First Refinement

At the earliest stages of project implementation

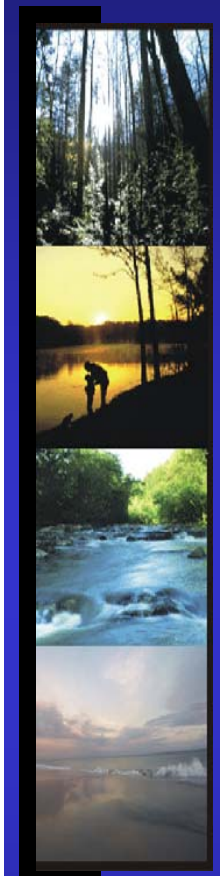
Final Refinement

At design stage with project site analysis and TE data in hand

RESPONSE

Final Project Goals Set

Factors to Integrate for Arriving at an optimized level of intervention and More Specific, Tailored and Achievable goals in Stream Rehabilitation



- Watershed and Project Stressors
- Attendant Functional Losses/Reductions
- Project Site Characteristics - Stream
  - Stream Evolutionary Factors
  - Channel Boundary Factors
  - Alignment Factors
  - Uplift modifiers
    - High uplift yield opportunities
    - Standing value (bio, hab, buffer)
    - Constraints

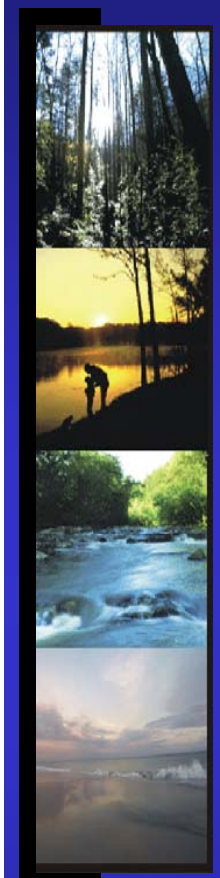
→ Maximum Remaining Uplift Potential

↕ Risk

↓ Approach / Level of Intervention

\+ Assessment/Monitoring Timeframe

↓ **Tailored Goals, Objectives and Success Criteria**



Summary of Items Requiring Continued Emphasis and Development

- "Functional Balance Sheet"
- Influence of Timeframe of Evaluation on Goals and Success Development.
- Elucidating linkages between functional loss, replacement and validation.
- Needs to be an internally driven, iterative development process.
- Expanded narrative on these topics in form of guidance to providers on the EEP website.

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