Five Essentials for Riparian and Wetland Restoration Success

Presenters
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Learning Objectives:
• Clarify the role of landscape architects on the ecological restoration team
• Understand appropriate goals for restoration projects
• Identify key components that can affect project success
• Learn the critical components for vegetative restoration plans to create sustainable mitigation plant communities
• Get tips for efficient and successful planting and monitoring methodologies
• Gain insights into networking with other restoration disciplines
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Presentation Outline:
1. Introduction
2. Terminology—Wetland and Riparian Mitigation Ecosystem Types and Methods
3. Challenges

Essential #1: Getting In and Staying in the Room: LA’s can add significant value from beginning to end

1. Planning, Design, Construction Documents, Construction Management
   i. Ask the right questions and problem solve construction feasibility
   ii. Identify and define plant performance metrics and efficiencies
   iii. Guide design developments and construction document production
   v. Embrace specifications and estimates
   vi. Lead during the construction phase; This is landscape construction, after all!

2. Prequalification, Teaming
   i. Get prequalified for state + municipal projects or roadside projects
   ii. Get involved in road project bidding alliances

Essential #2: Slopes and Soils:

1. Slopes:
   i. Wider flatter buffers (rights-of-way and areas around restoration zone).
   ii. Slopes: 4:1 or flatter is ideal - TRB research
   iii. When erosion control blankets are required, it's difficult to plant seedlings
   iv. Seed mixes wash away on steep slopes
   v. Steep slopes are difficult and dangerous to walk
   vi. Trees tend to be less stable
   vii. Tips for unavoidably steep slopes

2. Soils:
   i. LA: Lead and partner on:
      a. construction access and minimizing soil impacts
      b. erosion control
      c. grading methods
      d. post project access
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Essential #3: Plantings: Less Expensive and Streamlined Ecological Re-vegetation Methods

1. Methods: Wetland
   i. “Jumpstarting” Pioneer + Climax plant community mixes
   ii. Plant groups + shrub group massing
   iii. Mulch? Understand level of potential plant and invasive competition + options
   iv. Dormant seeding
   v. Multi-year Plant Guarantee

2. Methods: Riparian
   i. Templates cause issues - Examples
   ii. Mimic nearby native volunteers/species from ecological survey
   iii. New constructions sites vs. mature wetland and stream buffer areas.
   iv. Multitrophic landscapes
   v. Riparian Seed Mixes- mix warm and cool season grasses.
   vi. Seedlings vs container grown
   vii. Plan on wildlife damage to plantings-Vexar tubes, fencing

Essential #4: Pre-Bid + Pre-Construction Meetings + Understanding Construction Contract Interactions

1. Pre-Bid – Bidder attendance required - Landscape subcontractor, not only the site/general contractor.
2. Pre-Construction – Bidder attendance required. Landscape subcontractor
   i. Review highlights and most important aspects of notes and specs.
   ii. Highlight critical methodologies and contractor constraints.
   iii. Ask questions about equipment, lead personnel on site, crew and equipment

3. Understanding Construction Contract Interactions
   i. Consistency: Stick to the specs and drawings. Avoid ad hoc field changes.
   ii. Relationship with compliance/agency representatives. Emphasize shared goals
   iii. Roles: Field inspection engineer, construction supervisor, LA, etc.
   iv. Build connections with the other parties at these meetings
      1. Offer help early interpreting contract information
      2. Offer or require staking/layout of plants
      3. Offer help in conflict resolution
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Essential #5: The most important tips for on-site construction oversight

1. Wetland
   i. Construction Documents should include “Restoration Specialist”
   ii. Clearing + minimizing impacts
      1. Enforce limits access roads and laydown areas.
      2. Responsible re-use of on-site cleared materials
   iii. Grading-Soil compaction happens in the field and is one major cause of failures
   iv. Planting-Simplify plant layout methods.
   v. Monitoring/Enforcement

2. Riparian
   i. Clearing + Tree Protection
      1. Put orange protective fencing beyond the drip line of trees
      2. Install fencing before clearing starts.
      3. Minimize soil disturbance for seeding, Don’t wake up invasives.
      4. Take photographs at the pre-construction meeting.
   ii. Grading
   iii. Plant Installation: Adapting construction schedule to right planting season
   iv. Monitoring/Enforcement –
      1. Field inspection engineers provided enforcement.
         a. Replanting + Reseeding examples
         b. Trust and support for inspection team. keep everyone in the loop.
   vi. Maintenance – Contractor is responsible for a two full growing seasons.
      1. Maintenance must include invasive control.
      2. New seedlings may require supplemental watering.
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Critical Roles for Landscape Architects Summary and Checklist: Lisa Cowan

Team Builder/Coordinator
• Integration of details and ideas from all the other disciplines and stakeholders.
• Define clear, practical goals - critical for restoration projects

Graphic representation
• Create images and plans that help the other project team members see, respond to, understand, and design the complete program
• Make visuals for other stakeholders (public, permitting agencies, clients, etc.) for engagement and support of the project

Planning + Permitting
• Use content and visual communication tools to develop and define reasonable objectives and communicate to permitting agencies

Design Phase
• Address the mechanics of ecosystems, shaping the land, construction phasing, low impact construction methodologies, build in flexibility and adaptive strategies, reduce costs and change orders.
• Increase the community value and appreciation of a project through well designed access, interpretation, and views of the project.

Construction document preparation
• Produce clear, organized and concise construction drawings are critical for appropriate bid as well as a guide for construction:
  • Clearly demarcated preservation areas and haul routes
  • Important grading details
  • Notes to define critical constraints and requirements – ex. low ground pressure equipment, planting and seeding dates (that recognize potential for seasonal delays).

Construction document preparation (Cont’d)
• Understand specifications are critical for bidding information as well as construction:
  • Soil salvage, handling, amendments
  • Plant & seeding requirements
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Critical Roles for Landscape Architects Summary and Checklist: Lisa Cowan

Include Construction Coordination, Oversight, and Management in Construction Documents!!!!

• Require pre-bid meetings to communicate important details for contractor clarification
• Pre-construction meeting – address critical requirements and constraints and partner on problem solving.
• Plan for strategic field oversight (monitoring): site layout of important features (access roads, stockpile areas, etc.) soil materials inspections, grading process (full time), plant reviews and layout.
• Long term management: Create a maintenance plan with critical permitting and performance goals, site constraints (ex. use of herbicides allowed?), and key contact information

Construction Phase:
Planning and design for post-construction monitoring and maintenance:
• Install post-construction monitoring measures during construction phase (flagging, monitoring wells, etc)
• Create plant layouts that are easy to locate and monitor, and balance the creation of appropriate plant communities
• Create conditions that minimize the need for watering, weeding and maintenance (mulch, materials certification to eliminate weed seeds and invasive plants
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Recommendations: Davie Biagi

The Restoration Team and Communication
- Look for mentors and provide mentorship
- Establish an eco-restoration team and speak up in meetings to address needs
- Build communication with field inspection engineers early in the design process

Specifications and Contracts with “Open-source” Instructions, Clear Roles, and Strong Enforcement
- Include design of mitigation plans and planting cost estimates in the contract Scope of Services
- Use performance-based special provisions
- Include a maintenance work plan in the specs
- Enforce the contract words

Design
- Visit the site – no templates
- Establish planting zones that accommodate clear zone and utility easements
- Provide typical cross sections and show individual seedlings and delineation of seeded areas on plans

Grading and Clearing
- Keep slopes as flat as possible for good plant establishment to avoid structural BMPs
- Preserve existing trees
  - Implement tree surveys
  - Draw detailed grading plans
  - Use protection fencing keep clearing contractors and equipment away from tree root drip zones

Cost-conscious Vegetative Plans
- Establish a multitrophic, layered mix of plants:
  - Choose riparian seed mixes for full sun, both dry and wet sites, both cool and warm-season
  - Plant bare root seedlings during the dormant season
- Address invasive species issues
- Choose pioneer species that mimic nearby volunteers

Healthy Plant Establishment, Self-sustaining Growth, Ease of Maintenance
- Offer help and contact information for the field inspection engineer
- Provide plain-language instructions of technical specifications for inspectors
- Back up the field inspection engineer when issues with the contractor happen
- Provide good monitoring and enforcement = success
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Guidance/framework documents:

[https://www.ser.org/resources/resources-detail-view/ser-international-primer-on-ecological-restoration](https://www.ser.org/resources/resources-detail-view/ser-international-primer-on-ecological-restoration)


More technical and specific books and articles:


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Resources and Links:

IECA—International Erosion Control Association [http://www.ieca.org/education/](http://www.ieca.org/education/) Industry experts provide educational events for members. Topics include stormwater and MS4 management and erosion control


TRB—Transportation Research Board [http://www.trb.org/AboutTRB/ResourcesandDatabases.aspx](http://www.trb.org/AboutTRB/ResourcesandDatabases.aspx) A place to find webinars and research results through keyword research.


ASLA 2015 Annual Meeting and EXPO
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Technical and Specific Books and Articles:


Information about stream mitigation and roadside design


[http://www.dot.ga.gov/BS/Programs/Landscapes](http://www.dot.ga.gov/BS/Programs/Landscapes) Typical roadside landscape requirements and guidance