

2009 Mid-Atlantic Stream Restoration Conference
Researcher and Practitioner Session: Practical Tools to Further the Science

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Things we may all agree with (*those in italics were sent out prior to the meeting*):

1. *Streams and rivers throughout the United States have been negatively impacted by direct and indirect disturbances.*
2. *Stream functions are diverse and are included in the following categories: hydrological, geomorphological, biological / ecological, and water chemistry.*
 - There are settings where function is not the goal but stability is the goal and it could be wasteful to implement natural in nonnatural settings
 - are included but not limited to... social effects, economic, aesthetics (although we don't always like the aesthetics)
 - language is an issue "restoration" and "natural" are dangerous words, as are rehabilitation, stabilization
 - cultural and socio-economic do not belong in number 2, they are not functions, they do need to be considered (function vs values)
 - outside drivers must be addressed as well, functions vs objectives
3. *Traditional approaches for stabilizing channels (concrete and rip rap) are not as suitable to restoring stream functions as natural stream restoration techniques.*
 - potentially desirable but in some cases rock and steel might be needed
 - what about urban- is it natural or nonnatural- maybe this should be its own category
 - we don't always need to restore natural functions
 - natural stream restoration technique definition- could include structures, stream can maintain channel dimension and profile without aggrading or degrading with whatever methods necessary to attain that, meant to be broad, includes natural recovery processes
 - restoring stream functions as those described in number
4. *Stream restoration is a multi-disciplinary endeavor.*
5. *Competent stream restoration designers require appropriate academic backgrounds, continuing education, and on-the-job experience.*
6. *Need for post construction monitoring*
7. Goals and needs of people are often driven by goals that do not require natural stream functions

Areas where more discussion / research is needed to reach agreement (*those in italics were sent out prior to the meeting*):

These are issues, they are not characteristic of what needs to be discussed- what questions do we ask? Working in sediment transport, how can you predict it? Is the sediment supply an issue at all? How do you distinguish between large sediment supplies and small sediment supplies? Coarse sediment choking up in top of bends, what is the design question or elements that will make it work? We really need to get at design intelligence questions. What are the tough design questions? Phrase these as questions, how can we work together?
Sensitivity analysis- these questions are not necessarily either/or, where are the critical points we need to focus on?

1. *Selecting a design discharge (channel forming discharge theory and regional curves versus analytical modeling)*
 - Bankfull- what discharge or discharges do we use for design?
2. *Sediment transport analysis (empirical approaches versus modeling approaches and total sediment load (bedload and suspended) versus just suspended)*
 - Sediment supplies are site specific
3. *Use of in-stream structures for channel stability and habitat diversity*
4. *Use of reference reaches for developing design criteria*
5. *Restoration versus enhancement (when to re-construct new channels versus stabilizing existing channels)*
6. *Role of stream classification in restoration assessment and design*

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7. *Use of form and process or just one or the other for design development*
8. *Development of post construction monitoring performance standards*

Additionally-

9. Channel and floodplain interaction, especially restoring in confined floodplain settings
10. Most functions are not limited by channel structure, what are the functional goals that we can reasonably meet through channel restoration?
11. Money, liability, ethics, time, Where is the balance? What can reduce risk and uncertainty?
12. What do you do to measure the achievement?
13. How can we effectively create this feedback loop: what are the questions, where do we start, how do we communicate?

Topics Further Discussed at the Meeting:

Discharge:

- Utility of channel forming discharge theory and regional curves vs strictly modeling approach
- What design discharges should we be using? it depends on the project and the goals, saturating floodplain vs urban 100 yr flood
- Design discharge is philosophical, it is not independent of sediment transport
- Different levels of flows due different things to channels, hydrologically, ecologically, etc
- Sediment design discharges... flow duration curves, hydrograph, evolving the science
- Effective discharge analysis, multiple peaks, what sediment corresponds to what flows?
- Is sediment supply an issue? If so, is the stream in balance over a range of flows? Where is reach in context of the system?

Bed-Material

- How to size bed-material for design, what is the grand size distribution
- When you add fines it helps to lubricate bed-flow
- Habitat needs

Society/Licensure Issue

- Common website or forum to combine, there may be answers already, infrastructure there for National Center for Earth Surface Dynamics, there are a boatload of tools out there but practitioners don't know where they are and when they should use them
- No curriculum for stream restoration, sue nesgota ASCEEWRI, gene castro- Portland state
- Should there be organization to do licensing?
- Research-not just about what the questions are but how are they to be delivered- journal articles, fact sheets, spreadsheets
- HMO – funding agencies are dictating approach to restoration and assessment- educate the clients
- So many things to do... we don't have one group that can grab this and run with it- there needs to be a governing group that manages that
- Difference between certification and a group taking the bull by the horns
- Concerned about creating a priesthood via Rosgen, PEs, what kind of culture do we want to create, society could help promote academia to get published and to get credit, an academic background is required but a practical application also must follow, we've left out a major component- social scientists (arguable)
- Education is key- clients, funders, explaining the risk
- Who does the education, stream brokers (USGS, NRCS)- someone who can neutrally address stream issues
- Data, no central depository for data or standards for measuring, metadata is missing, algorithms and background data sometimes are also missing, USGS quality control is beyond reproach, if a researcher is developing a tool it has been published somewhere

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- Another critical team member needs to be the contractor, state by state variability in requirements for design also a problem
- A few bad practitioners give practitioners a bad rap
- Another group that needs to be educated is regulators
- Is certifying individuals or certifying projects better? A permit certifies the project essentially but the regulators aren't necessarily educated
- Ag extension of land grant institution model is out there, extensions are largely funded on federal \$

Collaboration

- Practitioners have data, researchers have time to write papers- there needs to be collaboration
- Concerted effort between researchers and practitioners
- List of experts to consult and list of journals with relevant subjects, geomorph list is a server, once a month put together a list of all stream restoration articles or have someone synthesize that and distribute it (North American Lake Management Society) there are a bunch of clearinghouses out there
- Organization managing this, receiving fees, finding other sources or funding (mitigation banking association), individual and corporate membership rates, nonprofits?, are there informal approaches that can be maintained
- American Ecological Engineering Society- set out to do this, what happened, where are they?
- Need clear access to Paula's webpage
- Riverrat
- NCED clearinghouse for tools

Functional Loss Issues

- We are supposed to be accounting for functional losses on impact side and improving. What functions are being lost and what lifts are being gained through mitigation? (Galveston corps for wetland methods may be good model)
- Functional lift goals help a lot with monitoring, and help optimize

Monitoring

- Measuring what worked what didn't, we need to look at end results in the field and incorporate that into the loop, need data of recovery and improvement for feedback loop

Sediment and Erosion Control

- Sediment and erosion control plan to address 50-100yr flood, incorporated into design analysis
- Common erosion control maintenance issues vs failure in design
- What is the objective specifically?

Over-Restoring

- Over-restoring streams is a problem

Paradigm shift

- People are spending money to do this, let's try to make it informed.
- What is typical time frame to collect data for project? Rare to fund project longer than fiscal year, how can we change that?
- Education of clients is needed
- Purpose of research is to develop general answers and solutions, researchers are not going to come up with the questions, practitioners are...
- Society of ecological restoration white paper about what is restoration
- How do we engage both communities?

Action Items:

- Fact sheets, risk rewards fact sheets to give to clients.

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- Better access to research, practitioners need to read more
- Tools to make better decisions followed by feedback:
 - **Practice – question – science – results - repeat**
- Guidance on site selection of projects that will lead to success
- A set of regional risk analysis models/tools (i.e. in urban stream in MD these are areas of risk you may encounter and here is how to address them)
- Paula created a webpage, maybe task of the group is a business plan to get this on the ground and running
- **Identify groups of people interested in working on same research topic, distribute contacts, and follow up – recommended that CVI could play this role as part of follow-up**