A prospective graduate program in river restoration at the University of Washington

A progress report

Derek B. Booth
Department of Civil and Environmental Engineering
Department of Earth and Space Sciences

February 2006
What is the goal?—to articulate a plan to graduate Masters-level students at the University of Washington with professional-quality, interdisciplinary training in the principles and practice of river restoration.
Talk outline:

• What is “river restoration”?
• Why is such a program needed?
• What are the opportunities?
• What is the proposal?
• What’s next?
Talk outline:

• What is “river restoration”?
• Why is such a program needed?
• What are the opportunities?
• What is the proposal?
• What’s next?
Restoration and Rehabilitation:

RESTORATION: The (complete) structural and functional return to a predisturbance state. Merely recreating the form without the functions, or the functions in an artificial configuration bearing little resemblance to a natural resource, does not constitute restoration.

REHABILITATION: The partial structural and functional return to a pre-disturbance state.
“River restoration means repairing waterways that can no longer perform essential ecological and social functions ...”

(Palmer and Allan, 2006, National Academy of Sciences Journal)
This is a multi-purpose definition, embraced here:
This is a multi-purpose definition, embraced here:
This is a multi-purpose definition, embraced here:
This is a multi-purpose definition, embraced here:
Biological Integrity of Puget Lowland Streams

Data from Sarah Morley, Univ. of WA 1997-1999

Note: no "threshold of effects..."
Management Strategies

Region of unlikely outcomes

Rehabilitation
Protection
Stewardship

Stream Health (BIBI score)
Urban Development (TIA in watershed)

From Booth and others, 2004
Talk outline:

• What is “river restoration”?
• Why is such a program needed?
• What are the opportunities?
• What is the proposal?
• What’s next?
From Bernhardt et al., 2005, Science
~$14-15B, i.e. >$1B/yr

From Bernhardt et al., 2005, Science
“However, just as rivers are in need of restoration, so too are the art and practice of restoration itself.” (Palmer and Allan, 2006)

Are we doing our jobs?
# North Carolina Stream Restoration Institute
## River Courses

| Spring, 2006, Raleigh, NC  
| (Lake Wheeler Training Center) | Fall, 2006, Asheville, NC  
| (NC Arboretum) |
|--------------------------------|--------------------------------|
| Section I. Stream Classification and Assessment  
March 21-28, 2006 **Full** | Section I. Stream Classification and Assessment  
August 14-16, 2006 |
| Section II. Stream Restoration Design Principles  
April 11-13, 2006 **Full** | Section II. Stream Restoration Design Principles  
August 28-30, 2006 |
| Section III. Advanced Stream Restoration Design Principles  
May 23-25, 2006 | Section III. (Not offered in Asheville) |

[Click here](#) for course descriptions and to view past PowerPoint presentations.
Wildland Hydrology
11210 N. County Road 19
Fort Collins, CO 80524
Phone: 970-568-0002
Fax: 970-568-0014
E-mail: wildlandhydrology@wildlandhydrology.com

Courses | About Wildland Hydrology | Publications | RIVERMorph

E-mail: wildlandhydrology@wildlandhydrology.com

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Talk outline:

• What is “river restoration”?  
• Why is such a program needed?  
• What are the opportunities?  
• What is the proposal?  
• What’s next?
The landscape of western Washington:
The diversity of expertise at the University of Washington
The expectations of others *about* the University of Washington:

From the University of Georgia ([http://www.arches.uga.edu/~esudduth/generallinks.html](http://www.arches.uga.edu/~esudduth/generallinks.html))

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<td>Institute of Ecology and River Basin Science and Policy Center</td>
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<td>University of Washington</td>
<td>Center for Urban Water Resources Management and Center for Streamside Studies</td>
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Talk outline:

• What is “river restoration”?  
• Why is such a program needed?  
• What are the opportunities?  
• What is the proposal?  
• What’s next?
...to graduate Masters-level students at the University of Washington trained in the principles and practice of river restoration.
...to graduate Masters-level students at the University of Washington trained in the principles and practice of river restoration.

Ok, but what about....
...to graduate Masters-level students at the University of Washington trained in the principles and practice of river restoration.

Ok, but what about….

• Why not broader than “just” rivers?
• Why not undergraduate, too?
• What about continuing education?
• Why not Ph.D. level?
• Is this a thesis or 5th-year coursework degree?
• What about existing, overlapping programs?
• Where is the money to support this?
Elements of the proposal:

- Course work
- Field experience
- Internship opportunities
- Communication skills
Elements of the proposal:

• Course work
• Field experience
• Internship opportunities
• Communication skills
• Humility
Autumn 1989
(http://www.rrnw.org/RRNW Survey Report03.pdf)

• 161 respondents (53 private, 98 govt., 10 academic)
• 46 biologists, 58 engineers/geologist, 57 other
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Recommended courses, 2003 (for professional development; in rank order):

- Geomorphology
- Restoration
- Sediment
- Monitoring
- Hydrology
- Construction
- Ecology
- Fish
CURRICULUM QUESTIONNAIRE

Dear 2006 Stream Restoration Design Symposium attendee:

The University of Washington is exploring the both undergraduate and graduate degree programs in environmental restoration. As part of this exploratory stage, we are soliciting input from government, consulting, and academic professionals on the knowledge and skill sets they would like to see from a university graduate at each of these degree levels.

The following courses are represented at various national and international programs that are already in existence. Please take a moment to share your preferences and suggestions for the creation of an Environmental Restoration degree program by checking the boxes of classes that you would like to see offered in this region, or by suggesting other courses. If you are early in your career, what courses did you take that were particularly useful? What did you wish you had taken? If you’ve been at this for a while, what kind(s) of academic background are you seeking in your new hires? What do you still wish you had taken (or been able to take) as a student?

Please return these forms to Derek Booth or in the labeled box at the registration desk. Thanks!

I am (check one): ☐ Academia    ☐ Govt/Tribal    ☐ Private/Industry    ☐ NGO

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Recommended courses, 2006 (for graduate degree program; in rank order):

- Risk Analysis and Decision Theory
- Hydrology
- Restoration Ecology
- Sediment Transport
- Fluvial Geomorphology
- Geographic Information Systems (GIS)
- Environmental Economics
- Environmental Problem Solving
Talk outline:

• What is “river restoration”?  
• Why is such a program needed?  
• What are the opportunities?  
• What is the proposal?  
• What’s next?
How close are we now?

- Risk Analysis and Decision Theory
- Hydrology
- Restoration Ecology
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How close are we now?

- Risk Analysis and Decision Theory
- Hydrology
- Restoration Ecology
- Sediment Transport
- Fluvial Geomorphology
- Geographic Information Systems (GIS)
- Environmental Economics
- Environmental Problem Solving
How close are we now?

Close, but...courses are located in units that may not even know that they are potentially part of a “River Restoration” program:

- Civil and Environmental Engineering
- Earth and Space Sciences
- Forest Resources
- Oceanography
- Evans School of Public Affairs
- Urban Design and Planning
- Economics
What’s needed now? What are the next steps?

1. Awareness that the effort exists
2. Suggestions (supportive, depreciating, whatever)
3. Participation

REPORT IS PLANNED FOR JUNE 2006—A path for implementation (or not)…

http://depts.washington.edu/cwws/streams.html
With thanks to the current supporters of this exploratory effort:

http://depts.washington.edu/cwws/streams.html