Engineering Innovative Fish Passage:

Design of Fish Passage at Dams and Road Crossings
January 10–12, 2005
Raleigh, North Carolina

The Design of Nature-like Fishways
January 12–14, 2005
Raleigh, North Carolina

By invitation of and in cooperation with American Rivers, North Carolina Department of Environment and Natural Resources, North Carolina Ecosystem Enhancement Program—North Carolina State University, and the U.S. Fish and Wildlife Service
Two complementary courses emphasizing...

**Engineering Innovative Fish Passage:**

**Design of Fish Passage at Dams and Road Crossings**

January 10–12, 2005 in Raleigh, North Carolina

- Fundamental considerations for design and implementation of fish passage measures
- Applicable federal guidance and regulations
- Designing pool and weir fishways
- Designing vertical slot and roughened channels fish passage
- Flow control, sediment and debris, and exits
- Culvert design methods, and more

**Engineering Innovative Fish Passage:**

**The Design of Nature-like Fishways**

January 12–14, 2005 in Raleigh, North Carolina

- Ecological, fisheries and engineering perspectives of designing nature-like fish passage
- German and European policy and development for river restoration and connectivity
- State-of-the-art design of nature-like fish passage in Europe
- Successful design processes and approaches
- Open channel design workshop
- Case studies from the field

*Save $295 by enrolling in both courses!*

See enrollment form.

*By invitation of and in cooperation with*  
*American Rivers, North Carolina Department of Environment and Natural Resources, North Carolina Ecosystem Enhancement Program–North Carolina State University, and the U.S. Fish and Wildlife Service*
The first of two complementary courses emphasizing...

Engineering Innovative Fish Passage: Design of Fish Passage at Dams and Road Crossings

January 10–12, 2005 in Raleigh, North Carolina

Why This Course
Attend this course and gain both a conceptual framework and practical information about the full range of factors involved with the consideration, design and implementation of fish passage measures. You will learn about the basics of fisheries biology and fish passage systems and how they relate to designing a functional fish passage. You will experience a diversity of perspectives and obtain multidisciplinary insights that will assist you in designing effective, functional fish passage.

Course Objectives
This practical course for professionals working on dams, road culverts and fish passage technologies will provide comprehensive information on bypass channels and traditional fishways. You can expect to

• understand fish behavior and barriers to fish passage
• consider strategic planning and site assessment
• learn about common fishway design components
• increase your knowledge of design and construction approaches

Discussion Highlights
During our interactive, fast-paced class sessions, plan to focus on these and other practical topics:

• applicable federal guidance and regulations
• designing pool and weir fishways
• designing vertical slot and roughened channels fish passage
• designing hybrid fish passage
• flow control, sediment and debris, and exits
• culvert design methods, and more!

Who Will Benefit
This comprehensive course will benefit

• design engineers
• regulatory agency staff
• fisheries managers
• fisheries biologists
• dam owners
• public sector professionals
• ecological consultants
• conservation personnel
• planners

Earn Continuing Education Credits
By participating in this course you will earn 1.8 Continuing Education Units (CEU) or 18 Professional Development Hours (PDH).

Course Planning Committee
Ken Bates
Fishway Consultant
Patrick Eagan
University of Wisconsin–Madison
Stephanie Lindloff
New Hampshire Department of Environmental Services
David Robinson
North Carolina State University, Center for Transportation and the Environment and North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program
Mike Wicker
U.S. Fish and Wildlife Service
Laura Wildman
American Rivers

Expert Instructors
Your instructors will share practical insights and knowledge gained from years of experience. Representing a range of agencies and organizations, they will address issues and approaches that will increase your ability to design effective, functional fish passages.
## Course Outline

### Monday, January 10

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 7:30  | **Registration**  
Sheraton Raleigh Capital Center  
Hotel  
421 South Salisbury Street  
Raleigh, North Carolina         |
| 8:00  | **Welcome and Introduction**  
Patrick Eagan PhD, PE  
Program Director/Associate Professor  
Department of Engineering  
Professional Development  
College of Engineering  
University of Wisconsin–Madison |
| 8:30  | **Overview of the Fish Passage Design Process**  
Ken Bates  
Fish Passage and Habitat Restoration Engineer  
Olympia, Washington            |
| 9:30  | **Break**                                                               |
| 9:45  | **Understanding Fish Behavior and Barriers**  
- Life history needs  
- Ecological needs  
- Physical requirements  
- Fish energy expenditures  
- Migration needs for anadromous fish, resident fish and aquatic species  
Stephen Gephard  
Fisheries Biologist  
Connecticut Department of Environmental Protection  
Old Lyme, Connecticut |
| 10:45 | **Strategic Planning for Fish Passage**  
- Prioritizing locations  
- Targeting species  
- Cost-benefit analyses  
- Strategic partnerships  
- Regulatory vs. voluntary approaches  
Stephen Gephard |
| 12:00 | **Lunch**                                                               |

### Tuesday, January 11

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30</td>
<td><strong>Coffee and Conversation</strong></td>
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</tbody>
</table>
| 8:00  | **Designing Pool and Weir Fishways**  
- Application  
- Limitations  
- Hydraulics  
Ken Bates  
Curt Orvis |
| 8:45  | **Designing Vertical Slot Fish Passage**  
- Application  
- Limitations  
- Hydraulics  
Ken Bates  
Curt Orvis |
| 9:45  | **Break**                                                               |
| 10:00 | **Designing Roughened Channels Fish Passage**  
- Application  
- Limitations  
- Hydraulics  
Ken Bates  
Curt Orvis |
| 11:00 | **Designing Hybrid Fish Passage**  
- Application  
- Limitations  
- Hydraulics  
Ken Bates  
Curt Orvis |
| 12:00 | **Lunch**                                                               |

### Wednesday, January 12

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30</td>
<td><strong>Coffee and Conversation</strong></td>
</tr>
</tbody>
</table>
| 8:00  | **Site Assessment for Culvert Design**  
- Geomorphic and watershed context  
- Long profile  
Ken Bates |
| 11:00 | **Monitoring and Evaluation of Fish Passage–Panel**  
Ken Bates  
Stephen Gephard  
Dr. Uli Dumont  
Principal and Engineering Consultant  
Floecksmuehle Consulting  
Aachen, Germany |
| 12:00 | **Lunch on Your Own and Final Adjournment**                            |

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**For Related Course Descriptions**  
http://epdweb.engr.wisc.edu/catalogs/civil.lasso
The second of two complementary courses emphasizing...

**Engineering Innovative Fish Passage: The Design of Nature-like Fishways**

January 12–14, 2005 in Raleigh, North Carolina

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**Why This Course**

This advanced course assumes that you understand the relevant fish behavior aspects to passage design. You will focus in depth on nature-like fishway design as you examine European experiences, various design perspectives, proven design approaches, and real-world case studies.

An excellent precursor to this course is *Design of Fish Passage at Dams and Road Crossings*, which immediately precedes this course.

**Course Objectives**

This course offers you expert knowledge of the nature-like fishways design process. Featuring the latest design information, internationally recognized instructors, and workshop/case study opportunities that will further your understanding of this innovative approach, the course will show you how nature-like fishways are proving to be an effective, affordable approach to fish passage.

You can expect to

- increase your knowledge of European nature-like fishway design
- understand differing design perspectives
- learn how to design fish passages in conjunction with the site’s ecology, and more!

**Discussion Highlights**

Your learning experience will be interactive and fast-paced. Plan to focus on these and other practical topics:

- the ecological perspective of designing nature-like fish passage
- a fisheries perspective of designing nature-like fish passage
- engineering perspectives of designing nature-like fish passage
- German and European policy and development for river restoration and connectivity
- state-of-the-art design of nature-like fish passage in Europe
- successful design processes and approaches
- open channel design (workshop)

**Who Will Benefit**

This advanced course will benefit

- design engineers
- regulatory agency staff
- fisheries managers
- fisheries biologists
- dam owners
- public sector professionals
- ecological consultants
- conservation personnel
- planners

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**Expert Instructors**

Your instructors, who are experts working in this cutting-edge area, will share with you key insights and approaches gained from multiple projects and years of experience. A special feature of the course will be the addition of Dr. Uli Dumont, principal of Floecksmuehle Consulting in Aachen, Germany. Dr. Dumont will address European experiences with design of nature-like fish passage.

**Special Course Materials**

In addition to a comprehensive course notebook, you will receive the book, *Fish Passes: Design Dimensions and Monitoring*, a $28 value. This difficult-to-get book was originally published in German by Deutscher Verband für Wasserwirtschaft and Kulturbau e.V. and published in English by the Food and Agriculture Organization of the United Nations.

**Earn Continuing Education Credits**

By participating in this course, you will earn 1.5 Continuing Education Units (CEU) or 15 Professional Development Hours (PDH).
Course Planning Committee

Ken Bates
Fishway Consultant

Patrick Eagan
University of Wisconsin–Madison

Stephanie Lindloff
New Hampshire Department of Environmental Services

David Robinson
North Carolina State University, Center for Transportation and the Environment and North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program

Mike Wicker
U.S. Fish and Wildlife Service

Laura Wildman
American Rivers

Course Outline

Wednesday, January 12

1:00 Registration
Sheraton Raleigh Capital Center Hotel
421 South Salisbury Street
Raleigh, North Carolina

1:30 Welcome and Introduction
Patrick Eagan PhD, PE
Program Director/Associate Professor
Department of Engineering Professional Development
College of Engineering
University of Wisconsin–Madison

1:50 Regional and National Overviews of Fish Passage—Case Study
Sara Nicholas
Associate Director of Dam Programs
Mid-Atlantic Region
Harrisburg, Pennsylvania

3:00 Break

3:20 Overview of the Fish Passage Design Process and Introduction to Nature-like Fishway Design, River Continuum
Ken Bates
Fish Passage and Habitat Restoration Engineer
Olympia, Washington

5:00 Adjourn for the Day

Thursday, January 13

7:30 Coffee and Conversation

8:00 German and European Policy and Development for River Restoration and Connectivity
Dr. Uli Dumont
Principal and Engineering Consultant
Floecksmuehle Consulting
Aachen, Germany

8:45 State-of-the-Art Design of Nature-like Fish Passage in Europe
• Design and dimension
• Examples
Uli Dumont

10:00 Break

10:20 An Ecological Perspective of Designing Nature-like Fish Passage
Luther Aadland
Research Scientist-River Ecologist
Minnesota Department of Natural Resources
Fergus Falls, Minnesota

12:00 Lunch

1:00 A Fisheries Perspective of Designing Nature-Like Fish Passage

Friday, January 14

7:30 Coffee and Conversation

8:00 An Engineering Perspective of Designing Nature-Like Fish Passage
Brent Mefford

10:00 Break

10:15 Course Summary

12:00 Lunch on Your Own and Final Adjournment

1:30 Open Channel Design Workshop
Brent Mefford
Hydraulic Engineer
Bureau of Reclamation
Water Resources Research Lab
Denver Federal Center
Denver, Colorado

2:45 Break

3:00 Cape Fear Lock and Dam Number One Case Study
Frank Yelverton
Lead Biologist
United States Army Corps of Engineers
Wilmington District
Wilmington, North Carolina

4:30 Adjourn for the Day

For Related Course Descriptions
http://epdweb.engr.wisc.edu/catalogs/civil.lasso
Attend Both Courses and Save!

Our two courses on engineering innovative fish passage address economic, biological, and environmental issues that impact property owners, agency and tribe personnel and the general public, as well as the native species in the region.

By attending, you can gain a broad perspective by focusing on the basics of fish passage systems, how they relate to designing functional fish passages, and how to design nature-like fishways, which are proving to be an affordable, effective alternative.

Save $295 by enrolling in both courses, and position yourself at the cutting edge of engineering innovative fish passage in this country.

Both Courses Feature...

• Speakers with extensive first-hand knowledge
• Comprehensive, practical information you can apply immediately
• Valuable course materials that will be useful references long after you return to work
• Opportunities to share ideas and solutions with others in your field of interest
• Hospitality from one of Raleigh's finest meeting venues, the Sheraton Raleigh Capital Center Hotel

On-site Courses Save Time and Money!

Engineering Professional Development can offer many of its courses:

• At a location of our choice in North America
• At your convenience
• At reduced per-person cost
• Tailored to your needs

To inquire about courses that we can bring to your site, including optimal group size and costs, or to request an on-site course, call 800-462-0876 or check our Web site at http://epdweb.engr.wisc.edu/onsite/

Coming by Car?

From Raleigh-Durham Airport, take Exit 298-B (South Sanders Street). South Sanders Street becomes McDowell Street. Stay on McDowell and take a right onto Davie Street, then a right onto Salisbury Street. The Sheraton is one block on the left. To enter parking deck, take immediate right onto Gale Street. Sheraton Parking Deck entrance is second on the right. Parking is $2 per hour, maximum cost $10.
Four Easy Ways to Enroll

Need to Know More?
Call toll free 800-462-0876 and ask for
Program Director:
Patrick Eagan PhD, PE
eagan@engr.wisc.edu
Program Assistant:
Diane Lange
Or e-mail custserv@epd.engr.wisc.edu

General Information
Fee Covers Course materials, break refreshments, lunches and certificate. Course materials are distributed only to course participants. We do not publish proceedings.
Cancellation If you cannot attend, please notify us at least 7 days prior to the first day of the course, and we will refund your fee. Cancellations received after this date and no-shows are subject to a $150 administrative fee. You may enroll a substitute at any time before the course starts.
Location Sheraton Raleigh Capital Center Hotel (http://www.sheraton.com/capitalctr), 421 South Salisbury Street, Raleigh, North Carolina.
Accommodations We have reserved a block of sleeping rooms ($82/single or double plus tax) for course participants at the Sheraton Raleigh Capital Center Hotel, the course site. To make a reservation, call 800-325-3535 by December 18 and tell the reservation specialist that you will be attending the UW–Madison course, Engineering Innovative Fish Passage: Design of Fish Passage at Dams and Road Crossings or Engineering Innovative Fish Passage: The Design of Nature-Like Fishways, or both courses. After December 18, the special room rates will still be available for attendees if rooms are available.

Course Information
Please enroll me in
- Course #G556 Engineering Innovative Fish Passage: Design of Fish Passage at Dams and Road Crossings
  January 10–12, 2005 in Raleigh, North Carolina  Fee $895
- Course #G557 Engineering Innovative Fish Passage: The Design of Nature-Like Fishways
  January 12–14, 2005 in Raleigh, North Carolina  Fee $895
- Both courses (#G556/#G557) January 10–14, 2005 in Raleigh, North Carolina  Reduced Fee: $1495
- I cannot attend at this time. Please send me brochures on future courses.

Personal Information (Please print clearly.)
Name __________________________________________
Title __________________________________________
Company _______________________________________
Address _______________________________________
City/State/Zip __________________________________
Phone (______ ) __________________________ Fax (______ )
E-mail _______________________________________

Additional Enrollees
Name __________________________________________
Title __________________________________________
E-mail _______________________________________
Name __________________________________________
Title __________________________________________
E-mail _______________________________________

Billing Information
- Bill my company □
- P.O. or check enclosed □ Payable in U.S. funds to UW–Madison
- □ American Express □ Visa □ MasterCard
Cardholder’s Name _______________________________
Card No. __________________________  Expires ________________

Important – please enter the 3-digit UW# Code from the mailing label.

Please check the box if you are a person with a disability and desire special accommodations. A customer service representative will contact you. Requests will be kept confidential.

For Related Course Descriptions
http://epdweb.engr.wisc.edu/catalogs/civil.lasso