

# River Health & Restoration Workshops & Mentoring

*Offered by the MN DNR River Ecology Unit*

*Our rivers and streams have been impaired by many factors resulting in poor water quality, lost biodiversity, accentuated flooding and drought, and increased rates of erosion and sedimentation.*

*As our rivers have become more widely recognized and appreciated as valuable natural resources that need restoration, the responsibility to better understand and properly restore these complex ecosystems takes on great importance. To that end, the Minnesota Department of Natural Resources offers a variety of stream related workshops.*

*The foundation of these workshops is to a) teach the fundamentals of stream science including: fluvial geomorphology, hydrology, connectivity, biology and water quality and to b) educate attendees in natural channel design techniques and approaches that ensure long-term health, stability, and resilience.*



## River Science Series

- » The Fundamentals of River Science: Applied Geomorphology & Ecology
- » River Monitoring & Assessment
- » River Restoration: Design & Application
- » Restoration Solutions in Fragmented River Ecosystems

## The Science of Healthy Waters Series

- » The Ditching Dilemma
- » The Dam Dilemma

**Diagnosing Streams: Symptoms, Underlying Causes, & Remedies**

## **Our definition of Restoration:**

*The act of relaxing human constraints on the development of natural patterns of diversity, where restoration measures should not focus on directly recreating natural structures or states but on identifying and reestablishing the conditions under which natural states create themselves (Ebersole et al. 1997, and Frissell et al. 1997 Frissell and Ralph 1998).*

## **Mentoring Opportunities -- \*New in 2017\***

### Project Review

*The River Ecology Unit will offer review of selected stream restoration projects to those that have completed formal stream restoration training. We will provide suggestions and guidance based on experience with similar projects.*

### On-site Training

*Interested students that have completed formal training can be notified of opportunities to observe project construction and discuss project details. These opportunities will be organized around a) the type of project, such as toe-wood, riffle, rock-arch-rapids, channel excavation and b) the availability of staff and accessibility of the site.*

## **Our definition of Success:**

*Implementing projects that reestablish self-sustaining geomorphic and ecological processes that*  
» form & maintain quality habitat and  
» protect or restore biodiversity.

## General workshop information

- We do take requests into consideration when scheduling each year's workshops, so we ask those interested in future workshops to express interest directly. See contact info on last pages.
- Course offerings are limited due to small staff size in addition to field and research responsibilities.
- Beverages, snacks, and lunches are included.
- Lodging is not included in the registration fee.
- Fieldwork is required so students need to be prepared to wade in streams and work outside in inclement weather conditions.

## Instructors:

**Dr. Luther Aadland** *Luther is the Program Consultant for the MN DNR River Ecology Unit. He earned his doctorate from the University of North Dakota in 1987. His work and research have included a wide variety of topics related to stream health, habitat, geomorphology, and ecology. He has developed designs for numerous channel restoration, fish habitat, fish passage, flood damage reduction, dam removal, and bank stabilization projects.*

**Ian Chisholm** *Ian is the Program Supervisor of the MN DNR River Ecology Unit. He earned his master's degree in Fisheries Science from the University of Wyoming in 1985. Ian has worked extensively to incorporate science and ecological principles into freshwater management, at every level, from field data collection to policy and management philosophy.*

**Neil Haugerud** *Neil is a River Ecologist with the MN DNR River Ecology Unit. He earned his master's degree in Wildlife and Fisheries Sciences from South Dakota State University in 2003. He is experienced in stream biological monitoring, macro-invertebrate identification, reference site selection, and evaluating water quality. Neil's work focuses on project monitoring, river restorations, and geomorphological data analysis and management.*

**Dr. Amy Childers** *Amy is a River Ecologist and Outreach Specialist with the MN DNR River Ecology Unit. She earned her master's degree and doctorate in Chemical Oceanography from the University of Alaska Fairbanks in 2001 and 2005 where her research focused on nutrient dynamics in the Gulf of Alaska. Her ambition is educating others about stream systems and health.*

**DNR staff** *Various staff from the River Ecology Unit and Clean Water Legacy Program, which are both within the Division of Ecological and Water Resources, and the Division of Fisheries instruct in their respective areas of expertise and provide expertise in the field. Current instructors include Kevin Zytkevich (River Scientist), Mark Ellefson (Survey Specialist), Amanda Hillman (Restoration Coordinator), Karl Koller (Clean Water Legacy Specialist), Nick Proulx (Clean Water Legacy Specialist), Jon Lore (Clean Water Legacy Specialist), and Jason Vinje (Clean Water Legacy Specialist).*

## *Diagnosing Streams: Symptoms, Underlying Causes, & Remedies*

*No prerequisites*

This workshop was developed in recognition of the need for additional training and practical experience in diagnosing stream condition and the underlying causes of degraded health. This workshop teaches:

- the fundamentals of river "physiology and anatomy" -- hydrology, fluvial geomorphology, and ecology,
- the underlying causes and the resulting impacts to stream stability, water quality, and biodiversity,
- demonstrations of diagnostic tools, and
- practical experience gained by stepping through real examples including examples brought by attendees.

This workshop can be taken by those with any level of expertise that wants to learn how to identify stream issues and practice diagnosing the causes of underlying causes. 3 days. \$300.

## *The Science of Healthy Waters Series*

*No prerequisites*

This series is designed for concerned citizens, natural resource professionals, administrators, decision makers... essentially anyone involved in watershed issues including rivers, lakes, and wetlands, water quality, aquatic and terrestrial habitat, land use, flooding and more. These workshops teach the fundamentals of stream function and health, address how streams are affected by a specific issue, and offer opportunities for engaged conversations about improving stream and watershed health.

The workshops in this series address a specific issue related to stream health and include:

- a) the science underlying integrative, system-based watershed management,
- b) the problems, issues, and barriers hampering our ability to protect and restore watershed health, and
- c) alternative approaches for accomplishing goals of clean water, improved fish and wildlife habitat, and reduction of flood damages and erosion.

In recent years we have offered **The Ditching Dilemma** and **The Dam Dilemma**. 3 days. \$300.

## **River Science Series**

*This series of workshops teaches the basic functions and processes of streams and rivers; stream classification; field surveying; assessment and monitoring of channel morphology, stability, and sediment transport; and restoration where natural, stable stream reaches are used as templates for design.*

*This series is designed for natural resource professionals whose work involves rivers and streams as well as those engaged in watershed-wide resource management issues. These workshops are a mix of lectures and field applications where students are required to complete fieldwork, data analysis, and present their findings.*

### **The Fundamentals of River Science: Applied Geomorphology & Ecology**

*No prerequisites*

Rivers and streams are formed by hydraulic, geomorphic, and biologic processes. This course discusses the fluvial geomorphological processes involved in creating and maintaining a stream's shape and stability, as well as the fundamental hydrology and hydraulics of rivers. We teach the skills necessary to properly determine a stream segment's type and degree of stability that requires the collection of field data needed for classifying streams based on bankfull channel dimensions, sinuosity, entrenchment, and slope. Upon completion of this course, students will have the field and office skills needed to classify a stream reach, greatly facilitating communications and planning among river managers worldwide. Students will also have a firm knowledge of the functions and processes that are critical to a river's health and biodiversity.

*5 days. \$1,000.*

### **River Restoration: Design & Application**

*Prerequisites: The Fundamentals of River Science: Applied Geomorphology and Ecology, River Monitoring and Assessment*

This course includes/incorporates principles, methods, and tools for stream restoration using natural materials and designs, with a focus on reestablishing geomorphic and ecological processes. Project types discussed will include re-meandering straightened channels, dam removal, channel restoration following removal of dams with sediment laden reservoirs, dam conversion to a rapids, fish bypass channels around dams, culvert replacement, and bank stabilization. In addition to classroom lectures and field observations, students will design a restoration project utilizing collected and provided field data. Students will also test designs in a laboratory stream model. After completing this course, students will be able to work with other professionals to design and implement stream restoration projects on the ground from beginning to end, using a natural stream approach.

*10 days. \$1,500.*

### **River Monitoring & Assessment**

*Prerequisite: The Fundamentals of River Science: Applied Geomorphology and Ecology*

This workshop is designed to teach natural resource professionals how to assess a stream's condition and stability and how to monitor streams through time.

Concepts taught include: • *stream monitoring design and evaluation* • *sediment transport* • *channel stability assessment* • *use of biological indicators* • *understanding riparian vegetation*.

Techniques used include: • *geomorphic surveying*, • *Pfankuch's Stability Rating system* • *biological sampling* • *BANCS Model – quantifying channel source sediment contribution* • *introduction to suspended and bedload sediment sampling methods, FLOWSED and POWERSED* • *Prediction Level Assessment (PLA) of the Watershed Assessment of River Stability and Sediment Supply (WARSSS) methodology* • *riparian and channel monitoring techniques*.

Students completing this course will be able to quantitatively describe a river's stability and condition through applying industry standard techniques and reporting. These skills provide natural resource professionals the ability to monitor a river's condition over time in a non-subjective manner then apply this knowledge in restoration prioritization. *10 days. \$1,500.*

### **Restoration Solutions in Fragmented River Ecosystems**

*Prerequisites: The Fundamentals of River Science: Applied Geomorphology and Ecology, River Monitoring and Assessment*

This course will cover the range of fragmentation effects on river ecology, alternatives for restoration, and design criteria for dam removals, natural channel based fish passage, and culvert replacement. Lecture topics will include loss of biodiversity, fish hydrodynamics, interruption of fluvial processes, altered nutrient processes, river restoration following dam removal, culvert design, fishway design, public safety issues (dam failure, hydraulic undertows), permitting, construction, and monitoring. A bus tour will provide visits to a number of projects, as well as opportunities to actually snorkel within fishways and observe passing fish. Students will visit a dam and develop conceptual fish passage designs that will be tested in a physical model.

*5 days. \$1,000.*

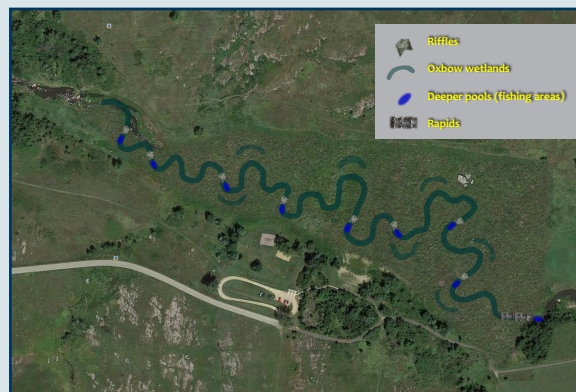


## Mentoring Opportunities

This opportunity is for those that have been through formal training but need additional hands-on exposure to design and construction. To sign up to the email distribution list, use the contact information provided below. This list will be used to send invitations for project submittals as River Ecology Unit staff time becomes available and to send notifications of on-site opportunities. The on-site training will be subject to short notice and sudden schedule changes due to construction issues, weather, and other unforeseen circumstances.

### Project Review

The River Ecology Unit is offering review of selected stream restoration projects. Invitations for projects will be emailed periodically as this opportunity is available. The invite will specify what information must be included such as reference field data, project site field data, data analysis, and conceptual or preliminary designs. Appropriate River Ecology Unit staff will evaluate the data and the concepts provided. Suggestions, corrections, and guidance will be provided as needed. The number and frequency of projects reviewed will depend on the number submitted, the degree of complexity of the projects selected, and the availability of staff.



### Project Implementation and On-site training

The River Ecology Unit is offering the opportunity to observe project construction and discuss project details on site. These opportunities will be organized around the type of project (e.g. toe-wood, riffle, dam removal, rock-arch-rapids, channel excavation, etc.), the availability of staff on site, and site accessibility. We will offer a range of project types and locations around the state, but we will be limited to projects in their implementation stage. Depending on the project, the number of attendees may be limited.

### Discounts

**College Students:** Full-time college students are eligible for a half price discount for the Stream Science Series workshops. Contact us for more information.

**Repeat:** Past students that would like to repeat a workshop in the Stream Science Series are eligible for a half price discount. For some it may have been several years since attending or since being engaged in fieldwork. Also our expertise and methodologies have developed over the years along with the available software and field/survey equipment.

For workshop questions, to express interest in a workshop(s), or to be on the mentoring opportunities email distribution lists, contact:

[Amy Childers](#)

MN DNR - River Ecology Unit

Phone: 218-739-7576 ext. 233

[Amy.R.Childers@state.mn.us](mailto:Amy.R.Childers@state.mn.us)



***Learn more on our websites:***

***MN DNR - [River Ecology Unit](#)***

***[Stream Health & Restoration Workshops](#)***

# 2018 MN DNR Stream Workshop Registration Form

## Registering for:

☐ **The Fundamentals of River Science: Applied Geomorphology & Ecology**

June 11 - 15, Marshall MN

## Price

\$1,000

### Registrant Information:

\_\_\_\_\_  
First & Last Name

\_\_\_\_\_  
Title/Position

\_\_\_\_\_  
Organization/Agency

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City, State, Zip

\_\_\_\_\_  
Daytime phone

\_\_\_\_\_  
E-mail address

\_\_\_\_\_  
Food allergy or dietary need

\_\_\_\_\_  
Payment information

Refreshments and snacks are provided throughout each workshop. Lunches are provided during full days. Suppers are provided when fieldwork and data analysis continues into the evening.

Lodging is not included with registration.

➡ Payment is due with registration.

➡ MN DNR staff or other state agencies can pay by purchase order. For all others, checks should be made out to 'MN DNR'.  
(Sorry, we can not accept credit cards.)

☐ Check is enclosed (make payable to **MN DNR**)

☐ Will provide purchase order (if MN state agency)

☐ If payment is not included explain when payment will be made.

➡ Registrations will be handled on a first come/first served basis; class size will be limited to 40 students.

➡ Cancellation after registering will result in a \$100 penalty. Cancellations less than two weeks prior to the first day of the workshop will result in forfeit of the registration fee or use towards the next time the workshop is offered.

➡ Class cancellations due to low enrollment will be determined two weeks prior to the start date.

### Mail or fax registration to:

MN DNR, Attn. [Carla Koski](#)  
1509 First Avenue North  
Fergus Falls, MN 56537  
Phone (218) 739-7576 ext. 227  
Fax (218) 739-7601  
[Carla.Koski@state.mn.us](mailto:Carla.Koski@state.mn.us)

*E-mails will be sent to confirm registration and to provide workshop information as the workshop date approaches.*

**For workshop questions or to express interest, contact:**

[Amy Childers](#)  
MN DNR - River Ecology Unit  
Phone: 218-739-7576 ext. 233  
[Amy.R.Childers@state.mn.us](mailto:Amy.R.Childers@state.mn.us)