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.

River Science Series
- The Fundamentals of River Science: Applied Geomorphology & Ecology
- River Monitoring & Assessment
- Restoring River Ecosystems: Design & Application

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).

Our definition of Success:
Implementing projects that reestablish self-sustaining geomorphic and ecological processes that
» form & maintain quality habitat and
» protect or restore biodiversity.

Mentoring Opportunities
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.
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, lunches, and some suppers 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. Recent instructors include Kevin Zytkovicz (River Scientist), Mark Ellefson (Survey Specialist), Amanda Hillman (Restoration Coordinator), Karl Koller (Clean Water Legacy Specialist), Jon Lore (Clean Water Legacy Specialist), Brady Swanson (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 goal of this series is to develop a foundation for work in this field where ongoing fieldwork, project experience and interdisciplinary collaboration will be critical to effective stream restoration.

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 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

Restoring River Ecosystems: Design & Application

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

This course will incorporate principles, methods, and tools for holistic stream restoration using natural materials and designs, with an emphasis on re-establishing both geomorphic and ecological processes. Fundamentals of restoration design that will be explained include: 1) diagnosis of underlying problems, 2) incorporation of local reference morphology, geomorphic and ecological processes, and 3) project design and construction techniques. Project types discussed will include remeandering straightened/ditched 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/remediation, 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. With this course, students will develop their foundation for work in this field that with ongoing fieldwork, project experience and interdisciplinary collaboration will lead to effective stream restoration. 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 River Science Series workshops. Contact us for more information.
Repeat: Past students that would like to repeat a workshop in the River Science Series are eligible for a half price discount. For some it may have been several years since attending and feel more experience/training is needed. Also our expertise and methodologies have developed over the years along with the available software and field equipment.

For workshop questions, to express interest in a workshop(s), or to be on the mentoring opportunities email distribution lists, contact:
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Find more information on our websites:
MN DNR - River Ecology Unit
River Health & Restoration Workshops