

Executive Summary
Oregon Headwaters Research Cooperative:
Workshop Summary
Corvallis, Oregon
ODF Technical Report #16

Synopsis

The scientific community has long recognized the need for research on very small headwater streams as evident in the words of Luna Leopold (1956):

"The flow of water in natural channels may be described as perennial, intermittent, or ephemeral. A perennial stream carries some flow at all times. An intermittent stream is one in which, at low flow, dry reaches alternate with flowing ones along the stream length. Those which carry water only during storms, and are therefore called ephemeral, are generally smaller but much more numerous than the perennial ones. ...Despite the fact that the channels of ephemeral streams are generally recognized to have an important part in the erosion of land and resultant production of fluvial landforms, they have not received careful or concentrated investigation." L. Leopold and J. Miller, 1956.

It has been estimated that small streams comprise approximately 95% of total stream channels and 75% of stream length. These streams are fundamentally different than larger streams, minimizing the applicability of research findings from larger streams. While the effects of forest management on small streams have not received much research attention, there is currently a stipulation that forest managers should increase protection of these small streams. Future research focused on small headwater streams is a priority given the extent of the landscape potentially affected by increased protection of these streams. Given this situation, the Oregon Headwaters Research Cooperative (OHRC) convened leading forestry, biologic, aquatic, riparian, and physical scientists at a workshop in October 2001 to articulate the state of the science, identify research gaps and prioritize research for small headwater streams.

Headwater streams vary greatly in terms of how they function both locally and at a basin scale. This variability manifests itself in a range of channel morphology, hydrologic regimes, riparian, and biologic characteristics. There were some general reoccurring themes and priorities that came out of workshop presentations and discussions.

- ? The variability of small streams challenges our ability to predict process and management effects at a large scale.
- ? Implications of process and management are married to the scale of analyses both in time and space. One of the challenges faced with small stream research is the limitation of current topographic maps and digital elevation models to represent them.
- ? Current stream classification systems do not adequately address the uniqueness and variability of headwater streams. There is a need to develop ontology for these streams.

- ? Retrospective studies on the effects of management are of limited utility given the evolution of forest practices over the past 20 years. Future research should focus on current practices.
- ? There is a need for both modeling and empirical studies. Such efforts should be collaborated to improve utility. It is not good enough for models to work the mechanics have to be right.
- ? Integrated research involving disciplines from both the physical and biological sciences is preferred.

Hydrologic, Wood and Sediment Routing Processes

- ? There is a need to identify landscape controls on headwater stream flow and surface water/groundwater interactions
- ? Continue to build on current knowledge regarding the role of headwater streams in routing wood and sediment to downstream reaches and its effects on biota, particularly in systems that are not dominated by debris flows.
- ? Evaluate the effects of wood storage and entrainment on debris flow travel distance.
- ? Model wood and sediment transport processes under varying management scenarios.
- ? Evaluate the relationship between wood size and distribution and its function in headwater stream processes.
- ? Investigate the effects of slash in very small headwater streams on dissolved oxygen and debris flow runout distances.

Riparian and Microclimate Dynamics

- ? Understand and model spatial and temporal changes in riparian forests.
- ? Investigate the relationships between microclimate and biota.

Organic Matter and Nutrient Cycling

- ? Investigate the pace and distance of transportation of organic matter and uptake lengths.

Temperature and Dissolved Oxygen

- ? Document temperature and flow dynamics and refugia patterns of small headwater streams.

Geomorphology and Classification

- ? Develop ontology for headwater streams.
- ? Develop a classification system that is multi-disciplinary and depicts flow duration, geomorphic controls, and biotic relevance.

Fish and Amphibians

- ? What are the attributes of headwaters systems that drive species composition, diversity and persistence?

Invertebrates and Periphyton

- ? Investigate the effects of management on invertebrate survival and the importance of headwaters streams in contributing to downstream populations.
- ? Do research at an appropriate spatial scale for the evaluation of biota.

Basin Scale

- ? Investigate cumulative effects of managing headwater streams on regional scale considering the biological and physical implications.

Clearly, there are a multitude of issues surrounding headwater streams. Forestland managers and researchers alike are just beginning to articulate the range of issues spanning economic, social, and environmental concerns. A limited number of studies representing a small portion of the variability form the basis of current management strategies and policies. In addition, researchers and managers are limited by the utility of current classification, evaluation, and analytical tools within the context of headwater streams. Ideally, today's research will provide the necessary information to address the range of issues and guide future management and policy decisions. The fact that entire workshops are dedicated to small stream issues, is itself an indication of both a shifting and perhaps more holistic focus on the part of researchers and land managers as well as an indication of the uniqueness of headwater streams. Ideally this document has accurately and completely captured and summarized the breadth and depth of discussions that took place over a two-day period. Overall the workshop was instrumental in the formation of the HRC and will significantly guide the direction and priorities of the cooperative.

Reference

Leopold and Miller. 1956. Ephemeral stream-hydraulic factors and their relation to the drainage network. USGS Professional Paper 282-A. USGS Gov. Printing office. Wash.DC.

Oregon Headwaters Research Cooperative

There was overwhelming support and interest in the October workshop and a consensus that a headwaters research cooperative could help promote applied research. Parallel efforts in Washington, British Columbia, and California are indications that headwater stream issues represent a common focus area for forest managers throughout the Pacific Northwest. Given the broad support for and attendance at the workshop, the organizers met and approved a charter to form and direct the actions of the OHRC (See appendix A). In summary the OHRC steering committee will have a maximum membership of 20 participants with a mandatory annual fee or in-kind contribution. The committee will appoint two chairpersons to serve on an annual basis and meet 1-2 times a year. Current steering committee members are shown in Appendix A. The committee will work to leverage additional funds, send out RFPs, and fund applied research on headwater streams. The goal for 2002 is to fund 1-2 research projects.

The workshop participants emphasized the need to keep research applied. The research should address management considerations such as roads, "buffers", skid trails, and site preparation (e.g. chemicals, slash treatment). Many topics were posed as important gaps in the science. The OHRC has reviewed the workshop materials and selected the following six areas from which to select the top priorities for the upcoming year. These potential projects are framed as hypotheses:

1. Headwaters Stream Ontology and Classification System: Develop a common language and reference system for headwater streams and relevant research. This should be the foundation of a classification system that is multi-disciplinary and depicts flow duration, geomorphic controls, and biotic relevance.
2. Temperature: Increases in headwater stream temperatures significantly influence temperature downstream in reaches with fish.
3. Wood: There is a relationship between size and quantity of wood in headwater streams and its degree of influence on function both locally and downstream.
4. Microclimate and Biota: Distribution and abundance of amphibians are not correlated with air moisture gradients.
5. Hydrology: There are landscape controls on headwater stream flow and surface water/groundwater interactions
6. Nutrients: Nutrient uptake length can be predicted through hydrologic and morphometric factors.

The number of projects funded is contingent on budget. Current indications are that approximately \$100,000 will be available. Exact amount of funding was being negotiated and was not guaranteed at the time this document was written.

Appendix A: Oregon Headwaters Research Cooperative: Organizational Charter

Oregon Headwaters Research Cooperative: Organizational Charter

The Oregon Headwaters Research Cooperative (OHRC) is a broad coalition of agencies, associations, and corporations that share an interest in research regarding small, generally non fish-bearing streams commonly referred to as "headwater" streams. The OHRC does not attempt to duplicate existing programs. The following charter solely addresses the make up and function of the OHRC.

Steering Committee

The OHRC seeks participation from state and federal agencies, private industry, and non-governmental organizations in Oregon. All interested parties are invited to attend OHRC meetings and sponsored events. The OHRC will be managed by the Steering Committee (SC).

In general, membership on the SC is open to all interested parties. The SC will operate by consensus when possible. It is the goal of the OHRC to have continuous, reliable participation by members. Membership is open to agencies/organizations that are not able to provide funding to OHRC in any given year but wish to be members. If at any time in the future the size of the group becomes unmanageable (regular participation by more than 20 individuals), the SC will at that time seek to limit the membership. Further, any corporation, agency, or group (an entity) can request permission from the larger group to allow more than one representative such that representation covers geographical or programmatic scope within a company, group, or agency.

When the SC is unable to reach consensus, decisions will be made based on a simple majority of voting members present. Voting members are those people who represent an entity that has made a minimum annual contribution of \$2500 (or \$5000 in-kind support). Both majority and minority positions will be documented.

For those SC members electing to contribute financially, money will be sent to NCASI offices in Corvallis, OR. NCASI will undertake fiscal operations at no cost such that no contributions in year 1 (2002) will be attributed to overhead costs. NCASI will retain fiscal operations until such time as they become too onerous or until the SC elects to move fiscal operations to a different entity.

The main task the SC will undertake is to evaluate research proposals and make a recommendation for funding. In the likely event that funding requests exceed available funds, the SC will be asked to prioritize requests. As such, SC members should come from a scientific background to provide the expertise needed to adequately evaluate the merit and soundness of proposed research projects. SC members may submit proposals but cannot vote on RFP decisions when their proposal is a candidate. The initial SC membership will consist of those who actively participated in the development of the October 2001 Headwaters Research Workshop.

Chairpersons

The SC will elect 2 Chairpersons that will serve for two years. The Chairpersons position may rotate among participating agencies and organizations of the OHRC. The OHRC Chairpersons will be responsible for

facilitating meetings, disseminating information to the group, facilitating correspondence with applicants and grantees, and coordinate fund administration with the responsible organization. The Chairpersons may delegate any or all of the above tasks to other Steering Committee members, as needed.

Steering Committee Responsibilities

The SC will meet at a minimum of once a year. It is likely that the SC will meet two or three times per year. The Chairpersons will determine the specific purpose and timing of meetings. In general, annual meetings will be held to discuss project progress reports and evaluate new proposals for funding. SC representatives are encouraged to seek input from their respective agency/organization's employees, researchers, and others prior to OHRC meetings where funding decisions will be made. The SC will actively seek and consider input from agencies/organizations that are not able to provide funding to OHRC when identifying priorities and reviewing proposals.

Project Prioritization

The SC should use the following criteria to identify its final priority projects:

1. Strive for consistency with the recommendations from the October 2001 Workshop;
2. Consider feasibility within the constraints of OHRC budget and timelines.
3. Focus on applied forest management in Oregon with the context of the greater Pacific Northwest region. Strive for an appropriate balance of east and west Oregon research.
4. The projects will increase our scientific understanding of physical and biological resources of headwater streams.

OHRC Communication Plan

The OHRC seeks to provide a transparent process under which funding decisions are made and findings are reported. The OHRC priorities and ultimately scientific findings from OHRC-funded projects will be communicated to state and federal agencies, private industry, and non-governmental organizations in Oregon. The OHRC SC will utilize the most efficient mechanisms for communication.