Volume 3, Issue 1
January / February 2005

UNIVERSITY OF WASHINGTON • COLLEGE OF FOREST RESOURCES • COLLEGE OF OCEAN & FISHERY SCIENCES

UNIVERSITY OF WASHINGTON Olympic Natural Resources Center

ONRC UPDATE

Director's Message

John Calhoun, Director

UW ONRC conducts a program of research consistent with our strategic priorities only because we can secure external funding in support of such a program. No state funding through the UW College of Forest Resources or the UW College for Ocean and Fishery Sciences comes directly to UW ONRC for research. Yet, we are a research institution.

We rely on what is termed 'external funding' in our never ending struggle to become self-sustaining, at least with regards to a research program. This is not altogether a bad thing. By subjecting our research program to the forces of the marketplace (i.e., conducting only research someone is willing to pay for), we achieve a certain relevance that is recognized by our constituency. Matching a priority research project with a willing funding source is an art form all of its own and one of the primary responsibilities of yours truly. Incidentally, Marine Program Manager Miranda Wecker is a master artist when it comes to finding funding for worthwhile projects.

Seeking external funding to support our research capability can sometimes lead to interesting relationships. In this issue of *ONRC Update,* you will read about a project completed by Research Program Coordinator Jason Cross for Washington State University (WSU) Extension Service in Skagit County. WSU funded work at UW ONRC to help WSU find the best solution for balancing shade requirements along waterways with loss of productivity due to shade falling on agriculture crops. While this issue is not among UW ONRC's strategic priorities, it does serve a useful purpose in sustaining our research capability.

> External funding is key to the research program at UW ONRC

To support a highly-qualified scientist (e.g., Jason Cross), we must find external funding to support his position full time, or he would seek more reliable employment. In fact, this is the case with several positions here. Without external funding sources, we could not offer employment to staff critical to the success of our mission. In this challenging environment, we have been able to slowly grow our capacity. Research, education, and outreach are only possible if we can find ways to support the talented people required to deliver it.

ONRC UPDATE is published bimonthly by the
University of Washington Olympic Natural Resources Center, PO Box 1628, Forks WA 98331
(360) 374-3220 or in Seattle (206) 685-9477 Website: www.onrc.washington.edu
Newsletter Editor: Ellen Matheny — ematheny@u.washington.edu

UW ONRC Builds Shade Model for Skagit Valley Berry Growers

Jason Cross, Research Program Coordinator

Several Pacific Northwest salmonid runs are currently listed as threatened under the Endangered Species Act (ESA). This designation has already had dramatic effects throughout the Pacific Northwest region, with the potential for more impact in the future.

Much concern and scientific research on river health and salmon survival to date has focused on the impacts of commercial forestry in upland, mountainous areas. However, research is lacking on how to manage floodplain riparian areas, where agriculture is practiced in western Washington. Because of this lack of data and the immediacy of action required by the ESA listing, regulatory agencies are considering the use of upland riparian data to guide rule-making decisions for downstream agricultural riparian areas. If the wide buffers currently being discussed are applied to all fish-bearing, or potentially fish-bearing, streams and ditches, the economic viability of the Pacific Northwest agriculture could be at risk. Much of the productive land could be lost to the buffer outright or impacted by field fragmentation, shading, and biotic influences (e.g., harboring insect pests and/or disease).

In response to these issues, Washington State University (WSU) is examining the environmental and economic implications of establishing and managing riparian buffers on agricultural lands. Riparian buffers are considered to be good land stewardship because they conserve soil, provide fish and wildlife habitat, and improve surface and ground water quality. However, scientific literature on riparian buffer function and design is limited for low gradient streams, rivers and associated floodplains and is non-existent for western Washington soils and climate.

Samuel Brelsfoard - stb@lollygagger.org

Blueberries

UW ONRC has contracted with WSU's Department of Natural Resource Sciences to build a model that measures the impacts of agricultural buffers. There are three impacts to be measured and quantified: (1) the direct impact of an agricultural buffer measured by the amount of cropland that must be sacrificed to install the buffer; (2) the (intended) effect of the agricultural buffer shading the adjacent stream, and; (3) the unintended consequence of agricultural buffers shading adjacent cropland; sunlight drives the sugar content - and therefore quality - of berries.

We have built a scientific model which measures the direct solar radiation upon cropland and accounts for the attenuation due to an agricultural buffer. Figure 1 is an illustration/schematic of the model. All of the labels represent input variables that must be known prior to an analysis. Figures 2 and 3 illustrate the output scenarios generated by the model that include the potential and attenuated radiation upon a crop for a given day of the year and the potential and attenuated radiation over a user-defined period of time (e.g., a growing season). The value of the model is that it facilitates comparisons between scenarios, illustrating the intended and unintended consequences of various management alternatives.

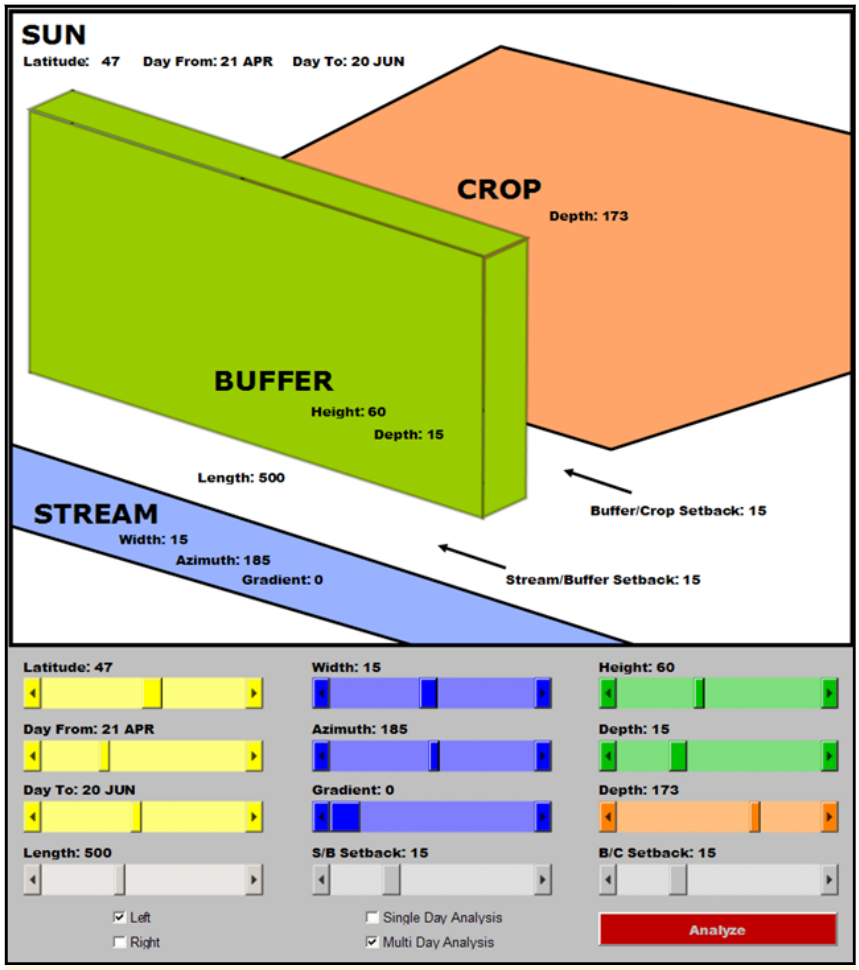

FIGURE 1
Shade Model Output — Labels identify input variables needed prior to analysis

Forestry Research @ UW ONRC

For more information about our forestry research and programs, please contact:

Jason Cross
Research Program Coordinator
(360) 374-3220 Ext 231
crossco@u.washington.edu

John Calhoun
Center Director
(360) 374-3220 Ext 225
jcalhoun@u.washington.edu

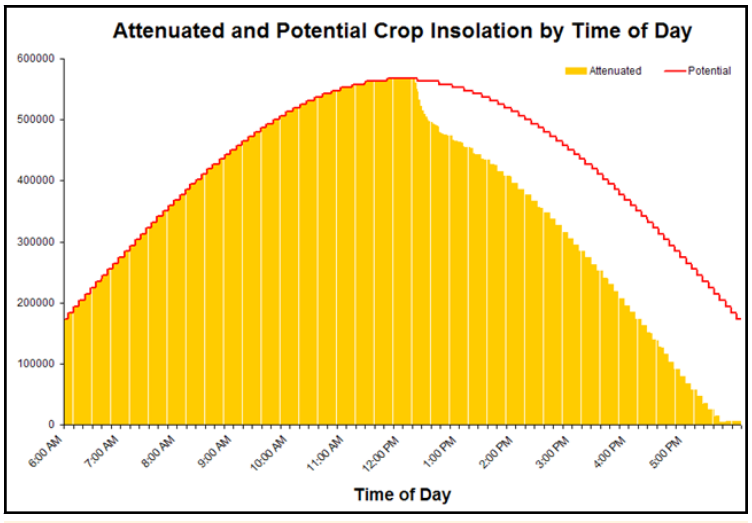

FIGURE 2
Output Scenario — Potential & Attenuated Radiation Upon Crop During Day

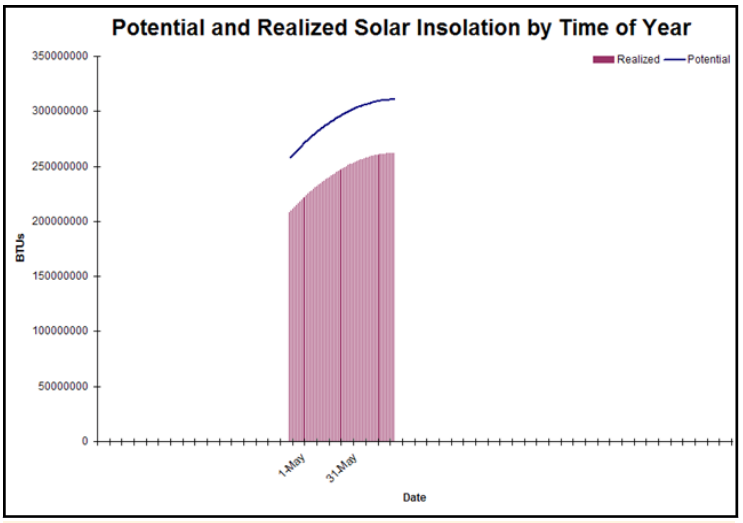

FIGURE 3
Output Scenario — Potential & Realized Solar Isolation Over a User-Defined Period

LMS Capability Expanded to Analyze Larger Landscapes

Jason Cross, Research Program Coordinator

Forest ecosystems can be defined at a variety of scales - a stand, a landscape, a region, a continent. At all scales, they are dynamic (i.e., constantly changing from one condition to another). To manage forest ecosystems requires an understanding and appreciation of the biological, social, and economic dynamics of forest ecosystems.

Past attempts to manage at the individual stand scale proved difficult since stands exist naturally in a variety of structures, and each structure provides different values. To provide all values, all structures need to be maintained by different stands across the landscape. This is the basis of the landscape approach to forest management. Landscape management can provide multiple forest values by maintaining a range of forest structures across a landscape through time.

The foundation of landscape management is knowledge. It includes the knowledge of:

- forest conditions
- forest dynamics and forest response to disturbance
- scientific management processes that avoid or minimize unintended consequences and inefficiencies, and
- modern computing and information technologies that efficiently synthesize and manage the ever-growing information resources on forests.

Managers can design and test several silvicultural pathways for each stand within a landscape using scientific modeling tools such as the Landscape Management System (LMS). Decisions can be made based on a simultaneous comparison of several combinations of these pathways (each combination known as a 'management alternative') and how they each provide different mixes of forest values.

LMS is an evolving software application designed to assist in landscape level analysis and planning of forest ecosystems by automating the tasks of stand projection, graphical and tabular summarization, stand visualization, and landscape visualization. LMS is implemented as a Microsoft Windows™ application that coordinates the activities of other programs (projection models, visualization tools, etc.) that makeup the overall system. LMS is comprised of many separate programs that make projections, produce graphical or tabular displays, store inventory information, and connect these diverse programs into a cohesive system.

Recently, UW ONRC has developed tools which allow for a 10-fold increase in the amount of data (i.e., size of landscape) that can be analyzed. Where we were limited to analyzing one or two landscapes (30,000 acres total) within the Olympic Experimental State Forest (OESF), we can now analyze and compare the entire 277,000 acres of the OESF.

In terms of the foundations of landscape management listed above, our knowledge of forest conditions, dynamics, and management processes has remained relatively constant. But our knowledge of modern computing and information technologies has increased significantly with the addition of Landscape Analyst Jeffrey Comnick to the UW ONRC staff. A testament to this increased knowledge capital at UW ONRC is the Skagit Valley shade model UW ONRC is building for Washington State University. This application is only tangentially related to forest management. Rather, it highlights UW ONRC's ability to model natural phenomena.