



Director's Message

John Calhoun, Director

The Washington State Legislature created UW Olympic Natural Resources Center (ONRC) as a result of recommendations made by the Commission on Old Growth Alternatives convened by then State Lands Commissioner Brian Boyle. The Commission believed UW ONRC could help the Washington State Department of Natural Resources (DNR) and other resource managers meet the challenges they faced through a focused program of research and science, addressing ways to integrate economic and ecological values. The Commission further recommended that DNR create an experimental state forest as a place to focus research and monitoring programs. The combination of a research center, such as UW ONRC, and an actively-managed experimental forest is a model for major advances in learning.

Creating an effective partnership between UW ONRC and DNR's Olympic Experimental State Forest has been the subject of much attention over the last

few years. This month a major advancement toward fulfilling the vision of the Commission on Old Growth Alternatives has been achieved. We have reached an agreement, in principle, to institutionalize this relationship through shared resources. UW ONRC is proposing the creation of a new research position at UW ONRC, supported equally between the two organizations. Additionally, DNR is



Elk Grazing at UW Olympic Natural Resources Center

working to provide UW ONRC direct access to DNR inventory data, facilitating landscape planning and analysis services.

These new resources will complement existing capacity at UW ONRC to provide the kind of synergistic relationship envisioned by the Commission. DNR and UW ONRC will develop a joint work plan in support of DNR's most pressing needs in implementing the Olym-

pic Experimental State Forest mission. We hope to have the new staff in place by July 1, 2004. The initial priority will be to conduct landscape analysis consistent with the Habitat Conservation Plan requirement on the Olympic Experimental State Forest. The new researcher will apply the Landscape Management System (LMS) to measure progress toward landscape goals, define efficient pathways, and analyze management options which seek to achieve multiple objectives.

This large scale production application of LMS will result in further development and refinement of this tool for wider application as well. UW ONRC has clearly become a leader in LMS applications.

With the agreement to share the support of resources on an ongoing basis, we reached a milestone along the pathway toward fulfilling the vision of the Commission on Old Growth Alternatives, the Washington Legislature, and so many others. Olympic Experimental State Forest and UW ONRC are poised now to make significant contributions to sustainable forest management.

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Status of Research Projects Funding

Jason Cross, Research Coordinator

When the Washington State Legislature created the Olympic Natural Resources Center at the University of Washington, it declared, "It is the intent of the legislature to foster and support the research and education necessary to provide sound scientific information on which to base sustainable forests and marine industries, and at the same time sustain the ecological values demanded by much of the public." UW ONRC was given authority to seek resources and enter into contracts to support a program of research to carry out the intent of the legislature.

2004 is the ninth year UW ONRC obtained support for a research program that will fulfill its legislative intent by obtaining a

Congressional earmark of funds within the budget of the USDA Forest Service, Pacific Northwest Forest and Range Experiment Station (PNW). We expect funding of appropriately \$250,000 will be confirmed by PNW in April or May 2004. To avoid a fate similar to

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2003 - when 90 percent of our appropriation was confiscated by the Forest Service to cover firefighting costs - we have initiated the Request for Proposals process much

earlier this year, with a hope of having completed the process by early May.

Our Science Advisory Panel consists of Dr. Robert "Bob" Lee of the UW College of Forest Resources and Dr. Robert Wissmar of the UW College of Ocean and Fishery Sciences. Our request for pre-proposals yielded 16 potential projects. After review and consultation with the Science Advisory Panel, full proposals have been requested for 10 projects; they are due to UW ONRC on April 5. These 10 potential projects represent nearly \$430,000 in research, of which UW ONRC will only be able to fund \$180,000. Funding decisions will be made by a subcommittee of the Policy Advisory Board on April 20,

Regional Teachers Explore Mathematics Using Forestry Principles

Ellen Matheny, Director of Education & Outreach

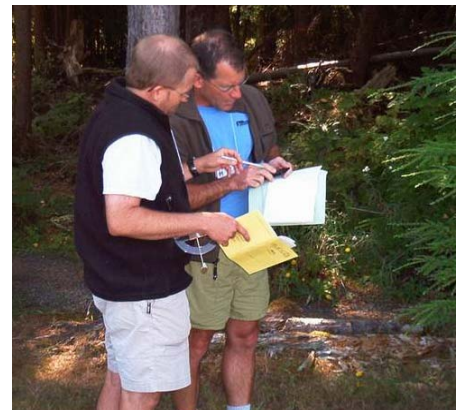
UW ONRC, UW College of Forest Resources, and UW College of Education have been working with regional teachers of mathematics and science in developing greater knowledge of forestry through the study of mathematics. Simple concepts, like tree volume, have been introduced using the inquiry approach to teaching.

For instance, one way to measure the volume of a tree would be to provide the formula for volume, measure the tree dimensions, and calculate an answer. Using inquiry-based methodology, the participants are given the problem ("What is the volume of wood in

this tree?") and asked to use their collective knowledge to figure out the answer. Participants pull from their sense of logic, creative extrapolations, and mathematics principles they have mastered to come up with possible solutions. This may sound like a "hit or miss" way of teaching mathematics. But actually cognitive studies have shown, when a person connects new learning with something already familiar, a new neural pathway is created in the brain and memory retention increases.

This still doesn't explain why I keep losing my car keys. But it does provide the foundation for

the discovery methodology being used in classrooms throughout the nation to teach science and mathematics.



Jeff Ryan & Tom Butler from Crescent Junior-Senior High School in Joyce work on tree measurement lesson

The Complexity of Mapmaking Using GIS Data

Teresa Zena Alcock, GIS Specialist

Eric Sfetku, GIS Technician

As maps are produced, a mapmaker runs into many issues in creating a useable product. As Geographic Information Systems (GIS) professionals, we have to deal with the realities of these issues on a daily basis.

UW ONRC GIS has encountered several recurring issues in our mapping projects regarding spatial data accuracy and relevancy, mostly resulting from the diverse origins of spatial data.

In one project, UW ONRC has been producing maps for the Water Resources Inventory Area (WRIA) 20 planning unit. Creating these maps has challenged us by requiring the incorporation of several layers of data onto a single map. This has proved to be difficult because, the more lines you have, the more difficult it is to distinguish between them. With city boundaries, rivers, lakes, watersheds, fish populations, public lands, roads, and above average water temperature data on one map, the individual features can become difficult to distinguish.

GIS data publication varies between agencies. For instance, two agencies can release similar data, but one agency's data does not necessarily complement the other agency's data. In this project, the Washington State Department of Natural Resources (DNR) released their watershed administrative units which for the most part correlate to Regional Ecosystems Office hydrologic units. But, in several instances, there are slivers in the data where the lines don't overlay perfectly. Sometimes the DNR data cuts straight through the middle of the hydrologic data. Coming from two different agencies, the two

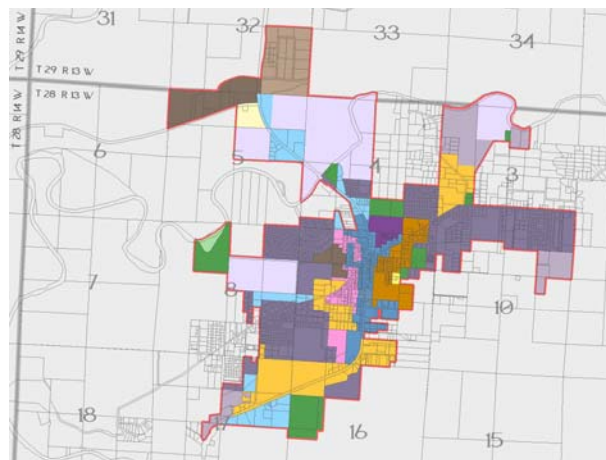
data sets might not necessarily complement each other. But both data sets are dealing with watersheds and by nature should agree with each other. We solve the problem by comparing the data to third party information, such as a digital elevation model, to determine which data is best to use.

In another project, mapping the tide tables and location of Spartina in Willapa Bay, we have GIS data from DNR, US Fish & Wildlife Service, and Pacific County which do not agree on parcel/ownership boundaries. Each organization has created and manages its data differently. When

GIS took all of the new computing power that was being developed and applied it to mapping.

overlaid onto more precisely measured Light Detection And Ranging (LIDAR) bathymetry and elevation data, one can finally see that all of the data is "wrong" in different ways. Since we are not loyal to any one organization's data, UW ONRC can bring these issues in accuracy and complexity to the surface and inform the GIS personnel in the agencies of the discrepancies.

A third project, The City of Forks and Urban Growth Area Zoning and City Limits mapping project, presents a similar problem. Clallam County, Washington State Department of Transportation, and the US Census have differing versions of



City of Forks Zoning 2004

the City of Forks city limits. Close consultation with city and county officials will ferret out the changes needed to bring the datasets into alignment.

Over time maps have progressed from artistic wall pieces to referable images which contain a highly-accurate representation of the world around us. In the past, the question of a map's accuracy was less of a concern because maps were used to determine relative boundaries. The goal of a historical navigational map was to get close enough to a landmark that you can identify and navigate from there. An accurate assessment of land ownership boundaries, in contrast, wasn't necessary because people weren't making measurements off the maps.

As the technology of mapmaking evolved, it was discovered that measurements could be made from maps. This led to a complete revolution of how a map was made as the issue of scale became relevant. Instead of a map showing a general relationship between two or more areas, it could show an accurate

Complexity of Mapmaking (continued)

representation of countries or individual ownerships. This revolution not only affected mapmakers but society as a whole. As more and more land was being subdivided and cordoned off, maps could be used to help legally solve disputes. As long as survey crews did their jobs correctly and transferred that data to the cartographer, disputes were often solved.

With the digital revolution came GIS. GIS took all of the new computing power that was being developed and applied it to mapping. This has been both a blessing and a curse for many government agencies and others using GIS. The benefits of GIS are enormous and far outweigh its deficiencies. GIS professionals can now draw lines and explain many different layers of

data on one map. They can harness a computer's mathematical prowess to measure spatial data down to the micron, if necessary.

That precision leads directly into the problems described above. It is possible to throw so much data onto a map that it becomes unreadable. The end users of these maps—such as WRIA 20, the City of Forks, and the Willapa Alliance—find GIS to be a great resource, sometimes almost overwhelmingly so. Each new layer of data adds another layer of complexity to the entire finished product. Maps can balloon into juggernauts of information that are entirely useless because no one can read them.

GIS professionals are trained to recognize the appropriate uses and representations of data at varying

scales. We have a gift in GIS that is revolutionizing the way we can make maps. But we have to remember they are still only *reference* tools. Unfortunately, in today's digital world, a map is frequently out-of-date the moment the ink hits the paper. Adaptive Managers in natural resources need to be made aware of this fact. Natural Resource Managers must make decisions based on imperfect and incomplete information. Geographic information is no exception. When UW ONRC does not create its own GIS data and we use others' data, all we can do is point out the discrepancies in the data to the data creators and manager. But, more importantly, UW ONRC can remind users of our maps that, even if not perfect, the maps will still very likely answer the questions asked of it.



Map of Public Land Ownership of the Water Resource Inventory Area 20 Recently Created by UW ONRC GIS Lab