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Researchers Try to Balance Rural Economics with Sustainable Forests

by Stacy Kish, CSREES

In the western United States, forest management programs struggle to strike a balance between encouraging vigorous rural economies and maintaining sustainable forest environments. With funding from USDA's Cooperative State Research, Education, and Extension Service (CSREES), scientists in Idaho examined different forest management programs in order to develop a program that finds this balance. >>

Timothy Link and colleagues at the University of Idaho, in partnership with Potlatch Corporation, conducted research at the Mica Creek Experimental Watershed in northern Idaho. Their work focused on how different forest management practices affect the surrounding watershed. As forest harvest intensifies, water flow increases in intensity and timing, which can impact surrounding communities. This study examined water flow in the watershed of three different forest management types: no harvest, thinned

and clearcut forests. Understanding how different management practices affect water flow will result in more effective best management practices that support both forest production and the surrounding community.

In the study, watersheds in forests that have been clearcut by 50 percent experience an increase in annual flows by approximately 30 percent. The same analysis in forests that have only been thinned by 50 percent show an increase in annual flow by roughly 20 percent.

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Right: The first detailed assessment of forested watershed Best Management Practices (BMP) effectiveness is occurring at the Mica Creek Experimental Watershed in northern Idaho.

Credit: Timothy Link

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Above (top): Radiometers installed in headwater streams to determine the effect of forest harvest and BMPs on stream heating.

Credit: Timothy Link

Above (middle): University of Idaho students sample snow at the Mica Creek Experimental Watershed to determine the effects of forest harvest on watershed hydrology.

Credit: Timothy Link

Above (bottom): Doctoral student Jason Hubbard installs radiometers at the Mica Creek Experimental Watershed in northern Idaho.

Credit: John Gravelle

The results of the study suggest a combination of thinned and cleared areas provides a greater volume of runoff to the surrounding communities. In addition, the water flow is sustained into the summer dry season when water is most needed downstream by communities and for maintenance of aquatic ecosystem health.

This research should help municipal watershed managers develop and adapt current plans to compensate for future environmental fluctuations caused by climate change.

Future research on this topic will provide further guidance on how to manipulate the forest canopy to help buffer the impacts of weather variability and warming trends as climate changes.

The results from the Mica Creek study area are being used in an upper-division watershed science and management course and a graduate-level physical hydrology course at the University of Idaho. The study is featured in a number of continuing and adult education programs for natural resource professionals and for outreach tours and presentations for political leaders, government officials, industry groups and scientists.

References:

Gravelle, J.A., and Link, T.E., 2007. Influence of timber harvesting on headwater peak stream temperatures in a northern Idaho watershed. *Forest Science*, 53(2): 189-205.

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Klos, P.Z. and Link, T.E., in preparation. Quantifying incoming shortwave and longwave radiation to headwater streams beneath different canopy structures. For submittal to: *Agricultural and Forest Meteorology*.

IFAFS was authorized to establish a research, extension and education competitive grants program to address agricultural genomics, food safety, value-added products, biotechnology, rural resource management and farm efficiency and profitability. At present, no IFAFS Request for Application is anticipated.

This is the first study to assess the effectiveness of Best Management Practices in industrial forestlands that are subjected to contemporary forest management practices, and it's the first comprehensive paired watershed study in the inland northwest.

CSREES funded this research project through the Initiative for Future Agricultural and Food Systems program. CSREES advances knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education and extension programs in the Land-Grant University System and other partner organizations. For more information, visit www.csrees.usda.gov. ■