

New Report: Greatest Value of Forests is Sustainable Water Supply

July 15 2008

(PhysOrg.com) -- The forests of the future may need to be managed as much for a sustainable supply of clean water as any other goal, researchers say in a new federal report – but even so, forest resources will offer no “quick fix” to the insatiable, often conflicting demands for this precious resource.

This new view of forests is evolving, scientists say, as both urban and agricultural demands for water continue to increase, and the role of clean water from forests becomes better understood as an “ecosystem service” of great value. Many factors – changing climate, wildfires, insect outbreaks, timber harvest, roads, and even urban sprawl – are influencing water supplies from forests.

Preserving and managing forests may help sustain water supplies and water quality from the nation’s headwaters in the future, they conclude, but forest management is unlikely to increase water supplies.

“Historically, forest managers have not focused much of their attention on water, and water managers have not focused on forests,” said Julia Jones, a professor of geosciences at Oregon State University, and vice chair of a committee of the National Research Council, which today released a report on the hydrologic effects of a changing forest landscape. “But today’s water problems demand that these groups work together closely.

“Because forests can release slightly more water for a decade or so

following timber harvest, there have been suggestions that forests could be managed to increase water supplies in some areas,” Jones said. “But we’ve learned that such increases don’t last very long, and often don’t provide water when you need it most.”

The science of how forest management affects water quantity and quality, Jones said, has produced a solid foundation of principles. But forests in the United States are changing rapidly, and additional research may reveal ways to provide a sustainable flow of fresh, clean water.

Changes in water supplies from forests due to climate change, the researchers said, are a particular concern, and water supplies may already be affected by increased fire frequency and insect or disease epidemics. Many such factors require more study, they said.

Among the findings of the report:

- * Forests cover about one-third of the nation’s land area, and although they have roles in timber production, habitat, recreation and wilderness, their most important output may be water.
- * Forests provide natural filtration and storage systems that process nearly two-thirds of the water supply in the U.S.
- * Demand for water continues to rise due to population growth, while forest acreage is declining and remaining forest lands are threatened by climate change, disease epidemics, fire and global climate change.
- * Forest vegetation and soils, if healthy and intact, can benefit human water supplies by controlling water yield, peak flows, low flows, sediment levels, water chemistry and quality.
- * Increases in water yield after forest harvesting are transitory; they

decrease over time as forests re-grow, and in the meantime water quality may be reduced.

- * Impervious surfaces such as roads and road drainage systems increase overland flow, deliver water directly to stream channels, and can increase surface erosion.

- * Forest chemicals, including those used to fight fire, can adversely affect aquatic ecosystems, especially if they are applied directly to water bodies or wet soil.

- * One of the biggest threats to forests, and the water that derives from them, is the permanent conversion of forested land to residential, industrial and commercial uses.

The report also outlined a number of research needs for the future, especially to improve specific predictions about the implications of forest harvests, disturbances by fire, insects and disease, climate change, land development, and shifts in forest species composition.

Modern forest practices have helped to protect streams and riparian zones, but more needs to be learned about the implications of such practices as thinning or partial cuts – development of “best management” practices could help balance timber harvest with sustainable water flow and quality.

And global warming, which affects timing and amount of snowmelt runoff, wildfires, and insect and disease outbreaks, is a huge variable.

The study also cited the value of watershed councils and citizen groups in getting more people involved in water, stream and land management issues at a local level, increasing the opportunities for all views to be considered, and conflicts avoided.

Support for this project, which involved numerous representatives from academia and private industry in the U.S. and Canada, was provided by the U.S. Department of the Interior and the Department of Agriculture. The National Research Council is operated by the National Academy of Sciences. This is one of the first major studies on forests and water since a U.S. Forest Service project in 1976, the authors noted.

“Times have changed,” the authors wrote in the report. “Thirty years ago, no one would have imagined that clearcutting on public lands in the Pacific Northwest would come to a screeching halt; or that farmers would give up water for endangered fish and birds; or that climate change would produce quantifiable changes in forest structure, species and water supplies.”

Those changes demanded a new assessment of current conditions, an understanding of rising tensions, and an evaluation of future needs, the researchers said.

Report: dels.nas.edu/dels/rpt_briefs/f..._hydrology_final.pdf

Source: Oregon State University

Citation: New Report: Greatest Value of Forests is Sustainable Water Supply (2008, July 15) retrieved 9 April 2024 from <https://phys.org/news/2008-07-greatest-forests-sustainable.html>

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