



Research Spotlight

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How do Forests Influence Water?

The role forests play in managing water remains a contentious issue in many parts of the world despite advances in scientific understanding. As new policy drivers emerge, such as bioenergy and environmental services, scientific knowledge is critical to decisions that realize the benefits of forests for water and avoid unintended consequences.

The International Union of Forest Research Organizations (IUFRO) promotes global science cooperation for the benefit of forests and people. Given new policy drivers and persistent information gaps between scientists and decision-makers, IUFRO is focusing efforts on forests and water interactions. Following is information from an IUFRO task force on this topic:

Water Use by Forests

Water use by forests is influenced by climate, forest and soil type, and other factors. In general, forests use more water than shorter types of vegetation because of higher evaporation, and less surface runoff and groundwater recharge occurs. Forest design and management practices can have a marked impact on forest water use through the mix of tree species and ages, forest structure and roughness, and the amount of felled and open ground.

Flood Flows

Forests can mitigate small and local floods but do not appear to impact either extreme flood events or those at a large catchment scale. One possible exception is the ability of floodplain forest to reduce downstream flooding due to hydraulic roughness acting to slow down and desynchronise flood flows.

Water Quality

Natural forests and well managed plantations can protect drinking water supplies. Forest management usually results in low input of nutrients, pesticides, and other chemicals compared to more intensive land uses such as agriculture. Forests planted in agricultural and urban areas can reduce pollutants, especially when located on run-off pathways or in riparian zones. However, trees exposed to high levels of air pollution capture sulphur and nitrogen and can increase water acidification in acid sensitive regions.

Erosion

Forests protect soils and reduce erosion rates and sediment delivery to rivers. Forestry operations such as cultivation, drainage, road construction, and timber harvesting may increase sediment losses but the implementation of best management practices can control this risk. Forest creation on erosion-prone soils and run-off pathways can reduce and intercept sediment.

Climate Change

Global climate models predict marked changes in seasonal snowfall, rainfall, and evaporation in many parts of the world. Based on these changes, water quantity and quality may be negatively or positively influenced by forests. As people look to large-scale forest planting in responding to climate change, they need to assure that forest and water interactions do not accentuate water shortages. The shade of riparian forests may help reduce thermal stress to aquatic life as climate warming intensifies.

Energy Forests

Fast growing forest crops have potential for high water demand that can lead to reduced water yields. The local trade off between energy generation opportunities and water impacts may be a key issue in regions where climate change threatens water resources.

For more information about scientific efforts about forest and water interactions visit:

<http://www.iufro.org/science/task-forces/water/>

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