

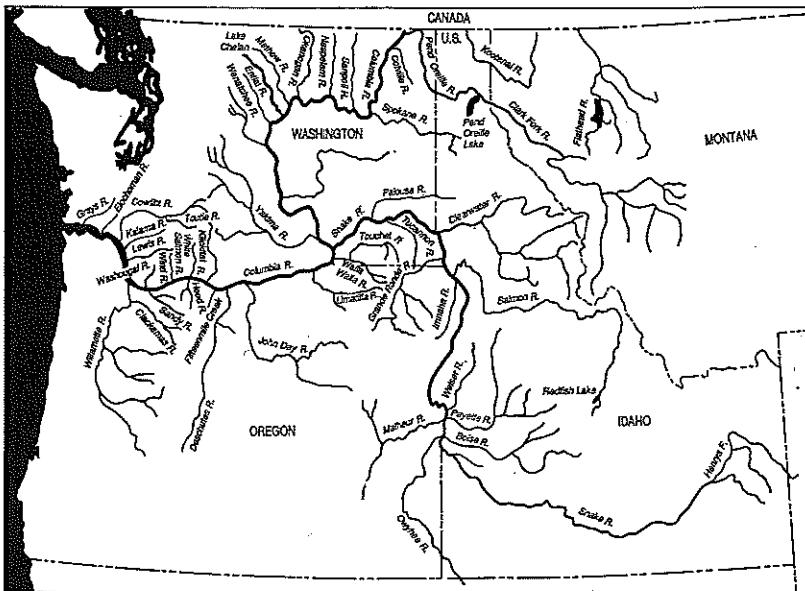
Institute for Environmental Studies
University of Washington

Volume 7

Fall/Winter 1991

Number 2

CONTENTS



Potential impacts of climate change on Columbia River basin salmon, page 271.

Global Climate Change: Focus on Northwestern North America

A Message from the Editor-in-Chief 167

Gordon H. Orians

Predicting Climate Change for the Pacific Northwest 169

C. Leovy and E. S. Sarachik

Determining the nature and extent of greenhouse warming is a difficult problem because the global climate system is complex and influenced by many factors. The authors show that climate warming is a certainty, but that much uncertainty surrounds predicting *how much and when*. They present the theoretical basis of the global

bon emissions to the atmosphere and to explore ways in which forest management could increase the capture of carbon dioxide by forests.

Year-to-Year Variations in the Water and Energy Balances of Forest Ecosystems

D. L. Spittlehouse, Forest Science Research Branch, Ministry of Forests, 31 Bastion Square, Victoria, British Columbia, Canada
V8W 3E7

A lack of water limits the growth of many forests during the summer in the Pacific Northwest. Computer modeling is used to determine the annual water use of the forests from site and climate data. Measurements of annual growth of the trees and the isotopes of carbon incorporated in the wood are compared with the water-use simulations and with air temperature data. This research provides baseline data which can be used to assess the response of forests to climate change.

The research has shown that the substantial year-to-year variations in water availability result in large inter-annual variations in growth (Robertson, Joza, and Spittlehouse 1990). The annual change in tree basal area varied by 20% about the mean at the sites studied. Relationships developed between water use, air temperature and tree growth will be used to estimate changes in productivity that might occur under a changed climate.

Similar modeling techniques are being used to assess the effect year-to-year variations in weather conditions have on reforestation success (Spittlehouse and Childs 1990). The results indicate that spring planting conditions are more sensitive to changes in climate than those in the fall. Thus improving stock quality and techniques for fall planting would be an appropriate strategy for addressing current climate variability and future changes.

References

- Robertson, E. O., L. A. Joza, and D. L. Spittlehouse. 1990. Estimating Douglas-fir wood production from soil and climate data. *Can. J. For. Res.* 20:357-364.
- Spittlehouse, D. L., and S. W. Childs. 1990. Evaluating the seedling moisture environment after site preparation. Pp. 80-94 in S. P. Gessel, D. S. Lacate, G. F. Weetman, and R. F. Powers, eds. *Sustained productivity of forest soils*. Vancouver, Canada: Faculty of Forestry Publ., Univ. British Columbia.