

Executive Summary

The Safe Drinking Water Act Amendments of 1996 require every State to perform source water assessments of all public drinking water sources and make the results public by 2003. Forests and grasslands serve as sources of many public drinking water supplies, and managers of these lands are expected to participate in preparing assessments and to work with the public to assure safe drinking water. To help managers of forests and grasslands meet this requirement, this report reviews the current scientific literature about the potential of common land-use practices to introduce contaminants that pose risks to human health into public drinking water sources. Potential audiences for this report include managers of national forests and grasslands and managers of other public and private lands with similar uses. Operators of public drinking water utilities and citizens' groups concerned with drinking water may also find this report useful.

Safe drinking water is essential to protect public health. Modern drinking water treatment can reduce most contaminants in source water to acceptable levels before it is delivered to consumers, but costs increase significantly when more rigorous treatment is needed to cleanse contaminated source water. Managing land to prevent source water contamination may be more cost-effective and may better protect human health than treating water after it has been contaminated.

Water from forests and grasslands is usually cleaner than water from urban and agricultural areas. Nevertheless, many common practices on forests and grasslands can contaminate drinking water sources. Soil disturbing activities such as road construction and maintenance, forest harvesting, and intermixed urban and wildland uses can introduce sediment into drinking water sources. Disease organisms may enter source waters from: (1) recreation and other human activities that lack developed sanitary facilities, (2) malfunctioning sewage disposal facilities, and (3) wild and domestic animals concentrated near source waters. Nutrients may enter source water from fertilizer and from atmospheric deposition of nitrogen compounds. Toxic chemicals may reach source water from pest control; from extraction of minerals, oil, and gas; from accidental chemical spills along highways and utility corridors; and from leaking underground storage tanks.

Gaps exist in the scientific understanding of the effects of many land-use practices on drinking water sources. For example, pathogens in wild animal populations and their transmission to source water are poorly known. Risk of contamination from recreation that occurs in areas without developed sanitary facilities is largely unstudied. Effects of multiple land uses that overlap in time and space across large watersheds are difficult to predict with current knowledge. Managers should consider uncertainties due to these unknowns in land-use decisions until research fills these knowledge gaps.

Source water assessments for forest and grassland watersheds are not likely to be fundamentally different from those in areas with other land uses. Scientific information will need to be applied locally on a case-by-case basis to consider what natural and human activities have a reasonable potential to introduce contaminants that are likely to reach a drinking water intake. Assessments will need to integrate across conventional disciplinary boundaries to assess the overall degree of risk to drinking water sources. Scientists, land managers, and the public will need to cooperate to translate the basic information in this report into meaningful source water assessments.

Keywords: Economics, land use, nutrients, pathogens, sediments, source water assessments, toxics.
