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An Approach To WATER RESOURCES EVALUATION OF NON-POINT SILVICULTURAL SOURCES (A Procedural Handbook)

by

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SPECIAL DEDICATION
DAVID A. FALLETTI

Dave Falletti recently met an untimely death while the manuscript was being prepared. He put in many hours of work and much dedication to the project, taking it through many complex obstacles. Those who have carried on this work have been guided by Dave's inspiration. The final document represents many of his ideas which we hope will be put into practice.

FOREWORD

Our Nation's forests are major sources of valuable resources including water supplies, wildlife habitats, recreational areas, and timber products. As pressures for these resources increase, the need to integrate resource management practices with techniques for controlling soil erosion and preventing the discharge of pollutants into the Nation's waters becomes more important. To further this integration, the Forest Service, U.S. Department of Agriculture, and the Athens Environmental Research Laboratory, U.S. Environmental Protection Agency, established a research project to develop methods for identifying and assessing alternative technical solutions to pollution problems associated with specific silvicultural activities.

This handbook addresses the technical aspects of non-point source water pollution related to silviculture as expressed in the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977. It was designed to aid environmental managers in developing water quality management plans, strategies, and implementation programs and should be used in conjunction with local expertise and information on economic, social, and institutional aspects of silvicultural activities.

David W. Duttweiler
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ABSTRACT

This handbook provides an analysis methodology that can be used to describe and evaluate changes to the water resource resulting from non-point silvicultural activities. It covers only the pollutant generation and transport processes and does not consider the economic, social and political aspects of pollution control.

This state-of-the-art approach for analysis and prediction of pollution from non-point silvicultural activities is a rational estimation procedure that is useful in making comparative analyses of management alternatives. These comparisons are used in selecting preventive and mitigative controls and require site-specific data for the analysis.

This handbook also provides quantitative techniques for estimating potential changes in streamflow, surface erosion, soil mass movement, total potential sediment discharge, and temperature. Qualitative discussions of the impacts of silvicultural activities on dissolved oxygen, organic matter, nutrients, and introduced chemicals are included.

A control section provides a list of control practices that have been used effectively and a methodology for selecting mixtures of these controls for the prevention and mitigation of water resource impacts. Such mixtures are the technical basis for formulating Best Management Practices.

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CONTENTS

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Mike Barton, Bob Meurisse, Lee Mulkey, and Dave Falletti laid the original ground work for the interagency agreement. Their continuous support and advice maintained a continuity towards the intended goals.

The "Control Opportunities" chapter was the collective work of many individuals. A committee chaired by Wayne Patton prepared the material. Committee members were George Dissmeyer, Joe Gorsh, Lee Cromley, Al Dahlgreen, Clay Smith, Doug Roy, Bill Beaufait, and Leland Fansher.

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CONVERSION FACTORS FOR U.S. AND METRIC UNITS

To convert column 1 into column 2, multiply by	Column 1	Column 2	To convert column 2 into column 1, multiply by
	LENGTH		
0.621	kilometer, km	mile, mi	1.609
1.094	meter, m	yard, yd	0.914
0.394	centimeter, cm	inch, in	2.54
	AREA		
0.386	kilometer^2, km^2	mile^2, mi^2	2.590
247.1	kilometer^2, km^2	acre, acre	0.00405
2.471	hectare, ha	acre, acre	0.405
	VOLUME		
0.00003531	centimeter^3, cm^3	foot^3, ft^3	28316.8
0.00973	meter^3, m^3	acre-inch	102.8
1.057	liter	quart (liquid), qt	0.946
1.3079	meter^3, m^3	cubic yard, yd^3	0.7646
	MASS		
1.102	ton (metric)	ton (U.S.)	0.9074
2.205	kilogram, kg	pound, lb	0.454
0.035	gram, g	ounce (avdp), oz	28.35
	PRESSURE		
14.50	bar	lb/inch^2, psi	0.06895
0.9869	bar	atmosphere, atm	1.013
0.9678	kg (weight)/cm^2	atmosphere, atm	1.033
14.22	kg (weight)/cm^2	lb/inch^2, psi	0.07031
	YIELD OR RATE		
0.446	ton (metric)/hectare	ton (U.S.)/acre	2.240
0.892	kg/ha	lb/acre	1.12
	TEMPERATURE		
	Celsius	Fahrenheit	
	−17.8C	0F	
$\left(\frac{9}{5}\ °C\right) + 32$	0C	32F	$\frac{5}{9}\ (°F - 32)$
	20C	68F	
	100C	212F	
	DENSITY		
62.43	gm/cm^3	lb/ft^3	0.016
	WATER MEASUREMENT		
8.108	hectare-meters, ha-m	acre-feet	0.1233
97.29	hectare-meters, ha-m	acre-inches	0.01028
0.00973	meters^3, m^3	acre-inches	102.8
0.00981	meters^3/hour, m^3/hour	feet^3/sec	101.94