STATE OF UTAH

NPS Task Force

NONPOINT SOURCE MANAGEMENT PLAN

SILVICULTURAL ACTIVITIES

Prepared for the NPS Taskforce:

July 1, 1998

Division of Water Quality
Forest Stewardship Coordinating Committee
U.S. Forest Service
Natural Resource Conservation Service
Forest Industry

Division of Forestry, Fire, and State Lands
Utah Department of Agriculture and Food
Utah Association of Conservation Districts

Utah State University Extension
Private Timber Landholders

STATE OF UTAH

NPS Task Force

Silviculture Addendum Subcommittee

NONPOINT SOURCE MANAGEMENT PLAN FOR SILVICULTURAL ACTIVITIES

Prepared for the NPS Taskforce:

July 1, 1998

Division of Water Quality
Forest Stewardship Coordinating Committee
U.S. Forest Service
Natural Resource Conservation Service
Forest Industry

Utah Department of Agriculture and Food
Utah Association of Conservation Districts
Utah State University Extension
Private Timber Landholders

Division of Forestry, Fire, and State Lands

State of Utah

Nonpoint Source Management Plan for Silvicultural Activities

Prepared by:

Rick P. Summers
Department of Environmental Quality
Division of Water Quality
288 North 1460 West
Salt Lake City, Utah 84114

Ed Storey
Department of Natural Resources
Division of Forestry, Fire and State Lands
1594 West North Temple, suite 3520
Salt Lake City, Utah 84114

E. Scott Burroughs
Department of Natural Resources
Division of Forestry, Fire and State Lands
1594 West North Temple, suite 3520
Salt Lake City, Utah 84114

Table of Contents

1.0 INTRODUCTION 1
- 1.1 Purpose and Scope 1
- 1.2 Summary of Required Contents for State Management Plans. 1
- 1.3 Definitions 2
- 1.4 Historical Overview 10
- 1.5 Silviculture and Water Quality 11
- 1.6 Status and Nature of the Problem 15

2.0 EXISTING AGENCY PROGRAMS AND RESPONSIBILITY 22
- 2.1 Utah Division of Water Quality 22
- 2.2 Utah Division of Forestry, Fire and State Lands 22
- 2.3 Utah State University Extension 23
- 2.4 Utah Department of Agriculture and Food 23
- 2.5 Utah Division of Water Rights 24
- 2.6 U.S.D.A. Forest Service 26
- 2.7 U. S. Army Corps of Engineers 33
- 2.8 U.S.D.I. Bureau of Land Management 37
- 2.9 U.S.D.I. National Park Service 38
- 2.10 U.S.D.A. Natural Resource Conservation Service 39
- 2.11 Soil Conservation Districts and the UACD 39
- 2.12 County Government 40
- 2.13 Municipal Government 42
- 2.14 Interagency Agreements 42
- 2.15 Permits and Licenses 43

3.0 PLAN IMPLEMENTATION AND MONITORING 45
- 3.1 Adoption process for Utah's Silviculture Forest Water Quality Guidelines . . 45
- 3.2 Program Implementation and Monitoring 46
- 3.3 Program Implementation Schedule 48

4.0 LITERATURE CITED 49

5.0 SILVICULTURE FOREST WATER QUALITY GUIDELINES 50
- 5.1 Preharvest Planning 51
- 5.2 Streamside Management Zone 54
- 5.3 Roads, Skid Trails, Landings and Stream Crossings 60
- 5.4 Timber Harvesting 71
- 5.5 Site Preparation, Regeneration and Revegetation 76
- 5.6 Chemical Management 80
- 5.7 Prescribed Fire 84
- 5.8 Forested Wetlands 89

Best Management Practices required by federal regulations 91

Appendix A-1
Utah Nonpoint Source Task Force A-2
Forest Water Quality Guideline Technical/Peer Reviewers A-4
Utah Forest Stewardship Coordinating Committee A-7
Forestry, Fire and State Lands Advisory Council Members A-9
Utah Division of Water Quality A-10
Utah Division of Wildlife Resources A-15
MEMORANDUM OF UNDERSTANDING A-19
Forest Service A-19
Bureau of Land Management A-24
Attorney General's Office Letter of Certification A-29
Plan Transmittal Cover Letter:: Governor Michael Leavitt A-30
Plan Approval Letter: U.S.E.P.A. A-32

Utah Nonpoint Source Silviculture Management Plan

1.0 INTRODUCTION

1.1 Purpose and Scope

The 1987 amendment to the Clean Water Act of 1972 recognized the need for control strategies for nonpoint source (NPS) pollution of U.S. waters. That act directed the states to identify land use categories that contribute nonpoint source pollution and adopt measures to control those sources. Silviculture or forest management was identified as a possible source of this type of water quality impairment.

This Silviculture Addendum to State Nonpoint Source Management Plan (State of Utah, 1989) documents the existing situation, prescribes voluntary Forest Water Quality Guidelines to protect water quality and outlines an implementation method for the promulgation and adoption of these guidelines. This addendum also describes the responsibilities of numerous agencies and different levels of government that have concerns regarding water quality and silvicultural activities. The interaction between these agencies and governmental entities is examined and, where appropriate, recommendations are made for cooperative agreements.

The Addendum also provides extensive literature references for further elucidation of proper forestry practices.

1.2 Summary of Required Contents for State Management Plans.

Section 319 (b)(2) of the Clean Water Act outlines the required contents for State Management Plans. These requirements are:

1. Identification of Best Management Practices (BMPs) approved by the State to be implemented to reduce NPS pollution. BMPs must account for impacts to groundwater.

2. Identification of regulatory and nonregulatory programs, technical assistance, I&E, and other existing programs that will be used to achieve implementation of silviculture BMPs.

3. A schedule with annual milestones for program implementation and BMP implementation.

4. A certification of the State Attorney General that Utah laws provide adequate authority to implement the program.

5. Sources of Federal and other assistance and funding (other than 319 (h) and 319(I) funding) available to support implementation **and** identify purposes for which such assistance will be used in each fiscal year.

6. Identification of Federal financial assistance programs and Federal development projects for which the State will review individual assistance applications or development projects for their effect on water quality and consistency with the State Management plan and the Silviculture addendum.

7. Must involve, to the extent possible, local and private experts.

8. Should attempt to develop and implement plan on a watershed-by-watershed basis within the State.

1.3 Definitions

Artificial regeneration -

direct seeding or by planting seedlings or cuttings.[1]

Avoid -

to refrain from when feasible.

Best Management Practice (BMP) -

A practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practical (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by Nonpoint sources to a level compatible with water quality goals (40 CFR 130.2(q). This definition is consistent with the State of Utah definition of "Forest Water Quality Guideline".

Best Management Practices as defined by State regulation or agreement between the State and Forest Service. In Utah these include:

- Best Management Practices for Nonpoint Source Water Pollution Control in Utah, 1989 inclusive of addendums dated 1996 and 1998.

- Best Management Practices for Nonpoint Source Pollution Reduction

[1] *Silviculture Terminology with Draft Appendix of Ecosystem Management Terms*; September, 1994; Silviculture Instructors Sub-Group, Silviculture Working Group (D2), Society of American Foresters.

in Waters of Summit, Wasatch and Utah Counties

- Salt Lake County Water Quality and Pollution Control: Erosion-Sediment Control Handbook.

- Land Use vs. Water Quality - Wasatch Streams.

Clean Air Act -

established in 1970 and amended in 1977 and 1990, is the federal law regulating air emissions; enforcement authority lies with the U.S. Environmental Protection Agency (EPA) who is charged with establishing National Ambient Air Quality Standards (NAAQS), these standards were to be established in every state by 1975; states were required to adopt standards that met or exceeded federal standards.[2]

Clean Water Act -

established in 1977 as an amendment to the 1972 Federal Water Pollution Control Act; Clean Water Act makes discharging pollutants from a point source to navigable waters illegal without a permit. The amendments of 1987 provide for the management of nonpoint source pollution into waters of the US.[3]

Drainage structure -

any device, excavation, berm or constructed structure used to provide stream crossings or divert runoff and/or stream channels. These structures may include bridges, culverts, waterbars, rolling dips, ditches, cross-drains, pipes, down spouts and other similar structures.

Fireline -

a constructed area generally void of combustible fuels that is used to stop or direct the spread of a wild or prescribed fire occurring in forest, grass, range or brush.

Fishery -

any stream, lake, river, creek, reservoir, pond or other body of water that supports naturally reproducing or stocked fish populations for any life stage.

---

[2] CPI Electronic Publishing Clean Air Act World Wide Web Page.

[3] CPI Electronic Publishing Clean Water Act World Wide Web Page.

Forest -

an area where the predominant vegetation is trees.

Forest Water Quality Guideline (FWQG) -

a collection of voluntary, field applicable practices for use during forestry activities to protect water quality adopted by the State and contained within the Nonpoint Source Management Plan.

Guideline -

see Forest Water Quality Guideline.

Hydrologic Modification -

occurs whenever human activities significantly change the hydrologic function (dynamics) or the attendant pollutant release regime of rivers (and streams) and riverine systems, lakes and impoundments, and ground water systems. These modifications can create nonpoint source (NPS) water pollution (and impacts to related aquatic wildlife habitat).

Insloped road -

a road constructed with a surface slope graded toward the cut slope to direct water to a ditch on the cut bank side of the road.

Landing -

a collection area, usually centrally located, to where logs or forest products are transported to by skidders, dozers, cable systems or other means so the products may be loaded onto trucks for transport to another destination.

Landowner -

an individual or group of individuals or any form of a legal entity that owns or possesses any interest in land; any government agency charged with management of public lands or any other type of group or agency that owns or manages land.

Natural Handbook of Conservation Practices -

a document containing a collection of specifications on a variety of conservation practices maintained by the United States Department of Agriculture, Natural

Resources Conservation Service.

Nonpoint source pollution -

diffuse sources of water pollution that originate from many indefinable sources and normally include agricultural and urban runoff, runoff from construction activities, etc. In practical terms, nonpoint sources do not discharge at a specific, single location (such as a single pipe). Nonpoint source pollutants are generally carried over or through the soil and ground cover via stormflow processes. Unlike point sources of pollution (such as industrial and municipal effluent discharge pipes), nonpoint sources are diffuse and can come from any land area. The following silvicultural activities are considered to be nonpoint sources of pollution: nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvest operations, surface drainage, and road construction and maintenance from which there is natural runoff (40 CFR 122.27).

Noxious weed -

any plant the Commissioner of Agriculture determines to be especially injurious to public health, crops, livestock, land, or other property.[4]

Outsloped road -

a road constructed with a surface slope graded toward the fill slope to direct water off the road in sheet flow.

Riparian areas -

units of land along watercourses or water bodies that produce unique vegetation as a result of abundant water in the rooting zone. The species and proportional amounts of vegetation are usually in marked contrast to the more arid adjacent uplands.[5]

Professional forester -

a person who has earned a bachelor of science in forestry or masters degree in forestry from a Society of American Foresters accredited college or university or equivalent and has experience in the management of forested lands.

Scarify -

---

[4] Utah Code Annotated; Utah Noxious Weed Act; 4-17-2.

[5] USDA Natural Resource Conservation Service

to mechanically (e.g. plowing, disking, ripping) break up or loosen the surface of the soil, roads or other areas.

Sedimentation -

the process of deposition of eroded and transported material, usually in the context of stream channel bottoms, reservoirs and lakes.

Silvicultural activities -

activities that involve controlling the establishment, growth, composition, health and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis; these activities do not include land conversion to non-forest uses or range management activities. [1]

Skid trail -

a corridor used for the dragging or transportation of logs by logging equipment.**Slash -**

any residual woody material left on the site after any type of harvest operation and usually includes tree stems, branches and foliage.

Slope distance -

a distance measured parallel to or along the ground with no correction for the slope.

Soil and Water Conservation Practices (SWCP) -

the set of practices used by the U. S. Forest Service which, when applied during implementation of a project, ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water-related beneficial uses are protected. These practices can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the States and thus are recognized as Best management Practices (BMPs). Others are defined by the Forest interdisciplinary teams or described in Forest Service Manual and Handbooks. Both kinds of SWCPs are included in the Forest Plans as Forestwide standards or are referenced in the plans. A third kind of SWCP is identified by the interdisciplinary team for application to specific management areas. These are included as Management Area Standards in the appropriate management areas in the Forest Plan. A fourth kind, site specific SWCPs, are based on project level evaluation and represent the most effective and practical means of accomplishing the soil and water resource goals and protecting the beneficial uses of a specific area. These site specific

conservation practices supplement the Forest Plan for specific projects. Soil and water conservation practices are grouped by management activity for ease of presentation and understanding. The activities are: (11) Water Management, (12) Recreation, (13) Vegetation Manipulation, (14) Timber, (15) Roads and Trails, (16) Minerals, (17) Range, and (18) Fire Suppression and Fuels Management. Although a practice might be shown under only one activity designation, it may apply to another activity. A number of the practices are referenced to more than one activity, and some apply to all activities.[6]

Special use permit -

a permit issued by the U. S. Forest Service under established laws and regulations to an individual, organization, or some company for occupancy or use of National Forest System lands for some special purpose.

Stand -

a contiguous group of trees sufficiently uniform in age class distribution, composition and structure and growing on a site of sufficiently uniform quality, to be a distinguishable unit.[1]

Stream -

for purposes of SMZ application, a stream is a natural water course of perceptible extent with defined beds and banks that confine and conducts continuously or intermittently flowing water; definite beds are defined as having a sandy, gravel or rocky bottom surface that is a result of the scouring action of water flow.

Perennial stream -
streams that flow most of the year in all but the driest of climatic cycles.

Intermittent stream -
streams that flow only part of the year when they receive water from springs or runoff.

Ephemeral stream -
streams that are above the water table at all times; these streams carry water only during and immediately after precipitation or during snowmelt runoff.

---

[6] USFS, 1988. SOIL AND WATER CONSERVATION PRACTICES HANDBOOK. United States Department of Agriculture, Forest Service, R-1, Missoula, Montana, R-4, Ogden, Utah Forest Service Handbook 2509.22.

Streamside management zone (SMZ) -

State definition: an area of specialized management to protect water quality by limiting soil disturbance and exposure; an area of land adjacent to a waterbody where soil disturbance is minimal and vegetative disturbance is reduced to provide a buffer for the filtration of water entering the waterbody.

U.S.F.S definition: as defined by the U. S. Forest Service, an SMZ is a designated zone that consists of the stream and an adjacent area of varying width where management practices that might affect water quality, fish, or other aquatic resources are modified. The SMZ is not a zone of exclusion, but a zone of closely managed activity. It is a zone which acts as an effective filter and absorptive zone for sediment; maintains shade; protects aquatic and terrestrial riparian habitats; protects channel and streambanks; and promotes floodplain stability. The SMZ may be wider than the riparian area.[7]

Turbidity -

an optical property of water that is a measure of the ability of suspended and colloidal materials to diminish the penetration of light through the water column. Turbidity increases with increased suspended sediment concentrations.

Waterbody -

any stream, creek, river, pond, lake, reservoir or other feature that contains or seasonally contains water.

[7] USFS, 1988. SOIL AND WATER CONSERVATION PRACTICES HANDBOOK. United States Department of Agriculture, Forest Service, R-1, Missoula, Montana, R-4, Ogden, Utah Forest Service Handbook 2509.22.

Wetland -

State & U.S. Army Corps of Engineers definition:

areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.[8]

U.S. Forest Service definition:

wetlands are those areas that are inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstances do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.[9]

---

8 Clean Water Act; federal wetland definition.

9 USFS, 1988. SOIL AND WATER CONSERVATION PRACTICES HANDBOOK. United States Department of Agriculture, Forest Service, R-1, Missoula, Montana, R-4, Ogden, Utah Forest Service Handbook 2509.22.

1.4 Historical Overview

Utah is primarily an arid state. However, those lands which lie at higher elevations where precipitation is generous enough to allow trees to grow are covered with coniferous and deciduous forests. Even with the elevation-dependent precipitation, the forests at these elevations are slow growing and usually of smaller size than the commercial forests of other states in the nation. In addition, the mountains of Utah are fairly rugged and sometimes quite remote. Access as well as size and species have all played a part in making the forests of Utah unattractive for economic consideration in the past. The state of Utah is largely federally-managed land. The Bureau of Land Management manages vast acreages of land in the low-lying areas of the state and the U.S. Forest Service manages much of the higher elevation forested land. Since the majority of forested land is federal, little attention has been given to the impact of forest management activities on state and private land.

In the early 1980s, the concern regarding nonpoint source pollution sparked an interest in what impact on water quality was being created by the timber harvest activities throughout the state on federal, state and private lands. An investigation done by the Division of State Lands and Forestry at that time (Kappe, 1982) led to a conclusion that the state was "not experiencing significant water quality adverse impacts from silvicultural activities." However, the study went on to state,"the evidence suggests that if there is a substantial increase in private timber sales, further consideration should be given to instigating some sort of a regulatory program."

Recently, the supply of timber from federal lands has become limited. This has increased the interest in privately owned timber. This interest has caused even the slow growing, smaller timber of Utah to become valuable. Many timber purchasers, particularly those from the Northwest, have come to Utah and found that despite the previously mentioned constraints, the forests of Utah now contain economically viable timber. This is made more attractive by the fact that there are no statutes or administrative rules such as exist in most other states governing the harvesting of timber**.** Consequently, the interest has become very active and a substantial amount of timber has been cut from private land in the past several years. In keeping with the previous contention that substantial increase in private timber sales might warrant some type of regulation, the Division of Forestry, Fire and State Lands felt that the need for a regulatory program addressing forest practices on public and private lands needed to be addressed.

In 1995, the Division of Forestry, Fire and State Lands became concerned about the amount of timber being cut from private land and the manner in which the timber was being cut. The Division approached the legislature and proposed the topic be considered by an Interim Legislative Committee. Approval was given by the full legislature. The Interim Committee directed the Division to form a task force to investigate the situation. The Forest Practices Task Force was organized and spent the summer of 1996 studying the issue. Some of the Task Force members were selected for their knowledge and expertise in the area of forest

management and timber harvesting. Others were selected for the perspective they could provide to insure that a sound, well-based analysis could be obtained and that a logical rationale be developed for proposed recommendations. The Task Force held a number of meetings, conducted investigative field trips, researched secondary information and examined findings of research conducted by Utah State University. The Task Force developed 13 recommendations for the Interim Legislative Committee.

Proposed legislation was introduced to the 1997 legislature. The proposal, Senate Bill 24, was passed by the Senate Committee, the full Senate and the House Committee. Before S.B. 24 came to the floor of the House of Representatives, the sponsor substituted S.B. 24A. This bill was passed by the House and subsequently passed the Senate. The bill provided for the education of landowners regarding forest practices. The education program is to be directed by the Utah State University Extension Service in cooperation with the Division of Forestry, Fire, and State Lands and the Utah Farm Bureau. Landowner education will be a component of the implementation of this Silviculture Addendum to the State Water Quality Plan.

The Utah Nonpoint Source Task Force independently recognized the increased harvest pressure on Utah's forest and expressed concerns about the effects on water quality and nonpoint source pollution. A motion was made and passed to assemble a subcommittee of public and private representatives to assess the situation and prepare an addendum to the existing "Utah Nonpoint Source Management Plan" (State of Utah, 1989) that addresses silviculture and nonpoint source pollution. That subcommittee was formalized and did an assessment of surrounding state's management programs, regulations, and policies. They assembled a library of reference materials pertaining to regulation and best management practices. A framework for the plan was developed and outlines of best management practices were prepared. In 1997, the process was reorganized with the Forest Stewardship Coordinating Committee, Division of Water Quality, and the Division of Forestry, Fire and State Lands assuming the lead for preparing and finalizing the addendum.

1.5 Silviculture and Water Quality

The effects of timber harvesting and silvicultural treatments (thinning, burning, mechanical site preparation, application of chemicals, planting) on stream ecosystems are complex (Meehan, 1991). The effects of a given activity on the stream area can be both positive and negative, thus decisions of land treatments must be made with care. The effects on small headwater streams (where most of Utah's forest resources are found), are especially important for two reasons: 1) it is estimated that headwater streams make up 85 percent of the total length of running waters; and 2) these small streams are most easily altered by human activities. These small streams are vital conduits to pass clean, good quality water to our lower watersheds. They also act as a passageway for the nutrient or energy base that drives the stream system from the smallest aquatic insects to a healthy fish population. In many areas, these streams play an important role in providing spawning and rearing habitat for our fish.

Harvesting Effects on Water Quality

Timber harvesting can change the distribution of precipitation that reaches the ground, the evaporation rate from the ground, the amount intercepted and evaporated by foliage, and the amount that can be stored in the soil. Removal of timber can increase runoff rates, therefore reducing the amount of precipitation that formerly recharged the water table. These hydrological properties, the density of road and surface-drainage networks, and the physical structure of the soil govern the rate and pathways of movement of water to stream channels. Primary watershed results of timber cutting and yarding are changed rates of sediment/nutrient delivery to the stream and altered levels of water temperature and dissolved oxygen. Harvest activities can deliver excess amounts of both fine and large organic matter to the stream. Harvest activities on upslope areas can weaken or compact the soil structure and expose large areas to bare mineral soil. Accelerated erosion, mass wasting and/or landslides are likely results and can have a profound effect on the stream. Such stream degradation can be relatively long-lasting.

Dissolved Oxygen. Dissolved oxygen concentration in the water is an important indicator of the overall water quality of the waterbody. Insufficient dissolved oxygen in water leads to anaerobic decomposition of organic matter. This produces noxious gases that cause odor problems in drinking water. Low dissolved oxygen levels are lethal to aquatic life and can increase the cost of water treatment processes.

Dissolved oxygen concentration within stream bed gravels may drop if logging causes fine organic debris to accumulate on the channel bottom. Low intragravel dissolved oxygen in spawning areas impairs or precludes incubation of fish eggs and may reduce or eliminate the fish population. Sediments washed from the exposed harvest area into the stream can also "smother" fish eggs in the gravel. The amount of dissolved oxygen that water can hold decreases as water temperature increases, sometimes to lethal levels. State Water Quality Standards (State of Utah, R317-2) have a numeric standard for dissolved oxygen.

Sediments. Road construction for a harvest area can be the largest contributor of sediments to the stream channel. Exposure of mineral soil to the effects of water erosion through tree removal and improper yarding can also contribute to an increase in sediment delivered to the channel. The effects on a stream affected by heavy sedimentation can be dramatic and long lasting.

Sediment in streams can lead to declines in fish populations by acting directly on the fish health, covering spawning and rearing gravels, modifying natural movements and migrations of fish, and reducing the abundance of available food (EIFAC, 1965). It can also increase the water treatment costs for drinking water supplies and interfere with recreational use and aesthetic enjoyment of the waterbody. State Water Quality Standards (State of Utah, R317-2) do not have a numeric standard for sediments, but provide a numeric standard for turbidity.

Water Temperature. When streamside vegetation is removed by timber cutting, summer water temperatures generally increase in direct proportion to the amount of the stream exposed to sunlight. Small streams that were previously shaded can be very sensitive and warm more and have greater daily temperature fluctuations than larger streams. For streams in the lower watershed, flows (rather than riparian vegetation) begin to play a primary role in regulating water temperatures. High stream temperatures can be detrimental or lethal to aquatic life and may contribute to low dissolve oxygen levels in the stream. State Water Quality Standards (State of Utah, R317-2) have a numeric standard for temperature.

Nutrients. Concentrations of inorganic nutrients (nitrogen, phosphate, potassium, and calcium) in streams may increase after logging, but usually by moderate amounts and for short periods (Chamberlin, 1991). Slash burning may increase nutrient releases 5 - 10 times, but again, have shown rapid returns to earlier levels. Streams with algal production limited by a nutrient may have major algal blooms in response to minor increases of that nutrient when temperature and flow conditions permit. Restricting application of forest fertilizers in the stream area and buffer zones will help minimize potential nutrient problems in the stream. State Water Quality Standards (State of Utah, R317-2) do not have numeric standards for nutrients, however, the code provides pollution indicator levels for phosphate and nitrate as (N).

Chemicals. Pesticides, fertilizers, and fire retardants used in timber harvest operations and applied to the watershed can ultimately be delivered to the stream through runoff or drift from aerial spraying. The effects of these chemicals are varied. At sometimes low levels, they can be toxic to humans, fish and aquatic insects. They can reduce riparian cover and habitat. They can result in aquatic life avoiding the stream resulting in a barren stream. These chemicals can bioaccumulate through the food chain to the harvestable size fish we consume when delivered to a stream or lake,. Concentrations of chemicals in an organism that are 100,000 times the concentration of the chemical in the water have been reported (Norris, et. al., 1991). State Water Quality Standards (State of Utah, R317-2) have numeric standards for a variety of chemical compounds.

Buffer Strips

The value of a buffer strip to alleviate the direct effects of logging activities has been extremely well researched and documented (Meehan, 1991). Streamside vegetation stabilizes streambanks and channels, provides cover, and maintains stream temperatures within ranges appropriate for aquatic life, and acts as a filter for disturbances from upland activities. Buffer zones can provide a sustained source of large organic debris that provides habitat and channel stability. Removal of trees at the streamside can eliminate root structure and result in weakened streambanks that are prone to washout and loss of land productivity. The breakdown of streambanks is most difficult to avoid when streamside felling or skidding and cross-stream yarding occur. Consideration should always be given to maintaining a streamside management zone when conducting forest activities in proximity to a stream.

Summary

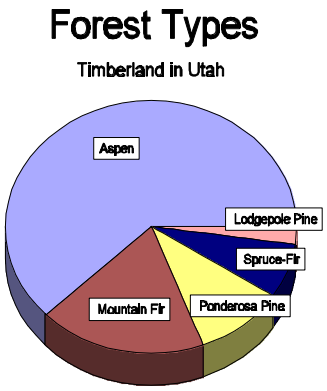
Fortunately, solutions are not complex. Reconnaissance, good planning, use of Forest Water Quality Guidelines, leaving a streamside buffer, careful thought about need and application of chemicals, diligent reforestation, and expedient road closure/reclamation are not costly and can result in an economically viable and ecologically sound timber harvest. Preplanning and use of the Forest Water Quality Guidelines presented in this plan before and during the harvest are usually effective and very inexpensive when compared with the costs that can be incurred to rehabilitate a stream after the damage has occurred. All decisions we make regarding our lands must be made with care. Understanding our forest ecosystems, implementation of Forest Water Quality Guidelines, and application of sound forestry principals can result in timber harvests that can be positive for our landscape and provide us with the sustained materials society needs.

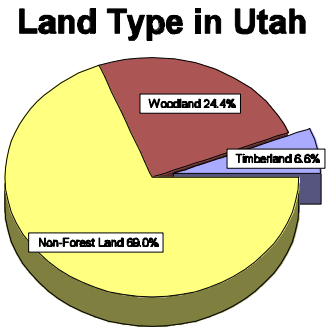
1.6 Status and Nature of the Problem

Utah's Forested Lands

Forested lands are an important natural resource in the state of Utah. Utah's generally high elevation forests are the principal source of water production in this arid state. Forests make an important contribution to Utah's way of life and to its quality of life by providing jobs, forest products, critical watershed areas, livestock forage areas, open space, wildlife habitat, scenic vistas, recreational experiences, and other social and economic benefits. In addition, these forested areas are critical recharge areas for most ground water sources in the state.

Nearly one third of Utah's 53 million acres is occupied by forest. Utah's forests are located throughout the state, mostly in areas of higher elevations (above 5,000 feet). These forests are often described as timberlands, areas that support commercial timber species, and woodlands, areas that support less commercially valuable species. Timberlands represent approximately 3.4 million acres or about 21% of Utah's forests. Approximately 75% of this timberland is in federal ownership, 6% in state and municipal ownership, and 19% in private ownership. Commercial forest types found in Utah include ponderosa pine, Douglas fir, aspen, lodgepole pine, and spruce-fir. About 20% of the timberland in Utah is privately owned. The other 80% is found on public lands. Private, municipal, and other forested lands are generally interspersed with each other and with federal forest lands. Much of the private forest land forms a fringe around larger tracts of public forest.

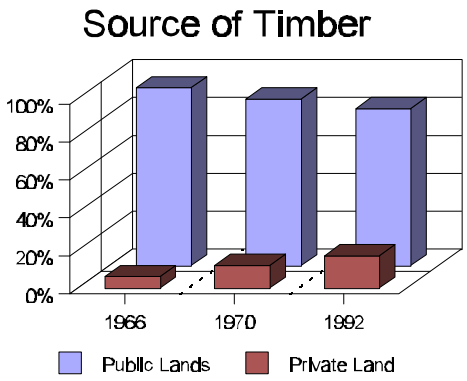




Noncommercial woodlands occupy almost 25% of the surface area of the state and include oak-maple and pinyon-juniper communities.

While private ownership of Utah timberlands was equally divided between farmer/ranchers and non-farmer/ranchers in the past, it appears that much of the private forest lands are being divided into smaller tracts and purchased by non-farmer/ranchers. Overall, recreation is the dominant land use for Utah's forests, regardless of ownership. Other forest land uses include livestock grazing, hunting, timber and firewood harvesting.

Contribution from public lands to the state's timber harvest has decreased in recent years. Harvest contribution from public lands has decreased from about 94% in 1966 to 83% in 1992. The exact percent of the timber harvest coming from private lands today is not known, but it is expected to continue to rise because timber demand is high and supply from public lands continues to decline.



Most private forest lands in Utah were originally acquired for cattle grazing, agriculture, or mining development. Many of the best forest lands in Utah are in private ownership. These lands generally contain sources of water, are located near roads, and are proximate to towns and communities. Since these lands are strategically located, they are capable of providing benefits as well as posing risks for nearby communities if they are not properly managed. Private forest lands are most abundant in the Weber River, Bear River, and Jordan River watersheds.

Even though the majority of forest lands in Utah are in federal ownership, private and other lands are still of great importance for Utah's citizens. If these nonfederal forest lands are well managed, they have the potential to provide continuing benefits to private landowners, to sustain a local timber industry, to help revitalize rural economies, and to contribute to the protection of Utah's natural resources and its renowned scenery. The protection or sound management of non-federal forested land as well as federally-managed forests is critical for protection of water quality in Utah.

Timber Harvesting Operations

Timber harvesting on Utah's nonfederal forest lands has increased in recent years. The decline in timber harvesting on federal lands combined with favorable timber prices has increased pressures to log private and state lands throughout the United States. Utah's geographic proximity to the Pacific Northwest makes it particularly susceptible to these pressures. The proportion of the state's total timber harvest coming from private lands rose from 6% in 1966 to 12% in 1970 and 17% in 1992. Harvest activity on the part of private landowners appears to have jumped dramatically in response to high timber prices since 1993. Because of recent increases in prices, more of Utah's private timber has been put under contract, making it more likely to be harvested in the coming years.

Pressures to harvest timber on private lands in Utah and other states are likely to continue in the future for many reasons. Population and wood product demand is increasing. The management focus of public lands has shifted from commercial to non-commercial uses. Growing restrictions on access to the vast timber resources of Western Canada reduces that source of wood for U.S. markets. In response to near-record stumpage prices, the pre-mature harvest of many private

timberlands will likely decrease that volume of supply in the future. Changes in milling technology and economics that allow for portable mills have increased access to private timberlands. Also, recognition for the fact that wood is one of our most cost-efficient and environmentally-friendly raw materials is increasing. It is renewable and requires a small fraction of the energy inputs needed to produce other substitutes like concrete, steel, and aluminum. While the general trend is increasing demands and decreasing supplies, the potential availability of timber from the Russian Far East could dampen this imbalance, depending upon import restrictions on that timber for fear of importing diseases and pests.

As currently practiced, timber harvesting on nonfederal lands in Utah sometimes leads to degradation of the physical condition of the land. The negative impacts of poor logging practices can include waste of timber resources, soil erosion, decline in water quality, decreased capacity of a forested area to retain and release snowpack, increased fire risks, increased susceptibility to insect infestation, spread of noxious weeds, restricted livestock movement and access to grazing areas, disruption of wildlife habitat and movement, and decline in visual qualities of an area. These impacts pose substantial costs to current and future generations of Utahns. State fire fighting costs run into the millions of dollars on an annual basis. Costs for the rehabilitation or relocation of state reservoirs whose storage capacity is decimated by siltation would be even more staggering. Sensitive forested areas, such as riparian zones, steep slopes, and wind-prone locations are particularly vulnerable to poor logging practices.

Poor harvesting operations also can compromise the regenerative capacity of timber resources, having long-term implications for Utah's forests. The productive capacity, natural rotation cycle, volumes of merchantable timber, commercial value, and alternative future uses of a site may be compromised if logging is not done in the context of silvicultural prescriptions designed for site regeneration. Regeneration is a challenge on Utah's forest lands because tree stands are not very dense or uniform and the sites are generally dry. In particular, greater care needs to be taken to regenerate Douglas-fir, spruce, and ponderosa pine, the species with the greatest commercial value. Assuming a 150-year rotation for many forest types in Utah, a 10-15% harvesting rate over the last five years and over the next five years (as indicated in responses to a landowner survey conducted by the Forest Practices Task Force, 1996) would place significant pressure on Utah's private forests, resulting in an unsustainable harvesting trend.

Over the past 25 years, most states have implemented programs to manage and control logging on nonfederal land, making those few states without forest practices programs more desirable places for loggers to operate. Utah remains only one of four western states (along with Arizona, Colorado, and Wyoming) that do not regulate or monitor forest harvesting practices on nonfederal lands. This leads to the concerns that Utah has "put out the welcome mat for bad operators" and that we are robbing our grandchildren by failing to provide for regeneration of healthy timber stands today.

On federal land, timber is harvested under more stringent stipulations. Harvesting activities which cause degradation of water occur less often. However, the 1982 report (Kappe, 1982) shows

some concerns on federal land silvicultural activities. These seemed to be caused by poor monitoring of logging activities or insufficient enforcement of contract provisions rather than lack of guidelines for logging operations. For the most part, federal constraints are either compatible with or more stringent that the Forest Water Quality Guidelines proposed.

Forest Landowners

Owners or managers of forests in Utah include the federal government (BLM, BIA and the U.S. Forest Service), the state of Utah, school and institutional trusts and private landowners. Private landowners in Utah are a very diverse group, consisting of corporate owners and private individuals, owners of large and of small acreages, multi-generation owners and those who have recently acquired forest land, and resident and absentee owners. These people own land for different reasons and respond to varying incentives. Many owners wish to exercise land stewardship but may be inexperienced in dealing with harvesting operators and timber brokers, uninformed about silvicultural prescriptions and timber harvesting methods, and unaware of various incentive programs that can increase their choices for managing their land. Some owners may disregard stewardship concerns or professional advice when faced with the possibility of substantial short-term financial gains.

Timber is an important resource for private forest landowners. When that resource matures, the landowner has several options. The timber can be cut and utilized, providing revenue to the landowner and additional economic benefits to rural communities. The timber can be left standing until it dies and falls down, leaving fuel for forest fires that could be ignited by lightning or humans. Or, the timber could become susceptible to disease, which could destroy its economic value. Landowners need education and assistance in order to know how to make use of timber resources in ways that do not destroy its long-term value and that continue to produce benefits.

Poor harvesting practices can have a variety of implications for landowners. Waste of wood generally accompanies poor logging and landowners often are not compensated for the full value of the timber removed. Degradation of the physical condition of the land can reduce its economic value. Landowners can be held liable for off-site impacts of poor harvesting practices, such as degradation of water sources or ignition of a fire from untreated slash. Future options may be foreclosed in terms of alternative uses of the land, its sustainability, its marketability, or its desirability as part of an inheritance. Tax liabilities for current owners and their heirs may be severe if no management plan or improper management plans are used.

Increasingly, landowners are being approached by timber contractors or brokers who scout good stands of timber, obtain landowner names from county recorder's offices, and contact landowners in an attempt to negotiate timber contracts. Nearly one-third of the landowners who responded to the landowner survey had been approached about selling timber. Of those who had actually harvested timber in the last five years, nearly 75% first considered harvesting timber after being contacted by a timber buyer. Limited market information on the part of landowners makes them susceptible to being offered what may appear to be high sums of money but which are, in reality,

often below market prices for their timber. Members of the Forest Practices Task Force learned of several cases where landowners had received very low prices for valuable timber.

Another major problem related to timber harvesting has to do with the nature of contracts negotiated between timber operators and landowners. Timber operators generally use their own contracts, which are written to provide the harvesters with discretion on how logging operations are conducted and which seldom provide performance or payment protections for the landowner. Sometimes no contract is used (as was the case with 31% of landowners who had harvested timber and responded to the survey conducted by the Forest Practices Task Force). Without a contract, loggers generally take the best merchantable timber and leave landowners with no legal recourse in cases where the land is left in a degraded condition or the landowners are not paid fully for their resources. Task Force members visited sites that had been harvested without a contract or with use of the harvester's contract and they learned of negative consequences for landowners. In one instance, the land was left degraded, the landowner had not been paid, and the landowner faced possible liability for downstream damages.

In order to protect landowners and ensure that logging meets their management objectives, contracts should specify how various aspects of a logging operation will be conducted (e.g. road design and placement, timber utilization, slash treatment, erosion control), how timber will be measured and how payment will be calculated, and how the logging operation will fulfill silvicultural prescriptions for site regeneration. Problems can best be prevented before a sale takes place. Negotiations over harvesting operations can specify the responsibilities of the contractor, the logger (if different than the contractor), and the landowner. Good contracts can clarify expectations, protecting landowners as well as harvesters, but they need to be carefully negotiated and well monitored.

There are direct and indirect economic benefits for landowners to ensure that timber harvesting is well conducted. If landowners have a proper contract, they can protect themselves against waste of timber and loss of stumpage value, limit their liability for injuries to loggers that may occur on their land, limit their liability for off-site impacts from poor harvesting, preserve the productive capacity of their forest resource, and increase the potential for future timber sales. Properly constructed and drained roads can reduce future costs related to road maintenance and prevention of soil erosion. Slash properly treated when heavy equipment is on the site for timber harvesting can reduce future costs of site clean-up. Good silvicultural prescriptions can enhance natural regeneration and reduce costs of replanting. Even in instances where logging operators may be the cause of problems, the landowner is the one who is ultimately liable for off-site impacts, posing the potential for substantial costs.

Members of the Forest Practices Task Force concluded that best management practices go hand-in-hand with best business practices since proper timber harvesting actually increases revenue, reduces costs, protects the resale value of forest land, expands a landowner's future options and reduces risk of water quality impairment and resultant liability (Stewardship of Utah’s Forests, A Report of the Utah Forest Practices Task Force, 1996).

Forest Products Industry

As with forest landowners, timber operators also are a diverse group of people that respond to different incentives. Out-of-state loggers generally come from the Pacific Northwest, where the greatest reduction of timber harvesting on federal lands has occurred in recent years. They often haul logs back to mills in the Pacific Northwest and, in order to justify their transportation costs, they take only the most commercially valuable trees, a practice which is referred to as "high-grading." Douglas-fir, spruce, and ponderosa pine are targeted for harvest more frequently than other tree species because of their commercial value. High-grading contributes to waste of timber and is not conducive to forest regeneration.

Timber harvesters hauling to local mills often have higher rates of resource utilization because it can be economical to haul less valuable timber shorter distances. Loggers who are residents of Utah communities are often concerned about staying in business without having to relocate. They generally care about their reputation, being honest with landowners, and exercising stewardship for the future of Utah's forests. Some established Utah harvesters, however, rely on traditional practices and lack knowledge about new and improved harvesting methods.

Since most forests in the Intermountain West are federally owned, many operators have harvested timber on federal lands and have complied with the standards set by the U.S. Forest Service. Some prefer to harvest timber on Forest Service lands out of recognition that federal standards and procedures clarify responsibilities and offer them some important protections. Their experiences lead to the conclusion that timber harvesting can meet fairly strict standards and still be profitable for the contractor. Some operators who harvest timber for the federal government voluntarily follow the federal standards when operating on nonfederal land. However, they can find themselves at a disadvantage when bidding on contracts to harvest on nonfederal land against operators who do not abide by these same standards. Even operators who are familiar with good harvesting practices and who normally harvest responsibly may cut corners in instances where they are not monitored or held responsible.

Utah has no procedures for monitoring the operations of timber contractors. This lack of oversight is in contrast to the requirements imposed on other professional contractors (e.g. builders, electricians, plumbers, landscapers) who also work on individual's private property. Neither is timber harvesting covered by a better business bureau that can help landowners obtain references on operators they might want to consider using. Other states employ registration, certification, or licensing programs in order to encourage responsible harvesting by timber operators. In some instances, timber industry organizations have educated and monitored their own members and member activities. Industry's initiative to certify forests and/or forest products as sustainably managed and harvested has added substantial financial value to such products due to the high demand for environmentally sensitive and responsibly-produced materials.

Public Concerns

The consequences of poor harvesting practices may not be confined to the land on which those activities occur. Neighboring landowners can be affected through increased fire risk, soil erosion, and spread of insects, disease, or noxious weeds, as well as through negative impacts to aesthetic qualities. In instances where neighboring landowners may grant road easements across their property for harvesting activities, their land could be affected if the roads are not properly constructed. These risks can threaten management objectives being pursued by neighboring landowners and can lower the value of neighboring property.

Nearby communities may be affected, particularly by poor harvesting practices in watersheds that they depend upon for culinary and irrigation water. At present, sites exist where poor harvesting practices pose downstream risks for a blue ribbon trout fishery, the culinary water supplies of a nearby community, the storage facilities of an irrigation company (through increased siltation), and an EPA priority watershed (Chalk Creek) in which costly mitigation efforts already are being conducted. Studies have shown that logging in uplands, if not done properly, can affect the ability of land to retain snowpack and release it more evenly throughout the spring and summer. This can negatively affect the amount and timing of water available to downstream irrigators as well as the general stability of a river channel.

Local community viability may also be affected by poor harvesting practices in instances where scenic qualities are integral to a tourism-based economy. In addition, land transfers, conversions to non-forested lands, and/or land subdivision resulting from decreased property values or burdensome estate taxes may have serious implications for the quality of local community life. Community viability is also threatened by the transfer of economic benefits from timber harvesting and processing from local operators and mills to those operating from out-of-state locations.

2.0 EXISTING AGENCY PROGRAMS AND RESPONSIBILITY

2.1 Utah Division of Water Quality

The Utah Department of Environmental Quality, Division of Water Quality (DWQ) acts as lead agency for the State Nonpoint Source Pollution Management Program. Among other regulatory programs, DWQ is the designated state agency responsible for the development and implementation of water quality standards, water quality planning and management, nonpoint source program including §319, clean lakes §314 program, and water quality certifications (401 certification) of the Army Corps of Engineers 404 Permits. DWQ also acts as the Grantee for §319 CWA funds and assumes ultimate responsibility for monitoring and reporting of Grant performance for the EPA. The Utah Department of Environmental Quality also has regulatory jurisdiction. The Utah Water Quality Board and the Division of Water Quality staff are to maintain, protect, and enhance the quality of Utah's surface and ground water resources. The statutory authority for the board is contained in Sections 19-5-101 through 119, Utah Code (Annotated 1953 as amended). Those sections describe the responsibilities and activities of the Water Quality Board and Division of Water Quality regarding water quality.

The Division of Water Quality also provides State 401 - Water Quality Certifications pursuant to Section 401 of the Federal Clean Water Act. The Clean Water Act provides that all applicants for a federal license or permit for activities that may impact the water quality of the waters of a State and/or the United States and/or adjacent wetlands must apply for and obtain state water quality certification, commonly known as State 401 - Water Quality Certification. Certification must be obtained prior to, and included as an integral part of, any permit or license application submitted to the affected federal agency. These include a Section 404, dredge and fill permit from the Corps of Engineers and a Federal Energy Regulatory Commission Permit or license to construct and operate a hydroelectric generating facility. The Division additionally provides agency review for Stream Alteration permit applications, General Permit 040, administered by the Division of Water Rights.

2.2 Utah Division of Forestry, Fire and State Lands

The Division of Forestry, Fire, and State Lands offers technical assistance to landowners to help them protect the value of their land and resources to meet their present and future land management objectives. Technical assistance includes: development of a management plan, inventory of timber and other resources, preparation of logging plans (roads, alternative harvest methods, slash treatment, erosion control), design of silvicultural prescriptions development of harvest contracts. Management plans are often required to qualify landowners for various incentive programs. A timber inventory provides information such as volume of timber in an area, species composition, condition of tree health, age of the forest stand, and status of the stand is in terms of broad cycles of growth. A timber inventory can provide valuable information to aid a landowner in making a decision about selling timber, obtain fair compensation for timber removed, know the appropriate harvest options, and provide data useful for long-term monitoring

of the land. Silvicultural prescriptions are recommendations regarding harvesting, treatments and regeneration of trees for the optimal growth from a forest stand. Timber marking is the process of identifying the specific tree to be harvested.

Utah's Division of Forestry, Fire, and State Lands has provided a forest management assistance for about thirty years. For over five years, the Division has administered a forest stewardship program which provides landowners with advice and action-oriented technical assistance intended to help them develop stewardship plans and manage their forest lands to meet their desired objectives. The Division has held informational meetings in communities throughout the state, but low attendance indicates that the effectiveness of generalized educational efforts is limited. A few years ago the Division sent a letter to all forest landowners informing them of the services available through the Division. They received some responses and have worked closely with many of those landowners. The one-on-one assistance that field staff can offer to individual landowners appears to be the most effective educational tool and can prove to be invaluable to landowners.

2.3 Utah State University Extension

USU Extension is a provider of research-based, unbiased, and up-to-date knowledge to Utahns. Extension consists of local Extension Agents or Educators in each county providing educational programming in cooperation with campus-based subject-matter Specialists.

Extension forestry expertise is available through an Extension Forestry Specialist covering several forestry-related areas and through Extension Agents, though currently most Agents have no formal forestry training or education. In addition, new funding received in 1997 from the Utah Legislature has resulted in the hiring of an Extension Program Associate who will work full-time on education of Utah's private forest landowners and related groups. This Program Associate will work with the Extension Forestry Specialist, Extension Agents, and with other faculty on campus to improve management of Utah's private forest lands. The program will also be coordinated with the Utah Division of Forestry, Fire and State Lands, and the Utah Farm Bureau, as well as other agencies and interested groups as needed.

2.4 Utah Department of Agriculture and Food

The Utah Department of Agriculture and Food has the responsibility to assist the private sector engaged in the production, processing, distribution, and marketing of products to insure the consumer high-quality and wholesome food and fiber products. Additionally the Department (with the Utah Soil Conservation Commission), are committed to assist with the economic development of agriculture products and enhance the state’s natural resources. The Department, working closely with farmers and ranchers, protects the soil and water resources through a partnership with USDA Natural Resources Conservation Service. They provide timely and professional technical assistance to design and implement management systems and practices to protect and enhance water quality, rangeland resources including silviculture, and production

cropland in the state. The Department has responsibility to implement the Best Management Practices of the Utah agricultural nonpoint source program which is administered by the Utah Division of Water Quality.

Pesticide Use and Application in Utah. Silviculture managers as well as all users of pesticides in Utah are regulated by state law and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Certain pesticides are Restricted Use Pesticides and require an applicators license to use or purchase. These licenses are issued by the Utah Dept. of Agriculture and Food after training and testing by the Department. For information on pesticide laws, Restricted Use Pesticides, applicator licensing and other questions, contact Clark Burgess at the Utah Dept. Of Agriculture and Food at (801) 538-7188 or write the Division of Plant Industry , Utah Dept. Of Agriculture and Food, P.O. Box 146500, Salt Lake City UT 84114-6500.

2.5 Utah Division of Water Rights

The State Engineer has regulatory authority with most hydrologic modifications. These regulatory responsibilities are defined in Utah Code Annotated in Section 73-2-1(3)(a), which reads, "The state engineer shall be responsible for the general administrative supervision of the waters of the state and the measurement, appropriation, apportionment, and distribution of those waters." The waters of the state have been interpreted to include both surface and ground waters. Geothermal resources in the state of Utah have been interpreted by the Legislature as a water resource rather than minerals, as they are characterized in other states, and this responsibility is also delegated to the State Engineer. The Division of Water Rights is an office of public record for all water rights, dam safety, stream alterations, and water well drillers.

If water is to be diverted or used, that water must be filed on and be on record with the Division of Water Rights. The Division of Water Rights spends the majority of its time in handling applications--processing new applications, extensions of time on unperfected water rights, proof of appropriation and the subsequent certificates on perfected water rights. These applications are of many forms: new applications to appropriate, change applications, exchange applications, segregations, extensions of time to resume use, diligence claims for use prior to 1903, and underground water claims for ground water used prior to 1935.

The State Engineer is currently responsible for the distribution of surface and ground waters on 35 river systems in the state. River commissioners have been appointed in each river system area and they (with their deputies) assume the responsibility of seeing that waters are diverted in correct amounts at the appropriate times and that diversions are for the proper water users. These river commissioners interpret court decrees and applications filed with the Division of Water Rights to assure that the Prior Appropriation Doctrine is followed in the diversion of water for the respective water user. Commissioners that have responsibilities in ground water basins determine the extent of diversion and assume the responsibility to see that yearly diversion amounts are not exceeded.

The Division performs adjudications of water rights when ordered to do so by the various courts. These adjudications are usually the result of litigation or of complaints about water diversions, water allocations or interference problems. The adjudication ultimately results in a new court decree on a particular river system.

The stream alteration program is also supervised by the dam safety section. Currently the Division has been issued General Permit 40 by the Corps of Engineers (Corps). This allows the Division to assume the responsibility of the Corps for the dredge and fill operations under Section 404 of the Clean Water Act, with the exception of those drainages that have endangered species. The Division processes approximately 250-300 of these applications annually. The applications assure that projects located in natural stream channels are conducted to minimize effect to stream banks and beds.

Utah first regulated stream channels when the Legislature passed the legislation providing the State Engineer with control over relocation, alteration or change of natural streams, channels, beds or banks in 1971 under section 73-3-29 of the Utah Code Annotated, 1953. The floods of 1983 and 1984 showed shortcomings in the law. In 1985, out of a desire to prevent unnecessary degradation to Utah's natural resources, the legislature (with guidance provided by the Corps of Engineers) modified the act by including regulatory authority over additional activities.

The strengthened act enabled Utah to apply for the above referenced statewide general permit, which was issued by the Corps as General Permit - 040 on October 23, 1987. This authorizes a State Stream Alteration Permit to fulfill the requirements of Section 404 of the Clean Water Act for many projects. More specifically, General Permit 040 does not apply if the project involves wetlands, Threatened or Endangered Species, properties listed on the National Historic Register, Navigable Waters, channel relocations, or the pushing of streambed material against a streambank using a bulldozer or similar equipment. Section 73-3-29 requires a written permit from the State Engineer to alter or change the beds and banks of any natural stream. Any federal or state agency, county, city, corporation, or person desiring to change the course, current, cross-section, or natural stream environment must first obtain a Utah State Stream Alteration Permit from the State Engineer. Please note that a Stream Alteration Permit is required for many kinds of work authorized by the Corps under a General Nationwide Permit, or a General Regional Permit. Typical projects requiring Utah State Stream Alteration Permits include:

1. dredging or excavation in or adjacent to any natural stream channel.

2. erosion protection including jetties, gabions, rip-rap, concrete walls, etc.

3. channel adjustment or realignment due to road construction.

4. installation or maintenance of irrigation works, sediment basins, or water control structures.

5. utility line crossings and bridges, and

6. construction of any facility adjacent to and impacting the channel or its natural environment.

The decision to approve applications in whole or in part or to deny the permit is based on a public interest review to determine if the proposed alterations would unreasonably or unnecessarily interfere with the natural resources of the State of Utah. The State Engineer (as the Director of the Utah Division of Water Rights) through the review process evaluates:

1. Natural stream environment
2. Impacts to fish and wildlife
3. Alteration of channel capacity
4. Effects on existing water rights
5. Recreational uses

Criteria for evaluation are the same as those used by the Corps of Engineers. General Permit 040 eliminates duplication of both state and federal permits for most projects. An applicant receiving a state permit under General Permit 040 is in compliance with section 404 guidelines and does not need additional permits from the Corps. Likewise, an applicant obtaining an Individual Permit from the Corps has fulfilled state requirements and is in compliance with state law. A joint application form has been developed to satisfy requirements of both the Stream Alteration Program and the Corps 404 program. These are available at offices of both agencies.

2.6 U.S.D.A. Forest Service

The United States Forest Service manages the majority of the timber lands in Utah. Policies and procedures for the management of water quality on those lands is largely guided by the SOIL AND WATER CONSERVATION PRACTICES HANDBOOK (USFS, Forest Service Handbook, FSH 2509.22).

Agency Structure and Authority

The Clean Water Act of 1972 (Public Law 92-500), as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4, was intended by Congress to provide a means to protect and improve the quality of water resources and maintain their beneficial uses. The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution. To provide environmental protection and improvement emphasis for water and soil resources and water-related beneficial uses, the National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) were developed. Soil and water conservation practices were recognized as the primary control mechanisms for nonpoint sources of pollution on National Forest System lands. This perspective is supported by the Environmental Protection Agency

(EPA) in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

Federal agency compliance with water pollution control mandates is addressed through Section 313 of the Clean Water Act and in Executive Order 12580 of January 23, 1987. Agency compliance is to be consistent with requirements that apply to "any nongovernmental entity" or private person. Compliance is to be in line with "all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution". To comply with State Water Quality standards, the Forest Service is required to apply water quality practices in State Forest Practices Regulations, where applicable, reasonable land, soil and water conservation practices, or specialized best management practices. All these types of practices are designed with consideration of geology, land type, soil type, erosion hazard, climate, cumulative effects, and other factors in order to fully protect and maintain soil, water, and water-related beneficial uses, and to prevent or reduce nonpoint source pollution.

The NEPA process and interdisciplinary involvement is critical for the development of site specific conservation practices. Direction for the NEPA process (environmental analysis and documentation) is contained in Forest Service Policy and Procedures that are found in FSM 1950 and FSH 1909.15. They also provide direction to incorporate the interdisciplinary process in planning and decision-making.

Memorandum of Understanding

Pursuant to Section 208 of the Clean Water Act, all agencies which are responsible for carrying out any portion of a State Water Quality Management Plan to minimize nonpoint source pollution must be designated as a Water Quality Management Agency. The Forest Service has been recognized as the Designated Water Quality Management Agency for National Forest System lands in Utah. The SOIL AND WATER CONSERVATION PRACTICES HANDBOOK has been prepared to provide the Forest Service with a means to meet requirements for obtaining and maintaining this designation. In 1993, the USFS and the Utah Division of Water Quality signed a memorandum of understanding (MOU) that defined the roles and responsibilities of each agency relative to water quality management on USFS managed lands (Appendix). Pursuant to this MOU, the USFS will utilize the SOIL AND WATER CONSERVATION PRACTICES HANDBOOK, Forest Plan Standards and Guidelines and USFS Policy to meet the water quality protection elements of this addendum to the State of Utah Nonpoint Source Management Plan on their lands. For purposes of this plan, the practices contained in the SWCP Handbook are adopted as comparable Forest Water Quality Guidelines.

Soil and Water Conservation Practices Handbook

The objective of the SOIL AND WATER CONSERVATION PRACTICES HANDBOOK is to present a process to develop site specific conservation practices for use on National Forest

System lands to minimize effects of management activities on soil and water resources, and to protect water-related beneficial uses. It describes the application, monitoring, evaluation, and adjustment of these conservation practices. This handbook is also to provide examples of soil and water conservation practices which have been tested and have provided protection in specific situations, and that can be utilized or adapted in developing site specific conservation practices. Additionally, this handbook is a supplemental document to all Forest Plans.

Soil and water resources and water-related beneficial uses are best protected during land disturbing activities from nonpoint source pollution by use of site specific, soil and water conservation practices. These are developed in an interdisciplinary process. This process places emphasis for maintenance and protection of these resources and uses on the application of the site specific practices, monitoring successes and failures, and adjusting the practices and or evaluation criteria until the resources are protected. The Soil and Water Conservation Practices Handbook describes this process and provides some examples of proven soil and water conservation practices for consideration. To develop and implement site specific practices, design standards and risks, environmental effects, practicality, and institutional, political, social, economic, and technical feasibility must be considered. The discussion on the process in 10.1 - 10.4 of the handbook is supported and additionally described by W.C. Harper in "A Resource Agency's Perspective on Nonpoint Source Management" (Symposium on Monitoring, Modeling, and Mediating Water Quality, American Water Resources Association, May 1987, pages 641-652).

Policy

The Forest Service must be responsible to the environmental intent and directives provided in the Clean Water Act, as amended, State water quality goals and standards, and other environmental legislation. As part of its land stewardship policy, the Forest Service's management actions must be carried out in a manner which protects the soil and water resources. The Forest Service will continue to coordinate all management actions affecting water quality and beneficial uses with State water quality agencies and will provide leadership in nonpoint source pollution control for Forest management.

In accordance with the Multiple Use-Sustained Yield act and other legislation (RPA, NFMA, etc.), National Forest System lands are to be managed for multiple uses. Maintenance of soil and water resources and protections of water-related beneficial uses are among those multiple uses. Use of soil and water conservation practices are a means to ensure protection of those resources and uses, while achieving other resource objectives. Application of soil and water conservation practices translates, in essence, to good land stewardship.

The soil and water conservation practices detailed in the Soil and Water Conservation Practices Handbook were utilized in Forest Planning in the Northern and Intermountain Regions and now supplement all Forest Plans. The interrelationships between Forest Planning and Forest Plan Implementation (project identification/organization, design/preparation, and execution/administration) are described in FSM 1922.5 and FSH 1909.12. During Forest Plan

Implementation, the Soil and Water Conservation Practices Handbook together with the Forest Plan are used by the interdisciplinary team to develop site specific conservation practices.

The soil and water conservation practices that are presented in the Soil and Water Conservation Practices Handbook are generally the initial development stage for site specific practices. They were compiled from Forest Service manuals, handbooks, contract and permit provisions, and policy statements. Their use or modification as more site specific conservation practices will directly or indirectly improve water quality, protect beneficial uses, reduce losses in soil erosion and productivity, and abate or mitigate management effects, while meeting other resource goals and objectives.

These soil and water conservation practices in the Soil and Water Conservation Practices Handbook are of three basic forms: administrative, preventive and corrective. They are not detailed solutions for specific problems. However, in some instances, specific examples and practices are provided. For the most part, they are purposely broad to ensure site specific adaptation prior to their use. In addition, they identify management requirements and considerations to be addressed prior to implementation of land management activities.

Responsibility

1. Regional Forester. The Regional Forester shall:

    a. Provide program guidance in soil and water conservation practices.
    b. Provide soil and water conservation practices training and materials.
    c. Coordinate with appropriate State and other Federal agencies involved in water quality regulation, management of water-related beneficial uses, watershed management, and best management practices.
    d. Monitor and evaluate on a regional basis the implementation and effectiveness of soil and water conservation practices.
    e. Notify the State of the results of monitoring and evaluation.

2. Forest Supervisor. The Forest Supervisor shall:

    a. Train appropriate Forest personnel in development and use of soil and water conservation practices.
    b. Coordinate with appropriate State and other Federal agencies involved in water quality regulation, management of water-related beneficial uses, watershed management, and best management practices.
    c. Develop and improve soil and water conservation practices with respect to changing technologies and Forest Service direction.
    d. Notify the Regional Forester of any development or improvement of soil and water conservation practices.
    e. Monitor the implementation and effectiveness of site specific, soil and water

conservation practices and suggest any necessary adjustments.

3. District Ranger. The District Ranger shall:

   a. Develop and implement site specific, soil and water conservation practices.
   b. Develop and implement site specific, soil and water conservation practices on all resource management projects.
   c. Monitor the implementation and effectiveness of site specific, soil and water conservation practices and provide any necessary adjustments.

Development Considerations for Soil Water Conservation Practices (SWCPs)

The effects of land management activities on soil and water resources and water-related beneficial uses vary considerably. The extent of these management effects on these resources and uses is a function of:

1. The physical, meteorologic, hydrologic, and biologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil type, vegetative cover, etc.).
2. The specific water-related beneficial use(s), the importance to various publics, and the sensitivity to management influences.
3. The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its real extent and magnitude.
4. The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant use vs. seasonal use, recurrent application or one-time application, etc.)
5. The season of the year that the activity occurs or is applied.

These factors vary within the National Forest System lands in the Northern and Intermountain Regions and from site to site. It follows that the extent and kind of impacts are variable, as are the abatement and mitigation measures. No specific practice, method, or technique is best for all circumstances. Thus, the soil and water conservation practices presented in the Soil and Water Conservation Practices Handbook include such phrases as "according to design," "as prescribed," "suitable for," "within acceptable limits," and similar qualifiers. The actual specifications, designs, and site specific conservation practices must be the result of evaluation and development by professional personnel through interdisciplinary involvement in the NEPA process. This results in conservation practices that are tailored to meet local resource requirements and needs for site specific conditions.

Additionally, it is important to establish an acceptable level of risk associated with failure in developing site specific conservation practices. Since land managers must work with the natural environment, all its complexities, and therefore uncertainty, it is necessary to accept some level of risk with any design. An important but difficult task is to agree on an acceptable level of risk

for given projects based on possible impacts on other resources, and the need to conduct the management activity for multiple uses. It must be recognized that acceptance of risk dictates that there will be some projects which will fail to meet an absolute standard. Through the process of monitoring, evaluation, and adjustment of SWCPs, soil and water resources and water-related beneficial uses can be maintained and protected.

USFS Implementation and Monitoring

Application. After development of site specific conservation practices, they are implemented on the ground along with other specific requirements, controls, and considerations that were built into a project activity.

A training and information program for personnel that are involved in application of conservation practices is critical to ensure maximum effectiveness of the practice in maintenance and protection of soil and water resources and water-related beneficial uses. This training and information program should involve Forest Service resource staff, Line Officers, and State Water Quality personnel. It should cover resource protection, water quality and beneficial use management opportunities, cause and effect relationships, and the relevance of conservation practices, their legal aspects, and their application. In addition to Contracting Officers, Engineering representatives, and certified Sale Administrators, disciplines involved in activities which have the potential to affect water quality, beneficial uses, and soil resources should be offered more intensive training.

Feedback Mechanism. Following application of site specific conservation practices, they are monitored and evaluated. Subsequent adjustments and modifications are made to the conservation practices and/or evaluation criteria until the soil and water resources and water-related beneficial uses are protected. This feedback mechanism is absolutely necessary to ensure sound land stewardship by the Forest Service.

Monitoring. Monitoring is the first step of the feedback mechanism. It is designed to answer questions about site specific conservation practice development, application, and effectiveness. Specific questions may be:

- Were the appropriate conservation practices included in the project?
- Did the project follow the plan?
- Are the conservation practices technically sound and appropriate for the specific site conditions?
- Is there a better conservation practice to apply which is technically sound, economically feasible, within institution authority, and protects the resources?
- Were the conservation practices applied in total concept or only partially employed?
- Were personnel, equipment, funds, or training lacking which resulted in incomplete or inadequate application?
- How effective were the site specific conservation practices in meeting the evaluation

criteria?

Monitoring also is designed to seek answers about the appropriateness of practices in maintaining or protecting soil and water resources and water related beneficial uses. Some questions may be:

- Are the practices protecting the soil and water resources and beneficial uses?
- Do the parameters that are monitored establish the right indices to indicate of resources or uses?
- Is there a cause and effect relationship between the conservation practices and soil water resources and beneficial uses?
- Was the hydrologic risk that was built into the practice exceeded?

To monitor all aspects of site specific conservation practices, an appropriate mix of both extensive and intensive monitoring is needed and performed at established intervals. Extensive monitoring is the primary means that the Forest Service will use to evaluate the development, application, and effectiveness of conservation practices. It can be characterized by use of project reviews and collection of both quantitative and qualitative information on nearly all project activities. Intensive monitoring tends to be more costly than extensive monitoring, and will be restricted to the determination of cause/effect relationships and specific basis. This type of monitoring obtains mostly quantitative information. Both extensive and intensive levels of monitoring are described and further discussed in Forest Service manuals and handbooks.

Evaluation. Evaluation is the second step in the feedback mechanism. To evaluate monitoring information and judge the effectiveness of site specific conservation practices, evaluation criteria must be defined. The Forest Plan standards and State Water Quality Standard Criteria have been developed to serve as the evaluation criteria. These criteria should be defined in quantitative terms, whenever possible. However, they should avoid instantaneous measurements given the dynamic nature of nonpoint source conditions. These criteria should recognize and consider the attributes and characteristics of the particular resource or use, natural variability and background, limits of acceptable change in magnitude and duration, transport mechanisms and pathways, time delayed effects, and risk.

Another consideration is recognition that the link between land management activities and the resulting impacts on soil and water resources and water-related beneficial uses is not always well understood. Monitoring and evaluation must be designed to improve our knowledge of this link and to provide an early warning system where little research information exists for guidance. Where adequate research information exists for similar conditions, the use of site specific conservation practices that are designed and based on this information can be reasonably expected to protect the soil and water resources and beneficial uses. In this case, monitoring and evaluation need not be so intensive.

The use of sometimes inappropriate State Water Quality Standard Criteria in evaluation is another element to recognize. With existing technology, it is extremely difficult to determine the natural

background levels and variability to a level of precision and accuracy necessary for direct control by numeric State Water Quality Standards. This difficulty is particularly evident when considering the tremendous temporal and spatial variability of soil and water resources and water-related beneficial uses. Because many existing water quality standards do not recognize this variability, they may be of limited value as an evaluation criteria for nonpoint source activities. For this very reason, State Quality Standards for nonpoint sources in conjunction with conservation practices are also monitored, evaluated, and adjusted, if necessary. Without any adjustment, there is a danger that site specific conservation practices will be required that are technically sound and feasible but are of little or no value in protecting soil and water resources and beneficial uses.

Adjustment. The last step of the feedback mechanism is adjustment. If monitoring and evaluation indicates evaluation criteria not being met, an adjustment of the site specific conservation practices are needed. This adjustment will vary dependent upon the type and severity of the impact to the soil and water resource or beneficial use. For minor or moderate impacts, the conservation practice will be redesigned or upgraded to assure the criteria are not exceeded. When the impact is major, the project activity will be reevaluated, redesigned, or dropped, or the application process for practices and other project requirements revised. Corrective actions to prevent or minimize the impact will be initiated immediately. Additionally, the appropriate evaluation criteria are reviewed for adjustment.

This feedback mechanism is an iterative type process. Through the continuous cycle of monitoring, evaluation, and adjustment of conservation practices and/or evaluation criteria, the site specific conservation practices will lead to achievement of evaluation criteria (i.e., State Water Quality Standards and Forest Plan standards) and protection of soil and water resources and beneficial uses.

2.7 U. S. Army Corps of Engineers

The U. S. Army Corps of Engineers (Corps) has regulated activities in the nation's waterways since 1890. The original purpose was to protect navigation. Since then, new legislation and judicial decisions have expanded the Corps' programs. Now, in cooperation with the Environmental Protection Agency, the full public interest is considered for both the protection and utilization of water resources.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps. This includes any work in or over these waters, or which affects the course, location, condition, or capacity of such waters. Several waterways in Utah are deemed navigable:

1. Bear Lake is navigable;

2. Flaming Gorge Reservoir is navigable;

3. the Green River is navigable from Dinosaur National Monument to its confluence with Sand Wash Creek about 2 miles upstream of its confluence with Nine Mile Creek at the head of Desolation Canyon, and from about 5 miles below its confluence with the Price River to its confluence with the Colorado River;

4. the Colorado River is navigable from its confluence with Castle Creek to 4.5 miles below the confluence of the Green River at the head of Cataract Canyon.

5. Lake Powell is navigable.

Section 10 and/or Section 404 permits are required for construction activities in, or over, these waterways.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (1977) (33 U.S.C. 1344) prohibits discharge of dredged or fill material, or excavation in waters of the United States without a permit from the Corps. "Discharge of dredged material" means any addition of dredged or excavated material into, including any redeposit of dredged material within, waters of the United States. "Waters of the United States" include essentially all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters and all impoundments of these waters. Typical activities requiring these permits include:

1. depositing of fill or dredging material in waters of the U. S. or adjacent wetlands;

2. site development fills for residential, commercial, or recreational developments;

3. construction of revetments, groins, leaves, dams, dikes, and weirs;

4. placement of rip-rap and road fills; and

5. excavation.

Excavation activities that require a Section 404 permit include:

1. mechanized land clearing, ditching, channelization, and other excavation activities that destroy or degrade waters of the United States, including wetlands;

2. dredged or excavated material placed at a specific discharge site in waters of the United States; and;

3. runoff or overflow from a contained land or water disposal area.

Other laws that may affect the processing of permit applications by the Corps of Engineers include:

1. Utah Stream Alteration Act (1971, 1985)
2. National Environmental Policy Act
3. Fish and Wildlife Coordination Act
4. Endangered Species Act
5. National Historic Preservation Act
6. Federal Power Act
7. Wild and Scenic Rivers Act
8. National Fishing Enhancement Act

Section 404 of the Clean Water Act, Silviculture Exemption

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into the "waters of the United States, including wetlands," must receive authorization for such activities. However, section 404(f)(1) of the Clean Water Act allows for normal, established (on-going) silvicultural activities to occur without being subject to the regulation. Additionally, this section allows for, without regulation, the construction and maintenance of permanent and temporary forest roads within wetland areas if the 15 federally mandated "Best Management Practices" are implemented (see pg. 91). The construction of roads to be utilized for non-silvicultural uses such as land conversion or development do not meet these exemptions from section 404 of the Clean Water Act even if the roads were initially constructed for silvicultural purposes.Types of permits issued by the Corps of Engineers

Individual Permits are required for projects on navigable and/or waters of the United States which will have more than minimal impacts. Permits are issued following a full public interest review of an individual application. A public notice is distributed to all known interested persons. After evaluating all comments and information received a final decision on the application is made.

The decision to grant or deny a permit is based on a public interest review of the probable impact of the proposed activity and its intended use. Benefits and detriments are balanced by considering effects on items such as:

1. Conservation
2. Economics
3. Aesthetics
4. General Environmental Concerns
5. Wetlands
6. Cultural Values
7. Fish and Wildlife Values
8. Flood Hazards
9. Flood Plain Values
10. Food and Fiber Production
11. Navigation
12. Shore Erosion and Accretion
13. Recreation
14. Water Supply and Conservation
15. Water Quality
16. Energy Needs
17. Safety
18. Needs and Welfare of the People
19. Consideration of Private Ownership

The following criteria are considered by the Corps in the evaluation of applications:

1. the relative extent of the public and private need for the proposed activity;

2. the practicability of using reasonable alternative location and methods to accomplish the objective of the proposed activity; and

3. the extent and permanence of the beneficial and/or detrimental effects which the proposed activity is likely to have on the public and private uses to which the area is suited.

The Corps also evaluates applications for compliance with the Section 404(b)(1) Guidelines. The Corps can only permit the least damaging practical alternative under these guidelines. An important requirement of the Guidelines is that for activities which come under Section 404, it is presumed there are less damaging upland alternatives to non-water dependent activities that are proposed for special aquatic sites. Thus, under the Guidelines, the permit applicant must address in sequential order whether the special aquatic site can be avoided, and if not, why not. If it cannot be avoided, the applicant addresses how the impacts will be minimized and how unavoidable impacts will be compensated through creation or restoration. The Guidelines also require no significant degradation, and compliance with other laws. Anyone proposing work in "waters of the U.S.", including wetlands, should contact the Corps (801-295-8380) early in the planning process.

2.8 U.S.D.I. Bureau of Land Management

The Bureau of Land Management manages 22 million acres or about 42% of the lands in the state of Utah. The majority of the land is rangeland/woodland with some forested areas.

Authority

The primary authority for the Bureau of Land Management (BLM) to manage public lands was vested by Congress via the passage of the Federal Land Policy Management Act (FLPMA, 1976). FLPMA established guidelines for administration, protection, development and enhancement of

public lands. That management be done on the basis of multiple use and sustained yield unless otherwise specified by law. In section 102 (a) (8), it specifically declared that it would be policy to manage public lands in a manner that would among other things, protect the quality of water resources.

In addition, FLPMA also requires that the management of public lands be considered and analyzed in Resource Management Plans(RMPs) through the National Environmental Policy Act of 1969 (NEPA) process. The BLM RMPs specify how much protection would occur. The development of a site specific Best Management Practice is done through the NEPA process Environmental Assessment or Environmental Impact Statements (EAs or EISs), that includes interdisciplinary/interagency involvement. Further, BLM's planning process requires compliance with all federal and associated state environmental protection including the Clean Water Act. Section 319 of the Clean Water Act Public Law 100-4 provides direction for control strategies for nonpoint source pollution. Federal agency compliance with pollution abatement mandates are specified in Section 313 of the Clean Water Act and in Executive Order 12580 of January 23, 1987. BLM's responsibility for compliance is the same as those requirements that apply to any nongovernmental entity or private person.

Memorandum of Understanding

On December 22, 1992, BLM MOU UT932-9302 was signed into effect between the Bureau of Land Management, Utah Department of Environmental Quality and Utah Department of Agriculture. The purpose of this agreement is to coordinate water pollution control activities on public lands in Utah; to protect, maintain and restore the beneficial uses of waters of the state; and to create a framework where the agencies can work together. The MOU specifies BLM as the Designated Management Agency (DMA) for implementing and controlling natural resource management programs for the protection of water quality on public lands to meet Utah Administrative Code R317-2, Standards of Quality for Waters of the State (Appendix, p A-19).

Activity Planning

Any Bureau activity such as forest silviculture that implements programs possibly affecting water quality will incorporate Best Management Practices (BMPs) to protect water quality. The BMPs will be developed through the BLM planning process EAs or EISs. Participating agencies have the opportunity to review and comment on the BMPs identified in the process. BMPs will be tailor made for the specific site and circumstances and will comply with the laws that control the proposed activity.

Evaluation

During implementation of a Management Plan, BMPs will be followed and their effectiveness will be evaluated. Periodic monitoring of both the practices and their effect on water quality will be done to determine if the BMPs are effective in meeting State Water Quality Standards. If the

evaluation shows that the BMPs improve and enhance water quality they will be maintained. If the evaluation shows that the standards are not being met then the BMP will be adjusted and/or mitigation will be done. Implementation and evaluation of BMPs on the public lands will be done in cooperation with DWQ and other interested parties.

BLM is a stakeholder in water clean-up efforts. The State's DWQ along with the EPA have the regulatory authority and leadership responsibility to clean up the waters of the state. Establishment of BMPs is a cooperative effort involving several stakeholders in a dynamic iterative process which will result in cleaner water for the state and the nation.

2.9 U.S.D.I. National Park Service

The National Park Service (NPS) was established in 1916 to:

> promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (NPS Organic Act, 16 USC 1)

In Utah, the National Park Service manages national parks including Arches, Bryce Canyon, Canyonlands, Capitol Reef, and Zion; national monuments including Cedar Breaks, Dinosaur, Hovenweep, Natural Bridges, Rainbow Bridge, and Timpanogos Cave; Glen Canyon National Recreation Area, and Golden Spike National Historic Site.

The National Park Service rarely conducts silvicultural activities within areas it manages. Rather, the preservation of natural systems and processes serves as the foundation of National Park Service direction and philosophy. Thus, silvicultural activities which might fall under the purview of this document are rarely, if ever implemented within NPS areas. Safety considerations might occasionally dictate the removal of one or several trees, but these instances are rare, and would be of minimal concern from a water quality viewpoint.

It is important to note, however, that fire is being used on a more frequent basis to, as closely as possible, mimic the natural role of fire in the forest ecosystem. The NPS has a strong commitment to allow fire to play its natural role in forested park areas with a well documented and understood fire history. Stipulations and conditions under which fire is prescribed are very specific and must be pre-approved before a plan is activated. Fire planning within the NPS is subjected to public and professional scrutiny and every effort is made to insure that visitor safety, natural and cultural resources and water quality are not degraded or compromised by the application of prescribed fire.

2.10 U.S.D.A. Natural Resource Conservation Service

NRCS conservation practice standards provide guidance for applying technology on the land and set the minimum level for acceptable application of the technology. NRCS issues national conservation practice standards in its National Handbook of Conservation Practices (NHCP). National standards for each practice are available. State NRCS offices determine which national standards will be used in their state. States that choose to use national standards adapt them for use in the state and issue them as state conservation practice standards. NRCS State Offices add the technical detail needed to effectively use the standards at the NRCS Field Office level. State conservation practice standards are contained in Section IV of the NRCS Field Office Technical Guide. Copies of the conservation practice standards for Utah can be obtained by contacting the NRCS State Office at (801) 524-5050.

2.11 Soil Conservation Districts and the UACD

Utah's 38 soil conservation districts are legal divisions of state government responsible for assessing and preventing soil erosion and nonpoint source pollution. They work with landowners on a voluntary incentive basis to assess natural resource needs and help locate technical and financial assistance. This is often achieved in cooperation with Utah's conservation partnership. The districts provide the local leadership and participation in the Coordinated Resource Management Planning (CRMP) process. In addition, the districts are the local delivery point for Utah's Agriculture Resource Development Loan (ARDL) program. They have available the professional and staff support of the Utah Association of Conservation Districts (UACD) and Utah Soil Conservation Commission (USCC).

Soil conservation districts were born out of the Dust Bowl. In 1937 the National Congress provided model legislation and encouraged states to form local divisions of government to address soil erosion, water conservation, and related natural resource problems. The Utah Soil Conservation District Act (March 11, 1937) authorized districts as political subdivisions of the state supervised by five locally elected officials. The districts are enabled by Utah Code-Special Districts-Title 17, Part 8.

The conservation districts are the grass-root link between the private land user and government agencies. Some of the basic legal powers and duties of the districts are to 1) devise and implement natural resource conservation programs or projects to prevent soil erosion, flooding, sediment damage, and nonpoint source water pollution, 2) make recommendations to land users (including municipalities) on land use practices needed to conserve natural resources, and 3) conduct, publish, and disseminate surveys, investigations, and research about resource conditions and problems.

Utah Association of Conservation Districts

(UACD) is a nongovernment, nonprofit organization founded in 1948. The mission of the UACD is to represent Utah's soil conservation districts as one voice, using the force of local initiative and self-government for the benefit of districts and Utah citizens. Our major purposes, defined by the districts, are to: 1) foster the wise use and management of Utah's natural resources; 2) help secure technical, financial, educational and scientific resources needed to assess and address local resource needs; and 3) facilitate coordination of conservation work on both private and public lands by encouraging cooperation among districts and public and private conservation agencies and groups.

Agriculture Resource Development Loan Program (ARDL)

The ARDL program expanded July 1, 1983 from the Utah Department of Agriculture Rangeland

Development Program to include cropland, watershed, and energy conservation practices. The program is a low interest revolving fund of more than $20 million administered by the Utah Soil Conservation Commission within the Utah Department of Agriculture and Food. The program provides loans to conserve soil and water, increase agricultural yields, maintain and improve water quality, conserve and improve wildlife habitat, prevent flooding, develop on-farm energy projects, and mitigate damages resulting from natural disasters (i.e. flooding, drought, etc.).

2.12 County Government

Although much of the forested land within the counties of Utah is administered by the U.S. Forest Service, private forested land occupies many areas of concern within the twenty-nine counties of the state.

*Authority***.** Each of the several counties of Utah is charged with the responsibility of providing for the safety and welfare , as well as numerous other benefits, of the citizens residing within that respective county. The county legislative body may enact ordinances to provide these amenities for its citizens. Title 17, Chapter 5, Utah Code Annotated(UCA), identifies the specific responsibilities of the Board of County Commissioners or legislative body and provides the legal authority for the county to enact ordinances. Section 17-5-263 is the specific delineation of authority to enact ordinances and provides a penalty for violation.

Title 17, Chapter 27 is the County Land Use Development and Management Act. This Chapter provides the authority and identifies the mechanism for planning and zoning to occur within each county.

*Planning***.** The Utah Code provides for a planning commission to be established in each county. The planning commission serves to prepare a general plan for the county, recommend zoning ordinances**,** administer provisions of zoning ordinance, if that authority is provided and make recommendations to the administrative body regarding conditional use permits.(17-27-204,UCA)

*Zoning***.** In many of the counties, zoning ordinances have been developed but have not specifically considered harvesting of timber as either a permitted activity or identified any standards or criteria required for a conditional use permit. When the zoning ordinances were developed, timber harvesting on private forested land was minimal and occurred infrequently. Now, however, a number of counties have become concerned about the cumulative impact of numerous timber sales and logging activity on private land. In some counties, private land timber sales are becoming more numerous than timber sales from national forest land. Although, zoning may be enacted specifically to address, ”governing uses,.....vegetation, and trees....”, (17-27-102,UCA), rarely, if ever, has a planning commission or board of county commissioners enacted zoning dealing with forestry activities in anything other than a very general manner. Some zoning categories are labeled forestry, forestry and grazing, or forestry and open space but few, if any, planning commissions have considered what impact accelerated timber harvesting might have on the waters and roads within a county.

County Concerns Regarding Forestry Activities. There are several issues regarding forestry activities that counties must consider. Increased traffic of heavily-laden vehicles such as logging trucks requires substantially more maintenance of existing county roads. If these roads are not closed when they are no longer needed, the county network of roads is increased without planning or proper consideration of the overall need for roads within the county.

Many of the timber sales occur in proximity to streams and reservoirs used by cities, towns and irrigation companies. Siltation of reservoirs, turbidity of water and other water quality concerns are issues that counties feel should be addressed.

2.13 Municipal Government

Within the state, most of the cities and towns are dependent upon watershed areas located at higher elevations for their water supply. This is true of those municipalities that rely on surface water to supply their needs and those communities that have developed ground water resources. The recharge area for the ground water aquifers is usually in the nearby mountains. As was stated earlier in this document, these areas of higher elevation are usually covered with forests because of the greater precipitation. Activities which may influence the amount or quality of water from these sources is of concern to the cities and towns.

Authority. In Title 10, Chapter 8, Section 15, Utah Code Annotated, cities and towns are provided the authority to construct or authorize construction of waterworks either inside or outside of city limits. Towns and cities may also protect the water from pollution. To do so, their jurisdiction is extended over all reservoirs, streams, canals, ditches, pipes and drains used for the operation of the waterworks. In addition, jurisdiction is extended over the stream or source of the water for 15 miles upstream from the source where the water is taken and for a distance of 300 feet on either side of the stream. Cities of the first class are granted jurisdiction over the entire watershed except that livestock grazing may occur beyond one thousand feet from the watercourse. Regulations and ordinances may be enacted to prevent the pollution or contamination of streams or watercourses from which the water comes.

Situation. The projected increase in population of the Wasatch Front will be attended by huge increases in the need for water. However, this is not confined to the Wasatch Front. Most of the communities of Utah are experiencing substantial growth and their water supplies are being strained to meet these needs. Development of water resources and delivery systems are among the most critical of any issues facing cities and towns throughout the state.

At present, no community has enacted ordinances or regulations that preclude or restrict forestry activities. Salt Lake City has constrained certain activities within the watershed for the city and relies on erosion control provisions of the county ordinance for protection of their water. However, these erosion control provisions only deal with road construction, primarily in subdivision development. The use of best management practices for erosion control are required by this ordinance. Forestry activities other than road construction are not presently addressed by

city regulation.

2.14 Interagency Agreements

Two existing Memoranda of Understanding (MOUs) between the Division of Water Quality, Department of Agriculture and Food and the USFS and BLM have been formalized and signed. As part of the implementation of the silviculture NPS water quality management plan, it is recommended that those MOUs be reviewed and revised to include components of this plan as necessary. It is also recommended that the need to include the Division of Forestry, Fire and State Lands as a signatory agency in those MOUs be assessed. An MOU between the Division of Forestry, Fire and State Lands and the Utah State University Extension Service relative to education components of the plan should also be investigated and pursued as those parties deem necessary.

2.15 Permits and Licenses

Stream Alteration

Any disturbance which alters the banks or bed of a stream of any size requires a consultation with the Division of Water Rights. Upon receipt of an application, the Division may determine that a permit is not required but that decision is based upon information submitted by the applicant on a form prescribed the Division. Utah Division of Water Rights currently has authority from the Corps of Engineers (under a general permit issued to the Division) that Stream Alteration Permits usually meet the requirements of Section 404 of the Clean Water Act. However, a 404 permit from the Corps of Engineers is required in projects involving lakes, wetlands, threatened or endangered species, properties listed on the National Historic Register, stream relocation or the pushing of stream bed material against a stream bank using a bulldozer or similar equipment.

Burning Permit

During the closed fire season (June 1 to October 31) of any year, a burning permit from the Division of Forestry, Fire and State Lands is required to burn on private, state or county wildland areas (Section 65A-8-9,Utah Code Annotated (UCA). The Division has authority from the Division of Air Quality to permit burning to be done under an approved burning plan and within the clearing indices prescribed by the Division of Air Quality.

Forest Products Transportation Act

When harvesting or transporting forest products, one is required to have in their possession some proof of ownership. Section 78-38-4.5, Utah Code Annotated, identifies proof of ownership as being a contract, permit, bill of sale or other legal instruments and specifies what information should be included on the document used for proof of ownership. The statute further includes other plants such as forest, desert or rangeland vegetation, shrubs, flora, roots, bulbs and seed as

native vegetation which also requires proof of ownership for harvest or transportation. The statute is located in the judicial code of UCA and prescribes a class B misdemeanor for violation of this law.

Commercial Road Use Permit

When timber is hauled over roads maintained by the U.S. Forest Service, a road use permit or agreement is required. The Forest Service uses this arrangement to insure roads are properly maintained. This agreement apparently identifies the existing condition of the road and requires periodic maintenance to the road while it is used. Upon completion of the activity that stimulated the increased use of the forest road, the road must be restored to at least the previously-existing condition.

404 Permit

Although silvicultural activities in forest wetlands are generally exempted from regulation by the U. S. Corps of Engineers, other activities which would alter a wetland area would require a consultation and probably a permit from the Corps. If a road built in a wetland area for silvicultural activities is subsequently used for other purposes, that road would require a 404 permit for the subsequent use. If any subsequent use of a logging road in a wetland area is contemplated, a consultation with the Corps of Engineers is strongly recommended even before the road is constructed. This early consultation, although not required for silvicultural activities, might preclude difficulties in procurement of a permit for subsequent use by proper consideration of concerns the Corps might have regarding the wetland area.

3.0 PLAN IMPLEMENTATION AND MONITORING

3.1 Adoption process for Utah's Silviculture Forest Water Quality Guidelines

In Utah, Forest Water Quality Guidelines for silviculture were developed by the Silviculture Subcommittee. The plan, including the Guidelines, then went through a public scoping process which included a public notice, a 30-day public comment period, and three public meetings across the state.

The Utah Forest Stewardship Coordinating Committee (FSCC) provided the Silviculture Subcommittee with valuable comments and review during the development of the Forest Water Quality Guidelines. The FSCC was established to promote forest resource management on non-industrial private forest land and agro-forestry practices on farm and ranch lands in Utah. The FSCC provides recommendations to the Division of Forestry, Fire and State Lands for the implementation and delivery of the Forest Stewardship Program, Agro-Forestry Program, Stewardship Incentives Program and the Forest Legacy Program. The diversity of membership of the FSCC provided an excellent existing source of knowledge and information for the subcommittee to utilize in the development of the FWQG. The FSCC will continue to play a key role in future revisions to the FWQGs, project proposals, educational efforts and plan promotion both as a review body and a partner in the implementation of Forest Water Quality Guidelines.

Finally, the Forest Water Quality Guidelines and associated comments were considered by the Utah NPS Task Force and were adopted in conjunction with this Silviculture Plan. In this manner, Utah's Silviculture Forest Water Quality Guidelines and the Silviculture Plan became a portion of Utah's NPS Management Plan.

The adopted Utah Silviculture Forest Water Quality Guidelines and Silviculture Plan (addendum to the NPS Management Plan) were forwarded to the EPA for their approval. This was because Congress has appointed the Administrator of the EPA to administer the Clean Water Act. Section 319 (b) describes State Management Plans (to address nonpoint sources of water pollution): "The Governor of each State, . . . shall, after notice and opportunity for public comment, prepare and submit to the Administrator for approval a management program. . .for controlling pollution added from nonpoint sources. . .".

The Silviculture Subcommittee will review, at least once every four years, the list of Utah's Silviculture Forest Water Quality Guidelines. This is in order to update and add existing Forest Water Quality Guidelines and to consider additional silviculture activities that may need additional or refined Forest Water Quality Guidelines.

3.2 Program Implementation and Monitoring

The Utah Forest Water Quality Guidelines (FWQG) are voluntary measures that landowners, loggers and natural resource professionals utilize for the conservation of Utah's forest and water resources. Actual implementation of these guidelines will be the landowner's choice and responsibility. Landowners desiring to have these practices implemented on their lands during forestry operations should incorporate these guidelines by reference within legal agreements and require that applicable practices be followed. Federal Agencies (USFS and BLM) will follow the provisions of the MOUs contained in the Appendix of this plan. Implementation of the practices contained in the SOIL AND WATER CONSERVATION PRACTICES HANDBOOK are considered to be appropriate to meet the objectives of this management plan on those lands.

The forest industry of Utah should realize the present and long term benefits of implementing Forest Water Quality Guidelines voluntarily. These guidelines are designed to provide the best protection of water quality and aquatic resources during the management of forest resources, including timber harvesting. It is expected that the forest industry within the state of Utah will follow the lead of industry in other states and utilize these guidelines in a voluntary, self policing fashion to provide water quality protection while providing forest resources to consumers. Acceptance and implementation of these guidelines may forestall and preclude the need for future regulation of timber harvesting by government agencies on private forest lands.

The Utah Forest Water Quality Guidelines will be implemented in a three pronged program: Education, Monitoring and Evaluation. The Division of Water Quality, as the responsible agency for the State Nonpoint Source Pollution Management Program, will act as lead agency for the implementation and management of the Silviculture addendum plan. They will provide technical assistance to operators and landowners, federal consistency with the USFS, participate in educational programs, and conduct field reviews of guideline implementation. They will also oversee development and revisions of the plan.

The education branch will include promulgation of the completed Forest Water Quality Guidelines through a cooperative effort between the Utah State University Extension, the Division of Forestry, Fire and State Lands, Utah Farm Bureau Federation and the Division of Water Quality to provide education to landowners, loggers and resource professionals through publications, seminars and newsletters. Utah State University Extension received an appropriation in state fiscal year 1998 from the Utah Legislature to implement a forest landowner education program and will include education and promotion of FWQG in these efforts. The Division of Forestry, Fire and State Lands will emphasize one on one contact with landowners, loggers and resource professionals for education on the use and installation of Forest Water Quality Guidelines as another service that the Division provides.

The Division of Water Quality will incorporate this Silviculture Addendum plan into the "Utah

Watershed Approach" (State of Utah, 1996). This statewide watershed/ecosystem approach is a management tool that helps integrate all water quality and other closely related programs statewide. This approach integrates existing surface and groundwater, regulatory and nonregulatory, point and nonpoint source programs more efficiently and effectively.

The statewide approach has delineated ten major watersheds wherein such programs as monitoring, permitting, modeling, TMDLs, BMPs, water quality planning and implementation will be scheduled on a 5 year cycle. Other activities such as compliance and enforcement are ongoing throughout the cycle. Products include (1) an initial State framework document describing the approach, (2) a watershed assessment and (3) a management plan for each area. Nine planning steps are conducted for each watershed during the cycle, ending with the promulgation and implementation of a management plan.

Stakeholder involvement will be a prominent component of the approach. Participation by local entities ensures that those most likely to be aware of watershed conditions and concerns play a major part in defining and implementing management plans. As the basin monitoring rotations and assessments are being conducted, information from the data will be supplemented with field observations from the U.S.F.S. Ranger Districts and the Division of Forestry, Fire and State Lands Area Offices. This information will assist in identification and prioritization of silviculture related NPS pollution. These assessments will be forwarded to the Utah Nonpoint Source Task Force for incorporation into the Utah Priority Watershed list and will be utilized in the development of Total Maximum Daily Loads (TMDLs) as they are prepared for selected basins.

Monitoring and Evaluation of the Forest Water Quality Guidelines will include field monitoring of harvested sites to provide feedback on the awareness, acceptance and degree of voluntary implementation of the Forest Water Quality Guidelines. Additionally, the effectiveness of the Forest Water Quality Guidelines to provide the intended protection to water quality will be evaluated during field monitoring. Upon implementation of the Forest Water Quality Guidelines, an initial inventory of harvested sites will be proposed. Upon securing adequate funding this initial inventory (and subsequent report) will be completed to provide baseline data on the current use of practices contained in the Forest Water Quality Guidelines. Approximately two years after completion of the initial report, a second inventory will be proposed to evaluate the effectiveness of educational efforts. FWQG use, FWQG effectiveness when used as described, and effectiveness of the voluntary program as a whole will be evaluated. Upon completion of the second inventory, revisions to the FWQG practices and the NPS silviculture program will be made. As with the initial drafting of the Forest Water Quality Guideline document, a wide spectrum of expertise and representation will be consulted for input on reviews and program updates.

3.3 Program Implementation Schedule

Milestones

I. Silvicultural Plan Dissemination & Promotion 1998

- A. brochures
- B. public meetings

II. Forest Water Quality Guideline Education and Training 1998/1999

- A. local workshops
- B. publish field guides
  1. technical
  2. general

III. Demonstration Forest Project

- A. proposal & implementation plan 1998
- B. implementation 2000
- C. educational tours 2000

IV. Monitoring & Review . . . . . on-going

- A. monitoring program . . . . . see *Implementation and Monitoring 3.2*
- B. field reviews . . . . . see *Implementation and Monitoring 3.2*
- C. Forest Stewardship Coordinating Committee Review . . . . . annually
- D. FWQG review and revision . . . . . annually

V. Assessment of need for Memorandum of Understandings (MOU) and execute required or amended MOUs

- A. Division of Water Quality & Division of Forestry, Fire and State Lands (plan implementation & designated management authority) 1998
- B. Division of Forestry, Fire and State Lands, Utah State University Forestry Extension & Utah Farm Bureau Federation (education) 1998
- C. Division of Water Quality and US Forest Service (plan implementation) 1998
- D. US Forest Service & Division of Forestry, Fire and State Lands (implementation & field audits) 1998

4.0 LITERATURE CITED:

Chamberlin, T.W., R.D. Harr, and F.H. Everest. 1991. Timber Harvesting, Silviculture, and Watershed Processes. American Fisheries Society Special Publication 19:181-205.

European Inland Fisheries Advisory Commission. 1965. Water Quality Criteria for European freshwater fish, report on finely divided solids and inland fisheries. Int. Jour. Air Water Poll. 9:151.

Kappe, K., D. Hosking and S. Henson. 1982. Utah Silvicultural Nonpoint Source Assessment Report. *funded by:* Utah Department of Health, Utah Bureau of Water Pollution Control (*now Department of Environmental Quality, Division of Water Quality).* Salt Lake City, Ut.

Meehan, W.R., editor. 1991. Influences of forest and rangeland management practices on salmonid fishes and their habitats. American Fisheries Society Special Publication 19.

Norris, L.A., H.W. Lorz, and S.V. Gregory. 1991. Forest Chemicals. American Fisheries Society Special Publication 19:207-296.

State of Utah. 1989. Utah Nonpoint Source Management Plan.

State of Utah. 1996a. Nonpoint Source Management Plan, Hydrologic Modification Addendum, Department of Environmental Quality, Division of Water Quality, Salt Lake City, Ut.

State of Utah. 1996b. Stewardship of Utah's Forests , A Report of the Utah Forest Practices Task Force to the Energy, Natural Resources and Agriculture Interim Committee of the Utah Legislature, September 10, 1996.

State of Utah. 1996c. Utah Watershed Approach Framework, Department of Environmental Quality, Division of Water Quality & The Cadmus Group, Salt Lake City, Ut.

State of Utah, R317-2. Standards of Quality for Waters of the State. Utah Administrative Code, R317-2, amended February 16, 1994. Salt Lake City, Ut.

USFS, 1988. SOIL AND WATER CONSERVATION PRACTICES HANDBOOK. United States Department of Agriculture, Forest Service, R-1, Missoula, Montana, R-4, Ogden, Utah Forest Service Handbook 2509.22.

UDWR. State of Utah. Division of Wildlife Resources. 1968. Stream and Lake Classification Manual. Vols. I and II. Department of Natural Resources. Salt Lake City, Ut.

5.0 SILVICULTURE FOREST WATER QUALITY GUIDELINES

Utah's Nonpoint Source Management Plan of 1988 describes Best Management Practices (BMPs):

> "BMPs may be defined as methods, measures or combination of measures that are determined by an agency after problem assessment to meet its nonpoint source pollution control needs. They include, but are not limited to, structural and nonstructural controls, and operation and maintenance procedures."

Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990 defines "management measures" of nonpoint pollution as:

> "economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives."

The 1988 Nonpoint Source Management Plan (State of Utah) narrated one important aspect of BMPs:

> "Best Management Practices cannot be viewed in isolation. They must be seen as a management strategy, an approach, or a system. Seldom is one practice sufficient to resolve a nonpoint source problem. A combination of practices is usually required along with a management philosophy of commitment to reducing nonpoint pollution. It is rarely sufficient to install a practice and forget it. BMPs and systems require an ongoing maintenance and management effort which must be recognized at the outset."

The 1998 Silviculture Addendum to the 1988 Nonpoint Source Management Plan uses Forestry Water Quality Guidelines as the basic management practice:

> Forest Water Quality Guidelines are a collection of voluntary field applicable practices for use during forestry activities to protect water quality adopted by the State and contained within the Nonpoint Source Management Plan.

5.1 Preharvest Planning

Definition: Preharvest planning is the design of timber harvest operations to meet landowner objectives.

Objective: To ensure forestry practices are well designed, meet objectives for the site, and avoid adverse impact on water quality, site productivity and the desired future resource.

Conditions Where the Guideline Applies: This guideline is recommended for timber sales and similar forestry activities. It should be particularly utilized wherever forest management activities have the potential to impact water quality.

Application Practices:

1. Contact or consultation with a professional forester. When site conditions dictate, other resource professionals should be consulted.

2. Have a forest management plan, forest stewardship plan, timber harvest plan, prescribed burning plan or other appropriate plan prepared. Include a list of specific Forest Water Quality Guidelines applicable to the site and the proposed activities.

3. Locate environmentally sensitive areas utilizing field observations, aerial photographs, topographic maps and other available maps and resources. This may include areas such as streams, wetlands, lakes, unstable soil areas, special plant and wildlife areas and steep slopes.

4. Locate and mark streamside management zones (SMZ). Steamside management zones should be located in the field and managed according to site specific needs. Any stream crossings should carefully located and disturbance within the SMZ should be minimized (see Streamside Management Zone, FWQG 5.2).

5. Choose the appropriate harvest prescription such as thinning (even or uneven aged), shelterwood, seedtree, clearcut, etc., to achieve objectives and provide for desired future conditions.

6. Identify the appropriate harvesting system such as a rubber tired skidder, crawler, skyline and cable system, mechanical harvesting or helicopter for the existing and desired site conditions.

7. Plan the road layout. A carefully planned road system will provide for post-harvest access if desired, decrease sediment, reduce soil disturbance and allow for a more efficient harvest.

8. Locate log landings, haul roads, and major skid trails prior to start of any work.

9. Establish and designate vehicle and machinery maintenance areas. These areas should be limited in number and located to prevent contamination of streams and wetlands by petroleum products and other chemicals.

10. The location of logging camps should be carefully chosen to avoid adverse impacts to sensitive areas from human activities.

11. Plan for the treatment of slash, closure of roads and forest regeneration prior to harvesting.

12. Plan to conduct operations using a legally binding document that specifies what is to be harvested, slash disposal, site reclamation and the utilization of water quality protection measures. Consider the inclusion of contract guarantees such as performance bonds or provisions. Additionally, landowners should consider including provisions specific for their protection.

13. Obtain all necessary permits and approvals prior to initiation of activities.

Concerns and Implications:

Proper planning is essential to limiting adverse environmental impacts from timber harvesting activities and to reduce potential liabilities as a result of those activities. Lack of planning prior to beginning any forestry activity may result in long term adverse impacts to all forest resources and water quality. Proper planning can not only reduce adverse impacts for an activity but may increase landowner income, reduce operator expenses, decrease road and trail construction and provide for a more aesthetically pleasing activity.

Construction activities affecting the bed or banks (including placement of stream crossings) of a stream may require a permit from the Division of Water Rights. A stream alteration permit is required prior to commencing such work. The Division of Water Rights must always be contacted before an activity of this type begins. They can be contacted at:

Utah Division Of Water Rights
P.O. Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7375

On private and non-federal lands, a burning permit is required for any burning. The permit requirements comply with the statutes and administrative rules of the Clean Air Act and the Utah Department of Environmental Quality. Most counties have a fire warden employed by the Division of Forestry, Fire and State Lands or a Fire Marshall who can issue a burning permit. Contact the Division of Forestry, Fire and State Lands office in your area for specific information regarding your county. For those counties which do not have a fire warden, the county sheriff may be contacted.

On federal land, burning is required to adhere to the rules of the Clean Air Act and clearing indices are used to indicate when burning may be conducted.

Selected Examples of Specifications: *(partial listing)*

National Handbook of Conservation Practices, Natural Resources Conservation Service:

666 Forest Stand Improvement
560 Access Road
394 Firebreak
655 Forest Harvest Trails & Landings
338 Prescribed Burning
391 Riparian Forest Buffer

References:

Forestry Handbook, Second Edition; edited for the Society of American Foresters by Karl F. Wenger. John Wiley & Sons, Inc. New York. 1984

Tree Farm Handbook; AFC Executive Board and the Forest Resources Policy Committee. 1997

Evaluating the Effectiveness of Forestry Best Management Practices in Meeting Water Quality Goals or Standards; USDA Forest Service Miscellaneous Publication 1520. July 1994

Water Quality Protection Guidelines for Forestry Operations in New Mexico. New Mexico Energy, Minerals and Natural Resources Department. March 1994

Tree Farmer(Water: The Essential Element); American Forest Foundation. March/April 1995

5.2 Streamside Management Zone

Definition: The Streamside Management Zone (SMZ) is an area or strip of land adjacent to a stream or other body of water where management practices (e.g., harvesting of timber, road construction, prescribed burning, etc.) are designed to protect water quality, aquatic wildlife and wildlife habitat. The trees and vegetation within the SMZ serve as a natural filter to keep sediment out of a stream, reduce soil erosion and act as a buffer to protect the stream from degradation caused by nearby activities. The SMZ is **not** a zone of exclusion where all silvicultural activities are precluded but, because of its values, the SMZ is an area where management activities should be closely managed.

Classification categories used in determining a SMZ are:

Class I Streams or other bodies of water used for domestic water supply and/or the spawning, rearing, migration of fish, including impacted streams with recovery potential for a fishery. Also included are perennial streams that contribute significant flow to downstream fisheries.

Class II All streams that do not meet the Class I definition and are identifiable in the field as having a defined channel bed of bed rock, sand, gravel, or rocky material, definite banks, generally having an ordinary high water mark and confines and conducts continuously or intermittently flowing water. Also included are reservoirs, lakes, and ponds greater than 1/10th of an acre that do not support fish or provide domestic water supply.

Objective: The purpose of creating and maintaining a Streamside Management Zone with attendant limitations on management activities is to protect water quality by:

a. providing a source of large organic debris for long term channel stability;

b. protecting the absorptive and filtering action of the riparian area;

c. preventing streambank collapse with resultant sedimentation into stream;

d. stabilizing floodplains;

e. providing nutrient and energy base for the stream ecosystem;

f. providing shade to the channel to maintain cool water temperatures; and

g. reducing erosive velocities and resultant sedimentation during flood events.

Additional reasons for the implementation of a SMZ are to preserve Streamside recreational areas and to create improved habitat for both aquatic and terrestrial wildlife habitat by providing cover and food for fish and wildlife.

Conditions Where the Guideline Applies: This guideline applies wherever forest management activities are contemplated or practiced and where a stream or other water body occurs. A stream or other water body is defined as a lake or natural water course of perceptible extent with defined beds and banks which confines and conducts continuously or intermittently flowing water. Definite beds are defined as having a sandy, gravel, rocky, or bedrock bottom which results from the scouring action of water flow.

Application Practices:

1. Designate the SMZ in the harvesting area based on the Stream Class and the percent of slope adjacent to the stream. Use the following zone distances.

Stream Class I	Recommended minimum slope distance from the ordinary high water marks on each side of the stream is 75 feet.
Stream Class II	Recommended minimum slope distance from the ordinary high water marks on each side of the stream is 35 feet.

In addition, the zone width should be increased in the following areas:

The width of the SMZ should be extended to include: 1) wetlands adjacent to the stream channel and 2) wetlands intercepted by the prescribed SMZ boundary (see Forest Wetlands, FWQG 5.8).

Where slopes adjacent to the stream are greater than 35%, it is recommended that the SMZ include the area encompassed by the following minimum slope distances on each side of the ordinary high water mark:

Stream Class I	100 feet
Stream Class II	50 feet

2. Establish an “undisturbed” strip of at least 15 feet slope distance on either side of the stream beginning at the ordinary high water mark. In this zone there would be no disturbance to vegetation or soil to maintain sufficient ground cover to trap sediment

and to protect root mass for bank stability.

3. Trees are important to a healthy SMZ. Leave hardwoods, unmerchantable conifers and shrubs for bank stabilization and as a future source of large woody debris to the stream channel. Along perennial streams, it may be desirable to leave selected, healthy, merchantable trees and promote the retention of long lived species.

4. Shading requirements may dictate independent criteria for tree retention. Leave sufficient trees and shrubs to provide adequate shade for stream.

5. Clearly mark the SMZ boundary with flagging, paint or signs to ensure that equipment operators and tree cutters have no question about the boundary.

6. Minimize disturbances that expose mineral soil on the forest floor in the streamside management zone.

7. Avoid clear cutting (removing all or most of the trees) in the SMZ. Clearly mark those trees to be harvested in the SMZ.

8. When trees are removed from the SMZ, it is recommended that a diversity of tree species and age classes are maintained unless management goals state some different requirement.

9. In the SMZ, leave an adequate number of mature trees to avoid potential regeneration problems.

10. Maintain or provide sufficient ground cover and understory in the SMZ to trap sediment.

11. Directional felling or use of a boom feller-buncher is recommended for harvesting operations in the SMZ or wetlands. Cable-assisted felling techniques can reduce loss to breakage and further protect the SMZ. Keep slash (tree tops, branches) from entering streams, lakes or other bodies of water. Avoid felling trees in streams or bodies of water. Limbing of trees should be done above the high-water mark of the channel.

12. Avoid driving heavy equipment and skidders in SMZ. Utilize end-lining skidding technique to remove trees from the SMZ. When absolutely necessary, operate equipment only during frozen or dry ground conditions in SMZ .

13. Restrict mechanical site preparation in the SMZ. Encourage natural revegetation, seeding, and hand planting in SMZ.

14. All new or reconstructed roads, landings, portable sawmills, camps, skid trails, and fire lines should be located on stable areas outside the SMZ. Stream crossings and fire lines may be an exception when carefully implemented.

15. At all road crossings of Class I and II streams, structures should be sized to allow for full surface flow of the stream throughout the entire life of the structure. Design of stream crossing should be based on how long the structure is expected to be in place, acceptable risk level and downstream resources. Consider 50 year - 24 hour design peak flows for permanent structures. All structures for Class I streams should be designed and constructed to allow unrestricted fish passage (see stream crossing guideline in Road, Trails, Landings and Stream Crossings, FWQG 5.3).

16. Plan stream crossings to avoid indiscriminate crossings. Cross stream at right angle (perpendicular) to channel. Minimize number of stream crossings to reduce bank impacts, sedimentation, and debris from entering the stream.

17. Do not side-cast soil or gravel into a stream, wetland or watercourse during road construction, grading or maintenance.

18. Wheeled or tracked equipment should not operate within the stream channel, draws, or the SMZ except on established roads. Do not skid down stream channels and draws.

19. Avoid the introduction of slash into the SMZ from adjacent areas. Avoid piling and burning slash in the SMZ (see Prescribed Fire, FWQG 5.7).

20. Carefully control skid patterns to avoid on-site and downstream channel damage, build-up of destructive runoff flows, and erosion in sensitive watershed areas such as meadows and the SMZ. Use end-lining to winch logs directly (shortest distance) out of the SMZ.

21. Any material which inadvertently or accidentally enters a stream course in an amount which adversely affects the natural flow, water quality, or fishery resource, should be removed in a manner which causes the least disturbance. Logging debris, especially small limbs and needles, that can reduce oxygen levels in the water are of particular concern. However, some large material (large organic debris) can be essential for long term channel stability.

22. Excavated material removed from stream courses as a result of necessary construction should be moved to an upland area and stabilized where it will not be washed back to the stream during runoff. Short term stockpiles should be bermed and stabilized with mulch, erosion netting or erosion mats as necessary. If practical, permanent piles should be shaped to minimize sideslopes and contoured to blend with existing topography.

Permanent piles should also be promptly stabilized using revegetation techniques.

23. Avoid broadcast burning (allowing fire to spread through an area) in the SMZ unless planned and identified as the proper management treatment (see Prescribed Fire, FWQG 5.7).

24. Do not handle, store, apply, or dispose of hazardous or toxic materials (fuels, pesticides and herbicides) in a manner that could pollute the stream or wetlands or causes damage or injury to humans, lands, animals, or plants. Limit pesticide and fertilizer use in the SMZ unless labeled for such use. Establish a buffer for pesticide application along all flowing streams (See Chemical Management, FWQG 5.6).

25. Do not mix or clean equipment or containers used for mixing or application of fuels, pesticides or herbicides near streams, bodies of water or in the SMZ (see Chemical Management, FWQG 5.6).

Concerns and Implications:

Abundant research has demonstrated that significant water quality benefits can be achieved when streamside management zones are defined and activities are conducted carefully within those zones. While many benefits are achieved during the period of actual work in the area, the project planner must realize that the ultimate goal is to provide for long term channel stability and balanced watershed function. Care in implementing streamside management zone Forest Water Quality Guidelines can prevent negative impacts from developing in future years. These impacts are often very costly and difficult to mitigate and repair.

The Utah Division of Wildlife Resources (UDWR) uses a stream/lake classification system for fishery management that is a function of the species and quality of the reach (UDWR, 1968). The Utah Division of Water Quality (UDWQ) has classified the waters of the state base upon the beneficial use of that water and includes classifications for domestic uses and aquatic wildlife (State of Utah, R317-2). For assistance in determining whether a waterbody is a fishery or domestic water supply contact the UDWR and/or the UDWQ. Using UDWR's classification, SMZ class I streams will include UDWR classes 1 through 3. Using UDWQs beneficial use classification, class 1 streams will include use designations 1C, 3, 3A, 3B. ***These classifications are not inclusive and a waterbody may meet the criteria for a fishery or water supply even when DWR and DWQ classification may be incorrect or the waterbody unclassified.*** See Appendix for a summary of DWQ and DWR classifications with locations and phone numbers for your local UDWR/UDWQ office.

Construction activities affecting the bed or banks (including placement of stream crossings) of a stream may require a permit from the Division of Water Rights. A stream alteration permit is required prior to commencing such work. The Division of Water Rights must always be

contacted before an activity of this type begins. They can be contacted at:

Utah Division Of Water Rights
P.O. Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7375

Selected Examples of Specifications: (partial listing)

National Handbook of Conservation Practices, Natural Resources Conservation Service:

666 Forest Stand Improvement
560 Access Road
394 Firebreak
580 Streambank & Shoreline Protection
655 Forest Harvest Trails & Landings
338 Prescribed Burning
391 Riparian Forest Buffer

crossing placement (WMT-C1)
culverts (UWR-9.7), (WMT-C2), (FRM- p 312-323)
stream channel protection (USFS-14.17)

References:

FRM - Meehan, W.R. 1991 Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society, Special Publication 19. Bethesda Maryland.

USFS - USDA Forest Service, Region 4, 1998. Soil and Water Conservation Practices Handbook. Ogden, Utah. Forest Service Handbook 2509.22

UWR - State of Utah, Administrative Rules for Stream Channel Alterations, Division of Water Rights, Robert Morgan, P.E. State Engineer. Reprinted 1991. State Archives No. 8858.

WMT - Musclow, H.J., and L.B. Dalton. 1990 Wildlife Mitigation Technologies for Man-Made Impacts. Utah Department of Natural Resources, Division of Wildlife resources. Publication Number 90-3.

5.3 Roads, Skid Trails, Landings and Stream Crossings

Definition: A road is a course of travel used for forest access. It may be used primarily or only occasionally for transportation of forest products. Roads may be either permanent or constructed in a manner intended to be temporary.
Skid trails are those areas used for the temporary transport of logs either by skidding or vehicle transport. These areas are usually excavated or denuded of vegetation by the repetitive use of a particular corridor.
Landings are those areas cleared of vegetation and sometimes excavated to facilitate the orderly stacking, decking, loading or bunching of logs in preparation for transport. Landings may include areas where logs are limbed and bucked if those areas are different from the areas where logs are decked or loaded.

Objective: To minimize adverse water quality impacts and reduce loss of soil by erosion caused by roads, trails, stream crossings and landings used for forestry activities.

Condition Where Guideline Applies: Any area where substantial amounts of soil are exposed, agitated, excavated, compacted or deposited during construction, use and maintenance of roads, trails, landings and stream crossings.

Application Practices:

Planning for roads:

1. Plan roads to fit within transportation networks and minimize road construction. Keep the number of roads to be built at a minimum. Bear in mind the impact upon visual quality of numerous roads. Provide standards to allow construction of roads which maintain forest productivity as well as protect water quality and fish and wildlife habitat.

2. Roads should be planned with safety in mind. Plan for road construction to the required standards for the intended purpose. Keep the roads no wider than necessary for safety and the intended use to minimize the disturbed area. Match the standards of road construction to the local site, terrain, soil conditions and topography as well as expected size of vehicle use.

3. Plan road location to avoid wetland areas where feasible. Temporary or permanent forest roads for silvicultural operations may be constructed without regulation by section 404 of the Clean Water Act if the 15 federally mandated Best Management Practices (BMPs) cited within the Concerns and Implications section of the Forest Wetland FWQG are implemented (see pg. 91). However, failure to utilize these BMPS or a future non-silvicultural use of the road to be constructed will require that a section 404 permit be applied for from the U.S. Army Corps of Engineers. Non-silvicultural uses include land conversion from forest to agricultural, residential/recreational development or other uses.

4. Plan roads which fit the natural terrain as much as possible. Minimize cuts and fills and where necessary, balance required fills with the amount of material to be excavated.

5. Locate roads upslope of natural drainages to allow road surfaces to drain.

6. Plan roads to avoid sustained excessive grades (10% to 20%).

7. Design road surface slope to utilize natural drainage (i.e., insloping, outsloping or changing of the grade).

8. Locate placement of dips, water bars and changes of road alignment to direct water off road surface. Use an appropriate number and spacing of dips and water bars based on grade of the road and soil types.

9. Design cross culverts or ditches to complement natural drainage for protection of the road surface, excavation or embankment.

    a. Locate cross culverts where fill erosion will be minimized and direct discharge into streams will be prevented.

    b. Road drainage structures should be spaced so peak flows between the features will not exceed the capacity of the individual drainage structures or result in excessive erosion of ditches and roadbeds.

10. Identify geologically stable areas to place excess excavated material.

11. Identify unstable areas and avoid road construction in these areas, if possible. An example might be where rock layers slant with the slope, rather than into the slope and represent potential for mass movement of rock and dirt. Obtain expert advice in these areas.

12. Plan stream crossings to avoid indiscriminate crossings. Cross stream at right angle (perpendicular) to channel and design approaches to prevent sediment transport onto roadfill. Minimize number of stream crossings to reduce bank impacts, sedimentation, and debris from entering the stream. Avoid more than one crossing point for the area harvested, if possible.

13. Design crossings to handle peak runoff and flood waters, minimize impact on water quality and provide adequate fish passage where appropriate. Design of stream crossing should be based on how long the structure is expected to be in place, acceptable risk level, and downstream resources. Generally, use of the 25 yr. - 24 hr. storm event for temporary road crossings and the 50 yr. - 24 hr. storm event for permanent road crossing will provide adequate structure sizing. Remember stream crossings may require a stream alteration permit from the Utah Division of Water Rights.

14. Select the most appropriate feature for stream crossings,(i.e. fords, culverts or bridges) considering the following criteria: stream size, impact on aquatic resources, cost, maintenance requirements, permanence of crossing, stream banks and soil conditions of approaches.

    a. Fords may be the least expensive alternative if conditions allow. Limited traffic, type of stream bed, weight of vehicles using ford and season of use should all be considered when contemplating a ford stream crossing. Fords may be the most practical alternative in areas prone to flash floods. Fords do, however, cause continued disturbance to the stream bed. If a culvert or bridge is not practical, locate fords on stable, rocky portions of the stream channel. Fords may be improved to reduce stream bed damage by the use of such items as concrete planks or other similar materials. Fords should be considered as temporary crossings with low frequency of use. Use particular care to prevent the stream from being diverted onto the road surface by the ford.

    b. Culverts are the most common stream crossing structure. They are relatively inexpensive, allow use of native fill material and can be quickly installed. Permanent culverts should be of sufficient size for runoff (see # 13 above) and at least 15 inches in diameter, even those used for seeps, springs, wet areas and cross ditches. Culverts larger than 6 feet in diameter should be designed by an engineer or stream hydrologist. Fish passage should be provided for all Class I streams and other live streams as needed. Removal of temporary culverts requires excavation of fill material, extraction of the culvert and stabilization of the stream banks.

    c. Bridges usually have less impact on water quality and fisheries. Bridges are especially appropriate when crossing large streams or when debris is a problem. While usually more expensive, bridges can be permanent or temporary. Temporary

bridges are easily placed and removed, relatively inexpensive, provide excellent stream protection, and usually require minimal stream bank rehabilitation. In addition, they can be reused.

Road Construction:

1. Time road construction activities to limit operations during periods of excessive moisture or frozen ground.

2. Install road drainage at time of construction. Roads should be constructed in such a manner that debris, overburden and excess material are kept from entering streams. Drainage ways should be kept free from such material.

3. All road fills should be compacted to settle the fill material and reduce water entry into the fill. Snow, ice, frozen soil and woody debris should not be buried in fills. This could lead to development of voids in the fill and may lead to subsequent failure of the road. This is particularly important near streams.

4. Use rip rap, vegetative material, down spouts or similar devices to reduce erosion on fills.

5. If possible, maintain live trees and shrubs at the base of fill slopes to serve as sediment filters.

6. Construct slash windrows at the toe of fill slopes on stream crossings (upstream and downstream) to act as a filter and prevent sediment from entering streams.

7. Where potential for sediment delivery to a channel exists, construct slash windrows at outlets of relief culverts, cross drains, water bars, rolling dips and at the toe of fill slopes.

8. Construct roads to provide adequate drainage from the road surface by using outsloped or insloped roads with the appropriate ancillary features to reduce erosion.

    a. Outsloped roads allow water to drain off the road in a low-energy flow but require fill to be stable. This type of road is not appropriate in proximity to streams and must be evaluated for safety reasons.

    b. Insloped roads require a drainage ditch on the inside of the road to carry the water away from the cut bank and roadside. The gradient of such ditches must be carefully constructed. Ditch gradients of 2 to 6 percent are steep enough to keep collected water moving but not so steep that excessive erosion occurs. These

ditches must then be allowed to drain away from the road at appropriate intervals along the road. This drainage may be accomplished by culverts, dips, water bars or cross drains.

9. Dips and water bars are constructed to effectively provide surface flow off the road. They should be built so that traffic does not obliterate them. Construction should be such that the proper drainage is provided but no driving hazard is created. The cross grade should be 2 or 3 percent at 90 degrees to the road centerline to minimize vehicle stress. Dips are usually the most economical way to provide cross road drainage.

10. Culverts are sometimes used to provide ditch relief for insloped roads. Culverts should be skewed 15 to 30 degrees toward the inflow of the ditch to optimize inlet efficiency and reduce maintenance problems. Protect the upstream end from plugging by armoring with rock or the use of drop inlets, boxes or screens (if appropriate). If possible, install these culverts at the gradient of the original ground slope. If not, the culvert outlets should be armored with rocks, logs or other material to dissipate the energy of the emerging water.

11. Avoid constructing a berm that may channel water down the road.

12. As soon as practical following construction, road cuts, fills and associated disturbed areas, should be stabilized and/or revegetated (e.g. backslope cut slopes as needed for stability). Natural revegetation may be adequate to stabilize these areas, however, seeding, hydro mulching or other revegetation may be necessary.

13. Surfacing of long term or permanent roads may be advantageous. This type of treatment includes graveling, covering with road base, chipping or pavement. Advantages of such treatment include less maintenance required, less transport of sediment, less road damage in wet periods and the extension of operating seasons.

14. Surfacing or other such treatment of short term roads on highly erodible areas such as switch backs and short sections of steep grades or other sensitive areas (e.g. stream crossings) reduces the opportunity for erosion and should be considered.

Stream Crossings:

1. Construction activities should be timed to minimize impact to water quality. Usually this is late summer when water flows are minimal. However, thunderstorm activity and fisheries must be considered. Stream crossings should be emplaced as quickly as possible to limit adverse impacts. De-watering of sites by diversion through temporary culverts or the use of hose should be considered when installing culverts.

2. Use fords when appropriate. See section on fords under road planning. Fords require rocky stream beds or some type of armor plating to protect the bed.

3. To function properly, culverts should be aligned with the natural stream channel. This alignment is critical. Any deflection from the stream channel will cause bank erosion. Culverts which are skewed are also more prone to plugging by debris.

4. Culverts should be placed slightly below the grade of the natural stream. This will avoid culvert outfall which could cause erosion of the stream bed or bank at either the intake or outlet of the culvert.

5. The bed for the culvert should be of the same slope as the natural stream channel and should be of rock-free soil or gravel. This will allow the even distribution of the load over the full length of the culvert.

6. The original channel of the stream should not be altered upstream from the culvert unless necessary to prevent blockage or protect the fill.

7. Compact the fill material around the culvert as backfill occurs. This will prevent seepage and failure of the culvert. The backfill material should be of finer materials and free of voids. Culverts should be covered with at least one foot of compacted fill material for culverts up to 36 inches in diameter and one third of their diameter for larger culverts.

8. Consider using trash racks or inlet grates where debris in catch basin may threaten the structure.

9. Protect culvert inlet and outlet against erosion by providing rock armor, logs, grass seeding or other suitable material. Observe the water flow in a newly-placed culvert and determine any need for additional armoring.

10. Compact and grade the approaches to a culvert to maintain a consistent road grade.

11. Temporary bridges require firm soil banks. Some cribbing may be necessary to provide additional support for the stream bank. Approaches can be constructed that will not create any sediment. Railway cars and wooden structures are sometimes used effectively for portable, temporary bridges.

12. As soon as practical upon completion of use, temporary stream crossings need to be removed, excess fill material excavated and deposited in a stable area, banks rehabilitated and bed of the stream restored to its original grade. In some instances it may be necessary to remove temporary crossings prior to the spring runoff.

13. Permanent bridges require solid foundations such as bedrock, or concrete abutments and should be engineered for the appropriate size, span and material of construction. Obtain expert advice for the design and installation.

Road Maintenance:

1. Grade roads only as often as needed to maintain a stable road surface and to retain the surface drainage. Avoid grading any section of a road unless maintenance is required. Unnecessary grading just creates a source of sediment from the newly disturbed surface.

2. Avoid cutting the toe of cut slopes when grading roads or pulling ditches. Clean ditches only when needed.

3. If grading produces excess material, feather it out or haul it away. Avoid side-casting material into streams. If large amounts of excess material exist, haul them to safe disposal sites which are stabilized to prevent erosion. Avoid locations near streams where erosion will carry materials into a stream.

4. Retain the appropriate inslope or outslope of the road. Avoid leaving a berm that channels water down the road.

5. To reduce maintenance, avoid using roads during wet periods if such use will damage the road or negate the effects of the erosion control features.

6. Reduce dust by use of water, rock or other appropriate road treatments.

7. Maintain erosion control features by periodic inspection and maintenance. Inspections should be conducted following heavy storms. Maintenance may include cleaning dips and cross drains, repairing ditches, cleaning culvert inlets and cleaning culvert trash racks or inlet grates.

8. Upon completion of forestry activities, examine the actual need for continued road use and erosional stability. In a timely manner, close all roads that are unstable, erodible or may not be necessary.

    a. Block access to discourage vehicular access.

    b. Remove structures and restore approximate natural drainage.

    c. Install water bars and broad based dips at appropriate intervals.

d. Scarify and revegetate where natural revegetation is inadequate.

Skid Trails:

1. Design and locate skid trails and skidding operations to minimize soil disturbance. The use of designated skid trails is one way of limiting soil compaction and site disturbance.

2. In designing skidding methods and trails, consider longer skidding routes which will reduce disturbance due to temporary road construction. Usually, roads cause more soil disturbance and opportunity for erosion than skid trails.

3. Use a skidding method such as a cable system, rubber tired skidder, tractor, feller-buncher or other equipment which is appropriate for the soil and terrain. Cable systems can be used on steeper slopes. Uphill skidding produces skid trails that diverge and spread water. Downhill skidding methods tend to create skid trails that converge and concentrate runoff downhill. Soils which are highly erosive, saturated, easily compacted or geologically unstable are situations which warrant careful consideration when selecting a skidding system and identifying constraints on the skidding.

4. Avoid skidding directly up and down steep slopes for long distances. If tractor skidding steep slopes consider excavating skid trails across the slope and winching to the trail. Cable yarding downhill may require additional measures (such as slash deposition) to prevent excessive erosion.

5. Locate skid trails away from natural drainage systems, avoid concentrating runoff and limit grade where possible.

6. Limit skidding during wet periods to minimize soil displacement and compaction.

7. Upon cessation of skidding operations, if the slope of an area is sufficient to cause concern, install appropriate water diversion devices such as cross ditches or water bars in skid trails to prevent channelization and erosion.

8. Seed or use slash to mulch exposed soils where erosion may become a problem due to slope, soils or other site-specific situations.

9. Skid trails should be located outside Streamside Management Zones (SMZ).

Landings:

1. If possible, construct or locate landings with 3 to 10 percent slopes for proper drainage.

2. Locate landings away from natural drainage systems and divert runoff to areas where vegetation can serve as a filter.

3. When locating landings, avoid areas where skidding down and across drainage bottoms to the landing may be a problem.

4. Minimize the number and size of landings yet still accommodate a safe, economical operation. However on steep slopes, more numerous and smaller landings along roads reduce the need for extensive excavations. Consider skidding as loading occurs to minimize landing size.

5. Landings should be located outside Streamside Management Zones (SMZ) and at a sufficient distance to preclude future encroachment into the SMZ.

6. Upon termination of operations, recontour landings to the extent practical, treat excessive compaction and revegetate where natural revegetation is inadequate.

Winter Operations:

1. Winter weather allows opportunity for low impact logging and even operations impractical in other seasons of the year in some sensitive areas such as wet meadows, high water table areas or other areas of soil erosion or compaction hazard.

2. Construct roads during warmer months to prevent frozen material being used in road fills or use compacted snow for roads or trails in sensitive areas. Roads of compacted snow may also be used for single-entry harvests or temporary roads.

3. Provide adequate surface and cross drainage for all roads before the winter season occurs.

4. Locate and mark existing culverts. Mark in such a manner that location will be visible even in deep snow and storm conditions.

5. Keep all drainages open and culverts unplugged.

6. Begin operations after ground is frozen or snow cover is adequate to prevent damage (usually 15 inches or more).

7. During cold weather, plow snow cover off roadway to facilitate deep freezing of the road grade leaving 2" to 3" of compacted snow to protect road surface. This provides tremendous strength but excessive or deep snow cover must be kept from road surface.

8. Plow away snow berm or provide breaks in snow berm to allow road drainage particularly as the spring thaw occurs.

9. Suspend operations when weather conditions change and preclude activity. For example, hauling should be limited to colder portions of the day since road surfaces deteriorate rapidly when thawing occurs.

10. When alternate freezing and thawing occur, snow cover should be kept on the roads to prevent thawing during the warmer periods.

11. Remove temporary stream crossings prior to spring runoff.

Concerns and Implications:

The construction, maintenance and use of forest roads, skid trails and landings expose mineral soil creating substantial opportunity for erosion. Movement of soil into proximate streams and other water bodies may cause siltation, sedimentation and turbidity. Erosion from roads is a major source of sedimentation from forestry activities. Proper planning of road layout prior to beginning construction saves money while reducing the chance for water quality impacts. The pre-harvest layout of skid trails and central location of landings can provide for minimal soil disturbance, reduce erosion potential while providing fuel savings to the operator. The use of sound methods during road, skid trail and landing construction may initially provide an added expense but the long term savings as well as reduced maintenance with few or no required remedial measures and minimal rehabilitation will compensate for this expense.

Construction activities affecting the bed or banks (including placement of stream crossings) of a stream may require a permit from the Division of Water Rights. A stream alteration permit is required prior to commencing such work. The Division of Water Rights must always be contacted before an activity of this type begins. They can be contacted at:

Utah Division Of Water Rights
P.O. Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7375

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into the “waters of the United States, including wetlands,” must receive

authorization for such activities. However section 404(f)(1) of the Clean Water Act allows for normal, established (on-going) silvicultural activities to occur without being subject to the regulation. Additionally, this section allows for, without regulation, the construction and maintenance of permanent and temporary forest roads within wetland areas if the 15 federally mandated "Best Management Practices" are implemented (see pg. 91) The construction of roads to be utilized for non-silvicultural uses such as land conversion or development do not meet these exemptions from section 404 of the Clean Water Act even if the roads were initially constructed for silvicultural purposes. Contact the Division of Forestry, Fire and State Lands or the U.S. Army Corps of Engineers for further information at:

Department of Natural Resources
Division of Forestry, Fire and State Lands
1594 West North Temple, Suite 3520
Salt Lake City, Utah 84114-5703
(801) 538-5555

Intermountain Regulatory Section
U.S Army Engineer District, Sacramento
1403 South 600 West, Suite A
Bountiful, Utah 84010
(801) 295-8380

Selected Examples of Specifications: *(partial listing)*

National Handbook of Conservation Practices, Natural Resources Conservation Service:

560 Access Road
655 Forest Harvest Trails & Landings
391 Riparian Forest Buffer

Forestry BMP's for Idaho

Guides for Controlling Sediment from Secondary Logging Roads; by Packer and Christensen; Intermountain Forest and Range Experiment Station and Northern Region, USDA-FS.

Permanent Logging Roads for Better Woodlot Management; U.S. Dept. of Agriculture, Forest Service State and Private Forestry, Northeastern Area; 1978; NA-FR-18.

References:

Natural Resource Conservation Service, National Handbook of Conservation Practices

Permanent Logging Roads for Better Woodlot Management; U.S. Dept. of Agriculture, Forest Service State and Private Forestry, Northeastern Area; 1978; NA-FR-18.

5.4 Timber Harvesting

Definition: Timber harvesting is the cutting and removal of trees for wood products or the cutting of trees to accomplish forest management objectives.

Objective: To harvest trees utilizing the most appropriate harvesting technology that will protect water quality by reducing the risk of sediment transport.

Conditions Where the Guideline Applies: Activities involving the cutting of forest trees. All timber harvesting where activities may adversely impact water quality.

Application Practices:

Harvesting Equipment

1. Layout skid trails prior to harvesting.

2. Utilize directional felling techniques.

3. Consider the use of mechanical harvesters and delimbers that may reduce soil compaction.

4. Exclude the use of ground based machinery within the streamside management zone. Trees to be harvested within the SMZ should be end lined or harvested utilizing a boom feller-buncher.

5. Limit whole tree skidding where excessive damage may occur to the residual stand.

6. Utilize cable harvesting systems or helicopter logging on steep slopes (generally in excess of 40%) where the use of wheeled or tracked machinery could cause excessive soil disturbance.

7. Choose the appropriate sized equipment that can adequately perform the operation required, minimize soil disturbance and compaction with the least damage to any residual stands.

8. Consider the use of low ground pressure equipment (floatation tires or tracked) on wetland areas.

9. Avoid the use of skidder blades for braking when descending steep slopes.

10. Consider use of animals or specialized equipment for skidding where site conditions warrant.

11. Avoid excessive soil compaction.

Winter Logging

1. Install adequate road or skid trail drainage prior to start of activities or the summer prior to harvesting.

2. Clearly mark culverts and other drainage structures to be visible in deep snow and keep all drainages open and culverts unplugged.

3. Compact skid trails in snow prior to skidding.

4. Prepare for thawing and expect temporary shut-downs.

5. Avoid road construction during winter months.

6. Consider harvesting wetlands and other sensitive areas during the winter months utilizing snow roads and snow skid trails.

Slash Management (see Prescribed Fire, FWQG 5.7)

1. The need to burn slash may be reduced by lopping, crushing, scattering, chipping or adherence to pre-determined utilization standards. Alternative uses of substandard merchantable material (e.g. firewood, fence stays, etc.) may also reduce the necessity of burning slash.

2. Slash can sometimes be cut in such a manner as to leave all branches and foliage within a foot or two of the ground. Slash treated in this manner, unless excessive in overall quantities, can be left to impede surface water flow, aid nutrient recycling and to provide protection for reproduction.

3. Minimal amounts of slash can sometimes be crushed by skidding equipment thereby making piling and burning unnecessary. This can be done efficiently if operators are instructed to do so during skidding operations.

4. Sometimes firewood or other products can be sold or given away from areas where concentrations of slash exist. However, some supervision may be necessary to prevent

scattering of piled slash which may reduce or eliminate the opportunity for efficient burning of the piles.

5. Use brush blades for the piling of slash to reduce the amount of soil in slash piles.

6. Retain small slash and brush for nutrient recycling, shade and soil retention.

7. Avoid piling of slash within the SMZ for disposal or burning.

8. Utilized prescribed fire according to a burn plan prepared by a knowledgeable fire professional and in accordance with laws and administrative rules.

9. Ensure best possible utilization to prevent excessive slash accumulations and waste of resources.

10. Select appropriate slash disposal treatment that minimize water quality impacts and reduce risk of insect infestations.

Regeneration

1. Retain a sufficient number of healthy trees with adequate crowns and good form for seedtrees or retention trees during seedtree, selection, shelterwood and thinning operations.

2. Scarify the soil only to the amount necessary to meet regeneration objectives.

3. Limit soil compaction or treat excessively compacted soil to obtain adequate regeneration or revegetation.

4. Locate skid trails to minimize damage to regeneration.

5. Avoid running equipment over advanced regeneration except were desired to thin or change composition. Consider end lining felled trees out of advanced regeneration.

Concerns and Implications:

The use of Forest Water Quality Guidelines (FWQG) during a timber harvest operation affords a landowner the best opportunity to limit environmental degradation during the harvest. An improper timber harvest is not only unaesthetic for quite a while, but also risks damage to water quality, threatens fisheries, alters wildlife habitat, causes soil movement and loss and reduces recreational opportunities. By requiring the use of FWQG in a contract a landowner can protect the property and help ensure the availability of forest resources for

future generations. By utilizing FWQG a timber harvest operator can work with pride knowing one is harvesting forest products in a sound manner with financial benefits.

Construction activities affecting the bed or banks (including placement of stream crossings) of a stream may require a permit from the Division of Water Rights. A stream alteration permit is required prior to commencing such work. The Division of Water Rights must always be contacted before an activity of this type begins. They can be contacted at:

Utah Division Of Water Rights
P.O. Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7375

On private and non-federal lands, a burning permit is required for any burning. The permit requirements comply with the statutes and administrative rules of the Clean Air Act and the Utah Department of Environmental Quality. Most counties have a fire warden employed by the Division of Forestry, Fire and State Lands or a Fire Marshall who can issue a burning permit. Contact the Division of Forestry, Fire and State Lands office in your area for specific information regarding your county. For those counties which do not have a fire warden, the county sheriff may be contacted.

On federal land, burning is required to adhere to the rules of the Clean Air Act and clearing indices are used to indicate when burning may be conducted.

Transportation of forest products within or into the state of Utah will require compliance with the Forest Products Transportation Act. This law requires possession of a contract, permit, bill of sale, bill of lading, receipt or other legal instrument to provide the following information:

1. date of sale
2. purchaser's name and address
3. transporter's name and address if different than purchaser
4. legal or other description of sale area
5. products, species and quantity
6. delivery point
7. name and address of landowner, agency or vendor

Proof of ownership is not required for private landowners harvesting or removing products from their own property. For further information concerning the Utah Forest Products Transportation Act contact the Forestry, Fire and State Lands office in your area.

Selected Examples of Specifications: *(partial listing)*

National Handbook of Conservation Practices, Natural Resources Conservation Service:

666 Forest Stand Improvement
560 Access Road
394 Firebreak
580 Streambank & Shoreline Protection
660 Tree/Shrub Pruning
655 Forest Harvest Trails & Landings
338 Prescribed Burning
391 Riparian Forest Buffer
612 Tree/Shrub Establishment

References:

Montana, Idaho, Wyoming BMP's

Water Quality Protection Guidelines for Forestry Operations in New Mexico. New Mexico Energy, Minerals and Natural Resources Department. March 1994

5.5 Site Preparation, Regeneration and Revegetation

Definition: Site preparation is the use of mechanical, chemical or other means to prepare a site for regeneration of a forest. Regeneration is the reestablishment of a forest stand or the re-stocking of a residual forest. Revegetation may include regeneration, however it additionally covers the need for soil stabilization by the use of herbaceous plants especially on log landings, skid trails, roads and within streamside management zones.

Objective: To limit soil movement and loss and ensure adequate groundwater recharge during and upon completion of forestry activities by ensuring desirable regeneration and revegetation.

Conditions Where the Guideline Applies: Practice is recommended for all timber harvesting and forestry activities. Regeneration methods should be addressed during the preharvest planning process and prior to harvesting of timber as well as any required site preparation needed to properly regenerate the harvested area. Revegetation of exposed soil should be done upon completion of harvesting and forestry activities. Roads or skid trails that are abandoned permanently or temporarily should be revegetated naturally or artificially.

Application Practices:

General Guidelines

1. Utilize pre-harvest planning that addresses the harvesting method (thinning, shelterwood, single and group tree selection, patch clearcutting, clearcutting, etc.) in regard to regeneration.

2. Consult with a forester in the planning and decision making process prior to signing contracts or harvesting timber.

3. Choose appropriate equipment for the harvest of timber on sensitive areas, including wetlands, bogs, slide areas and steep slopes. Selection should consider effects of erosion, compaction, sedimentation of waterbodies, soil displacement and minimization of soil disturbance.

4. Close trails, roads and landings upon completion of harvest or when use is no longer desired.

5. Reduce the opportunity for invasion of noxious weeds by prompt revegetation with appropriate seed.

6. Install water diversion devices where needed to limit the erosion potential.

Site Preparation

1. Ensure slash disposal and treatment to prepare site for regeneration through use of fire and/or mechanical means.

2. Create optimal conditions for the regeneration on the site or within the residual stand through the use of fire, mechanical or chemical means.

3. Plan prescribed burning to accomplish objectives without causing excessive damage to soil or the residual stand.

4. Scarify soil only to the amount required by the species desired for regeneration.

5. Consider chemical site preparation instead of mechanical site preparation where possible to reduce soil disturbance.

Regeneration

1. Retain healthy trees of desired species, with sufficient crowns and good form for seed trees or retention trees during seedtree, shelterwood and thinning operations to provide quality regeneration from genetically superior seed sources.

2. Retain stocking levels suited to site moisture conditions. Dry sites or southern aspects may require retention of some trees to provide shade for regeneration. Shade will reduce soil moisture loss and reduce temperatures providing better conditions for regeneration.

3. Plant proper species for soil and site conditions when using artificial regeneration.

4. Use local seed source stock during artificial regeneration projects where possible.

5. Monitor regeneration survival and take necessary measures to promote the long term survival of regeneration that protects water quality and meets the landowner's stocking objectives.

Revegetation

1. As soon as practical following construction of road cuts, fills and associated disturbed areas, these areas should be revegetated and/or stabilized. Natural revegetation may be adequate. If not, revegetation should be augmented by seeding, hydro mulching or other means. Upon termination of operations, landings should be recontoured to the extent practical and revegetated.

2. Stabilize exposed soil (including firelines) with proper seed mixtures for soil and site conditions. Minimize the use of fertilizers to amend the soil.

3. On steep slopes the use of straw mulch or logging slash may be needed to stabilize soil until establishment of grasses.

4. Following removal of temporary culverts and bridges, establish earth or straw dikes on stream banks and seed with proper seed mixtures.

5. Utilize a native herbaceous seed mixture suited to site conditions. Avoid seeding herbaceous vegetation where tree seedling establishment is desired unless erosive conditions warrant. Slash may be used to reduce erosiveness.

Concerns and Implications:

The consideration of regeneration prior to harvesting is a vital part of the preharvest planning process. Harvest methods, equipment choice, site conditions and slash treatments have significant impact on harvest areas and their regeneration. Improper consideration for regeneration during harvesting can reduce site productivity for generations. Future productivity of forested areas and supply of forest resources depend on adequately regenerating sites. Only through preharvest planning, proper harvesting and site preparation can sites be regenerated properly.

On private and non-federal lands, a burning permit is required for any burning. The permit requirements comply with the statutes and administrative rules of the Clean Air Act and the Utah Department of Environmental Quality. Most of the counties have a fire warden employed by the Division of Forestry, Fire and State Lands or a Fire Marshall who can issue a burning permit. Contact the Division of Forestry, Fire and State Lands office in your area for specific information regarding your county. For those counties which do not have a fire warden, the county sheriff may be contacted.

On federal land, burning is required to adhere to the rules of the Clean Air Act and clearing indices are used to indicate when burning may be conducted

Selected Examples of Specifications: *(partial listing)*

National Handbook of Conservation Practices, Natural Resources Conservation Service:

666 Forest Stand Improvement
560 Access Road
394 Firebreak
580 Streambank & Shoreline Protection
490 Forest Site Preparation
655 Forest Harvest Trails & Landings
338 Prescribed Burning
391 Riparian Forest Buffer
612 Tree/Shrub Establishment

References:

Montana, Idaho, Wyoming BMP's

Water Quality Protection Guidelines for Forestry Operations in New Mexico. New Mexico Energy, Minerals and Natural Resources Department. March 1994

5.6 Chemical Management

Definition: Chemical management refers to the use of chemicals such as pesticides (herbicides, rodenticide, insecticides, fungicides, etc.), petrochemicals (oil, gasoline, diesel), antifreeze, fire retardants and fertilizers for forest management.

Objective: To facilitate proper use while minimizing contamination of soil and surface and ground water when transporting, storing, handling, applying, and disposing of chemicals used in forest management.

Conditions where Guideline Applies: Anywhere and anytime that conditions require the use of chemicals and where water bodies, wetlands or runoff potential exists.

Application Practices:

General

1. Have a contingency plan to follow in the event of a chemical spill. This plan should include who to contact in the event of a spill and may include having absorbent or neutralizing materials on hand with literature that describes spill cleanup or containment procedures.

2. Transport and store chemicals in leak-proof, labeled containers.

3. Chemical storage containers and facilities should be located outside the SMZ.

4. Use impervious dikes or berms around storage tanks with a capacity adequate to contain the entire volume of the tank according to local regulations.

5. When possible mix chemicals and clean equipment only in areas that are part of the application site.

Pesticides

1. Follow label instructions, EPA guidelines, and state law when using pesticides. Use pesticide for target species according to label instructions.

2. Restricted-use pesticides should only be applied under the supervision of persons who are properly trained and licensed. Such pesticides pose considerable risk to persons and the environment if used improperly.

3. Apply chemicals during appropriate weather and season. The biology of a pest normally determines the time of year when it can be controlled, and attempted control at other times is unlikely to be effective. Other weather factors that should be considered include wind that can cause chemical drift, extreme heat that can cause chemical volatilization and drift, humidity, and precipitation. Always follow label instructions.

4. Avoid aerial or broadcast application of pesticides in SMZs unless chemical is specifically labeled for application over or near water. Utilize spot treatments where appropriate in an SMZ. Herbicide treatments in an SMZ should be done in a manner to avoid killing large amounts of vegetation.

5. Consider chemical site preparation instead of mechanical where possible to reduce sedimentation and other adverse impacts to water quality

6. Pesticides should not be applied to surface waters directly, by drift, or by washing into water, unless labeled for such use.

7. Do not mix chemicals or clean equipment or containers in or near streams, water bodies or streamside management zones.

8. Mix the appropriate amount of pesticide needed. Dispose of excess pesticides according to label instructions and existing regulations.

9. Transport, store and apply pesticides using leakproof, labeled containers. Dispose of pesticide containers in an approved landfill or according to label instructions.

10. Prevent chemical backflow (siphoning) into the water source by using an air gap or reservoir between the water supply hose and mixing tank.

11. Inspect and service equipment frequently, paying particular attention to seals, hoses and calibration of metering equipment.

12. Keep records of the chemical used, amounts or rates, date applied, where used, weather or site conditions at the time of use and results.

13. Ensure pesticide use is warranted and use the least amount and lowest toxicity that will achieve desired control. Consider biological, cultural, manual and preventative means to reduce amounts of chemicals applied (use IPM - Integrated Pest Management).

Petrochemicals and Antifreeze

1. Do not drain used oil, fuel, or antifreeze onto ground. Dispose of properly at an approved disposal station.

2. Fuel and service equipment away from SMZ's and avoid spillage.

3. Keep all fuel, oil, and antifreeze away from surface waters and away from areas where spilled material may enter or be washed into water.

4. Do not apply used oil on road surfaces for dust control.

Other Considerations

1. Minimize use of fertilizers. Limit fertilizer applications in SMZs. Fertilizer use should be based on indication of need from a soil test or plant symptoms.

2. Avoid aerial fire retardant and foam drops within streamside management zones.

3. Avoid locating retardant mixing and filling stations within the SMZ.

Concerns and Implications:

Use of chemicals in forestry activities can have considerable benefit. In some cases their use is nearly unavoidable, such as the use of petrochemicals and antifreeze in vehicles and machinery. However, most chemicals have a potentially great impact on water quality and aquatic organisms if they are misused, misapplied, or spilled. Pesticides and petrochemicals in particular pose risks due to their concentrated nature. Petrochemicals may pose a greater risk because they are so common and their use are taken for granted in our society. Petrochemicals have great potential to harm water quality, even when present in small amounts. Fertilizers in forestry pose comparably less risk to water quality since their use is not common. During prescribed fire and wildfire activities the use of fire retardants and foam in or adjacent to bodies of water should be avoided to prevent fish kills and water quality degradation. Water quality degradation associated with pesticide, petrochemical/antifreeze, fertilizer and firefighting chemicals can be minimized by following label instructions and these Forest Water Quality Guidelines.

The Utah Department of Agriculture has specific regulations regarding pesticides including product registration and labeling, product classification, applicator certification and licensing, dealer licensing and pesticide transportation. For further information contact:

Utah Department of Agriculture
350 North Redwood Road
P.O. Box 146515
Salt Lake City, UT 84114-6515
(801) 538-7188

Selected Examples of Specifications: *(partial listing)*

Utah Department of Agriculture, Utah Pesticide Control Act (R68-7)

National Handbook of Conservation Practices, Natural Resources Conservation Service:

595 Pest Management
596 Agrichemical Handling Facility

References

5.7 Prescribed Fire

Definition: Prescribed fire is the use of fire as a management tool for a specified purpose when conducted under specific conditions to attain the stated objective without unduly damaging or jeopardizing soil, existing desirable vegetation and water quality.

Objective: To reduce the possibility of water quality degradation which could result from the intentional use of fire for any reason and to identify criteria for the responsible, reasonable, and safe use of fire.

Conditions Where Guideline Applies:

This guideline may be applicable wherever or whenever there is a need to:

a. reduce the accumulation of woody debris or fuel in a forest setting,
b. provide site conditions conducive to re-establishment of a forest stand,
c. reduce the risk of an uncontrolled wildfire which could occur and result in unfavorable conditions for productive growth of a forest stand,
d. remove or reduce material which could be infested by insects or disease and serve as a population source to affect healthy, nearby plants,
e. create opportunities for change in plant composition,
f. maintain a desirable stand of trees using fire to eliminate unwanted competition or invading species,
g. remove undesirable species which occupy a site and limit any opportunity for growth or regeneration of desired species,
h. eliminate invasive, undesirable understory species to the advantage of a desirable overstory of trees,
i. improve forest health by using fire to eliminate unhealthy, infested or infected trees,
j. maintain or increase species diversity or
k. create or maintain a desired ecosystem.

Application Practices:

Prescribed burning or In Place *(In situ)* burns (may include broadcast burns)

1. A prescribed burn plan should be prepared by a qualified professional prior to any burning.

2. Burns should not be conducted within a streamside management zone or in proximity to perennial streams, lakes or reservoirs unless specifically required by a management

objective.

3. Response of vegetation to fire should be forecast by knowledgeable persons to ensure expected outcome is consistent with the management objectives.

4. Weather conditions and fuel moisture content should be specified for a burn to accomplish the intended purpose and yet avoid excessive damage to the existing vegetation and soil. Soil moisture should be optimal to reduce impact of burn to residual desirable vegetation and micro flora and fauna.

5. Total consumption or kill of target species is usually not necessary for a burn to be successful.

6. Ignition should be conducted in a manner to accomplish the purpose of the burn yet minimize the impact of resultant heat to the site.

7. Precautions should be taken which are necessary to ensure control of a fire at all times or to limit the risk of fire escaping an area intended for burning. If a wildfire occurs and control of the wildfire dictates fire line construction, these guidelines should also be implemented.

    a. If fire lines are necessary, they should be constructed along contours as much as possible. When erosion could become a problem, control measures should be taken to minimize soil loss. These measures include but are not limited to the installation of water bars, spreader ditches and the reseeding of disturbed areas susceptible to erosion (see Revegetation guideline in Road, Trails, Landings and Stream Crossings, FWQG 5.3).

    b. If weather conditions and the burn warrant, fire suppression forces such as engines or crews should be kept available to respond if needed.

8. A contingency plan should be prepared to identify appropriate actions to be taken if a prescribed fire exceeds control parameters (area, size, flame lengths or rate of spread).

9. Personnel experienced and qualified in fire management techniques should plan and conduct burns, provide supervision or be asked to provide technical expertise to conduct a safe, efficient, minimal impact burn.

Burning of slash

1. The decision to burn slash should be made judiciously. Other alternatives exist which may accomplish the same purpose.

    a. The need to burn slash may be reduced by lopping, crushing, chipping or adherence to pre-determined utilization standards. Alternative uses of substandard merchantable material (e.g. firewood, fence stays, etc.) may also reduce the necessity of burning slash.

    b. Slash can sometimes be cut in such a manner as to leave all branches and foliage within a foot or two of the ground. Slash treated in this manner, unless excessive in overall quantities, can be left to impede surface water flow, aid nutrient recycling and to provide protection for reproduction.

    c. Minimal amounts of slash can sometimes be crushed by skidding equipment thereby making piling and burning unnecessary. This can be done efficiently if operators are instructed to do so during skidding operations.

    d. Sometimes firewood or other products can be sold or given away from areas where concentrations of slash exist. However, some supervision may be necessary to prevent scattering of piled slash which may reduce or eliminate the opportunity for efficient burning of the piles.

2. A prescribed burn plan should be prepared by a qualified professional prior to any burning.

3. Pile and burn or burn only that slash necessary to abate the problem for which the burning will be done. Some slash left on a area will provide protection and nutrients for the regeneration while excessive removal of slash will cause soil compaction, higher soil temperatures and increase soil erosion.

4. Avoid introduction of slash into the Streamside Management Zone (SMZ) from adjacent areas.

5. When appropriate, whole length tree skidding with delimbing and bucking done at landings may concentrate slash in limited areas. Slash is much easier to treat when concentrated is such a manner. In addition, any damage done to the soil by subsequent burning is more limited in size of area affected.

6. Conduct slash piling operations only when soils are frozen or dry enough to minimize compaction and displacement.

7. Slash piled for burning should be sufficiently free from dirt and other unburnable material as to allow efficient burning and piles that do not burn clean shall be further treated to abate the problem caused by such slash.

    a. Use brush blades on dozers when piling slash. Avoid the use of dozers with angle blades.

    b. Slash piles should be large enough to generate sufficient heat when burned to consume the accumulated debris.

8. Burns of piles should not be conducted within a streamside management zone or in proximity to perennial streams, lakes, reservoirs or intermittent drainages.

9. Slash on moderately steep slopes may be more appropriately burned without being piled since use of dozers on these steeper slopes may initiate erosion waterways.

10. Very steep slopes may preclude burning if erosion would result. Erosive soils would also warrant special consideration.

Concerns and Implications:

Prescribed fire is sometimes a risky treatment. The risk of fire escape from intended areas for burning is always present. As the fire intensity of the prescribed fire increases or the weather parameters become more critical, the risk of escape is increased. Slow spreading, low intensity fires are recommended whenever possible. If burning can be done under inclement weather conditions and still accomplish the purpose of the burn, it is recommended that burning be done in those seasons of the year most favorable to inclement weather.

Safety must always be considered. Human beings are very susceptible to harm from even the most innocuous-looking fire. As fires increase in rate of spread, intensity or size, the danger increases dramatically. Personal safety, risk of fire escape from areas intended for burning and liability are the main reasons that qualified and experienced personnel are recommended for planning and implementation of prescribed burns. Property owners may be held liable for loss of life, personal injury or property damage from a prescribed fire and suppression costs of an escaped fire.

Unwise use of fire may have devastating effects on the water quality emanating from such an area. Fires caused when weather parameters are too severe, soil moisture is too low or fuel loading is too heavy over large areas of land may cause more problems than are solved by such burns. The soil structure may be affected, the soil micro flora and fauna may be

destroyed or the soil chemistry may be altered significantly. In addition, the impact on existing or adjacent vegetation may exceed acceptable levels and cause significant damage or mortality.

Prescribed burns produce smoke that can cause problems such as reduced visibility and breathing concerns for persons suffering from numerous maladies. The Clean Air Act identifies the conditions under which a prescribed burn can occur to minimize smoke problems.

On private and non-federal lands, a burning permit is required for any burning. The permit requirements comply with the statutes and administrative rules of the Clean Air Act and the Utah Department of Environmental Quality. Most of the counties have a fire warden employed by the Division of Forestry, Fire and State Lands or a Fire Marshall who can issue a burning permit. Contact the Division of Forestry, Fire and State Lands office in your area for specific information regarding your county. For those counties which do not have a fire warden, the county sheriff may be contacted.

On federal land, burning is required to adhere to the rules of the Clean Air Act and clearing indices are used to indicate when burning may be conducted.

Selected Examples of Specifications: *(partial listing)*

National Handbook of Conservation Practices, Natural Resources Conservation Service:

394 Firebreak
338 Prescribed Burning
391 Riparian Forest Buffer

FSM Title 5100 Fire Management

References:

Natural Resource Conservation Service Handbook

Forest Service Manual

National Wildfire Coordinating Group (NWCG) Publication 310-1 Part 2

5.8 Forested Wetlands

Definition: Wetlands, as defined in federal regulations and laws are "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Forested wetlands are wetland areas that are covered by or surrounded by trees or forests.

Objective: To protect the aquatic and hydrologic functions of forested wetlands during all aspects of forestry activities and timber harvests.

Condition Where Practice Applies: Practice should be applied to forested wetlands where forestry activities are planned and conducted. These activities may include timber harvesting, forestry road design and construction, slash treatment, site preparation, regeneration and use of chemicals.

Application Practices:

1. Avoid locating roads, trails and landings in wetlands.

2. Utilize mats or other similar devices to disperse loads when crossing wetland areas.

3. Conduct harvest activities in wetlands when the ground is frozen, covered with snow or during extended dry periods.

4. Locate, identify, and mark wetlands prior to the start of any forestry operations.

5. Keep open water free from slash.

6. Use only pesticides labeled for use in wetlands.

7. Do not fuel or service equipment in wetlands.

8. Avoid equipment operation in areas of open water, seeps and springs.

9. Utilize low ground pressure equipment (floatation tires or tracked) as necessary to minimize rutting and compaction.

10. Provide adequate cross-road drainage to minimize changes to natural surface and subsurface wetland flows.

11. Avoid creation of ruts in wetlands. Where possible skid around wetlands or endline felled trees out of wetland areas. Utilize slash or matts to reduce rutting when skidding through wetlands is necessary.

12. Avoid skidding through open wetland meadows and big game wallows.

13. Where possible divert runoff from roads, trails and landings to upland areas above wetlands to reduce silting of wetland areas.

14. Minimize soil disturbance and compaction in wetlands during the treatment of slash.

Concerns and Implications:

Forest wetlands are nature's filter for streams and water supplies. Forestry activities including timber harvesting are compatible with the management of wetlands when done in a sensitive manner and precautions are taken. Current regulations recognize the compatibility of forestry operations and wetlands and have provided an exemption to the regulatory process through the use of these guidelines.

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into the "waters of the United States, including wetlands," must receive authorization for such activities. However section 404(f)(1) of the Clean Water Act allows for normal, established (on-going) silvicultural activities to occur without being subject to the regulation. Additionally, this section allows for, without regulation, the construction and maintenance of permanent and temporary forest roads within wetland areas if the 15 federally mandated "Best Management Practices" (listed below) are implemented. The construction of roads to be utilized for non-silvicultural uses such as land conversion or development do not meet these exemptions from section 404 of the Clean Water Act even if the roads were initially constructed for silvicultural purposes. Contact the Division of Forestry, Fire and State Lands or the U.S. Army Corps of Engineers for further information at:

Department of Natural Resources
Division of Forestry, Fire and State Lands
1594 West North Temple, Suite 3520
Salt Lake City, Utah 84114-5703
(801) 538-5555

Intermountain Regulatory Section
U.S. Army Engineer District, Sacramento
1403 South 600 West, Suite A
Bountiful, Utah 84010
(801) 295-8380

Federally Required Best Management Practices

Specific Best Management Practices required by federal regulations drafted under the Clean Water Act [CFR 323.4 (D)(6)] for the construction and maintenance of forest roads within wetland areas include:

1. Permanent roads (for farming or forestry activity), temporary access roads (for mining, forestry, or farm purposes) and skid trails (for logging) in waters of the U.S. shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural or mining operations, and local topographic and climatic conditions;

2. All roads, temporary or permanent, shall be located sufficiently far from streams or other bodies of water (except for portions of such roads which must cross water bodies) to minimize discharges of dredged or fill material into waters of the U.S.;

3. The road or fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows;

4. The fill shall be properly stabilized and maintained during and following construction to prevent erosion;

5. Discharges of dredged or fill material into waters of the United States to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within the waters of the United States (including wetlands) that lie outside the lateral boundaries of the fill itself;

6. In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the U.S. shall be kept to a minimum;

7. The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body;

8. Borrow material shall be taken from upland sources whenever feasible;

9. The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species;

10. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist;

11. The discharge shall not be located in the proximity of a public water supply intake;

12. The discharge shall not occur in areas of concentrated shellfish production;

13. The discharge shall not occur in a component of the National Wild and Scenic River System;

14. The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts; and

15. All temporary fills shall be removed in their entirety and the area restored to its original condition.

Selected Examples of Specifications: (partial listing)

National Handbook of Conservation Practices, Natural Resources Conservation Service:

666 Forest Stand Improvement
560 Access Road
580 Streambank & Shoreline Protection
655 Forest Harvest Trails & Landings
391 Riparian Forest Buffer

crossing placement (WMT-C1)
culverts (UWR-9.7), (WMT-C2)(FRM-p 312-323)
stream channel protection (USFS-14.17)

References:

FRM - Meehan, W.R. 1991 Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society, Special Publication 19. Bethesda Maryland.

USFS - USDA Forest Service, Region 4, 1998. Soil and Water Conservation Practices Handbook. Ogden, Utah. Forest Service Handbook 2509.22

UWR - State of Utah, Administrative Rules for Stream Channel Alterations, Division of Water Rights, Robert Morgan, P.E. State Engineer. Reprinted 1991. State Archives No. 8858.

WMT - Musclow, H.J., and L.B. Dalton. 1990 Wildlife Mitigation Technologies for Man-Made Impacts. Utah Department of Natural Resources, Division of Wildlife resources. Publication Number 90-3.

Utah Wetlands Assistance Guide

Section 404 of the Clean Water Act and Federal Wetland Regulations (Federal Register; volume 51, no. 219; Thursday, November 19, 1986; pp 41233 - 41235).

Appendix

Utah Nonpoint Source Task Force

Jan 23, 1998

John Rokich
Division of Comprehensive
Emergency Management
State Office Building - Rm 110
Salt Lake City, Utah 84114

Kim Christy
Utah Farm Bureau
9865 State Street
Sandy, Utah 84070-3205

Kevin Brown, Director
Division of Drinking Water
150 North 1950 West (Bldg. #1)
P.O. Box 144830
Salt Lake City, Utah 84114

Kimball Goddard, District Chief
USGS-WRD
1745 West 1700 South
Salt Lake City, Utah 84104

Brooks Carter
Army Corps of Engineers
1403 South 600 West, Suite A
Bountiful, Utah 84010

Boyd Christensen, Hydrologist
Bureau of Land Management
Division of Resources
P.O. Box 45155
Salt Lake City, Utah 84119

Jerry Chaney
UDOT- Environmental Division
P.O. Box 1488450
4501 South 2700 West
Salt Lake City, Utah 84114

Chuck Gay
College of Natural Resources
USU - UMC 5200
Logan, Utah 84322-5200

Tom Bingham
Utah Mining Association
136 South Main, Suite 709
Salt Lake City, Utah 84101-1672

Phillip J. Nelson, State Conservationist
Natural Resources Conservation Service
125 South State Street
P.O. Box 11350
Salt Lake City, Utah 84147-0350

George Hopkin
Utah Dept. of Agriculture
Environmental Quality Section
350 North Redwood Road
Salt Lake City, Utah 84116

Tom Miyagishima
Farm Service Agency
125 S. State - Room 4239
Salt Lake City, Utah 84138

Steve Jensen
Salt Lake Co. Public Works Dept
SL County Government Center
2001 South State Street #N3300
Salt Lake City, Utah 84190-4600

Kris Jensen
US EPA Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2466

Utah Nonpoint Source Task Force (cont)

Jan 23, 1998

Ray Loveless
Mountainland Association of Governments
2545 N. Canyon Road
Provo, Utah 84604

Robert Morgan, State Engineer
Division of Water Rights
1636 W. N. Temple, 2nd Floor
Salt Lake City, Utah 84116-3156

Dianne R. Nielson, Ph.D.,
Executive Director
Dept of Environmental Quality
P.O. Box 144810
Salt Lake City, Utah 84114-4810

Steve Noyces
US Bureau of Reclamation
302 East 1860 South
Provo, Utah 84606-7317

Don Ostler, Director
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Howard Thomas
Natural Resources Conservation Service
P.O. Box 11350
Salt Lake City, Utah 84147-0350

Mark Petersen
Natural Resources Conservation Service
P.O. Box 11350
Salt Lake City, Utah 84147-0350

Cary G. Peterson, Commissioner
Utah Department of Agriculture
350 North Redwood Road
Salt Lake City, Utah 84116

Howard Rigtrup, Associate Director
Department of Natural Resources
1636 W. North Temple
Salt Lake City, Utah 84116-3193

Pete Stender, USFS
324 25th Street
Ogden, Utah 84401

Bill Bradwisch
Division of Wildlife Resources
1594 W. North Temple, Suite 2110
Salt Lake City, Utah 84114-6301

Gordon Younker
Utah Association of Conservation Districts
1860 N. 100 E.
North Logan, Utah 84341-1784

Forest Water Quality Guideline Technical/Peer Reviewers

Carl Lucero, NRCS/EPA Liaison
Region VIII
999 18th Street-Suite 500
Denver, Colorado 80202-2468

Kris Jensen, NPS Project Officer *
U.S. Environmental Protection Agency
Region VIII
999 18th Street-Suite 500
Denver, Colorado 80202-2468

James Long
Utah State University
Forest Resources Department
Logan, UT 84322

Jack Amundson
USDA - Forest Service
Regional Forester's Office - Vegetation Management
324 25th Street
Ogden, UT 84401

Ron Wilson
USDA - Forest Service
Cedar City Ranger District
P.O. Box 627
Cedar City, UT 84721

Gary Laing
USDA - Forest Service
Loa Ranger District
138 S. Main
Loa, UT 84747

Michael Orndorff
Cascade Mountain Resources
P.O. Box 9
Wellington, UT 84542

Jim Burr
Heber Valley Log and Lumber
2375 S Highway 40
Heber City, UT 84032

John Blazzard
Blazzard Lumber Company, Inc.
P.O. Box 65
Kamas, UT 84036

Ron Gropp
Division of Forestry, Fire & State Lands
585 North Main
Cedar City, UT 84720

Brian Ferguson *
Dixie National Forest
82 N 100 E
Cedar City, UT 84720

Edwin Coates *
Louisiana-Pacific Corporation
P.O. Box 185
Rexburg, ID 83440

Garry Domis *
Louisiana-Pacific Corporation
P.O. Box 116
Fredonia, AZ 86022

Amelia Fine Jenkins
Wild Utah Forests Campaign
1264 East 24th Street
Ogden, UT 84401

Gary Cornell, Fire Management Coordinator
Division of Forestry, Fire and State Lands
1594 West North Temple
Salt Lake City, Utah 84114

Linda Chappell, Ecologist
Fishlake National Forest
115 East 900 North
Richfield, Utah 84701

Dave Langley, Fire Management Officer
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

Kim Martin, Forest Engineer
Uinta National Forest
88 West 100 North
Provo, Utah 84601

Keith Schnare
U.S. Forest Service, Federal Building
324 25th Street
Ogden, Utah 84401

Dave Thomas, Regional Fuels Specialist
U.S. Forest Service, Federal Building
324 25th Street
Ogden, Utah 84401

Doug Austin, Forester
U.S. Forest Service, Federal Building
324 25th Street
Ogden, Utah 84401

Peter Stender
U.S. Forest Service
Regional Office
324 25th Street
Ogden, Utah 84401

Craig Kendal, Hydrologist
Dixie National Forest
82 N 100 E
Cedar City, UT 84720

Bob Gecy, Hydrologist
Uinta National Forest
88 West 100 North
Provo, Utah 84601

Charles Condrat, Hydrologist *
Wasatch-Cache National Forest
8230 Federal Building
125 South State Street
Salt Lake City, Utah 84138

Paul Cowley, Fishery Biologist *
Wasatch-Cache National Forest
8230 Federal Building
125 South State Street
Salt Lake City, Utah 84138

Linda Wadleigh, Fire Ecologist
Wasatch-Cache National Forest
Ogden Ranger District
507 25th Street, Suite 103
Ogden, Utah 84401

Douglas Lofstedt
U.S.E.P.A, Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2466

Utah Division Of Water Rights
P.O. Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7375

Chaz Carmichael *
Aspen Consultants
P.O. Box 308
Richfield, UT 84701

Doug Page
Uinta National Forest
Society of American Foresters
P.O. Box 190
Heber City, Utah 84032

Janette Kaiser *
Manti-Lasal National Forest
599 West Price River Drive
Price, UT 84501

Kelly Shannahan *
Dixie National Forest
82 N 100 E
Cedar City, UT 84720

Paul Flood *
Wasatch-Cache National Forest
8236 Federal Building
125 South State Street
Salt Lake City, UT 84138

Chuck Frank *
Wasatch-Cache National Forest
1556 HWY 150 South, suite A
P.O. Box 1880

Evanston, WY 82931

Douglas Koza *
Bureau of Land Management
P.O. Box 45155
Salt Lake City, UT 84145

Boyd Christensen *
Bureau of Land Management
P.O. Box 45155
Salt Lake City, UT 84145

* Denotes comments received during the public comment period (February 1 to March 1, 1998)

Utah Forest Stewardship Coordinating Committee

Dwight Bunnell
Division of Wildlife Resources
1594 West North Temple, Suite 2110
Box 146301
Salt Lake City, Utah 84114-5703

George Hopkin, Chief
Environmental Quality Section
Utah Department of Agriculture
350 North Redwood Road
Salt Lake City, Utah 84116

Michael Kuhns, Extension Forester
College of Natural Resources
Dept. Of Forest Resources
UMC 52, Utah State University
Logan, Utah 84322

Lisa Dennis-Perez
College of Natural Resources
Dept. Of Forest Resources
UMC - 52, Utah State University
Logan, Utah 84322

Rick Summers
DEQ - Division of Water Quality
288 North 1460 West
Salt Lake City, Utah 84116

Dave Baumgarter, Coop. Forestry
USDA - Forest Service
State & Private Forestry
324 - 25th Street
Ogden, Utah 84401

Ms. Jana Johnston
USDA - NRCS
302 East 1860 South
Provo, Utah 84606-6154

Richard Mickelsen
USDA - Farm Services Agency
125 South State Street, Rm. 4239
Salt Lake City, Utah 84138-1189

John Keeler
Utah Farm Bureau Federation
406 E Union
Manti Utah 84642

Mr. Richard J. Oldroyd
2829 Sleepy Hollow Drive
Salt Lake City, Utah 84117

Stuart Wamsley
P.O. Box 67
Laketown, Utah 84038

Danielle Salanina
Box 328
Cleveland, Utah 84518

Kresha Eastman, Coordinator
Castleland RC&D
P.O. Box 141
652 West Price River Drive
Price, Utah 84501

George Roether
Fiber Resource Recovery Inc.
2790 Buchanan Ave.
Ogden, Utah 84403

Diane Jones
Utah Nursery & Landscape Association
1903 East 2100 South
Salt Lake City, Utah 84106

Utah Forest Stewardship Coordinating Committee (cont)

Bryant Anderson

Emery County Planning & Zoning

Box 417
Castledale, Utah 84513

Paul Anderson
P.O. Box 461
Beaver, Utah 84713

Steve Steed
Utah Forest Products
P.O. Box 379
Escalante, Utah 84726

Blain Hamp
Division of Forestry, Fire & State Lands
1780 N Research Parkway, suite 104
North Logan, UT 84341

Erich Bretthauer
PO Box 80596
Las Vegas NV 89180

Keith Schnare
US Forest Service
324 25th Street
Ogden UT 84401

Dave Schen (past chairman)
Division of Forestry, Fire & State Lands
1594 W North Temple, suite 3520
Salt Lake City, UT 84114

Scott Burroughs (chairman)
Division of Forestry, Fire & State Lands
1594 W North Temple, suite 3520
Salt Lake City, UT 84114

A special thanks to members of the Forest Stewardship Coordinating Committee for all their input, especially to Mike Kuhns, Lisa Dennis-Perez and Keith Schnare for help in drafting sections of initial FWQGs.

Forestry, Fire and State Lands Advisory Council Members

Kenneth R. Brown
465 South Main
Randolph, UT 84064

Rosemary Corey
724 Ramona Avenue
Salt Lake City, UT 84105-3121

Joanna Endter-Wada
Department of Forest Resources
Utah State University
Logan, Utah 84321-5215
e-mail: endter@cc.usu.edu

Willard Gardner
1495 Oak Lane
Provo, UT 84604

Stanley Leavitt
P.O. Box 96
Kamas, UT 84783

Judy Lever
5277 S. Havenwood Lane
Holladay, UT 84117

Wayne Martinson
549 Cortez Street
Salt Lake City, UT 84103-2122

Gary Merrill
622 West Anderson Avenue
Murray, UT 84123

Jack Ray
Fabian & Clendenin, P.C.
P.O. 510210
Salt Lake City, UT 84151

Max Reynolds
Great Salt Lake Minerals
P.O. Box 1190
Ogden, UT 84402

Brooke Williams
329 W. Pierpont #200
Salt Lake City, UT 84101

Utah Division of Water Quality

Standards of Quality for Waters of the State

Division of Water Quality
288 North 1460 West
Salt Lake City, Utah 84114
(801) 538-6146

R317. Environmental Quality, Water Quality.
R317-2. Standards of Quality for Waters of the State.
R317-2-1A. Statement of Intent.

Whereas the pollution of the waters of this state constitute a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and whereas such pollution is contrary to the best interests of the state and its policy for the conservation of the water resources of the state, it is hereby declared to be the public policy of this state to conserve the waters of the state and to protect, maintain and improve the quality thereof for public water supplies, for the propagation of wildlife, fish and aquatic life, and for domestic, agricultural, industrial, recreational and other legitimate beneficial uses; to provide that no waste be discharged into any waters of the state without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution; to place first in priority those control measures directed toward elimination of pollution which creates hazards to the public health; to insure due consideration of financial problems imposed on water polluters through pursuit of these objectives; and to cooperate with other agencies of the state, agencies of other states and the federal government in carrying out these objectives.

R317-2-1B. Authority.

These standards are promulgated pursuant to Sections 19-5-104 and 19-5-110.

R317-2-2. Scope.

These standards shall apply to all waters of the state and shall be assigned to specific waters through the classification procedures prescribed by Sections 19-5-104(5) and 19-5-110 and R317-2-6.

R317-2-3. Antidegradation Policy.

3.1 Maintenance of Water Quality

Waters whose existing quality is better than the established standards for the designated uses will be maintained at high quality unless it is determined by the Board, after appropriate intergovernmental coordination and public participation in concert with the Utah continuing planning process, allowing lower water quality is necessary to accommodate important

economic or social development in the area in which the waters are located. However, existing instream water uses shall be maintained and protected. No water quality degradation is allowable which would interfere with or become injurious to existing instream water uses.

In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Federal Clean Water Act.

3.2 High Quality Waters - Category 1

Waters of high quality which have been determined by the Board to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection, shall be maintained at existing high quality through designation, by the Board after public hearing, as High Quality Waters - Category 1. New point source discharges of wastewater, treated or otherwise, are prohibited in such segments after the effective date of designation. Protection of such segments from pathogens in diffuse, underground sources is covered in R317-5 and R317-7 and the Regulations for Individual Wastewater Disposal Systems (R317-501 through R317-515). Other diffuse sources (nonpoint sources) of wastes shall be controlled to the extent feasible through implementation of best management practices or regulatory programs.

Projects such as, but not limited to, construction of dams or roads will be considered where pollution will result only during the actual construction activity, and where best management practices will be employed to minimize pollution effects.

Waters of the state designated as High Quality Waters - Category 1 are listed in R317-2-12.1.

3.3 High Quality Waters - Category 2

High Quality Waters - Category 2 are designated surface water segments which are treated as High Quality Waters - Category 1 except that a point source discharge may be permitted provided that the discharge does not degrade existing water quality. Waters of the state designated as High Quality Waters - Category 2 are listed in R317-2-12.2.

R317-2-4. Colorado River Salinity Standards.

In addition to quality protection afforded by these regulations to waters of the Colorado River and its tributaries, such waters shall be protected also by requirements of "Proposed Water Quality Standards for Salinity including Numeric Criteria and Plan of Implementation for Salinity Control, Colorado River System, June 1975" and a supplement dated August 26, 1975, entitled "Supplement, including Modifications to Proposed Water Quality Standards for Salinity including Numeric Criteria and Plan of Implementation for Salinity Control, Colorado River System, June 1975", as approved by the seven Colorado River Basin States and the U.S. Environmental Protection Agency, as updated by the 1978 Revision and the 1981, 1984, 1987, 1990, and 1993 Reviews of the above documents.

R317-2-5. Mixing Zones.

A mixing zone is a limited portion of a body of water, contiguous to a discharge, where dilution is in progress but has not yet resulted in concentrations which will meet certain standards for all pollutants. At no time, however, shall concentrations within the mixing zone be allowed which are acutely lethal as determined by bioassay or other approved procedure. Mixing zones may be delineated for the purpose of guiding sample collection procedures. The zone shall be small in extent and must not form a barrier to migrating aquatic life. Domestic wastewater effluents discharged to mixing zones shall meet effluent requirements specified in R317-1-3.

R317-2-6. Use Designations.

The Board as required by Section 19-5-110, shall group the waters of the state into classes so as to protect against controllable pollution the beneficial uses designated within each class as set forth below. Surface waters of the state are hereby classified as shown in R317-2-13.

6.1 Class 1 -- Protected for use as a raw water source for domestic water systems.

a. Class 1A -- Reserved.
b. Class 1B -- Reserved.
c. Class 1C -- Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health.

6.2 Class 2 -- Protected for in-stream recreational use and aesthetics.

a. Class 2A -- Protected for primary contact recreation such as swimming.
b. Class 2B --Protected for secondary contact recreation such as boating, wading, or similar uses.

6.3 Class 3 -- Protected for in-stream use by aquatic wildlife.

a. Class 3A -- Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
b. Class 3B -- Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
c. Class 3C -- Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.
d. Class 3D -- Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.

6.4 Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

6.5 Class 5 -- The Great Salt Lake. Protected for primary and secondary contact recreation, aquatic wildlife, and mineral extraction.

6.6 Class 6 -- waters requiring protection when conventional uses as identified in R317-2-6.1 through 6.5 do not apply. Standards for this class are determined based on environmental and human health concerns.

R317-2-7. Water Quality Standards.

7.1 Application of

The numeric criteria listed in R317-2-14 shall apply to each of the classes assigned to waters of the State as specified in R317-2-6. It shall be unlawful and a violation of these regulations for any person to discharge or place any wastes or other substances in such manner as may interfere with designated uses protected by assigned classes or to cause any of the applicable standards to be violated, except as provided in R317-1-3.1. The Board may allow site specific modifications based upon bioassay or other tests performed in accordance with standard procedures determined by the Board.

7.2 Narrative Standards

It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures.

R317-2-8. Protection of Downstream Uses.

All actions to control waste discharges under these regulations shall be modified as necessary to protect downstream designated uses.

R317-2-9. Intermittent Waters.

Failure of a stream to meet water quality standards when stream flow is either unusually high or less than the 7-day, 10-year minimum flow shall not be cause for action against persons discharging wastes which meet both the requirements of R317-1 and the requirements of applicable permits.

Utah Division of Wildlife Resources

*A BRIEF DESCRIPTION OF THE SYSTEM USED TO CLASSIFY FISHING WATERS IN UTAH**

Utah Division of Wildlife Resources
1594 West North Temple
P.O. Box 146301
Salt Lake City, Utah 84114
(801) 538-4700

Fisheries habitat in Utah is being inventoried and classified on a statewide basis by the Utah Division of Wildlife Resources (UDWR) to aid in their management decisions. This type of information is also extremely valuable and is in great demand by various government and public agencies. These are the decision makers who determine the fate of various land and water proposals, and also, what provisions will be instituted to preserve wildlife habitat. Another use that has become important as this inventory classification system has been developed is to help the fishing public. It is now possible to provide specific information concerning individual waters. These data are useful in planning fishing trips and other forms of recreation.

An important feature of any good inventory and classification system is that it provided current and accurate information. To accomplish this, the UDWR has recently computerized the data. This makes it possible to update the information from field data which are continually being collected and improved. It also makes it possible to print out the data in various forms to accommodate various needs and uses. Below is a brief summary of the habitat inventory and classification system used to categorize the fishery and current totals by class, as available December 1992.

In addition to a physical inventory, each lake or stream section is rated using three criteria: esthetics, availability, and productivity. A numerical value on a scale of one to five is determined for each of the above criteria. The value of esthetics is then multiplied by a factor of one, the value of availability by two and the value of productivity by four. The sum of these scores is the numerical rating of the lake or stream section.

Based on this numerical rating, Utah fishing waters are placed in classes as indicated below:

Class	Numerical Rating
I	31-35
II	25-30
III	18-24
IV	11-17
V	7-10
VI	Dewatered

Waters which have exceptional qualities for natural reproduction, nursery area or threatened and endangered species are further identified by adding a letter (alphameric listing) to the

numerical rating.

R **S** Important Spawning Area
N **S** Important Nursery Area
B **S** Important for Spawning and Nursery
X **S** Important for Threatened and Endangered Fish Species

A unique rating is given certain fishing streams and lakes. This designation has added a much needed dimension to our classification system in that it further identifies waters that provide unique habitat. It is the general policy of the fisheries section that, for any proposed development that will measurably impact a water meeting unique quality criteria, mitigation measure must be prescribed to maintain or improve quality (not to diminish) the physical, chemical, and biological values of the fishery value class in place.

General definitions of Class I, II, III, IV, V, and VI Streams

Class I streams are the top quality fishing waters of the state. They should be preserved and improved for fishery and similar recreational uses. These streams are generally outstanding in natural beauty and of a unique type. They are accessible by modern car at suitable points, and larger waters are floatable with suitable launching facilities. Productivity is such that it supports high fish populations in good condition of one or more species of the more desirable game fish. Natural reproduction or the stocking of small fish maintains an excellent sport fishery.

Class II waters are of great importance to the state fishery. These are productive streams with high esthetic value and should be preserved. Fishing and other recreational uses should be the primary consideration. They are moderate to large in size and may have some human development, such as farms or commercial establishments, along them. Many Class II streams are comparable to Class I except for size.

Class III streams comprise approximately half of the total stream fishery habitat of Utah. These waters are important because they support the bulk of stream fishing pressure in Utah. Water developments involving Class III waters should be planned to include fisheries as a primary use, and fishery losses should be minimized and enhanced when possible.

Class IV streams are typically poor in quality with limited fishery value. Fishing should be considered a secondary use. A few Class IV waters provide an important catchable fishery in areas where no other fishery exists. Water development plans should include proposals to enhance fisheries values where feasible.

Class V streams are now practically valueless to the fishery resource. Other water uses should take preference over fisheries use in planning water developments; however, many waters in this class could provide valuable fisheries if additional water could be provided.

Class VI streams are those stream channels which are dewatered for significant time period during the year. Many of the stream sections now in this class could support good to excellent fish populations if appropriate minimum flows could be provided. Planning of water developments should include consideration for restoration of these dewatered sections of

stream.

General definitions of Class I, II, III, IV, V and VI Lakes

Class I lakes are large bodies of water that satisfy heavy fishing pressure. Productivity is such that it supports a high fish population in good condition of one or more species of game fish. Natural reproduction and/or stocking of small fish maintain an excellent sport fishery. It is essential to maintain the fishery value of these waters to provide fishing for Utah residents and as tourist attractions.

Class II lakes are also important to the Utah economy because of their recreational value. Willard Bay Reservoir (10,000 acres), and Utah Lake, the largest natural lake in Utah, are examples of this class. In addition, many medium and large trout lakes and reservoirs increase the total acres of fishing water in Class II. Productivity is such that it supports a high fish population in good condition of one or more species of game fish. Coldwater lakes in this class require stocking of small fish to maintain good fishing. Some Class II lakes are comparable to Class I except for size; others have low esthetic ratings or biological deficiencies. It is essential to maintain the fishery value of these waters to provide fishing for Utah residents and as tourist attractions.

Class III lakes and reservoirs may be locally important waters throughout in Utah. They are, in some instances, attractions for out-of-state anglers but normally provide angling for those who reside 50 miles or less from each lake or reservoir. Because of the geographical location of some Class III waters in areas where there is little fishing, they may be very important locally. These key lakes and reservoirs should be enhanced for fishery production if possible.

Class IV, V and VI lakes and reservoirs contribute little to the fishery resource in Utah. Some of these lakes and reservoirs do provide fishing where little fishery exists when stocked with catchable trout.

*The present classification report does not include many of the alpine lakes on Boulder Mountain or alpine lakes or streams in the High Uinta Mountains. These water will be classified separately due to their unique features.

Division of Wildlife Resources Offices

(contact for assistance in classification of fishery waterbodies)

SALT LAKE
1594 West North Temple
P.O. Box 146301
Salt Lake City, Utah 84114
(801) 538-4700

CENTRAL REGION
1115 North Main Street
Springville, Utah 84663
(801) 489-5678

NORTHERN REGION
515 East 5300 South
Ogden, Utah 84405
(801) 479-5143

SOUTHERN REGION
622 North Main Street
Cedar City, Utah
(801) 586-2455

NORTHEASTERN REGION
152 East 100 North
Vernal, Utah 84078
(801) 789-3103

SOUTHEASTERN UTAH
455 West Railroad Avenue
Price, Utah, 84501
(801) 637-3310

110451039201

MEMORANDUM OF UNDERSTANDING

Forest Service
U.S. Department of Agriculture

Utah Department of Environmental Quality
Utah Department of Agriculture

THIS MEMORANDUM OF UNDERSTANDING (MOU) is entered into between the Division of Water Quality, Utah Department of Environmental Quality, and the Utah Department of Agriculture hereinafter referred to as the State, and the Forest Service, U.S. Department of Agriculture, hereinafter referred to as the Forest Service. The purpose of this agreement is to coordinate water pollution control activities on National Forest System lands in Utah to protect, maintain and restore the beneficial uses of the waters of the State.

WHEREAS, the Utah Department of Environmental Quality, Division of Water Quality is responsible for safeguarding water quality of the State of Utah through the Federal Clean Water Act of 1972 (33 U.S.C. 1329), as amended, the Utah Water Quality Act, Utah Code Annotated, Chapter 19-5 (1991) and the Standards of Quality for Waters of the State, Utah Administrative Code R317-2 (1991) and

WHEREAS, the State has the authority to prepare and implement the State Nonpoint Source Management Plan and through the Utah Water Quality Board require implementation of appropriate Best Management Practices included and referenced thereto; and

WHEREAS, the Forest Service under the Organic Act of 1897 (16 U.S.C. 551), the Multiple Use Sustained Yield Act of 1960 (16 U.S.C. 528), as amended, and the National Forest Management Act of 1976, is directed to regulate the occupancy and use of National Forest System lands; and

WHEREAS, the Forest Service under the National Environmental Policy Act of 1969 (42 U.S.C. 4321) is directed to utilize a systematic interdisciplinary approach in planning and decision making, to evaluate and report environmental impacts of proposed actions, and to provide alternatives to those actions; and

WHEREAS, the National Forest Management Act of 1976 (16 U.S.C. 1601) provides for the interdisciplinary development, the content, use, review, revision and amendment of the National Forest System resource planning process, and also provides for the establishment of National, Regional and local resource goals on the basis of the assessed capability of local and resource planning of State and local governments, including Indian tribes, and other Federal agencies; and

WHEREAS, the Forest Service under the Clean Water Act of 1972 (33 U.S.C. 1329), as amended; and Executive Orders 11752 (December 19, 1973), 11991 (May 24, 1977), 12088 (October 13, 1978) and 12581 (January 23, 1987) is directed to meet State, interstate and local substantive as well as procedural requirements respecting control and abatement of pollution; and

WHEREAS, the Forest Service under the National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) is directed to prevent or control pollution from nonpoint sources and to protect and maintain water quality and beneficial uses; and

WHEREAS, the Forest Service and the State mutually desire:

1. To comply with Section 208 of P.L. 92-500 including subsequent amendments and with the nonpoint source control Sections (319 and others) of the Federal Clean Water Act, as amended and applicable executive orders.

2. To implement the Standards of Quality for Waters of the State, Utah Administrative Code R317-2 (1991) on National Forest System lands.

3. To implement the Utah Nonpoint Source Management Plan.

4. To develop and implement a procedure to review proposed projects for nonpoint source impacts.

5. To develop cooperative and/or complementary water quality monitoring systems, share technical expertise, and promote research on water quality management related to forest and grazing practices.

6. To develop procedures to minimize duplication of effort and facilitate complementary pollution control and abatement programs.

NOW, THEREFORE, the parties agree as follows:

The Forest Service agrees to:

1. Implement a feedback loop concept for the control of nonpoint source pollution on National Forest System Lands. Implementation effectiveness and validation monitoring will be used to determine the success of nonpoint source pollution control measures and to provide information needed to refine best management practices (BMP's) or alter land management activities where needed to protect beneficial uses of water.

2. Meet the water quality protection elements of the Utah Nonpoint Source Management Plan by implementing Forest Plan standards and guidelines and soil and water conservation practices as described in Forest Service Handbook 2509.22.

3. Provide training to staff regarding potential impacts to water quality, applicable state and federal law, and state-of-art techniques used to prevent water quality problems.

4 Conduct internal review of best management practices by annually examining a representative sample (target 10%) of projects which may significantly impact water quality and prepare written evaluation reports. Summaries of these reports will be provided to the State.

5 Provide technical support for development of a process to minimize cumulative effects of forest practices and participate in demonstration projects which include National Forest System lands.

6. Participate in reviewing State water quality standards revisions.

7. Coordinate water quality monitoring at the field level whenever there is a mutual benefit. Data obtained will be put on EPA's data storage and retrieval system (STORET).

8. Provide an assessment of water quality conditions on the National Forest system lands as requested by the State for inclusion in the biannual Utah Water Quality Report (Section 305(b) Clean Water Act).

9. Participate in development and implementation of Utah's Nonpoint Source Assessment and Management Program Plan (Section 319, Clean Water Act).

10. Provide to the State a schedule of proposed major land-disturbing activities, as identified by the Forest Service, which may have potential to adversely impact water quality. Projects and programs on which the National Forest specifically requests assistance will be identified.

11. Provide annually information on in-stream monitoring and evaluation efforts, research results, and evaluation of BMP effectiveness.

12. Involve the State at the beginning of the NEPA Process for projects having potential impact to beneficial water uses. The National Forests or Regional Office will develop a screening procedure with the State for the purposes of flagging projects in which the State is interested. Emphasis should be placed on obtaining written input from the State during the early stages of project analysis and planning.

13. Implement water quality improvement projects which have been identified in Forest Service Land and Resource Management Plan and State and local water quality management plans, to the extent that funds and manpower are available.

14. Notify the State of all violations of water quality standards or regulation and spills of oil or hazardous materials.

15. Participate on the Utah Nonpoint Source Task Force as a permanent member.

The State agrees to:

1. Support the designation of the Forest Service as the Water Quality Management Agency on National Forest System lands.

2. Coordinate water quality management planning and implementation efforts by the State and Areawide Water Quality Management Agencies with the Forest Service where National Forest land is involved and discuss these efforts during the annual coordination meeting.

3. Invite Forest Service representation on policy or technical advisory committees that relate to forest or rangeland management.

4. Provide technical assistance to the extent resources and manpower are available in project and program planning and development as requested by the Forest Service.

5. Review the Forest Service's listing of proposed projects and activities scheduled for NEPA process, participate in those affecting water quality, and provide timely written review comments.

6. Provide copies of applicable environmental quality laws, rules, policies and guidelines to the Forest Service for review during the development stages and for information following publication.

7. Notify the Forest Service of suspected violations of State or federal environmental quality laws or rules which may impact National Forest lands and to aid in or perform, as negotiated, the implementation of corrective or enforcement proceedings.

8. Provide instructors and resource expertise when requested for Forest Service training and education.

9. Provide assistance and training to the National Forests in the use of EPA's water quality data storage and retrieval system (STORET). Enter Forest Service water quality data on STORET as resources permit.

10. Keep Forest Supervisors and the Regional Office informed of present and proposed water quality monitoring activities within or adjacent to the National Forests and discuss during the annual coordination meeting.

It is mutually agreed that:

1. The parties will cooperate in the protection, restoration, enhancement and management of

water resources in the State of Utah.

2. The Forest Service is the Designated Management Agency for management of water quality on National Forest System lands in the State of Utah.

3. The parties will develop and seek application of Best Management Practices (BMP's) for activities and uses of forest and rangelands with intent to meet State water quality standards.

4. An audit team from the State Nonpoint Source Task Force will select a few projects annually which will be evaluated for BMP effectiveness.

5. In cases of potential conflict an opportunity will be provided for informal conflict resolution prior to taking other actions provided by law.

6. The parties will coordinate water quality monitoring activities and cooperate in the collection, analysis and processing of water quality samples when the results are thought to be mutually beneficial to the Forest Service and the State. Cooperative monitoring programs between the State and the National Forests will be described in detailed plans and resource commitments will be made through project-specific memoranda of understanding or annual monitoring agreements.

7. Annual meetings will be held each spring to coordinate efforts of the National Forests, the State and local water quality management agencies. The meetings will be arranged by the Forest Service.

8. The parties will work jointly on the development of standard monitoring techniques for the assessment of forest practice impacts on water quality through establishment of a technical working team. The technical working team will be comprised of specialists with monitoring expertise and will also include representatives from other agencies.

9. Nothing in this agreement shall be construed as limiting or affecting in any way the legal authority of the Forest Service in connection with the proper administration and protection of National Forest System lands in accordance with federal laws and regulations.

10. Nothing in this agreement shall be construed as limiting or affecting in any way the legal authority of the State in the discharge of its mission and responsibilities according to State laws and rules.

11. Nothing in the agreement shall be construed as obligating the Forest Service or the State to expend funds in any contract or other obligation for future payment of funds or services in excess of those available or authorized for expenditure. However, it is recognized that to make progress on this agreement that resource commitments are necessary and will be pursued as part of annual budget preparation.

12. The parties will periodically (two-year interval) review this Memorandum of Understanding and make revisions and updates as necessary to meet the purpose of the agreement. Amendments shall become effective following written approval by both parties.

13. This agreement shall become effective as soon as it is signed by the parties and shall continue in force unless terminated by either party upon 30 days notice in writing to the other of intention to terminate upon a date indicated.

14. No member of or delegate to Congress, or Resident Commissioner of the United States, shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom.

15. Each and every provision of this Memorandum is subject to the laws of the State of Utah,

the laws of the United States, the regulations of the Secretary of Agriculture, and rules of the State and the Utah Water Quality Board.

IN WITNESS THEREOF, the parties hereto have caused this Memorandum of Understanding to be executed as of the last date signed below.

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

by: _____ Date: 7 Nov 92

Kenneth L. Alkema, Executive Director

UTAH DEPARTMENT OF AGRICULTURE

by: _____ Date: 11/7/93

Miles "Cap" Ferry, Commissioner

FOREST SERVICE
U.S. Department of Agriculture

by: _____ Date: 12/11/92

for Gray F. Reynolds
Regional Forester, Intermountain Region

RDG/cjl
USFSMOU.MEM

BLM MOU UT932-9302

MEMORANDUM OF UNDERSTANDING

Bureau of Land Management	Utah Department of Environmental Quality
U.S. Department of Interior	Utah Department of Agriculture

THIS MEMORANDUM OF UNDERSTANDING (MOU) is entered into by the Division of Water Quality, Utah Department of Environmental Quality, and the Utah Department of Agriculture hereinafter referred to as the State, and the Bureau of Land Management, U.S. Department of Interior, hereinafter referred to as the BLM. The purpose of this agreement is to coordinate water pollution control activities on BLM lands in Utah, to protect, maintain and (or "in order to") restore the beneficial uses of the waters of the State, and to create a framework within which the agencies involved can effectively cooperate on projects of mutual concern.

WHEREAS, the Utah Department of Environmental Quality, Division of Water Quality is responsible for safeguarding surface and ground water quality of the State of Utah through the Federal Clean Water Act of 1972, as amended, the Utah Water Quality Act, Utah Code Annotated, Chapter *19-5* (1991) and Standards of Quality for Waters of the State, Utah Administrative Code R 317-2 (1991) and

WHEREAS, the State has the authority to prepare and implement the State Nonpoint Source Management Plan and through the Water Quality Board require implementation of appropriate Best Management Practices included and referenced thereto; and

WHEREAS, the cooperative agreement, between the Governor of Utah and the State Director of BLM, which sets up the RDCC to provide a process for the State of Utah and BLM to jointly identify, communicate and coordinate actions of common concern and provide a mechanism for continuing involvement in the development and revision of land use plans; and

WHEREAS, the BLM, under the Federal Land Policy and Management Act of 1976-43 U.S.C. 1701, 1711, P.L. 94-579, is directed to regulate the multiple use and occupancy of public lands that will protect the water resources; and

WHEREAS, the BLM under the Public Rangeland Improvement Act of 1978 (43 U.S.C. 1901 etc. reg, P.L. 95-514) provides for improving the condition of the public rangelands. Improvements include any program to provide water, stabilize soil and water conditions and provide habitat for livestock and wildlife; and

WHEREAS, the BLM is the Designated Management Agency (DMA) charged with implementing and enforcing natural resource management programs for the protection of water quality on federal lands under its jurisdiction; and

WHEREAS, Nonpoint source water quality problems are best controlled through the development, adoption, and implementation of sound resource management practices referred to as "Best Management Practices (BMPs); and

WHEREAS, the BLM and the State mutually desire:

1. To comply with Section 208 of P.L. 92-500 including subsequent amendments and with the nonpoint source control sections (319 and others) of the Federal Clean Water Act, as amended and applicable executive orders.

2. To implement the Utah Administrative Code R317-2 (1991) on BLM lands.

3. To comply with Section 319 of P.L. 1004 of the Federal Clean Water Act to implement the Utah Nonpoint Source Management Plan.

4. To develop and implement a procedure to review proposed projects for nonpoint source impacts.

5. To develop cooperative and/or complementary water quality monitoring systems, share technical expertise, and promote research on water quality management related to livestock and wildlife grazing practices.

6. To develop procedures to minimize duplication of effort and facilitate complementary pollution control and abatement programs.

7. To implement BMP's as outlined in BLM's manuals and handbooks that are "State of the Art" for land management activities.

NOW, THEREFORE, the parties agree as follows;

The BLM agrees, to the extent resources, funds, and manpower become available, to:

1. Implement a feedback loop concept for the control of nonpoint source pollution on BLM Lands. The feedback loop includes implementation of best management practices (BMP's), implementation and effectiveness monitoring, comparison to criteria, and modification of BMP's or altering land management activities where needed to protect beneficial uses of water as described in the Utah Water Pollution Control Act.

2. Meet the water quality protection elements of the Utah Nonpoint Source Management Plan by implementing soil resource management plans, resource activity plans and water conservation practices.

3. Provide training to staff regarding potential impacts to water quality, applicable state and federal law, and state-of-art techniques used to prevent water quality problems.

4. Provide annually information on in-stream monitoring and evaluation efforts, research results, and evaluation of BMP effectiveness.

5. Provide technical support for development of a process to control cumulative effects and participate in demonstration projects which include BLM lands.

6. Participate in reviewing state Water Quality Standard revisions.

7. Coordinate water quality monitoring at the field level whenever studies by the Bureau of Land Management and the State can be correlated. Data obtained will be put on the STORET.

8. Provide an assessment of water quality conditions on the BLM lands when requested by the State for inclusion in the Utah Water Quality Report (Section 305(b) Clean Water Act).

9. Participate in development and implementation of Utah's Nonpoint Source Assessment and Management Program Plans (Section 319, Clean Water Act).

10. Provide annually to the State at the annual coordination meetings, a general schedule of proposed land-disturbing activities during the forthcoming year. Such activities include proposed road and bridge construction and/or maintenance projects, stream channel restoration, fish habitat improvement projects, activities authorized by special use permit, and other projects as requested outside of BLM. Projects and programs on which the BLM specifically requests assistance will be identified.

11. Involve the State through RDCC and BLM's electronic bulletin board in the NEPA Process for projects having significant potential to impact beneficial water uses. Emphasis should be placed on obtaining input from the State during the early stages of project

analysis and planning.

12. Implement water quality improvement projects which have been identified in BLM, State and local water quality management plans, to the extent that funds and manpower are available.

13. Notify the State of all violations of water quality standards or regulation of oil and hazardous materials.

14. Participate on the Utah Nonpoint Source Task Force as a permanent member.

The State agrees to:

1. Coordinate water quality management planning and implementation efforts by the State and Areawide Water Quality Management Agencies with the BLM where BLM land is involved, and keep the BLM updated on any changes to State standards, rules regulation, or guidelines.

2. Invite BLM representation on policy or technical advisory committees that relate to forest or rangeland management such as cumulative effects and water quality criteria.

3. Provide technical assistance to the extent resources and manpower are available in project and program planning and development as requested by the BLM.

4. Review the Bureau of Land Management's District Office listings of proposed projects and BLM's bulletin board listings for EPA documents, participate in those affecting water quality, and provide timely review comments for finalizing the NEPA documents. Participate in annual coordination meetings.

5. Provide copies of applicable environmental quality laws and regulations to the BLM for review during the development stages and for information following publication.

6. Notify the BLM of suspected violations of State environmental quality laws or regulations which may impact BLM lands and to aid in implementation of corrective or enforcement proceedings.

7. Provide instructors and resource expertise when requested for BLM training and education.

8. Provide assistance and training to the BLM in the use of EPA's Water Quality Date Storage and Retrieval System (STORET). Enter BLM water quality data on STORET as resources permit.

9. Keep BLM District Managers informed of present and proposed water quality monitoring activities within or adjacent to the BLM lands.

It is mutually agreed that:

1. The agencies will cooperate in the protection, restoration, enhancement and management of water resources in the State of Utah.

2. The BLM is the Designated Management Agency for management of water quality on BLM lands in the State of Utah.

3. The agencies will develop and seek application of Best Management Practices (BMP's) as defined by BLM and the State for activities and uses of forest and rangelands with intent to meet State water quality standards.

4. In cases of potential conflict between agency missions, the agencies will provide an

opportunity for informal conflict resolution prior to taking other actions provided by law.

5. The agencies will coordinate water quality monitoring activities and cooperate in the collection, analysis, and processing of water quality samples when the results are mutually beneficial to the BLM and the State. Cooperative monitoring progress between the State and BLM will be described and resource commitments will be made through annual monitoring agreements.

6. Annual meetings will be held each spring to coordinate efforts of the BLM, the State and local water quality management agencies. The meetings will be arranged by the BLM.

7. An audit team from the State NPS Task Force will select a few projects annually which will be evaluated for BMP effectiveness.

8. The agencies will work jointly on the development of standard monitoring techniques for the assessment of land use impacts on water quality through establishment of a technical working team. The technical working team designated at annual coordination meetings will be comprised of specialists with monitoring expertise and will also have representatives from other agencies.

9. Nothing in this agreement shall be construed as limiting or affecting in any way the legal authority of the BLM in connection with the proper administration and protection of BLM lands in accordance with federal laws and regulation.

10. Nothing in this agreement shall be construed as limiting or affecting in any way the legal authority of the State in the discharge of its mission and responsibilities according to State laws and rules.

11. Nothing in the agreement shall be construed as obligating the BLM or the State to expend funds in any contract or other obligation for future payment of funds or services in excess of those available or authorized for expenditure. However, it is recognized that to make progress on this agreement that resource commitments are necessary and will be pursued as part of annual budget preparation.

12. The agencies will periodically (two-year interval) review this Memorandum of Understanding and make revisions and updates as necessary to meet the purpose of the agreement. Amendments shall become effective following written approval by both parties.

13. This agreement shall become effective as soon as it is signed by the parties and shall continue in force unless terminated by either party upon thirty (30) days notice in writing to the other of intention to terminate upon a date indicated.

14. No member of or delegate to Congress, or Resident Commissioner of the United States, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom.

15. Each and every provision of this Memorandum is subject to the laws of the State of Utah, the laws of the United States, the regulations of the Secretary of Interior, and rules of the State and the Utah Water Quality Board.

IN WITNESS THEREOF, the parties hereto have caused this Memorandum of Understanding to be executed as of the last date signed below.

by: _____ Date: 12/10/92

Kenneth L. Alkema, Executive Director

UTAH DEPARTMENT OF AGRICULTURE

by: _____ Date: 12/22/92

Miles "Cap" Ferry, Commissioner

BUREAU of LAND MANAGEMENT
U.S. Department of Interior

by: James M. Parker Date: 17 Dec '92

James M. Parker
State Director

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

STATE OF UTAH
OFFICE OF THE ATTORNEY GENERAL

JAN GRAHAM
ATTORNEY GENERAL

CAROL CLAWSON
Solicitor General

REED RICHARDS
Chief Deputy Attorney General

PALMER DEPAULIS
Chief of Staff

Don A. Ostler, P. E.
Director, Division of Water Quality
Department of Environmental Quality
288 North 1460 West
P. O. Box 144870
Salt Lake City, Utah 84114-4870

March 19, 1998

RE: State Nonpoint Source Management Plan for Silviculture Activities Addendum

Dear Mr. Ostler:

This is in response to your letter dated January 8, 1998, concerning Utah's State Nonpoint Source Management Plan for Silviculture Activities Addendum. The plan is the final draft dated December 1997.

A review of the plan has been conducted as you requested. This letter constitutes certification by the Office of the Attorney General that the laws of the State of Utah provide adequate authority to implement the Silviculture Addendum. This certification is provided pursuant to Section 319 of the Federal Clean Water Act.

Sincerely,

FRED G NELSON
Chief, Environmental Division
Utah Office of the Attorney General
Counsel, Utah Water Quality Board

M. M. HUBBELL
Attorney, Environmental Division
Utah Office of the Attorney General

160 East 300 South, 5th Floor, P.O. Box 140873, Salt Lake City, Utah 84114-0873
Telephone: (801) 366-0290 Facsimile: (801) 366-0292

STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114-0601

MICHAEL O. LEAVITT
GOVERNOR

OLENE S. WALKER
LIEUTENANT GOVERNOR

May 11, 1998

William P. Yellowtail
Regional Administrator
US EPA Region VIII
999 18th Street, Suite 500
Denver, CO 80202

Dear Mr. Yellowtail:

In compliance with Section 319 of the 1987 Federal Clean Water Act, I hereby certify and submit to you copies of the *Nonpoint Source (NPS) Silviculture Addendum* to the *State of Utah NPS Management Plan*.

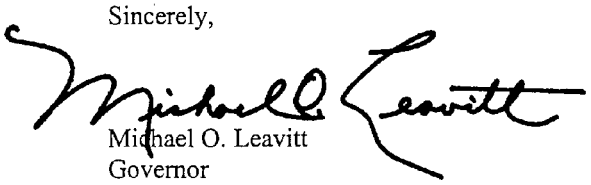
The report describes the nature, extent and effect of nonpoint source (NPS) pollution and programs and methods used for controlling this pollution. The Management Plan contains the following basic elements required by the U.S.E.P.A. in the NPS guidance:

1. Best Management Practices (Forest Water Quality Guidelines) and measures which will be used to reduce pollutant loading from Silviculture sources;
2. Programs to achieve implementation of the best management practices;
3. A schedule to achieve implementation;
4. A certification of authority by the Attorney General's Office to carry out these programs (enclosed);
5. Sources of federal and other state and local assistance to be used in implementing the nonpoint source program.

We feel that efforts made in preparation of this report represent an excellent cooperative effort for control of silviculture induced sources of water pollution in Utah. The Silviculture Subcommittee of the Utah NPS Task Force consisted of representatives from private landholders,

forest industry, and state and federal agencies. These representatives contributed written material, ideas and peer review in the formation of the plan and the collaborative effort is reflected in the quality of the document.

Sincerely,



Michael O. Leavitt
Governor

MOL:DRN:dco

cc: Don Ostler, DWQ
Commissioner Peterson, UDA
Kris Jensen, EPA, Region VIII

enclosures:
Three bound copies of "silviculture Addendum"
Certification Letter from A.G.'s office

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

June 23, 1998

Honorable Michael O. Leavitt
Governor of Utah
Salt Lake City, Utah 84114-0601

Dear Governor Leavitt:

Thank you for the recent submittal of the Nonpoint Source (NPS) Silviculture Addendum to the Utah NPS Management Plan. Members of my staff have followed the development of this document; we are pleased with the outcome of this cooperative effort. It represents a thorough, coordinated approach to an important component of the state's program to prevent and/or control pollution from a significant sector in terms of nonpoint source contributions.

We appreciate the state's responsiveness to our comments. Following a thorough review of the final document, I am hereby approving the Silviculture Addendum to the State Nonpoint Source Management Plan for Utah without further comment.

Sincerely,

Wm Yellowtail

William P. Yellowtail
Regional Administrator

cc: Don Ostler, UDEQ
Commissioner Peterson, UDA
Roy Gunnell, UDEQ
Rick Summers, UDEQ