

## APPENDIX D - SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

**TIMBER.** Timber harvesting and reforestation are the culmination of several years of timber resource assessment and detailed project planning. The actual physical activities consist of felling, bucking, skidding, yarding, loading and hauling, site preparation, tree planting, and other activities associated with stand establishment.

Planning generally starts 5 to 10 years before the timber is sold for harvesting. First, the land must be suitable for and allocated to timber resource activities in the Forest Plan. The proposed sale must follow the standards, guidelines, and direction within the Forest Plan. Next, a cumulative effects feasibility analysis is conducted prior to including the project on the implementation schedule to ensure that the project will not impact soil, water, and other resources beyond acceptable limits. A position statement is then prepared which documents the intent and schedule to harvest and offers tentative harvesting alternatives. The harvest proposal is next considered by an interdisciplinary team which conducts an environmental analysis. Based on the analysis results, the appropriate NEPA document, which is tiered to the Forest Plan is prepared documenting the estimated effects of the proposed timber project. This is used by the appropriate Line Officer in decision-making. When the sale plan is approved, the timber project is implemented under terms of this decision. The Timber Sale Contract and appraisal are then prepared by using contract provisions that were selected to satisfy management constraints and mitigation measures in the environmental analysis. The timber is now advertised and sold to the successful bidder. Finally, the terms of the Timber Sale Contract, including harvesting, are administered on the ground by the certified Sale Administrator and Forest Service Representative.

Success of a good harvest is measured by comparing the on-the-ground results to the management objectives and constraints identified and addressed in the environmental analysis and Forest Plan.

### 1. Timber Sale Planning

**OBJECTIVE:** To incorporate soil and water resource considerations into Timber Sale Planning.

**EFFECTIVENESS:** High

**EXPLANATION:** Timber Sale Planning is accomplished through the NEPA process. The environmental analysis will evaluate the potential for impacts to and the cumulative effects on the soil and water resources. If a significant potential exists, the environmental analysis will: (1) consider how to minimize potential effects during and following the sale layout and subsequent logging operations; (2) include mitigation of effects for those treated areas where impacts are unavoidable; (3) and identify environmentally sensitive areas where impacts from proposed treatments can not be mitigated to conform with standards.

**IMPLEMENTATION:** Watershed considerations were paramount in the planning of the vegetation manipulation activities for this project. It was decided at the start of the project, that timber harvest would not have an affect on water quality or watershed function, a decision that was based directly on the information gained from the inventories and analysis done for Chapter 3. Consequently, the activities associated with this project have been planned, designed, and located with those goals in mind. Other SWCP's will more fully explain in site-specific terms how watershed values will be protected.

REFERENCES: NFMA; NEPA; FSM 1950, 2431.1, 2431.2, 2511, and 2531; the Timber Sale Contract; individual Forest Plans; SWCP 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.07; and 11.14; Sale Preparation Handbook (FSH 2409.18).

## 2. Timber Harvest Unit Design

OBJECTIVE: To insure that timber harvest unit design will secure favorable conditions of water flow, maintain water quality and soil productivity, and reduce soil erosion and sedimentation.

EFFECTIVENESS: High

EXPLANATION: This is an administrative and preventive practice. The proposed timber harvest units are evaluated to estimate the response on the affected watersheds. This involves field examination, utilization of existing data, analysis of potential watershed response (i.e., water yield and sediment yield analysis), and professional judgment. Characteristics to be evaluated can include: (1) the recovery from past harvests; (2) the allowable area that can be harvested; (3) the protection of stream channels; (4) the erosion potential of the area; (5) landform characteristics; (6) the number, size, shape, and location of harvest units; (7) estimated location and size of roads and skid trails; (8) logging system design; and (9) the potential natural recovery rate of the watershed. Where adverse water quality and soil productivity impacts or undesirable streamflows may result, the harvest unit design should be modified, individual units deleted, and/or the natural recovery rate accelerated by using watershed improvement measures.

IMPLEMENTATION: Timber harvest unit design AND LOCATION, plays a crucial role our ability to protect aquatic resources. Proximity to streams in terms of sediment delivery is the most important aspect when assessing the effects of a harvest unit. The fuel reduction units (those harvested during the summer) have been located to take advantage of topographic buffering, and the amount of down material between the activity and the nearest stream course. Topographic and vegetative buffering has been maximized so that sediment delivery will be minimized.

REFERENCES: NFMA (Section 3091-6 F, III-V, and Section 219.10); Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18); FSM 2471 and 2405.13; SWCP 11.01, 11.02, 11.03, and 11.14.

## 3. Use of Sale Area Maps for Designating Soil and Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and available water sources and to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

EXPLANATION: Sale area maps are part of the Timber Sale Contract, and are produced before the start of timber harvest. They are designed to portray all the pertinent information to protect aquatic resources:

- a. Location of stream courses to be protected (perennial, intermittent, and ephemeral)
- b. Wetlands and Riparian Areas (meadows, lakes, pot holes, etc.) to be protected
- c. Boundaries of harvest units
- d. Areas for different skidding and yarding methods
- e. Water sources available for Purchaser's use

- f. Domestic or public water supply source.

IMPLEMENTATION: Sale area maps will identify all of the pertinent information necessary to protect aquatic resources. The interdisciplinary team identifies and delineates these and other features on maps which are included in the project design along with a discussion of each feature. The Presale Forester includes them on the Sale Area Map at the time of contract preparation. The features are reviewed on the ground by the Purchaser and the certified Sale Administrator prior to harvesting.

REFERENCES: Timber Sale Contract Provisions B (Standard) and C (Special); FSM 2431.1-.3 and 2471; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18).

#### 4. Limiting the Operating Period of Timber Sale Activities

OBJECTIVE: To minimize soil erosion and sedimentation and loss in soil productivity by insuring that the Purchaser conducts his operations, including erosion control work, road maintenance, etc., in a timely manner, within the time period specified in the Timber Sale Contract.

EFFECTIVENESS: Moderate to High

EXPLANATION: Timber is purchased by individuals or companies who either harvest the timber themselves or contract harvest to other parties. Therefore, it is necessary to insure that Purchasers understand and adhere to soil and water resource recommendations determined in the NEPA process. This is accomplished by setting forth the Purchaser's responsibilities in the Timber Sale Contract.

The B6.311 "Plan of Operations" provision is required in all Timber Sale Contracts. This provision states that the Purchaser must submit a general plan of operation which will set forth planned periods for and methods of road construction, timber harvesting, completion of slash disposal, erosion control work, and other contractual requirements. Forest Service written approval of the Plan of Operation is a prerequisite to commencement of the Purchaser's operation.

The contract provision "Operating Schedule" requires that the Purchaser shall provide an annual schedule of anticipated activities such as road maintenance and erosion control work.

Contract provision C6.316 "Limited Operating Period" may be used in a contract to limit the Purchaser's operations to specified periods of the year. Provision B6.6 can be used to control operations because of wet weather, high water, etc., in order to protect resources.

IMPLEMENTATION: Harvesting in winter is an effective method to reduce surface disturbance or avoid effects on wet areas.

REFERENCES: Timber Sale Contract Provisions B (Standard) and C (Special); FSM 2451 and 2453.2; Sale Preparation Handbook (FSH 2409.18).

#### 5. Riparian Area Designation

OBJECTIVE: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

EFFECTIVENESS: High

EXPLANATION: The Riparian Area is not a zone of exclusion, but an area of closely managed activity. It acts as (1) an effective filter and absorptive zone for sediment; (2) maintains shade;

(3) protects aquatic and terrestrial riparian habitats; (4) protects channel and streambanks; and (5) promotes floodplain stability. As a preventive measure, roads, skid trails, landings, and other timber harvesting facilities will be kept out of these areas when feasible or at a prescribed distance from streams and wetlands. Factors such as stream class, channel stability, sideslope steepness, slope stability, resources dependent on these areas, and standards, guidelines, and direction from Forest Plans are considered in determining the management of activities and width of Riparian Areas. Fisheries habitat condition and its estimated response to the proposed timber sale are also evaluated.

IMPLEMENTATION: All riparian areas in the sale area will be designated.

REFERENCES: FSM 2405.13, 2453.2, 2526, and 2471; NEPA; NFMA; Timber Sale Contract Provision B (Standard) and C (Special); SWCP 11.02, 11.05, 13.03, and 14.03; Timber Sale Administration Handbook (FSH 2409.15) and Sale Preparation Handbook (FSH 2409.18); see references in "Best Management Practice" Definition (05--2 and 3).

## **6. Determining Tractor Loggable Ground**

OBJECTIVE: To protect water quality from degradation caused by tractor logging ground disturbance.

EFFECTIVENESS: Moderate - High

EXPLANATION: This practice is intended to minimize soil erosion and subsequent sedimentation and water quality degradation. Tractor loggable ground is a product of local slope limitations, the volume of timber to be harvested from the site, and the soil, land type, geologic, climatic, and hydrologic characteristics of the site. On-the-ground reconnaissance may be necessary.

IMPLEMENTATION: All areas where tractors will operate are less than 35% sideslope. When coupled with the location of harvest units to avoid sediment delivery to streams, this slope restriction will prevent sediment from reaching streams.

REFERENCES: Timber Sale Contract; FSM 2522; SWCP 13.02 and 13.03;

Sale Preparation Handbook (FSH 2409.18); see references in "Best Management Practice" Definition (05--2 and 3).

## **7. Tractor Skidding Design**

OBJECTIVE: To minimize erosion and sedimentation and protect soil productivity by designing skidding patterns to best fit the terrain.

EFFECTIVENESS: Moderate - High

EXPLANATION: This is a preventive practice. The watershed factors that are considered include slope, aspect, soil stability, vegetative cover, Riparian Areas, meadows, and other factors that may affect the flood and sediment yield potential of the land. The careful control of skidding patterns serves to avoid onsite and downstream channel impacts, the build up of destructive runoff flows, erosion in sensitive watershed areas such as meadows and Riparian Areas, and a reduction in soil productivity.

Two complementary methods of protecting soil and water resources by tractor skid trail design are:

- a. End-Lining. This method involves winching the log directly out of the sensitive areas (such as meadows and Riparian Areas) with a cable operated from outside the sensitive area. In this

manner, logs can be removed from the sensitive areas while avoiding encroachment by heavy equipment and associated site damage.

b. Felling to the Lead. This method involves felling trees toward a predetermined skid pattern. This procedure facilitates an uncomplicated approach of the tractor operating between the log and the skid trail. Soil disturbance and compaction are consequently lessened and residual stand and site impacts are minimized.

IMPLEMENTATION: For skid trail design, sensitive areas are identified and evaluated in the environmental analysis during the Timber Sale Planning Process. If necessary, prescriptions can be included in the Timber Sale Contract through the use of a special provision. The certified Sale Administrator then executes the prescription on the ground by locating the skid trails with the timber purchaser or by agreeing to the Purchaser's proposed locations prior to construction.

REFERENCES: Timber Sale Contract Provision B6.422, B6.424, and C6.6; FSM 2524 and 2451; Sale Preparation Handbook (FSH 2409.18) and Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

## **8. Erosion Prevention and Control Measures During Timber Sale Operations**

OBJECTIVE: To ensure that the Purchaser's operations shall be conducted reasonably to minimize soil erosion.

EFFECTIVENESS: High

EXPLANATION: Timber is purchased by individuals or companies who either harvest the timber themselves or contract harvest to other parties. Therefore, it is necessary to insure that purchasers understand and adhere to soil and water resource prescriptions arrived at in the Timber Sale Planning Process. This is accomplished by setting forth the Purchaser's responsibilities in the Timber Sale Contract.

IMPLEMENTATION: This practice is the responsibility of the Sale Administrator. It is up to them to identify when and where conditions exist that could lead to adverse soil/water effects, and to halt operations if those conditions exist. Equipment shall not be operated when ground conditions are such that excessive impacts will result. The kinds and intensity of control work done by Purchaser shall be adjusted to ground and weather conditions and the need for controlling runoff. The certified Sale Administrator is responsible for insuring that the Purchaser conducts his operations according to the Timber Sale Contract. Erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff. If the Purchaser fails to do erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility for the work and any unencumbered deposits (performance bonds) may be used by the Forest Service to do the work.

REFERENCES: Timber Sale Contract Provisions B (Standard) and C (Special); FSM 2451, 2453.2, and 2522; SWCP 14.04; Timber Sale Administration Handbook (FSH 2409.15); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981; see references in "Best Management Practice" Definition (05--2 and 3).

## **9. Erosion Control on Skid Trails**

OBJECTIVE: To protect water quality by minimizing erosion and sedimentation derived from skid trails.

EFFECTIVENESS: Moderate - High

**EXPLANATION:** This practice employs preventive controls to reach the objective. The Timber Sale Contract requires the installation of erosion control measures on skid trails, tractor roads, and temporary roads. Normally, the work involves constructing cross ditches and water spreading ditches. Other methods such as backblading may be agreed to in lieu of cross drains. Grass seeding may also be required by a "C" provision which may be added to the Timber Sale Contract. Areas in need of erosion control measures are shown on the Sale Area Map and designated on the ground annually as logging and temporary access construction progresses.

**IMPLEMENTATION:** It is the responsibility of the sale Administrator to locate erosion control on skid trails as the need arises. This practice responds to changing conditions during the sale, and cannot be specified in advance. Location of all erosion control measures are designated and agreed to on the ground by the certified Sale Administrator. The Timber Sale Administration Handbook contains guidelines for spacing of cross drains, construction techniques, and cross drain heights. The Sale Administrator can use these guidelines on the ground to identify site specific preventive work to be required of the Purchaser. The Purchaser is obligated to complete and maintain erosion control work as specified in contract provisions.

**REFERENCES:** Timber Sale Contract Provisions B (Standard) and C (Special); Timber Sale Administration Handbook (FSH 2409.15); see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981.

#### **10. Modification of the Timber Sale Contract**

**OBJECTIVE:** To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

**EFFECTIVENESS:** Moderate - High

**EXPLANATION:** Once timber sales are sold, they are harvested as described in the Timber Sale Contract. However, it may be necessary to modify a timber sale contract because of new concerns about the effects of the sale on soil and water resources.

**IMPLEMENTATION:** If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract. Once the decision to take action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations for implementation.

**REFERENCES:** NFMA, Section 6; Timber Sale Contract Provision B (Standard); SWCP Handbook 10.40, Feedback Mechanism.