

APPENDIX C

- Appendix C.1 Forest Service's Best Management Practices for Watershed Protection
- Appendix C.2 Design Features, Best Management Practices, Required Measures, and Mitigation Measures for Invasive Species Control

APPENDIX C.1

FOREST SERVICE'S BEST MANAGEMENT PRACTICES FOR WATERSHED PROTECTION

Available online at www.wapa.gov/transmission/grapevine.htm

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Albuquerque, New Mexico

FSH 2509.22 - SOIL AND WATER CONSERVATION PRACTICES HANDBOOK

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2509.22 - Establishes a new handbook, Soil and Water Conservation Practices Handbook.

This handbook is in the new format. One copy is being sent to each site. Amendments will be issued electronically unless paper copies are part of an amendment.

The electronic document names are shown for ease of accessing them from the REGION3 Information Center.

All subsequent amendments will be issued by document.

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01 - AUTHORITY.

See FSM 2501 for authorities related to water resource management and soil resource management.

02 - OBJECTIVES.

See FSM 2530.2 for objectives related to water resource management and FSM 2552.02 for objectives related to soil resource management. This handbook outlines the process for meeting the water quality goals contained in the Forest Land and Resource Management Plans (FLMP) and the objectives of The Clean Water Act, through the development and implementation of a Best Management Practice (BMP) for each project.

03 - POLICY.

See FSM 2530.3 for policy related to water resource management. This handbook outlines the process for addressing specific water quality issues in project planning, project implementation, and project monitoring through the Integrated Resource Management (IRM) process.

04 - RESPONSIBILITY.

See FSM 2530.4 and R-3 Supplement for responsibilities related to water quality management. See also FSM 2552.04 for responsibilities related to soil management.

CHAPTER 10 - THE PROCESS FOR IDENTIFYING BEST MANAGEMENT PRACTICES

Contents

The Southwestern Region's Integrated Resource Management (IRM) process is the basic process for developing a specific Best Management Practice (BMP) for each project or plan. An interdisciplinary approach using the 13 phase IRM process is used to design, implement, and monitor projects identified in the Forest Land and Resource Management Plans (FLMP). This interdisciplinary approach to project design will identify the resources involved, define the resource interrelationships and reasonably predict the effects or impacts of the project.

The 13 phases of the IRM process meet the criteria contained in the BMP definition. That is, a practice or combination of practices will be defined for each project using problem assessment, examination of alternatives, and appropriate public involvement.

Chapters 20, 30, and 40 of this Handbook contain soil and water conservation practices. These chapters are intended as a catalog of possible practices which can be recommended by an interdisciplinary team in developing a Best Management Practice through the Integrated Resource Management process. At least once a year this catalog will be reviewed. If there are new practices or updates to old practices they will be added.

10.5 - Definitions.

Best Management Practice (BMP's). 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, practicable (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.

Integrated Resource Management (IRM). A land management philosophy which recognizes that all the natural resources are connected through an intricate series of interrelationships.

Line Officer. Management personnel within the Forest Service organization

consisting of: Secretary of Agriculture, Chief of Forest Service, Regional Foresters, Forest Supervisors, and District Rangers. Refers to the line of authority and responsibility.

Log Landing. An area where logs are skidded or yarded prior to loading and transporting to a mill.

Mitigate. To offset or lessen real or potential impacts or effects through the application of additional controls or actions. Counter measures are employed to reduce or eliminate undesirable or unwanted results.

Monitoring. The periodic evaluation of resources or activities on a representative sample basis to establish long-term trends, assess the impacts of land management activities, determine how well objectives have been met, and check compliance with established standards.

NEPA Process. All measures necessary for compliance with the requirements of section 2 and Title I of the National Environmental Protection Act (NEPA).

Nonpoint Source Pollution. Water pollution that originate from many indefinable sources and normally include agricultural and urban runoff, runoff from construction activities, specific, single location (such as a single pipe). Nonpoint source pollutants are generally carried over, or through, the soil and ground cover via streamflow processes. Unlike point sources of pollution (such as industrial and municipal effluent discharge pipes), 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).

Normal Operating Season. A portion of a year when normal timber harvesting operations are expected to take place uninterrupted by adverse weather conditions.

Outsloping. Shaping a road to cause drainage to flow toward the outside shoulder (generally the fill slope), as opposed to insloping which encourages drainage to flow to the inside shoulder (generally the cut slope). Emphasis is on avoiding concentrated water flow.

Permittee. Individual or entity that has received a grazing or special use permit from the Forest Service.

Pesticide. A general term applied to a variety of chemical materials including insecticides, herbicides, fungicides, and rodenticides.

Point Source. Originating from a discrete identifiable source or conveyance. Silvicultural point sources of pollution include the following: rock crushing, gravel washing, and log sorting and storage facilities where water is applied intentionally to the logs (40 CFR 122.27).

Purchaser. The entity which is awarded a USDA Forest Service contract after bidding, usually with competition. As used in timber, the entity which has purchased timber as identified in a timber sale contract.

Reclamation. Restabilization of land denuded by land management activities.

Reforestation. The renewal of forest cover by seeding, planting, or natural means.

Revegetation. The replacement of vegetative cover which as been harvested or lost due to natural occurrences. Accomplished either through planting of nursery stock or seeding, or through natural processes.

Riparian Areas. Geographically delineable areas with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems.

Riparian Ecosystem. A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Rip Rapping. The use of large rock, boulders, concrete chunks or similar non-erosive, heavy objects as an armoring device.

Road Maintenance Plan. A documented schedule and program for upkeep of roads to provide a level of service for the user and protection of resources. There are five levels of maintenance: Level I being the least intense and Level V being the most intensive.

Rocking. The application of aggregate to a roadbed to provide strength and a more stable erosion resistant surface.

Sale Area Map. A map of suitable scale and detail to be legible which is part of a timber sale contract. The map identifies sale area boundaries and contract requirements specific to the sale.

Significant Disturbance. Disturbance of surface resources, including soil, water and vegetation, which has the potential to degrade water quality to a level requiring corrective action.

Site Preparation. A general term for removing unwanted vegetation, slash, and even roots and stones from a site before reforestation. It is generally accomplished by either mechanical, chemical, or biological means, or controlled fire.

Site Specific. Pertains to a discernible, definable area or point on the ground where a project or activity will (or is proposed) to occur.

Soil and Water Conservation Practices (SWCP). The set of practices which, when applied during implementation of a project, protects soil and water quality to the level required by beneficial uses. They are used during the IRM process to create Best Management Practices for each project.

Soil Productivity. The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture, nutrients, texture, structure, organic matter, and length of growing season.

Special Use Permit. A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest System lands for some special purpose.

Specified Road. A forest development transportation system road that is identified in and to be constructed or reconstructed under a Forest Service timber sale contract.

Stream or Streamcourse. A natural channel with defined bed and banks. It may be perennial, intermittent, or ephemeral.

Streamside Management Zone (SMZ). 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.

Wetlands. 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.

Windrowing. To pile slash or debris in a row along the contour of the slope.

11 - INTEGRATED RESOURCE MANAGEMENT.

11.1 - Environmental Analysis.

The IRM process incorporates 13 phases which meet the National Environmental Policy Act (NEPA) and National Forest Management Act (NFMA) requirements. The first phase is a review of the FLMP, followed by the the initial determination of the project parameters. Subsequent steps guide the design process so that NEPA compliance is assured. Citizen participation is sought and utilized, adequate environmental analysis is accomplished, and successful on-the-ground implementation is achieved.

11.2 - Integrated Resource Management (IRM) Phases. These are the IRM Phases.

Phase 1 - Review Forest Plan.

Phase 2 - Develop Project Concept.

Phase 3 - Conduct Extensive Reconnaissance.

Phase 4 - Prepare Feasibility Report.

Phase 5 - Update Forest Plan 10-Year Implementation Schedule.

Phase 6 - Conduct Intensive Reconnaissance, Survey, or Design.

Phase 7 - Generate and Compare Alternatives.

Phase 8 - Select Alternative.

Phase 9 - Prepare NEPA Documentation.

Phase 10 - Create Project Record.

Phase 11 - Prepare Project Action Plan.

Phase 12 - Implement Project.

Phase 13 - Monitor and Evaluate Results.
Following is a detailed discussion on each phase.

1. Phase 1 - Review Forest Plan

a. Phase Objective. Determine how proposed project may contribute to the accomplishment of Forest Plan goals and objectives. Determine how the project must be designed to conform with specific Forest Plan constraints, requirements, standards, guidelines, and so forth.

b. Narrative. Project Leader reviews the Forest Plan Forest-wide and management area specific standards and guidelines, manual, handbook, existing data bases, and other pertinent direction which is applicable to the proposed project area. This phase marks the beginning of project scoping (NEPA definition).

Line Officers and their staffs familiarize themselves with the project planning area in preparation for Phase 2, Develop Project Concept. Define the influence area of the project in such a manner that a meaningful estimate of direct, indirect, and cumulative environmental effects can be made.

Initial citizen participation needs should be established. Make initial contacts with public known to be interested or affected by this project. Note preliminary issues, concerns, and opportunities (ICO's)

c. Roles.

(1) Project Leader. Initiates project proposal and/or planning, develops background material on proposal to facilitate District Ranger and staff involvement.

(2) Support Staff. Review Forest Plan and other pertinent direction. Make initial contacts with key members of public.

Develop initial concepts of project ICO's, Forest Plan relationships, citizen participation needs, and influence area.

(3) Line Officer. Review Forest Plan and other pertinent direction to provide input in developing project concept (Phase 2).

d. Products of Phase

(1) Notes on emphasis items from Forest Plan.

(2) Notes on project's potential contribution in meeting Forest Plan goals and objectives.

(3) Notes on citizen participation needs and results of key contacts.

(4) Notes on preliminary ICO's.

2. Phase 2 - Develop Project Concept

a. Phase Objective. Determine precisely what this project will be designed to do and why.

b. Narrative. District Ranger and staff develop the project concept. They identify and list the site specific ICO's, the specific project activities (what this project will actually do; install tank, replace bridge, create forage), the skills needed on the interdisciplinary team or as constraints in subsequent phases and lists of affected or interested "publics." Use the public comments to the Forest Plan as a starting point for identifying interested and affected publics.

If a Line Officer does not have a needed skill represented on his staff, one will be invited to participate from another unit or from the public. This phase will serve to "set the tone" for this particular project.

To determine a project's specific objectives, first identify the ICO's. Following the identification of ICO's, determine project objectives to resolve the issues, to mitigate the concerns, and to accomplish the opportunities. Evaluation criteria are identified based on ICO's and project objectives.

As the project concept develops, alternatives will begin to emerge. These should be noted for use in later phases.

The project record to be completed by Phase 10 will be started in this phase. Make preliminary public contacts and begin design of citizen's participation plan.

c. Roles

(1) Line Officer. Participates in identification of ICO's, skills needed, and interested publics. Makes decision on project objectives.

(2) Project Leader. Facilitates interaction and manages the IRM process.

(3) Support Staff. Represents their respective resource or functional areas; participates in identification of ICO's, skills needed, and interested publics. Recommends project objectives.

d. Products of Phase

(1) List of ICO's.

(2) List of project objectives--specific and unique.

(3) List of skills needed, including publics.

(4) List of potentially affected and interested publics.

(5) Project record file established.

- (6) Notes on preliminary public contacts made.
 - (7) Notes on citizen's participation plan needs.
 - (8) List of preliminary evaluation criteria.
 - (9) Notes on emerging alternatives and monitoring needs.
3. Phase 3 - Conduct Extensive Reconnaissance
- a. Phase Objective. Visit the project area to determine whether the project concept developed in Phase 2 will work.
 - b. Narrative. Items to be checked in the field.
 - (1) Are ICO's sufficient?
 - (2) Are additional skills necessary?
 - (3) Have all affected or interested publics been identified?
 - (4) Can project objectives be met?
 - (5) Can Forest Plan objectives, constraints, standards, and guidelines be met?
 - (6) Should the interdisciplinary team proceed to Phase 4 or should Phase 2 be repeated?
 - (7) Are there additional alternatives?

Tools that are useful prior to and during extensive reconnaissance are aerial photos, orthophotos, contour maps, transportation plan and appropriate resource surveys. Invite members of the public who expressed an interest during preliminary contacts during Phase 1 and 2 to go along on field trips.

c. Roles. The project leader conducts extensive reconnaissance with whatever assistance is necessary, including interested members of the public.

Reports results to Line Officer and staff.

d. Products of Phase

- (1) Notes on verification, additions or changes to ICO's, interested publics, or project objectives.
- (2) Recommendation for or against proceeding with project analysis, reschedule Phase 2 if appropriate.
- (3) Map of project planning area on contour map or orthophoto base showing known resource information.

- (4) Notes on resource information, physical features, road conditions, right-of-way needs and any other special information that may be helpful during subsequent project phases.
 - (5) Notes on technical, economic, and public feasibility.
 - (6) Notes on public comments.
 - (7) Notes on additional emerging alternatives.
4. Phase 4 - Prepare Feasibility Report
- a. Phase Objective. Prepare a brief report demonstrating the proposed project's technical, economic, and public feasibility. Line officer decides whether or not to proceed based on report.
 - b. Narrative. A Project Feasibility Report (PFR) (for example, scoping report) is prepared as directed by the line officer. In timber sale planning, this report is called a "Position Statement." The PFR should record the results of scoping from the previous phases and serve as a decision document for making further project investments. Economics should play a role in the project feasibility determination. A major consideration of the project's feasibility is consistency with the Forest Plan's stated goals, objectives, standards and guidelines. If the project is not consistent with the Forest Plan, the project must be changed (go back to Phase 2) or the Forest Plan must be amended. The amendment will be formalized in Phase 9, but the determination of need to amend will be made here.
 - c. Roles
 - (1) Project Leader: Prepare PFR or at minimum, provide Phase 4 product information to line officer concerning the project's feasibility. Provide line officer with initial assessment of project's consistency with the Forest Plan.
 - (2) Line Officer: Decide whether to proceed with additional project investment.

Approve feasibility report if decision is to proceed. Redefine project or drop it from implementation plan if project is not feasible. Recycle project back to Phase 1 or Phase 2 if necessary.
 - d. Products of Phase. Approved Project Feasibility Report. Items that should be included in report are:
 - (1) Description of project.
 - (2) Location of project, with base map.
 - (3) Statement of resource objectives.
 - (4) List of tentative alternatives.

- (5) Statement of Forest Plan consistency.
- (6) Statement of technical feasibility, including special skills necessary.
- (7) Statement of public feasibility including, cultural ICO's.
- (8) Statement of economic feasibility, including outputs, effects, activities, receipts, and costs.
- (9) Project development schedule.
- (10) List of evaluation criteria.
- (11) Description of other pertinent information.

5. Phase 5 - Update Forest Plan 10-Year Implementation Schedule.

a. Phase Objective. Verify that the proposed project is on the Forest's 10-year Implementation Schedule. Amend schedule as necessary. Provide a smooth orderly flow of projects by assuring sufficient project development lead time. Design detailed citizen's participation plan.

b. Narrative. Maintain an updated 10-year Implementation Schedule. At the Forest level, update the schedule as often as necessary to maintain a smooth orderly flow of projects with appropriate lead times.

Project leaders ensure that all interested parties, internal and external, are aware of the project schedule. Resource specialists and program managers interested in these projects must keep informed of implementation schedules. Those interested in providing input into the project design coordinate their schedules with the project leader. Assign project development tasks with time lines for their completion.

The 10-year Implementation Schedule is a primary tool for keeping the public informed. Other schedules, (for example, 5-year timber sale action plan, capital investment plans, and so forth) should be incorporated into the 10-year Implementation Schedule.

Prepare the detailed citizen's participation assessment and plan at this phase.

c. Roles.

(1) Project Leader. Develop and present to District and Forest personnel, the District's project action plans and citizen's participation plan. Keeps everyone informed of project work schedules.

(2) Line Officer. Approve project action plans. Validate that proposals are incorporated in the Forest's 10-year Implementation Schedule to ensure project funding and adequate project development lead time. Continue involvement in process to ensure quality project design and implementation is the result. Has

primary responsibility for keeping all interested parties notified of 10-year Implementation Schedule changes.

(3) Support Staff. Note that project is approved for implementation and assess impacts. Be prepared to provide input during subsequent project phases.

d. Products of Phase

(1) Updated project action plans.

(2) Updated Forest 10-year Implementation Schedule.

(3) Detailed citizen's participation plan.

(4) Schedule of project activities through Phase 8.

6. Phase 6 - Conduct Intensive Reconnaissance, Survey, or Design

a. Phase Objective. Acquire specific on-the-ground knowledge of the project planning area and its resources to design a project that addresses the ICO's and project resource objectives.

b. Narrative. Intensive reconnaissance is the most critical phase of project preparation. In this phase, sufficient on-the-ground knowledge is gained to design a project to its unique location, its unique objectives, and to interrelate the various resources which exist within the area.

During intensive reconnaissance, the project leader conducts an intensive field inspection to identify project design specifics. Collect all site specific information needed for the project environmental analysis during this phase (for example; road location, cultural resource survey, fence location, problem soil areas, riparian areas, and so forth). Identify and gather inventory information which will be used to monitor project results in Phase 13.

If there are interested "publics" who are concerned about the effects or impacts of the project, a field trip to the project will usually help to resolve the conflict. It is an excellent technique for receiving site specific input from the public, for understanding their concerns, and for helping the interested parties understand the project more fully.

c. Roles

(1) Project Leader. Ensures that all input necessary for project design is received from various resource specialists.

Directs specialists to specific problem sites.

Conducts field trip(s) with interested "publics" to receive their input and demonstrates and explains project on the ground.

(2) Support Staff. Provide input on resources, on planning area in general, and on specific project "problem" sites. Conduct needed surveys of project, delineating sensitive sites on-ground with "flagging" for later painting of boundaries during layout phase (Phase 12).

(3) Line Officer. Directs and monitors project design as the Intensive Reconnaissance phase progresses.

d. Products of Phase.

(1) Activity unit boundaries marked on-the-ground by topography features, roads, streams or "flagged" lines sufficient enough so that they can be located. Resource input is recorded.

(2) Project transportation plan. Include "Right-of-Way" needs and Resource Access objectives.

(3) All needed roads are "flagged" with "control points" and "critical points" clearly identified and marked.

(4) Land lines needing surveying and posting identified.

(5) Cultural resource survey completed and sites identified.

(6) Borrow pits or rock sources located.

(7) Refined ICO's.

(8) Notes on project monitoring needs.

7. Phase 7 - Generate and Compare Alternatives

a. Phase Objectives. Develop and compare a reasonable range of alternatives including a "No Action" alternative.

b. Narrative. There is no secret formula for the number alternatives that should be considered. Alternatives for projects tiered to the Forest Plan Environmental Impact Statement (EIS) will be narrower in range than preplan alternatives. The "No Action" alternative must be considered in detail for all project environmental analysis (FSH 1909.15, Chapter 20).

Modify alternatives or develop new alternatives when necessary as the analysis proceeds. Alternatives must specify activities that may produce important environmental changes, and they must address management requirements, mitigation measures, and monitoring of environmental effects.

The Interdisciplinary (ID) Team should develop the alternatives and make the alternative comparisons. Alternatives will emerge from early phases. This phase finalizes the alternatives considered and ensures that a reasonable range of

alternatives was considered. Gaps in the range of alternatives are filled in. Note alternatives generated earlier, but dropped from consideration, for inclusion in Phase 9 documentation. The alternatives are compared and evaluated at this phase. The last step of this phase is the ID Team's development of their recommended course of action. Do not prepare formal environmental documentation until the line officer makes a decision on the required documentation (Phase 8).

c. Roles. The project ID Team develops and compares alternatives. Recommends to the line officer a course of action.

d. Products of Phase.

(1) Notes on environmental analysis including alternatives generated, and environmental effects comparison.

(2) Notes on recommended course of action including environmental documentation.

8. Phase 8 - Select Alternative.

a. Phase Objectives. Line officer selects alternative to be implemented

b. Narrative. The phase marks the completion of the "environmental analysis" portion of the NEPA process. An alternative to be implemented is selected by the appropriate line officer. The line officer may include instructions to modify or refine any or all of the previously conducted analysis, which will require recycling back to previously conducted phases.

Another important line officer role during this phase is to determine the appropriate level of NEPA documentation. Potential documentation products to be completed in Phase 9 include Environmental Assessment (EA), Finding of No Significant Impact (FONSI), Decision Notice (DN), Decision Memo (DM), Notice of Intent (NOI), Environmental Impact Statement (EIS), and Record of Decision (ROD). If no significant environmental effects were discovered during the environmental analysis, it may be appropriate to "categorically exclude" the analysis from preparation of an EA or EIS. However, the decision on how to document is left to the line officer and documentation in an EA or EIS may be appropriate for reasons other than NEPA compliance.

In some cases where analysis and documentation are being done at a lower level, the responsible line officer may only decide on the level of documentation and ask for a preferred alternative from the project ID Team at this phase. The selected alternative may be the preferred alternative or a modification. Final selection of the alternative to be implemented would then occur in Phase 9 and be documented in the appropriate decision document. While this phase marks the completion of analysis, Phase 8 and Phase 9 can be blended together, depending on how each Forest manages their process.

c. Roles.

- (1) Line Officer. Select the alternative to be implemented and provide Interdisciplinary Team rationale for his decision.
 - (2) Ensure environmental analysis is adequate.
 - (3) Determine the appropriate form of documentation of the environmental analysis.
 - (4) Ensure monitoring actions are described.
 - d. Products of Phase.
 - (1) Selected alternative to be implemented.
 - (2) Determination of documentation for Phase 9.
9. Phase 9 - Prepare National Environmental Protection Act Documentation.
- a. Phase Objectives. Complete environmental documentation as directed by line officer (Phase 8). Notify public of the decision and resolve any post-decision public conflicts (for example; appeals).
 - b. Narrative. Documentation should be prepared as directed in FSM 1950 and FSH 1909.15. Notify the public of the decision to comply with NEPA and to clearly establish the "Date of Decision" for the administrative appeals process.

Public concerns (for example, appeals) with the decision may result even though the public has fully participated throughout the previous eight phases. These concerns should be resolved by the deciding line officer. Appeals should be viewed as notice that prior citizens participation has not been complete. Sufficient "lead time" for accomplishment of Phases 1 through 8 with citizens participation will facilitate resolving conflicts that may result during this phase. If conflicts can not be successfully resolved, follow standard appeal process procedures and time frames.
 - c. Roles.
 - (1) Project ID Team. Prepare final environmental documentation.
 - (2) Line Officer. Approve final environmental documentation and Forest Plan amendment if needed.

Notify the public of the decision.

Resolve post-decision conflicts.
 - d. Products of Phase.
 - (1) Environmental documents EA, FONSI, DN, EIS, ROD.
 - (2) Categorical Exclusion. Develop Decision Memo.

- (3) Conflict resolution documentation or appeal decision if necessary.
- (4) Public notification of decision (letter, newspaper article, and so forth).
- (5) Amended Forest Plan if needed.

10. Phase 10 - Create Project Record.

a. Phase Objectives. Validate that all pertinent information concerning the project is in a single packet at one location for easy access. Incorporate project level information into the Geographical Information System (GIS) and related data bases.

b. Narrative. Start the project record in Phase 2. It should be stored in a single "packet" (may be a folder, drawer, box, notebook or binder, or whatever else you prefer that is commensurate with the volume of material). By Phase 10, this packet should contain such items as maps, photos, ICO's, project objectives, feasibility report, all site specific data, including designs and summary forms from intensive reconnaissance, reports, from supporting functions (for example; transportation plan), clearances and consultation documents, and any environmental documentation.

Final project design and data will be incorporated into the Forest Geographic Information System and related data bases. The existing directives system may require some cross filing of certain types of documentation.

c. Roles. The Project Leader creates and maintains project record, assuring that all pertinent data, specialists reports, clearances, and documents are collected and stored in an orderly fashion.

d. Products of Phase.

(1) A single project packet which includes all information pertinent to the project and supporting the final decisions made in earlier phases. Documents created after this phase should also be included as they are ready; therefore, room should be set aside for them.

(2) Digitized geographic information reflecting final project design incorporated in Forest GIS.

(3) Related resource data bases updated to reflect final project design for example; Stand File, RAnge Management Information System (RAMIS), and so forth.

11. Phase 11 - Prepare Project Action Plan.

a. Phase Objectives. Produce a work schedule for project implementation on the ground, specifying who does what, when, where, and how.

b. Narrative. The project work plan (implementation plan) is assembled by gathering together all of the specific instructions necessary to carry out the project in the manner specified by the final decision. It should specifically designate who

should accomplish each item and establish both the sequence and time frame for each activity.

c. Roles.

(1) Project Leader. Complete final maps or plat designs using most detailed base available (for example, contour maps).

Complete any necessary forms and finish any required documents, licenses, and so forth.

Develops the schedule for all activities including layouts, surveys, designs, contracts, appraisals, final prescriptions or plans, and so forth, and schedules the unit, function, or individual responsible for completing each activity.

Schedule post project monitoring and evaluation.

(2) Support Staff. Provide any necessary input to project including any clearances, maps, photos, designs, specific final prescriptions, or other pertinent information.

Schedule any time necessary to assist the carrying out of the project for their unit, function, or speciality.

(3) Line Officer. Approves final project work plan and schedule.

d. Products of Phase.

(1) Final maps, photos, and designs.

(2) Final detailed prescriptions.

(3) Specific schedule of all activities associated with the project (project work plan).

(4) Final clearances, licenses, permits, forms, and so forth.

(5) Post project monitoring and evaluation schedule.

(6) Contract documents if appropriate.

12. Phase 12 - Implement Project.

a. Phase Objectives. Accomplish the project in accord with the final decision.

b. Narrative. This is the "do it" phase of any project. The design is "laid out" on the ground, final checks are made by the design team or responsible official, appraisals are completed, any necessary contracts are written and awarded, and/or the agency people accomplish the project along with any necessary protection of other resources. This is the move from the paper product to the ground.

c. Roles.

(1) Project Leader. Responsible for supervision of overall process and assurance that final prescriptions are actually implemented on the ground. Monitors project for needed adjustments as it is being implemented.

(2) District Ranger. Approves final design standards and assures that final decision is completed and carried out successfully.

(3) Support Staff. Provide necessary support and advice in a timely manner. Look for ways to facilitate project accomplishment in an efficient manner, including inspections.

d. Products of Phase.

(1) Completed project with appropriate project administration.

(2) Resource objectives met.

(3) Forest Plan implemented.

(4) Project design amended as needed.

13. Phase 13 - Monitor and Evaluate Results.

a. Phase Objectives. Monitor and evaluate project implementation to determine success or failure of project design in meeting project and Forest Plan resource objectives.

b. Narrative. First, as the project is being accomplished, monitor implementation to ensure the project is being done according to design standards. Implementation must be monitored to ensure that project designs are adjusted when on-the-ground conditions warrant (for example, finding a previously unknown spotted owl territory or cultural resource site).

Second, after a successful project design using this process is accomplished, the recycling of knowledge concerning "what works and what doesn't work" should be done. Continually reassess to improve project designs. Internal information sharing concerning project design is vital to provide quality on the ground management.

A spin-off benefit of monitoring is better definition of significance of environmental effects (NEPA definition). Better understanding of what constitutes a significant effect will reduce the need for NEPA documents and give the deciding officer additional information on whether to "categorically exclude" project documentation or to prepare an environmental document (Phase 8 decision). This information will also aid in improving future environmental analysis that is required for every project proposal.

Final project design data will be verified and GIS and related data bases updated.

c. Roles.

(1) Line Officer. Assures project is accomplished as designed. Validates what monitoring efforts should be accomplished during and after project implementation as described in Phase 8.

(2) Project Leader. Accomplishes monitoring, coordinates field review, and writes any required reports. Ensures that results are shared with all interested parties, both internally and externally.

d. Products of Phase.

(1) Project Monitoring Report that provides documentation of project design results. Line officers should monitor projects each year using an interdisciplinary review approach as scheduled in Phase 11.

(2) Updated 10-year implementation schedule showing project accomplished.

(3) Updated GIS and related data bases.

(4) Forest Plan monitoring information.

11.3 - Integrated Resource Management (IRM) Phases and Best Management Practices (BMP)

1. Phase 1 - Review Forest Plan. The Forest Land Management Plan (FLMP) and any tiered plan will be reviewed for water quality and soil productivity related priorities that were identified for the management area. The State will be notified so that they can identify any water quality or soil productivity concerns they have for the management area.

2. Phase 2 - Develop Project Concept. Identify water quality and soil productivity related ICO's, standards, and guidelines specific to the project. State concerns will be added to the list.

3. Phase 3 - Conduct Extensive Reconnaissance. Identify beneficial uses, points of downstream use, state water quality standards, and soil productivity. Identify streams that are out of compliance with State and Federal water quality standards. Identify activity that impacts water quality and soil productivity (temporary and long-term, on-site and off-site). Identify soils that are in unsatisfactory watershed or soil condition. Identify riparian areas in unsatisfactory condition. Identify current management practices that are in conflict with soil and water conservation practices (for example, transportation systems that have portions of roads located in streams or streamside management zones). Describe the potential for improving or degrading water quality or soil productivity. Invite the State to help with this task.

4. Phase 4 - Prepare Feasibility Report. Provide information from item 2 to project leader for use in feasibility statement.

5. Phase 5 - Update Forest Plan 10-Year Implementation Schedule. Review the Forest Implementation Schedule for water quality and soil productivity targets. Identify those water

and soil targets that will be accomplished by the actions proposed or need to be adjusted because of the proposed action. Identify "publics" that have water and soil interest that are effected by the proposed action.

6. Phase 6 - Conduct Intensive Reconnaissance, Survey, or Design. Gather on-site watershed data necessary to formulate BMP's. Invite the State to assist in the effort.

7. Phase 7 - Generate and Compare Alternatives. Evaluate activity generated impacts. Propose soil and water conservation practices common to all alternatives and those that are specific to an alternative. Describe how soil and water conservation practices will improve water quality or mitigate/prevent non-point source pollution. Estimate the cost for implementing soil and water conservation practices. If water quality standards will not be met by any of the alternatives, propose new alternatives that will achieve water quality goals. The State may want to be an ID Team participant.

8. Phase 8 - Select Alternative. Review final preferred alternative, ensure soil and water conservation practices are identified and that they will be sufficient to meet water quality standards.

9. Phase 9 - Prepare NEPA Documentation. Review final documents, ensure that non-point source pollution, including cumulative effects is adequately addressed. Send documents to the State for review.

10. Phase 10 - Create Project Record. Include documentation from State and other publics concerning water quality. Start storage of water quality data, if it is decided in Phase 8 to monitor water quality in the EPA STOrage and RETrieval (STORET) computer system and see if water quality data can be retained in GIS.

11. Phase 11 - Prepare Project Action Plan. Ensure that the BMP comprising the soil and water conservation practices are carried forward.

12. Phase 12 - Implement Project. Assist project personnel in on-the-ground implementation of the BMP.

13. Phase 13 - Monitor and Evaluate Results. Monitor BMP implementation. Evaluate effectiveness of the implemented BMP in preventing non-point pollution using methods identified in Phase 7 and 8. The State may want to assist.

12 - MANAGEMENT PRACTICES DOCUMENTATION.

The following chapters identify soil and water conservation practices which can be used in the IRM process to develop a BMP. The practices described in these chapters were compiled from Forest Service manuals, handbooks, contract and permit provisions, and policy statements.

These practices are neither detailed prescriptions nor solutions for specific problems. They are action initiating mechanisms which will help in the development of detail prescriptions and solutions. They identify management standards, guidelines, and considerations which will be considered in the formulation of alternatives for land management actions using the IRM

process. They serve as checkpoints to consider in formulating a plan, a program, and/or a project.

The format for the practice descriptions is as follows:

Heading	-	Content
Practice	-	Includes the number of the practice and a brief title.
Objective	-	Describes the desired results or attainment of the practice as it relates to water quality protection.
Explanation	-	Further defines the brief title and expresses how the practice is applied. Describes criteria or standards used when applicable.
Implementation	-	Describes where the practice is applied, who is responsible for application, direction and supervision, and when the practice is employed.

CHAPTER 20 - RESOURCE MANAGEMENT ACTIVITIES

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21 - PESTICIDE USE MANAGEMENT AND COORDINATION.

The Forest Service uses pesticides very judiciously, safely, and effectively. Base actual use and recommended use on analysis of effectiveness, specificity, environmental impacts, and economic efficiency. The Forest Service may use only pesticides registered or otherwise permitted in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.

21.1 - Pesticide Use Planning Process.

1. Objective. To introduce water quality and hydrologic considerations into the pesticide use planning process.

2. Explanation. The Pesticide Use Planning Process is the framework for incorporation of hydrologic considerations contained in a Best Management Practices (BMP) developed for pesticide use projects. An environmental analysis addresses these considerations in terms of impacts and mitigation measures. Project work and safety plans then specify management direction.

3. Implementation. The Interdisciplinary (ID) Team evaluates the project in terms of site response, social and environmental impacts, and the intensity of monitoring needed. The responsible line officer then prepares the appropriate National Environmental Protection Act (NEPA) documentation, Project Plan, and Safety Plan. Approval authority for proposed pesticide projects is contained in the R-3 supplement to FSM 2150.

21.11 - Pesticide Application According to Label Directions and Applicable Legal Requirements.

1. Objective. To avoid water contamination by complying with all label instructions and restrictions.

2. Explanation. Directions found on the label of each pesticide are detailed and specific, and include legal requirements for use.

3. Implementation. Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. For in-service projects, responsibility for ensuring that label directions and other applicable legal requirements are followed rests with the Forest Service's project supervisor who shall be a certified commercial applicator. For contracted projects, it is the responsibility of the Contracting Officer or the Contracting Officer's Representative (COR) to ensure that label directions and other applicable legal requirements are followed.

21.12 - Pesticide Application Monitoring and Evaluation.

1. Objective.

- a. To determine whether pesticides were applied safely, restricted to intended target areas, and deposited at the recommended application rates. To also, evaluate if non-target species were affected.

- b. To document and provide early warning of possible hazardous conditions resulting from possible contamination of water or other non-target areas by pesticides.
 - c. To determine the extent, severity, and probable duration of any potential hazard that might exist.
2. Explanation. This practice documents the placement accuracy, amount applied, and any water quality affects of the pesticide application. Monitoring methods include spray cards, dye tracing, and direct measurement of pesticide on vegetation and in or near water. Type of pesticide, type of equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of laboratory analysis, and applicable Federal, State and local laws, and regulations are all factors considered when developing the monitoring plan.
3. Implementation. The need for a monitoring plan is identified during the pesticide use planning process as part of the project environmental analysis. The water quality monitoring plan will specify:
- a. Who will be involved and their roles and responsibilities.
 - b. What parameters will be monitored and analyzed.
 - c. When and where monitoring will take place.
 - d. What methodologies will be used for sampling and analysis.
 - e. The rationale behind each of the preceding specifications.

A water quality specialist and the project director/COR will evaluate and interpret the water quality monitoring results in terms of compliance with and adequacy of project specifications.

21.13 - Pesticide Spill Contingency Planning.

1. Objective. To eliminate contamination of water that may occur from accidental spills.
2. Explanation. The Forest Oil and Hazardous Substances Pollution Contingency Plan prepared by each Forest consists of predetermined actions to be implemented in the event of a spill. The plan lists who will notify whom and how, time requirements for the notification, guidelines for spill containment, and who will be responsible for cleanup. Site-specific planning that involves hazardous substances requires a spill plan which is contained in the project safety plan. Guidance on pesticides spill prevention and planning can be obtained in the FSH 2109.12.
3. Implementation. Spill contingency planning is incorporated into the Project Safety Plan. The environmental analysis process provides the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

21.14 - Cleaning and Disposal of Pesticide Containers.

1. Objective. To prevent water contamination resulting from cleaning or disposal of pesticide containers.
2. Explanation. The cleaning and disposal of pesticide containers must be done in accordance with Federal, State and local laws, regulations, and directives. Specific procedures for the cleaning and disposal of pesticide containers are documented in State and local laws and in the Pesticide Storage, Transportation, and Spills Handbook, FSH 2109.12.
3. Implementation. The Forest or District Pesticide Use Coordinator will approve proper rinsing procedures in accordance with State and local laws and regulations, and arrange for disposal of pesticide containers when the pesticide is applied by in-service personnel. When the pesticide is applied by a contractor, the contractor is responsible for proper container disposal in accordance with label directions and Federal, State, and local laws.

21.15 - Streamside and Wet Area Protection During Pesticide Spraying.

1. Objective. To minimize the risk of any pesticide inadvertently entering waters or unintentionally altering the riparian area or wetlands.
2. Explanation. When spraying pesticides for the purposes of meeting non-riparian area land management objectives, an untreated strip (buffer strip) of land and vegetation shall be left alongside surface waters, wetlands, and riparian areas. Strip widths are established by the ID team. Factors considered in establishing buffer strip widths are beneficial water uses, adjacent land use, rainfall, wind speed, wind direction, terrain, slope, soils and geology. The persistence, mobility, acute toxicity, bio-accumulation, and formulation of the pesticide are also considered. Equipment used, spray pattern, droplet size, application height, and past experience are other important factors. Pesticide label precautions directed toward water quality protection are followed.
3. Implementation. The perennial and intermittent surface waters, wetlands or riparian areas are identified from on-site observation and mapped by an ID team during project planning. When included as part of the final NEPA documentation and Project Work Plan, surface water, wetland, or riparian area protection is the responsibility of the project supervisor for in-service projects and the COR for contracted projects. The certified commercial applicators are briefed about the location of surface waters, wetlands, or riparian areas. Buffer strip boundaries are flagged or otherwise marked when necessary to aid identification from the air.

21.16 - Controlling Pesticide Drift During Spray Application.

1. Objective. To minimize the risk of pesticide falling directly into water or non-target areas.
2. Explanation. The spray application of pesticide is accomplished according to a prescription which accounts for terrain, and that specifies the following: spray exclusion areas,

buffer areas, and factors such as formulation, equipment, droplet size, spray height, application pattern, flow rate, and the limiting factors of wind speed and direction, temperature, and relative humidity.

3. Implementation. The prescription is prepared using the Integrated Resource Management (IRM) process and involves the Forest or District Pesticide Use Coordinator. On in-service projects, the Forest Service's project supervisor is responsible for ensuring the prescription is followed during application and for closing down the application when specifications are exceeded. These responsibilities belong to the Contracting Officer or the COR.

22 - RANGE MANAGEMENT.

The use of National Forest System (NFS) lands for grazing in the Southwestern Region generally predates the establishment of individual Forests. Grazing continues as a recognized tool for vegetation management on NFS lands and is considered a compatible use of public lands. Designated ranges are managed to accommodate grazing along with other uses. NFS rangelands are divided into allotments for administration. Allotments are used by rancher permittees who pay a mandated fee for each month of use for each animal (and its 6 month or older offspring).

Range vegetation management involves such activities as range analysis, allotment management planning and improvement, and a grazing permit system. It includes controlling overall livestock numbers, season of use, livestock distribution, constructing structural and non-structural improvements, maintaining or enhancing diverse landscapes for the benefit of the overall biological aspects of the ecosystem including fish and wildlife and other resources, and restoration of deteriorated rangelands. The actual physical activities include grazing, trampling, ponding, salting, fencing, sediment traps, fuelwooding, prescribed burning, using herbicides, site preparation, seeding, and other activities associated with forage establishment. Livestock can be an effective tool in managing vegetation.

Successful range vegetation management is measured by the results on-the-ground through production utilization surveys (range inspections) and compared to the environmental protection attainment identified and addressed in range analyzes and allotment plans made by interdisciplinary teams through the IRM process.

Water and soil management concerns can be effectively included into the Range Management Planning Process when the Allotment Management Plan is written or revised. Allotment planning is accomplished using the Region's IRM process and must be consistent with the Forest's Land Management Plan.

22.1 - Range Analysis, Allotment Management Plan, Grazing Permit System, and Permittee Operating Plan.

1. Objective. To manage rangelands through IRM and ensure they are meeting Forest Land Management Plan objectives.

2. Explanation. An analysis of a potential and/or existing grazing area is conducted by an interdisciplinary team to evaluate its productive capabilities, inherent hazards, resource values, and uses for the purpose of meeting Forest Land Management Plan objectives. Following this analysis the Forest Service, in cooperation with the permittee, prepares a written allotment management plan and authorizes livestock grazing as per stipulations in the management plan. These documents include measures to protect other resource values, such as water quality, riparian area resource management, and to coordinate livestock grazing with other resource uses. Specific methods for controlling when, where, amount of utilization, and numbers of livestock to be grazed are covered in the plan. Also included are needed rangeland improvements, monitoring methods, and an implementation schedule. A permittee operating plan is prepared, reviewed, and revised annually to reflect direction in the allotment management plan. The amount of livestock use is determined primarily through measurement of vegetative utilization.

Allowable use is set to meet the objectives of the Forest Land Management Plan. The maintenance of soil productivity and stability is considered in determining allowable use.

3. Implementation. The District Ranger is responsible for analysis of range allotments, completion of environmental assessment reports, preparation of management plans, and processing of grazing applications. The Forest Supervisor or District Ranger approves management plans and issues grazing permits with stipulations and conditions. Most permits are issued for 10 year terms. Revise allotment management plans as needed to meet the Forest Land Management Plan objectives. Annually prepare a operating plan with the permittee to allow for current allotment conditions. The permittee carries out the plans under the immediate direction and review of the District Ranger. Take corrective action if a permittee does not comply with grazing permit conditions designed to protect soil and water resources.

22.11 - Controlling Livestock Numbers and Season of Use.

1. Objective. Safeguard water and soil resources under sustained forage production. Managed forage utilization by livestock to maintain healthy ecosystems for all resource objectives.

2. Explanation. In addition to proper stocking rate and season of use specified in the grazing permit, periodic field checks are made to identify needed adjustments in season and livestock numbers. Checks include:

- a. Range readiness evaluations to assure that the soil is not too wet and that sufficient forage growth has occurred.
- b. Stock counts to assure that only permitted livestock enter the allotment.
- c. Forage utilization measurements to provide data, for grazing use pattern, improved livestock distribution, and stocking.
- d. Assessment of rangeland to verify soil and vegetative condition and trend.

- e. Assessment of streambanks to assure banks are not being degraded and contributing sediment to water courses.

When standards for allowable utilization are established they are incorporated into the allotment management plan.

3. Implementation. Allotments are administered by the District Ranger. Provisions are carried out by the grazing permittee as permit requirements. Field check and measurements are made periodically by the Forest Service. Livestock numbers and seasons of use may be changed annually to reflect current years climatic condition.

22.12 - Controlling Livestock Distribution.

1. Objective. To manage sustained forage production and forage utilization by livestock while protecting soil and water resources. Maintaining healthy ecosystems for wildlife and other resources.

2. Explanation. Livestock use within allotments is typically not uniform due to variations in topography, water availability, vegetation type and condition. Several techniques are used to achieve proper distribution, or lessen the impact on areas which are sensitive or which would naturally be overused. These techniques include:

- a. Construction of fences, and implementation of seasonal or pasture systems of management.
- b. Water development in areas that receive little use and closing off water developments when proper use has been achieved.
- c. Riding and herding to shift livestock locations.
- d. Using salt or supplement feed as tools to gain proper distribution of livestock.
- e. Range improvements, prescribed burning, trail construction, or seeding.
- f. Prevention of intensive livestock grazing or concentrated livestock use on soils that have low bearing strength and are wet.

Open herding, limiting trailing, and use of new bed grounds are additional techniques used for sheep. Developing sufficient watering places is one way to limit the amount of trailing. Livestock distribution needs are determined through evaluations of range conditions and trends, including watershed condition assessments and utilization studies.

3. Implementation. Livestock distribution practices are carried out by the permittee under the direction and review of the District Ranger. Direction is incorporated in the allotment management plan and the annual operating plan, which are integral parts of the grazing permit and provides current Forest Service instructions. The instructions reflect current allotment conditions and vegetative trends.

22.13 - Rangeland Improvements.

1. Objective. To improve, maintain or restore range resources, including soil and water through the use of rangeland improvements.

2. Explanation. Rangeland improvements are intended to enhance forage quality, quantity, and/or availability, and to provide protection to the other resources. Building fences to control the movement of livestock, improve watershed condition, and develop watering sites are just a few of the types of rangeland improvements implemented by the permittee or Forest Service as identified in the allotment plan. If a structure is causing soil erosion or water quality degradation the allotment plan will identify it and state corrective measures. Other measures may include stream channel stabilization efforts such as riprapping, gully plugging, and planting; or mechanical treatments such as pitting, chiseling, or furrowing. Reseeding and/or fertilization may be done alone or in conjunction with any of these measures.

3. Implementation. The permittee is involved as a cooperator in rangeland improvements and may actually complete the work under Forest Service direction. Implementation may also be done by Forest Service crews or contractors. Range improvement needs are recognized in the range allotment planning process and are scheduled for implementation in the allotment plan and the 10-Year Forest Plan Implementation Schedule.

22.14 - Determining Grazing Capability of Lands.

1. Objective. To maintain or improve soil stability, soil productivity, and water quality by grazing the land within its capability.

2. Explanation. This practice is an administrative and preventative control. Soil condition classes, based on the relationship of current and natural soil loss tolerances, are used to determine grazing capability. Only land with soils in stable condition are considered as "full capability" range. Grazing capability ratings are then used in conjunction with other grazing considerations to determine the actual grazing capacity of an area.

3. Implementation. Soil condition class is determined by qualified soil scientists using Terrestrial Ecosystem Survey (TES). A range conservationist will use the soil condition class in determining the grazing capacity.

22.15 - Revegetation of Areas Disturbed by Grazing Activities.

1. Objective. To establish a vegetative cover on disturbed sites to prevent accelerated erosion and sedimentation.

2. Explanation. Where soil has been severely disturbed by past overgrazing and the establishment of vegetation is needed to minimize erosion, the appropriate measures shall be taken to establish an adequate cover of grass or other vegetation acceptable to the Forest Service and outlined in the allotment management plan. This measure is applied where it is expected that disturbed soils in parts of the area will require vegetative cover for stabilization and the problems will not be mitigated by other management plan provisions.

3. Implementation. Through the IRM process an estimate of the need is determined and included in the allotment plan. Where the ground cover is needed, objectives that will provide for vegetative establishment will be included in the allotment plan. The Forest Service shall identify on-the-ground disturbed areas that must be treated.

The Forest Service, shall provide instruction as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the District Ranger to make sure that revegetation work is done correctly and in a timely manner.

22.16 - Erosion Control Structure Maintenance.

1. Objective. To ensure that constructed erosion control structures are stabilized and working.

2. Explanation. Erosion control structures are only effective when they are in good repair and stable conditions. It is necessary to provide follow-up inspection and structural maintenance in order to avoid these problems and ensure adequate erosion control.

3. Implementation. During the period of grazing the permittee will implement and adhere to the Forest Service prescribed grazing protection measures.

23 - RECREATION MANAGEMENT.

Recreation on NFS lands occurs in developed sites, on trails, rivers, roads, and in general forest areas. Developed recreation area is the term used to describe recreation areas that are designed and built to provide facilities to the user. An example is a constructed campground; where tables, fire places and toilets and so forth, have been provided, recreational residences, resorts, ski areas, and similar facilities are also developed recreation areas.

All other recreation is considered dispersed and occurs in forest and rangeland outside of developed sites. Facilities are, however, often required to protect resources, enhance the quality of visitor experiences, and disperse users.

23.1 - Sampling and Surveillance of Designated Swimming Sites.

1. Objective. To ensure the health and safety of water contact recreationists at designated National Forest swimming sites, and to provide an indicator of possible nonpoint source pollution.

2. Explanation. The monitoring and evaluation of bacterial water quality is mandatory at all developed, designated swimming sites. Analysis values are tested against state water quality standards for primary contact recreation. Optional monitoring may be considered at other areas where swimming occurs (often associated with developed campgrounds or picnic areas) but where swimming sites have not been designated.

Monitoring results may indicate a need to complete a watershed condition evaluation to identify possible nonpoint source pollution.

3. Implementation. Each forest with designated swimming sites assigns a functional area (such as Watershed, Engineering, or Recreation) to develop a swimming area water quality monitoring plan. This plan will identify swimming water monitoring locations, data requirements, monitoring frequency, procedures, data analysis and interpretations, and reporting. All data will be entered onto the EPA STOrage and RETrieval (STORET) computer system.

23.11 - Control of Sanitation Facilities.

1. Objective. To protect surface and subsurface water from unacceptable levels of bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of waste water and sewage at Forest Service and special use permitted facilities.

2. Explanation. Toilet facilities are provided at developed recreation sites. The type and number depends on the capacity of a given site. Sanitation facilities will be planned, located, designed, constructed, operated, inspected, and maintained to minimize the possibility of water contamination. Waste water includes water from showers and faucets.

3. Implementation. Field investigations will be performed by the appropriate disciplines to evaluate soil, geological, vegetative, climatic, and hydrological conditions. The location, design, inspection, operation and maintenance will be performed or controlled by qualified personnel who are trained and familiar with the sanitation system and operational guidelines. Federal, state and local regulations will be met in the installation of new sanitation facilities or modifications of existing facilities. Disposal of collected sewage at designated sewage treatment plants is required.

23.12 - Control of Refuse Disposal.

1. Objective. The objective is to protect water from unacceptable levels of nutrients, bacteria, and chemicals associated with solid waste disposal.

2. Explanation. The users of National Forest recreation facilities are encouraged to cooperate in the proper disposal of garbage and trash. Receptacles are provided for garbage and trash at most developed sites. Garbage and trash must be "packed out" by those who use general forest and wilderness areas.

3. Implementation. The public education effort is a continuing process accomplished through the use of signs, printed information, mass media, and personal contact. Public cooperation is vital.

Garbage containers are placed in areas which are convenient for recreationists and are easily maintained. Authorized Forest Officers may issue citations to violators. The final disposal of collected garbage will be at a properly designed and operated county or state sanitary landfill meeting Federal, state, and local regulations.

23.13 - Sanitation at Hydrants and Water Faucets Within Developed Recreation Sites.

1. Objective. To maintain high water quality standards around hydrants and faucets which provide water for consumptive use in developed recreation sites.

2. Explanation. The cleaning or washing of any personal property, fish, animal, or food at a hydrant or at a water faucet not provided for that purpose is prohibited. The public must be informed of their responsibilities concerning sanitary regulations. Acceptable designated cleaning areas are those that are located away from consumptive water sources and where effluent from the washing operation can be disposed of properly.

3. Implementation. Recreation staff, with the aid of public affairs personnel will seek public cooperation in meeting the objective in a positive manner through the implementation of BMP's and appropriate signing for the site. If necessary, authorized Forest Officers will issue citations to violators.

23.14 - Protection of Water Quality Within Developed and General Forest Recreation Areas.

1. Objective. To comply with Federal and state water quality standards by regulating the discharge and disposal of pollutants.

2. Explanation. Placing in or near a stream, lake, or other water body (including ephemeral, or intermittent streams), substances which may degrade water quality must be prevented.

This includes, but is not limited to, human and animal waste, petroleum products, and other hazardous substances. Areas may be closed in order to restrict use in problem areas.

3. Implementation. The public will be encouraged through positive signs, pamphlets, and public contacts to conduct their activities in ways that will not degrade water quality. Officers will issue citations to violators.

23.15 - Location of Pack and Riding Stock Facilities.

1. Objective. To avoid unacceptable soil erosion loss and degradation of water quality from pack and riding stock facilities.

2. Explanation. This practice directs the location of pack and riding stock facilities at safe distances away from springs, streams (including ephemeral or intermittent streams), lakes, wet meadows, and any other surface waters. The facilities will be located outside of stream management zones (filter strips).

3. Implementation. Forest Supervisors will authorize the construction and installation of facilities that have been identified and approved in the wilderness implementation plan or

other such planning effort, if they are necessary in connection with pack stock operation. During the planning and construction effort, location and drainage of these facilities will be laid out to avoid streamside management zones.

Patrol personnel check for compliance with the use of authorized areas.

23.16 - Management of Off-Road Vehicle Use.

1. Objective. Manage Off-Road Vehicle (ORV) use to prevent unacceptable soil erosion and adverse effects on water quality.

2. Explanation. ORV use has the potential to cause severe erosion due to soil disturbance and water channelization on steep terrain, in riparian areas, and ephemeral and intermittent streamcourses. Unmanaged use can result in a high density of trails.

3. Implementation. Forest Plans provided for the initial direction on managing ORV use. This direction is being implemented through the Resource Access Travel Management (RATM) process. Monitoring ORV use is a tool which can help to identify areas contributing or likely to contribute to water quality degradation. Corrective action may include signing or barriers to redistribute use, placing restrictions on areas, rotation of use on areas, closure to vehicles that are causing problems (including mountain bicycles), or total closure. Structural measures to minimize contact with streamcourses, such as bridges or culverts, and the closure and obliteration of parallel or redundant trails may also be considered. Preventative actions include development, construction and maintenance of ORV trails and trailheads that limit soil erosion, public information designed to encourage use on ORV trails and discourage use in areas that are susceptible to erosion. Closure can be done by authority of the Forest Supervisor.

23.17 - Public Awareness.

1. Objective. To comply with Federal and state water quality standards by enlisting public participation in the implementation of soil and water conservation practices directed at the impacts resulting from recreation use of the National Forests.

2. Explanation. Since Forest Service resources available to monitor and gain compliance of public related BMP's are limited, voluntary public compliance is the key to water quality protection. Voluntary compliance is best gained through public education efforts and positive public contacts which explain the importance of complying with Federal and state water quality standards and how such protection is achieved.

3. Implementation. Positive education efforts and public contacts can be done through various forms of media such as radio, television, newspapers, brochures, signs, and personal contacts. Recreation staff, in conjunction with public affairs staffs and other Forest Service personnel, develop and distribute information and make personal contacts.

24 - TIMBER MANAGEMENT.

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.

One of the most effective points to include water and soil management concerns into the timber sale planning process is when silvicultural prescriptions are being written. Writing and approving silvicultural prescriptions is the responsibility of certified silviculturist at the District level in consultation with soil and water specialists.

Timber sale planning starts 5 to 6 years before the timber is sold for harvesting. The proposed sale must follow the guidelines written in the Forest Land and Resource Management Plan. Preparation of the sale follows IRM process.

Successful timber harvest is measured by the results on the ground compared to the environmental protection attainment identified and addressed by the interdisciplinary team in the IRM process.

24.1 - Timber Harvest Unit Design.

1. Objective. To ensure that timber harvest cutting unit design will secure favorable conditions of water flow and water quality.

2. Explanation. This is an administrative and preventative practice. The proposed timber harvest units are evaluated to estimate the response of the watersheds involved to the proposed timber sale. This includes a field examination of the ability of the watershed to absorb the impacts of the proposed harvest. Characteristics to be evaluated can include the recovery from past harvests; the protection of channels; the number, size, and location of harvest units; estimated location and size of roads and skid trails; logging system design; the condition of the protective ground cover in filter strips; and the potential natural recovery rate of the watershed. Where adverse water quality impacts and undesirable streamflows can result, the harvest unit design should be modified, and/or the natural recovery rate can be accelerated using watershed treatment measures.

3. Implementation. The hydrologic survey and evaluation of proposed timber harvest is accomplished through the IRM process. Incorporate prescriptions to assure acceptable conditions of water flow into the project plan.

On-the-ground accomplishment of the project plan direction is carried out by the Sale Preparation Forester, the Timber Sale Administrator, and the administrator of sale slash disposal and cultural activities, with follow-up review by qualified resource specialists. Identify the need for water quality monitoring in the project plan when necessary for water quality control.

24.11 - Use of Terrestrial Ecosystem Survey Timber Harvest Limitation Rating.

1. Objective. To identify severe and moderate erosion hazard areas and other soil limitations in order to adjust treatment measures to prevent downstream water quality degradation.

2. Explanation. This is a preventative practice. The Region 3 Terrestrial Ecosystem Survey (TES) contains a timber harvest limitation rating which evaluates the potential erosion and soil disturbance hazards due to timber harvest. Moderate and severe ratings point to the need to consider various mitigation measures to improve and maintain water quality in order to comply with Federal and state water quality standards, such as minimizing the use of ground disturbing equipment or restrictions on operating season.

3. Implementation. Timber Harvest Limitation ratings are available through published TES surveys or can be made by soil scientists or other personnel specifically trained to perform these evaluations. Such information is then utilized in the IRM project design process.

24.12 - Use of Sale Area Maps for Designating Water Quality Protection Needs.

1. Objective. To delineate the location of protection areas and available water sources as a guide for both the Purchaser and the Sale Administrator, and to ensure their recognition and proper consideration and protection on the ground.

2. Explanation. The following features are designated on the Sale Area Map, which is an integral part of the Timber Sale Contract:

- a. Location of non-riparian ephemeral and intermittent streamcourses to be protected with filter strips.
- b. Wetlands (wet meadows, lakes, pot holes, and other riparian areas) which have a riparian streamside management zone or a filter strip to protect them.
- c. Boundaries of harvest units.
- d. Specified roads.
- e. Roads where log hauling is prohibited or restricted (for example, roads located in filter strips and streamcourses).
- f. Structural improvements.
- g. Areas where method of skidding and yarding is designated.
- h. Sources of rock for road work, riprapping, and so forth.
- i. Water sources available for Purchaser's use.
- j. Other features required by Division "C" contract provisions.

This is an administrative and preventative practice.

3. Implementation. The IRM process results in identification of these and other features. The Sale Preparation Forester will include them on the Sale Area Map at the time of contract preparation. The areas are reviewed on the ground by the Purchaser and the Sale Administrator prior to harvesting.

24.13 - Limiting the Operating Period of Timber Sale Activities.

1. Objective. To ensure that the Purchaser conducts operations, including but not limited to erosion control work, road maintenance, and log landing drainage in a timely manner, within the time period specified in the Timber Sale Contract.

2. Explanation. The C6.3 "Plan of Operation" 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 the commencement of the Purchaser's operation.

The contract provision B6.31 "Operation Schedule" requires that the Purchaser shall provide an annual schedule of anticipated activities such as road maintenance and erosion control work.

Provision B6.6 can be used to suspend operations because of wet or saturated soils in order to protect soil and water resources.

3. Implementation. Limited operating periods are identified and recommended during the IRM process. The sale preparation officer prepares the contract to include provision C6.314. Provisions B6.3, B6.31, and C6.3 are all mandatory provisions of the Timber Sale Contract. Provision C6.3 is only mandatory for sales over a two-year contract period. The Purchaser must submit a general plan and annual plans to the Forest Service. The Purchaser may commence operations only after written Forest Service approval of the general plan under C6.3.

24.14 - Protection of Extremely Unstable Lands.

1. Objective. To provide for special treatment of unstable areas or soils with severe erosion hazard and thereby avoid unacceptable erosion and sedimentation.

2. Explanation. This practice is an administrative and preventative control. Where extremely unstable lands (landslide areas) and highly erodible soils (severe erosion hazard) are delineated, they are taken out of suitable forest lands and are reclassified as unsuitable forest land. Using existing harvesting technologies, unsuitable forest lands cannot be managed for timber production because irreversible damage to soils, productivity, or watershed conditions may occur. Timber harvesting is deferred until improved harvesting technologies are developed and proven.

24.15 - Prescribing the Size and Shape of Even-Age Regeneration Cuts.

1. Objective. To control the physical size and shape of even-age regeneration cuts as a means of reducing stream sedimentation.

2. Explanation. This is an administrative and preventative practice. The National Forest Management Act, October 22, 1976, Section 6, contains the following:

"(F) ensure that clearcutting, seed tree cutting, shelterwood cutting and other cuts designed to regenerate an even-aged stand of timber will be used...only where...(iv)

they are established according to geologic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: Provided, that such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm; and (v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource."

The limitation on even-age regeneration cut opening size in the Southwestern Region is 40 acres. Unless the Regional Forester approves a specific request for a larger unit.

3. Implementation. The size and the shape of the proposed even-age regeneration units shall be reviewed on the ground in the IRM process. A map showing proposed units is included in the sale plan, which is reviewed and approved by the appropriate line officer. The timber sale should not be delineated on the ground (roads staked, timber marked) until after the NEPA document and sale plan is approved.

24.16 - Streamside Management Zone (Filter Strip) Designation.

1. Objective. To designate a zone along streams (including ephemeral and intermittent streams, wet areas, meadows, riparian areas, or any area that has the hydrological characteristics of carrying water on or near the surface and that the delivery of sediments to this area can effect water quality) where management actions are designed to minimize adverse effects on water and related resources.

2. Explanation. Factors such as stream class, existing ground cover conditions, soil erosion hazard, channel aspect, channel stability, side slope steepness, and slope stability are considered in determining the constraints of activities and width of streamside management zones. Fisheries habitat condition and its estimated response to the proposed activities are also evaluated in determining the need for and width of the streamside management zone. The streamside management zone is not 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 habits; protects channel and streambanks; and promotes floodplain stability.

3. Implementation. Identify the streamside management zone requirements during the IRM process. Contracted projects are implemented by contractors or operators. Compliance with environmental analysis criteria, contract specification, and operating plans is assured by the Contracting Officers Representative or Timber Sale Administrator.

24.17 - Determining Tractor Loggable Ground.

1. Objective. Comply with Federal and state water quality standards when tractor logging.

2. Explanation. This practice is intended to minimize soil erosion, subsequent sedimentation and water quality degradation. The Timber Harvest Limitation rating provided by the TES is the basic method of determining tractor loggable ground.

3. Implementation. The TES is utilized by a trained and qualified Forest Service representative during the on-the-ground assessment of the timber sale. Consider the resulting Timber Harvest Limitation rating during the selection of logging and silvicultural methods and use it in determining acceptable intensity of and restrictions for land disturbance activities. Give interpretations of the considerations in the NEPA documentation. Provisions in the Timber Sale Contract specify the areas determined by the TES upon which tractors can operate. Tractor logging is generally not permitted on slopes exceeding 40 percent. Exceptions may be made after a thorough investigation of on site conditions and inclusion of special specified mitigation prescriptions in the timber sale contract. Tight administrative control of such operations is also required.

24.18 - Tractor Skidding Location and Design.

1. Objective. To minimize erosion and sedimentation by designing skidding patterns to best fit the terrain. To maintain the integrity of the streamside management zones, riparian areas, and other sensitive watershed areas.

2. Explanation. This is a preventative practice. The watershed factors that are considered include slope, soil stability, exposure, vegetative cover and any factor that may affect the peak flow and sediment yield potential of the land. The careful control of skidding patterns serves to minimize on site erosion and downstream channel damage by preventing the concentration of runoff in skid trails.

Proper skid pattern management involves such things as locating skid trails to avoid stream courses and restriction of skidders to designated trails.

Two complementary methods of complying with water quality standards when tractor skid trails are design:

a. End-Lining. This method involves winching the log directly out of the sensitive areas (streamside management zone, wet meadow, riparian area, and so forth) with a cable operated from outside the sensitive area.

b. Felling To The Lead. This method involves felling trees toward a predetermined skid pattern. Soil disturbance, compaction, and residual stand and site damage are minimized when this method is used.

c. Implementation. For skid trail design, identify and evaluate sensitive areas in the environmental assessment review during the IRM process. A special Timber Sale Contract provision can be included in the Timber Sale Contract for the location of skid trails. The Sale Administrator locates the skid trails with the timber Purchaser or by agreeing to the Purchaser's proposed locations prior to construction. Guidelines for skid trail locations are referenced in the sale plan, the Timber Sale Administration

Handbook (FSH 2409.23), the Timber Sale Contract, and on the Presale Cutting Unit Summary card (R3-2400-50).

24.19 - Suspended Log Yarding in Timber Harvesting.

1. Objective. To protect the soil mantle from excessive disturbance. To maintain the integrity of the streamside management zone, riparian areas, and other sensitive watershed areas.

2. Explanation. Suspended log yarding includes cable or aerial yarding systems which suspend logs either partially or wholly off of the ground. The systems are used on steep slopes or other areas sensitive to excessive disturbance. All of the systems result in less soil disturbance since heavy machinery is not used over the sale area. In most cases these systems require fewer roads. Fewer roads and less soil disturbance will result in less impact on the water resource.

3. Implementation. Areas where suspended log yarding is to be used shall be determined during the pre-sale planning process and designed in the sale plan. The specific systems are included in the contract and designated on the Sale Area Map by the Sale Preparation Officer. The Timber Sale Administrator shall oversee the project operation using the guidelines and standards established in the Timber Sale Contract and Sale Administration Handbook with reference to the sale plan.

24.2 - Log Landing Location.

1. Objective. To locate landings so creation of unsatisfactory watershed conditions which lead to water quality degradation is avoided.

2. Explanation. This practice is both administrative and preventative. Location of all landings shall be agreed to by the Forest Service and Purchaser prior to construction. The following criteria are used in evaluating landings:

- a. The cleared or excavated size of landings shall not exceed that needed for safe and efficient skidding and loading operations.
- b. Landing locations are selected which minimize the amount of excavation and on-site soil loss.
- c. Where possible, landings are located so that felled timber lying between drainages can be skidded to the landing without crossing channels.
- d. Landings are located where the least number of skid roads are required, and side cast will neither enter drainages nor damage other sensitive areas.
- e. Landings are positioned such that the skid road approach will be nearly level or less than 3 percent grade, far enough back to allow for good drainage.
- f. Landings are located so a minimum number of tractor roads enter the landing.
- g. Landings are not located in streamside management zones.

3. Implementation. Landing locations chosen by the contractor must be agreed to by the Timber Sale Administrator (SA). The SA can negotiate with the Purchasers' representative to select mutually acceptable landing locations. To be an acceptable landing, it must meet the above criteria. Should agreement not be reached, the decision of the Forest Service shall prevail within the limitations of law.

24.21 - Erosion Prevention and Control Measures During Timber Sale Operations.

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

2. 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 ensure that purchasers understand and adhere to water quality prescriptions arrived at in the timber sale planning process. This is accomplished by setting forth the Purchaser's and the Forest Service's responsibilities in the Timber Sale Contract.

3. Implementation. Equipment shall not be operated when soil conditions are such that accelerated soil erosion will result. The kinds and intensity of control work required of the Purchaser shall be adjusted to soil and weather conditions and the need for controlling runoff. Erosion control work shall be kept current immediately preceding expected seasonal periods of precipitation or runoff.

If the Purchaser fails to do seasonal 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 may be used by the Forest Service to do the work.

24.22 - Special Erosion Prevention Measures on Disturbed Land.

1. Objective. To prevent accelerated on-site soil loss and sedimentation of streamcourses.

2. Explanation. This is an administrative and preventive treatment. When required by the contract, the Purchaser shall give adequate treatment by spreading slash or wood chips (or, by agreement, some other treatment) on portions of tractor roads, skid trails, landings, or temporary road fills. This provision is to be used only for sales which contain soil stabilization problems which are not expected to be taken care of by the normal methods prescribed under other contract provisions.

3. Implementation. The ID team shall identify the treatment areas in the IRM process and in the timber sale plan. The District Timber Sale Preparation Officer shall identify the acreage to be treated in the legend of the Sale Area Map (SAM) and prepare a special provision for the contract. The specific acreage to be treated shall be designated on-the-ground by the Forest Service.

24.23 - Revegetation of Areas Disturbed by Harvest Activities.

1. Objective. Establish a vegetative cover on disturbed sites to prevent accelerated on-site soil loss and sedimentation of streamcourses.

2. Explanation. Where soil has been severely disturbed by Purchaser's operations, and the establishment of vegetation is needed to minimize erosion, the Purchaser shall take appropriate measures normally used to establish an acceptable vegetative groundcover, or take other agreed stabilization measures.

This measure is applied in contracts where it is expected that disturbed soils in parts of the sale area will require vegetative cover for stabilization and the problems will not be mitigated by other contract provisions. Apply this measure on soil with moderate and severe erosion hazard ratings.

3. Implementation. Through the IRM process, an estimate of the need for vegetative cover is determined and included in the sale plan, and in the timber sale appraisal. Where the establishment of vegetation is needed, use provision C6.6 in the Timber Sale Contract. The Forest Service shall designate on-the-ground the disturbed soils, such as skid trails, landings, and temporary roads, and so forth, that must be treated.

The Forest Service, shall provide instructions as to soil preparation and the application of suitable seed mixtures, mulch, and fertilizer, and the timing of such work. It is the responsibility of the Sale Administrator (SA) to make sure that revegetation work is done correctly and in a timely manner.

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24.24 - Log Landing Erosion Prevention and Control.

1. Objective. To minimize on-site soil loss and subsequent sedimentation of streamcourses, from log landings.

2. Explanation. This practice employs administrative, preventive, and corrective controls to meet the objective. After landings have served the Purchaser's purpose, the purchaser shall ditch or slope the landings to permit the drainage and dispersion of water. Landings will be properly drained when constructed before timber sale operations begin. Provisions are also made for revegetation. Other provisions may include ripping, scarifying, smoothing and sloping construction of drainage ditches, prevention of water draining off roads from reaching a landing, spreading slash, covering with wood chips, or applying straw mulch. Unless agreed otherwise, cut and fill banks around landings shall be sloped to remove overhangs and otherwise minimize erosion. The specific work needed on each landing will depend on the actual ground conditions. As part of the IRM process the interdisciplinary team assesses the need for stabilization.

3. Implementation. Timber Sale Contract requirements provide for erosion prevention and control measures on all landings. It is the responsibility of the Timber SA to ensure that this practice is properly implemented on-the-ground.

24.25 - Erosion Control on Skid Trails.

1. Objective. To comply with Federal and state water quality standards by minimizing on-site soil loss and sedimentation of streamcourses derived from skid trails.

2. Explanation. This practice employs preventive measures in order to meet the objective. The Timber Sale Contract requires the installation and maintenance of erosion control measures on skid trails, tractor roads, and temporary roads. Normally, the work involves constructing cross ditches and water spreading ditches. Grass seeding may also be required. This can be added to the Timber Sale Contract by use of contract clause C6.601. These areas are designated on-the-ground as logging and temporary access construction progresses.

3. Implementation. Location of all erosion control measures are designated and agreed to on-the-ground by the SA. The SA will identify site-specific preventive work to be required of the Purchaser. The Purchaser is obligated to maintain erosion control structures after construction, specified in contract provisions for one year unless maintenance need is caused by other National Forest users.

24.26 - Meadow Protection During Timber Harvesting.

1. Objective. To avoid unacceptable groundcover, a reduction of soil productivity, soil compaction, severe soil erosion, and water not being in compliance with Federal and state water quality standards in meadows.

2. Explanation. This is an administrative and preventive action. Unauthorized operation of vehicular or skidding equipment in meadows that are designated on SAM's and marked on-the-ground is prohibited. Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. Unless otherwise agreed, trees felled into meadows shall be removed by end-lining. Logging slash shall be removed from the meadow.

3. Implementation. The concerns and constraints mentioned above are set forth in Timber Sale Contract requirements. It is the responsibility of the Timber SA to ensure that this practice is properly implemented on-the-ground.

24.27 - Streamcourse Protection.

1. Objective. To protect the natural flow of streams (including ephemeral and intermittent). To provide unobstructed passage of stormflows. To reduce sediment and other pollutants from entering streams. To restore the natural course of any stream as soon as practicable where diversion of the stream may occur as a result of timber management activities.

2. Explanation. This management practice employs administrative, preventive, and corrective measures to meet the objectives. The following points are fundamental to protecting streams and streamcourses:

a. Location and method of streamcourse crossings must be agreed to prior to construction. This is done when locations of skid trails, tractor roads, and temporary roads are agreed on by the Forest Service and the Purchaser.

b. Purchaser shall repair damage to a streamcourse, including damage to banks and channel.

c. All timber sale debris shall be removed from streamcourses within 48 hours, unless otherwise agreed, and in an agreed manner that will cause the least disturbance.

d. Equipment shall not operate within streamside management zones as determined in the IRM process. Streamside management zone boundaries may be modified by the SA to meet unforeseen operation conditions.

e. When ground skidding systems are employed, logs will be end-lined out of streamside management zones. Equipment is permitted to cross streamside management zones and streamcourses only at locations agreed to by the SA and the Purchaser.

f. Lead-out ditches, water bars and other erosion control structures will be located so as not to channelize drainage water directly into streamcourses. Energy dissipators will be located at the end of these structures to spread the water. This allows the sediments to drop out and the water to infiltrate.

g. Logs will be fully suspended in cable log harvesting operations within the streamside management zone when required.

h. All streamcourses are to be protected with a streamside management zone.

3. Implementation. The SA works with the Purchaser's representative to ensure that the Timber Sale Contract clauses covering the above items are carried out on-the-ground. Specialists can be called upon to help the SA with decisions. In the event Purchaser causes debris to enter streamcourses in amounts which adversely affect the natural flow of the stream, water purity, or fishery resources, Purchaser shall remove such debris as soon as practicable, but not to exceed 48 hours and in an agreed-upon manner that will cause the least disturbance to streamcourses.

24.28 - Erosion Control Structure Maintenance.

1. Objective. To ensure that constructed erosion control structures are stabilized and working.

2. Explanation. Erosion control structures are only effective when they are in good repair and stable condition. Once the erosion control structures are constructed and seeded, there is a possibility that they may not be adequately vegetated or they may be damaged by subsequent harvest activities or large storms. It is necessary to provide follow-up inspection and structural maintenance in order to avoid these problems and ensure adequate erosion control.

3. Implementation. During the period of the Timber Sale Contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after construction. If erosion control structures are damaged by other National Forest uses, the Purchaser is not responsible. The Forest Service may agree to perform such structure maintenance under B4.225 (Cooperative Deposits), if requested by the Purchaser, subject to agreement on rates. If the Purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the Purchaser accordingly.

24.29 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure.

1. Objective. To assure the adequacy of required erosion control work on timber sales.

2. Explanation. The effectiveness of soil erosion prevention and control measures is determined by the results found after sale areas have been exposed to the elements one or more years after a cutting unit or the entire timber sale has been closed. Although a careful check is required before a timber sale is closed to assure that planned erosion work has been completed to the standard prescribed, the erosion prevention work done in previous years should be periodically inspected during the life of the timber sale. These inspections will help determine whether the planned work was adequate, if maintenance work is needed, the practicability of the various treatments used, and the necessity for modifying present standards or procedures.

3. Implementation. "Acceptable" erosion control means that established standards have been met. SAs shall not accept erosion control measures which fail to meet set standards.

24.3 - Slash Treatment in Sensitive Areas.

1. Objective. To comply with Federal and state water quality standards by protecting sensitive areas (including streamside management zones, landslide areas, and so forth) from degradation which would result from using mechanized equipment for slash disposal.

2. Explanation. Special slash treatment may be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment. Meadows, wetlands, streamside management zones, and landslide areas are typically sensitive areas where equipment use is normally prohibited. Slash treatment methods identified during the IRM process are indicated for each cut unit on the SAM.

3. Implementation. An assessment of the sale area shall be made in the timber sale planning process. Sensitive areas needing protection are identified. Results shall be documented in the sale plan and identified in the Timber Sale Contract and on the SAM. The Timber SA shall inspect the treatment for correct and satisfactory slash disposal accomplishment.

24.31 - Five-Year Reforestation Requirement.

1. Objective. To assure a continuous forest cover and to limit disturbance on areas with limited regeneration potential.

2. Explanation. When timber production is a land management objective, regeneration cutting of timber is not permitted where the site cannot be reforested within five years of final harvest. If the timber cutting is for other resource objectives this constraint does not apply. Regeneration areas will be planted with trees within five years if natural regeneration is not expected to occur within the five-year period.

3. Implementation. During the IRM process, the ID team assesses the capability of proposed areas to achieve reforestation within the prescribed period. The soil scientist uses information (for example, soil productivity, depth, and available moisture holding capacity) to determine the potential for reforestation. TES provides the reforestation potential rating for both artificial and natural reforestation. When TES is available, the silviculturist and soil scientist will use the information it contains, along with field observations, to determine whether lands are suitable, unsuitable, or unproductive for timber production. This information, along with pertinent information contained in Sale Area Improvement plans, harvest plans and compartment inventory analyses, is used to determine harvesting and regeneration methods.

24.32 - Non-recurring "C" Provisions That Can Be Used For Water Quality Protection

1. Objective. To comply with Federal and state water quality standards where standard "B" or "C" provisions of the Timber Sale Contract do not apply or are inadequate to protect watershed values.

2. Explanation. Special "C" contract provisions are sometimes needed to meet management objectives on a particular sale area. They are written and proposed by District Rangers or Forest Supervisors and approved by the Regional Forester. Such authorization shall apply only to the sale for which approval was given.

An example of a "C" provision which is commonly used for complying with Federal and state water quality standards is the provision concerning the directional felling of timber. This provision is used for riparian areas where it is important to avoid felling trees into streams or into important areas of riparian vegetation or residual timber.

Another example is the use of a "swing yarding" special provision in situations where such a method would help protect water quality. Swing yarding refers to the use of more than one yarding system to accomplish a difficult yarding problem. In one situation, it might be possible to avoid building a stream crossing by using a tractor to yard logs to a point where they could then be lifted across the stream to a road by a skyline yarder.

This practice can be used for a variety of special situations which may occur on any timber sale. There are no standard or set provisions that can be referenced, since each Special "C" provision is unique and specific to one sale.

3. Implementation. The need for Special "C" provisions shall be identified and recommended during the IRM process by the ID team. The Sale Preparation Officer shall prepare Special "C" provision needed and submits it through line officers to the Regional Forester for approval. The Regional Forester will prepare appropriate contract wording of the provision and returns the approved provision to the district. The Special "C" provision shall be applied by the SA in the same manner as the standard contract provisions.

24.33 - Modification of the Timber Sale Contract.

1. Objective. To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will irreversibly damage soil and water values.

2. Explanation. Once timber sales are sold, they are harvested as planned via the Timber Sale Contract. At times, however, it may be necessary to modify a Timber Sale contract because of new concerns about the potential affects of land disturbance on the water resource. If new evidence raises serious concerns to the Forest Service representative, an interdisciplinary team will be assigned to assess the evidence and implications. The environmental document prepared for the timber sale shall then be amended to reflect the findings of the ID team. The team will make recommendations to the appropriate Line Officer on whether the timber sale, as currently planned, will (1) irreversibly damage watershed conditions, or (2) inadequately protect streams (including ephemeral and intermittent), streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of watercourses, and deposits of sediment.

3. Implementation. If the timber sale, as determined by the appropriate Line Officer, will unacceptably affect watershed values, corrective actions must be taken which may include

contract modification. The timber sale modification can be accomplished by agreement with the timber sale Purchaser, or unilaterally by the Forest Service using an amended environmental document prepared by an interdisciplinary team.

24.4 - Site Preparation for Reforestation.

1. Objective. To provide appropriate erosion and sedimentation protection for sites disturbed during site preparation. To protect existing erosion control structures or to replace damaged structures during and after site preparation.

2. Explanation. Site preparation has the potential to increase compaction and reduce groundcover. The possible result of such activity is an increase in the concentration of surface water along with its associated erosive forces. Additional erosion control work may be needed after site preparation. The quality of erosion control work required under the timber sale contract needs to be upheld through completion of site preparation.

3. Implementation. Specific requirements for erosion control are included in each environmental assessment and timber sale contract. All these requirements need to be brought forward into site preparation contracts. The COR is responsible for enforcing contract provisions that pertain to erosion prevention and control during site preparation.

25 - WATERSHED MANAGEMENT.

The objective of watershed management is to protect watersheds by implementing practices designed to retain soil stability, improve or maintain site productivity, secure favorable conditions of water flow, and preserve or enhance aquatic values. The watershed management program is oriented towards maintenance or improvement of watershed conditions, restoration of National Forests lands damaged by catastrophic events or degraded by past use, and monitoring of soil and water quality.

25.1 - Watershed Restoration.

1. Objective. To reduce the potential for nonpoint source pollution by improving hydrologic function, soil stability, and soil productivity.

2. Explanation. Watershed restoration is a corrective measure to:

- a. Increase ground cover (for example, vegetation and litter).
- b. Increase infiltration.
- c. Slow overland flow and conserve the soil resource.
- d. Stabilize streambanks and stream channels.
- e. Enhance soil productivity.

- f. Reduce flood occurrence and flood damage.
- g. Improve water quality to ensure compliance with state and Federal water quality standards.
- h. Reduce on-site soil loss to within acceptable soil loss values.
- i. Improve stream channel stability.
- j. Protect watershed restoration projects until the areas have stabilized.

The following factors shall be considered during development of restoration projects; predicted changes in water quality, downstream values, site productivity, threats to life and property, any direct or indirect economic returns and social or scenic benefits.

3. Implementation. This management practice is implemented through the development of a watershed improvement needs inventory and integrated watershed improvement project plans.

Planning and implementation will be done using the IRM Process. Pursue multifunctional funding of projects where improvement of watershed conditions will benefit multiple resource areas. The actual work may be done by Forest Service crews, through contract, or by volunteers.

25.11 - Conduct Floodplain and Wetland Hazard Analyses and Evaluations

1. Objective. To minimize the long- and short-term adverse impacts to hydrologic function associated with the occupancy and modification of floodplains.

2. Explanation. The condition of floodplains and wetlands plays an important role in the hydrologic functioning of a watershed. Development in the floodplain frequently has an adverse effect on hydrologic function. Forest Service policy is to recognize floodplains and wetlands as specific management areas, and to avoid adverse impacts which may be associated with the occupancy and modification of floodplains and with the destruction, loss, or degradation of wetlands.

3. Implementation. Floodplain analysis and evaluation are part of the environmental analysis process. Make flood hazard analysis and evaluation prior to acquisition or exchange of land within floodplains. A floodplain analysis and evaluation must be made when sites within floodplains are being considered for structures or developments. Include recommendations for alternative ways to achieve exchange, acquisition, or project goals, and protect hydrologic function in project designs and NEPA documents.

25.12 - Protection of Wetlands and Riparian Areas.

1. Objective. To avoid adverse impacts, including impacts to water quality, associated with disturbance or modification of wetlands.

2. Explanation. The Forest Service recognizes the beneficial values of wetlands, and will, in accordance with Executive Order 11990 of May 24, 1977, take action to minimize destruction, loss, or degradation of wetlands.

3. Implementation. During project planning, all potentially impacted wetlands are mapped. Wetland values are considered and evaluated as an integral part of the project planning process. Mitigating measures are incorporated into project plans and designs to maintain the hydrologic and biologic function of the wetlands.

25.13 - Oil and Hazardous Substance Spill Contingency Plan and Spill Prevention Control and Countermeasure (SPCC) Plan.

1. Objective. To prevent contamination of waters from accidental spills.

2. Explanation. A contingency plan is a predetermined organization and action plan to be implemented in the event of a hazardous substance spill. Factors considered for each spill are the specific substance spilled, the quantity, its toxicity, proximity of the spill to waters, and the hazard to life and property.

The SPCC Plan is a document which requires appropriate measures (40 CFR 112) to prevent oil products from entering the navigable waters of the United States. An SPCC Plan is needed if the total oil products on-site above-ground storage exceeds 1320 gallons or if a single container exceeds a capacity of 660 gallons.

3. Implementation. Each forest shall be responsible for designating emergency spill coordinators and documenting names and telephone numbers of agencies to call regarding cleanup of spills in the contingency plan. Individual Forests should maintain an inventory of materials to use during the cleanup of a spill. Disposal methods and sites must be coordinated with Environmental Protection Agency (EPA), state, and local officials responsible for safe disposal.

All Forests shall maintain a Spill Contingency Plan and SPCC Plans are required for Forest Service owned and special use permitted facilities, as well as by timber sale operators and other contractors who store petroleum products.

25.14 - Control of Activities Under Special Use Permit.

1. Objective. To protect surface and subsurface water quality from physical, chemical, and biological pollutants resulting from activities that are under special use permit.

2. Explanation. Many activities and uses take place on National Forest System (NFS) lands which are not directly related to Forest Service management activities. Some examples are: electronic sites, highway and railroad rights-of-way, wastewater treatment and disposal, solid

waste disposal, and power transmission lines. There are other uses which are recognized Forest Service land management activities which are achieved through permits to a public or private agency, group, or individual. Examples of these types of uses are; organization camps, recreation residence tracts, and ski areas.

Activities on lands withdrawn under Federal Energy Regulatory Commission (FERC) authority may be exempt from Forest Service control. When the FERC permit is renewed, the Forest Service makes a complete restudy of water quality and quantity impacts and updates the constraints with which the permittee must operate. (FSM 2726.11)

3. Implementation. The special use permit under which agencies, groups, or individuals operate, shall detail the conditions they must meet to continue operating including measures necessary to comply with state and Federal water quality standards. The permittees shall conform to all applicable State and Local regulations governing water quality and sanitation. The regulations may in turn require the permittee to obtain a waste discharge permit from the state. Failure on the part of the permittee to meet the conditions of the special use permit may result in the permit being revoked.

25.15 - Water Quality Monitoring.

1. Objective. To verify the effectiveness of BMP through the collection of representative water samples.

2. Explanation. Water quality monitoring is a mechanism which evaluates the effectiveness of a management prescription in protecting water quality. A water quality monitoring plan may be made a part of an environmental assessment, a management plan, a special use permit, or it may be developed in response to other needs.

3. Implementation. If it is determined in the IRM process that a water quality monitoring plan is needed, a plan is written or reviewed by a hydrologist. The plan may be implemented by the hydrologist or by other qualified Forest personnel. The actual analysis of the samples are done by the hydrologist, State certified laboratory or other trained Forest personnel. Interpretation of the data and any reporting is also done by the hydrologist or trained personnel. Use the EPA STORage and RETrieval computer system (STORET) system for computer storage of all water quality data collected.

25.16 - Soil Moisture and Wetland Limitations for Equipment Operation Vehicle Use.

1. Objective. The objective of this measure is to prevent compaction, rutting, and gullyng which may result in site degradation, sediment production, and turbidity.

2. Explanation. This is a preventative measure that reduces surface disturbance by equipment operating during wet soil conditions. Soil erodibility, climatic factors, soil/water relationships, and mass stability are factors used by soil scientists, and hydrologists during the

environmental analysis process to make recommendations on equipment limitations during wet seasons.

3. Implementation. The COR is responsible for determining when the soil moisture is such that the soil surface is unstable and susceptible to damage. The COR is also responsible for suspending or terminating operations for contracted projects when soil moisture content warrants. The project supervisor is responsible for determining when the soil surface is susceptible to damage, and is then responsible for terminating operations when Forest Service personnel or volunteers are used to accomplish a project. Project planners are responsible for including appropriate contract provisions and management requirements in project work plans and environmental documents.

25.17 - Slope Limitations for Equipment Operation and Vehicle Use.

1. Objective. The objective is to reduce erosion and associated sediment production by limiting equipment and vehicle use on steep slopes.

2. Explanation. This is a preventative measure that limits excessive surface disturbance and surface erosion. This measure facilitates proper drainage of disturbed areas by limiting equipment and vehicle operation to slopes where corrective measures such as water bars can be installed.

3. Implementation. The need for slope limitation is determined in the IRM process. The COR is responsible for ensuring implementation of the contract provisions that pertain to equipment operation on steep slopes. The project planners have the responsibility to ensure that appropriate tractor operation provisions are included in the contract. This practice is implemented on all vegetative manipulation projects where appropriate. The project supervisor is responsible for identifying areas where operations should be limited on projects accomplished by Forest Service people or volunteers. The supervisor's direction is taken from the project work plan and environmental documentation.

25.18 - Revegetation of Surface Disturbed Areas.

1. Objective. To comply with state and Federal water quality standards by minimizing soil erosion through the stabilizing influence of vegetative ground cover.

2. Explanation. This is a corrective practice to stabilize the soil surface of a disturbed area. The vegetation selected will be a mix of species that is best suited to meet the erosion control objective, with consideration for range, wildlife, timber, or fuels management objectives. Fertilization and irrigation, along with placement of a tackifier, jute netting or other soil surface stabilizing material may be necessary to ensure vegetation is established.

3. Implementation. When developing project plans using the IRM process, assess surface disturbed areas and prescribe vegetative species mix needed for revegetation. Monitor projects to assess their effectiveness, and need for follow-up action.

25.19 - Contour Disking, Contour Furrowing, Contour Terracing, Harrowing, and Ripping

1. Objective. The objective of these practices is to reduce on-site soil losses and associated sediment production by reducing overland flow.
2. Explanation. These measures reduce the concentration of surface water and its associated erosive forces by enhancing soil infiltration rates.
3. Implementation. Determine the need and suitability of these practices using the IRM process. The COR is responsible for enforcing the contract provision for contracted projects. The project supervisor is responsible for enforcing management requirements provided in the project NEPA documentation for in-service projects. The project planners are responsible for appropriate contract provisions or management requirements, including work plans, NEPA documents, and contracts.

25.2 - Evaluation of Cumulative Watershed Condition Effects.

1. Objective. To protect the beneficial uses of water from adverse effects of multiple land management activities.
2. Explanation. Watershed condition is a description of the health of a watershed in terms of water quality, quantity, and timing. Many management activities have an effect, either positive or negative, on watershed condition. Usually the effects of management activities are temporary, or declining in magnitude over time. Natural events may also have a positive or negative effect on watershed condition.

The ability and rate of a watershed to recover from negative effects is determined primarily by climate and soil. Each watershed has some tolerance for negative effects. When this tolerance is exceeded, permanent impairment to the watershed may result. Measures of groundcover, estimates of erosion, road density, water yield or macro-invertebrate diversity, can be used as indicators of the management effects on watershed condition. These indicators can also be used to set watershed tolerances. When a watershed tolerance will be exceeded by a proposed activity, managers will consider changing the activity, changing the activity schedule, or employing mitigative measures to reduce the effects.

3. Implementation. Conduct the cumulative watershed condition effects evaluation as part of the IRM process.

25.21 - Soil Quality Monitoring.

1. Objective. To assure that management practices do not allow significant or permanent impairment of the productivity of the land.
2. Explanation. Soil quality monitoring is used to evaluate the effects of management activities on soil productivity, and determine if soil management objectives have been achieved. Monitoring can be either implementation, effectiveness, or validation types of monitoring.

3. Implementation. Soil scientists and other trained personnel routinely conduct implementation monitoring. Additional effectiveness or validation monitoring may be identified through the IRM Process, in which case a complete Soil quality monitoring plan will be prepared by the soil scientist or other trained Forest personnel.

26 - WILDLIFE AND FISHERIES MANAGEMENT.

The objective of wildlife and fisheries management is to protect, maintain, and enhance habitat for wildlife and fisheries resources.

26.1 - Control of Channel Disturbance from Fish Habitat Improvement Structures.

1. Objective. To minimize sediment in streamcourses during construction and placement of fish habitat improvement structures.

2. Explanation. Installation of fish habitat improvement structures such as logs sills, wing deflectors, and bank cover structures commonly dislodges or exposes sediments creating a potential for erosion. This disturbance can be minimized by limiting the extent and duration of impact by utilizing techniques such as installing structures during low flow periods, using staged construction, limiting the total amount of installation activity at any given time, construction of temporary sandbag or rock coffer dams around the areas, diverting or piping streamflow around or through the site, minimizing use of heavy machinery operating in the channel, and/or using rubber tired equipment when operating in the channel.

3. Implementation. Water quality protection needs and techniques are identified through the IRM process. The project manager is responsible for ensuring techniques are entered as contract provisions for contracted projects with subsequent implementation by COR. The project manager will communicate to Forest Service personnel or volunteer personnel to ensure correct implementation when projects are accomplished in-house.

26.11 - Control of Sedimentation from Wildlife Habitat Improvements.

1. Objective. To minimize sediment production resulting from soil movement associated with construction of wildlife habitat improvement structures.

2. Explanation. Installation of wildlife habitat improvement structures such as wildlife waters, waterfowl nesting islands, dams, dikes, channels, and so forth, sometimes require excavation. Disturbance can be minimized by limiting the extent and duration of impact by utilizing techniques such as installing structures during dry periods, using staged construction, limiting the total amount of installation activity at any given time, minimizing use of heavy machinery, and using rubber tired equipment.

3. Implementation. Water quality protection needs and techniques are identified through the IRM process. The project manager is responsible for ensuring techniques are entered as contract provisions for contracted projects with subsequent implementation by COR. The project manager will communicate to Forest Service personnel or volunteer personnel to ensure correct implementation when projects are accomplished in-house.

27 - MINING AND MINERALS MANAGEMENT.

Mineral (including oil, gas, and geothermal resources) exploration and development activities on National Forest System lands fall into the following categories:

1. Locatable. Activities authorized under the U. S. Mining Laws, Act of May 10, 1872, as amended. This law applies to most hard rock and placer mineral deposits in National Forest System lands reserved from the public domain.
2. Leasable. Activities authorized by various mineral leasing acts. Generally applies to all minerals, except mineral materials, in acquired National Forest System lands and to energy minerals in National Forest System lands reserved from the public domain.
3. Salable Mineral Materials. Activities administered under the Act of July 31, 1947, and several other Acts. Mineral materials such as sand, stone, gravel, pumice, cinders, and clay located in National Forest land may be disposed of by one of the following means:
 - a. Sale to companies and individuals.
 - b. Free use permits to other government units and to nonprofit associations and individuals.
 - c. Forest Service force account or contract to carry out Forest Service programs (for example, timber sale contracts).

27.1 - Water Resources Protection on Locatable Mineral Operations

1. Objective. To comply with state and Federal water quality standards and prevent water quality degradation by physical and chemical pollutants resulting from locatable mineral exploration, development, production, and associated activities.
2. Explanation. It is the Forest Service's objective to ensure that all mineral activities are conducted in an environmentally sound manner and that lands disturbed by mineral activities are reclaimed for other productive uses (FSM 2802).

Since a mining operation usually involves activities such as site clearance and road construction, soil and water conservation practices should be implemented as warranted.

3. Implementation. Seven instruments may be used in controlling the impact on surface resources, including the water quality, of locatable mineral activities on NFS administered lands. It is not necessary to use all of them in every case; they are:
 - a. Notice of Intention to Operate
 - b. Plan of Operations
 - c. Environmental Analysis and appropriate NEPA documentation

- d. Guarantee to Perform Reclamation Work
- e. Special Use Permit
- f. Road Use Permit
- g. Notice of Noncompliance

A Notice of Intention to Operate (NIO) is required from those intending to conduct mining operations which have the potential to cause disturbance of surface resources, including surface waters, on National Forest System lands. The NIO must include sufficient information concerning the mining activity to allow for an environmental analysis and determination of the need for a detailed Plan of Operations. A Plan of Operations is required from operators when mining actions will likely cause a significant disturbance of surface resources, including surface waters. The plan must be approved prior to commencing any work.

The District Ranger reviews the operating plan, assures that it contains the necessary protective practices. These practices include proper disposal of solid wastes, erosion control measures during road construction and maintenance, reclamation of disturbed sites, and prevention of hazardous substance spills. In addition the operator may be required to furnish a security bond as a guarantee that reclamation work will be performed. Through the use of the "Notice of Intent," "Plan of Operations," and provisions in any "Special Use Permit" issued, the Forest Officer checks for compliance with prescribed measures. Legal remedies are available if mutual cooperation fails.

27.11 - Administering Terms of BLM Issued Permits or Leases for Mineral Exploration and Extraction on National Forest System Lands .

1. Objective. To assure that other resource values, including water quality, are protected during mineral exploration, extraction, processing, and reclamation activities carried out on National Forest land under the terms of Prospecting Permits and Mineral Leases.

2. Explanation. Through the NEPA process, the Forest Service (FS) and Bureau of Land Management (BLM) make a determination as to whether or not to issue a BLM prospecting permit or lease. The decision is based on the Forest Plan's management direction, prescriptions, and standards and guidelines, including those for soil and water protection. The lease/permits contain standard stipulations or terms to protect soil and water. In addition, the FS and the BLM review each lease to determine the need for any additional lease stipulation required for soil/water protection.

After a lease is issued, if the lessee proposes to conduct any actual on-the-ground operations, additional FS and BLM review and environmental analysis of the proposed operation is required. There are numerous BLM regulations and requirements which provide the authorities to protect soil and water resources during and after lease operations. In addition, FS practices to protect soil and water resources (including reclamation requirements) are part of the review and approval process and are incorporated as needed in operating plans.

3. Implementation. Implementation is primarily by two interagency agreements (IA) between the BLM and the FS. The 1984 IA provides the policy and procedures for FS/BLM cooperation in the processing of BLM issued leases and permits to federally owned minerals on NFS lands. The agreements provides for NEPA compliance and stipulation on development and use. The 1987 IA provides the policy and procedures for FS/BLM cooperation in the processing, approval, and supervision of leasable mineral operations on NFS lands. The agreement provides for NEPA compliance and the development and use of conditions of approval for lease operations.

The Federal On-Shore Oil/Gas Leasing Reform Act of 1987 provides the FS with new authority in regard to oil/gas lease issuance and operations. The FS has approval authority for lease issuance and for approval and enforcement of Surface Use Plans including appropriate measures to protect water quality.

27.12 - Administering Forest Service Mineral Material Regulations (36 CFR 228C) for Disposal of Mineral Materials (Common Variety Minerals).

1. Objective. To assure that resource values, including water quality, are protected during the exploration and development of common variety minerals.

2. Explanation. Forest Service mineral materials regulations provide the mechanism for protecting soil and water resources in the disposal of mineral materials. Forest Service policy is to make mineral materials on National Forest System lands available to the public and to local, State, and Federal government agencies where reasonable protection of, or mitigation of effects on, other resources is assured, and where removal is not prohibited.

The authorized officer must ensure that an environmental analysis is conducted for all planned disposal of mineral materials.

Decisions to authorize the disposal of mineral materials must conform to approved land and resource management plans.

Adequate measures must be taken to protect, and minimize damage to the environment. Mineral materials may be disposed of only if the authorized officer determines that the disposal is not detrimental to the public interest. Reclamation requirements are included for all pits and quarries.

3. Implementation. Water protection measures (including reclamation requirements) are identified during the review and environmental analysis of any proposed permit, contract, or plan for mineral materials.

The authorized officer can deny approval of any permit or contract in which reasonable protection of, or mitigation of effects on, water resources (or other resources) cannot be assured. Review of proposed permits and contracts by interdisciplinary teams provides for development of contract or permit terms to protect water resources.

27.13 - Mined Land Reclamation.

1. Objective. To reduce on-site soil loss to within tolerable soil loss limits and protect surface and groundwater quality from toxic substances through reclamation of mined lands.

2. Explanation. Mined lands are often devoid of vegetation and, in some instances, may produce acidic or toxic leachate which can contaminate groundwater or nearby streams. Reclamation is a required part of all mining operations on NFS lands. Aside from these mined lands which are routinely reclaimed, there are some mined lands which were abandoned decades ago, were acquired by land exchanges, or for other reasons are considered abandoned mined lands. Reclamation plans for reducing impacts to soil and water resources may be developed for abandoned mines. Reclamation may include such measures as surface drainage control, reshaping, and revegetation. A thorough analysis of chemical and physical properties of soils and spoil/tailing materials must be done to determine if soil amendments are needed and to select species which will successfully revegetate these areas.

3. Implementation. Land reclamation is typically implemented through coordination with the State, since they have programs and funds available to accomplish restoration of abandoned mined lands. First identify mined lands needing reclamation. If the claim is still active or if the claimant can be located, reclamation should be performed by the claimant. If the mined land is truly abandoned, then notify the State, and reclamation is pursued through that means. If this is unsuccessful then a reclamation plan should be developed by the Forest Service using the IRM process, and alternate sources of funding pursued. The Forest Service also implements this objective by coordinating with EPA on the Federal Facilities Compliance Program as mandated by the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) and its amendments, the Superfund Amendments and Reauthorization Act (SARA).

CHAPTER 30 - RESOURCE PROTECTION ACTIVITIES

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31 - FIRE SUPPRESSION AND FUELS MANAGEMENT.

Emergency fire suppression activities on National Forest lands are conducted to reduce resource losses (including, the loss of soil productivity and degradation of water quality) and to minimize threats to life and property both on and off-site. Suppression activities include hand and dozer fireline construction, access road construction, firing operations, and use of fire retardants and suppressants.

Water and soil objectives are considered during the development of fire suppression strategies.

Burned area rehabilitation surveys, to assess fire damages, are conducted by an interdisciplinary (ID) team on all wildfires larger than 300 acres. District Rangers may request an interdisciplinary assessment for smaller fires if significant resource damage has, or could occur.

Fuels management activities, which may include the use of prescribed burning intended to reduce the size, cost, and damage from wildfire, are planned and designed with water and soil protection as criteria.

31.1 - Fire and Fuel Management Activities.

1. Objective. To reduce public and private losses which result from wildfires and/or subsequent flooding and erosion, by reducing the frequency, intensity, and destructiveness of wildfire.

2. Explanation. Administrative, corrective and preventive measures include:

- a. Fuelbreak construction.
- b. Vegetation management.
- c. Greenbelt establishment to separate urban areas from wildlands.
- d. Fuel reduction blocks and corridors.
- e. Access roads for rapid ingress and egress.
- f. Fire suppression.
- g. Fuel utilization and modification programs.
- h. Public information and education programs.

3. Implementation. Fuel Management is implemented through normal program planning and budgeting and the Integrated Resource Management (IRM) process. Fuel management projects are planned, evaluated, and documented by an ID team. Management constraints and multiple resource protection measures and monitoring requirements are prescribed by the ID team and are documented in the project environmental analysis. Application of constraints and protection measures are the responsibility of the project officer.

31.11 - Consideration of Water Quality in Formulating Fire Prescriptions.

1. Objective. To provide for water and soil resource protection while achieving management objectives through the use of prescribed fire.

2. Explanation. Prescription elements will include such factors as weather, slope, aspect, soils and soil moisture, fuel type and amount, and fuel moisture which influence the fire intensity and thus have a direct effect on whether or not a litter layer remains after burning, and whether or not a water repellent layer is formed. Spatial distribution and contiguous size of the planned burn area in a watershed are considered in developing prescriptions to reduce the effects of peak flow change on channels.

3. Implementation. The prescription elements are defined by the ID team during project planning using the IRM process. Field investigations are conducted as required to identify site-specific conditions which may affect the prescription. Both the optimum and tolerable limits for water quality needs should be established. Additional monitoring requirements established through IRM, will be used to verify or deny the validity of prescriptions.

31.12 - Protection of Water Quality from Prescribed Burning Effects.

1. Objective. To maintain soil productivity, minimize erosion, and prevent detrimental amounts of ash, sediment, nutrients, and debris from entering water bodies.

2. Explanation. Some of the techniques used to prevent water quality degradation are:

- a. Construct water bars in firelines.
- b. Reduce fuel loading in drainage channels.
- c. Maintain the integrity of the streamside management zone.
- d. Avoid intense fires on sensitive soils, which may promote water repellency, nutrient leaching, and erosion.
- e. Modify desired fire behavior prescriptions relative to burn unit location in watersheds.
- f. Retain or plan for sufficient groundcover to prevent erosion of the burned site.

3. Implementation. The ID team identifies streamside management zones and soils with hydrophobic tendencies as part of the project plan. Forest Service and/or other crews are used to prepare and implement prescribed burning plans.

31.13 - Minimizing Watershed Damage from Fire Suppression Efforts.

1. Objective. To avoid watershed damage in excess of that which would be caused by the fire itself.

2. Explanation. Heavy equipment operation on fragile soils, sensitive areas, and steep slopes is avoided when possible and acceptable under objectives identified in the "Escaped Fire Situation Analysis." The analysis will be prepared by the local line officer and staff. Watershed considerations must be part of the analysis. Major project fires utilize a Resource Advisor to advise the Incident Commander of resource values and objectives during the suppression effort.

3. Implementation. A Resource Advisor is assigned by the Forest Supervisor and works for the Incident Management Team, as a member of the command staff (agency or unit liaison), or for the Planning Section Chief. Technical resource people are available to identify fragile soils, sensitive and unstable areas and would be assigned to the fire as a technical specialist under the Planning Section Chief.

31.14 - Repair or Stabilization of Fire Suppression Related Watershed Damage.

1. Objective. To stabilize all areas that exhibit a significant increase in erosion potential, or a drainage pattern altered by suppression related activities.

2. Explanation. Treatments for fire-suppression damages include, but are not limited to, installing water bars and other drainage diversions in fire roads, fire lines, and other cleared areas; seeding, planting, and fertilizing to provide vegetative cover, spreading slash or mulch to protect bare soil; repairing damaged road drainage facilities; and clearing stream channels of structures or debris that was deposited by suppression activities.

3. Implementation. This work may be done by the fire fighting forces either as a part of the suppression effort or before personnel and equipment are taken off the fire lines. The Incident Commander may be responsible under the direction of the local line officer for repair of suppression related resource damage. Post incident area rehabilitation may be required on burned areas of significant size (300 acres or larger).

31.2 - Emergency Rehabilitation of Watersheds Following Wildfires.

1. Objective. To provide for immediate rehabilitation of watersheds following wildfire. This includes stabilizing soil and directing water flow to reduce sediment and debris movement.

2. Explanation. Emergency rehabilitation is a corrective measure that involves a variety of treatments. Treatments may include:

- a. Seeding grasses or other vegetation to provide a protective cover as soon as possible.
- b. Fertilizing.
- c. Fencing to protect new vegetation from wildlife and livestock.

- d. Clearing debris from stream channels.
- e. Constructing trash racks, channel stabilization structures, and debris retention structures.

Treatments are selected on the basis of on-site values, downstream values, probability of successful implementation, social environmental considerations, and cost as compared to benefits.

3. Implementation. Burned-area surveys of all fires larger than 300 acres shall be conducted by an ID team. Team members normally include a hydrologist, a soil scientist, and representatives of other disciplines as needed. If the rehabilitation project is needed, a project supervisor and restoration team will begin work with the objective of project completion before damaging storms occur. Rehabilitation projects are evaluated following major storms and runoff events and until the watershed is stabilized. The evaluation determines the effectiveness of the rehabilitation measures and indicates if followup actions are needed.

CHAPTER 40 - RESOURCE ACCESS AND FACILITIES

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41 - ACCESS AND TRANSPORTATION SYSTEMS AND FACILITIES.

Road planning is a complex process that assures that roads are located and designed to meet Forest management objectives. General objectives are developed by legislation, policy, directives, and in Forest Land Management Plans. Project-specific resource objectives are developed by an interdisciplinary (ID) team using the road development Project Implementation Process (PIP), a specific utilization of Integrated Resource Management (IRM).

Generally, most of the Forest Service roads in the Southwestern Region are built under Timber Sale Contracts. However, roads may also be constructed under Public Works Contracts or under special use permits. The process of planning these roads is essentially the same no matter which resource purposes they serve.

Transportation planning is normally conducted using the road development PIP, with the objectives of locating roads both to service individual timber sale areas and to serve Forest long-range transportation needs. Existing roads that are used for the timber sale go through the same

interdisciplinary scrutiny. Inadequate roads are upgraded to reduce adverse environmental effects, improve user safety, and reduce user cost.

Design engineers design access and transportation systems according to the selected design standards identified in the IRM process. At times, members of the ID team may be involved in the road design phase to assist in meeting the selected resource objectives.

The implementation phase of road development includes road design and construction inspection.

When road construction is in progress, the Engineering Representative, Contracting Officers Representatives, and/or Construction Inspector are frequently on the project area. These inspectors, along with a Forest or construction industry representative, assure that the project is carried out according to the specifications in the contract. Various ID team members may be called upon to review proposed design modifications during construction.

Forest Service crew leaders and supervisors are responsible for ensuring that projects accomplished by Forest Service organizations meet design standards.

Facilities normally encountered on National Forests System lands are administrative sites, such as guard and fire stations, work centers, ranger stations, or Visitor Information Service centers. Other proposals come from the private sector to build such facilities as: ski areas, marinas, concession buildings, or waste disposal areas. Proposed facilities are evaluated using the IRM process.

41.1 - Erosion Control Plan.

1. Objective. To minimize erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.

2. Explanation. Land disturbing activities including pioneer roads (routes cleared of vegetation before road construction is started) usually result in some erosion. By effectively planning for erosion control, water quality impacts can be reduced. Practices, locations of practices, and specifications for practices will be used to minimize erosion and sedimentations. Erosion control objectives usually require a combination of practices that promote the re-establishment of vegetation on exposed slopes, provide physical protection to exposed soil, prevents the downslope movement of soil, or controls drainage.

3. Implementation. Detailed practices are developed, using an IRM process; the measures are incorporated in the contract's specifications and provisions.

41.11 - Timing of Construction Activities.

1. Objective. To comply with state and Federal water quality standards.

2. Explanation. Scheduling operations during periods when the probabilities for rain and runoff are low is an essential element of effective erosion control. Equipment shall not be operated when ground conditions are such that unacceptable soil compaction or displacement result.

Erosion control work is kept current. Construction of drainage facilities and performance of other contract work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon thereafter as practicable. The area being graded at a site at any one time should be limited, and the time that an area is without protective cover (for example, vegetation, jute matting, and so forth) should be minimized. Erosion control work must be kept current when construction occurs outside of the normal operating season.

3. Implementation. Detailed mitigative measures, including operation scheduling, are developed using the IRM process and are incorporated into the National Environmental Protection Act (NEPA) documentation and contracts.

41.12 - Road Slope Stabilization.

1. Objective. To prevent on-site soil loss from exposed cut slopes, fill slopes, and spoil disposal areas.

2. Explanation. Depending on various factors such as slope angle, soils, climate, and proximity to waterways, fill slopes, cut slopes, and spoil disposal areas will require vegetative and/or mechanical measures to provide soil stability. The level of stabilization effort needed must be determined on a case-by-case basis.

Vegetation measures include the seeding of herbaceous species (grass, legumes, or browse species), or the planting of brush or trees. Vegetative measures may include fertilization and mulching to ensure success.

Mechanical measures may include, but are not limited to: wattling, erosion nets, terraces, side drains, blankets, mats, riprapping, mulch, tackifiers, pavement, soil seals, and retaining walls.

3. Implementation. Initial project location, mitigative measures, and management requirements and needs are normally developed during the IRM process. These requirements and needs are translated into project plans, contract provisions and specifications. Forest Service crew leaders, road inspectors, and their supervisors typically monitor work accomplishment and effectiveness, to help ensure that design standards, project plan constraints, and mitigative measures are met.

Mechanical and vegetative surface stabilization measures shall be periodically inspected, as necessary, to determine effectiveness. In some cases, additional work may be needed to ensure

that the vegetative and/or mechanical surface stabilization measures continue to function as intended.

41.13 - Dispersion of Subsurface Drainage from Cut and Fill Slopes.

1. Objective. To minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.

2. Explanation. Roadways may change the subsurface drainage characteristics of a slope. Since the angle and height of cut and fill slopes increase the risk of instability, it is often necessary to provide subsurface drainage to avoid moisture saturation and subsequent slope failure. Where it is necessary because of slopes, soil, aspect, precipitation amounts, inherent instability or other related characteristics, one of the following dispersion methods should be used:

- a. Pipe under-drains.
- b. Horizontal drains.
- c. Stabilization trenches.

Dispersal of collected water should be accomplished in an area capable of withstanding increased flows. Energy dissipators may need to be placed below pipes carrying large volumes of water.

3. Implementation. Project location and detailed mitigative measures are determined by the design engineers, using the IRM process.

41.14 - Control of Road Drainage.

1. Objective.

- a. To minimize the erosive effects of concentrated water flows caused by road drainage features.
- b. To disperse runoff from disturbances within the road clearing limits.
- c. To lessen the sediment load from roaded areas.
- d. To minimize erosion of the road prism by runoff from road surfaces and from uphill areas.

2. Explanation. A number of measures can be used (alone or in combination) to control road drainage. Methods used to reduce erosion may include such things as properly placed

culverts, cross drains, water bars, dips, energy dissipators, aprons, downspouts, gabions, and/or debris racks, and armoring of ditches and drain inlets and outlets.

Dispersal of runoff can be accomplished by such means as rolling the grade, insloping, outsloping, crowning, installation of water spreading ditches, contour trenching, or overside drains, and so forth. Dispersal of runoff also reduces peak downstream flows and associated high water erosion and sediment transport.

Sediment loads can be reduced by installing such things as: sediment filters, settling ponds, and contour trenches. Soil stabilization and dispersed water flows on borrow and waste areas, cut and fill slopes, and road shoulders can minimize sedimentation.

3. Implementation. Project location, design criteria and detailed mitigative measures are determined through the IRM process.

41.15 - Timely Erosion Control Measures on Incomplete Roads and Streamcrossing Projects.

1. Objective. To minimize erosion and sedimentation from road construction sites where final drainage structures have not been completed.

2. Explanation. The best drainage design can be useless if projects are incomplete at the end of the normal operating season. Affected areas can include roads, fills, tractor trails, skid trails, landings, streamcrossings, bridge excavations, and firelines. Preventative measures include:

- a. The removal of water controlling devices that will not carry anticipated seasonal water runoffs, such as temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways.
- b. The installation of temporary devices that will carry anticipated seasonal water runoffs, such as culverts, side drains, flumes, cross drains, diversion ditches, energy dissipators, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion.
- c. The removal of debris, obstructions, and spoil material from channels and floodplains.
- d. Grass seeding, planting deep-rooted vegetation, and/or mulching.

3. Implementation. Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside of the Normal Operating Season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed" if weather conditions deteriorate. Do not abandon areas for the winter with remedial measures incomplete.

Project mitigative measures and location are developed and documented during the IRM process.

41.16 - Construction of Stable Embankments (Fills).

1. Objective. To construct embankments with materials and methods which minimize the possibility of failure and subsequent water quality degradation.

2. Explanation. The failure of road embankments and the subsequent deposition of material into waterways may result from a lack of compaction during the construction of the embankment, as well as from the use of inappropriate placement methods.

To minimize this occurrence, the roadway should be designed and constructed as a stable and durable earthwork structure with adequate strength to support the pavement structure, shoulders, and traffic. Proper slope ratio design will promote stable embankments.

3. Implementation. Project constraints and mitigative measures are developed through the IRM process. The appropriate method of embankment placement is chosen during this process.

41.17 - Control of Sidecast Material.

1. Objective. To minimize sediment production from sidecast material during road construction, reconstruction, or maintenance.

2. Explanation. Unconsolidated sidecast material can be difficult to stabilize and is susceptible to erosion and/or mass instability. Site-specific limits or controls for the sidecasting of uncompacted material should be developed through interdisciplinary input, and shown on the plans. Loose, unconsolidated sidecast material should not be permitted to enter streamside management zones. Sidecasting is not an acceptable construction alternative in areas where it will adversely affect water quality. Prior to commencing construction or maintenance activities, waste areas should be located where excess material can be deposited and stabilized.

3. Implementation. Project location, selected disposal areas, and mitigative measures are developed through the IRM process.

Forest Service crew leaders and work supervisors are responsible for ensuring that projects accomplished by Forest Service organizations meet design standards and project NEPA analysis criteria. Road Maintenance Plans are developed for each Forest which include needed slide and slump repairs, and, in critical areas, disposal site location for excess material.

Contracted projects are implemented by the contractor or timber sale operator. Compliance with project criteria, contract specifications, and operating plans is assured by the Forest Service Contracting Officer's Representative (COR) or engineering representative (ER).

Timber sale contracts include C5.4 and T-Road Maintenance Specifications which address slide and slump repair, surface blading, and ditch cleaning.

41.18 - Servicing and Refueling of Equipment.

1. Objective. To prevent pollutants such as fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials from being discharged into or near rivers, streams, and impoundments, or into natural or man-made channels leading thereto.

2. Explanation. During servicing or refueling, pollutants from logging or road construction equipment may enter a watercourse. This threat is minimized by selecting service and refueling areas well away from wet areas and surface water, and by using berms around such sites to contain spills. Spill prevention, containment, and countermeasures (SPCC) plans are required if the volume of fuel exceeds 660 gallons in a single container or if total storage at a site exceeds 1320 gallons.

3. Implementation. The COR/ER or SA will designate the location, size, and allowable uses of service and refueling areas. They will also be aware of actions to be taken in case of a hazardous substance spill, as outlined in the Forest Hazardous Waste Contingency Plan. Any SPCC needs to be reviewed and certified by a registered professional engineer.

41.19 - Diversion of Flows Around Construction Sites.

1. Objective. To ensure that all stream diversions are carefully planned. To comply with state and Federal water quality standards. To restore stream channels to their natural grade, condition, and alignment.

2. Explanation. Flow must sometimes be guided or piped around project sites. Typical examples are bridge and dam construction. Flow in streamcourses will be diverted, if necessary, to protect water and related resources. Such a diverted flow shall be restored to the natural streamcourse as soon as practicable and, in any event, prior to the major storm season.

3. Implementation. Where and when diversions are required will be determined in the Integrated Resource Management (IRM) process. Design shall include mitigative measures necessary to protect fishery values and other downstream uses. The IRM process may require project review by other Federal, State, and/or local agencies and private parties, to ensure that all factors are considered.

41.2 - Streamcrossings on Temporary Roads.

1. Objective. To keep temporary roads from unduly degrading water quality, damaging streams, disturbing channels or impeding fish passage, so that state and Federal water quality standards are complied with.

2. Explanation. Culverts, coarse rock fills, hardened fords (using such features as rocked approaches), low water crossings, and temporary bridges shall be evaluated in the IRM process for each sensitive streamcrossing. Such facilities shall be designed to provide for unobstructed flows and the passage of fish, and to minimize damages to streamcourses. The number of crossings shall be kept to the minimum needed for access. Channel crossings shall be as perpendicular to streamcourses as possible. Streambank excavation shall be kept to the minimum needed for use of the crossings, and entry and exit ramps may need to be rocked. Fords or turnpike crossings hardened with washed rock or landing mats are sometimes an acceptable alternative, depending on fishery and hydrological considerations. Crossing facilities will be removed when the facility is no longer needed or, if the crossing obstructs high flows, prior to closing down operations for the season.

3. Implementation. Project location and mitigated measures are developed using an IRM process.

41.21 - Controlling In-Channel Excavation.

1. Objective. To minimize sedimentation and turbidity resulting from excavation for in-channel structures, so as to comply with state and Federal water quality standards.

2. Explanation. Excavation is a common requirement for the installation of bridges, culverts and minor streamside structures such as weirs, check dams, riprapping or fish barriers. Spoil material developed in such operations should neither obstruct the streamcourse (including natural floodplains) nor the efficiency of the associated structures. If spoil or imported material is needed within the wetland as defined by Corps of Engineers, then a 404 permit will need to be secured from the Corps. Preventative measures include:

- a. Keeping excavated materials out of streamcourses (including ephemeral and intermittent).
- b. Removing any materials stacked or stockpiled on floodplains prior to high water.
- c. Diversion of flowing water around work sites to minimize erosion and downstream sedimentation.
- d. Suitably locating bypass roads with plans made for their subsequent obliteration and stabilization when needed.
- e. Importing fill material for better soil compaction. Original fill may have to be exported to a disposal site.

For streams designated as important fisheries by the Forest Service wildlife specialists, culverts will be installed only during flow periods specified in the project plan. Normally, this work would occur during minimum flow periods when water could be more easily diverted; work may not be allowed during spawning periods. Downstream sediment basins may be necessary to mitigate impacts on low flows.

3. Implementation. Project location and detailed mitigative measures are developed during the design process to meet the project criteria, using an IRM process.

41.22 - Disposal of Right-of-Way and Roadside Debris.

1. Objective.

- a. To comply with state and Federal water quality standards.
- b. To ensure that debris generated during road construction is kept out of streams and to prevent slash and debris from subsequently obstructing channels.
- c. To ensure debris dams are not formed which obstruct fish passage or which could result in downstream damage from high water flow surges after dam failure.

2. Explanation. As a preventative measure, construction debris and other newly generated roadside slash developed along roads near streams (in the streamside management zone) shall not be deposited in stream channels (including ephemeral and intermittent). Some disposal methods are:

a. On site:

- (1) Piling and burning.
- (2) Chipping,
- (3) Burying.
- (4) Scattering.
- (5) Windrowing.
- (6) Disposal in cutting units.

b. Removal to approved disposal sites (especially stumps from the road prism).

c. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

3. Implementation. Disposal of right-of-way and roadside debris criteria are established in the project plan by the responsible forest official with the help of the ID team. Project location and detailed mitigative measures are developed using the IRM process.

41.23 - Specifying Riprap Composition.

1. Objective. To minimize sediment production associated with the installation and utilization of riprap material. To comply with state and Federal water quality standards.

2. Explanation. Riprap is commonly used to armor streambanks and drainage ways from the erosive forces of flowing water. Riprap must be sized and installed in such a way that it effectively resists erosive water velocities. On occasion, this may require the use of filter blankets or other methods to prevent the undermining of fines. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to streamflow and would only serve as sediment sources.

3. Implementation. Project location and detailed mitigative measures are developed through the IRM process and design process to meet the constraints and requirements of the project plan.

41.24 - Water Source Development Consistent With Water Quality Protection.

1. Objective. To supply water for roads and fire protection while maintaining existing water quality. To comply with state and Federal water quality standards.

2. Explanation. Water source development is normally needed to supply water for road construction, dust control, and fire control. Problems may arise when cofferdams or water holes are built in streams. In many instances earth fill is used as a dam. This practice creates sediment problems during installation and removal. Cofferdams and water holes should be built out of sandbags filled with clean sand or gravel, or other methods that will not contribute to nonpoint source pollution. Also, at no time shall downstream water flow be reduced to a level that may be detrimental to aquatic resources, fish passage, or other established uses. Damage to resources caused by Purchaser's or Contractor's Operations or fire suppression activities shall be repaired by Purchaser, Contractor, or fire suppression crews in a timely and agreed manner to the extent practical to restore and prevent further resource damage.

Overflow from water holding developments should be piped directly back to the stream. Approaches should be kept as close to perpendicular as possible to the stream. Streambank excavation should be kept to a minimum needed for entry and exit, and may be gravel surfaced as appropriate.

3. Implementation. Timber sale administrators and engineering representatives in conjunction with a hydrologist and fisheries biologist should evaluate streams in which water developments may be constructed. Water holes and other improvements shall be put into a condition, prior to a rainy season or winter, to avoid resource damage. Project location and detailed mitigative measures are developed by the design engineer, using the IRM process to meet project criteria.

41.25 - Maintenance of Roads.

1. Objective. To maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities (all of which can cause sedimentation and erosion).

2. Explanation. Roads normally deteriorate because of use and weather impacts that are not corrected with maintenance. This deterioration can be minimized through adequate maintenance and/or restriction of use. Our goal is to maintain all system roads so as to protect the road investment and to see that damage to adjacent land and resources is held to minimum. Maintenance scheduling requires an annual inspection to determine what work, if any, is needed to keep drainage functional and the road stable. Higher levels of maintenance may be chosen to reflect greater use or administrative needs. Additional maintenance measures could include resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches and spot rocking.

For maintenance of roads on active timber sales, the Forest Service and the Purchaser shall annually agree at the beginning of the operating season on an Annual Road Maintenance Plan outlining responsibilities and timing. If the road is subjected to commercial use, the Forest Service may collect deposits to facilitate road maintenance and to equitably assess maintenance cost of each user.

3. Implementation. The work is controlled by the Forest Engineer who develops a road maintenance plan. Maintenance levels are declared for each road in a timber sale area, and are documented in the sale plan. On timber sales, maintenance is a Purchaser responsibility, compliance with standards is assured by the COR or ER. On system roads outside of active timber sales, Forest Service crews or contract crews perform road maintenance under supervision of an engineering representative.

41.26 - Road Surface Treatment to Prevent Loss of Materials.

1. Objective. To minimize sediment production and erosion from road surface materials. To comply with state and Federal water quality standards.

2. Explanation. Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies. On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action is identified.

Road surface treatments are prescribed based on traffic levels, road design standards, soils, and geology. These treatments include watering, dust oiling, penetration oiling, magnesium chloride, lignin sulfonate, calcium chloride, aggregate surfacing, chip-sealing, or paving.

3. Implementation. Project location and detailed mitigative measures are developed, using the IRM process to meet project criteria.

41.27 - Traffic Control During Wet Periods.

1. Objective. To reduce road surface disturbance and rutting of roads. To lessen sediment washing from disturbed road surfaces.

2. Explanation. The unrestricted use of many National Forest roads during wet weather often results in rutting and churning of the road surfaces. Runoff from such disturbed road surfaces often carries a high sediment load. The damage/maintenance cycle for roads that are frequently used when wet can create a road surface that is a continuing sediment source.

Roads that must be used during wet periods should have a stable surface and sufficient drainage should be provided to allow such use with a minimum of resource impact. Rocking, oiling, paving, and armoring are measures that may be necessary to protect the road surface and reduce material loss. Roads that are not needed for public access or forest administrative use should be closed to use during the wet season. In many cases, use can be discouraged, but not prevented. Where rainy season field operations are planned, roads may need to be upgraded, use restricted to low ground pressure vehicles, or maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

3. Implementation. Road closures and traffic control measures should be used outside active timber sale areas. Project-associated implementation procedures can be enforced by District personnel. Hauling activity can be controlled by the sale administrator within active timber sales. The decision for closure is based on local soil moisture conditions and other criteria.

Detailed mitigative measures are developed using the IRM process.

41.28 - Snow Removal Controls to Avoid Resource Damage.

1. Objective. To minimize the impact of melt water on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

2. Explanation. This is a preventative measure used to protect resources and indirectly to protect water quality. Forest roads are sometimes used throughout the winter for a variety of

reasons. For such roads, the following measures are employed to meet the objectives of this practice:

- a. The contractor is responsible for snow removal in a manner which will protect roads and adjacent resources.
 - b. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.
 - c. Snow berms shall be removed or placed to avoid accumulation or channelization of melt water on the road and prevent water concentration. If the road surface is damaged the Purchaser or cooperator shall, prior to road use, replace lost surface material with similar quality material and repair structures damaged in blading operations, unless climatic conditions prevent necessary work from being accomplished or as otherwise agreed to in writing.
3. Implementation. Project location and detailed mitigative measures are developed using the IRM process.

41.3 - Obliteration of Roads.

1. Objective. To reduce sediment generated from unneeded roads, roads that run in streambeds, and roads that are located in streamside management zones by closing them to vehicle use and restoring them to productivity.

2. Explanation. Roads that are no longer necessary for public access or management purposes need to be obliterated. Roads that were located in streambeds or streamside management zones need to be relocated and closed. Roads that are allowed to exist without proper maintenance are subject to continued, uncorrected damage and can become chronic sediment sources.

Effective obliteration is generally achieved through a combination of these measures:

- a. Road effectively drained and blocked.
 - b. Temporary culverts and bridges removed and natural drainage configuration re-established.
 - c. Road returned to resource production through revegetation (including ripping, scarification, fertilizing, and seeding.)
 - d. Sideslopes reshaped and stabilized.
 - e. Natural means
3. Implementation. Identification of roads no longer necessary for public access or management purposes and roads that were located in streambeds or streamside management zones is accomplished using the IRM process and the Resource Access Travel Management assessment.

In timber sale areas, road closure, removal of culverts and bridges, and stabilization is accomplished by the timber purchaser or K-V funds. Compliance with plans and the Timber Sale Contract is assured by the sale administrator. Further revegetation needs are addressed in Sale Area Improvement Plans. The sale administrator may request the advice of a soil and water specialist in determining the most appropriate relocation and stabilization measures required.

Road obliteration is also accomplished through Forest Service funding provided for watershed, wildlife, and range improvement. In this case, Forest Service supervisors or contracting officers representations oversee restoration work and ensure road obliteration objectives are being met.

41.4 - Restoration of Borrow Pits and Quarries.

1. Objective. To minimize sediment production from borrow pits and quarry sites.
2. Explanation. Borrow pits and quarries are often susceptible to erosion due to steep sideslopes, lack of vegetation, and/or their proximity to water courses. Prior to excavation of the site, top soil should be removed and stockpiled for surface dressing in the post-operation period. Once excavation has been completed final treatment and erosion control for the site will be guided by the future land use. Site slope grading, seeding and mulching will be required. Sediment basins should be considered. Access roads to the site should be ripped, drained, blocked to traffic and seeded unless other treatment is required by the design.
3. Implementation. Project location and mitigative measures are developed through the IRM process.

41.5 - Surface Erosion Control at Facility Sites and Recreation Sites.

1. Objective. Reduce the amount of surface erosion taking place in conjunction with developed sites, and minimize the amount of sediment entering streams.
2. Explanation. On lands developed for administrative sites, ski areas, campgrounds, summer homes, parking areas, or waste disposal sites some ground is usually cleared of vegetation. Erosion control methods must be implemented to minimize erosion and sedimentation. Some examples of erosion control methods that could be applied at a site for keeping the soil in place would be applying grass seed, jute mesh, tackifiers, hydromulch, paving, or rocking of roads, water bars, cross drains, or retaining walls. Potential negative effects to the balance of the natural drainage pattern should be mitigated; sediment basins and sediment filters should be established to filter surface runoff where such runoff may enter streams; and diversion ditches or berms should be built to divert surface runoff around bare areas. Construction activities should be scheduled to avoid periods of precipitation and runoff.
3. Implementation. This management practice is used as a preventative and remedial measure for any land development project that will remove the existing vegetation and ground cover and leave bare soil. Erosion control measures are developed in the IRM process and incorporated in the project by the design engineer.

APPENDIX C.2

DESIGN FEATURES, BEST MANAGEMENT PRACTICES, REQUIRED PROTECTION MEASURES, AND MITIGATION MEASURES FOR INVASIVE SPECIES CONTROL

Available online at www.wapa.gov/transmission/grapevine.htm

Appendix B - Design Features, Best Management Practices, Required Protection Measures, and Mitigation Measures

Design Features for Integrated Weed Treatment Projects

- Establish 1-mile limited spray zones adjacent to communities, private lands, recreation sites, trailheads, and scenic overlooks identified by public meetings with the MCS community. Nonherbicidal treatment methods will be prioritized in these areas; only if these treatments are not successful will herbicides be used on deep-rooted perennial weeds.
- Any proposed use of herbicides in right-of-way corridors under national forest jurisdiction will be coordinated, publicly posted, and completed in such a manner that alternate routes will remain accessible until the manufacturer's re-entry period is met, so individuals with multiple chemical sensitivities and other people vulnerable to chemicals can still access recreational and other facilities found within the project area.
- Public posting will include signs at trailheads leading to or near herbicide application sites and on the trail before encountering herbicide application sites adjacent to forest trails.
- Hold a yearly meeting to discuss spraying goals and locations and alternative travel areas around sprayed zones to allow chemically sensitive people freedom to travel for the year ahead and to listen to concerns from the MCS community as the project proceeds.
- No mixing, loading, and equipment cleaning will be done within the limited spray zones, nor within 300 feet of the limited spray zones or private land.
- An 800 number will be available with weekly updates of all herbicide applications on the Prescott, Kaibab or Coconino National Forests.
- Plan the timing of herbicide applications to coordinate with times of low public use (for example mid-week or during forest or area closures if timing is effective for weed species control).
- Use dye markers with herbicides to raise awareness of the physical spray location on the weeds.
- Develop "Adopt an Area" program for concerned citizens to take responsibility for weed control in locations where herbicides are not preferred as a control method.

Integrated Weed Management Practices (Coconino, Kaibab, & Prescott National Forests Noxious and Invasive Weed Strategic Plan 1998, Amended 2002)

Introduction

Preventing the introduction and spread of noxious weeds is one objective of integrated weed management programs on National Forest System lands throughout the United States. This guide to integrated weed management practices provides a comprehensive directory for use in planning and wildland resource management activities and operations. This guide will help managers and cooperators identify weed management practices that mitigate identified risks of weed introduction and spread for a project or program.

Supporting Direction

Development of weed management prevention practices is supported by Forest Service noxious weed policy and strategy. Forest Service policy identifies prevention of the introduction and establishment of noxious weed infestations as an Agency objective. This policy directs the Forest Service to: (1) determine the factors that favor establishment and spread of noxious weeds, (2) analyze weed risks in resource management projects, and (3) design management practices to reduce these risks. The Forest Service Noxious Weed Strategy identifies development of practices for prevention and mitigation during ground-disturbing activities as a long-term emphasis item. The February 1999 Executive Order on invasive species requires Federal agencies to use relevant programs and authorities to prevent introduction of invasive species and not authorize or carry out actions that are likely to cause introduction or spread of invasive species unless the Agency has determined, and made public, documentation that shows that the benefits of such actions clearly outweigh the potential harm, and all feasible and prudent measures to minimize risk of harm will need to be taken in conjunction with the actions.

This guide uses the term “*weed*” to include the National Invasive Species Council definition of all plants exotic to the relevant ecosystem that have the potential to cause economic or ecological harm. The term “*noxious weed*” has legal definitions by Forest Service policy:

“ . . .plants designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof.” (FSM 2080.5)

The Coconino, Kaibab, and Prescott National Forests use the Arizona State-defined noxious weed list (R3-4-244 and 245) as well as the region/forest designated invasive weed lists. The listed weed species are the priority for implementing weed management in cooperation with neighbors and partners as specified in CFR 222.8.

The following table replaces Tables 3 and 5 in the 1998 “Noxious Weeds Strategic Plan Working Guidelines, Coconino, Kaibab and Prescott National Forests.”

**General Integrated Weed Management Practices for
All Site-disturbing Projects and Maintenance Programs**

Objective	Best Known Practice
<p>1. Incorporate weed prevention and control into project layout, design, alternative evaluation, and project decisions.</p>	<p>1.1 – Environmental analysis for projects and maintenance programs will need to assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices. Determine prevention and maintenance needs, including the use of herbicides if needed, at the onset of project planning.</p> <p>1.2 – Coordinate with other agencies and adjacent landowners to prevent and control weeds. (CFR 222.8)</p>
<p>2. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>2.1 – Before ground-disturbing activities begin, inventory and prioritize treatment of invasive weeds in project operating areas and along access routes, or within reasonably expected potential invasion vicinity. Do a risk assessment accordingly; control weeds as necessary.</p> <p>2.2 – After completing “Practice 2.1” above, reduce risk of spreading and creating weed infestations. Plan operating areas and access routes to avoid heavy infestation areas, plan closure of access routes at finish of project, and/or begin project operations in uninfested areas before operating in weed-infested areas. Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict to those periods when spread of seed or propagules are least likely.</p> <p>Equipment Wash Station – Centralized wash station areas will be developed in several locations throughout the CNF. They must have a filter system, for example at least 6 inches of large cinder or gravel spread over an area 10' x 30'. Filter cloth may be used for temporary stations. The area will be a perched drainage to allow excess moisture to drain after being filtered and must be at least 200 yards from a natural drainage to avoid contamination. All wash station locations must be monitored annually and all weed materials removed as soon as possible.</p> <p>2.3 – Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Determine the need for, and when appropriate, identify sites where equipment can be cleaned. Clean all equipment before entering National Forest System lands; a forest officer, in coordination with the unit invasive species coordinator, needs to approve use of on-forest cleaning sites in advance. This practice does not apply to service vehicles traveling frequently in and out of the project area that will remain on a clean roadway. Seeds and plant parts need to be collected when practical and incinerated.</p> <p>2.4 – If operating in areas infested with weeds, clean all equipment before leaving the project site. To minimize time spent cleaning equipment, time all work in infested areas last and concurrently, designate a “contaminated” parking lot where project vehicles working in the infested area may be parked for the duration of the project. This area should be monitored in followup mitigation and should be near a “clean” vehicle/equipment lot. Identify sites where equipment and vehicles can be cleaned before leaving the site at the end of the project. Seeds and plant parts need to be collected when practical and incinerated.</p>

Appendix B - Design Features, Best Management Practices,
Required Protection Measures and Mitigation Measures

Objective	Best Known Practice
	<p>2.5 – Workers need to inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment after being trained to recognize the priority species in the area. Proper disposal means bagging the seeds and plant parts and incinerating them.</p> <p>2.6 – Coordinate project activities between resources and between agencies (such as city, county, ADOT, ASLD) with any nearby weed treatments, including herbicide applications, to maximize cost effectiveness of weed treatments.</p>
<p>3. Prevent the introduction and spread of weeds caused by moving infested sand, gravel, borrow, and fill material in Forest Service, contractor and cooperator operations.</p>	<p>3.1 – Inspect material sources on site annually, and ensure that they are weed-free before use and transport. Treat weed-infested sources for eradication, and strip, stockpile, and treat contaminated material before using pit materials.</p> <p>3.2 – Inspect and document the areas where materials are used (including those from treated weed-infested sources) annually for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled.</p> <p>3.3 – Maintain stockpiled, uninfested material in a weed-free condition.</p> <p>3.4 – Work with the responsible transportation agencies to adopt these practices for maintenance of roads that cross National Forest System lands.</p>
<p>4. Avoid creating soil conditions that promote weed germination and establishment.</p>	<p>4.1 – Minimize soil disturbance to the extent practical, consistent with project objectives.</p> <p>4.2 – In those vegetation types that have relatively closed canopies as a natural condition, retain shade to the maximum extent possible to suppress weeds and prevent their establishment and growth in and around project activity.</p>
<p>5. Where project disturbance creates bare ground, establish vegetation to minimize favorable conditions for weeds.</p>	<p>5.1 – Treat disturbed soil (except surfaced projects) in a manner that optimizes native plant establishment for that specific site. Define for each project what constitutes disturbed soil and objectives for plant cover revegetation.</p> <p>5.2 – Revegetation may include topsoil replacement, native seedbank promotion, planting, seeding, fertilization, and/or weed seed-free mulching as necessary. Use local native material where appropriate and feasible (or specifically identify why not used). Always use certified weed-free and weed seed-free hay or straw. Always use certified materials in areas closed by administrative order. Where practical, stockpile weed seed-free topsoil from the project area and replace it on disturbed areas (e.g. road embankments, staging areas, wash stations, or landings).</p> <p>5.3 – Use local seeding guidelines to determine detailed procedures and appropriate mixes. To avoid weed contamination, a certified seed laboratory needs to test each lot against the all-State noxious weed list to Association of Seed Technologists and Analysts (AOSTA) standards, and provide documentation of the seed inspection test. Seed lots labeled as certified weed seed-free at time of sale may still contain some weed seed</p>

Objective	Best Known Practice
	<p>contamination.</p> <p>5.4 – Monitor and document all limited term ground-disturbing operations near weed infested areas for at least five growing seasons, or the documented seed viability for the species of concern following completion of the project. For ongoing projects, continue to monitor until reasonable certainty is obtained that no weeds have occurred. Provide for followup treatments based on inspection results.</p> <p>5.5 – Evaluate options, including closure, to minimize future infestations on sites where desired vegetation needs to be established.</p>
<p>6. Improve effectiveness of prevention practices through weed awareness and education.</p>	<p>6.1 – Provide information, training and appropriate weed identification materials to people potentially involved in weed introduction, establishment, and spread on National Forest System lands, including agency managers, employees, forest workers, permit holders, and recreational visitors. Educate them to an appropriate level in weed identification, biology, impacts, and effective prevention measures. Educate resource level managers to allow them to incorporate weed prevention practices in their planning of projects and daily activities.</p> <p>6.2 – Provide proficient weed management expertise at each administrative unit. Expertise means that necessary skills are available and corporate knowledge is maintained.</p> <p>6.3 – Develop incentive programs encouraging weed awareness, detection, reporting, and for locating new invaders.</p>
<p>7. Set the example; maintain weed-free administrative sites.</p>	<p>7.1 – Treat weeds at administrative sites and use weed prevention practices to maintain sites in a weed-free condition.</p>

**Integrated Weed Management Practices for
Fire Management Projects and Maintenance Programs**

Objective	Best Known Practice
Pre-incident - Training and Planning	
<p>FM-1. Improve effectiveness of prevention practices through weed awareness and education for incident management teams.</p>	<p>1.1 – Increase weed awareness, weed identification and weed prevention in all fire training.</p> <p>1.2 – Include weed risk factors and weed prevention practices in resource advisor duties on all incident management teams and burn rehabilitation teams.</p> <p>1.3 – Assign a local weed specialist or include in resource advisor duties to the incident management team when wildfire or control operations occur in or near an area infested with weeds.</p> <p>1.4 – Resource advisors need to provide briefings that identify operational practices to reduce weed spread (for example: avoiding known weed infestation areas when locating fire lines). Include this information in shift briefings.</p> <p>1.5 – Provide weed identification aids to field observers.</p>
Wildfires, General – All wildfire weed prevention goals apply except in instances where human life or property is at risk.	
<p>FM-2. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>2.1 – Ensure that all outside (rental, other agency or unit) equipment is free of weed seed and propagules before it is accepted by the contracting officers representative.</p> <p>2.2 – Maintain a network of airports, helibases, camps, and staging areas in a weed-free condition. Coordinate with local weed specialists to locate and treat practice jump areas to make them weed free.</p> <p>2.3 – Monitor and treat weeds that establish at equipment cleaning sites after fire incidents.</p> <p>2.4 – If safety precautions allow, inspect and clean all fire equipment (boots, shovels, tents, rigs, tankers, water buckets, etc..) prior to moving from weed infested lands or lakes to areas that are not infested. If not possible beforehand, then power wash all equipment in a designated/mapped/monitored wash site (4-6" of cinder/gravel with controlled drainage).</p>
<p>FM-3. Avoid creating soil conditions that promote weed establishment.</p>	<p>3.1 – Use appropriate suppression tactics to reduce suppression-induced disturbances to soil and vegetation while minimizing seedbed creation due to disturbance from fire effects.</p>

Objective	Best Known Practice
Prescribed Fire	
<p>FM-4. Manage fire as an aid in control of weeds to prevent new weed infestations and the spread of existing weeds.</p>	<p>4.1 – Pre-inventory project area and evaluate weeds present with regard to the effects on the weed spread relative to the fire prescription. Remove weeds (live plants and seed sources) before project initiation.</p> <p>4.2 – Plan to avoid or remove existing sources of weed seed and propagules. Avoid ignition and burning in areas at high risk for weed establishment or spread due to burn aftereffects. Treat weeds that establish or spread because of unplanned burning of weed infestations.</p> <p>4.3 – Burn noninfested areas first before entering weed infested sections of the burn. Clean all equipment when project is completed. Or treat and burn all infested areas first to remove seed source then clean equipment and proceed to uninfested areas.</p>
<p>FM-5. Avoid creating soil conditions that promote weed germination and establishment.</p>	<p>5.1 – Time burns to promote native species and to hinder weed species germination.</p> <p>5.2 – Consult weed species specific information and consider effects of current local conditions on species growth.</p>
Fire Rehabilitation	
<p>FM-6. Incorporate weed management into project layout and design.</p>	<p>6.1 – Evaluate weed status and risks in burned area emergency rehabilitation (BAER) plans. When appropriate, apply for burned area emergency rehabilitation and restoration funding to inventory, control, and monitor weeds. If the presence of weed seed is suspected, request BAER funds to inspect and document for spring emergence.</p>
<p>FM-7. Encourage vegetation establishment as appropriate to the site objectives.</p>	<p>7.1 – To minimize weed spread, treat weeds in burned areas as part of the burned area emergency rehabilitation plan. For adjacent known infestations that will likely spread, remove the potential contaminating seed source and encourage competitive species.</p> <p>7.2 – Inspect and document weed establishment at fire access roads, cleaning sites, all disturbed staging areas, and within burned areas; control infestations to prevent spread within burned areas.</p> <p>7.3 – Seed and straw mulch to be used for burn rehabilitation (for wattles, straw bales, dams, etc.) all need to be inspected and certified free of weed seed and propagules.</p> <p>7.4 – Regulate human, pack animal, and livestock entry into burned areas at risk for weed invasion until desirable site vegetation has recovered sufficiently to resist weed invasion.</p>

**Integrated Weed Management Practices for
Lands Stewardship Projects and Maintenance Programs**

Objective	Best Known Practice
VEGETATION MANAGEMENT	
Timber Harvest Operations and Stewardship Contracting	
<p>VM-1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>1.1 – Treat weeds on contracted projects, emphasizing treatment of weed infestations on existing landings, skid trails, and helibases before activities commence.</p> <p>1.2 – Train contract administrators to identify weeds and select lower risk sites for landings and skid trails.</p> <p>1.3 – Encourage operators to maintain weed-free mill yards, equipment parking, and staging areas.</p> <p>1.4 – Use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment cleaning.</p>
<p>VM-2. Retain native vegetation in and around project activity and minimize soil disturbance.</p>	<p>2.1 – Minimize soil disturbance to no more than needed to meet project objectives. Logging practices to reduce soil disturbance include, but are not limited to:</p> <ul style="list-style-type: none"> • Over-snow logging • Skyline or helicopter logging • Reuse landings, skid trails and helibases when they are weed free <p>2.2 – Minimize period from end of logging to site preparation, revegetation, and contract closure.</p>
Post Vegetation Management Operations	
<p>VM-3. Retain native vegetation in and around project activity and minimize soil disturbance.</p>	<p>3.1 – Minimize soil disturbance to no more than needed to meet vegetation management objectives. Prevention practices to reduce soil disturbance include, but are not limited to:</p> <p>Minimizing heat transfer to soil in burning by:</p> <ul style="list-style-type: none"> • Treating fuels in place (broadcast burning) instead of piling • Using small, tall steep piles • Minimizing fireline construction <p>Minimizing soil disturbance by logging techniques:</p> <ul style="list-style-type: none"> • Preference for forwarders that carry logs, rather than skidders that drag logs • Using hand fellers instead of machines • Using hand piling rather than machine piling • Avoiding decking logs in the woods • Using low PSI (impact) equipment (big tires)

Objective	Best Known Practice
VM-4. Encourage native vegetation on bare ground.	<p>4.1 – Recognize the need for prompt growth of native vegetation, long-term restoration and weed suppression where forested vegetation management has created openings.</p> <p>4.2 – Allow natural seedbank to provide vegetation if possible, next preference is for native seed grown from local collections. All seed must be certified weed seed-free for all species on the forest noxious or invasive weed list.</p>
RANGE MANAGEMENT	
Grazing	
RM-1. Consider weed prevention and control practices in the management of grazing allotments.	<p>1.1 – Include weed prevention practices, inspection and reporting direction, and provisions for inspection of livestock concentration areas in allotment management plans and annual operating instructions for active grazing allotments.</p> <p>1.2 – For each grazing allotment containing existing weed infestations, include prevention practices focused on preventing weed spread and cooperative management of weeds in the annual operating instructions. Prevention practices may include, but are not limited to:</p> <ul style="list-style-type: none"> • Maintaining healthy vegetation • Preventing weed seed transportation • Minimize potential ground disturbance - altering season of use or exclusion • Weed control methods • Revegetation • Inspection and Monitoring • Reporting • Education
RM-2. Minimize transport of weed seed into and within allotments.	<p>2.1 – If livestock are potentially a contributing factor to seed spread, schedule units with existing weed infestations to be treated prior to seed set before allowing livestock on those units. Schedule these infested units to be the last in the rotation.</p> <p>2.2 – If livestock were transported from a weed-infested area, corral livestock with weed-free feed, and annually inspect and treat allotment entry units for new weed infestations.</p> <p>2.3 – Designate pastures as unsuitable range to livestock grazing when infested to the degree that livestock grazing will continue to either exacerbate the condition on site or contribute to weed seed spread.</p>
RM-3. Maintain healthy, desirable vegetation that is resistant to weed establishment.	3.1 – Through the allotment management plan or annual operating instructions, manage the timing, intensity (utilization), duration, and frequency of livestock activities associated with harvest of forage and browse resources to maintain the vigor of desirable plant species and

Objective	Best Known Practice
	<p>retain live plant cover and litter.</p> <p>3.2 – Manage livestock grazing on restoration areas to ensure that vegetation is well established. This may involve exclusion for a period of time consistent with site objectives and conditions. Consider practices to minimize wildlife grazing on the areas if needed.</p>
<p>RM-4. Minimize ground disturbances.</p>	<p>4.1 – Include weed prevention practices that reduce ground disturbance in allotment management plans and annual operating instructions. Consider for example: changes in the timing, intensity, duration, or frequency of livestock use; location and changes in salt grounds; restoration or protection of watering sites; and restoration of yarding/loafing areas, corrals, and other areas of concentrated livestock use.</p> <p>4.2 – Inspect known areas of concentrated livestock use for weed invasion. Inventory and manage new infestations.</p>
<p>RM-5. Promote weed awareness and prevention efforts among range permittees.</p>	<p>5.1 – Use education programs or annual operating instructions to increase weed awareness and prevent weed spread associated with permittees’ livestock management practices.</p> <p>5.2 – To aid in their participation in allotment weed control programs, encourage permittees to become certified pesticide use applicators.</p>
WATERSHED MANAGEMENT	
<p>WM-1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>1.1 – Inspect and document for early detection of weed establishment and spread in riparian areas and wetlands. Eradicate new infestations before they become established.</p> <p>1.2 – Address weed risks in watershed restoration projects and water quality management plans.</p> <p>1.3 – Pay particular attention to practices listed under “General Weed Prevention Practices for Site-disturbing Projects and Maintenance Programs” and “Aquatic Weed Management Practices.”</p>
WILDLIFE AND FISHERIES	
<p>WM-2. Avoid creating soil conditions that promote weed germination and establishment.</p>	<p>1.1 – Periodically inspect for weeds and document those areas where wildlife concentrate in the winter and spring resulting in overuse or soil scarification.</p> <p>1.2 – Use weed-free materials at big game baiting stations.</p> <p>1.3 – For wildlife openings and habitat improvement projects, follow the practices outlined in “General Weed Prevention Practices” and “Vegetation Management.”</p>

**Integrated Weed Management Practices for
Engineering/Roads/Minerals Projects and Maintenance Programs**

Objective	Best Known Practice
ENGINEERING/ ROADS/ MINERALS	
Project Planning	
<p>ERM-1. Incorporate weed prevention into project layout, design, alternative evaluation, and decisions.</p>	<p>1.1 – Include weed surveys at the project planning stage as outlined in “General Weed Management Practices”</p> <p>1.2 – For timber sale purchaser road maintenance and decommissioning, use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment cleaning.</p> <p>1.3 – For new and reconstruction of roads conducted as part of public works (construction) contracts and service contracts include contract language for equipment cleaning such as is in WO-C/CT 6.36.</p> <p>1.4 – Include weed prevention measures—including project inspection and documentation—in minerals operation and reclamation plans.</p>
Project Implementation	
<p>ERM-2. Prevent conditions favoring weed establishment, minimize bare soil conditions and promote vegetation on bare ground.</p>	<p>2.1 – Ensure that all outside (rental, other agency or unit) equipment brought onto the forest is free of weed seed and propagules before it is accepted by the contracting officers representative.</p> <p>2.2 – Schedule and coordinate all earth-moving or soil-disturbing activities (such as pulling of invasive weed-infested roadsides or ditches) in consultation with the local weed specialist. Do not blade or pull roadsides and ditches that are infested with weeds unless doing so is required for public safety or protection of the roadway. If the ditch must be pulled, ensure the weeds remain onsite. Blade from least infested to most infested areas. When it is necessary to blade weed-infested roadsides or ditches, schedule the activity when seeds or propagules are least likely to be viable and spread. Minimize soil surface disturbance and contain bladed material on the infested site.</p>
Decommissioning and Maintenance	
<p>ERM-3. Minimize roadside sources of weed seed that could be transported to other areas.</p>	<p>3.1 – Retain bonds until reclamation requirements are completed, including weed treatments, based on inspection and documentation. Require followup monitoring based on seed viability in soil of known and potential weed species.</p> <p>3.2 – Periodically inspect system roads and rights-of-way for invasion of weeds. Train road maintenance staff to recognize weeds and report locations to the local weed specialist. Inventory weed infestations and schedule them for treatment.</p> <p>3.3 – Avoid acquiring water for dust abatement from weed-infested areas.</p> <p>3.4 – For timber sale purchaser road maintenance and decommissioning,</p>

Appendix B - Design Features, Best Management Practices,
Required Protection Measures and Mitigation Measures

Objective	Best Known Practice
	<p>use contract clauses for equipment cleaning such as in WO-C/CT 6.36.</p> <p>3.5 – For road maintenance and decommissioning conducted as part of public works (construction) contracts and service contracts include contract language for equipment cleaning such as in WO-C/CT 6.36.</p> <p>3.6 – Treat weeds in road decommissioning and reclamation projects before roads are made impassable. Re-inspect and plan followup monitoring and treatment based on initial inspection and documentation.</p>

Integrated Weed Management Practices for Public Services and Aquatic Projects

Objective	Best Known Practice
Recreation, Wilderness, and Special Management Areas	
<p>PS-1. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>1.1 – On designated public lands, issue closure orders that specify the use of weed free or weed seed-free feed, hay, straw, and mulch. Refer to 36 CFR 251.50. Cooperate with State, county, tribal governments, and other agencies to develop and support publicly available weed-free materials.</p> <p>1.2 – Where they exist, post and enforce weed-free feed orders. (FSM 2081.03)</p> <p>1.3 – Encourage backcountry pack and saddle stock users to feed stock only weed-free feed for several days before travel on National Forest System lands.</p> <p>1.4 – Inspect, brush, and clean animals—especially hooves and legs—before entering public land. Inspect and clean tack and equipment.</p> <p>1.5 – Tie or hold stock in ways that minimize soil disturbance and avoid loss of desirable native vegetation.</p> <p>1.6 – Annually inspect all campgrounds, trailheads, and recreation areas that are open to public vehicle use for weeds; document and treat new infestations.</p> <p>1.7 – Maintain trailheads, boat launches, outfitter and public camps, picnic areas, airstrips, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition. Consider high use recreation areas as high priority for weed eradication.</p> <p>1.8 – Consider seasonal or full-time closure of campgrounds, picnic areas, and other recreation use areas until weeds are reduced to levels that minimize potential for spread.</p> <p>1.9 – In areas susceptible to weed infestation, limit vehicles to designated maintained travel routes. Inspect and document inspections on travel ways for weeds and treat as necessary.</p>
<p>PS-2. Promote weed prevention practices through public awareness and education.</p>	<p>2.1 – Educate public land users to identify common invasive weeds and to avoid recreating in infested areas. If weeds are encountered, the public should inspect and clean motorized and mechanized trail vehicles of weeds and their seeds.</p> <p>2.2 – Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and forest portals.</p> <p>2.3 – In weed-infested areas, post weed awareness messages and prevention practices at roadsides.</p>
Lands and Special Uses	
<p>PS-3. Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.</p>	<p>3.1 – Consider weed status of lands when making land acquisition or disposal decisions.</p> <p>3.2 – Conduct weed inventories of all lands considered for acquisition.</p> <p>3.3 – Land acquisition decisions may require weed control as a condition of sale or exchange.</p> <p>3.4 – Include a weed prevention and control provision in all special use permits,</p>

Objective	Best Known Practice
	<p>authorizations, or other grants involving ground-disturbing activities. Include this provision in existing ground-disturbing authorizations that are being amended for other reasons; consider including this provision by amending existing ground-disturbing authorizations as necessary.</p> <p>3.5 – Require weed prevention and control in operating and maintenance plans when authorized activities present a high risk for weed infestation or the location of the activity is vulnerable to weed introduction or spread.</p>
Aquatic Management for Forest Projects and Special Use Permits.	
<p>AM-1. To prevent new weed infestations and the spread of existing weeds, avoid or remove sources of weed seed and propagules.</p>	<p>1.1 – Provide outreach to Arizona Game and Fish Department, counties, and other agencies concerning the unique prevention measures and control practices associated with aquatic weeds.</p> <p>1.2 – Rinse and inspect boats (including rafts), trailers, and other boating equipment and remove any visible plants, animals, or mud before leaving any waters or boat launching facilities. Drain water from motor, live well, bilge, and transom wells while on land before leaving the vicinity. Wash and dry boats, tackle, downriggers, anchors, nets, floors of boats, props, axles, trailers, and other boating equipment to kill weeds not visible at the boat launch. Clean with high pressure or hot (90 degrees) water, or dry boat and equipment for at least 5 days.</p> <p>1.3 – Maintain a 100-foot buffer of aquatic weed-free clearance around boat launches and docks.</p> <p>1.4 – Promptly post sites if aquatic invasives are found. Confine infestation. Where prevention is infeasible or ineffective, close facility until infestation is contained.</p> <p>1.5 – Wash and dry tackle, downriggers, float tubes, waders, and other equipment to remove or kill harmful species not visible at the boat launch.</p> <p>1.6 – Avoid moving weed plants from one body of water to another.</p> <p>1.7 – Avoid running personal watercraft through aquatic plants near boat access locations. Instead, push or winch watercraft onto the trailer without running the engine. After the watercraft is out of the water, start the engine for 5-10 seconds to blow out any excess water and vegetation. After engine has stopped, pull weeds out of the steering nozzle. Inspect trailer and any other sporting equipment for weed fragments and remove them before leaving the access area. Wash or dry watercraft before transporting to another body of water.</p> <p>1.8 – Waterfowl hunters may use elliptical, bulb-shaped, or strap anchors on decoys, because these types of anchors avoid collecting submersed and floating aquatic plants. Inspect waders and hip boots, removing any aquatic plants and, where possible, rinse mud from them before leaving the water. Remove aquatic plants, animals, and mud attached to decoy lines and anchors.</p> <p>1.9 – Construct new boat launches and ramps at deepwater sites. Restrict motorized boats in lakes near areas that are infested with weeds. Move sediment to upland or quarantine areas when cleaning around culverts, canals, or irrigation sites. Clean equipment before moving to new sites. Inspect and clean equipment before moving from one project area to another.</p>

Soil, Water and Air Best Management Practices

The Soil and Water Conservation Practices Handbook (FSH 2509.22) was developed in concert between the USDA Forest Service, Southwestern Region and both Departments of Environmental Quality from Arizona and New Mexico. It is a formalized agreement with the specific purpose to respond to the objectives defined by Congress in the Federal Water Pollution Control Act, as amended. The main objective of this law is to restore and maintain the chemical, physical, and biological integrity of the Nation's water.

Basically, the Forest Service has agreed to ensure that all project work contains site-specific best management practices (BMPs) developed through the National Environmental Policy Act process. The Forest Service has also agreed to implement a BMP monitoring strategy that includes implementation monitoring to ensure application of BMPs as specified in the project, as well as effectiveness monitoring to determine if the BMP met stated objectives.

A best management practice is defined as a practice or combination of practices, that is determined by the State after problem assessment, to be the most effective and practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to the level compatible with water quality goals (FSH 2509.22).

The following lists of BMPs have been developed for this project and are designed to minimize any potential water quality problems with approval of herbicide use on the forests. All BMPs are considered standard procedure and do not constitute deviation from normal planning or implementation processes. BMPs identified for this project are also listed in the Soil and Water Conservation Handbook (2509.22). Application of the BMPs will ensure compliance with the requirements of the Federal Water Pollution Control Act.

- 21.11: Pesticide Application According to Label Directions and Applicable Legal Requirements — All approved herbicides will be applied according to label instructions to avoid water contamination. Directions found on the label of each herbicide are detailed and specific and include legal requirements for use. These constraints will be incorporated into individual project plans and contracts. Responsibility for inservice projects rests with the Forest Service's project supervisor who shall be a certified applicator. For contracted projects, it is the responsibility of the contracting officer or the contracting officer's representative to ensure that label instructions and other applicable legal requirements are followed.
- 21.12: Pesticide Application Monitoring and Evaluation — The objective of this BMP is to determine whether pesticides were applied safely, restricted to intended target areas, and deposited at the right rates. It is also designed to evaluate if nontarget species were impacted. Another component is also to provide early warning of possible hazardous conditions and determine the extent, severity, and duration of any potential hazard that might exist. Monitoring methods include spray cards, dye tracing, and direct measurements of herbicides on plants or near water. Monitoring of existing herbicide concentrations will be conducted prior to any treatments in riparian corridors where perennial water is found.
- 22.13: Pesticide Spill Contingency Plan — The objective of this BMP is to eliminate contamination of water or the soil resource that may occur from accidental spills.

- 24.14: Cleaning and Disposal of Herbicide Containers — This BMP is designed to prevent water contamination from cleaning or disposal of herbicide containers. The cleaning and disposal of these items will be done in accordance with Federal, State, and local laws. The forest or district pesticide use coordinator will approve proper rinsing procedures in accordance with State and local laws and regulations, and arrange disposal of containers when inservice personnel apply the product. When a contractor applies the herbicide, the contractor is responsible for proper container disposal in accordance with label instructions.
- 21.16: Controlling Pesticide Drift During Spray Application — The objective of this BMP is to minimize risk of pesticides falling directly into water or nontarget areas. The spray application of herbicides is accomplished according to a prescription which accounts for terrain and that specifies the following: spray exclusion areas, buffer zones, and factors such as formulation, equipment, droplet size, spray height, application pattern, flow rate, and the limiting factors of wind speed and direction, temperature, and relative humidity. On inservice projects, the Forest Service project manager supervisor is responsible for ensuring the prescription is followed, whereas if contracted, the contracting officer is delegated the responsibility.

Weed Control Pesticide Safety and Spill Plan

Information and Equipment

The forest pesticide coordinators for the Coconino, Kaibab, and Prescott National Forests will fulfill the role as the certified pesticide applicator for the project. The regional pesticide coordinator will initially serve as the technical staff and advisor until forest personnel are trained and certified.

All participants will receive training on safety and application procedures prior to any spraying.

The certified applicator will supervise spraying operations as required.

A copy of the labels and material safety data sheets (MSDS) for all herbicides will be available at all times during project operations. Employees will be completely familiar with the information in these documents in case it is needed in the event of a spill or incident.

Required personal protective equipment (PPE) will be worn at all times when herbicides are being mixed and applied. Label requirements for specific herbicides will be followed. Applicators and handlers must wear long-sleeved shirt and long pants, waterproof and chemical-resistant gloves, and boots and socks.

An emergency spill kit, with directions for use, will be present when herbicides are being mixed, transported, and applied. Employees will be trained in the use of the spill kit prior to initiation of operations.

The spill kit will contain the following equipment:

- Shovel
- Broom
- Ten pounds of absorbent material
- Box of large plastic bags
- Nitrile gloves

Mitigations for Herbicide Use

- Application personnel will be trained by, and all application will be under direct supervision of, a Forest Service certified pesticide applicator (Region 3 Supplement 2100-98-1). All applicators must wear protective clothing as described on the label.
- All herbicide applications will follow EPA label requirements, USDA policy, and Forest Service direction (e.g., FSM 2150 Pesticide Use Management and Coordination; FSH 2109.11 Pesticide Project Handbook; FSH 2109.12 Pesticide Storage, Transportation, Spills, and Disposal Handbook; and FSH 2109.13 Pesticide Project Personnel Handbook).
- Only herbicides labeled for use adjacent to water will be used within riparian zones and areas with shallow ground water.

- Suspension of broadcast herbicidal applications will occur when the following conditions exist. During these weather patterns, herbicide application methods will be limited to hand-held spot spraying or wick application:
 - Wind velocity exceeds 6 miles per hour for liquids or 15 miles per hour for granular herbicides, unless a lower maximum wind speed is specified on the label.
 - Snow or ice covers the target plant.
 - Precipitation is occurring or is imminent.
 - Fog significantly reduces visibility.
 - Air turbulence, such as thermal updrafts, is sufficient to affect the normal herbicide distribution pattern.
- Herbicides will be transported daily to the project site under the following conditions: (a) transport only the quantity needed for that day's work, and (b) transport concentrate only in containers in a manner that will prevent tipping or spilling, and in a compartment that is isolated from food, clothing, and safety equipment.
- Mixing, loading, and equipment cleaning must be done onsite and at least 300 feet from the edge of a "Limited Spray Zone" or from private land (unless the owner is cooperating in the project), open water, known wellheads, or sensitive areas. Mixing and cleaning water must be transported to the site in labeled containers that are separate from water used for other purposes.
- Nonherbicidal methods, except grazing, will be the preferred choice for 100 feet around wellheads. If herbicides must be used, treatments will be timed with the driest periods to prevent leaching of any herbicides directly into the wellhead and still have effective control.
- Safety and spill plans will be written for each project.
- All herbicide containers will be disposed of in accordance with label, State, and Federal requirements.
- Broadcast spray sites will be posted at all access points 2 weeks before, during, and 2 weeks following herbicide application.

Procedures for Herbicide Spill Containment

Notify the supervisor's office and relevant district office of an incident or spill. Identify the nature of the incident and extent of the spill. Include the following information:

Product Name:	Tordon 22K	Reclaim
Chemical Name:	Picloram	Clopyralid
EPA Registration Number:	62719-6	62719-83

Remove any injured or contaminated person to a safe area. Remove contaminated clothing and follow instructions on the MSDSs. Do not leave an injured person alone. Obtain medical help for any injured employee.

Contain the spilled herbicide as much as possible on the site. Prevent the herbicide from entering ditches, gullies, wells, or water systems.

Small Spills (Less than 1 gallon of herbicide formulation or less than 10 gallons of herbicide mixture)

- Qualified employees will be present to confine a spill.
- Follow MSDS guidelines for emergency first aid procedures in the event of an accidental exposure.
- Restrict entry to the spill area by roping off and flagging.
- Contain spread of spill with earthen dikes.
- Cover spill with absorbent material.
- Place contaminated materials into leakproof containers and label them.
- Dispose of contaminated materials according to label instructions and State requirements.

Large Spills (More than 1 gallon of herbicide formulations or more than 10 gallons of herbicide mixture)

- Keep people away from the spill.
- Flag and rope off the spill area.
- Follow MSDS guidelines for emergency first aid procedures in the event of an accidental exposure.
- Contact Dow AgroSciences at 1-800-992-5994.
- Call Chemical Transportation Emergency Center (Chemtrec) at 1-800-424-9300 if DowAgroSciences cannot be reached.
- Notify the highway patrol or sheriff if the spill occurs on a highway.
- Contain spread of the spill with earthen dikes.
- Cover the spill with absorbent material.
- Spread the absorbent material around the perimeter of the spill and sweep toward the center.
- Call the direct supervisor or safety coordinator and the forest hazardous material coordinator for further instruction or action.

Notification List of Key Personnel

(To be updated for individual districts/projects)

Forest Supervisor (numbers for each SO): _____

District Offices (numbers): _____

Regional Pesticide Coordinator: Doug Parker at (505) 842-3280

National Forest Safety Officers: Name & number _____

National Forest Hazardous Materials Coordinator: Alan Anderson (928) 527-3590

Local hospital and number: _____

Chemtrec: 1-800-424-9300

Required Protection Measures for Weed Treatments in Identified Species Habitats

Integrated Treatment for Noxious or Invasive Weeds on Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties

Endangered Species Act Section 7 Consultation #2-21-01-I-0335

Species Conservation Measures (Project Design Features)

RPMPA refers to the Recommended Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service (summarized in Tables 26 and 27) authored by J. Allen White, July 2004.

General Project BMPs

1. Implement integrated weed best management practices.
2. Survey T&E species' habitats to determine and prioritize the occupied and potential habitats that would be most vulnerable to encroachment of invasive and noxious weeds.
3. Use native species for seeding and planting during revegetating. An exception is the use of sterile hybrid grasses after careful analysis to provide immediate ground cover after wildfires.
4. FS will review "weed-free" certifications for seed and mulch to ensure they are "free" of the weed species to be controlled in the action area.
5. Treatments that are not within these design features would require additional analysis and may require additional coordination with the FWS (U.S. Fish and Wildlife Service).
6. Work cooperatively with adjacent landowners to manage noxious or invasive weeds to prevent their spread into NFS (National Forest System) lands.

All Species

1. Where specified, species breeding season timing restrictions and buffers are applicable to all treatment methods that are not commensurate with the designated uses.
2. Where two or more species' habitats occur, the more restrictive measures will take priority.
3. Noxious or invasive weed treatment methods during the breeding seasons for birds would be commensurate with designated uses (nonmotorized, motorized, livestock, etc.) in the treatment areas.
4. Adjuvants including surfactants and cleaners would be used or applied according to the adjuvant Table 27.
5. Forest Service would submit to the FWS an annual report of herbicide treatments occurring within T&E species' habitat.

Arizona cliffrose (*Purshia subintegra*)

1. Survey forest Arizona cliffrose habitat for noxious or invasive weeds.
2. Survey Arizona cliffrose habitat to determine and prioritize the occupied and potential seedling sites that would be most vulnerable to encroachment of invasive and noxious weeds.
3. Treatment crew members will be experienced in identifying Arizona cliffrose and FS sensitive species and will be supervised by a botanist.
4. Prior to initiation of weed treatments, survey each forest Arizona cliffrose treatment site for presence of seedlings of Arizona cliffrose.
5. Establish a buffer zone with a minimum radius equal to the height of the seedling when using manual/mechanical treatments where seedlings occur.
6. If application of herbicides is deemed necessary, conduct test treatments of the herbicide on ex situ Arizona cliffrose with varying distances for buffers to determine appropriate buffer zones to avoid adverse effects.
7. Only those herbicides reviewed and approved by the FS botanist may be used in or near Arizona cliffrose habitat.
8. Timing of herbicide treatments is critical: when effective for controlling weeds, treatments should be done in fall when Arizona cliffrose plants are not actively growing or not under water stress.
9. Do not use torching of noxious or invasive weeds in Arizona cliffrose habitat. Treatments with herbicide will be done without prior torching.

**Apache trout, Gila chub, Gila topminnow,
Little Colorado spinedace in Small Riparian Habitats**

1. After a survey has been conducted, no restrictions on pesticide applications if USFWS concur that habitat is unoccupied by the species (RPMPA, pg. 73).
2. When streamflows are 100 cfs or greater, herbicides would be applied per guidelines for large aquatic habitats in RPMPA, pg. 76 (see Table 26 in RPMPA).
3. When streamflows are less than 100 cfs, herbicides would be applied per guidelines in RPMPA pg. 73 with the following modifications (see Table 26 in RPMPA).
 - Approved herbicides (aquatic formulations only): Glyphosate, Imazapic, and Imazapyr may be used within the riparian zone adjacent to but not in the aquatic habitat.
 - Spot applications to individual plants are permitted within the buffer zone.
 - For pool habitats, no pesticide applications may occur near pools when there is no surface flow of water in and out of the pool(s). Per the RPMPA, a 30-foot buffer would apply when there is no surface flow of water.
4. When streamflows exceed 100 cfs (cubic feet per second), may apply guidelines for large riparian habitats (see Table 26 in RPMPA).

**Colorado pike minnow, loach minnow, razorback sucker,
spikedace and roundtail chub in large riparian habitats**

1. After a survey has been conducted, no restrictions on pesticide applications if USFWS concur that habitat is unoccupied by the species (RPMPA, pg. 76).
2. When streamflows are 100 cfs or greater, herbicides would be applied per guidelines for large aquatic habitats in RPMPA, pg. 76 (see Table 26 in RPMPA).
3. When streamflows are less than 100 cfs, herbicides would be applied per guidelines in RPMPA, pg. 73 with the following modifications (see Table 26 in RPMPA):
 - Approved herbicides (aquatic formulations only): Glyphosate, Imazapic, and Imazapyr may be used within the riparian zone adjacent to but not in the aquatic habitat.
 - Spot applications to individual plants are permitted within the buffer zone.
 - For pool habitats, no pesticide applications may occur near pools when there is no surface flow of water in and out of the pool(s). Per the RPMPA, a 30-foot buffer would apply when there is no surface flow of water.

Southwestern willow flycatcher

1. No biological control of tamarisk anywhere on the three forests (“SWWF Recovery Plan,” pg. 121) until further NEPA analysis and ESA Section 7 compliance is documented.
2. Treatment within patches will comply with the southwestern willow flycatcher recovery plan.
3. FS biologist will determine patch size for nesting areas per the “SWWF Recovery Plan” and identify sites on the ground prior to treatments.
4. FS biologist would confirm occupancy during the breeding season (April through August, “SWWF Recovery Plan,” pg. 21).
5. For occupied breeding patches, treatments adjacent to breeding patches would occur 100 meters from the edge of the patch (“SWWF Recovery Plan,” pg. H-21).
6. Herbicides would be applied per guidelines in RPMPA, pg. 64 (see Table 26 in RPMPA).

Yellow-billed cuckoo

1. Herbicides would be applied per guidelines in RPMPA, pg. 64 (see Table 26 in RPMPA).
2. FS biologist would determine patch size for nesting areas and identify sites on the ground prior to treatments.
3. FS biologist would confirm occupancy during the breeding season (May through August).
4. In occupied breeding areas, treatments adjacent to breeding areas would occur outside the time of occupancy.

Bald Eagle

1. Breeding season is December 1 through June 30 (BECAS, pg. 32).
2. Nest occupancy confirmed by FS biologist.
3. No treatments may occur within one-half mile of occupied bald eagle nests (FWS per consultation) from the beginning of breeding season through occupancy for each breeding season as confirmed by FS biologist.
4. Specified herbicides may be applied along road rights-of-way within breeding areas during the breeding season (see Table 26 in RPMPA).
5. No treatments within 100 feet of occupied winter roosts (roosting season October 1 through March 30).

California Condor

1. Forest Service will contact FWS immediately prior to herbicide applications in condor habitat to determine if any roosting or nesting condors are in the proposed application area. If condors are present, no herbicides will be used within 0.2 km (0.125 mi) for spot applications using hand-operated equipment, or within 0.4 km (0.25 mi) for mechanized ground applications of roost or nest sites to protect California condors from disturbance.

Mexican spotted owl

1. Breeding season is March 1 through August 30.
2. No treatments may occur within occupied “No Activity Centers.” “No Activity Center” is the nest area from the MSO Recovery Plan, page 86. FS biologist to determine occupancy. If no surveys are done, MSO territories are assumed occupied until surveys are done to determine otherwise.
3. Specified herbicides may be applied along road rights-of-way in MSO PACs during the breeding season (see Table 26 in RPMPA).
4. Only specified herbicides may be applied within MSO PACs (see Table 26 in RPMPA).
5. Specified herbicides may be applied from FS system trails during the breeding season commensurate with the designated trail use (nonmotorized, motorized, livestock). Crews of two people may enter the PAC up to six times per breeding season for treatment purposes.
6. Specified herbicides may be applied during the breeding season to the remainder of the MSO PAC outside of the “No Activity Center” by nonmotorized methods.

Chiricahua, Northern, and Lowland leopard frogs

1. Herbicides would be applied per guidelines in RPMPA, pg. 136 (see Table 26 in RPMPA).
2. If there is a high probability (80 percent chance) of local, moderate rain (0.25 inch or less within 24 hours), then applications should only occur when it is anticipated that there shall be sufficient time (at least 4 hours) for the application to dry before rainfall occurs. If rainfall of

more than a moderate amount (more than 0.25 inch) is predicted locally within 48 hours, applications will be discontinued until predictable local conditions improve. When plant cover is wet from recent rain, heavy dew, or frost, applications will be delayed until conditions are nearly dry.

Yuma clapper rail

1. Herbicides would be applied per guidelines in RPMPA, pg. 64 (see Table 26 in RPMPA).
2. FS biologist will determine nesting areas and identify the site on the ground prior to treatment.
3. FS biologist would confirm occupancy during the breeding season (March through July).
4. In occupied breeding areas, treatments adjacent to breeding areas would occur outside the time of occupancy.

Black-footed ferret, brown pelican, Mexican gray wolf

1. No herbicide limitations for this project per the RPMPA (pages 41, 28, and 109, respectively).

Kanab ambersnail, Page springsnail, Verde Rim springsnail

1. Herbicides would be applied per guidelines in RPMPA, pg. 69 (see Table 26 in RPMPA).
2. If there is a high probability (80 percent chance) of local, moderate rain (0.25 inch or less within 24 hours), then applications should only occur when it is anticipated that there shall be sufficient time (at least 4 hours) for the application to dry before rainfall occurs. If rainfall of more than a moderate amount (more than 0.25 inch) is predicted locally within 48 hours, applications will be discontinued until predictable local conditions improve. When plant cover is wet from recent rain, heavy dew, or frost, applications will be delayed until conditions are nearly dry.

Northern goshawk

1. Breeding season is March 1 through September 30.
2. No treatments may occur within occupied “nest stands.” FS biologist to determine occupancy.
3. Specified herbicides may be applied along road rights-of-way in goshawk PFAs during the breeding season (same as MSO).
4. Only specified herbicides may be applied within goshawk PFAs (same as MSO).
5. Specified herbicides may be applied from FS system trails during the breeding season commensurate with the designated trail use (nonmotorized, motorized, livestock).
6. Specified herbicides may be applied during the breeding season to the remainder of the goshawk PFA outside of the “nest stand” by nonmotorized methods.

Migratory Birds Including Sensitive, MIS, and PIF Species

1. Class 0 or 1 avian toxicity herbicides may be applied during nesting season (March through August).
2. Treatment and application methods would be commensurate with the designated uses within the treatment area.
3. Avoid using avian toxicity Class 2 or 3 (Dicamba) during the breeding season. For all habitats, these herbicides may be used September through February.

Table 26. Required protection measures for pesticide applications in identified species habitats.

Species	Herbicides					
	2,4-D (acid formulations)	2,4-D (aquatic amine salt formulations)	2,4-D (nonaquatic amine salt formulations)	2,4-D (aquatic ester formulations)	2,4-D (nonaquatic ester formulations)	Chlorsulfuron
Apache trout, Gila chub, Gila topminnow, Little Colorado spinedace (Flows <100cfs)	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid- 30-foot buffer from edge of water body or habitat.	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream. Liquid – 50-foot buffer			Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid – 30-foot buffer from edge of water body or habitat*	
Arizona cliffrose	May not be used in habitat.			May not be used in or near habitat.		
Bald eagle	A half-mile buffer from currently occupied nests. May be applied along existing road ROW (paved or gravel-base roadways only) during breeding season.			Buffer applies for 1 mile up and downstream from nest's location when applied at edge of water of	Buffer applies for 1 mile up and downstream from nest's location when applied at edge of occupied nest. Spot - 10 ft.	A ½-mile buffer from currently occupied nests. May be applied along existing road ROW (paved or gravel-base roadways only) during breeding season.

Table 26. Required protection measures for pesticide applications in identified species habitats.

Species	Herbicides					Chlorsulfuron
	2,4-D (acid formulations)	2,4-D (aquatic amine salt formulations)	2,4-D (nonaquatic amine salt formulations)	2,4-D (aquatic ester formulations)	2,4-D (nonaquatic ester formulations)	
				occupied nest. Spot - 10 ft. from water edge. Mechanized - 80 ft. from water edge. A ½-buffer from currently occupied nests.	from water edge. Mechanized - 80 ft. from water edge. A ½-buffer from currently occupied nests.	
California condor	May be applied along road ROW. A ¼-mile buffer from nests, roosts, and release sites					
Chiricahua leopard frog, Northern leopard frog, Lowland leopard frog	Spot applications on land above high water line of species habitat, one-half mile upstream (including tributaries), 300 feet downstream. Liquid – 30-foot buffer					May be applied on land below or above the high water line of species habitat.
Colorado pikeminnow, loach minnow, razorback sucker, spikedace and roundtail chub (Flows >100cfs)	No buffer			Spot applications in the following areas: one-half mile upstream (including tributaries), all species habitat, and 300 feet downstream. Liquid – 20-foot buffer		No buffer
Kanab ambersnail, Page springsnail, Verde Rim springsnail	Spot applications around habitat: Liquid – no buffer	Spot applications around habitat: Liquid – 10-foot buffer ULV – 150-foot buffer				Spot applications around habitat: Liquid – no buffer ULV – 80-foot buffer

Table 26. Required protection measures for pesticide applications in identified species habitats.

Species	Herbicides					
	2,4-D (acid formulations)	2,4-D (aquatic amine salt formulations)	2,4-D (nonaquatic amine salt formulations)	2,4-D (aquatic ester formulations)	2,4-D (nonaquatic ester formulations)	Chlorsulfuron
	ULV – 80-foot buffer					
Mexican gray wolf, black-footed ferret, brown pelican	No limitations					
Mexican spotted owl	May be sprayed along road ROW during breeding season. May be applied in rest of PAC outside the breeding season.		May be sprayed within the PAC outside of No Activity center during the breeding season.		May be sprayed along road ROW during BS. May be applied in rest of PAC outside the BS.	
Migratory birds including sensitive & PIF species	May be applied during the breeding season.					
Northern goshawk	May be sprayed along road ROW during the breeding season. May be applied in rest of PFA outside the breeding season.		May be sprayed within PFA outside of nest stand during the breeding season.		May be sprayed along road ROW during the BS. May be applied in rest of PFA outside the BS.	
Southwestern willow flycatcher	Spot – no buffer Mechanized – 30-foot buffer Breeding season timing restriction – April through August		No buffer. Breeding season timing restriction – April through August		Spot – no buffer Mechanized – 30-foot buffer BS TR – April-August	
Yellow-billed cuckoo	Spot – no buffer Mechanized – 30-foot buffer Breeding season timing restriction – May through August		No buffer Breeding season timing restriction – May through August		Spot – no buffer Mechanized – 30-foot buffer BS TR – May-August	

Table 26. Required protection measures for pesticide applications in identified species habitats.

Species	Herbicides					
	2,4-D (acid formulations)	2,4-D (aquatic amine salt formulations)	2,4-D (nonaquatic amine salt formulations)	2,4-D (aquatic ester formulations)	2,4-D (nonaquatic ester formulations)	Chlorsulfuron
Yuma clapper rail	Spot applications within species habitat, ½ mile upstream (including tributaries) and 300 feet downstream: Liquid – 10-foot buffer ULV – 150-foot buffer Breeding season timing restriction – March through July			No buffer. Breeding season timing restriction – March through July		Spot applications within species habitat, ½ mile upstream (including tributaries), and 300 feet downstream: Liquid – 10-foot buffer ULV – 150-foot buffer BS TR – March - July

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides						
	Clopyralid	Dicamba	Glyphosate (aquatic)	Glyphosate (nonaquatic)	Imazapic	Imazapyr (technical formulation)	Imazapyr (aquatic)
Apache trout, Gila chub, Gila topminnow, Little Colorado spinedace (Flows <100cfs)	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft. downstream: Liquid – 30-foot buffer from edge of water body or habitat*		Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft. downstream: Liquid- No buffer w/spot applications per the conservation measures	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft. downstream: Liquid- 30-foot buffer from edge of water body or habitat*	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft. downstream: Liquid- No buffer w/spot applications per the conservation measures	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid- 30-foot buffer from edge of water body or habitat* *10-foot buffer if FWS approved & spot applied	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft. downstream: Liquid- No buffer w/spot applications per the conservation measures
Arizona cliffrose	Conduct test treatments of the herbicide on ex situ Arizona cliffrose with varying distances for buffers to determine appropriate buffer zones; treatments should be	May not be used in or near habitat.			Conduct test treatments of the herbicide on ex situ Arizona cliffrose with varying distances for buffers to determine appropriate buffer zones; treatments should be	May not be used in or near habitat	

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides						
	Clopyralid	Dicamba	Glyphosate (aquatic)	Glyphosate (nonaquatic)	Imazapic	Imazapyr (technical formulation)	Imazapyr (aquatic)
	done in fall.				done in fall		
Bald eagle	A ½-mile buffer from currently occupied nests. May be applied along existing road ROW (paved or gravel-base roadways only) during breeding season	Buffer applies for 1 mile up & down stream from nest's location when applied at edge of water of occupied nest. Spot-10 feet from water edge Mechanize d-80 feet from water edge. Half-mile buffer from currently occupied nests.	A ½-mile buffer from currently occupied nests. May be applied along existing road ROW (paved or gravel-base roadways only) during breeding season.				
California condor	May be applied along road ROW- a ¼-mile buffer from nests, roosts, and release sites	A ¼ mile from occupied nests, roosts, release sites	May be applied along road ROW. A ¼-mile buffer from nests, roosts, and release sites.				

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides						
	Clopyralid	Dicamba	Glyphosate (aquatic)	Glyphosate (nonaquatic)	Imazapic	Imazapyr (technical formulation)	Imazapyr (aquatic)
Chiricahua leopard frog, Northern leopard frog, Lowland leopard frog	May be applied on land below or above the high water line of species habitat.	Spot applications on land above high water line of species habitat, ½ mile upstream (including tributaries), 300 feet downstream: Liquid – 30-foot buffer	May be applied on land below or above the high water line of species habitat.	Spot applications on land above high water line of species habitat, ½ mile upstream (including tributaries), 300 feet downstream Liquid – 30-foot buffer	May be applied on land below or above the high water line of species habitat.		
Colorado pikeminnow, loach minnow, razorback sucker, spokedace and roundtail chub (Flows >100cfs)	No buffer	Spot applications in the following areas: ½ mile upstream (including tributaries), all species habitat, and 300 ft downstream: Liquid – 10-foot buffer	No buffer	Spot applications in the following areas :½ mile upstream (including tributaries), all species habitat, and 300 feet downstream : Liquid – 10-ft. buffer	No buffer		
Kanab ambersnail, Page springsnail, Verde Rim springsnail	Spot applications around habitat: Liquid – no buffer ULV – 80-foot buffer						

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides						
	Clopyralid	Dicamba	Glyphosate (aquatic)	Glyphosate (nonaquatic)	Imazapic	Imazapyr (technical formulation)	Imazapyr (aquatic)
Mexican gray wolf, black-footed ferret, brown pelican	No limitations						
Mexican spotted owl	May be sprayed along road ROW during BS. May be applied in rest of PAC outside the BS.	May not be sprayed in MSO PACS Spot-300 ft outside PACs & unsurveyed habitat Mechanized-¼ mile outside PACs & unsurveyed habitat.	May be sprayed within PAC outside of No Activity center during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PAC outside BS.	May be sprayed within PAC outside of No Activity center during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PAC outside BS.	May be sprayed within PAC outside of No Activity center during the BS.
Migratory birds including sensitive & PIF species	May be applied during the BS.	May be applied Sept.- February	May be applied during the breeding season.				
Northern goshawk	May be sprayed along road ROW during BS. May be applied in rest of PFA outside BS.	May be sprayed within PFA outside of nest stand during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PFA outside BS.	May be sprayed within PFA outside of nest stand during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PFA outside BS.	May be sprayed within PFA outside of nest stand during the BS.	

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides						
	Clopyralid	Dicamba	Glyphosate (aquatic)	Glyphosate (nonaquatic)	Imazapic	Imazapyr (technical formulation)	Imazapyr (aquatic)
Southwestern willow flycatcher	Spot - no buffer Mechanized - 30 ft BS TR - April-August	Spot - 10 ft Mechanized - 60 ft BS TR - April-August	No buffer. BS TR - April-August	Spot - no buffer Mechanized - 30 ft BS TR - April-August	No buffer. BS TR - April-August	Spot - no buffer Mechanized - 30 ft BS TR - April-August	No buffer. BS TR - April-August
Yellow-billed cuckoo	Spot - no buffer Mechanized - 30 ft BS TR - May-August	Spot - 10 ft Mechanized - 60 ft BS TR - May-August	No buffer. BS TR - May-August	Spot - no buffer Mechanized - 30 ft. BS TR - May-August	No buffer. BS TR - May-August	Spot - no buffer Mechanized - 30 ft buffer BS TR - May-August	No buffer. BS TR - May-August
Yuma clapper rail	Spot applications within species habitat, ½ mile upstream (including tributaries), and 300 ft. downstream: Liquid - 10 ft buffer ULV - 150 ft buffer BS TR - March - July	Spot applications within species habitat, ½ mile upstream (including tributaries), and 300 ft. downstream: Liquid - 20 ft buffer ULV - 200 ft buffer BS TR - March - July	No buffer. BS TR - March - July	Spot applications within species habitat, ½ mile upstream (including tributaries), and 300 ft downstream: Liquid - 10 ft buffer ULV - 150 ft buffer BS TR - March - July	No buffer. breeding BS TR - March - July	Spot applications within species habitat, ½ mile upstream (including tributaries), and 300 ft downstream : Liquid - 10 ft buffer ULV - 150 ft buffer BS TR - March - July	No buffer. BS TR - March - July

Table 26. Required protection measures for pesticide applications in identified species habitats.

Federal Species	Herbicides					
	Imazapyr (nonaquatic)	Metsulfuron--Methyl (see note below)	Picloram (see note below)	Sulfometuron--Methyl	Triclopyr (amine salt formulations)	(ester formulations)
Apache trout, Gila chub, Gila topminnow, Little Colorado spinedace (Flows <100cfs)	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid - No buffer w/spot applications per the conservation measures	Spot applications in the following areas: 1 mile upstream (including tributaries), all species habitat, and 300 ft downstream: Liquid – 30-foot buffer from edge of water body or habitat*				Spot applications in the following areas 1 mile upstream (including tributaries), all species habitat, and 300 feet downstream Liquid – 50-foot buffer
Arizona cliffrose	May not be used in or near habitat					
Bald eagle	A ½-mile buffer from currently occupied nests. May be applied along existing road ROW (paved or gravel-base roadways only) during the breeding season.				Buffer applies for 1 mile up & downstream from nest’s location when applied at edge of water of occupied nest. Spot - 10 ft. from water edge Mechanized-80 ft. from water edge ½ mile buffer from currently occupied nests.	

Appendix B - Design Features, Best Management Practices,
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Federal Species	Herbicides					
	Imazapyr (nonaquatic)	Metsulfuron-- Methyl (see note below)	Picloram (see note below)	Sulfometuron-- Methyl	Triclopyr (amine salt formulations)	(ester formulations)
California condor	May be applied along road ROW 1/4 mile buffer from nests, roosts, and release sites.					
Chiricahua leopard frog, Northern leopard frog, Lowland leopard frog	May be applied on land below or above the high water line of species habitat.	Spot applications on land above high water line of species habitat, ½ mile upstream (including tributaries), 300 feet downstream: Liquid – 30-foot buffer		May be applied on land below or above the high water line of species habitat.	Spot applications on land above high water line of species habitat, ½ mile upstream (including tributaries), 300 feet downstream: Liquid – 50-foot buffer	
Colorado pikeminnow, loach minnow, razorback sucker, spikedace and roundtail chub (Flows >100cfs)	No buffer	Spot applications in the following areas: ½ mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid – 10-foot buffer		No buffer	Spot applications in the following areas: ½ mile upstream (including tributaries), all species habitat, and 300 feet downstream: Liquid - 20-foot buffer	
Kanab ambersnail, Page springsnail, Verde Rim springsnail	Spot applications around habitat: Liquid - no buffer; ULV – 80-foot buffer.					
Mexican gray wolf, black-footed ferret, brown pelican	No limitations					

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Federal Species	Herbicides					
	Imazapyr (nonaquatic)	Metsulfuron--Methyl (see note below)	Picloram (see note below)	Sulfometuron--Methyl	Triclopyr (amine salt formulations)	(ester formulations)
Mexican spotted owl	May be sprayed within PAC outside of No Activity center during the BS.	May be sprayed along road ROW during breeding season. May be applied in rest of PAC outside the breeding season.		May be sprayed within PAC outside of No Activity center during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PAC outside BS.	May be sprayed within PAC outside of No Activity center during the BS.
Migratory birds including sensitive & PIF species	May be applied during the breeding season.					
Northern goshawk	May be sprayed within PFA outside of nest stand during the BS.	May be sprayed along road ROW during the breeding season. May be applied in rest of PFA outside the breeding season.		May be sprayed within PFA outside of nest stand during the BS.	May be sprayed along road ROW during BS. May be applied in rest of PFA outside BS.	May be sprayed within PFA outside of nest stand during the breeding season.
Southwestern willow flycatcher	No buffer - BS TR - April-August	Spot - no buffer. Mechanized - 30 ft. BS TR - April-August	No buffer. BS TR - April-August	No buffer. BS TR - April-August	Spot - no buffer. Mechanized - 30 ft. BS TR - April-August	No buffer. BS TR - April-August
Yellow-billed cuckoo	No buffer - BS TR - May-August	Spot - no buffer. Mechanized - 30 ft. BS TR - May-August	No buffer. BS TR - May-August	No buffer. BS TR - May-August	Spot - no buffer. Mechanized - 30 ft. BS TR - May-August	No buffer. BS TR - May-August
Yuma clapper rail	No buffer. BS TR - March - July	Spot applications within species habitat, ½ mile upstream	No buffer. BS TR- March – July.		Spot applications within species habitat, ½ mile upstream	No buffer. BS TR - March - July

Federal Species	Herbicides					
	Imazapyr (nonaquatic)	Metsulfuron--Methyl (see note below)	Picloram (see note below)	Sulfometuron--Methyl	Triclopyr (amine salt formulations)	(ester formulations)
		(including tributaries), and 300 feet downstream: Liquid - 10 ft. buffer ULV - 150 ft. buffer BS TR - March - July			(including tributaries), and 300 feet downstream: Liquid - 10 ft. buffer ULV - 150 ft. buffer BS TR - March - July	

Notes:

RPMPA - Resource Protection Measures for Pesticide Applications in Region 2 of the U.S. Fish and Wildlife Service. J. Allen White, U.S. Fish and Wildlife Service, 10711 Burnett Road, Suite No. 200, Austin, Texas 78758, July 2004. These RPMPAs are to be implemented in concert with the required protection measures detailed in Appendix B of the FEIS for the tri-forest noxious or invasive weed treatments.

Metsulfuron = metsulfuron is rated as Class 1 in toxicity groups for fish and amphibians due to reported mortality incidents not indicated by toxicity data.

Picloram = picloram is used mostly for broad-leaved plants but can harm some grasses and other monocots.

A **buffer zone** is the distance between the boundary of the area requiring protection and the closest point of the last spot application or application swath. Standard weather conditions for pesticide application (i.e., no temperature inversions, wind speeds between 3 and 10 miles per hour, and no rainfall for 24 hours) should be followed in implementing recommended buffer zones.

Spot applications include pesticide applications by hand-operated equipment or a spray gun that discharges pesticide in liquid streams from a spray tank.

Low aerial applications (nozzle or spreader height less than 12 feet) and high aerial applications (nozzle or spreader height greater than 12 feet) are relative to the plant canopy or a bare ground surface. In grassland or semi-open plant communities (shrubland, woodland, etc.) with more than 40 percent grass cover, the top of the grass canopy should be used to determine whether an aerial application is low or high. For forested lands or dense shrubland with less than 40 percent grass cover, the tops of trees or shrubs should be used in determining whether applications are low or high.

Solid formulations include baits, granules, pellets, and treated seed but do not include dusts.

Liquid formulations include any type of liquid-based formulation other than ULV formulations.

ULV (ultra low volume) refers to liquid formulations applied at a rate of 1/2 gallon or less per acre.

Abbreviation Key: BS - Breeding Season; ROW - Right of way; PAC - Protected Activity Center; PFA – Post-fledging family area; MSO - Mexican spotted owl; TR - Timing restriction.

Table 27. Adjuvant summary table and required protection measures

Species	ACTIVATOR 90, SILWET L-77, CHOICE, LI 700, ACIDI pHACTANT, ALL CLEAR, Tank and Equipment Cleaner Mineral oil**	Methylated Seed Oil**, AMIGO**, Marker dye WSP, CHEM-TROL, NU FILM P, FIGHTER F, FOAM FIGHTER
Apache trout, Gila chub, Gila topminnow, Little Colorado spinedace Colorado pikeminnow, loach minnow, razorback sucker, spikedeace, roundtail chub, Chiricahua leopard frog, northern leopard frog, lowland leopard frog, southwestern willow flycatcher, yellow-billed cuckoo, Yuma clapper rail, bald eagle, brown pelican, Kanab ambersnail, Page springsnail, Verde Rim springsnail, riparian migratory birds	Shall not be used in riparian habitat*.	Approved for use in riparian habitat.
Arizona cliffrose, Mexican spotted owl, California condor, black-footed ferret, Mexican gray wolf, Northern goshawk, terrestrial migratory birds,	Approved for use in habitat.	Approved for use in habitat.

***Riparian habitat** – Overstory trees include alders, conifers, cottonwood, maple, sycamore, and willows. Understory species include hackberry, New Mexico locust, and soapberry. Herbaceous plants include sedges, spikerush, bull rush, little bluestem, blue grama, Canadian wildrye, sand bluestem, squirreltail, smartweed, and curlydock (EIS vegetation affected environment).

****Carriers** – Three types of oils used to ensure even distribution of small amounts of herbicides during application.

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