FOREST SERVICE MANUAL

NATIONAL HEADQUARTERS (WO)

WASHINGTON, DC

FSM 2500 – WATERSHED AND AIR MANAGEMENT

CHAPTER 2560 – GROUNDWATER RESOURCE MANAGEMENT

Amendment No.: The Directive Manager completes this field.

Effective Date: The Directive Manager completes this field.

Duration: This amendment is effective until superseded or removed.

Approved: NAME OF APPROVING OFFICIAL
Title of Approving Official

Date Approved: mm/dd/yyyy

Posting Instructions: Amendments are numbered consecutively by title and calendar year. Post by document; remove the entire document and replace it with this amendment. Retain this transmittal as the first page(s) of this document. The last amendment to this title was 2500-2000-2 to 2520.

New Document	2560	39 Pages
Superseded Document(s) (Amendment Number and Effective Date)	None	0 Pages

Digest:

2560 – Establishes new chapter and sets forth direction on managing groundwater resources associated with National Forest System lands and clarifies roles, responsibilities, and procedures for addressing groundwater resource management. Refers to the National Forest System by using the acronym NFS throughout the chapter.

Table of Contents

2560.01 – Authority 4
2560.02 – Objectives 7
2560.03 – Policy 8
2560.04 – Responsibility 13
2560.04a – Washington Office, Staff Directors 13
2560.04b – Washington Office, Directors of Watershed, Fish, Wildlife, Air, and Rare Plants and of Minerals and Geology Management 13
2560.04c – Washington Office, Director of Engineering 14
2560.04d – Washington Office, Directors of Recreation and Heritage Resources and Lands 14
2560.04e – Washington Office, Director of Environmental Sciences Research 14
2560.04f – Regional Foresters 15
2560.04g – Station Directors and Directors of the International Institute of Tropical Forestry, the Forest Products Laboratory, and the Job Corps National Field Office 16
2560.04h – Forest and Grassland Supervisors 16
2560.04i – Research and Development Project, Program, and Team Leaders and Job Corps Center Directors 18
2560.05 – Definitions 18
2560.08 – References 22

2561 – CONSIDERATION OF GROUNDWATER RESOURCES IN FOREST SERVICE PROJECTS, APPROVALS, AND AUTHORIZATIONS 22
2561.1 – Conjunctive Uses of Groundwater and Surface Water 23
2561.2 – Minerals and Energy Development 23
2561.21 – Locatable Mineral Mining 23
2561.22 – Leasable Mineral Mining 24
2561.23 – Mineral Materials Development 24
2561.24 – Oil and Gas Operations 25
2561.25 – Geothermal Operations 26
2561.3 – Tunneling Operations 26
2561.4 – Effects of Authorized and Administrative Uses on Groundwater Quality 27

2562 – SOURCE WATER PROTECTION AND WATER SUPPLIES 27
2562.1 – Authorizations for Water Supply Facilities 28
2562.11 – Siting of Water Supply Facilities in Response to Water Supply Emergencies 28

2563 – AUTHORIZATIONS INVOLVING WATER WELLS OR WATER PIPELINES 29
2563.1 – General Requirements for Authorizing Water Wells and Water Pipelines 29
2563.2 – Pre-Proposal Meetings for Proponents of New Water Wells or Water Pipelines 29
2563.3 – Requirements for Proposals Involving New Water Wells or Water Pipelines 30
2563.4 – Requirements for All Applications Involving Water Wells or Water Pipelines 31
2563.5 – Additional Requirements for Applications for Certain Water Supplies 32
2563.6 – Additional Analyses for Applications Involving Water Wells or Water Pipelines 33

2563.7 – Terms and Conditions in Special Use Authorizations for Water Wells and Water Pipelines 35
2563.8 – Monitoring and Mitigation for Water Wells and Water Pipelines 35
2564 – MEASURING AND REPORTING VOLUME OF EXTRACTED OR INJECTED WATER 36
2565 – CLEANUP OF CONTAMINATED GROUNDWATER 37
2565.1 – Collection of Data for Groundwater Cleanup Activities 38
2566 – INFORMATION AND DATA MANAGEMENT FOR GROUNDWATER 38
2567 – LEGAL CONSIDERATIONS IN MANAGING GROUNDWATER RESOURCES 38
2568 – STRATEGIES FOR SUSTAINING GROUNDWATER RESOURCES 39

2560.01 – Authority

1. Statutes. A number of Federal statutes direct or authorize water or watershed management on National Forest System (NFS) lands (FSM 2501). Several of these statutes grant authority or provide direction to the Forest Service for the management of groundwater resources:

a. Organic Administration Act (16 U.S.C. §§ 473-475, 477-482, 551). This act contains the basic authority for watershed management on NFS lands. The act provides for improvement and protection of the national forests and securing favorable conditions of water flows. The act also authorizes use of water within national forests for domestic, mining, milling, and irrigation purposes under applicable State or Federal law.

b. Weeks Act (16 U.S.C. §§ 480, 500, 513-19, 521, 552, 563). This act authorizes the Secretary of Agriculture to acquire forested, cut-over, or denuded lands in the watersheds of navigable streams as necessary to regulate the flow of navigable streams.

c. Clarke-McNary Act (16 U.S.C. § 568 *et seq.*). This act authorizes the Secretary of Agriculture to identify Federal lands that are primarily valuable for streamflow protection and that can be economically administered as part of the national forests.

d. Bankhead-Jones Farm Tenant Act (7 U.S.C. §§ 1010-1012). This act authorizes the acquisition of damaged or non-productive agricultural lands and requires development of a program of land conservation to control soil erosion, preserve natural resources, protect fish and wildlife, mitigate floods, conserve surface and subsurface moisture, and protect the watersheds of navigable streams.

e. Domestic Water Supply Act (16 U.S.C. §§ 552a-552d). This act provides for special management of watersheds on NFS lands to protect municipal water supplies.

f. Multiple Use–Sustained Yield Act (MUSYA) (16 U.S.C. §§ 528-531). This act provides that watershed protection is one of the five co-equal purposes for which NFS lands were established and are to be administered.

g. Forest and Rangeland Renewable Resources Planning Act (FRRRPA) (16 U.S.C. § 1600 *et seq.*). This act emphasizes the need for Forest Service programs to protect and improve the quality of soil, water, and air resources on NFS lands. This act defines the NFS to include all national forests and national grasslands and other lands and waters administered by the Forest Service. This act also requires the development and maintenance of a comprehensive inventory of all NFS lands and renewable resources, including water. Additionally, FRRRPA mandates

consideration of the physical, biological, economic, and other applicable sciences in the development and maintenance of land management plans for units of the NFS.

h. Federal Land Policy and Management Act (FLPMA) (43 U.S.C. § 1701 *et seq.*). This act authorizes issuance of rights-of-way for water diversions, including wells, on NFS lands. This act requires terms and conditions in authorizations for these rights-of-way to minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment, Federal property, and the public interest.

i. Safe Drinking Water Act (SDWA) (42 U.S.C. § 300f *et seq.*). This act provides for the safety of public drinking water supplies. The SDWA establishes safe drinking water standards and protects surface and groundwater supplies from contamination (FSM 7420). Pertinent sections of the act include: Wellhead Protection (42 U.S.C. § 300h-7); Source Water Assessment (42 U.S.C. § 300j-13); Drinking Water Standards (42 U.S.C. § 300g-1(b)); and Underground Injection Control (42 U.S.C. §§ 300h–300h-5).

j. Clean Water Act (CWA) (33 U.S.C. § 1251 *et seq.*). This act provides for restoration and maintenance of the chemical, physical, and biological integrity of waters in the United States (FSM 7430 and 7440). The CWA regulates the discharge of pollutants into waters through point sources. In addition, the CWA provides for management of non-point source pollution by States. Pertinent sections of the act include: Water Quality Standards and Implementation Plans (33 U.S.C. § 1313); Certification (33 U.S.C. § 1341); National Pollutant Discharge Elimination System (33 U.S.C. § 1342); and Permits for Dredged or Fill Material (33 U.S.C. § 1344).

k. Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 *et seq.*). This act regulates the generation, management, transportation, treatment, storage, and disposal of waste materials, including hazardous waste (FSM 2130, 2160, and 7460).

l. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. § 9601 *et seq.*). This act authorizes the U. S. Environmental Protection Agency (EPA) and other Federal agencies, including the U. S. Department of Agriculture (USDA), to respond to actual and threatened releases of hazardous substances, pollutants, and contaminants (FSM 2160). CERCLA can be used to assign liability to potentially responsible parties (PRPs) for response and restoration costs, including cleanup of water contamination.

m. Surface Mining Reclamation and Control Act (SMCRA) (30 U.S.C. § 1201 *et seq.*). This act provides authority to the U. S. Department of the Interior, Office of Surface Mining (OSM), and other Federal agencies to mitigate the environmental, health, and safety effects of abandoned surface mines, primarily those used to recover coal resources.

2. Other Authorities.

a. National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR part 300). The NCP establishes procedures and standards for responding to oil spills and releases of hazardous substances, pollutants, and contaminants. The NCP implements the response and restoration provisions of the CWA, CERCLA, and the Oil Pollution Act (33 U.S.C. § 2701 *et seq.*). The NCP also defines "natural resources" to include water, groundwater, and drinking water and designates the responsible federal land management agency as the Federal trustee for the natural resources located on, over, or under lands administered by that agency.

b. Compensatory Mitigation for Losses of Aquatic Resources (40 CFR part 230). These regulations establish performance standards and criteria for application of compensatory mitigation, mitigation banks, and in lieu programs by holders of a CWA Section 404 permit issued by the U.S. Department of the Army (principally, the Corps of Engineers) to improve the quality and success of compensatory mitigation projects. Planning, implementation, and management of compensatory mitigation projects are improved by emphasizing a watershed approach in selecting compensatory mitigation project locations; requiring measurable, enforceable ecological performance standards and regular monitoring for all types of compensation; and specifying the components of a complete compensatory mitigation plan, including assurances of long-term protection of compensation sites, financial assurances, and identification of parties responsible for specific tasks.

c. Executive Order 12580. This Executive order delegates the President's authority under CERCLA to the Secretary of Agriculture to perform investigations, conduct response actions, seek cost recovery, enter into agreements with PRPs to perform investigations and conduct response actions, and issue unilateral administrative orders, subject to certain conditions, with respect to actual and threatened releases on lands administered by USDA. This Executive order also delegates authority to the Forest Service, as the Federal trustee, to assess damages to natural resources on NFS lands, recover costs, and enter into agreements with PRPs to conduct restoration actions on NFS lands.

d. Executive Order 11990. This Executive order requires Federal agencies in carrying out their responsibilities to minimize the destruction, loss, and degradation of wetlands and to preserve and enhance their natural and beneficial values.

e. Executive Order 11988. This Executive order requires Federal agencies to restore and preserve the natural and beneficial values of floodplains.

f. Executive Order 12088. This Executive order requires Federal agencies to comply with applicable pollution control standards and to take all necessary actions for the

prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under their control.

g. Executive Order 13423. This Executive order requires Federal agencies to reduce the intensity of water consumption, implement environmentally sustainable practices affecting water quantity and quality, and implement environmental management systems to address aspects of agency operations that affect the environment. This Executive order also requires Federal agencies to ensure that all future written authorizations require the holder to address as appropriate provisions of the Executive order that fall within the scope of their operations.

h. Homeland Security Presidential Directive 7 (HSPD-7). This Presidential directive requires certain Federal agencies to identify and prioritize critical national infrastructure and resources for protection from terrorist acts that could cause catastrophic health impacts or mass casualties; undermine public confidence; or disrupt essential government functions, essential services, or the economy. HPSD-7 designates the EPA as the lead agency for the water sector (which includes water supply and wastewater management). EPA has required that other Federal agencies limit public access to information regarding the specific location of water sources and water and wastewater treatment facilities.

i. USDA Manual 5600-001 (DM 5600-001). This manual provides direction on prevention, control, and abatement of environmental pollution from all facilities and on all lands administered by USDA and from all activities conducted by USDA.

j. USDA Departmental Regulation 9500-8 (DR 9500-8). This Departmental regulation provides direction for all USDA agencies on protection and enhancement of groundwater quality. DR 9500-8 provides for protection of water users and the natural environment from exposure to harmful substances in groundwater and enhancement of groundwater quality where appropriate through prudent use and careful management of potential contaminants and promotion of programs and practices that prevent contamination.

k. Forest Service Directives. FSM 2540 and FSH 2509.16 establish procedures for complying with Federal policy and State water rights laws and FSM 2540 establishes procedures for management of watersheds on NFS lands that serve as a source of municipal water supplies. FSM 2880 provides direction on inventorying and monitoring groundwater resources. FSH 2709.11 establishes procedures for administering special uses.

2560.02 – Objectives

1. To manage groundwater underlying NFS lands cooperatively with States and Territories (hereafter "States") and Tribes to promote long-term maintenance or

restoration of groundwater systems and their groundwater-dependent ecosystems, including springs, seeps, lakes, ponds, rivers and streams, cave and karst or pseudokarst systems, riparian areas, and wetlands.

2. To gather and make available information on NFS groundwater resources and their uses to provide for informed decisions during Forest Service planning and development and implementation of Forest Service projects.

3. To consider the effects on NFS groundwater resources of all proposed activities on and uses of NFS lands and to avoid, minimize, or mitigate adverse effects to the extent practical or as required by law.

4. To authorize the use of NFS lands to access groundwater resources, including uses for water supply purposes, only when the use is conducted in a manner that complies with federal laws, regulations and policies and protects NFS water resources and when the use of water is authorized by the State.

2560.03 – Policy

1. Primary Focus of Groundwater Resource Management. Focus Forest Service groundwater resource management on those portions of the groundwater system that if depleted or contaminated would have an adverse effect on surface resources or present or future uses of groundwater.

2. Water Resource Connectivity. Manage surface water and groundwater resources as hydraulically interconnected, and consider them interconnected in all planning and evaluation activities, unless it can be demonstrated otherwise using site-specific information.

3. Scale of Hydrological Resource Management. Evaluate and manage the surface water–groundwater hydrological system on an appropriate spatial scale, taking into account surface water and groundwater watersheds, which may not be identical and relevant aquifer systems.

4. Effects of Proposals on Groundwater Resources.

   a. Consider the effects of proposed actions on groundwater quantity, quality, and timing prior to approving a proposed use or implementing a Forest Service activity.

   b. Use appropriate science, technology, models, information, and expertise to address groundwater resources when revising or amending applicable land management plans and evaluating project alternatives.

c. Require that written authorization holders provide to the authorized officer all groundwater monitoring data and information they collect in compliance with local, State, or other Federal requirements. Appropriately use the data and information while evaluating effects on groundwater resources from ongoing activities and proposed actions.

d. Require that monitoring and mitigation appropriate to the scale and nature of potential effects is conducted, evaluated, and reported when authorizing a proposed use or Forest Service activity that has a significant potential to adversely affect NFS groundwater resources.

5. Limiting Impacts on Groundwater Resources. Unless otherwise required by law, prevent, minimize, or mitigate, to the extent practical, adverse impacts from Forest Service actions on groundwater resources and groundwater-dependent ecosystems located on NFS lands.

6. Cooperation with Other Governmental Entities.

a. Manage groundwater quantity and quality on NFS lands in cooperation with appropriate State agencies and, if appropriate, EPA.

b. Collaborate with other Federal agencies, such as experts from the U.S. Geological Survey, State, Tribal and local governments, State geological surveys, universities, and industry and other appropriate organizations when locating, investigating, or assessing the hydrogeology and groundwater resources of NFS lands (FSM 2880).

c. Provide comments on proposed activities either on or off NFS lands that may adversely affect groundwater resources on NFS lands to the proponents and to State, Tribal, or other Federal entities that have the authority to regulate those activities.

d. Manage wellhead protection areas, source water protection areas, and critical aquifer protection areas ("protection areas") that are designated pursuant to the provisions of the SDWA (42 U.S.C. §§ 300h-6, 300h-7, and 300j-13) or State equivalent and by utilizing the procedures for municipal supply watersheds in 36 CFR 251.9 and FSM 2542.

e. Obtain water rights under applicable State law for groundwater and groundwater-dependent surface water needed by the Forest Service (FSM 2540). Require written authorization holders operating on NFS lands to obtain water rights in compliance with applicable State law, FSM 2540, and the terms and conditions of their authorization.

f. Evaluate all applications to States for water rights on NFS lands and applications for water rights on adjacent lands that could adversely affect NFS groundwater

resources, and identify any potential injury to those resources or Forest Service water rights under applicable State procedures (FSM 2541).

7. Use of Groundwater.

   a. Efficiently use groundwater needed to meet NFS purposes, especially in water-scarce areas or during periods of drought.

   b. Since groundwater sources generally have more stable water quality and quantity than surface water sources, favor development of suitable and available groundwater sources rather than surface water sources for drinking water at Forest Service administrative and recreational sites (FSM 7420).

   c. Encourage the use of water sources located off NFS lands when the water use is largely or entirely off NFS lands, unless the applicant is a public water supplier and the proposed source is located in a designated municipal supply watershed for that supplier (FSM 2542).

   d. Require implementation of water conservation strategies in Forest Service administrative and recreational uses (FSM 7420). Ensure incorporation of water conservation strategies in operating plans for new and reissued special use authorizations involving groundwater withdrawals from high-capacity wells and new and reissued special use authorizations for public drinking water systems.

8. Measurement of Groundwater Withdrawals and Injections on NFS Lands.

   a. Require measurement and reporting to the Forest Service in the corresponding written authorization of the quantity of water utilized for all public drinking water systems that withdraw groundwater from NFS lands and that are classified as community water systems under the SDWA (FSM 7420). Include this requirement in written authorizations for affected public drinking water systems to be authorized, reauthorized, or modified. Include this requirement in existing written authorizations for affected public drinking water systems if the authorization allows for amendment to incorporate new terms required by a directive at the discretion of the authorized officer or if the holder consents.

   b. Require measurement and reporting to the Forest Service in the corresponding written authorization of the quantity of water utilized for all groundwater withdrawals from high-capacity wells located on NFS lands (including those sourced from springs). Withdrawals do not have to be measured or reported from wells equipped only with a hand or windmill pump. Include this requirement in written authorizations for affected wells to be authorized, reauthorized, or modified. Include this requirement in existing written authorizations for affected wells if the

authorization allows for amendment to incorporate new terms required by a directive at the discretion of the authorized officer or if the holder consents.

c. Require measurement and reporting to the Forest Service in the corresponding written authorization of the quantity of water injected for those large water-injection wells located on NFS lands that open into a geological formation containing fresh water (less than 10,000 parts per million (ppm) total dissolved solids (TDS)). Include this requirement in written authorizations for affected water injection wells to be authorized, reauthorized, or modified. Include this requirement in existing written authorizations for affected water injection wells if the authorization allows for amendment to incorporate new terms required by a directive at the discretion of the authorized officer or if the holder consents.

9. Compliance with Groundwater Requirements.

a. Prevent groundwater contamination from all Forest Service activities involving transporting, storing, mixing, and applying pesticides and other potentially toxic or hazardous materials; cleaning, repairing and fueling equipment; and disposing of fuels, lubricants, pesticides, or other potentially toxic or hazardous materials by following applicable Federal, State, and local requirements and the hazardous materials provisions of the Health and Safety Code Handbook (FSH 6709.11) and applying best management practices.

b. For all Forest Service uses and activities authorized or to be authorized involving water wells (including monitoring wells), require compliance with applicable Federal, State, or local standards or, as applicable, American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), National Ground Water Association (NGWA), or other water well industry standards for the design, construction, and abandonment of wells. Include this requirement in existing and new written authorizations for affected water wells.

c. For all Forest Service uses and activities authorized or to be authorized involving water wells (including monitoring wells), require that wells that are no longer needed or maintained be abandoned in compliance with applicable Federal, State, or local standards or, as applicable, ASTM, AWWA, NGWA, or other water well industry standards for decommissioning wells. Include this requirement in existing and new written authorizations for affected water wells.

d. For all Forest Service uses and activities authorized or to be authorized involving on-site wastewater systems, including septic systems and holding tanks, require compliance with applicable Federal, State, or local standards for the design, construction, operation, and maintenance of wastewater systems. Include this requirement in existing and new written authorizations for affected on-site wastewater

systems. For Forest Service facilities, follow the direction in FSM 2330, 7410, and 7430 and the Sanitary Engineering and Public Health Handbook (FSH 7409.11).

e. Install appropriate water conservation equipment and utilize suitable water conservation practices at all Federally owned facilities (FSM 7420).

f. Ensure that Forest Service-operated drinking water systems that use groundwater comply with EPA's National Primary Drinking Water Regulations, including the National Primary Drinking Water Standards (40 CFR parts 141-142) (FSM 7420). Require holders that operate public drinking water systems using water wells located on NFS lands to comply with the National Primary Drinking Water Standards and to submit the results of any required monitoring to the Forest Service.

g. Follow applicable State and EPA SDWA regulations for evaluating whether a groundwater source of drinking water is under the direct influence of surface water (FSM 7420).

h. Comply with applicable Federal, State, Tribal, and local requirements (FSM 7420) for wellhead and critical aquifer protection (40 CFR part 149), and underground injection control, including for septic systems (40 CFR part 144). Additionally, ensure that all underground injection wells (Classes I through V under the SDWA) on NFS lands are inventoried with the appropriate State agency or EPA and meet all applicable requirements.

i. Manage groundwater resources in municipal supply watersheds per 36 CFR part 251.9 and FSM 2542.

10. Cleanup of Contaminated Groundwater.

a. Use the procedures in FSM 2160 to conduct the appropriate response to contaminated groundwater or a potential threat of contamination of groundwater. Notify the National Response Center, as appropriate (FSM 2165).

b. Use the Forest Service's delegated authority under CERCLA to ensure cleanup of contaminated groundwater or otherwise respond to a potential threat of contamination resulting from a release or threatened release of a hazardous substance, as defined in 42 U.S.C. § 9601(14), or a pollutant or contaminant, as defined in 42 U.S.C. § 9601(33), that presents an imminent and substantial danger to the public health or welfare.

c. Where exercise of the Forest Service's CERCLA authority may not be appropriate, work with EPA or other Federal agencies under other applicable authorities such as RCRA, SMCRA, or CWA, or work with States under applicable State authority to clean up contaminated groundwater or otherwise respond to a potential threat of

contamination resulting from a release or threatened release of a hazardous substance, as defined in 42 U.S.C. § 9601(14), a pollutant or contaminant, as defined in 42 U.S.C. § 9601(33), or petroleum or petroleum products excluded from the definition of "hazardous substance" in 42 U.S.C. § 9601(14).

11. Land Valuation and Groundwater. Require that an appropriate assessment of potential groundwater availability be conducted by qualified groundwater personnel as part of the appraisal process when water availability may be of significance on NFS lands proposed for a land exchange.

2560.04 – Responsibility

2560.04a – Washington Office, Staff Directors

It is the responsibility of all Washington Office, staff directors to:

1. Ensure that policy development in their area of responsibility with the potential to affect groundwater resources involves consideration of the potential impact on the quantity, quality, and timing of groundwater.

2. Formulate and maintain policies and procedures to minimize, to the extent practical, the impact of program activities in their area of responsibility on groundwater quantity, quality, and timing.

2560.04b – Washington Office, Directors of Watershed, Fish, Wildlife, Air, and Rare Plants and of Minerals and Geology Management

It is the responsibility of the Washington Office, Directors of Watershed, Fish, Wildlife, Air, and Rare Plants and of Minerals and Geology Management to:

1. Formulate and maintain groundwater policy and procedures within the NFS (FSM 1230.5).

2. Coordinate training on groundwater policy and management.

3. Coordinate development and maintenance of Servicewide data management capabilities for groundwater, including hydrogeology and soils, well construction and development, and water quantity and quality.

4. Coordinate groundwater policy and management with other Forest Service staffs, as appropriate.

2560.04c – Washington Office, Director of Engineering

It is the responsibility of the Washington Office, Director of Engineering to:

1. Formulate and maintain policy and procedures for the use and protection of groundwater related to drinking water and wastewater infrastructure and SDWA Class V and RCRA injection wells, including compliance with applicable Federal and State regulations governing construction, maintenance, and waste and wastewater disposal (FSM 1230.5 and FSM 7400).

2. Formulate and maintain policy and procedures for implementation of Forest Service-delegated authority under CERCLA for cleaning up contaminated groundwater or otherwise responding to a release or threatened release of hazardous substances, pollutants, or contaminants into groundwater (42 U.S.C. § 9601; FSM 1230.5 and 2160).

3. Coordinate groundwater policy and management with other Forest Service staffs, as appropriate.

2560.04d – Washington Office, Directors of Recreation and Heritage Resources and Lands

It is the responsibility of the Washington Office, Directors of Recreation and Heritage Resources and Lands to:

1. Develop and maintain policy and procedures for processing special use applications and administering special use authorizations affecting NFS groundwater resources.

2. Coordinate development and maintenance of appropriate clauses in the Special Uses Handbook (FSH 2709.11) addressing special use authorizations involving groundwater uses with the Watershed, Fish, Wildlife, Air and Rare Plants; Minerals and Geology Management; and Engineering Staffs.

3. Coordinate implementation of groundwater policy and management with other Forest Service staffs, as appropriate.

2560.04e – Washington Office, Director of Environmental Sciences Research

It is the responsibility of the Washington Office, Director of Environmental Sciences Research to:

1. Formulate and maintain groundwater policy and procedures for all Forest Service research and development projects and facilities (FSM 1230.5).

2. Incorporate research on significant groundwater issues, including groundwater-dependent ecosystems, into the environmental sciences program and enhance the capacity of the program to conduct that research.

3. Coordinate groundwater research with other Forest Service staffs, as appropriate.

2560.04f – Regional Foresters

It is the responsibility of regional foresters to:

1. Develop agreements as needed with States, Tribes, other Federal agencies, and private entities to investigate and assess NFS groundwater resources. Focus efforts on groundwater resources that are now or are reasonably expected to be developed or adversely affected by development.

2. Obtain water rights to groundwater and groundwater-dependent surface water that are needed by the Forest Service. Require written authorization holders operating on NFS lands obtain necessary water rights in compliance with applicable State law and the terms and conditions of their authorization. Consult with the local Office of the General Counsel prior to filing (FSM 2541).

3. Develop and implement standards for the use, conservation, and protection of NFS groundwater resources (FSM 2541).

4. Approve plans for the cleanup of contaminated groundwater on NFS lands in accordance with FSM 2160.

5. Ensure that training on groundwater resource management is available to regional and forest staff and ensure that qualified groundwater personnel are available to address groundwater issues, including authorization of appropriate groundwater uses, in the region.

6. Maintain cooperative relationships with other entities having an interest in groundwater in the States in their region.

7. Maintain adequate and readily accessible records of groundwater requirements and uses on and withdrawals from NFS lands.

8. Monitor program results and assist with reviews and oversight by higher line and staff officers.

9. Ensure that all legal requirements are met and best practices followed for transporting, storing, mixing, and applying pesticides and other potentially toxic or hazardous

materials; for cleaning, repairing, and fueling equipment; and for disposing of fuels, lubricants, pesticides, or other potentially toxic or hazardous materials (FSH 6709.11).

2560.04g – Station Directors and Directors of the International Institute of Tropical Forestry, the Forest Products Laboratory, and the Job Corps National Field Office

It is the responsibility of station directors and Directors of the International Institute of Tropical Forestry, the Forest Products Laboratory, and the Job Corps National Field Office to:

1. Develop agreements as needed with States, Tribes, Federal agencies, and private entities to investigate and assess groundwater resources inside and outside the boundaries of experimental forests, ranges, grasslands, and watersheds (EFRGWs), Research Natural Areas (RNAs), and Job Corps Centers (JCCs) under their jurisdiction. Focus efforts on groundwater resources that are now or are reasonably expected to be developed or adversely affected by development. Where EFRGWs, RNAs, and JCCs are located in an NFS land management unit, consult with the regional forester in execution of these responsibilities.

2. Foster the development of research programs on groundwater issues, as appropriate to their jurisdiction.

3. Fulfill the same responsibilities enumerated for regional foresters in FSM 2543.04f, paragraphs 2 through 9, as applicable.

2560.04h – Forest and Grassland Supervisors

It is the responsibility of forest and grassland supervisors to:

1. Address in planning documents the long-term protection and sustainable use of groundwater and groundwater-dependent resources on NFS lands. Appropriately protect groundwater resources on NFS lands that are critically important to surface water resources or to natural features, ecosystems, or organisms.

2. Evaluate the quantity, quality, and probable yields of groundwater resources under their jurisdiction (FSM 2880). Focus efforts on groundwater resources that are now or are reasonably expected to be developed or adversely affected by development.

3. Inventory connections between the groundwater and surface water resources under their jurisdiction. Focus efforts on groundwater resources that are now or are reasonably expected to be developed or adversely affected by development.

4. In consultation with the regional forester and the local Office of the General Counsel, prepare or evaluate claims for water rights under applicable State law that are needed for

beneficial uses of groundwater and groundwater-dependent surface water by the Forest Service and authorization holders operating on NFS lands (FSM 2541).

5. Evaluate all applications for State water rights on NFS lands and those on adjacent lands with the potential to affect NFS groundwater resources. Identify any injury to NFS water rights and groundwater resources in applicable Federal, State, and local proceedings (FSM 2541).

6. Coordinate and implement agreements with Federal, State, and local agencies, Tribes, and other interested parties for management and restoration of groundwater resources.

7. Safeguard drinking water by complying with:

a. Applicable requirements for wellhead, source water, and critical aquifer protection areas designated by a State or local government by utilizing procedures for municipal supply watersheds in 36 CFR part 251.9 and FSM 2542.

b. Underground injection control regulations of Federal, State, and local governmental agencies.

c. EPA's National Primary Drinking Water Standards (40 CFR parts 141-142), other SDWA regulations, and FSM 7420 at all Forest Service-owned drinking water systems with a groundwater source.

8. Use qualified groundwater personnel to address groundwater issues on NFS lands under their jurisdiction and to evaluate all Forest Service activities and proposed and authorized uses with the potential to adversely affect groundwater and groundwater-dependent resources.

9. Ensure that the effects on groundwater resources from authorized activities involving groundwater withdrawals are monitored and evaluated. Require that all groundwater monitoring data and information collected in compliance with local, State, or other Federal requirements are provided to the Forest Service by the holder and are included in monitoring and evaluating those effects. Appropriately address adverse impacts on groundwater resources from proposed and authorized activities, such as by modifying the activities or adopting mitigation strategies.

10. Ensure that all applicable legal requirements are met and all best practices are followed in all agency activities involving transporting, storing, mixing, and applying pesticides and other potentially toxic or hazardous materials; cleaning, repairing and fueling equipment; and disposing of fuels, lubricants, pesticides, or other potentially toxic or hazardous materials (FSH 6709.11).

11. Collect appropriate land use fees for groundwater extraction, injection, and water pipeline operations authorized as special uses in accordance with FSM 2715 and FSH 2709.11, chapter 30. Land use fees do not apply to groundwater extraction or injection conducted as part of approved mineral or energy operations.

2560.04i – Research and Development Project, Program, and Team Leaders and Job Corps Center Directors

It is the responsibility of Research and Development project, program, and team leaders and Job Corps Center Directors to:

1. Include in land management plan revisions and amendments appropriate provisions for the long-term protection and sustainable use of groundwater resources in EFRGWs, RNAs, and JCCs under their jurisdiction. Protect groundwater resources under their jurisdiction that are critically important to surface water resources or natural features, ecosystems, or organisms. Where EFRGWs, RNAs, or JCCs are located in an NFS land management unit, consult with the forest supervisor in execution of these responsibilities.

2. Develop a research program to address groundwater issues, as appropriate to their jurisdiction.

3. Fulfill the same responsibilities enumerated for Forest Supervisors in FSM 2543.04h, paragraphs 2 through 8, as applicable.

2560.05 – Definitions

Aquifer. A geological formation or deposit that contains or transmits significant quantities of water (for example, to wells and springs). The term is usually restricted to those water-bearing geological units capable of yielding water sufficient to meet normal household needs.

Aquifer test. A field experiment, including a slug, packer, or pump test, designed to yield information on the *in-situ* hydraulic characteristics of an aquifer.

Artesian condition. Groundwater in an aquifer that is under pressure significantly greater than that of the atmosphere, due to the presence of an overlying confining unit, leading to a pressure sufficient to raise water in a well above the bottom of the overlying layer.

As-Built report. A written report submitted by a licensed professional engineer documenting that a water well or water pipeline has been constructed in compliance with the applicable engineering plans, special use authorization, and Federal, State, and local laws and regulations.

Confined aquifer. An aquifer that is bounded above and below by confining units.

Confining unit. A geological formation or deposit that does not contain or transmit significant quantities of water relative to the hydraulic characteristics of adjacent formations. A type of geological unit that is a confining unit in one area may be an aquifer in another.

Community water system. Defined under the SDWA (33 U.S.C. § 300f(15)) as a public water system that serves 25 or more year-round residents or has 15 or more service connections used by year-round residents (40 CFR 141.2; FSM 7420.05).

Conjunctive use. Combined or coordinated usage of surface and groundwater to meet water supply needs.

Critical aquifer protection area. A sole source aquifer that a State may designate under a groundwater quality protection plan that has been approved by EPA under Section 208 of the CWA prior to June 19, 1986, or a sole or principal source aquifer for which a designation under the SDWA is pending before or has been approved by EPA (42 U.S.C. § 300h-6).

Epikarst. The relatively thick portion of bedrock in karst areas that extends downward from the base of the soil zone and is characterized by extreme fracturing and enhanced dissolution.

Flowpaths. Routes taken by groundwater, governed principally by the hydraulic gradient and the permeability of the geological media, as it moves through the subsurface from aquifer recharge areas, including injection wells and infiltration basins, to natural discharge areas or water production wells.

Groundwater. Subsurface water contained in unconsolidated deposits and bedrock.

Groundwater-dependent ecosystems (GDEs). Communities of plants, animals, and other organisms whose existence and life processes depend on access to or discharge of groundwater, such as springs, fens, seeps, areas of shallow groundwater, cave and karst systems, hyporheic and hypolentic zones, and groundwater-fed lakes, streams, and wetlands.

Groundwater resources. The groundwater systems and the groundwater-dependent ecosystems linked to those systems that are associated with one or more parcels or units of land.

Hydraulic head. A measurement at a location within an aquifer or body of surface water of water pressure, or total energy per unit weight, above a datum, usually measured as a water surface elevation. The distribution of hydraulic head through an aquifer determines where groundwater will flow, with flow occurring from higher to lower head.

High-capacity well. A well or a set of wells located within a limited area and accessing the same aquifer or spring system, or a spring development that is or is capable of withdrawing water at a continuous rate of 35 gallons per minute (equivalent to 50,400 gallons per day, 6,737 cubic feet per day, or 0.15 acre-feet per day) or greater based upon a capacity test, pumping test, or measured or estimated daily water usage. Non-artesian wells accessed only using a hand or windmill pump are not high-capacity wells.

Hydraulic gradient. The ratio of the difference in the hydraulic head between two points and the distance between those points, typically determined through measurement of water-level elevations in two wells of a known separation distance.

Hydrogeology. The science that addresses subsurface waters and related geological aspects of surface waters.

Hyporheic zone and hypolentic zone. The interface between the groundwater system and surface water bodies (in streams, referred to as hyporheic; in lakes and wetlands, referred to as hypolentic) where an active exchange of water, solutes, and colloids takes place and often consists of multiple flowpaths connecting surface waters and their groundwater catchments.

Injection well. A well that puts water or other fluids into the ground.

Karst. Terrain created by the chemical solution of the bedrock, including carbonate rocks, gypsum, and to a minor extent other rocks, and characterized by disrupted surface drainage, abundant enclosed depressions, and a well-developed system of underground drainage, which may include caves and epikarst.

Large water injection well. An injection well that is utilized for water or wastewater and that has a casing with an inside diameter of 4 inches or more.

Monitoring. For purposes of FSM 2560 only, all procedures used to collect samples, data, and information on NFS resources, including groundwater and surface water.

Municipal supply watershed. A watershed that serves a public water system as that term is defined in the SDWA (42 U.S.C. § 300f(4)), as amended, or as defined in state safe drinking water statutes or regulations (FSM 2542.05).

Produced water. Groundwater withdrawn as a byproduct by an oil and gas or geothermal production operation.

Pseudokarst. Karst-like terrain formed in non-carbonate bedrock.

Publicly accessible water supply. A water supply that is used to provide drinking water or water of potable or near-potable quality to a business or organization; to a water

distribution system that serves more than one property, facility, or lease; or to a governmental facility, and that is not to be confused with a "public water system" as defined in FSM 7420 and the SDWA.

Qualified groundwater personnel. Forest Service staff or contractors with appropriate education, training, and experience in groundwater science to satisfy project needs and, if applicable, licensed or registered to practice geology, hydrology, soil science, or engineering, as appropriate, in the State in which the project is located.

Recharge. The infiltration of water into the groundwater from the ground surface, the bottom of a surface water body, or a man-made feature, such as a storage pond.

Saturated zone. Layers of unconsolidated deposits or bedrock in which all of the voids are filled with water.

Source water protection area. A contributing area surrounding a public water system supply intake that is designed to protect the integrity of the water source and that has been formally designated under the SDWA (42 U.S.C. §§ 300h-6, 300h-7, and 300j-13), the CWA, or State equivalent, such as critical aquifer or wellhead protection areas.

Spring. The area on the surface of the land where a localized flow of groundwater emerges to become surface water. including seeps, limited areas within many fens, and other groundwater-fed wetlands.

Sustainable use. The rate of groundwater usage that can be maintained indefinitely without substantial adverse consequence to groundwater resources.

Timing. The availability of water at any specific place for a particular purpose, which is temporally variable and affected by seasonality, storm frequency, and upstream or upgradient water uses (both natural and anthropogenic).

Unconfined aquifer. An aquifer that is bounded below by a confining unit, but is open to the atmosphere above.

Unsaturated zone, vadose zone, or zone of aeration. Layers of unconsolidated deposits or bedrock that typically extend upward from a saturated zone to the surface of the land and in which the voids are filled with a combination of air and water, where the water is at less than atmospheric pressure.

Water production well. A well that is used to remove water from the subsurface and that is not associated with the extraction of hydrocarbons.

Water right. A legally recognized usufructuary right to divert, store, or use water for a State-accepted beneficial use that confers no property right or ownership interest in the

physical access to the water source across property owned by adjacent or overlying landowners, even when access is needed for the physical withdrawal of the water. Access to the water source occurs pursuant to federal law on federal lands or pursuant to state real property laws on non-federal lands.

Water table. The upper surface of an unconfined aquifer where the water in the voids is at atmospheric pressure, and which is typically identified by mapping the elevations of the water levels in shallow wells extending a few feet into the zone of saturation and measuring the water level in those wells.

Well. Any drillhole, borehole, or other excavation or opening deeper than it is wide that extends more than 3 feet into the ground and that is constructed for the purpose of accessing or injecting liquids.

Wellhead protection area. The surface and subsurface area surrounding a water well or wellfield which supplies a public water system and through which contaminants are reasonably likely to reach that water well or wellfield (SDWA, 42 U.S.C. § 300h-7(e)).

Written authorization. A grazing permit, plan of operations, special use authorization, or other type of written instrument issued by the Forest Service that authorizes the use and occupancy of NFS lands and resources subject to certain terms and conditions set forth in the instrument.

2560.08 – References

USDA Forest Service, 2007. "Technical Guide to Managing Ground Water Resources," FS-881, US Government Printing Office, 281p.
http://www.fs.fed.us/biology/resources/pubs/watershed/index.html.

2561 – CONSIDERATION OF GROUNDWATER RESOURCES IN FOREST SERVICE PROJECTS, APPROVALS, AND AUTHORIZATIONS

1. Assume that there is a hydrological connection between groundwater and surface water, regardless of whether State law addresses these water resources separately, unless a hydrogeological evaluation using site-specific data indicates otherwise. This type of connection means that cross-contamination and reductions in quantity can occur unless natural geological barriers exist or prevention strategies are in place.

2. Prior to implementation or approval, assess the potential for proposed Forest Service projects, approvals, and authorizations to affect the groundwater resources of NFS lands. If there is a high probability for substantial impact to NFS groundwater resources, including its quality, quantity, and timing, evaluate those potential impacts in a manner appropriate to the scope and scale of the proposal and consistent with this chapter.

3. Include in all new and reissued written authorizations terms that require the holder to provide to the Forest Service all groundwater monitoring data and information collected in compliance with applicable local, State, or other Federal requirements.

2561.1 – Conjunctive Uses of Groundwater and Surface Water

For proposed actions that involve conjunctive uses of groundwater and surface water, including aquifer storage and recovery (ASR):

1. Consider effects from the combined use of surface and groundwater and the effects of one upon the other, including but not limited to quantity, quality, timing, and spatial distribution.

2. Where conjunctive uses are proposed, evaluate groundwater, surface water, and watershed issues, including potential effects on groundwater-dependent ecosystems, by conducting appropriate hydrological assessments of the geographic area.

2561.2 – Minerals and Energy Development

Work with appropriate State agencies or EPA, depending on whether the State has received delegated authority from EPA under the SDWA, to ensure that all holders of written authorizations for minerals or energy development appropriately address compliance with EPA's Underground Injection Control Program (40 CFR parts 144 and 146) or State equivalent to protect underground sources of drinking water.

2561.21 – Locatable Mineral Mining

The Forest Service can apply terms and conditions for the reasonable use of groundwater for locatable minerals operations. Reasonable use of either surface or groundwater in connection with locatable mining must be authorized in an approved mining Plan of Operations.

1. Existing Locatable Mineral Mines.

   a. Manage groundwater resources at existing locatable (hardrock) mineral mines (placer, underground, and open pit) on NFS lands consistent with 36 CFR part 228, subpart A; FSM 2810 and 2880; and this chapter. Ensure that operating procedures, facility designs, construction oversight, bonding, and groundwater monitoring are appropriately addressed in any required plan of operations.

   b. Evaluate the groundwater contamination potential and ensure appropriate monitoring of adits, shafts, underground workings, open pits, overburden and waste rock storage and disposal areas, and associated facilities, such as tailings impoundments, leach pads, and process ponds. As necessary, request the operator to

furnish a modification of the plan of operations, or, if the operations were under a notice of intent, require a plan of operations to address critical issues.

2. Proposed Locatable Mineral Mines.

a. Evaluate potential groundwater problems at proposed locatable mineral mines on NFS lands consistent with 36 CFR part 228, subpart A; FSM 2810 and 2880; and this chapter. Ensure that terms governing appropriate operating procedures, facility design, construction oversight, bonding, and groundwater monitoring are included in any required plan of operations or special use authorization for proposed locatable mineral mines prior to their approval.

b. In reviewing a plan of operation for a proposed locatable mineral mine, evaluate the potential for the mining activity to disrupt the natural groundwater flow regime (hydraulic gradients, flowpaths, quantity, and timing) or adversely affect groundwater or surface water quality or groundwater-dependent ecosystems.

2561.22 – Leasable Mineral Mining

1. In reviewing proposals for leasable mineral mining (not including oil and gas or geothermal), consider the potential for underground and surface coal, phosphate, sodium, potassium, sulfur, and other leasable mineral mining and related activities to interrupt natural groundwater flow regimes, adversely affect groundwater-dependent ecosystems, or the quantity, quality, and timing of groundwater and surface water.

2. Require or recommend, as appropriate, that the Bureau of Land Management (BLM), Office of Surface Mining (OSM), and applicable State agencies appropriate lease terms, design modifications, and approval conditions, as applicable, to protect NFS groundwater resources consistent with FSM 2820 and 2880 and this chapter.

2561.23 – Mineral Materials Development

1. Prior to issuing a request for bids, contract, or authorization for a mineral materials (such as common varieties of sand, gravel, stone, and aggregate) removal operation, consider the potential effects of the proposed operation upon the quantity, quality, and timing of area surface water and groundwater, the morphology of adjacent stream channels, the interaction of groundwater and surface water, and the integrity of groundwater-dependent ecosystems.

2. Include terms in any contract or authorization for mineral materials to protect groundwater resources appropriately based upon the scope and scale of the project.

2561.24 – Oil and Gas Operations

1. Evaluate potential effects of oil and gas exploration and development on surface and groundwater quality and quantity and groundwater-dependent ecosystems before authorizing BLM to proceed with leasing on NFS lands, and ensure those effects are evaluated and appropriately addressed during review of any surface use plan of operations.

2. Utilize the provisions of any applicable memorandum of understanding (MOU) between the BLM and the Forest Service to facilitate gathering of relevant information and completion of needed assessments for oil and gas development and operations.

3. Assess geological and hydrogeological conditions in an area on or adjacent to NFS lands proposed for coal-bed natural gas (CBNG) or other non-traditional shallow natural gas leasing or development. Notify BLM and appropriate State or EPA officials, depending on whether the State has received delegated authority from EPA under the CWA, if:

   a. Local springs, seeps, and water supply wells depend on groundwater associated or hydraulically connected with the production zone.

   b. Anticipated produced well water quality is likely to be unsuitable for irrigation or livestock watering.

   c. Enlarged saline seeps, damage to vegetation, or other reclamation problems are likely to occur.

4. Work with BLM and the State or EPA, depending on whether the State has received delegated authority from EPA under the CWA and SDWA, to provide BLM with appropriate conditions of approval, when necessary, for protection of groundwater resources on NFS lands during oil and gas exploration and production operations.

5. Establish terms and conditions requiring appropriate monitoring and protection of groundwater resources on NFS lands, consistent with FSM 2820, and 2880 and this chapter, for inclusion in surface use plans of operations for oil and gas production operations on NFS lands. Share these terms and conditions with operators.

6. Using the National Pollution Discharge Elimination System (NPDES) or equivalent adopted by the State, evaluate potential discharges of produced water from proposed oil and gas exploration and production operations into surface drainages. Provide to the authorizing entity appropriate recommendations to protect NFS water resources, including a recommendation regarding whether water produced from oil and gas exploration and production operations should be allowed to discharge into surface drainages.

7. Assist BLM and the State or EPA, depending on whether the State has received delegated authority from EPA under the SDWA, in evaluating the capability of local geological formations to accept produced water from oil and gas operations introduced using groundwater injection wells. Where available, use studies of existing groundwater quality and quantity.

2561.25 – Geothermal Resource Operations

1. Utilize the provisions of any applicable MOU between BLM and the Forest Service to facilitate gathering of relevant information and completion of needed assessments for geothermal resource development and operations.

2. Evaluate potential effects on groundwater quality and quantity and groundwater-dependent ecosystems on NFS lands proposed for leasing by BLM. If the Forest Service grants consent to BLM for leasing of geothermal resources on NFS lands, include appropriate lease terms to protect those resources as a condition of the Forest Service's consent to BLM for its issuance of geothermal resource leases.

3. Prior to BLM's issuance of an authorization for geothermal resource activities on NFS lands, provide recommendations to BLM regarding conditions needed in the authorization to appropriately protect NFS groundwater resources.

4. Using the NPDES or equivalent adopted by the State for point source discharges and the nonpoint source requirements of the State, evaluate potential discharges of produced water from proposed geothermal resource operations. Provide to the authorizing entity recommendations or requirements, as appropriate, to protect NFS water resources, including an assessment as to whether the water produced from geothermal resource operations should be allowed to discharge into surface drainages.

5. Assist BLM and the State or EPA, depending on whether the State has received delegated authority from EPA under the SDWA, in evaluating the capability of local geological formations to accept produced water from geothermal resource operations introduced using groundwater injection wells. Where available, use studies of existing groundwater quality and quantity.

2561.3 – Tunneling Operations

1. During both the construction and operational phases, evaluate proposed transportation tunnels and other tunneling projects that would be on or beneath NFS lands and that would not be authorized as part of minerals or energy development for their potential to impact ground and surface water quality and quantity and groundwater-dependent ecosystems.

2. Ensure that appropriate environmental studies are conducted of proposed transportation tunnels and other tunneling projects that would be on or beneath NFS lands and that would not be authorized as part of minerals or energy development, and that they include, as appropriate, analyses of the geology, hydrology, geochemistry, hydrogeology, and potentially affected biota; groundwater and geochemical modeling; and test borings and observation wells.

3. Utilize personnel with the requisite qualifications and expertise in appropriate scientific and technical disciplines, such as mining engineering and fracture flow hydrology, to address the issues likely to be associated with proposed transportation tunnels and other tunneling projects.

2561.4 – Effects of Authorized and Administrative Uses on Groundwater Quality

The following provisions do not apply to authorized minerals or energy development on NFS lands.

1. Authorize or conduct activities on NFS lands with a significant potential to adversely affect the quality of groundwater, including new waste containment facilities developed as part of environmental cleanup actions, only after appropriate levels of analysis have been completed, the range of potential groundwater resource impacts are adequately understood, and appropriate mitigation measures and an appropriate monitoring program have been developed.

2. Whenever possible, encourage siting on non-NFS lands of activities with a significant potential to adversely affect the quality of groundwater (FSM 2703).

2562 – SOURCE WATER PROTECTION AND WATER SUPPLIES

1. Work with EPA, State and local governments, Tribes, drinking water providers, and holders of special use authorizations to protect drinking water systems located entirely or partially on NFS lands through delineation and appropriate management of source water protection areas under the SWDA and applicable State law.

2. Manage NFS lands designated as source water protection areas under the SWDA or applicable State law in accordance with 36 CFR 251.9 and FSM 2542, governing management of municipal supply watersheds.

3. See FSM 2563.5 for direction regarding the requirement to submit a water supply development and operation plan in an application for a publicly accessible water supply that utilizes one or more high-capacity wells.

2562.1 – Authorizations for Water Supply Facilities

1. In lieu of accessing water from NFS lands, encourage public water suppliers and other water users to employ new treatment technology to meet water supply needs when water quality in an existing water source has degraded or become polluted.

2. Ensure that public water suppliers and other proponents and applicants for authorizations involving water supply facilities on NFS lands provide an evaluation of all other reasonable alternatives to the Forest Service before authorizing access to new water sources or increased capacity at existing water sources on NFS lands, unless the proposed use is entirely on NFS lands or the proponent or applicant is a public water supplier and the proposed water source is located in a designated municipal watershed (FSM 2542).

3. When issuing or reissuing an authorization or approving modification of an authorized use, require implementation of water conservation strategies to limit total water withdrawals from NFS lands (FSM 2541.21h) deemed appropriate by the authorized officer, depending on the type of authorized use; existing administrative and other authorized uses in the area; the physical characteristics of the setting; and other relevant factors. If the holder of the authorization consents, amend the authorization to include this requirement.

2562.11 – Siting of Water Supply Facilities in Response to Water Supply Emergencies

Ensure that local public water suppliers develop safeguards, contingencies, and, when possible, plans that can serve as an acceptable permanent solution when proposing to develop new or expanded water supply facilities on NFS lands in response to emergency water supply shortages.

1. Evaluate potential hydrological impacts of large groundwater withdrawals on NFS lands proposed as part of an emergency response, where possible, integrating technical evaluation (FSM 2563) with construction of additional water supply facilities.

2. Allow hydraulic, injection, or aquifer testing (FSM 2563.3) to be performed only if adequate safeguards are in place during drilling of pilot boreholes and construction and testing of wells or piezometers. The adequacy of safeguards depends on the specifics of the proposal, the geology and hydrology of the site, the proximity to and importance of groundwater-dependent ecosystems, and other relevant factors. If safeguards are inadequate, delay construction until safeguards are sufficient.

3. Where possible, increase the staffing and frequency of oversight activities during emergency situations.

2563 – AUTHORIZATIONS INVOLVING WATER WELLS OR WATER PIPELINES

This section addresses proposals, applications, and special use authorizations that involve water extraction or injection wells on NFS lands or water pipelines crossing NFS lands (36 CFR part 251, subpart B).

2563.1 – General Requirements for Authorizing Water Wells and Water Pipelines

1. A special use authorization issued under 36 CFR part 251, subpart B, is required for all individuals or entities other than the Forest Service to develop water wells or construct water pipelines on NFS lands, other than water wells or water pipelines that are authorized under U.S. Department of the Interior (DOI) or USDA regulations for mineral or energy exploration, development, or production (36 CFR 251.56; FSM 2729, 2810, 2820, and 2850; FSH 2709.11, ch. 10).

2. The authorized officer has the discretion to determine whether to authorize new water wells or water pipelines that are not expressly authorized under DOI or USDA regulations for mineral or energy exploration, development, or production (36 CFR 251.56; FSM 2729 and 2820;
FSH 2709.11, ch. 10).

3. All special use authorizations involving water wells and water pipelines must have a fixed term. Authorizations involving water wells and water pipelines that have a term of more than 30 years must provide for revision of their terms and conditions at specified intervals to reflect changed circumstances (36 CFR 251.56(b)(1)(v)).

2563.2 – Pre-Proposal Meetings for Proponents of New Water Wells or Water Pipelines

At a pre-proposal meeting, advise proponents of authorizations involving new water wells or water pipelines that:

1. When a State-issued water right or one or more State or local approvals are needed for a water development, the process for securing State water permits, licenses, registrations, certificates, or rights should proceed concurrently with the Forest Service process for authorizing use and occupancy of NFS lands for a water development.

2. Proponents must comply with applicable Federal, State, and local laws and regulations governing water wells and water pipelines, including:

a. State and local requirements regarding:

(1) Notifications to undertake an action.

(2) Drilling permits.

(3) Boring and well logs.

(4) Well completion and abandonment.

(5) Filing of applications for water rights, permits, licenses, and certificates.

b. Federal requirements and recommendations for well construction, development, sampling, and abandonment.

3. A copy of all documents required for other water-related permits and approvals and for compliance with laws and regulations governing water wells and pipelines must be submitted to the authorized officer and included in the project file.

2563.3 – Requirements for Proposals Involving New Water Wells or Water Pipelines

1. Deny proposals to construct wells on or pipelines across NFS lands which can reasonably be accommodated on non-NFS lands and which the proponent is proposing to construct on NFS lands because they afford a lower cost and less restrictive location than non-NFS lands (FSM 2703.2).

2. The following additional requirements apply to second-level screening of proposals for new high-capacity water wells or large water injection wells; new water wells that may adversely affect groundwater-dependent ecosystems critical to land management goals established for the administrative unit; or new water pipelines crossing NFS lands and diverting water from adjacent non-NFS lands.

a. The quantity of water. The proposal must identify current and expected future quantities of water and, for water withdrawals, the beneficial uses of water. If the proponent seeks to inject water into a geological formation containing fresh water, the proposal must identify the quantity, sources, and quality of both the proposed source of the injection and the receiving waters and the likely effects of this action on NFS water resources. Proponents of all community water systems (FSM 7420), high-capacity wells, and large water injection wells that open into geological formations containing fresh water must propose to equip the water systems and wells with flow metering devices and to maintain the devices in good working order.

b. Water conservation. Any proposal to withdraw groundwater underlying NFS lands using a well or set of wells within a limited area or from springs on NFS lands must include the use of appropriate water conservation measures (FSM 2541.21h).

c. Drilling activities. The proposal must include sufficient information, including a description of the geological and hydrological setting and the drilling methods to be employed, to demonstrate that there is a reasonable likelihood of successfully completing any water wells proposed to be located on NFS lands and adequately mitigating any associated resource damage from drilling activities.

d. Associated facilities. The proposal must identify anticipated associated facilities, such as roads, power lines, pipelines, water storage tanks, runoff control basins, and pumping stations, that are expected to be needed on NFS lands to produce, inject, or convey water on or across NFS lands.

e. Key resources and existing water withdrawals. The proposal must identify water-dependent resources and existing water withdrawals in the vicinity of the proposed project to allow for evaluation of its potential to adversely affect NFS water resources and facilities and neighboring non-NFS water supplies.

2563.4 – Requirements for All Applications Involving Water Wells or Water Pipelines

1. Ensure that applicants for authorizations involving water wells or water pipelines identify all necessary State water rights and State and local water approvals in their application and to provide a copy of them to the authorized officer upon issuance.

2. If necessary State water rights or State or local water approvals have not been obtained by the time the authorized officer grants the application, issue the authorization contingent upon obtaining the necessary rights or approvals (36 CFR 251.56(a)(2)).

3. Evaluate the potential impacts upon groundwater and surface water resources from new water wells proposed to be drilled on NFS lands and new pipelines that would transport water across NFS lands that are not authorized as part of an approved minerals or energy operation, including potential impacts from well drilling, water extraction, and pipeline construction.

4. To the extent practicable, evaluate the impacts on groundwater quantity and quality of a water injection proposal involving one or more wells that open into a geological formation containing fresh water, taking into account:

a. The addition of non-native water of a different quality from the aquifer; and

b. The impact that added liquid volume would have on aquifer structure and function.

5. Do not subject water developments related to a CERCLA response action to environmental review under Forest Service NEPA procedures. Rather, in accordance with the NCP, utilize the engineering evaluation/cost analysis procedure for non-time-

critical removals and the remedial investigation/feasibility study procedure for remedial actions.

6. After a proposal involving water wells or water pipelines has passed first and second-level screening (36 CFR 251.54(e)(1)-(e)(5); FSH 2709.11, sec. 11.2) and an application for that project has been accepted, the authorized officer shall deny the application if NFS groundwater resources would be compromised, despite mitigation, if the proposed use were authorized (36 CFR 251.54(g)(2)(i), (g)(4); FSH 2709.11, sec. 12.62).

2563.5 – Additional Requirements for Applications for Certain Water Supplies

Ensure that all applicants (including holders whose authorizations are expiring) for a special use authorization involving a publicly accessible water supply that utilizes one or more high-capacity wells provide a water supply development and operation plan to the Forest Service with a level of detail commensurate with the scale of the existing or proposed withdrawal. The water supply development and operation plan must be approved in writing by the authorized officer.

1. Ensure that a water supply development and operation plan:

   a. Addresses development and implementation of source water protection plans for water supply wells and well fields used for drinking water in accordance with applicable State or local procedures.

   b. Characterizes the groundwater systems from which the water is withdrawn and connections to surface water at a scale and resolution appropriate to the water withdrawal.

   c. Provides for periodic water quality monitoring at each water source and, as appropriate, at nearby potential contaminant sources, including any CERCLA or equivalent State removal or remediation sites.

   d. Provides for regular reporting to the Forest Service in an electronic format acceptable to the agency of the results of all monitoring and testing, including monitoring and testing required by local, State, or other Federal agencies.

   e. Includes a copy of all other required Federal, State, or local water-related permits or approvals or, if pending, the applications for those permits or approvals.

   f. Includes a contingency plan addressing safeguarding of facilities, provision of alternate water supplies, and response to potential contamination events.

2. In reviewing a water supply development and operation plan, consider:

a. Advising the applicant to provide for phasing of separate applications for exploration and testing and final construction and production to allow for collection of additional project-specific information and adjustments based on that information.

b. Including special terms and conditions, such as mitigation measures, in the special use authorization based on provisions in the plan.

2563.6 – Additional Analyses for Applications Involving Water Wells or Water Pipelines

The following provisions apply to evaluation of applications for new uses that include high-capacity water wells; large water injection wells; water wells with the potential to adversely affect groundwater-dependent ecosystems critical to land management goals established for the administrative unit; pipelines crossing NFS lands; and proposals for modification of an authorized use involving these water wells or pipelines.

1. Phasing. If an application includes a water removal or injection rate that has the potential for significant impacts on groundwater-dependent ecosystems critical to land management goals established for the administrative unit, substantial additional analyses may be necessary. Analyze potential effects of the proposed uses on NFS water resources and neighboring water withdrawals. Analyze the potential effects in two phases: (1) exploration and testing and (2) construction and production. When an applicant proposes to use existing wells, the procedures described in paragraphs 3a through 3d may still apply.

2. Advising Applicants.

a. Advise applicants that obtaining authorization for exploratory drilling or testing for new water sources does not guarantee that construction or operation of production-phase facilities will be authorized.

b. Advise applicants that substantial mitigation measures may be required under the authorization for production-phase facilities and that the scope of these measures may not be identified until the conclusion of appropriate analyses.

3. Additional Procedures.

Ensure that authorizations that involve utilization of any of the following additional procedures to evaluate site conditions have a term of no more than 10 years and contain terms and conditions that are necessary to minimize impacts on NFS water resources and that require that all applicable State and local water rights or approvals be obtained prior to project initiation (36 CFR 251.56(b)(1)). Complete environmental analyses appropriate to the scale of the proposed operations.

a. Exploratory drilling. If exploratory drilling is included in the application, require the applicant to submit a detailed project plan for the drilling. The project plan must be site-specific; must incorporate appropriate field procedures; must comply with all State and local requirements for drilling; must be prepared at a level of detail appropriate for the scale of the proposed project; and must clearly identify potential impacts on NFS water resources and nearby water withdrawals. Approve the project plan in writing prior to initiation of drilling.

b. Hydraulic well testing. If existing wells or wells established during exploratory drilling appear to meet the applicant's needs, require the applicant to submit a project plan for hydraulically testing the sufficiency of the wells. The project plan must be site-specific; must use appropriate field test data; must be prepared at a level of detail appropriate for the scale of the proposed project; and must clearly identify potential impacts on NFS water resources and nearby water withdrawals. Approve the project plan in writing prior to initiation of hydraulic well testing.

c. Injection testing. If the injection wells to be utilized open into geological formations containing fresh water, require site-specific analyses of the physical and chemical effects from any water introduced during exploration, testing, or operation of the wells. Approve the project plan in writing prior to initiation of injection testing.

d. Aquifer testing. Require the applicant to submit a detailed aquifer testing plan if the proposed project may have a substantial impact on existing water withdrawals or on groundwater-dependent ecosystems critical to land management goals established for the administrative unit. Approve a project plan in writing prior to the initiation of any aquifer testing.

(1) Wells. Require an appropriate level of aquifer testing in the absence of sufficient site-specific information to evaluate impacts on NFS water resources and nearby water withdrawals from proposed groundwater withdrawals or injections into geological formations containing fresh water on NFS lands. Aquifer testing involves pumping the preexisting water supply or monitoring wells or newly installed exploratory or monitoring wells and monitoring the surface and groundwater to assess impacts on NFS water resources and nearby water withdrawals from removing or injecting water at the anticipated production rates from the proposed wells.

(2) Pipelines. Require aquifer testing for proposals that involve transporting water across NFS lands in the absence of sufficient site-specific information to evaluate impacts on NFS water resources from groundwater withdrawals or injections on nearby non-NFS lands associated with the proposed pipeline (40 CFR 1508.25).

e. Construction documentation. Require submission of an as-built report for all well and pipeline construction on NFS lands. Ensure that the construction of the well or

pipeline is conducted in accordance with the as-built report (FSH 1909.15, ch. 20, 30, and 40).

f. Data analysis. Analyze results from exploratory drilling, hydraulic well testing, injection testing, and aquifer testing to determine potential effects on NFS water resources and nearby water withdrawals.

2563.7 – Terms and Conditions in Special Use Authorizations for Water Wells and Water Pipelines

Ensure that all new and reissued authorizations involving a water well or water pipeline provide for modification of their terms and conditions at the sole discretion of the authorized officer:

1. If deemed necessary to comply with applicable laws or regulations, the applicable land management plan, or project decisions implementing a land management plan pursuant to 36 CFR part 215; or

2. If deemed necessary, based on a written analysis conducted by qualified groundwater personnel, an aquatic biologist, or another similarly trained professional of the results of monitoring, to prevent the authorized groundwater withdrawals or injections from significantly reducing the quantity or unacceptably modifying the quality of surface or groundwater resources on NFS lands.

2563.8 – Monitoring and Mitigation for Water Wells and Water Pipelines

1. Ensure that all new and reissued authorizations involving water wells or water pipelines that have a substantial potential to adversely affect NFS groundwater resources are monitored in a manner appropriate to the scale and nature of the potential effects.

2. Ensure that all new and reissued authorizations involving water wells and water pipelines include terms and conditions to minimize damage to scenic and aesthetic values and fish and wildlife habitat, as well as any mitigation measures necessary to comply with Federal and State law and to provide for the long-term protection of NFS water resources during construction and operation of water pumping, injection, storage, or transport facilities. Monitor and evaluate all mitigation measures for efficacy.

3. Ensure that the operating plan for all new and reissued authorizations involving water wells and water pipelines that contain monitoring or mitigation measures includes detailed information on implementation of those monitoring and mitigation measures and requires annual reporting of the status and results of those monitoring and mitigation measures. Require the holder to prepare the monitoring and mitigation provisions and all other parts of the operating plan in consultation with the authorized officer and to submit the operating plan to the authorized officer for written approval.

4. If monitoring detects insufficiency of mitigation measures or additional or unforeseen adverse impacts on NFS water resources from groundwater withdrawals or injections, notify the holder and work with the holder to identify alternative mitigation measures that adequately protect NFS water resources. Add monitoring or mitigation measures, change or limit the activities authorized, modify the holder's operations, or otherwise modify the terms and conditions of the authorization if deemed necessary, based on an analysis conducted by qualified groundwater personnel, an aquatic biologist, or another similarly trained professional of the results of monitoring, to prevent the authorized groundwater withdrawals or injections from significantly reducing the quantity or unacceptably modifying the quality of surface or groundwater resources on NFS lands.

5. If monitoring or mitigation is not conducted as required by a special use authorization, provide notice and an opportunity to correct the deficiencies and take appropriate action in accordance with 36 CFR 251.60(a)(2) and the terms of the authorization.

2564 – MEASURING AND REPORTING VOLUME OF EXTRACTED OR INJECTED WATER

Provisions 1 through 3 of this section do not apply to authorized minerals or energy development on NFS lands.

1. Require measurement in gallons per day or liters per day, on a continuous basis, of the volume of groundwater extracted for all public water systems classified as community water systems (FSM 7420) and for all Forest Service and Forest Service-authorized uses that involve a high-capacity well. Measurement of withdrawals from wells equipped only with a hand or windmill pump is not required.

2. Require measurement in gallons per day or liters per day, on a continuous basis, of the volume of water injected into the ground from large water injection wells on NFS lands authorized by the Forest Service.

3. Require quarterly reporting in an electronic format acceptable to the Forest Service of groundwater withdrawals and injections that must be measured under this section. More frequent reporting may be required if necessary to evaluate effects on water resources critical to land management goals established for the administrative unit or nearby water supplies.

4. Require reporting on the same timetable to the Forest Service in an electronic format acceptable to the agency of any groundwater withdrawal, injection, or use that is reported to local, State, or other Federal authorities.

5. Require measurement and reporting of groundwater withdrawals and injections as follows:

a. For new uses and activities, at the time of the issuance of the authorization.

b. For authorized uses and activities, at the time of reissuance of the authorization or approval of modification of the authorized use. If the holder of the authorization consents, amend the authorization to include this requirement.

c. For Forest Service administrative uses, at the time of a significant upgrade to or maintenance of a water system or expansion of water system capacity.

2565 – CLEANUP OF CONTAMINATED GROUNDWATER

1. Ensure that cleanup of groundwater on NFS lands contaminated with hazardous substances, petroleum products, pollutants, or contaminants is completed in a manner that protects human health and the environment and that provides protection from encumbrances on future land use (FSM 2160).

2. At a potential cleanup site on NFS lands determine whether:

a. A release of a hazardous substance, petroleum product, pollutant, or contaminant has occurred.

b. There is a significant threat to the public health or welfare.

c. Significant harm to the environment or natural resources has occurred or could reasonably be expected to occur.

3. Ensure that determinations are consistent with requirements of:

a. CERCLA and RCRA.

b. The NCP.

c. Departmental Manual 5600-1, Chapter V.

4. Comply with other applicable Federal and State laws and regulations.

5. Before authorizing a response action or an investigation or assessment of potential damage to natural resources, consult with the USDA Hazardous Materials Management Division Director, the Forest Service National Environmental Engineer, and the local Office of the General Counsel and determine whether there are any potentially responsible parties who can perform or fund a response action.

2565.1 – Collection of Data for Groundwater Cleanup Activities

1. Collect data regarding water quality and quantity, water uses, and potentially impacted ecological systems, if needed. Consider post-cleanup data needs.

2. Employ safeguards during data collection to protect:

   a. Water quality and quantity.

   b. Potentially affected water users.

   c. Sensitive ecological systems.

2566 – INFORMATION AND DATA MANAGEMENT FOR GROUNDWATER

1. Conform to current Forest Service data system standards (the Forest Service Natural Resource Applications (FSNRAs)), such as the National Resource Information System (NRIS) or INFRA, and to applicable Servicewide GIS data standards in managing and storing groundwater data and information.

2. Store groundwater data and information in operational FSNRA databases. Data on groundwater quality should be managed in a format compatible with STORET (an EPA database) until FSNRA water quality applications are available. Data management requirements for drinking water are specified in FSM 7420.

3. Develop a comprehensive record of authorized uses affecting groundwater resources to support future decisions, including but not limited to documentation of:

   a. The impacts on NFS resources.

   b. The rationale for mitigation measures required to protect those resources.

   c. The reasons why the activity in question is consistent or inconsistent with the applicable land management plan.

2567 – LEGAL CONSIDERATIONS IN MANAGING GROUNDWATER RESOURCES

1. Work cooperatively with appropriate State agencies to ensure that applicable State and Federal water-related laws and regulations are implemented on NFS lands to protect groundwater for such purposes as outdoor recreation, authorized special uses, permitted livestock grazing, and fish and wildlife management. Whenever possible, establish a process for mutual consultation with appropriate State agencies regarding groundwater-related issues on NFS lands.

2. Use the regulations promulgated under the SDWA, including the Underground Injection Control Rule (42 U.S.C. §§ 300h–300h-5), and other applicable Federal laws and regulations to protect groundwater resources on NFS lands.

3. Follow the direction in FSM 2541 and applicable State law when filing groundwater claims during State water rights adjudications and administrative proceedings. Apply Federal reserved water rights (the Reservation or Winters doctrine) to groundwater as well as surface water to meet Federal purposes under the Organic Administration Act, the Wild and Scenic Rivers Act, and the Wilderness Act.

4. Recognizing Tribal treaty and reserved rights, work cooperatively with DOI and affected tribes during tribal water settlement negotiations involving NFS groundwater resources.

5. Consult the local Office of the General Counsel whenever specific questions arise regarding groundwater laws and regulations. Additional guidance and information on laws, regulations, and case law related to groundwater in the 43 States and Territories that contain NFS lands can be found in a sourcebook at this Forest Service Web site: *http://www.fs.fed.us/biology/resources/pubs/watershed/index.html*.

2568 – STRATEGIES FOR SUSTAINING GROUNDWATER RESOURCES

1. Collaborate with local, State, and other Federal agencies and Tribes to sustain the availability and usability of groundwater over the long term through the use of conventional and innovative approaches.

2. Consider conjunctive use of surface and ground waters; artificial recharge of groundwater, such as infiltration ponds or water injection wells; and appropriate use of recycled and reclaimed water where those approaches also protect the quality of the receiving water and affected water-dependent ecosystems.

3. To protect local groundwater resources, encourage utilization of one or more of the following conventional strategies where impacts on surface and groundwater resources are deemed acceptable:

   a. Modify the rates, timing, or spatial patterns of groundwater withdrawal.

   b. Use sources of water other than local groundwater, or import surface or groundwater from outside the basin where laws, water quality, and hydrological conditions in both the source and receiving areas allow.