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CHAPTER 1. OVERVIEW

1.1 Purpose

This manual section sets forth the authorities, policies, and responsibilities for protecting the quality of scientific, ecological, and environmental values of water resources, riparian and wetland areas, and aquatic habitats on public lands managed by the Bureau of Land Management (BLM). This manual emphasizes and integrates policies vital to ensuring that public land management based on multiple use and *sustained yield*¹ principles provides healthy and productive habitat for fish and wildlife²; achieves *land health standards* for riparian, wetland, and aquatic ecosystems; and considers society's long-term needs for healthy, functioning *watersheds*.

An interdisciplinary framework is provided to ensure water of sufficient quality and quantity is available for public land management purposes; to protect and restore the chemical, biologic, hydrologic, and geomorphic components of watersheds, *riverscapes*, and aquatic habitats; to ensure *conservation* of riparian, wetland, and aquatic species; and to preserve certain lands and waters in their natural state.

1.2 Objectives

The BLM Aquatic Resources Program protects and restores water resources, riparian and wetland areas, and aquatic habitats to provide functioning ecosystems for a combination of balanced and diverse uses, including fish and wildlife, and the long-term needs of future generations. This subsection identifies the following interdependent objectives to achieve this goal:

A. Ecosystem Structure and Function

Protect and restore the physical and ecological processes of functioning riparian and wetland areas, aquatic habitats, and water resources.

B. Water Quality

Protect and restore the chemical, physical, and biological integrity of surface water and groundwater.

C. Water Availability

Ensure that water is legally and physically available for *beneficial uses*, including protection and *restoration* actions.

D. Riparian, Wetland, and Aquatic Habitat

Proactively protect and restore riparian, wetland, and aquatic habitats to ensure the presence, abundance, and diversity of healthy, self-sustaining, and desirable riparian,

¹ Words appearing in bold and italics are defined in the glossary.

² This manual section provides direction for protecting and restoring habitat for riparian, wetland, and aquatic species and should be used together with MS-6500, Wildlife and Fisheries Management, and MS-6840, Special Status Species Management, to provide food and habitat for fish and wildlife.

wetland, and aquatic species and other wildlife and plant populations that depend upon these habitats, including *special status species*.

1.3 Authority

Principal authorities relating to the BLM's role in protecting and restoring water resources and riparian, wetland, and aquatic species and habitats and the procedures that guide the decision-making process to carry out these activities include:

A. Legislation

1. Agriculture Improvement Act of 2018 (Sec. 8624, Pub. L. 115-334, 132 Stat. 4857). Enables the BLM to enter into good neighbor authority agreements with counties, Tribes, and States to implement mutually agreed upon management objectives.
2. Alaska National Interest Lands Conservation Act of 1980 (Pub. L. 96-487). Expands the BLM's land management responsibilities under the Federal Land Policy and Management Act of 1976 to include subsistence management responsibilities and establishes conservation-related designations in Alaska.
3. Anadromous Fish Conservation Act of 1965 (16 U.S.C. 757 et seq.). Authorizes the Secretary of the Interior to initiate with States a cooperative program for the conservation, development, and enhancement of the Nation's anadromous fish and for other purposes.
4. Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451-64). Provides for the protection of natural resources (including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and habitat for fish and wildlife within the coastal zone), management of coastal development, and coastal public access through coordination with the States.
5. Colorado River Basin Salinity Control Act of 1974, as amended (Pub. L. 99-320 et seq.). Directs the Secretary of the Interior to enhance and protect the quality of water in the Colorado River and to develop a comprehensive program for minimizing salt contributions to the Colorado River from BLM-administered lands.
6. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq.). Requires cleanup of uncontrolled or abandoned hazardous waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.
7. Dingell-Johnson Sport Fish Restoration Act of 1950 (16 U.S.C. 777). Establishes a program of matching Federal grants to the States and territories for the restoration and management of all species of fish which have material value in connection with sport or recreation in the marine or fresh waters of the United States.

8. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901). Promotes the purchase of wetlands by the Secretary of the Interior through funds allocated from the Land and Water Conservation Fund and fulfills international obligations in various migratory bird treaties.
9. Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Establishes protections for fish, wildlife, and plants that are listed as threatened or endangered; requires Federal agencies to utilize their authorities to carry out programs for the conservation of endangered and threatened species; provides for adding species to and removing them from the list of threatened and endangered species and for preparing and implementing plans for their recovery; provides for interagency cooperation to avoid take of listed species and for issuing permits for otherwise prohibited activities; provides for cooperation with states, including authorization of financial assistance; and implements the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora.
10. Federal Land Policy and Management Act (FLPMA) of 1976, as amended (43 U.S.C. 1701 et seq.). Establishes the BLM's multiple use and sustained yield mission to manage public lands for present and future generations and provides exceptions for tracts of public land that have been dedicated to specific uses in accordance with other provisions of law. Sections relevant to the Aquatic Resources Program include 102(a)(8), 103(c), 202(c)(8), and 302(a)-(b).
11. Federal Water Pollution Control Act of 1948 (33 U.S.C. 1251 et seq.). ("Clean Water Act" became the act's common name with 1972 amendments.) Directs the States to establish numerical criteria, based on the Environmental Protection Agency's national water quality criteria, for toxic pollutants which could otherwise interfere with designated water uses. Provides for restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters by preventing point and nonpoint pollution sources and maintaining the integrity of wetlands.
12. Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq.). Directs that wildlife conservation be given equal consideration and be coordinated with other features of water resource development programs.
13. Great American Outdoors Act of 2020 (54 U.S.C. 100101 et seq.). Authorizes \$900 million annually in permanent funding for the Land and Water Conservation Fund.
14. Land and Water Conservation Fund Act of 1965 (16 U.S.C. 460). Fulfills a bipartisan commitment to safeguard natural areas, water resources, and cultural heritage and to provide recreation opportunities to all Americans. Provides funds and matching grants to Federal, State, and local governments for the acquisition of land and water and easements on land and water.

15. Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 U.S.C. 1801 et seq.). Governs marine fisheries management in U.S. Federal waters and fosters the long-term biological and economic sustainability of marine fisheries.
16. McCarran Amendment of 1952 (43 U.S.C. 666). Requires the BLM to assert and defend all existing Federal reserved water rights in State general stream adjudications and allows the relevant State government to administer State law-based water rights owned by the U.S.
17. Mining and Minerals Policy Act of 1970 (30 U.S.C. 21a). Fosters the orderly development of economically stable mining and minerals industries and the studying of methods for reclamation and the disposal of waste.
18. National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321-47). Requires Federal agencies to assess the environmental effects of any major Federal action prior to making decisions that significantly affect the quality of the human environment.
19. National Invasive Species Act of 1996 (16 U.S.C. 4701 et seq.). Prevents and controls infestations of the coastal inland waters of the U.S. by the zebra mussel and other nonindigenous aquatic nuisance species.
20. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4701 et seq.). Creates an Aquatic Nuisance Species Task Force to develop a program to prevent the introduction and dispersal of nonindigenous aquatic species and monitor, control, and release information about nonnative aquatic species.
21. Omnibus Public Land Management Act of 2009 (16 U.S.C. 7201-7203). Establishes the BLM's National Landscape Conservation System (also known as National Conservation Lands) to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations and requires system units to be managed in a manner that protects the values for which they were designated.
22. Oregon and California Railroad Lands Act of 1937 (43 U.S.C. 1181a). Regulates Oregon and California lands for timber production under the principle of sustained yield and protects watersheds and streamflows and provides recreational facilities while contributing to the local economy.
23. Public Rangelands Improvement Act of 1978 (49 U.S.C. 1901 et seq.). Defines the current grazing fee formula and establishes rangeland monitoring and inventory procedures for rangelands managed by the BLM and the U.S. Forest Service to improve rangeland conditions.

24. Safe Drinking Water Act of 1974 (42 U.S.C. 300f et seq.). Protects the quality of drinking water in the U.S. and focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources.
25. Salmon and Steelhead Conservation and Enhancement Act of 1980 (16 U.S.C. 3301 et seq.). Establishes a salmon and steelhead enhancement program to be jointly administered by the Departments of Commerce and the Interior.
26. Sikes Act of 1960, as amended (16 U.S.C. 670g-h). Authorizes the Secretary of the Interior to cooperate with State agencies through comprehensive plans for the conservation and rehabilitation of fish, wildlife, and game.
27. Soil Conservation and Domestic Allotment Act of 1935, as amended (16 U.S.C. 590). Promotes the control and prevention of soil erosion to preserve water quality.
28. Sport Fish Restoration and Recreational Boating Safety Act of 2012 (16 U.S.C. 777 et seq.). Authorizes the Secretary of the Interior to cooperate with States in fish restoration and management projects.
29. Taylor Grazing Act of 1934, as amended (43 U.S.C. 315 and 315a-r). Regulates grazing on certain Department of the Interior lands and authorizes the improvement of public rangelands.
30. Water Resources Planning Act of 1965, as amended (42 U.S.C. 1962). Establishes a Water Resources Council consisting of heads of all major departmental units to maintain studies related to water supplies and to coordinate on water policies.
31. Water Resources Research Act of 1964, as amended (42 U.S.C. 1961-1961c-7). Establishes water research centers to promote a more adequate national program of water research.
32. Watershed Protection and Flood Prevention Act of 1954, as amended (16 U.S.C. 1001-1009). Directs the Federal Government to cooperate with States including soil and water conservation districts to preserve, protect, and improve the Nation's land and water resources in response to flooding and soil erosion.
33. Watershed Restoration and Enhancement Agreements of 1997 (16 U.S.C. 1011). Authorizes the BLM to enter into cooperative agreements with Federal, Tribal, State, and local governments; private and nonprofit entities; and landowners to conduct activities on public or private lands for the purposes of the protection, restoration, and enhancement of fish and wildlife habitat and reduction of risk from natural disaster where public safety is threatened.
34. Wild and Scenic Rivers Act of 1968, as amended (16 U.S.C. 1271 et seq.). Requires the BLM to administer certain rivers with outstanding natural, cultural, and

recreational values in a free-flowing condition for the enjoyment of present and future generations; creates a Federal reserved water right for each wild and scenic river at the time of designation; and directs the BLM to evaluate proposed water resource projects that have the potential to affect a BLM-administered wild and scenic river.

35. Wilderness Act of 1964 (16 U.S.C. 1131 et seq.). Requires the BLM to preserve the wilderness character of each designated wilderness area.

B. Regulations

1. Conservation and Landscape Health (43 CFR 6101). Promotes the use of conservation to ensure ecosystem resilience and prevent permanent impairment, unnecessary degradation, or undue degradation of public lands. Applies land health standards to all BLM-managed public lands and uses, clarifies that conservation is a “use” within FLPMA's multiple use framework, and outlines restoration principles.
2. Fundamentals of Rangeland Health (43 CFR 4180.1(a), (b) and (c)). Requires that standards and guidelines be developed or revised by a BLM State Director under Section 4180.2(b) and be consistent with the fundamentals of rangeland health. The authorized officer shall take appropriate action if, upon review, the rangeland is failing to achieve standards and livestock grazing management practices do not conform to the guidelines.
3. National Primary Drinking Water Regulations (40 CFR 141 and 142). Establishes primary drinking water regulations applicable to public water systems, sets maximum contaminant levels for inorganic chemicals and turbidity, and requires total coliform monitoring.
4. Pesticides and Groundwater State Management Plan Regulation (40 CFR 152 and 156). Establishes a program whereby States and Tribes will develop and implement plans to manage the use of pesticides determined to leach to groundwater.
5. Planning (43 CFR 1600). Establishes a process for the development, approval, maintenance, amendment, and revision of resource management plans and the use of existing plans for BLM-administered lands.
6. Resource Management and Public Activities on Federal Lands (43 CFR 24.4). Requires the BLM to cooperate with States to prepare and institute fish and wildlife plans; permit public hunting, fishing, and trapping; exercise closure authority for hunting, fishing, and trapping; and comply with State permit requirements for specified activities.
7. Surface Management (43 CFR 3809). Requires the BLM to prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws, provide for reclamation of disturbed areas, and provide for maximum possible coordination with appropriate State agencies to avoid adverse environmental impacts.

8. Total Maximum Daily Loads and Individual Water Quality-Based Effluent Limitations (40 CFR 130.7). Requires States and eligible Tribes to establish the maximum amount of a pollutant a water body can receive and still meet water quality standards. Determinations consider critical conditions for streamflow, loading, and water quality parameters.
9. Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (65 FR 62566). Provides a framework for a watershed approach to Federal land and resource management activities.
10. Water Quality Planning and Management (40 CFR 130). Gives States and eligible Tribes the authority to adopt water quality standards, conduct water quality monitoring, and develop and implement water quality management plans.
11. Water Quality Standards (40 CFR 131). Describes State responsibilities for developing, reviewing, revising, and approving water quality standards, which may be more stringent than those required by Federal regulation, and includes designation of uses of waters, establishment of water quality criteria, and adoption of an antidegradation policy.

C. Executive/Secretarial Orders

1. Executive Order, Public Water Reserve No. 107, 1926. Withdraws and creates Federal reserved water rights on BLM-administered lands for important springs and water holes that existed as of April 17, 1926, on vacant, unappropriated, unreserved public lands.
2. Executive Order 11988, Floodplain Management, 1977. Requires Federal agencies to minimize or avoid activity that adversely affects floodplains.
3. Executive Order 11990, Protection of Wetlands, 1977. Requires Federal agencies to minimize or avoid activity that adversely affects wetlands and to encourage the preservation and enhancement of beneficial functions of wetlands.
4. Executive Order 13112, Invasive Species, 1999. Establishes a national process to mobilize and coordinate the activities of the Federal government to mount an effective and cost-efficient set of programs and activities to mitigate the threats posed by invasive species and establishes the National Invasive Species Council.
5. Secretarial Order 3356, Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes, and Territories, 2017. Continues the Department of the Interior's efforts to enhance conservation stewardship; increase outdoor recreation opportunities for all Americans, including opportunities to hunt and fish; and improve the management of game species and their habitats for this generation and beyond.

1.4 Responsibility

A. Director and Deputy Directors

Are responsible for overseeing the implementation of this policy so that its purpose and objectives are consistent with the multiple use and sustained yield mission of the agency.

B. Assistant Director for Resources and Planning

Is responsible for:

1. Providing guidance in meeting the Director's priorities during the development of policies, priorities, and general procedures for implementation of the Aquatic Resources Program.
2. Providing appropriate resources to BLM directorates, state offices, and centers to ensure consistent and timely implementation of this policy.
3. Coordinating with other Federal agencies and Tribal and State governments, as appropriate, when implementing this policy.

C. Division Chief, Wildlife Conservation, Aquatics, and Environmental Protection

Is responsible for:

1. Developing, approving, and implementing procedures for carrying out the policies and priorities of the Aquatic Resources Program.
2. Collaborating with other BLM divisions, state offices, and centers to ensure the intent of this policy is integrated and consistently implemented.
3. Coordinating, as appropriate, with other Federal agencies; Tribal and State fish, wildlife, and water management agencies; and national organizations to advance the policies and priorities of the Aquatic Resources Program.

D. National Program Lead

Is responsible for:

1. Developing and maintaining up-to-date policies, priorities, and general procedures for the Aquatic Resources Program at a national level.
2. Developing budget guidance pertaining to the Aquatic Resources Program and recommending funding allocations to state offices and centers.
3. Monitoring Aquatic Resources Program expenditures and performance.
4. Coordinating with state office program leads and other national program leads to ensure consistent implementation of this policy.

5. Providing strategic program oversight, leadership, and support for the protection and restoration of water resources and riparian, wetland, and aquatic species and habitats at the national level.
6. Providing technical expertise and appropriate resources across the BLM to ensure proper consideration and implementation of this policy.
7. Coordinating with Federal, Tribal, and State agencies and national organizations to advance the policies and priorities of the Aquatic Resources Program.
8. Working with the BLM's National Operations Center and National Training Center to develop science initiatives, tools, and training materials relevant to this policy.
9. Facilitating reviews of new and proposed legislation, regulations, policies, and court rulings to determine how they affect the policies and priorities of the Aquatic Resources Program.
10. Reviewing resource management plans and associated documents to ensure proper consideration and implementation of this policy.

E. National Operations Center

Is responsible for:

1. Providing technical support, expertise, and guidance across the BLM and to partners to ensure consistent implementation of this policy.
2. Developing and implementing training in cooperation with Headquarters and the National Training Center to support the policies and priorities of the Aquatic Resources Program.
3. Providing tools to manage, access, and analyze data collected by Aquatic Resources Program staff.
4. Preparing, reviewing, and evaluating BLM technical references, user guides, technical notes, and other documents supporting the policies and priorities of the Aquatic Resources Program in coordination with national program leads.

F. State Directors

Are responsible for:

1. Implementing laws, regulations, policies, and procedures for the protection and restoration of water resources and riparian, wetland, and aquatic species and habitats on BLM-managed lands within their state(s).

2. Coordinating Aquatic Resources Program activities with adjoining BLM state offices; Federal, Tribal, and State agencies; and BLM stakeholders.
3. Establishing and maintaining an interdisciplinary workforce that provides expertise regarding the implementation of the policies and priorities of the Aquatic Resources Program at the state, district, and field office levels.
4. Ensuring that when the BLM engages in the land use planning process, desired outcomes, management direction, and monitoring are established to protect and restore water resources and riparian, wetland, and aquatic species and habitats on BLM-managed lands.

G. State Office Program Leads

Are responsible for:

1. Communicating and assisting in implementing the policies, priorities, and general procedures of the Aquatic Resources Program at the state leadership, district, and field staff levels.
2. Coordinating Aquatic Resources Program work plan and budgeting efforts and recommending funding allocations to state leadership and district and field offices.
3. Monitoring Aquatic Resources Program expenditures and reporting performance and accomplishments for their state(s). This includes conducting periodic program reviews to assess the adequacy and effectiveness of staffing levels, budget, training, and other resources to achieve program policies and priorities, and providing feedback to the national program lead.
4. Coordinating with Federal, Tribal, and State agencies; adjoining BLM state, district, and field offices; other state program leads; and BLM stakeholders to advance the policies and priorities of the Aquatic Resources Program.
5. Providing technical expertise and support to state leadership and district and field offices to ensure the policies and priorities of the Aquatic Resources Program are included in decision documents and land use authorizations.
6. Reviewing new and proposed legislation, regulations, policies, and court rulings as needed to determine how they affect the implementation of this policy in their state(s).
7. Responding to data calls and requests for information from Headquarters in a timely manner with high-quality products.

H. Line Officers, including District and Field Managers

Are responsible for:

1. Implementing laws, regulations, policies, and procedures for the protection and restoration of water resources and riparian, wetland, and aquatic species and habitats on BLM-managed lands within the area serviced by their office.
2. Developing and implementing an interdisciplinary district or field office program of work to ensure consistent implementation of this policy.
3. Implementing Aquatic Resources Program work plans, ensuring appropriate budget allocations, and supporting periodic evaluations of program implementation and efficacy and providing feedback to the state program lead.
4. Coordinating, as appropriate, with Federal, Tribal, and State agencies; adjoining BLM district and field offices; and BLM stakeholders to advance the policies and priorities of the Aquatic Resources Program.
5. Overseeing the inventory of BLM-managed lands to determine the location and spatial extent of water resources and riparian, wetland, and aquatic species and habitats; the condition and trend of these resources; and how BLM actions affect resource condition and trend.
6. Ensuring that implementation-level activity plans and land use authorizations protect and restore water resources and riparian, wetland, and aquatic species and habitats via terms and conditions, or necessary discretionary denial of applications, and address reasonably foreseeable impacts from public lands uses, drought, and climate change by incorporating any required mitigation and taking proactive measures to build ecosystem resilience and adaptability.
7. Evaluating the effectiveness of district and field office activities to ensure compliance with applicable laws relating to environmental analysis or protection and the successful protection and restoration of water resources and riparian, wetland, and aquatic species and habitats on BLM-managed lands.
8. Maintaining adequate staffing with appropriate expertise to implement the policies and priorities of the Aquatic Resources Program.

1.5 References

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- B. BLM Handbook H-1601-1 (Rel. 1-1693), Land Use Planning Handbook.

- C. BLM Handbook H-1684-1 (Rel. 1-1805), Fund Code Handbook.
- D. BLM Handbook H-9112-1 (Rel. 9-431), Bridge Design, Construction, and Maintenance Handbook.
- E. BLM Manual Section MS-1270 (Rel. 1-1804), Records Management.
- F. BLM Manual Section MS-1740 (Rel. 1-1713), Renewable Resource Improvements and Treatments.
- G. BLM Manual Section MS-1745 (Rel. 1-1603), Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants.
- H. BLM Manual Section MS-1780 (Rel. 1-1780), Tribal Relations.
- I. BLM Manual Section MS-6100 (Rel. 6-131), National Landscape Conservation System Management Manual.
- J. BLM Manual Section MS-6400 (Rel. 6-136), Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management.
- K. BLM Manual Section MS-6500 (Rel. 6-114), Wildlife and Fisheries Management.
- L. BLM Manual Section MS-6600 (Rel. 6-117), Fish, Wildlife, and Special Status Plant Species Resource Inventory and Monitoring.
- M. BLM Manual Section MS-6840 (Rel. 6-125), Special Status Species Management.
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1.6 Policy

The BLM’s policy for the protection and restoration of water resources and riparian, wetland, and aquatic species and habitats is organized according to the four objectives described in Chapter 1.2. Three additional subsections address the roles of internal and external involvement; inventory, assessment, and monitoring activities; and adaptive management in achieving these four objectives. The policies are interrelated and must be considered together by an interdisciplinary team to effectively achieve land health standards and support the agency’s multiple use and sustained yield mission.

A. Ecosystem Structure and Function

1. Protect and restore longitudinal, lateral, and vertical connectivity of watersheds and riverscapes for the movement of water, sediment and other organic and inorganic matter, and energy. Evaluate all proposed use authorizations to determine if connectivity is likely to be reduced and to avoid or minimize such potential impacts.
2. Protect and restore diverse desired riparian and wetland plant assemblages. This includes minimizing or eliminating nonnative or nuisance plant assemblages to maintain and restore healthy riverscapes and *groundwater-dependent ecosystems*. Use of plant species for restoration must be done in accordance with BLM policy (refer to MS-1745, Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants; and MS-1740, Renewable Resource Improvements and Treatments).
3. Protect and restore the fluvial processes of watersheds following riverscape principles where possible (e.g., Wheaton et al. 2019):

- i. Maintain or improve the physical space stream and river systems need to be dynamic, regularly shift position within their *valley bottom*, and rework and interact with their floodplain.
 - ii. Sustain, mimic, or promote structural complexity, such as beaver dams and large wood, to force changes in flow patterns that produce physically diverse habitats, increased biodiversity, and ecosystem resilience.
 - iii. Recognize that the relative importance and abundance of *structural elements* varies based on local stream or river geomorphology, valley setting, and flow regime.
 - iv. Maintain or improve diverse flow paths and residence times of water to attenuate damaging floods, replenish shallow aquifers in valley bottoms, capture sediment, cycle nutrients, and build drought and wildfire resilience.
4. Protect and restore groundwater-dependent ecosystems with a focus on the processes that support native *phreatophytes*, soil moisture, shallow groundwater levels, the water storage capacity of aquifer systems, interconnections with surface water, and drought resilience.
5. Address root causes of impairment or degradation and implement *process-based restoration*, where possible, to maintain attributes and resource values associated with the potential or capability of riverscapes, watersheds, and aquifer systems. Process-based restoration projects should be implemented at relevant spatial and temporal scales required to create and maintain attributes of the system and be prioritized in areas where the BLM manages sufficient lands and/or partnerships exist to implement projects at meaningful scales.
6. Develop restoration plans consistent with guidance such as the Society for Ecological Restoration's "International Principles and Standards for the Practice of Ecological Restoration" (Gann et al. 2019).
7. Establish reference and desired future conditions for all restoration projects within restoration project planning and design documents that adequately consider spatial and temporal dynamics of the system(s).
8. When feasible, conduct programmatic analysis for the protection and restoration of water resources and riparian, wetland, and aquatic species and habitats to facilitate watershed- or *landscape*-scale decision making for implementation-level decisions.
9. Implement a standardized geospatial framework for conducting *watershed condition assessments* to identify priority habitats, including priority habitat

connectivity areas, *intact landscapes*, riverscapes, watersheds, and aquifer systems, for protection and restoration actions. Specific management direction for these areas should be identified during land use planning and incorporated into subsequent project implementation decisions.

10. Manage authorized uses of BLM-administered lands to avoid, control, or limit surface occupancy, use, or human disturbances in riparian and wetland areas and associated valley bottoms by identifying appropriate management for riparian, wetland, and aquatic species and habitats, including special status species, and by recommending appropriate setbacks, areawide use restrictions, and other design features.
11. Manage certain public lands to preserve and protect their natural condition or prevent irreparable damage to important natural systems or processes. This may be achieved through means such as protecting and restoring the values for which National Conservation Lands units were designated; identifying and designating areas of critical environmental concern or backcountry conservation areas; or less formally through implementing landscape-scale protection and restoration actions.

B. Water Quality

1. Protect and restore watershed, riverscape, and hydrogeologic processes and attributes that naturally capture and ameliorate pollutants, such as those processes and attributes described in policy statements A.1 through A.4.
2. Ensure land use plans provide management direction for compliance with applicable water quality laws such as the Clean Water Act and its implementing regulations, as well as State water quality standards and implementing regulations.
3. Ensure use authorizations provide for compliance with applicable water quality laws such as the Clean Water Act and its implementing regulations, as well as State water quality standards and implementing regulations. Incorporate provisions allowing for the suspension or revocation of use authorizations for noncompliance with water quality standards.
4. Do not authorize activities that will contribute to the listing of water bodies as impaired under Clean Water Act Section 303(d) (40 CFR 130.7(b)(4)) or that will lead to further degradation of water bodies listed as impaired.
5. Reduce water quality degradation on public lands from point and nonpoint sources of pollution, including nutrients, sediment, pesticides, and salinity, by implementing a *watershed approach* and incorporating *best management practices*.

6. Include stipulations requiring surface water and groundwater quality monitoring to determine pollutant concentrations and ensure compliance with the Clean Water Act, State water quality standards, and State implementing regulations when granting, issuing, or renewing rights-of-way for managed aquifer recharge activities and when water quality monitoring is essential to implementing adaptive management.
7. Protect and enhance water quality values of designated wild and scenic rivers administered by the BLM.

C. Water Availability

1. Protect and restore the watershed, riverscape, and hydrogeologic processes and attributes that sustain streamflow, aquifer discharge, groundwater levels, soil moisture, and the natural water storage capacity of public lands, such as those processes and attributes described in policy statements A.1 through A.4.
2. Encourage the management of water as a renewable natural resource (refer to 600 DM 2).
3. Implement BLM water rights policy (refer to MS-7250, Water Rights, and MS-6400, Wild and Scenic Rivers) and state office-specific water rights policy and procedures to appropriate water for beneficial uses on public lands, including habitat protection and restoration. Focused consideration should be given to proactive measures that protect instream flow and in situ groundwater needs for special status species and on lands withdrawn from the public domain by Congress or the executive branch for a specific Federal purpose.
4. Assess the severity, timing, and duration of drought at the relevant landscape scale to determine if drought conditions need to be addressed when authorizing public land uses. Evaluate all proposed use authorizations to determine if drought resilience is likely to be reduced on public lands and to avoid or minimize such potential impacts.
5. Address the availability of water to support the BLM's multiple use and sustained yield mission in all land use and implementation plans. Assess existing consumptive, instream, and in situ uses of surface water and groundwater and the BLM's future water needs at the relevant landscape scale to determine if ***water availability*** needs to be addressed when authorizing public land uses.
6. Consider the potential ecological and socioeconomic consequences of groundwater development prior to constructing water supply wells for public land management purposes or granting, issuing, or renewing rights-of-way for water supply wells on BLM-administered lands. Such considerations must include the following to inform water availability and sustained yield assessments:

- i. Conformance with land use plans; potential impacts to Federal, Tribal, and State water rights and uses; and the specific requirements of the BLM's rights-of-way regulations.
 - ii. Depletion of aquifer discharge and storage, groundwater-level declines, and potential impacts to groundwater-dependent ecosystems. It is not sufficient for the BLM to determine whether groundwater is available for proposed activities based solely upon the long-term average rate of recharge of an aquifer system.
7. It is strongly recommended that the BLM install meters on water supply wells constructed for public land management purposes and require third parties to meter and report their groundwater use from wells located on BLM-administered lands as a condition of approval in lease/grant/permit authorizations.

D. Riparian, Wetland, and Aquatic Habitat

1. Implement BLM policy to protect and restore habitats on BLM-managed lands to ensure healthy, self-sustaining, and improving populations of fish and wildlife for present and future generations (refer to MS-6500, Wildlife and Fisheries Management).
2. Implement BLM policy to conserve and/or recover species listed as endangered or threatened under the Endangered Species Act, other BLM special status species, and the ecosystems on which they depend. Initiate proactive conservation measures and strategies that reduce or eliminate threats to special status species (refer to MS-6840, Special Status Species Management).
3. Protect and restore watershed, riverscape, and hydrogeologic processes and attributes that create and maintain habitats and support riparian, wetland, and aquatic species, such as those processes and attributes described in policy statements A.1 through A.4 to preclude the listing of sensitive species or advance the recovery of listed species.
4. Proactively protect and restore viable populations of diverse desired riparian, wetland, and aquatic species.
5. Apply best management practices and incorporate project design features to avoid, minimize, rectify, reduce, or eliminate impacts to water resources and riparian, wetland, and aquatic species and habitats from all BLM-authorized uses when preparing implementation-level activity plans.
6. Prevent the introduction, establishment, and spread of riparian, wetland, and aquatic invasive species to avoid impairment or degradation of resource values by conducting public education and outreach campaigns; developing and

implementing early detection and rapid response plans; and installing decontamination stations at high use or high-risk areas.

7. Inventory human-made barriers and assess passage for riparian, wetland, and aquatic species. Protect and restore connectivity for aquatic organism passage between headwater tributaries and main stem channels and between streams and their floodplains, off-channel habitats, and wetlands. Identify priority habitat connectivity areas that are important for riparian, wetland, and aquatic species.
8. Evaluate all proposed actions to determine if adverse impacts to habitat connectivity are likely to occur. Barriers to connectivity should only be maintained or constructed if they are required for the protection and recovery of native species. Any portion of a wildlife or fisheries restoration or enhancement project that has the potential to affect a wild and scenic river's free-flowing condition will be evaluated as a water resources project under Section 7 of the Wild and Scenic Rivers Act (refer to MS-6400, Wild and Scenic Rivers).
9. Ensure bridge and culvert replacements and new structures follow BLM-approved aquatic organism passage design criteria and guidelines (refer to MS-9112, Bridges and Major Culverts and H-9112-1, Bridge Design, Construction, and Maintenance).
10. Acquire riparian and wetland habitat and water rights through the Land and Water Conservation Fund or other means to benefit habitat necessary for the maintenance and enhancement of riparian, wetland, and aquatic species.
11. Ensure riparian and wetland areas remain in Federal ownership unless disposal would be in the public interest. When considering land disposal or exchange, ensure adequate valuation of water resources and riparian, wetland, and aquatic habitats.
12. Ensure riparian and wetland areas essential for the conservation of special status species remain in Federal ownership (refer to MS-6840, Special Status Species Management) and ensure designated wild and scenic rivers are withdrawn from entry, sale, or other disposition (refer to MS-6400, Wild and Scenic Rivers).

E. Internal and External Involvement

Work with other BLM programs and governmental agencies, Tribes, members of the public, and interest groups to achieve conservation objectives for water resources and riparian, wetland, and aquatic species and habitats (refer to Chapter 3 for additional guidance).

F. Inventory, Assess, and Monitor

Inventory, assess, and monitor water resources and riparian, wetland, and aquatic species and habitats to inform management decisions (refer to Chapter 6 for additional guidance).

G. Adaptive Management

Encourage the use of *adaptive management*, as appropriate, as a tool in protecting and restoring water resources and riparian, wetland, and aquatic species and habitats in compliance with applicable laws and authorities (refer to 522 DM 1 and Chapter 2.3 for additional guidance).

1.7 Files and Records Maintenance

Many aspects of the program pertain to the creation, maintenance, use, retrieval, access, security, and disposition of government records (refer to MS-1270, Records Management). Within the Aquatic Resources Program, a large portion of records are related to data. The BLM must ensure that the data it collects, uses, and disseminates relate to the agency's mission requirements, is of known quality, and is applied and used objectively. To satisfy this requirement, program staff should synthesize collected data in field or technical reports. All records should be maintained in the appropriate case file and comply with applicable BLM corporate data standards. All geospatial data, including maps and geospatial layers, will comply with national geospatial standards and will be compatible with BLM corporate data standards such as those outlined for Assessment, Inventory, and Monitoring (AIM); Proper Functioning Condition (PFC); or other nationally standardized methods. To count towards the BLM's program element targets of MO (Monitor Streams/Riparian Habitat), MN (Monitor Lake and Wetland Habitat), or BU (Inventory lakes/wetlands) and BV (inventory streams/riparian areas), relevant data must be entered into databases such as AIM, Multiple Indicator Monitoring, or PFC. State-specific data management requirements may also exist and should be followed when applicable. The time necessary to comply with the requirements outlined in this section for files and records maintenance will be budgeted as part of the program.

CHAPTER 2. DECISION GUIDANCE

To manage BLM-administered public lands for multiple uses and sustained yield, the BLM must consider, through the planning process, how proposed actions will “...protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values...provide food and habitat for fish and wildlife...” (FLPMA 102(a)(8)); “account for the long-term needs of future generations for renewable and nonrenewable resources” (FLPMA 103(c)); and affect “... the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands” (FLPMA 103(h)). To ensure these resource values and the policy contained herein are given the same level of consideration as other resource values and uses of public lands, the following must be integrated into land use plan and implementation-level decisions:

2.1 Land Use Plan Decisions

- A. Identify measurable and quantifiable desired outcomes (i.e., objectives) for riparian and wetland areas, aquatic habitats, special status species, and water resources. The desired outcomes should reflect policy related to ecosystem structure and function, water quality and availability; habitat quality and availability; and aquatic connectivity, as well as the conditions needed to achieve land health standards.
- B. Design alternatives to avoid impairment or degradation of ecosystem structure and function, water quality, water availability, and/or habitat conditions through managing uses of BLM-administered lands, including but not limited to, rangeland management, timber harvest, fluid and solid mineral development, energy development, rights-of-way, or recreation.
- C. Ensure land use plans address requirements to protect and restore water resources and riparian, wetland, and aquatic species and habitats on National Conservation Lands designated due to the presence of these values.
- D. Identify actions to achieve desired outcomes in accordance with the multiple use and sustained yield principles and consistent with the scope established by the purpose and need of the plan. Actions can include and are not limited to:
 1. Developing management direction for water resources and riparian, wetland, and aquatic species and habitats, including special status species, having special significance for focused protection or restoration actions. These may include, but are not limited to, priority habitats identified by State and Federal fish and wildlife agencies, priority habitat connectivity areas, intact landscapes, groundwater protection zones, impaired water bodies, and riparian management areas.
 2. Identifying priority landscapes for passive or active restoration actions to meet desired outcomes for water resources and riparian, wetland, and aquatic species and habitats.

3. Specifying allowable uses and use restrictions such as surface occupancy limits when in proximity to water resources and riparian, wetland, and aquatic species and habitats.
4. Identifying best management practices and design features to minimize, avoid, or reduce impacts to ecosystem structure and function, water quality, water availability and sustainability, and habitat conditions for riparian, wetland, and aquatic species.
5. Identifying measures, including filing for water rights under applicable Federal and State procedures, to ensure water availability for sustained yield and healthy riparian and wetland areas and aquatic habitats, wild and scenic river values, recreation, and other resources (refer to MS-7250, Water Rights).
6. Identifying, evaluating, and giving priority to areas that have potential for designation and management as areas of critical environmental concern and wild and scenic river segments.

2.2 Implementation Decisions

- A. Identify system or site-specific management and restoration actions for water resources and riparian, wetland, and aquatic species and habitats to meet desired outcomes for:
 1. Ecosystem structure and function.
 2. Water quality requirements.
 3. Water availability and sustained yield.
 4. Habitat quality and availability for riparian, wetland, and aquatic species, including habitat conditions for special status species.
- B. Prepare implementation-level activity or restoration plans for water resources and riparian, wetland, and aquatic species and habitats in need of management intervention to achieve land health standards or other desired conditions.
- C. Ensure that protection, restoration, and other management actions have clearly defined and measurable outcomes and are implemented and monitored for effectiveness.
- D. Determine effects of proposed water resources projects on the free-flowing conditions and other river values of designated and congressionally authorized study rivers administered by the BLM under Section 7 of the Wild and Scenic Rivers Act.
- E. Decline to authorize discretionary public land uses, consistent with applicable law, including where such use would permanently impair the productivity of the land and the quality of the environment, where impacts are expected to extend beyond BLM

administrative boundaries, or where the proposed activity would result in unnecessary or undue degradation, even after mitigation.

- F. Avoid impairment or degradation of ecosystem structure and function, water quality, water availability, and/or habitat conditions through managing uses of BLM-administered lands, including but not limited to, rangeland management, timber harvest, fluid and solid mineral development, energy development, rights-of-way, or recreation. Example management practices to avoid impacts include:
1. Protective terms and conditions on livestock grazing authorizations and riparian fencing.
 2. Protective stipulations for oil and gas leases or other related authorizations.
 3. Best management practices and design features for road development and maintenance near water resources and riparian, wetland, and aquatic species and habitats.
 4. Best management practices and design features to minimize, avoid, or reduce erosion and the transport of pollutants to downstream water bodies.
 5. Filing for water rights under applicable State or Federal procedures to ensure water availability for sustained yield; healthy riparian, wetland, and aquatic habitats; and to protect the outstandingly remarkable values of wild and scenic rivers.

2.3 Adaptive Management

Adaptive management is a management approach to structured decision making that may be used in conjunction with the land use planning and implementation-level decision-making process. Adaptive management should be integrated into the decision-making process where long-term impacts to water resources and riparian, wetland, and aquatic species and habitats on BLM-administered lands may be uncertain and future monitoring will be needed to adjust management practices during implementation or in subsequent implementation decisions. Adaptive management is most effective when the effects of management practices are uncertain. In contrast, adaptive management is not appropriate when management objectives are uncertain, management decisions cannot be revisited and modified by the BLM over time, monitoring cannot reduce uncertainty, or the risks associated with learning-based decision making are too high. Ensure appropriate NEPA compliance when employing adaptive management (43 CFR 46.145).

- A. Incorporate adaptive management into the land use planning and implementation-level decision-making processes, as appropriate, with a focus on the following principles to achieve the purpose and objectives of this policy:

1. Base adaptive management strategies upon predicted possible outcomes, specific resource condition thresholds, and standardized monitoring. Predicted possible outcomes and condition thresholds must be defined in sufficient detail to allow progress toward their achievement to be objectively assessed through implementation and effectiveness monitoring.
 2. Clearly identify the adjustments in management that will be made when monitoring indicates a resource condition threshold has been exceeded.
 3. Incorporate adaptive management processes into alternatives to facilitate the agency's ability to change its management direction without the necessity of land use plan amendments. The considered alternatives should include management direction that will be applied if the selected alternative is not achieving land health standards or other desired outcomes.
- B. Further guidance on implementing adaptive management strategies into resource management decisions is published in "Adaptive Management: The U.S. Department of the Interior Technical Guide" (Williams et al. 2009).

CHAPTER 3. INTERNAL AND EXTERNAL INVOLVEMENT

The following forms of internal, public, and intergovernmental involvement are required to implement this policy:

3.1 Consultation

Consult with other governmental agencies and Tribal governments as required by law and statute to obtain the advice or opinion of another agency or government regarding an aspect of land management for which that agency or government has particular expertise or responsibility. For example, Section 7 of the Endangered Species Act of 1973 requires the BLM to consult with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration to implement proactive conservation measures and for all actions that may affect listed species, designated critical habitat, or essential fish habitat; and many authorities and directives require regular and meaningful consultation with federally recognized Tribes in the development of Federal policies and decisions that have Tribal implications (refer to MS-1780, Tribal Relations).

3.2 Coordination

Coordination involves ongoing communication among BLM staff and managers and with Tribal, State, and local governments.

- A. Coordinate with Tribal, State, and local, governments as required by FLPMA (Section 202(c)(9)) to ensure the BLM considers pertinent provisions of non-BLM plans in managing public lands and provides ample opportunities for non-Federal agencies to comment on the development of BLM land use plans.
- B. Coordinate with Federal, Tribal, State, and local agencies to ensure consideration of their guidelines and best management practices related to the prevention, control, and spread of nuisance/invasive aquatic species within the range of occurrence on public lands.
- C. Coordinate with State agencies and other BLM programs to maintain inventories of fish and wildlife populations and their habitat, including priority habitat connectivity areas.
- D. Coordinate with State agencies and other BLM programs to provide habitat on public lands that supports recreational fishing opportunities for diverse desired fish species, including the preparation of management plans for managing habitat for these species, the monitoring of public lands and waters impacted by recreational fishing, and supporting adherence to regulations and guidelines developed by State agencies.
- E. Coordinate with other BLM programs to protect and restore water resources and riparian, wetland, and aquatic species and habitats and ensure achievement of the BLM's land health standards as they relate to this policy. This includes land use plan development and implementation; active engagement with interdisciplinary teams; the mitigation of impacts to these resources from any proposed action including mitigation leases; the design and implementation of on-the-ground restoration actions including restoration leases; and the inventory, assessment, and monitoring of resource values on public lands.

3.3 Cooperation

Maintain meaningful cooperative relationships with other Federal, Tribal, State, and local governmental agencies that have primary authority and responsibility for:

- A. Allocation and management of water resources.
- B. Management of fish and wildlife populations, including special status species and other priority species.
- C. Promulgation of water quality standards in accordance with the Clean Water Act, administration of the National Pollutant Discharge Elimination System permitting program, and designation of beneficial uses for water bodies.

3.4 Collaboration

Collaborate with interested parties to foster the exchange of information and seek opportunities to collectively advance the policies and priorities of the Aquatic Resources Program. More specifically:

- A. Collaborate with stakeholders, including private landowners and partners, to protect and restore water resources and riparian, wetland, and aquatic species and habitats. This includes seeking participation in the development of watershed assessments, watershed management plans, and land use plans; the design and implementation of on-the-ground restoration actions; identifying priority habitats and intact landscapes and improving aquatic connectivity; and the inventory, assessment, and monitoring of resource values. Employ effective, early, and frequent communication regarding conservation measures to proactively address disagreements and generate broad support for these activities.
- B. Collaborate with Federal, Tribal, and State agencies; local water conservancy districts and user groups; individual water rights owners; and partners to protect water quality, instream flows, and in situ uses of groundwater. This includes the development of formal agreements to foster landscape- and watershed-scale approaches for preventing or reducing impacts from water uses within a watershed or aquifer system.
- C. Collaborate with Federal, Tribal, State, and local agencies; academic institutions; and partners that share an interest in protecting and restoring BLM-managed resources or conducting research to inform management decisions. Initiate and develop cooperative agreements or contracts to further collaboration and accomplish objectives that sustain or improve aquatic connectivity, water quality and availability, habitats, and ecosystem processes.
- D. Collaborate with BLM partners to conduct education and outreach activities that increase public awareness and promote the conservation of water resources and riparian, wetland, and aquatic species and habitats.

3.5 Memoranda of Understanding (MOUs)

Maintain and update, as needed, MOUs between the BLM and governmental agencies and stakeholders to advance the policies and priorities of the Aquatic Resources Program.

CHAPTER 4. REPORTING AND ACCOUNTABILITY REQUIREMENTS

BLM state offices are required to complete annual reporting of accomplishments beyond basic program elements as outlined in the agency's annual work plan. These reports are designed to maintain or increase awareness of program activities and emerging issues across the agency and to better communicate the BLM's role in conservation, partnerships, and community outcomes.

All offices are responsible for adhering to activity-based costing principles (refer to H-1684-1, Fund Code Handbook), for which the 1160 subactivity and associated program elements are limited in use to actions directly benefiting the Aquatic Resources Program and driven by or caused by the program. All BLM offices are responsible for coding time and work accurately in accordance with the Bureau's budget structure and the benefitting subactivity concept.

Technical program reviews or other program assessments should be routinely completed by program leads at the state and/or headquarters level. Program reviews can be singularly focused or multifaceted to examine budget allocations, short- and long-term performance, staffing levels and structure, data collection and management, policy adherence, and to identify emerging issues. Reviews should be designed to enhance program delivery while maintaining a high degree of program accountability at each level of the organization consistent with policy.

CHAPTER 5. TECHNICAL SKILLS

To successfully carry out the BLM mission, Department of the Interior priorities, and policies of the interdisciplinary Aquatic Resources Program, the agency requires significant breadth and depth of professional skills. For example, subject matter experts in aquatic ecology, aqueous geochemistry, fisheries science (with a focus on habitat management), fluvial geomorphology, hydrology, hydrogeology, limnology, riparian and wetland ecology, and water rights are required. Since the breadth and depth of knowledge, skills, and abilities required by the subactivity exceeds the capacity of any one employee, the BLM should employ a range of technical specialists under this subactivity with a focus on positions in the Hydrology (1315), Fish Biology (0482), Ecology (0408), and Natural Resources Management and Biological Science (0401) series. Tangential or generalist experience in these fields is generally not considered sufficient for long-term, programmatic success apart from entry-level positions. The BLM should employ a diverse array of technical specialists, strive for functional redundancy in such skills, and invest in continuing education under this program to successfully implement this policy. The program must also reestablish early career positions and career ladders to ensure long-term program development and momentum.

CHAPTER 6. INVENTORY, ASSESSMENT, AND MONITORING

6.1 Inventory, Assessment, and Monitoring

Inventory, assessment, and monitoring of water resources and riparian, wetland, and aquatic species and habitats are essential activities of the Aquatic Resources Program. Following the policies established in this manual section, the use of inventory, assessment, and monitoring data should be directed to:

- A. Inform and establish baseline information for on-the-ground protection and restoration actions, assess the effectiveness of protection and restoration actions, and inform adaptive management.
- B. Assess achievement of land health standards.
- C. Track the condition and trend of the chemical, physical, and biological integrity of surface water and groundwater resources.
- D. Assess surface water and groundwater availability, quantify instream flow and in situ groundwater needs, and assess the sustainability of water uses.
- E. Assess and maintain current inventories of priority fish and wildlife populations and their habitat, including priority habitat connectivity areas, to evaluate their status and trends (refer to MS-6600, Fish, Wildlife, and Special Status Plant Species Resource Inventory and Monitoring, and MS-6840, Special Status Species Management).
- F. Track the condition and trend of aquatic-related resources, objects, and values for which certain National Landscape Conservation System units were designated (refer to MS-6100, National Landscape Conservation System Management).

6.2 Monitoring Plans

The information needs outlined in 6.1A–F are diverse and represent a significant workload. State, district, or field offices shall use their interdisciplinary program of work to prioritize information needs among water resources and riparian, wetland, and aquatic species and habitats. A strategy for collecting priority information should be outlined in monitoring plans and incorporate the following best practices:

- A. Utilize structured interdisciplinary implementation processes to guide inventory, assessment, and monitoring program development and implementation such as the AIM strategy or the integrated riparian management process (Dickard et al. 2015; Kachergis et al. 2022).
- B. Include the following in all monitoring plans: (1) management objectives; (2) **SMART monitoring objectives**; (3) indicators and their connection to monitoring objectives; (4) reporting areas; and (5) appropriate survey designs for selecting monitoring locations relative to spatial and temporal scales of relevant management issues.

- C. Use standardized field methods to allow data comparisons throughout the BLM and in collaboration with partners.
- D. Use electronic data capture, management, and storage tools.
- E. Integrate remote sensing tools.
- F. Ensure appropriate training and data quality assurance and quality control procedures.
- G. Develop and use standard analysis workflows for specific decision types when possible.
- H. Coordinate inventory, assessment, and monitoring activities with other agencies and BLM programs so that such activities are conducted in the most efficient and cost-productive manner.

6.3 Scientific Integrity Standards

All inventory, assessment, and monitoring information should be robust, repeatable, transparent, and adhere to Department of the Interior scientific integrity standards (refer to 305 DM 3) and Department information quality standards. Quality data are required to inform management decisions and sustain water resources and riparian, wetland, and aquatic species and habitats.

CHAPTER 7. GLOSSARY OF TERMS

Adaptive management. A system of management practices based on clearly identified outcomes and monitoring to determine whether management actions are meeting desired outcomes; and, if not, facilitating management changes that will best ensure that outcomes are met or reevaluated. Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain (43 CFR 46.30).

Beneficial use. Consumptive and nonconsumptive uses of water for the benefit of the appropriator as defined by Federal and State law. Beneficial use is the basis, measurement, and limit of a water right (refer to MS-7250, Water Rights).

Best management practices. Guidelines designed to facilitate progress towards achievement and maintenance of land health standards or other desired outcomes.

Conservation. The management of natural resources to promote protection and restoration. Conservation actions are effective at building resilient lands and are designed to reach desired future conditions through protection, restoration, and other types of planning, permitting, and program decision-making.

Groundwater-dependent ecosystem. An ecosystem that is maintained by direct or indirect access to groundwater and relies on the flow or chemical characteristics of groundwater for some or all its water needs, including phreatophytic vegetation, springs and seeps, cave and karst systems, rivers, wetlands, and lakes.

Intact landscape. A relatively unfragmented landscape free of local conditions that could permanently or significantly disrupt, impair, or degrade the landscape's composition, structure, or function. Intact landscapes are large enough to maintain native biological diversity, including viable populations of wide-ranging species. Intact landscapes provide critical ecosystem services and are resilient to disturbance and environmental change and thus have high conservation value. For example, an intact landscape would have minimal fragmentation from roads, fences, and dams; low densities of agricultural, urban, and industrial development; and minimal pollution levels.

Land health standards. Describe the minimum requirements for land health across all ecosystems managed by the BLM and are used to develop objectives in land use plans. Land health means the degree to which the integrity of the soil, water, and ecological processes sustain habitat quality and ecosystem functions.

Landscape. An area that is spatially heterogeneous in at least one factor of interest, which may include common management concerns or conditions. The landscape is not defined by the size of the area, but rather by the interacting elements that are relevant and meaningful in a management context. Landscapes may be defined in terms of aquatic conditions, such as watersheds, or terrestrial conditions, such as ecoregions.

Phreatophytes. Deep-rooted vegetation that depend upon groundwater for their water needs.

Process-based restoration. Restoration practices that focus on restoring natural rates and magnitudes of physical, chemical, and biological processes, while recognizing and allowing inherent dynamics and changes to occur in these systems (Beechie et al. 2010).

Restoration. The process or act of conservation by passively or actively assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed to a more natural, native ecological state.

Riverscape. The connected floodplain and channel habitats that together make up the valley bottom (Wheaton et al. 2019).

SMART monitoring objectives. Monitoring objectives that are specific, measurable, achievable, relevant, and time-bound.

Special status species. Collectively, federally listed or proposed and Bureau sensitive species, which include both Federal candidate species and delisted species within 5 years of delisting (refer to MS-6840, Special Status Species Management).

Structural elements. Discrete objects that directly influence hydraulics (e.g., wood, boulders, beaver dams, bedrock, vegetation) (Wheaton et al. 2019).

Sustained yield. The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of BLM-managed lands without permanent impairment of the productivity of the land. Preventing permanent impairment means that renewable resources are not permanently depleted, and that desired future conditions are met for future generations. Ecosystem resilience is essential to the BLM's ability to manage for sustained yield.

Valley bottom. Low-lying area in a valley containing the stream channel and contemporary floodplain. The valley bottom represents the current maximum possible extent of channel movement and riparian areas (Wheaton et al. 2019).

Water availability. Reflects the quantity, timing, quality, and use of water resources. The availability of water has several integrated components: (1) the need for a certain volume of water to meet the intended purpose, (2) the timing characteristics with which water is delivered, (3) the adequate quality of the water for the intended purpose, and (4) the need for water to meet human and environmental/ecological uses.

Watershed. A geographic area of land, water, and biota within the confines of a drainage divide. The total area above a given point of a water body that contributes flow to that point. Typically refers to a fifth-level of classification or 10-digit hydrologic unit code (65 FR 62566).

Watershed approach: A framework to guide watershed management that: (1) uses watershed assessments to determine existing and reference conditions; (2) incorporates assessment results

into resource management planning; and (3) fosters collaboration with all landowners in the watershed (65 FR 62566).

Watershed condition assessment: A process for assessing and synthesizing information on the condition of soil, water, habitats, and ecological processes within watersheds relative to the BLM's land health fundamentals. A watershed condition assessment may include assessment of one or more of watershed physical and biological characteristics, landscape intactness, and disturbances.