

## **CHAPTER 11 - RIPARIAN RESOURCES**

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Riparian and wetland areas are sensitive vegetative or physical ecosystems that develop in association with surface or subsurface water (Leonard et al. 1992). Riparian and wetland ecological systems comprise less than 1 percent of the 22 million acres of public lands administered by BLM in Utah, but are among the most important, productive, and diverse ecosystems on the landscape. Benefits from riparian/wetland ecosystems are essential to both human and wildlife values and include:

- maintaining clean renewable water supplies;
- providing for diverse plant and wildlife ecosystems, including special status species and fisheries;
- importance in cultural and historic values;
- economic value derived from sustainable uses (open space, hunting, livestock grazing; commercial recreation);
- greenbelt associated recreation and scenic values;
- thermal/shade protection for both humans and wildlife, which is especially important within the arid Southwest.

Riparian/wetland habitats are fragile resources and are often among the first landscape features to reflect impacts from management activities. These habitats are used as indicators of overall land health and watershed condition. Some of the functions of a healthy riparian systems filter and purify water as it moves through the riparian zone, reduce sediment loads and enhance soil stability, reduce destructive energies associated with flood events, provide physical and thermal micro-climates in contrast to surrounding uplands, and contribute to groundwater recharge and base flow (BLM Riparian Area Management Policy, 1987).

### **11.1 RESOURCE OVERVIEW**

BLM regulations regarding the Fundamentals of Rangeland Health give management priority to maintaining “healthy functioning ecosystems”, based on ecological site capabilities to achieve its potential as affected by human changes on the landscape (CFR 4180 et. Seq, and BLM 1998a).

BLM administers 32,800 acres (1.8 percent of BLM-administered lands in the Moab FO) of riparian and wetland resources on public lands within the MFO. The majority of these resources are riparian areas located along the Colorado River, Green River, Dolores River, and their associated tributary drainages including Mill Creek, Kane Creek, Onion Creek, Tenmile Wash and many others. Please refer to the Watershed section (Chapter 14) for a list of major streams and additional details on stream resources.

Riparian and wetland areas include, but are not limited to, areas adjacent to waterways (whether waters are surface, subsurface, or ephemeral), springs, potholes, wet meadows, sloughs, marshes, swamps, bogs, floodplains, lakes, and reservoirs. Riparian areas are recognized as “a form of wetland transition” between permanently saturated wetlands and upland areas (Leonard et al.

1992), and for BLM purposes, riparian and wetland areas are referred to synonymously unless specifically discerned.

BLM utilizes various tools to describe, analyze, and evaluate riparian/wetland ecosystems, relative to their potential and capability to achieve a properly functioning and healthy ecosystem. One such system, utilizes a riparian/wetland habitat classification system to characterize ecosystems based on topography and flooding regimes. Those ecosystems found locally include:

Riverine systems- channelized aquatic or herbaceous streams

Palustrine systems- woody dominated wetlands or marshes

Lacustrine systems- deepwater river channels with aquatic marshes (1977, USDI, US Fish and Wildlife Service, Classification of Wetlands and Deepwater Habitats)

Another stream classification system includes the Rosgen Classification of Natural Rivers, which categorizes all streams and associated riparian systems by common physical and hydrologic characteristics. The Rosgen Classification system categorizes streams by entrenchment ratio, width to depth ratio, sinuosity, slope, and channel materials (substrate).

Within most riparian/wetland systems in the arid southwest, the potential of a riparian/wetland ecosystem is strongly dependent upon the availability of water. The degree, timing and source of water availability, among other physical factors, is commonly referred to in terms of perennial (yearlong), interrupted (perennial flow discontinuous in space), intermittent (seasonal), or ephemeral (storm) water sources. Various types of spring or river based riparian/wetland ecosystems can be described using these terms of water availability (see Chapter 14, Watershed section, for additional details and definitions of water resources within the Moab FO area).

### **11.1.1 Riparian/Wetland Status**

The BLM specifically manages and monitors riparian/wetland resources in terms of lotic and lentic ecosystems. (See Figure 11-1 for Riparian Ecosystems within the Moab Field Office.) Lotic riparian areas are those ecosystems associated with running waters, streams, springs or drainages, while lentic riparian areas are those associated with standing water ecosystems, such as marshes, swamps, lakes, springs, seeps, low velocity backwater areas or areas where permanent soil moisture is available. Ecological evaluations based on ecosystem attributes and processes differ between lotic and lentic systems, with current condition and activities in Moab FO area reported annually to Congress. FY 2003 summaries regarding lotic and lentic systems indicate over 96 percent (31,700 acres) of riparian/wetland resources in Moab FO are lotic riparian systems, with less than 4 percent (1,102 acres) in lentic wetland systems. Refer to Figure 1 for more details regarding lotic/lentic status.

Regardless of the type of riparian or wetland ecosystem, Proper Functioning Condition (PFC) is assessed for each stream or varying segments (See Figure 11-2). Functioning condition is rated by category to reflect ecosystem health as affected by management practices. Definitions follow below (BLM 1998):

Properly Functioning Condition (PFC): currently 18,584 acres (57 percent) of riparian/wetland areas are in PFC when adequate vegetation, landform, or woody debris are present to:

- dissipate high-energy water flow
- filter sediment, capture bedload, and aid floodplain development
- improve floodwater retention and groundwater recharge
- develop root masses that stabilize streambanks
- develop diverse fluvial geomorphology (pool and channel complexes) to provide habitat for wildlife
- support greater biodiversity

Functioning at Risk (FAR): currently 11,192 acres (34 percent) of riparian-wetland areas are in functional condition, but at least one soil, water, or vegetation attribute makes them susceptible to degradation following high flow events. Management practices that make them “At Risk” include livestock grazing, the presence of county roads, off-highway vehicle (OHV) activities, and commercial recreation and development.

Non-Functioning (NF): currently 2,973 acres (9 percent) of riparian-wetland areas that are clearly not providing adequate vegetation, landform, or large wood debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc.

A field inventory form for lotic riparian systems is included in Appendix A. PFC assessments are conducted by an interdisciplinary team (ID team), which can consist of combinations of a botanist, rangeland specialist, riparian specialist, hydrologist, biologist, soil scientist, geologist, or recreation specialist as available. The results of these assessments are presented in Table F-1 (Appendix F) by watershed and stream system, and include allotments associated with each stream. An abbreviated version of this table appears in Table 11-1. The Level 4 Hydrologic Unit Code (HUC) area boundaries appear in Figure 1.

While Functional Ratings can indicate the health of an ecosystem and be used as management tools, they do not in themselves reflect the degree of ecosystem diversity relative to invasive, exotic or noxious plant species, or severity of dewatering. Both of these factors have severely altered the majority of native riparian and wetland ecosystems throughout the west. These factors and other site details are included within the narrative of an ecosystem assessment. However, a system can be severely altered by these factors, and still be functioning to a lesser degree than its desired or potential condition.

<b>Level 4 HUC* (Stream System)</b>	<b>PFC (acres/%)</b>	<b>FAR (acres/%)</b>	<b>NF (acres/%)</b>	<b>Total Ripn (acres/%)</b>
14010005 (Colorado Headwaters– Plateau) Colorado River, Cottonwood Canyon	178.34 100%	0	0	178.34
14030001 (Upper Colorado-Dolores–Westwater) Agate Wash, Bitter Creek, Cisco Wash, Coates Creek, Colorado River, Cottonwood Canyon, Cottonwood Wash, Danish Wash, Diamond Ck, Dolores River, Dry Gulch, East Canyon, Hay Canyon, Jones Canyon, Little Dolores, Marble Canyon, Nash Wash, Pinto Wash Rengade Ck, Ryan Ck, Sagers Wash, Star Cnyn, Sulphur Canyon, Westwater Creek	6753.21 62%	1502.91 14%	2692.47 25%	10948.59
14030002 (Upper Colorado-Dolores –Upper Dolores) East Coyote Wash, La Sal Creek	559.19 82%	122.89 18%	0	682.08
14030004 (Upper Colorado-Dolores – Lower Dolores) Beaver Ck, Colorado River, Dolores River, Fisher Ck, Granite Ck	1247.36 53%	1134.60 48%	0	2381.96
14030005 (Upper Colorado-Dolores – Kane Springs) Castle Creek , Bartlett Wash, Buck, Bull Canyon, Colorado River, Courthouse Wash, Day Canyon, Dolores River, Dripping Spring, Dry Oak Spring, Fish Seep Wash, Gold Bar Canyon, Hatch Wash, Hunters Canyon, Ice Box, Jackass Canyon, Kane Springs Ck, Little Canyon, Little Valley, Lockhart, Mill Canyon, Mill Creek, Muleshoe, Negro Bill Canyon , Onion Creek, Pritchett Canyon, Professor Creek, Rill Creek, Sagers Wash, Salt Valley, Salt Wash ,Sevenmile, Shafer Basin, Trough Springs, Trout Water, Tusher Wash, West Coyote Wash, Yellow Jacket	7035.90 78%	1923.16 21%	26.47 1%	8985.53
14060005 (Lower Green – Desolation Canyon) Coal Creek, Green River, Rattlesnake	1133.97 61%	677.63 37%	43.93 2%	1855.53
14060006 (Lower Green – Willow) Moon Ridge, Willow Creek	30.51 100%	0	0	30.51
14060008 (Lower Green – Lower Green) Tennile Wash, Browns Wash, Crescent Wash, Dubinky, Floy Creek, Green River, Hell Roaring, Little Grand Wash, Mineral Bottom, Rattlesnake, Red Wash, Salt Valley, Salt Wash, Spring Canyon, Thompson Wash, Tusher Canyon, White Wash	1646.50 21%	5831.29 76%	210.61 3%	7688.40
<b>Grand Totals</b>	<b>18584.98</b>	<b>11192.48</b>	<b>2973.48</b>	<b>32750.94</b>
* - refer to Figure 1 for Level 4 HUC area boundaries				

**11.1.2 Rangeland Health Standards**

As further explained in the following sections, BLM has developed Standards and Guidelines for Rangeland Health to promote “*functioning ecosystems.*” This means that the needs of the land and its living and nonliving components (soil, air, water, flora, and fauna) are to be considered first. Only when ecological systems are functioning properly can the consumptive, economic, political, and spiritual needs of man be attained in a sustainable way (BLM 1997b). In 1977,

Utah's Standards for Rangeland Health were developed to assess and protect ecological communities and their associated values.

Of the 83 allotments managed within the Field Office boundary, ten allotments are meeting Standards and 73 allotments have not been assessed. Of the ten allotments assessed for Rangeland Health, 9 allotments contain riparian/wetland resources and of these, 3 allotments required corrective action or implementation of guidelines to improve riparian/wetland resources. For additional details regarding Rangeland Health Standards refer to the Livestock and Grazing, Chapter 7.

Some isolated springs, wells and reservoirs occur throughout the Moab FO area, but comprise less than 1% percent of riparian/wetland resources.

Common riparian/wetland species within Moab FO area are listed in Appendix B, Table B-1. The majority of lotic riparian ecosystems, regardless of elevation, within Moab FO area contain varying potentials for cottonwood-willow-bulrush communities; while lentic systems share common potentials for communities of bulrush, cattail, and rushes.

### **11.1.3 Riparian/Wetland Restoration**

Restoration of riparian/wetland ecosystems can involve efforts to manually, mechanically, chemically, or biologically alter or restore riparian/wetland resources or conditions for the benefit of the riparian/wetland ecosystem.

Exotic and noxious species (namely tamarisk, Russian olive, and Russian knapweed) are now common within most riparian/wetland ecosystems along major riverways, and involve all types restoration methods. Possibly the most devastating aspect of invasive exotic species is the cumulative alteration to an unhealthy riparian ecosystem; however the individual functions or processes which exotic species can alter include:

- exotics often dewater riparian sites since they have deeper tap roots to out-compete natives for availability of water in arid environments;
- tamarisk secrete salt and increase soil and water salinity, resulting in reduced seed establishment of native species, and reduced downstream water quality. This has severe economic impacts
- exotics compete for sun, space in narrow available habitats;
- exotics reduce over bank flooding, decreasing establishment of nursery seed beds;
- exotics have large numbers of seeds and long seed establishment periods (very prolific in comparison to native species);
- exotic communities have reduced biodiversity (significant decreases in numbers and types of associated biotic species including birds, bats, insects, amphibians etc );
- exotic communities promote entrenched systems with highly destructive flooding energies which remain undissipated within deep channels, resulting in high bank loss, sedimentation, and salinity.

Exotic species control is only one aspect of riparian ecosystem rehabilitation, and is managed similarly to noxious weed species under the rangeland program. Riparian/wetland management objectives include management of ecosystems to support diverse native species to the degree possible regarding exotic species management. Please refer to the vegetation and/or rangeland chapters for additional details regarding exotic species management.

Other types of riparian restoration include riparian plantings, cottonwood protection (wire wrapping to prevent beaver depredation), proper use of fire, floodplain contouring and stabilization, fencing, improved grazing practices/systems, improved education or other types of manipulations, or mitigation to maintain or improve healthy ecosystems, increase species diversity or use of native seed sources.

## **11.2 SPECIFIC MANDATES AND AUTHORITY**

Many mandates and authorities related to multiple-use activities overlapping to protect sensitive riparian/wetland resources (riparian related mandates and authorities are referenced in Appendix C of this report). Those most specific to riparian related values are discussed below.

In addition to those laws embedded in the very foundation of BLM as a public land management agency (Taylor Grazing Act, 1934, Federal Land Policy Management Act 1976, and Public Rangelands Improvement Act, 1978), the premiere authority which provides for the most protection of riparian/wetland and associated resources is the Clean Water Act of 1977. In response to the Clean Water Act, two central Executive Orders (Wetland and Floodplains) were signed under Presidential authority to protect riparian/wetland and associated floodplain and wildlife values. Other regulations, policy, and guidance relative to management of riparian/wetland resources include:

- Federal Clean Water Act (CWA, 1977)
- Executive Order (EO) 11988 (May 24, 1977), the Floodplains EO
- EO 11990 (May 24, 1977), the Wetlands EO
- EO 12088 (October 24, 1978), the Local Water Quality EO
- EO 12962 (1995), Fisheries and Aquatic Ecosystems EO
- EO 13186 (2001), EO in support of the Migratory Bird Treaty Act of 1918
- Fundamentals of Rangeland Reform (1995), under 43 CFR 4180 – Fundamentals of Rangeland Health and Guidelines for Grazing Administration (*Standards and Guidelines*)
- National Riparian Area Management Policy (NRAMP, 1987) Establishes standards and technical methods for riparian area assessment and inventory.
- National Cooperative Riparian Restoration Program (1996) Cooperative program between BLM, USDA Forest Service, and NRCS.

### **11.2.1 Rangeland Health Assessments**

The Fundamentals of Rangeland Health give management priority to maintaining healthy “functioning ecosystems”. In response, Utah’s Standards for Rangeland Health and Guidelines for Grazing Management (1997) were developed to assess and protect ecological communities

and their associated values. Standards are descriptions of the desired condition of the biological or physical components and characteristics of rangelands applied to management of all public land resources and uses. Guidelines include management approaches, methods, and practices intended to achieve established standards. To date, Utah BLM has developed guidelines for livestock grazing (1997) and recreation activities (2001), with additional guidelines to be developed for other resource uses.

Each of the four Utah Standards is applied to all resources within a rangeland ecosystem, which can directly or indirectly apply to riparian/wetland ecosystems. However, Standard # 2 directly pertains to riparian condition and functions. Each of the Standards is briefly summarized below, but also includes indicators by which resources are evaluated. Please refer to Appendix D, for the complete version of Utah Standards for Rangeland Health and Guidelines.

Utah BLM Rangeland Health Standard # 1. Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform. (Refer to indicators in Appendix D)

Utah BLM Rangeland Health Standard # 2. Riparian and wetland areas are in Properly Functioning Condition, stream channel morphology; and functions are appropriate to soil type, climate, and landform. This is indicated by:

1. Stream bank vegetation consisting of, or showing a trend toward, species with root masses capable of withstanding high stream-flow events. Vegetative cover adequate to protect stream banks and dissipate stream-flow energy associated with high-water flows which protects against accelerated erosion, captures sediment, and provides for groundwater recharge.
2. Vegetation reflecting desired potential community, maintenance of riparian and wetland soil moisture characteristics, diverse age structure and composition, high vigor, large woody debris when site potential allows, and provides food, cover, and other habitat needs for dependent animal species.
3. Re-vegetated point bars, lateral stream movement associated with natural sinuosity, channel width, depth pool frequency and roughness appropriate to landscape position.
4. Active floodplain.

Utah BLM Rangeland Health Standard # 3. Desired species, including native, threatened, endangered, and special-status species, are maintained at a level appropriate for the site and species involved. (Refer to indicators in Appendix D)

Utah BLM Rangeland Health Standard # 4. BLM will apply and comply with water quality standards established by the State of Utah (R.317-2) and the Federal Clean Water and Safe Drinking Water Acts. Activities on BLM Lands will support the designated beneficial uses described in the Utah Water Quality Standards (R.317-2) for surface and groundwater. (Refer to indicators in Appendix D)

Additionally, Guidelines for Grazing and Recreation activities have been developed for Utah BLM, which are practices designed to achieve the Standards. With respect to riparian/wetland ecosystems, these guidelines require specific actions or criteria to maintain or improve

riparian/wetland resources to Properly Functioning Condition (PFC). Refer to Appendix D for complete listing of Utah Guidelines, including those related to grazing and recreation.

Other Federal regulations or mandates that influence the management of riparian/wetland ecosystems include:

Wilderness Study Areas- Interim Management Policy, which influence riparian/wetland improvements.

Wild & Scenic Rivers- Interim Management Policy, which protects outstandingly remarkable riparian/wetland values.

Endangered Species Act (ESA)- conservation and protection of critical riparian/wetland habitat for endangered species dependent on these areas.

### **11.2.2 Utah State Laws and Regulations**

Stream Alteration/404 Permits: The Utah Division of Water Rights, State Engineer's Office administers the Stream Alteration Permit Program, through delegation of authority from the U.S. Army Corps of Engineers and the Clean Water Act. Depending on the type or location of activities, either the State or the Corps regulates and permits activities affecting the beds or banks or natural streams, washes, or riparian vegetation.

Utah Non-point Source Management: The Utah Division of Water Quality regulates this program through use of NPDES permits (Utah Administrative Code R317-2). This program is designed to reduce or eliminate the introduction of pollutants such as sediments, nutrients, pesticides, bacteria, organics and heavy metals that enter surface waters or leach into groundwater. Utah Non-point Source Management Plan (October 2000), includes an amendment for Non-point Source Management Plan for Hydrologic Modifications (March 1995) and Non-point Source Management Plan for Silviculture Activities (July 1998).

Utah Water Quality Standards: R317-2 of the Utah Administrative Code provides the standards for water quality in the State of Utah. Waters are classified by use (domestic, recreation, wildlife, agriculture), with special reservations made for waters specifically determined by regulation to be High Quality Waters (there are no High Quality Waters designated within the planning area). Use classifications of major water bodies within the planning area and their associated surface water quality standards are summarized in Chapter 14, Watersheds and Soils.

Total Maximum Daily Load Reports (TMDL): Under EPA regulation in response to the Clean Water Act, the Utah Division of Environmental Quality is required to develop TMDL reports on impaired streams (303d listed) with water quality exceeding established state standards. TMDLs evaluate and develop recommendations to improve water quality. Presently, TMDLs have been developed for Onion Creek (2002) and Mill Creek Canyon (2002), both of which included recommendations to improve riparian conditions associated with these streams.

### **11.2.3 BLM Technical References**

The BLM uses principles and methods set forth in the following documents to inventory and manage its riparian and wetland resources:

#### ***11.2.3.1 Riparian***

1. The use of aerial photography to inventory and monitor riparian areas: Riparian area management (TR1737-2; BLM 1987)
2. Inventory and Monitoring of Riparian Areas (TR 1737-3; BLM 1989a)
3. Grazing Management in riparian areas: Riparian area management (TR 1737-4; BLM 1989b)
4. Riparian and wetland classification review (TR 1737-5; BLM 1992a)
5. Management Techniques in Riparian Areas (TR 1737-6; BLM 1992b)
6. Procedures for Ecological Site Inventory – with Special Reference to Riparian-Wetland Sites (TR 1737-7; BLM 1992c)
7. Greenline riparian-wetland monitoring: Riparian area management (TR 1737-8; BLM 1993a)
8. Process for Assessing Proper Functioning Condition (TR 1737-9; BLM 1993b)
9. The use of aerial photography to manage riparian-wetland areas: Riparian area management (revised) (TR 1737-10; BLM 2001a)
10. Process for assessing proper functioning condition for lentic riparian-wetland areas (TR 1737-11; BLM 1994)
11. Using aerial photographs to assess proper functioning condition of riparian wetland areas (TR 1737-12; BLM 1996a)
12. Observing physical and biological change through historical photographs (TR 1737-13; BLM 1996b)
13. Grazing management for riparian-wetland areas: riparian area management (TR 1737-14; BLM 1997)
14. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas (TR 1737-15; BLM 1998a)
15. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas (TR 1737-16; BLM 1999)
16. A guide to managing, restoring, and conserving springs in the Western United States (TR 1737-17; BLM 2001b)
17. Managing for enhancement of riparian and wetland areas of the Western United States: An annotated bibliography (TR 1737-18; BLM 2000)
18. Riparian-wetland soils (TR 1737-19; BLM 2003)

#### ***11.2.3.2 Vegetation Sampling***

1. Sampling vegetation attributes (TR 1734-4, BLM 1996c)
2. Measuring and monitoring plant populations (TR 1730-1; BLM 1998b)

## **11.3 CURRENT MANAGEMENT PRACTICES**

### **11.3.1 1985 RMP and Plan Amendments**

Under BLM's multiple use management, a variety of activities occur on public lands including recreation, livestock production, energy development, mineral extraction, fire management, access roads and utility corridors. These activities can affect the quality and health of sensitive riparian/wetland ecosystems.

Many of the authorities and initiatives currently used to protect and manage riparian/wetland ecosystems were developed following completion of the 1985 Grand RMP. The 1985 Grand RMP provides basic protection for riparian resources, often through association with other sensitive values including critical watersheds, streams, floodplains, water quality and wildlife habitat protection. During the RMP process, riparian/wetlands are included as critical watershed values defined as: municipal watersheds, floodplains, wetlands, accelerated erosion or unstable areas, and saline-alkaline soils" (definition, 1982 MSA, pp. 1-3).

In addition to RMP goals and objectives that encourage protection of riparian and other sensitive resources, specific 1985 Grand RMP decisions regarding riparian resource values are identified as follows:

- Maintain present livestock management on 37 grazing allotments to benefit livestock and wildlife by maintaining and improving present medium to high ecological condition. (Page 16 Appendix D, 1985 Grand RMP). The current status of riparian/wetland areas by allotment are available in Table F-1, Appendix F.
- Implement livestock manipulation techniques on 24 grazing allotments (fences, water developments, grazing rotation systems) to benefit livestock and wildlife by improving presently low ecological and medium ecological condition. Improvements and grazing systems currently in place within allotments containing riparian/wetland areas are described in Chapter 7, Livestock and Grazing.
- Change livestock season of use on Diamond, Floy Canyon, Potash, and South Sand Flats allotments to provide for growth requirements of perennial plants, restrict use of spring forbs by livestock in critical wildlife areas, and protect soils in critical watersheds. Current season of use data and departures from the 1985 Grand RMP are detailed in Chapter 7, Livestock and Grazing.
- Improve management of 3 miles of perennial streams in Cottonwood, Diamond and Showerbath Springs allotments by fencing and rotation to restore riparian and wildlife values (page 1, 20). Currently Cottonwood and Diamond are largely managed to improve the perennial stream, despite recent catastrophic fires in 2002 which have naturally set the system back to Non-Functioning condition. The Showerbath Springs allotment includes riparian resources in Function at Risk condition. Additional improvements are possible through fencing, rotation, season of use or stocking rate adjustments.
- Establish OHV designations to limit use to existing roads and trails, for the protection of highly erodible watersheds and for scenic values, including Mill Creek Canyon. Currently, all surface disturbing activities within Mill Creek Canyon are managed under

the Mill Creek Canyon Management Plan (2001) to reduce direct and indirect impacts to the riparian/wetland ecosystem. This includes OHV designations to limit vehicles to established county roads. The 1985 Grand RMP limited driving to existing roads (in portions of the Field Office area) to protect highly erodible soils and watersheds.

- Implement oil and gas category stipulations to protect critical wildlife, watersheds and recreation for applications for permits to drill (APDs). Currently, various versions of lease stipulations exist for selected floodplain resources, which additionally protect surface resources including riparian/wetland ecosystems. Other standard stipulations (200 meters) allow for mitigation of adverse impacts during site-specific analysis during the application phase (APD).
- Manage 65 mile of Colorado River and Dolores River as nominated for inclusion as Wild and Scenic River System to retain stream related resources including fish, wildlife and scenic values. Currently, previously recommended segments remain in eligible and suitable condition as required by law. Additional stream segments have been evaluated as part of this RMP amendment and are included in Chapter 17, Wild and Scenic Rivers.
- Designate Negro Bill Canyon as an Outstanding Natural Area (ONA) to be managed under 43 CFR 8352 to protect scenic recreational values, sensitive plant species, and riparian values along the stream.
- Prioritize nine new riparian or wildlife monitoring studies within Granite Creek, Kane Springs, Cottonwood, Diamond, Showerbath Springs, Ida Gulch, North Sand Flats, Mill Creek, and Between the Creeks allotments in response to stream resources, and an additional 18 allotments with critical watershed or watershed studies (RMP Table 4 page 43). In addition to data collected in response to Riparian Condition Assessments (PFC) and annual stream monitoring, specific riparian studies have been established within the following drainages to evaluate, monitor or protect riparian resources: Mill Creek Canyon (17 transects), 10-mile Wash (3 transects), Kane Springs Creek ( 4 transects, plus photospots), Westwater Creek (Middle Canyon Exclosure- 4 transects), Negro Bill Creek (photospots), 7-mile wash (photospots), Courthouse/ Tusher/ Bartlett (Photospots), Point Bottom (Fire), Roberts Bottom (Restoration), Goose Island (Fire), Coates Creek (2-Ripn Exclosures), Westwater Canyon (Cottonwood Exclosure), 10-mile Wash (Cow Canyon Exclosure), 10-mile Wash (Levi-Well Exclosure), Buckhorn/Sand Flats Seep Exclosure, Westwater Creek Riparian Exclosure, Diamond Creek Exclosure (destroyed). Grazing related issues associated with the Between the Creeks allotment have been eliminated with retirement of the allotment.
- The RMP established livestock allocations based on the previous 5-year average number of animals authorized (1977-1982). To date, only half the allotments have implemented the livestock allocations identified in the 1985 RMP through agreements with the livestock operators or by monitoring adjustments (Appendix D, page A-29). In many cases this means that a grazing operator is authorized to graze more livestock than the allotment can normally support, and even with proper annual stocking adjustments, the rangeland on average is grazed beyond its capability. This becomes critical on allotments with sensitive resource values including riparian/wetlands, or during drought cycles, when over-allocation of rangeland resources results in overgrazing and potential long-term ecological damage. Data regarding RMP allocation by allotment versus current

permit authorization for each allotment, and actual use since the last RMP are included in Chapter 7, Livestock and Grazing.

### **11.3.2 Riparian/Wetland Management Actions**

#### ***11.3.2.1 Rangeland Health Standards***

Since being initiated in 1997, Rangeland Health Assessments have been completed on ten grazing allotments, totaling 164,834 acres (BLM, state, and private lands), and will continue to occur on every grazing allotment once within a ten year period before term permits are renewed as required by current regulation. To date, 10 allotments have been determined to meet Standards for Rangeland Health. These allotments include: Bar-X, Beaver Creek, Big Triangle, Crescent Canyon, Floy Canyon, Floy Creek, Gateway, Squaw Park, Sulphur Canyon, and Thompson Canyon. Of the ten allotments assessed for Rangeland Health, 9 allotments contain riparian/wetland resources and of these, 3 allotments required corrective action or implementation of guidelines to improve riparian/wetland resources. The remaining 73 allotments are to be assessed by 2009.

Utah's Standards for Rangeland Health and Guidelines for Grazing Management (1997) and Recreation Activities (2001) require riparian/wetlands resources to be managed in Properly Functioning Condition (PFC). Currently, 43 percent of the Moab FO area's riparian/wetlands are rated as Functioning at Risk (FAR) or Non-functioning (NF) and may not achieve Rangeland Health Standards if functioning condition is reduced due to management activities.

As required in Grazing Guideline # 11, (See Appendix D), on rangelands where a Standard (such as in Standard 2 riparian/wetland resources above) is not being met, but conditions are moving toward meeting the standard, grazing may be allowed to continue. On lands where a Standard is not being met and conditions are not improving toward meeting the Standard or other management objectives (and livestock grazing is deemed responsible), administrative action with regard to livestock can be taken by the Authorized Officer pursuant to CFR 4180.2©. Recommendations to achieve Standards and/or Guidelines occur at the field office level, in consultation, cooperation, and coordination with permittees, the interested public, and landowners. For additional details regarding Rangeland Health Standards please refer to the Chapter 7, Livestock and Grazing.

#### ***11.3.2.2 Activity Management Plans***

Twenty-five livestock allotments within the Moab FO area implement specialized grazing management under allotment management plans (AMPs), while the remaining 52 allotments do not. Of the 25 allotments managed under an AMP, 18 allotments have riparian/wetland resources, and of the remaining 52 allotments, 43 allotments have riparian/wetland resources. Numerous actions are recommended within AMPs or as a result of grazing allotment evaluations or riparian condition ratings (PFC) to improve or mitigate grazing impacts within rangelands, including sensitive riparian areas. For example, livestock grazing within riparian/wetland canyons of Tenmile Wash Allotment has been removed based on agreement with the permittee (1998). The Hatch Point Allotment evaluation (1987) recommends rotation and stubble heights requirements within Three Mile and Hatch Canyons to reduce livestock utilization within the

riparian/wetland. However, recommendations within the Hatch Point Allotment evaluation have not yet been implemented. Since the RMP, numerous individual allotment evaluations and Rangeland Health Assessments (S&G) have recommended a 50% utilization limit on forage to provide wildlife forage, cover, and soil stability.

Habitat Management Plans (HMP) have been developed in three areas to manage rangeland/riparian/wetland habitats for protection or improvement of wildlife. Fish habitat improvements were implemented within the Granite Creek drainage through Dolores Triangle HMP recommendations. Many riparian/stream exclosures have been constructed through HMPs to protect or monitor riparian dependent wildlife habitat (see page 17, status of riparian studies).

Recreation Area Management Plans (RAMPs) manage multiple uses in popular recreation areas and include the Canyon Rims Recreation Area, Colorado Riverway, and Sand Flats. The Canyon Rims RAMP used the plan amendment process to restrict motorized travel to existing roads. This action was undertaken to reduce adverse impacts to 848 acres of riparian/wetland resources. The Colorado Riverway RAMP and the Sand Flats RAMP did not use a plan amendment process, but rather utilized a Federal Register action to restrict vehicle use to designated roads. The Colorado Riverway RAMP covers the management of 58 miles of Colorado River riparian corridor along Utah Scenic Byways 128 and 279, and covers 4,287 acres of riparian/wetland area. The Sand Flats RAMP covers the management of 7,240 acres. This Federal Register action stands only until the current RMP is revised. Similarly, camping has been restricted in all three of these RAMP areas. Restricting camping to designated sites benefits riparian resources as the destruction caused by dispersed camping is curtailed and all camping activities take place in one area. Camping restrictions are also in place using a Federal Register process that stands only until the revision of the RMP. Actions taken to restrict recreation activities (in these plans or in areas such as the Highway 313 corridor, Kens Lake and Gemini Bridges) on the behalf of riparian resources need to be carried forward during this plan revision process.

Other plans that include actions taken to protect riparian resources include:

- Mill Creek Canyon Management Plan (2001) includes management for the protection of the riparian corridor, including restoration of recreation and horse trails, stabilization/erosion control, cottonwood protection (wire wrapping to reduce beaver depredation), exotic species control (manual, mechanical, chemical), and habitat enhancement (riparian plantings). Dispersed camping is disallowed, and vehicles are restricted to designated roads.
- The Greater Sagers Wash Watershed Management Plan (1993) area covers 153,200 acres. This plan was necessary to manage annual sediment and salt yields into the Colorado River. The plan identified reallocation of livestock allocations (AUMs), vegetation treatments, and monitoring of existing watershed structures. These measures were designed to reduce annual sediment and salt yields from the watershed to the Colorado River by 5,600 tons/year and 200 tons/year, respectively, thereby improving downstream riparian condition.

- Moab District Fire Management Plan (1998) identifies management priority and criteria for wildfire suppression and management within rangeland resources including sensitive riparian/wetland ecosystems.

**11.3.2.3 Riparian/Wetland Improvement and Restoration**

Improvements and restoration efforts are conducted to ensure proper management of riparian/wetland ecosystems based on monitoring and on evaluations of individual resources, resource objectives or in response to activity plans (Table 11-2). Improvements are actions such as protective fencing or adjustments in management uses, while restoration refers to the repair of ecological functions of a riparian/wetland system. Due to regulatory requirements, riparian/wetland definitions regarding rehabilitation and restoration are very specific and not synonymous.

Important differences exist between riparian species when considering potential effects associated with disturbance. For example, Fremont cottonwood is extremely susceptible to fire scorch, whereas narrowleaf cottonwood responds favorably to fire due to its clonal characteristics (similar to aspen). Currently, only 1 to 2 years of rest are provided to upland and riparian vegetation following restoration treatments. However, riparian woody trees/shrubs may require as much as 2 to 10 years of rest to provide sufficient growth for protection from grazing. The planting of new plugs (or relocation of existing mats) of hydrophytic species such as *Scirpus*, *Juncus*, and *Equisetum* is crucial to restore wetland areas. The rhizomatous nature of these species is critical to curbing or eliminating soil erosion (and subsequent sedimentation) adjacent to the riparian/wetland zone. Additionally, it is important to limit disturbance to the dense root mats that stabilize the soils that carry mycorrhizal fungi critical to the local plant communities.

<b>Watershed</b>	<b>Issues receiving corrective action</b>
Negro Bill Canyon	Exotics, trail erosion
Kane Springs Creek	Exotics, OHV use
Ten-mile Wash (and tributaries)	OHV use, camping, exotics, livestock
Seven-mile Wash	OHV use, exotics, livestock
Hunters Canyon	Exotics, camping
Lost Spring	Exotics
Hay Canyon	Livestock, exotics
Westwater Canyon	Livestock
Cottonwood Creek	Fire, stream restoration
Diamond Creek	Fire, stream restoration
Onion Creek	OHV, stream restoration
Bartlett Wash	OHV, camping, road erosion
Moonflower Canyon	Trail erosion
Granite Canyon	Fish habitat improvement
Dolores River	Exotics/weeds, livestock
Mill Creek Canyon	Trail erosion, exotics, road erosion, stream restoration

### ***11.3.2.4 Riparian/Wetland Condition***

The MFO has developed a riparian/wetland database within GIS to assist in the management of riparian/wetland resources. This database is continually modified based on site-specific monitoring and analysis that refines data or indicates changes in functioning condition. Additionally, inventory forms or PFC assessments document site-specific conditions, and provide data and photographs for most major riparian/wetland systems or segments within MFO.

#### ***11.3.2.4.1 Riparian/Wetland Data History***

Riparian/wetland areas were initially surveyed during the 1970-1980s, and stream descriptions were developed for aquatic fish, macro-invertebrate, and riparian habitats. In 1990, Moab FO contracted a comprehensive riparian/wetland inventory on the public lands. These inventories mapped and described riparian/wetland areas from interpretation of color infra-red aerial photography (1974-75 photos). These data were digitized into the current Moab FO riparian/wetland GIS database. By 2001, following gradual refinement to improve the quality of the data, the database had incorporated Proper Functioning Condition ratings (PFC) for most identified areas.

In 2001, Moab BLM was directed to complete 360 miles of riparian/wetlands rated in the “unknown” functioning condition categories. BLM specialists conducted field inventories, and utilized low-level aerial flights and photo interpretation to revise and update data and site conditions within identified riparian/wetland areas. In 2002, revision of data relative to lentic wetlands was undertaken and, in preparation for the RMP amendment analysis, data were further refined in 2003 with respect to accuracy of location and extent of riparian mapping (See Appendix E for description of metadata for the riparian/wetland database).

#### ***11.3.2.4.2 Current Riparian/Wetland Condition Status***

Functioning condition (PFC) of riparian and wetland ecosystems is revised annually and reported to Congress, along with additional reports concerning restoration, improvements or benefits accomplished. The 2003 status of riparian/wetland ecosystems in the Moab FO reflect that approximately 57% of lotic riparian systems are in PFC, while only 30% of lentic wetlands are in PFC. These findings followed a 2002 catastrophic wildfire within Cottonwood and Diamond Creeks which degraded 35% (450 acres) of the total wetlands within MFO (refer to riparian/wetland status at the beginning of this chapter).

Appendix B in Livestock and Grazing (Chapter 7) references Proper Functioning Condition (PFC), Functioning-at-Risk (FAR), and Non-Functioning (NF) riparian/wetlands by grazing allotment, but does not indicate the source of the adverse impact. The riparian/wetland database contains information by individual stream or riparian area. Table F-1, Appendix F, summarizes Moab FO major stream systems, their 2003 condition, and allotments within the stream systems to identify riparian/wetland health issues.

Changes in riparian/wetland functioning condition generally occur dramatically rather than gradually, and often in response to cumulative impacts that cause failure following high flood events when functioning processes are most critical to dissipate destructive flows. However, in assessing the 1990 priority of riparian/wetlands in MFO, very few changes in management

priority are reflected, indicating that similar issues or conditions have been maintained over the last few years. Some notable differences in riparian/wetland condition and priorities have occurred in areas with popular OHV use (and associated dispersed camping), reoccurring livestock grazing, and increased use of county access roads.

Priority riparian/wetland ecosystems within MFO are listed in Table 11-3. Recent revisions of riparian/wetland priorities are based on the protection of important riparian/wetland resources or the need for additional management in response to impacts resulting in Functioning-At-Risk conditions or declining trends.

<b>Priority Status</b>	<b>2004 Priority</b>	<b>1990 Priority</b>
1	Colorado River (including Day Cnyn) Green River Dolores River	Colorado River (Colo-Ut Stateline to Potash)
2	Mill Creek Canyon Onion Creek 10-mile Wash Kane Spring Canyon Negro Bill Canyon Cottonwood & Diamond Creeks	Negro Bill Mill Creek Canyon Kane Springs Canyon
3	Seven-Mile Creek Bartlett/Tusher/Mill/Courthouse Rattlesnake Canyon	Dolores River Green River (Rattlesnake to GR City)
4	Westwater Creek Hatch Wash Floy Creek Flat Nose George Canyon East Coyote Wash Fisher/Beaver/Granite Creeks	Seven-Mile Creek Courthouse Wash Westwater Creek Cottonwood Creek Hatch Wash Rattlesnake Canyon Flat Nose George Canyon

High priority management is also given to special riparian/wetland ecosystems or conditions including :

- Isolated riparian/wetland areas where exotic/noxious encroachment is low;
- Arid or remote regions where riparian/wetlands are especially critical to wildlife and susceptible to impacts from grazing and recreation uses;
- Riparian/wetlands which contain unique, rare or diverse functions or values, such as rare hanging garden ecosystems, rare plant or wildlife species, or health indicator species including amphibians, arthropods, bats, etc;
- Perennial streams, springs, or seeps that develop and support diverse and developed biotic or aquatic ecosystems including fish;
- Sites containing native riparian/wetland species. Of particular importance are ecosystems containing Fremont cottonwood due to its current recruitment history and susceptibility to fire, grazing and beavers; willows (especially Gooding willow) due to their sparseness from overgrazing; and any wetland/lentic systems, sites or species due to their importance in stabilizing soils and water recharge.

#### 11.3.2.4.3 Roads, Campgrounds, and Riparian Areas

Roads and campgrounds adjacent to or within riparian areas contribute to riparian community degradation through the following mechanisms:

- Erosion of roadbed material (and subsequent stream sedimentation)
- Increased dust from vehicle traffic (also contributing to stream sedimentation)
- Firewood collection in riparian areas by campers
- Increased access and recreational use of riparian areas by the public

Analysis of riparian areas and existing roads in the Moab FO determined that 4,792 segments of road occur within 100 feet of a riparian area. And of these, 3,360 segments of road actually intersect a riparian area. In addition to roads, the BLM offers 6 dispersed “Camping Areas” and 3 developed “Campgrounds.”

#### 11.3.2.4.4 Drought

The current and prolonged drought has placed additional stress on the capacity and condition of fragile riparian/wetland ecosystems by lowering supporting water tables, and increased livestock and wildlife grazing pressure. Mortality of Fremont cottonwoods within drier marginal sites or within the upper extent of their elevation range has occurred. Stability and distribution of wetlands are also affected by current drought conditions.

#### **11.3.2.5 Riparian/Wetland Studies**

Riparian/wetland studies to monitor vegetative, hydrologic, and soil characteristics and trends have been established within seven perennial streams: Mill Creek Canyon, Negro Bill, Kane Creek, Tenmile Wash, Sevenmile Wash, Tusher Wash, and Mineral Point Bottom. Initiated in the late 1990s as baseline information, few intensive transects have been repeated. Photographic monitoring and site-specific analysis of conditions in response to objectives occur throughout the year in many riparian/wetland locations, and often includes repeat sequence photos that reflect annual or seasonal variation.

Riparian/wetland exclosures have been constructed within eight sites: Coates Creek (2 exclosures), Westwater Creek (3 exclosures), Buckhorn/Sand Flats Seeps (1 exclosure), Ten-Mile Wash/Levi Well (1 exclosure), Ten-mile Wash/Cow Canyon (1 exclosure) to either determine ecological site potentials or to protect/improve natural functions.

Riparian pastures such as those within the Tenmile Wash and Mill Creek Canyon allotments have been established to provide special protection to sensitive riparian/wetland ecosystems. Negro Bill, Cottonwood Creek, Diamond Creek, and portions of Mill Creek Canyon have no livestock grazing.

#### **11.3.2.6 Routine Riparian/Wetland Management**

Riparian/wetland management activities that occur on a routine basis include:

- Riparian/wetland habitats continue to be inventoried, monitored, and revised with respect to PFC Functioning condition and Rangeland Health Assessments, site data, or surface management to maintain or improve functioning health.
- Riparian/wetland restoration continues seasonally with respect to exotic species control, riparian protection, and stabilization based on available funding and workforces.
- Riparian/wetland ecosystems identified within TMDL reports or located within municipal watersheds/source water protection zones will be managed to favor improved water quality.
- Site-specific review, analysis and protection of riparian/wetland resources will continue in response to multiple-use activities and applications to maintain or improve functioning health.
- Coordination regarding Stream Alteration Permits for potential disturbances within riparian/wetland ecosystem will continue according to regulation.
- Riparian/wetland habitat areas will continue to be managed to maintain or improve biotic diversity and in accordance with endangered or special status species management.
- Many riparian/wetland ecosystems are located in areas with mixed land ownership. Acquisition of riparian/wetland resources in key areas such as Colorado River, Mill Creek and Negro Bill continue on a willing basis to improve ecosystem management and assist in BLM management of public lands.

#### **11.4 RESOURCE DEMAND AND FORECAST**

Riparian/wetland ecosystems are strong attractors for both animal and human activities, especially in the arid southwest where temperatures often exceed 100°F. Demand for diverse riparian/wetland ecosystems is high and currently exceeds the average capacity, sustainability, and functioning condition in 43 percent (approximately 14,060 acres) of riparian/wetland ecosystems within the Moab FO (2003 MFO Riparian Database- FAR and NF ratings).

The recreational demand within riparian/wetland areas is highest during the critical spring growing season when seedling establishment and stand recruitment occur. Recreation use peaks again during fall seasons after extreme summer temperatures decline. Livestock grazing demands during spring and summer often result in overgrazing of riparian/wetlands due to improper season of use or poor grazing systems. Demands for water resources with potential direct and indirect impacts to riparian/wetlands will likely increase in response to prolonged drought. With decreasing quantity and quality of riparian/wetland areas due to growing popularity of use by the public, the demand for diverse wildlife habitat becomes even more critical as more species and habitats are threatened by recreational and grazing activities.

The demand for riparian/wetland resources will not diminish. Special management or zoning of riparian/wetland ecosystems may reduce issues and conflicts created in the demand for these sensitive resources.

## **11.5 CONSISTENCY WITH NON-BUREAU PLANS**

### **11.5.1 Federal and State Plans**

Standards employed by the Utah BLM are consistent with both state and federal plans, especially those associated with water related resources. The Utah Rangeland Health Standards, Standard 4, best summarizes the Moab Field Office's consistency with state and federal non-BLM plans (BLM 2002):

Standard 4 – BLM will apply and comply with water quality standards established by the State of Utah and the federal Clean Water and Safe Drinking Water Acts. Activities on BLM lands will fully support the designated beneficial uses described in the Utah Water Quality Standards (R317.2) for surface and ground water. As indicated by:

1. Measurement of nutrient loads, total dissolved solids, chemical constituents, fecal coliform bacteria, water temperature, and other water quality parameters.
2. Macroinvertebrate communities that indicate water quality meet aquatic objectives.

Additionally, the Moab Field Office cooperates with the Manti-LaSal National Forest to manage for riparian functions and values.

### **11.5.2 County Plans**

Language in the updated Grand County General Plan is in accord with BLM Standards and Guidelines for Rangeland Health (Grand County, 2004). The Grand County General Plan (Update) has been revised, and the definition of "Sensitive Lands" has been updated. Relative to riparian resources, the Sensitive Lands defined by the Grand County Land Use Code include public drinking water supply watersheds (recharge areas for the aquifer in the Glen Canyon Formation), floodplains, and riparian habitats.

Implementation actions proposed by Grand County include consideration of Sensitive Lands in all development reviews, and protection of riparian corridors and recharge areas for public water supplies from incompatible uses.

## **11.6 ISSUES OR CONCERNS**

Many of the issues concerning riparian/wetland resources identified by the 1985 Grand RMP (page 12) remain:

1. disturbance and degradation to critical watersheds and floodplains
2. improper season of use on livestock allotments resulting in use during critical growth periods of plants
3. livestock and wildlife competition for forage, water, and habitat in some areas
4. mineral resource production needs to provide for the protection of sensitive resource values
5. recreational activities need to provide for the protection of the resource base

- RMP Alternatives C and D contained many actions, including specific adjustments within grazing allotments that were designed to emphasize protection of critical watershed values including riparian/wetland resources (page 5). Nearly twenty years later, 43% (approximately 14,060 acres) of Moab FO area riparian/wetlands, are currently in FAR and NF condition, and may not achieve Rangeland Health Standards largely due to livestock grazing, recreation and road related issues. Issues have intensified in critical watersheds since the 1985 Grand RMP; many grazing alternatives developed in the 1985 Grand RMP should be re-evaluated.
- The capability of riparian/wetlands to meet the demand for livestock and wildlife grazing and other multiple use values seems to outweigh sustainable forage production. Forage allocations by allotment have not been quantified within the Moab FO area; current livestock rates are not based on sustainability of rangelands, nor are they responsive to current rangeland conditions. Proper rangeland practices, grazing systems or allotment management plans should be developed and revised so that they protect riparian/wetland ecosystems.
- Demands for riparian/wetlands during critical growing seasons (spring and summer periods) often compete with sensitive resource values such as wildlife forage and cover, water availability, and riparian functions.
- To date, only half of the allotments have implemented the livestock adjustments identified in the 1985 Grand RMP through agreements with the livestock operator or by monitoring adjustments (Appendix D, page A-29). Large reductions were established on many of grazing allotments based on the previous 5-year average (1977-1982) number of animals authorized. Appendix B in Livestock and Grazing (Chapter 7) identifies RMP allocation by allotment vs. current permit authorization for each allotment, plus actual use since the last RMP. In many cases this means that a grazing operator is authorized to graze more livestock than the allotment can normally support. Even with proper annual stocking adjustments, the rangeland on average is grazed beyond its capability. This becomes critical on allotments with sensitive resource values or during drought cycles, when over-allocation of rangeland resources results in overgrazing and potential long-term ecological damage to riparian/wetland areas.
- Currently, degraded riparian/wetland ecosystems appear to correlate with critical soils, arid regions, heavy recreation areas (including OHV use and camping), and grazing allotments with long spring season-of-use (past March 15) with repeated use or improper rest rotation and on allotments that contain mixed land ownership, and on grazing allotments which have never implemented the livestock adjustments recommended in the 1985 RMP. Table 11-2 identifies issues by selected streams that are currently receiving restoration or focus.
- The management and maintenance of native diverse ecosystems has become a larger issue in recent years. Vegetative conversions to invasive or exotic species have occurred within riparian/wetlands through management practices and wildfires, including a vast insurgence of noxious weeds. Native communities are preferred but not always attainable or affordable. Management requirements related to prevention of weed spread, including weed-free hay certification and clean vehicle stipulations are necessary to stop the distribution of adverse species. Biological control agents for exotic or noxious species may soon become available for local release following proper authorization.

- The RMP should develop best management practices (BMPs) for riparian/wetland management and restoration techniques/stipulations to assure properly functioning ecosystems. Guidelines developed for Rangeland Health are essentially BMPs. Riparian/wetland areas, however, need 2 to 10 yrs of rest, so trees can reach 6 to 8 feet in height to withstand grazing pressure and other impacts. Field office-wide stipulations or a mitigation plan should be developed similar to Appendix B in the 1985 Grand RMP (page A-19), but should include BMPs applied equally to all activities (recreation, grazing, etc.).
- County inventory roads exist in riparian/wetlands. These roads directly degrade stream channels through vehicle use and maintenance, as well as unauthorized OHV activities that radiate from access roads. Key riparian/wetland areas impacted by county road inventory include Onion Creek, Bartlett Wash, Tusher Wash, Seago Canyon, Kane Creek, and Tenmile Wash.
- Many developed BLM recreational campgrounds and trails are located in association with riparian/wetland ecosystems. Native cottonwoods are some of the most susceptible species with regard to functioning condition and long-term sustainability, but are also the most desirable native and diverse riparian/wetland ecosystem within MFO. Recreational developments within riparian/wetlands increase competition for natural habitats, or eliminate habitats critical to riparian-dependent wildlife species.
- The extreme susceptibility of some native riparian species (Fremont cottonwood) to fire temperatures requires careful use of fire as a management tool. BMPs should be developed to protect native riparian ecosystems and requirements (buffer strips, scorch buffers, etc)
- Conversion of native riparian/wetland communities due to alteration by exotic and noxious species, and catastrophic loss from wildfire (including human caused) is an issue. Once destroyed, many native species or communities cannot be replaced under currently altered riparian/wetland systems. Camping in riparian areas is a particular fire risk, since people build campfires under flammable canopies and adjacent to understory brush. Fires caused by burning toilet paper are common in dispersed recreation areas where facilities are not offered and containment of waste is not required. Areas that have experienced catastrophic loss of native cottonwoods include 7-mile, Kane Springs, Colorado River, Green River, Cottonwood Creek, and Diamond Creeks.
- Periods of prolonged or severe drought have stressed riparian/wetland ecosystems through loss of water tables, increased grazing pressure, and increased susceptibility to surface disturbing impact due to dry soils. Extreme drought has increased fire severity within riparian/wetland corridors such that recreational campfire restrictions and OHV closures may be necessary to prevent additional loss.
- Recreational demand for hiking, horse trails and commercial recreation permits often concentrate uses along streams due to the available water source, thermal protection and scenery. However, unconsolidated alluvial soils often located within riparian canyons have shown to be extremely susceptible to erosion and degradation by horses and other heavy uses.

- Oil and gas lease stipulations do not cover all floodplains and associated riparian/wetland ecosystems. A revision of stipulations is necessary. Additional no surface occupancy (NSO) stipulations need to be developed in Mill Creek.
- Dogs commonly accompany hikers within riparian/wetland systems due to the cool temperatures and presence of water. This can result in issues where dog droppings deter visitor values and degrade water quality. Dogs often cause additional erosion and trail damage within riparian areas when they are not controlled/leashed properly as required by county ordinance.
- Many riparian/wetland guidance, policies, handbooks from the 1980s have either expired or been revoked. Measures need to be implemented to continue adequate protection of riparian/wetland ecosystems.
- Opportunities to obtain available workforces within rural Utah limit BLM capabilities to restore or protect many riparian/wetland ecosystems.

## **11.7 MANAGEMENT OPPORTUNITIES AND LIMITATIONS**

The inventory of riparian and wetland resources for the Moab FO (the PFC assessment) has sufficient data to be used as an effective management tool.

- Riparian/wetland management alternatives should include grazing season adjustments and/or seasonal restrictions to allow for protection of vegetation requirements, sensitive watershed, riparian, wildlife, TES species, scenic, or other resources values. Alternatives proposed in the 1985 Grand RMP should be re-evaluated.
- Opportunities are available to re-evaluate riparian/wetland management on grazing allotments which were never implemented in the livestock adjustments established within the 1985 Grand RMP. Additional adjustments are still required.
- Establish a maximum 50 percent utilization limit (livestock or wildlife) on all grazed rangelands including riparian/wetlands as an alternative within the new RMP. This would allow 50 percent of any given plant to remain ungrazed to protect plant growth, provide wildlife forage, and habitat, and provide sufficient plant stubble/cover to retard erosion and retain sediments. Other sensitive resources such as riparian ecosystems, restoration sites, wildfire areas, or scenic resources may be even more restrictive on grazing utilization.
- Protocols for implementing rangeland management during drought periods, and in response to drought impacts, need to be developed to recommend appropriate actions for protection of sustainable riparian/wetland ecosystems.
- Riparian/wetland management alternatives should include restoration and conservation of sensitive or degraded ecosystems to promote diverse and functioning native communities as primary objectives. Livestock grazing would be retired in areas selected for native ecosystem restoration.
- Development of a riparian/aquatic/floodplain habitat management plan could be considered as part of management alternatives.

- Allotments that require development of allotment management plans (AMPs) or revision of rangeland management systems or season-of-use adjustments are highlighted in Chapter 7, Livestock and Grazing.
- Allotments that require improvement of rangeland resources including fencing, water development, or rangeland manipulation are highlighted in Chapter 7, Livestock and Grazing.
- Special management areas/prescriptions should be considered in the development of management alternatives to favor management of priority riparian/wetland areas including: Tenmile Wash Cultural Resource Management Plan (CRMP) / Area of Critical Environmental Concern (ACEC), Onion Creek Watershed Management Plan (or CRMP/ACEC), White Wash Sand Dunes riparian ACEC, Mill Creek Canyon ACEC (including the North Fork), Kane Creek ACEC, Bartlett/Tusher/Mill/Courthouse.
- Certain land acquisitions would improve management of riparian/wetlands (e.g., Colorado River, Mill Creek Canyon, Negro Bill Canyon).
- Special management designations, including OHV limitations, would reduce impacts to riparian/wetland ecosystems. There is also the need for increased enforcement and compliance on the part of OHV users. Increased efforts and better education of OHV users is required to adequately manage for riparian objectives.
- Biological controls for exotic species are available for restoration efforts within riparian/wetland ecosystems.
- Development of BMPs for stream and riparian ecosystems is necessary. Examples include: trail/horse locations specific to acceptable soils; perpendicular crossings are preferred over lateral trails/roads; limit disturbances in the stream corridor to high dry stable terraces, as opposed to disturbance of active vegetated channels; avoid disturbances to vegetated stream banks and re-route roads/trails within streams/riparian areas. Additionally, BMPs for oil and gas operations should be developed. Develop BMPs to apply to rangeland management and restoration. Include possible restrictions to livestock grazing in noxious weed areas during seed production stages to reduce contamination throughout rangelands. BMPs for restoration of riparian areas should include 2-10 years of rest to allow six foot of riparian canopy growth before resuming grazing pressure. Grazing reductions following catastrophic loss of forage are required immediately until successfully rehabilitated.
- Revise oil and gas lease stipulations to include all floodplain resources and associated surface-related values including riparian/wetland areas, instead of selected streams.
- It is necessary to redefine riparian/wetland policies, objectives, and actions/stipulations to replace expired guidance.
- Coordination with counties is necessary to process or resolve pending county road inventories within riparian/wetland resources to benefit sensitive resources.
- Conduct feasibility studies within Seven-Mile Canyon to restore riparian/wetlands with respect to tamarisk control and relocation of livestock water by drilling a well in the adjacent floodplain and providing troughs, outside of wetlands.
- Evaluate East Coyote Wash Allotment for restoration of the riparian/wetland ecosystem as potential sage-grouse habitat through construction of a riparian pasture fence and

development of alternate upland water sources to eliminate grazing within lentic wetlands.

- One of the greatest limitations the MFO faces is lack of funding to effectively manage, protect, and restore riparian areas.

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- \_\_\_\_. 2001a. The use of aerial photography to manage riparian-wetland areas: Riparian area management (revised). TR 1737-10.
- \_\_\_\_. 2001b. A guide to managing, restoring, and conserving springs in the Western United States. TR 1737-17.
- \_\_\_\_. 2003. Riparian-wetland soils. TR 1737-19

**APPENDIX A**

**PFC DATA SHEETS FOR LENTIC AND LOTIC SYSTEMS**

Lentic Standard Checklist

ID Number:

Date:

Area/Segment ID:

ID Team Observers:

Yes	No	N/A	<b>Hydrology</b>
			1) Riparian-wetland area is saturated at or near the surface or inundated in relatively frequent events.
			2) Fluctuation of water levels is not successive.
			3) Riparian-wetland area is enlarging or has achieved potential extent.
			4) Upland watershed is not contributing to riparian- wetland degradation.
			5) Water quality is sufficient to support riparian-wetland plants.
			6) Natural surface or subsurface flow patterns are not altered by disturbance (i.e., hoof, action, dams, dikes, trails, gullies, and drilling)
			7) Structure accommodates safe passage of flows (e.g., no headcut affecting dam or spillway).

Yes	No	N/A	<b>Vegetation</b>
			8) There is a diverse age-class distribution of riparian-wetlands vegetation (recruitment for maintenance/recovery).
			9) There is diverse composition of riparian-wetland vegetation.
			10) Species present indicate maintenance of riparian-wetland soil moisture characteristics.
			11) Vegetation comprised of those plants or plant communities that have root masses capable of withstanding wind or wave events, or overland flow.
			12) Riparian-wetland plants exhibit high vigor.
			13) Adequate riparian- wetland cover is present to protect shoreline/soil surface and dissipate energy during high wind, wave events, or overland flows.
			14) Frost or abnormal hydrological heaving is not present.
			15) Favorable microsite conditions (woody material, water temp) is maintained by adjacent site characteristics.

Yes	No	N/A	<b>Erosion/Deposition</b>
			16) Accumulation of chemicals affecting plant productivity/composition is not apparent.
			17) Saturation of soils is sufficient to compose and maintain hydric soils.
			18) Underlying geologic structure/soil material is capable of restricting water percolation.
			19) Riparian-wetland is in balance with the water and sediment being supplied by the watershed.
			20) Islands and shoreline characteristics are adequate to dissipate wind and wave energies.

Remarks/Observations: Wetland is east of Coal Creek. This saltgrass wetland is in very poor condition. Wetland has been used as an ATV course, and livestock also use this wetland.

Functional Rating:

- Proper Function Condition
- Functional At Risk
- Nonfunctional
- Unknown

Trend for Functional-at-risk:

- Upward
- Downward
- Not Apparent

What factors, if any, are contributing to unacceptable conditions?

- Dewatering
- Dredging activities
- Other (specify)
- Mining Activities
- Road encroachment
- Watershed conditions
- Landownership

Remarks:

Lotic Standard Checklist

Name of Riparian – Wetland Area:

Date:

Segment/Reach ID:

ID Team Observers:

Yes	No	N/A	Hydrology
			1) Floodplain above bankfill is inundated in relatively frequent events.
			2) Where beaver dams are present they are active and stable.
			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region).
			4) Riparian – wetland area is widening or has achieved potential extent.
			5) Upland watershed is not contributing to riparian – wetland degradation.

Yes	No	N/A	Vegetation
			6) There is diverse age-class distribution of riparian - wetland vegetation (recruitment for maintenance/recovery).
			7) There is diverse composition of riparian – wetland vegetation (for maintenance and recovery).
			8) Species present indicate maintenance of riparian – wetland soil moisture characteristics.
			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstand high-streamflow events.
			10) Riparian – wetland plants exhibit high vigor.
			11) Adequate riparian – wetland vegetative cover is present to protect banks and dissipate energy during high flows.
			12) Plant communities have an adequate source of coarse and/or large woody material (for maintenance and recovery).

Yes	No	N/A	Erosion/Deposition
			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy.
			14) Point bars are revegetating with riparian – wetland vegetation.
			15) Lateral stream movement is associated with natural sinuosity.
			16) System is vertically stable.
			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition).

Remarks/Observations: This stream is downcutting. No access of the main channel to adjacent wetlands. No overflow channels present. Tamarisk, Russian olive, and Baltic rush.

Functional Rating:

- Proper Function Condition
- Functional At Risk
- Nonfunctional
- Unknown

Trend for Functional-at-risk:

- Upward
- Downward
- Not Apparent

What factors, if any, are contributing to unacceptable conditions?

- Flow regulations channel conditions
- Mining Activities
- Upstream
- Channelization
- Road encroachment
- Augmented Flows
- Other (specify)

Remarks:

## APPENDIX B

## COMMON PLANT SPECIES OCCURRING IN THE MOAB FO

<b>Table B-1. Common plant species occurring in the Moab FO.</b>	
<b>Species Type Common Name</b>	<b>Scientific Name</b>
<b>Native Riparian Species</b>	
Fremont cottonwood	<i>Populus fremontii</i>
Narrowleaf cottonwood	<i>Populus angustifolia</i>
Gooding willow (black willow)	<i>Salix goodingii</i>
Coyote willow	<i>Salix exigua</i>
Yellow willow	<i>Salix lutea</i>
Water birch	<i>Betula occidentalis</i>
Box elder	<i>Acer negundo</i>
Bullrushes	<i>Scirpus</i> spp.
Rushes	<i>Juncus</i> spp.
Spike-rushes	<i>Eleocharis</i> spp.
Cattail	<i>Typha</i> spp.
Phragmites	<i>Phragmites</i> spp.
<b>Invasive/Exotic Species</b>	
Russian olive	<i>Elaeagnus angustifolia</i>
Tamarisk	<i>Tamarix</i> spp.
Chinese elm	<i>Ulmus parvifolia</i>
Ravenna grass	<i>Erianthus ravennae</i>
Clematis	<i>Clematis</i> spp.
<b>Noxious Species</b>	
Russian knapweed	<i>Acroptilon repens</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Bermudagrass	<i>Cynodon dactylon</i>
Bindweed	<i>Convolvulus</i> spp.
<b>Noxious Species continued:</b>	
Broad-leaved peppergrass (tall whitetop)	<i>Lepidium latifolium</i>
Canada thistle	<i>Cirsium arvense</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Dyers woad	<i>Isatis tinctoria</i>
Perennial sorghum (including Johnson grass)	<i>Sorghum</i> spp.
Leafy spurge	<i>Euphorbia esula</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Musk thistle	<i>Carduus nutans</i>
Quackgrass	<i>Elytrigia repens</i>
Scotch thistle	<i>Onopordium acanthium</i>

<b>Table B-1. Common plant species occurring in the Moab FO.</b>	
<b>Species Type Common Name</b>	<b>Scientific Name</b>
Squarrose knapweed	<i>Centaurea squarrosa</i>
Whitetop	<i>Cardaria</i> spp.
Yellow Starthistle	<i>Centaurea solstitialis</i>

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**APPENDIX C**

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**RIPARIAN/WETLAND RELATED MANDATES AND AUTHORITIES:****Federal Acts**

- The Economy Act of 1936, as amended, forms the basis for agreements between BLM and the NRCS or USGS concerning soil survey and stream monitoring work.
- The Taylor Grazing Act of 1934, as amended, provides for continued study of erosion and flood control, and provides for any work that may be necessary to protect and rehabilitate public lands to prevent soil deterioration.
- The Watershed Protection and Flood Contract Act of 1954, as amended, directs the federal government to cooperate with states and their political subdivisions, soil or water conservation districts, flood prevention or control district, and other local public agencies to prevent erosion or damage from flood waters and sediment.
- The Water Resources Act of 1954, as amended, permits the Secretary of the Interior to give grants to, and cooperate with, federal, state, and local agencies to undertake research into any water problems related to the mission of the Department.
- The Multiple Use Sustained Yield Act of 1960 recognizes recreation, range, timber, watershed, wildlife, and fish resources in a combination that best fits the needs of the American people.
- The Water Resources Planning Act of 1965, as amended, established the Water Resources Council, which is directed to maintain studies of water supplies and water programs. The chairman of any river basin commission can request from an agency, and that agency is authorized to furnish, such information as is necessary to carry out its function.
- The Wild and Scenic Rivers Act of 1968 provides direction, procedures, and standards for management of waters located within the National Wild and Scenic River System.
- The Federal Pollution Control Act, with amendments 1972 and 1977, has the objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. The Clean Water Act of 1987 provides additional authorizations.
- The Sikes Act of 1974 authorizes conservation and rehabilitation programs on public lands for fish and wildlife purposes in coordination with state game agencies.
- The Water Resources Development Act of 1974 directs the Department of the Interior to undertake research and develop demonstration projects to identify methods to improve the water quality of the Colorado River.
- The Colorado River Basin Compact states, which include Utah, have adopted numeric salinity criteria for the basin. Criteria for stations downstream of the planning area include: 723 mg/L salinity below Hoover Dam, 747 mg/L salinity below Parker Dam, and 879 mg/L salinity below Imperial Dam.
- The Colorado River Basin Salinity Control Act of 1974 directs the Department of Interior to undertake research and develop demonstration projects to identify methods to improve water quality obligations with Mexico. The amendment of 1984 directs the Secretary of

the Interior to develop a program for minimizing salt contributions to the Colorado River from land administered by the BLM.

- The Federal Land Policy Management Act of 1976 requires that public lands be managed in a manner that will protect scientific, environmental, air and atmospheric, and water resource values. It also requires land use plans to be in compliance with applicable pollution control laws, including state and federal air, water, and other pollution standards.
- The Surface Mining Control and Reclamation Act of 1977 requires federal agencies to gather hydrologic data to ascertain the suitability for mining.
- The Safe Drinking Water Act of 1977 protects all public water systems from pollutants or contaminants that would endanger public health and welfare. Activities on public lands in these watersheds must not cause contaminant levels to exceed promulgated standards.
- The Clean Water Act of 1977 requires all Resource Management Plans be consistent with state water quality standards. The Clean Water Act is designed to protect both riparian resources and wetlands by restoring and/or maintaining the chemical, physical, and biological integrity of the nation's waters. (33 USC 1251-1387).

### **Executive Orders**

- EO 11738 (September 10, 1973) directs each federal agency to enforce the Clean Water Act in the procurement of goods, materials, and services.
- EO 11752 (December 17, 1973) mandates that federal agencies shall provide leadership to protect and enhance the quality of air, water, and land resources through compliance with applicable federal, state, interstate, and local pollution standards.
- EO 11988 (May 24, 1977) referred to as the Floodplains EO, this directs each federal agency to take action to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.
- EO 11990 (May 24, 1977) referred to as the Wetlands EO, this directs federal agencies to minimize the destruction, loss, or degradation of riparian/wetlands and to preserve and enhance the natural and beneficial value of wetlands in carrying out programs affecting land use.
- EO 12088 (October 24, 1978) (Water Quality EO) requires all federal agencies to comply with local standards and limitations relating to water quality. Each federal agency is bound to recognize and adopt the policies, goals, and standards of area-wide water quality management plans in regard to those federal lands under its jurisdiction and to implement the standards of the plans to the maximum extent feasible in its own planning process and management activities.
- EO 12962 (1995) supports the conservation, restoration and enhancement of aquatic systems for increased recreational fishing opportunities, and to minimize conflicts between recreational fish and endangered species.
- EO 13186 (2001) The Migratory Bird Treaty Act of 1918 and this Executive Order supports the protection of migratory birds and conservation and restoration of their habitats.

## Federal Regulations

- The U.S. Water Resource Council published Floodplain Guidelines on February 10, 1978, after being directed to establish guidelines for floodplain management and preservation.
- President G.H.W. Bush 1989 recommended a federal *no-net loss* riparian/wetland policy, which resulted in issuance of national manual Identifying and Delineating Jurisdictional Wetlands used by the Corps, EPA, USFWS, NRCS.
- Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (Federal Register, October 18, 2000).
- 43 CFR 4180 – Fundamentals of Rangeland Health and Guidelines for Grazing Administration

## Circulars

OMB Circular A-81 directs that federal agencies need to meet water quality standards and related plans that states have developed under the Federal Water Pollution Control Act and cooperate with state and local pollution control agencies and with other federal agencies in the evaluation of their pollution control needs.

## BLM Manuals

- 1737 Riparian-Wetland Area Management (Manual expired)
- 6610 Terrestrial Wildlife and Riparian Habitat Inventory (Manual expired)
- 6670 Aquatic Studies (Manual expired)
- 6672 Lake and Reservoir Surveys (Manual expired)
- 6674 Water Analysis for Fisheries to determine productivity of fish habitats (Manual expired).
- 6740 Establishes policy and procedures for the identification, protection, maintenance, and management of riparian/wetland areas (Manual expired)
- 7120. Provides guidelines for maintaining all BLM watershed improvements constructed on public lands. (Manual expired)
- 7150. Provides guidance in the conduct and maintenance of water utilization and development, water quality, water yield and timing, and water rights. (Manual expired)
- 7160. Provides general guidance for preventing water and wind erosion. (Manual expired)
- 7210. Provides the basic framework for the soil and watershed activity. (Manual expired)

- 7221. Describes the policies, responsibilities, and procedures used to incorporate floodplain management into all BLM activities. (Manual expired)
- 7240. Describes the policies to protect, restore, and enhance the quality of water on public lands so that its utility for other dependent ecosystems will be maintained equal to or above legal water quality criteria. (Manual expired)
- 7250. Establishes policy and guidance for acquiring, perfecting, and protecting water rights necessary for multiple use management. (Manual expired)
- 7316. Provides procedures for inventory and analysis of ground and surface water inventories and of erosion and sediment reduction. (Manual expired)
- 7322. Provides procedures for analyzing watershed problems and developing plans for improving watershed conditions. (Manual expired)
- 8351. Wild and Scenic Rivers - Policy and Program Direction for Identification, Evaluation, and Management.
- Utah Strategic Riparian Plan.

### **BLM Instruction Memoranda and Information Bulletins**

- IB 98-116. Clean Water Action.
- M-78-410. Sets BLM policy on protection of wetlands and riparian areas.
- IM-78-523. Compliance with BLM interim floodplain and management procedures.
- IM-79-713. Implementation of BLM Manual 7221, Floodplain management and restoration.
- IM-87-261. Implementation of the Riparian Area Management Policy.
- IM-99-123. Reporting to the Colorado River Salinity Control Forum.
- UT-80-46. Implementation of BLM Manual 7221, Floodplain management and restoration.
- UT-98-28. Riparian Performance Measures
- UT-97-73. Implementing Standards for Rangeland Health and Guidelines for Grazing Management on BLM Lands in Utah.

### **BLM Technical References**

#### ***Riparian***

- The use of aerial photography to inventory and monitor riparian areas: Riparian area management (TR1737-2; BLM 1987)
- Inventory and Monitoring of Riparian Areas (TR 1737-3; BLM 1989a)
- Grazing Management in riparian areas: Riparian area management (TR 1737-4; BLM 1989b)
- Riparian and wetland classification review (TR 1737-5; BLM 1992a)
- Management Techniques in Riparian Areas (TR 1737-6; BLM 1992b)
- Procedures for Ecological Site Inventory – with Special Reference to Riparian-Wetland Sites (TR 1737-7; BLM 1992c)
- Greenline riparian-wetland monitoring: Riparian area management (TR 1737-8; BLM 1993a)
- Process for Assessing Proper Functioning Condition (TR 1737-9; BLM 1993b)
- The use of aerial photography to manage riparian-wetland areas: Riparian area management (revised) (TR 1737-10; BLM 2001a)
- Process for assessing proper functioning condition for lentic riparian-wetland areas (TR 1737-11; BLM 1994)
- Using aerial photographs to assess proper functioning condition of riparian wetland areas (TR 1737-12; BLM 1996a)
- Observing physical and biological change through historical photographs (TR 1737-13; BLM 1996b)
- Grazing management for riparian-wetland areas: riparian area management (TR 1737-14; BLM 1997)
- A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas (TR 1737-15; BLM 1998)
- A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas (TR 1737-16; BLM 1999)
- A guide to managing, restoring, and conserving springs in the Western United States (TR 1737-17; BLM 2001b)
- Managing for enhancement of riparian and wetland areas of the Western United States: An annotated bibliography (TR 1737-18; BLM 2000)
- Riparian-wetland soils (TR 1737-19; BLM 2003)

### ***Vegetation Sampling***

- Sampling vegetation attributes (TR 1734-4, BLM 1996)
- Measuring and monitoring plant populations (TR 1730-1; BLM 1998)

### **Applicable Utah State Laws and Regulations**

Utah Nonpoint Source Management Plan (October 2000), including amendment for Nonpoint Source Management Plan for Hydrologic Modifications (March 1995) and Nonpoint Source Management Plan for Silviculture Activities (July 1998).

## **Utah Water Quality Standards**

R317-2 of the Utah Administrative Code provides the standards for water quality in the State of Utah. Waters are classified by use (domestic, recreation, wildlife, agriculture), with special reservations made for waters specifically determined by regulation to be High Quality Waters (there are no High Quality Waters designated within the planning area). Use classifications of major water bodies within the planning area and associated surface water quality standards are summarized in Watersheds and Soils, Chapter 14.

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## APPENDIX D

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### GRAZING GUIDELINES (RANGELAND HEALTH)

**Standard 1. Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform.**

*As indicated by:*

- a) Sufficient cover and litter to protect the soil surface from excessive water and wind erosion, promote infiltration, detain surface flow, and retard soil moisture loss by evaporation.
- b) The absence of indicators of excessive erosion such as rills, soil pedestals, and actively eroding gullies.
- c) The appropriate amount, type, and distribution of vegetation reflecting the presence of (1) the Desired Plant Community [DPC], where identified in a land use plan, or (2) where the DPC is not identified, a community that equally sustains the desired level of productivity and properly functioning ecological conditions.

**Standard 2. Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate and landform.**

*As indicated by:*

- a) Streambank vegetation consisting of, or showing a trend toward, species with root masses capable of withstanding high streamflow events. Vegetative cover adequate to protect stream banks and dissipate streamflow energy associated with high-water flows, protect against accelerated erosion, capture sediment, and provide for groundwater recharge.
- b) Vegetation reflecting: Desired Plant Community, maintenance of riparian and wetland soil moisture characteristics, diverse age structure and composition, high vigor, large woody debris when site potential allows, and providing food, cover and other habitat needs for dependent animal species.
- c) Revegetating point bars; lateral stream movement associated with natural sinuosity; channel width, depth, pool frequency and roughness appropriate to landscape position.
- d) Active floodplain.

**Standard 3. Desired species, including native, threatened, endangered, and special-status species, are maintained at a level appropriate for the site and species involved.**

*As indicated by:*

- a) Frequency, diversity, density, age classes, and productivity of desired native species necessary to ensure reproductive capability and survival.
- b) Habitats connected at a level to enhance species survival.
- c) Native species reoccupy habitat niches and voids caused by disturbances unless management objectives call for introduction or maintenance of nonnative species.
- d) Appropriate amount, type, and distribution of vegetation reflecting the presence of (1) the Desired Plant Community [DPC], where identified in a land use plan conforming to these Standards, or (2) where the DPC is identified a community that equally sustains the desired level of productivity and properly functioning ecological processes.

**Standard 4. BLM will apply and comply with water quality standards established by the State of Utah (R.317-2) and the Federal Clean Water and Safe Drinking Water Acts. Activities on BLM Lands will support the designated beneficial uses described in the Utah Water Quality Standards (R.317-2) for surface and groundwater. <sup>1</sup>**

*As indicated by:*

- a) Measurement of nutrient loads, total dissolved solids, chemical constituents, fecal coliform, water temperature and other water quality parameters.
- b) Macro-invertebrate communities that indicate water quality meets aquatic objectives.

<sup>1</sup> BLM will continue to coordinate monitoring water quality activities with other Federal, State and technical agencies.

### **Guidelines for Grazing Management**

1. Grazing management practices will be implemented that:
  - a) Maintain sufficient residual vegetation and litter on both upland and riparian sites to protect the soil from wind and water erosion and support ecological functions;
  - b) Promote attainment or maintenance of proper functioning condition riparian/wetland areas, appropriate stream channel morphology, desired soil permeability and infiltration, and appropriate soil conditions and kinds and amounts of plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow.
  - c) Meet the physiological requirements of desired plants and facilitate reproduction and maintenance of desired plants to the extent natural conditions allow;
  - d) Maintain viable and diverse populations of plants and animals appropriate for the site;
  - e) Provide or improve, within the limits of site potentials, habitat for Threatened or Endangered Species;
  - f) Avoid grazing management conflicts with other species that have the potential of becoming protected or special status species;

- g) Encourage innovation, experimentation and the ultimate development of alternatives to improve rangeland management practices;
  - h) Give priority to rangeland improvement projects and land treatments that offer the best opportunity for achieving the Standards.
2. Any spring or seep developments will be designed and constructed to protect ecological process and functions and improve livestock, wild horse and wildlife distribution.
  3. New rangeland projects for grazing will be constructed in a manner consistent with the Standards. Considering economic circumstances and site limitations, existing rangeland projects and facilities that conflict with the achievement or maintenance of the Standards will be relocated and/or modified.
  4. Livestock salt blocks and other nutritional supplements will be located away from riparian/wetland areas or other permanently located, or other natural water sources. It is recommended that the locations of these supplements be moved every year.
  5. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands non-intrusive, nonnative plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, can not achieve ecological objectives as well as nonnative species, and/or (d) cannot compete with already established native species.
  6. When rangeland manipulations are necessary, the best management practices, including biological processes, fire and intensive grazing, will be utilized prior to the use of chemical or mechanical manipulations.
  7. When establishing grazing practices and rangeland improvements, the quality of the outdoor recreation experience is to be considered. Aesthetic and scenic values, water, campsites and opportunities for solitude are among those considerations.
  8. Feeding of hay and other harvested forage (which does not refer to miscellaneous salt, protein, and other supplements) for the purpose of substituting for inadequate natural forage will not be conducted on BLM lands other than in (a) emergency situations where no other resource exists and animal survival is in jeopardy, or (b) situations where the Authorized Officer determines such a practice will assist in meeting a Standard or attaining a management objective.
  9. In order to eliminate, minimize, or limit the spread of noxious weeds, (a) only hay cubes, hay pellets, or certified weed-free hay will be fed on BLM lands, and (b) reasonable adjustments in grazing methods, methods of transport, and animal husbandry practices will be applied.
  10. To avoid contamination of water sources and inadvertent damage to non-target species, aerial application of pesticides will not be allowed within 100 feet of a riparian/wetland area unless the product is registered for such use by the EPA.
  11. On rangelands where a standard is not being met, and conditions are moving toward meeting the standard, grazing may be allowed to continue. On lands where a standard is not being met, conditions are not improving toward meeting the standard or other management objectives, and

livestock grazing is deemed responsible, administrative action with regard to livestock will be taken by the Authorized Officer pursuant to CFR 4180.2(c).

12. Where it can be determined that more than one kind of grazing animal is responsible for failure to achieve a Standard, and adjustments in management are required, those adjustments will be made to each kind of animal, based on interagency cooperation as needed, in proportion to their degree of responsibility.

13. Rangelands that have been burned, reseeded or otherwise treated to alter vegetative composition will be closed to livestock grazing as follows: (1) burned rangelands, whether by wildfire or prescribed burning, will be ungrazed for a minimum of one complete growing season following the burn; and (2) rangelands that have been reseeded or otherwise chemically or mechanically treated will be ungrazed for a minimum of two complete growing seasons.

14. Conversions in kind of livestock (such as from sheep to cattle) will be analyzed in light of Rangeland Health Standards. Where such conversions are not adverse to achieving a Standard, or they are not in conflict with BLM land use plans, the conversion will be allowed.

**Standards for Public Land Health and  
Guidelines for Recreation Management for  
BLM Lands in Utah<sup>1</sup>**

**INTRODUCTION**

The mission of the BLM is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The resources of these lands include timber, minerals, soils, riparian areas, water, air, and vegetation, historical and archaeological sites, wildlife habitats, threatened and endangered species habitats, and wilderness. Recreational uses of public land is a highly regarded social value of our society. Recognizing that social and economic factors must be considered in achieving healthy public lands, the Utah BLM, will consult with citizens, interest groups and local governments, to conduct planning, and to establish partnerships with stakeholders to manage and to pursue funding sources. Public lands will be managed so that various services, activities, and all renewable resources of the land are environmentally sustainable and non-renewable resources are recovered in ways that ensure the long-term health of the land.

Standards for Rangeland [ecological] Health of BLM Lands in Utah, and grazing management guidelines to meet these standards, were adopted in May 1997. The following guidelines for recreational use of the public lands are intended to assist in meeting not only the Rangeland [ecological] Health Standards but also to minimize harm to public land values as listed above. A premise of these guidelines is that health of the land and quality of the recreation experience are inseparable.

It is the intent of the following guidelines to encourage and allow for outdoor recreational opportunities, to enhance the quality of the outdoor experience, and to serve diverse recreational interests while minimizing conflicts between various kinds of users. However, recreation on public land is a limited and precious resource whose long-term use is dependent on the users' responsible and ethical behavior.

Field managers are encouraged to establish partnerships with stakeholders affected by guideline implementation. Communication protocols will be implemented to inform and involve those affected stakeholders.

**RECREATION MANAGEMENT GUIDELINES**

**Rangeland Health Standard 1. UPLAND SOILS EXHIBIT PERMEABILITY AND INFILTRATION RATES THAT SUSTAIN OR IMPROVE SITE PRODUCTIVITY, CONSIDERING THE SOIL TYPE, CLIMATE, AND LAND FORM.**

1. Designate areas for intensive recreational use or cross-country motorized travel where disturbance of soil and vegetation is acceptable, either because impacts are insignificant and/or temporary or because the value of intensive use of the land outweighs whatever ecological changes may occur. Decisions on such designation should take into account conflicts with other users as well as adverse effects on archaeological or historical sites,

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<sup>1</sup> These standards apply to all uses of BLM lands in Utah and are designated as Rangeland Health Standards in the Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah

threatened or endangered species habitat, wildlife habitat, or social values such as beauty, solitude, and quiet.

2. In all other areas, travel routes and other disturbances should be kept to the minimum necessary to provide access and visitor facilities appropriate to the area. Through blocking, signing, and public education, unneeded travel routes should be eliminated and rehabilitated and unplanned development of new ones discouraged.
3. It may be necessary to manage some areas to be entirely free of planned travel routes.

**Rangeland Health Standard 2. RIPARIAN AND WETLAND AREAS ARE IN PROPERLY FUNCTIONING CONDITION. STREAM CHANNEL MORPHOLOGY AND FUNCTIONS ARE APPROPRIATE TO SOIL TYPE, CLIMATE AND LAND FORM.**

1. Where feasible, and consistent with user safety, developed travel routes should be located/relocated away from sensitive riparian and wetland areas.
2. Camping in riparian areas should be avoided and must be managed, monitored, and modified as conditions dictate to reduce vegetation disturbance and sedimentation.
3. Stream crossings will be limited to the number dictated by the topography, geology, and soil type. Design any necessary stream crossings to minimize sedimentation, soil erosion, and compaction.

**Rangeland Health Standard 3. DESIRED SPECIES, INCLUDING NATIVE, THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES, ARE MAINTAINED AT A LEVEL APPROPRIATE FOR THE SITE AND SPECIES INVOLVED.**

1. Protect against the establishment and/or spread of noxious or other weeds from intensive recreation, including the use of riding and pack animals, hiking, motorized, or other mechanized vehicles.
  - a. Conduct an educational campaign to inform recreational users about the damage caused by noxious weeds and how their spread can be minimized.
  - b. here appropriate, apply restrictions, e.g. don't permit surface disturbing activities.
2. Protect wildlife and/or habitat by:
  - a. Preserving connectivity and avoiding fragmentation.
  - b. Controlling recreational activities that would interfere with critical wildlife stages such as nesting, reproduction, or seasonal concentration areas.
  - c. Avoiding creation of artificial attractions such as the feeding of wild animals or improper disposal of garbage.
3. Where necessary, control recreational use by changing location or kind of activity, season, intensity, distribution, and/or duration in order to protect plant and animal communities, especially those containing threatened, endangered or candidate species.

**Rangeland Health Standard 4. BLM WILL APPLY AND COMPLY WITH WATER QUALITY STANDARDS ESTABLISHED BY THE STATE OF UTAH (R. 317-2) AND THE FEDERAL CLEAN WATER AND SAFE DRINKING WATER ACTS. ACTIVITIES ON BLM LANDS WILL FULLY SUPPORT THE DESIGNATED BENEFICIAL USES DESCRIBED IN THE UTAH WATER QUALITY STANDARDS (R. 317-2) FOR SURFACE AND GROUNDWATER.**

1. Manage recreational uses in coordination with other uses on public lands to comply with applicable water quality standards by:
  - a. Identifying areas where recreational activities may seriously impair water quality.
  - b. Establishing thresholds for numbers, types, and duration of visitor use, and when those thresholds are reached, by developing facilities and/or possibly limiting or relocating use.
2. Monitor and control disposal of human or domesticated animal waste, trash, and other pollutants to prevent serious impairment of water quality.

**Implementing the Recreation Guidelines**

The Recreation Guidelines integrate the recreation program with the standards for rangeland health, and broadly define the procedures that would be applied to achieve the standards for rangeland health within the recreation program. Implementing the Recreation Guidelines means defining a more specific management approach and recommending actual practices that could be followed to implement the Guidelines. The Guidelines in this document are designed as Atools@ to assist managers in implementing recreation management decisions and actions. At this stage, the environmental effects of implementing the guidelines are too broad, speculative, or conjectural to lend themselves to meaningful environmental analysis under the National Environmental Policy Act (NEPA). Furthermore, implementing actions will be subject to further NEPA review and analysis. Therefore, the adoption of the guidelines is categorically excluded from NEPA analysis (516 DM, Chapter 6, Appendix 5, 5.4, categorical exclusions).

As consistent with existing policies, guidance, and budgetary constraints, it is recommended that the BLM do the following:

- Recognize that in some cases various levels of regulations and limits on users are necessary. Restrictions and limitations on public uses should be as small as possible without compromising the primary goal.
- Use on-the-ground presence as a tool to protect public lands.
- Where long-term damage by recreational uses is observed or anticipated, limit or control activities through specialized management tools such as designated campsites, permits, area closures, and limitations on number of users and duration of use. Revise recreation management plans and management framework plans when they prove to be either overly restrictive or inadequate to maintain public land health.
- Coordinate with federal and state agencies, county and local governments, and tribal nations in recreation planning and managing traffic, search and rescue operations, trash control and removal and public safety.

- Consider and, where appropriate, implement management methods to protect the resource as well as maintain the quality of experience of the various user groups. These could include limitation of numbers, types, timing and duration of uses.
- Encourage the location of public land recreational activities near population centers and highway corridors by placement of appropriate visitor use infrastructure. Provide restrooms and other facilities adequate for anticipated uses at designated campgrounds, trail heads, and other areas where there is a concentration of recreational users.

### **Building a Stewardship Ethic for Public Land Use**

A critical step in achieving and maintaining public land health and enjoyment of the public land is that the users of the public land practice responsible stewardship ethics. All users, from recreationists to commodity producers, should understand, practice and promote behavior that does not damage the environment. Below are recommended strategies to instill principles of public land user ethics:

- Use information and interpretative services as major tools to protect public land health as well as significant natural, cultural, and recreational resources. Where feasible, improve public knowledge by locating kiosks, interpretive signs, and visitor information facilities at visitor contact points. Provide guidebooks and pamphlets for users.
- Incorporate information about public land values and user ethics into the terms and conditions of permits and land use authorizations.
- Increase efforts to educate public land visitors and users about an ethic of responsible use through programs such as Tread Lightly, Leave No Trace, Project Archaeology, the International Mountain Bike Association's *Rules of the Trail*, and Public Lands Watch program.
- Communicate to the members of the public their individual rights and responsibilities in the use and preservation of public lands, including the recognition of the rights and responsibilities of others.
- Initiate and maintain collaborative partnerships among government agencies, local governments, business communities, volunteers, user groups, stakeholders, educational institutions, individuals, and the private sector to achieve Rangeland Health Standards and implement associated guidelines.
- Encourage the development of a concise educational program to be implemented at the initial point of contact with the public and public land users. The program should promote public land values, knowledge of rights and responsibilities, environmental awareness, and communication between the BLM and the public. It should inform the public about changing management practices and policies. In addition, the educational program should demonstrate the connection between the health of the public land and the benefits users and local communities receive from those lands.
- Encourage the private sector to conduct responsible marketing of activities available on public lands while avoiding use of products and services in ways that may harm public lands.
- Educate the public in proper human and solid waste disposal techniques.

## **GLOSSARY:**

**Guidelines, Recreation:** Recreation management tools, methods, and techniques designed to provide activities, experiences, and benefits for the recreating public while maintaining or achieving healthy public lands as defined by the standards. The recreation guidelines contained in this document are directed toward maintaining or achieving public land health.

**Mechanized Vehicle:** Any motorized or non-motorized vehicle capable of, or designed for, travel on or immediately over land. An example of a mechanized, but not motorized vehicle is a mountain bike. All motorized vehicles are mechanized.

**Motorized Vehicle:** Synonymous with off-road and off-highway vehicle. Examples of this type of vehicle include all-terrain vehicles (ATV), sport utility vehicles (SUV), motorboats, and snowmobiles.

**Non-Motorized Use:** Recreational human and animal foot traffic. Examples include horses, llamas, and other domestic animals. Wheel chairs designed for indoor use as a medical appliance are not considered mechanized.

**Protect:** To take actions to guard against or minimize injury or loss.

**Riparian:** Of, on, or relating to the bank of a natural course of water.

**Special Status Species/Sensitive Species:** Those species designated by a State Director, usually in cooperation with the State agency responsible for managing the species as sensitive.

**Standards for Public Land Health:** A description of conditions needed to sustain public land health; the standards relate to all uses of the public lands in Utah.

**Threatened and Endangered Species:** those species officially listed as threatened or endangered by the Secretary of the Interior under the provisions of the Endangered Species Act.

**Visitor Use Infrastructure:** Amenities such as roads, parking areas, and facilities, to protect the resource and support the recreation user in his/her pursuit of activities, experiences, and benefits.

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## APPENDIX E

### METADATA

#### MOAB BLM RIPARIAN GIS DATABASE

VERSION: 3-03-mfo-riprn  
VGRIPN\_NEW

#### METADATA

##### History:

The riparian database was derived from a 1990 contract to map and describe riparian vegetative communities by individual polygon within the old Moad DISTRICT boundaries (once including Moab, Monticello and Price Field Offices). Data was digitized into GIS (from 7.5 quads VGRIP.SHP) based on aerial interpretation of 1:32,000 scale color infrared aerial photography taken in June 1974 and July 1975. Only a small percentage of riparian areas identified were field verified during the following years and the database contained many errors in presence, extent, and type of riparian area. By 2001, the database had incorporated Bureau Health Function ratings (Properly Functioning, Functional-At-Risk, or Non-Functional condition) for all verified riparian polygons.

In 2001, Washington Office BLM directed Moab Field Office to report riparian functioning condition on all areas identified in the database as UNKNOWN. BLM specialists conducted field inventories, low-level aerial flights, and photo interpretation to revise locations, extent, functioning ratings, land ownership, and vegetative community for approximately 360 miles of “unknown” riparian areas.

In 2002, revision of data relative to lentic wetland areas were focused upon. In preparation for an RMP revision in 2003, the entire GIS database was reviewed and revised utilizing new high resolution color satellite imagery for the Field office (July 2001, 1:1200 resolution). Accuracy now appears high with vegetation and functioning condition being the weakest parameters of the database. The database is revised and updated yearly based on site-specific field analysis and environmental changes.

##### Database Fields:

**Riparian ID #**- Originally assigned during the first photo interpretation, polygons were numbered in sequence of drainage using individual 7.5 quad Ohio codes (eg- 38109c5.8,38110g1.21). Revisions in the database following evaluation often utilized alpha variants to identify modified or newly added segments (38109c5.8a).

**Condition 2003**-Indicates the current known riparian functioning condition as directed by Bureau policy and guidance.

PFC = Properly Functioning Condition

FAR = Functioning-At-Risk

NF = Non-Functional

**Potential Community-** Reflects the capability or potential of the identified riparian vegetative community. Identified species may reflect the dominant vegetation in the community; the Desired Plant Community (DPC); or the potential of a riparian area depending on site characteristics. Preferred management is toward diverse native riparian species.

<u>Species list (5-letter limit)</u>	<u>Standard Abbreviation</u>
Cottonwood (fremontii, angustifolia)	POPUL
Willow spp.	SALIX
Tamarisk (salt cedar)	TAMAR
Boxelder	ACNE
Grasses	PAFG or PPGG
Oak	QUERC
Alder	ALNUS
Aspen	POTR
ELAN	RUSSIAN OLIVE
Cattail	TYPHA
Birch	BEOC
Ash	FRAXI
Douglas-fir	PSTU
Cattail	TYPHA
Bulrush	SCIRP
Rush	JUNCU

**Vegetation Other:** Other vegetation found within the community. Same naming convention as above.

**Riparian Type:** Generally, this field records the type of riparian area. Currently this field is the easiest way to select for Lentic areas (standing water or hillslope wetland systems = marshes, swamps), although the potential community field for these types of riparian areas should also reflect mesic grass species (typha, juncus, scirpus). Other entries include Lotic areas (running water systems=perennial, intermittent streams or ephemeral washes), or hanging gardens (typically seeps in canyon overhangs). Column reflects lotic conditions unless otherwise indicated.

**Acres:** As generated through Xtools extension in Arcview.

**Source:** Location by largest near stream or watershed drainage.

**2003 DATA NEED:**

Standard riparian reference includes Length in Miles. Previous version had data field of polygon length to accurately reflect meandering channel in river miles. Data will need to be recomputed by year-end for required Annual Congressional Riparian Reports.

Data Source Contact: Stephanie Ellingham MFO, BLM 435-259-2145, stephanie\_ellingham@blm.gov

## APPENDIX F

**2003 CONDITION STATUS OF RIPARIAN AREAS BY WATERSHED, AND THE ALLOTMENTS CONTAINED WITHIN, MOAB FO**

<b>Table F-1. 2003 Condition Status of Riparian Areas by watershed, and the allotments contained within, Moab FO.</b>						
<b>Level 4 HUC* Stream System</b>	<b>Allotments within Stream System</b>	<b>PFC (acres)</b>	<b>FAR (acres)</b>	<b>NF (acres)</b>	<b>RSVR (acres)</b>	<b>Total (acres)</b>
<b>14010005 (Colorado Headwaters – Plateau)</b>						
Colorado River	Agate, Behind the Rocks, Buckhorn, Cisco, Harley Dome, Highlands, Hotel Mesa, Ida Gulch, Little Hole, North River, Potash, Professor Valley, Squaw Park, Taylor	148.06	0	0	0	148.06
Cottonwood Canyon	Cisco Mesa, Prairie Canyon	30.28	0	0	0	30.28
<b>14030001 (Upper Colorado-Dolores – Westwater Canyon)</b>						
Unnamed Stream	Unallotted	3.08	0	0	0	3.08
Agate Wash	Agate	0	8.13	0	0	8.13
Bitter Creek	Harley Dome, San Arroyo	266.00	0	0	0	266.00
Cisco Wash	Buckhorn, Cisco, Cisco Mesa, Highlands, Hotel Mesa	292.36	149.97	52.57	7.74	502.65
Coates Creek	Big Triangle, Buckhorn	278.98	84.23	0	0	363.21
Colorado River	Agate, Behind the Rocks, Buckhorn, Cisco, Harley Dome, Highlands, Hotel Mesa, Ida Gulch, Little Hole, North River, Potash, Professor Valley, Squaw Park, Taylor	1810.34	39.31	0	0	1849.64
Cottonwood Canyon	Cisco Mesa, Prairie Canyon	2.01	0	0	0	2.01
Cottonwood Wash	Agate, Cisco Mesa, Cottonwood, Little Hole, Pipeline, Sulphur Canyon	572.01	604.39	1535.63	14.03	2726.05
Danish Wash	Agate, Cisco	0	54.81	0	0	54.81
Diamond Creek	Cisco Mesa, Diamond	0	0	1037.12	0	1037.12
Dolores River	Beaver Creek, Buckhorn, Gateway, Granite Bench, Hotel Mesa, Scharf Mesa, Steamboat Mesa, Taylor	0	0.41	0	0	0.41
Dry Gulch	Buckhorn	44.71	0	0	0	44.71
East Canyon	Middle Canyon	46.40	0	0	0	46.40
Hay Canyon	Middle Canyon	31.32	0	0	0	31.32
Jones Canyon	Buckhorn	70.55	0	0	0	70.55
Little Dolores	Buckhorn	24.07	63.19	0	0	87.27
Marble Canyon	Buckhorn	25.51	0	0	0	25.51
Nash Wash	Bogart, Cisco, Highlands, Monument Wash	930.59	181.02	67.15	0	1178.76
Pinto Wash	Cisco, Monument Wash	155.63	0	0	0	155.63
Renegade Creek	Big Triangle, Buckhorn, Mesas	95.06	110.72	0	0	205.77
Ryan Creek	Buckhorn, Mesas	143.76	6.52	0	0	150.28

<b>Table F-1. 2003 Condition Status of Riparian Areas by watershed, and the allotments contained within, Moab FO.</b>						
<b>Level 4 HUC* Stream System</b>	<b>Allotments within Stream System</b>	<b>PFC (acres)</b>	<b>FAR (acres)</b>	<b>NF (acres)</b>	<b>RSVR (acres)</b>	<b>Total (acres)</b>
Sagers Wash	Cisco, Highlands, Monument Wash, Suqaw Park, Thompson Canyon	667.32	104.76	0	19.16	791.25
Star Canyon	Buckhorn	12.33	0	0	0	12.33
Sulphur Canyon	Corral Wash, Diamond, Harley Dome	131.26	0	0	8.22	139.48
Westwater Creek	Corral Wash, Corral Wash Canyon, Harley Dome, Main Canyon, Middle Canyon, Pipeline, Sulphur Canyon	1149.92	95.45	0	0	1245.37
<b>14030002 (Upper Colorado-Dolores – Upper Dolores)</b>						
East Coyote Wash	East Coyote, Lisbon	516.41	109.00	0	0	625.40
Kane Springs Cr.	Behind the Rocks, Black Ridge, Hatch Point, Kane Springs, Lisbon	25.34	0	0	0	25.34
La Sal Creek	Lisbon	17.44	13.89	0	0	31.33
<b>14030004 (Upper Colorado-Dolores – Lower Dolores)</b>						
Beaver Creek	Beaver Creek, S Beaver Mesa	176.72	24.97	0	0	201.68
Colorado River	Agate, Behind the Rocks, Buckhorn, Cisco, Harley Dome, Highlands, Hotel Mesa, Ida Gulch, Little Hole, North River, Potash, Professor Valley, Squaw Park, Taylor	0.73	0	0	0	0.73
Dolores River	Beaver Creek, Buckhorn, Gateway, Granite Bench, Hotel Mesa, Scharf Mesa, Steamboat Mesa, Taylor	596.39	986.57	0	0	1582.96
Fisher Creek	Beaver Creek, Fisher Valley, Taylor	255.47	123.06	0	0	378.53
Granite Creek	Granite Bench, Granite Creek, Scharf Mesa, Steamboat Mesa,	218.05	0	0	0	218.05
<b>14030005 (Upper Colorado-Dolores – Kane Springs)</b>						
Castle Creek	Adobe Mesa, River	103.67	2.00	0	0	105.67
Unnamed Stream	Unallotted	1080.87	4.42	0	0	1085.29
Bartlett Wash	Big Flat, Little Grand	81.40	261.40	0	0	342.80
Buck	Black Ridge, Hatch Point	64.17	0	0	0	64.17
Bull Canyon	Arths Pasture, Big Flat	18.43	0	0	0	18.43
Colorado River	Agate, Behind the Rocks, Buckhorn, Cisco, Harley Dome, Highlands, Hotel Mesa, Ida Gulch, Little Hole, North River, Potash, Professor Valley, Squaw Park, Taylor	2457.65	3.55	0	0	2461.20
Courthouse Wash	Dalton Wells	6.40	22.81	0	0	29.21
Day Canyon	Big Flat, Potash	17.40	4.62	0	0	22.02
Dolores River	Beaver Creek, Buckhorn, Gateway, Granite Bench, Hotel Mesa, Scharf Mesa, Steamboat Mesa, Taylor	0	0.27	0	0	0.27
Dripping Spring	Hatch Point	11.52	0	0	0	11.52
Dry Oak Spring	Monument Wash	0	0.79	0	0	0.79

<b>Level 4 HUC* Stream System</b>	<b>Allotments within Stream System</b>	<b>PFC (acres)</b>	<b>FAR (acres)</b>	<b>NF (acres)</b>	<b>RSVR (acres)</b>	<b>Total (acres)</b>
Fish Seep Wash	Highlands	37.53	0	0	0	37.53
Gold Bar Canyon	Arths Pasture	23.55	0	0	0	23.55
Hatch Wash	Hatch Point, Kane Springs, Lisbon, Windwhistle	530.06	159.22	0	1.30	690.58
Hunters Canyon	Behind the Rocks	42.40	158.92	0	0	201.33
Ice Box	No allotments	4.15	0	0	0	4.15
Jackass	No allotments	0.51	0	0	0	0.51
Jackass Canyon	No allotments	11.20	0	0	0	11.20
Kane Springs Cr.	Kane Springs	574.97	303.34	26.47	0	904.78
Little Canyon	Arths Pasture	125.16	0	0	0	125.16
Little Valley	Little Grand	29.76	6.70	0	0	36.46
Lockhart	Hatch Point	40.25	0	0	7.97	48.22
Mill Canyon	Big Flat	35.87	46.24	0	0	82.11
Mill Creek	Behind the Rocks, Between the Creeks, Mill Creek, S Sand Flats, Wilson Mesa	261.13	245.71	0	0	506.84
Muleshoe	Hatch Point, Kane Springs	60.56	9.18	0	0	69.73
Negro Bill	No allotments	223.42	0	0	0	223.42
Negro Bill Canyon	No allotments	167.79	0	0	0	167.79
Onion Creek	Fisher Valley, Professor Valley	102.55	145.52	0	0	248.07
Pritchett Canyon	Behind the Rocks	78.62	0	0	0	78.62
Professor Creek	Professor Valley	256.59	0	0	0	256.59
Rill Creek	Behind the Rocks, Black Ridge, S Sand Flats	139.68	29.42	0	0	169.11
Sagers Wash	Cisco, Highlands, Monument Wash, Suqaw Park, Thompson Canyon	48.26	85.53	0	0	133.79
Salt Valley	Little Grand, Monument Wash	0.33	0	0	0.96	1.30
Salt Wash	Athena, Cisco, Highlands, Little Grand, Monument Wash, Ruby Ranch, Taylor	51.23	185.44	0	3.82	240.48
Sevenmile	Arths Pasture, Big Flat, Dalton Wells	149.46	175.02	0	0	324.48
Shafer Basin	Potash	0	2.71	0	0	2.71
Trough Springs	Hatch Point, Kane Springs	68.58	0	0	5.85	74.43
Trout Water	Hatch Point, Kane Springs	45.08	0	0	0	45.08
Tusher Wash	Big Flat	32.98	49.28	0	0	82.25
West Coyote	Lisbon	0	0.24	0	0	0.24
West Coyote Wash	Hatch Point, Rattlesnake, Rocky	41.34	20.83	0	0	62.16
Yellow Jacket	Squaw Park	11.38	0	0	0	11.38
<b>14060005 (Lower Green – Desolation Canyon)</b>						
Coal Creek	Rattlesnake North	355.69	0	0	0	355.69
Green River	Athena, Desert, Elgin, Gray Canyon Wildland, Green River Flats, Mineral Bottom, Rattlesnake N, Ruby Ranch, Spring Canyon Bottom, Tenmile Point	0	289.01	0	0	289.01
Rattlesnake	Rattlesnake N, Shower Bath Springs, Tusher Wash	778.28	388.62	43.93	0	1210.83

<b>Table F-1. 2003 Condition Status of Riparian Areas by watershed, and the allotments contained within, Moab FO.</b>						
<b>Level 4 HUC*</b> Stream System	<b>Allotments within Stream System</b>	<b>PFC (acres)</b>	<b>FAR (acres)</b>	<b>NF (acres)</b>	<b>RSVR (acres)</b>	<b>Total (acres)</b>
<b>14060006 (Lower Green – Willow)</b>						
Moon Ridge	McClelland	22.06	0	0	0	22.06
Willow Creek	Bogart	8.45	0	0	0	8.45
<b>14060008 (Lower Green – Lower Green)</b>						
Unnamed Stream	Unallotted	0.99	0	0	3.88	4.87
Tenmile	Big Flat, Little Grand, Tenmile Point	26.74	107.43	0	0	134.17
Browns Wash	Athena, Elgin, Horse Canyon	0	0	0	15.48	15.48
Crescent Wash	Crescent Canyon, Floy Creek	0	0	0	3.11	3.11
Dubinky	Big Flat	0	1.03	0	0	1.03
Floy Wash	Athena, Crescent Canyon, Floy Canyon, Floy Creek, Horse Canyon,	486.10	282.61	0	1.35	770.06
Green River	Athena, Desert, Elgin, Gray Canyon Wildland, Green River Flats, Mineral Bottom, Rattlesnake N, Ruby Ranch, Spring Canyon Bottom, Tenmile Point	0	2141.70	0	0	2141.70
Hell Roaring	Big Flat, Spring Canyon Bottom	5.07	0	0	0	5.07
Labyrinth Canyon (Green River)	Spring Canyon Bottom, Tenmile Point	0	906.86	0	0	906.86
Little Grand Wash	Athena, Floy Creek, Little Grand	51.22	615.35	0	2.26	669.68
Mineral Bottom	Big Flat, Mineral Bottom,	97.12	0	0	0	97.12
Rattlesnake	Rattlesnake N, Shower Bath Springs, Tusher Wash	7.20	0	0	0	7.20
Red Wash	Ruby Ranch, Tenmile Point	0	161.06	0	0	161.06
Salt Valley	Little Grand, Monument Wash	34.11	0	0	0	34.11
Salt Wash	Athena, Cisco, Highlands, Little Grand, Monument Wash, Ruby Ranch, Taylor	302.14	0	0	0.22	302.36
Spring Canyon	Big Flat, Spring Canyon Bottom	189.03	24.70	0	0	213.72
Tenmile Wash	Big Flat, Little Grand, Tenmile Point	43.78	467.16	115.17	1.39	627.50
Thompson Wash	Cisco, Crescent Canyon, Little Grand, Monument Wash, Thompson Canyon	88.33	48.55	95.44	23.69	256.00
Tusher Canyon	Desert, Green River Flats, Rattlesnake N, Shower Bath Springs, Tusher Wash,	290.48	32.60	0	0	323.08
White Wash	Little Grand, Ruby Ranch	24.19	1042.24	0	0	1066.44
<b>Totals</b>		<b>18584.98</b>	<b>11192.48</b>	<b>2973.48</b>	<b>120.43</b>	<b>32872.18</b>

\* HUC = Hydrologic Unit Code; refer to Figure 1 for the Level 4 HUC Areas.