4.11 RIPARIAN AND WETLAND RESOURCES

Impacts to riparian areas in the VPA would be a result of surface disturbing activities within the riparian zones and are subject to restrictions to insure conditions are improved or at least not degraded. The Utah BLM Standards for Rangeland Health apply to riparian resources in the VPA. All alternatives must adhere to Standard 2 of these standards, "Riparian and wetland areas [must be] in properly functioning condition (PFC). Stream channel morphology and functions are appropriate to soil type, climate, and function" (BLM 1997).

As identified in the preliminary riparian inventory, the VFO would maintain 295 miles and 3674 acres of riparian areas currently in proper functioning condition. Also, the VFO would improve 133 miles and 1452 acres functioning at risk and 79 miles and 1213 acres not in properly functioning condition. These are preliminary numbers and will change as the inventory is completed. Monitoring would be used to determine the trend and condition of riparian areas (considering the soil type, climate, and land form). Site-specific conditions would need to be documented before modifying any prescriptions.

There are several potential impacts that would adversely affect riparian resources:

- Upland surface disturbance would result in loss of vegetation, accelerating soil erosion, which would in turn cause sedimentation in adjacent streams.
- Loss of riparian vegetation would lead to reduced riparian condition and loss of PFC.
- Degradation of riparian-wetland soils would lead to reduced riparian condition and loss of PFC.
- Drawdown of groundwater levels from oil, gas, and coal bed methane leasing could lead to dewatering of riparian areas.

Decisions making lands unavailable for upland surface disturbance and riparian corridor disturbance would be beneficial to riparian resources. Beneficial impacts would result from stubble height requirements, utilization levels, reduced use, and season of use changes that are proposed in some of the alternatives.

4.11.1 Impacts Common to All

Activities that would not comply with Standard 2 in the short term would require reclamation and rehabilitation to ensure soil productivity and sustainability. The BLM would take measures to ensure riparian area productivity and sustainability in the event of wildland fire, drought, or other natural disasters, by reducing or eliminating livestock, wild horses, and/or wildlife forage allocations, reducing or eliminating recreational activities (camping and campfires, OHV use, etc.), and reducing or eliminating mineral exploration and acquisition until riparian conditions are properly functioning. Cultural and paleontological resource management would not have any effect on riparian resources.

Fire Management practices would have short-term, direct adverse impacts to riparian resources through practices such as prescribed burning or fuels reduction by increasing erosion rates, which could result in stream sedimentation. However, these fire management activities would reintroduce the natural fire return interval in the long term, decreasing or eliminating the occurrence of catastrophic rangeland fires, and promoting more productive rangelands, resulting in less soil degradation and subsequent stream sedimentation.

Effects to riparian resources specified under forage and wild horse management decisions would be short-term, direct, and potentially beneficial, depending on season of use and duration. These decisions would also have long-term direct beneficial impacts to riparian resources by improving riparian conditions. AUMs would be adjusted for livestock, wild horses, and/or wildlife when monitoring shows that riparian condition is not at PFC.

Effects from lands and realty decisions would be direct and long-term. Land withdrawals would have a beneficial effect on riparian resources by precluding areas from mineral entry and would result in riparian resource protection. Increasing visitor access to river segments would have long-term, indirect adverse impacts to riparian resources by increasing visitor traffic, bank trampling, and spread of noxious weeds. With respect to right of ways, the BLM has strict riparian area reclamation and restoration guidelines regarding linear projects such as pipelines; therefore, no impacts are expected.

The effects of livestock and grazing decisions on riparian areas would generally be adverse, long-term, and direct. Long-duration grazing would impact riparian areas through loss of vegetative cover and trampling of soils, potentially leading to riparian area degradation. Limited livestock grazing, when properly managed, would benefit riparian areas by stimulating new growth in riparian vegetation. Effects on riparian vegetation vary between seasons of use. For example, grazing riparian areas in late spring allows vegetation to grow through summer and into the fall, where it can protect banks during critical spring runoff and late summer thunderstorms. Any changes to season of use or AUMs would need to be in compliance with Standard 2 (and all other standards) of the Utah BLM Standards for Rangeland Health.

Effects of minerals decisions on riparian resources would be adverse, long-term, and direct, resulting in upland erosion and subsequent stream sedimentation through surface disturbing activities. The impacts analysis represents relative risks of adverse impacts to riparian resources by alternative, due to the incomplete riparian inventory data. Site-specific analyses would need to be undertaken on a case-by-case basis to establish quantitative impacts. Reclamation and restoration of oil and gas, locatable minerals, surface minerals, and alternative energy sites would be required upon abandonment of the site, resulting in less stream sedimentation. The risks of accidental release of hazardous materials and petroleum products from oil, gas, and coal bed methane (CBM) leasing sites would also have an indirect, long-term, adverse impact on riparian resources. Drawdown of groundwater due to techniques used to extract oil, gas, and coal bed methane could lead to dewatering of riparian areas, increasing the risks of invasive species introduction and reducing water available for riparian ecosystems. Additionally, road development providing access to oil, gas, and CBM leasing would increase risks sediment runoff and noxious weed infestation into previously undeveloped areas. More roads would also increase access for illegal OHV use in remote riparian areas. Surface mineral developments would not be placed in wetlands and would be at least 100m from riparian zones, and must occur outside the 100-year floodplain. These stipulations on surface disturbance are discussed in Appendix M, and would be used unless there are no practical alternatives or impacts would be fully mitigated. The limits placed on surface disturbance from locatable minerals would limit the adverse impacts from these activities and there is no measurable difference between alternatives.

The effects of rangeland improvements on riparian areas would be beneficial, long-term, indirect, and direct. Vegetation treatments would ultimately reduce stream sedimentation and improve riparian vegetative cover. Fencing of riparian areas would reduce impacts from grazing in these areas and development of other water sources away from riparian areas would limit

grazing use of river corridors. Development of reservoirs would have long-term adverse impacts to riparian resources by inundation of riparian habitat and dewatering of downstream areas.

The effects of recreation decisions on soils would generally be long-term, indirect, and beneficial, by limiting OHV use to designated areas and by providing management for areas as SRMAs. Adverse effects would occur from increased visitor traffic, development of trails, and OHV use. Adverse impacts would include trampling of banks, compaction of soils, and spread of noxious weeds. Where limits are place on OHV travel off of designated routes for big game retrieval, beneficial effects would occur. The "Tread Lightly" program is invaluable in educating OHV users to stay on existing trails, thereby decreasing impacts to riparian areas. "Sacrifice" areas would be designated for OHV users in areas that are not ecologically sensitive and present little or no risk to riparian condition and other components identified in the Utah BLM Standards for Rangeland Health.

Riparian management would be designed to improve riparian conditions. The effects of maintaining minimum vegetation stubble height thresholds on riparian vegetation would be beneficial, long-term, and direct. Maintaining plant stubble along the banks traps sediment and reduces stream bank erosion, thereby maintaining or enhancing riparian condition. Managing herbaceous and woody vegetation in riparian areas would have long-term, direct beneficial effects by trapping sediment, attenuating floods, and providing stability for banks during periods of high flow. Proper functioning condition is the minimum acceptable goal for riparian areas. Riparian-wetland areas would be maintained, restored, protected, and/or expanded to achieve PFC with respect to soils, vegetation, and hydrology/water quality.

Soils and watershed management would be beneficial to riparian areas by limiting surface disturbance and requiring erosion control on slopes steeper than 20 percent. Slopes below 20 percent would not be required to have erosion control plans and would have short-term adverse impacts to riparian areas through increased sedimentation and runoff. The BLM would reduce or eliminate the discharge of pollutants and sediment into surface waters with stipulations on surface disturbance, providing protection for fish, amphibians, wildlife, and water recreation. Oil and gas well pads would not be permitted in active floodplains, protecting watersheds and riparian areas from sedimentation as well. The BLM would examine the effects of prescribed fire, post fire management, invasive weed control, energy development, grazing, OHV use, and range improvement projects prior to taking action.

Special designation areas would have long-term, direct beneficial effects to riparian areas, where management plans are designed to protect riparian ecosystems or limit surface disturbance by designating Class I and II VRM areas. Wild and Scenic River designations would have direct, long-term beneficial impacts to riparian resources by limiting development along river corridors. Increased visitor traffic would have long-term, indirect adverse impacts due to increases in bank trampling and recreational use of these river segments. Wilderness study areas would be managed in a manner that does not impair riparian condition, as per Standard 2 of the Utah BLM Standards for Rangeland Health. These designations would not allow surface disturbance, thereby providing direct protection for riparian areas.

The effects of special status species on riparian resources would be beneficial, long-term, and direct by limiting surface development. Each of the alternatives offers varying level of protection to special status species and their habitats by placing no-disturbance buffers around critical habitat (e.g., raptor nests). Habitat protection indirectly equates to reduced soil disturbance and

stream sedimentation. Inventories of these plant and animal resources would provide well-defined protection areas. Ute ladies'-tresses is the only TES plant that occurs in riparian areas within the VPA. The protection of this species' habitat would provide beneficial, long-term effects to riparian areas through limitation of surface disturbing activities under all alternatives.

Travel decisions would have direct and indirect, short- and long-term beneficial impacts to riparian resources where newly permitted roads and trails are obliterated or returned to their original condition. Repair by maintenance, upgrade, or realignment of roads causing resource damage, and installation of water crossings designed to allow the free passage of aquatic life would be beneficial to riparian resources as well. Direct and indirect, long- and short-term adverse impacts would occur where riparian areas on BLM land are within areas open to OHV use with no limits on travel.

Visual resource management (VRM) decisions would be beneficial, long-term, and would directly affect riparian resources by precluding some areas from surface disturbance due to their proximity to highways, scenic areas, and special designations. However, adverse, short-term, indirect impacts would occur if vegetation treatments could not be implemented in VRM-sensitive areas. VRM classes range from I to IV – Class I lands are not open to surface disturbance (full retention), and Class IV lands are available for full development.

Wildlife and fisheries management would have limited direct effects on riparian resources. Introduction of moose populations would have long-term, indirect beneficial impacts on riparian resources by increasing biodiversity in these areas. The BLM would provide habitat for a diversity of wildlife and fish species by limiting fragmentation, resulting in less surface disturbance and stream sedimentation. The effects of wildlife management decisions on riparian resources would be beneficial, long-term, and indirect, by limiting surface development within specified wildlife buffer zones. Most of the wildlife and fisheries management decisions involve seasonal constraints and would not necessarily preclude surface-disturbing activities. The only measurable component of wildlife and fisheries management decisions on riparian resources would be the preservation of crucial deer winter range and the enhancement of winter range to mitigate surface disturbance. The alternatives are similar with respect to their effects on riparian resources.

Woodlands and Forest management would generally have long-term indirect, beneficial impacts to riparian resources. The BLM would follow national BLM Forest Health and Forest Management Standards and Guidelines to achieve desired future conditions, and minimize impacts to riparian resources, while providing for multiple forest product use. Adverse, short-term, direct impacts to riparian resources would occur with treatments and harvesting in the form of sedimentation. However, in the long term, treatments and harvesting would have the potential to reintroduce natural fire return intervals, reducing stream sedimentation through fewer catastrophic fires.

4.11.2 Alternative Impacts

Surface disturbing activities for all alternatives and all effects would generally be adverse to riparian resources through sedimentation. Surface stipulations in Appendix M would be applied to all surface disturbing activities, and would limit disturbance of riparian areas. Exceptions to these stipulations could be authorized if: a) there are no practical alternatives; b) impacts could be fully mitigated; or c) the action is designed to enhance the riparian resources. Additionally,

mineral developments require a network of access roads, which typically require some form of water crossing. The duration of these impacts is dependent on the action.

4.11.2.1 Impacts of Fire Management Decisions on Riparian Resources

4.11.2.1.1 Alternatives A, B, and C

Alternatives A, B, and C would have approximately 3 times more surface disturbance in the short term than Alternative D – No Action (156,425 acres versus 50,900 acres). However, in the long term, these fire management activities would reintroduce the natural fire return interval to an area 3 times greater than that proposed in Alternative D – No Action. This would decrease or eliminate the occurrence of catastrophic wildland fires, which often require aggressive suppression, promoting more productive rangelands with less soil erosion and stream sedimentation.

4.11.2.1.2 Alternative D – No Action

Long-term benefits to riparian resources from prescribed fire would be 3 times less under Alternative D – No Action than under other alternatives.

4.11.2.2 Impacts of Forage and Wild Horse Management Decisions on Riparian Resources

4.11.2.2.1 Alternatives A and B

Total AUMs for Alternatives A and B are similar; however, Alternative B has 10 percent greater forage utilization than Alternative A. Greater forage utilization and more AUMs would put greater stress on riparian areas through loss of cover and trampling. This could potentially result in loss of PFC. These alternatives provide more beneficial impacts to riparian resources than Alternative D – No Action, which has unspecified forage utilization.

4.11.2.2.2 Alternative C

Alternative C has the most beneficial impacts to riparian resources relative to Alternative D – No Action through reductions in livestock use and retention of AUMs for watershed in many localities.

4.11.2.2.3 Alternative D – No Action

Alternative D – No Action generally provides no specifications for forage utilization and, therefore, would provide the least beneficial impacts to riparian resources.

4.11.2.3 Impacts of Lands and Realty Decisions on Riparian Resources

4.11.2.3.1 Alternative A

Alternative A would pursue public access to the White River at the mouth of Cowboy Canyon, Bonanza Bridge, and Wagon Hound Road. Additionally, this alternative would pursue acquisition of Indian trust lands in Bitter Creek and near the confluence of South and Sweetwater Canyons. These actions would have greater long-term, indirect adverse impacts to riparian resources than Alternative D – No Action, by increasing visitor use, thereby increasing trampling of banks and spread of noxious weeds. This alternative would preclude agricultural entry on land withdrawals, therefore would have more indirect beneficial impacts to riparian resources than Alternative D – No Action, which precludes agricultural entry on withdrawal lands.

4.11.2.3.2 Alternative B

Alternative B would not pursue public access to any new lands nor acquisition of Indian trust lands, therefore would have similar impacts to Alternative D – No Action. This alternative would preclude agricultural entry on withdrawal lands, therefore having similar impacts to Alternative A.

4.11.2.3.3 Alternative C

Alternative C would have similar impacts to Alternative A, with exception of pursuing an easement in Evacuation Creek. This easement would increase visitor access; therefore adversely impact riparian resources in Evacuation Creek more than all other alternatives.

4.11.2.3.4 Alternative D – No Action

Alternative D – No Action precludes agricultural entry on less acres of land than do Alternatives A, B, and C. Land access decisions are unspecified under Alternative D – No Action.

4.11.2.4 Impacts of Livestock and Grazing Decisions on Riparian Resources

4.11.2.4.1 Alternative A

Alternative A would use a phenology-based system for timing livestock use. This system would use timing of vegetation growth to determine proper grazing limits. Due to limits on grazing time, Alternative A provides an intermediate amount of direct, long-term beneficial impacts to riparian resources, as compared to Alternatives B and C. This alternative would provide greater direct, long-term beneficial impacts than Alternative D – No Action.

4.11.2.4.2 Alternative B

Alternative B would use a billed use-based system for timing livestock use. This system would generally allow more time for grazing than all other alternatives, therefore having more direct, long-term adverse impacts to riparian resources than Alternative D – No Action.

4.11.2.4.3 Alternative C

Alternative C would use an adjudicated system for timing livestock use. This system would allow the least time for grazing, compared to all alternatives. The direct, long-term beneficial impacts to riparian resources would be the highest, as compared to Alternative D – No Action.

4.11.2.4.4 Alternative D – No Action

Alternative D – No Action would use a permitted system for timing livestock use. This system is currently in use and provides an intermediate amount of impacts between other alternatives.

4.11.2.5 Impacts of Minerals Decisions on Riparian Resources

4.11.2.5.1 Alternative A

Alternative A would potentially develop approximately 6,342 oil, gas, and CBM wells, which is 486 more than Alternative D – No Action. This alternative would have a higher risk of more indirect, short- and long-term adverse impacts to riparian resources, due to a higher number of wells, more roads, and more acreage of surface disturbance, as compared to Alternative D – No Action.

4.11.2.5.2 Alternative B

Alternative B would potentially develop approximately 6,391 oil, gas, and CBM wells, which is 535 more than Alternative D – No Action. This alternative would have the highest risk of indirect, short- and long-term adverse impacts to riparian resources due to a higher number of wells, more roads, and more acreage of surface disturbance, as compared to Alternative D – No Action.

4.11.2.5.3 Alternative C

Alternative C would potentially develop approximately 6,224 oil, gas, and CBM wells, which is 368 more than Alternative D – No Action. Compared to alternatives A, B, and C this alternative would have the lowest risk of indirect, short- and long-term adverse impacts to riparian resources due a lower number of wells, fewer roads, and fewer acres of surface disturbance. Compared to Alternative D – No Action, adverse impacts to riparian resources would be greater.

4.11.2.5.4 Alternative D – No Action

Alternative D – No Action would potentially develop approximately 5,856 oil, gas, and CBM wells in the VPA.

4.11.2.6 Impacts of Rangeland Improvement Decisions on Riparian Resources

4.11.2.6.1 Alternatives A, B, C, and D – No Action

Vegetation treatments for rangeland improvement would total 34,640 acres, 50,900 acres, 45,860 acres, and 40,390 acres for Alternatives A, B, C, and D – No Action, respectively. Therefore, Alternative B would be the most beneficial to riparian resources, and Alternative A would be the least beneficial, as compared to Alternative D – No Action. Fencing would provide for timed grazing and would have an indirect beneficial effect on riparian areas, except for trampling effects along the fence line. Water developments would provide water to upland range sites, keeping livestock and other ungulates out of sensitive riparian areas. Guzzlers, reservoirs, wells, and springs would attract livestock away from riparian areas and would decease soil disturbance and sedimentation around riparian areas.

4.11.2.7 Impacts of Recreation Decisions on Riparian Resources

4.11.2.7.1 Alternative A

Alternative A would have direct and indirect, short- and long-term, beneficial impacts to riparian resources by designating the White River SRMA, which would be managed as VRM II, limiting surface disturbance within line of sight or up to ½ mile either side of the river. The designation of Blue Mountain and the Book Cliffs SRMAs would provide management of OHV use, which would not be managed in these areas under Alternative D – No Action. The expansion of Browns Park (52,721 versus 18,474 acres) SRMA would further protect riparian resources in this area, as compared to Alternative D – No Action. Long-term indirect adverse impacts would occur to these areas due to increase in visitor traffic.

Development of up to 400 miles of non-motorized trails would have long-term, indirect adverse impacts due to increasing visitor traffic. This would be 345 more miles of trails developed than under Alternative D – No Action. Not allowing OHV use for big game retrieval off designated routes would have long-term indirect beneficial impacts to riparian resources by limiting

trampling of riparian vegetation and spread of noxious weeds. OHV use off of designated trails for big game retrieval is unspecified under Alternative D – No Action.

4.11.2.7.2 Alternative B

Alternative B would not designate any new nor expand current SRMAs. This alternative would not develop any new non-motorized trails and would allow for big game retrieval off of designated routes, therefore Alternative B would have similar impacts, as compared to Alternative D – No Action.

4.11.2.7.3 Alternative C

Alternative C would have similar impacts to Alternative A, except Bitter Creek drainages and the head of Sweetwater Canyon would be closed to leasing. This alternative would have the most beneficial and fewest adverse impacts to riparian resources, as compared to Alternative D – No Action and the other alternatives.

4.11.2.7.4 Alternative D – No Action

Alternative D – No Action would continue managing Browns Park (18,474 acres) as an SRMA. OHV use would be limited to designated roads and trails, therefore having long-term, indirect and direct, beneficial impacts to riparian resources.

4.11.2.8 Impacts of Riparian Management Decisions on Riparian Resources

4.11.2.8.1 Alternatives A and C

Alternatives A and C would offer the most protection for riparian resources, where key streamside herbaceous vegetation, non-streamside herbaceous vegetation, and woody riparian vegetation utilization would be managed. These alternatives would have more long-term, direct beneficial impacts to riparian resources than Alternative D – No Action, which specifies lower stubble heights, does not specify about woody riparian vegetation, and has no utilization requirements.

4.11.2.8.2 Alternative B

Alternative B would also protect key streamside herbaceous vegetation, but would graze key non-streambank herbaceous and woody vegetation more than Alternatives A and C. This alternative would have more direct, long-term beneficial impacts to riparian resources than Alternative D – No Action, but fewer beneficial impacts than Alternatives A and C.

4.11.2.8.3 Alternative D – No Action

Alternative D – No Action offers the least protection to riparian resources, because the minimum stubble height is less (3 inches versus 4 inches in Alternatives A, B, and C) and percent utilization is not specified.

4.11.2.9 Impacts of Soils and Watershed Decisions on Riparian Resources

4.11.2.9.1 Alternative A

Alternative A would use oil and gas industry slope disturbance guidelines (Gold Book) to limit surface disturbances from oil and gas activities, which would provide indirect, long-term beneficial impacts to riparian resources by reducing soil erosion on steep hillsides, and thus reducing the potential for increased stream sedimentation. Under Alternative A, surface disturbances on slopes between 21 – 40% would require erosion control, GIS modeling, and

surveying, and slopes greater than 40% would not be disturbed unless other proposed construction alternatives would cause unnecessary degradation. These actions would also provide indirect, long-term beneficial impacts to riparian and wetland areas by reducing surface disturbances that cause soil erosion and subsequent stream and wetland sedimentation. These management actions would provide more indirect long-term beneficial impacts to riparian and wetland resources than Alternative D – No Action.

4.11.2.9.2 Alternative B

Alternative B would use oil and gas industry slope disturbance guidelines (Gold Book) to limit surface disturbances from oil and gas activities, and would require erosion control, GIS modeling, and surveying on slopes greater than 20% for unavoidable surface disturbances, with similar indirect beneficial impacts to riparian and wetland areas as described for Alternative A. This alternative would not restrict surface disturbances to slopes greater than 40%, and thus would not provide indirect beneficial impacts to riparian and wetland resources, and would not protect steep slopes from surface-disturbance erosion.

4.11.2.9.3 Alternative C

Alternative C would have greater indirect beneficial impacts on riparian and wetland resources than the other alternatives by applying the same management actions (with similar impacts as Alternative A) on 21 – 40% slopes and by prohibiting surface disturbances, and thus reducing the risk of increased stream sedimentation, on slopes greater than 40%.

4.11.2.9.4 Alternative D – No Action

Alternative D proposes restrictions on slopes greater than 40% for mineral production only, and actions on slopes less than 40% are unspecified Allowing other activities with no restrictions for slopes over 40% and not specifying slope restrictions on slopes less than 40% would have more indirect, long-term adverse impacts to riparian and wetland resources, as compared to other alternatives.

4.11.2.10 Impacts of Special Designation Decisions on Riparian Resources

4.11.2.10.1 Alternatives A and C

Alternative C would offer the greatest protection to riparian resources through ACEC designations, protecting approximately 515,186 acres more than Alternative D. Alternative A offers the next best level of protection to riparian resources with approximately 182,072 more acres than Alternative D. Alternative C has the most miles of riparian corridor recommended for designation as either wild or scenic. Alternatives A, B, and D – No Action would recommend for designation less miles of wild and scenic rivers than Alternative C.

4.11.2.10.2 Alternatives B and D – No Action

Alternatives B and D – No Action offer the least protection to riparian resources, and would protect only half of the area Alternative A protects. Alternatives B and D would recommend for designation only the Lower and Upper Green River as Wild and Scenic; other streams, such as the White River, middle Green River, Bitter Creek, Argyle Creek, and Evacuation Creek would not be recommended as suitable for Wild and Scenic designation. Alternatives B and D – No Action would not recommend for designation any new ACECs or wild and scenic river segments.

4.11.2.11 Impacts of Special Status Species Decisions on Riparian Resources

4.11.2.11.1 Alternatives A and C

Alternatives A and C offer the best protection to riparian resources when compared to Alternative D – No Action and are similar with respect to raptors; however, Alternative C offers slightly more protection than Alternative A.

4.11.2.11.2 Alternative B

Alternative B would offer more habitat protection than Alternative D – No Action, providing more direct riparian resource protection, though the level of protection would be less than Alternatives A and C.

4.11.2.11.3 Alternative D – No Action

Alternative D – No Action offers the least direct protection of riparian resources because raptor buffers for surface disturbance are unspecified in the Book Cliffs Resource Area.

4.11.2.12 Impacts of Travel Decisions on Riparian Resources

4.11.2.12.1 Alternative A

Alternative A would obliterate and/or return roads to their original condition when they no longer serve their permitted purpose or public interest. Additionally, roads causing resource damage would be repaired or closed, and water crossings would be designed and built to allow for the free passage of aquatic life. These actions would provide more long-term, direct, and indirect beneficial impacts to riparian resources by limiting sediment input into riparian systems, as compared to Alternative D – No Action, which is unspecified about roads and trails. With respect to OHV use, this alternative would have 786,657 fewer acres open, 756,200 more acres limited, and 25,457 more acres closed, as compared to Alternative D – No Action. Under Alternative A, 4,860 miles of routes would be designated to OHV travel, where none would be designated under Alternative D – No Action. Alternative A is second to Alternative C with respect to riparian protection and would have slightly more acreage of limited OHV use areas than Alternative C.

4.11.2.12.2 Alternative B

Alternative B would not obliterate roads or trails if they serve a public interest. Roads causing resource damage would be repaired, but not closed if they are causing resource damage. These actions would be similar to Alternative D – No Action, with direct and indirect, short- and long-term adverse impacts to riparian resources. With respect to OHV travel, this alternative would have 782,425 fewer acres open, 772,626 more acres limited, and 9,799 more acres closed, as compared to Alternative D – No Action. Under Alternative B, 4,861 miles of routes would be designated to OHV travel.

4.11.2.12.3 Alternative C

Alternative C would have similar impacts to Alternative A, except where newly permitted roads or trails would be obliterated. With respect to OHV travel, this alternative would have 782,425 fewer acres open, 466,254 more acres limited, and 316,171 more acres closed, as compared to Alternative D – No Action. Under Alternative C, 4,707 miles of routes would be designated to OHV travel. Alternative C would provide the most protection to riparian areas of any alternative, by having the least acreage accessible to OHV use.

4.11.2.12.4 Alternative D – No Action

Alternative D – No Action would be unspecified about road and trail closure, obliteration, and repair. With respect to OHV travel, this alternative would have 787,859 acres open, 887,275 acres limited, and 50,388 acres closed. These actions would have direct and indirect, short- and long-term adverse impacts to riparian resources through increased sedimentation in riparian areas.

4.11.2.13 Impacts of Vegetation Management Decisions on Riparian Resources

Vegetation management decisions that affect riparian resources are a combination of fire management, forage allocation, livestock use, and range management. The direct and indirect impacts are discussed in the sections above.

4.11.2.13.1 Alternatives A, B, C, and D – No Action

Generally Alternative A provides more protection for riparian resources than does Alternative B and less protection than Alternative C. Alternative D – No Action provides less protection for riparian resources than any other alternative.

4.11.2.14 Impacts of Visual Resource Management Decisions on Riparian Resources

4.11.2.14.1 Alternative A

Alternative A would designate 67,357 and 446,287 acres as VRM Classes I and II respectively, which is 11,230 and 215,613 more acres with limits on surface disturbance than Alternative D – No Action. This alternative would provide more long-term indirect beneficial impacts, when compared to Alternative D – No Action, due lower levels of sedimentation and fragmentation of riparian areas.

4.11.2.14.2 Alternative B

Alternative B would designate 56,127 and 230,674 acres as VRM Classes I and II respectively, which is the same as Alternative D – No Action under VRM Class I and 344 more acres more under VRM Class II. This alternative would thus have similar impacts to riparian resources, as compared to Alternative D – No Action.

4.11.2.14.3 Alternative C

Alternative C would designate 148,260 and 620,630 acres as VRM Classes I and II respectively, which is 92,133 and 390,300 more acres with limits on surface disturbance. This alternative would provide the most long-term indirect beneficial impacts to riparian resources.

4.11.2.14.4 Alternative D – No Action

Alternative D – No Action would designate 56,127 and 230,330 acres as VRM Classes I and II respectively. This alternative would have long-term indirect beneficial impacts to riparian resources, due to these designations.

4.11.2.15 Impacts of Woodlands and Forest Management Decisions on Riparian Resources

4.11.2.15.1 Alternatives A, B, and C

Alternatives A and C would have 552,663 acres of woodlands treated or harvested (264,363 more acres of harvesting and/or treatments than Alternative D – No Action), which would have long-term adverse impacts on riparian resources caused by soil erosion. Alternative B would

have 554,108 acres of woodlands harvested or treated, with impacts similar to Alternatives A and C.

4.11.2.15.2 Alternative D

Alternative D would have 288,300 acres of harvesting and/or treatments, with the least adverse impacts to riparian resources from soil erosion.

Ecologically sound treatments and harvesting would occur under Alternatives A and C to ensure adequate biodiversity and reintroduce the natural fire return interval. Treatments and harvesting under Alternative B would be conducted with wood products production in mind. The goals of treatments and harvesting are unspecified under Alternative D – No Action.

4.11.2.16 Summary

In general, the greatest adverse impacts would be due to livestock and grazing, oil, gas, and coal bed methane leasing, and OHV use, therefore the alternatives with higher open areas and less restriction on activities would be least beneficial and most adverse to riparian areas. Alternative D – No Action would have the greatest direct adverse impacts due to unmanaged OHV use and lack of limits on riparian grazing. Alternative B would have the greatest indirect adverse impacts due to oil, gas, and CBM leasing. Alternative A would have a moderate amount of direct and indirect adverse impacts, and Alternative C would have the least direct and indirect adverse impacts of any alternative.

4.11.3 Mitigation Measures

Riparian and wetland areas are protected under Section 404 of the Clean Water Act. Mitigation measures are required for development activities affecting these areas. Administrative actions can be undertaken where riparian resources are being degraded.

4.11.4 Unavoidable Adverse Impacts

Any proposed road water crossings would result in the loss of riparian habitat.

4.11.5 Short-term Uses Versus Long-term Productivity

Construction of well pad access roads would provide a short-term mineral use that would eventually result in long-term loss of riparian vegetation due to sedimentation, unless new roads are effectively maintained and restored after use.

4.11.6 Irreversible and Irretrievable Impacts

Where roads are built across riparian areas loss of riparian habitat would be irreversible and irretrievable. Due to general surface disturbing activities, loss of riparian habitat would be reversible and retrievable given effective restoration.