

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3 provides the scientific and analytical basis for the comparison of alternatives presented in Chapter 2, Section 2.4. It first describes the location of the Cow Canyon Springs Project Area within the Ashley National Forest (ANF). It then describes the existing physical, biological, and socio-economic resource components of the affected environment, and provides an assessment of potential changes that would result from the implementation of the three alternatives that are studied in detail. Mitigation measures are part of the alternatives and are thus factored into the resource assessments. Potential changes to environmental resources are described separately for each alternative in terms of direct, indirect, cumulative, and unavoidable adverse impacts. A discussion of the irreversible and irretrievable commitments of environmental resources that would result under each alternative is provided at the end of this chapter.

3.1 Project Area Location

The three project alternatives studied in detail occur within the Cow Canyon Springs Project Area. The Project Area is located in the Duchesne/Roosevelt Ranger District in Duchesne County, Utah. It is situated within the Yellowstone River watershed on the south slope of the Uinta Mountains, south of the High Uintas Wilderness (see also Figure 1-1). It is located near the mouth of Cow Canyon in the northwest quarter of Section 15, Township 2 North, Range 4 West, Salt Lake Meridian (see also Figure 1-2). The elevation of the Project Area is approximately 7,980 feet msl.

The Project Area is approximately 5 acres in size and encompasses the existing pipeline right-of-ways, including the Yellowstone River crossing site; the Springs #1 and #2 development sites; the undeveloped Spring #3 site; and the mitigation sites. Spring #3 is located about 600 feet west of the existing pipeline crossing of the Yellowstone River. Spring #1 (developed) is about 1,000 feet uphill of Spring #3; Spring #2 (developed) is located immediately south of Spring #3 (see Figure 1-2).

3.2 High Uintas Wilderness

The Project Area is located outside of the High Uintas Wilderness. Undeveloped, mountainous terrain separates the Project Area from the wilderness area boundary. The closest distance to the wilderness area boundary is approximately 1.7 miles northwest of the Project Area (see also Figure 1-2).

Alternative 1 – No Action. There are no activities associated with the implementation of the No Action Alternative that would result in any direct, indirect, cumulative, or unavoidable adverse impacts to the High Uintas Wilderness due to the Project Area's location and 1.7 miles distance from the wilderness area boundary.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. There are no activities associated with the implementation of the Proposed Action that would result in any direct,

indirect, cumulative, or unavoidable adverse impacts to the High Uintas Wilderness due to the Project Area's location and 1.7 miles distance from the wilderness area boundary.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. There are no activities associated with the implementation of Alternative 3 that would result in any direct, indirect, cumulative, or unavoidable adverse impacts to the High Uintas Wilderness due to the Project Area's location and 1.7 miles distance from the wilderness area boundary.

3.3 Inventoried Roadless Areas/Recreation

The Project Area is located on the west side of the Yellowstone River. There are no existing roads that cross the river in the vicinity of the Project Area, and there are no permanent access roads to the Project Area. The east side of the river can be accessed via a jeep trail that spurs off Forest Road 124. A temporary, unimproved crossing site is located where the right-of-way for the existing pipeline crosses the river. The right-of-way can provide access to the existing Spring #1 and #2 development sites; however, logs have been placed to block the jeep trail and boulders have been placed along the riverbanks to prohibit unauthorized vehicles from crossing the river and using the right-of-way. The jeep trail and crossing are only used if there is a need for heavy machinery to access the right-of-way for maintenance work. The right-of-way has been successfully revegetated.

Roadless Areas: The Project Area was once situated within Roadless Area #01901, according to the Forest Service 1983 Roadless Area Inventory. When the Forest Service approved the Water District's development of Springs #1 and #2 in 1992, it amended the Forest Plan to remove approximately 5 acres from this roadless area for the spring development sites, and for the right-of-ways to these sites. This 5-acre area defines the boundaries of the Cow Canyon Springs Project Area. All three springs are situated within the area that was removed from the Roadless Area Inventory in 1992.

However, there is a discrepancy between the 1992 roadless area amendment for the Cow Canyon Springs Project Area and the official Roadless Areas Inventory that was completed and adopted by the ANF in December 2000. The 1992 removal of the Cow Canyon Springs Project Area from roadless areas was accidentally omitted from the Forest Service's official Roadless Areas Inventory. Therefore, for the purposes of this EA, the Project Area is considered to be in a roadless area and project alternatives will be evaluated for potential affects to roadless attributes.

The existing roadless attributes and cumulative effects at the Project Area are described below:

Natural Integrity

Natural Integrity is the extent to which long-term ecological process are intact and operating. Impacts to natural integrity are measured by the presence and magnitude of human-induced change to an area. This change includes physical developments as well as activity in the area.

Impacts to the natural integrity in the Project Area are characterized by and limited to the existing pipeline right-of-way, the earthen encapsulations of the source areas, spring boxes, and livestock exclosure fencing for the Springs # 1 and #2 development sites. The pipeline right-of-

way is not designated as an access road, although it is the only means for equipment to access the existing pipeline and spring development sites for maintenance. Human activity associated with maintenance and operation of the existing spring development sites mostly entails periodic inspections of the spring boxes and collection of water samples for culinary testing. The most apparent on-going human-induced activity affecting the natural integrity of the Project Area is seasonal livestock grazing.

Apparent Naturalness

Apparent naturalness is an indicator of whether an area appears natural to most people who are using the area. It is a measure of visitor's perception of human impacts to the area. Past disturbance associated with the development of Springs #1 and #2 has altered the apparent naturalness in areas where ground disturbance occurred, which was limited to the construction of the pipeline right-of-way and the earthen encapsulation of the two spring development sites.

The revegetation of the existing pipeline right-of-way and spring development areas has been a success from the perspective of reestablishing vegetative cover. The revegetation has visually reintegrated these construction areas with the existing landscape. It has been successful in mitigating the visual impacts associated with construction. Although the impacts are less obvious to the casual observer, the right-of-way and spring development sites remain apparent; and the use of the Project Area for livestock grazing is apparent.

Remoteness

Remoteness is the perceived condition of being secluded, inaccessible, and "out of the way". Topography, vegetative screening, distance from human impacts, distance from sights and sounds of man, and difficulty of travel all contribute to remoteness.

The Project Area is located within a designated roadless area, but does not occur in a remote area. Readily accessible areas to the general public such as the Moon Lake Hydroelectric Project and Reservoir Campground are located within 0.6 mile of the Project Area. Cross-country hiking and horseback riding are the most direct modes of access to the Project Area for the general public. The existing right-of-way has been intentionally blocked with large logs and boulders as a means to deter unauthorized off-road vehicular access to the Project Area, but remains accessible for construction equipment when needed.

Solitude

Solitude is a personal, subjective value defined as isolation from the sights, sounds, and presence of others, and the developments of man. A primitive recreation experience includes the opportunity to experience solitude, a sense of remoteness and closeness to nature, serenity, and spirit of adventure.

The Project Area offers a certain amount of solitude and serenity because it provides the sights and sounds of nature in a relatively undisturbed setting with relatively infrequent human visitations. The greatest use of the Project Area by the general public probably occurs during the hunting season; a period when a visitor's sense of solitude may be detracted. The seasonal presence of livestock grazing within the Project Area may also detract a visitor's sense of solitude.

Special Features

Views to the Yellowstone River valley, prominent ridges, broad basins, small and large meadows, and stream courses are special features that can be observed from within the Project Area. The existing spring pond, wetlands, pockets of dense tree cover and flowing perennial stream courses are special features that occur within the 5-acre Project Area.

Manageability/Boundaries

The 5-acre Project Area is situated within a designated roadless area. The existing pipeline right-of-ways for the existing Spring #1 and #2 development areas provide the only vehicular access routes to the Project Area. There are no other means for vehicular access to the Project Area or adjacent roadless areas due to steep topographical relief and dense tree cover. The right-of-ways are readily manageable and clearly demark boundaries for the Project Area within the roadless area.

Recreation: The Reservoir Campground is located on the east side of the Yellowstone River near the diversion dam and reservoir for the Moon Lake Hydroelectric Project (see also Figure 1-2). The campground is situated approximately 0.6 mile east of the Project Area. It is mainly used for family camping during the summer months, and for hunting during the autumn months. Hunters and family campers also set up dispersed campsites in areas adjacent to the campground. The reservoir area is used for picnicking and fishing; boating is not allowed. The west side of the river provides opportunities for dispersed recreation. There are no developed campgrounds or trails on the west side of the river in the vicinity of the Project Area. The next nearest recreational facilities are at the Riverview Campground, which is located on the east side of the river approximately 1.1 miles north of the Reservoir Campground and 1.5 miles northeast of the Project Area.

Alternative 1 – No Action. There would be no long-term impacts to the existing roadless attributes under the No Action Alternative because there would be no ground disturbance or any other activity that would change the existing roadless character. There would be no long-term impacts to the recreational classification or to opportunities for dispersed recreation at the Project Area because there would be no changes to existing campgrounds or trail systems; there would be no changes to the accessibility of the Project Area; and because there would be no ground disturbance that would change the existing habitats or features within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. There would be a temporary reduction in solitude during the 2-week construction period. The excavation of a new borrow area, the encapsulation of Spring #3 with an earthen mound, and the installation of additional livestock fencing would permanently reduce the natural integrity and the apparent naturalness of the Project Area. There would be less than 0.5 acre of temporary earth disturbance within a designated roadless area. There would be no net loss or long-term impacts to special features because all disturbed areas would be revegetated with native plant species and visually reintegrated into the surrounding landscape. The Forest Service would monitor compliance with spring and wetland mitigation measures, including the maintenance of

mitigation bypass flows and surplus water for the created pond and wetland restoration areas. All revegetation and mitigation measures would likely be fully established within three post-construction growing seasons. The remoteness and manageability of the Project Area would be unaffected because there would be no activities that would change the roadless designation, manageability of right-of-ways, or the accessibility of the Project Area.

Certain construction workers may want to live on-site and use the Reservoir Campground facilities during the approximately 2-week construction period. Construction would occur between September 15 and March 15, which is a low- to moderate-use period for this campground with the exception of the autumn hunting season. The 2-week presence of construction workers at the campground may compete with recreational users. The presence of construction equipment and workers would temporarily displace dispersed recreation at the Project Area during the 2-week construction period. However, there would be no long-term impacts to the recreational classification or long-term use of the Project Area for dispersed recreation because there would be no changes to existing campgrounds and trails; there would be no changes to the accessibility of the Project Area; and all disturbed areas would be revegetated and reintegrated with the landscape.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. There would be a minor amount of earth disturbing work in a roadless area associated with the replacement of the Spring #2 box and the installation of livestock exclosure fencing around Spring #3. Overall, there would be very little affect to the existing roadless attributes within the Project Area. There would be a temporary affect to solitude during the 1-week construction period, and there would be a minor reduction in the natural integrity and apparent naturalness the Project Area due to the installation of additional livestock exclosure fence and reduction in spring bypass flows during periods of peak user demand in the summer. It is expected that there would be no net loss of special features. The remoteness and manageability of the Project Area would be unaffected because there would be no activities that would change the roadless designation, the manageability of right-of-ways, or the accessibility of the Project Area.

Certain construction workers may want to live on-site and use the Reservoir Campground facilities during the approximately 1-week construction period. Construction would occur between mid-September and mid-March, which is a low- to moderate-use period for this campground with the exception of the autumn hunting season. The 1-week presence of construction workers at the campground may compete with recreational users. The presence of construction equipment and workers would temporarily affect dispersed recreation at the Project Area during the 1-week construction period. However, there would be no long-term impacts that would alter the recreational classification or long-term use of the Project Area for dispersed recreation because there would be no changes to existing campgrounds and trails; there would be no changes to the accessibility of the Project Area; and there would be no net loss of special features at the Project Area.

The Roadless Area Conservation Initiative (RACI): The RACI Environmental Impact Statement and implementing regulations released January 12, 2001, described several attributes that contribute to roadless character. For clarification, these attributes are summarized as follows:

1. Soil, Water and Air Resources: See Sections 3.9, 3.7 and 3.6 for detailed discussions pertaining to soil, water and air resources, respectively.
2. Sources of Public Drinking Water: The purpose of this EA is to analyze a proposal to develop additional culinary water in Cow Canyon, which is located within a designated roadless area. The roadless character of the landscape has contributed to the Cow Canyon springs being a good source of high quality water for municipal purposes. The previous developments of Springs #1 and #2 have resulted in minor changes to the roadless characteristics at the 5-acre Project Area and adjacent lands, which would remain the same under the No Action Alternative. Both of the action alternatives evaluated in Chapter 3 of this EA would have minor effects to roadless characteristics at the Project Area and adjacent lands. Thus, the roadless character of the Project Area and adjacent lands would continue to contribute to the high quality of water in the Cow Canyon springs under all three of the alternatives analyzed in detail.
3. Diversity of Plant and Animal Species: None of the alternatives would result in any impacts that would affect the diversity of plant or animal species within the designated roadless area. See Sections 3.7, 3.9, 3.10, and 3.11 for discussions on plants and animals.
4. Habitat for threatened and endangered species and species dependent on large undisturbed areas of land: None of the alternatives would change the amount or condition of suitable habitat for federally listed threatened or endangered species, or for species dependent on large areas or undisturbed land. See Sections 3.9, 3.10 and 3.11 for discussions on threatened and endangered species and species requiring large areas of undisturbed land.
5. Primitive and semi-primitive classes of recreation: Recreation use in the vicinity of the Cow Canyon Springs is minor and generally occurs as dispersed recreation during the hunting season. The development of Springs #1 and #2 did not change the recreation opportunity class from its existing pre-development classification. None of the alternatives would result in any long-term changes to the recreational classification of the Project Area.
6. Reference landscapes for research study and interpretation: The previous development of Springs #1 and #2 have changed the natural state of these springs, and have reduced their value for certain kinds of research and interpretation. The Proposed Action would alter Spring #3 and the immediate adjacent area from its natural state, which would reduce their value for certain kinds of research and interpretation. No such research has been proposed in the past, and there is no such research proposed for the future. There are no reference landscapes in the vicinity of the Cow Canyon Springs that have been identified as valuable for potential research and interpretation.
7. Landscape character and integrity: The past development of Springs #1 and #2 have altered the landscape character and integrity of about 5 acres of 174,077 acres of roadless lands (0.0029 %) in the Uinta Mountains area of Duchesne County. Both action

alternatives would result in additional changes that would have minor effects to the existing landscape character and integrity within this 5-acre area.

8. Traditional cultural properties and sacred sites: None of the alternatives would result in any changes to traditional cultural properties or sacred sites See Section 3.12 for details.
9. Other locally unique characteristics: None of the alternatives would result in any long-term changes to other locally unique characteristics.

3.4 Land Use/Grazing

The Project Area is situated within Forest Management Area f. According to the ANF Forest Plan, Management Area f encompasses approximately 16,602 acres within the Duchesne / Roosevelt District. The Project Area is approximately 5 acres in size and represents approximately 0.03 percent of the land within this management area. The existing land uses within Management Area f are predominantly recreation, fish and wildlife habitat, and livestock grazing. The existing land uses within the Project Area are compliant with the management objectives identified in the Forest Plan. Recreational uses at the Project Area are described above in Section 3.3. Wildlife and aquatic habitat uses at the Project Area are described below in Sections 3.10 and 3.11, respectively.

The Project Area is located in the Yellowstone cattle and horse grazing allotment, which authorizes 234 cattle between June 14 and September 30 each year. Livestock presently have full access to Spring #3, and use the spring for both forage and watering. The existing Springs #1 and #2 development sites are encapsulated with earthen mounds and are protected with buck and rail livestock enclosure fences as a water quality, source protection measure. These fences exclude approximately 0.1 acre of potential forage at each spring development site. Livestock have access to the mitigation bypass flows and unused surplus flows from Springs #1 and #2. Livestock also have access to other sources of surface water within the grazing allotment, including the Yellowstone River.

Alternative 1 – No Action. Under the No Action Alternative, there would be no changes to the current land uses within the grazing allotment. Spring #3 would remain accessible to livestock use during the permitted use period, as well as to wildlife use year-round. Livestock would also continue to have access to bypass flows and the open water, riparian and wetland habitats situated downstream of the existing Spring #1 and #2 development sites. Grazing of riparian and wetland vegetation and hoof action in the Spring #3 pond and overflow channel and the Spring #1 and #2 overflow channels would continue. Stream channels in the area have boulder/cobble content of about 55-65% and gradients of up to 10%, suggesting resilience to livestock grazing (ANF field notes 2003). There would be no land use/grazing changes that would affect the current condition of fish and wildlife habitat, wetlands, or water quality. The above conditions describe cumulative effects.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Livestock would continue to have access to the unused overflows and mitigation bypass flows from Springs #1 and #2. Livestock would also have access to the mitigation bypass flows from Spring #3

downstream of the pond creation site. Stream channels in the area have boulder/cobble content of about 55-65% and gradients of up to 10%, suggesting resilience to livestock grazing (ANF field notes). The installation of livestock enclosure fencing around the Spring #3 development site, the pond creation site, and wetland restoration area would remove an additional 0.5 acre of potential livestock forage from the grazing allotment.

These changes in livestock use would not result in any long-term impacts that would adversely affect the overall condition or use of the grazing allotment, nor would these changes impact other land uses. Cumulative effects would include increased competition by wildlife for use of the same sources of surface when the grazing allotment is occupied by livestock (June 14 – September 30). Also, surface water within the fenced in areas would be unavailable for horseback riders at this off-trail location.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, approximately 0.4 acre of open water and wetlands associated with the Spring #3 source area would be fenced in and removed from livestock grazing as mitigation for the full utilization of Springs #1 and #2. Livestock would continue to have access to Spring #3 flows in the channel segments located downstream of the fencing. Livestock would continue to have access to the unused surface flows from Springs #1 and #2 as in Alternatives 1 and 2; however, the volume of these flows would be substantially reduced during peak summer demands, which typically occurs in July. Other water sources in the area, including the stream channel below the Spring #3 fence, would be available to livestock. Stream channels in the area have boulder/cobble content of about 55-65% and gradients of up to 10%, suggesting resilience to livestock grazing (ANF field notes 2003).

These changes in livestock use would not result in any long-term impacts that would adversely affect the overall condition or use of the grazing allotment, nor would these changes impact other land uses. Cumulative effects would include increased competition by wildlife for use of the same sources of surface when the grazing allotment is occupied by livestock (June 14 – September 30). Also, surface water within the fenced in areas would be unavailable for horseback riders at this off-trail location.

3.5 Visual Resources

The Project Area is about 5 acres in size and is surrounded by mixed aspen and conifer forest. The Project Area cannot be viewed directly from the east side of the Yellowstone River Valley when traveling Forest Roads 227 or 124 due to forest cover and hillside ridgelines. The Project Area cannot be viewed directly from any of the developed campgrounds along the Yellowstone River.

Alternative 1 – No Action. Implementation of the No Action Alternative would not result in any impacts to visual resources. There would be no new earth disturbances or construction of any new structures or fences. The water sources, wetlands and upland vegetation associated with Spring #3, and the existing Spring #1 and #2 development sites would remain unchanged. There would be no need to haul heavy equipment on Forest roads. Existing livestock enclosure fences around the Spring #1 and #2 development sites would remain in place. Spring #3 and its

associated open water and wetland habitats would remain visible to off-trail hikers and horseback riders. The above conditions describe cumulative effects.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. The construction of the Proposed Action would result in the permanent removal of about 24 birch, alder and conifer trees; the excavation of a new borrow site approximately 8,000 sq-ft in size; the earthen encapsulation of Spring #3; the creation of a 0.03 acre pond; the restoration of 0.4 acre of an abandoned beaver pond/wetland complex; and the installation of additional livestock enclosure fence. The borrow site and Spring #3 development site would be revegetated and visually reintegrated with the landscape. The Spring #3 pond and wetland would no longer be visible to hikers or horseback riders users in this off-trail location. Instead, the pond creation and the wetland restoration areas would be visible. The use of wooden buck and rail (or post and rail) fencing would help mitigate visual impacts. Although the visual impact would be mitigated, the apparent naturalness of these areas would be changed. No visuals changes would be discernable from the existing Forest roads or campgrounds. Persons visiting the Project Area would likely be the only individuals that would view these changes. For the reasons described above, there would be minimal long-term or cumulative impacts to visual resources.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Implementation of Alternative #3 would not have any construction-related work that would change the existing visual resource conditions at the Project Area. The installation of wooden buck and rail (or post and rail) livestock enclosure fence would have minimal visual impact. Other visual effects would be similar to Alternative #1 except that there would be reduced stream flows below Springs #1 and #2 during the peak summer demand period. No visuals changes would be discernable from the existing Forest roads or campgrounds. Persons visiting the Project Area would likely be the only individuals that would view these changes. For the reasons described above, there would be minimal long-term or cumulative impacts to visual resources.

3.6 Air Quality

The existing air quality in the vicinity of the Project Area is unimpaired and is considered to be excellent.

Alternative 1 – No Action. Smoke from natural and prescribed fires (and campground campfires), road dust from unpaved roads are the main sources of air pollution in the vicinity of the Project Area and would continue under the No Action Alternative. (The power plant associated with the hydroelectric facility is located below the National Forest boundary.) The above activities represent cumulative effects.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. The existing air quality conditions described for the No Action Alternative would remain unchanged. The air quality in the Project Area would be temporarily affected by construction-related dust and emissions from construction equipment. Dust and emissions are also expected when hauling equipment to and from the Project Area on unpaved roads. Construction activities would occur during a low-flow period when the soils would be drier than during spring runoff. Less than 0.5

acre of soil would be disturbed by project construction during a period of about 2 weeks. Seed and mulch applied following disturbance would reduce post-construction wind erosion.

Implementation of the Proposed Action would not result in any permanent changes to air quality. For the reasons discussed above, the cumulative effects to air quality, including the existing air quality impacts described under the No Action Alternative, would be minimal and the air quality within the Project Area would remain in excellent condition.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would not require any earthmoving work, and the construction of this alternative would require a less work with heavy machinery. Thus, construction-related dust and emissions from construction equipment would be less than would occur under the Proposed Action.

As with the Proposed Action, this alternative would not result in any permanent changes to air quality. For the reasons discussed above, the cumulative effects to air quality, including the existing air quality impacts described under the No Action Alternative, would be minimal and the air quality within the Project Area would remain in excellent condition.

3.7 Water Resources/Wetlands/Water Quality

Direct and indirect effects are evaluated at the Project Area scale, whereas cumulative effects are evaluated at the watershed scale.

All three springs are situated within the Cow Canyon drainage, which is a tributary drainage to the Yellowstone River. The Yellowstone River is a tributary to the Lake Fork River in the Duchesne River system, which drains into the Green River and ultimately into the Colorado River. The Project Area is within the Crystal Creek-Yellowstone River watershed (5th level hydrologic unit code #1406000307). The downstream endpoint of this watershed is the Lake Fork River. The Yellowstone Feeder Canal is a diversion structure located between the Project Area and the Lake Fork River confluence.

All three springs flow into channels that drain into the Yellowstone River downstream of the existing diversion dam for the Moon Lake Hydroelectric Project. These are first order stream channels with similar characteristics. Channels range from 4 to 16 feet in width. Stream gradients up to 10% (steep) were observed during 2003 field reconnaissance, and substrate estimates indicate rocky channel beds (10-15% boulder, 40-50% cobble, 10-25% gravel and 5-20% fine-grained sand and silt (ANF field notes 2003). The stream channel below Spring #1 is approximately 2,250 linear feet in length; the channel below Spring #2 is approximately 550 linear feet in length; and the channel for Spring # 3 is approximately 650 linear feet in length. All three of these spring-fed channels are believed to be gaining reaches (Frontier 2002).

“Waters of the U.S.” are regulated by the U.S. Army Corps of Engineers (USACE) in accordance with Section 404 of the federal Clean Water Act (CWA). Waters of the U.S. include rivers, streams, lakes, springs, wetlands and other special aquatic sites. Section 404 authorizes the USACE to regulate certain activities involving the excavation and/or discharge of dredged or fill materials into waters of the U.S. Any authorization resulting from a decision document by

the deciding Forest Service official will be dependent on the Water District's compliance with the applicable CWA Section 404 permitting requirements necessary to implement the decision.

Frontier Corporation USA (Frontier) completed a wetland delineation technical report for the Project Area in 2002. The report includes a reconnaissance-level survey of the spring-fed stream channels and associated riparian-wetlands, and jurisdictional wetland delineation for the Spring #3 development area. The report provides a general description of the riparian and wetland habitat conditions associated with the three springs, and it contains a jurisdictional wetland survey map for the Spring #3 development area. The USACE has issued a jurisdictional determination letter concurring on the results of the wetlands report and the delineated wetland boundaries (on file at the ANF, Duchesne/Roosevelt Ranger District Office).

The open water and wetland habitats associated with the source areas for Springs #1 and #2 were filled when these springs were developed in 1992. The Forest Service required the Water District obtained at CWA Section 404 permit from the USACE prior to the filling of these wetlands. The remaining wetlands associated with Springs #1 and #2 are the fringing riparian-wetland areas associated with the spring-fed stream channels. The width of these wetland areas (including the stream channels) varies from 7 to 70 feet depending on the location along the length of the channels, presence of historic beaver activity, and presence of side seeps. In general, the width of the riparian-wetland areas increases as the channels progress downstream.

At the lowest reaches of these channels, they divide into more than one channel, as well as adjacent seep areas, where the mouth of Cow Canyon approaches the valley wall of the Yellowstone River floodplain. The valley wall on the west side of the river's floodplain is a vertical terrace approximately 70 feet in height. The spring-fed channels cascade over the terrace and flow into the river. The terrace functions as a barrier for the upstream movement of aquatic organisms from the river. The lip of the terrace also has an abundance of wet seep areas, some of which approach 100-feet in width.

Remnants of beaver activity are visible at Spring #3, in the stream channels for all three springs. The Spring #1 drainage has the greatest amount of remnant beaver activity, including abandoned, non-functioning beaver dams and ponds. No active beaver work has been recently observed in the vicinity of the Project Area (ANF field data 2003).

All of the wetland areas associated with the three springs are very distinct and are generally delineated by sharp topographical breaks that define their overflow channels. Wetland plant communities associated with the three springs are very similar. Common plant species include: willow (*Salix* sp.), woods rose (*rosa woodsii*), water birch (*Betula occidentalis*), mountain alder (*Alnus incana*), horsetail (*Equisetum* sp.), sedges (*Carex* spp.), and Muhly (*Muhlenbergia* sp.). Lesser amounts of reed canary grass (*Phalaris arundinacea*), baltic rush (*Juncus balticus*), and horsetail (*Equisetum* sp.) are also present.

An abundant growth of watercress (*Nasturtium officinale*) is present in an approximately 1,310 sq-ft (0.03 acre), shallow (< 2-feet deep) pond associated with Spring #3. The pond is located at the spring source and appears to have been created, in part, by a remnant beaver dam. Lesser amounts of watercress are present in the overflow channels associated with all three springs.

Watercress is a European wetland plant that is non-native to America. It was probably introduced to the Project Area when the Forest was first used for livestock grazing in the late-1800s. Watercress is an early colonizer that is indicative of recent or ongoing disturbances typically associated with an early-seral wetland plant community (Winward 2000). It has a capacity to grow and spread quickly. The abundance of watercress in the spring-fed pond could be indicative of ongoing disturbances associated with livestock.

All three springs have perennial flows that remain fairly constant throughout the year. The average combined flow for Springs #1 and #2 is about 756 gpm (1.7 cfs), and the average flow for Spring #3 is about 525 gpm (1.2 cfs) (Horrocks Engineers 2003). These flow volumes differ from those that were calculated for the 1992 Cow Canyon EA, which were based on a limited amount of flow measurements. The 2003 calculations are based on periodic flow measurements that have been taken by the Water District since the development of Springs #1 and #2 in 1992 (flow measurement data on file at the ANF, Duchesne/Roosevelt Ranger District Office). Thus, the 2003 calculations are derived from a data set spanning 10 years that include flow measurements taken in the controlled environment of the spring boxes.

The water quality of all three springs is excellent, with no treatment required for culinary use. Flows from Springs #1 and #2 are collected at the existing spring development sites and are piped directly into the Water District's culinary water system. The Forest Service requires a combined flow of 0.5 cfs (225 gpm) to be continually released as mitigation bypass flows to maintain downstream aquatic and wetland habitats. This is implemented by continually releasing approximately 112.5 gpm (0.25 cfs) from each spring. Thus, the Water District can use 531 gpm (1.2 cfs, or about 70 percent of the available spring flows) for its culinary water supply. During periods of low user demand, unused water is bypassed with the mitigation flows via backup when the pipeline is full. The average annual amount of unused water that is bypassed with the mitigation flows is about 230 gpm (1.0 cfs or about 43 percent of the permitted flow) (Horrocks Engineers 2003).

The Water District has an existing agreement with the Moon Lake Hydroelectric Project to release up to 1.5 cfs (674 gpm) of water from its diversion reservoir such that there is no net loss of flow in the Yellowstone River downstream of Springs #1 and #2. This requires Moon Lake to reduce its diversions for hydroelectric production by up to 1.5 cfs as compensation for the loss of spring flows into the Yellowstone River. A second agreement dated March 12, 2004 allows for a release up to 0.5 cfs (225 gpm) of additional water (2.0 cfs or 900 gpm total).

Executive Orders – Floodplains and Wetlands.

Executive Orders applicable to this project proposal include 11988-Floodplain Management and 11990-Protection of Wetlands. "Floodplains" refer to the "lowland and relatively flat areas adjoining inland and coastal waters ...including at a minimum, that area subject to a one percent or greater chance of flooding in any given year." (EO 11988). "Wetlands" refer to "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet

meadows, river overflows, mud flats, and natural ponds.” (EO 11990). Thus, the riparian zones along the spring channels and associated wetlands fall within the directives of EO 11988 and EO 11990.

The two Executive Orders have similar but slightly differing direction. Both apply to agencies in carrying out responsibilities for:

- Providing federally undertaken, financed or assisted construction and improvements;
- Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

For EO 11988, agencies are directed to “take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Specifically, it requires the agency to determine whether a proposed action will occur in a floodplain, consider alternatives to avoid adverse effects and incompatible development in the floodplain. If the only practicable alternative consistent with the Executive Order requires siting in a floodplain, the agency must design or modify the action to minimize potential harm to or within the floodplain and circulate a notice containing an explanation of why the action is to be located in the floodplain.

Executive Order 11990, Protection of Wetlands, directs federal agencies to take actions to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Specifically, it requires the agency to avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative to such construction; and to include all practicable measures to minimize harm to wetlands, which may result from such use. In determining that all practicable measures to have been incorporated avoid/minimize wetland impacts, the agency may take into account economic, environmental, and other pertinent factors.

Forest Service Manual sections 2526 and 2527 also address riparian areas, floodplains and wetlands. The direction for floodplains and wetlands applies to federally undertaken, financed or assisted construction or improvements and conducting federal activities and programs affecting land use including but not limited to water and related land and resources planning, regulating, and licensing activities. The definitions of “Base Floodplain” and “Wetlands” match those in the Executive Orders (FSM 2527.05). If it is determined that a proposal involves an action in or affecting a floodplain or wetland and that the action could result in adverse impacts, all practical alternatives are to be evaluated with special emphasis to alternatives that would relocate the proposed action outside of the area as opposed to minimizing the adverse impacts of the proposed action (FSM 2527.3).

The direction includes (FSM 2526.03, FSM 2527.02, FSM 2527.03):

- Give special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water (at least the recognizable area dominated by riparian vegetation and adjacent terrestrial areas needed for protection of the riparian-dependent resources);
- Minimize destruction, loss and degradation of wetlands;
- Preserve and restore the natural and beneficial values of floodplains and wetlands;

- Early public review of plans or proposals in floodplains;
- Avoid adverse impacts associated with the occupancy and modification of floodplains and with the destruction, loss or degradation of wetlands. Avoid filling of land within floodplains and wetlands wherever practicable;
- Do not permit floodplain development and new construction in wetlands wherever there is a practicable alternative; and
- Preserve, and where needed and feasible both economically and technically, enhance the natural and beneficial function and values of wetlands.

Forest Supervisors have the following responsibilities (FSM 2527.04c):

- Analyze proposed actions affecting floodplains or involving new construction in wetlands to assess the specific flood hazards, quantify the floodplain or wetland values of the areas; determine the impacts of the proposal on those hazards and values; formulate and evaluate land and resource management options; come up with a practicable alternative action or location; and determine whether the “no action” option is practicable.
- Modify plans, activities and designs to minimize impacts of the action and to mitigate its effects on the natural and beneficial values of the floodplain or wetland in all actions where an alternative to an action in or affecting the floodplain or new construction in a wetland is not practicable.
- Ensure that all practicable and necessary mitigating measures are incorporated in specifications for the proposed action, and that the implementation of the selected action is accomplished in a manner that to the extent practicable restores and preserves the natural and beneficial values served by floodplains and preserves and enhances the natural and beneficial values of wetlands.
- Require flood hazard and wetlands evaluations prior to issuing of licenses, permits, loans, or grants-in-aid, and provide assistance to applicants in obtaining help to make such evaluations in their proposals.

Exemptions from the Executive Order on Floodplains (EO 11988) may be authorized if eight steps are followed (FSM 2527.06). No process is identified for exemption from the Executive Order on Wetlands (EO 11990).

Alternative 1 – No Action. Under the No Action Alternative, no additional water would be developed from any of the three Cow Canyon springs, and there would be no construction requiring earth disturbance or vegetation removal. The existing pond, wetlands, and stream channel associated with Spring #3 would not be altered. The Water District would continue to operate and maintain the existing Spring #1 and #2 developments as per the terms and conditions of the Special Use Permit, including the continual release of the mitigation bypass flows to maintain downstream aquatic and wetland habitats. Unused surplus water would also continue to be bypassed with the mitigation flows. The existing water quality associated with the three springs would remain unchanged.

Cumulative Effects would include livestock and wildlife utilization and hoof action on the pond and wetlands associated with Spring #3, and the existing overflow channels associated with each of the springs. Cumulatively, the three springs would provide a minimum of 750 gpm (1.7 cfs) to downstream aquatic environments, 525 gpm (1.2 cfs) from Spring #3 and 112.5 gpm (0.25

cfs) from each of Spring #1 and Spring #2, plus the unused surplus flows. Surface and subsurface water also contribute to the stream channels below the springs.

The No Action Alternative is consistent with Executive Orders 11988 and 11990. There would be no new effects to floodplains or wetlands. A CWA Section 404 Permit would not have to be obtained from the USACE. There would be no detectable change in cumulative effects at the confluence of Yellowstone River and Lake Fork River (watershed outlet point), and there would be no depletion of water quantity to the Yellowstone River/Colorado River System.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action, the Water District would develop Spring #3 and incorporate 413 gpm (0.9 cfs) directly into its existing culinary water system. No water treatment or pumping would be required. The spring would be encapsulated with a clay cap and 10-foot thick earthen mound, and enclosed with a wooden buck and rail (or post and rail), livestock enclosure fence to protect the water quality of the source flows. Fill material would be obtained from a new borrow site, approximately 8,000 sq-ft in size, located in an upland area on the south side of Spring #3.

Two or three pieces of construction equipment would cross the Yellowstone River in order to access the Spring #3 development site. The river crossing would occur at the existing pipeline right-of-way during a low-flow period. The crossing would result in localized disturbances to the river channel and riparian area at the crossing site but little effect due to the rock content of the river bed and banks. Trace amounts of vehicle dirt or oils may enter the Yellowstone River. Best management practices for erosion and sediment control would be implemented to protect water quality during project construction. A spill prevention plan would also be implemented. Designating a latrine site for construction workers in a suitable upland location would also be implemented to protect water quality.

The existing developments for Spring #1 and #2 would remain unchanged, and there would be no actions that would affect the existing water resources or water quality associated with these two springs. The Water District would continue to operate and maintain the existing Spring #1 and #2 developments as per the terms and conditions of the Special Use Permit, including the continual release of the mitigation bypass flows to maintain downstream aquatic and wetland habitats. Unused surplus water would also continue to be bypassed with the mitigation flows.

Based on the Water District's recent measurements, the source flow of Spring #3 is estimated to be approximately 525 gpm (1.2 cfs) (Horrocks Engineers 2003). The source flows would be collected with 18-inch PVC pipe and transferred underground with 10-inch PVC pipe to a prefabricated spring box that would replace the existing spring box for Spring #2. Thus, the new spring box would be used to manage flows from both Spring #2 and #3. A total of approximately 120 feet of buried pipeline would be installed.

Approximately 112 gpm (0.25 cfs) from Spring #3 would be continually bypassed at the redesigned spring box as mitigation flows for the maintenance of a pond and downstream aquatic and wetland habitats. The remaining 413 gpm (0.9 cfs) (or about 79 percent of the total available flow) would be available for the Water District's use. The Water District has agreements with the Moon Lake Hydroelectric Project to release up to 2.0 cfs (898 gpm) of additional flows to

compensate for depletion in the Yellowstone River (on file at the ANF, Duchesne/Roosevelt Ranger District Office). The redesigned spring box would also have a separate outlet to continuously bypass approximately 112 gpm (0.25 cfs) for the maintenance of existing downstream aquatic and wetland habitats below Spring #2 (Figure 2-2). The development of Spring #3 is not expected to change the water quality of its source flows.

Approximately 0.21 acre of unavoidable impacts to open water (i.e., shallow pond) and wetland habitats would be mitigated on-site and in-kind. The loss of 1,300 sq-ft (0.03 acre) of shallow pond (<2 feet deep) associated with the spring source would be mitigated at a 1:1 surface area ratio with the creation of an approximately 1,510 sq-ft (0.03 acre) pond with similar features and characteristics. The created pond would be sustained by the 112 gpm of mitigation bypass flows from Spring #3. The bypass flows would be conveyed via a buried pipeline that would have a bubble outlet to simulate the groundwater action that currently sustains the shallow pond at Spring #3. The substrates, plant materials and macroinvertebrates in the existing pond would be removed and transplanted into the created mitigation pond. Thus, the mitigation pond would be created with the same water source, substrates, plant materials, and macroinvertebrates found in Spring #3. The created pond would be a flow-through system, and the overflows would maintain the existing downstream aquatic and wetland habitats below Spring #3 (Figure 2-1).

The 0.18 acre of wetland impacts would be mitigated at a 2.2:1 surface area ratio by restoring the hydrology to an abandoned beaver pond/wetland complex located approximately 200 feet east of Spring #3 (Figure 2-1). The unused portions of the permitted flows (i.e., surplus flows) from Spring #2 and #3 would be conveyed by a buried pipeline and applied to approximately 17,700 sq-ft (0.4 acre) of remnant drainages that were once supplied by overflows from a series of beaver ponds that were built in the Spring #1 drainage (Figure 2-1). The hydrologic restoration of this area would reestablish, expand and enhance aquatic and riparian-wetland habitats.

Surplus flows would be continuously bypassed to the wetland restoration area beginning at the outset of the Spring #3 development. The surplus flows would decrease over time as the Water District sells more connections to its culinary system. The amount of surplus flows would remain relatively constant throughout the non-irrigation months, but the amount of surplus flows during the summer months would diminish over time as the Water District's user demand increases. Based on the Water District's growth and water use projections, it is possible that there may be no surplus flows 21 years in the future during the peak summer demand period, which has historically occurred during the month of July.

The Water District would be responsible for installing and maintaining wooden buck and rail (or post and rail) fencing to exclude livestock from the pond and wetland mitigation areas. The existing livestock enclosure fences around the Spring #1 and Spring #2 development sites would remain in place and would be maintained by the Water District.

The Water District would have to obtain a CWA Section 404 Permit from the USACE prior to amending the Special Use Permit; and a detailed mitigation and monitoring plan for the pond and wetland mitigation areas would have to be approved by the Forest Service and the USACE prior to the development of Spring #3. The Water District would be responsible for the maintenance and monitoring of the pond and wetland mitigation areas for a period of three years, or until the

mitigation areas have been successfully established. The Water District would be responsible for making any necessary adjustments to ensure the effectiveness of the pond and wetland mitigation areas while the Special Use Permit is in effect. The Water District would be responsible for all work to restore the three spring development areas should the Special Use Permit be terminated.

Cumulatively, a maximum total of up to 944 gpm (2.1 cfs) of flows from Springs #1, #2 and #3 would be removed for the Water District's culinary use. The Moon Lake Hydroelectric Project's agreement to release additional water from its existing diversion reservoir to offset the volume of water that would be removed by the Water District would compensate for flow depletions in the Yellowstone River.

Cumulative effects to wetlands include livestock and wildlife utilization and hoof action on streamside riparian zones located outside of the livestock enclosure fencing. Wildlife would also have access to the pond and wetland mitigation areas, although these areas would be fenced in to exclude livestock. Overall, there would be no long-term impacts that would adversely change the condition of wetlands at the Project Area because the implementation of the proposed mitigation would result in a no net loss of functioning open water and wetland habitats within the Project Area.

Cumulatively, all three springs would provide a minimum of 336 gpm (0.75 cfs) to downstream aquatic environments (112 gpm from each of 3 springs), plus unused surplus flows. Natural surface and subsurface water would also contribute to the stream channels below the springs. No water quantity or quality change would be detectable at the confluence of Yellowstone and Lake Fork Rivers (watershed outlet point).

The Proposed Action is consistent with Executive Orders 11988 and 11990. There would be no unmitigated impacts to floodplains or wetlands. No increased flood risk is expected from the proposed development of Spring #3. The physical structure of channels below Spring #3 is not removed, so the water-carrying capacity for conveyance of snowmelt, rain-on-snow events, summer thunderstorms, or other flood-type events is preserved. There would be no detectable change in cumulative effects at the confluence of Yellowstone River and Lake Fork River (watershed outlet point), and there would be no depletion of water quantity to the Yellowstone River/Colorado River System.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under this alternative, the Water District would fully use the entire 756 gpm (1.7 cfs) combined flow of Springs #1 and #2. This would equate to 675 ERCs. The Water District has an agreement with the Moon Lake hydroelectric project to release up to 2.0 cfs (898 gpm) of additional flows to compensate for depletion (on file at the ANF, Duchesne/Roosevelt Ranger District).

A minor amount of work would be required to reconfigure the existing spring boxes so as to eliminate the 225 gpm (0.5 cfs) of continuous mitigation bypass flows. The additional water would be fully used during the irrigation (summer) months when user demands are the greatest. During the non-irrigation months when user demands are the least, all unused water (i.e., surplus water) would be bypassed into the existing spring channels to maintain downstream aquatic and

wetland habitats. The additional water development would not change the water quality of the source flows of Springs #1 and #2.

The implementation of Alternative 3 may require a single piece of construction equipment, which would access the Project Area by crossing the Yellowstone River. The river crossing would occur at the existing pipeline right-of-way during a low-flow period. The crossing would result in localized disturbances to the river channel and riparian area at the crossing site but little effect due to the rock content of the river bed and banks. Trace amounts of vehicle dirt or oils may enter the Yellowstone River. Best management practices for erosion and sediment control would be implemented to protect water quality during project construction. A spill prevention plan would also be implemented. Designating a latrine site for construction workers in a suitable upland location would also be implemented to protect water quality.

The implementation of Alternative 3 would not result in the filling of any open water or wetland habitats associated with any of the three springs, or affect the water quality of the three springs. However, the full utilization of the flows and Spring #1 and #2 could stress downstream riparian and wetland vegetation along the overflow channels. The removal of the mitigation bypasses would substantially diminish the surface flows in the overflow channels of these two springs, especially during the peak summer demand period. With increased residential connections over time, these channels may eventually become dry immediately below the existing spring boxes in mid-summer. However, because the lower reaches of these stream channels are gaining reaches, these areas should retain sufficient hydrology to maintain the existing vegetation. Therefore, only a portion of the 2,800 feet of channels (approximately 2,250 linear feet downstream of Spring #1 and approximately 550 linear feet downstream of Spring #2) would be prone to dewatering effects.

The Water District would be responsible for installing a wooden buck and rail (or post and rail) livestock exclosure fence around the source area of Spring #3 to protect the shallow pond and adjacent wetland areas as a mitigation measure to compensate for the dewatering impacts described above for Springs #1 and #2. At a minimum, 0.4 acre of open water and wetlands associated with the Spring #3 source area would be protected. The existing livestock exclosure fences around Spring #1 and Spring #2 development sites would remain in place and would be maintained by the Water District.

The wetland vegetation within the exclosure area would be able to move toward higher seral stages, thus improving the wetland quality unless wildlife use or other factors maintain current conditions. Because watercress – along with other “colonizer” species – can remain dominant species in the water surface of low- to moderate-gradient springs (Sada et al. 2001), it is unlikely that watercress would be totally eliminated from the aquatic system. An increase in plant diversity and a trend toward higher seral monocots such as sedges (*Carex* spp.) along the spring banks is not guaranteed but is a reasonable expectation with livestock fencing, given the presence of sedges in the current wetland plant community. Thus, the presence of watercress is expected to remain in the open water area, but the streamside vegetation should be improved.

Alternative 3 would require an amendment to the Section 404 permit that was previously issued for the Spring #1 and #2 development project by the USACE. The USACE specified in its

Section 404 permit for the original project that Spring #1 and #2 could be developed, provided "...sufficient flow remains in the stream to maintain important riparian vegetation." The Water District would be responsible for obtaining the Section 404 permit amendment, and for implementing any additional mitigation measures required by the USACE. The Forest Service would amend the Special Use Permit accordingly.

Cumulative effects to wetlands include livestock and wildlife utilization and hoof action on streamside riparian zones located outside of the livestock enclosure fencing. Wildlife would also have access to the existing open water and wetland habitats associated with the Spring #3 source area, although these areas would be fenced in to exclude livestock. Livestock use of water and vegetation formerly at Spring #3 would be transferred to the dispersed stream channels and streamside riparian zones in the Cow Canyon Springs allotment. Ungulate effects on the Spring #3 wetland are less than in Alternatives 1 or 2. Overall, there would be no long-term impacts that would adversely change the condition of wetlands at the Project Area because the implementation of the proposed mitigation would result in a no net loss of functioning open water and wetland habitats within the Project Area.

Cumulatively, the three springs would provide a minimum of 525 gpm (1.2 cfs) to downstream aquatic environments (all perennial flows originating from Spring #3), plus the unused surplus flows from Spring #1 and #2. Natural surface and subsurface water also contribute to the stream channels below the springs. No water quantity or quality change would be detectable at the confluence of Yellowstone and Lake Fork Rivers (watershed outlet point).

Alternative 3 is consistent with Executive Orders 11988 and 11990. There would be no unmitigated impacts to floodplains or wetlands. No increased flood risk is expected from the proposed development of Spring #3. The physical structure of channels below Spring #3 is not removed, so the water-carrying capacity for conveyance of snowmelt, rain-on-snow events, summer thunderstorms, or other flood-type events is preserved. There would be no detectable change in cumulative effects at the confluence of Yellowstone River and Lake Fork River (watershed outlet point), and there would be no depletion of water quantity to the Yellowstone River/Colorado River System.

3.8 Water Rights

Water rights information pertaining to the Cow Canyon Springs is summarized in Table 3.1 (based on the State Engineers' Office website and personal correspondence between the Forest Service and State Engineer's Office). The Water Resources Planning Report (Horrocks Engineers 2003) (Appendix A) provides a detailed discussion concerning the Water District's water rights in Cow Canyon. The Water District also has water rights in Starvation Reservoir, which is located off-Forest.

Water rights are under the jurisdiction of the State Engineer, not the Forest Service. Any authorization resulting from a decision document by the deciding Forest Service official will be dependent on the Water District obtaining or confirming valid water rights to implement the decision.

Table 3.1 Water rights associated with the Cow Canyon Springs.

Holder	Water Right Number	Season of Use	Water Source(s)/ Use	Allocation	Comment
Duchesne County Upper Country Water Improvement District	43-10445	11/1-3/31	Cow Canyon Spring #1 and #2 - Municipal	1.58 cfs (711 gpm)	Fixed-time application certificate, expires July 31, 2015 subject to possible extension
Duchesne County Upper Country Water Improvement District	43-10444	11/1-3/31	Cow Canyon Spring #1 and #2 - Municipal	2.0 cfs (900 gpm)	
Duchesne County Upper Country Water Improvement District	43-11108	1/1-12/31 on water right; 4/1-10/31 on application	Cow Canyon Spring #1 and #2 - Municipal	1.5 cfs (675 gpm) or 315.0 acre-feet	Based on shares of Dry Gulch Irrigation Co.
Forest Service	43-3858	5/1-11/30	Cow Canyon Spring – Stockwatering 130 cattle or equivalent, and Domestic	0.055 cfs (25 gpm)	May need to file change application for Point of Diversion for livestock use. The domestic water is delivered via the Water District’s culinary system for Forest Service facilities and campgrounds.
Duchesne County Upper Country Water Improvement District	43-1645, a16509 – WITH-DRAWN				

Alternative 1 – No Action. Water right adequacy (as determined by the State Engineer’s office) is a condition of the Water District’s existing Special Use Permit. Under the No Action Alternative, the Water District would have to pursue other alternatives for developing additional water supplies. The existing water rights and activities at Springs #1 and #2 would continue. Water right #43-10045 expires in 2015 and would either need to be extended or replaced with another water right. The Forest Service’s water right would be unaffected; and the Water District’s water rights in Starvation Reservoir would be unaffected.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Water right adequacy (as determined by the State Engineer’s office) for the Water District’s expanded use would need to be confirmed prior to amendment of the Special Use Permit. Current water right adequacy is the same as described for the No Action Alternative. The Water District would continue to provide the water for the Forest Service’s domestic use. The Forest Service would file a change application for the point of diversion for the livestock use. The Water District’s water rights in Starvation Reservoir would be unaffected.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Water right adequacy (as determined by the State Engineer’s office) for the Water District’s expanded use would need to be confirmed prior to amendment of the Special Use Permit. Current water right adequacy is the Cow Canyon Municipal Water Development Project
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same as described for the No Action Alternative. The Water District would continue to provide the water for the Forest Service's domestic use. The Forest Service would file a change application for the point of diversion for the livestock use. The Water District's water rights in Starvation Reservoir would be unaffected.

3.9 Soils/Vegetation

This section evaluates soils and vegetation, including plant species of conservation concern in the Project Area. The plant species of concern include federally listed threatened, endangered, and candidate species protected under the Endangered Species Act (PL 93-205, as amended) and Forest sensitive species (FSS) designated for the Intermountain Region (Region 4). Additional information and references on threatened, endangered, and candidate species, and Forest sensitive species can be found in the Biological Assessment and Biological Evaluation technical reports, respectively, that were prepared for the Cow Canyon Municipal Water Development Project (on file at the ANF, Duchesne/Roosevelt Ranger District Office).

The soils within the Project Area are comprised of landslide materials deposited at the mouth of Cow Canyon. Uplands surrounding Springs #1 and #2 have about 20 percent slopes. The soils typically have a thin surface layer of organic material and a mixed soil profile. Soil composition within the Project Area consists of sandy loams, sandy clay loams, gravel and cobble. Soils that were disturbed by the construction of the Springs #1 and #2 development sites and pipeline right-of-ways have been successfully revegetated and are generally stable. There are no indications of excessive soil erosion.

The Project Area generally contains mixed spruce-fir and aspen forest on north- and west-facing slopes and sagebrush rangeland on south- and east-facing slopes. Blue spruce (*Picea pungens*), common juniper (*Juniperus communis*), aspen (*Populus tremuloides*), mountain snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier alnifolia*) and blackberry (*Ribes sp.*) are common plants in the mixed forest; Utah juniper (*Juniperus osteosperma*), sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), Idaho fescue (*Festuca idahoensis*), and wheat grass (*Agropyron sp.*) are common plants in the rangeland. Sagebrush, Kentucky bluegrass (*Poa pratensis*), smooth brome (*bromus inermis*), wheat grass, Idaho fescue and thistles (*Circium spp*) are the predominant plants in the areas that were revegetated after the development of the Springs #1 and #2.

Cumulative Effects Analysis: The soil/vegetation impact assessments include the following cumulative effects analysis.

The analysis area for cumulative effects includes the 5-acre Project Area. Within the cumulative effects area, summer livestock grazing is expected to continue as per the terms approved by the Forest Service for the existing grazing allotment, which authorizes up to 234 cattle between June 14 – September 30 each year. Existing livestock exclosure fencing would remain in place and livestock would continue to have access to the unfenced portions of the spring channels for watering. The two action alternatives would entail the installation of additional fencing to protect wetlands and open water habitats, but livestock would continue to have access to unfenced portions of the spring channels for watering. The Project Area is situated within a

designated roadless area, which has no existing plans for new road or trail construction or timber harvest. The only tree removal within the Project Area that would occur in the foreseeable future would be associated with Alternative 2 (the Proposed Action), if approved. There would be no tree removal associated with either Alternative 1 (No Action) or Alternative 3 (Full Utilization of Springs #1 and #2). Current patterns of recreation within the Project Area are expected to continue because none of the alternatives would result in any long-term changes to existing campgrounds or dispersed recreational opportunities at the Project Area. None of the alternatives is expected to change the presence of human disturbance within the Project Area, which primarily consists of occasional visits to the spring areas for maintenance and repair, and occasional visits by off-trail recreationists.

Alternative 1 – No Action. Under the No Action Alternative, there would be no impacts to soil or vegetative conditions because there would be no construction requiring earth disturbance or vegetation removal.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action, a total of approximately 0.5 acre of land would be disturbed during project construction. This would include the removal of approximately 24 trees and the excavation of a new borrow site approximately 8,000 sq-ft in size. Removed trees would be left on-site for wildlife habitat. The new borrow site would be immediately recontoured and revegetated at the end of project construction in accordance Forest Service guidelines (FSH 2509.22, Part 15.17, Regulation of Borrow Pits, Gravel Sources, and Quarries). The hydrologic restoration of the inactive beaver pond/wetland complex east of Spring #3 would entail the reintroduction of surface water both in and around existing side channels. Water introduced on upland hillslopes may cause minor amounts of soil erosion until new flow paths are reestablished.

The Water District would develop and implement an erosion control and revegetation plan. The plan would identify best management practices (BMPs) for controlling soil erosion and sediment transport during project construction. The plan would also include revegetation specifications and details for the long-term revegetation and restabilization of disturbed soils. The Forest Service would monitor the implementation and effectiveness of the plan.

The removal of the trees and earth disturbance would be a direct, but temporary impact to the soils and vegetation within the construction area for the Spring #3 development site. No long-term impacts to soils and vegetation are anticipated because the implementation of erosion control and revegetation plan would reestablish vegetative cover and stabilize disturbed soils.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would not likely require any earthmoving work to modify the existing spring boxes, or require the removal of any trees or vegetation. Therefore, there would be no impacts to soils or vegetation.

3.9.1 Federally Listed Threatened, Endangered, and Candidate Species

The U.S. Fish and Wildlife Service (USFWS) maintains the current list of federally protected threatened, endangered and candidate species. The listing used for this assessment was last

updated in May 2004. Based on this listing, the Ute ladies tresses (*Spiranthes diluvialis*) is the only federally listed plant species that could potentially occur on the ANF.

Ute ladies tresses

The Ute ladies' tresses is an orchid typically found along the riparian areas of low-elevation streams in the Intermountain West. Orchid species are rarely common. It is believed that the Ute ladies' tresses historically occurred over a wide range, but was distributed in small populations and was never a dominant plant species (USFWS 1995). The Ute ladies' tresses requires low elevation (4,000-6,800 feet in elevation) riparian habitat that is either seasonally or intermittently flooded. Since European settlement, many western rivers and streams have been dammed or dewatered and channelized to provide irrigation or culinary water and/or prevent flood damage. Floodplains have been converted into agricultural land or otherwise developed. The net result has been a substantial reduction in potential habitat for this species throughout its range. Today, the species range extends from central Wyoming and western Montana to southeastern Idaho, Colorado, Utah, and far eastern Nevada (USFWS 1995).

There are no known occurrences of this plant species on the ANF. The Project Area does not contain suitable floodplain habitat for this species, and is located approximately 1,000-feet higher than this species known elevational range. However, there is a known population of Utes ladies' tresses along the lower reaches of the Yellowstone River below the Forest boundary. Utes ladies' tresses may also occur below the Forest boundary along Rock Creek, Lake Fork, Uinta River and Whiterocks River.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no effect** to Ute ladies' tresses because there are no known populations of this plant species at or near the Project Area; there is no suitable floodplain habitat for this plant species at or near the Project Area; and there would be no changes to surface flows in the Yellowstone River that would affect floodplain habitat below the Forest boundary.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be **no effect** to Ute ladies' tresses because there are no known populations of this plant species at or near the Project Area; there is no suitable floodplain habitat for this plant species at or near the Project Area; and there would be no changes to surface flows in the Yellowstone River that would affect floodplain habitat below the Forest boundary.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no effect** to Ute ladies' tresses because there are no known populations of this plant species at or near the Project Area; there is no suitable floodplain habitat for this plant species at or near the Project Area; and there would be no changes to surface flows in the Yellowstone River that would affect floodplain habitat below the Forest boundary.

3.9.2 Forest Sensitive Species (FSS)

Forest sensitive species are identified by the Forest Service Regional Forester as 'those...for which population viability is a concern, as evidenced by...significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution' (FSM

2670.5). The current list of sensitive plant species pertinent to the ANF and the species habitat requirements are located in Table 3-2. None of the species listed are associated with the habitats in or near the Project Area.

Table 3-2 . Habitat use and local distribution for plant Forest Sensitive Species (FSS) evaluated for the Cow Canyon Municipal Water Development Project.

Species	Habitat Use and Local Distribution	References
Graham columbine <i>Aquilegia grahamii</i>	Requires cliffs, ledges, and sandy drip lines of wet cliffs and ledges. Project Area does not contain suitable habitat for this species.	USFS data
Petiolate wormwood <i>Artemisia campestris</i>	Requires Red Pine Shale outcrops with curleaf mountain mahogany, manzanita, and ponderosa pine. Project Area does not contain suitable habitat for this species.	USFS data
Brownie ladyslipper <i>Cypripedium fasciculatum</i>	Requires moderately dense ponderosa pine forest with sparse understory. Project Area does not contain suitable habitat for this species.	USFS data
Pointed draba <i>Draba densifolia apiculata</i>	Typically found on disturbed snow beds in alpine areas. Project Area does not contain suitable habitat for this species.	USFS data
Untermann fleabane <i>Erigeron untermannii</i>	Requires fine-textured sandy-silty soil on windswept ridge tops. Project Area does not contain suitable habitat for this species.	USFS data
Papaveraceae <i>Papaver radicum</i>	Known to occur on 10 sites in the ANF, including site(s) near the headwaters of the Yellowstone River drainage. Requires scree and tallus slopes from 11,100 to 12,800 feet elevation. Project Area does not contain suitable habitat for this species.	UDWR 1998 USFS data
Stemless beardtongue <i>Penstemon acaulis</i>	Requires flat surfaces in black sagebrush-grass-forb communities with silty sand and gravelly soil. Project Area does not contain suitable habitat for this species.	UDWR 1998 USFS data
Uinta greenthread <i>Theelesperma caespitosum</i>	Known to occur near the town of Green River, Wyoming , at the head of the Antelope drainage on the West Tavaputs Plateau, and in Indian Canyon in Duchesne County. Grows in areas subject to a high degree of disturbance. Project Area does not contain suitable habitat for this species.	USFS data
Goodrich blazingstar <i>Mentzelia goodrichii</i>	Requires highly erosive escarpments and is adapted to disturbance. Project Area does not contain suitable habitat for this species.	USFS data

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impacts** to any of the designated FSS plants because there is no suitable habitat for these species at the Project Area, and because there would be no elements associated with this alternative that would affect the availability or quality of suitable habitat outside the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be **no impacts** to any of the designated FSS plants because there is no suitable habitat for these species at the Project Area, and because there would be no elements associated with this alternative that would affect the availability or quality of suitable habitat outside the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no impacts** to any of the designated FSS plants because there is no suitable habitat for these species at the Project Area, and because there would be no elements associated with this alternative that would affect the availability or quality of suitable habitat outside the Project Area.

3.10 Terrestrial Wildlife

This section evaluates terrestrial wildlife species of conservation concern in the Project Area. The species of concern include federally listed threatened, endangered, and candidate species protected under the Endangered Species Act (PL 93-205, as amended), Forest sensitive species (FSS) designated for the Intermountain Region (Region 4), and management indicator species (MIS) designated in the ANF Forest Plan. This section also evaluates migratory birds of conservation concern and Utah Partners in Flight conservation strategy priority bird species. Additional information and references on threatened, endangered, and candidate species, and Forest sensitive species can be found in the Biological Assessment and Biological Evaluation technical reports, respectively, that were prepared for the Cow Canyon Municipal Water Development Project (on file at the ANF, Duchesne/Roosevelt Ranger District Office).

Cumulative Effects Analysis: The terrestrial wildlife impact assessments include the following cumulative effects analysis.

The analysis area for cumulative effects includes the 5-acre Project Area and the land located to the east of the Yellowstone River in the general locale of the Moon Lake Hydroelectric Project that was included in the recreational analysis. Within the cumulative effects area, summer livestock grazing is expected to continue as per the terms approved by the Forest Service for the existing grazing allotment, which authorizes up to 234 cattle between June 14 – September 30 each year. Existing livestock enclosure fencing would remain in place and livestock would continue to have access to the unfenced portions of the spring channels for watering. The two action alternatives would entail the installation of additional fencing to protect wetlands and open water habitats, but livestock would continue to have access to unfenced portions of the spring channels for watering. The Project Area is situated within a designated roadless area, which has no existing plans for new road or trail construction or timber harvest. The only tree removal within the Project Area that would occur in the foreseeable future would be associated with Alternative 2 (the Proposed Action), if approved. There would be no tree removal associated with either Alternative 1 (No Action) or Alternative 3 (Full Utilization of Springs #1 and #2). Ongoing Forest-based recreational activities associated with the use of developed campgrounds and undeveloped campsites, which are located on the east side of the Yellowstone River near the Moon Lake Hydroelectric Project approximately 0.6 miles away from the Project

Area, are expected to continue. Current patterns of dispersed recreation are expected to continue because none of the alternatives would result in any long-term changes to dispersed recreational opportunities at the Project Area. None of the alternatives is expected to change the presence of human disturbance within the Project Area, which primarily consists of occasional visits to the spring areas for maintenance and repair, and occasional visits by off-trail recreationists.

3.10.1 Federally Listed Threatened, Endangered, and Candidate Species

The federally listed terrestrial wildlife species that are known or suspected to occur on the ANF, and the habitats typically used by each species, is provided in Table 3-3. The listing used for this assessment was last updated in May 2004. The Forest Service has initiated informal consultation with the USFWS and conducted an on-site meeting with USFWS biologists on August 4, 2003 to review habitat conditions at the Project Area. Of the six species listed, the bald eagle and Canada lynx may potentially occur in or near the Project Area, or may potentially have suitable habitat in or near the Project Area.

Table 3-3. Habitat use and local distribution for federally listed terrestrial wildlife species evaluated for the Cow Canyon Municipal Water Development Project.

Species	Status	Habitat Use and Local Distribution	Reference
TERRESTRIAL WILDLIFE			
Bald eagle <i>Haliaeetus leucocephalus</i>	Threatened	Bald eagle is a winter visitant to the ANF and is commonly found near Flaming Gorge Reservoir and Green River corridor and occasionally near other waters until winter freeze-up. Only 5 confirmed active nest sites in Utah, none of which occur on the ANF. Suitable winter habitat consists of expansive areas of ice-free open water with abundant food supplies and large trees for roosting.	ANF wildlife sighting records. Messmer et al. 1998
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	Candidate	Nests in lowland riparian habitats (typically in cottonwood/willow habitats) with dense understory vegetation, usually within 300' of water. In Utah, nesting habitat is thought to occur between 2,500-6,000' elevations. There are no records of occurrence on the ANF, but suitable habitat may exist in the low elevation portions of stream and glacial canyon land-type associations where cottonwood trees are found in combination with conifers and aspen.	VanRiper 2004 Parrish et al. 2002
Mexican spotted owl <i>Strix occidentalis lucida</i>	Threatened	Historic range exists in the BLM-managed Tavaputs Plateau south of the Uintas Basin. Two male owls have been found on Dinosaur National Monument; owls have also been located in Desolation Canyon on at least two occasions. Typical habitat on the Colorado Plateau (Utah) and southern Rocky Mountains (Colorado) is steep-sided canyons containing pockets of usually coniferous overstory trees mixed with smaller Gambel oak and box elder trees. In southern Utah owls have not been found above 7,200' elevation (cutoff for suitable habitat considered 8,000'). Suitable habitat may exist in the Stream Canyon and possibly Glacial Canyon land-type associations. No locations recorded on the ANF.	personal communication with NPS personnel, personal communication with UDWR personnel, USFWS 1995

Species	Status	Habitat Use and Local Distribution	Reference
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	Endangered	Nests in swampy thickets, especially of willow but sometimes of other species such as tamarisk, where vegetation is 4-7m or more in height. Associated with mid- to low-elevation riparian habitats (<8500'). Known to occur in extreme southern Utah, may occur along major riparian corridors elsewhere in the State. The ANF is located north of this species know breeding range.	UDWR 2004 USFWS 2002
Canada lynx <i>Lynx canadensis</i>	Threatened	Mesic mid- to high-elevation forests including Engelmann spruce, subalpine fir, lodgepole pine and possibly Douglas fir. Uses aspen when it is mixed with or adjacent to suitable conifer forests. Needs areas of dense understory cover and/or thickets of young trees for foraging, mature forests with large amounts of coarse woody debris for denning. Abundance and population persistence linked to snowshoe hare populations; red squirrels are secondary prey. The Project Area contains suitable habitat.	Ruediger et al. 2000 UDWR 1998 UDWR 2004
Black-footed ferret <i>Mustela nigripes</i>	Endangered	Black-footed ferret distribution is coincident with prairie dog colonies. Habitat is therefore restricted to open or slightly brushy areas at relatively low elevations in the western U.S. An experimental population was recently established in Uintash County southeast of Vernal, UT on lands managed by the BLM. Suitable habitat may exist on the Flaming Gorge NRA near Gilsonite Draw on the South Unit. No other areas on the ANF appear to have suitable habitat for this species.	UDWR 2004

Of the six species listed, the bald eagle and Canada lynx may potentially occur in or near the Project Area, or may potentially have suitable habitat in or near the Project Area.

Bald Eagle

The bald eagle is considered to be a winter visitant in Utah and is rarely found in the State during the non-winter months (Behle 1985, Messmer et al. 1998). There are only five active bald eagle nests in Utah (two near Moab, one near Orangeville, one near Manila, and one near Farmington Bay), and they are all located more than 75 miles away from the Project Area (L. Romin, USFWS, personal communication).

Wintering bald eagles depend on areas that maintain ice-free open water for foraging. Suitable winter habitat must contain an abundant available food supply, with one or more night roost sites nearby (Behle 1981). Bald eagle will feed on fish, waterfowl and carrion, and will typically roost in nearby forested canyons or along rivers and reservoirs bordered by tall cottonwood trees (Messmer et al. 1998). Bald eagles are known to occur on the ANF, primarily near Flaming Gorge Reservoir and the Green River corridor during the winter months (ANF unpublished data). Bald eagles are also occasionally found near other large bodies of water on the ANF until winter freeze-up.

The Project Area does not contain any active nest sites. It also does not contain suitable winter habitat for bald eagle due to the lack of expansive, ice-free open water and lack of abundant available food supplies.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no effect** to bald eagle because there are no known nesting sites at or near the Project Area and because there is no suitable winter habitat for bald eagle at or near the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be **no effect** to bald eagle because there are no known nesting sites near the Project Area and because there is no suitable winter habitat for bald eagle at or near the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no effect** to bald eagle because there are no known nesting sites near the Project Area and because there is no suitable winter habitat for bald eagle at or near the Project Area.

Canada Lynx

In the United States, Canada lynx inhabit conifer and conifer-hardwood forests that support their primary prey, snowshoe hares. Lynx habitat in the Southern Rockies is likely found within the subalpine and upper montane forest zones, typically between 8,000 – 12,000 feet in elevation (Ruediger et al. 2000).

Snowshoe hares are the primary prey of lynx, comprising 35-97% of the diet throughout the range of the lynx. Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities. Other prey species include red squirrel, grouse, flying squirrel, ground squirrel, porcupine, beaver, mice, voles, shrews, fish, and ungulates as carrion or occasionally as prey (Ruediger et al. 2000).

Lynx rarely occur in the Uinta Mountains (McKay 1991). Ten lynx specimens have been reliably traced to the Uinta Mountains, with collection dates ranging from 1916 to 1972 (Bates 1999). Forest Service track surveys (ANF unpublished data) in 1996-1997 (covering 237+ miles of transects) did not document any lynx tracks in the Uinta Mountains. The ANF began hair snare surveys in the autumn of 1999 as part of the National Lynx Detection Protocol (McKelvey et al. 1999). In 1999, several hair samples were collected and results from the Rocky Mountain Research Lab indicated no positive Canada lynx hair samples. Hair samples from the 2000 and 2001 field seasons also resulted in no positive Canada lynx hair samples.

Although no positive Canada lynx hair samples were collected, there is suitable lynx habitat on the ANF. A lynx analysis unit, or LAU, is a subwatershed that approximates a female's home range. The ANF, in cooperation with the USFWS, has identified potential LAUs within the Forest. The Project Area is located within the Yellowstone River/Dry Gulch LAU (Figure 3-1) (ANF unpublished data) and is considered to contain suitable lynx habitat. The Yellowstone River/Dry Gulch LAU is approximately 30,387 acres in size.

This is a 1"=250,000 scale map showing the LAU boundary with respect to the Forest Boundary and the Project Area.

Figure 3 -1. Location of the Yellowstone River/Dry Gulch Lynx Analysis Unit (LAU).

An individual, radio-collared lynx released as part of the Colorado Reintroduction Program dispersed on to the ANF during the Summer of 2004. This reintroduction program and radio-tracking of released individuals is managed by the Colorado Division of Wildlife (CDOW). Prior to this occurrence, the last definitive siting of Canada lynx in the Uinta Mountains was in 1972 (ANF unpublished data). At this time, it is unknown whether this individual lynx will remain on the ANF.

Alternative 1 – No Action. Under the No Action Alternative, there would be no change to the amount or condition of suitable habitat within the Project Area. Therefore, it is anticipated that the implementation of the No Action Alternative would have **no effect** to individual Canada lynx or suitable habitat.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Implementation of the Proposed Action Alternative would result in the disturbance of approximately 0.5 acre of land, including the filling of 0.21 acre of wetland and open water habitat and the removal of approximately 24 trees. The 0.5 acre of disturbance represents approximately 0.0016 percent of the land area within the Yellowstone River/Dry Gulch LAU. Wetland and open water impacts would be mitigated on-site and in-kind and disturbed uplands would be revegetated, resulting in essentially no net change in either the amount or condition of suitable habitat within the Yellowstone River/Dry Gulch LAU. Noise and disturbances associated with construction activities may temporarily displace (2 weeks) Canada lynx using the Project Area at that time. Therefore, it is anticipated that the implementation of the Proposed Action **may affect, is not likely to adversely affect**, individual Canada lynx or suitable habitat.

Monitoring: If subsequent locations obtained from CDOW indicate that Canada lynx is occupying the Yellowstone/Dry Gulch LAU, the Forest Service will reinitiate consultation with the USFWS.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would not result in any earth-moving disturbances to existing habitats, and there would be essentially no long-term changes to the amount or condition of suitable lynx habitat within the Yellowstone River/Dry Gulch LAU. Noise and construction disturbances associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) Canada lynx using the Project Area at that time. Therefore, it is anticipated that the implementation of the Alternative 3 **may affect, is not likely to adversely affect**, individual Canada lynx or suitable habitat.

Monitoring: If subsequent locations obtained from CDOW indicate that Canada lynx is occupying the Yellowstone/Dry Gulch LAU, the Forest Service will reinitiate consultation with the USFWS.

3.10.2 Forest Sensitive Species (FSS)

FSS are designated by the Forest Service Regional Forester as “those...for which population viability is a concern, as evidenced by...significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution” (FSM 2670.5). The current

list of designated FSS pertinent to the ANF, and the habitat requirements for these species, is provided in Table 3-4. Of the 13 designated species, the greater sage grouse, northern goshawk, boreal owl, great gray owl, three-toed woodpecker, and spotted bat may potentially occur in or near the Project Area, or may potentially have suitable habitat in or near the Project Area.

Table 3-4. Habitat use and local distribution for terrestrial Forest Sensitive Species (FSS) evaluated for the Cow Canyon Municipal Water Development Project.

Species	Status	Habitat Use and Local Distribution	References
TERRESTRIAL WILDLIFE			
Peregrine falcon <i>Falco peregrinus</i>	FSS	Requires steep, rocky cliffs or artificial towers for nesting. Known to nest on cliffs along Flaming Gorge Reservoir; sightings and one confirmed nest in canyons in the Stream Canyon and Glacial Canyon Land-type Associations. Usually found where rivers, marshes or other wet habitats are associated with cliffs. Project Area lacks suitable habitat.	DeGraff et al. 1991 USFWS 1999
Boreal owl <i>Aegolius funereus</i>	FSS	Uses spruce/fir or mixed conifer (Engelmann spruce, subalpine fir, and lodgepole pine) forest. May use aspen if conifers are nearby. Requires large cavities for nesting. Individuals have been recorded during winter calling surveys on the ANF, but there are no known nesting pairs on the ANF. Project Area may contain suitable habitat.	DeGraff et al. 1991 USFS 2002
Great gray owl <i>Strix nebulosa</i>	FSS	Requires mixed conifer forests and old stick nests constructed by other species. Two (possibly 3) recent locations and one historic record on Ashley, all in mixed conifer. Uses old stick nests constructed by other species, depressions in broken tops of trees, etc. for nesting. Uinta Mountains are at or just beyond southern limit this species range; species is considered casual or irregular visitor in Utah. Individuals have been recorded during winter calling surveys on the ANF, but there are no known nesting pairs on the ANF. Project Area may contain suitable habitat.	Duncan and Hayward 1994 Behle 1981 USFS 2002
Flammulated owl <i>Otus flammeolus</i>	FSS	Occurs in Douglas fir and Ponderosa pine forests throughout the ANF; has not been found in lodgepole or mixed conifer. Stream Pediment, Stream Canyon, Glacial Canyon, Limestone Plateau and Limestone Hills Land-type Associations contain nearly all the suitable habitat on the south slope of the Uintas. Secondary cavity nester. Project Area lacks suitable habitat.	McCallum 1994 DeGraff et al. 1991 USFS 2002
Common loon <i>Gavia immer</i>	FSS	Requires large bodies of open water with abundant fish for foraging. Known to use Flaming Gorge Reservoir during migration. Project Area lacks suitable habitat, and there are no known occurrences in the Project Area.	UDWR 2004 USFS 2002 McIntyre and Barr 1997
Trumpeter swan <i>Cygnus buccinator</i>	FSS	Swans from Wyoming transplant programs have been seen on the Flaming Gorge NRA during the winters of 2000 and 2001. Preferred winter habitats provide ice-free waters with slow currents, extensive beds of aquatic plants, low levels of human disturbance, and few trees or shrubs to obscure their view. No known occurrences in the Project Area.	Matteson et al. 1995 UDWR 2004

Species	Status	Habitat Use and Local Distribution	References
Greater sage grouse <i>Centrocercus urophasianus</i>	FSS	A sagebrush obligate species. Requires sagebrush for winter forage and cover. In spring and summer, broods use wet meadow habitat up to 9,000 feet in elevation where they feed on forbs and insects. Preferred areas during spring and summer are those that provide an abundance of forbs with grasses and sagebrush for cover. Suitable habitat may occur at the Project Area.	Parish et al. 2002
Pygmy rabbit <i>Brachylagus idahoensis</i>	FSS	Deep, loose soil. Old riverbeds, alluvial fans, base of hills where soils have slumped. Typically associated with dense, tall stands of sagebrush in lower elevations. Project Area lacks tall stands of sagebrush, probably due to its elevational location.	UDWR 2004
Northern goshawk <i>Accipitar gentilis</i>	FSS	Uses a variety of forest types for foraging. Uses a wide variety of forest types, but most of the known breeding territories on the ANF are in lodgepole or mixed conifer stands. Home ranges include a variety of stand ages and structures, but older-age stands with a high density of large trees, relatively high canopy closure and high basal area are preferred for nesting. Stands with large trees and relatively open understories are preferred for foraging. Sensitive to disturbance during the nesting season. Project Area contains suitable habitat.	DeGraff et al. 1991 UDWR 1997
Three-toed woodpecker <i>Picoides tridactylus</i>	FSS	Requires conifer or conifer-aspen forest. Has been found in other forest types on the ANF. Requires some snags for constructing cavity nests. Mixed-conifer habitat does exist within the Project Area.	DeGraff et al. 1991 USFS 2002
Townsend's big-eared bat <i>Plecotus townsendii</i>	FSS	Requires caves or abandoned mines. Uses shrub steppe and pinyon/juniper habitat. Needs caves or mines for hibernation and maternity roosts; occasionally uses old buildings. Sensitive to disturbance at these roosts. Have been located in two caves on the ANF. Limestone Hills, Limestone Plateau and various canyon land-type associations contain most of the suitable habitat on the ANF, since they have rock formations that are likely to contain caves. Project Area lacks suitable habitat.	Oliver 2000 Bill Bosworth, NHP, personal communication
Spotted bat <i>Euderma maculata</i>	FSS	Various habitats and elevations, but most often collected in dry, rough desert terrain. Distribution thought to be limited by availability of roosts (primarily under loose rock or in crevices in rock cliffs). On the south slope of the Uinta Mountains, they have been located near steep-walled stream canyons such as Ashley Creek, Black Canyon and Brush Creek. They have also been located on the South Unit in pinyon/juniperper/sage at 7,400 feet in elevation. Closest known roost is approximately 23 miles from the Project Area and is within travel limits (up to 25 miles) for this species. Uses a variety of habitats at various elevations. Wetland habitats in the Project Area may provide foraging habitat.	Oliver 2000 Bill Bosworth, NHP, personal communication

Species	Status	Habitat Use and Local Distribution	References
Wolverine <i>Gulp luscus</i>	FSS	Tundra, boreal forests, coniferous forests of western mountains. Needs a diversity of habitats to support its prey base, especially large mammals (scavenged ungulate carrion is an important food source). Habitat may be better defined as large, sparsely inhabited areas with adequate food than by topography or vegetation. Appears to be sensitive to habitat fragmentation and human disturbance; consequently often restricted high elevation, remote portions of mountain ranges. Uinta Mountains, especially the High Uintas Wilderness, appear to contain suitable habitat. Last confirmed record in Utah from 1924. Project Area lacks suitable habitat for a variety of reasons.	McKay 1991

Greater Sage Grouse

Greater sage grouse depend on sagebrush plant communities for all aspects of their life history. In winter, sagebrush is the primary food source for greater sage grouse and also provides thermal and hiding cover. In spring, greater sage grouse congregate on lek sites, areas with little vegetation surrounded by sagebrush, to display and mate. Greater sage grouse hens typically nest under sagebrush bushes near the lek site. Subsequently, sagebrush plant communities near the nest site are used by hens and their broods. The grass and forb understory in this plant community provides a critical food resource. In addition, insects associated with the sagebrush plant community provide an important protein source for young chicks. In late-summer, as habitats become drier, broods will use wet meadows where abundant grasses and forbs provide cover and food. Insects in wet meadows again become an important food source.

There is an abundance of sagebrush habitat on the ANF, and greater sage grouse are known to occur on the ANF. The ANF has both suitable winter habitat and suitable spring-summer nesting and brood-rearing habitat. According to UDWR habitat maps for greater sage grouse, the Project Area contains winter habitat and brood-rearing habitat. Approximately 2 acres of sagebrush habitat is located on the hillside upgradient of Springs #2 and #3. A minor amount of wet meadow vegetation is associated with the wetlands bordering the riparian areas along the spring channels.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to greater sage grouse because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, approximately 0.29 acre of upland habitat containing minor amounts of sagebrush would be disturbed by the development of Spring #3. The majority of the sagebrush disturbance would be associated with the excavation of an approximately 8,000 sq-ft borrow area, which would be revegetated with a native plant seed mix. Sagebrush would likely recolonize this borrow area over the long-term. Implementation of the wetland mitigation plan would result in approximately 0.4 acre of improved wet meadow habitat associated with the restoration of an abandoned beaver pond/wetland complex. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) greater sage grouse using the

Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** greater sage grouse by displacing individuals as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would no changes to the amount or condition of suitable habitat within the Project Area. Noise and disturbance associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) greater sage grouse using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season. Therefore, the implementation of Alternative 3 **may impact** greater sage grouse by displacing individuals as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Northern Goshawk

Northern goshawk inhabits coniferous, deciduous, and mixed forests in North America and prefers to forage in closed canopy forests with moderate tree densities as compared to young forests (Graham et al. 1999). A goshawk's home range may be up to 6,000 acres and has three main habitat component needs (nesting, post fledgling area, and foraging area) within this home range (Reynolds 1992). Nesting areas are typically 30 acres in size and may include more than one nest (Reynolds 1992). The post-fledgling area is 420 acres in size and surrounds the nest area (Reynolds 1992). The post-fledgling area typically includes a variety of forest types and conditions, but should contain patches of dense trees as well as developed herbaceous areas and shrubby understory, snags, downed logs and small openings (Reynolds 1992). These attributes are needed to provide security cover as well as the necessary habitats for prey species (Reynolds 1992). The foraging area is approximately 5,400 acres and surrounds the post-fledgling area (Reynolds 1992).

In Utah, most of the 421 known nests located during project level surveys occur in mid-elevation (6,000 feet) to high-elevation (10,000 feet) sites, which are currently occupied by mature quaking aspen or coniferous forests (Graham et al. 1999). However, some nests in Utah have been documented in the spruce/fir type (Graham et al. 1999). Many of the documented goshawk territories on the ANF are associated with lodgepole and aspen cover types (ANF unpublished data). Nest areas are occupied from early-March until late-September, when fledglings are no longer dependent upon the post fledgling area PFA (Reynolds et al. 1992). The northern goshawk amendment to the ANF Forest Plan also considers the nesting period to be this same period. According to ANF monitoring data, young usually fledge from early-July to early-August (approximately 43 days of age) and are dependent upon the PFA until August or mid-September (approximately 65 days of age), at which time the fledglings venture further away from the PFA (Dewey 1999). The ANF annually monitors known goshawk territories on the Forest (ANF unpublished data).

The predominant habitat types in the Project Area are mixed conifer and aspen forests; sagebrush, riparian, wetland, and meadow habitats are also present. There are no documented goshawk territories in or near the Project Area, and field surveys have determined that there are no nesting sites within the Project Area. However, suitable habitat is present within the Project Area.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to northern goshawk because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be no earthmoving work in suitable habitat for northern goshawk and there would be no disturbances to any known nesting sites. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) northern goshawk using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** northern goshawk as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no changes to the amount or condition of suitable habitat within the Project Area. Noise and disturbance associated with the modification of the existing spring boxes and installation of additional livestock fencing temporarily displace (1 week) northern goshawk using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** northern goshawk as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Boreal Owl

The boreal owl occurs throughout the holarctic in boreal climactic zones (Hayward 1994). (Hayward 1994). Within North America, boreal owls occur in a continuous band concurrent with the boreal forests of Alaska and Canada (Hayward 1994). South of this continuous band, populations are restricted to subalpine forests with the southern most records in the mountains of northwestern New Mexico (Hayward 1994). In the southern portions of their range in North America, they are documented in subalpine forests characterized largely by subalpine fir and Engelmann spruce (Hayward 1994).

Boreal owls nest in cavities excavated by woodpeckers in mixed coniferous, aspen, Douglas fir, and spruce/fir forests (Hayward 1994). Nests are usually initiated by mid-April to the first of June, and young have usually fledged by early-July (28 – 36 day nestling period) (Hayward 1994). Foraging habitat has been documented in mature and older spruce/fir forests (Hayward

1994). Prey consists of voles (particularly red-backed vole), lemmings, mice, shrews, pocket gophers, squirrels, chipmunks, small birds, and insects (Hayward 1994).

Boreal owls have been detected on the ANF in spruce/fir and mixed conifer forest types during winter calling surveys (ANF unpublished data). However, no nesting pairs have been documented on the ANF. The only known nesting pair in Utah is located on the Wasatch-Cache National Forest.

The predominant habitat types in the Project Area are mixed conifer and aspen forests; sagebrush, riparian, wetland, and meadow habitats are also present. Field surveys have determined that there are no nesting sites within the Project Area. However, suitable habitat is present within the Project Area.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to boreal owl because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be no earthmoving work in suitable habitat for boreal owl and there would be no disturbances to any known nesting sites. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) boreal owls using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** boreal owl as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no changes to the amount or condition of suitable habitat within the Project Area. Noise and disturbance associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) boreal owls using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** boreal owl as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Great Gray Owl

The great gray owl ranges from the boreal forests of Alaska, northwestern Wyoming, western Montana, Idaho, and through the Sierra Nevada Mountains of California (Duncan and Hayward 1994). In the southern portion of their range, great gray owls nest in relatively dry coniferous or mixed deciduous/coniferous forests, especially Douglas fir, lodgepole pine and aspen (Duncan and Hayward 1994). Detections on the ANF show they will also use mixed conifer forests (ANF unpublished data). Eggs are usually laid by the first of May, and young have usually fledged in 3 to 4 weeks (first of June) and ready to fly 1 to 2 weeks later (mid-June) (Duncan and Hayward

1994). Foraging habitat consists of relatively open grassy areas, or timber stands with low canopy closure and grassy understories (Duncan and Hayward 1994). Availability of prey and nest sites (typically old hawk or raven stick nests or natural depressions in broken-topped snags) are believed to be the primary factors limiting distribution of this species (Duncan and Hayward 1994).

(Behle 1981) described this species as “casual or possibly a rare resident” of northeastern Utah. A statewide bird distribution study (UDWR 1983) was less optimistic, listing the great gray owl as an “accidental” species (meaning it was considered outside its normal range) in extreme northern and northeastern Utah. Three great gray owls have been detected during winter calling surveys in mixed conifer habitat on the ANF on several occasions (ANF unpublished data). However, there are no documented nesting sites on the ANF and there are no known breeding pairs in Utah.

The predominant habitat types in the Project Area are mixed conifer and aspen forests; sagebrush, riparian, wetland, and meadow habitats are also present. Field surveys have determined that there are no nesting sites within the Project Area. However, suitable habitat is present within the Project Area.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to great gray owl because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be no earthmoving work in suitable habitat for great gray owl and there would be no disturbances to any known nesting sites. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) great gray owls using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** great gray owl as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no changes to the amount or condition of suitable habitat within the Project Area. Noise and disturbance associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) great gray owls using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** great gray owl as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Three-toed Woodpecker

The three-toed woodpecker ranges from Alaska across northern Canada to Newfoundland, and south and southeast through the Rocky Mountains to Arizona and New Mexico (DeGraaf et al. 1991). In Utah, this woodpecker nests and winters in coniferous forests, generally above 8,000 feet in elevation (Parrish et al. 2002). They stay on their territories year-round, though insect outbreaks, such as spruce bark beetle infestations, may cause irregular movements (Parrish et al. 2002). Nesting for three-toed woodpeckers occurs in May and June and young can be found in the nest into July (Nature Serve 2003). In Montana, they have been known to fledge later, in early-August (Nature Serve 2003). Because the three-toed woodpecker requires snags for feeding, perching, nesting, and roosting, it is threatened by activities such as logging and fire suppression, which remove or eliminate snags (Parrish et al. 2002). Feeding consists mainly of wood boring insects (Parrish et al. 2002).

Three-toed woodpeckers have been found throughout the ANF in suitable lodgepole, Douglas fir, spruce/fir and mixed conifer forests (ANF unpublished data). The mixed conifer forest at the Project Area contains suitable habitat for this species.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to three-toed woodpecker because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be no earthmoving work in suitable habitat for three-toed woodpecker. No three-toed woodpecker nest sites have been found in the trees that would be removed. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) three-toed woodpeckers using the Project Area at that time, but would not impact any nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** three-toed woodpecker as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no changes to the amount or condition of suitable habitat within the Project Area. Noise and disturbance associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) three-toed woodpeckers using the Project Area at that time, but would not impact any nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action **may impact** three-toed woodpecker as discussed above, but **is not likely to cause a trend toward the federal listing of the species** because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Spotted Bat

Spotted bats are found between 2,700 and 9,200 feet in elevation (Olivers 2000) and appear to use a wide range of habitat types for roosting and foraging, including: riparian, desert shrub, sagebrush/rabbitbrush, ponderosa pine, grassland/aspen, and grass/spruce/aspen. Spotted bats are also known to roost in buildings, and will travel up to 25 miles in one night from their roost site to forage.

The spotted bat probably occurs throughout the state of Utah, although there are incomplete records for most of western and northern Utah (Oliver 2000). Lengas (1994) captured 220 bats in the ANF; no spotted bats were captured, although two were believed to have been heard calling during the fieldwork. More recently, spotted bats were detected near Ashley Creek, Black Canyon, and Brush Creek (Perkins 2001 *in* USFS 2002). All of the habitats within the Project Area may be potential forage sites for spotted bat, and are all within foraging distance from the Brush Creek roost.

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to spotted bats because there would be no changes to the amount or condition of potential forage habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. The implementation of the Proposed Action would result in a permanent change in the condition of the forage habitat at the Project Area, but would not result in a net loss of forage habitat. The forage potential within non-wetland habitats would likely remain unchanged. However, implementation of the wetland mitigation plan would likely improve the forage potential within the 0.4 acre of hydrologically restored wetlands. Construction activities would occur during daylight hours when bats are not foraging. Therefore, there would be **no impacts** to individual spotted bats, and there would be no net loss of suitable habitat for this species.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no impact** to spotted bat because there would be no net loss of suitable habitat within the Project Area, and because the minor amount of construction work that would be needed to modify the existing spring boxes and install additional livestock fence would be done during the daylight hours when bats are not foraging.

3.10.3 Management Indicator Species (MIS)

The current list of terrestrial MIS designated for the ANF is provided in Table 3-5. Of the ten species listed, elk and mule deer, northern goshawk, Lincoln's sparrow and song sparrow, and greater sage grouse may occur within or near the Project Area, or may potentially have suitable habitat in or near the Project Area.

Table 3-5. Habitat use and local distribution for terrestrial Management Indicator Species (MIS) evaluated for the Cow Canyon Municipal Water Development Project.

Species	Status	Habitat Use and Local Distribution	References
TERRESTRIAL WILDLIFE			
Elk <i>Cervus elaphus nelsoni</i>	MIS	Rocky Mountain elk is used as a MIS because of its economic importance. Elk use various plant communities on the ANF, typically between 6,000 and 10,000 feet in elevation. Elk forage for sedges, grasses, and forbs in the summer months and will browse on shrubs, lichen, twigs, bark, and pine needles in winter. Elk occur throughout the ANF where suitable habitat exists. The Project Area contains suitable habitat.	Adams 1994
Mule deer <i>Odocoileus hemionus</i>	MIS	Mule deer is used as a MIS because of its economic importance. Mule deer use various plant communities on the ANF. Mule deer typically migrate between high elevation summer range, and lower elevation winter range, following the snow line. Mule deer are browsers and will eat shrubs, brush, and a variety of forbs and grasses. This species will use a variety of habitat types including forest, rangeland, shrubland, and riparian areas. Mule deer occur throughout the ANF where suitable habitat exists. The Project Area contains suitable habitat.	Stewart 1999
Northern goshawk <i>Accipitar gentilis</i>	MIS	MIS for old growth timber. Uses a variety of forest types for foraging. Uses a wide variety of forest types on the ANF, but majority of known breeding territories on the Forest are in lodgepole or mixed conifer stands. Home ranges include a variety of stand ages and structures, but older-age stands with a high density of large trees, relatively high canopy closure and high basal area are preferred for nesting. Stands with large trees and relatively open understories are preferred for foraging. Sensitive to disturbance during the nesting season. The Project Area contains suitable habitat.	DeGraff et al. 1991 UDWR 1997
Lincoln's sparrow <i>Melospiza lincolnii</i>	MIS	MIS for riparian-shrub. The Lincoln's sparrow prefers wetland habitats such as bogs, wet meadows, and riparian thickets. This species is also found in forest edges, clearings, and shrubby areas. The Lincoln's sparrow builds a shallow depression nest that is lined with grasses, leaves, and moss. This species primarily eats insects including spiders and millipedes. The ANF is within the breeding range for this species. The Project Area contains suitable habitat.	DeGraff et al. 1991
Song sparrow <i>Melospiza melodia</i>	MIS	MIS for riparian shrub. Song sparrows need moist areas with low, irregular plants, dense grass, or brush. They are commonly found along waterways, seacoasts, and marshes with cattails or bulrushes. They are also associated with forest edges, forest bogs, thickets, and gardens. This species is a management indicator species for riparian shrub habitats. The ANF is within this species' breeding range. The Project Area contains suitable habitat.	DeGraff et al. 1991

Species	Status	Habitat Use and Local Distribution	References
Warbling vireo <i>Vireo gilvus</i>	MIS	MIS for deciduous woodlands. Warbling vireos prefer open deciduous and mixed hardwood/conifer forests, especially in riparian areas. In mixed forests, this species is typically associated with deciduous trees. Preferred habitat will also contain a low intermediate shrub layer and low-intermediate canopy cover. This species is also found in groves, scrubby hillsides, and residential areas. The Project Area lacks suitable habitat for this species.	DeGraff et al. 1991 Ehrlich et al. 1998 Baicich et al. 1997
Red-naped sapsucker <i>Sphyrapicus muchalis</i>	MIS	MIS for deciduous woodlands. Red-naped sapsuckers construct cavity nests in live trees, near water and montane riparian woodlands. Red-naped sapsuckers drill rows of holes in tree bark to which they return to eat the insects and sap they are caught in. Birds will often guard their “sap wells” from other species. The cavities drilled by red-naped sapsuckers for nesting and feeding are critical because they provide nesting cavities to various forest species that require them. The ANF is within this species’ breeding range, but the Project Area lacks suitable habitat for this species.	DeGraff et al. 1991
White-tailed ptarmigan <i>Lagopus leucurus</i>	MIS	MIS for alpine meadow. Prefers spruce/willow stands above 10,000 feet in elevation. They nest on the ground under shrubs or next to rocks on snow free areas in early June and incubate eggs for 23 days. They feed on willow, forbs, leaves, flowers and some insects. The ANF is within this species’ breeding range, but the Project Area lacks suitable habitat for this species.	UDWR 1997 Rawley et al. 1996 DeGraff et al. 1991 Nature Serve 2003
Golden eagle <i>Aquila chrysaetos</i>	MIS	MIS for cliff and rock outcroppings. The golden eagle requires cliffs and rocks for nesting. Golden eagles require elevated nest sites, primarily cliffs (4,000 – 10,000 feet elevation) that are close to hunting areas, but may also use trees. Prefers forest habitat with openings for foraging. The ANF is within this species’ breeding range, but the Project Area lacks suitable habitat for this species.	DeGraff et al. 1991
Greater sage grouse <i>Centrocercus urophasianus</i>	MIS	MIS for sagebrush habitat. A sagebrush obligate species. Requires sagebrush for winter forage and thermal cover. In spring and summer, prefers sagebrush habitats with grassy understories that provide ample cover and food supplies. Are known to use wet meadow habitat up to 9,000 feet in elevation where they feed on forbs and insects. Project area contains suitable habitat.	Parish et al. 2002

Elk and Mule Deer

Elk and mule deer are native ungulates that occur within the Project Area and surrounding landscape. Both elk and mule deer are listed as MIS because of their recreational value and economic importance as hunted species. Elk are primarily grazers, eating grasses, sedges and forbs during the summer. During the winter, elk will also browse on the leaves, twigs and bark of deciduous shrubs and trees (Nature Serve 2003). Mule deer also graze on grasses, sedges and other herbaceous plants during the spring and summer, and browse on the current year’s growth of shrub stems and leaves during the fall and winter (UDWR 2003). The elk and mule deer

habitat within the Project Area is summer and fall range. There is no critical habitat (winter range) within the Project Area. The Water District's service area (located off-Forest) has winter range for elk and mule deer. For the purposes of this analysis, it is assumed that undeveloped land within the approximately 104-square mile (66,560-acre) service area could potentially be used as winter range by elk and mule deer.

The ANF occurs within five of the State's wildlife management subunits. The elk population objectives and estimates within these subunits are as follows (UDWR 2004):

Subunit	Elk Population Objective	Elk Population Estimate
North Slope, Daggett	1,300	1,400
South Slope, Vernal	2,500	2,600
South Slope, Yellowstone	5,500	5,300
Nine Mile, Anthro	700	810
Wasatch Mountains, Avintaquin	1,000	1,250

Because portions of these subunits are located off the ANF, not all of these animals would occur on the Forest. The Project Area is located within the South Slope, Yellowstone subunit. With the exception of the Yellowstone subunit, the elk population on each of these subunits appears to be on a stable to slightly increasing trend. The Yellowstone subunit has nearly met the population objective and has been relatively stable for the past three years (R. Thacker, UDWR biologist, personal communication). Before that time, elk numbers in this subunit were on an increasing trend (R. Thacker, UDWR biologist, personal communication). Since the ANF constitutes a large portion of these subunits, and population objectives have been exceeded or nearly met, it appears that the elk population across the Forest is stable. It also appears that the Forest is providing well-distributed habitat that supports a viable population of elk based on the available data.

Mule deer population objectives and estimates for the five wildlife management subunits are as follows (UDWR 2004):

Subunit	Mule Deer Population Objective	Mule Deer Population Estimate
North Slope, Daggett	5,300	4,500
South Slope, Vernal	13,000	11,600
South Slope, Yellowstone	12,000	10,400
Nine Mile, Anthro	8,500	3,400
Wasatch Mountains, Avintaquin	3,000	1,600

The estimated mule deer population is below the population objectives for all five of the wildlife management units that occur on the ANF. There was a sharp decline of mule deer populations in Utah during the winter of 1992-1993. This decline has been attributed to several years of drought followed by an unusually hard winter. The deer population rebounded slowly during the

years following this decline. However, the deer population has again taken a downward trend since 2000 due to persistent drought conditions (UDWR 2003).

Because the ANF constitutes a large portion of these wildlife management units, it is likely that the overall mule deer population on the Forest is currently in this same downward trend. Data from recent UDWR classifications indicate that mule deer numbers in the Yellowstone subunit continue to be down (R. Thacker, UDWR biologist, personal communication). However, the data also suggest that the ANF is providing well-distributed habitat that supports a viable population of mule deer.

Alternative 1 – No Action. Implementation of the No Action Alternative would not affect the viability of elk or mule deer populations or impair the ability of the Forest to provide well-distributed habitat for elk and mule deer because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area. There would be no substantial changes in the amount or condition of off-Forest winter range because the Water District would continue its moratorium on the issuance of new water connections until an alternative water supply was developed and brought online. This would deter new development within the Water District's service area. Therefore, there would be no change in winter range that would affect the viability of elk or mule deer populations. It is also determined that there would be no change to population trends of these species on the Forest or within the wildlife management subunits because of the same rationale discussed above.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. The implementation of the Proposed Action Alternative would not result in a net loss of elk or mule deer habitat, and the condition of existing elk and mule deer habitat within the Project Area would essentially remain unchanged. The installation of livestock fencing would not exclude elk and mule deer from being able to access all habitats within the Project Area. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) elk and mule deer using the Project Area at that time. Therefore, the Proposed Action may temporarily affect elk or mule deer by displacing individuals during project construction. However, the implementation of the Proposed Action would not affect the viability of elk or mule deer populations or impair the ability of the Forest to provide well-distributed habitat for elk and deer because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area.

The Water District's current water supply can support 474 equivalent residential connections (ERCs). Water supplied by the Proposed Action would support an additional 369 equivalent residential connections (ERCs), raising the total number of ERCs that could be used within the Water District's service area to 843. Assuming a typical residential site is supported by one ERC and is 0.33 acre in size, a cumulative total of approximately 278 acres of potential winter range could be developed within the Water District's service area (off-Forest) within the next 15-years, which is the projected ERC supply period for the Proposed Action (See Section 3.13 for water supply and socio-economic analysis). This represents approximately 0.42 percent of the land area within the Water District's 104-square mile (66,560-acre) service area. The removal of this small percentage of off-Forest winter range is not expected to affect the overall availability or

condition of winter range within the Water District's service area or the viability of elk or mule deer populations on- or off-Forest.

It is also determined that the implementation of the Proposed Action would not affect the population trends of these species on the Forest or within the wildlife management subunits because of the same rationale discussed above.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no changes to the amount or condition of suitable habitat within the Project Area for elk or mule deer. Noise and construction disturbances associated with the modification of the existing spring boxes and installation of additional livestock fencing may temporarily displace (1 week) elk and mule deer using the Project Area at that time. Therefore, this alternative may temporarily affect elk or mule deer by displacing individuals during project construction. However, the implementation of Alternative 3 would not affect the viability of elk or mule deer populations or impair the ability of the Forest to provide well-distributed habitat for elk and deer because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area.

The Water District's current water supply can support 474 ERCs. Water supplied by Alternative 3 would support an additional 201 ERCs, raising the total number of available ERCs within the Water District's service area to 675. Assuming a typical residential site is supported by one ERC and is 0.33 acre in size, a cumulative total of approximately 223 acres of potential winter range could be developed within the Water District's service area (off-Forest) within the next year, which is the projected ERC supply period for Alternative 3 (See Section 3.13 for water supply and socio-economic analysis). This represents approximately 0.33 percent of the land area within the Water District's 104-square mile (66,560-acre) service area. The removal of this small percentage of off-Forest winter range is not expected to affect the overall availability or condition of winter range within the Water District's service area or the viability of elk or mule deer populations on- or off-Forest.

It is also determined that the implementation of the Proposed Action would not affect the population trends of these species on the Forest or within the wildlife management subunits because of the same rationale discussed above.

Northern Goshawk

The northern goshawk is the MIS for mature and old forest habitats on the ANF. Northern goshawk inhabits coniferous, deciduous, and mixed forests in North America and prefers to forage in closed canopy forests with moderate tree densities as compared to young forests (Graham et al. 1999). A goshawk's home range may be up to 6,000 acres and has three main habitat component needs (nesting, post fledgling area, and foraging area) within this home range (Reynolds 1992). Nesting areas are typically 30 acres in size and may include more than one nest (Reynolds 1992). The post-fledgling area is 420 acres in size and surrounds the nest area (Reynolds 1992). The post-fledgling area typically includes a variety of forest types and conditions, but should contain patches of dense trees as well as developed herbaceous areas and shrubby understory, snags, downed logs and small openings (Reynolds 1992). These attributes are needed to provide security cover as well as the necessary habitats for prey species (Reynolds

1992). The foraging area is approximately 5,400 acres and surrounds the post-fledgling area (Reynolds 1992).

In Utah, most of the 421 known nests located during project level surveys occur in mid-elevation (6,000 feet) to high-elevation (10,000 feet) sites, which are currently occupied by mature quaking aspen or coniferous forests (Graham et al 1999). However, some nests in Utah have been documented in the spruce/fir type (Graham et al. 1999). Many of the documented goshawk territories on the ANF are associated with lodgepole and aspen cover types (ANF unpublished data). Nest areas are occupied from early-March until late-September, when fledglings are no longer dependent upon the post fledgling area PFA (Reynolds et al. 1993). The northern goshawk amendment to the ANF Forest Plan also considers the nesting period to be this same period. According to ANF monitoring data, young usually fledge from early-July to early-August (approximately 43 days of age) and are dependent upon the PFA until August or mid-September (approximately 65 days of age), at which time the fledglings venture further away from the PFA (Dewey 1998 and 1999). The ANF annually monitors known goshawk territories on the Forest (ANF unpublished data).

The predominant habitat types in the Project Area are mixed conifer and aspen forests; sagebrush, riparian, wetland, and meadow habitats are also present. There are no documented goshawk territories in or near the Project Area, and field surveys have determined that there are no nesting sites within the Project Area. However, suitable habitat is present within the Project Area.

Statistical analysis of autumn migratory raptor counts in the Wellsville Mountains of Utah from 1977-1979 and 1987-2001, showed a decline in counts of northern goshawks along this flyway. This analysis also suggests that northern goshawk productivity has dropped substantially in portions of northern Utah (Hoffman and Smith 2002). Hoffman and Smith (2002) further suggest that the severe drought may be depressing raptor populations, range-wide in the interior west.

The ANF has been monitoring northern goshawks since 1991, and has documented a total of 236 active nests over the course of this 13-year period. Of this total, 162 (69%) fledged young (USDA Forest Service 2003). The average occupancy rate of known territories surveyed between 1992 and 2003 was 46.9% (USDA Forest Service 2003). Kennedy (1997) studied goshawk populations across the west, including the goshawk population on the ANF, and found no statistical evidence of a decline in the goshawk population on the Forest.

Analysis of goshawk data collected on the ANF since Kennedy's study indicates that the population is apparently stable across the Forest (USDA Forest Service 2003, ANF unpub. data). Territory occupancy was fairly consistent between 1992 and 2000. The recent decrease in occupancy may also be related to persistent drought. Although the data suggest a decline in occupancy over the last three years (Table 3-6), it is not statistically significant and therefore the trend for the species is apparently stable. It also appears that the ANF supports a viable goshawk population and continues to provide well-distributed habitat across the Forest for this species (ANF unpublished data).

Table 3-6. Northern goshawk data collected on the ANF between 1992-2003.

Measurement	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
# Territories	27	32	41	44	49	53	53	54	55	55	55	56
# Visited	12	27	28	37	43	46	53	49	54	48	45	51
# Occupied	25	24	24	23	30	25	21	23	29	9	13	18

Alternative 1 – No Action. Implementation of the No Action Alternative would not affect the viability of northern goshawk populations or impair the ability of the Forest to provide well-distributed habitat for northern goshawk because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area. It is also determined that there would be no change to the population trend of this species on the Forest because of the same rationale discussed above.

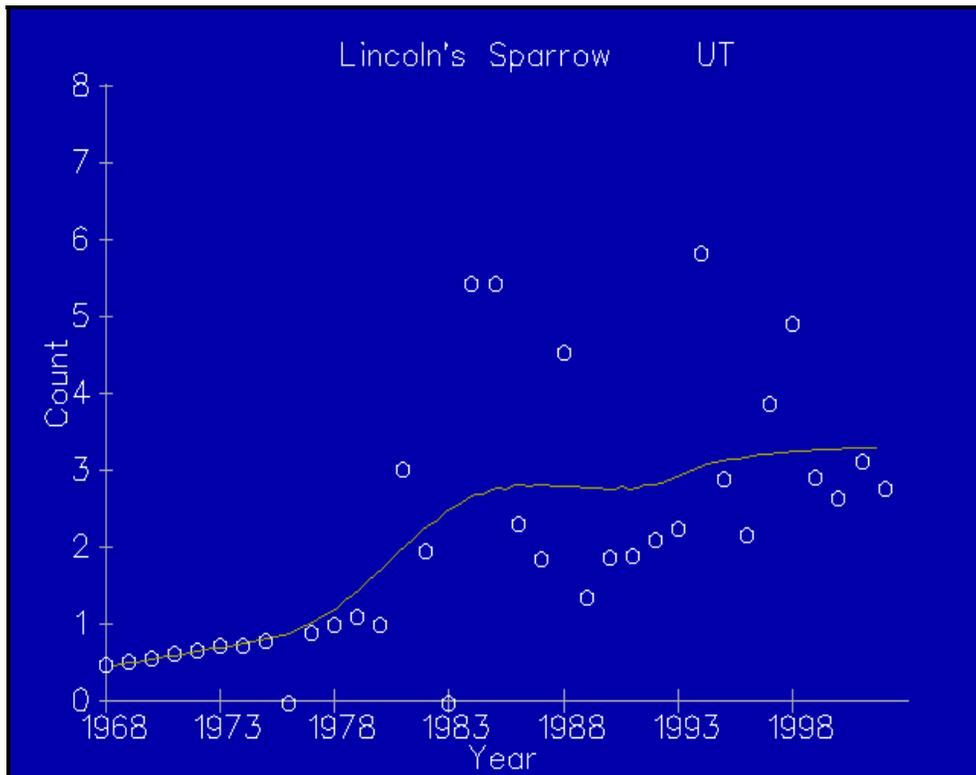
Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be no earthmoving work in suitable habitat for northern goshawk and there would be no disturbances to any known nesting sites. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) northern goshawk using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action may temporarily affect northern goshawk by displacing individuals during project construction. However, the implementation of the Proposed Action would not affect the viability of northern goshawk populations or impair the ability of the Forest to provide well-distributed habitat for northern goshawk because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for this species on the Forest because of the same rationale discussed above.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no earthmoving work in suitable habitat for northern goshawk and there would be no disturbances to any known nesting sites. However, suitable habitat does exist within the Project Area in proximity to where construction activities would occur. Noise and disturbance associated with the construction activities may temporarily displace (1 week) northern goshawk using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, this alternative may temporarily affect northern goshawk by displacing individuals during project construction. However, the implementation of Alternative 3 would not affect the viability of northern goshawk populations or impair the ability of the Forest to provide well-distributed habitat for northern goshawk because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for this species on the Forest because of the same rationale discussed above.

Lincoln's Sparrow and Song Sparrow

Lincoln's sparrow and song sparrow are indicators of riparian shrubs. These species are generally found along streams, wet meadows, riparian thickets, and brushy forest edges (Nature Serve 2003). They forage on insects and seeds, and nest on the ground in concealing vegetation (Nature Serve 2003). Home range for both species is approximately 1 acre (Nature Serve 2003). The Project Area contains suitable habitat for both of these species.

Nature Conservancy data shows Lincoln's sparrow populations in Utah to be "vulnerable" (Nature Serve 2003). However, according to data compiled from North American Breeding Bird Surveys (NABBS) (including two survey routes on the ANF) from 1966 to 2002, Lincoln's sparrow populations in Utah to have a positive trend (Sauer et al. 2003).

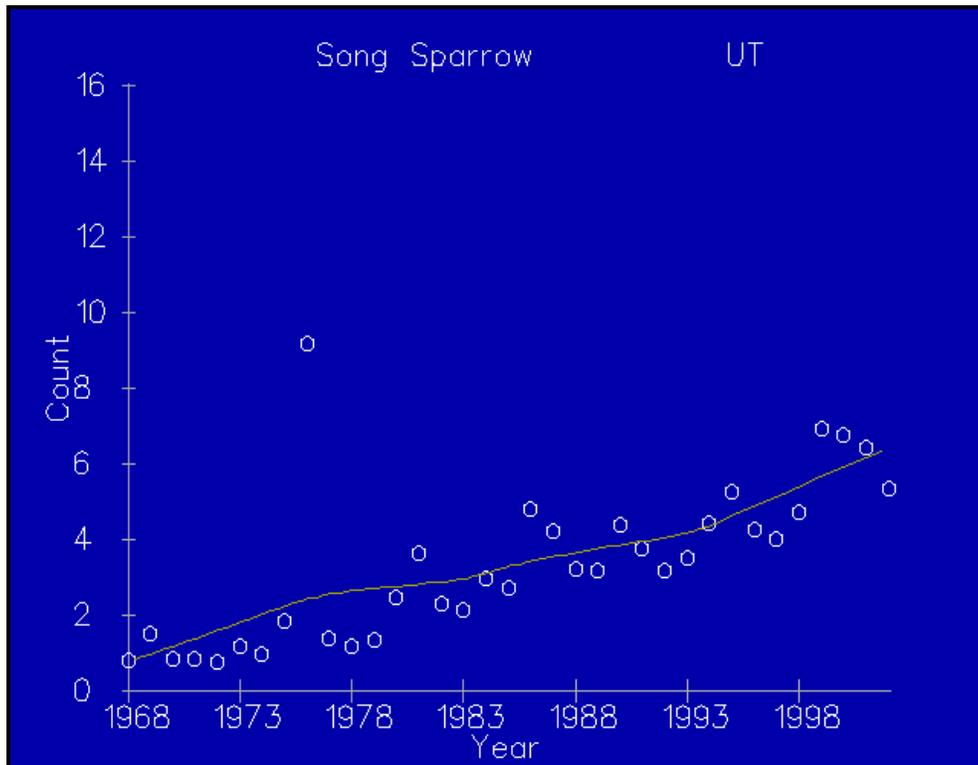


Credibility Measures as stated in Sauer, J. R., J. E. Hines, and J. Fallon. 2003. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1*, [USGS Patuxent Wildlife Research Center](http://www.fws.gov/patuxent/wildlife/researchcenter/), Laurel, MD.

Data from the Grizzly Ridge route (occurs on the Vernal Ranger District of the ANF) appear to indicate that Lincoln's sparrow populations are slightly increasing (Sauer et al. 2003). There have been no detections of Lincoln's sparrows on the Moon Lake route (occurs on the Duchesne/Roosevelt Ranger District of the ANF) (Sauer et al. 2003). Four other BBS routes (Soapstone, Wasatch, Matt Warner Reservoir and Flaming Gorge routes) have habitats similar to those that occur on the ANF and are in close proximity to the Forest (Sauer et al. 2003). The Flaming Gorge and Matt Warner routes did not have any Lincoln's sparrow occurrences, but the Soapstone and Wasatch routes indicate a stable to increasing trend of occurrences of this species (Sauer et al. 2003). The Forest ran three transects in the riparian canyon type in 1994 and 1995

and detected no Lincoln's sparrows and seven song sparrows respectively (ANF unpublished data). Other recorded sightings of Lincoln's sparrows on the Forest appear to be distributed across the Forest (ANF unpublished data).

Nature Conservancy data shows song sparrow populations in the state to be "apparently secure" (Nature Serve 2003). Data compiled from the NABBS from 1966 to 2002 indicate song sparrow populations in Utah have a positive trend.



Credibility Measures as stated in Sauer, J. R., J. E. Hines, and J. Fallon. 2003. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1*, [USGS Patuxent Wildlife Research Center](http://www.fws.gov/pnw/patuxent/wildlife/researchcenter/), Laurel, MD.

Data from the Grizzly Ridge and Moon Lake routes appear to indicate a stable to slightly decreasing trend in song sparrow populations (Sauer et al. 2003). The Flaming Gorge and Wasatch routes did not have any song sparrow occurrences, but the Soapstone and Matt Warner routes indicate a stable to increasing trend of occurrences of this species (Sauer et al. 2003). The Forest ran three transects in the riparian canyon type in 1994 and 1995 and detected 120 song sparrows and 47 song sparrows respectively (ANF unpublished data). Other recorded sightings of song sparrows on the Forest appear to be well distributed across the Forest (ANF unpublished data).

Based on the available data for the ANF and for Utah (Nature Conservancy data, NABBS statewide data, NABBS data on the ANF and areas adjacent to the ANF, and ANF bird transects and sighting records), it is believed that the Lincoln's sparrow population on the Forest is stable to increasing and the song sparrow population is stable. It is also believed that the ANF provides

ample riparian shrub habitat (20,700 acres) that is well distributed across the Forest, and that the ANF sustains viable populations of Lincoln's and song sparrows (USFS 1986).

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to Lincoln's sparrow or song sparrow populations because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Noise and disturbance associated with the construction of the Proposed Action may temporarily displace (2 weeks) Lincoln's sparrow or song sparrow using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, this alternative may temporarily affect Lincoln's sparrow or song sparrow by displacing individuals during project construction. However, the implementation of the Proposed Action would not affect the viability of Lincoln's sparrow or song sparrow populations or impair the ability of the Forest to provide well-distributed habitat for these species because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for these species on the Forest because of the same rationale discussed above.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no impact** to the viability of Lincoln's sparrow or song sparrow populations because there would be no changes to the amount or condition of suitable habitat within the Project Area, and because the minor amount of construction work that would be needed to modify the existing spring boxes would be done during the non-nesting season (September 15 – March 15). Therefore, this alternative may temporarily affect by displacing individuals during project construction. However, the implementation of Alternative 3 would not affect the viability of Lincoln's sparrow or song sparrow populations or impair the ability of the Forest to provide well-distributed habitat for these species because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for these species on the Forest because of the same rationale discussed above.

Greater Sage grouse

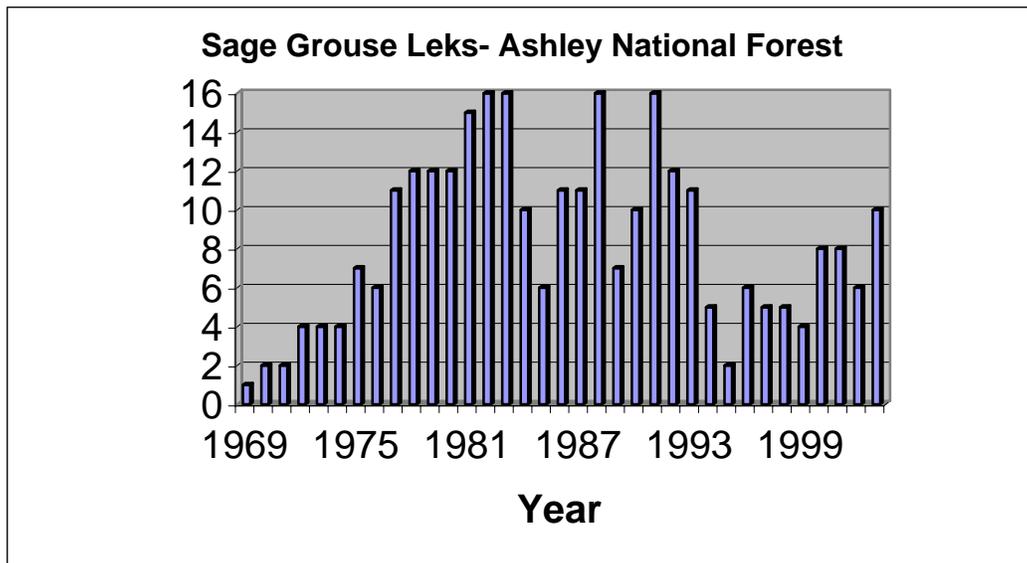
This species is an indicator for sagebrush. Greater sage grouse depend on sagebrush plant communities for all aspects of their life history. In winter, sagebrush is the primary food source for Greater sage grouse and also provides thermal and hiding cover. In the Spring, greater sage grouse congregate on lek sites, areas with little vegetation surrounded by sagebrush, to display and mate. Greater sage grouse hens typically nest under sagebrush bushes near the lek site. Subsequently, sagebrush plant communities near the nest site are used by hens and their broods. The grass and forb understory in this plant community provides a critical food resource. In addition, insects associated with the sagebrush plant community provide an important protein source for young chicks. In late-summer, as habitats become drier, broods will use wet meadows where abundant grasses and forbs provide cover and food. Insects in wet meadows again become an important food source.

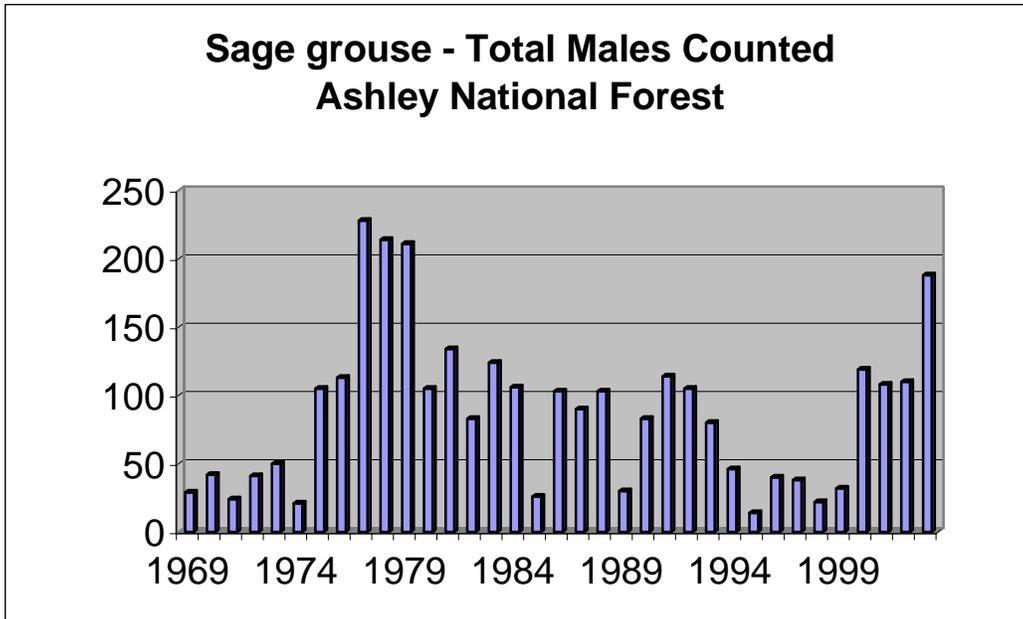
There is an abundance of sagebrush habitat on the ANF, and greater sage grouse are known to occur on the ANF. The ANF has both suitable winter habitat and suitable spring-summer nesting and brood-rearing habitat. According to UDWR habitat maps for greater sage grouse, the Project Area contains winter habitat and brood-rearing habitat. Approximately 2 acres of sagebrush habitat is located on the hillside upgradient of Springs #2 and #3. A minor amount of wet meadow vegetation is associated with the wetlands bordering the riparian areas along the spring channels.

The greater sage grouse is relatively common in the core of its range, but its range has contracted significantly (it is now extirpated in five states and one province). Populations have declined 45 to 80 percent since the 1950s, and by an average of 33 percent across ten states (essentially range-wide) since 1985. This species is threatened by habitat loss, fragmentation and degradation of sagebrush habitat (NatureServe 2003).

In Utah, sage grouse are hunted and their populations controlled in part by harvest. Beginning in 2002, 200 two-bird permits were issued for the Uintas Basin, which includes a portion of the ANF. Harvest levels are currently not available for these years. Harvest levels between 1989 and 1999 varied from 114 to 500 birds (UDWR 1999). The state of Utah has monitored number of active leks and the number of male sage grouse from 1969 to 2003.

Sage grouse use only about one third of the sagebrush habitats on the ANF. The Forest supports about 10% of the sage grouse population in the Uintash Basin; the core range occurs at lower elevations. The UDWR monitors all sage grouse in the Uintash Basin, including the grouse that use the ANF, to determine the threshold populations needed to maintain hunter harvest.





Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to greater sage grouse because there would be no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, approximately 0.29 acre of upland habitat containing minor amounts of sagebrush would be disturbed by the development of Spring #3. The majority of the sagebrush disturbance would be associated with the excavation of an approximately 8,000 sq-ft borrow area, which would be revegetated with a native plant seed mix. Sagebrush would likely recolonize this borrow area over the long-term. Implementation of the wetland mitigation plan would result in approximately 0.4 acre of improved wet meadow habitat associated with the restoration of an abandoned beaver pond/wetland complex. Noise and disturbance associated with the construction activities may temporarily displace (2 weeks) greater sage grouse using the Project Area at that time, but would not impact any potentially nesting or brood rearing birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, this alternative may temporarily affect greater sage grouse by displacing individuals during project construction. However, the implementation of the Proposed Action would not affect the viability of greater sage grouse populations or impair the ability of the Forest to provide well-distributed habitat for greater sage grouse because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for this species on the Forest because of the same rationale discussed above.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no impact** to greater sage grouse because there would be no changes to the amount or condition of suitable habitat within the Project Area, and because the minor amount of construction work that would be needed to modify the existing spring boxes would be done during the non-nesting season (September 15 – March 15). Therefore, this alternative may

temporarily affect greater sage grouse by displacing individuals during project construction. However, the implementation of Alternative 3 would not affect the viability of greater sage grouse populations or impair the ability of the Forest to provide well-distributed habitat for greater sage grouse because there would be no changes to the amount or condition of suitable habitat for this species within the Project Area. It is also determined that there would be no change to population trends for this species on the Forest because of the same rationale discussed above.

3.10.4 Migratory Birds of Conservation Concern

Executive Order 13186 (January 2001) defines responsibilities of federal agencies to protect migratory birds. On December 9, 2002 the Forest Service, USFWS, and USDI Bureau of Land Management entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds as per the directive of EO 13186. This MOU, although presently in draft, provides direction for managing migratory birds. This direction includes identifying species designated by the USFWS as Birds of Conservation Concern that could be potentially impacted by proposed projects, and to utilize best available demographic, population, or habitat association data in the assessment of potential impacts to these species. Only two species on the USFWS List of Birds of Conservation Concern are associated with those habitat types in or near the Project Area: Williamson’s sapsucker and Brewer’s Sparrow (Table 3-7).

Table 3-7. USFWS Birds of Conservation Concern (BCC) for Regions 10 & 16, and Utah Partners in Flight (PIF) Priority Species analyzed for the Cow Canyon Municipal Water Development EA.

Species	BCC	PIF	Habitat description	Analyzed for EA?	Basis for Determination
American Avocet		X	Occurs in shallow ponds, marshes and lakeshores.	No	No Suitable habitat within the Project Area
Black Rosy-Finch		X	Occurs in alpine areas near snow banks in summer.	No	No Suitable habitat within the Project Area
Black-necked Stilt		X	Occurs in shallow ponds, marshes and lakeshores	No	No Suitable habitat within the Project Area
Black-throated Gray Warbler	X	X	Occurs in pinyon/juniper, and brushlands.	No	No Suitable habitat within the Project Area
Brewer's Sparrow	X	X	Occurs in sage flats, desert scrub, and dry brushy montane meadows.	Yes	Project Area contains suitable habitat for this species
Broad-tailed Hummingbird		X	Occurs in mountain riparian.	Yes	Project Area contains suitable habitat for this species
Burrowing Owl	X		Occurs in open country - grasslands, prairies, desert.	No	No Suitable habitat within the Project Area
Flammulated Owl	X		Occurs in ponderosa pine/Douglas fir.	No	No Suitable habitat within the Project Area
Golden Eagle	X		Occurs in open, hilly or cliffy country.	No	No Suitable habitat within the Project Area

Species	BCC	PIF	Habitat description	Analyzed for EA?	Basis for Determination
Greater Sage Grouse		X	Occurs in sagebrush habitats.	Yes	Project Area contains suitable habitat for this species
Lewis's Woodpecker	X	X	Occurs in open forests, especially ponderosa, cottonwood; burned areas.	No	No Suitable habitat within the Project Area
Loggerhead Shrike	X		Occurs in low elevational shrub/scrub habitats.	No	No Suitable habitat within the Project Area
Northern Harrier	X		Occurs in open, grassy habitats or marshes/wetlands.	No	No Suitable habitat within the Project Area
Peregrine Falcon	X		Occurs in open areas with cliffs and water (canyons).	No	No Suitable habitat within the Project Area
Pinyon Jay	X		Occurs in pinyon/juniper and ponderosa in foothills/lower mountains.	No	No Suitable habitat within the Project Area
Pygmy Nuthatch	X		Occurs in ponderosa pine and pinyon/juniper woodlands.	No	No Suitable habitat within the Project Area
Prairie Falcon	X		Occurs in open cliffy country, foothills, and canyons.	No	No Suitable habitat within the Project Area
Red-naped Sapsucker	X		Occurs in coniferous forest and montane riparian woodlands.	No	No Suitable habitat within the Project Area
Sage Sparrow		X	Occurs in shrub-steppe habitats.	Yes	Project Area contains suitable habitat for this species
Three-toed Woodpecker		X	Occurs in coniferous forests.	Yes	Project Area contains suitable habitat for this species
Virginia's Warbler	X	X	Occurs in pinyon/juniper, ponderosa, and scrub habitats.	No	No Suitable habitat within the Project Area
Williamson's Sapsucker	X		Occurs in open, dry coniferous forests; spruce/pine/fir and aspen.	Yes	Project Area contains suitable habitat for this species
Wilson's Phalarope	X		Nests on grassy borders of shallow lakes and marshes.	No	No Suitable habitat within the Project Area
American White Pelican		X	Occurs in large bodies of open water and adjoining marshlands.	No	No Suitable habitat within the Project Area
Black Swift	X	X	Occurs and nests in waterfalls in coniferous forests.	No	No Suitable habitat within the Project Area
Bobolink		X	Occurs in grasslands and fields.	No	No Suitable habitat within the Project Area
Ferruginous Hawk	X	X	Occurs in open and arid rangeland habitats.	No	No Suitable habitat within the Project Area
Gray Vireo	X	X	Occurs in dry, brushy areas; pinyon/juniper woodlands.	No	No Suitable habitat within the Project Area
Long-billed	X	X	Occurs in wet meadows.	No	No Suitable habitat within the

Species	BCC	PIF	Habitat description	Analyzed for EA?	Basis for Determination
Curlew			irrigated fields, and adjoining grasslands.		Project Area
Marbled Godwit	X		Nests in grassy meadows near lakes and ponds.	No	No Suitable habitat within the Project Area
McCown's Longspur	X		Occurs in open habitats; short-grass prairie and low fields.	No	No Suitable habitat within the Project Area
Mountain Plover	X	X	Occurs in dry, upland short-grass prairie; semi-desert.	No	No Suitable habitat within the Project Area
Short-eared Owl	X		Occurs in open, grassy habitats; fields; marshes.	No	No Suitable habitat within the Project Area
Snowy Plover	X		Occurs in mudflats and shores of salt ponds/alkaline lakes	No	No Suitable habitat within the Project Area
Swainson's Hawk	X		Occurs in open, arid habitats, and fields.	No	No Suitable habitat within the Project Area
Yellow-billed Cuckoo	X	X	Occurs in cottonwood riparian forests.	No	No Suitable habitat within the Project Area
Abert's Towhee		X	Occurs in Utah, but only in SW Utah	No	Project Area is outside known distribution of this species.
American Golden-Plover	X		Occurs in grasslands, pastures, and flooded fields.	No	No Suitable habitat within the Project Area
Bell's Vireo		X	Occurs in Utah, but only SW Utah.	No	Project Area is outside known distribution of this species.
Bendire's Thrasher	X		Occurs in Utah, but only Southern Utah.	No	Project Area is outside known distribution of this species.
Chestnut-collared Longspur	X		Nests in moist upland prairies; prefers dense grassy areas.	No	No Suitable habitat within the Project Area
Crissal Thrasher	X		Occurs in Utah, but only SW Utah.	No	Project Area is outside known distribution of this species.
Gambel's Quail		X	Occurs in Utah, but only southern Utah.	No	Project Area is outside known distribution of this species.
Grace's Warbler	X		Occurs in Utah, but only southern Utah.	No	Project Area is outside known distribution of this species.
Gunnison Sage-Grouse	X	X	Occurs in Utah, but restricted to SE Utah.	No	Project Area is outside known distribution of this species.
Lucy's Warbler		X	Occurs in Utah, but only SW Utah.	No	Project Area is outside known distribution of this species.
Sanderling	X		May occur in Utah during migration, on sandy beaches and salt pond dikes.	No	No Suitable habitat within the Project Area
Sharp-tailed Grouse		X	Occurs in sagebrush steppe, riparian mountain shrub, and oak scrub.	No	No Suitable habitat within the Project Area

Species	BCC	PIF	Habitat description	Analyzed for EA?	Basis for Determination
Solitary Sandpiper	X		May occur in Utah during migration, in wetlands and flooded fields.	No	No Suitable habitat within the Project Area
Sprague's Pipit	X		May occur in Utah during migration on prairies, pastures, and fields.	No	No Suitable habitat within the Project Area
Upland Sandpiper	X		Does not occur in Utah.	No	Project Area is outside known distribution of this species.
Whimbrel	X		May occur in Utah during migration on beaches, tidal flats, marshes, pastures, and flooded fields.	No	No Suitable habitat within the Project Area
White-headed Woodpecker	X		Does not occur in Utah.	No	Project Area is outside known distribution of this species.
Yellow Rail	X		Does not occur in Utah.	No	Project Area is outside known distribution of this species.

Williamson's Sapsucker

Williamson's sapsucker is associated with montane coniferous forest, especially fir and lodgepole pine. In migration and winter they are also found in lowland forest (Nature Serve 2003). Species selection of trees for nesting varies from conifers to aspen; however, trees infected with heart rot, or trees that have cavity nests, are preferred (DeGraaf et al. 1991). Nesting occurs in mid-May to mid-June and young are usually fledged by the end of July (Dobbs et al. 1997). They feed primarily on sap, cambium, and ants, but also forage on wood-boring larvae, moths, and other insects (Nature Serve 2003). The ANF is within the breeding range for this species. They arrive in the spring and leave in the fall. North American Breeding Bird Surveys have found that the Williamson's sapsucker is present on the ANF (Sauer et al 2003). The mixed conifer forest at the Project Area may contain suitable habitat for this species.

Brewer's Sparrow

The brewer's sparrow is typically associated with sagebrush habitat. The species typically breeds in sagebrush rangeland but will also use sagebrush openings in pinyon-juniper or conifer forests. During the breeding season, this species primarily preys on insects (Parish et al. 2002). The Brewer's sparrow is a common breeding migrant in Utah. The breeding population in the State appears to be stable or increasing, despite downward trends range-wide. In Utah, the species breeds in sagebrush, desert scrub, and greasewood habitats (Parish et al. 2002).

Alternative 1 – No Action. Under the No Action Alternative, there would be no affect to the viability of Williamson's sapsucker or Brewer's sparrow populations on the ANF because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Disturbances associated with the construction of the Proposed Action Alternative may temporarily displace (2 weeks) Williamson's sapsucker or Brewer's sparrow using the Project Area at that time, but

would not impact any potentially nesting birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action may temporarily affect these species by displacing individuals during project construction, but is not expected to have any long-term effects to the viability of these species populations on the ANF because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no effect to the viability of Williamson’s sapsucker or Brewer’s sparrow populations on the ANF because there would be no changes to the amount or condition of suitable habitat within the Project Area, and because the minor amount of construction work that would be needed to modify the existing spring boxes would be done during the non-nesting season (September 15 – March 15).

3.10.5 Utah Partners in Flight Conservation Species

The Utah Partners in Flight (PIF) working group recently completed a statewide avian conservation strategy (Parrish et al. 2002). The strategy identifies “priority species” for conservation due to declining abundance or distribution, or vulnerability to various local and/or range-wide risk factors. This list of priority bird species is intended to be used as a tool by Federal and State agencies in prioritizing bird species that should be considered for “conservation action” (Parrish et al. 2002); and the Forest Service has adopted this list for consideration in accordance with the guidance directed in EO 13186. One application of the strategy and priority list is to give these birds specific consideration when analyzing effects of proposed management actions, and to implement the recommended conservation measures where appropriate.

Five species on the PIF priority species list are associated with habitat types that occur in or near the Project Area (see also Table 3-7). These species are the sage sparrow, Brewer’s sparrow, broad-tailed hummingbird, greater sage grouse, and three-toed woodpecker. Greater sage grouse and three-toed woodpecker are also designated as FSS and are discussed in detail under the analysis provided above for FSS. The FSS analysis for these two species is also applicable for the PIF priority species assessment.

Sage Sparrow

The sage sparrow prefers shrub-steppe habitats. Although this species typically nests in sagebrush openings in conifer forests, habitat structure may be more important than plant species composition. Sage sparrows require semi-open habitats with vertical structure, patches of forest and open areas, and dense shrubs and grasses. This species typically builds an open cup nest in shrubs and, occasionally, in bunch grass or on the ground under a shrub (Parish et al. 2002). This species can be found foraging on insects, seeds, and plant material on the forest floor.

Sage sparrows are found throughout North America. They are an uncommon permanent resident in Utah, but are a common migrant to the State, typically arriving in early-March and leaving in early-September (Parish et al. 2002). They are found up to 8,000 feet in elevation.

Brewer's Sparrow

The brewer's sparrow is typically associated with sagebrush habitat. The species typically breeds in sagebrush rangeland but will also use sagebrush openings in pinyon-juniper or conifer forests. During the breeding season, this species primarily preys on insects (Parish et al. 2002). The Brewer's sparrow is a common breeding migrant in Utah. The breeding population in the State appears to be stable or increasing, despite downward trends range-wide. In Utah, the species breeds in sagebrush, desert scrub, and greasewood habitats (Parish et al. 2002).

Broad-tailed Hummingbird

Broad-tailed hummingbird prefers streamside areas adjacent to open patches of meadow with wildflowers available (Parrish et al. 2002). They can be found foraging on small insects and nectar in open woodlands, brushy hillsides, conifer/aspen mix, and montane scrub thickets (Nature Serve 2003). Breeding usually begins in early-June and ends by mid-August. Breeding broad-tailed hummingbirds in Utah usually nest between 6,000 and 8,000 feet in elevation and have been confirmed breeding as high as 10,400 feet. (Parrish et al. 2002).

Greater Sage grouse

Greater sage grouse depend on sagebrush plant communities for all aspects of their life history. In winter, sagebrush is the primary food source for greater sage grouse and also provides thermal and hiding cover. In the Spring, greater sage grouse congregate on lek sites, areas with little vegetation surrounded by sagebrush, to display and mate. Greater sage grouse hens typically nest under sagebrush bushes near the lek site. Subsequently, sagebrush plant communities near the nest site are used by hens and their broods. There is an abundance of sagebrush habitat on the ANF, and greater sage grouse are known to occur on the ANF. The ANF has both suitable winter habitat and suitable spring-summer nesting and brood-rearing habitat. According to UDWR habitat maps for greater sage grouse, the Project Area contains winter habitat and brood-rearing habitat.

Three-Toed Woodpecker

The three-toed woodpecker ranges from Alaska across northern Canada to Newfoundland, and south and southeast through the Rocky Mountains to Arizona and New Mexico (DeGraaf et al. 1991). In Utah, this woodpecker nests and winters in coniferous forests, generally above 8,000 feet in elevation (Parrish et al. 2002). They stay on their territories year-round, though insect outbreaks, such as spruce bark beetle infestations, may cause irregular movements (Parrish et al. 2002). Nesting for three-toed woodpeckers occurs in May and June and young can be found in the nest into July (Nature Serve 2003). Three-toed woodpecker is known to occur on the ANF.

Alternative 1 – No Action. Under the No Action Alternative, there would be no affect to the viability of PIF priority species populations on the ANF because there would be no changes to the amount or condition of suitable habitat for these species within the Project Area.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Disturbances associated with the construction of the Proposed Action Alternative may temporarily displace (2 weeks) PIF priority species using the Project Area at that time, but would not impact any potentially nesting birds because the construction would be done during the non-nesting season (September 15 – March 15). Therefore, the Proposed Action may temporarily affect individual

birds by displacing them during project construction, but is not expected to have any long-term effects to the viability of PIF priority species populations on the ANF because there would be essentially no changes to the amount or condition of suitable habitat within the Project Area.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no affect to the viability of PIF priority species populations on the ANF because there would be no changes to the amount or condition of suitable habitat within the Project Area, and because the minor amount of construction work that would be needed to modify the existing spring boxes would be done during the non-nesting season (September 15 – March 15).

3.11 Aquatic Wildlife

This section evaluates aquatic wildlife, including aquatic species of conservation concern in the Project Area. The aquatic species of concern include federally listed threatened, endangered, and candidate species protected under the Endangered Species Act (PL 93-205, as amended), Forest sensitive species (FSS) designated for the Intermountain Region (Region 4), and management indicator species (MIS) designated in the ANF Forest Plan. Additional information and references on threatened, endangered, and candidate species, and Forest sensitive species can be found in the Biological Assessment and Biological Evaluation technical reports, respectively, that were prepared for the Cow Canyon Municipal Water Development Project (on file at the ANF, Duchesne/Roosevelt Ranger District Office).

Cumulative Effects Analysis: The aquatic wildlife impact assessments include the following cumulative effects analysis.

The analysis area for cumulative effects includes the 5-acre Project Area and the length of the Yellowstone River between the diversion reservoir for the Moon Lake Hydroelectric Project and the Forest boundary, a length of approximately 2.6 miles. Within the cumulative effects area, the existing Springs #1 and #2 development project would continue as per the terms and conditions of the Forest Service Special Use Permit. The existing spring boxes, buried pipelines, and right-of-ways would remain unchanged. The permitted diversion of water from Springs #1 and #2 would continue, and the bypass of mitigation flows and unused surplus water would continue. The Moon Lake Hydroelectric Project would also continue to release water from its diversion reservoir such that there would be no net loss of river flow below the Project Area. Summer livestock grazing is expected to continue as per the terms approved by the Forest Service for the existing grazing allotment, which authorizes up to 234 cattle between June 14 – September 30 each year. Existing livestock enclosure fencing would remain in place and livestock would continue to have access to the unfenced portions of the spring channels for watering. The two action alternatives would entail the installation of additional fencing to protect wetland and open water habitats, but livestock would continue to have access to unfenced portions of the spring channels for watering. The only filling of aquatic habitats within the Project Area that would occur in the foreseeable future would be associated with Alternative 2 (the Proposed Action), if approved. There would be no filling of aquatic habitats associated with either Alternative 1 (No Action) or Alternative 3 (Full Utilization of Springs #1 and #2). The only crossing of the Yellowstone River by heavy machinery in the foreseeable future would be associated with Alternative 2 (Proposed Action) or Alternative 3 (Full Utilization of Springs #1 and #2), if

approved. None of the alternatives would result in a net loss of river flow. It is expected that the Moon Lake Hydroelectric Project would continue its routine sluicing of accumulated sediment from the diversion reservoir as an ongoing maintenance measure for this facility. The Forest Service would continue its program to monitor in-stream habitat and fish populations downstream of the Moon Lake Hydroelectric Project's diversion reservoir as a measure to monitor the effects that may be caused by sluicing.

The reach of the Yellowstone River in the vicinity of the existing pipeline right-of-way crossing supports a fishery consisting of mountain whitefish (*Prosopium williamsoni*), mountain sucker (*Catostomus platyrhynchus*), rainbow trout (*Salmo gairdneri*), brown trout (*Salmo trutta*), cutthroat trout (*Oncorhynchus clarki spp.*), brook trout (*Salvelinus fontinalis*), mottled sculpin (*Cottus bairdi*), and speckled dace (*Rhinichthys osculus*). Instream habitat at the river crossing mostly consists of swift flowing runs dominated by small boulders, large cobble and gravel substrates. This type of in-stream habitat occurs throughout the reach, both upstream and downstream of the river crossing site.

The west bank of the Yellowstone River floodplain abuts a steep terrace wall that functions as a barrier for fish movement between the river and the spring-fed channels within the Project Area. There are no fish-bearing streams associated with the three Cow Canyon Springs, but the spring channels support a somewhat diverse assemblage of aquatic macroinvertebrates. A more detailed discussion for macroinvertebrates is provided in the MIS analysis (see Section 3.11.3). An analysis of potential effects to the Yellowstone fishery is provided below.

Alternative 1 – No Action. The implementation of the No Action Alternative would not alter the existing amount of water flowing from the Cow Canyon Springs into the Yellowstone River. The permitted diversion of water from Springs #1 and #2 would continue, and the bypass of mitigation flows and unused surplus water would continue. The Moon Lake Hydroelectric Project would also continue to release water from its diversion reservoir such that there would be no net loss of river flow below the Project Area. Additionally, there would be no alterations to the existing pipeline right-of-way where it crosses the Yellowstone River. Therefore, there would be no impacts to the Yellowstone River fishery because there would be no changes to the amount or condition of in-stream habitat.

Alternative 2 – Proposed Action, Cow Canyon Springs Development. The implementation of the Proposed Action would not result in a net loss of flow in the Yellowstone River below the Project Area because the Moon Lake Hydroelectric Project would release an equivalent amount of water from its diversion reservoir. In order to access the Spring #3 development site, heavy equipment would only be permitted to cross the river at the existing pipeline right-of-way crossing. This would result in a temporary disturbance to the small boulder, large cobble and gravel substrates and in-stream habitat at the river crossing. However, there would be no long-term impact to the Yellowstone River fishery because there would be no net change in river flow below the Project Area, and because the temporary disturbance to channel substrates at the river crossing would not result in a permanent change to the amount or condition of in-stream habitat.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would not result in a net decrease of flow in the Yellowstone River because the

Moon Lake Hydroelectric Project would release an equivalent amount of water from its diversion reservoir. In order to access the spring sites, heavy equipment would only be permitted to cross the river at the existing pipeline right-of-way crossing. This would result in a temporary disturbance to the large cobble and gravel substrates and in-stream habitat at the river crossing. However, there would be no long-term impacts to the Yellowstone River fishery because there would be no net change in river flow below the Project Area, and because the temporary disturbance to channel substrates at the river crossing would not result in a permanent change to the amount or condition of in-stream habitat.

3.11.1 Federally Listed Threatened, Endangered, and Candidate Species

There are four federally listed aquatic wildlife species that are known or suspected to occur on the ANF, or could be affected by actions taken on the ANF: Humpback chub, bonytail chub, Colorado pikeminnow, and razorback sucker. The habitat use and local distribution of these species is shown in Table 3-8. All four of the federally listed species are found in the Colorado River Basin.

Although the Project Area does not contain suitable habitat for any of the listed species, they are evaluated because the spring channels within the Project Area drain into the Yellowstone River, which is a tributary source to the Colorado River.

Table 3-8. Habitat use and local distribution of federally listed aquatic wildlife species evaluated for the Cow Canyon Municipal Water Development Project.

Species	Status	Habitat Use and Local Distribution	Reference
AQUATIC			
Humpback chub <i>Gilia cypha</i>	Endangered	Requires deep, fast-flowing canyon river habitat. Known populations are located in the Colorado River Basin. Project Area does not contain suitable habitat.	USFWS 2002a
Bonytail chub <i>Ptychocheilus lucius</i>	Endangered	Requires fast-flowing river habitat in the Colorado River Basin. Project Area does not contain suitable habitat.	USFWS 2002b
Colorado pikeminnow <i>Ptychocheilus lucius</i>	Endangered	Requires deep, warm water rivers with variable-flow. Known populations are located in the Colorado River Basin. Project Area does not contain suitable habitat.	USFWS 2002c
Razorback sucker <i>Xyrauchen texanus</i>	Endangered	Requires fast-flowing, warm water river habitat with sandy substrates. Known populations are located in the Colorado River Basin. Project Area does not contain suitable habitat.	USFWS 2002d

Alternative 1 – No Action. The implementation of the No Action Alternative would not impact suitable habitat for the federally listed species or alter the amount of water flowing from the Cow Canyon Springs into the Yellowstone River. The permitted diversion of water from Springs #1 and #2 would continue, and the bypass of mitigation flows and unused surplus water would continue. The Moon Lake Hydroelectric Project would also continue to release water from its

diversion reservoir such that there would be no net loss of river flow below the Project Area. Therefore, there would be **no effect** to humpback chub, bonytail chub, Colorado pikeminnow, or razorback sucker because there would be no impacts to suitable habitat and there would be no net loss of flow to the Colorado River Basin.

Alternative 2 – Proposed Action, Cow Canyon Springs Development. The implementation of the Proposed Action would not impact suitable habitat or result in a net loss of flow in the Yellowstone River because the Moon Lake Hydroelectric Project would release an equivalent amount of water from its diversion reservoir to avoid flow depletions. Therefore, there would be **no effect** to humpback chub, bonytail chub, Colorado pikeminnow, or razorback sucker because there would be no impacts to suitable habitat and there would be no net loss of flow to the Colorado River Basin.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would not impact suitable habitat or result in a net loss of flow in the Yellowstone River because the Moon Lake Hydroelectric Project would release an equivalent amount of water from its diversion reservoir to avoid flow depletions. Therefore, there would be **no effect** to humpback chub, bonytail chub, Colorado pikeminnow, or razorback sucker because there would be no impacts to suitable habitat and there would be no net loss of flow to the Colorado River Basin.

3.11.2 Forest Sensitive Species (FSS)

FSS are designated by the Forest Service Regional Forester as “those...for which population viability is a concern, as evidenced by...significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution” (FSM 2670.5). The Colorado River cutthroat trout is the only aquatic FSS that has suitable habitat in the vicinity of the Project Area.

Colorado River Cutthroat Trout

The subspecies Colorado River cutthroat trout (CRCT) was petitioned for threatened or endangered listing in 1999, but was dropped from the petition list in 2004 because of the successful implementation of a multi-state/agency Conservation Agreement and Strategy that has been in effect since 1999 (CDOW 1999).

Intensive surveys for CRCT habitat and distribution have been conducted on the ANF in recent years and these surveys are planned to continue. The subspecies appear to be distributed throughout parts of the Forest, but populations in various streams or stream segments vary in strength. While some populations are threatened by competition and hybridization with nonnative species, a few appear to be thriving in isolated streams or stream reaches. Some populations appear to have been replaced by introduced nonnative fish species. Genetic interactions between existing CRCT populations have diminished from historic conditions because of a decrease in habitat connectivity. The ANF has an ongoing objective to better define CRCT habitat and distribution within the Forest.

The historical range for CRCT included parts of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Behnke 1992). Current distribution is limited to headwater streams or lakes with average daily flows less than 0.85 m³/sec (Young 1996). Behnke (1979) stated that CRCT occupy less than 1% of their historical range. Colorado River cutthroat trout are adapted to cold water. Water temperatures between 4.5 and 15.5 °C appear to be optimum for the subspecies. This subspecies migrates for spawning when threshold water temperatures approach 5 °C (optimum 10 °C) and stream flows subside from spring peaks. Streams selected for spawning are commonly low gradient (up to 3%), perennial streams, with groundwater and snow fed water sources. Use of intermittent streams for spawning is not well documented. Spawning occurs wherever optimum size gravel (12-85 mm in diameter) and optimum water temperatures (5.5-15.5 °C) are found. Depending on variations in growth, spawning populations are comprised of individuals age 3 and older (primarily ages 4-7). Juveniles congregate in shallow, slow-moving parts of the stream.

The ANF is within the Northeastern Management Unit for CRCT. The South Slope of the Uinta Mountains has several pure and potentially pure populations of CRCT. Genetically pure CRCT are known to occur in four miles of the Yellowstone River headwaters, and other tributaries of the Yellowstone River contain potentially pure and suspected hybrid populations. However, the reach of the Yellowstone River included in the Project Area is below this headwaters area and is primarily a brown trout and rainbow trout fishery (ANF unpub. data).

Alternative 1 – No Action. Under the No Action Alternative, there would be **no impact** to CRCT because there are no known populations of pure strain CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, there would be **no impact** to CRCT because there are no known populations of pure strain CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be **no impact** to CRCT because there are no known populations of pure strain CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

3.11.3 Management Indicator Species

Macroinvertebrates and cutthroat trout are the only aquatic MIS designated in the ANF Forest Plan that may have suitable habitat in the vicinity of the Project Area.

Macroinvertebrates

Forest-wide aquatic macroinvertebrates populations have been monitored on the ANF since the early 1980's. The forest wide trend for macroinvertebrates has been steady for the past 20+ years with an average Biotic Condition Factor (BCI) that exceeds 75, which is the minimum value to manage for on the ANF. The genera identified in the Forest Plan include mayflies (*Epeorus ssp*, *Ephemerella doddsi*, *Ephemerella inermis*), Stoneflies (*Zapada spp.*), and the True Cow Canyon Municipal Water Development Project
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fly family Chironomidae. All of these genera are widespread and common on the ANF (ANF unpublished data).

Dr. Mark Vinson (Department of Aquatic, Watershed and Earth Resources, Utah State University) sampled the three Cow Canyon springs for aquatic macroinvertebrates in April 2003 (Vinson 2004). The overflow channels for Springs #1, #2, and #3 were sampled, and the small pond associated with Spring #3 was sampled. The macroinvertebrate assemblages sampled in Springs #1 and #2 are similar with about 20 taxa present, but there is approximately three times as many taxa present (60 taxa) in Spring #3. The greater diversity in taxa in Spring #3 is probably due to the presence of a ponded area, which is absent with the flows associated with Springs #1 and #2; the abundance of watercress, which provides a diversity of niches to be occupied; and warmer water temperatures and higher specific conductance, which may also be due to the abundance watercress present. No rare or unique taxa were collected in any of the spring samples (Vinson 2004). The taxa that were collected are commonly found in macroinvertebrate populations inhabiting other springs in similar mountain settings with similar water quality in northern Utah and elsewhere.

Cutthroat Trout

Cutthroat trout prefers cold-water streams and lakes. The CRCT is the subspecies of cutthroat trout that is native to the ANF. Pure strain populations of CRCT have been documented on the ANF, and are known to occur in four miles of the Yellowstone River headwaters. Other subspecies of cutthroat trout have been stocked on the ANF, and are suspected to have hybridized with CRCT. The dominant fish populations in the Yellowstone River below the Moon Lake Hydroelectric Project's diversion reservoir are rainbow trout and brown trout (ANF unpub. data). The Forest Service has identified a minor amount of cutthroat trout in this segment of the river during electroshocking studies to monitor the Moon Lake Hydroelectric Project's sluicing of its diversion reservoir, but has not completed genetic studies to determine whether these fish are pure strain CRCT (ANF unpub. data). However, a reproducing pure strain population of CRCT within the lower reaches of the Yellowstone River downstream of the Moon Lake Hydroelectric Project's diversion reservoir is not likely not present due to competition with rainbow trout and brown trout.

Successful implementation of the CRCT Conservation Agreement and Strategy by the Utah Division of Wildlife Resources (UDWR) and the ANF has led to an upward trend for CRCT populations in several lakes on the south slope of the Uinta Mountains. However, stream populations of CRCT still remain at risk on the ANF and are on a downward trend Forest-wide primarily due to non-native competition, hybridization, historical grazing, roads, habitat fragmentation, and timber practice. CRCT appears to be distributed throughout much of the ANF, but populations in various streams and stream reaches vary in strength. It appears that some populations are thriving in isolated streams or stream reaches. Many populations have been replaced by non-native fish species. However, with continued planned conservation actions for stream populations as outlined in the Conservation Strategy, an upward trend could be achieved within 5-7 years on the ANF.

The UDWR and ANF continue to better define fish distribution through ongoing surveys. The Forest Service and UDWR are also actively engaged in habitat protection through various

activities such as constructing migration barriers to protect reclaimed streams. Along with the fish barriers, new construction and maintenance of riparian fencing has taken place to protect streamside vegetation and streambanks from livestock damage. In addition, various road projects have been implemented to reduce sediment loading in streams. Paramount to the CRCT stream effort is UDWR's lead role in an interagency effort for mechanical and chemical removal of non-native trout to expand non-competitive habitat for CRCT (ANF unpublished data).

The upward trend for lake populations is largely attributed to the development of a CRCT broodstock program. For example, a healthy and very productive broodstock population of CRCT exists in Sheep Creek Lake. For the past 5 years (1999-2003), thousands of fingerlings from this source have been stocked in several lakes across the south slope of the Uinta Mountains. UDWR's 2001 monitoring effort indicates that 14 of the 62 stocked lakes in 1999 and 2000 exhibit a good potential for full establishment. The continued success of this current trend will be dependent upon future stocking.

In addition to the Sheep Creek Lake broodstock program, two other broodstock programs were recently initiated on the ANF. The Lake Canyon Lake broodstock program located on the south unit was started in 2002 and is scheduled to be ready for stockables in 2006. The third broodstock source, which will be used to supplement CRCT populations on the North Slope of the Uinta Mountains, also resides in Sheep Creek Lake and is also scheduled for stockables in 2006.

Alternative 1 – No Action. Under the No Action Alternative, there would be no affect to the viability of aquatic macroinvertebrate populations on the ANF because there would be changes to the amount or condition of aquatic/spring habitat within the Forest. There would also be no affect to the viability of cutthroat trout populations on the ANF because there are no known pure strain populations of CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Under the Proposed Action Alternative, the encapsulation of Spring #3 would result in the filling of the 1,300 sq-ft (0.03 acre) spring-fed pond. This impact would be with the creation of a similar pond, approximately 1,510 square feet (0.03 acre) in size, that would be sustained by the 112 gpm of mitigation bypass flows from Spring #3. The bypass flows would be conveyed via a buried pipeline that would have a bubble outlet to simulate the groundwater action that currently sustains the shallow pond at Spring #3. The substrates, plant materials and macroinvertebrates in the existing pond would be removed and transplanted into the created mitigation pond. Thus, the mitigation pond would be created with the same water source, substrates, plant materials, and macroinvertebrates found in Spring #3. Therefore, it is anticipated that there would be no affect to the viability of aquatic macroinvertebrate populations on the ANF because there would be no net loss in the amount, and there would essentially be no change in the condition, of aquatic/spring habitat. There would also be no affect to the viability of cutthroat trout populations on the ANF because there are no known pure strain populations of CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Under Alternative 3, there would be no earthmoving impacts to the aquatic habitat associated with Spring #3. Unused surplus water would continue to be bypassed down the overflow channels. However, the aquatic habitat associated with the overflow channels for Springs #1 and #2 would diminish over time as user demand increases, and may eventually become dry during the peak user demand period in the summer when the total flow associated with these two springs would be fully utilized. This impact would be greatest in the channel reaches located immediately downstream of the two spring boxes. The lower channel reaches of these two springs would likely maintain some aquatic habitat because they are gaining reaches. Approximately 0.4 acre of aquatic and wetland habitat associated with the source area of Spring #3 would be protected with livestock enclosure fencing as a mitigation measure to offset the impacts to Springs #1 and #2. The removal of livestock disturbances from the Spring #3 source area would enhance habitat condition. It is expected that there would be no affect to the viability of aquatic macroinvertebrate populations on the ANF because the enhancement of the Spring #3 source area is expected to increase the carrying capacity of the habitat such that there is no net change in the macroinvertebrate populations in the Project Area. There would also be no affect to the viability of cutthroat trout populations on the ANF because there are no known pure strain populations of CRCT within the Project Area, and because there would be no long-term changes to the amount or condition of suitable habitat that could be used by CRCT in the future.

3.12 Cultural Resources

A cultural survey for the Project Area was conducted in 1991 for the Cow Canyon Springs #1 and #2 development project by ARCON archeological research consultants. The survey included a file search and a site inspection of the spring sites. No cultural resource sites were identified within the Spring #1 development site, within an approximately 2-acre area around Spring #2, or within the pipeline right-of-way corridor.

Alternative 1 – No Action. Under the No Action Alternative, no additional water would be developed from any of the Cow Canyon springs and there would be no construction requiring earthmoving. Therefore, there would be no actions that would potentially result in any direct, indirect, cumulative, or unavoidable adverse impacts to cultural resources.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. All machinery disturbances and earthmoving work would be confined to the existing pipeline right-of-way corridor and the 2-acre survey area previously cleared for cultural resources for the Spring #2 development. Approximately 50 percent of the construction work for the Proposed Action would occur in areas that were previously disturbed by the development of Spring #2. Therefore, the likelihood of encountering any cultural sites is expected to be low, and no direct, indirect, cumulative or unavoidable adverse impacts to cultural resources are expected for the reasons stated above. If any cultural resource sites were discovered during project construction, the Water District would immediately notify the Forest Service and cease work until a qualified cultural specialist inspected the site.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. No earthmoving construction work would be associated with Alternative 3. Therefore, the likelihood of

encountering any cultural sites is expected to be low, and no direct, indirect, cumulative or unavoidable adverse impacts to cultural resources are expected for the reasons stated above. If any cultural resource sites were discovered during project construction, the Water District would immediately notify the Forest Service and cease work until a qualified cultural specialist inspected the site.

3.13 Socio-Economics

The Water District was organized in August 1990 as a Special Improvement District to address long-standing culinary water problems faced by the communities it now serves, which include: Altamont, Altonah, Bluebell, Boneta, Mountain Home, Mt. Emmons, Sand Wash and Talmage. As organized, the Water District has the authority to levy taxes on landowners within the Water District's service area. State law requires that all tax-paying landowners within the Water District's service area must be provided equal access to the Water District's services; and that the Water District must provide access to its services when requested.

Financial. The initial start-up cost for the development of Spring #1 and #2 and the construction of the Water District's culinary water distribution system was approximately \$9.74 million. The Water District funded its start-up costs by obtaining \$7.83 million in general obligation and revenue bond loans, and \$1.3 million in grant monies from various State agencies. The balance was funded with the initial tax revenue and hook-up fees collected by the Water District. As of January 1, 2004, the Water District's has approximately \$4.72 million in outstanding loans to be repaid; and its general obligation indebtedness exceeds the limits allowed under State regulations.

Rate Schedule and User Fees. The Water District has two rate schedules. A "normal" schedule is used during the non-irrigation months when user demand is low. The monthly costs for the normal schedule are based on a \$30 base fee for the first 10,000 gallons of water usage; \$1.00 for each additional 1,000 gallons up to 20,000 gallons; and \$0.50 for each additional 1,000 gallons thereafter. A "conservation" schedule is used during the irrigation season. The monthly costs for the conservation schedule are based on a base fee of \$30 for the first 10,000 gallons of water usage; \$1.00 for each additional 1,000 gallons up to 60,000 gallons; \$1.25 for each additional 1,000 gallons between 60,000 and 500,000 gallons; \$2.00 for each additional 1,000 gallons between 500,000 and 750,000 gallons; and \$3.50 for each additional 1,000 gallons thereafter.

The Water Districts normal rates are among the highest 6 percent in the State of Utah (Horrocks Engineers 2003). The median adjusted gross income (MAGI) of the Water District's users is \$26,690 and is 14 percent below the State average of \$32,711. Under the normal rate schedule, the average monthly water bill of the Water District's users is about 1.5 percent of their MAGI. The State-wide average for normal water bills is 1.25 percent of MAGI. This comparison does not include taxes that are assessed by the Water District, or shareholder fees for the Water District's users that are members of the DGIC.

Demographics. The Water District is located in the rural area of northern Duchesne County. Farming and ranching are the primary occupations in this area. Employment in the energy sector fluctuates widely with oil and gas prices. The Governor's Office of Planning and Budget

projects a 0.23 to 1.41 percent growth in the County's population over the next 25 years. Based on its past growth patterns, the Water District projects a 1.32 to 2.96 percent growth in its water users over the next 25 years. The availability of a dependable culinary system is one of the main factors why the Water District's population growth is higher than the County average.

Equivalent Residential Connections and User Demand. As stated previously, UDDW has rules and regulations pertaining to the minimum amount of source water (i.e., ERC flow requirements) that PWSs must have available for their tax-paying users (see R-309-510 of the State of Utah Administrative Rules). The Water District's water system can support a total of 474 ERCs based on its 1.12 gpm ERC flow requirement and the availability of 531 gpm from the existing Springs #1 and #2 development. The Water District has obligations to provide service to 675 ERCs that are currently in use, and an additional 61 ERCs that have been obligated but are currently not in use. As such, the Water District's water system is currently over-appropriated by a total of 262 ERCs (or about 294 gpm), and is out of compliance with State-mandated ERC flow requirements.

User Demands. The Water District does not have sufficient water supplies to meet the peak summer demands of its existing users. The shortage in water supply has precluded the Water District from issuing new connections to its system. In the summer of 2003, the Water District was forced to enact an on-going moratorium on the issuance of new connections until additional water supplies are brought into the system. The Water District does, however, have ample water supplies to meet the demands of its existing users during the non-irrigation months.

In its 2003 Water Resources Plan, the Water District estimated future water usage demands based on projected population growths for a 25-year planning period. Presently, the Water District estimates that 30 percent of its users use the system's culinary water for outdoor irrigation, whereas 70 percent irrigate with secondary water.

Based on the Water District's projections, it will need 1,124 gpm of water supply at the end of the 25-year planning period for peak daily usage, and 1,161 gpm for compliance with State-mandated ERC flow requirements (total of 1,036 ERCs). In order to meet these long-term needs, the Water District will have to develop an additional 593 gpm for peak daily demands and 630 gpm for compliance with State-mandated ERC requirements. These projections account for water conservation measures.

Alternative 1 – No Action. Under the No Action Alternative, the Water District would have to pursue other administratively available alternatives to address its need for additional water supplies. The only technically viable alternatives that would meet the Water District's need would be the groundwater development or surface water treatment alternatives. Overcoming financial obstacles may not be obtainable for the Water District because of its existing indebtedness, debt to equity ratio, and small population and tax base relative to the revenue that would have to be generated in order to fund these alternatives.

The pursuit of other alternatives would require the Water District to continue its moratorium on issuing new water connections. The Water District would likely have to enact emergency

conservation measures restricting water use during peak demand periods for an indefinite period of time until an alternative water supply is secured.

The Water District would remain out of compliance with its State-mandated ERC requirements until an alternative water supply is identified and developed. The Water District would have insufficient water supplies to meet its peak user demands during the summer irrigation months, and it would have to continue its moratorium on issuing new culinary water connections to its taxpayers.

This could place the Water District's viability as a PWS at risk if additional water supplies were not secured in a timely manner. The State could impose fines on the Water District for its noncompliance with ERC flow requirements, and for its inability to provide service to its tax paying users. Taxpayers unable to get new service could rescind their participation in the Water District and demand reimbursement for taxes that have been paid since the Water District was formed. Therefore, implementation of the No Action Alternative could result in substantial adverse socio-economic impacts to the Water District and its taxpaying users for the reasons stated above.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Implementation of the Proposed Action would provide an additional 413 gpm of culinary water supply, which would support an additional 369 ERCs (843 ERCs total). The additional water would allow the Water District to lift its moratorium on issuing new connections, and would bring it into compliance with its State-mandated ERC requirements. The development of Spring #3 would cost approximately \$75,000 to construct. Annual mitigation monitoring costs would be approximately \$5,000 (\$15,000 for three years of mitigation monitoring). The Water District has cash in a State-mandated reserved account to pay for this alternative. Maintenance and operational costs would be minimal.

The Proposed Action would provide enough water supplies to meet the Water District's peak demands for approximately 21 years, and to meet the State-mandated ERC flow requirements for approximately 15 years. This would provide the Water District 15 years to improve its financial position and pursue other water supply alternatives for its long-term needs, which would most likely entail surface water treatment. Based on the Water District's financial projections, its debt structure and revenue flows would allow it to fund a \$2.0 million water treatment project by 2012, and a \$2.5 million project by 2013. Thus, the Water District would be in position to fund a long-term solution to its water supply needs before its water supplies in Cow Canyon Springs would run out. Therefore, the socioeconomic impacts associated with this alternative would be beneficial for the Water District and its taxpaying users because the adverse consequences described for the No Action Alternative would be avoided.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. The implementation of Alternative 3 would provide an additional 225 gpm of culinary water supply, which would support an addition 201 ERCs (675 ERCs total). Alternative 3 would cost approximately \$5,000 to construct. The Water District has cash in a State-mandated reserved account to pay for this alternative. Maintenance and operational costs would be minimal.

Full utilization of Springs #1 and #2 would provide enough water for the Water District's projected peak demands for approximately 11 years. However, it would not provide enough water to meet the 736 ERCs required for the Water District's existing obligated connections. In addition, it would not provide enough water to meet ERC requirements for future growth. The Water District would have to immediately continue its search for additional water supplies in order to meet its State-mandated requirements, and would have to maintain its moratorium on the issuance of new connections to its system. Therefore, this alternative would not be responsive to the Water District's long-term needs and would likely result adverse socio-economic impacts to both the Water District and its taxpaying users for the same reasons stated for the No Action Alternative.

3.14 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments are those that result in loss of future options, such as elimination of non-renewable resources. Irretrievable commitments are those that result in loss of production, harvest, or use of natural resources; if the use changes, it is possible to resume productivity.

Alternative 1 – No Action. Implementation of the No Action Alternative would not result in any irreversible commitments of resources. Flows diverted into the Water District's culinary system from Springs #1 and #2 would be irretrievable.

Alternative 2 – Proposed Action, Cow Canyon Spring #3 Development. Implementation of the Proposed Action would not result in any irreversible commitments of resources. The diversion of flows from Springs #1, #2 and #3 into the Water District's culinary system would be irretrievable. The loss of wetland soil productivity associated with the encapsulation of Spring #3 may also be irretrievable.

Alternative 3 – Full Utilization of Cow Canyon Springs #1 and #2. Implementation of Alternative #3 would not result in any irreversible commitments of resources. The diversion of the flows for Springs #1 and #2 into the Water District's culinary system would be irretrievable.