Rebuttal Report to Roundy (2017)

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1.0 INTRODUCTION

This document presents a rebuttal to the *Review of potential effects of water withdrawal on vegetation of the Cleveland Ranch, Spring Valley, Nevada* (Roundy, 2017). The report by Dr. Bruce Roundy (Roundy report) was prepared for the Corporation of the Presiding Bishopric for the Church of Jesus Christ of Latter-day Saints (CPB) and presented as CPB Exhibit 22. The Roundy report was developed based on a review of reports and transcripts from the Nevada State Engineer's (NSE) 2011 hearing, the Natural Resources Conservation Service Web Soil Survey, and literature on effects of water availability and groundwater drawdown on wetland and riparian plants (Roundy, 2017, p. 1).

The concerns identified in the Roundy report are either already addressed in the *SNWA Monitoring, Management, and Mitigation Plan for Spring Valley, Nevada* (3M Plan) (SNWA, 2017b, presented as Exhibit 592), or are not relevant based on the hydrogeologic conditions, senior water rights, and environmental resources on CPB ranch lands and CPB-permitted grazing allotments.

The 3M Plan was prepared for the Southern Nevada Water Authority (SNWA) groundwater rights in Spring Valley (Hydrographic Area 184) granted under Ruling 6164 (NDWR, 2012), and will be used for the Clark, Lincoln, and White Pine Counties Groundwater Development Project (GDP). The approach and scientific rationale for the 3M Plan are detailed in the *Technical Analysis Report Supporting the Spring Valley and Delamar, Dry Lake, and Cave Valleys, Nevada, 3M Plans* (3M Plan analysis report) (Marshall et al., 2017, presented as SNWA exhibit 507). The Roundy report states that SNWA "needs to clearly state thresholds and triggers for mitigation and then detail proposed mitigation actions" (Roundy, 2017, p. 2). The 3M Plan identifies hydrologic and environmental thresholds, quantitative triggers, and monitoring, management, and mitigation actions to avoid unreasonable effects from SNWA GDP pumping in accordance with the Remand Order (Seventh Judicial District Court of the State of Nevada, 2013) and Nevada water law.

This rebuttal report is organized into the following sections:

Section 2.1. *CPB private ranch lands*. The majority of the Roundy report focuses on the concern that decreased water availability to wetlands, wet and dry meadows, and obligate phreatophytic vegetation on CPB private ranch lands would result in less productive plant communities and not allow Cleveland Ranch to sustain its current productivity. These mesic habitats are supported by senior water rights that are either protected under the 3M Plan, or cannot be affected by SNWA GDP pumping due to lack of hydraulic connectivity. Thus, the mesic habitats on CPB ranch lands can be maintained through protection of senior water rights, provided CPB continues suitable irrigation and grazing practices that support the habitat.

Section 2.2.*CPB-permitted grazing allotments*. The Roundy report briefly discusses the concern for decreased productivity on U.S. Bureau of Land Management (BLM) grazing allotments where CPB holds grazing permits. Multiple lines of evidence indicate that the plants with forage value for cattle that occur within the shrubland habitat of the CPB-permitted allotments are precipitation-dependent, or grow well solely on precipitation, and thus would not be affected by GDP pumping.

Section 2.3. *Plant succession and restoration*. The Roundy report makes a number of statements that are inaccurate or not applicable. Rebuttals are provided for these statements.

2.0 DISCUSSION

2.1 CPB Private Ranch Lands

The Roundy report states that aquatic and wetland vegetation, wet meadows, and obligate phreatophytic communities are the most highly productive communities for CPB ranching operations, and are critical in supplying the private land forage that constitutes 70 percent of the total forage requirement for the Cleveland Ranch livestock (Roundy, 2017, p. 3). The report also states that dry meadows are moderately productive communities for CPB ranching operations, and an essential component of the Cleveland Ranch's private forage base (Roundy, 2017, p. 3). These types of vegetation communities are referred to as "mesic habitat" below and in the 3M Plan (SNWA, 2017b) and 3M Plan analysis report (Marshall et al., 2017).

The mesic habitat in the CPB private ranch lands, which are shown in Figure 1, is supported by CPB senior water rights. Most of the mesic habitat occurs on Cleveland Ranch, which receives irrigation water from Cleve Creek, Stephens Creek, Freehill Creek, Indian Creek, and springs within the parcel (Permit No. 2852 and vested claim Application Nos. V00790, V01217, V01218, and V02817-V02828). South Cleveland Unit, which is managed as part of Cleveland Ranch (Resource Concepts, 2011, p. 9), has limited mesic habitat supported by springs, and a point of diversion (POD) for a BLM reserved spring water right (Application No. R05293). North Cleveland Unit has a small spring used for stock watering (vested claim Application No. V10086)[1]. Rogers Ranch has mesic habitat that is supported by irrigation water from Negro Creek (Permit Nos. 80453-80456), which is conveyed in a pipeline from Negro Creek Homestead. Rogers Ranch also has limited additional mesic habitat created by outflow from South Millick Spring, with a CPB senior water right (Permit No. 8721) for stock watering at the springhead, and a second a senior spring water right (vested claim Application No. V10087) for stock watering within the parcel. Negro Creek Homestead, which is no longer irrigated[2], has limited mesic habitat along Negro Creek. Four Mile Spring Unit has limited mesic habitat associated with a spring, and senior spring water rights (Permit Nos. 3927 and 5028) for irrigation.

None of the surface water in the streams that support mesic habitat in CPB ranch lands will be affected by SNWA GDP pumping. Cleve, Stephens, Freehill, Indian, and Negro creeks do not have a saturated continuum between the stream bed and the producing aquifer in which SNWA GDP production wells will be installed; without hydraulic connectivity, effects from GDP pumping cannot

1. Based on imagery, there also appears to be limited additional mesic habitat in North Cleveland Unit as a result of current irrigation practices on the adjacent private ranch.
2. The vested water claim (Application No. V01080) previously used to irrigate a portion of Negro Creek Homestead was abrogated and replaced by Permit No. 80456, with place of use changed to Rogers Ranch.

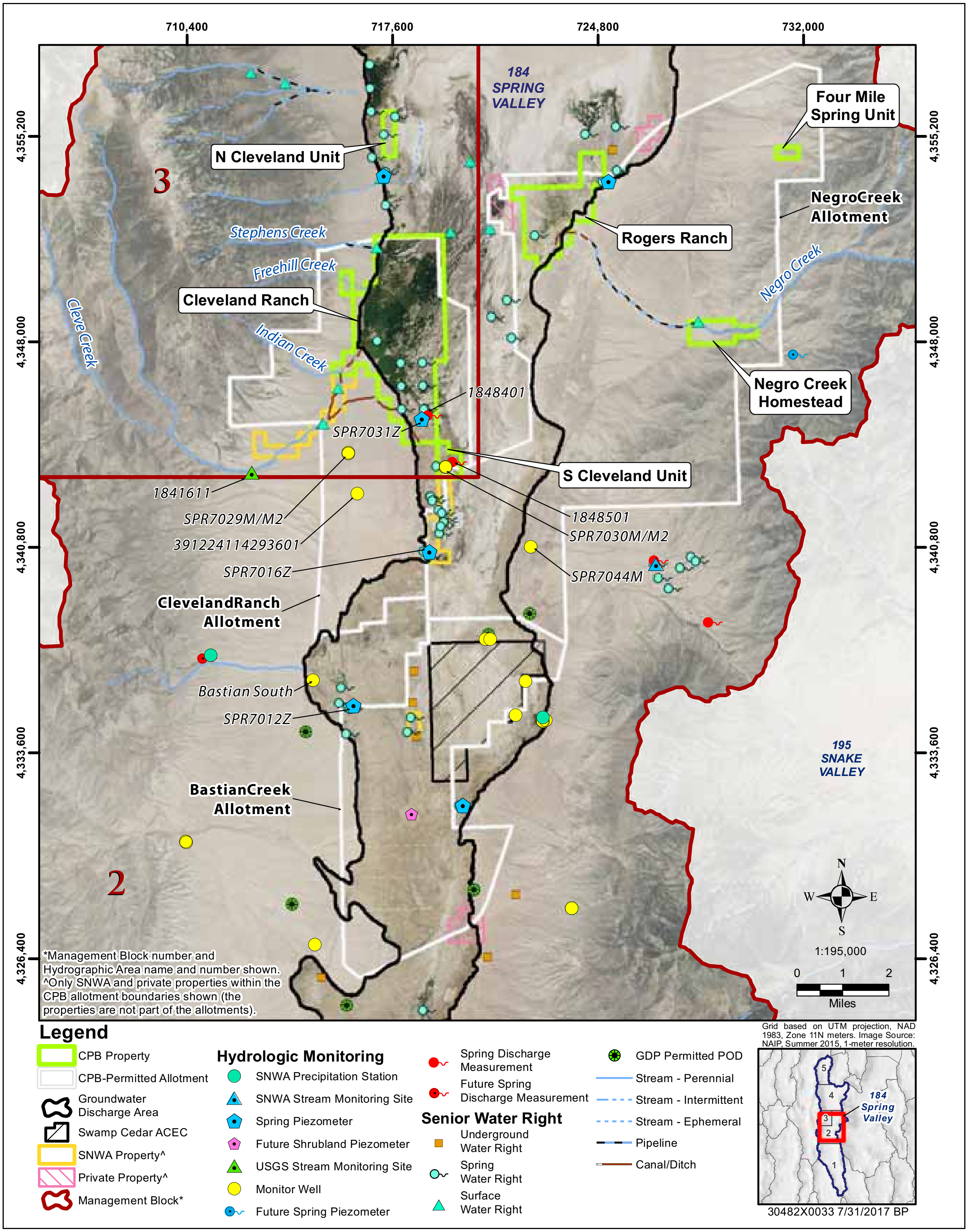

Figure 1
CPB Properties, Allotments, Water Rights, and Hydrologic Monitoring Network

occur (Marshall et al., 2017, p. 4-6). The mountain block springs that irrigate Four Mile Spring Unit also will not be affected by GDP pumping, as they too are not hydraulically connected to the producing aquifer (Marshall et al., 2017, p. 4-6). Lastly, mesic habitat in the Four Mile Spring Unit and the Negro Creek Homestead is outside of the groundwater discharge area (Figure 1), where groundwater levels are deeper than the maximum plant rooting depth. Because the groundwater is not accessible to the plants, changes in groundwater levels will not affect plant survivorship and growth (Marshall et al., 2017, p. 4-6).

The remaining senior water rights that support mesic habitat on CPB ranch lands are protected under the 3M Plan. The 3M Plan includes thresholds, quantitative triggers, and monitoring, management, and mitigation actions that avoid or eliminate conflicts with senior water rights in accordance with Nevada water law (Marshall et al., 2017, Sections 3.0 and 6.2; SNWA, 2017b, Sections 2.1 and 3.0). As stated in the Roundy report, if groundwater withdrawal does not reduce water availability, then impacts to wetlands, meadows, and obligate phreatophytes should be limited (Roundy, 2017, p. 7). Thus, the concerns in the Roundy report regarding mesic habitat on CPB ranch lands are resolved by the 3M Plan, and the fact that the stream irrigation water rights will not be affected by SNWA GDP pumping.

Management Block 3, which includes Cleveland Ranch and the South and North Cleveland Units, is identified in the 3M Plan as an area of focus for enhanced monitoring, management, and mitigation (Marshall et al., 2017, Section 6.3.2.1; SNWA, 2017b, Section 3.3.2.2). The 3M Plan strategy for Management Block 3 includes the following:

- five sentinel wells and four intermediate wells to detect and measure groundwater drawdown that may propagate toward Management Block 3;
- two flumes to measure spring flow, three stream gages to measure stream flow, and a piezometer to measure groundwater level on Cleveland Ranch (including South Cleveland Unit); and
- a stream gage to compare reference conditions on Cleve Creek to groundwater levels and spring discharge on Cleveland Ranch.

The five sentinel wells, which are located in the vicinity of Cleveland Ranch, include two nested wells (SPR7030M and SPR7030M2) on the South Cleveland Unit, two nested wells (SPR7029M and SPR7029M2) southwest of Cleveland Ranch, and one planned well (SPR7044M) southeast of Cleveland Ranch (Figure 1). The four intermediate wells (Bastian South Well, 391224114293601, SPR7016Z, and SPR7012Z) are located between Management Block 3 and SNWA GDP PODs. A piezometer (SPR7031Z) and a flume (11848401) are located at Cleveland Ranch North Spring, and a flume (1848501) is located at Cleveland Ranch South Spring. Pending CPB permission, three stream gages are also planned on Cleveland Ranch irrigation ditches: one upstream of the diversion splitter with the winter ditch, one downstream of the summer ditch, and one on the winter ditch on the ranch. The USGS gaging station on Cleve Creek (1841611) is located upstream of the CPB PODs. The locations of the wells and flumes on CPB property were selected in consensus with CPB and NSE. Descriptions of these monitoring sites and their utility are provided in the 3M Plan (SNWA, 2017b, Section 2.1.3.3) and the 3M Plan analysis report (Marshall et al., 2017, Section 6.2.3). The ability to detect and measure groundwater drawdown propagation from GDP pumping is further discussed in the *Rebuttal Report to Jones and Mayo (2017)* (Burns et al., 2017).

Investigation triggers, which prompt investigation and management actions, are established at all of the above monitor wells and the Cleveland Ranch Spring South flume (Marshall et al., 2017, at Sections 3.2 and 6.2; SNWA, 2017b, at Sections 3.2.1 and 3.3.1). Current baseline hydrographs and investigation triggers for these monitoring sites are presented in Appendix C of the 3M Plan (SNWA, 2017b). Mitigation triggers, which prompt mitigation actions, are established for all senior water rights in the 3M Plan (SNWA, 2017b, Appendix B). The effectiveness of management and mitigation actions in the vicinity of Cleveland Ranch is further discussed in the *Rebuttal Report to Jones and Mayo (2017)* (Burns et al., 2017). Mitigation triggers are designed to protect the volumes of water committed to beneficial use (Marshall et al., 2017, at Sections 3.2 and 6.2; SNWA, 2017b, at Sections 3.2.1 and 3.3.1). Thus, mesic habitat in CPB ranch lands can be maintained through protection of senior water rights under the 3M Plan, provided CPB continues suitable irrigation and grazing practices that support the habitat.

2.2 CPB-permitted Grazing Allotments

The CPB-permitted grazing allotments (Cleveland Ranch, Negro Creek, and Bastian Creek allotments), shown in Figure 1, are dominated by shrubland habitat. Shrubland habitat within the Spring Valley groundwater discharge area is protected under the 3M Plan (SNWA, 2017b, Sections 2.2.1.3 and 3.3.2.3). As stated in Section 2.1, plants outside of the groundwater discharge area will not be affected by GDP pumping.

According to the Southwest ReGAP digital land cover map (Lowry et al., 2007), the following vegetation classifications largely cover the CPB-permitted allotments within the groundwater discharge area: inter-mountain basins big sagebrush shrubland (dominated by basin big sagebrush *Artemisia tridentata tridentata* and/or Wyoming big sagebrush *Artemisia tridentata wyomingensis*), inter-mountain basins greasewood flat (dominated by greasewood *Sarcobatus vermiculatus*), Great Basin xeric mixed sagebrush shrubland (dominated by black sagebrush *Artemisia nova*), inter-mountain basins playa (sparsely vegetated playa), and inter-mountain basins mixed salt desert scrub (dominated by *Atriplex* spp., such as shadscale saltbush). The species listed above can also be co-dominants within these vegetation classifications, as can other shrub species such as Douglas rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosa)*, winterfat (*Krascheninnikovia lanata)*, and ephedra (*Ephedra nevadensis*). A brief overview of these species in relation to their forage value and use of precipitation versus groundwater is provided below.

- Winterfat provides valuable winter forage for cattle (Ogle et al., 2012). It grows in a variety of soils and conditions (Ogle et al., 2012), and populations in the region show that it grows well solely on precipitation. For example, a large winterfat flat in the center of Dry Lake Valley, Nevada (Hydrographic Area 181) exists where depth to water is hundreds of feet (ft) below ground surface[1], far deeper than the maximum plant rooting depth.

1. The depth to water is based on nearby well data (Feast Geosciences, 2011) and surface elevation data (U.S. Geological Survey Digital Elevation Model),

- Black sagebrush provides valuable fall and winter forage for cattle (Fryer, 2009). Soils supporting black sagebrush populations are typically shallow, rocky, and xeric (Fryer, 2009). While black sagebrush occurs in the Spring Valley groundwater discharge area, it is most abundant on the alluvial fan where its roots cannot reach groundwater.

- Shadscale saltbush provides winter forage for cattle (Simonin, 2001a). It prefers soils where groundwater is below the rooting zone (Simonin, 2001a).

- Nevada ephedra is fair forage for cattle (Anderson, 2004). It requires only 6-7 inches of annual precipitation (less than received in Spring Valley)[1] and can grow in a variety of environments, including alluvial fans and well-drained soils on arid hills (Anderson, 2004; Kitchen, 2004). Thus, it can grow well on precipitation alone.

- Douglas rabbitbrush provides less desired forage for cattle after more desirable species are utilized (Tilley and St. John, 2012; Tirmenstein, 1999b). It is shallow rooted (roots have been documented growing to 1.9 ft deep) (Tirmenstein, 1999b), and thus precipitation dependent.

- Wyoming big sagebrush is not preferred by cattle for forage (Howard, 1999). Wyoming big sage-brush is as common on the Spring Valley alluvial fans (where its roots cannot reach groundwater) as it is in the groundwater discharge area, and thus can grow well solely on precipitation.

- Basin big sagebrush is not preferred by cattle for forage (Tirmenstein, 1999a). It is less common in the Spring Valley groundwater discharge area and alluvial fans than Wyoming big sagebrush, as indicated by rangeland monitoring data (SNWA, 2011, 2016, and 2017a). It has deep penetrating roots (Tilley et al., 2008a; Schultz and McAdoo, 2002), and thus is likely using groundwater facultatively in the Spring Valley groundwater discharge area to some degree.

- Rubber rabbitbrush is marginal forage for cattle (Scheinost et al., 2010). It has a deep taproot with less well-developed lateral roots (Tirmenstein, 1999c), and can extend its roots at least 20 ft deep (McLendon, 2011). Thus, it is likely using groundwater facultatively in the Spring Valley groundwater discharge area.

- Greasewood is poor forage for cattle, and can be toxic if eaten in large amounts (Benson et al., 2009). It can extend its roots at least 20 ft deep to greater than 50 ft deep (BLM, 2012, p. 3.5-13; McLendon, 2011), and thus is likely using groundwater facultatively in the Spring Valley groundwater discharge area.

Given precipitation dependence or the ability to grow well solely on precipitation, the shrub species listed above with forage value for CPB cattle should not be affected by SNWA GDP pumping. The shrub species that are likely using groundwater facultatively in the Spring Valley groundwater discharge area (greasewood, rabbitbrush, and basin big sagebrush), and may reduce in cover as a

1. Ely WBO 1981-2010 normal annual precipitation = 9.76 inches (https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?nv2631, National Climate Data Center (NCDC) 1981-2010 Normals).

result of groundwater drawdown, are marginal to poor forage for cattle. As discussed in the 3M Plan analysis report (Marshall et al., 2017, Section 6.3.3) and the Roundy report (Roundy, 2017, p. 6), facultative phreatophytic species typically use groundwater as a secondary source after precipitation, and can also exist on sites where groundwater is not available. A reduction in cover of facultative shrub species would likely lead to a transition in shrubland plant communities. The exact nature and rate of plant transition would depend on a number of inter-relating factors, such as plant species composition and health, hydrology (e.g., groundwater level), soil types and conditions, topography, animal use, disturbance (e.g., fire/lack of fire, drought, unusually wet periods, insects, and disease), and management actions (Marshall et al., 2017, and references therein). To manage such transitions and ensure avoidance of unreasonable effects, the 3M Plan includes a threshold, quantitative triggers, and monitoring, management, and mitigation actions for shrubland habitat within the Spring Valley groundwater discharge area (SNWA, 2017b, Sections 2.2.1.3 and 3.3.2.3).

The shrubland habitat also includes grasses and forbs that provide forage for cattle. BLM identified four key native species within the CPB-permitted allotments: Indian ricegrass (*Achnatherum hymenoides),* needle-and-thread (*Hesperostipa comata*), bottlebrush squirreltail (*Elymus elymoides)*, and shadscale saltbush (*Atriplex confertifolia*) (Resource Concepts, 2011).[1] The first three species are perennial bunchgrasses, and the fourth species is a shrub (which is discussed above). All of these species are relatively common in the shrubland habitat within the Spring Valley groundwater discharge area. A brief overview of these species in relation to their forage value and use of precipitation versus groundwater is provided below.

- Indian ricegrass provides highly valued forage for cattle (Ogle et al., 2013). It is drought tolerant, can extend its roots 3 to 5 ft deep, and does not tolerate poorly drained soils (such as where groundwater is near the surface) (Ogle et al., 2013; Schwinning and Hooten, 2009, p.296; Wickens, 1998, p. 263).

- Needle-and-thread provides good forage for cattle (Ogle et al., 2010). It is very drought tolerant, can extend its roots 3 to 5 ft deep, and has more than half of its root biomass within the first 0.6 ft of soil (Zlatnik, 1999), indicating that it is precipitation dependent.

- Bottlebrush squirreltail provides fair to desirable forage for cattle (Tilley et al., 2008b). It can extend its roots 3 ft deep, and commonly occurs on dry soils (Simonin, 2001b), indicating that it is precipitation dependent.

- James' galleta (*Pleuraphis jamesii*) is another native perennial bunchgrass that provides desirable forage for cattle (Simonin, 2000), and is relatively common in shrubland habitat within the Spring Valley groundwater discharge area (SNWA, 2011, 2016, and 2017a). It prefers soils with low water holding capacity, and can extend its roots 1.5 ft deep (Simonin, 2000), indicating that it is precipitation dependent.

As observed by SNWA during ranching operations over the past 10 years, the reproduction, growth, and forage availability of grasses and forbs in the Spring Valley groundwater discharge area are

1. BLM designates key species in grazing permits, describes them as generally important components of a plant community, and uses them in determining utilization rates and rangeland health (Coulloudon et al., 1999).

strongly determined by seasonal precipitation. This relationship is apparent each spring, as well as other times of the year when precipitation deviates from the norm. For example, the herbaceous plants on SNWA-permitted allotments in Spring Valley produced limited forage in spring 2013 due to drought conditions, but flourished in the fall after heavy monsoon rains.

The ecophysiology of the grass species listed above (e.g., their shallow rooting depths and preference for well-drained soils), the strong relationship between precipitation and herbaceous forage in Spring Valley grazing allotments, and the dominance of shrubs across the CPB-permitted allotments provide strong evidence that the herbaceous forage species, like the shrub forage species, are relying on precipitation. Thus, GDP pumping should not affect the forage for cattle within the shrubland habitat in the CPB-permitted allotments.

Rocky Mountain juniper communities, referred to as “terrestrial woodland habitat” below and in the 3M Plan and 3M Plan analysis report, are also briefly mentioned in the Roundy report (Roundy, 2017, p. 4). Within the CPB-permitted allotments, terrestrial woodland habitat mostly occurs within the BLM-designated Swamp Cedar ACEC in the Bastian Creek Allotment (Figure 1) (Marshall et al., 2017, p. 6-116 Figure 6-55). This terrestrial woodland habitat co-occurs with the shrubland habitat discussed above (i.e., the trees are intermixed with the shrubs). Both Rocky Mountain juniper (*Juniperus scopulorum*) and Utah juniper (*Juniperus osteosperma*) trees are present.[1] These trees do not provide forage for the cattle, but they can provide shade.

As a species, Rocky Mountain juniper has a broad ecological range, is not groundwater dependent, and is adapted to relatively dry and wet conditions within its range (Marshall et al., 2017, Section 6.3.4.1; McLendon, 2011). Utah juniper also has a fairly broad ecological range, is very drought tolerant and a fierce competitor for little available moisture in its habitat (Francis, 2004), and is abundant on the Spring Valley alluvial fan where its roots cannot reach groundwater. Roundy cites the McLendon (2011) report as the source for Roundy’s statement that groundwater withdrawal below 10 ft could “doom [the Rocky Mountain juniper population] to extinction” (Roundy, 2017, p. 4). This statement does not occur in the McLendon (2011) report. Instead, the McLendon (2011) report states that an increase in depth to water could lead to reduced Rocky Mountain juniper cover, and if the trees become decoupled from groundwater the cover would stabilize (McLendon, 2011, p. 3-18). A threshold, quantitative triggers, and monitoring, management, and mitigation actions for terrestrial woodland habitat are identified in the 3M Plan (SNWA, 2017b, Sections 2.2.1.4 and 3.3.2.4).

2.3 Plant Succession and Restoration

The Roundy report makes a number of statements relating to plant succession and restoration that are inaccurate or not applicable, as discussed below.

The Roundy report states:

1. Hybridization between the two species is possible, as they commonly occur together and are both known to hybridize with other juniper species (Francis, 2004; Scianna, 2011).

> *McClendon (2011) indicated that greasewood/saltgrass areas would eventually succeed to sagebrush, but natural plant distribution in the Great Basin indicates that would only occur on relatively small areas. Sagebrush is adapted to and occurs in areas that transition from sagebrush to greasewood-dominated zones (ecotone). Its lack of salt tolerance and tolerance to even periodic flooding, as well as its water requirements restrict it from occurring, and therefore dominating over extensive areas once occupied by greasewood* (Roundy, 2017, p. 6).

This statement is inaccurate for the following reasons:

- Sagebrush can cover large areas in the Great Basin, as evidenced by the Southwest ReGAP digital land cover map (Lowry et al., 2007) and SNWA rangeland monitoring data collected across Spring Valley from 2008 to 2016 (SNWA, 2011, 2016, and 2017a). For example, in the SNWA-permitted Majors Allotment - Osceola Use Area, which is adjacent to the CPB-permitted Bastian Creek Allotment, Wyoming big sagebrush was a dominant or co-dominant species on 18 SNWA rangeland transects surveyed in 2009-2010, 8 of which were located in the groundwater discharge area (SNWA, 2011).

- Not all subspecies of big sagebrush are salt-intolerant. For example, while it is true that basin big sagebrush is salt-intolerant, Wyoming big sagebrush is not (Howard, 1999; Tilley et al., 2008a).

- Additional salt-tolerant shrub species occur in the Spring Valley groundwater discharge area that could also increase on saline soils as part of a shrubland community transition. A good example is shadscale saltbush, which performs well under a variety of salt concentrations, and prefers soils where groundwater is below the rooting zone (Simonin, 2001a). An increase in shadscale saltbush would be beneficial to CPB's ranching operations, as shadscale saltbrush provides winter forage for cattle (Simonin, 2001a), compared to greasewood and rabbit rubberbrush whose forage value for cattle is poor to marginal (Benson et al., 2009; Scheinost et al., 2010; Tirmenstein, 1999c).

- A declining water table over a long time period can reduce the amount of salt brought to the surface via plant capillary action, causing a transition to salt-intolerant species that were previously unable to live under such saline conditions (Marshall et al., 2017, p. 6-90, and references therein).

- Although greasewood is generally considered to be a salt-tolerant species, it is not confined to saline soils, and greasewood-dominated sites in Spring Valley do not appear to have high salinity levels based on associated species (McLendon, 2011, p. 3-10 and 4-8).

- A transition from mesic habitat to shrubland habitat, which was presented as an example in the McLendon (2011) report, versus a transition from one shrubland community to another are substantively different. This distinction is often not clear in the Roundy report. As discussed in Section 2.1, a transition of the mesic habitat on CPB ranchlands will not occur due to protection of the senior water rights under the 3M Plan, provided that CPB continues its irrigation practices that currently maintain that habitat. Furthermore, as discussed in

Section 2.2, multiple lines of evidence indicate that forage for cattle in the shrubland habitat in the CPB-permitted allotments is precipitation-dependent or grows well solely on precipitation, and thus would not be affected by GDP pumping. Lastly, any transition in shrubland plant communities that may occur as a result of GDP pumping will be managed to avoid unreasonable effects under the 3M Plan (Section 2.2).

The Roundy report discusses restoration of cheatgrass (*Bromus tectorum*)-infested areas, stating that “much” of the uplands (alluvial fans) in Spring Valley have “converted to cheatgrass annual grassland due to repeated fires” (Roundy, 2017, p. 3 and 7). In actuality, while cheatgrass invasions have occurred in Spring Valley, only certain areas are dominated by infestations. Furthermore, SNWA has not proposed large-scale restoration of upland areas dominated by cheatgrass which, whether caused by fire or other factors, would not be a result of GDP pumping. As discussed in Section 2.2, the 3M Plan establishes management and mitigation actions for shrubland habitat within the groundwater discharge area.

The Roundy report identifies that drought (or reduced water availability) can reduce growth, biomass, and seedling survival of wetland and riparian species (Roundy, 2017, p. 4), failing to acknowledge that such effects on vegetation depend on a variety of factors (such as rate, intensity, and duration of the drought; land and water management actions; and plant species composition). For example, if CPB were to stop all irrigation on Cleveland Ranch during the entire growing season during a drought year, the effects listed in the above statement could be realized. On the other hand, if CPB were to slightly reduce irrigation levels for a period of time and then resume previous practices, the effects would be much more minimal. Furthermore, species that are drought tolerant would be affected differently than species that are intolerant to drought. As documented in 2008-2009 (SNWA et al., 2011), both drought-tolerant and drought-intolerant species are common on the CPB ranch lands, as well as species that produce seeds that can survive in the soil for multiple years. Roundy did not consider the species composition of the CPB ranch lands, and the citations he provided were not tailored to the common species or the region (the single species evaluated by Touchette and Steudler (2009) has a native range that does not extend into the southwestern U.S., and none of the species analyzed by Garseen et al. (2014) are dominant on CPB ranch lands). Finally, as discussed in Section 2.1, these concerns regarding mesic habitat on CPB ranch lands are resolved by the fact that CPB stream irrigation water rights will not be affected by SNWA GDP pumping, and the remaining senior water rights are protected under the 3M Plan.

The Roundy report states that successful seeding using only rainfall on former wetlands and meadows without irrigation is unlikely (Roundy, 2017, p. 7). Because mesic habitat on CPB ranch lands will not be affected by GDP pumping, discussion about seeding these areas is not relevant. Furthermore, SNWA never stated plans to simply drop seed on an area and wait to see if the seeding was successful. As discussed in the 3M Plan analysis report in regard to shrubland habitat mitigation, the success rate of seeding and seedling transplanting is dependent on a variety of factors such as the specific method, species, quality of plant/seed materials, existing soil conditions, timing, precipitation, and subsequent land use (Marshall et al., 2017, Section 6.3.3.4). Thus, SNWA’s shrubland habitat mitigation actions include appropriate implementation of vegetation restoration techniques, assessment of mitigation efficacy, and continued implementation as necessary to achieve successful mitigation (Marshall et al., 2017, Section 6.3.3.4; SNWA, 2017b, Section 3.3.2.3).

3.0 CONCLUSION

The Roundy report focuses largely on potential effects of decreased water availability on wetlands, meadows, and obligate phreatophytic vegetation (mesic habitat) within the CPB private ranch lands, but does not consider that this habitat is supported by senior water rights. Many of the senior water rights are on streams that will not be affected by SNWA GDP pumping due to lack of hydraulic connectivity (Section 2.1). The remaining senior water rights are protected by the Spring Valley 3M Plan (SNWA, 2017b) in accordance with the Remand Order and Nevada water law (Section 2.1). Water and habitat management within CPB ranch lands is not within the authority of SNWA. However, protection of the senior water rights under the 3M Plan ensures that the mesic habitat supported by those water rights can be maintained, provided CPB continues suitable irrigation and grazing practices that support the habitat.

The Roundy report briefly discusses the concern for effects from GDP pumping to shrubland habitat within the CPB-permited allotments, but does not consider species forage value or precipitation dependency. Multiple lines of evidence indicate that the shrubs and herbaceous plants that provide forage for cattle in these areas are precipitation-dependent or grow well solely on precipitation, and thus would not be affected by SNWA GDP pumping (Section 2.2). The shrub species that are likely using groundwater facultatively in the Spring Valley groundwater discharge area, and may reduce in cover as a result of groundwater drawdown, are poor to marginal forage for cattle. The juniper trees within the terrestrial woodland habitat in the CPB-permitted allotments, which co-occurs with the shrubland habitat (i.e., the trees are intermixed with the shrubs), also do not provide forage for cattle (Section 2.2). To avoid unreasonable effects to environmental resources, the 3M Plan includes thresholds, triggers, and monitoring, management, and mitigation actions for both shrubland and terrestrial woodland habitat within the Spring Valley groundwater discharge area (SNWA, 2017b, Sections 2.2.1.3 to 2.2.1.4 and 3.3.2.3 to 3.3.2.4)

A variety of natural and human-induced events unrelated to GDP pumping can affect vegetation and ranching practices in Spring Valley. Such events include but are not limited to fire, land management (e.g., overgrazing), water management (e.g., irrigation and water diversions), drought, weed infestations, and insect pests (e.g., grasshopper infestation and herbivory). Roundy fails to address all of these relevant factors, and instead attributes total causation of potential effects to SNWA GDP pumping.

Policy statements in the Roundy report, such as whether environmental change is acceptable, or regarding the potential success of large capital investment, are not expert opinions. Rather, these statements relate to policy decisions that the NSE has already addressed in Ruling 6164 (NDWR, 2012) and that were not overturned by the Court (Seventh Judicial District Court of the State of Nevada, 2013). The issue in the Remand Order of relevance to the Roundy report is to “Define standards, thresholds or triggers so that mitigation of unreasonable effects from pumping of water are neither arbitrary nor capricious in Spring Valley” (Seventh Judicial District Court of the State of Nevada, 2013, p. 23). The 3M Plan identifies hydrologic and environmental thresholds, quantitative triggers, and monitoring, management, and mitigation actions to avoid unreasonable effects from SNWA GDP pumping in accordance with the Remand Order and Nevada water law.

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