3.9 Master Response on Biological Resources

3.9.1 Introduction

Overview

This master response addresses issues commenters raised on Biological Resources. Generally, concerns were raised that the Project could adversely affect the desert ecosystem. Specific issues raised include potential effects on endangered species such as desert tortoise and bighorn sheep, which may rely on natural seeps and springs that commenters believe could be affected by Project operations. Concerns were raised that spreading basins constructed as part of the Imported Water Storage Component could attract ravens, which in turn could prey on desert tortoise. Other concerns involve how the removal of water might affect moisture in the valleys and whether that could change the microclimate and adversely affect plant communities. Concerns were also raised that impacts to biological resources could reach beyond the Project area into the Mojave National Preserve and federal wilderness land.

This master response is organized by the following subtopics:

3.9.2 Impacts to Biological Resources

Summary of Issues Raised by Commenters

Comments were received stating that the Project will cause irreversible harm to the desert ecosystem and will affect endangered species such as bighorn sheep and desert tortoise. Commenters stated that impacts and mitigation measures were not adequately addressed. Commenters stated that the Project would remove water from the desert community that depends on it for survival and that the Project would affect moisture in the valleys, changing the microclimate and adversely affecting plant communities. Comments expressed concern for potential impacts to biological resources beyond the Project area, particularly into the Mojave National Preserve and federal wilderness land.

Response

Groundwater Use in the Desert

Vegetation

The alluvial aquifer beneath the Fenner, Cadiz, and Bristol Watersheds is inaccessible to the surface ecosystem. Depth to fresh groundwater in the upper reaches of the Fenner Watershed can be as much as 400 feet and is never less than 65 feet (Draft EIR Vol. 1, Section 4.9 Hydrology and Water Quality, pp. 4.9-28 to 4.9-31 and Final EIR Vol. 7, Appendix E2 Fugitive Dust and Effects from Changing Water Table at Bristol and Cadiz Playas). Under the Cadiz Inc.

properties approximately seven miles east of Bristol Dry Lake, groundwater is between 150 feet below ground surface (bgs) on the western edge and over 200 feet bgs on the eastern side. At these depths, even deep-rooted plant life does not reach the stored water in the aquifer. Under the Dry Lakes themselves where groundwater is closer to the surface, the water is hyper-saline and could not support plant life. As a result, changes in the water table or depth to groundwater below the surface will have no impact on plant life at the surface. Phreatophytic vegetation is a category of plants that can use groundwater, but do not always depend upon groundwater for their survival. These plants often exhibit deep and wide tap roots extending 30 feet or more below ground surface (Draft EIR Vol. 1, Section 4.9 Hydrology and Water Quality, p. 4.9-49). Analysis of the highest verdant vegetation cover of the region, located on the northern margin of the Bristol Playa where phreatophytic vegetation would most likely be present, determined that plant roots do not extend down far enough to reach groundwater, and therefore these plants do not depend upon groundwater for their survival. Rather the vegetation relies on surface water, primarily as runon from the Orange Blossom Wash after storms. Surveys along the northern margin of the Cadiz Playa confirmed a lack of verdant cover – verdant cover that would be present if groundwater were accessible to plant root systems. This analysis is described in detail in the Final EIR Vol. 7, Appendix F4 Vegetation Groundwater Levels and Potential Impacts from Groundwater Pumping Near Bristol and Cadiz Playas. Please see also **Master Response 3.6** Vegetation.

The broad alluvial valleys in the Project area are dominated by creosote scrub habitats with Mojave wash scrub found in ephemeral washes; these habitats survive only on surface water runoff (See Draft EIR Vol. 1, Section 4.4.1 Biological Resources, pp. 4.4-1 to 4.4-4).

As described in **Master Responses 3.5** Dry Lakes and Dust and **3.6** Vegetation, groundwater at the edges of the Bristol Dry Lake occurs at depths of 65 feet or more below ground surface. In these marginal areas, the creosote scrub gives way to widely-spaced salt bushes. This habitat transition is likely due to the increasing salinity of the soils. On the relatively flat surface of the Dry Lakes toward the center and western quadrants of Bristol Dry Lake where groundwater is shallower (~10 feet below ground surface) no vegetation occurs; any water that does reach the surface is highly saline with high concentrations of calcium chloride and does not support plant life. At Cadiz Dry Lake, shallow groundwater is found under most of the playa, though no vegetation survives in the highly saline soils.

Wildlife

As described above, the alluvial groundwater is inaccessible to plant life and wildlife within the Fenner, Bristol, and Cadiz Watersheds. Desert plants and animals adapt to their arid environment relying on surface water, since groundwater is located well beyond their reach. The millions of acre-feet of stored fresh water are not utilized, except by scattered groundwater wells in the Watershed serving private properties. Given that wildlife in the region does not currently have access to this water, lowering of the depth to groundwater beneath the Project wellfield and Dry Lakes would have no effect on wildlife.

The important mountain springs that support wildlife such as Nelson's bighorn sheep, are top-fed. That is to say, the springs are fed from rainwater or snow melt seeping through rocks and soil from higher elevations in the mountains, as described in detail in **Master Response 3.4** Springs. These springs are not created by pressure from below. They have no connectivity with the lower alluvial aquifer, i.e., groundwater, which is thousands of feet lower in elevation. Accordingly, any lowering of the groundwater levels in the valley aquifers would have no effect on the springs, which are located at higher elevations. Ephemeral pools or tinajas recently mapped in the Marble Mountains are fed exclusively by surface runoff and guzzlers (a barrel reinforced by a concrete apron that directs rainfall into a pool) (Vol. 1, Section 4.9 Hydrology and Water Quality, p. 4.9-19). Water remaining *after* the mountain springs have taken their supply migrates down gradient to the valley floor and on to the Dry Lakes. Therefore, the springs and supporting man-made features serving as watering holes for the bighorn sheep and other desert wildlife would not be affected by Project operations. See **Master Response 3.4** Springs.

Mojave National Preserve

The Mojave National Preserve (MNP) is a 1.6 million acre park established by Congress in 1994 and managed by the National Park Service (NPS). The NPS management objectives for the MNP include protecting natural and cultural resources and fostering a better understanding of the resources in the Preserve.[1] The MNP is located approximately 20 miles north of the proposed Cadiz wellfield and includes the northern portion of the Fenner Watershed north of I-40. The proposed Project would not affect natural resources in the MNP including wildlife, vegetation, geological resources, groundwater resources, or the noise environment since no facilities would be located within 20 miles of the Preserve. As shown in the Draft EIR (Vol. 4, Appendix H1 Cadiz Groundwater Modeling and Impact Analysis, Figures 64 to 69) , the groundwater within the MNP would not be affected by the Project, since the drawdown would not reach north of I-40. Therefore, the Project would have no impact on resources or management goals of the MNP.

Impacts to Desert Ecosystem from Construction and Operation

The Draft EIR Vol. 1, Section 4.4 Biological Resources provides an extensive assessment of the biological resources within the footprint of the Project that could be affected by construction or operation of the Project. Thirteen special status and five natural diversity database animal species (Vol. 1, Section 4.4 Biological Resources, p. 4.4-10) and three special status and five limited distribution plant species (p. 4.4-33) were identified as having medium to high potential to occur in the Project area. Multiple field surveys, including protocol surveys in some areas, were conducted along the proposed pipeline alignment, within the proposed wellfield area, and within the conceptual spreading basins area to identify plants, animals, reptiles, and birds (pp. 4.4-37 to 4.4-38).

Within the vast desert environment, the Phase 1 footprint would be minimal and largely confined to existing disturbed areas along the Arizona and California Railroad Company (ARZC) Right-of-

[1] Mojave National Preserve General Management Plan, National Park Service, 2002, p 2.

Way (ROW) and an expansion of the existing wellfield northeasterly up the Fenner Gap. Potential impacts would occur primarily during the Project construction period when earthwork and equipment movement activities could potentially disturb or harm wildlife species that enter the active construction area. After construction is completed, there would be minimal operational activity and limited permanent impact to potential habitat acreage.

Impacts from construction of the 43-mile pipeline corridor would occur within the 200-foot wide ARZC railroad easement from the Cadiz Inc. properties to the CRA. This corridor is largely disturbed by the development and active use of the railroad and existing access road. Operation of the pipeline would increase traffic on the access road slightly, but not substantially, with fewer than three trips a day (Draft EIR Vol. 1, Section 4.3 Air Quality, p. 4.3-13). Furthermore, the pipeline will be laid underground, along the railroad tracks no more than 100 feet from the centerline thus causing no permanent disturbance once installed and only temporarily impacting a narrow area of desert along the tracks during construction.

Construction of the Phase 1 wellfield would occur in phases and could include clearing up to 34 well pads and connecting access roads for installation of the wells and manifold. Well pads would be spaced at approximately 1,500-foot intervals, accommodating approximately four wells per square mile as shown in Figures 3-6a and 3-6b. As described in the Draft EIR Vol. 1, Chapter 3 Project Description, p. 3-26, a typical well pad would be located within a fenced area of approximately 1,000 square feet (e.g., 30 feet x 34 feet or 20 feet by 50 feet). See new Figure 3-9a for an example of a typical existing well pad on the Cadiz Inc. property (Final EIR Vol. 6, Chapter 5 Draft EIR Text Changes). Clearing around the well pad would be maintained for vehicle parking and staging. The Draft EIR Vol. 1, Section 4.4 Biological Resources concludes in Table 4.4-2 that the Project wellfield would permanently impact up to 113 acres of previously undisturbed desert habitat. The northern and southern segments of the ARZC ROW would permanently affect no more than 129 acres. There would be approximately 250 acres of overall permanent Project footprint. As discussed in the Draft EIR, tortoises are not considered common anywhere along the ARCZ ROW; and survey evidence suggests that they occur in low densities in the area around the northern half of the pipeline alignment and may be absent or occur in low density in the area around the southern half of the pipeline alignment.

No federal or State-listed plant species were identified within these construction areas. Except for a single observation well within the Piute Wash Watershed, none of the facilities (i.e., the wellfield, the pipeline, or the CRA tie-in) is located in designated critical habitat for any special-status species. The impacts to all species that could potentially be impacted would be mitigated to a less than significant level through pre-construction surveys, fencing, and programs to avoid, protect and preserve habitat as compensation for potential effects. The Draft EIR Vol. 1, Section 4.4 Biological Resources, pp. 4.4-45 through 4.4-53 identifies 17 mitigation measures that would be implemented for the Phase 1 Component to ensure that impacts to biological resources are avoided or substantially minimized and that appropriate habitat compensation is conserved to offset the limited effects of the Project. In response to comments that requested additional detail for proposed mitigation measures and urged that avoidance opportunities be analyzed and pursued where possible, additional detail has been incorporated into the mitigation measures to

further clarify the specific steps and activities that will be implemented to avoid impact to wildlife resources, particularly the desert tortoise (see **Response O_NPCA-CBD *et al*.-61** as well as **-62** and Final EIR Vol. 6, Chapter 5 Draft EIR Text Revisions for revisions to select biological resources mitigation measures). As reflected in the detailed mitigation measures, all feasible mitigation measures will be imposed to avoid impact to the desert tortoise during construction and operation. There are no significant and unmitigable impacts to any biological resources identified in the Draft EIR resulting from construction or operation.

As compared to construction impacts, operation of the Project would have an even smaller effect. During Project operations, only a few vehicle trips per day (approximately three trips per day) would occur within the Project area, similar to current conditions for the existing agricultural operations. The Draft EIR concludes that operation of the Project would involve low-intensity uses that would result in minimal impacts to the local ecosystems. Most facilities would be unmanned, including unmanned wellheads, an underground pipeline, and an unmanned CRA tie-in facility; Project facilities would be monitored constantly and remotely with occasional visual inspection and required maintenance occurring onsite. Furthermore, as discussed above, operations causing the lowering of groundwater would have no effect on the local ecosystems.

Federal or State Listed Species – Desert Tortoise

Only one federal or State-listed species (identified as either Threatened or Endangered on the National or California Endangered Species Act) was found to have the potential to occur within the Project area: the desert tortoise (see Draft EIR Vol. 3, Appendix F1 Focused Survey for Desert Tortoise, Habitat Evaluation for Burrowing Owl, and General Biological Resource Assessment). With the sole exception of one monitoring well in the Piute Valley, however, none of the Project components in Phase 1 would be located in designated critical habitat for desert tortoise. All of the Project facilities also are located outside of a Desert Wildlife Management Area (DWMA) and, as such, are in areas characterized as Category 3 Habitat, which is the lowest priority management area for viable populations of desert tortoise. Evidence from the 2010 field surveys conducted for the Project indicates that tortoise only occur in low densities in the general area and may be absent or occur in low density in the southern half of the pipeline alignment. The habitat quality for the tortoise improves to the northeast of the wellfield, outside the Project area (Draft EIR Vol. 3, Appendix F1).

Regarding the potential for the Project to establish new surface water sources that might attract predators to desert wildlife, the storage facility proposed as an optional element of the CRA tie-in (forebay and/or equalization storage facility) would be located near the CRA, which is an existing and constant source of water that runs through the desert. Therefore, the addition of a CRA tie-in facility that holds standing water would not increase the viability of ravens and coyotes given its proximity to an already existing water source. Similarly for the proposed Phase 2 recharge basins, they may provide a periodic water source for raven and other predators, but because the basins would not be full for more than a few weeks of the year they would not present a permanent water source for ravens and other predators, nor would they increase water availability to ravens given the existing agricultural operations (Draft EIR Vol. 1, Section 4.4 Biology, p. 4.4-55).

The Draft EIR Vol. 1, Section 4.4 Biological Resources concludes that with implementation of Mitigation Measures **BIO-1** through **BIO-8**, impacts to desert tortoise can be avoided. To compensate for the small amount of habitat loss associated with development of the Phase I wellfield (well pads and access roads, approximately 113 acres) and temporary disruption of the pipeline corridor, which has been previously disturbed in large part, Mitigation Measure **BIO-6** requires the implementation of a site restoration plan that includes a soil salvage and replacement program, a plant salvage and replanting program, and invasive species maintenance and five-year maintenance and monitoring plans. Mitigation Measure **BIO-4** requires that construction be halted in any area where desert tortoise are spotted. Mitigation Measure **BIO-7** requires that, consistent with California Department of Fish & Game tortoise compensation requirements, habitat compensation be implemented to provide for the purchase of compensatory mitigation land at a 1:1 ratio for permanent impacts and at a 0.5:1 ratio for temporary impacts to desert tortoise habitat. This mitigation property would be conserved in perpetuity and managed for desert tortoise habitat values. Updated Mitigation Measures **BIO-1** through **BIO-7** are included in Vol. 6, Chapter 5 Draft EIR Text Revisions of this Final EIR.

Nelson's Bighorn Sheep

Nelson's bighorn sheep are known to traverse the valley areas to their preferred ranges at higher elevations. The Draft EIR concludes that although the Project construction activities would be within the designated bighorn sheep movement corridors, the Project would not impede movement during construction because active construction would occur in segments along the pipeline corridor and in small portions of the wellfield allowing movement around and/or through the Project area. Active construction areas would be fenced to exclude the desert tortoise but fencing would extend approximately two feet above ground (see Mitigation Measures **BIO-2**) specifically to exclude tortoise movement but not impede other species such as the bighorn ship. Moreover, no fencing that would impede wildlife movement across the valley would be installed along linear roads during the life of the Project (Draft EIR Vol. 1, Section 4.4 Biological Resources, p. 4.4-52).

The pipeline alignment would be constructed in segments and any disturbance would be both temporary and localized to the specific segment under construction, allowing for wildlife movement around the impacted area. The proposed wellfield would also be located within a BLM-designated bighorn sheep movement corridor and would not impede wildlife movement once constructed. Fences would surround well pads and potentially other structures along the pipeline ROW but would not truncate habitat or create linear barriers that would impede wildlife movement. A typical well pad would be located within a fenced area of approximately 1,000 square feet (e.g., 30 feet x 34 feet or 20 feet x 50 feet). Construction activity would deter wildlife in the immediate vicinity of the Project segment under construction, and the distances between well sites would leave ample room for wildlife movement from one side of the valley to the other. Construction of the proposed Project would not affect the habitat or movement of the bighorn sheep (Draft EIR Vol. 1, Section 4.4 Biological Resources, p. 4.4-52).

Other Sensitive Species

The Draft EIR Vol. 1, Section 4.4 Biological Resources lists special-status species in Table 4.4-1 that may occur in the Project area. The Draft EIR acknowledges that there is a medium to high potential for the following species to utilize the Project area:

- Mojave fringe-toed lizard
- Cooper's hawk
- sharp-shinned hawk
- burrowing owl
- ferruginous hawk
- prairie falcon
- loggerhead shrike
- Le Conte's thrasher
- pallid bat
- American badger

Mitigation measures such as surveys and detailed protection protocols are assured for the Mojave fringe-toed lizard (**BIO-8**), migratory birds (**BIO-9**), burrowing owl (**BIO-10**), American badger (**BIO-11**), and pallid bat (**BIO-12** and **BIO-13**).

The Draft EIR concludes that no special status plant species occur within the Project footprint, although some species covered under the San Bernardino County Desert Plant Protection Ordinance were identified, including the smoke tree. Mitigation Measures **BIO-14, BIO-16**, and **BIO-17** would ensure that, with implementation, any impacts to these species are less than significant. Construction sites would be flagged, staked, and fenced, and protected species would be inventoried and marked to avoid their removal, or, if removal is necessary, to facilitate their replanting. Implementation of these mitigation measures would ensure that even though compliance is not required, the Project nevertheless is consistent with the San Bernardino County Desert Plant Protection Ordinance.

3.6.3 Effects of Reduced Evaporation from the Dry Lakes on Microclimate

Summary of Issues Raised by Commenters

Commenters expressed concern that the loss of evaporating water from the Dry Lakes could have a warming effect on the desert ecosystem and alter climatic conditions.

Response

The Mojave Desert receives between four and twelve inches of rain per year. Prevailing winds at the Bristol and Cadiz Dry Lakes are out of the west and northwest. The Sierra Nevada Mountains

present a block to moisture from the west, resulting in a rain shadow in the northern portions of the Mojave Desert. Strong winter storms from the northwest contribute most of the rain and snow in the higher elevations. However, during the summer when groundwater evaporation rates are at their highest, the climate of the Fenner Valley is influenced primarily by a Pacific Subtropical High cell that results in minimal cloud formation and daytime solar heating in the inland desert areas. During these hot summer months, most desert moisture arrives from infrequent warm, moist, and unstable air masses from the south.[2] These monsoonal systems are generated from the eastern Pacific and move northward contributing precipitation to the region. Sporadic thunder storms can result in significant downpours and flash flooding in summer.

Groundwater levels are shallowest at the low point in the Fenner Valley (at the Dry Lakes), pressurized by the flow of groundwater from the Bristol and surrounding watersheds. As the groundwater nears the surface, the desert heat evaporates groundwater from within the shallow soils through a process called thermal transfer. Capillary action in the soils assists in the process and causes the water to rise toward the surface. Operation of the Project would ultimately reduce the amount of groundwater evaporating from the Dry Lakes by an estimated 32,000 AFY since the groundwater levels below the Dry Lakes would be lowered, thus reducing groundwater exposure to the heat and atmosphere. Figures 4.9-11a and 4.9-11b of the Draft EIR Vol. 1, Section 4.9 Hydrology and Water Quality illustrates how the reduction in evaporation will occur slowly over time and then begin recovering when pumping ceases. The reduced groundwater evaporation would result in reduced moisture content entering the atmosphere directly over the Dry Lakes. However, the area exhibits extreme heat and dryness under existing conditions. Current groundwater evaporation from the Dry Lakes does not substantially elevate local humidity compared to other areas of the Mojave.[3] Precipitation in the watershed is influenced by regional weather patterns, as discussed above, and would not be expected to change with reduced local evaporation. In addition, the vegetation in the Cadiz Valley is predominantly a low density creosote scrub that is also found throughout other portions of the Mojave Desert not adjacent to Dry Lakes. The scrub vegetation down-wind of the Dry Lakes (toward the southeast) does not appear more dense, diverse, or verdant than in other areas of the desert as shown in Figure 3 of Final EIR Vol. 7, Appendix F4 Vegetation, Groundwater Levels and Potential Impacts from Groundwater Pumping Near Bristol and Cadiz Playas. No species known to thrive on atmospheric moisture, such as Joshua Trees, occur in the immediate vicinity of the Dry Lakes. As shown in Figures 3 and 4 of Appendix F4, the comparably more dense vegetation east of Bristol Dry Lake corresponds to a topographical drainage in the Orange Blossom Wash and benefits from surface runoff. Otherwise, vegetation density and verdure is consistently low near and far from the Dry Lakes thereby demonstrating no influence from evaporation or microclimate humidity. Once evaporated into the air above the Dry Lakes, moisture disperses into the surrounding atmosphere via thermal and mechanical turbulence effects (local heating and wind currents) within the atmospheric boundary layer (typically considered to be the first 1,000 meters of air above ground surface) and moves as influenced by regional wind currents and atmospheric instability.[4] With or

2 Mojave Desert AQMD, CEQA Guidelines, p. 7, August 2011.
3 Average afternoon humidity at Twentynine Palms is 25 percent annually and 15 percent during dry summer months. Western Regional Climate Center, *Average Afternoon humidity at Twentynine Palms*, http://www.wrcc.dri.edu/htmlfiles/westcomp.rhaft.html, accessed April 2012.
4 William D. Sellers, Physical Climatology, University of Chicago Press, 1965.

without a reduction in evaporation resulting from the Project, precipitation and humidity in the surrounding desert will continue to be dominated by these regional weather patterns.

Further, evaporation of surface water following rain and snow storms will continue to occur, especially at higher elevations. Evaporation from the mining operations' brine trenches will also continue. These sources of evaporation and the evapotranspiration from plants in these areas will not be affected by the Project.