The following section supplements the analysis found in Chapter Three, Section 3.5 - Riparian Areas and Wetland Ecosystems of the Draft EIS on page 3.81, "Impacts Related to Oil and Gas Development".

DIRECT AND INDIRECT IMPACTS

Impacts to riparian areas and wetland ecosystems (RWE) from oil and gas development on all currently unleased SJPL within the GSGP area could occur at the project level if oil and gas development (primarily the construction of well pads and roads) were to occur. Direct impacts would be the same as those described in the Draft EIS except that there could be four times more ground-disturbance, which potentially could cause more mortality to RWE plants, more RWE habitat modification, more soil disturbance, and more establishment and spread of invasive plants that compete with native riparian/wetland plants for space, light, water, and nutrients. An increase in invasive plants along with a decrease in the native hydrophytic plants could adversely affect the composition, structure, and function of the affected RWE, and could decrease the ability of those RWE to protect streambanks, prevent soil erosion, provide cover for native biota, and function properly.

Oil and gas development on all currently unleased SJPL within the GSGP area could also cause contaminants to be released into the environment, which could adversely affect RWE plants and their associated RWE. Project designs (that avoid RWE) and the implementation of design criteria and stipulations in the Draft LMP (including NSO stipulations) would protect and minimize adverse impacts to RWE.

The high amounts of Nitrogen emissions that could potential result from development of the GSGP (as indicated in the air quality model results) could affect RWE. Studies have shown that the deposition of nitrogen (N) from N emissions could increase N levels in soils resulting in a decrease of native plant species and an increase in invasive plant species that compete with native plants, a change in the species composition of plant communities, and increased fire risk (Allen et al. 2009, Brooks M. L. 2003, and Floyd-Hanna et al. 2004). Furthermore, monitoring on SJPL shows that N loading is increasing in lakes and across the San Juan landscape. In particular, monitoring at Molas Pass shows that since the 1990s there has been a significant increasing trend in NO_3 concentrations in precipitation; and water chemistry monitoring of pure water lakes in the Weminuche Wilderness over the last decade indicates that those lakes are becoming seasonally saturated with nitrogen (Musselman and Slausen 2002). These monitoring and modeling results suggest that effects to the vegetation of aquatic, riparian/wetland, and terrestrial ecosystems on SJPL may be occurring (or could occur) due in part to current and future oil and gas development on SJPL. For more information on this topic, see the air quality section.

Alternative Comparison: Impacts to RWE are a function of the amount of ground-disturbance that could occur. Alternative A would have the most potential for impacts to RWE on currently unleased SJPL within the GSGP area if development occurs on those lands because it proposes to disturb the highest number of acres (2,111 acres), followed by Alternative D (2,085 acres), Alternative B (2,060 acres) and C (2,035 acres). However, the use of lease stipulations, standards and guidelines and BMPs would minimize RWE impacts, and there would be little measurable difference between Alternatives A through D in that respect. The No Lease Alternative would have no direct or indirect impacts to the RWE within the GSGP area.

CUMULATIVE IMPACTS

Past management activities on all federal, private and state lands within the Paradox Basin of the planning area (which is the cumulative impacts boundary for RWE) caused direct ground-disturbance impacts to RWE as described above. In addition to the potential disturbance from oil and gas development described above for unleased lands, there are also projections for more development on federal lands already leased. An additional 1,786 acres of disturbance could result from future development on lands currently held under lease on BLM and USFS mineral estate (1,166 acres from future gas shale development, and approximately 620 acres from conventional gas development).

Direct impacts to RWE from oil and gas development on lands already leased within the GSGP area (which is about 35% of the GSGP area) could occur and would be the same as those described above. Mitigations for lands currently held under lease would be similar to the mitigations described for unleased lands and would be specified during project level NEPA analysis using COA based on the Draft LMP, Part Three (see Design Criteria for a listing of these mitigation measures).

Overall, even if all the foreseeable future management activities were to occur, combined with all past and current management actions, the resulting ground disturbance would only adversely affect a very small number of RWE on a very small amount of acres because of the avoidance and protections provided to RWE resources from stipulations and design criteria.