11.18 Iowa Hill Mule Deer Study Plan

11.18.1 Pertinent issue questions

This study addresses the following terrestrial resource questions for the Iowa Hill Development (Development), as identified by the Upper American River Project (UARP) Relicensing Terrestrial Resources Technical Working Group (TWG):

- What is the suitability of existing habitats for mule deer within the Iowa Hill Development area?
- What will be the net change in available suitable habitats for mule deer resulting from the Iowa Hill Development?

Information pertaining to these questions will also be generated from associated terrestrial resource study plans developed for the Iowa Hill Development.

11.18.2 Background

The proposed Iowa Hill Development includes almost 300 acres of terrestrial habitats in the vicinity of the reservoir, intake structure, and appurtenant facilities, and approximately two linear miles of proposed transmission line corridor. The Iowa Hill Development would permanently alter a majority of these habitats. The proposed upper reservoir area (approximately 100 acres) will no longer represent habitat for mule deer, whereas existing habitats along the new transmission line will be altered, but will remain habitat. Loft and Menke (1984) suggest that transmission line corridors may provide areas of foraging habitat and hiding cover that are superior to that found in dense forests.

Optimal habitat for mule deer is commonly agreed to consist of cover and forage in an arrangement that provides the greatest opportunity for mule deer throughout the largest area (Leckenby et al. 1982). Mule deer cover is comprised of hiding cover and, where potential winter range exists (such as at Iowa Hill) thermal cover. Mule deer foraging areas typically do not meet the criteria for either hiding or thermal cover (Leckenby et al. 1982).

Hiding cover is defined by Thomas (1979) as vegetation used by deer for security or to escape from danger. Although vegetation typically provides hiding cover, topographic features may also be important. Leckenby et al. (1982) suggest suitable hiding cover exists if 90 percent of a bedded deer is obscured at a viewing distance of 150 feet (45 meters). In mule deer wintering areas, the structure and arrangement of vegetation and the presence of topographic features can also provide thermal cover. Thermal cover is defined as any vegetation or topography that protects deer from wind, rain, or snow or, in more arid environments, from direct sunlight. Thomas et al. (1988) describe thermal cover as stands (≥ 2acres) of either deciduous or evergreen trees or shrubs at least 40 feet (12 meters) tall, with canopy cover greater than 70 percent and in close proximity to suitable forage.

Mule deer forage on a variety of herbaceous and woody species depending on the season, but also display apparent preferences. Forage preferences have been determined based on differences in foraging rates (Sampson and Jespersen 1963.). Typically, deer change their feeding strategy throughout the year in response to food availability. Following winter, deer graze on grasses and herbs, transitioning to leaves and woody shoots and stems later in the year (Snyder 1991). Suitable foraging habitats are most often located adjacent to shrub or wooded habitats where cover opportunities are greatest and within a moderate distance to water. Transmission line corridors through forested areas may provide these conditions (Loft and Menke 1984).

11.18.3 Study objectives

The primary objectives of the mule deer study are: 1) to characterize existing habitats for mule deer within the Development area; 2) determine the amount and type of mule deer habitat that will be affected by the Development, and 3) identify opportunities to compensate for habitat loss or degradation through habitat improvement measures (such as management for shrub-dominated habitat within the new transmission line route) and/or habitat acquisition.

In addition, conditions within the adjacent corridor for the primary 230 kV UARP Transmission Line will be assessed to determine suitability as mule deer habitat.

Information derived from this study will be used to develop a Deer Habitat Compensation and Improvement Plan, which will identify resource measures to compensate for impacts of the Development, and will identify future monitoring needs.

The interrelationships of forage, cover, and other habitat elements for mule deer are complex and often assessed using a habitat suitability index (HSI) model. In lieu of an applicable mule deer habitat model specific to the Sierra Nevada that will produce, as an output, HSI habitat values, we present a more simplified, yet equally effective approach to assess and quantify mule deer habitat within the Development area. The mule deer study will provide data on current habitat conditions for mule deer both within the upper reservoir area and in the transmission line corridor.

11.18.4 Study area

The study area includes the preliminary project boundary as described in Figures 2 and 14 of the Iowa Hill Initial Information Package (IIP, SMUD 2003), including the area surrounding the proposed reservoir, intake structure, transportation and construction access routes, temporary spoils sites, laydown areas, and transmission line corridor. In addition, a one-mile section of the UARP 230 kV transmission line corridor located approximately 0.5-mile to the north and south of the estimated intersection of the proposed transmission line will be included in the study area to characterize the existing mule deer habitat within this corridor. A more general habitat mapping, which may utilize Forest Service existing vegetation data or aerial photo interpretation, will be completed for a larger analysis area surrounding the project boundary (e.g., between Slab Creek Reservoir, North Canyon Road and Cable Road). This mapping will characterize areas of deer forage and cover in the project vicinity in order to better inform the development of a Deer Habitat Compensation and Improvement Plan.

11.18.5 Information needed from other studies

The results of the vegetation mapping study portray the extent and distribution of existing vegetation cover types in the Development area necessary for stratification of sample points within the vegetation types. Maps depicting the cover types, the arrangement of sampling points, and access to the sampling points will be essential before the field effort can proceed.

11.18.6 Study methods and schedule

Sampling points will be randomly placed in the Development area, including the appurtenant transmission line corridor. Sampling will be stratified within each vegetation cover type in approximate proportion to its occurrence in the area (Table 11.18.6-1), with the understanding that at least one sampling point will be placed within each cover type patch (i.e., each polygon on the cover type map), unless precluded by dangerously steep slopes. A total of approximately 50 sampling points will be placed in the Development area. An additional 20 points will be placed within the existing UARP 230 kV Transmission Line corridor to the north and south of the proposed junction of the two lines. The sampling points within the proposed transmission line corridor may be revisited over time to document changes in habitat suitability. The locations of sampling points will be determined prior to the field study. Because GPS units are sometimes unreliable under dense forest canopies, points will be along transects and the field survey team will be provided with the compass bearing, end points, and distance between points for each transect.

Table 11.18.6-1. Distribution of CWHR Habitat types in the Iowa Hill Development area and proposed sampling regime.		
Project Feature	**CWHR Habitat Type**	**Total Acres and Percentage of Total**
Footprint of the Development excluding intake structures and appurtenant facilities, and transmission line.	SMC 4/5 M/D	244.6 (81.5)
	SMC 4/5 S/P	20.6 (6.9)
	SMC 3 M/D	8.7 (2.9)
	SMC 3 S/P	2.1 (0.7)
	SMC 1/2 P	5.6 (1.9)
	MCH 1 M/D	11.1 (3.7)
	MHW 4 D	7.4 (2.5)
Proposed Transmission line	SMC 4/5 M/D	47.7 (76.6)
	SMC 3 M/D	1.7 (2.7)
	SMC 3 S/P	1.5 (2.4)
	SMC 1/2 P	3.9 (6.3)
	MHW 1/2 P	7.4 (11.9)

Habitat characteristics will be sampled in circular plots (25-foot diameter). At each sampling point, data will be collected that describes the suitability of existing habitat for mule deer forage, hiding cover, and thermal cover. Suitability of forage will be based on qualitative aspects (forage value of dominant species) and quantitative aspects (total shrub cover and groundcover of herbaceous vegetation). Shrub species with accessible foliage (≤5 ft height) will be assigned a browse value rating from useless to excellent (1-5) based on criteria outlined in Sampson and Jespersen (1963). The following forage categories will each be assessed for coverage within the plot: shrubs (including woody vines), perennial grasses, annual grasses, forbs, and total herbaceous cover. The most common species of shrubs on the site will also be assessed separately for coverage.

The extent of hiding cover at a site will be determined by using a 6-foot (2 meter) cover pole located in the center of the plot and viewed from the four cardinal directions at a distance of 50 feet (15 meters). This technique has been shown to correlate well with hiding cover (Griffith and Youtie 1988). Thermal cover is associated with dense canopy closure. Sampling sites will be considered to provide thermal cover if they are within stands of at least 2 acres of either deciduous or evergreen trees or shrubs at least 40 feet (12 meters) with canopy cover greater than 70 percent (Thomas et al. 1988). In addition, all indications of recent use (e.g., tracks, browsing, number of pellet groups, beds) by mule deer will be noted at each sampling site.

11.18.7 Analysis

Data collected during fieldwork will be transcribed, entered into spreadsheet format and analyzed to determine the amount, location and spatial relationship of suitable habitat. Habitat values will be determined using the principal elements of forage, hiding cover, and thermal cover. Habitat suitability will be determined for each sampling location and applied to each polygon of each vegetation cover type in which the point occurs. This will provide the area and spatial arrangement of polygons representing differing habitat elements and suitability. Suitable forage, hiding cover, and thermal cover will be mapped as a layer on existing Iowa Hill maps. Once the extent and distribution of mule deer habitat elements is determined in relation to the proposed development, net loss of suitable habitat can be calculated. In the same way, the current condition of the existing UARP 230 kV transmission line corridor will be examined to ascertain the suitability for mule deer. Habitat conditions in the existing corridor can be used to describe expected conditions within the proposed powerline corridor, and to identify new or additional resource measures that might improve deer habitat within the proposed Iowa Hill transmission line corridor.

11.18.8 Study Output

Complete study results including tabulated field data will be provided to the Terrestrial Resources TWG toward the end of 2004 in written and electronic format. The study output will be a written report that includes the issues addressed, objectives, study area, methods, analysis, results, discussion, and conclusions. Study output will also

contain appropriate maps depicting study methodologies and results. Ultimately, the results of the study will be incorporated into Exhibit E of the Licensee's application to FERC for a new license for the UARP.

11.18.9 Technical Working Group and Plenary Group Endorsement

On April 12, 2004 the draft Iowa Hill Mule Deer Study Plan was distributed electronically to the Terrestrial TWG for comment. Agency comments were received the week of April 27, 2004 which in turn DTA provided some additional information for consideration relative to transmission line corridors, and how this habitat could provide an overall benefit to the Project. At the May 5, 2004 Plenary meeting, USFS and CDFG stated they had no further comments on the revised study plan. The plan was then approved at the June 7, 2004 Terrestrial TWG meeting, and approved at the July 7, 2004 Plenary Group meeting. There was no one at either meting who said they could not "live with" the plan as presented.

11.18.10 Literature Cited

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