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EXHIBIT 19-A

Draft

Carmel River Flow Threshold Study

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January 2003

Chapter VII
Thresholds

This chapter provides the flow thresholds developed for each of the resources evaluated in the study. It also provides a comparison of the flow thresholds between topics of the resource.

VII-1. Steelhead

In dry and critically dry years, annual steelhead production can be severely limited by inadequate winter flows for upstream migration of adults and inadequate spring flows for rearing and downstream migration of juveniles. These conditions can result in zero to remnant levels of production, and may lead to severe reductions or collapse of the population if such conditions persist for two or more consecutive years. Consequently, a key objective of this analysis was to define flow thresholds that maintain annual steelhead production at levels that would sustain the resource through such periods. This was achieved by applying the adult return index method to evaluate the relative performance of the population under existing and unimpaired hydrologic conditions, as simulated by CVSIM.

Based on analysis of adult returns, the proposed flow thresholds for dry and critically dry years are designed to:

- maximize opportunities for upstream migration of adults to critical spawning areas upstream of the Narrows,
- maintain sufficient rearing flows during the summer and fall to support the resulting levels of fry seeding, and
- provide adequate juvenile rearing and emigration flows to sustain the population through an event equivalent to the 1987-1991 drought.

The flow thresholds for dry and critically dry water years were designed to avoid significant impacts on the steelhead resource resulting from multi-year droughts, and also serve as minimum thresholds for other year types. However, to provide additional protection and resilience of the population in view of uncertainties regarding future conditions, these flow thresholds were increased in below normal to wet years to ensure that potential increases in production associated with these year types continue to be realized.

The proposed flow thresholds for Carmel River steelhead are summarized in Table IV-1 and shown in Figure VII-1.

VII-2. Conclusions

The following conclusions can be drawn about hydrologic effects on riparian vegetation and their implications for flow thresholds:

- During wet or extremely wet years with dispersal flows (e.g., flows in excess of 1,000 cfs in the March – May period), seed dispersal and seedling establishment are not limited by flows at least until May 31.
- Any flow reduction that would lead to a lengthening of the area or time period that the channel is dry may lead to a significant effect on riparian vegetation that would require additional irrigation in excess of the irrigation that is applied under existing conditions.
- Any increase in the time period that groundwater declines exceed 1 foot/day may lead to a significant effect on riparian vegetation.
- Any increase in the time period that groundwater is more than 20 feet deep in riparian areas may cause a significant effect on riparian vegetation.

VII-3. California Red-legged Frog

The historical conditions of the CRLF population in the Carmel River watershed are largely unknown prior to construction of the two dams in the system (Los Padres and San Clemente), alteration of stream flows, and the advent of groundwater pumping. In addition, there is no information on trends in CRLF populations in this area, or on the structure of the population. However, based on CEQA's treatment of significant effects with respect to "threatened and endangered" species, it is assumed that any overall negative effect on the current CRLF population could be considered a significant effect. .

Given the limited information on population dynamics and distribution of CRLF along and adjacent to the Carmel River, river flow thresholds for determining adverse effects must be general in nature and based on flow trends rather than specific flow levels. Proposed flow thresholds are as follows:

- Any project-induced increase in flows that results in currently ephemeral in-channel or off-channel habitats becoming permanently inundated in most years would allow bullfrogs and non-native fish to colonize new habitat. If the new habitat were occupied by CRLF, it would likely adversely affect the sustainability of the CRLF population in the Carmel River watershed.
- Any project-induced decrease in Carmel River flows such that a substantial amount of ephemeral off -channel habitats become dry in normal water

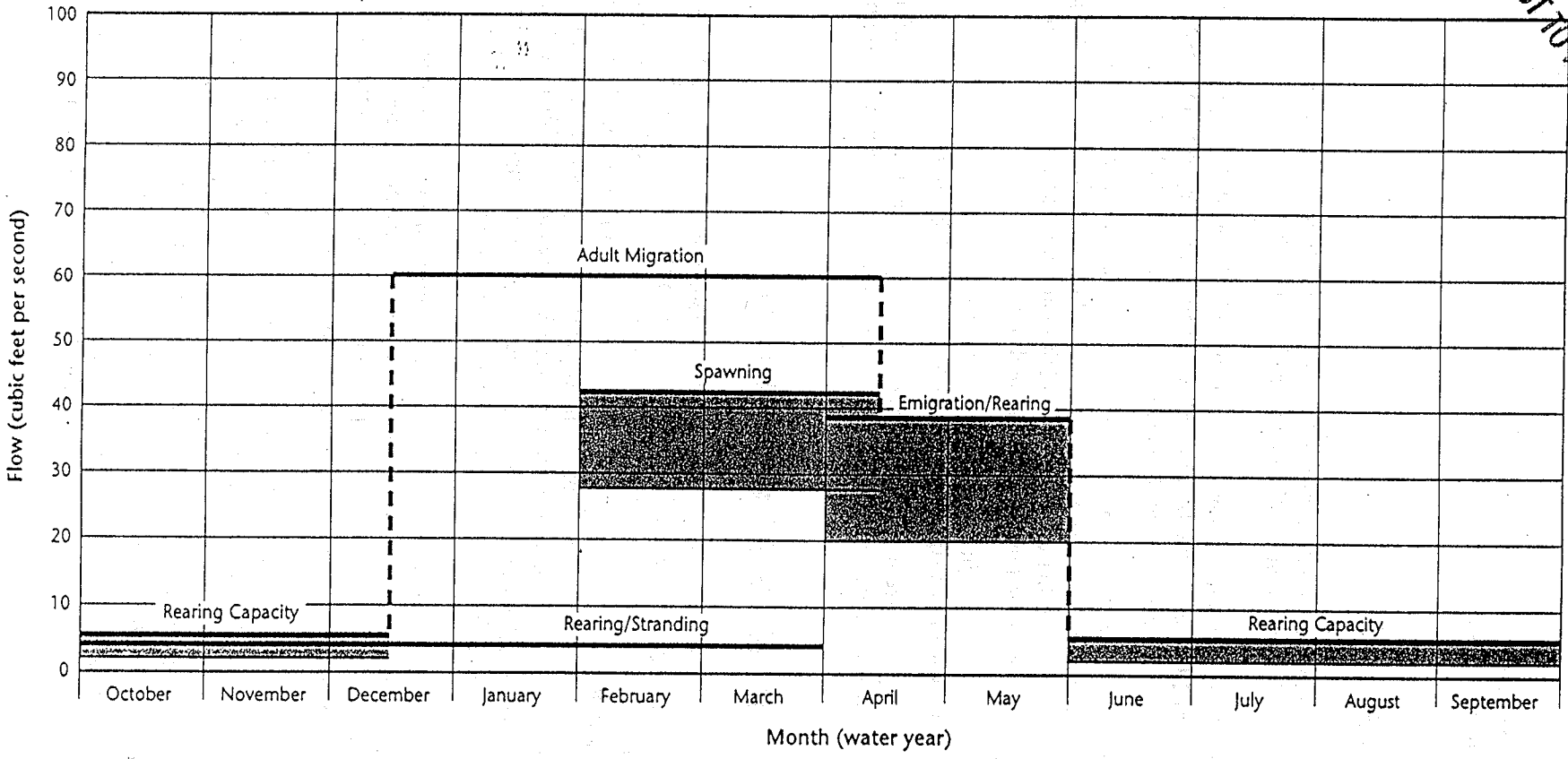

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Figure VII-1
Proposed Thresholds for Carmel River Steelhead in Normal, Below Normal, and Dry Years

years, too soon (prior to June) to allow for metamorphosis of the current year's production of tadpoles, would likely adversely affect the sustainability of the CRLF population in the Carmel River watershed.

VII-4. Thresholds Comparison

Existing in formation and the results of the analysis suggest that the flow thresholds developed for the steelhead would also be protective of riparian vegetation. Although the relationship between river flow and groundwater is not precisely understood, because the lower Carmel River frequently runs dry during the summer months requiring artificial irrigation, any increase in river flow is expected to benefit vegetation. In addition, the peak flow required for seed dispersal would be maintained.

The exact relationship between Carmel River flows and the quality of habitat for CRLF is not known. The flow thresholds developed for steelhead would not affect side channels or tributary streams, important habitat for CRLF. Increasing flows could affect the distribution of predators, primarily bull frogs, however, the magnitude of this increase is not known. Any action that decreases flow below existing conditions could adversely affect CRLF by decreasing off-channel habitat.