

JACKASS MEADOW INUNDATION STUDY

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1.0 INTRODUCTION

The purpose of the Jackass Meadow Inundation Study was to collect supplemental information on the magnitude of flows that enter into and inundate the meadow and to determine the extent of inundation at specified discharges. Previously, hydraulic modeling was completed for three meadow reaches (Meadows 30/34, 26/28, and 36) conducted during the CAWG 11, Riparian studies (SCE 2004, Volume 3, SD-D) along the South Fork San Joaquin River and to determine the range of discharges at which flows overtop the banks and inundate the bars. The study revealed that flows enter into and inundate the floodplain at low elevation points upstream of the modeled reach. Therefore, the meadow is inundated at lower flows than previously identified by the modeling study.

2.0 METHODS

A flow study was conducted on June 22, 2005 to visually assess from low-level helicopter flight the extent of inundation of Jackass Meadow on the South Fork San Joaquin River at different flow magnitudes. For the purposes of this study, all observations of Jackass Meadow under inundated conditions are based on the rating table for the spillway gate adjustments on Florence Dam (Florence Lake Rating Table 1, begin date 10/1/87). Three flow magnitudes were observed during the study: approximately 516 cfs (initial conditions), 1,270 cfs, and 1,679 cfs.

On the morning of June 22, 2005, an ENTRIX geomorphologist and riparian ecologist met with a SCE hydrographer at Florence Dam to begin the study. As a result of the snow runoff conditions at the time of the study, the lowest possible discharge that could be evaluated was approximately 500 cfs.

The initial discharge assessed was 516 cfs, which was set at approximately 8:30 am on the morning of June 22, 2005. The first helicopter flight began at 9:45 am. The flight encompassed only the Jackass Meadow area. The flooded area was videotaped, photographed, and preliminarily mapped. Observation notes on the extent of the inundated area were also taken.

The first flow adjustment was made at 10:30 am to 1,270 cfs. The helicopter flight began at 12:00 noon. The second and final flow adjustment was made at 12:45 pm to 1,679 cfs and the helicopter flight began at 2 pm. Flows were returned to 753 cfs following the last aerial observations.

Maps delineating the extent of inundation at each of the flow magnitudes that were initially drawn during the aerial observations were subsequently verified through careful examination of the videotape and photographs. The inundated areas at the three flows were finalized using the videotape and photographs, and subsequently digitized to determine the approximate floodplain inundation area.

3.0 RESULTS

3.1 FLOW ADJUSTMENTS

Five general locations were repeatedly photographed and videotaped during the study, shown in Figure 1, which include:

1. Location A: Right floodplain¹, downstream of the auto bridge crossing, near Tombstone Creek confluence (Meadow 31).
2. Location B: Left floodplain across from the Tombstone/Jackass Meadow area (Location 1).
3. Location C: Left floodplain at the auto bridge crossing into the Jackass Campground (Meadow 36).
4. Location D: Left and right floodplain near the 'Low Flow Road Crossing' (Meadows 34 and 26 and Meadows 28 and 30, respectively).
5. Location E: Meadows 32 and 33.

The extent of inundation was compared at these various locations, as well as others, such as bars. A map showing the extent of inundation at the three flows is provided in Figures 2a and 2b. The approximate areas inundated (in m² and acres) are below:

Flow (cfs)	Incremental Area Inundated (m ²) (acres)	Total Inundated Area (m ²) (acres)
516	162,045 (40)	162,045 (40)
1,250	59,429 (15)	221,474 (55)
1,679	35,679 (9)	257,153 (64)

3.1.1 INITIAL CONDITIONS: APPROXIMATELY 516 CFS

Prior to the morning of June 22, 2005, flows were approximately 1,350 cfs and were adjusted to initial conditions (516 cfs) at 8:30 am. In addition, flows were approximately 5,800 cfs in mid-June. Standing water was observed in low-lying areas in the left and right floodplain upstream and downstream of the 'Low Flow Road Crossing' at the initial flow conditions. As a result of the antecedent flow conditions, it is not possible to definitively determine the source of ponded water within the floodplain, such as whether it is ponded groundwater, local runoff from the surrounding watershed, or ponded water captured during earlier flows.

¹ All references to locations along the stream are facing in the downstream direction.

At 516 cfs, the channel bars were inundated except for the highest elevations (Figure 3). Specifically, bars upstream of the auto bridge crossing, near Tombstone meadow, and upstream and downstream of the low flow crossing were inundated (Meadows 31, 36, 26, 28, 30, and 34). The vegetation along the stream margins was also inundated. Meadow 31 was inundated almost to the fence line. Over-banking was not observed. Photographs taken during the initial flight show the extent of inundation at the various meadow locations (Figures 4 to 9).

Meadows 32 and 33 (Location E) were completely inundated at the initial study discharge and appear to have been inundated prior to the study, probably from local runoff and/or previous high flows. A raft of large woody debris observed within Meadow 33 suggests that previous high flows did enter into the meadow, transporting large woody debris. It is unlikely though, based on studies conducted during the CAWG 11, Riparian studies (SCE 2004, Volume 3, SD-D), that flows overtopped the banks at this location to enter into this meadow. Rather, it is more probable that flows entered into the meadow at a point upstream and flowed down-valley within the floodplain.

3.1.2 FLOW ADJUSTMENT 1: APPROXIMATELY 1,250 CFS

Channel-floodplain connectivity was observed at specific locations, particularly in the vicinity of Meadows 31, 34, and 28 (Locations A and D). Within Meadows 31 and 34, increases in the extent of inundation were fairly obvious at many locations along the river compared to the initial observations at 516 cfs, with inundation extending approximately to the bands of willows within the meadows. A greater floodplain area is inundated at Location B, across from Meadow 31 (Figures 4 to 9).

3.1.3 FLOW ADJUSTMENT 2: APPROXIMATELY 1,679 CFS

At 1,679 cfs, greater meadow areas were inundated, particularly on the left floodplain downstream of the low flow crossing (Figures 2 to 9) (Location D). The left bank floodplain area in between Locations B and D was also inundated. The right bank floodplain, upstream of the low flow crossing, was connected to the channel at 1,679 cfs. The extent of inundation increases a relatively small amount, about nine additional acres, compared with the total area of inundation at 1,250 cfs, although the area is noticeable when compared to permanent markers on the floodplain. For example, water extends past the band of willows within the meadows at Locations A and D.

4.0 SUMMARY

Bars and areas near the channel margin were inundated at 516 cfs. Low-lying areas within the floodplain were also inundated, although the source of this water (surface or groundwater) is uncertain based on high flow conditions that occurred prior to this study. Floodplain connectivity was observed at 1,270 cfs, particularly near Tombstone Meadow and upstream and downstream of the 'Low Flow Road Crossing'. The increase in inundated area from 512 cfs to 1,270 cfs was 15 acres. These same meadows were inundated for a short distance past the outer line of willows when flows reached 1,679 cfs. The additional area of inundation between 1,270 cfs and 1,679 cfs





was nine acres. 'Overbanking' along the entire channel length within Jackass Meadow is not needed to inundate large portions of the floodplain.

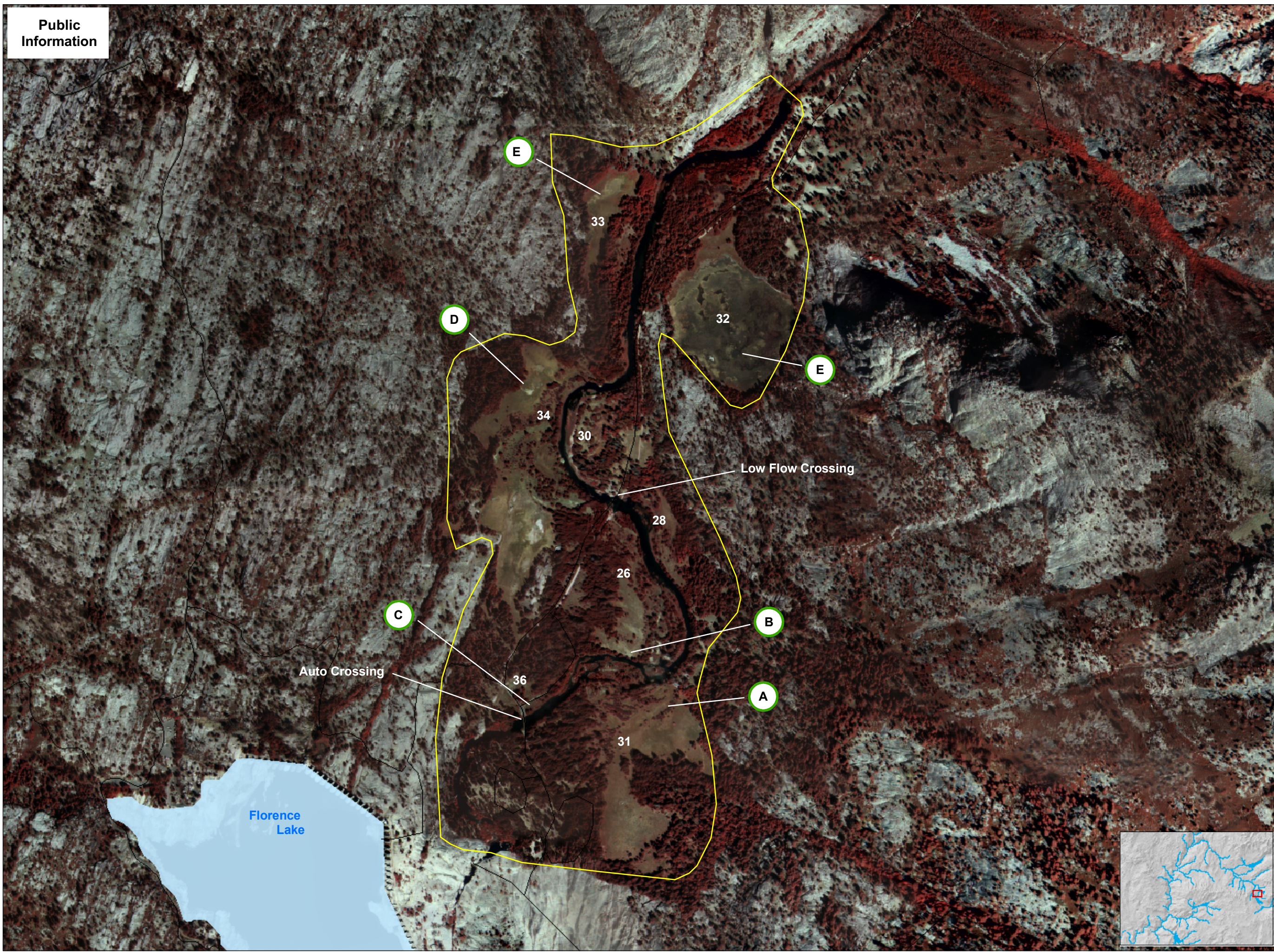
5.0 REFERENCES


Southern California Edison Company. 2004. CAWG 11, Riparian, 2003 Final Technical Study Report Package for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison Company. December 20, 2004.


FIGURES

Public Information

- Map Features**
-  Jackass Meadow Floodplain
 -  Roads
 -  Lakes
 -  Photopoint Location Areas (Refer to Text)



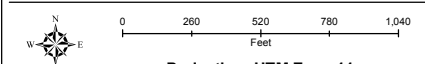


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Jackass Meadow
South Fork San Joaquin River

Figure 1









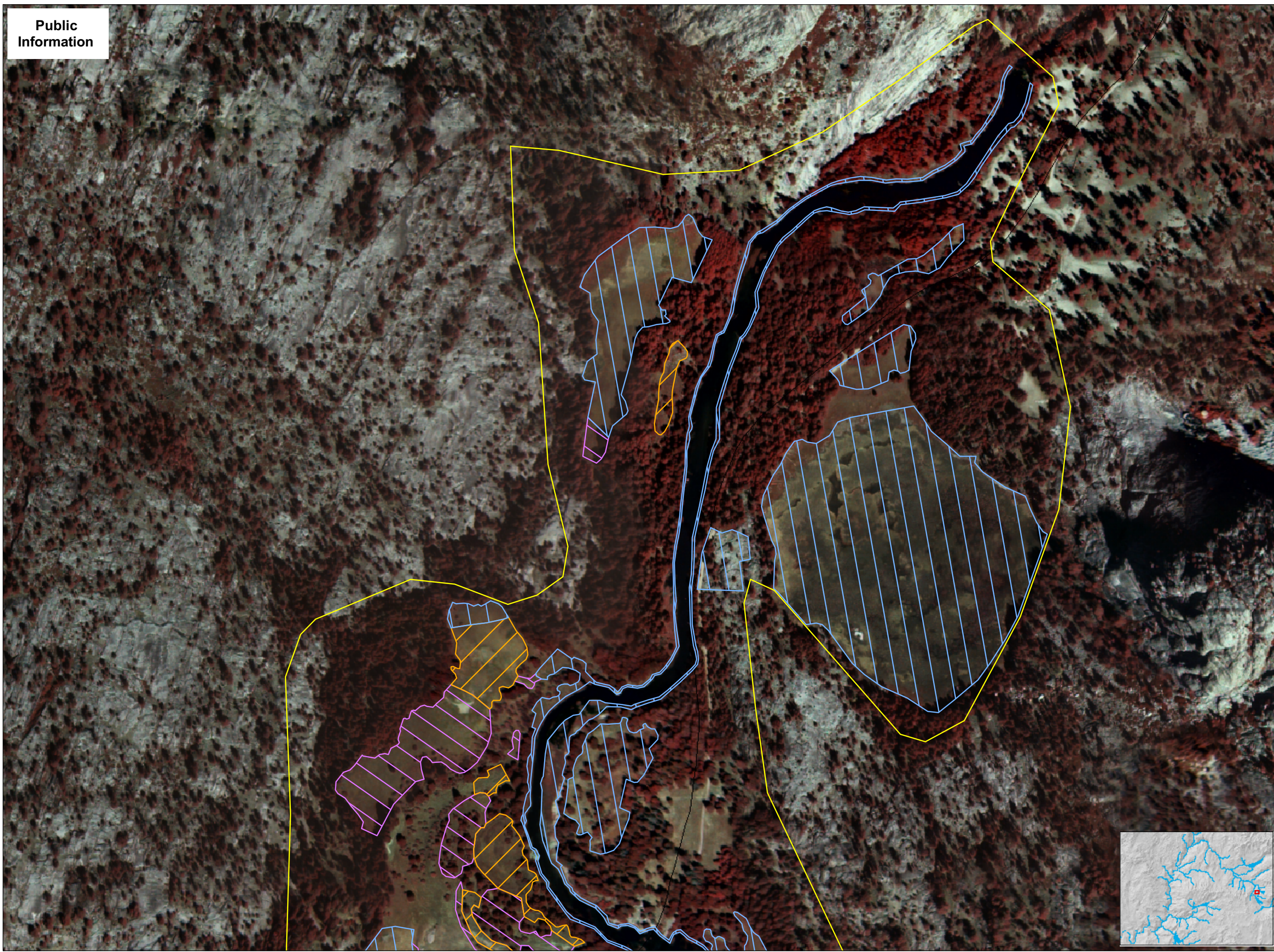
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Projection: UTM Zone 11
 Datum: NAD 83
 Date: 7/21/05

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Public Information

- Map Features**
-  Jackass Meadow Floodplain
 -  516 CFS
 -  1250 CFS
 -  1679 CFS
 -  Roads
 -  Lakes






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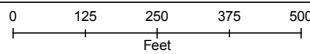
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**Extent of Inundation
6/22/05**

Figure 2a



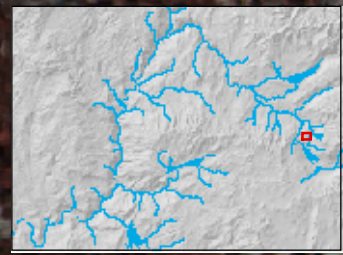
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
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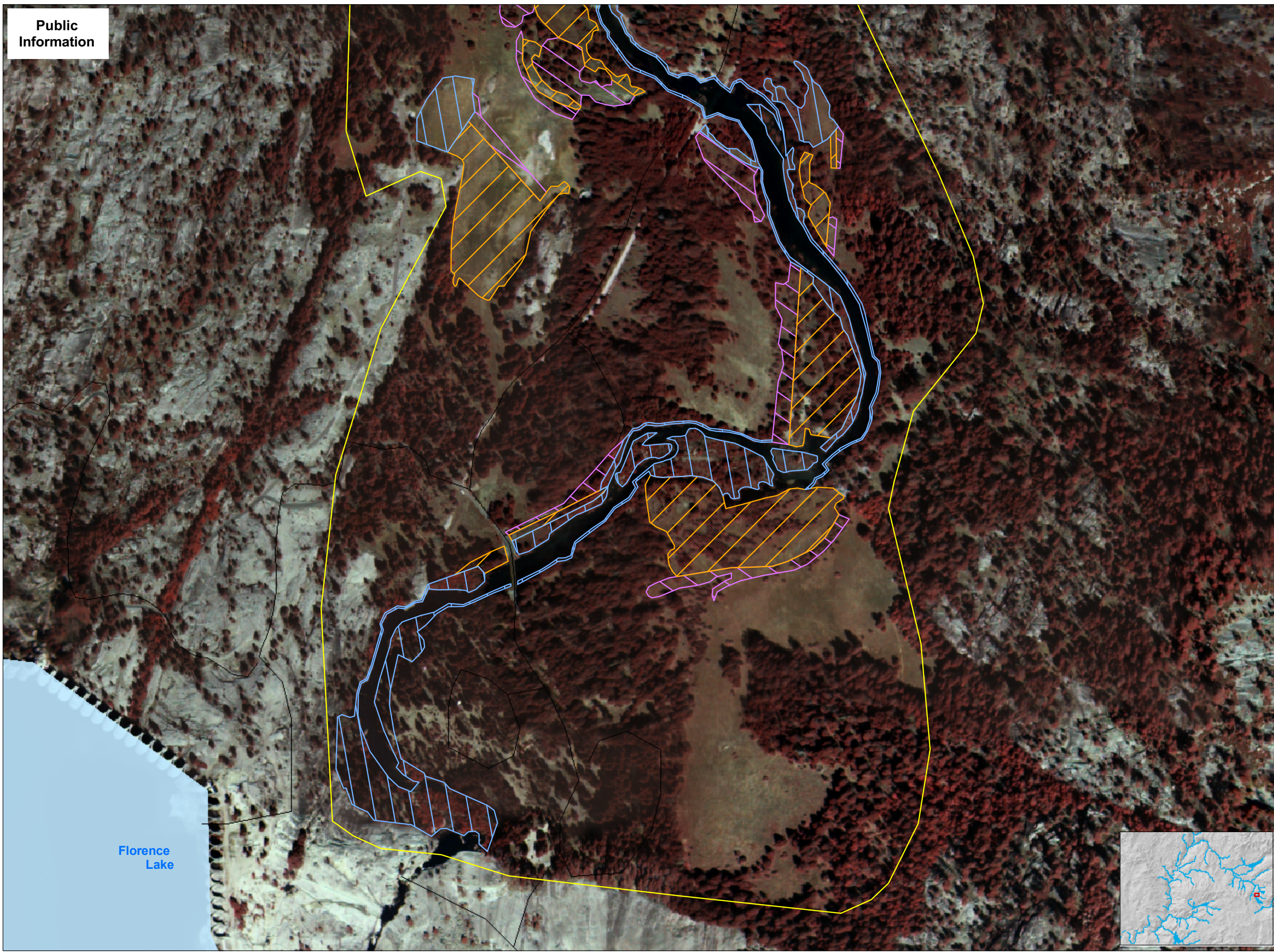
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Florence Lake




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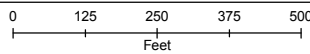
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**Extent of Inundation
6/22/05**

Figure 2b



Date: 7/21/05



0 125 250 375 500
Feet

**Projection: UTM Zone 11
Datum: NAD 83**

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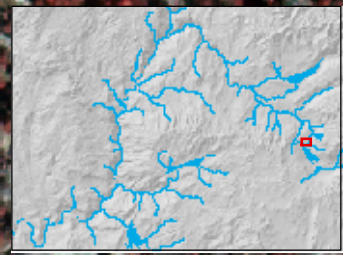


Figure 3. Examples of Bar Inundation on the South Fork San Joaquin River, Jackass Meadow area, at Approximately 516 cfs.



Figure 4: Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along the Right Bank Downstream of the Auto Bridge Crossing, near the Tombstone Creek Confluence (Location A).



Figure 4: Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along the Right Bank Downstream of the Auto Bridge Crossing, near the Tombstone Creek Confluence (Location A) (continued).



Figure 4: Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along the Right Bank Downstream of the Auto Bridge Crossing, near the Tombstone Creek Confluence (Location A) (continued).



Figure 5. Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) on the Left Floodplain Across from Meadow 31 (Location B).

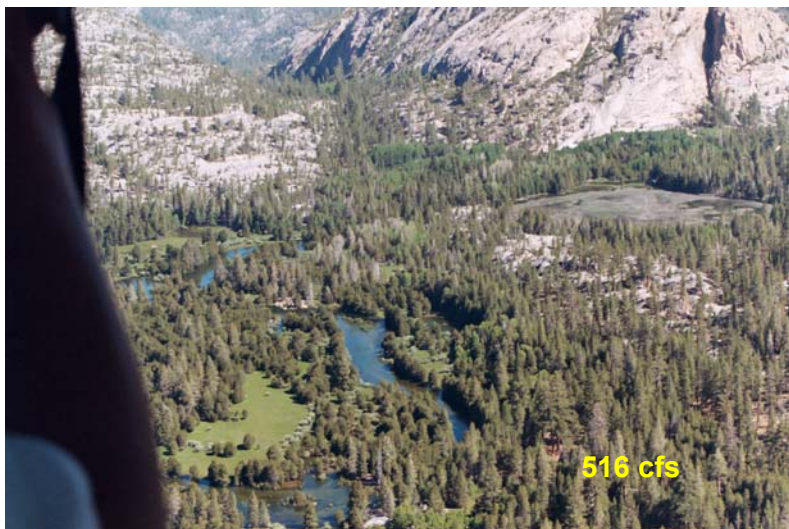


Figure 6. Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) at the Auto Bridge Crossing and Meadow 36 (Location C).

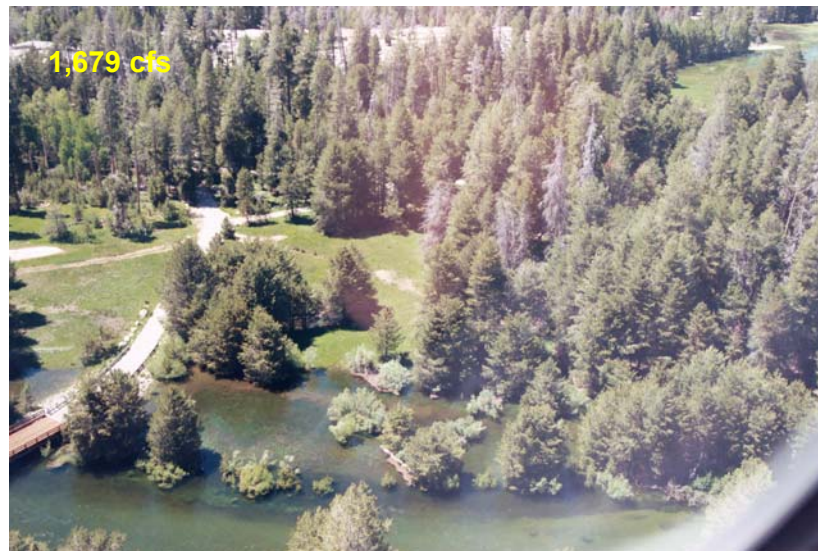


Figure 7. Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along Meadows 26, 28, 30 and 34 (Location D).



Figure 7. Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along Meadows 26, 28, 30 and 34 (Location D) (continued).



Figure 7. Comparison of Inundation Extent (516 cfs, 1,250 cfs, and 1,679 cfs) along Meadows 26, 28, 30 and 34 (Location D) (continued).



Figure 8. Low Flow Crossing.



Figure 9. Meadow 32, Photographed when Flow within the South Fork San Joaquin River was 516 cfs (left) (Location E). Accumulations of Large Woody Debris within Meadow 33 are Shown in the Right Photograph (taken at 2,150 cfs) (Location E).

