Appendix 1

Tables, Graphics, & Photographs

for 4(e) Rationale

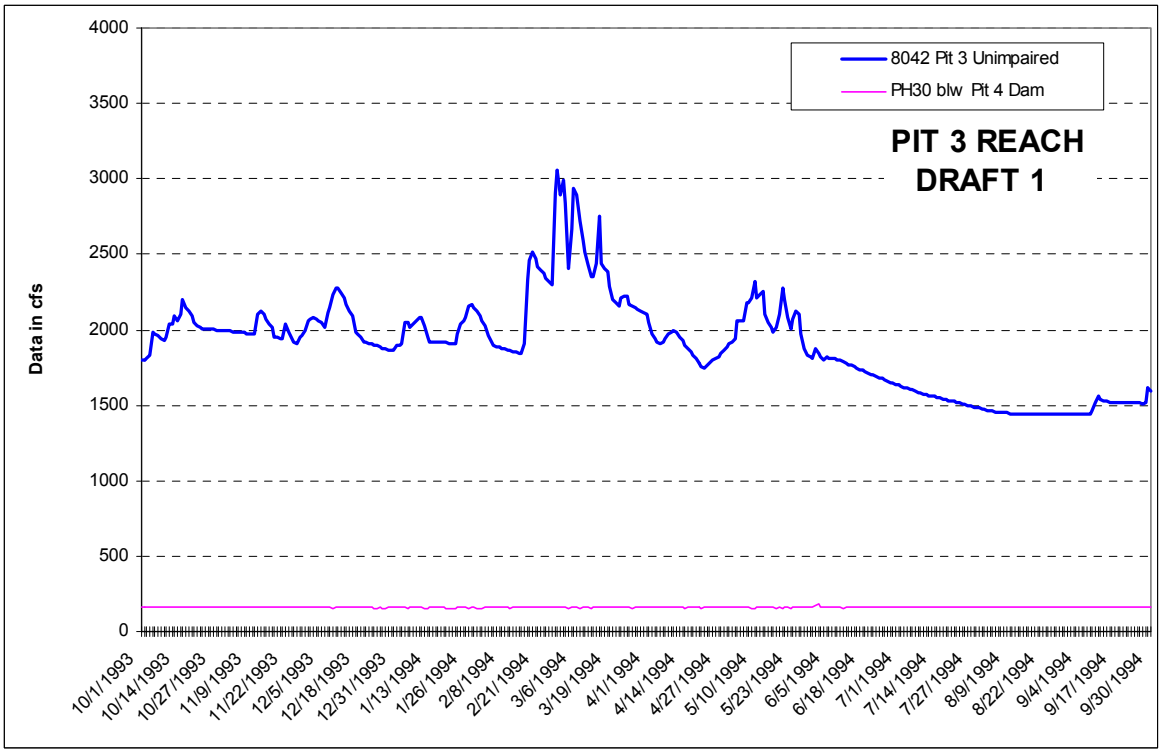


Figure 1. 1994 (dry water year) unimpaired flows (blue) and existing flow conditions (red).

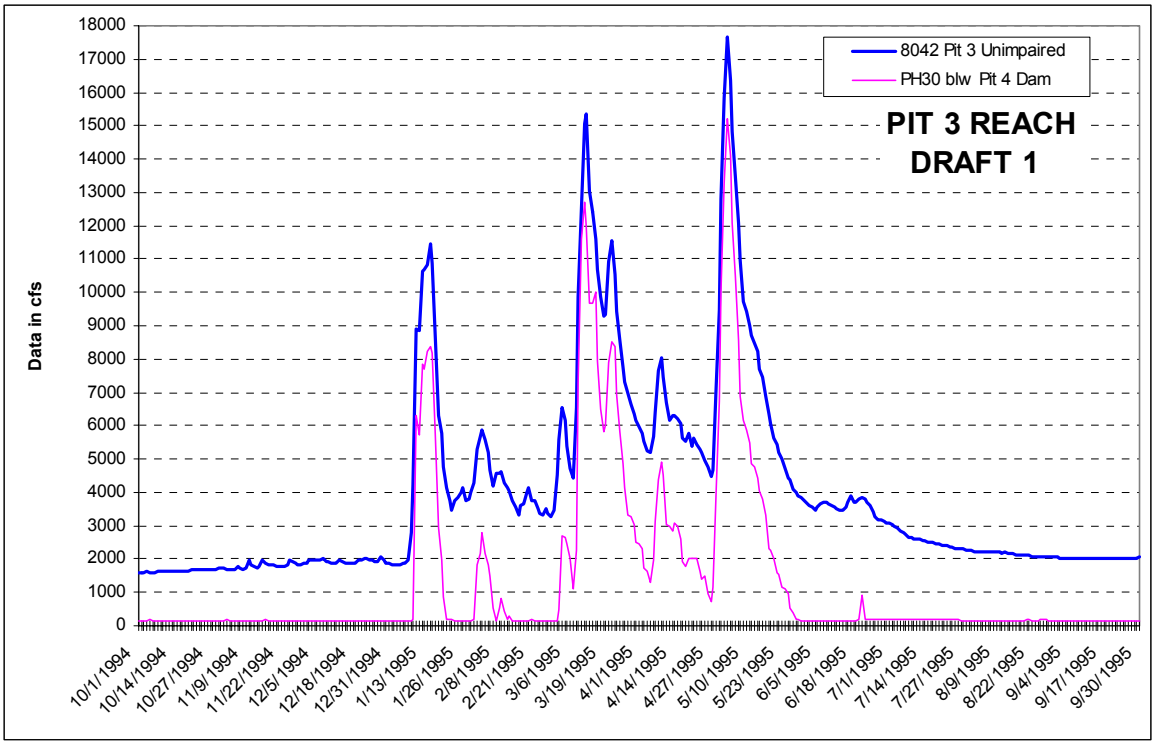


Figure 2. 1995 (average water year) unimpaired flows (blue) and existing flow conditions (red).

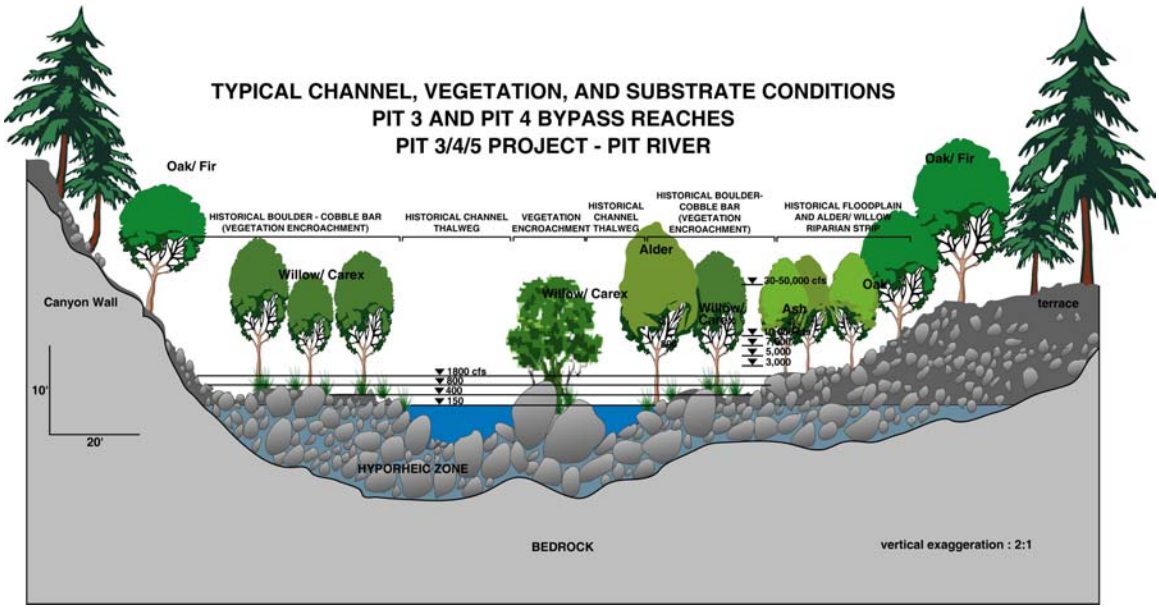
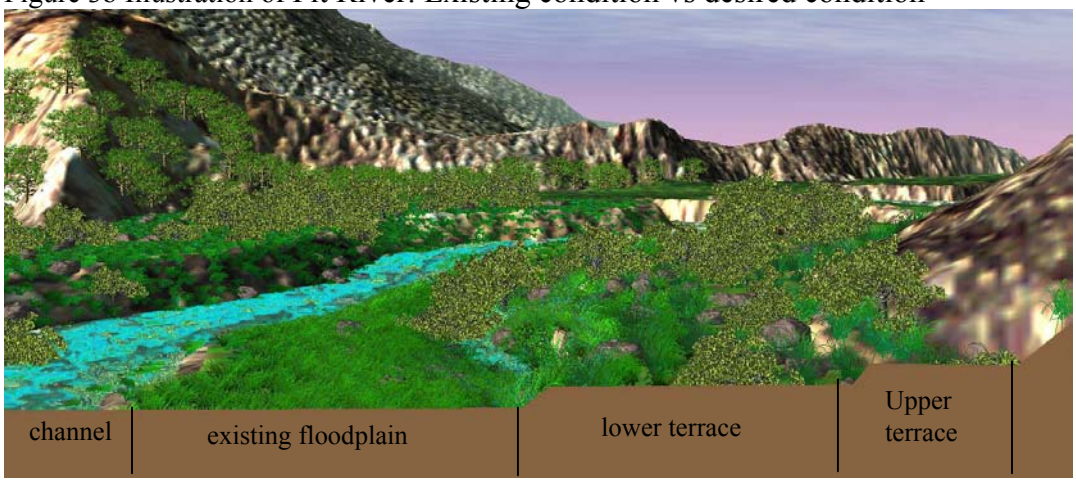
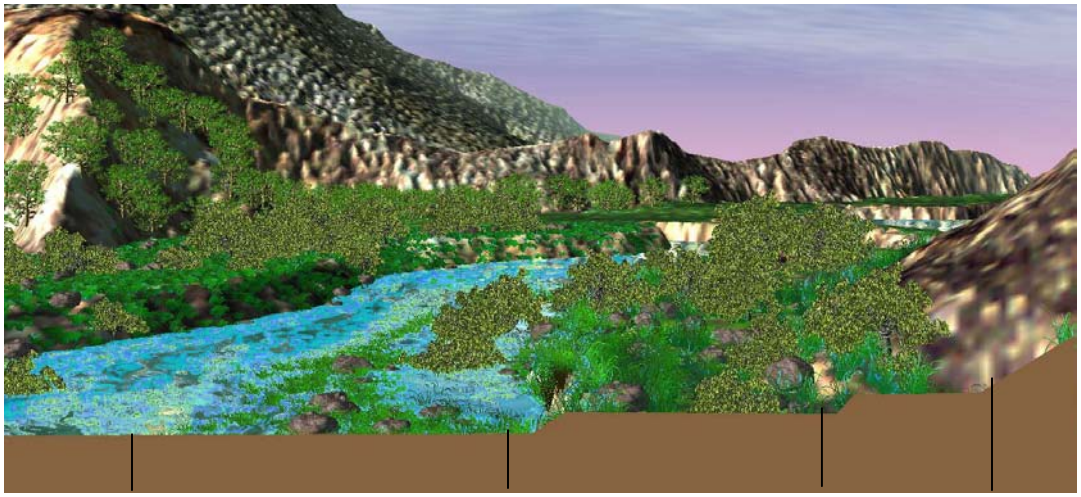


Figure 3a. Typical cross-section of Pit River bypassed reaches.

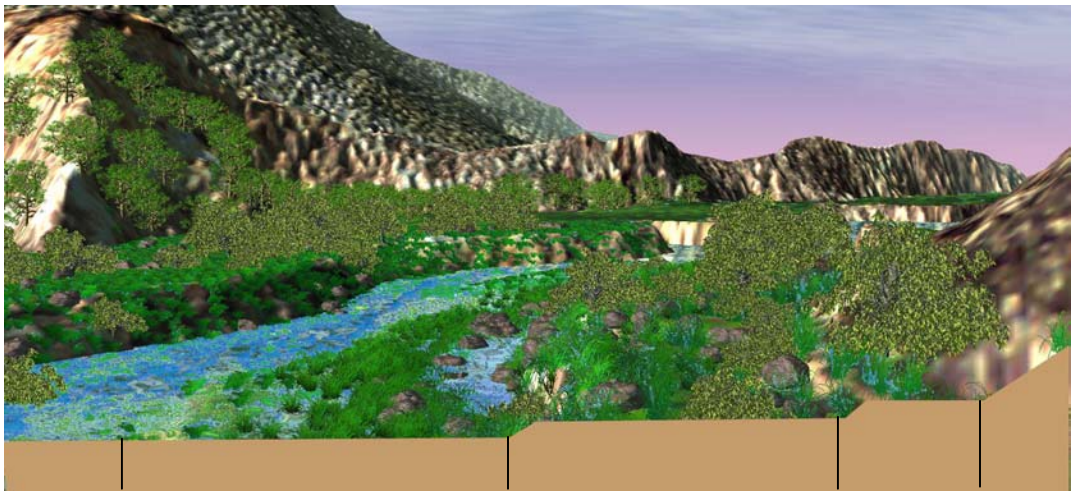
Figure 3b Illustration of Pit River: Existing condition vs desired condition



Existing condition: base flows approx. 150 cfs. Vegetation encroachment into channel.



Flooding in spring inundates vegetation and widens vegetation-free zone.



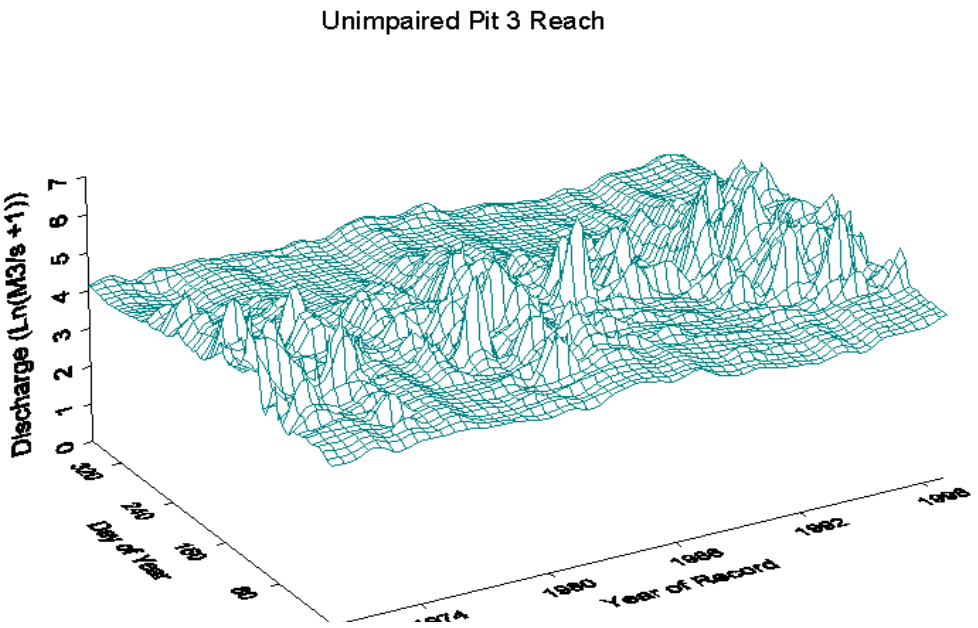
Desired condition: base flows of approx. 350-400 cfs provide shallows for frog and fish habitat at channel edge, help maintain riparian vegetation.

Figure 3c. Photographs of Pit 3 Reach showing actual inundation at various flows.

Pit 3 Reach at 150 cfs baseflow – river confined to thalweg

Pit 3 Reach at 400 cfs test flow. River inundating left & right river margins & peninsula

Pit 3 reach at 1,800 cfs test flow, such as a freshet or spring spill event. Note margin widening, backwater area inundation on left of photo (difficult to see under tree canopy).



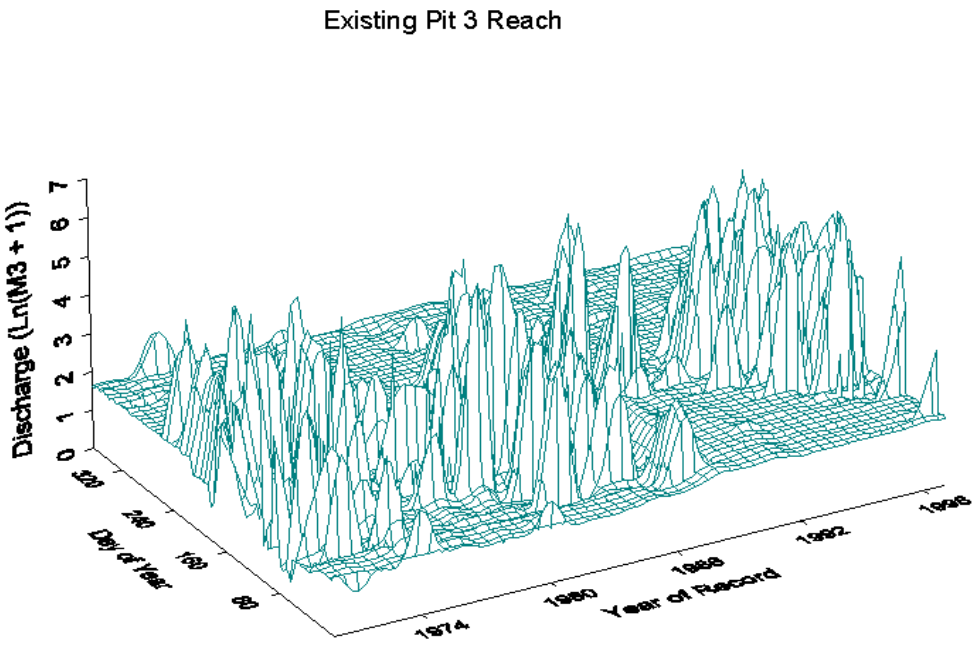


Figure 4. Plot of all daily flows 1970- 1999 for unimpaired conditions and existing conditions. Flows are scaled by the taking the natural log of the flow (cms) + 1. Note the order of magnitude change in flow fluctuations. These log transformed changes are similar to stage changes because stage is generally a logarithmic function of flow. See Poff & Ward 19xx and Poff & Ward 19xx, and Poff et al. 19xx for a discussion of these types of plots.

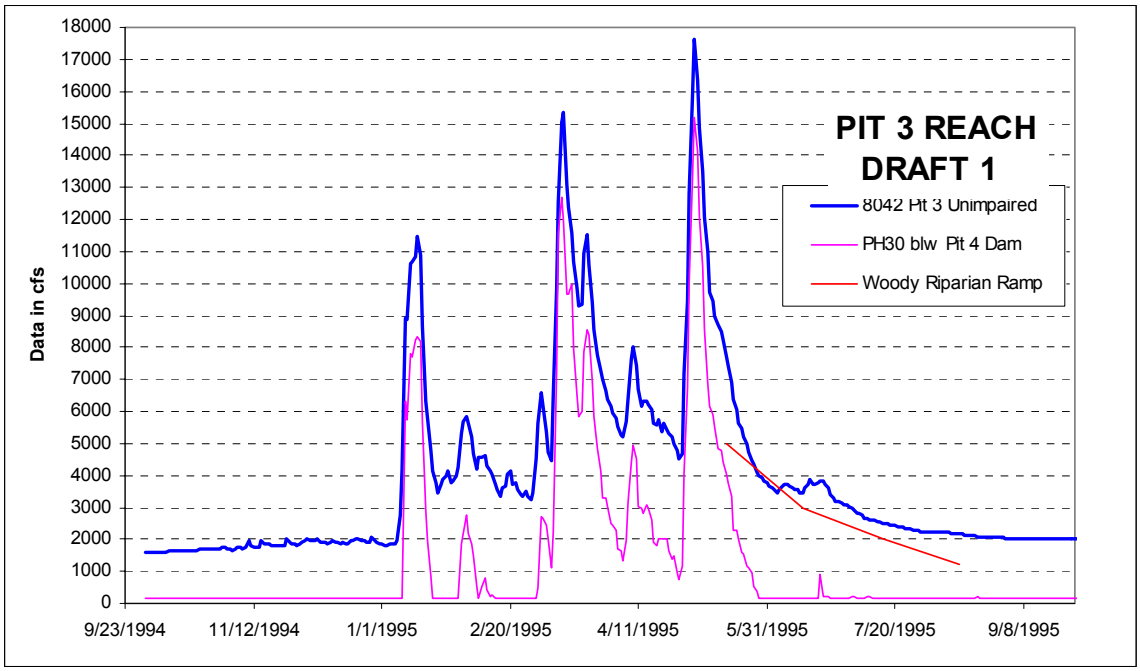
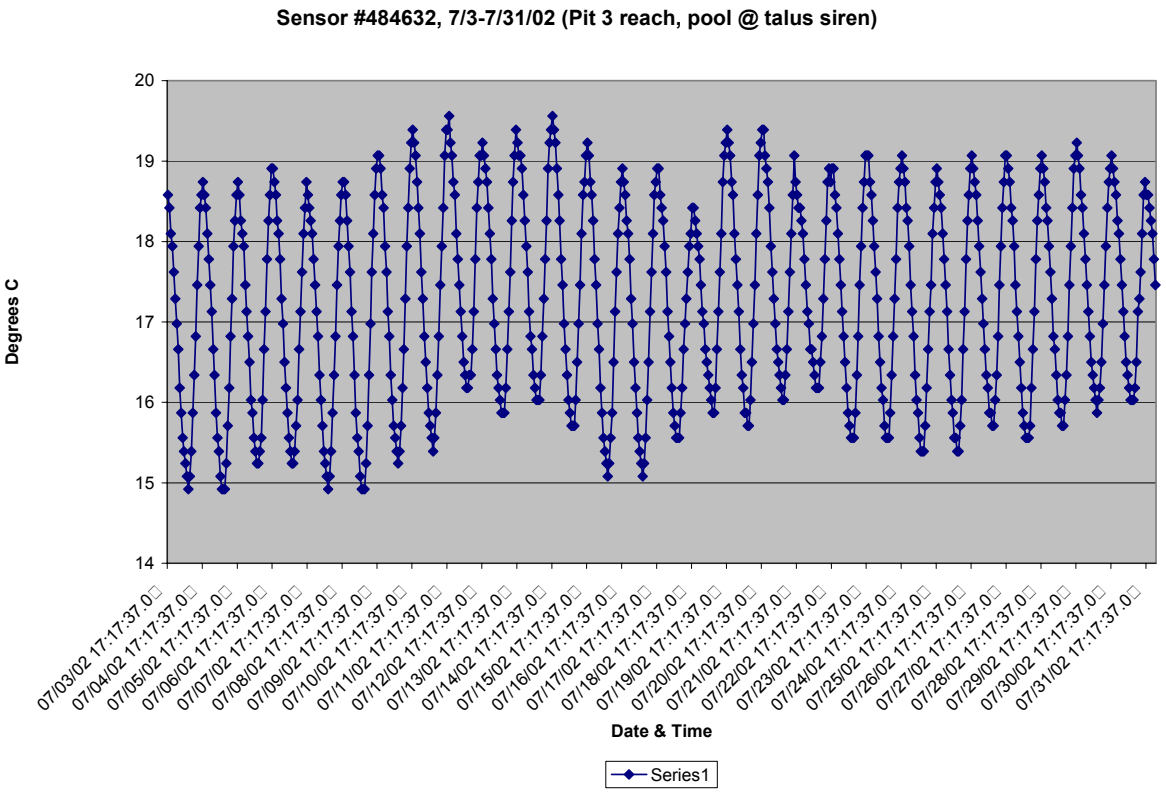


Figure 5. 1995 (average water year) unimpaired flows (blue) and existing flow conditions (magenta) and approximate flows (red) to provide proper stage change for recruitment of woody vegetation (cottonwood, willow, etc) at the 5,000 cfs level in the channel. Note how well unimpaired conditions match the necessary recruitment conditions and how the existing conditions drop much too fast.



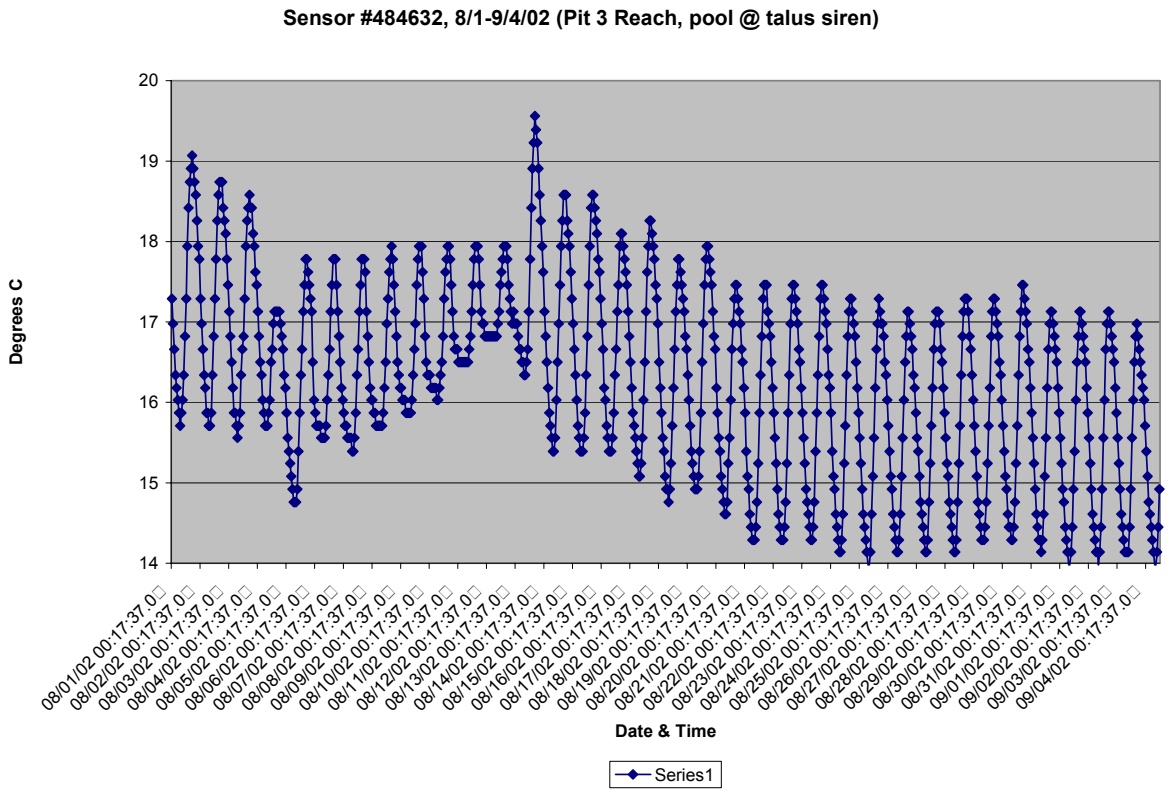
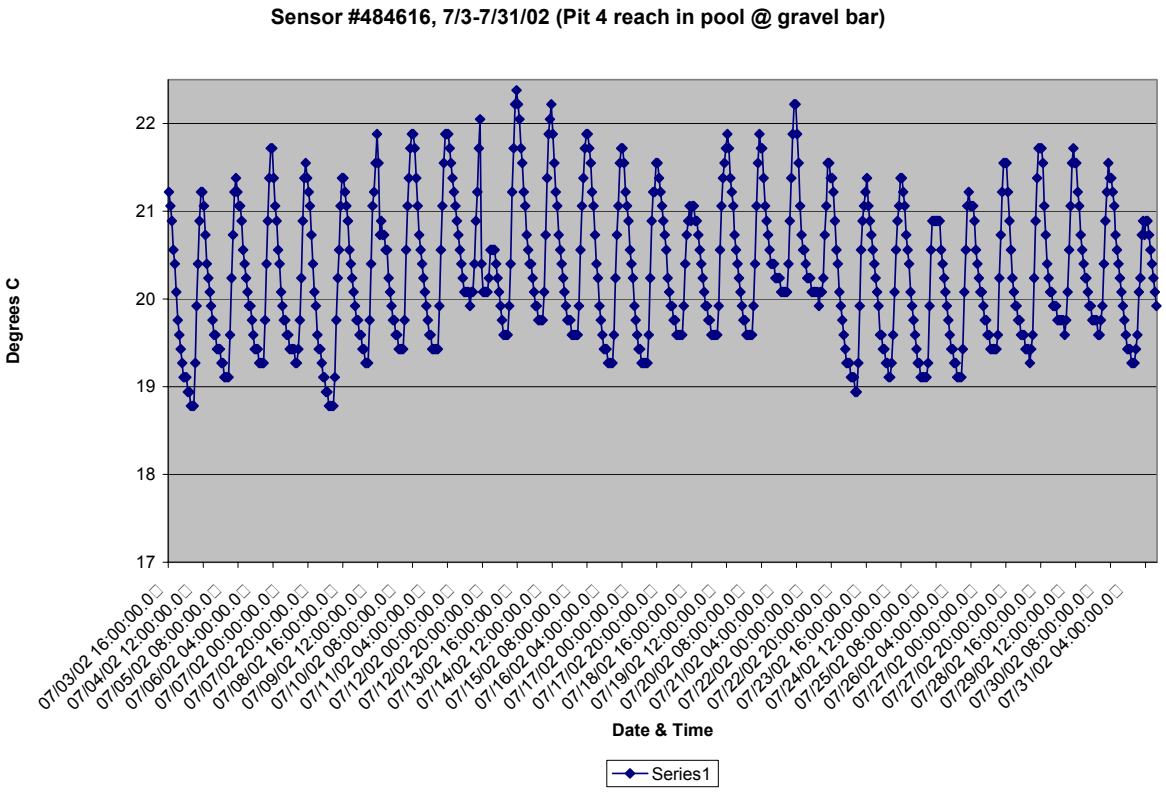


Figure 6a. Temperatures in the Pit 4 reach during July (top) and August (bottom). Reduced temperature variability and reduced mean temperatures in early August were caused by flow releases of 400, 600, 800, 1200, and 1800 cfs, respectively. The first two flows were released for 2 days and the others were released for one day each. Base flows before and after the releases were 150 cfs (existing conditions).



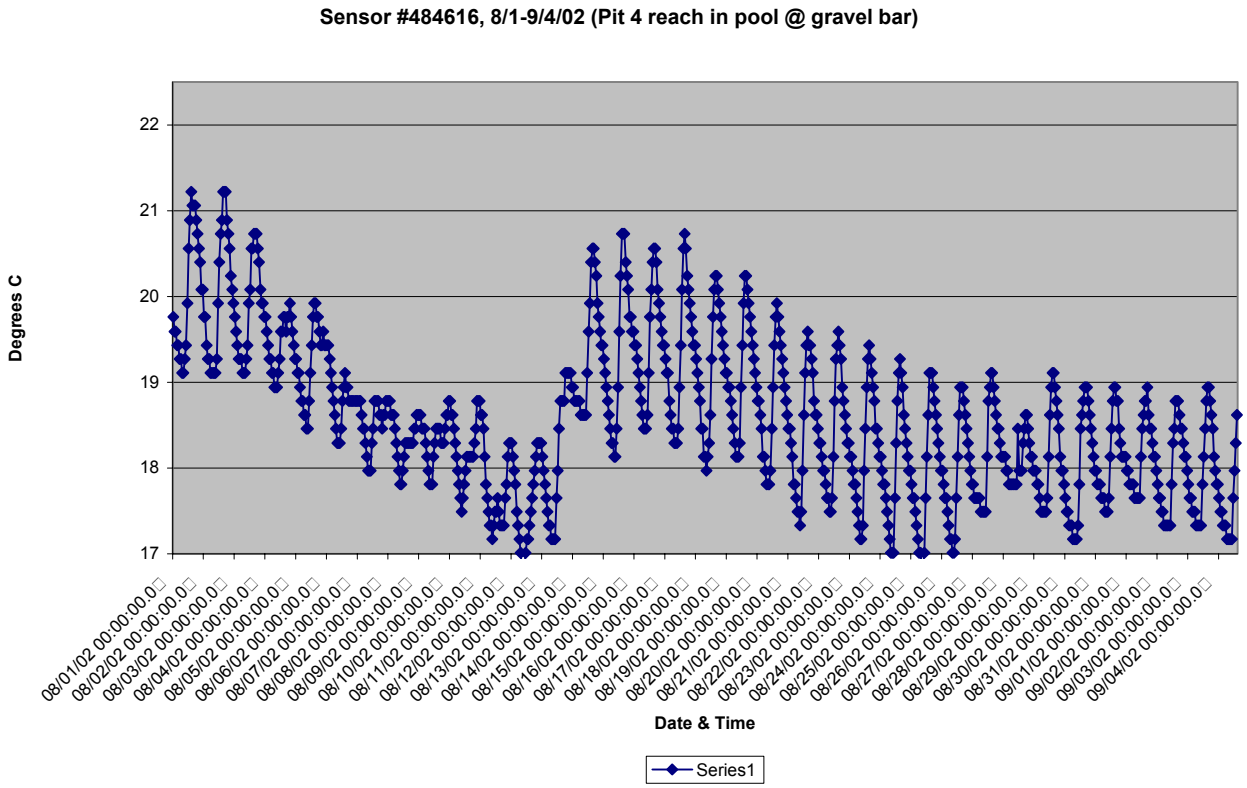


Figure 6b. Temperatures in the Pit 4 reach during July (top) and August (bottom). Reduced temperature variability and reduced mean temperatures in early August were caused by flow releases of 250, 400, 600, 800, 1200, and 1800 cfs, respectively. The first three flows were released for 2 days and the others were released for one day each. Base flows before and after the releases were 150 cfs (existing conditions).

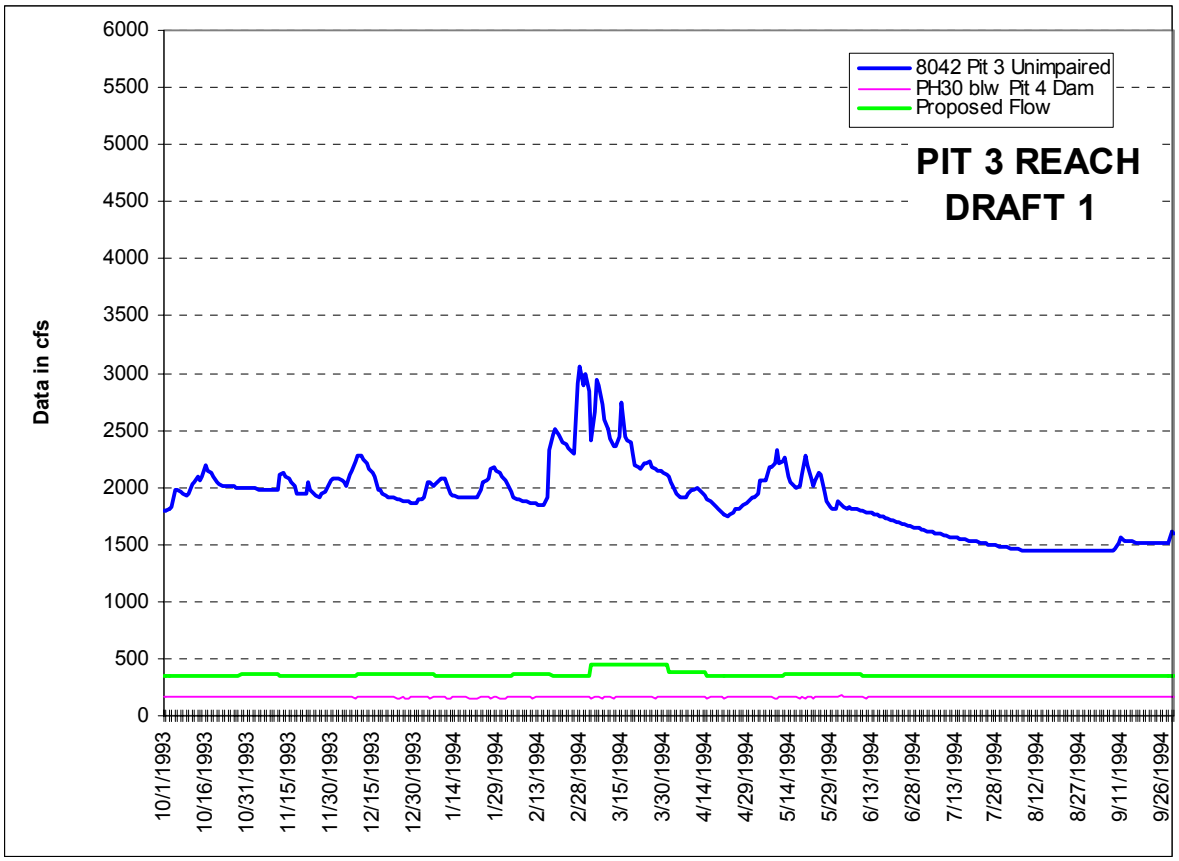


Figure 7. Dry year (1994) proposed flow regime (green), unimpaired flow (blue), and existing flow regime (magenta).

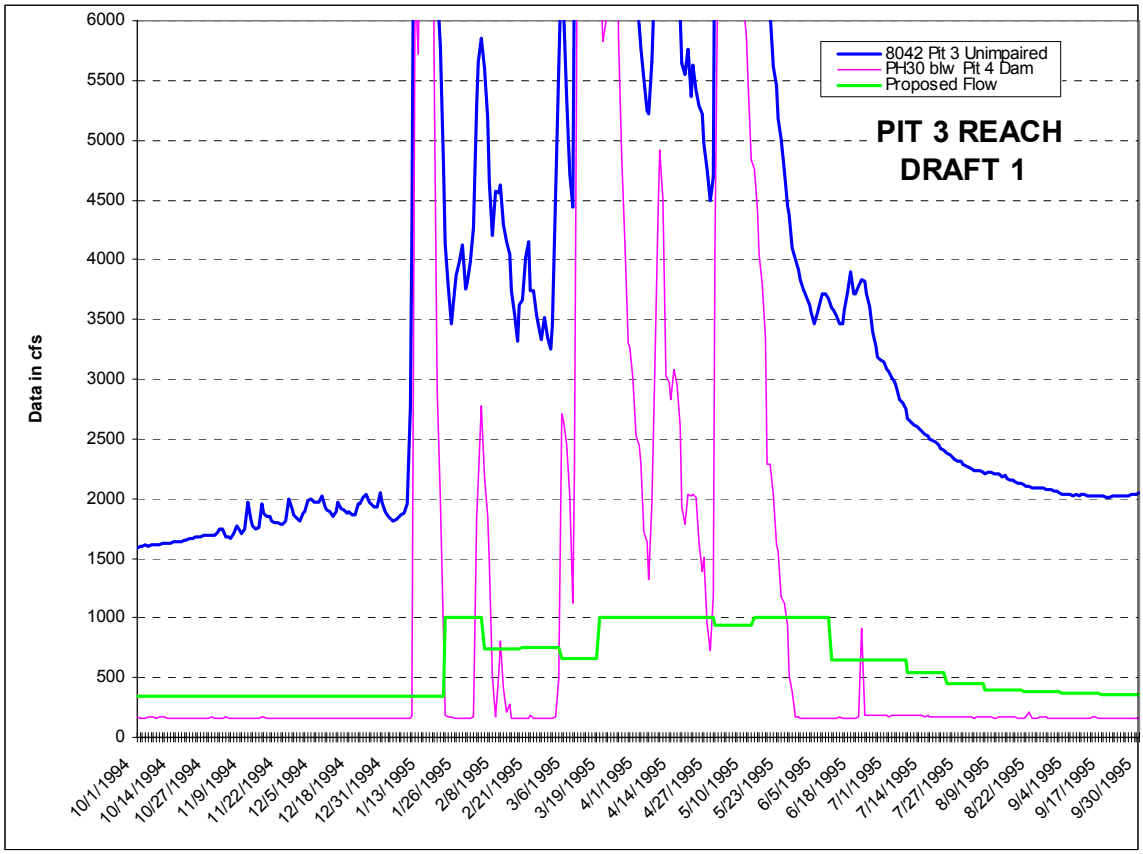


Figure 8. Average water year (1995) proposed flow regime (green), unimpaired flow (blue), and existing flow regime (magenta). The actual flow regime would be the upper of the green and magenta lines (spills filled by releases). Note the better recession limb hydrograph and that the high winter release really just fill the voids in the spills (buffer the flow fluctuations). Base flows are 540 cfs in July down to 350 cfs in the fall and early winter.

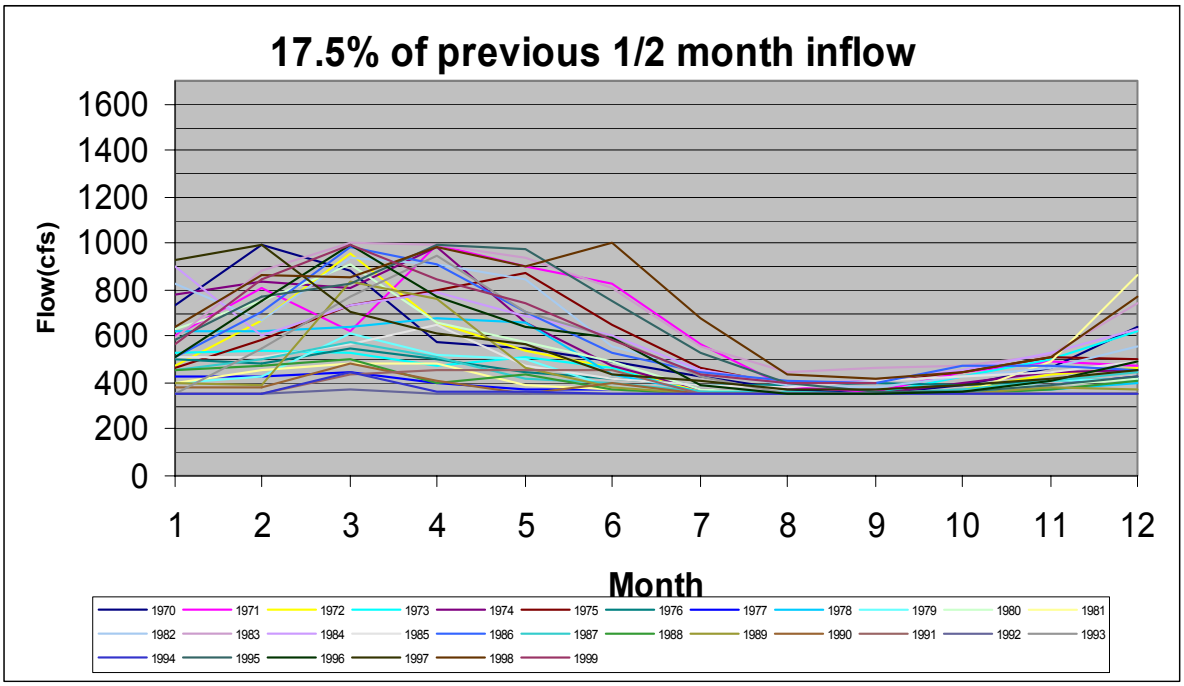


Figure 9. Resulting mean monthly flow release for the period of record (1970-1999) under the proposed flow regime. Note that in some years high flows occur late in the year (e.g., June) and in some years the come very early (e.g., February).