October 7, 2008

Parties Addressed on Attached List

Re: Rock Creek - Cresta Project (FERC No. 1962)
Proposed Revisions of Condition 5.A – Minimum River Flows

Rock Creek - Cresta Settlement Agreement Parties:

This letter provides proposed modifications to the Rock Creek – Cresta License Condition 5.A (Minimum River Flows) and requests your support for these modifications. The purpose of the proposed Cresta flow modification is to facilitate a flow schedule for recreational boating opportunities that is also protective of the foothill yellow-legged frog (FYLF) population as well as other aquatic biota, and allows for hydroelectric generation consistent with the Rock Creek – Cresta Project Relicensing Settlement Agreement (SA). PG&E plans to formally submit this proposal, with letters of support, to the Forest Service in early November and request the Forest Service revise its Section 4(e) conditions to incorporate the proposed modifications to Condition 5. PG&E requests that letters of comment or support be provided by November 7, 2008. It is PG&E's intent that this letter initiate the 90-day review period under Settlement Agreement Section 4.7.2.

The ERC and FS have previously agreed to changes to recreational flows for the Rock Creek reach and the A.2 Tables have been further modified to recognize the agreement reached by the ERC on March 21, 2007 concerning recreation flows. An updated Table A, which includes the proposed Cresta reach flow modifications and all previously agreed to changes to Rock Creek reach flows is attached.

Any changes to instream flows in Project 1962, are not intended to constrain or limit the Section 401 Water Quality Certification process for Projects 2105 or 2107. The ERC foresees a separate and distinct process regarding measures to address water temperature issues throughout the North Fork Feather River (NFFR) watershed, which will likely include a venue broader than the Project 1962 ERC.

<u>Background and Rationale for Proposed Modification to Condition 5.A - Minimum River Flows</u>

Boating flows in the Cresta reach of the NFFR were cancelled in 2006, 2007 and 2008, due to concerns of potential impacts on the FYLF population. In 2007, the ERC agreed to explore options that would provide a recreational flow opportunity in the Cresta reach while protecting FYLF breeding and development. One option suggested was to structure the instream flow to provide a boating level in the spring and then reduce the flow over the later spring and summer similar to a "natural" hydrograph. A proposal was presented using the total volume of water for instream flows in a normal/wet year based on the flow caps from the third 5-year period. Under this proposal, a peak flow would have been established in May and flow would have declined throughout the summer.

PG&E felt that this proposal provided a framework that could be molded into a flow schedule that would remain protective of the FYLF population as well as other aquatic biota, allow for

recreational boating opportunities, and allow for hydroelectric generation that is consistent with the SA. The Project is currently in the second 5-year flow test period under License Condition 5. The ERC and FS worked together on creating a modified flow schedule for this period that had higher spring base flows and reduced winter base flows, using the total annual volume for the second flow test period. While this shifted Project generation patterns, PG&E determined that this was acceptable since there was not a significant seasonal variation in the energy values in the months that experienced a shift, and the total annual volume of water under Table 5.A was appropriate since the monthly increases were automatic during this second flow test period.

The ERC and FS developed a modified minimum river flow schedule for the Cresta reach (Condition 5.A), for the second five-year test flow period of the license. Additionally, if the ERC and FS decide to continue with this volume based concept, the ERC and FS have developed monthly minimum flows and volume boundaries (low and high) for the third five-year test flow period. The monthly minimum flows and annual volume boundaries for the third test flow period are as follows: Minimum flows in the third test flow period shall not be reduced below monthly base flow values shown on Table A.1 in the months December through April, and May through November minimum flows shall be no less than monthly base flow values shown on Table A.3; The ERC and FS may continue to use the total volume concept in the third test flow period. Although the method for determining the appropriate flow in each month of the third flow test period (which could then be totaled to produce an annual volume) has not been determined, the annual volume shall be no more than total volume contained in Table A.3 annual Cap values, and no less than the total volume contained in Table A.3 annual base flow values. Any changes to the minimum river flows for the third 5-year period and beyond must be consistent with the objectives agreed upon as appropriate and necessary in the SA Appendix B.

The ERC and FS has not made a decision on the minimum river flow schedule boundaries for the Rock Creek or Cresta reaches following the third test flow period, and will refer back to the SA to make final flow schedule decisions. The option of using the volume based concept can be considered at that time.

<u>Proposed Modification to Condition 5.A – Minimum River Flows</u>

Attachment A contains the proposed revisions to Condition 5.A, which specifies the minimum river flow schedule for the Rock Creek and Cresta reaches of the North Fork Feather River during the license term. The proposed changes provide flexibility in setting flows in the second and third 5-year test periods and after the third 5-year test period. At the present time the ERC and FS have agreed to specific changes to the Cresta second 5-year test flow period and a modified Table A.2 is attached to be consistent with current ERC and FS modifications. These modifications consist of increases in base flows in May and June and decreases in base flows in December, January, February, March, and April during Normal, Wet and Dry water years. In Normal and Wet years, the modifications include a July base flow with an augmentation that has been designated as a “boating flow”. This boating flow would apply at all times during July except during “no touch” periods as designated by the California Independent System Operator (CalISO). The decreases in base flows are to levels equivalent to the first 5-year flow period. There is no proposed change in base flows during Critically Dry water years.

The new flow schedule is proposed to become effective in 2009 and continue through the remainder of the second 5-year flow period, nominally scheduled to end in 2011. The actual length of the second 5-year flow period will be longer due to current critically dry year

conditions. As stated in the SA, "flows shall be maintained at the second 5-year level for a five year test period provided at least four consecutive non-critically dry years occur. If the test period is interrupted by one or more critically dry years the test period shall be extended as determined by the ERC and FS."

As agreed upon in the SA, "adjustments to required Minimum River Flows after the completion of the second 5-year test period shall be made as specified by the ERC and FS. Such adjustments shall not exceed the Cap Flows applicable for the third 5-year test period. The length of the third 5-year test period shall be subject to the same conditions as the second 5-year test period (may be extended by the ERC and FS in the event critically dry years occur). Adjustments after the third 5-year test period shall be as specified by the ERC and FS, and such adjustments shall not exceed the Cap Flows applicable for the third 5-year test period. FERC shall be advised of the status of the test periods in the ERC's annual report."

Any changes to the minimum river flows for the third 5-year period and beyond must be consistent with the objectives agreed upon as appropriate and necessary in the SA Appendix B. Also, the flow increases and decreases in December – June for the Cresta reach are specific accommodations for the second 5-year Cresta recreational flow test and are not intended to change flows beyond the second 5-year test period unless otherwise agreed by the ERC and FS.

License Condition 16 - Recreational Flows

The ERC has relied on existing language in Condition 16 that allows the ERC to modify the recreational flow schedule and PG&E is proposing that this practice continue. No change to License Condition 16 is proposed.

The recreational flows for the Rock Creek reach will be consistent with the flow schedule described in Appendix B of the Condition 17 report filed on May 31, 2007. Recreational flows in the Cresta reach during the 5-year test period will be consistent with the License Condition 5 Table A.2 described above and in Attachment A. Any additional changes to the recreational flows for the Rock Creek and Cresta reaches shall be decided by the ERC and FS.

License Condition 17 – Recreation and Pulse Flow Biological Evaluation

To ensure that the modified flows are protective of the existing FYLF population, PG&E has agreed to monitor the FYLF breeding activity in the Cresta and Poe reaches of the NFFR for, at a minimum, the next three years (2009 through 2011). Attachment B contains the initial FYLF survey protocols for the Cresta and Poe reaches that is referenced in the modified Condition 5.A. These proposed survey protocols are subject to modification by the ERC and FS.

Although not anticipated, FYLF survey results could necessitate the cancellation or modification of the flows described in Table A.2. The factors that could facilitate these changes and the types of changes that could be made have been initially described in Attachment B (see Initial Flow Modification Contingency Plan), and are subject to modification by the ERC and FS.

The initial FYLF survey protocols for the Cresta and Poe reaches included as Attachment B are considered an extension of the Condition 17 Recreation and Pulse Flow Biological Evaluation studies. PG&E had previously committed to monitoring the FYLF population as part of this study through 2008. It was stated that additional monitoring might be necessary. As stated

previously, due to the concerns for this population and to ensure that the modified flows are protective of the existing FYLF population, PG&E has agreed to monitor the FYLF breeding activity in the Cresta and Poe reaches of the NFFR for, at a minimum, the next three years (2009 through 2011).

The final report for the Condition 17 studies was to be submitted to FERC by May 31, 2010. This final report was to include the results of the ongoing pulse flow macroinvertebrate study, the ongoing FYLF study, and all of the other resources that have been studied to date. With the extension of the FYLF study beyond 2010, PG&E plans on continuing to pursue submitting the final Condition 17 report to FERC by May 31, 2010, with a supplemental report covering the FYLF study within one year of the conclusion of the study.

ERC Review and Condition 5.A Revision Process

As noted above, flow modifications to accommodate recreational flows have been under discussion within the ERC and FS since 2007 and the ERC and FS representatives participating in ERC meetings support the attached modification of Condition 5.A. These modifications would change Project operation. License Condition 22 specifies that "*The licensee shall provide notice to the Commission within 30 days (but prior to implementing the change) of any decisions by the ERC or Forest Service that would result in changes to Project operations or facilities, and will, where required by the FPA, the Commission's regulations, or the license, obtain Commission approval prior to making any such changes."*

The ERC requests letters of support from SA parties by November 7, 2008 for the proposed flow modifications. With these letters of support, PG&E will then formally request that the FS revise Condition 5.A consistent with the proposed modifications (Condition 5 is a Section 4(e) condition as applied to the Cresta reach). FERC would then be notified of the proposed changes to Project operations consistent with the requirements of Condition 22. It is the objective of the ERC participants that developed this proposed flow modification decision to implement the modifications in March 2009.

If you have any questions, please call me at (415) 973-1646.

Sincerely,

Bill Zemke
Regulatory Supervisor

Attachments

Rock Creek – Cresta Settlement Agreement Parties

Richard Roos-Collins
Natural Heritage Institute
100 Pine Street, Suite 1550
San Francisco, CA 94111

Mary Lisa Lynch
CA Dept. of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Lori Powers
CA Dept. of Fish and Game
P.O. Box 1858
Portola, CA 96122

Tristan Leong
CA Water Res. Control Board
P. O. Box 2000
Sacramento, CA 95812

Terri Simon-Jackson
Plumas National Forest
P.O. Box 11500
Quincy, CA 95971

Cheryl Mulder
Plumas National Forest
P.O. Box 11500
Quincy, CA 95971

Curtis Knight
California Trout
P. O. Box 650
Mt. Shasta, CA 96067

Stephen Bowes
National Park Service
1111 Jackson Street
Oakland, CA 94607

Dave Steindorf
American Whitewater/Chico Paddleheads
4 Baroni Drive
Chico, CA 95928

Kelly Catlett
Policy Advocate
Friends of the River
915 20th Street
Sacramento, CA 95814

Nate Rangel
CA Outdoors
PO Box 401
Coloma, CA 95613-0401

Shasta Paddlers

Dennis Smith
U. S. Forest Service
650 Capitol Mall, Suite 8-200
Sacramento, CA 95814-4706

Deborah Giglio
U. S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

John Beuttler
CA Sportfishing Protection Alliance
1360 Neilson Street
Berkeley, CA 94702

Chris Shutes
CA Sportfishing Protection Alliance
1608 Francisco Street
Berkeley, CA 94703

Brian Morris
Plumas County
520 Main Street, Rm 302
Quincy, CA 95971

Robert Meacher
Plumas County Supervisor
520 Main Street, Rm 309
Quincy, CA 95971

Plumas County Council
520 West Main Street, Room 302
Quincy, CA 95971

Attachments

WEZemke (223-1646) (Cond5A_Letter_and_Attachments_100708.doc)

Bcc: Annette Faraglia
Mike Malloy
David Moller
Craig Bolger
Craig Geldard
Tom Jereb
Kent Karge
Mark Sanford
Scott Tu
Lee Woodson

File: Project 1962, 026.1191

Attachments

Attachment A

Condition 5.A and Table A.2 Modification

Proposed Revisions to License Condition 5

Condition 5 – River Flow Management

A. Minimum River Flows. For the preservation and improvement of fisheries resources in the Project area, Licensee shall maintain specified Minimum River Flows and Pulse Flows below Project dams as measured at gages NF-56 and NF-57 in accordance with Table A below. Table A provides for adjustments in flow releases over the term of the license. Minimum River Flows at the levels specified in the first 5-year period shall be initiated within 60 days of issuance of a New Project License. The first official test year shall begin on the January 1 of the year following issuance of a New Project License. Test years shall be on a calendar year basis and the first 5-year test period shall last until December 31 of the fifth full year after issuance of a New Project License. On January 1 of the sixth full year after issuance of a New Project License the Minimum River Flows shall increase automatically to the levels of the second 5-year period. Minimum River Flows shall be maintained at the second 5-year level for a five year test period provided at least four consecutive non-critically dry years occur. If the test period is interrupted by one or more critically dry years the test period shall be extended as determined by the ERC and FS. Flows in Revised Table A.2 shall be maintained for the second 5-year period. Adjustments to required Minimum River Flows after the completion of the second 5-year test period shall be made as specified by the ERC and FS and a revised Table A.3 shall be prepared. Such adjustments shall not exceed the Cap Flows applicable for the third 5-year test period. Minimum flows in any test period shall not be reduced below values shown on Table A.1 in the months December through April. May through November minimum flows in any test period shall be no less than monthly ~~Baseflow~~Minimum River Flow values shown on Table A.3. The length of the third 5-year test period shall be subject to the same conditions as the second 5-year test period (may be extended by the ERC and FS in the event critically dry years occur). Adjustments after the third 5-year test period shall be as specified by the ERC and FS, and such adjustments shall not exceed the Cap Flows applicable for the third 5-year test period. The Commission shall be advised of the status of the test periods in the ERC's annual report.

Table A.1

Rock Creek Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Normal & Wet Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	250	2 @ >1600	rise & fall from EBF (1)	-	-	-
	Apr	250	0	rise & fall from EBF (1)	-	-	-
	May	250	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	220	0	300/400 cfs rise/150 cfs fall (4)	-	1600	10 - 4 pm
	Jul	180	0	400 cfs rise/150 cfs fall	no	1200	10 - 4 pm
	Aug	180	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Sep	180	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Oct	180	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Nov	180	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	200	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	225	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-
	Feb	225	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

Table A.1 (continued)

Rock Creek Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	200	0	rise & fall from EBF (1)	-	-	-
	Apr	200	0	rise & fall from EBF (1)	-	-	-
	May	200	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	175	0	300/400 cfs rise/150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	150	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	150	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	150	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	150	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	150	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	160	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	180	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	180	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

Table A.1 (continued)

Rock Creek Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Critically Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	110	0	rise & fall from EBF (1)	-	-	-
	Apr	110	0	rise & fall from EBF (1)	-	-	-
	May	150	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	150 (7)	0	300/400 cfs rise/150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	150 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	150 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	150 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	150 (7)	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	110	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	110	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	110	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	110	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(7) The base flow of 150 cfs shall be increased to 200 cfs, or to any flow between 150 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Rock Creek Reach. Similarly, this increased flow shall be reduced back to the 150 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Rock Creek Reach. For the first three years after issuance of a new project license, or until a temperature model as referred to in Section I, Paragraph 3 is developed, licensee shall use the mean daily water temperature measured at NF 57 to determine whether and how to implement this flow provision. This flow provision shall not apply, and the base flow shall remain at 150 cfs, if the ERC and FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature new project beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, licensee shall, in consultation with the ERC and FS, submit to the Commission for approval, as soon as practicable but no later than one year after issuance of a license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to support maintenance of mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 150 and 200 cfs) and decreasing flows back to 150 cfs.

Table A.1 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Normal & Wet Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	250	2 @ >1600	rise & fall from EBF (1)	(3)	-	-
	Apr	250	0	rise & fall from EBF (1)	(3)	-	-
	May	250	0	rise & fall from EBF (1)	(3)	-	-
Summer & Fall	Jun	240	0	300/400 cfs rise/150 cfs fall (4)	(3)	1600	10 - 4 pm
	Jul	220	0	400 cfs rise/150 cfs fall	no	1200	10 - 4 pm
	Aug	220	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Sep	220	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Oct	220	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Nov	220	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	240	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	240	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-
	Feb	240	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June.

(3) If flows at NF 56 are between 275 and 3000 cfs, Rock Creek will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

Table A.1 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	200	0	rise & fall from EBF (1)	(3)	-	-
	Apr	200	0	rise & fall from EBF (1)	(3)	-	-
	May	200	0	rise & fall from EBF (1)	(3)	-	-
Summer & Fall	Jun	190	0	300/400 cfs rise/150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	175	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	175	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	175	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	175	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	175	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	190	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	190	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	190	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek, & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion during March - first 2 weeks of June.

(3) If flows at NF56 are between 225 and 3000 cfs, Cresta will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

Table A.1 (continued)

Rock Creek Reach Minimum River Flow, Pulse, and Ramping First 5-Year Flow Period - Critically Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs)**	**Launch Window**
Spring	Mar	100	0	rise & fall from EBF(1)	(3)	-	-
	Apr	100	0	rise & fall from EBF (1)	(3)	-	-
	May	140	0	rise & fall from EBF (1)	(3)	-	-
Summer &Fall	Jun	140 (7)	0	300/400 cfs rise/150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	140 (7)	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	100	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	100	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam between March and first 2 weeks of June.

(3) If flows at NF 56 are between 225 and 3000 cfs, Rock Creek will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(7) The base flow of 140 cfs shall be increased to 200 cfs, or to any flow in between 140 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Cresta Reach. Similarly, this increased flow shall be reduced back to the 140 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Cresta Reach. For the first three years after issuance of a New Project license, or until a temperature model as referred to in Section I, paragraph 3 is developed, Licensee shall use the mean daily water temperature measured at NF 56 to determine whether and how to implement this provision. This flow provision shall not apply, and the base flow shall remain at 140 cfs, if the *ERC and* FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, Licensee shall, in consultation with the *ERC and* FS, submit to the Commission for approval, as soon as practicable but no later than one year after issuance of a new project license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to maintain mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 140 and 200 cfs) and decreasing flows back to 140 cfs.

Table A.2

Rock Creek Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Normal & Wet Years (8)							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (9)(10)**	**Launch Window (9)**
Spring	Mar	350	2 @ >1600	rise & fall from EBF (1)	-	-	-
	Apr	350	0	rise & fall from EBF (1)	-	-	-
	May	350	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	260	0	300/400 cfs rise/150 cfs fall (4)	-	1600	10 – 4 pm
	Jul	260	0	400 cfs rise/150 cfs fall	no	1100 - 800~~1200~~	10 – 4 pm, end 2 pm Sun.
	Aug	260	0	400 cfs rise/150 cfs fall	no	1000 - 900	10 – 4 pm, end 2 pm Sun
	Sep	260	0	400 cfs rise/150 cfs fall	no	1000 - 900	10 – 4 pm, end 2 pm Sun.
	Oct	260	0	400 cfs rise/150 cfs fall	no	900~~1000~~	10 – 4 pm
	Nov	260	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	350	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	350	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-
	Feb	350	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(8) Implementation of flow in this table is automatic after first 5 years.

(9) Boating flow levels and launch windows shall be as specified by ERC's decision on March 21, 2007 as provided to FERC by letter dated May 31, 2007 or subsequent decisions by the ERC consistent with license Condition 16.

(10) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows

Table A.2 (continued)

Rock Creek Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Dry Years (8)							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (9)(10)**	**Launch Window (9)**
Spring	Mar	280	0	rise & fall from EBF (1)	-	-	-
	Apr	280	0	rise & fall from EBF (1)	-	-	-
	May	280	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	210	0	300/400 cfs rise/150 cfs fall (4)	no	~~1000~~	~~10 - 1 pm~~
	Jul	210	0	400 cfs rise/150 cfs fall	no	800	11 – 2 ~~10 – 1~~ pm
	Aug	210	0	400 cfs rise/150 cfs fall	no	800 - 700	11 - 3~~10 - 1~~ pm, end 1 pm Sun.
	Sep	210	0	400 cfs rise/150 cfs fall	no	800 - 700	11 - 3~~10 – 1~~pm, end 1 pm Sun.
	Oct	210	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	210	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	280	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	280	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	280	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(8) Implementation of flow in this table is automatic after first 5 years.

(9) Boating flow levels and launch windows shall be as specified by ERC's decision on March 21, 2007 as provided to FERC by letter dated May 31, 2007 or subsequent decisions by the ERC consistent with license Condition 16.

(10) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows

Table A.2 (continued)

Rock Creek Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Critically Dry Years (8)							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (9)(10)**	**Launch Window (9)**
Spring	Mar	110	0	rise & fall from EBF (1)	-	-	-
	Apr	110	0	rise & fall from EBF (1)	-	-	-
	May	150	0	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	150 (7)	0	300/400 cfs rise/150 cfs fall (4)	no	~~1000~~	~~10 - 1 pm~~
	Jul	150 (7)	0	400 cfs rise/150 cfs fall	no	800	11 - 2~~10 - 1~~pm
	Aug	150 (7)	0	400 cfs rise/150 cfs fall	no	800	11 - 3~~10 - 1~~ pm, end 1 pm Sun.
	Sep	150 (7)	0	400 cfs rise/150 cfs fall	no	800	11 - 3~~10 - 1~~pm, end 1 pm Sun.
	Oct	150 (7)	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	110	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	110	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	110	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	110	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(7) The base flow of 150 cfs shall be increased to 200 cfs, or to any flow between 150 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Rock Creek Reach. Similarly, this increased flow shall be reduced back to the 150 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Rock Creek Reach. For the first three years after issuance of a new project license, or until a temperature model as referred to in Section I, Paragraph 3 is developed, Licensee shall use the mean daily water temperature measured at NF 57 to determine whether and how to implement this flow provision. This flow provision shall not apply, and the base flow shall remain at 150 cfs, if the ERC and FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, Licensee shall, in consultation with the ERC and FS, submit to The Commission for approval, as soon as practicable but no later than one year after issuance of a new project license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to support maintenance of mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 150 and 200 cfs) and decreasing flows back to 150 cfs.

(8) Implementation of flow in this table is automatic after first 5 years.

(9) Boating flow levels and launch windows shall be as specified by ERC's decision on March 21, 2007 as provided to FERC by letter dated May 31, 2007 or subsequent decisions by the ERC consistent with license Condition 16.

(10) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows

Table A.2 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Normal & Wet Years (8)							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window**
Spring	Mar	~~350~~ 250	2 @ >1600	rise & fall from EBF (1)	(3)	-	-
	Apr	~~350~~ 250	0	rise & fall from EBF (1)	(3)	-	-
	May	~~350~~ 600	0	rise & fall from EBF (1)	(3)	1200/800~~1600~~	~~(9)-~~
Summer & Fall	Jun	~~325~~ 500	0	300/400 cfs rise/150 cfs fall (4)	(3)	500~~1600~~	~~-10 - 4 pm~~
	Jul	325 (10)	0	400 cfs rise/150 cfs fall	no	400~~1200~~ (10)	(10)~~10 - 4 pm~~
	Aug	325	0	400 cfs rise/150 cfs fall	no	~~-1000~~	~~-10 - 4 pm~~
	Sep	325	0	400 cfs rise/150 cfs fall	no	~~-1000~~	~~-10 - 4 pm~~
	Oct	325	0	400 cfs rise/150 cfs fall	no	~~-1000~~	~~-10 - 4 pm~~
	Nov	325	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	~~350~~ 240	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	~~350~~ 240	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-
	Feb	~~350~~ 240	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past dam during March - first 2 weeks of June.

(3) If flows at NF56 are between 275 and 3000 cfs, Rock Creek will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(8) Implementation of flow in this table is automatic after first 5 years.

(9) In May, flows will increase to 800 cfs from May 1 through May 7 with an additional increase to 1200 cfs for 24 hours the first weekend in May from noon Saturday until noon Sunday. If May 1 is a Sunday the 1200 cfs flow will take place starting May 7 with flows reduced to 600 cfs after noon on May 8.

(10) A boating flow of 400 cfs will be provided throughout July except during "no touch days", periods when the California Independent System Operator has issued a Restricted Maintenance Operations Notice.

(11) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows

Table A.2 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Dry Years (8)							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfsΔ/hr)**	**Block Loading**	**Boating Flow (cfs) (10)**	**Launch Window**
Spring	Mar	~~280~~ 200	0	rise & fall from EBF(1)	(3)	-	-
	Apr	~~280~~ 200	0	rise & fall from EBF(1)	(3)	-	-
	May	~~280~~ 500	0	rise & fall from EBF(1)	(3)	1200/750 ~~-~~	~~(9)-~~
Summer & Fall	Jun	~~260~~ 400	0	300/400 cfs rise/150 cfs fall (4)	no	~~-1000~~	~~10 - 1 pm-~~
	Jul	260	0	400 cfs rise/150 cfs fall	no	~~-800~~	~~10 - 1 pm-~~
	Aug	260	0	400 cfs rise/150 cfs fall	no	~~-800~~	~~10 - 1 pm-~~
	Sep	260	0	400 cfs rise/150 cfs fall	no	~~-800~~	~~10 - 1 pm-~~
	Oct	260	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	260	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	~~280~~ 190	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	~~280~~ 190	2 @ >1000~~0~~	400 cfs rise/150 cfs fall	no	-	-
	Feb	~~280~~ 190	2 @ >1000~~0~~	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Belden, Rock Creek, & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past dam during March - first 2 weeks of June.

(3) If flows at NF56 are between 225 and 3000 cfs, Belden & Cresta will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(8) Implementation of flow in this table is automatic after first 5 years.

(9) In May, flows will increase to 750 cfs from May 1 through May 7 with an additional increase to 1200 cfs for 24 hours the first weekend in May from noon Saturday until noon Sunday. If May 1 is a Sunday the 1200 cfs flow will take place starting May 7 with flows reduced to 500 cfs after noon on May 8.

(10) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows.

Table A.2 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Second 5-Year Flow Period - Critically Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (10)**	**Launch Window**
Spring	Mar	100	0	rise & fall from EBF (1)	(3)	-	-
	Apr	100	0	rise & fall from EBF (1)	(3)	-600	-(9)
	May	140	0	rise & fall from EBF (1)	(3)	-	-
Summer &Fall	Jun	140 (7)	0	300/400 cfs rise/150 cfs fall (4)	no	~~1000~~	~~10 - 1 pm~~
	Jul	140 (7)	0	400 cfs rise/150 cfs fall	no	~~800~~	~~10 - 1 pm~~
	Aug	140 (7)	0	400 cfs rise/150 cfs fall	no	~~800~~	~~10 - 1 pm~~
	Sep	140 (7)	0	400 cfs rise/150 cfs fall	no	~~800~~	~~10 - 1 pm~~
	Oct	140 (7)	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	100	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	100	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past dam during March – first 2 weeks of June.

(3) If flows at NF56 are between 225 and 3000 cfs, Belden & Cresta will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(7) The base flow of 140 cfs shall be increased to 200 cfs, or to any flow in between 140 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Cresta Reach. Similarly, this increased flow shall be reduced back to the 140 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Cresta Reach. For the first three years after issuance of a New Project license, or until a temperature model as referred to in Section I, Paragraph 3 is developed, Licensee shall use the mean daily water temperature measured at NF 56 to determine whether and how to implement this provision. This flow provision shall not apply, and the base flow shall remain at 140 cfs, if the ERC and FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, Licensee shall, in consultation with the ERC and FS, submit to FERC for approval, as soon as practicable but no later than one year after issuance of a New Project license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to maintain mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 140 and 200 cfs) and decreasing flows back to 140 cfs.

(9) In April, a boating flow of 600 cfs will be provided on the third Saturday in April (from 8am Saturday morning until 5pm Sunday evening). This date was selected to not affect the trout season opener and the onset of FYLF breeding activity

(10) Condition 17 study results could necessitate the cancellation or modification by the ERC and FS of the flows

Table A.3

Rock Creek Reach Minimum River Flow, Pulse, Ramping, & Riparian Third 5-Year Flow Period - Normal & Wet Years (9)								
Season	**Month**	**Base Flow/Cap & Riparian (cfs) (5)**	**Pulse (cfs) (6)**	**Riparian (10)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	350/525 & 1000	2 @ >1600	yes	rise & fall from EBF (1)	-	-	-
	Apr	350/525 & 800	0	yes	rise & fall from EBF (1)	-	-	-
	May	350/525 & 600	0	yes	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	600 to 260/390	0	yes	300/400 cfs rise 150 cfs fall (4)	-	1600	10 - 4 pm
	Jul	260/390	0	no	400 cfs rise 150 cfs fall	no	1200	10 - 4 pm
	Aug	260/390	0	no	400 cfs rise 150 cfs fall	no	1000	10 - 4 pm
	Sep	260/390	0	no	400 cfs rise 150 cfs fall	no	1000	10 - 4 pm
	Oct	260/390	0	no	400 cfs rise150 cfs fall	no	1000	10 - 4 pm
	Nov	260/390	0	no	400 cfs rise 150 cfs fall	no	-	-
Winter	Dec	350/525	0	no	400 cfs rise 150 cfs fall	no	-	-
	Jan	350/525	2 @ >1600	no	400 cfs rise 150 cfs fall	no	-	-
	Feb	350/525	2 @ >1600	no	400 cfs rise 150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57. Actual flow levels to be determined by ERC and FS consistent with Condition 5

(6) Pulses are 12 hrs continuous duration.

(9) Minimum flows in this table set by the ERC based on monitoring results

(10) Riparian test flows elevate base flow from March 15-30, 1000 cfs continuous. For April 1-30, 20 of 30 days at 800 cfs, for May 1-31, 20 of 30 days at 600 cfs, base/cap flow otherwise. From June 1 - 15, ramp in two steps to base/cap. After the 5-yr test and assoc. monitoring, riparian releases may cease unless significant resource improvement is observed. Prior to implementation of riparian flows the ERC will evaluate whether changes are necessary based on the results of the Recreation and Streamflow and Pulse Flow Biological Evaluation Study effort pursuant to License Condition 17.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Table A.3 (continued)

Rock Creek Reach Minimum River Flow, Pulse, Ramping, & Riparian Third 5-Year Flow Period - Dry Years (9)								
Season	**Month**	**Base Flow/Cap & Riparian (cfs) (5)**	**Pulse (cfs) (6)**	**Riparian (10)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	280/420 & 800	0	yes	rise & fall from EBF (1)	-	-	-
	Apr	280/420 & 640	0	yes	rise & fall from EBF (1)	-	-	-
	May	280/420 & 480	0	yes	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	480 to 210/310	0	yes	300/400 cfs rise 150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	210/310	0	no	400 cfs rise 150 cfs fall	no	800	10 - 1 pm
	Aug	210/310	0	no	400 cfs rise 150 cfs fall	no	800	10 - 1 pm
	Sep	210/310	0	no	400 cfs rise 150 cfs fall	no	800	10 - 1 pm
	Oct	210/310	0	no	400 cfs rise 150 cfs fall	no	-	-
	Nov	210/310	0	no	400 cfs rise 150 cfs fall	no	-	-
Winter	Dec	280/420	0	no	400 cfs rise 150 cfs fall	no	-	-
	Jan	280/420	2 @ >1000	no	400 cfs rise 150 cfs fall	no	-	-
	Feb	280/420	2 @ >1000	no	400 cfs rise 150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57. Actual flow levels to be determined by ERC and FS consistent with Condition 5.

(6) Pulses are 12 hrs continuous duration.

(9) Minimum flows in this table set by the ERC based on monitoring results

(10) Riparian test flows elevate base flow from March 15-30, 800 cfs continuous. For April 1-30, 20 of 30 days at 640 cfs, for May 1-31, 20 of 30 days at 480 cfs, base/cap flow otherwise. From June 1 - 15, ramp in two steps to base/cap. Riparian releases occur only in first year of consecutive dry year sequences. After the 5-yr test and assoc. monitoring, riparian releases may cease unless significant resource improvement is observed. Prior to implementation of riparian flows the ERC will evaluate whether changes are necessary based on the results of the Recreation and Streamflow and Pulse Flow Biological Evaluation Study effort pursuant to License Condition 17.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Table A.3 (continued)

Rock Creek Reach Minimum River Flow, Pulse, Ramping, & Riparian Third 5-Year Flow Period - Critically Dry Years (9)								
Season	**Month**	**Base Flow/Cap & Riparian (cfs) (5)**	**Pulse (cfs) (6)**	**Riparian (10)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	150	0	no	rise & fall from EBF (1)	-	-	-
	Apr	150	0	no	rise & fall from EBF (1)	-	-	-
	May	150	0	no	rise & fall from EBF (1)	-	-	-
Summer & Fall	Jun	150 (7)	0	no	300/400 cfs rise 150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	150 (7)	0	no	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	150 (7)	0	no	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	150 (7)	0	no	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	150 (7)	0	no	400 cfs rise/150 cfs fall	no	-	-
	Nov	110	0	no	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	110	0	no	400 cfs rise/150 cfs fall	no	-	-
	Jan	110	1 @ >1000	no	400 cfs rise/150 cfs fall	no	-	-
	Feb	110	1 @ >1000	no	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek PHs constant during pulse (unless RCPH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past dam during March - first 2 weeks of June.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF57. –

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur in critically dry years

(7) The base flow of 150 cfs shall be increased to 200 cfs, or to any flow between 150 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Rock Creek Reach. Similarly, this increased flow shall be reduced back to the 150 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Rock Creek Reach. For the first three years after issuance of a new project license, or until a temperature model as referred to in Section I, Paragraph 3 is developed, licensee shall use the mean daily water temperature measured at NF 57 to determine whether and how to implement this flow provision. This flow provision shall not apply, and the base flow shall remain at 150 cfs, if the ERC and FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, Licensee shall, in consultation with the ERC and FS, submit to the Commission for approval, as soon as practicable but no later than one year after issuance of a New Project license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to support maintenance of mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 150 and 200 cfs) and decreasing flows back to 150 cfs.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Table A.3 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Third 5-Year Flow Period - Normal & Wet Years (9)							
Season	**Month**	**Base Flow/Cap (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	350/525	2 @ >1600	rise & fall from EBF (1)	(3)	-	-
	Apr	350/525	0 0	rise & fall from EBF (1)	(3)	-	-
	May	350/525	0	rise & fall from EBF (1)	(3)	-	-
Summer & Fall	Jun	325/440	0	300/400 cfs rise 150 cfs fall (4)	(3)	1600	10 - 4 pm
	Jul	325/440	0	400 cfs rise/150 cfs fall	no	1200	10 - 4 pm
	Aug	325/440	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Sep	325/440	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Oct	325/440	0	400 cfs rise/150 cfs fall	no	1000	10 - 4 pm
	Nov	325/440	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	350/525	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	350/525	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-
	Feb	350/525	2 @ >1600	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek, & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+/-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(3) If flows at NF56 are between 275 and 3000 cfs, Rock Creek will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times. Actual flow levels to be determined by ERC and FS consistent with Condition 5

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(9) Minimum flows in this table set by the *ERC and* FS based on monitoring results.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Table A.3 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Third 5-Year Flow Period - Dry Years (9)							
Season	**Month**	**Base Flow/Cap (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	280/420	0	rise & fall from EBF (1)	(3)	-	-
	Apr	280/420	0	rise & fall from EBF (1)	(3)	-	-
	May	280/420	0	rise & fall from EBF (1)	(3)	-	-
Summer & Fall	Jun	260/350	0	300/400 cfs rise/150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	260/350	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	260/350	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	260/350	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	260/350	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	260/350	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	280/420	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	280/420	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	280/420	2 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek, & Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+/-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(3) If flows at NF56 are between 225 and 3000 cfs, Cresta will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times. Actual flow levels to be determined by ERC and FS consistent with Condition 5

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(9) Minimum flows in this table set by the *ERC and* FS based on monitoring results.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Table A.3 (continued)

Cresta Reach Minimum River Flow, Pulse, and Ramping Third 5-Year Flow Period - Critically Dry Years							
Season	**Month**	**Base Flow (cfs) (5)**	**Pulse (cfs) (6)**	**Ramping Rate (cfs/hr)**	**Block Loading**	**Boating Flow (cfs) (11)**	**Launch Window (11)**
Spring	Mar	100	0	rise & fall from EBF (1)	(3)	-	-
	Apr	100	0	rise & fall from EBF (1)	(3)	-	-
	May	140	0	rise & fall from EBF (1)	(3)	-	-
Summer & Fall	Jun	140 (7)	0	300/400 cfs rise 150 cfs fall (4)	no	1000	10 - 1 pm
	Jul	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Aug	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Sep	140 (7)	0	400 cfs rise/150 cfs fall	no	800	10 - 1 pm
	Oct	140 (7)	0	400 cfs rise/150 cfs fall	no	-	-
	Nov	100	0	400 cfs rise/150 cfs fall	no	-	-
Winter	Dec	100	0	400 cfs rise/150 cfs fall	no	-	-
	Jan	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-
	Feb	100	1 @ >1000	400 cfs rise/150 cfs fall	no	-	-

Notes:

(1) Rise and fall to follow E. Branch Feather rate, to be achieved by holding Rock Creek, Cresta PHs constant during pulse (unless Cresta PH decreased to maintain flow > target pulse). Pulse event can be terminated when EBF flow is constant (+-100 cfs/hr), at which time normal operations resume, and spill may be reduced at 150 cfs/hr. Same rise and fall ramping limitations apply to non-pulse spill events past diversion dam during March - first 2 weeks of June.

(3) If flows at NF56 are between 225 and 3000 cfs, Cresta will be block loaded to avoid having spills start and stop at Cresta Reservoir.

(4) 300 cfs/hr rise during first 2 weeks of June, 400 cfs/hr rise for second 2 weeks of June if spill is from operations.

(5) Minimum monthly flow to be measured at Licensee gage NF56, and at least 100 cfs will be released from Cresta Diversion Dam at all times.

(6) Pulses are 12 hrs continuous duration, and no riparian flows occur.

(7) The base flow of 140 cfs shall be increased to 200 cfs, or to any flow in between 140 and 200 cfs, to the extent necessary to contribute to the maintenance of mean daily temperatures of 20 degrees Celsius or less in the Cresta Reach. Similarly, this increased flow shall be reduced back to the 140 cfs base flow when not required to maintain mean daily temperatures of 20 degrees Celsius in the Cresta Reach. For the first three years after issuance of a New Project license, or until a temperature model as referred to in Section I, Paragraph 3 is developed, Licensee shall use the mean daily water temperature measured at NF 56 to determine whether and how to implement this provision. This flow provision shall not apply, and the base flow shall remain at 140 cfs, if the *ERC and* FS determine, based on a review of temperature monitoring results or by assessment from a reasonably accurate water temperature model, that the increase in base flows will not result in a reduction in water temperature beneficial to cold freshwater habitat, or the cost of the increase in base flow is dramatically disproportional to the benefit. To implement this flow provision, Licensee shall, in consultation with the *ERC and* FS, submit to The Commission for approval, as soon as practicable but no later than one year after issuance of a new project license, a Critically Dry Year Flow Operations and Compliance Plan. The plan shall establish reasonable procedures and criteria to maintain mean daily water temperatures of 20 degrees Celsius. These procedures and criteria shall be similar for both increasing flows up to 200 cfs (or any flow between 140 and 200 cfs) and decreasing flows back to 140 cfs.

(11) Boating flow levels and launch windows shall be as specified by the ERC consistent with license Condition 16.

Attachment B

Proposed FYLF Survey Protocols and Flow Modification Contingency Plan for the Cresta and Poe Reaches

Initial FYLF Survey Protocols and Flow Modification Contingency Plan
Cresta and Poe Reaches, 2009 - 2011

To ensure that the modified flows are protective of the existing Foothill Yellow-legged Frog (FYLF) population, PG&E has agreed to monitor the FYLF breeding activity in the Cresta and Poe reaches of the North Fork Feather River (NFFR) for, at a minimum, the next three years (2009 through 2011). This period of time was selected so as to be consistent with the maximum number of monitoring years stipulated in the Rock Creek-Cresta Relicensing Settlement Agreement (SA) for Recreation and Pulse Flow Evaluation[1]. One additional year of monitoring to ensure that the full three-year breeding cycle of FYLF has been evaluated in relation to the change in base flow, could be added if agreed to by the ERC and Forest Service (FS).

In addition to the FYLF survey protocols, a flow modification contingency plan is included in the event the modified flows in the Cresta reach adversely affect the existing FYLF population.

Initial FYLF Survey Protocols

FYLF survey protocols will follow the "Proposed Survey Protocols for FYLF egg mass surveys on the Cresta and Poe Reaches for 2008" (attached) with the following exceptions:

1. Water temperature monitoring in breeding locations will be added to the monitoring program with a HOBO like device. Temperature monitoring will be done at all Cresta breeding sites and a subset of reference sites in the Poe reach. Monitors will be in place through metamorphosis and removed on or after September 30.
2. Egg mass surveys will take place, at a minimum, prior to any flow change periods (for example, before flows increase or decrease in late April, early-May, mid-May, June, and July).
3. Reach-wide surveys (metamorph surveys) and temperature monitoring will continue through the next three years, or less if it is determined by the ERC and FS that the increases in flow described in Table A.2 do not significantly decrease water temperatures in the Cresta reach.

These proposed survey protocols are subject to modification by the ERC and FS.

Initial Flow Modification Contingency Plan

Although not anticipated, FYLF survey results could necessitate the cancellation or modification of the flows described in Table A.2. The factors that could facilitate these changes and the types of changes that could be made have been initially described here, and are subject to modification by the ERC and FS.

[1] Per the SA, monitoring will take place during years 1, 2, 3, 4, and 5 (or choice of five alternating years to better ensure surveys during appropriate conditions or water year types). In the event of a positive change in the frequency of recreation flows, up to five additional years of monitoring, if the ERC and FS determine the need for supplemental data.

Cancellation of Boating Flows[2]

For all water year types (Normal and Wet, Dry, and Critically Dry years), no boating flow will occur if FYLF breeding has occurred in the Cresta reach prior to the scheduled date of the boating flow (third Saturday in April for Critically Dry years, and May 1 in Wet and Normal, and Dry years). If boating flow is cancelled, no make-up boating flow will be scheduled.

Base Flow[3] *Changes*

Base flow changes in the presence of FYLF egg masses shall continue as described in Table A.2 unless the projected drop in stage would desiccate more than 20% of the egg masses.

Risk of egg mass desiccation will be determined by the depth of the egg masses as measured during the most recent FYLF survey and the approximate stage change at potential FYLF egg mass sites associated with the change in base flow. The "Cresta Reach Test Flow Results" (attached) will provide an initial estimate of stage change at potential FYLF egg mass sites.

In the event a change in base flow according to Table A.2 is not possible due to the depth of the egg masses present, base flow changes shall be determined upon consultation with the ERC and FS.

[2] Boating Flows are specified in a column in Table A.2. Boating flow releases are made for a defined period of time ("Launch Window" in Table A.2).
[3] Base Flows are specified in a column in Table A.2.

GANDA

Garcia and Associates
2601 Mission Street, Suite 600
San Francisco, CA 94110
Phone: (415) 642-8969
Fax: (415) 642-8967

To: Stuart Running

From: Joe Drennan

Date: September 12, 2007

RE: Proposed Survey Protocols for FYLF egg mass surveys on the Cresta and Poe Reaches for 2008

Background

Egg mass surveys for foothill yellow-legged frogs (*Rana boylii*) (FYLF) were conducted on the Cresta and Poe reaches of the North Fork Feather River (NFFR) during 2006 and 2007. These surveys were designed to monitor FYLF populations within each reach to assess the effects of the new license flow regime (implemented January, 2002), which includes increased base flow levels and white water boating flows. Results from the 2006 survey effort documented 4 egg masses on the Cresta Reach and 89 on the Poe Reach (GANDA 2006a). Due to concerns about the survey protocol, a revised and improved methodology was implemented in 2007. The 2007 surveys documented 7 egg masses on the Cresta Reach and 113 on the Poe Reach. During September 2007, GANDA will perform a reach-wide survey on the Cresta Reach in an effort to determine if other sites, not currently being monitored, have breeding sub-populations of frogs. If any foothill yellow-legged frog lifestage is observed at a new location not currently monitored, the location will be recommended for inclusion in 2008 monitoring effort.

Field Survey Protocol

The goal of the field survey effort is to locate and enumerate egg masses at established foothill yellow-legged frog breeding sites on the Poe and Cresta Reaches. These sites were selected between 2000 and 2004 and have clearly delineated boundaries (See Appendix A, GANDA 2007). For each site surveyed, the objective is to evaluate the population trend by conducting thorough searches for egg masses in a consistent and repeatable manner, providing data comparable to past surveys.

Surveys should begin on the Poe Reach in the first week of April unless mainstem water temperature is ≥10°C prior to this date (If mainstem water temperature is ≥10°C prior to the first week of April then surveys should be initiated at that time). This corresponds with the time period just prior to earliest documented breeding on the Poe Reach, April 11 (GANDA 2004). In 2007, a critically dry year, the first egg masses were laid April 27. If breeding sites are accessible (i.e. river conditions are suitable), all of the Poe Reach sites will be surveyed (1b, 2a, 2c, 3b, 4a, 4b, 4c, 4d, 5a, 5b-e, 6c and 6d plus 2d, a new site located in 2006 between sites 6c and 2c). Once breeding has been observed on the Poe Reach, the Cresta Reach sites (sites 1a, 1d, 6a, 6b, 6c, 9a, 9b, 9d, 9e) will be surveyed at intervals of ≤10 days until one survey round has failed to document new egg masses or gravid females. Cresta Reach site 1c, where a single adult frog has been observed during previous surveys (June 11, 2003; June 10, 2004), will also be surveyed.

If breeding is not observed on the Poe Reach by the end of April, then surveys will be initiated on the Cresta Reach sites during the first week of May, the time period corresponding with the earliest breeding dates observed on the Cresta Reach (May 1, 2007 (site 9a) GANDA 2007; May 4, 2002; GANDA 2005).

If conditions are such that sites are inaccessible due to dangerous conditions from high flow levels, surveys for adult frogs on tributaries associated with breeding sites will be conducted. (During 2006 surveys, most river breeding sites were inaccessible at flows greater than 2,500 cfs and breeding sites that require crossing the river were generally not accessible until the river reached base flow levels within each reach). This tributary survey approach will focus on assessing the condition of adult female frogs to determine if they have laid eggs. Such information will provide a means to evaluate if egg masses were undercounted due to scouring or stranding of egg masses when surveys of breeding sites are not possible.

Tributary surveys will be initially conducted on the Poe Reach tributary 6c. The breeding sites associated with this tributary have consistently had the first egg masses of the year during surveys conducted from 2003 to 2007. Surveyors will hike down this tributary from Bardees Bar Road to the confluence with the mainstem NFFR breeding sites. All captured adult frogs will be photographed, weighed, and measured and their location on the tributary (in meters upstream of the mainstem) will be recorded. Chin photographs for each frog will be taken and a unique code for each individual will be assigned. By comparing photographs of each frog's unique pattern of chin spots, it will be possible to determine if captures are repeats or new individuals. Reproductive status will be assess by determining if female frogs are gravid (full of eggs) or spent (eggs laid) by evaluating the degree of swelling in their abdominal region. Gravid females are identified by their swollen flanks and relatively tight skin, while spent females are those with loose folds of skin on the belly and flanks. This technique was successfully used to determine breeding activity during a previous study on the NFFR (GANDA 2006b).

Surveying this tributary will allow inference if any frogs have laid eggs based on the condition of captured females (i.e. a spent female will infer that an egg mass has been

laid). In addition to surveys of Poe Reach tributary 6c, Flea Valley Creek on the Poe Reach and tributary 1a on the Cresta Reach will be surveyed if breeding sites are inaccessible due to high flows on the mainstem NFFR.

All surveys will be conducted using Pacific Gas and Electric's (PG&E's) standardized survey protocol (Seltenrich and Pool 2002). Each survey will be performed with two surveyors: one snorkeler and one wading surveyor. Wading surveyors will use Plexiglass® viewing boxes and polarized sunglasses to enhance visibility. Surveys will be conducted from the downstream end of each site to the upstream end, with a single pass through each site. Although surveys will focus on locating egg masses, all life stages will be documented and appropriate data sheets will be completed.

During 2006, high flows precluded complete surveys of all sites on the Poe and Cresta Reaches until June 14 and 15 due to dangerous conditions at river breeding sites. Because complete surveys were delayed at some sites, there was some concern that egg masses counts were biased between reaches, specifically that egg masses were undercounted on the Cresta Reach. The potential sources of bias for undercounted egg masses are: (1) they were at the site but not detected; (2) they were removed from the site prior to the survey (e.g. a spike flow scoured them); (3) they were at the site but were previously stranded and desiccated; or (4) they were oviposited at a breeding site that was not surveyed. To remedy each of these potential sources of bias, the following modifications to the survey protocol will be implemented:

- If high flows (>1000 cfs) persist to June 1st, crews will survey Cresta Reach sites concurrent with Poe Reach sites (i.e. one crew will survey Cresta Reach sites on the same day that one crew surveys the Poe Reach sites). Access to sites that normally require crossing the river will be gained through alternate means which may include use of boats, hiking in from the nearest accessible bridge, or using two snorkelers that swim to sites at safe pool crossings. In the event that high water crossings are required, surveyors will use conservative judgment and cross only when they are fully comfortable with this decision.
- If flows have decreased >500 cfs since the previous survey, the cobble bars adjacent to each breeding site will be surveyed to locate potentially stranded egg masses.
- Site wide and reach wide surveys of each reach will be conducted during 2008. If other breeding sites are located, data from those sites will be used to relate the densities at index sites to the population size as a whole.
    - Site wide surveys are surveys of potential breeding habitats above and below (within 200 m or one riffle-pool sequence) of each known breeding site. If potential breeding habitats are present above and below known breeding sites, they will be surveyed. These surveys will be performed once breeding has been documented at known breeding sites. If any FYLF life stages are found at these sites, they will be resurveyed at least one additional time concurrent with the final or penultimate egg mass survey round.

- Reach wide surveys are surveys of the entire reach with a focus on locating new breeding sites. For reach wide surveys, one round of surveys during the fall (mid to late September) focusing on juvenile (young of the year) frogs which are relatively conspicuous and are detectable by visual encounter and by turning over rocks along the shore will be conducted.

Data Analysis

Egg mass counts will be summarized for each site, subsite, and reach. These counts will be converted to densities (number per square meter) and catch per unit effort (number per survey hour) to standardize counts by the level of survey effort. The number of egg masses per square meter will be computed by dividing the number of egg masses by the area surveyed. In addition, the number of egg masses per survey hour will be computed by dividing the number of egg masses by the actual survey time. The purpose of calculating densities and catch per unit effort is to characterize the population to allow for comparisons between reaches. *Lambda* (the rate of change in population size) will be calculated by dividing the annual egg mass count (the sum of egg masses at the index sites) by the previous year's egg mass count (at the same index sites). The purpose of calculating *lambda* is to monitor the inter-annual trend in abundance.

Egg mass count data will also be analyzed using a before-after-control-impact (BACI) paired design (Green 1979, Underwood 1994). To avoid limitations of study designs where the control and impact locations are on the same river where pseudoreplication (Hurlbert 1984) could lead to false conclusions, an ANOVA method that can overcome pseudoreplication issues (specifically the lack of spatial independence) will be used. The BACI design uses egg mass monitoring data from upstream and downstream sites collected in 2002, 2003, and 2004, as the "before" data . These years represent the time when the effects of the changed flow regime on eggs and tadpoles would not be detected in the egg mass censuses due to a 3 year lag time between the time when offspring are produced and when those offspring enter the adult breeding population. Growth curves estimated using mark-recapture weight data from both Poe and Cresta reach frogs indicate that it takes three years for an embryo to reach the minimum size of a breeding female. The "after" data are from the years 2005, 2006, 2007, and 2008. The "control" reach is Poe and the "impact" reach is Cresta. Differences between the two "treatments" (that is control vs. impact) are compared through time, (that is before vs. after). In this two way analysis of variance, the important test statistic is the interaction term (time * treatment). If this interaction term is significant it can be inferred that spatial effects between upstream and downstream only occurred once the perturbation (e.g., the new license flow regime: white water boating flows and increased base flows) had been initiated. For the purpose of this study, a significant treatment effect would indicate differences between reaches in the grand mean of each reaches' population size, and does not refer to the changes in population through time.

Within the framework of this BACI paired design, repeated-measures analysis of variance (ANOVA) to test for a flow-related effect will be used. The response variable will be the reproductive effort per site (i.e. mean number of egg masses per site). Because adult

FYLF lay one clutch of eggs each year, this variable is also a metric for the population size of adult female frogs. The repeated-measures ANOVA is the same as a regular ANOVA except that it does not assume that the repeated measurements at the same subsites are independent through time. Instead, the repeated-measures ANOVA models the correlation within each subsites' measurements, and thereby avoids breaking the independence assumption required in traditional ANOVA. In the repeated-measures analysis, the sites within a reach (and between reaches) are assumed to be independent of one another, and the subsites within a site (and between sites) are assumed to be independent of one another.

This analysis assumes that the Poe and Cresta reaches are similar in physical habitat and other environmental influences except for the flow schedules. The Cresta Reach has had white water boating flows and increased minimum stream flow release since 2002 during the summer months, including one year, 2002, when the initial release occurred in June during a period when egg masses were present in the river. The null hypothesis is that the difference in the mean number of egg masses per site between the Poe and Cresta Reaches is the same during the "before" period from 2002-2004 and the "after" period 2005-2008. .

Each subsite will be considered to represent a subsample of that numbered breeding site with two exceptions. The two exceptions are 9d and 1c on the Cresta Reach. These two subsites are considered as a unique site because they are most closely associated with Bear Ranch Creek. All other subsites are considered subsamples of their numbered site. For example, subsites 1a and 1d are subsamples of breeding site 1 and subsites 6a, 6b, and 6c are subsamples of site 6. Subsite 2d on the Poe Reach, which was discovered in 2006 may also be considered a unique site rather than a part of the site 2 complex, however, since only two years of data are available from site 2d, it will not be used for hypothesis testing.

A second statistical test will be performed using the same data to evaluate the population trends within each reach. For this test, the null hypothesis is that there is no difference between the population trends in each reach (i.e., that the population trend lines are parallel) on the Poe and Cresta reaches during 2003 to 2007. An alpha level of 0.1 (adjusted it to 0.05 (0.10/2) will be used because two separate hypotheses will be tested) for these statistical tests.

Statistical analysis using alternative techniques or statistical software (e.g. PROC GLIMMIX, SAS ver. 9.1) as appropriate based on recommendations from the ERC and the Technical Advisory Group will be conducted.

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GANDA

Garcia and Associates
2601 Mission Street, Suite 600
San Francisco, CA 94110
Phone: (415) 642-8969
Fax: (415) 642-8967

To: Craig Geldard

From: Joe Drennan

Date: March 18, 2008

RE: Cresta Reach Test Flow Results

Garcia and Associates (GANDA) was contracted by Pacific Gas and Electric Company to perform amphibian surveys as part of a recreational test flow on the Cresta Reach of the North Fork Feather River on February 23, 2008. The purpose of the test flows was to evaluate white water boating conditions at 400 cfs and 600 cfs. Prior to and during the test flows, GANDA performed surveys for foothill yellow-legged frogs (FYLF) and measured physical habitat parameters at four known FYLF breeding sites. This memo briefly summarizes the methods and the results of the test flow measurements and visual encounter surveys.

Methods

Visual Encounter Surveys
Visual encounter surveys for FYLF were conducted by GANDA biologists Kevin Wiseman and Karla Marlow on February 22 (the day before the test flows) and during test flows on February 23, 2008. Surveys were performed at Cresta sites 6b, 9e, 1a, and 1d following *A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (Rana boylii)* (Seltenrich and Pool 2002).

Test Flow Measurements
On February 22, 2008, (the day prior to the test flows) staff gages were installed at four Cresta sites 6b, 9e, 1a, and 1d). Three of these sites (6b, 9e, and 1d) are located on the highway-side of the river and one site (1a) required crossing the river to access.

Two staff gages were installed at the wetted edge of each site: one 10 meters above the bottom (downstream end) of the site and one 10 m below the top (upstream end) of the site. During base flow (250 cfs) and during elevated flows (400 and 600 cfs) measurements were recorded at each staff gage. These measurements included:

- stage height (cm)
- water velocity (cm/sec)
- distance to wetted edge (cm), and,
- wetted channel width (m)

Photographs of staff gages were also taken at each flow level from similar vantage points. Stage height (cm) was recorded by reading the water level at each staff gage at each flow level. Water velocity was measured using a pygmy water current meter (USGS Pygmy Meter Model 6205, Rickly Hydrological Company®). Wetted channel width was measured using a Bushnell® Yardage Pro Rangefinder (to the nearest 1 m). Distance to wetted edge was measured using a Keson® fiberglass tape (to the nearest 1 cm). Water temperature was recorded in degrees Celsius at the edgewater adjacent to each gage with an Enviro-Safe® thermometer.

Results

Visual Encounter Surveys

No FYLF were observed.

Test Flow Measurements

The test flows resulted in measurable changes to each of the parameters that were monitored. Raw data values are provided in Table 1, descriptive statistics of these values averaged across sites are provided in Table 2 and Table 3 provides a summary of the changes in parameter values by site for each of the test flow levels. Table 4 provides a summary of the mean changes across all sites. In short, the stage height increased by approximately 17 cm as flows increased from 250 to 400 and from 400 to 600. Distance to shore, increased 143.5 cm as flows increased from 250 to 400 and by 121.8 cm as flows increased from 400 to 600. As flows increased from 250 to 600, wetted channel width increased by 3.8 m and velocity increased by 12.3 cm/sec. Water temperatures decreased by an average 0.3° C overall for all sites as flows increased from 250 to 600 cfs.

Table 1. Measured hydrological parameters during test flows on the Cresta Reach, February 23, 2008. Data table represents raw values observed at four site locations at base flow (250 cfs) and two pulse flow levels (400 cfs and 600 cfs).

Flow	Site and Staff Gage Location	Stage Height (cm)	Distance to Shore (cm)	Wetted Channel Width (m)	Velocity (cm/sec)	EdgeH^{2}0 Temp (^{o}C)
250 cfs	1d - Bottom	13	0	32	0	6.5
	1d - Top	6	0	30	0	6.5
400 cfs	1d - Bottom	36	220	36	0	5
	1d - Top	29	300	34	0	5
600 cfs	1d - Bottom	57	284	38	0	5
	1d - Top	53	595	37	5.3	5
250 cfs	1a - Bottom	7	0	45	0	5.5
	1a - Top	8	0	47	0	5
400 cfs	1a - Bottom	20	95	48	5.3	6
	1a - Top	31	280	49	3.1	6
600 cfs	1a - Bottom	28	322	49	36.7	6
	1a - Top	53	350	51	1	6
250 cfs	9e - Bottom	16	9	26	0	5.25
	9e - Top	10	0	33	0	6
400 cfs	9e - Bottom	29	61	27	3.1	6.5
	9e - Top	26	32	34	0	6.5
600 cfs	9e - Bottom	43	130	27	12	5.5
	9e - Top	43	150	36	1	5.5
250 cfs	6b - Bottom	16	25	16	0	5.5
	6b - Top	9	0	30	0	5.5
400 cfs	6b - Bottom	32	115	17	54.9	5
	6b - Top	19	77	31	1	5
600 cfs	6b - Bottom	50	146	18	24.3	5
	6b - Top	30	173	33	18.4	5

Table 2. Summary of measured hydrological parameters during test flows on the Cresta Reach, February 23, 2008. Values represent descriptive statistics for each flow level (250, 400 and 600 cfs) across all sites. Base flow values for water velocity equal zero because gages were installed at the wetted edge.

Flow	Statistic	Stage Height (cm)	Distance to Shore (cm)	Wetted Channel Width (m)	Velocity (cm/sec)	EdgeH^{2}0 Temp (ºC)
250	Minimum	6	0	16	0	5
250	Maximum	16	25	47	0	6.5
250	Range	10	25	31	0	1.5
250	Mean	10.6	4.3	32.4	0.0	5.7
250	Standard Dev	3.9	9.0	10.0	0.0	0.6
400	Minimum	19	32	17	0	5
400	Maximum	36	300	49	54.9	6.5
400	Range	17	268	32	54.9	1.5
400	Mean	27.8	147.5	34.5	8.4	5.6
400	Standard Dev	5.8	104.0	10.5	18.9	0.7
600	Minimum	28	130	18	0	5
600	Maximum	57	595	51	36.7	6
600	Range	29	465	33	36.7	1
600	Mean	44.6	268.8	36.1	12.3	5.4
600	Standard Dev	10.8	157.5	10.8	13.3	0.4

Table 3. Summary of changes in mean hydrological parameters, by site, during test flows on the Cresta Reach, February 23, 2008. Values represent mean changes at each flow level (250, 400 and 600 cfs). Differences were calculated by subtracting parameter values at lower flow values from values at each increment of increased flows (i.e. 400 minus 250, 600 minus 400 and 600 minus 250).

Flow Change	Site and Staff Gage Location	Stage Height Δ (cm)	Distance to Shore Δ (cm)	Wetted Channel Width Δ (m)	Velocity Δ (cm/sec)	EdgeH^{2}0 Temp Δ(ºC)
250 to 400	1a	18.0	187.5	2.5	4.2	0.8
250 to 400	1d	23.0	260.0	4.0	0.0	-1.5
250 to 400	6b	13.0	83.5	1.0	28.0	-0.5
250 to 400	9e	14.5	42.0	1.0	1.6	0.9
400 to 600	1a	15.0	148.5	1.5	14.7	0.0
400 to 600	1d	22.5	179.5	2.5	2.7	0.0
400 to 600	6b	14.5	63.5	1.5	-6.6	0.0
400 to 600	9e	15.5	93.5	1.0	4.9	-1.0
250 to 600	1a	33.0	336.0	4.0	18.9	0.8
250 to 600	1d	45.5	439.5	6.5	2.7	-1.5
250 to 600	6b	27.5	147.0	2.5	21.4	-0.5
250 to 600	9e	30.0	135.5	2.0	6.5	-0.1

Table 4. Mean changes in hydrological parameters, across all sites, during test flows on the Cresta Reach, February 23, 2008. Differences were calculated by subtracting parameter values at lower flow values from values at each increment of increased flows (i.e. 400 minus 250, 600 minus 400 and 600 minus 250).

Flow Change	Statistic	Stage Height Δ (cm)	Distance to Shore Δ (cm)	Wetted Channel Width Δ (m)	Velocity Δ (cm/sec)	EdgeH^{2}0 Temp Δ (ºC)
250 to 400	Mean	17.1	143.5	2.1	8.5	-0.1
250 to 400	Std. Error	2.2	49.5	0.7	6.6	0.6
400 to 600	Mean	16.9	121.8	1.6	4.0	-0.3
400 to 600	Std. Error	1.9	26.2	0.3	4.5	0.3
250 to 600	Mean	34.0	264.8	3.8	12.3	-0.3
250 to 600	Std. Error	4.0	74.3	1.0	4.5	0.5