

Potter Valley Project 2012 Block Water Release & Guidelines

Eel Russian River Commission Meeting July 30, 2012

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Figure 1. Location of the Potter Valley Project













Project License Amendment

- > Biological Opinion issued November 2002
- Federal Energy Regulatory Commission (FERC) amended the project license in January 2004, license expires 2022
- > Amended license incorporated the Reasonable and Prudent Alternative (RPA) outlined in 2002 Biological Opinion
- Pacific Gas &Electric (PG&E) began implementing the RPA in 2004
- > RPA and FERC license required the development and implementation of several operation, monitoring and compliance plans, and associated annual reports

Reasonable and Prudent Alternative

- Improved flows for salmon and steelhead, the RPA provides quasi-natural flows throughout the year to benefit multiple life stages of salmon and steelhead
- Variable summer flows of 3-35 cfs depending on previous two water year types (as compared to ~5 cfs)
- Reduced amount of water diverted to the East Branch Russian River, dependent on the amount of storage in Lake Pillsbury
- > Annual monitoring of summer water temperatures, steelhead and Pikeminnow rearing, assess Pikeminnow suppression
- Requires PG&E to release warm surface water from Scott Dam in the spring to promote Chinook salmon emigration, if requested by agencies
- Includes a block of water reserved to release from the project to benefit salmon and steelhead in the Eel River

Background on Block Water in RPA

The RPA modified the minimum flow floor of the proposed action, increasing the floor from 35 cfs to 100 cfs from December through May 15 ensuring availability of about 80 percent of the maximum potential physical habitat conditions for spawning, incubation and rearing of steelhead and Chinook salmon

This modification eliminates the need to rely on and utilize the block water for the minimum flow augmentation purposes (built into the RPA prescribed flow schedule)



RPA does include 2,500 acre-feet of block water annually that can be released throughout water year at the discretion of NMFS and CDFG if necessary

Implementation of RPA Block Water

In 2004, NMFS and CDFG developed block water release procedures to expedite responses and implementation of releases

Block Water Release Procedure for the Potter Valley Project

The National Marine Fisheries Service (NOAA Fisheries) and California Department of Fish and Game (DFG) shall jointly make the final decision regarding the timing, magnitude, and duration of block water flow releases from Lake Pillsbury into the Eel River. NOAA Fisheries shall contact and direct the Licensee to make block water releases. The Licensee shall monitor the ordered block water releases and document compliance or non-compliance with said releases as required in Article 52b. It shall be the Licensee's responsibility to immediately notify NOAA Fisheries and DFG of any deviation from an ordered block water release.

Section 1. Procedure for Requesting A Block Water Release

Any stakeholder including NOAA Fisheries and DFG may request the release of block water using the following procedure:

- A. Any stakeholder may contact either NOAA Fisheries or DFG to request the release of block water if they have determined that relevant salmonid species will benefit from the release of such flows.
- B. Contact by the stakeholder shall first be made by phone and then, within an hour of phone contact, by e-mail or fax. The requesting party shall make a reasonable effort to confirm e-mail or fax receipt. Phone contact shall give notice of request to release, and e-mail or fax contact shall provide a written biological justification for said release request. The written justification shall be brief and not exceed one page.
- C. NOAA Fisheries and DFG shall consult and reach consensus to approve or deny the request to release block water flows.
- D. If the request to release block water flows is approved, then the procedure described in Section 2 will be followed.
- E. If the request to release block water flows is denied, then the procedure described in Section 3 will be followed.

Section 2: Notification ProcedureWhen A Block Water Request Is Approved

NOAA Fisheries/DFG

A. If NOAA Fisheries and DFG jointly determine to a order block water release, NOAA Fisheries shall first contact the Licensee and give the order to release, then immediately thereafter contact the United States Fish and Wildlife Service (USFWS) and Round Valley Indian Tribes (RVIT) to inform them of the approval of a request to release block water.

B. Contact will first be made by phone and then, within an hour of phone contact, by e-mail or fax. All identified parties shall make a reasonable effort to confirm e-mail or fax receipt. Phone contact shall give notice of intent to release, and e-mail or fax contact shall provide a written biological justification for said release. The written justification shall be brief, not exceeding one page.

Section 3: Notification Procedure When A Block Water Request Is Denied

- A. If NOAA Fisheries and DFG jointly determine not to order block water releases, NOAA Fisheries shall first contact the originator of said request and then immediately thereafter contact the USFWS and RVIT and inform them of the denial of the request to release block water.
- B. Contact will first be made by phone and then, within an hour of phone contact, by e-mail or fax. All identified parties shall make a reasonable effort to confirm e-mail or fax receipt. Phone contact shall give notice of the denial of the request to release block water, and e-mail or fax contact shall provide a written justification for said denial. The written justification shall be brief, not exceeding one page.

Section 4: Resolution When A Consensus Can Not Be Reached

A. In the event that NOAA Fisheries and DFG Regional management are unable to reach a consensus on a decision for a request for block water usage, the issue will be elevated to the NOAA Fisheries Southwest Region Regional Administrator and the DFG Director for resolution.



November 2004

Implementation of RPA Block Water

> NMFS has worked collaboratively with CDFG Region 3 on the implementation of the RPA since 2004, and with CDFG Region 1 since 2008

Fishery Biologists from the NMFS North Central Coast Office and the NMFS Northern California Office assist with evaluation and implementation of block water releases

In 2012, NMFS and CDFG developed block water guidelines intended to help NMFS and CDFG determine when block water will provide the most benefits to salmon and steelhead in the Eel River



Implementation of RPA Block Water

- > RPA reserves 2,500 acre-feet of water that can be used annually to benefit salmon and steelhead in the Eel River
- Utilize 2004 Block Water Release Procedures, NMFS and CDFG jointly determine if release is warranted
- > NMFS and CDFG jointly denied the requests for block water in the fall of 2010 and 2011 ~ did not want to encourage movement of salmon to upstream holding areas more prone to poaching , and did not want to attract the majority of salmon to Cape Horn Dam away from natal spawning grounds
 - Spring 2012 block water release implemented
 - Utilize 2012 NMFS and CDFG Joint Block Water Release Guidelines

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2012 Spring Block Water Release

NMFS and CDFG had several meetings and calls to develop block water guidelines, then switched focus to develop block water release

NMFS Fishery Biologists and hydrologist, CDFG Fishery Biologists, PG&E Fishery Biologist and consulting biologist participated in the development

Information from spring block water release incorporated into guidelines

2012 Spring Block Water Release

FACTORS TO CONSIDER

- > Is a release warranted?
- How can it benefit salmon and steelhead
- > Timing
- > Magnitude
- > Duration

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Water Temperature (surface warm water release or needle valve release)

2012 Spring Block Water Release

- Flow data (below each dam and downstream)
- Water temperature data (particularly below Scott Dam)
- Juvenile salmonid emigration studies from 1980's and 1990's
- > PG&E's 10-Year Study Report
- > Other regional emigration reports, literature

Van Arsdale Fisheries Station adult Chinook salmon and steelhead monitoring data

Timing of block water release

NOAA



1982; Brown and Haley 1974; and SEC 1987-1990).]



2012 Spring Block Water Release

Increased numbers and density of juvenile Chinook salmon between twelve mile reach between dams due to another record return of Chinook salmon to Van Arsdale Fisheries Station



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2012 Spring Block Water Release

National Weather Service long-range forecast indicating dry conditions through mid-May

Past monitoring in the Upper Eel River identified a 19 day difference in Chinook salmon emigration timing compared to Tomki Creek potentially due to cooler releases from the needle valve placed low in Scott Dam

Data from the Upper Eel River and other locations has shown that Chinook salmon fry emigration increases in the spring in response to a rescinding limb in the hydrograph, increases in water temperatures, and the advent of the dark new moon

2012 Spring Block Water Release

Since there was no substantial rain storm expected, the block water was developed to mimic a spring rain event to increase flows to encourage fish to emigrate, and enhance survival of downstream migrating juvenile Chinook salmon and steelhead from the 12 mile reach between Scott and Cape Horn dams

Maximize benefits of block water by increasing warm water surface release in conjunction with the block water release, to increase water temperatures downstream of Scott Dam



Minimize potential negative effects of using block water, did not want to encourage movement of young of the year steelhead out of quality rearing habitat

NOAA NATIONAL

2012 Spring Block Water Release

> Hydrologist assisted in the development of the target block water hydrograph including the timing, magnitude and duration or the release

Final request submitted to PG&E was to release block water (as per RPA D.1.), combined with a warm water surface release (as per RPA B.3.) from Scott Dam during the period of May 18 to May 24

Release coincided with the new moon on May 20 and increases in surface water temperatures in Lake Pillsbury to maximize biological benefits of a block water release

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2012 Spring Block Water Release

> Hydrograph based on a one inch rain event, with a peak and maximized recessional limb

Peak in the hydrograph on May 18 with the rescinding limb of the hydrograph extended into May 24

- maximize surface releases to increase water temperature downstream;
- duration of approximately six days

Release served as a pilot block water release to assess feasibility, operational and procedural constraints; and to test our working hypothesis

NNAA

2012 Spring Block Water Release

> HYPOTHESIS: A block water release of Lake Pillsbury surface (warm) water that mimics a spring rainstorm during the new moon will enhance Chinook salmon juvenile emigration in the 12 mile reach between the dams in response to a spring recessional limb with warmer water temperatures during the dark phases of the moon



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2012 Spring Block Water Release Monitoring

Flows were measured at E-2 (~ 1 mile downstream of Scott dam) and E-11(just downstream of Cape Horn Dam ~12 miles from Scott Dam) in addition to additional gage data downstream of Cape Horn dam

Water temperatures were monitored at E-2 and within the fishway at Cape Horn Dam to gather temperature data prior to, during and after the block water release

> Additional temperature loggers were placed in the river early as part of PG&E's annual summer temperature monitoring, data not yet available

CDFG conducted downstream migrant trapping within the fishway prior to, during, and after the use of block water to gather data on fish responses to the block water release

Block Water Release May 2012





Scott Dam Release and Water Temperature Spring 2012



Block Water Release May 2012



Juvenile Chinook salmon trapping results at Van Arsdale Fish Ladder Block Water Release, 2012 (Preliminary Data)



PG&E

Preliminary CDFG data

-Raw



VAFS Chinook 2012

3000



Date and Time

Preliminary data

Flow and Temperature vs. Lamprey Counts

2012 Spring Block Water Release

- > Approximately 2,550 acre-feet of water from Scott Dam was released from May 18 to May 25, 2012
- During the release, the reservoir decreased by approximately 2.4 feet with approximately 1.3 feet of elevation attributed to the block water release
- The additional decrease in reservoir elevation was associated with decreasing inflow into Lake Pillsbury, baseflow releases, and increases in diversions to the East Branch Russian River
- > The block water release only minimally impacted storage in Lake Pillsbury
- Block water release increased flows downstream of Van Arsdale potentially benefiting salmon and steelhead entering the Eel River from tributaries downstream of Cape Horn Dam (ie., Chinook salmon and steelhead from Tomki Creek; Chinook salmon, coho salmon, and steelhead from Outlet Creek)

Upper Eel River Dicharge and Lake Pillsbury Surface Elevation



Upper Eel River Dicharge and Lake Pillsbury Surface Elevation







2012 Spring Block Water Release

- > PG&E Operators did an excellent job at executing requested release with seamless transition
- Release encouraged Chinook salmon emigration, did not encourage movement young of year steelhead
- > Release encouraged adult Lamprey to migrate upstream
- Data prompted improvements to fish ladder to increase ability of Lamprey to successfully migrate through ladder
- > The block water release minimally impacted storage in Lake Pillsbury
- Release increased flows downstream of Van Arsdale potentially benefiting salmon and steelhead entering the Eel River from tributaries downstream of Cape Horn Dam (ie., Chinook salmon and steelhead from Tomki Creek; Chinook salmon, coho salmon, and steelhead from Outlet Creek)



2012 Spring Block Water Release

Provide notification to stakeholders as soon as possible, prior to issuing press release

- Provide as much lead time to PG&E to allow adequate time for required notification to downstream users
- Increase annual salmonid emigration monitoring in Upper Eel River to determine peak emigration timing regardless of block water release
- Increase fishery, temperature, and flow monitoring for subsequent block water releases

- Developed by NMFS and CDFG Fishery Biologists and NMFS hydrologist, pending management approval
- Incorporated information from Spring 2012 block water release
- Summarizes potential uses for block water and highlight the possible benefits and/or negative consequences of each
- Intended to help NMFS and CDFG determine when block water will provide the most benefits to salmon and steelhead in the Eel River

POTTER VALLEY PROJECT BLOCK WATER RELEASE GUIDELINES

National Marine Finheries Service and California Department of Fish & Game

Background

NOAA's National Marine Fisheries Service (NMFS) consulted under Section 7 of the Endangered Species Act on the proposed amendment to Federal Energy Regulatory Commission (FERC) license for the Potter Valley Potjeci located on the Upger Eal River in Northern California NMPS issued a biological opinion in November 2002 that included a Reasonable and Prudent Alternative (RPA). The RPA included a flow schedule, limits on the diversion, monitoring, and other measures including 2.000 arcs feet of water that can be related a translity to benefit salmonids. The FERC license for operation of the Potter Valley Project was amended in 2004, and incorporated the RPA. The FERC license requires Pacific Gas & Electric Company (PG&E) to operate the project and adhese to other requirement included in the license

In 2004, NMFS, California Department of Fish & Game (CDFG), Round Valley Indian Tribes, and PG&E developed Block Water Release Proceedures. The procedures focused on the solification and decision process for block water release request, and didnot include specific parameters for when or how block water would be used Rather, requests for block water release will be assessed utilizing flow, wather and fish information are valiable at the time of the sequest. The procedures do indicate that NMFS and CDFG will jointly make the final decision on whether to deay or approve a request, including the timing, magnitude, and duration of block water flow releases form the Potter Valley Poterist into the EB River.

The purpose of this document is to summarize potential uses for block water and to highlight the possible benefits and or negative consequences of each. These guidelines are intended to help NMPS and CDPG determine when block water will provid the most benefits to salmon and steelhead in the Est River. NMPS and CDPG will assess information seasonally throughout the year to determine if block water should be implemented, and when the most benefits to bisted salmonids will occur from the release. In addition, NMPS and CDPG will use these guidelines to assess block water release requests submitted to NMPS and or CDPG. The 2004 Block Water Release Procedures for the Potter Valley Project will be addresd to whan block water releases as as more information becomes available, especially based on data from block water releases as they occur over time.

Potential Fall Block Water Releases

Eal River tributaries lack sufficient flow for adult salmon passage prior to significant rain events Releasing block water during the adult migration season prior to rain events would streast Chinock salmon to Van Aradale Fisheries Station (VAFS) way from their naral tributaries like Tomki and Outlet creaks, resulting in less spawning in tributaries and a concentration of spawning in the twelve mille Eal River seath berunen Cape Hom and Scort dams. In addition, the beneficial affects

Last updated on 07/25/2012



POTTER VALLEY PROJECT BLOCK WATER RELEASE GUIDELINES

National Marine Fisheries Service and California Department of Fish & Game

of block water would be negligible in magnitude and of limited duration once it arrived to the lower Eel River.

The RPA requires a 100 cubic feet per second (cfs) base flow release at Cape Horn Dam from December 1 to March 31 in all but very dry years to ensure adequate conditions for migration, syswring and incubistion. Chinotok salmon and steellhead can migrate to XAPS at flow shelow 100 cfs; however, peak adult numbers at VAPS in 2008, 2009, and 2011 (2010 was wer and had early high flows) occurred once flows approached and exceeded 100 cfs. Due to migration timing, steelhead gaveness rasely makes it to VAPS until after the implementation of winter floor flows (*i.e.*, Desember). NMPS and CDPG believe that releasing block water during the fall is most. if not all year, is not optimal because the risk involved is high and it would likely provide negligible biological benefits to listed calmonids.

Potential Spring Block Water Releases

Spring block water releases could benefit emigrating Chinooks almon, seelhead, and cobo salmon in the Bel River. The RPA requires a minimum of 100 cfb releases at Cape Horn Dam during the spring through May 15 to provide adequate flow for incubation, rearing, and emigration However, providing a spring pulse flow, especially in years with flew to no substantial rain events, may increase survival of salmonid emigrants by decreasing predation and increasing habitat volume, reducing energy expenditure, stimulating earlier emigration, and decreasing emigration time. The spring block water release in 2012 also seemed to aid in upstream migration of Lampey NMEPS and CDFG believe that releasing block water during the spring has the potential to provide more biological benefits to listed salmonids compared to releases in the fall and summer. Based on our understanding of salmonid emigration in the Eel River, the following will be considered when determining a block water release

- · Optimal time to provide a spring block water release is between April 1- June 30;
- Primary goal is to benefit emigrating Chinook salmon, steelhead, and coho salmon (i.s., Outlet Creek) in the main stem Eel River by enhancing conditions in the Upper Eel River.
- Emigrating salmonids most benefited by the release would be from the Upper Eel River from Scott Dam downstream to the confluence of the Middle Fork Eel River, as well as those from Upper Eel triburaties (i.e., Tomki Creek, Outler Creek).
- Consider combining block water release with B 3, warm surface water release and reducing the release volumes from the needle valve to increase stream temperature to encourage downstream mizration of juvenile Chinook salmoo with a thermal misration cue;
- Use biological and hydrological data to help inform the timing, magnitude and duration of releases

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POTTER VALLEY PROJECT BLOCK WATER RELEASE GUIDELINES

National Marine Finherie: Service and California Department of Finh & Game

Factors to Inform Timing, Magnitude and Duration

Biological

- The timing of block water releases should occur during the peak emigration window when possible, especially in dryer springs.
- Use historical emigration data to inform timing, magnitude, and duration of releases;
- When local emigration data is unavailable, calculate potential migration timing based on data from Chinook salmon spawning in the Upper Eel River, Tomki Creek, and Outlet Creek, in addition to peak migration of Chinook salmon at Cape Horn Dam;
- Utilize local emigration data when available to time release to coincide with peak emigration from Upper Eel and tributaries;
- During wetter springs, consider releasing block water towards the end of emigration to provide an additional migration cue;
- Consider timing the block water release to coincide with a new moon;
- Monitor to assess and incorporate fish responses to block water releases in the Upper Eel River when possible

Hydrological

- Hydrological conditions in the Upper Eel River, Tomki Creek, Outlet Creek, and Middle Fork Eel River will be assessed to help determine the timing, magnitude, and duration of release;
- Potential release of block water in the spring include mimicking the magnitude and duration of a forecasted Middle Fork Eel snowmelt rain event, mimicking the daily hydrograph of the Middle Fork Eel for a set amount of days, mimicking previous spring flow events in the Upper Eel River, or celeasing a "fixed" pulse.

Potential Summer Block Water Releases

Prior to the RPA, summer flows (July – September) were set at 5 cfs every year. The RPA summer flows are determined by the two previous water year types (e.g., very dry, wet) and range from 3 cfs to 35 cfs to be more consistent with the natural hydrograph. Summer block water releases could benefit juvenile steellhead venting in the Upper Zel River, and may potentially benefit immigrating adult summer steelhead. NAFS and CDFC believe that in most years, releasing block water during the summer will only provide limited benefits to steelhead rearing in the main stem Zel River downstream of Van Arsdale.

- > NMFS and CDFG will assess information seasonally throughout the year to determine if block water should be implemented, and when the most benefits to listed salmonids will occur from the release
- > NMFS and CDFG will use the guidelines to assess block water release requests submitted to NMFS and/or CDFG
- The 2004 Block Water Release Procedures for the Potter Valley Project will be adhered to when a block water release is requested by NMFS, CDFG, or any other entity
- The guidelines will be updated when necessary as more information becomes available, especially based on data from block water releases as they occur over time

NMFS/CDFG Block Water Guidelines Fall

- Releasing block water during the adult migration season prior to rain events would attract Chinook salmon to Van VAFS away from their natal tributaries like Tomki and Outlet creeks, resulting in less spawning in tributaries and a concentration of spawning in the twelve mile Eel River reach between Cape Horn and Scott dams
- The RPA requires a 100 cubic feet per second (cfs) base flow release at Cape Horn Dam from December 1 to March 31 in all but very dry years to ensure adequate conditions for migration, spawning and incubation.
 - NMFS and CDFG believe that releasing block water during the fall in most, if not all years, is not optimal because the risk involved is high and it would likely provide negligible biological benefits to listed salmonids.

- Spring block water releases could benefit emigrating Chinook salmon, steelhead, and coho salmon in the Eel River
- The RPA requires a minimum of 100 cfs releases at Cape Horn Dam during the spring through May 15 to provide adequate flow for incubation, rearing, and emigration
- However, providing a spring pulse flow, especially in years with few to no substantial rain events, may increase survival of salmonid emigrants by decreasing predation and increasing habitat volume, reducing energy expenditure, stimulating earlier emigration, and decreasing emigration time

- > Optimal time to provide a spring block water release is between April 1- June 30
- Primary goal is to benefit emigrating Chinook salmon, steelhead, and coho salmon (i.e., Outlet Creek) in the main stem Eel River by enhancing conditions in the Upper Eel River
- Emigrating salmonids most benefited by the release would be from the Upper Eel River from Scott Dam downstream to the confluence of the Middle Fork Eel River, as well as those from Upper Eel tributaries (i.e., Tomki Creek, Outlet Creek)

- Consider combining block water release with B.3. warm surface water release and reducing the release volumes from the needle valve to increase stream temperature to encourage downstream migration of juvenile Chinook salmon with a thermal migration cue
 - Use biological and hydrological data to help inform the timing, magnitude and duration of releases



Biological Factors to Inform Timing, Magnitude and Duration

The timing of block water releases should occur during the peak emigration window when possible, especially in dryer springs

> Use historical emigration data to inform timing, magnitude, and duration of releases

When local emigration data is unavailable, calculate potential migration timing based on data from Chinook salmon spawning in the Upper Eel River, Tomki Creek, and Outlet Creek, in addition to peak migration of Chinook salmon at Cape Horn Dam

Biological Factors to Inform Timing, Magnitude and Duration

- Utilize local emigration data when available to time release to coincide with peak emigration from Upper Eel and tributaries;
- During wetter springs, consider releasing block water towards the end of emigration to provide an additional migration cue
- Consider timing the block water release to coincide with a new moon
- Monitor to assess and incorporate fish responses to block water releases in the Upper Eel River when possible

Hydrological Factors to Inform Timing, Magnitude and Duration

- Hydrological conditions in the Upper Eel River, Tomki Creek, Outlet Creek, and Middle Fork Eel River will be assessed to help determine the timing, magnitude, and duration of releases
- Potential release of block water in the spring includes mimicking the magnitude and duration of a forecasted Middle Fork Eel snowmelt/rain event, mimicking the daily hydrograph of the Middle Fork Eel for a set amount of days, mimicking previous spring flow events in the Upper Eel River, or releasing a "fixed" pulse



NMFS/CDFG Block Water Guidelines Summer

- Prior to the RPA, summer flows (July September) were set at 5 cfs every year
- The RPA summer flows are determined by the two previous water year types (e.g., very dry, wet) and range from 3 cfs to 35 cfs to be more consistent with the natural hydrograph
- Summer block water releases could benefit juvenile steelhead rearing in the Upper Eel River, and may potentially benefit immigrating adult summer steelhead
- However, NMFS and CDFG believe that in most years, releasing block water during the summer will only provide limited benefits to steelhead rearing in the main stem Eel River downstream of Van Arsdale





Thanks to PVP Block Water Team for collaborating on a successful block water request, assessment and guidelines

Thanks to CDFG for carrying out fish monitoring

Thanks to PG&E for implementing the release consistent with request

Questions?