United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY REFER TO:

DEC 14 2018

CVO-100
WTR-2.00

VIA ELECTRONIC MAIL ONLY

Mr. Erik Ekdahl
Deputy Director
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA

Subject: Transmittal of Draft Reclamation Temperature Reporting and Coordination Protocol Pursuant to Order 90-5 for Water Year 2019

Dear Mr. Ekdahl,

This letter responds to the requests in your letters of March 14, 2018, and June 7, 2018, (Enclosures 1 and 2). In those letters, the State Water Resources Control Board (Board) requested "an updated protocol for conducting temperature monitoring, modeling, planning, and reporting to provide a clear communication and coordination pathway for temperature compliance pursuant to Order 90-5." The letters further requested that the Bureau of Reclamation (Reclamation) meet with Board staff and members of the Sacramento River Temperature Task Group (SRTTG) to discuss development of the protocol, and that a draft protocol be provided to the Board by November 1, 2018. Due to a variety of operational issues and priorities that occurred over the summer and early fall of 2018, Reclamation requested and was granted an extension of the November 1 due date (Enclosure 3) to December 14, 2018. Using the time granted through the extension, Reclamation met with Board staff and the SRTTG to discuss the draft protocol. Based on those meetings, Reclamation developed the enclosed draft protocol for your consideration (Enclosure 4).

As discussed through our meetings with Board staff, the protocol is limited in duration to a single year – Water Year 2019 – in recognition of the fact that Reclamation expects to implement several changes to the regulations and agreements under which Reclamation operates the Central Valley Project in the near future. For instance, Reclamation expects to have new Biological Opinion(s) in place prior to the end of Water Year 2019 pursuant to the October 19, 2018 Presidential Memorandum on Promoting the Reliable Supply and Delivery of Water in the West. In addition, Reclamation recognizes that there may be operational changes in future years associated with the Board's update to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. For these reasons, the enclosed protocol is for Water Year 2019, and also recognizes the need for Reclamation to keep the Board informed on any changed circumstances, obligations or operations relevant to the protocol.

As requested in the March 14, 2018 letter, the draft protocol attempts to ensure that the process identified in the protocol is coordinated with the process outlined in the current (2009) National Marine Fisheries Service (NMFS) Biological Opinion, and specifically Action Suite I.2 of the 2009 NMFS Biological Opinion. As noted in your letter, this design should help avoid redundancy and potential conflicts in the activities associated with either process.

As noted in both the March 14 and June 7, 2018 letters, the draft protocol primarily focuses on ensuring a clear coordination and communication pathway during the course of Reclamation's 2019 temperature management planning and implementation activities. Reclamation intends to build on improvements made over the past two years in the coordination and communication among the parties of the SRTTG, as well as with water and power contractors, Tribes, non-governmental organizations, and other interested parties. Our hope is that the draft protocol will serve as the framework for effective communication during the course of the 2019 temperature management process.

The draft protocol includes a section outlining the monitoring and reporting that Reclamation intends to undertake during Water Year 2019. This monitoring and reporting protocol builds on elements of the monitoring and reporting processes that have been developed over many years, and that Reclamation believes have been found sufficient in the last few years by the SRTTG. Included in the protocol is reference to the locations where Reclamation's reporting can be found on the web, as well as letters that Reclamation provides to the Board on a monthly basis (example from November 2018 enclosed as Enclosure 5).

As identified during meetings in the spring of 2018 and in recent meetings this fall with Board staff, Reclamation and Board staff recognize that elements of the requests in the June 7, 2018 letter pertaining to planning tools and evaluations desired by the Board may warrant further discussion between Reclamation and the Board beyond the scope of the enclosed draft protocol. Reclamation believes that additional discussions with Board staff might help clarify the nature of the requests, and refine both parties' understanding of their respective positions on these requests. It is Reclamation's hope that this type of ongoing dialog might provide for more positive outcomes, thus Reclamation requests ongoing engagement to attempt to resolve these remaining requests.

Reclamation appreciates the ongoing interaction we have had with Board staff on these matters, and looks forward to working with the Board, as well as the members of the SRTTG and other interested parties during Water Year 2019 to ensure a successful temperature management season. Should you have questions or wish to discuss, please contact me at (916) 979-2197 or jrieker@usbr.gov.

Sincerely,

Jeff Rieker
Operations Manager

Enclosures – 5

cc: See next page.

cc: Continued from previous page.

Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Ms. Eileen Sobeck
Executive Director
State Water Resources Control Board
1001 I Street
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Ms. Kaylee Allen
Field Supervisor
Bay Delta Fish and Wildlife Office
U.S. Fish and Wildlife Service
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Mr. John Leahigh
Operations Control Office
California Department of Water Resources
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Mr. David Mooney
Area Manager
Bay-Delta Office
Bureau of Reclamation
801 I Street, Suite 140
Sacramento, CA 95814
w/encl to each

Ms. Diane Riddle
Assistant Deputy Director
Division of Water Rights
State Water Resources Control Board
P.O. Box 2002
Sacramento, CA 95812

Ms. Molly White
Operations Control Office
California Department of Water Resources
3310 El Camino Avenue, Suite 300
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Mr. Jason Roberts
Environmental Program Manager
– Inland Fisheries
Northern Region (Region 1)
California Department of Fish and Wildlife
601 Locust Street
Redding, CA 96001

Enclosure 1

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

MAR 14 2018

Mr. Jeff Rieker
Operations Manager, Central Valley Project
U.S. Bureau of Reclamation
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
jrieker@usbr.gov

Dear Mr. Rieker:

ORDER 90-5 SACRAMENTO RIVER TEMPERATURE MANAGEMENT

This letter is in regard to State Water Resources Control Board (State Water Board) Order 90-5 requiring the U.S. Bureau of Reclamation (Reclamation) to maintain temperatures on the Sacramento River for the protection of fish and wildlife. I appreciate the recent discussions we have had on this matter and your willingness to work with the State Water Board. The recent drought highlighted the difficulties that exist with managing temperatures and related issues on the Sacramento River. In order to foster greater collaboration, communication, and timely consideration of management challenges, it is obvious that additional work, earlier in the water year, will be necessary. This letter identifies the specific work necessary to ensure compliance with Order 90-5 in a coordinated fashion this year and in future years.

As you know, Order 90-5 requires Reclamation to maintain a daily average temperature (DAT) of 56 degrees Fahrenheit (F) in the Sacramento River at Red Bluff Diversion Dam during times when higher temperatures will be detrimental to fish, unless factors beyond Reclamation's reasonable control prevent it from maintaining such temperatures. If Reclamation is unable to meet the temperature requirement at Red Bluff Diversion Dam throughout the temperature control season, Reclamation must develop an operations plan for approval by the Chief of the State Water Board's Division of Water Rights (Deputy Director). The plan, which is required to be developed in consultation with the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Marine Fisheries Service (NMFS) (collectively fisheries agencies), and the U.S. Western Area Power Administration (WAPA), must designate a location upstream of Red Bluff Diversion Dam where the temperature requirement will be met. Order 90-5 includes specific monitoring and reporting requirements in addition to a general requirement (Condition 3) that Reclamation conduct such monitoring and reporting as is required by the Deputy Director to ensure compliance with the terms and conditions of Order 90-5.[1]

[1] Reclamation may, upon notice to all interested parties, petition the State Water Board to review any requirements imposed under this condition by the Deputy Director.

Managing temperatures and related issues on the Sacramento River is complex and challenging, not only during drought years, but also during other years requiring close planning and coordination. In past years, the practice of submitting a temperature management plan to the State Water Board in June has proven to be too late in the season to ensure that operations are planned in such a way as to ensure the protection of winter-run Chinook Salmon and other species in a coordinated fashion. In our recent meetings with you and other Reclamation staff, we specifically identified the need for closer and earlier coordination, planning, and monitoring and the need to coordinate between compliance with the NMFS Biological Opinion (BiOp) conditions related to Sacramento River temperature management and Order 90-5. As you know, NMFS has raised potential concerns with temperature management this year in response to Reclamation's initial water supply allocations, which also indicates a need for coordination with Order 90-5 compliance.[2]

Given the challenges of complying with Order 90-5, the State Water Board has determined that additional monitoring, reporting, and coordination are necessary to ensure compliance with Order 90-5. This letter specifies the additional monitoring, planning, and coordination requirements that I have determined are necessary pursuant to condition 3 and other provisions of Order 90-5. Specifically, I am requesting that Reclamation immediately begin coordinating on a regular basis with the State Water Board, the fisheries agencies, and WAPA on proposed operations for the remainder of the temperature control season. I appreciate that a Sacramento River Temperature Task Group meeting has been planned for next week in which this consultation can begin.

Based on next week's consultation and any necessary follow up consultations, Reclamation shall prepare and submit a strategy for temperature management in an initial Sacramento River temperature management plan (plan) by April 2, 2018, for my approval that identifies the measures that Reclamation will take to ensure that temperature and related impacts to winter-run Chinook salmon do not occur this year while avoiding impacts to other native species, including spring-run and fall-run Chinook salmon. The plan must be integrated with actions to implement the NMFS BiOp and must be updated with each month's hydrologic forecast or more often if reservoir temperature profile measurements or other information indicate temperature management concerns. The plan and monthly updates must be supported by temperature modeling conducted in coordination with the State Water Board and fisheries agencies and must include evaluation of alternative operational scenarios and assumptions requested by the State Water Board and fisheries agencies. The plan and updates must also identify projected operations throughout the temperature control season, including the basis for assumptions for accretions, depletions, and water supply needs for salinity control underlying those operations. Monthly updates to the plan shall be submitted within 2 weeks following receipt of runoff projections from the Department of Water Resources or more frequently as needed based on reservoir profile measurements or other conditions indicating a potential concern with temperature management.

In addition, Reclamation shall prepare a plan by April 15, 2018, in consultation with the State Water Board and fisheries agencies, for my approval identifying how Reclamation will ensure accurate, consistent, transparent, and timely monitoring and reporting of: 1) the Shasta, Trinity, and Whiskeytown reservoir temperature profiles; 2) temperature conditions in the Sacramento River; and 3) potential redd dewatering and stranding to ensure that

[2] Correspondence related to this matter can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/

impacts from flow ramping and related issues do not occur this year. Specifically, Reclamation must provide weekly reservoir temperature profile measurements and isothermobaths for Shasta Reservoir and bimonthly measurements for Trinity and Whiskeytown reservoirs in digital format. In addition, Reclamation shall provide daily temperature measurements of Keswick releases, and the Sacramento River at Clear Creek and Balls Ferry.

To ensure that we are well coordinated in future years, I also request that, in coordination with State Water Board staff and fisheries agency staff, Reclamation develop an updated protocol for conducting temperature monitoring, modeling, planning, and reporting pursuant to Order 90-5 that provides for coordination with the fisheries agencies and WAPA. I request Reclamation to submit the plan for my approval by November 1, 2018. That protocol should include the submittal of an initial temperature management plan to the State Water Board that identifies the strategies that Reclamation will employ to ensure that the requirements of Order 90-5 are met prior to initial water supply allocations in February, and updates to that plan throughout the temperature control season. The protocol should also provide for coordination with the NMFS BiOp process to avoid potential redundancy and unnecessary conflicts.

The State Water Board appreciates your cooperation on these matters and looks forward to working with you further to ensure compliance with Order 90-5. If you have any questions regarding this letter, please contact Diane Riddle at diane.riddle@waterboards.ca.gov or (916) 341-5297.

Sincerely,

ORIGINAL SIGNED BY:

Erik Ekdahl, Deputy Director
Division of Water Rights
State Water Resources Control Board

Enclosure 2

Enclosure 2

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

JUN 07 2018

Mr. Jeff Rieker,
Operations Manager, Central Valley Project
U.S. Bureau of Reclamation
3310 El Camino Avenue, Suite 300
Sacramento, CA 95828
jriecker@usbr.gov

ORDER 90-5 SACRAMENTO RIVER TEMPERATURE MANAGEMENT

Dear Mr. Rieker:

Thank you for your letter dated May 15, 2018, submitting the U.S. Bureau of Reclamation's (Reclamation) 2018 Sacramento River Temperature Management Plan (TMP). The TMP is required pursuant to State Water Resources Control Board (State Water Board) Water Right Order 90-5, and identifies Reclamation's proposed strategy for preventing temperature-related impacts to winter-run Chinook salmon while also avoiding impacts to other native species, including spring-run and fall-run Chinook salmon. Reclamation also submitted the National Marine Fisheries Service's (NMFS) May 15, 2018 response to the TMP to the State Water Board, which is related to requirements included in Reclamation's Biological Opinion from NMFS.

The State Water Board appreciates Reclamation's early and regular coordination on this matter with State Water Board staff and other stakeholders this year. Through this regular and early communication, Reclamation has developed a TMP that proposes the following key elements:

1) A 56-degree Fahrenheit (F) daily average temperature (DAT) compliance point at Balls Ferry from May 15 through October 31;
2) A study targeting 53.5 degrees F DAT on the Sacramento River above Clear Creek (CCR gage) (a surrogate location for the most downstream winter-run Chinook salmon redd) during the same time frame unless cold water pool volumes are less than expected;
3) Monitoring of actual cold-water pool (water equal to or less than 49 degrees F) volumes and conducting modeling on a regular basis to inform operational decisions;
4) Reconvening the Sacramento River Temperature Task Group (SRTTG) to discuss operations, including a potential conclusion of the study and a reversion to compliance measured only at Balls Ferry, if: the measured volume of cold water equal to or less than 49 degrees F is less than projected, the difference between the measured and projected volumes is greater than ten percent, and fall temperature performance appears at risk;
5) A commitment from Reclamation to work with the SRTTG on fall operations to prevent redd dewatering.

Reclamation's TMP is based on April hydrological and operational forecasts at the 50 and 90 percent exceedance levels, using historical meteorological forecasts at the 50 and 10 percent exceedance levels. Based on these assumptions, Reclamation indicates that it has confidence in its ability to provide temperature control this year. As you point out in your letter, however, the cold water pool volume is less than average this year. At the same time, hydrologic conditions appear to be trending drier than the 90 percent exceedance and, depletions from the Sacramento River have been trending somewhat higher than projected. As a result, I am including the following conditions on my approval of the TMP:

1. Reclamation shall consult with the SRTTG to discuss necessary modifications to the TMP as soon as the assumptions upon which the plan are based (including cold water pool volumes, release schedules, or any other controllable factors) change in a manner that could affect temperature control this season. This condition is consistent with Reclamation's TMP proposal to conduct regular monitoring and modeling, to meet with the SRTTG at least monthly, and to reconvene the SRTTG if cold-water pool conditions deviate from modeled projections. The State Water Board reserves the authority to rescind or modify this approval as necessary based on information that indicates that the current TMP may not achieve reasonable temperature control this year.

2. Reclamation shall consult with the SRTTG to develop and implement specific provisions to avoid winter-run and fall-run Chinook salmon stranding and redd dewatering based on the California Department of Fish and Wildlife's real-time redd monitoring data and other relevant information. This condition is consistent with Reclamation's TMP proposal to work with the SRTTG on fall operations to avoid redd dewatering. The State Water Board reserves authority to modify this approval to require implementation of specific measures to avoid stranding and redd dewatering as necessary.

3. Reclamation shall follow the expectations detailed in NMFS's May 15, 2018 response to the TMP.

The State Water Board appreciates Reclamation's efforts to improve coordination and transparency related to temperature control planning this year, and we look forward to continuing to work with you on these matters. Historically, Reclamation has submitted TMPs to the State Water Board late in the spring, at which point there is less opportunity to discuss and understand temperature control operations as conditions evolve. This year, Reclamation engaged with State Water Board staff earlier in the season, providing the opportunity to review and respond to the spring's changing hydrologic conditions. We believe that the earlier coordination in 2018 was helpful and request that Reclamation engage the State Water Board beginning in January of future water years on temperature control and related considerations.

During previous meetings in early 2018, Reclamation and the State Water Board discussed the benefits of developing an updated protocol for conducting temperature monitoring, modeling, planning, and reporting. Relatedly, and consistent with my letter dated March 14, 2018, we reiterate our request that Reclamation work with the Board – in addition to other interested stakeholders, including fisheries agencies and water use interests (Northern California Water Agencies, Western Area Power Administration, and other SRTTG members) – to work throughout the summer and fall to develop an updated protocol for conducting temperature monitoring, modeling, planning, and reporting to provide a clear communication and coordination pathway for temperature compliance pursuant to Order 90-5. We request that Reclamation meet with the State Water Board and SRTTG members to discuss development of the protocol this summer/early fall and that Reclamation submit a draft protocol to the Board by

November 1st of 2018. We also encourage federal agencies and stakeholders to consider development of a charter to address temperature management issues in the upper Sacramento River in a coordinated fashion.

We propose that the protocol describe how Reclamation, the Board, and other stakeholders can work together so that initial temperature planning begins prior to initial water supply allocations in February. The development of earlier TMPs and related data will help ensure that the requirements of Order 90-5 are met, allows for adaptive management as water supply conditions solidify in the spring of each year, and can identify compliance issues early on (so that water supply considerations are planned for in advance). The protocol would also provide for coordination with the NMFS Biological Opinion process to avoid redundancy and any unnecessary conflicts.

Based on the discussions that occurred during the April 2018 meeting on Reclamation's forecasts, Reclamation's current planning tools do not appear to allow for evaluation of lower Shasta releases and delivery assumptions in drier conditions to conserve cold water pool resources without redistributing those impacts to Folsom or Oroville reservoirs, or causing violations of water quality and flow requirements in the Delta. Tools that can evaluate different release and delivery assumptions are necessary to prepare for future dry conditions, and to evaluate options to avoid impacts to salmonids and other species that occurred during the dry conditions of 2014 and 2015. Accordingly, the protocol should also identify how Reclamation will develop tools that incorporate different operational assumptions (that do not have redirected impacts to other watersheds or Delta conditions). The ability to evaluate different operational assumptions will be critical in drier years when water supplies are limited, and when deliveries may need to be limited to provide for temperature control.

The State Water Board appreciates the coordination and outreach between our agencies, and looks forward to continued cooperation on these matters and working with you further to ensure compliance with Order 90-5. If you have any questions regarding this letter, please contact Diane Riddle at diane.riddle@waterboards.ca.gov or (916) 341-5297.

Sincerely,

ORIGINAL SIGNED BY

Erik Ekdahl,
Deputy Director
Division of Water Rights

Enclosure 3

Request for time extension - Draft Protocol for monitoring, modeling, planning, reporting

Ekdahl, Erik@Waterboards <Erik.Ekdahl@waterboards.ca.gov> Thu, Nov 1, 2018 at 3:10 PM
To: "Rieker, Jeffrey" <jrieker@usbr.gov>
Cc: "Riddle, Diane@Waterboards" <Diane.Riddle@waterboards.ca.gov>, "BARAJAS, FEDERICO" <fbarajas@usbr.gov>, "White, Kristin N" <knwhite@usbr.gov>, ELIZABETH KITECK <ekiteck@usbr.gov>, Randi Field <rfield@usbr.gov>, Amy Aufdemberge <amy.aufdemberge@sol.doi.gov>

Thank you Jeff. December 14th sounds good. Please work with Diane - or let me know if my assistant can be any help in setting up coordination meetings.

Best,
Erik

Sent from my iPhone

On Nov 1, 2018, at 10:33 AM, Rieker, Jeffrey <jrieker@usbr.gov> wrote:

> Erik,
>
> Reclamation is requesting an extension of the November 1, 2018 deadline contained in your letters of March 14, 2018 and June 7, 2018, which requested a draft protocol for conducting temperature monitoring, modeling, planning, and reporting pursuant to Order 90-5. This protocol would not be implemented until spring 2019. It was Reclamation's intent to interact with the Board and other stakeholders including the SRTTG during the summer and early fall on the draft protocol, as you requested. However, our office has been faced with other pressing matters during this summer and early fall of 2018, including but not limited to our operations and recovery efforts from the Carr Fire, late summer temperature management efforts, and other priorities. Reclamation has not yet been able to address stakeholder interaction for the draft protocol.
>
> Reclamation is requesting an extension to December 14, 2018, to provide additional time for the interactions described in the June 22 letter. I intend to work with Diane Riddle of your staff to develop a schedule of meetings with State Water Resources Control Board staff as well as the members of the SRTTG and potentially others over the next six weeks to continue efforts on the requested protocol. Given that the requested protocol would not be implemented until spring 2019, we believe that such an extension would not impede implementation in 2019.
>
> Please let me know if you have questions or would like to discuss, and we look forward to further discussions on the future of temperature management on the Sacramento River.
>
> Thanks for your consideration,
> Jeff
>
> Jeffrey Rieker
> Operations Manager
> Bureau of Reclamation; Central Valley Operations Office
> Office: 916-979-2197; Mobile: 916-214-7555
> jrieker@usbr.gov

Enclosure 4

DRAFT
Reclamation Temperature Reporting/Coordination Protocol Pursuant to Order 90-5
Water Year 2019

December 14, 2018

Duration

The duration of this protocol will be for Water Year 2019. Reclamation is proposing a single year protocol in recognition of the fact that water operations and temperature management on the Sacramento River may undergo changes in 2019 and/or thereafter as the result of several ongoing processes. These processes include, but are not limited to the following:

- Development of new Biological Opinion(s) for the Central Valley Project as a result of the October 19, 2018 Presidential Memorandum on Promoting the Reliable Supply and Delivery of Water in the West
- Potential changes in future years associated with the State Water Resources Control Board (Board) update to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

Communication and Coordination

December 2018 through January 2019

Reclamation plans to provide monthly updates via email to the Sacramento River Temperature Task Group (SRTTG), outlining current river and reservoir conditions, operations, hydrology, meteorology, and long-range precipitation forecast information. Should any significant issues arise concerning temperature management for the 2019 season in this timeframe, an SRTTG meeting will be convened, as appropriate.

February through May 2019

Reclamation will convene SRTTG meetings from February through May on a monthly basis, or more often as necessary to ensure communication and coordination among the parties as planning is completed for the temperature management season.

Reclamation will prepare initial projections of anticipated temperature management capability and considerations in mid-February based on the February hydrologic and runoff forecasts from the Department of Water Resources and National Weather Service River Forecast Center. These projections are anticipated to be shared with the SRTTG in the third full week of February, and represents the initiation of the process for developing temperature management plans for the year, recognizing that the forecasts remain highly uncertain this early in the year. The initial projections are also anticipated to be utilized for the activities associated with Action I.2.3 of the NMFS Biological Opinion.

Reclamation will prepare updated projections of anticipated temperature management capability and considerations in mid-March and mid-April as updated hydrologic forecasts become available, and more often should sufficient new information warrant. These updated projections

will be shared with the SRTTG in advance of scheduled SRTTG meetings, and will assist with ongoing development of an initial draft temperature management plan. Reclamation anticipates having that initial draft temperature management plan prepared in association with the April SRTTG meeting, which is currently anticipated to occur on or about April 25, 2019. This schedule will provide for coordination with the NMFS Biological Opinion process, and specifically Action I.2.4 of the NMFS Biological Opinion.

Reclamation anticipates presenting the initial draft temperature management plan at a stakeholder meeting to include Central Valley Project and State Water Project water and power contractors, Tribes, non-governmental organizations, and other interested parties during the first full week of May. Based on feedback from that meeting and any other ongoing dialog among the SRTTG, Reclamation anticipates submitting a final temperature management plan to the Board on or about May 15, 2019. This timing will also provide for coordination with the requirements under Action I.2.4 of the NMFS Biological Opinion.

June through October 2019

Reclamation plans to convene SRTTG meetings each month through October, or more often as warranted by any changing conditions, to ensure tracking and monitoring of the temperature management plan. Should changes to the plan be necessary, those changes will be developed through communication and coordination with the SRTTG, and other interested parties as warranted.

Changes in Regulations or Operating Agreements

Should any relevant regulations or agreements change prior to October 2019, Reclamation will review this protocol and contact the Board with any necessary changes to it. This includes any relevant new Biological Opinions.

Extreme Conditions

Though the above communication and coordination protocol is designed to provide for adequate interaction across any hydrologic or operational conditions faced in 2019, should drought or other extreme conditions require Reclamation to deviate from the above protocol, Reclamation anticipates these deviations would follow the process outlined in Action I.2.3.C of the NMFS Biological Opinion. Reclamation will contact the Board should conditions warrant changes to this protocol based on extreme conditions.

Reclamation further intends to inform the Board as soon as practicable regarding any change in circumstances, obligations or operations relevant to this protocol.

Monitoring and Reporting

For Water Year 2019, Reclamation plans to continue the monitoring and reporting practices that have been conducted throughout the 2018 Water Year. These include the following:

- Monthly letters to the Board containing relevant data and information as identified in Order 90-5 (example from November 2018 enclosed)
- Near-real time reporting through Reclamation's web interface of relevant information, located at the following website: https://www.usbr.gov/mp/cvo/vungvari/sactemprpt.pdf
- Transmittal of pertinent data and information to the SRTTG prior to meetings or more often as conditions warrant, including applicable modeling and tracking information during the course of the temperature management season. It is anticipated that the specifics of the modeling and tracking information that will be utilized in 2019 will be outlined in the development of the final temperature management plan for the year.

Reclamation intends to provide temperature profile measurements for Shasta, Whiskeytown, and Trinity Reservoirs in Water Year 2019 as shown in the following table:

Reservoir	Every Month	Every Two Weeks	Every Week	Comment
Shasta	01/01 – 03/01 12/1 – 12/31	03/01 – 05/01 11/15 – 12/01	05/01 – 11/15	25 ft intervals for "Every Month", otherwise 5 ft intervals
Whiskeytown	01/01 – 12/31	N/A	N/A	25 ft intervals
Trinity	01/01 – 12/31	N/A	N/A	25 ft intervals

The time and depth intervals identified above are linked to the historical stratification and de-stratification of the lakes. When de-stratified and temperature management is inactive, a finer resolution of the thermal profile at Shasta Reservoir is not needed.

Reclamation believes that monthly temperature profiles for Whiskeytown and Trinity are sufficient to capture the thermal dynamics; both have limited abilities to actively manage selective withdrawal and the cold-water-pool volume does not rapidly change for most of the year. Reclamation will post the corresponding isothermobaths on our website identified above as soon as the information becomes available.

As in past years, Reclamation intends to rely on the California Department of Fish and Wildlife's (CDFW) redd dewatering monitoring program for 2019 to provide information on potential redd dewatering and stranding for informing real-time operations of Shasta and Keswick Dams. Reclamation will continue to coordinate with CDFW on river operations and any flood control releases to ensure this program can be safely and effectively implemented.

It is Reclamation's understanding that the manner in which the information is provided on Reclamation's website and in its letters currently meets the needs of the Board and fisheries agencies for the locations currently being monitored. Should the Board or fisheries agencies require the data from any of the monitoring stations outlined above in other formats, or obtain data from other monitoring sites that Reclamation maintains or has access to, Reclamation can work with the Board or fisheries agencies to provide that data.

Enclosure 5

United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY
REFER TO:

CVO-400
WTR-4.10

NOV 05 2018

VIA ELECTRONIC MAIL

Mr. Erik Ekdahl
Deputy Director, Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Subject: Monitoring and Reporting Program on Water Rights Order No. 90-5 (Water Rights)

Dear Mr. Ekdahl:

For the month of October 2018, the temperature control point was set at Balls Ferry, per the May 2018, Sacramento River Temperature Plan.

During the month, the average daily water temperature compliance of 56.0°F or less was met at the Balls Ferry compliance point on the Sacramento River. During the month, the observed average monthly water temperature was 54.9°F at Balls Ferry.

Enclosed is the monitoring report for October 2018, under Order No. 90-5. Some directly measured information is not available due to issues with the telemetry system that records and transmits data from the station (this is the same issue United States Geological Survey is experiencing with Geostationary Operational Environmental Satellite system). Reclamation plans to recover communication as soon as possible. The report contains the following data as required:

ID #	Station	Temperature*	Turbidity*	Dissolved Oxygen*	Flow*
1	Shasta Inlets	X	X		
2	Shasta Dam	X	X	X	
2a	Shasta Dam				X
3	Sacramento River below Keswick Dam	X		X	
3a	Keswick Dam		X		X
4	Spring Creek Power Plant	X	X		X
5	Temperature Control Point	X	X	X	
6	Sacramento River at Delta	X	X		
7	McCloud River	X	X		

ID #	Station	Temperature*	Turbidity*	Dissolved Oxygen*	Flow*
8	Pit River	X	X		
9	Trinity River below Lewiston Dam	X			
9a	Lewiston Dam				X
10	Trinity River at Douglas City Bridge	X			
11	Trinity River at confluence of North Fork	X			

*Monitoring frequency, period, and units are specified in enclosures

Please contact Ms. Randi Field at 916-979-2066, should you have any questions regarding this data.

Sincerely,

Elizabeth Kiteck

Elizabeth Kiteck
Chief, Water Operations

Enclosures

cc: Ms. Alessia Siclari Melchor
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Mr. Vadim Demchuk
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Ms. Diane Riddle
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812
(w/encl)

90-5 Required Water Monitoring Data

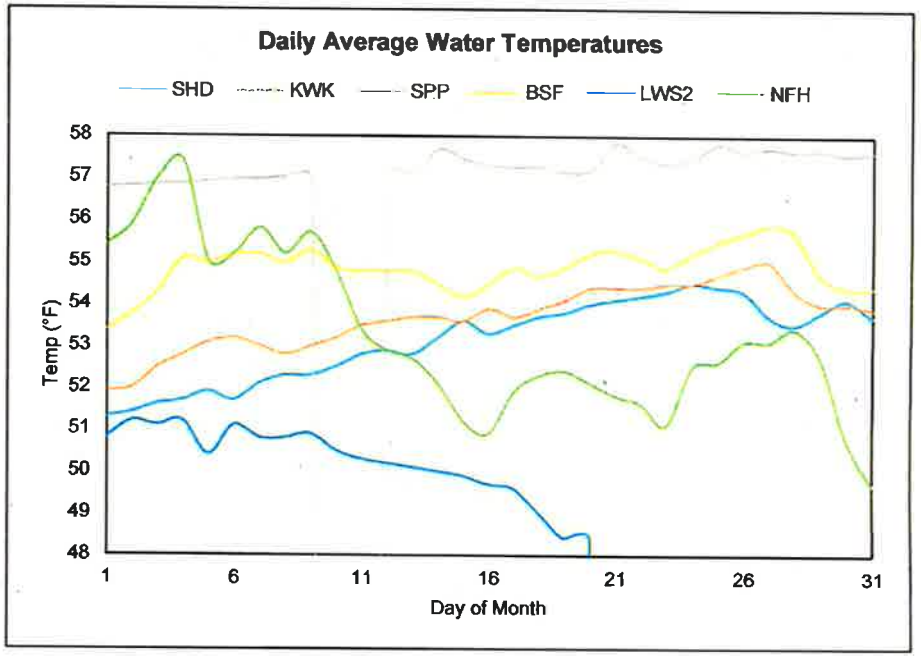
October 2018

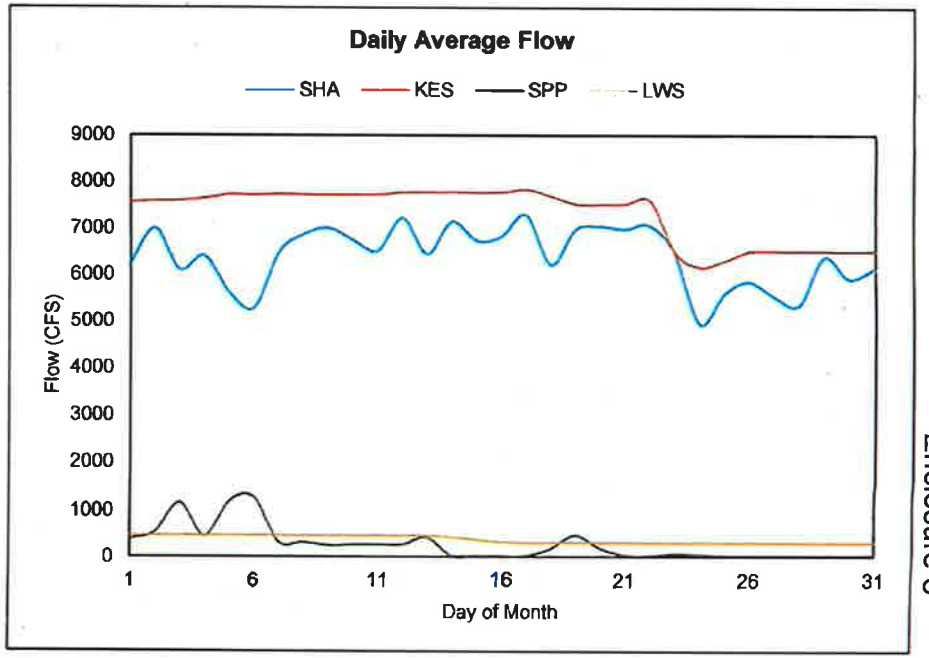
Daily Averages from Hourly Automated Observations											
Parameter		Temp (°F)						Flow (CFS)			
Site		2	3	4	5	9	11	2a	3a	4	9a
		SHD	KWK	SPP	BSF[1]	LWS[2]	NFH	SHA	KES	SPP	LWS
Day of Month	1	51.3	51.9	56.8	53.4	50.8	55.4	6210	7551	380	459
	2	51.4	52.0	56.8	53.8	51.2	55.9	6991	7586	528	460
	3	51.6	52.5	56.9	54.3	51.1	57.0	6099	7588	1162	459
	4	51.7	52.8	56.9	55.1	51.2	57.4	6396	7641	450	460
	5	51.9	53.1	56.9	55.0	50.4	55.0	5599	7718	1191	461
	6	51.7	53.2	57.0	55.2	51.1	55.2	5261	7705	1260	460
	7	52.1	53.0	57.0	55.2	50.8	55.8	6466	7725	311	458
	8	52.3	52.8	57.0	55.0	50.8	55.2	6849	7715	310	456
	9	52.3	53.0	57.0	55.3	50.9	55.7	6994	7710	242	457
	10	52.5	53.2	-	54.9	50.5	54.8	6732	7708	261	457
	11	52.8	53.5	-	54.8	50.3	53.4	6496	7712	261	458
	12	52.9	53.6	57.1	54.8	50.2	52.9	7206	7755	261	457
	13	52.8	53.7	57.1	54.8	50.1	52.7	6424	7761	415	456
	14	53.2	53.7	57.7	54.5	50.0	52.1	7124	7767	14	418
	15	53.6	53.6	57.4	54.2	49.9	51.2	6715	7757	14	367
	16	53.3	53.9	57.3	54.5	49.7	50.9	6796	7763	14	313
	17	53.5	53.7	57.3	54.9	49.6	51.9	7268	7820	14	300
	18	53.7	53.9	57.3	54.7	49.0	52.3	6184	7675	163	301
	19	53.8	54.1	57.2	54.9	48.4	52.4	6953	7503	458	303
	20	54.0	54.4	57.2	55.2	48.4	52.1	7022	7496	184	302
	21	54.1	54.4	57.8	55.3	-	51.8	6955	7506	28	304
	22	54.2	54.4	57.5	55.1	-	51.6	7035	7576	16	304
	23	54.3	54.5	57.4	54.9	-	51.1	6429	6455	54	303
	24	54.5	54.5	57.5	55.2	-	52.5	4889	6143	41	304
	25	54.4	54.7	57.8	55.5	-	52.6	5547	6276	17	303
	26	54.3	54.9	57.6	55.7	-	53.1	5812	6481	14	303
	27	53.7	55.0	57.7	55.9	-	53.1	5485	6485	14	303
	28	53.5	54.3	57.6	55.7	-	53.4	5293	6483	14	301
	29	53.8	54.0	57.7	54.7	-	52.7	6345	6479	14	298
	30	54.1	54.0	57.6	54.4	-	50.8	5865	6474	14	298
	31	53.7	53.9	57.6	54.4	-	49.7	6086	6481	18	298
	Max							7268	7820	1260	461
	Mean							6372	7306	262	374
	Min							4889	6143	14	298
	Volume (TAF)							392	449	16	23

Notes

[1] Current temperature control point

[2] Missing data per faulty transmitter





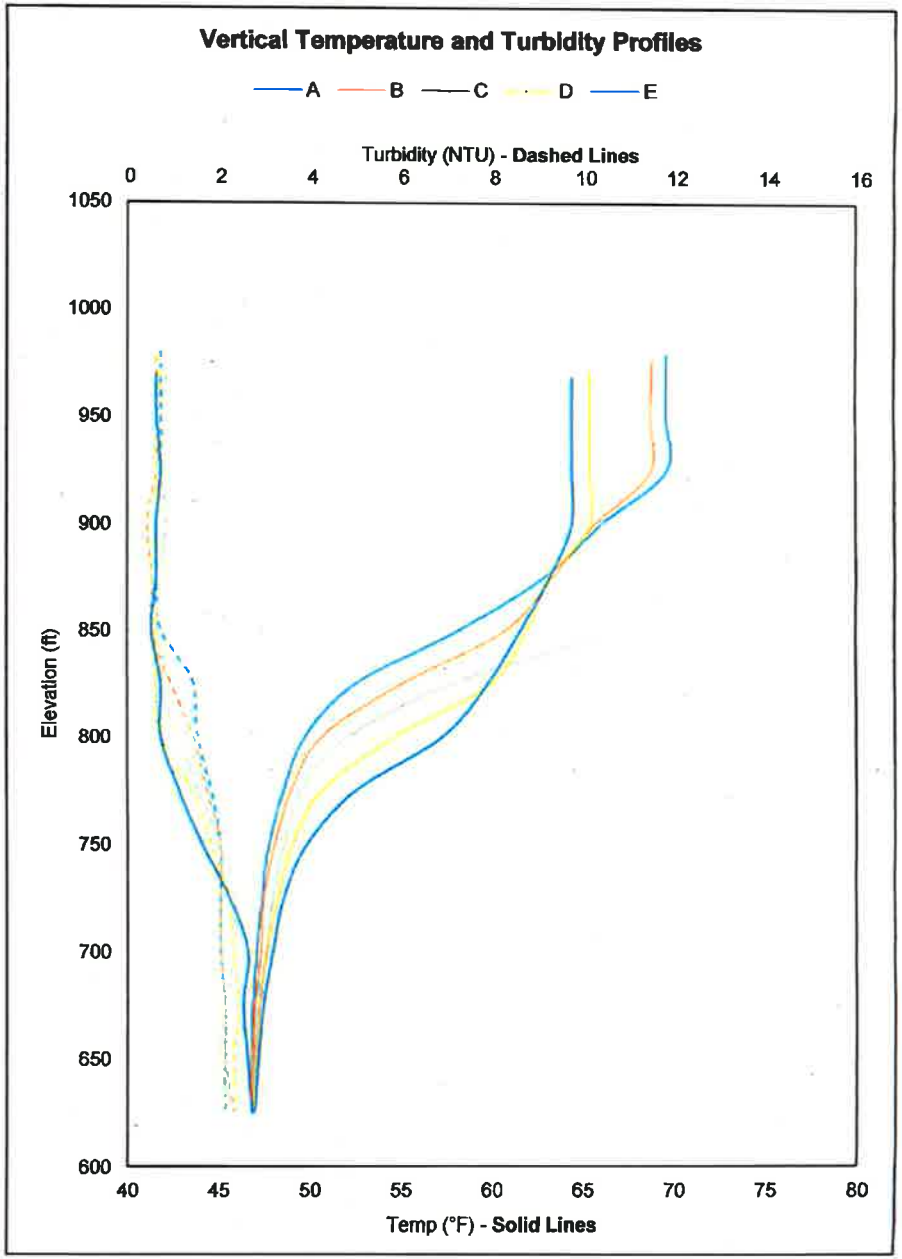
Enclosure 5

90-5 Required Water Monitoring Data (Continued)

October 2018

Vertical Profiles Taken at Site 1 (Shasta Lake at Dam Inlets)										
Profile		A		B		C		D		E	
Day of Month		2		9		16		23		30	
Lake Elev.		979.03		976.77		973.89		970.79		968.66	
Parameter		Temp	Turb	Temp	Turb	Temp	Turb	Temp	Turb	Temp	Turb
Elevation (ft)	L.E.	69.7	0.7	68.9	0.6	66.2	0.8	65.5	0.7	64.5	0.6
	1050	-	-	-	-	-	-	-	-	-	-
	1025	-	-	-	-	-	-	-	-	-	-
	1000	-	-	-	-	-	-	-	-	-	-
	975	69.7	0.7	68.9	0.6	-	-	-	-	-	-
	950	69.7	0.7	68.8	0.6	66.3	0.8	65.5	0.6	64.5	0.6
	925	69.7	0.7	68.8	0.6	66.2	0.7	65.5	0.6	64.5	0.7
	900	66.1	0.6	65.7	0.4	66.2	0.8	65.5	0.6	64.5	0.6
	875	63.0	0.6	63.4	0.5	66.2	0.7	63.2	0.5	63.3	0.6
	850	58.3	0.7	60.8	0.5	66.3	0.6	62.0	0.6	61.7	0.5
	825	52.6	1.4	55.1	0.9	57.8	0.6	60.0	0.6	59.9	0.7
	800	49.8	1.5	50.7	1.4	52.2	1.1	54.7	0.7	57.4	0.7
	775	48.6	1.8	49.0	1.7	49.6	1.5	50.7	1.4	52.6	1.1
	750	47.8	2.0	48.1	2.0	48.6	2.0	49.1	1.8	49.9	1.6
	725	47.4	2.0	47.5	2.0	48.0	2.3	48.3	2.2	48.6	2.2
	700	47.1	2.0	47.3	2.0	47.6	2.3	47.7	2.3	48.0	2.6
	675	46.9	2.1	47.0	2.1	47.2	2.1	47.3	2.4	47.5	2.5
	650	46.8	2.1	46.9	2.1	47.0	2.0	47.1	2.3	47.2	2.6
	625	46.8	2.1	46.8	2.3	46.9	2.2	46.9	2.4	47.0	2.7

Monthly Manual Observations										
Parameter	Temp (°F)			Turb (NTU)						
Site	6	7	8	2	3	4	5	6	7	8
	DLT	MSS	PMN	SHD	KWK	SPP	RDB	DLT	MSS	PMN
Value	49.7	46.6	57.3	1.4	1.4	1.9	2.1	1.2	0.9	2.3
Day of Month	16	23	12	24	10	2	11	16	23	12



Enclosure 5

90-5 Required Water Monitoring Details

Site	CDEC ID	Description
1	-	Shasta Dam inlets or lake adjacent to the dam face.[1]
2	SHD	Shasta Dam release immediately downstream from the power plant.
2a	SHA	Shasta Dam release.
3	KWK	Sacramento River immediately downstream from Keswick Dam.
3a	KES	Keswick Dam release.
4	SPP	Spring Creek Power Plant release.
5	RDB	Sacramento River downstream from Red Bluff Diversion Dam.
6	DLT[2]	Sacramento River (above Shasta Dam).
7	MSS	McCloud River (above Shasta Dam).
8	PMN	Pit River (above Shasta Dam).
9	LWS	Trinity River immediately downstream from Lewiston Dam.
9a	LWS	Lewiston Dam release.
10	DGC	Trinity River at the Douglas City Bridge.
11	NFH	Trinity River at the confluence of the North Fork Trinity River.

	Temperature		Turbidity[3]		Dissolved Oxygen[4]		Flow	
	Frequency	Period	Frequency	Period	Frequency	Period	Frequency	Period
1	Every 2 weeks	5/1 to 11/30	Monthly	All Year	-	-	-	-
2	Average Daily	All Year	Monthly	All Year	Every 2 weeks	5/1 to 9/30	-	-
2a	-	-	-	-	-	-	Average Daily	All Year
3	Average Daily	All Year	-	-	Every 2 weeks	5/1 to 9/30	-	-
3a	-	-	Monthly	All Year	-	-	Average Daily	All Year
4	Average Daily	All Year	Monthly	All Year	-	-	Average Daily	All Year
5	Average Daily[5]	All Year	Monthly	All Year	Every 2 weeks	5/1 to 9/30	-	-
6	Monthly	All Year	Monthly	All Year	-	-	-	-
7	Monthly	All Year	Monthly	All Year	-	-	-	-
8	Monthly	All Year	Monthly	All Year	-	-	-	-
9	Average Daily	All Year	-	-	-	-	-	-
9a	-	-	-	-	-	-	Average Daily	All Year
10	Average Daily	9/15 to 10/1	-	-	-	-	-	-
11	Average Daily	10/1 to 12/31	-	-	-	-	-	-

Notes

[1] Take sufficient collection points to characterize the vertical profile for temperature and turbidity.

[2] Site 6 (DLT) is not accessible year round making it unsuitable for real-time Dissolved Oxygen monitoring do to calibration requirements.

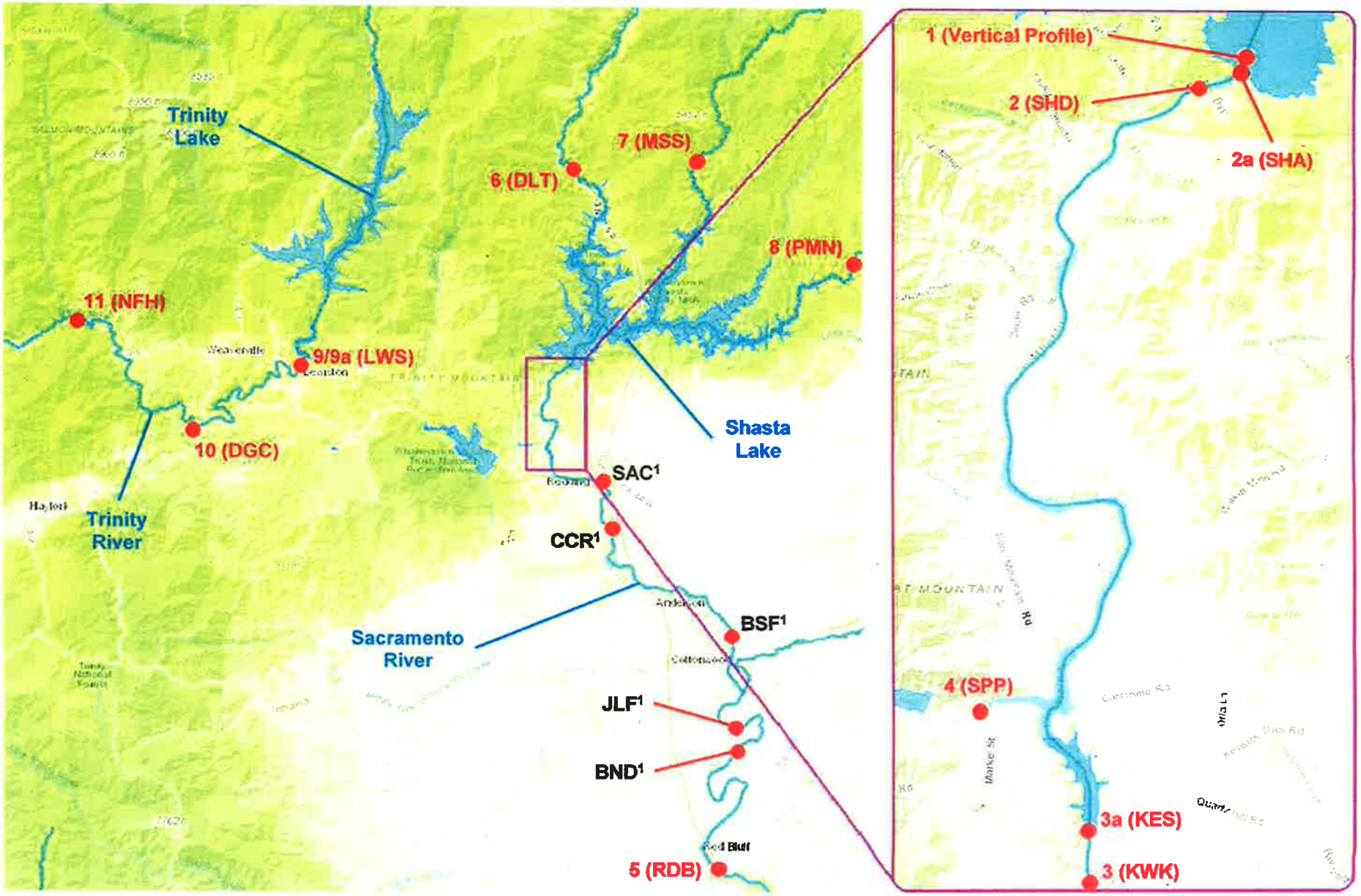
[3] From 5/1 to 9/30 if turbidity at site 2 is greater than or equal to 10 ntu's then frequency must be weekly.

[4] To be taken before 10:00 am.

[5] If the temperature control point is moved upstream from site 5, then temperature monitoring shall continue at the new site.

Enclosure 5

90-5 Required Water Monitoring Site Map



Notes

[1] SAC, CCR, BSF, JLF and BND are alternative upstream temperature control points to RDB

Enclosure 5