



Seepage and Conveyance Technical Feedback Group

Monday, January 23, 2017, 1:00 p.m. – 4:00 p.m.

San Luis Canal Company

11704 Henry Miller Avenue, Dos Palos, CA 93620

Meeting Summary

Attendees

Shelly Abajian	Office of U.S. Senator Diane Feinstein
Tom Berliner (phone)	Duane Morris
Maggie Boberg (phone)	River Partners
Joe Brummer	CNS
Dan Burns	Nickel Family, LLC
Chris Cardella	Landowner
Steve Chedester	San Joaquin River Exchange Contractors Water Authority
Ron Cunha (phone)	Nickel Family, LLC
Casey Gudel	Land IQ
Katrina Harrison	U.S. Bureau of Reclamation
Mica Heilmann	Land IQ
Brian Heywood	CDM Smith
Randy Houk	Columbia Canal Company
Chase Hurley	San Luis Canal Company
Anusha Kayshap	CDM Smith
Stephen Lee	U.S. Bureau of Reclamation
Bill Luce	Bill Luce Consulting
Mari Martin	Landowner/RMC
Palmer McCoy	Henry Miller Reclamation District
Josh Newcom	U.S. Bureau of Reclamation
Patti Ransdell	Circlepoint
Ken Samarin	Landowner
Blake Sanden	University of California Cooperative Extension
Regina Story	U.S. Bureau of Reclamation
Emily Thomas	U.S. Bureau of Reclamation
Stephanie Tillman	Land IQ
Stephanie Tolbert	Circlepoint
Mark Tompkins (phone)	TAC
Liz Vazquez	U.S. Bureau of Reclamation
Chris White	Central California Irrigation District
Cameron Zuber	University of California Cooperative Extension – Merced

This document is a summary of the discussion and questions that were raised during the Seepage and Conveyance Technical Feedback Group (SCTFG) meeting held on January 23, 2017. This document does not provide all the information that was presented during the meeting. Refer to the presentation materials posted on the San Joaquin River Restoration Program (SJRRP) website (<http://www.restoresjr.net/get-involved/technical-feedback-meetings/seepage-and-conveyance/>) for additional information, including a copy of the presentation.

Introductions, Meeting Objectives, and Agenda

Patti Ransdell, facilitator, opened the SCTFG meeting with introductions and reviewed the agenda. The purpose of the meeting was to provide SJRRP program updates, provide an update on the almond root zone study findings, discuss changes to groundwater seepage thresholds as posted to the SJRRP website for review, and gather input and comments on the proposed threshold changes.

Restoration Program Update

Katrina Harrison, U.S. Bureau of Reclamation (Reclamation), provided flow schedule updates. Water Year (WY) 2017 is forecast to be a Wet year. Flood releases from Millerton Lake began January 4, 2017. No Restoration Flows will be released during flood flow releases. When flood flows end, Restoration Flows will begin again, with up to 150 cubic feet per second (cfs) at Sack Dam. Reclamation anticipates that the Restoration Administrator will recommend increasing these flows to about 300 cfs below Sack Dam in March 2017, if flood flows are complete at that point.

An attendee asked a question regarding releasing Restoration Flows in Reach 2B prior to the completion of Reach 2B projects. Flow releases are constrained at 1,120 cfs due to channel capacity constraints in Reach 2B. This channel capacity constraint was determined using the updated levee stability analysis that was part of the channel capacity report. Completion of Reach 2B project will increase the Reach 2B channel capacity. There was a follow up question asking why Reclamation is releasing Restoration Flows. Reclamation is currently not releasing Restoration Flows.

Katrina Harrison informed everyone that the draft Environmental Assessment (EA) for SJRRP Seepage Management Actions was posted to Reclamation's National Environmental Policy Act (NEPA) website on December 22, 2016 and public comments are due by January 30, 2017. Reclamation is planning to release the final EA in April 2017. Reclamation wants to have seepage projects or easements in place that would allow Restoration Flows of up to 1,300 cfs in all Reaches by 2019, 2,500 cfs by 2024, and 4,500 cfs by 2030. The draft EA includes actions to allow Restoration Flows of up to approximately 1,300 cfs.

Thresholds Overview

Katrina Harrison, Reclamation, provided an overview of the meeting's purpose which is to get input on proposed groundwater seepage threshold changes documented in the revised Seepage Management Plan (SMP).

An attendee asked if Restoration Flows will be reduced or curtailed if there is seepage on just one person's property. If groundwater level thresholds are exceeded at a well because of Restoration Flows,

Reclamation will adjust Restoration Flows releases so that the threshold is not exceeded. Reclamation will conduct a site visit to determine if the threshold exceedance may be due to Restoration Flows or others factors such as irrigation.

Katrina provided an overview of the methodology used to establish thresholds. She discussed the two calculation methods used: (1) the 1:1 stage relationship and (2) the drainage method.

There was a comment on the drainage method. The group noted drainage could be a lot slower than it normally would be absent Restoration Flow due to the increased groundwater levels. Katrina stated that a difference in predicted water surface elevations and threshold elevation of 0.3 feet or more is maintained to ensure a gradient toward the river. However, maintaining groundwater levels at the threshold elevation reduces the gradient, thereby potentially reducing drainage. As a follow-up another commenter asked if the drainage methodology would be the typical calculation method following flood flows. Yes, after flood flows the drainage method would be used, as well as the 1:1 stage method evaluated.

One commenter asked if Reclamation would have had to curtail flows until fields are drained and groundwater levels are below thresholds using the prior threshold method. No, the SMP has included the drainage method for several years. Reclamation always anticipated releasing Restoration Flows after flood flows, and as long as groundwater levels can drop to below thresholds (and are not above thresholds as a result of Restoration Flows), then Restoration Flows may be released.

Another commenter suggested that flood flows be discussed in the SMP.

A commenter asked about Reclamation's choice to only include two seepage measures (land acquisition and seepage easements) in the project description of the draft EA. The commenter asked why other seepage project types, such as physical projects (e.g., interceptor lines, slurry wall) were not discussed in detail in the document. The EA was meant to cover the potential environmental impacts related to realty-type seepage projects. The potential environmental impacts of physical seepage projects would be described in separate documentation when the details of each project are known.

There was a comment that the EA does not discuss the executed or potential projects with other landowners. The commenter suggested that the EA included text that physical seepage projects are not precluded from implementation by this document. There was a question about land purchased upstream of Columbia Canal Company for flood easements and what will be done with farmlands in the middle of easements. Katrina noted that if Reclamation and the landowner decide to move ahead with a Reclamation funded interceptor line on the property, a separate environmental compliance document will be developed for the project. The design of the interceptor line will take into consideration easements on adjacent properties.

An attendee asked if a landowner with an existing well(s) can add another well to their property for their benefit and can the new well be a shallow well completed above the Corcoran clay layer. The attendee also noted that installing a well below the Corcoran clay layer could potentially cause subsidence. Restoration Flows are protected from unlawful diversion under Reclamation's water rights. Installing a shallow well close to San Joaquin River (SJR) could potentially divert Restoration Flows and would be

considered unlawful. However, if the shallow groundwater well is far enough away from the San Joaquin River, then it would not divert Restoration Flows and could be installed.

There was another question about adding a new well to a property. Existing wells can be replaced, but new well(s) cannot be added near the SJR if that well could reduce Restoration Flows in the SJR. Wells farther from the SJR that do not reduce Restoration Flows are not an issue to Reclamation. As a follow-up question, a commenter asked what would happen if a well was installed without first asking permission from Reclamation. Paragraph 13 (h) of the Stipulation of Settlement of *NRDC vs. Rodgers, et al.*, says Settling Parties must protect Restoration Flows against unlawful diversions and take appropriate actions when necessary.

There was a question regarding parcels that are not shown in the draft EA, but have been previously shown on the flow prioritization map. The focus of the EA was on parcels/properties where seepage projects would occur during the next few years so as to allow Restoration Flow of approximately 1,300 cfs. One of the commenters suggested that the 1,300 cfs flow threshold be documented in the EA. There was a follow up question about the total easement/acquisition acreage in the EA (11,252 acres) potentially increasing. Yes, more acreage would be affected at flows above 1,300 cfs. The potential impacts to this additional acreage would be documented separately.

Almond Root Zone and Capillary Fringe Study

Mica Heilmann of Land IQ provided an overview of the almond root zone study.

An attendee asked if design and easements for future projects will adhere to root zone and capillary fringe information as documented in the SMP. Yes, if a farmer wishes to convert to almond trees, Reclamation will use the 6-foot root zone as proposed in the SMP (as revised per the almond root zone study documents) with the additional capillary fringe. As a follow-up question, a grower asked if he would need to wait for Reclamation approval before installing a drain system. If Reclamation implements the physical project (e.g., interceptor line or slurry wall), it would take between 18 and 24 months to implement the project (including environmental compliance) before starting construction. Another attendee asked, how the process would differ if the grower constructed the interceptor line on their own. Growers can install their own interceptor line after implementation of an easement or acquisition contract with Reclamation, if they so choose. Implementation of a seepage easement removes Reclamation's risk due to seepage of Restoration Flows. Reclamation's approximate timeline for completing an easement is between 15 to 29 months. If the landowner hired their own appraiser the timeframe could be reduced by approximately 6 to 12 months.

An attendee asked if Katrina could provide a timeline for the seepage easements currently being worked on. For the first purchased easement, the process took one and a half years. The other easements are at the two-year mark and appraisals are nearing completion. An attendee asked for an estimate of the amount paid for the easements. The value varies by property, but could be estimated between \$3,000 and \$25,000 per acre. Katrina said it could be up to half the value of a fee title. An attendee asked for a copy of the land acquisition process presentation slides.

Action item: Katrina to send a hardcopy of the land acquisition process presentation slides to Ken Samarin.

Stephanie Tillman from Land IQ continued the presentation with an overview of the capillary fringe study. She covered the details of the literature review, historical data review, and expert consultation.

There was a question about how many types of soil were found in Reach 4A during testing. One of the references used by Land IQ, the Handbook of Soils, lists up to 1,320 types of soils in 32 states. Joe Brummer from CNS, added that the same soils have different names in different counties. He also suggested that it is difficult to predict what soil types will be found at depth because there is clay, sand, and soil spread throughout all area. Surficial soil mapping from the Natural Resources Conservation Service (NRCS) may not be indicative of the soils found 9 feet below ground surface.

Stephanie presented the proposed changes to the capillary fringe values to be used in the SMP. Regina Story from Reclamation presented the steps for determining the thresholds values as proposed in the 2017 SMP revisions.

An attendee asked if there is a table presenting capillary fringe versus capillary rise. Capillary rise is site specific and depends on soil and crop type, the time of year, surface conditions such as tilt and cap, and evaporation.

One of the attendees asked about the dead zone (i.e., the portion of the almond root that could substantially reduce yield or cause damage to the tree if there is any saturation in that zone). The attendee wanted to know what the dead zone was for almonds. Mica noted capillary fringe is the tension saturated zone (i.e., 100% anoxic zone). In reality, transition from anoxic zone to the unsaturated zone is steeper than in the schematic figure in Slide 35 of the presentation. There is no clear point that distinguishes the top of the capillary fringe. This is a challenge because it makes it hard to make an informed decision about the dead zone above the saturated zone. Blake Sanden from UCCE explained that capillary fringe is the 100% anoxic zone where the almond roots will be subject to anoxic conditions and will be damaged. The purpose of Land IQ's analysis was to come up with acceptable capillary fringe thicknesses for different types of soils.

Blake Sanden explained efficient irrigation would need no leaching of salts beneath 5 to 6 feet. However, increased river levels could cause salt to come up higher into the capillary zone.

There was a comment that growers typically desire groundwater depths below 3 to 4 feet in the summer and 5 feet in the fall. They would then flush salts down to 5 to 7 feet during the winter. A grower noted that with Restoration Flows, salt could rise back to the top of this zone. It was asked what the grower should do to leach salts when flows are adding pressure with a higher water table.

One of the attendees suggested that groundwater levels be maintained at levels observed prior to the SJRRP and not at the agricultural threshold. Katrina answered that in some reaches (e.g., Reach 2A) the groundwater table is deep (e.g., on the order of 100 feet below groundwater surface). She suggested that an increase in the groundwater level in the reach may be beneficial in these cases. The agricultural

threshold method is used to determine acceptable depth to groundwater that does not impact crops. Additionally, the historic threshold method determines the threshold prior to the SJRRP.

There was a question if root zones would be crop specific because almond root zones do not represent root zone for all crop types. Yes, the SMP lists root zone by crop type.

There was a comment stating that it seems the study is trying to push capillary fringe limits to their absolute minimum. Mica explained that the goal is to identify a defensible number based on science that lies somewhere between the minimum and the maximum. Mica stated they are trying to find a threshold which protects the crop root zone by incorporating the effective root zone (based on crop type) and the capillary fringe (based on soil type).

There was a question asking if it is possible to have five different soil types on one very small portion of land. Yes, in these cases the limiting conditions (i.e. largest capillary fringe) will determine the capillary fringe used, as discussed in Slide 53.

There was a comment that soil types can vary within relatively small areas (e.g., 50 feet), and, thus, the capillary fringe would vary as well. Katrina stated a combination of the deepest root zone and finest texture will be considered when establishing a threshold. A follow up question asked how they will be able to find all the soil types in the field because it seems impossible to cover every inch of a property, especially closer to the river. Reclamation is using the well logs to determine the soil type as this is as specific as they can get currently. However, if a landowner has more detailed information they could share this with Reclamation and they will use that in place of the well logs. Additionally, in lieu of this information, a landowner can request Reclamation to conduct more soil tests on a particular field. The landowner can contact Stephen Lee or Katrina Harrison regarding additional testing.

An attendee commented that growers will face a lot of problems before Reclamation gets these details figured out. Mica said there is always variability but the hope is to capture enough samples to account for these variations.

An attendee asked if Reclamation will adjust Restoration Flows based on a single occurrence of seepage impacts on private property. Yes, Restoration Flows will be adjusted if any seepage impacts are noticed. Reclamation has developed a monitoring well system strategically placed in known seepage spots on properties. Katrina suggested calling the Seepage Hotline if seepage is noticed at a particular spot. Reclamation would then review the issue and reduce Restoration Flows if the issue is caused by Restoration Flows. Reclamation would also potentially add a monitoring well at that location and incorporate it into their monitoring route.

Regina resumed the overview of the 2017 SMP revisions pertaining to agricultural thresholds and the capillary fringe study.

An attendee asked why the 2017 SMP revisions are being made and changing what was proposed in 2016. Katrina mentioned that the 2012 SMP Peer Review Panel proposed a 6-foot almond root zone (instead of 9 ft) based on the data the Panel reviewed. The almond root zone study was conducted to confirm the 6-foot root zone suggested by the peer review panel. The results of the almond root zone

study confirmed the 6-foot almond root zone. This study suggested that additional review and/or analysis be conducted to understand the capillary fringe. The 2017 SMP revisions incorporate suggested changes proposed by the peer review panel and the results from the Almond root zone study. Overall, Reclamation is deepening thresholds for row crops with deepening of the capillary fringe for these types of crops.

Lateral Gradient Buffers

Regina provided an overview and explanation of lateral gradient buffers and calculations.

There was a discussion about normal deliveries to San Luis Canal Company via Reach 3 of the SJR. Those flows combined with Restoration Flows have the potential to exceed channel capacity. Katrina Harrison explained that releases will not be made that exceed channel capacity or threshold levels.

There was a comment that historical baseline groundwater conditions will change due to Restoration Flows and water cannot drain naturally when the river is continually running. The commenter suggested that seepage control projects should be implemented before making suggested SMP revisions.

Historical Groundwater Method

Katrina provided an overview of the proposed revisions to the historical groundwater threshold method.

There was a comment about comparing groundwater levels used in the C1 method to the groundwater levels in C4 method and see how they compare.

An attendee asked if each groundwater level data point was a one-week measurement. The frequency of groundwater level measurements varies between wells. Some wells are measured weekly, and some are measured less frequently.

Katrina explained and presented the proposed C4 historical groundwater level method.

An attendee stated that some of the identified outlier data points might not be outliers. Rather these values may reflect changing field conditions such as irrigation, precipitation, or pumping. One of the attendees suggested that to establish shallowest historic groundwater levels, all external factors such as irrigation or precipitation should be removed from the record. Katrina mentioned that irrigation events can be screened using the field notes. She committed that Reclamation will review this approach and share data with CCID. A follow up comment was made about using the 75th percentile number for the C1 method. There were flood flows occurring during the C1 analysis period and the 75th percentile was used to screen out those periods.

Action item: Reclamation will recalculate the historic threshold using the C4 method after removing data points that identify irrigation and/or precipitation events. Reclamation will share the results of this analysis with Chris White and get his input on the methodology.

There was a question if the threshold value set in the C4 method means that groundwater levels will be maintained at that level from August to March. Groundwater levels are not maintained at the threshold.

The threshold is the upper limit that Reclamation must not allow groundwater levels to exceed due to Restoration Flows.

An attendee asked if the SMP revisions would cause the highest river level (in spring for a period of a couple weeks) to last for a period of 120 days. Furthermore, without Restoration Flows there will be an opportunity for ground to dry out between July and September. The attendee also asked if Restoration Flows would move the groundwater levels up to the C4 historic threshold levels. Groundwater level thresholds are the maximum – Reclamation would anticipate the groundwater levels to be near the thresholds only during the highest Restoration Flows in the spring. Katrina stated the thresholds are a limit and Reclamation would manage Restoration Flows such that groundwater levels would not rise above the threshold due to Restoration Flows.

There was a comment stating that Reclamation is assessing how crops would be minimally damaged during a 2-week high flow period, but not during a period of a few months. Thresholds have been established to ensure no damage to crops.

Katrina asked the meeting attendees for suggestions on how the SJRRP could calculate historical groundwater thresholds differently.

There was a comment stating the C4 method is a good attempt, but there has to be a solid reason for removing the peaks. Katrina said Reclamation will recalculate the historic threshold using the C4 method after removing data points that identify irrigation and/or precipitation events.

There was a question asking if the threshold should be set to the shallowest level since although Reclamation is not required to improve the water level, they should not make it worse either.

An attendee stated the rise of the river occurs prior to the rise in groundwater so there must be a method to connect the correlation. Reclamation is collecting additional river stage data and could complete a comparison of the timing of groundwater level changes as compared to changes in river stage.

There was a comment regarding how historically, in Reach 4, farmers know when to grow crops and plant to compensate for the rising groundwater. If a threshold is set at six feet, trees will die. The attendee questioned why the most restrictive level would be chosen as the threshold. Katrina stated that Reclamation will pull irrigation events from the data set and recalculate thresholds with the C4 method. A follow up question asked if weather events will also be pulled from the data set. Yes, rain data can be retrieved and removed as well.

There was a question of how many years of monitoring was used for the C4 threshold method. Slightly more than 4 years of monitoring, from December 2011 to January 2016.

Blake Sanden mentioned that toward the end of the SMP, page 9-1, there is mention of using an EM38 evaluation for soil salinity. He recommended using EM 38 meters more, to determine soil salinity plus water logging. Reclamation will work with Blake Sanden to further understand of this methodology.

Wrap Up

Reclamation will schedule another meeting towards the end of February to discuss changes that are to be made to the SMP.

Public comments on the draft EA and revised SMP are due on January 30, 2017.

Action Items

- *Katrina to send a hardcopy of the land acquisition process presentation slides to Ken Samarin.*
- *Reclamation will recalculate the historic threshold using the C4 method after removing data points that identify irrigation and/or precipitation events. Reclamation will share the results of this analysis with Chris White and get his input on the methodology.*