1.7 San Joaquin River Resource Management Coalition and San Joaquin River Exchange Contractors Water Authority

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July 21, 2011

Ms. Michelle Banonis
Natural Resources Specialist
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Re: **Comments of the San Joaquin River Exchange Contractors Water Authority, Its Member Agencies and the San Joaquin River Resource Management Coalition to the Draft Supplemental Environmental Assessment and Proposed Finding of No Significant Impact for the San Joaquin River Restoration Program Water Year 2012 Interim Flows Project, June 14, 2011**

Dear Ms. Banonis:

The following are the comments of the San Joaquin River Exchange Contractors Water Authority, its member agencies[1] and the San Joaquin River Resource Management Coalition (referred to for convenience collectively as "Exchange Contractors") to the above-referenced "Draft Supplemental Environmental Assessment, ... for Water Year 2012 Interim Flows Project" (hereafter "DEA"). This document is organized in two parts, those comprising general comments and then specific comments to the DEA itself and the appendices.

The Exchange Contractors very much appreciate the extension of time granted to respond to the DEA.

[1] The member agencies of the Exchange Contractors are Central California Irrigation District, Columbia Canal Company, Firebaugh Canal Water District, and the San Luis Canal Company

General Comments

RMC-SJREC- 1

1. The Exchange Contractors hereby incorporate as though fully set forth herein the comments it submitted to prior EAs. Since the prior comments referenced hereafter are in the possession of Reclamation, they will not be physically attached to these comments. However, electronic copies of the water rights orders are available at the following sites:

- See Exchange Contractors' letter of July 23, 2010, at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=6480

- See Exchange Contractors' letter of July 17, 2009, at

  http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=4390

RMC- SJREC- 2

2. The Bureau of Reclamation ("Reclamation") should at a minimum incorporate into the Final EA all of the terms and conditions included in the water rights orders issued by the SWRCB for WY 2011 as mitigation measures, as well as any additional measures recommended herein or proposed by Reclamation in response to these comments. Since the water rights orders referenced hereafter are in the possession of Reclamation, they will not be physically attached to these comments. However, electronic copies of the water rights orders are available and they are incorporated herein by reference for inclusion into the record. See WR Order 2010-0029 at : http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2010/wro2010_0029dwr.pdf

and WR Order 2011-0002 at : http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2011/wro2011_0002.pdf

3. This environmental analysis is incomplete; Reclamation has made an irretrievable commitment of resources; Reclamation has improperly segmented the program/project.

RMC-SJREC- 3

a. Reclamation indicates it will release flows for the next year consistent with the hydrographs set forth in Exhibit B to the Settlement. Any environmental review must analyze a range of hydrographs (alternatives) to accomplish the proposed action of fish reintroduction. The purposes of the Settlement and Act are to reintroduce salmonids to the San Joaquin River (restoration goal) and the recovery as much of the water released for this purpose as possible to benefit the Friant contractors (water management goal). (See DEA at p. 1-3) There may be more than one set of hydrographs that could accomplish the first of these project purposes.

RMC-SJREC- 4

b. Reclamation has irretrievably committed resources prior to meaningful environmental review. These resources include binding itself to hydrographs, the

RMC-SJREC- 4

construction of hundreds of millions of dollars of infrastructure described in the Settlement, the release of interim flows without first completing the programmatic environmental impact statement, and the expenditure of funds associated with the release of these flows.

RMC- SJREC- 5

c. Once again Reclamation has improperly segmented its environmental review of the program/project. Improper segmentation has occurred by separating one year of interim flows from subsequent years, interim flows from restoration flows and interim flows from the recapture of those flows. None of these are separable actions or have independent utility. As was explained in previous comments referenced above, but for the restoration goal interim flows serve no independent purpose. Similarly the information gathered by the interim flows serve no purpose independent of the restoration goal. Further, the DEA concedes this year's interim flows are simply a continuation of last year's flows. The recovery of the interim flows to benefit the Friant contractors is also not separable from the interim flows and a separate NEPA evaluation to address recapture of flows serves no independent utility because the recapture itself is not independent of the interim flows and would not be necessary but for the interim flows. Finally, the interim flows are not independent of the restoration flows as the interim flows are the basis upon which restoration flows are based. Hence, all of these actions are part of the overall program/project and serve no independent utility.

RMC-SJREC- 6

4. As explained in the comments of the San Luis & Delta Mendota Water Authority (Authority), the Act requires that the adverse impacts of the program be fully mitigated. The Act created a standard stricter than the "significance" standard typically applied in NEPA and CEQA. This NEPA-plus standard requires that impacts be reduced to that of a *de minimis* impact. The Authority proposed a definition of "harm" that should be adopted for purposes of assessing impacts. The Exchange Contractors support that definition, which is as follows:

"The Act requires that the Proposed Project not harm third parties. "Harm" here means

(1) any impact that deprives third parties, including south-of-the-Delta CVP contractors, of water that would otherwise be available to them in the absence of the Proposed Project,

(2) any impact that adversely affects the reliability of their water supply,

(3) any impact that increases the financial costs of their water supply (such as cost to water purchase, operation and maintenance costs, etc.), or

RMC-SJREC- 6

(4) any adverse impact to or obligation incurred by a downstream water user, landowner, water agency, or levee district that occurs as a result of, arises from or is caused by implementation of the San Joaquin River Restoration Program.

Reclamation will assess project impacts by comparing conditions with and without the Proposed Project, using that definition as the "threshold of significance". Reclamation will not implement the Proposed Project in a manner that harms third parties. The Proposed Project will either avoid impacts that cause harm or fully mitigate for them."

Specific Comments

The following comments concern the draft Finding of No Significant Impact:

RMC-SJREC- 7

1. The DEA includes a draft "Finding of No Significant Impact" ("FONSI"). It is evident that Reclamation anticipates that the Proposed Action will not have significant unmitigated impacts. However, Reclamation has little to no basis upon which to make this statement if, as is stated in the DEA, it intends to release water consistent with the hydrographs set forth in Exhibit B to the Settlement. As Reclamation is aware, significant impacts to downstream landowners have occurred as a result of the release of interim flows. (See attached July 5, 2011 letter from Senator Feinstein to Commissioner Connor.) While protective water level thresholds have been established to some degree, the draft plan is not complete at this time. (See comments below to Appendix G – Seepage Monitoring and Management Plan.) Further, because WY2011 has been an extraordinarily wet year, Reclamation has no data to indicate when groundwater levels will drop below the thresholds. Any operations for WY2012 must take into account actions necessary to reduce groundwater levels to those below the thresholds.

RMC-SJREC- 8

2. Page 2, Item 2. The FONSI states that it "will not significantly impact agricultural and forest resources." Yet, to the extent that seepage causes damage to farmland, it will convert lands designated as primary farmland, unique farmland or farmland of statewide importance, to non-agricultural uses. While such conversion may be temporary, that is not certain at this point. What standard is Reclamation applying to determine whether or not an impact is "significant"?

RMC-SJREC- 9

3. Page 2, Item 5. The FONSI states that the Proposed Action will not significantly impact fishery resources. Yet, it is our understanding that the bass population in the San Joaquin River just upstream of the confluence with the Merced River, has increased dramatically. The DEA fails to discuss the fact that as a result of the release of interim flows, an increased bass population now exists in an area where it can feed off of migrating fall run salmon. Again, what level of "significance" is Reclamation applying? Does Reclamation acknowledge this increase

RMC-SJREC- 9

in the bass population? Is Reclamation planning to reduce the population of these and other predators?

RMC-SJREC- 10

4. The FONSI indicates that during WY2010 interim flows will not exceed existing channel capacity. To the extent that flows cause or increase seepage problems, including preventing the decline in high groundwater levels, the flow does in fact exceed channel capacity and result in damage.

The following comments concern the Supplemental Environmental Assessment:

RMC-SJREC- 11

5. Page 1-2 states that authorization for implementing the Settlement, including release of the WY2010 interim flows, is provided in the San Joaquin River Restoration Settlement Act. This is an incomplete statement. The release of WY2010 interim flows is authorized by and subject to the water rights permits held by Reclamation as issued by the State Water Resources Control Board ("Water Board").

RMC-SJREC- 12

6. At page 1-3, the Settlement is described as having two primary goals: the restoration goal and the water management goal. The DEA should acknowledge that an additional goal is to accomplish the foregoing without adversely impacting third parties. This is a requirement from the Act and is an additional obligation to those set forth in the Settlement.

RMC-SJREC- 13

7. At page 1-4, the sixth bullet states that one of the purposes of the WY2012 interim flows is to identify a relationship between river flow and groundwater levels. This should more accurately state that it is to quantify, rather than identify, the relationship, between the river and groundwater levels. Identification of impact has already occurred. What is necessary is the quantification of those impacts, the relationship between river flow and groundwater levels and the measures necessary to avoid those impacts. (See comments to Appendix G and the Annual Technical Report, Problem Statements and Reports, Appendix, April 2011, incorporated herein by reference and in the possession of Reclamation at: http://restoresjr.net/program_library/02-Program_Docs/20110502_AppA.pdf.)

RMC-SJREC- 14

8. At page 1-4, an item not included is the assessment of the impact of restored flows on the potential for increased predation. The bass population in the San Joaquin River upstream of the confluence with the Merced River has increased since the interim flows commenced. Reclamation should study the relationship between these new flows and increased predation.

RMC- SJREC- 15

9. At page 1-6, a history of the flow releases is set forth. During Fall WY2011, the DEA notes that flows past Sack Dam were reduced to 50 cfs to address "downstream seepage concerns." This is incorrect. The flows were released to address downstream seepage "impacts," not just concerns.

RMC-SJREC- 16

10. At page 1-6, second paragraph, it states that flows will be limited such that adverse impacts to lands from seepage will be "avoided or reduced." Pursuant to Section 10004 of the Act, the Secretary must avoid impacts to third parties, not just reduce them. Hence, the words "or reduced" should be eliminated.

RMC-SJREC- 17

11. At page 1-6, Reclamation admits that it had intended to proceed with a PEIS/R for post-WY2011 interim flows. Because of delays by Reclamation, the PEIS/R has not been completed in time. NEPA requires that the appropriate level of environmental review be conducted prior to undertaking a proposed action. A lead agency may not proceed with a project until it has taken a hard look at the environmental impacts resulting from the project. Reclamation has failed to do so. There is no independent utility to Reclamation's current actions, as they are part and parcel of the overall restoration program. Reclamation should have delayed the onset of interim flows until such time as the PEIS/R was completed.

RMC-SJREC- 18

12. At page 2-2, the Proposed Action is described as the release of interim flows made in accordance with the Settlement and the Act, as limited by downstream channel capacities and potential material adverse impacts from groundwater seepage, etc. Reclamation must define what it means by channel capacities and material adverse impacts from groundwater seepage. What level of significance is Reclamation proposing to use? Pursuant to the Act, such impacts must be fully mitigated. (See Section 10004(d)).[2] The proposed action purports to not include fish reintroduction (but see below), and yet, in WY2011, the California Department of Fish and Game ("DFG") moved fall run Chinook salmon into the restoration area. What is the actual fishery plan for WY2012? What impacts will occur?

RMC-SJREC- 19

13. At page 2-2, Section 2.2.1 states that interim flows will be released based on the restoration year type and flow schedule as described in Exhibit B to the Settlement. As stated above, Reclamation must consider a full range of flows, not just those set forth in Exhibit B. NEPA requires a thorough investigation of all alternatives, including different flows. Reclamation may not legally commit itself to fixed flows based upon the Settlement until such time as it has completed environmental review of those flows. Yet, Reclamation treats Exhibit B as a requirement that is not to be analyzed. This is an improper irretrievable commitment of resources prohibited by NEPA.

RMC-SJREC- 20

14. At page 2-5, the SEA states that the flow releases will be "ramped up slowly over time with flows held at constant levels to allow surface water and groundwater conditions to stabilize before the next increase." What is the ramping rate? How long will flows be held at a

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[2] Section 10004(d) states as follows: MITIGATION OF IMPACTS.—Prior to the implementation of decisions or agreements to construct, improve, operate, or maintain facilities that the Secretary determines are needed to implement the Settlement, the Secretary shall identify—
(1) the impacts associated with such actions; and
(2) the measures which shall be implemented to mitigate impacts on adjacent and downstream water users and landowners.

RMC-SJREC- 20

constant level? How will Reclamation determine when surface water and groundwater conditions have stabilized? Once stabilized, what are the next step increases in flows anticipated by Reclamation?

RMC-SJREC- 21

15. At page 2-7, the SEA states that additional factors to be considered during implementation of the WY2012 interim flows include operation of Mendota Dam and Sack Dam. Pursuant to the water rights permit issued to Reclamation by the Water Board for WY2011, prior to February 1, 2011 Reclamation was obligated to enter into an operation and maintenance agreement with the owners of the Mendota Dam (CCID) and Sack Dam (SLCC). (See WRO 2010-0029, Cond. 13) To date, no such agreement has been entered into. When is Reclamation going to provide the dam owners with draft agreements?

RMC-SJREC- 22

16. At page 2-7, Section 2.2.2 discusses the recapture and recirculation of interim flows. Interim flows may not be recaptured or recirculated if such actions interfere with the senior water rights of the Exchange Contractors or other CVP water users. How will Reclamation ensure there will be no impacts to the Exchange Contractors?

RMC-SJREC- 23

17. At page 2-13, the SEA indicates that flows will be managed in part as described in the Seepage Monitoring and Management Plan set forth in Appendix G. See our comments pertaining to Appendix G below.

RMC-SJREC- 24

18. At page 2-13, the DEA indicates that flows may also be limited based upon information related to levee underseepage. See our comments to Section 2.2.5.

RMC-SJREC- 25

19. At page 2-16, the DEA states that salmon will not be reintroduced to the river during WY2012. Yet, footnote 4 appears to acknowledge that salmon may be introduced prior to the conclusion of WY2012. In this event, the DEA simply states that Reclamation will coordinate with the National Marine Fisheries Service ("NMFS"). If fish are to be reintroduced to the river during WY2012, there is no discussion within the DEA of that action. No fish may be reintroduced until complete environmental review pertaining to such reintroduction is finalized. Therefore, the DEA for WY2012 is insufficient to support the reintroduction of fish.

RMC-SJREC- 26

20. At page 2-16, the DEA describes the proposed release of flows to the San Joaquin River. Flow levels are discussed. What is omitted is how these flow levels will be achieved in a manner so as to not cause downstream impacts. Hence, it may be unrealistic to start releasing 350 cfs as of October 1, 2011. The inability to release this amount due to downstream damage must be analyzed by this SEA.

RMC-SJREC- 27

21. At page 2-19, Section 2.2.5 notes that for WY2011, flows past Sack Dam were reduced to 50 cfs to address downstream seepage concerns. Again, it was not seepage concerns, but seepage impacts. For WY2012, the section states that it is possible that flows past Sack Dam would again be constrained by potential seepage concerns. Reclamation should commit to

RMC-SJREC- 27

releasing no more than 50 cfs below Sack Dam until it can ensure that there will be no impacts to adjacent landowners.

RMC-SJREC- 28

22. At page 2-19, Section 2.2.5 states that in WY2011, flows were limited to no greater than 50 cfs past Sack Dam. It also states that for WY2012, interim flows, it is possible that flows past Sack Dam would again be constrained by seepage concerns and that flows may be limited to reduce or avoid groundwater impacts. For WY2012, it is essential that flows past Sack Dam be no greater than 50 cfs until mitigation measures are installed utilizing technologies proven to eliminate impacts from groundwater seepage.

RMC-SJREC- 29

23. At page 2-20, the DEA indicates that Reclamation is negotiating various agreements pertaining to the release and conveyance of flows through some reaches of the San Joaquin River and bypass system, and/or the potential diversion of flows. It further indicates that WY2012 interim flows would be constrained by any agreements in place at the time of flow release. Specifically, what agreements are being negotiated? How do these agreements constrain operations? These agreements need to be analyzed as part of this SEA.

RMC-SJREC- 30

24. At pages 2-22 – 2-24, the DEA discusses the seepage monitoring and management plan. Comments on this plan are reserved for the comments on Appendix G.

RMC-SJREC- 31

25. Section 2.2.7 at page 2-30 discusses the 2010 Annual Technical Report ("ATR"). Unfortunately, in 2010 the ATR was released after the Environmental Assessment was finalized. Apparently, Reclamation intends to release the 2011 ATR after this DEA is completed. In 2010, significant impacts were disclosed in the ATR that were denied to exist in the 2010 EA. This failure to disclose known environmental impacts is in direct violation of NEPA. One would expect that Reclamation will release the 2011 Agency Plan and ATR in a manner timely to address impacts resulting from the past year's operations. Unfortunately, the timing of the issuance of the DEA and the comment deadline of July 11th likely precludes review of these important documents. Reclamation is urged to revise its timetable for release of these documents so that meaningful review can be provided. It may be necessary for Reclamation to issue a supplemental EA after release of these new documents. This puts the public at a distinct disadvantage in reviewing and commenting on the DEA. Further, it may prejudice Reclamation's permit application to the Water Board, in that there will be a lack of confidence that Reclamation has timely disclosed all impacts that should be taken into account in the permit to be issued for WY2012.

RMC-SJREC- 32

26. At page 2-36, a number of activities are set forth that will be undertaken or continued from prior years. A study is to occur regarding spawning area bed mobility at two riffles. Given the high flood flows that have been released this year, did Reclamation not take advantage of those flows to assess the impact on bed mobility? Reclamation should take advantage of naturally occurring high flows, rather than requiring storage releases. Requiring storage releases is inefficient and a waste of water when naturally occurring high flows are otherwise available.

RMC-SJREC- 33

27. At page 2-38, the DEA commences a discussion of the movement of fall run Chinook salmon upstream on the San Joaquin River above the Hills Ferry Barrier. It is unclear why this timeline is included. The bottom line of the failure of the Hills Ferry Barrier to properly operate in WY2011 is that approximately 70 or more fall run salmon moved upstream and perished. This represents approximately 10% of the Merced River run for that year. While the Department of Fish and Game treated these fish as lost once they moved upstream of the Hills Ferry Barrier, this is no justification for a poorly operated barrier. This "experiment of manually moving" fish upstream yielded little to no valuable results. The fact that a fish was found near Friant Dam merely confirms that in order to get fish that far upstream, they had to be transported by DFG. Further, it should be noted that the river had flows in excess of those that would then be occurring under the Restoration Program.

At the time that the described events occurred, representatives of the Exchange Contractors had discussions with representatives from the Department of Fish and Game and other agencies. The Exchange Contractors were promised a letter describing the circumstances and noting that these fish were moving upstream in very high flow conditions. The letter was further to state that this "experiment" was non-precedential for any future actions or considerations. A letter has yet to be received. The DEA should be amended to reflect this circumstance.

RMC-SJREC- 34

28. At page 2-40, Section 2.2.9 discusses Restoration Administrator recommendations. Among the recommendations is to potentially initiate riparian recruitment flows in the late spring after the conclusion of flood releases. As mentioned above, it seems to be a waste of water to release flows in a flood year which provide naturally occurring recruitment flows.

RMC-SJREC- 35

29. At page 2-42, Section 2.3 discusses the Hills Ferry Barrier and notes the investigation regarding whether the barrier needs to be maintained during the spring to prevent the upstream migration of salmonids. Pursuant to the legislation and the related legislative history, the DFG has committed to the operation of the Hills Ferry Barrier. It is deemed an essential component of this program. This is not an optional requirement. See Act, §10004(h)(4).

RMC-SJREC- 36

30. At page 3-2, Table 3-1 summarizes changes to the affected environment and includes an environmental consequences analysis. This analysis is extracted from the WY2010 final EA/IS. This analysis fails to include the effects to agricultural lands in Reach 4A of the San Joaquin River. Under the section entitled "Agricultural Resources," the only discussion is of impacts to the Friant Division. In our prior comments to the past EAs, we have raised concern regarding this faulty analysis. Given the substantial impacts in Reach 4A, this table needs to be updated. This raises the question of what Reclamation considers to be significant. Pursuant to the Act, the Secretary of the Interior must mitigate all impacts. If Reclamation takes a position that damage to downstream agricultural lands is not significant, this will result in significant

RMC- SJREC- 36

discontent along the river and will likely alienate downstream landowners. Reclamation is cautioned to tread lightly in this area. We are aware that in response to prior comments, Reclamation stated that seepage or flooding damage to downstream lands was considered less than significant. Clearly, Reclamation has not treated this result as less than significant and nor should its environmental documents. The downstream landowners recognize that Reclamation has gone to some length to try to address seepage and flooding impacts. Reclamation must keep up this positive effort. However, to carry over a faulty analysis from WY2010 is not confidence building.

RMC-SJREC- 37

31. At page 3-4, Table 3-1 discusses impacts to geology and soils, the immediately preceding comment is applicable here as well.

RMC-SJREC- 38

32. At page 3-5, Table 3-1 also discusses land use and planning. To the extent that seepage and flooding impact the use of land for agricultural purposes, the above comment is applicable.

RMC-SJREC- 39

33. Commencing at page 3-8, Section 3.2 contains the environmental consequences analysis. This analysis fails to address seepage and flooding impacts. Prior comments in this letter and comments from prior years are applicable here.

RMC-SJREC- 40

34. At page 3-17, Section 3.2.3 includes mandatory findings of significance as required under the California Environmental Quality Act ("CEQA"). The mandatory findings of significance fail to adequately describe "the potential to substantially degrade the quality of the environment." Any further adverse impacts to farmland or levees as a result of the interim flows will result in adverse environmental impacts of significance. As mentioned above, Reclamation must not treat these impacts as less than significant. These should be identified as likely significant impacts if flows are increased above 50 cfs below Sack Dam. In addition, levee failure was experienced in Reach 2 as a result of interim flows. Again, Reclamation must protect against such adverse impacts and analyze their potential in this document.

RMC-SJREC- 41

35. At page 3-20, Section 3.2.6 identifies mitigation measures. Reclamation should affirmatively set forth the mitigation measures that it will employ to avoid seepage and flooding impacts. For example, elsewhere in the DEA, Reclamation discusses maintaining flows below Sack Dam at 50 cfs or less. Further, Reclamation should have a program of installing tile drains as an experimental means to prevent additional seepage damage. Other measures may be appropriate and should be considered, particularly since it is uncertain at this time whether the tile drains will be sufficient to prevent seepage damage. Given the amount of attention that has been paid to seepage, and the proactive efforts by the Exchange Contractors and private landowners, it is surprising that Reclamation has not included a tile drain program with its mitigation measures. Again, the Secretary is obligated to avoid adverse impacts to third parties pursuant to Section 10004 and to fully mitigate adverse impacts pursuant to Section 10004(d).

The following are comments to Appendix C – Restoration Administrator 2011 Spring Interim Flow Program Real-Time Management Recommendations:

RMC-SJREC- 42

36. At page 2, the Restoration Administrator ("RA") states that it will be necessary to begin implementing real-time flow management to prepare for the reintroduction of Chinook salmon by the end of 2012. As stated above, Chinook salmon may not be introduced by the end of 2012, as the infrastructure required to protect these fish will not be in place. It is an explicit requirement of the Settlement that the Restoration Program be undertaken in a phased manner. The Phase 1 facilities are to be in place at the time that salmon are reintroduced. (See Paragraph 11 of the Settlement.) Any earlier reintroduction will be inconsistent with the Settlement. Further, the DEA fails to analyze the environmental effects of such reintroduction should it occur during the WY2012.

RMC-SJREC- 43

37. At page 3 and following, the RA sets forth a number of analyses to be conducted. To the extent that the flows recommended by the RA could cause damage to downstream landowners, such flows must be mitigated prior to any such release. This could affect the extent of analysis to be successfully undertaken in WY2012. A discussion of the extent to which this analysis may realistically be undertaken in WY2012 should be set forth.

RMC- SJREC- 44

38. At page 10, Section 3 of the RA recommendations notes the likely flow constraints due to seepage impacts. There is no discussion about how these seepage impacts may affect the RA's recommendations. The RA suggests that the seepage constraints may be better qualified at a later date. The RA should assume that the seepage constraints identified as flows no greater than 50 cfs below Sack Dam are in place.

The following comments pertain to Appendix F – 2010 Annual Technical Report:

RMC-SJREC- 45

39. The 2010 Annual Technical Report ("ATR") was released April, 2011. As such, it was not available to assess the expected injury of legal users of water downstream from Friant Dam. For WY2012, the issues raised in the ATR have not yet been resolved or mitigated. As such, damages are expected to occur in WY2012 if flows are increased below Sack Dam above 50 cfs. The following are concerns related to the ATR:

a. Problem Statement – Seepage Management. The problem of seepage impacts to farmland has not been mitigated. Damage to property has not been mitigated and measures to prevent or minimize seepage impacts have not been installed. If flows are released pursuant to the hydrographs set forth in Exhibit B to the Settlement land downstream of Friant Dam will be damaged. Also see comments below regarding Appendix G.

b. Problem Statement – San Joaquin River Channel Capacity Management. See comments above regarding seepage management.

RMC-SJREC- 46

The following comments concern Appendix G – Seepage Monitoring and Management Plan:

a. While there has been significant progress in development of the Seepage Monitoring and Management Plan it is not complete. In December 2010 the Exchange Contactors and the RMC worked with the USBR to form the Seepage-Conveyance Technical Feedback Group. Several meetings have occurred and are documented on the SJRRP web site. (http://restoresjr.net/group_activities/TFMB-Seepage/index.html). These documents are in the possession of Reclamation and are incorporated herein. The meetings have resulted in the current Draft Seepage Monitoring and Management Plan which is also posted on the SJRRP web site. (http://restoresjr.net/flows/ Groundwater/index.html) These documents are also in the possession of Reclamation and are incorporated herein.

The draft document accurately reflects the joint work done to date with one issue yet to be resolved and agreed on. The issue is the establishment of thickness of the "Capillary Fringe" which is the rise of moisture above the observed or measured water table. In their November 12, 2010 report the Irrigation Training and Research Center (ITRC) described capillary fringe. "The monitoring wells measure the depth to the water table – which is the water surface seen by a person who looks into a hole in a high water table area. The plants see something entirely different – they see the beginning of soil saturation a considerable distance above the water table. The upper limit of this soil saturation, called the capillary fringe, has a height above the water table that varies depending upon the soil texture." A copy of the ITRC report entitled "Impacts of the San Joaquin River Restoration Flows on Agricultural Fields adjacent to Reach 4A of the San Joaquin River" is included with and incorporated into these comments.

The Exchange Contractors and the RMC are advocating the method used by ITRC to estimate the thickness of the capillary fringe. The method used in the Draft Seepage Monitoring and Management Plan significantly underestimates the thickness of the capillary fringe. For example the ITRC documented that the thickness of the capillary fringe at the SJRRP monitoring well W92 at 4.5 feet, versus the estimate in the Draft Seepage Monitoring and Management Plan of only 1.0 feet. (See Appendix H, Table H-8, Page H53) The trigger or threshold elevations established in the plan for each monitoring well is based in part on the Capillary Fringe.

Therefore, the seepage thresholds established in the Draft Seepage Monitoring and Management Plan are set too shallow. If the SJRRP Interim or Restoration Flows are allowed to flow at a level high enough to raise the adjacent groundwater to the levels set in the draft plan, then significant crop damages in key locations will occur. The Seepage-Conveyance Technical Feedback Group is currently working on the issue, but it is not yet resolved.

Even with the current estimates, the SJRRP current estimate of the maximum non-damaging interim flow is for 50 cfs. The limiting location in the system is in the Eastside Bypass downstream of Reach 4A. (Use of the correct capillary fringe will show that the flow limit at the

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end of Reach 4A is 50 cfs.) The next task of the Seepage-Conveyance Technical Feedback Group is to develop the list of prioritized projects that are necessary in order to protect surrounding farm land from seepage during full Interim and Restoration Flows. Work on this part of the plan is expected to be completed in the fall of 2011.

Thank you for this opportunity to comment on the DEA. If you have any questions regarding these comments, please contact the undersigned.

Sincerely yours,

Thomas M. Berliner

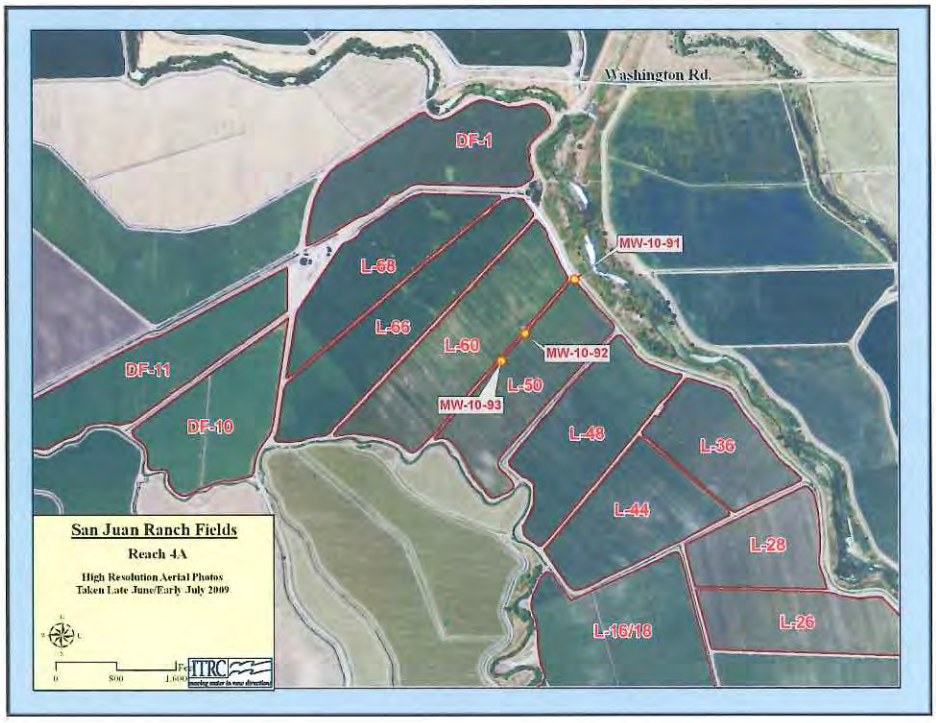
TMB:fs

ITRC
moving water in new directions

IRRIGATION TRAINING AND RESEARCH CENTER

Impacts of the San Joaquin River Restoration Flows

on Agricultural Fields adjacent to Reach 4A of the San Joaquin River



San Joaquin River Exchange Contractors Water Authority

November 12, 2010

IRRIGATION TRAINING AND RESEARCH CENTER

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Irrigation Training and Research Center
November 2010

EXECUTIVE SUMMARY

ITRC examined data from the San Juan Ranch fields adjacent to Reach 4A of the San Joaquin River, regarding possible negative impacts from the San Joaquin River Restoration Program flows. ITRC concluded that:

1. The water table's rise and fall in the agricultural fields closely corresponded to the rise and fall of the river water level.
2. The water table's rise and fall was primarily due to river level fluctuations, as opposed to being caused by canal seepage or field over-irrigation (deep percolation).
3. Crops were damaged due to the unusually high water table conditions in the 2010 cropping season.
4. There is a saturated zone of soil above the water table due to capillary rise – measured at about 4.5 feet.[1]
5. Salt is brought upward into the root zone as the water table rises.
6. The recommended minimum threshold water table depth should be 7.5 feet below the ground surface to avoid soil salinization and crop damage to annual crops. The depth should be greater for permanent crops.
7. A system of deep interceptor drains between the fields and the river will prevent the damaging high water tables from occurring. The elevation top of interceptor drain pipes should be at least 7.5 feet below the lowest ground surface elevation in any field that the drain is meant to protect, assuming only annual crops will be grown.

[1] The 4.5 ft of capillary rise is based on measurements taken in sandy loam soils at San Juan Ranch.

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1.0 BACKGROUND

As part of the San Joaquin River Restoration Program (SJRRP), higher-than-normal flows were released from Friant Dam in late 2009. River flows were maintained through August 2010 in Reach 4A (below Sack Dam), which is normally dry during the irrigation season.

The SJRRP implemented a monitoring program on the San Juan Ranch fields that lie upstream of Sand Slough, southwest of the San Joaquin River, and north of Hutchins Road. Nickel Family Farms, which owns San Juan Ranch, also collected soil samples and data on tile drain pumping, salinity, irrigation water applied, and crop yields for those fields. **Figure 1** shows the physical locations of fields and monitoring wells of interest.

The San Joaquin River Exchange Contractors Water Authority has raised concerns over negative impacts within Reach 4A. ITRC was hired to provide an independent analysis as to whether there were negative impacts, what they are (if they exist), and what solution(s) might exist to avoid those negative impacts.

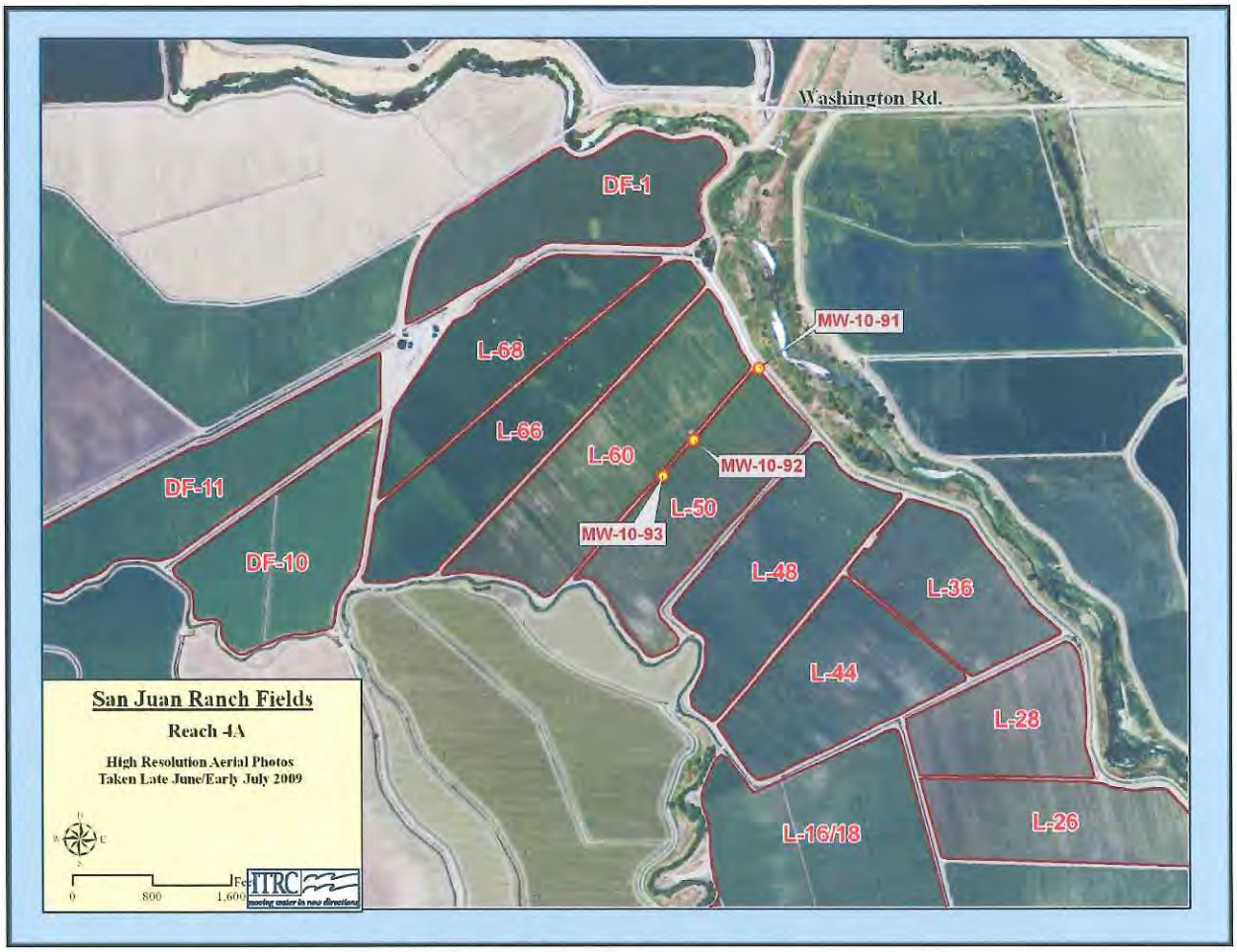

Figure 1. San Juan Ranch fields and monitoring wells

2.0 WATER TABLE MOVEMENT IN FIELDS ADJACENT TO REACH 4A – RIVER IMPACT

Figure 2 was provided by the SJRRP, and depicts groundwater and river levels.

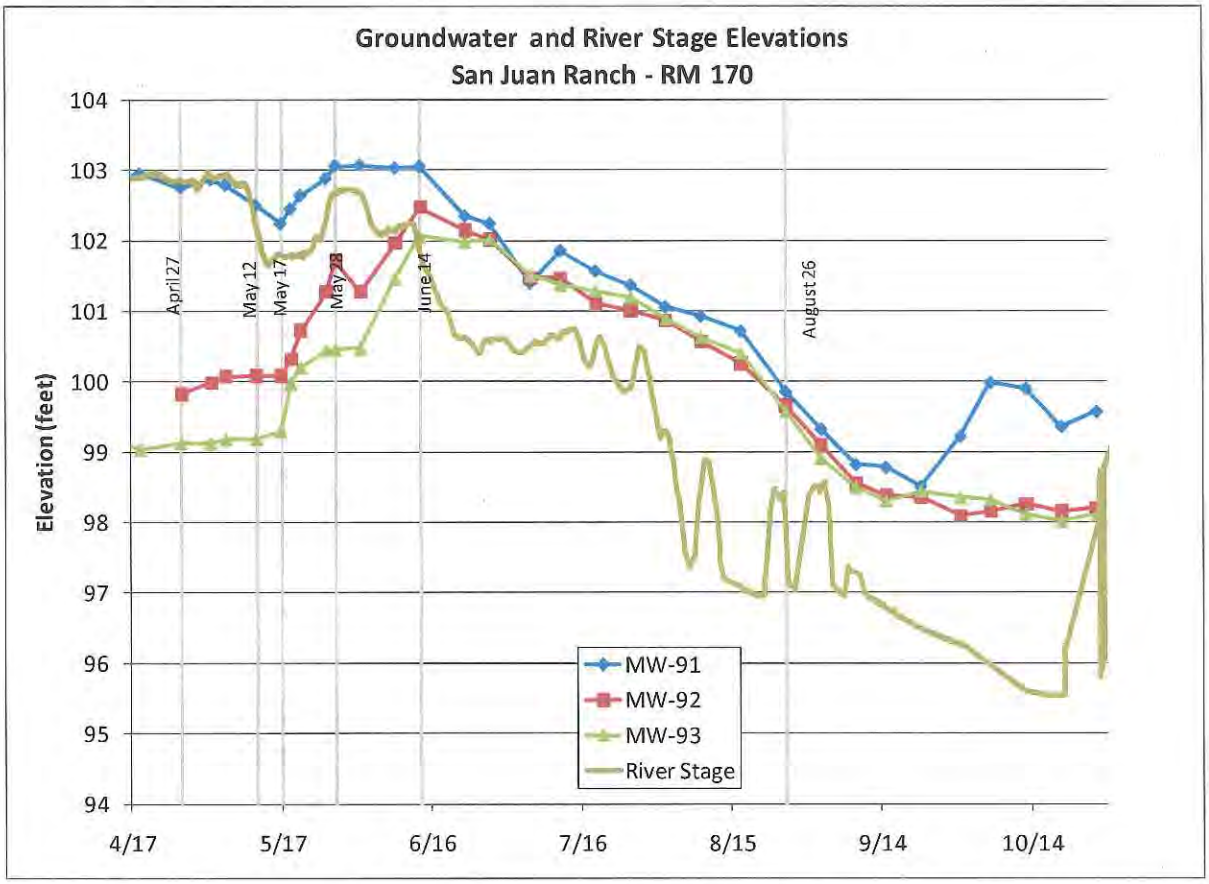

Figure 2. Groundwater and river stage elevations – San Juan Ranch. Courtesy K. Harrison, USBR

The upward spike in monitoring well MW-91 beginning in mid-September was due to work being done on the drip system that required it to be run for long periods for several days of maintenance after the crop was harvested.

Figure 3, also provided by the SJRRP staff, displays some of the information from **Figure 2** in a slightly different format. It shows the slope of the groundwater surface along a transect defined by the location of the three monitoring wells.

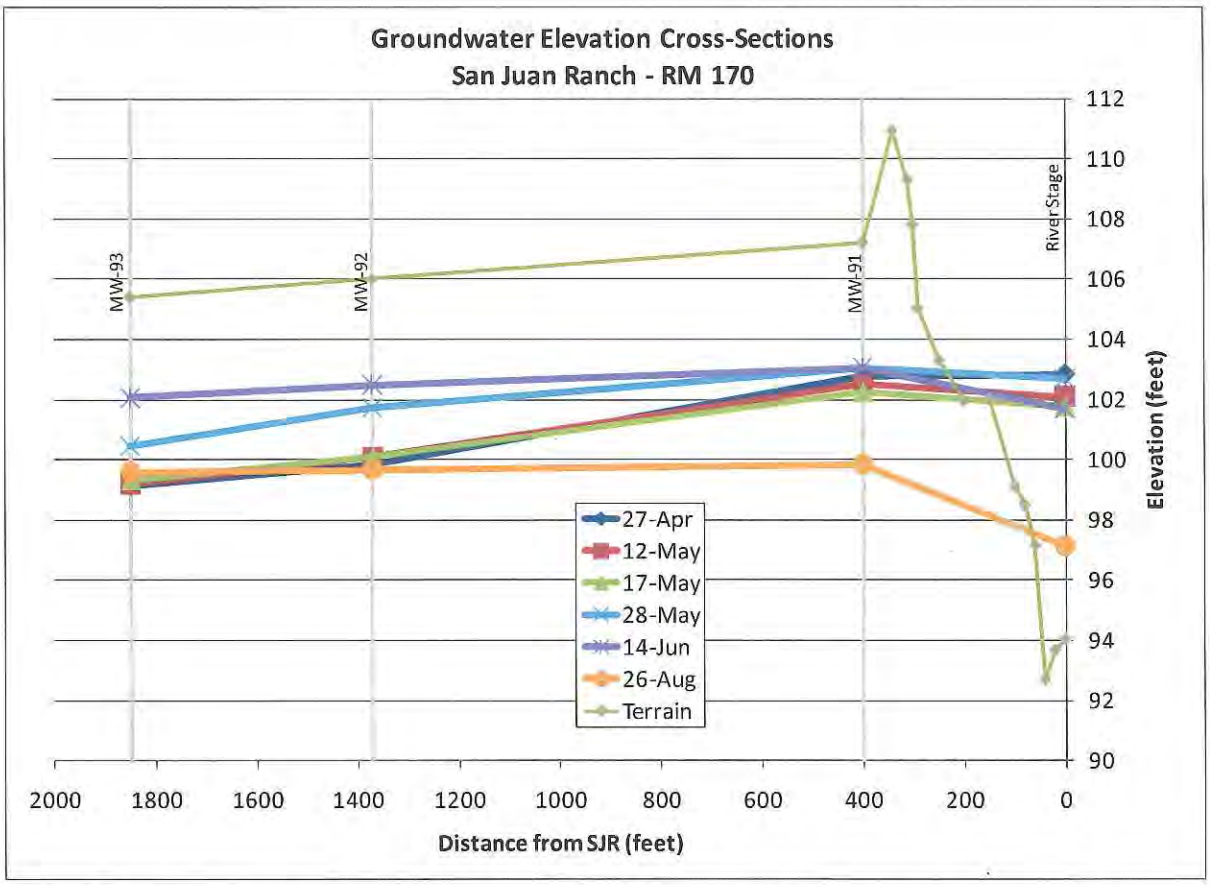

Figure 3. Groundwater elevation cross-sections on San Juan Ranch fields. Courtesy K. Harrison, USBR

Figures 2 and **3** show the following:

1. There is a clear link between San Joaquin River levels and field water table levels.
2. As the river water level dropped, the field water table levels dropped.
3. There is a slower rise in the water table further away from the river (MW-93), as compared to immediately adjacent to the river (MW-91).
4. The slope of the groundwater falls from the river toward the field. Water flows from uphill to downhill in water tables, so there is very definitely flow from the river, toward and into the field.
5. On June 14, the water table was less than 4.0 feet from the ground surface at MW-92 and MW-93.

3.0 WATER TABLE RISE IN FIELDS ADJACENT TO REACH 4A – IRRIGATION AND CANAL IMPACT

3.1 Canal Impact on Water Table

During a field visit by ITRC on October 12, 2010, the Central California Irrigation District (CCID) Riverside Canal between the river and the San Juan Ranch fields was observed to be almost full of water. It was dammed up, with no flow leaving the downstream end (near the Eastside Bypass). There was some slight leakage into the canal pool from the upstream pool. The leakage was not measured.

The low depth of the water table almost immediately adjacent to this canal on that date and for a month before indicates that the seepage from the canal is minimal. That corresponds to the observation of the minimal inflow to the canal pool while the water level was staying constant.

In addition, there is an interceptor tile line adjacent to about 4,200 ft of the Riverside Canal (between Fields L-21 and L-28), which has historically been dry even when the canal is full of water. A fuse for the electric sump pump was broken during the winter of 2010, so the tile sump was not pumping until April 2010.

The estimated seepage rate provided by CCID for this canal is approximately 0.6 cfs per mile.

These observations lead to the conclusion that the negligible leakage from the CCID canal does not contribute to the water table problem.

3.2 Irrigation Impact on Water Table

The irrigation events at San Juan Ranch are scheduled by a commercial irrigation scheduler who uses CIMIS reference evapotranspiration (ETo), crop coefficients, and a model for soil water balance. In addition, he uses soil moisture sensors in each field, frequently hand probes the soil, and regularly observes the visual health/stress of the crops. Records of applied water are kept for every irrigation event, by field. Furthermore, all of the tomato fields in question were irrigated with drip irrigation. These factors combine to provide a high level of irrigation management, compared to average tomato fields in California.

The records of irrigation events show the gross annual applied values of **Table 1**.

Table 1. Gross irrigation applied to Reach 4A tomato fields in 2010

San Juan Ranch Field	Gross Irrigation Water Applied (ft)
L-26	2.30
L-28	2.34
L-50	2.08
L-60	1.94
L-66	1.87
L-68	2.44
Average	**2.16**

The average per-acre volume of irrigation water applied to drip-irrigated tomato fields in San Juan Ranch between 2006 and 2008 was about one-third of that applied to furrow-irrigated fields during the same time period.

The ITRC website publishes estimated crop evapotranspiration (ET) values for tomatoes in this region for "typical" years, under drip irrigation. The published ET is 2.34 ft per year, but that assumes a growing season that is 1.5 months shorter than the tomato varieties grown at San Juan Ranch in 2010. Therefore, the ITRC-published values would be lower by comparison.

There was no significant ET of precipitation by the tomatoes, because a crop of small grain mix was planted on each one of the tomato fields the previous November, and plowed under in March. That small grain mix consumed the majority of the precipitation water.

An approximate water balance is:

Applied irrigation water (avg) = 2.2 acre-feet per acre
ET of irrigation water by tomatoes = 2.6 acre-feet per acre

These numbers are quite close. By definition, the ET of irrigation water cannot be higher than the applied irrigation water. ET estimates are not precise, and it is highly probable that some of the water from the capillary rise was consumed by the tomatoes as ET. The obvious conclusion is that the field irrigation did not create the high water table.

One can also look at historical irrigation records, in light of the fact that the slow growth and yield impacts have not shown up before on these fields. In prior years, the applied water was much greater than in 2010 when furrow irrigation was being used. ITRC examined the records of applied irrigation water on tomato fields on the San Juan Ranch, in the Reach 4A and 4B zones for 2006 to 2010. The values are as follows:

Tomato acreage under furrow:	944	Avg. applied: 5.0 acre-feet per acre
Tomato acreage under drip:	1,483	Avg. applied: 1.7 acre-feet per acre

Most of the drip conversion has occurred in the last 2 years.

Clearly the field irrigation is not responsible for the high water table if one considers the following:

- The drip system provided excellent control of irrigation water.
- The applied irrigation water closely matched the ET requirement of tomatoes.
- The problem did not manifest itself in prior years when the field irrigation applied much more water.

4.0 CROP YIELD IMPACTS

4.1 General

It is well understood in farming that the critical period of growth for plants is immediately after transplanting or seeding. Published reports rarely acknowledge this, but instead provide information about problems and tolerances once the plants are established. This is certainly the case with salinity tolerance tables, for example. But plants are much more sensitive to high salinity during early growth than after establishment.

The San Juan Ranch personnel have recorded what they consider to be unusual growth and yield patterns early in the 2010 growing season for the fields adjacent to Reach 4A.

Observations by farm personnel regarding early establishment of plants are as follows:

- L20/21 – Beans: germination problems
- L26/28 – Couldn't get transplants to grow. High salt table/high water table.
- L36 – Corn: germination problems. High salt table/high water table. Started to grow unevenly, but grew out of it with sufficient yields.
- L44/48 – Melons: struggle germination: especially on the east side along 48 next to the river.
- L50/60 – Tomatoes: east side of both fields had weak stands.
- L66/68 – Tomatoes: crop looked good, no major problems.

According to farm personnel, these early season problems are unusual on these fields, and they did not have them on other fields.

4.2 Tomato Yields

Historical tomato yield records were examined to see if there is any clear evidence of depressed yields in 2010 in the fields adjacent to Reach 4A. There are always challenges with comparing historical tomato yields because of different varieties and plant/harvest dates. **Figure 4** shows yields through 2009.

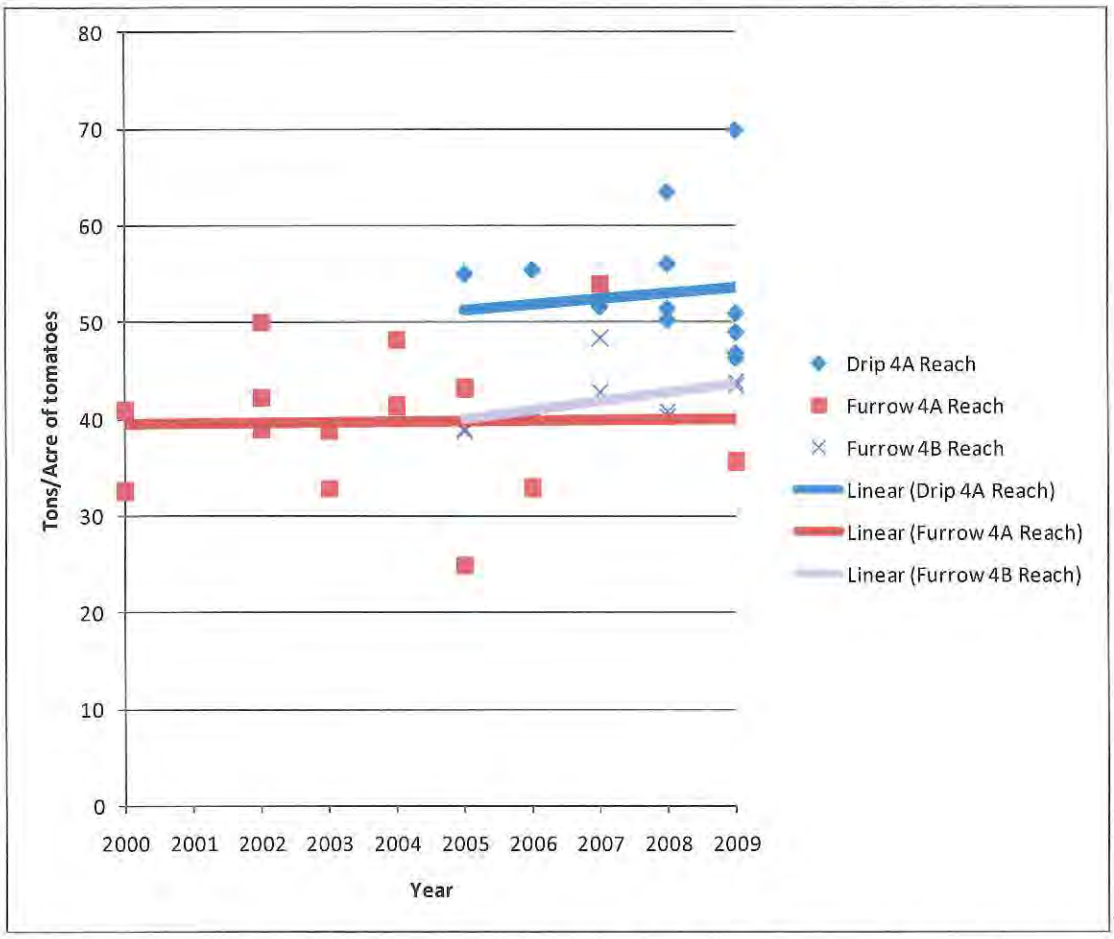

Figure 4. Historical (through 2009) tomato yields on individual San Juan Ranch fields along Reaches 4A and 4B

Figure 4 shows two sets of fields – those along Reach 4A, and those downstream of Reach 4A, and adjacent to Reach 4B. The fields adjacent to Reach 4B were not impacted by the restoration flows.

The points to be drawn from **Figure 4** include the following:

1. There is always "noise" in data. For every year, for each field and irrigation method combination, there are variations in yield between fields.
2. The tomato yields under furrow irrigation were similar in fields of both Reach 4A and 4B.
3. When field irrigation methods were converted from furrow to drip on fields in Reach 4A, there were substantial average increases in yield – about 12 tons per acre

The weakness of **Figure 4** is that it shows individual field data, without respect to the acreage per field. **Figure 5** has the same data as **Figure 4**, but also includes the additional yield data from 2010. There are fewer individual data points because the total yields from all the fields in a category (e.g., drip irrigation in Reach 4A) were divided by the total acreage (in the same category) to obtain the average yields.

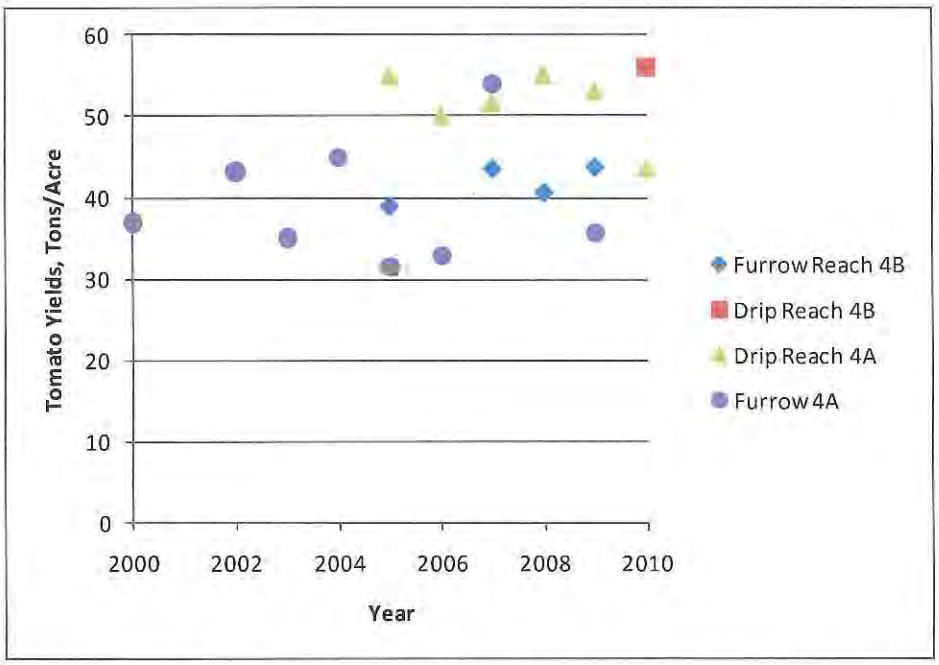

Figure 5. San Juan Ranch average tomato yields through 2010

The two points that stand out from **Figure 5** are:

1. The average yields on the Reach 4A fields dropped by at least 10 tons per acre, on the average, compared to what the annual trends indicate would be expected to happen.
2. The drip-irrigated fields on Reach 4B fields had very high yields in 2010. Specifically, they increased (compared to previous years with furrow irrigation) by about 20 tons per acre. This is a much higher yield increase than had been seen with the shift in Reach 4A to drip irrigation, indicating that 2010 was a "good year" for tomatoes, all other things being equal. Because the soils and varieties are similar in Reach 4A and 4B, one might conclude from this that the yields in Reach 4A fields actually dropped by the equivalent of about 15-20 tons per acre in 2010, compared to what happened on the adjacent Reach 4B fields.

To summarize, crop yields on the fields in question were reduced in 2010 as evidenced by:

- General observations of the San Juan Ranch personnel early in the 2010 season indicated that there were severe germination problems for the tomato fields, but also affecting adjacent fields planted with corn, beans and melons.
- Historical yield records showed a significant yield increase (extra 12 tons per acre) in previous years when furrow irrigation was replaced by drip irrigation. Thus, in years prior to 2010, drip-irrigated fields were consistently reaching yields over 50 tons per acre. This pattern was obviously interrupted in 2010 when average yields on the same drip-irrigated fields fell to nearly 40 tons per acre.
- Average yields in 2010 for drip-irrigated fields adjacent to Reach B were a useful comparison both because they increased by a large amount (about 20 tons per acre) compared to previously when they were furrow-irrigated, and because they were so much higher than similar fields adjacent to Reach A.

5.0 CAPILLARY RISE OF WATER ABOVE THE WATER TABLE

The monitoring wells measure the depth to the water table – which is the water surface seen by a person who looks into a hole in a high water table area. The plants see something entirely different – they see the beginning of soil saturation a considerable distance above the water table. The upper limit of this soil saturation, called the capillary fringe, has a height above the water table that varies depending upon the soil texture.

The United Nations Food and Agriculture Organization (FAO) provides the following general guidelines for the height of capillary rise above a water table. Similar values can be found in many other references.

Table 2. Capillary rise values provided by FAO
www.fao.org/docrep/r4082e/r4082e03.htm

Soil texture	Capillary rise (inches)
coarse (sand)	8-20
medium	20-30
fine (clay)	more than 30 inches up to several yards

Such published values are for general information. Soils are so variable, and the differences between soils that are classified as having the same texture are so great, that field measurements are necessary to verify actual capillary rise in areas of interest. Capillary rise in a field at San Juan Ranch was measured by ITRC personnel in two backhoe pits, with 2 sample lines per pit, in October 2010 (see **Attachment A**). The measured capillary rise in the L-50/60 region was about 4.5 feet.

The concept of capillary rise is generally not well understood. For example, a report by the San Joaquin River Seepage Management Plan (10/6/2010, well or boring # HC-10), noted that the water table was at 9.4 feet. But the moisture content for the 9-12 ft depth was only classified as being "wet", which was considered "capillary fringe conditions" in the report. Certainly, the depth below 9.4 feet is not within the capillary fringe (which by definition exists only above the water table), and the capillary fringe in that soil core must have extended greater than 9.4 feet high. This reported information highlights the inadequacy of assessing and understanding capillary fringe information using standard coring techniques.

The importance of understanding the capillary rise, as opposed to just looking at the depth of water tables, includes several points:

1. The capillary rise of water is accompanied by an upward movement of salts from the water table and the bottom of the root zone.
2. The water table and bottom of a root zone both typically have much higher salinities than the upper soil layers. Therefore, a high capillary rise can contaminate the upper soil layers.
3. Tile drainage should be much deeper than is often thought, to provide a healthy root zone.
4. Early in the year, when plants are transplanted or planted, a high water table and associated high capillary rise contributes to a cool soil. This in turn inhibits germination and early growth.

6.0 SALT PROBLEMS CAUSED BY A TEMPORARILY RAISED WATER TABLE

Limited soil salinity data were available for examination. When the crops on the L- fields were in their early stages of growth, the furrow-irrigated fields were given a strong leaching irrigation after salinity was identified as a possible problem. According to ranch personnel, there was almost immediate improvement of plant growth following the leaching irrigation.

Dellavalle Laboratory took 4 soil samples on fields L-36 and L-28 on June 11, 2010. The ECe values were 2.7, 2.4, 1.2, and 2.1 dS/m in the four 0-8 inch samples. Because of the high variability of salinity in soil, and the late date of sampling (relative to the problems with crop establishment), it is difficult to interpret the importance of those samples.

Tomatoes have a threshold ECe (point at which yield begins to decline) of 2.5 dS/m, but that is for mature tomatoes, and the growth problem was during early growth stages, when tomatoes are more sensitive to salinity.

Dellavalle Laboratory took core samples (one/foot of depth, with only one core per field) in 5 L- fields and DF- fields later in July (7/21/2010). Results are seen in **Figure 6**. The height of any particular depth increment indicates the ECe in that increment. The total salinity in L-26 is much greater than in field DF2, as can be seen by comparing the total height of each field's column.

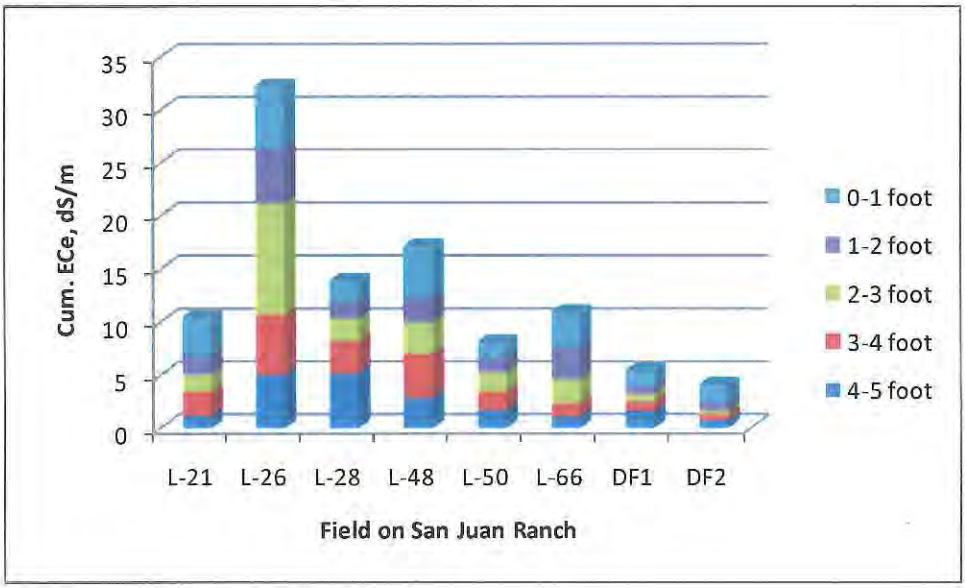

Figure 6. Results of limited soil core samples by Dellavalle Laboratory. July 21, 2010

Figure 6 has limited value because there was only one core per field, and the cores were taken well after the growth problems manifested themselves. Nevertheless, it is clear that the salinities in the L- fields are greater in these samples than those in the DF- fields. The DF- fields were downstream of Reach 4A and unaffected by the rise in the river water level; the L- fields are adjacent to Reach 4A. Field L-21 received a leaching irrigation in the spring.

In October 2010 when ITRC staff measured the depth of the capillary rise in the backhoe pits, in-situ soil salinities were also measured (**Figure 7**). These measurements are only relative values, because they are obtained completely differently than ECe values. One cannot compare the values directly against the values from **Figure 6**.

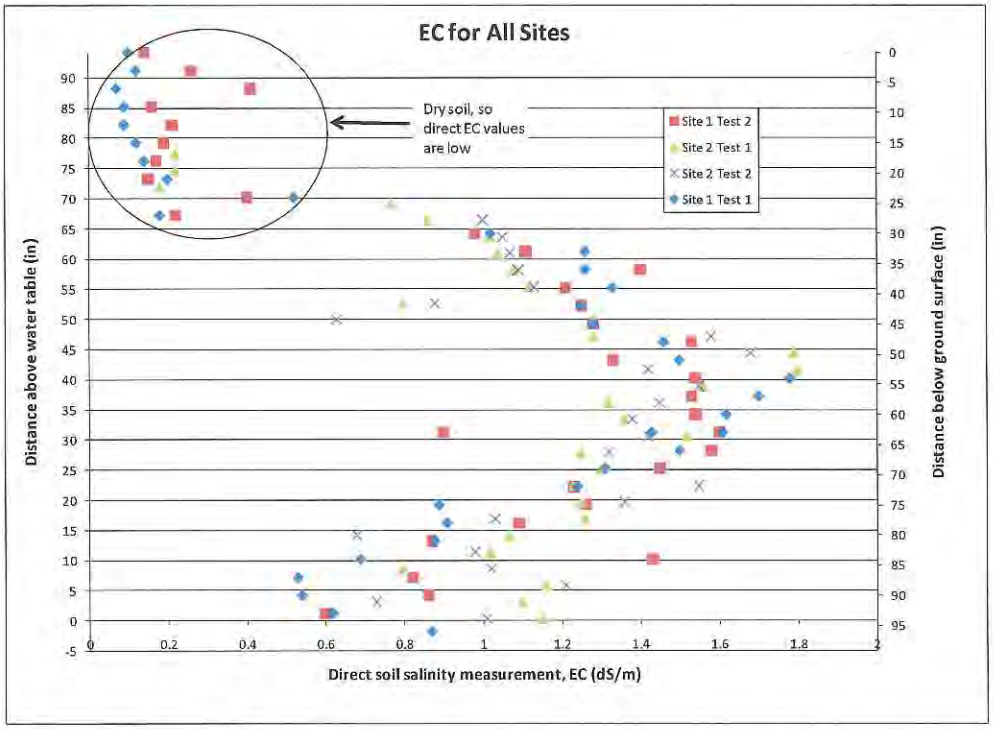

Figure 7. Direct soil salinity measurements by ITRC (not ECe). Between fields L-50 and L-60

Conclusions from **Figure 7** are:

1. There is a wide scatter of salinity values, yet there are some definite trends.
2. There is a zone of salt concentration at about 4-6 ft below the ground surface.
3. Near the soil surface, the soil salinities appear to be low. However, this is misleading until one examines the moisture content by depth. With a dry soil, the EC measured by the probe is less than with moisture in the soil (given the same amount of salt). No ECe (saturated paste extract) measurements were made, so there are no direct comparisons for this case. However, it is hypothesized that the amount of the salt per cubic centimeter of soil is similar in the top 3 ft.

The irrigation water (see **Table 3** below) has a water salinity of about 440 dS/m. However, the groundwater levels are much saltier. For example, the groundwater salinities near the backhoe pits (near monitoring wells MW-92 and MW-93) are about 3,300 and 4,100 dS/m. A rise in water table levels into a crop root zone, plus the accompanying rise in salts and moisture in the capillary fringe, will definitely increase the salinity in a root zone.

The authors of this report believe that the spike in salinity about 4-6 ft below the soil surface, as seen in **Figure 7**, is likely due to the early season rise in saturated soil. It likely dropped in elevation during the growing season due to added irrigation water and a dropping water table.

Table 3. Water quality values provided by USBR in November 2010

San Juan Ranch Water Quality Investigation - Nickel Family Farms Samples Collected September 2, 2010						
Field ID	Site	Date	Temperature (° C)	EC (µS/cm)	pH (units)	Turbidity (NTU)
SJRI_W124A	Tile Drain Sump L28	9/2/2010	20.7	942	7.4	0.70
SJRI_W125	MW-92	9/2/2010	21	3366	7.2	5.7
SJRI_W126	MW-93	9/2/2010	20.4	4086	6.7	3.2
SJRI_W127	MW - 91	9/2/2010	21	908	7.5	3.4
SJRI_W128	* Riverside Canal	9/2/2010	23.6	435	8.5	58
SJRI_W129	San Joaquin River at MP 170	9/2/2010	26.6	440	8.1	25
SJRI_W134	* Riverside Canal	9/2/2010	23.6	435	8.5	58
SJRI_W135	San Joaquin River at MP 170	9/2/2010	26.6	440	8.1	25
SJRI_W136	MW - 4	9/2/2010	20	3319	6.9	2.0

* Riverside Canal at Turnout 24 and MP 5.682

7.0 CONCLUSIONS

1. The water table in San Juan Ranch fields adjacent to Reach 4A rose to a plant-unhealthy elevation in 2010 due to the rise in the San Joaquin River water levels.
2. Tomato yields are estimated to have been lowered by approximately 10-15 tons per acre, due to the high water table.
3. A properly-designed interceptor tile line, between the river and adjacent fields, will avoid the damage seen in 2010.
4. An interceptor tile line should be installed such that the top of the tile line is deeper than 7.5 ft below the lowest ground surface in an adjacent field. If the soil has a higher clay content than seen in the backhoe pits between fields L-50/60, the tile line must be deeper.
5. The 7.5 ft threshold considers the need for a minimum 3.0 ft unsaturated root zone, and the influence of the saturated capillary rise above the water table of about 4.5 feet.
6. It could be correctly argued that the 3.0 ft unsaturated root zone requirement is too shallow, and should be at least 5.0 ft to prevent damage to permanent crops that may be planted in the fields, in the future.

APPENDIX A
San Juan Ranch Testing for Soil Salinity and Capillary Rise

ATTACHMENT A
San Juan Ranch Testing for Soil Salinity and Capillary Rise

Nature of the Testing

Two backhoe pits were dug by San Juan Ranch employees, according to ITRC instructions (refer to **Figure A1**). The pits were approximately 8 ft deep, and were sloped for safety. The water table was visible in the very bottom of each pit.

Figure A1. Open backhoe pit at Site 2. Trees along the San Joaquin River can be seen in the background, to the east.

The sides were scraped off with shovels, and marking flags were placed in 3 inch vertical increments (refer to **Figure A2**).

Portable instruments were used to measure two properties:

a. Soil moisture volume
b. Direct soil salinity (as contrasted with the EC of a saturated paste extract)

Figure A2. Flags used to mark 3 inch vertical increments in backhoe pit #2. Round holes to the right of the flags indicate where soil moisture measurements were made by ITRC.

Instruments used

Soil Moisture Volume: Spectrum Field Scout TDR 200 (Spectrum item number 6435FS) with 3 inch rods.

Data for the (first hole, first reading) used 8 inch rods from 3-30 inches above the water table.

TDR measurements provide a volumetric reading of water content. However, the TDR 200 readings should only be considered "relative" readings. At the same physical point, the TDR 200 might read 69% volumetric water content if the soil selection button on the TDR 200 is "standard", but it might read 50% water content if the TDR is set to read it as a "high clay" soil. This explains the big scatter in readings seen in **Figure A4**.

Soil Salinity (EC): Spectrum Field Scout 24" direct Soil EC Probe with Replaceable Tip. Tip was inserted 6-12 inches into soil for readings, except for readings near the soil surface at Site 2. At Site 2, the surface soil was so hard, readings were only taken when the probe was far enough in to be covered in soil.

Dates of sampling

Testing of Site 1 was done between 3 and 5:30 PM on Oct 21, 2010. Volumetric water content measurements were done with the probe in "general" soil mode on Oct 22, 2010 at 9 am. Distance from ground surface to water surface was measured at 3 PM on Oct 21 to be about 8.2 ft. It was measured on Oct 22 at 11 AM to be about 7.8 ft.

Testing of Site 2 was done between 9 and 11 AM on Oct 22, 2010. Distance from ground surface to the water surface was measured at 9 AM on Oct 22 to be 7.8 ft. It was measured on Oct 22 at 11 AM to be 7.6 ft.

Sierra Orvis and Mariana Pasqual of ITRC performed the tests.

Location

Both pit sites were between fields L-50 and L-60, which are located along the San Joaquin River just upstream of the Sand Slough Bypass Control Structure. Site 1 was just southwest of the filter station and near observation well MW-92. The hole was dug on part of the road and into the edge of field L-60.

Site 2 was about 950 feet further southwest down the road. It was also on part of the road and into the edge of field L-60.

Salinity Measurements

Figure A3 shows the soil salinities that were measured.

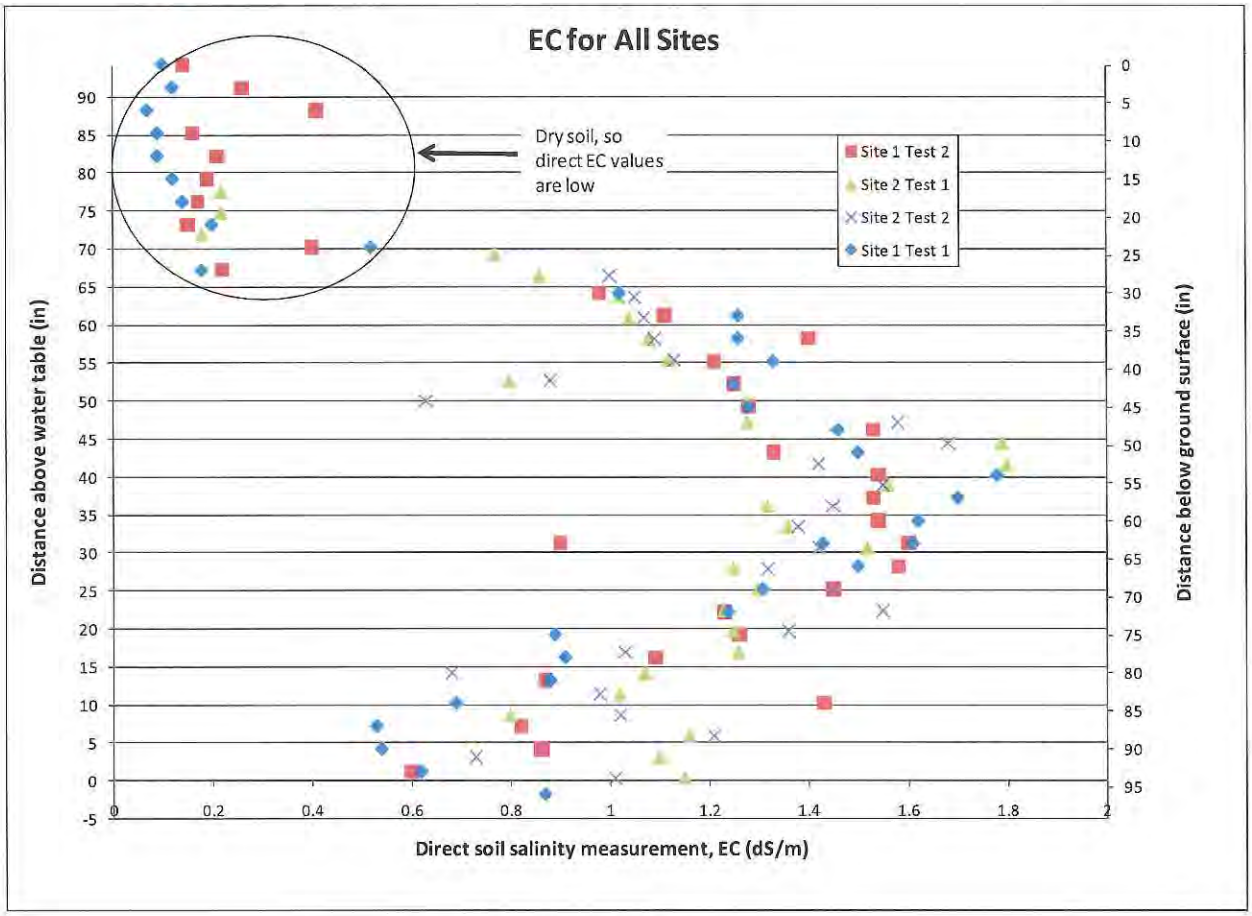

Figure A3. Direct soil salinity measurements

Conclusions from **Figure A3** are:

1. There is a wide scatter of salinity values, yet there are some definite trends.
2. There is a zone of salt concentration at about 4-6' below the ground surface.
3. Near the soil surface, the soil salinities appear to be low. However, this is misleading until one examines the moisture content by depth. With a dry soil, the EC measured by the probe is less than with moisture in the soil (given the same amount of salt). No ECe (saturated paste extract) measurements were made, so there are no direct comparisons for this case. However, it is hypothesized that the amount of the salt per cubic centimeter of soil is similar in the top 3 feet.

Volumetric Moisture Contents

To determine the height of capillary rise above the water table, moisture content by volume was measured at 3" vertical increments. The TDR device was inserted into soil that had been freshly scraped away from the walls of the pits. Assuming the soil is uniform in texture and structure, the volumetric moisture content should be similar between the capillary fringe and the water table. **Figure A4** displays the results of the field measurements.

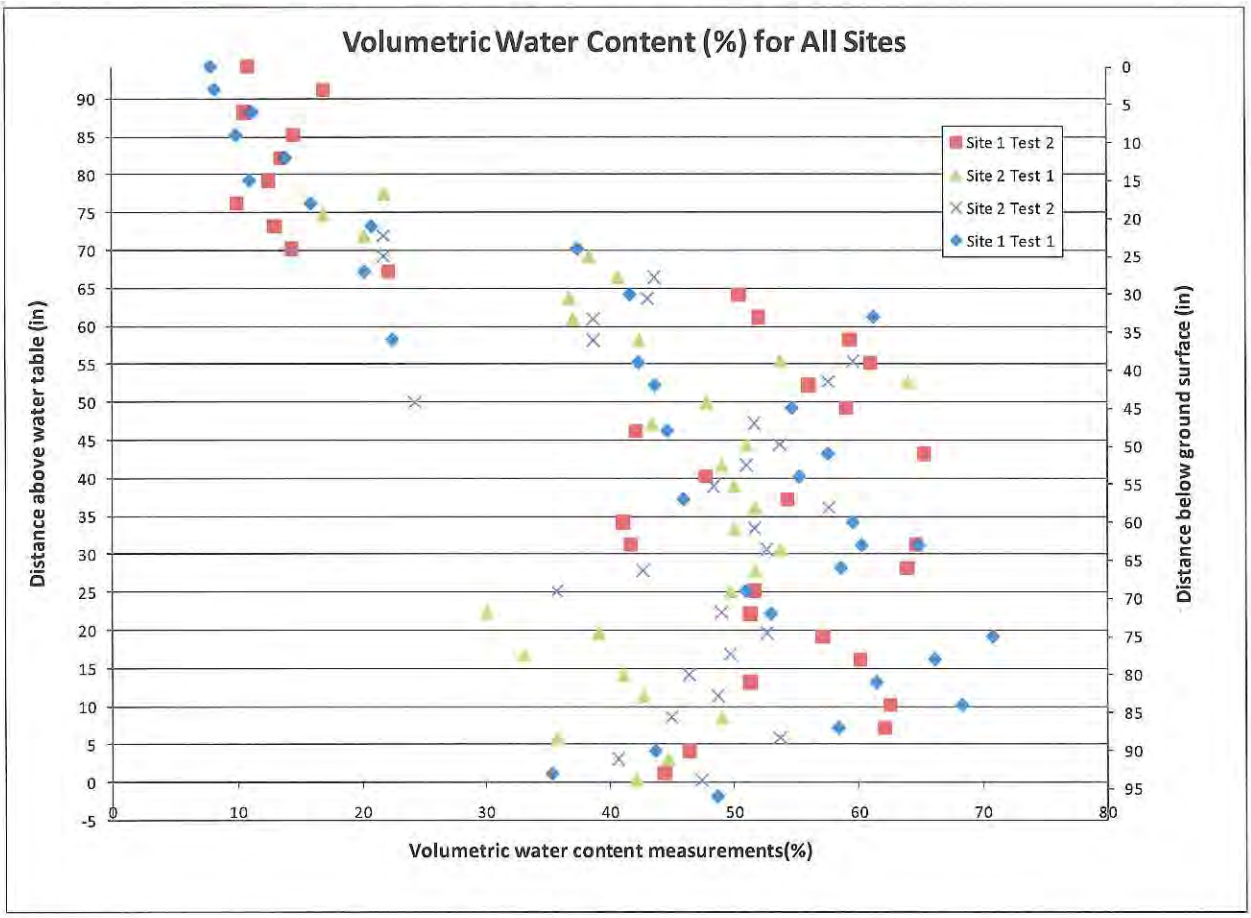

Figure A4. Volumetric water contents. The upper horizontal blue line indicates the water table location at Site 1; the lower blue line is for Site 2.

Figure A4 clearly shows a capillary rise of about 4.5' above the water table in both locations. At a depth from the ground surface of about 3', the moisture content showed a sudden increase.

The scatter in volumetric water contents at any particular depth is partly due to instrument sensitivities, but primarily due to the non-homogeneity of the soil. Numerous thin horizontal strata were seen in the pit walls, varying from quite sandy to high silt/clay lenses. As mentioned earlier, the volumetric water reading with a TDR is very sensitive to the texture, and only a few of the readings were adjusted to reflect sandy lenses.

DIANNE FEINSTEIN
CALIFORNIA

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United States Senate
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http://feinstein.senate.gov

July 5, 2011

The Honorable Michael Connor
Commissioner
U.S. Bureau of Reclamation
U.S. Department of the Interior
Washington, D.C. 20240

Dear Commissioner Connor:

I am writing to urge the Bureau of Reclamation to take action to address unintended third party impacts of the San Joaquin River Restoration Program (SJRRP). While I appreciate the time and effort that Reclamation staff have dedicated to trying to resolve this issue, I feel more decisive action is required to bring this issue to a resolution.

As you know, the potential for seepage-related damages resulting from increased flows was a significant issue in the development of the San Joaquin River Restoration Settlement Act (SJRRSA). To address this, Section 10004(d) of the Act specifically requires that:

> *"Prior to the implementation of decisions or agreements to construct, improve, operate or maintain facilities that the Secretary determines are needed to implement the Settlement, the Secretary shall identify (1) the impacts associated with such actions; and (2) the measures which shall be implemented to mitigate impacts on the adjacent and downstream water users and landowners."*

Consequently, it is critical to the success of the program that Reclamation honor the commitments made in the settlement and the legislation to mitigate impacts on the adjacent and downstream water users and landowners. To accomplish this, I believe Reclamation should develop standards for determining if seepage impacts are fairly attributable to the program, establish processes to prevent impending property damage related to the program and quickly reimburse losses resulting from the program that should be compensated.

It is my understanding that Reclamation was informed of seepage problems by one such property owner, Mr. Jim Nickel, more than a year ago. Because Reclamation was not able to act quickly enough to remedy the problem, Mr. Nickel installed a drainage system at his own expense to capture and remove excess water from his property. While Reclamation has apparently accepted responsibility for Mr. Nickel's damages, at least in

part, he has yet to receive any compensation for his losses. I'm sure you agree, this situation is unacceptable and a resolution must be found very soon.

In the unfortunate event that implementation of the SJRRP does cause damages to third parties and Reclamation acknowledges responsibility, does Reclamation currently possess the statutory authority to compensate for these losses? If not, I request that Reclamation provide me with proposed statutory language that would enable you to reimburse parties in these instances. Additionally, I request that Reclamation provide information regarding how you intend to resolve Mr. Nickel's claims in particular in the absence of such existing authority.

Thank you for your time and consideration of my concerns. I look forward to continuing to work with you to ensure the success of the San Joaquin River Restoration Program.

Sincerely,

Dianne Feinstein
United States Senator

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Cc: Mr. Jim Nickel