Appendix B

# Attachments to Comment Letters

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Some of the comment letters received on the SDIP Draft EIS/EIR included lengthy attachments. This Appendix contains those attachments that do not have specifically called out comments and were too long to include in their respective chapters.

The following is a list of those letters with attachments in this Appendix:

- CDWA
- COT
- SLDMWA

# Comment Letter CDWA

January 31, 1997
**CORRECTED 2-3-97**

**Via Facsimile No. (916) 653-9574**
**and Regular U.S. Mail**

State Lead Agency
Department of Water Resources
Stephen Roberts, Project Manager
1416 Ninth Street
Sacramento, California 95814

Federal Lead Agency
Bureau of Reclamation
Alan R. Candish
7794 Folsom Dam Road
Folsom, California 95630

Re: Draft EIR/EIS - Interim South Delta Program

Dear Sir:

The Central Delta Water Agency is concerned with the combination of projects and characteristics of the projects. The head of Old River barrier and three flow control structures are projects required to mitigate adverse impacts of the SWP and CVP exports from the Delta. The new intake structure at the SWP Clifton Court Forebay and the other features appear to be designed to increase exports from the Delta, thereby adding to adverse impacts when it has not yet been demonstrated that even the existing adverse impacts will be mitigated. Consideration of increased exports should be deferred until such time that the adverse consequences of existing levels of exports are fully mitigated.

**Water Quality**

The Draft EIR/EIS concludes that the proposed ISDP-related changes in salinity did not indicate violations of Delta Water Quality standards therefore, the adverse impacts are considered to be less than significant. Delta Water Quality standards do not adequately protect agricultural water uses in the Delta and

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therefore are not an appropriate measure of significant impact. It should also be noted that whether or not the Delta Water Quality standards adequately protect other uses including those related to fish and wildlife remains to be demonstrated.

The present Delta Water Quality standards for agriculture in the interior and western Delta extend only from April 1st through August 15th and apply only to a limited number of locations. Typically, the irrigation of many crops extends through September and "winter flooding" extends through October, November, December and portions of January. Depending upon the rainfall, pre-irrigation is necessary in February and March.

Typically with the exception of September and October of the driest years, historical water qualities for the unprotected months have been far better than the standards.

The year around water qualities necessary to sustain agriculture in the Central Delta Area have been determined by the Central Delta Water Agency to be as set forth in Exhibit "A" attached hereto.

The Draft EIR/EIS at page 4-45 shows increased chlorides by more than ten percent (10%) at Prisoner's Point and San Andreas Landing for many of the most important irrigation months in most years. The specific concentrations are not given and therefore the impact of the increase cannot be adequately determined.

There is no water quality data presented for areas likely to be most adversely impacted such as:

1) San Joaquin River between the head of Old River and the confluence with Middle River
2) Turner Cut
3) Empire Cut
4) Middle River between Highway 4 and the San Joaquin River and
5) Victoria Canal

To the extent that the water quality at Clifton Court and the Los Vaqueros Reservoir Supplemental Intake are representative, the impact appears to be significantly adverse.

**Improper Combination of Projects**

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The Draft EIR/EIS fails to provide sufficient information or analysis to separate the adverse impacts resulting from the independent project elements.

Decision makers are not being provided sufficient information to determine whether or not they should construct just the three flow barriers or the three flow barriers plus the head of Old River barrier or just the new intake or any other alternative.

We support the objective of mitigating the adverse impacts caused by the projects but object to the shifting of such impacts onto other Delta users. The SWP and CVP are by law required to limit exports to water surplus to the needs of the Delta and other watershed of origin users. The degradation of water quality in the Central Delta appears to be caused by the introduction of more poor quality San Joaquin River water. In order to prevent such degradation, the Draft EIR/EIS should address measures to correct the degradation such as reducing water deliveries into those areas along the west side of the San Joaquin Valley which drain into the San Joaquin River, controlling releases of drainage to times when adequate dilution is available, providing dilution water from San Luis Reservoir and/or by recirculating water by way of the Delta Mendota Canal or California Aqueduct and providing a drain to the ocean. Although the impacts are not segregated, the proposed increase in exports would appear likely to increase the adverse impacts. The Draft EIR/EIS should analyze the steps necessary to dilute or otherwise correct the degradation of the San Joaquin River water quality so that no degradation in Central Delta water quality would result from the installation of the three flow barriers and head of Old River barriers or increased pumping.

The burden to be placed on the exporters for correction of the results of the San Joaquin River degradation should most heavily fall upon the CVP in that the USBR contrary to the laws of Congress contracted its San Luis Unit Water without the assurance of construction of a drain. Attached hereto as Exhibit "B" please find a copy of the relevant portions of the San Luis Act.

**Piecemeal Analysis**

Inclusion of the increased export segment requires that north Delta facilities and changes to operation of the Delta Cross Channel be analyzed. To do otherwise is a clear attempt to

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artificially piecemeal a project which should be analyzed as a whole.

**Impacts of Increased Exports**

The increased export segment requires that compliance with the November 12, 1986, letter agreement between the Department of Water Resources and Department of Fish and Game be explained in the EIR/EIS.

The most pertinent portion of said agreement provides as follows:

> "The two departments agree that further measures will be needed to offset all adverse fishery impacts of the State Water Project in the delta and have agreed to begin discussing how to offset impacts not covered by this agreement. Until agreement is reached on such issues, the State Water Project will not be operated to export more water than can be exported by the existing pumps, except during winter months when additional amounts can be diverted during high San Joaquin River flow periods.
>
> Finally, in an effort to provide for greater public confidence that the agreement will be diligently implemented, both departments have agreed not to object to the participation of groups concerned with protecting fish resources in efforts to enforce the agreement."

Has agreement been reached as to how to offset all adverse fishery impacts? The answer is obviously "NO"!

The efficacy of such measures as the 1995 Water Quality Control Plan fish requirements and the head of Old River barrier remains to be demonstrated.

The existing adverse impacts of the SWP and CVP not only on fish but on water quality and water levels should be fully mitigated before embarking upon further exports.

A reasonable alternative which has not been evaluated would be the three flow barriers with the head of Old River Barrier and with measures to correct the degradation of the San Joaquin River upstream of Vernalis including recirculation and such limited reductions in deliveries to the exporters as may be necessary. Additional features would only be included to the extent they are necessary to reduce other adverse impacts of the SWP and CVP on the Delta.

**Need to Utilize Full Pumping Capacity and Banks Pumping Plant**

The EIR/EIS at page 1-5 cites the SWP water supply contracts as justification for the need to utilize the additional pumps. It is interesting to note when the additional pumps were installed the representation was made that the additional pumps were simply needed for maintenance of existing levels of pumping such as operation when other pumps were down for maintenance.

Water Code sections 12200, et seq. limits the export of water to that which is surplus to the needs of the Delta and other "areas of origin". The EIR/EIS correctly points out that SWP contract entitlements have increased while the ability to develop additional water supplies is diminishing. Without the development of additional water supplies, the additional export pumping will simply further deplete the so-called unregulated flow. This increased reliance on unregulated flow is contrary to the plan of the SWP and CVP which was to continue to develop new conservation storage projects as the needs developed, thereby protecting the interests of both the "areas of origin" and the export areas. Attached hereto as Exhibit "C" are excerpts from the December 1980 Preliminary Edition of Bulletin 76 which clearly show that surplus unregulated flow and the supply from Oroville and San Luis would only meet the needs until about 1981. Thereafter, other development such as " Middle Fork of Eel, Trinity River No. 1, Trinity River No. 2, Mad-Van Duzen and Klamath River No. 1 would be required.

The EIR/EIS does not contain any evidence to show that increased export of unregulated flow will not cause further significant damage to fish and wildlife and water quality. The portion of the San Joaquin River between the Old River fish barrier and Middle River is of particular concern.

**Fishery Impacts**

Since the SWP commenced its operations, major fish populations in Sacramento/San Joaquin Delta have diminished and two have been declared to be endangered (Delta Smelt and Winter Run Salmon).

Although much more study is required to determine what is needed to protect and restore fish populations, it is absolutely clear that increased export pumping will cause further damage to the fish. Mitigation measures implemented to this date have not been demonstrated to be effective and the EIR/EIS should forthrightly critically analyze the effectiveness of the proposed mitigation.

The disingenuousness of the State and Federal actions including the EIR/EIS analysis is punctuated by the statement at page 1-7 as follows:

> "To deal with take of delta smelt and winter-run chinook salmon under the regulatory authority of the Endangered Species Act (ESA), the State-federal agreement empowered a joint State-federal operations group (CALFED Operations Group) to develop operational flexibility by adjusting proposed export limits. Adjustments would be based on real-time monitoring data <u>and are intended to result in no net annual water supply loss to CVP and SWP water users</u>." (emphasis added)

The commitment to no water supply loss to CVP and SWP water uses is unsupported and contrary to law which limits exports to surplus flows. The December 15 State-Federal Accord also contrary to law includes the requirement that the burden of San Joaquin River flows will be imposed on the "watersheds of origin" and not on exports. The stipulation "that the new standards effectively offset the existing indirect losses of fish attributable to joint CVP/SWP operations," is not supported by any scientifically reliable data or analysis. It is apparent that a politically expedient compromise was made which remains to be supported with competent evidence as to the real impacts on fish and other resources. Such a political compromise does not eliminate the need for analysis in this EIR/EIS.

**<u>Wasteful, Inefficient and Unnecessary Consumption of Energy and Growth Inducing Impacts</u>**

Aside from the obvious illegality of agreeing to give priority to exports of water from the Delta over "area of origin" needs including those of fish and wildlife, the EIR/EIS fails to analyze the growth inducing impacts and increased use of energy resulting from the increased export of water to foster greater development of the deserts of southern California. Attached hereto as Exhibit "D" are excerpts from the June 1992 "Current and Projected Water Needs In the Metropolitan Water District of Southern California Service Area" submitted by the State Water

Contractors to the State Water Resources Control Board as SWC Ex 36. It is clear that much of the new growth is in the inland desert regions such as Riverside and San Bernardino counties. That the gallons per capita day in the desert regions are about 66% higher than in the coastal areas and about 30% higher than in the so-called inland area. Without imported water, growth in the deserts would be constrained. The growth-inducing impact of the increased exports should be analyzed.

Since a given population can be adequately served with less water in the inland or coastal areas and in areas of comparable temperatures closer to the source of water, the wasteful, inefficient and unnecessary consumption of energy associated with increased exports must be analyzed. The analysis should include the energy losses associated with the lifting and transportation of such water and those associated with the evaporative and seepage losses.

The analysis in Chapter 8 does not address such concerns.

**Water Levels**

We continue to be concerned with the impact upon water levels in the areas downstream from the proposed South Delta barriers. As recognized in the EIR/EIS, it is extremely difficult to predict such effects with precision. It would appear that other factors besides tides and export pumping rates are relevant. The variation in Clifton Court gate operations, barometric pressure changes, sedimentation and variation in local diversion rates could add to the complexity. Adequate mitigation of water level impacts requires that minimum water level objectives be established for the area of pumping influence, probably those areas within two miles of the intakes. There should be a clear and enforceable requirement that the export diversions from the Delta channels be curtailed during such periods of low water levels.

**Reliance on Old River (Component 2)**

We object to the proposed extensive reliance on Old River to carry the water to the export diversion facilities. Such reliance requires excessive dredging in areas which likely will cause increased seepage into adjoining levees and lands and aggravate existing scour conditions. Increased diversions will of course require more extensive dredging than would be required to mitigate existing problems. Under existing conditions, much of the cross-delta flow from Middle River passes through Woodward Canal

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and North Victoria Canal into Old River and thence to the export diversions. The Middle River flow must wrap around the southeast corner of Woodward Island. This condition appears to have resulted in undermining of the Woodward Island levee and has contributed to increased seepage. Although called to the attention of DWR, the problem has been ignored. Component 2 as proposed will make the problem worse. Component 2 should be modified to ensure that the flow through Middle River reaches Clifton Court Forebay by way of Victoria Canal and North Canal rather than by way of Woodward Canal and North Victoria Canal. Removal of portions of the channel islands and dredging of the shoals in Middle River, Victoria Canal and North Canal would reduce the dredging in Old River. Although all dredging has the potential to increase seepage, our experience would reflect that the deeper the dredging cuts into the underlying sands, the greater the problem. The deeper dredging generally requires steeper slopes which tend to resist resealing and also have an increased propensity to slip. The assumption that confining dredging to the center two-thirds of the channel and maintenance of minimum 3 to 1 side slopes would alleviate the potential for levee instability is unsupportable. The changing dynamics of river flows and currents, the variation in channel configuration, the variation of soil types, the fluctuation in groundwater levels, the possibility of earth tremors, and the interaction with biological factors guarantees that such 3 to 1 side slopes will not remain stable. An ongoing maintenance effort will be required. History has shown that promised actions of State and Federal water agencies and others particularly with regard to difficult problems such as seepage and levee stability problems are not fulfilled. Adequate mitigation requires advance deposit of sufficient funds controlled by a reliable third party to assure that maintenance of the underwater slopes and mitigation of the seepage problems will be carried out.

Attached hereto as Exhibit "F" is draft of a Mitigation Agreement proposed by the Central Delta Water Agency in connection with the Delta Wetlands Project. This draft reflects the basic structure of what we view to be the minimum requirements for mitigation of the proposed dredging impacts.

Because the local Reclamation Districts' facilities could be adversely affected by your actions, approval by each of the affected Districts should be a prerequisite to your going forward with your proposal.

**Flood Control**

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The recent flood events highlight the need to assure that the various barriers will be designed to provide for the passage of floodwaters without any increase in the flood elevation. The design should also address the need for flood control improvements. Some State and Federal officials have mentioned constructing "bypasses" for the San Joaquin River. The current bypass in the Mossdale area is Paradise Cut. Enlargement of Paradise Cut would require that both Old River and Grantline Canal carry greater flood flows.

It would appear that construction and operation of the barriers may increase sedimentation in portions of the channels. Dredging to maintain channel capacity should be a part of the plan of operation.

The barriers should also allow for the passage of barges and waterborne equipment.

**Public Access**

The incorporation of public recreational features should not create new public access to remotely located areas. Local law enforcement is stretched to the limit and remote locations are impossible to police. Garbage and sanitary services must also be provided. Unpoliced public access always leads to vandalism and damage to levees and other property.

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Improved public access and recreational features should be located in those areas adjacent to existing public roads and facilities where policing, garbage and sanitation facilities can be effectively provided.

Respectfully submitted,

DANTE JOHN NOMELLINI
Manager and Co-Counsel

DJN:ju
Enclosures

**TESTIMONY OF RUDY MUSSI**

**STATE WATER RESOURCES CONTROL BOARD**

**HEARING ON DELTA SALINITY DRAFT CDOs AND WQRP**

I am a farmer and a general partner of Rudy M. Mussi Investment L.P. which holds a 50% interest in the property on Roberts Island shown in CDWA-9b. I have been farming in the Roberts Island area of the Delta for about 30 years. My ownership interest in the subject property was acquired in 1984 and I have been farming the property since about a year after acquisition.

The property is currently served with water from Middle River through the Woods Irrigation Co. canals. Said canals replaced natural sloughs connecting to Middle River. At the time of patent from the State of California the property was part of a large parcel which abutted Middle River and the San Joaquin River as well as the sloughs. Farming of the property extends back to the late 1800s and appears to have commenced at about the time when the Certificate of Purchase was issued in 1869.

The property is currently planted to grapes. Irrigation of the grapes is generally in late June, August and October depending on measurements of soil moisture. All water applied in excess of the consumptive use of the crop is drained into the Woods Irrigation Co. drainage canals and pumped back into the Delta. The actual amount of water used by the crops is reflected by the consumptive use estimates of the Department of Water Resources. The water table is relatively high and crops draw from the water table as well as the applied water.

Management of the salt balance in the soil is an ongoing challenge. Attached hereto as CDWA-9c are colored maps showing areas of particular salinity concern. The darkest areas are

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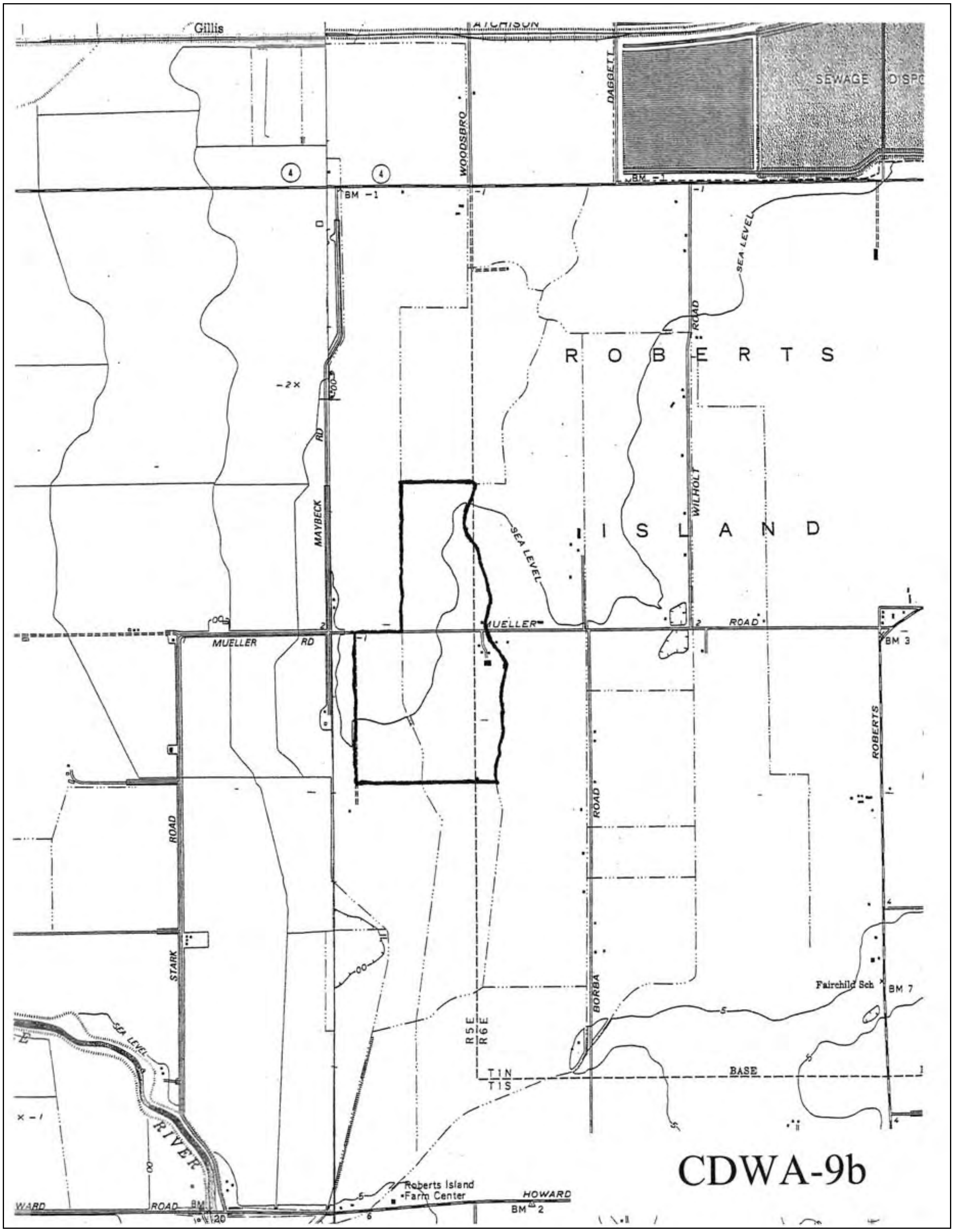
CDWA-9a

areas where crop damage and yield losses are already occurring. The applied water and the water table contain salts in addition to the salts remaining in the soil. When the crop uses water the salts remain in the soil profile. I depend upon October irrigation waters, rainfall and chemical treatment to leach sufficient salts from the soil profile to maintain a salt balance throughout the growing season which will avoid crop damage. My June and August irrigations are basically to meet the evapotranspiration requirements of the grapes. The field maps attached as Exhibit B show that high sodium concentrations already exist in portions of the fields and limit both production and quality. Any increased salt in the irrigation water will aggravate the existing problems and create new problems. The problem salt areas are visually apparent. The wood on the plants on these areas is smaller and more costly to prune, the vegetative cover is lighter which causes sunburn and requires culling and the harvest is noticeably lighter. Additionally, the lack of plant vigor requires special treatment to avoid plant death.

The present chemical management includes application of N. Phuric to the applied water and application of gypsum and lime to the soils. If the salinity of the irrigation water increases the amount of chemical management will also increase. I estimate the present level of chemical treatment to manage salts is costing about $100.00 per acre per year. Increases in salinity will increase the chemical costs in a greater proportion than the increase in salinity and may result in the total inability to maintain satisfactory salt balance. The result will be increased cost of the other practices described above as well as additional loss of quality and production.

The salinity of the water in Middle River and in my irrigation increases if the salinity of the water of the San Joaquin River at Vernalis increases.

2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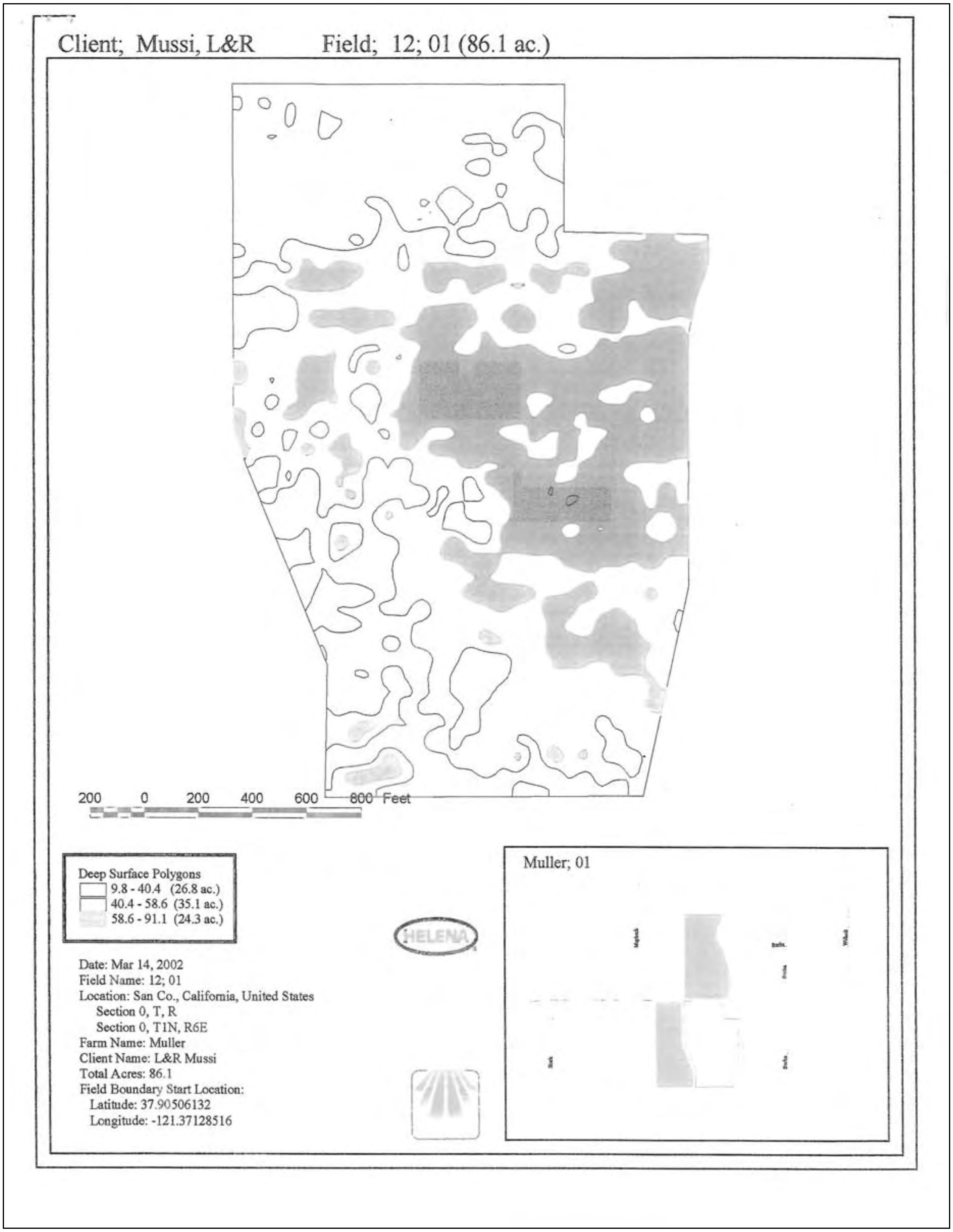
DAGGETT
SEWAGE DISPO
WOODSBRO
BM -1
SEA LEVEL
ROAD
R O B E R T S
I S L A N D
MAYBECK
RD
WILHOLT
MUELLER
MUELLER RD
ROAD
BM 3
ROBERTS
STARK
ROAD
BORBA
Fairchild Sch
BM 7
R5E
R6E
T1N
T1S
BASE
RIVER
WARD
ROAD
Roberts Island
Farm Center
HOWARD
BM 2

CDWA-9b

CDWA-9c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40.4 - 58.6 (35.1 ac.)
58.6 - 91.1 (24.3 ac.)
HELENA
Date: Mar 14, 2002
Field Name: 12; 01
Location: San Co., California, United States
Section 0, T, R
Section 0, T1N, R6E
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 86.1
Field Boundary Start Location:
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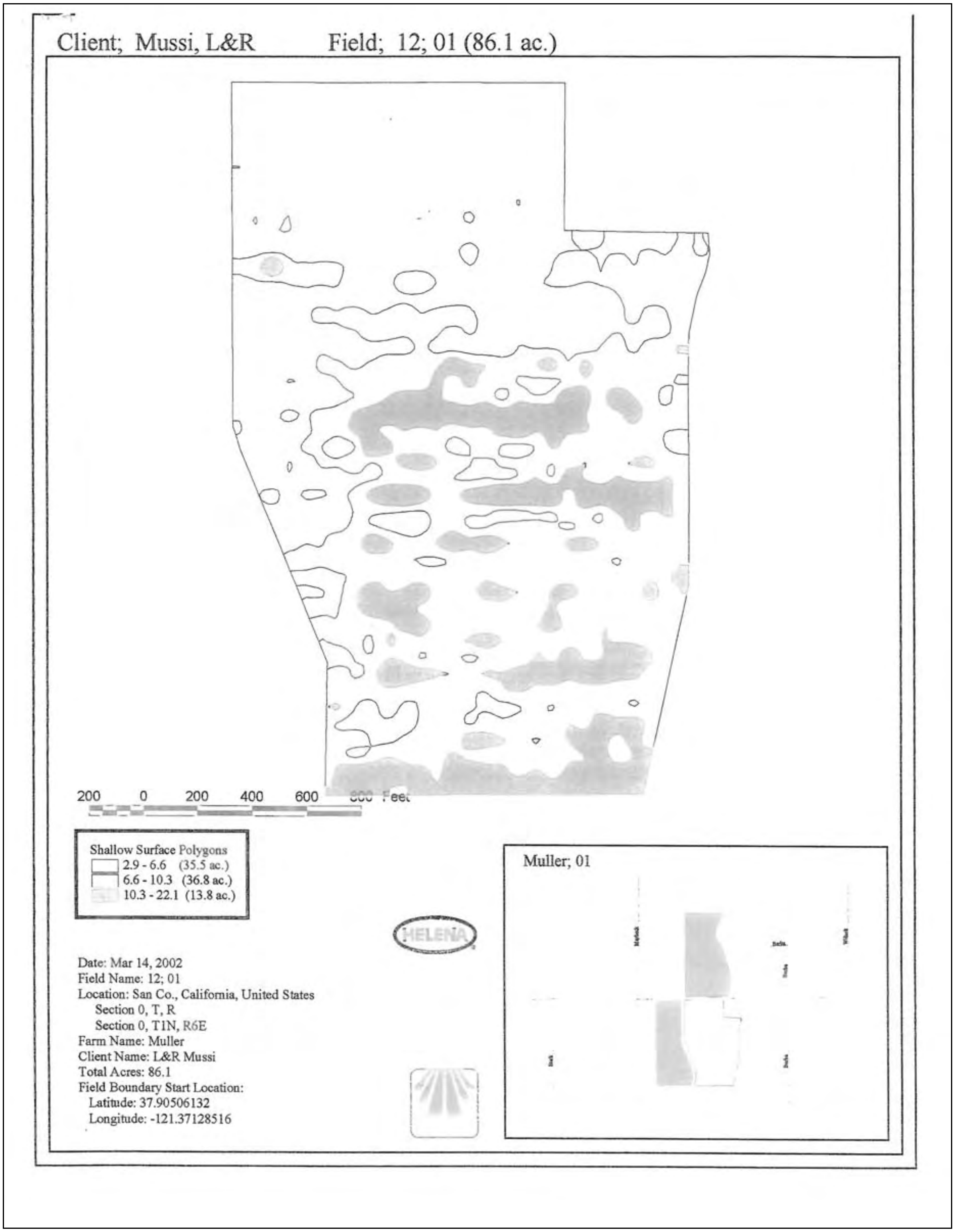
Longitude: -121.37128516
Muller; 01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6.6 - 10.3 (36.8 ac.)
10.3 - 22.1 (13.8 ac.)
HELENA
Muller; 01
Date: Mar 14, 2002
Field Name: 12; 01
Location: San Co., California, United States
Section 0, T, R
Section 0, T1N, R6E
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 86.1
Field Boundary Start Location:
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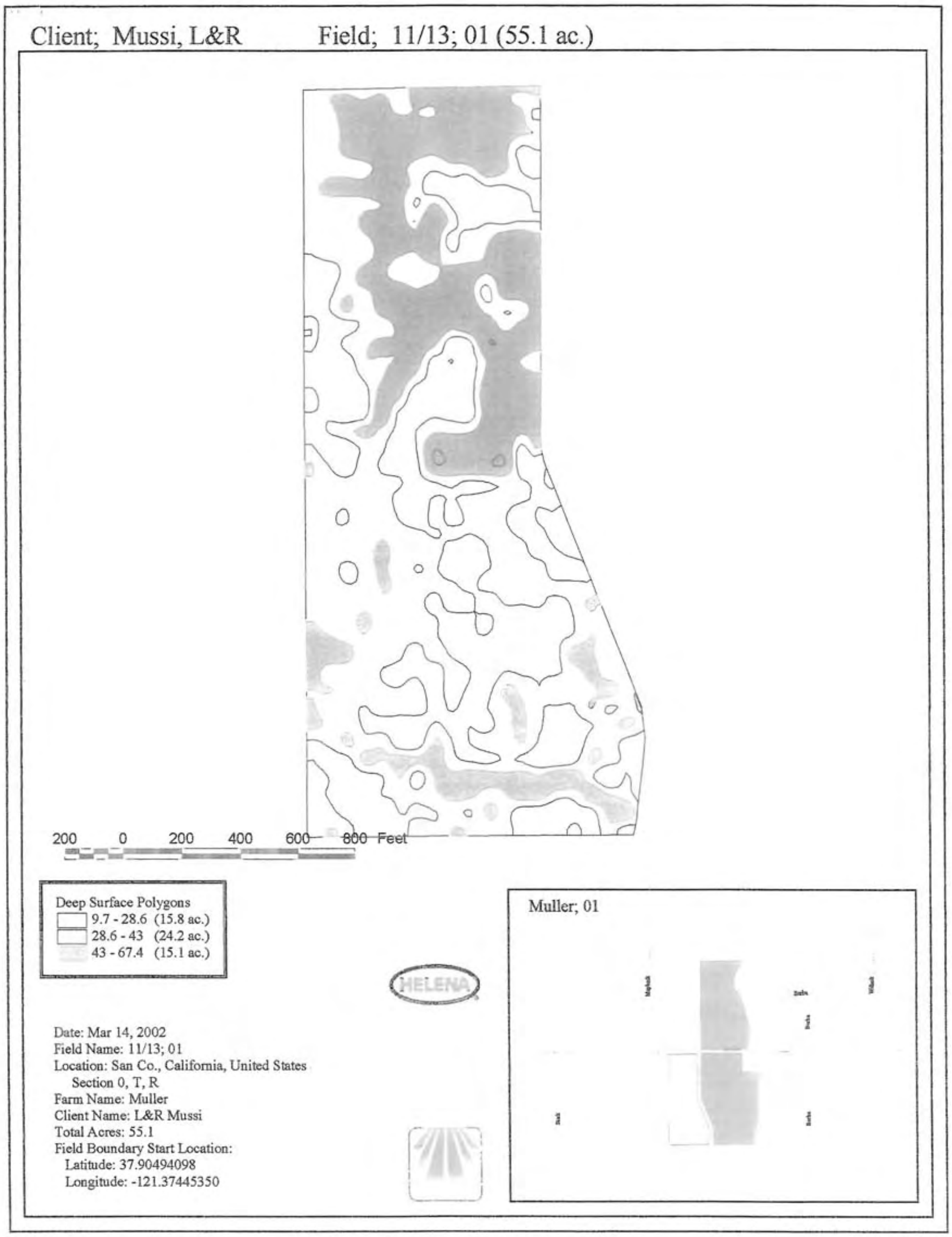
Longitude: -121.37128516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28.6 - 43 (24.2 ac.)
43 - 67.4 (15.1 ac.)
HELENA
Muller; 01
Date: Mar 14, 2002
Field Name: 11/13; 01
Location: San Co., California, United States
Section 0, T, R
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 55.1
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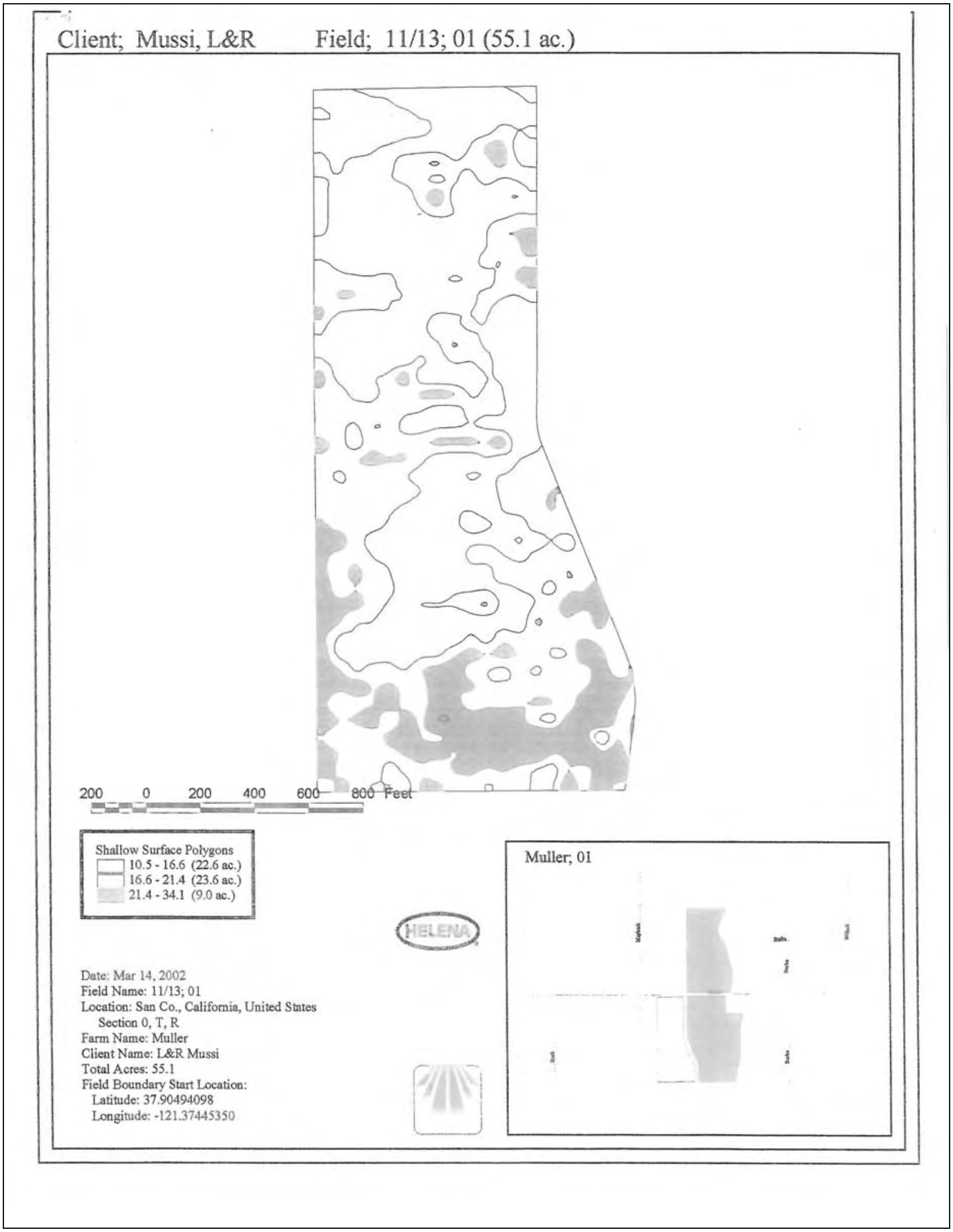
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21.4 - 34.1 (9.0 ac.)
HELENA
Muller; 01
Date: Mar 14, 2002
Field Name: 11/13; 01
Location: San Co., California, United States
Section 0, T, R
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 55.1
Field Boundary Start Location:
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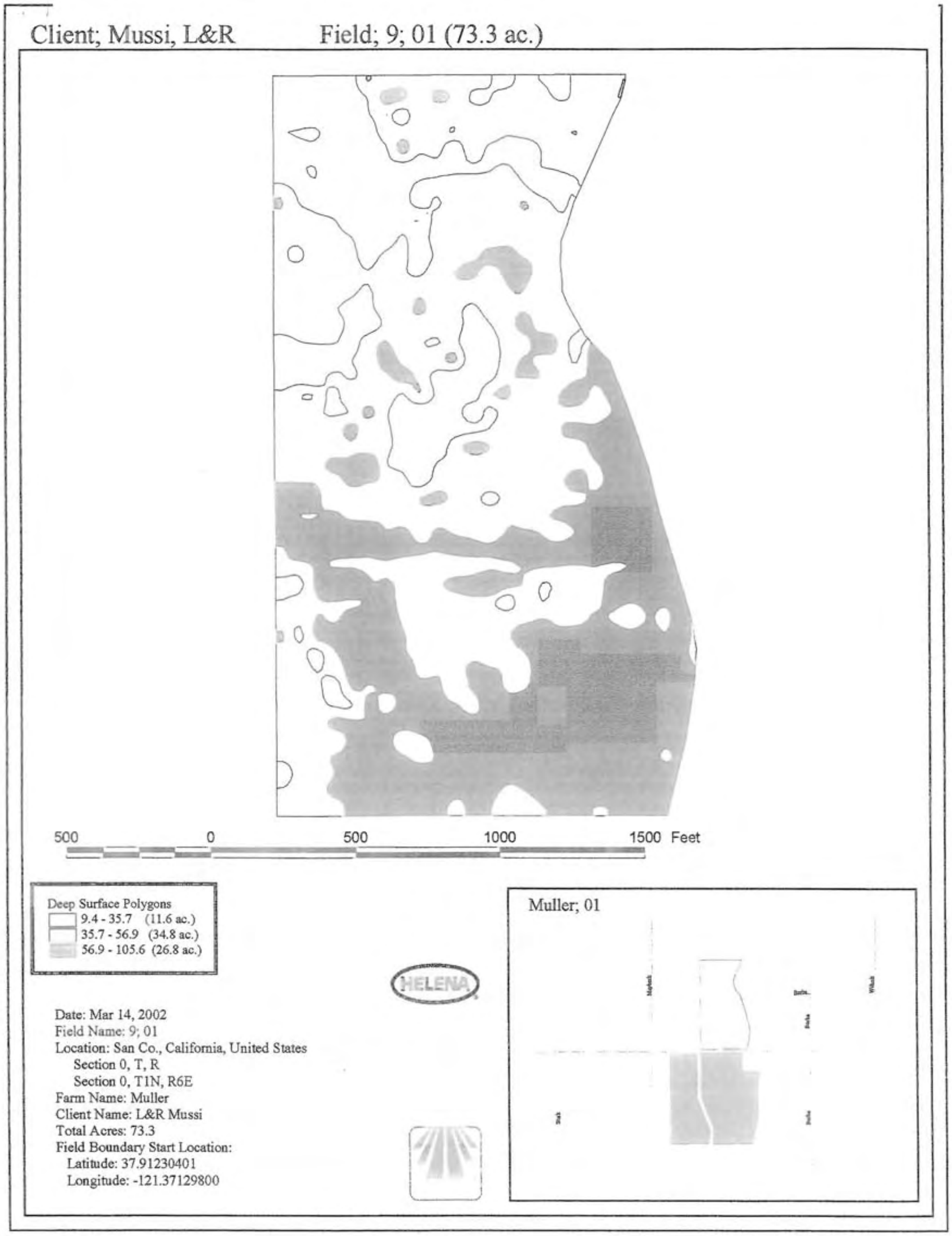
Longitude: -121.37445350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0
500
1000
1500 Feet
Deep Surface Polygons
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35.7 - 56.9 (34.8 ac.)
56.9 - 105.6 (26.8 ac.)
HELENA
Date: Mar 14, 2002
Field Name: 9; 01
Location: San Co., California, United States
Section 0, T, R
Section 0, T1N, R6E
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 73.3
Field Boundary Start Location:
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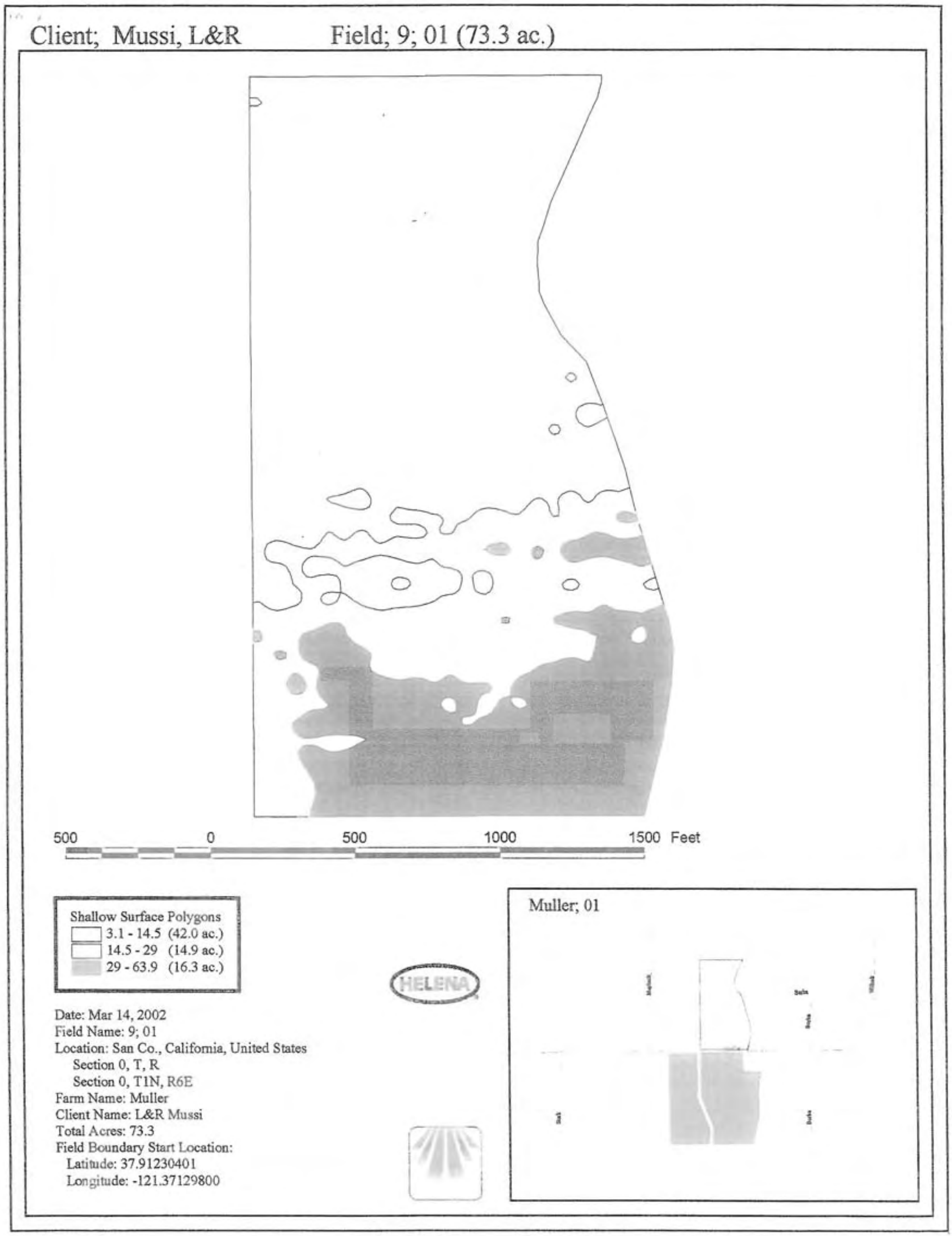
Muller; 01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0
500
1000
1500 Feet
Shallow Surface Polygons
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14.5 - 29 (14.9 ac.)
29 - 63.9 (16.3 ac.)
HELENA
Date: Mar 14, 2002
Field Name: 9; 01
Location: San Co., California, United States
Section 0, T, R
Section 0, T1N, R6E
Farm Name: Muller
Client Name: L&R Mussi
Total Acres: 73.3
Field Boundary Start Location:
Latitude: 37.91230401
Longitude: -121.37129800
Muller; 01

**TESTIMONY OF KURT SHARP**
**STATE WATER RESOURCES CONTROL BOARD**
**HEARING ON DELTA SALINITY DRAFT CDOs AND WQRP**

I am one of the managers of R C Farms, Inc.

R C Farms, Inc. is the owner of land riparian to the San Joaquin River on Lower Roberts Island downstream of the confluence with Old River and upstream from the confluence with Turner Cut and Middle River. Said land is within the Central Delta Water Agency. Attached hereto as Exhibit A is a map showing the land. CDWA-4 is a chain of title prepared for said land. The land currently abuts the San Joaquin River and it is my understanding of the documents in the chain of title that the land has never been separated from the San Joaquin River.

As an owner of said riparian lands, R C Farms, Inc. is entitled to divert waters from the San Joaquin River for reasonable beneficial uses upon those lands. R C Farms, Inc. and its predecessors in interest have so used said waters for irrigation at various times of the year and in various quantities for a period extending back to the late 1800's.

R C Farms, Inc. was formed April 17, 1973, and shortly thereafter commenced diverting water from the San Joaquin River for irrigation of row and field crops. The amount of water used has not been measured but varies with crops and climatic conditions. Last year (2004) there were 100± acres of asparagus and 140± acres of field corn. This year (2005) there are 71± acres planted to alfalfa and 169± acres planted to field corn. Such lands of R C Farms, Inc. are below sea level and all water which is not evaporated or used for the evapotranspiration needs of the crops is pumped back into the Delta by way of the Reclamation District canals and pumping plants. Depending upon crops and climatic conditions, evaporation and/or evapotranspiration

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CDWA-8

take place throughout the year. Water from the San Joaquin River constantly seeps into the land, thereby at times providing water for crops through natural sub-irrigation. Additional water is applied to crops by way of siphons. Siphons are used to supplement the irrigation of corn from near the end of June through September and to supplement the irrigation of alfalfa starting in April or May and continuing through September. "Winter" flooding of corn ground is typically in November and December. Attached hereto is Table A-5 from DWR Bulletin 168 showing estimated crops Et Values for the Delta Service Area for 1976-77. Although climatic conditions including precipitation will vary so as to change the amount of applied water required for any particular crops in any given year, Table A-5 provides a reasonable tool for estimating actual diversions and water use. Average annual precipitation in the Central Delta is in the range of 12 to 14 inches.

The points of diversion for R C Farms, Inc. are located in Sections 28 and 29, T. 2 N., R. 5 E., M.D.B. & M.

The months of special concern for R C Farms, Inc. on the San Joaquin River are April through August, the peak irrigation months, and water quality is of great concern to R C Farms, Inc. because it impacts the crops that R C Farms, Inc. grows.

Salt in the irrigation water adds to the salt in the soil and soil water. When the concentration of salts in the root zone of growing plants reaches a high enough level the plants suffer and in some cases die. Because of different soil and drainage conditions in the fields the salt problem varies. Some of the fields have areas which are already high in salts. Adding additional salt will increase the salt accumulation in the soil and damage the crops. Both the degree of impact and the area affected increase as salinity of the water entering the field

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increases. There is also a problem at the time of seed germination if there is too much salt in the soil. The adverse effects of the salt on the crops is visually apparent.

Attached hereto as Exhibit B are the results of a February 7, 2003 soil sampling on the subject R C Farms, Inc. land. Sample #3 which was taken from the field in the northwest portion of the land shows a high level of sodium.

The northerly 71± acres of the property are presently planted to alfalfa and the balance of the acres are planted to field corn.

Because the surface of the land is substantially below the water level in the San Joaquin River which abuts the property the fields are constantly receiving water which "seeps" from the river. We attempt to hold the water table below the ground surface by way of drainage ditches from which the excess water flows into the Reclamation District 684 canals and then is pumped back into the Delta.

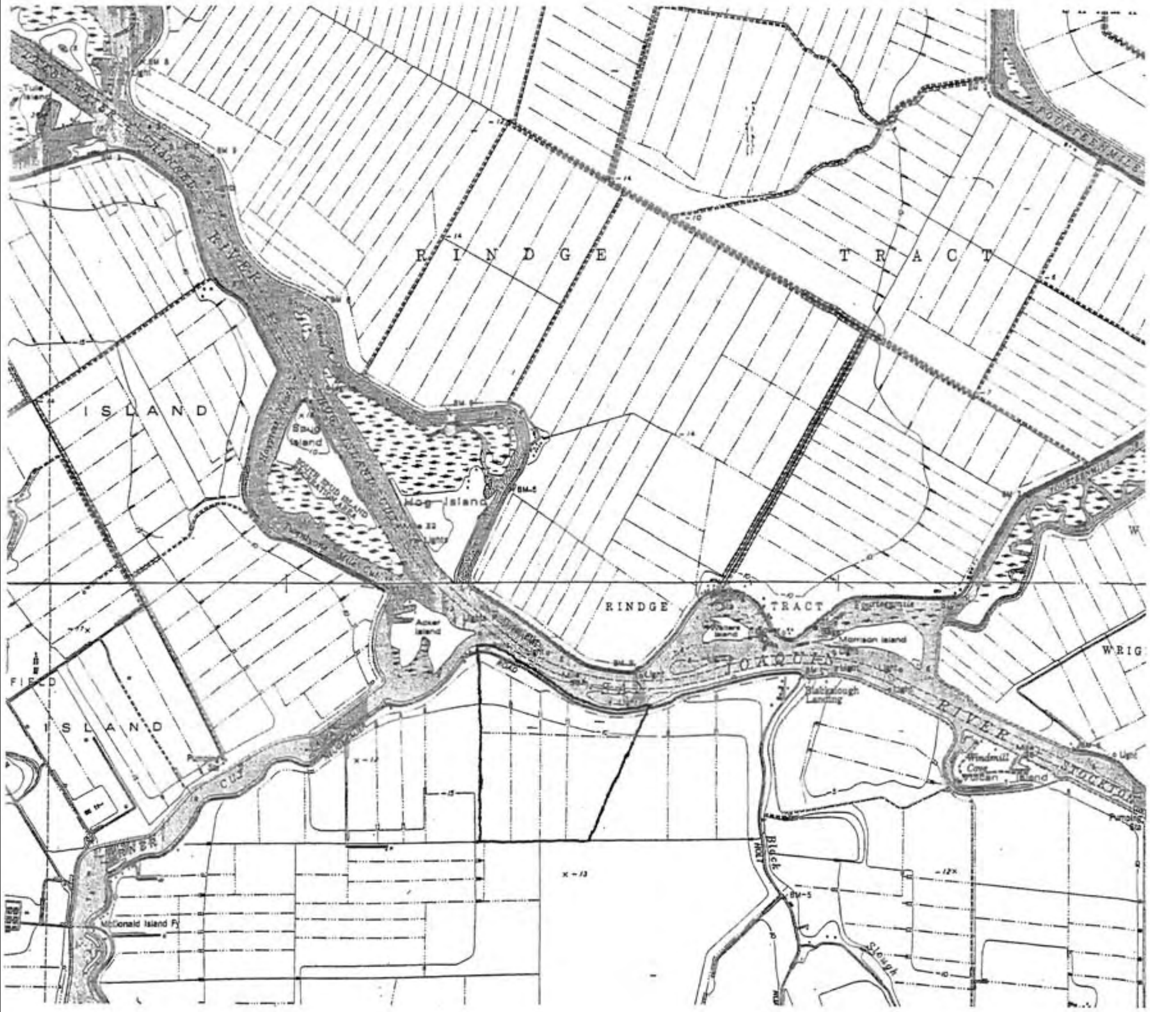
With the alfalfa we apply water from the San Joaquin River through siphons so as to flood irrigate between ridges in the fields. Typically the irrigation starts in April or May depending upon weather and continues after each cutting through September. The portions of the fields near the river receive sufficient subirrigation from seepage. The fields planted to field corn are irrigated starting near the end of June and continuing on about ten day intervals into late August or September and then the fields are flooded in November and December. The "winter" flooding of the field corn ground is a customary practice which I believe is intended to facilitate leaching of salts from the ground by the rain or at the very least drive down the salts.

The customary practices are no longer sufficient to control the salt buildup in the problem areas of the fields. Artificial leaching such as is customary for potatoes is costly and economically infeasible for the crops which are grown.

R C Farms, Inc. has farmed said land for over twenty (20) years. The water quality at Vernalis affects the quality of the water in the San Joaquin River abutting said lands. The water from the San Joaquin River seeps into and is also applied to the lands of R C Farms, Inc. Typically higher salinity in the San Joaquin River at Vernalis are particularly at Brandt Bridge means higher salinity in the R C Farms, Inc. irrigation water.

As salinity in the seepage and applied irrigation water increases, the salinity in the soil and soil water increases thereby adversely impacting the crop production.

My family and I live in the vicinity of the R C Farms, Inc. land and boat, fish, swim and water ski in the Delta channels including the San Joaquin river along the R C Farms, Inc. land. Higher salinity water from the San Joaquin River entering the Ship Channel at Stockton, California, not only reduces the general quality of water in the San Joaquin River along the R C Farms, Inc. land but also reduces the quality in adjoining channels.


R I N D G E
T R A C T
I S L A N D
RINDGE
TRACT
Hog Island
JOAQUIN
RIVER
WRIG
I S L A N D

# EXHIBIT - A

# EXHIBIT - B

p. 1

**Precision Agri Lab**

24730 Avenue 13 Madera, CA 93637 Phone: 559-661-6386 FAX: 559-661-6135 email: pal@mail.agdecision.net

# SOIL ANALYSIS REPORT

**CONRAD SILVA**

| | | | |
|---|---|---|---|
| **BRANCH NAME** WALNUT GROVE-W | **TEST ID #** 2456 | **DATE SAMPLED:** 2/ 7/03 |
| **FIELDMAN** DON JOHNSON | **LOG IN #** 232078 | **DATE SUBMITTED:** 2/11/03 |
| **CROP** ASPARAGUS | | **DATE REPORTED:** 2 /17/03 |

**ID#** 1 **DESCRIPTION** RC-1 See MAP

## Physical And Chemical Properties

Clays / Loams / Sands — S P

Alkali / Neutral / Acid — pH 5.0

High / Low — O_M Big Field

Salts — High / Moderate / Low — FIZZ, ECe ESP

--------meq / liter--------

| Ca | Mg | Na | Cl | SO4 |
|---|---|---|---|---|
| | | 3.3 | 2.2 | |

## Soil Nutrition

--------nutrients in parts per million ppm-------- Above Adequate / Adequate / Deficient

NO3-N PO4-P K SO4-S Zn Mn Fe Cu B

**ID#** 2 **DESCRIPTION** RC-2

## Physical And Chemical Properties

Clays / Loams / Sands — S P

Alkali / Neutral / Acid — pH 5.7

High / Low — O_M Close to Armento

Salts — High / Moderate / Low — FIZZ, ECe ESP

--------meq / liter--------

| Ca | Mg | Na | Cl | SO4 |
|---|---|---|---|---|
| | | 3.0 | 1.6 | |

## Soil Nutrition

--------nutrients in parts per million ppm-------- Above Adequate / Adequate / Deficient

NO3-N PO4-P K SO4-S Zn Mn Fe Cu B

**ID#** 3 **DESCRIPTION** RC-3

## Physical And Chemical Properties

Clays / Loams / Sands — S P

Alkali / Neutral / Acid — pH 4.8 by Plow Shed

High / Low — O_M

Salts — High / Moderate / Low — FIZZ, ECe ESP

--------meq / liter--------

| Ca | Mg | Na | Cl | SO4 |
|---|---|---|---|---|
| | | 6.5 | 4.0 | |

NA = Salts High

## Soil Nutrition

--------nutrients in parts per million ppm-------- Above Adequate / Adequate / Deficient

NO3-N PO4-P K SO4-S Zn Mn Fe Cu B

APPROVED:__________

Page 1 of 2

Feb 18 03 04:41p

P. 2

# Precision Agri Lab

24730 Avenue 13 Madera, CA 93637 Phone: 559-661-6386 FAX: 559-661-6135 email: pal@mail.agdecision.net

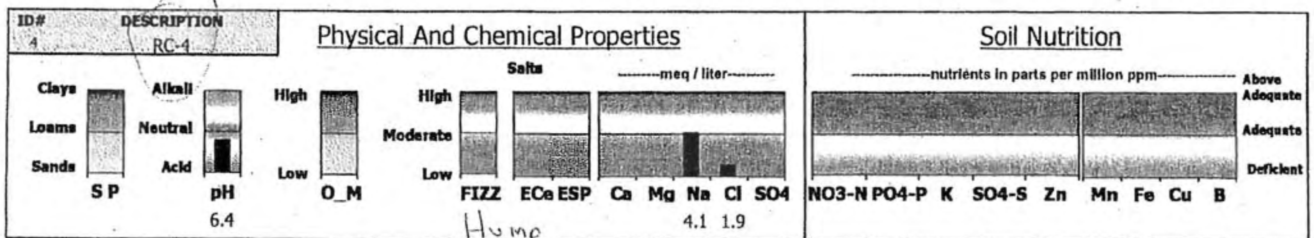
## SOIL ANALYSIS REPORT

CONRAD SILVA

**BRANCH NAME** WALNUT GROVE-W
**FIELDMAN** DON JOHNSON
**CROP** ASPARAGUS

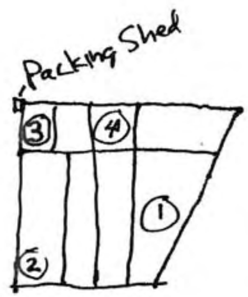
**TEST ID #** 2456
**LOG IN #** 232078

**DATE SAMPLED:** 2/ 7/03
**DATE SUBMITTED:** 2/11/03
**DATE REPORTED:** 2 /17/03




ALL Ph Low

Salts are high
in Asp next to
Packing Shed

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APPROVED:________

Page 2 of 2

**Draft Program**

# Environmental Impact Report for the Consolidated and Conformed Place of Use

Prepared for:

**California State Water Resources Control Board**
**Division of Water Rights**
**P.O. Box 2000**
**Sacramento, California 95812-2000**

Petitioner:

**U.S. Department of the Interior**
**Bureau of Reclamation**

Prepared by:

**CH2M HILL**

**December 1997**

oxygenated and has low dissolved concentrations of solids throughout its length. Significant amounts of agricultural drainage are not being discharged to the river.

#### 3.3.2.3 Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta is a complex system of deepened and channelized rivers and sloughs of widely varying depth, flow, and water quality. The San Joaquin and Sacramento rivers meet the relatively minor flows of the Cosumnes and Mokelumne rivers and merge their waters in the Delta.

The resulting water quality of the Delta channels reflects a mixture of a large volume of higher quality water from the north (Sacramento River and American River drainages) with a relatively small volume of low-quality water from the south (San Joaquin River drainage). Salinity, including saltwater intrusion from the San Francisco Bay estuary, and agricultural drainage are the primary water quality issues of concern for the Delta. Annual seasonal saltwater intrusion is now limited to some areas of the western Delta by water management of the CVP and State Water Project (SWP) (Herbold and Moyle, 1989; Skinner, 1972). Reverse flows can occur in the fall when CVP and SWP pumping increases compared to Sacramento River inflow to the Delta, resulting in saltwater intrusion.

Specific water quality objectives have been established for M&I beneficial uses, agricultural beneficial uses, and fish and wildlife beneficial uses. Water quality objectives for the Delta are set forth in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (SWRCB, 1995) and the Bay-Delta Accord (SWRCB, 1994). These forums established objectives for dissolved oxygen, salinity, Delta outflow, river flows, export limits, toxic chemicals, bacterial contamination, and Delta Cross Channel operations.

#### 3.3.2.4 San Joaquin River

The San Joaquin River Basin covers 15,880 square miles. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. This watershed excludes those lands that drain to the Tulare Lake Basin.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

After leaving the Sierra Nevada, the river enters the Central Valley floor where its flows are subject to agricultural, municipal, and industrial water diversions. In addition, the river receives drainage flows from agricultural lands located in the San Joaquin Valley. As a result of these agricultural discharges and the historical alteration of surface water flows, groundwater supplies, and land use, water quality has been significantly altered. Discharges of agricultural drainage, containing salts, selenium, boron, molybdenum, and other trace elements, have degraded the water quality of the San Joaquin River.

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STATE WATER RESOURCES CONTROL BOARD 1047
1998 Bay/Delta Hearings Phase 1-8
SWRCB EXHIBIT 97
INTRODUCED 7/1/98
ACCEPTED IN EVIDENCE YES NO
DATE 7/1/98

# Sources and Circulation of Salt in the San Joaquin River Basin

Leslie F. Grober[1]

## Abstract

Historical data and a water quality model were used to quantify the sources of salt, boron and selenium in the lower San Joaquin River (SJR) basin, California. Mean monthly data for sources and sinks in the SJR basin and Delta Mendota Canal (DMC) service area were assembled and evaluated. The San Joaquin River Input-Output model (SJRIO), a mass balance water quality model, was used to estimate mean monthly salt, boron, and selenium loads for various inflows to the SJR. Model results show that agricultural drainage discharges are the primary source of dissolved salts, boron and selenium to the SJR. Groundwater accretions and seasonal wetland releases are also important sources of salt and boron. Salt dissolved in DMC water imports is the primary source of salt circulating in the lower SJR basin; in situ dissolution of salts and pumping from the underlying confined aquifer are important secondary sources. Salts are moved out of the basin only in the SJR but some salt is also moved out of the unconfined aquifer of the basin into long term storage in the confined aquifer beneath the basin. The DMC supplies most of the higher quality surface irrigation water in the lower SJR basin. The quality of this supply may be impaired by the recirculation of salts from the SJR to the DMC intake pump, leading to a greater net accumulation of salts in the basin.

## Introduction

Water quality objectives established by the State Water Resources Control Board (SWRCB, 1995) and California Regional Water Quality Control Board, Central Valley Region (CRWQCB,CVR, 1994) for selenium, boron, and electrical conductivity (EC) are routinely exceeded in the lower SJR. Progress is now being made towards the establishment of a regulatory program (CRWQCB,CVR, 1994 and

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Karkoski, 1996) to limit the loading of selenium to the SJR. The technical challenges to establish and enforce a regulatory program for boron and total dissolved solids (TDS) will be more difficult. Naturally high concentrations of selenium are found in the soils of alluvial deposits south of Los Banos due to their provenance from rocks of marine origin in the Coastal Range (Leighton et al., 1991). The areal distribution of selenium in the lower SJR basin is therefore relatively limited compared to the widespread distribution of total salts and boron. Whereas the source of most selenium is from within the basin, large quantities of salt are imported from outside the basin via the DMC. Subsurface agricultural return flows from seleniferous soils of limited areal extent account for most of the selenium load in the SJR but the east side tributaries, groundwater and wetland releases contribute significant salt and boron loads to the SJR . The more pervasive occurrence of salt and boron make these compounds much more difficult to regulate and reduce. Water quality data for the SJR and DMC are presented here to demonstrate these differences and difficulties.

Historical and model data were assembled to show the relative contribution of selenium, boron, and TDS in the lower SJR. Flow and EC data for the DMC were also compiled to show the relative impact of this major basin import. This data was then used to make a rough accounting of salt loads in the lower SJR basin. A mass balance water quality model was used to estimate some of the salt loads in this analysis. When TDS data was not available, TDS loads were calculated based on a TDS/EC ratio of 0.6 for TDS in mg/l and EC in µs/cm.

Study Area

The area of interest is a sixty mile reach of the lower SJR from Lander Avenue to Vernalis (Figure 1). Water and salts are imported from outside the basin via the DMC of the Central Valley Project (CVP); water and salt imports are based on net quantities imported to the DMC service area on the west-side of the SJR, north of Mendota Pool. The SJR at Lander Avenue and the Merced, Tuolumne,and Stanislaus rivers are the major tributary inputs to the lower SJR.

Model Description

SJRIO is a mass balance water quality model that was originally developed to study the effects of agricultural drainage on water quality in the SJR (Kratzer et al, 1987). The model performs a mass balance accounting of mean monthly flows and loads of TDS, boron and selenium. Loads and concentrations are calculated for a sixty mile reach of river from Lander Avenue to Vernalis. Primary model components include the SJR at Lander Avenue, the upstream boundary to the model, and three east side tributaries: the Merced, Tuolumne, and Stanislaus rivers. The major sources of agricultural discharge considered in the model are Mud Slough (North) and Salt Slough, which consist of a mixture of surface and subsurface agricultural drainage, SJR flood waters and wetland releases. The model also considers minor west side tributaries, diversions, subsurface agricultural return flows,

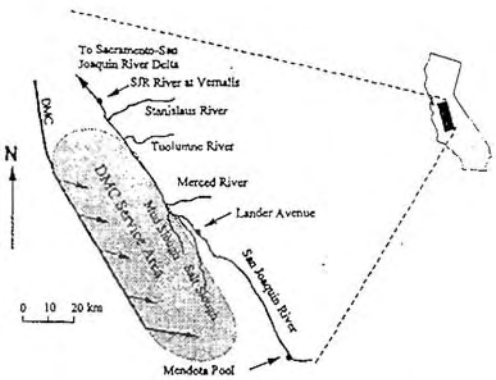


Figure 1. Lower San Joaquin River Study Area

surface agricultural return flows, municipal and industrial discharges, groundwater accretions and depletions, riparian vegetation water use, evaporation, and precipitation.

Discharge and EC data for the major tributaries and sloughs were obtained from the United States Geological Survey (Shiffer, personal communication, 1995) and California Department of Water Resources (Yamagata, personal communication, 1995). Boron and selenium data were obtained from the CRWQCB,CVR (Westcot, personal communication, 1995). Flow and water quality data for other model components were estimated based on a mix of constant parameter and historical data as described in Kratzer et al (1987).

San Joaquin River Salt Loads

SJRIO was used to estimate discharge, TDS, boron and selenium loading to the SJR. A full set of flow and water quality data needed to run SJRIO was compiled for water years 1985 through 1994. The model was run in calibration mode so that model results at Vernalis would match observed Vernalis discharge and water quality.

The mean annual salt load added to the lower SJR for water years 1985 through 1994 was approximately 845,000 metric tons per year. The net discharge of salts out of the basin via the SJR near Vernalis was 700,000 tons per year. This model calculated load is the same as computed using historical mean monthly flow and EC data for the USGS gage near Vernalis. The difference of 145,000 tons per year between the loading and discharge figures is mostly attributable to the loss of salts in the lower SJR due to agricultural diversions. The mean annual diversion from the main stem of the lower SJR is approximately 222 million cubic meters per

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year. The mean annual boron load added to the lower SJR was approximately 1,000 tons and the mean annual selenium load added was 4,300 kilograms. Agricultural diversions in the lower SJR accounted for an average loss of 163 tons of boron and 795 kilograms of selenium.

The east-side tributaries account for most of the flow in the SJR but Mud and Salt sloughs contribute the greatest TDS, boron and selenium loads (Figure 2). The sloughs contribute disproportionately high selenium load relative to TDS and boron. Groundwater contributes less than five percent of the total selenium load but over twenty percent of the TDS and boron load. The east side tributaries contribute less than ten percent of the selenium load but close to twenty percent of the TDS load. Surface agricultural return flows contribute a higher percent of the TDS load than they do of boron or selenium. Preliminary SJRIO model runs show that reduction of subsurface agricultural return flows in the sloughs result in significant reduction of selenium loads but much less reduction of boron and TDS.

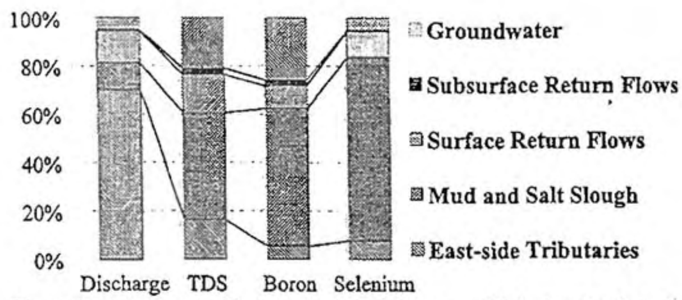


Figure 2. Mean Percent Discharge and TDS, Boron, and Selenium Loads in the San Joaquin River for Water Years 1985 Through 1994

Figure 2 does not show the breakdown of sources for Mud and Salt sloughs. Flow and load in the sloughs come from a combination of surface and subsurface agricultural return flows, seasonal wetland releases, and flood flows. Recent studies show that March and April wetland releases from Grassland Water District can account for ten percent of the TDS load and nineteen percent of the boron load in Salt Slough during these months (Grober et al, 1995). Little selenium was attributable to wetland releases.

Delta Mendota Canal Service Area Salt Budget

The major source of imported salts in the lower SJR basin and DMC service area is the DMC. An estimate for the amount of salt imported to the DMC service area was made based on monthly diversions into the DMC and mean monthly EC values. Accounting for losses to the State Water Project at O'Neill, the approximate

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mean annual delivery to the DMC service area for water years 1985 through 1994 was 16 billion cubic meters and the mean annual salt load was 545,000 tons. The flow weighted average monthly TDS concentration was therefore 330 mg/l for this time period. This 545,000 ton annual salt loading is in agreement with previous estimates made by the San Joaquin Valley Drainage Program (SJVDP) in their report on San Joaquin Valley salt budgets. (SJVDP, 1988)

SJR discharge into the Sacramento-San Joaquin River Delta is the only outlet for salts in the basin. The movement of salt to deep groundwater or confined aquifers is sometimes referred to as a loss (SJVDP,1988). This should be considered a short term loss because the salts still reside in the basin and will eventually be discharged to surface waters through natural groundwater accretions or groundwater pumping. The SJVDP report estimated a salt budget for two subareas (Northern and Grasslands) that are roughly equivalent to the DMC service area. The mean annual movement of salts to the confined aquifer beneath this area was estimated to be 390,000 tons per year. This report also found that 245,000 tons of salt per year were being pumped to the surface from the confined aquifer and 227,000 tons of salt per year were being dissolved and mobilized in surface soils within these subareas.

Based on the salt load information presented for the SJR and DMC service area, it is possible to make a rough accounting of salt in the lower SJR basin. The purpose of this accounting is to present the relative magnitude of the various salt loads in the basin and not necessarily to suggest the presence or absence of a salt balance. The data presented here show that there is a mean annual salt inflow of 545,000 tons into the DMC service area from the DMC, 145,000 tons recirculated from SJR diversions, and 227,000 tons from salt dissolution for a total of 917,000 tons per year. Mean annual salt discharge for the SJR near Vernalis is 700,000 tons which includes 135,000 tons from the east side tributaries. The net basin discharge of salt from the DMC service area is 565,000 tons per year. This suggests a net gain of 352,000 tons per year in the DMC service area. If one considers the confined aquifer a sink and includes 245,000 tons per year gained from pumping and 390,000 tons per year lost to leakage, then the annual net gain for the DMC service area is 207,000 tons per year, with a net loss of 145,000 tons per year to the confined aquifer.

Preliminary model runs using SJRIO show that there would be little immediate degradation of water quality in the river when the quality of DMC supply is degraded. An increase from 330 mg/l to 430 mg/l in DMC water would result in an increased TDS load of 36,000 tons per year entering the SJR-- four percent of the total SJR load. This 100 mg/l increase in the supply water of the DMC would actually add 163,000 tons per year to the DMC service area. The difference of 127,000 tons would go into short or long term storage in confined and unconfined aquifers.

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Summary

The relatively high loading of boron and TDS from groundwater, east-side tributaries and surface agricultural return flows will make management of these loads difficult. Management of subsurface agricultural return flows can have a dramatic impact on SJR selenium loads but comparatively little effect on boron and TDS loads. Wetland releases in the spring add significant amounts of boron, moderate amounts of TDS and little selenium to the lower SJR. SJR diversions remove significant amounts of salt, selenium and boron from the river but contribute to the problem of salt recycling in the basin. Similar recycling is probably occurring with the diversion of Sacramento-San Joaquin River Delta water into the DMC. Preliminary results using the SJRIO model show that a 100 mg/l increase in TDS concentration of irrigation water supplies from the DMC would result in an immediate four percent increase in salt load to the SJR. Long term increases would be higher as salts in short and long term storage move through the groundwater system.

Long term water quality improvements in the SJR will not be obtained by simply reducing short term salt loading to the river. Efforts must be made to reduce basin-wide salt loading or increase salt exports from the basin to promote long term improvement of SJR water quality and ensure continued productivity of the basin.

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