Restoration Goal Technical Feedback Group Meeting

San Joaquin River Restoration Program

July 7, 2011

CSU Stanislaus, Turlock, CA

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Agenda

- Introductions
- Program Background
- Technical Feedback Group Context
- TFG Meeting Purpose
- Program Updates
- Presentation monitoring/analysis studies
- Next Meeting

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Introductions

- Name
- Agency or Affiliation

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Settlement Background

1988	Lawsuit filed challenging Reclamation's renewal of the long-term contracts with Friant Division contractors
2004	Federal Judge rules Reclamation violated Section 5937 of the Fish and Game Code
2005	Settlement negotiations reinitiated to avoid remedy phase

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Settlement Goals

- Restoration Goal
  - To restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.
- Water Management Goal
  - To reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

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Implementing Agencies

- Federal Agencies:
  - Bureau of Reclamation
  - Fish and Wildlife Service
  - National Marine Fisheries Service
- State Agencies:
  - Department of Water Resources
  - Department of Fish and Game

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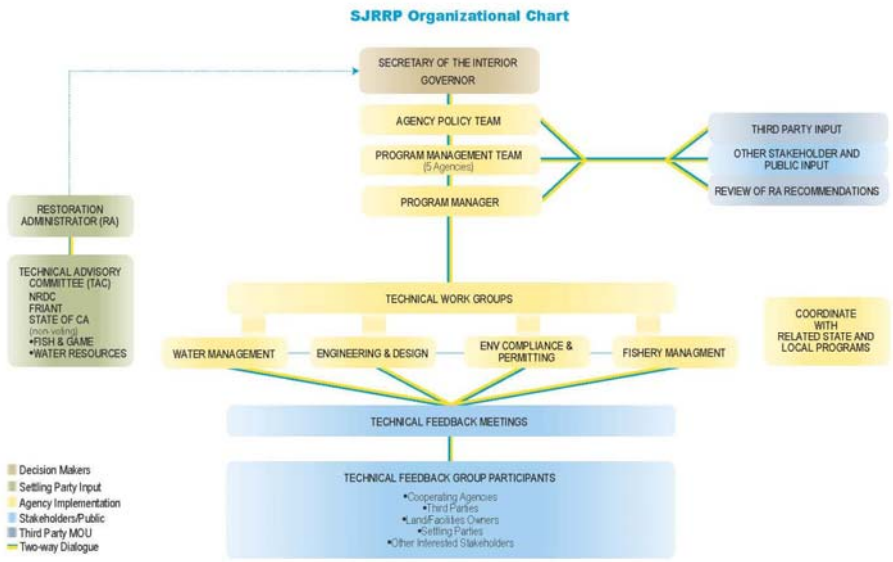
Technical Feedback Meetings



Restoration TFG Meeting Purpose

- Exchange of restoration technical information between the Implementing Agencies, Cooperating Agencies, Settling Parties, Third Parties, landowners, and other interested stakeholders.
- Today's meeting: program updates and presentation of select monitoring/analysis activities

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Interim Flows/ Flood Control Operations

Dave Mooney
Reclamation

July 7, 2011
Restoration Goal Technical Feedback Group Meeting
Turlock

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Purpose

- To collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture and reuse.
- Current Data Collection includes:
  - Flow Measurements
  - Water Surface Profile Surveys
  - Groundwater Measurements
  - Temperature Measurements
  - Water Quality Measurements
  - Sediment Studies
  - Aerial Photos
  - Fish Tagging Study

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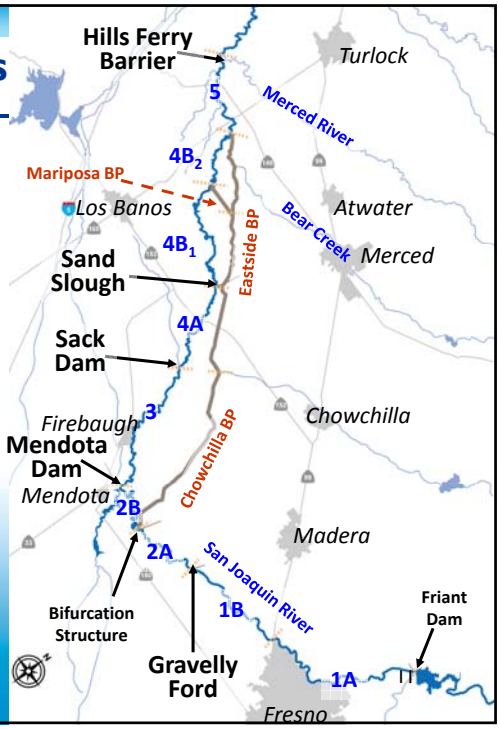
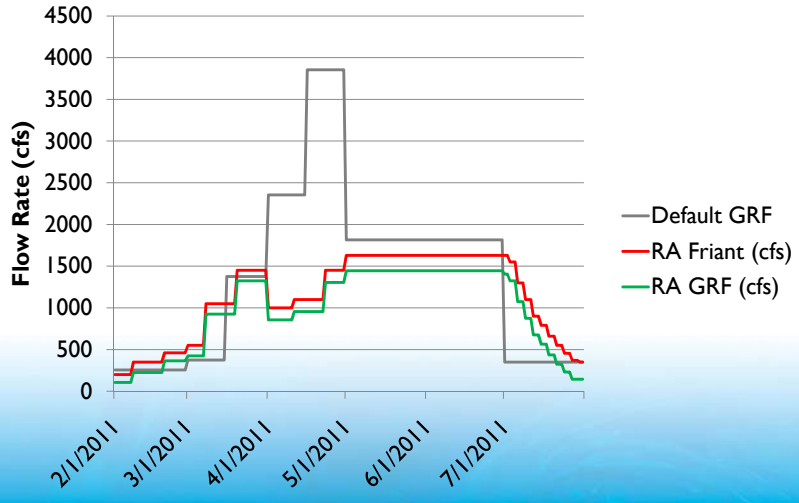
Flow Locations

- Friant Dam
- Chowchilla Bifurcation
- James Bypass
- Mendota Dam
- Sand Slough
- Mariposa Bifurcation



2011 Restoration Flow Schedule



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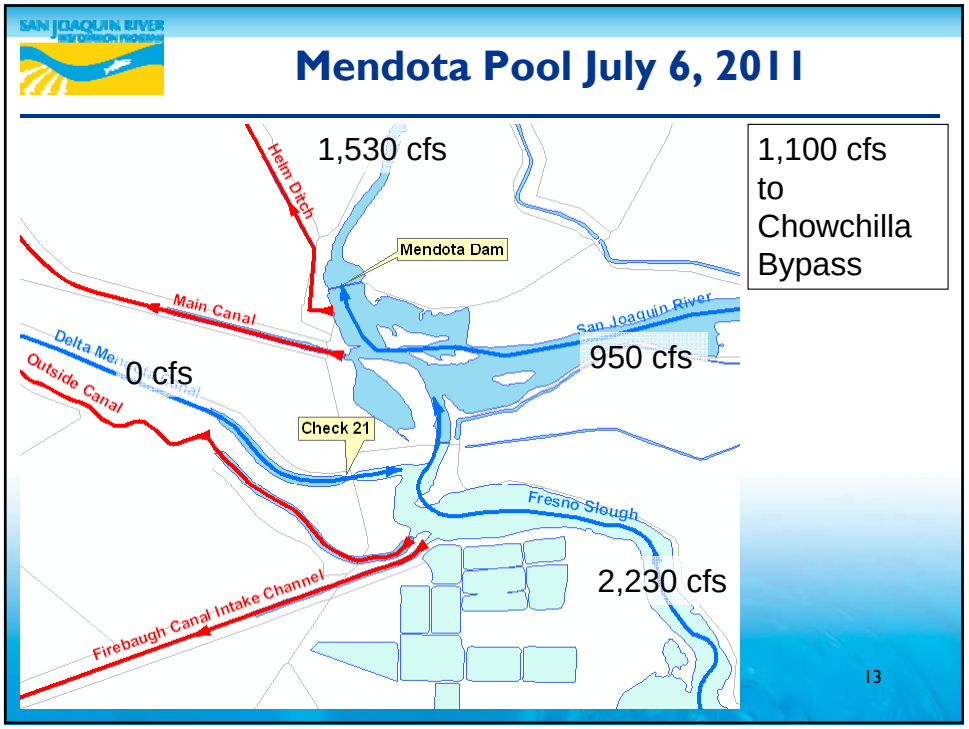
SAN JOAQUIN RIVER
Mendota Pool July 6, 2011
1,530 cfs
Helm Ditch
Mendota Dam
1,100 cfs to Chowchilla Bypass
Main Canal
San Joaquin River
950 cfs
0 cfs
Outside Canal
Check 21
Fresno Slough
2,230 cfs
Firebaugh Canal Intake Channel
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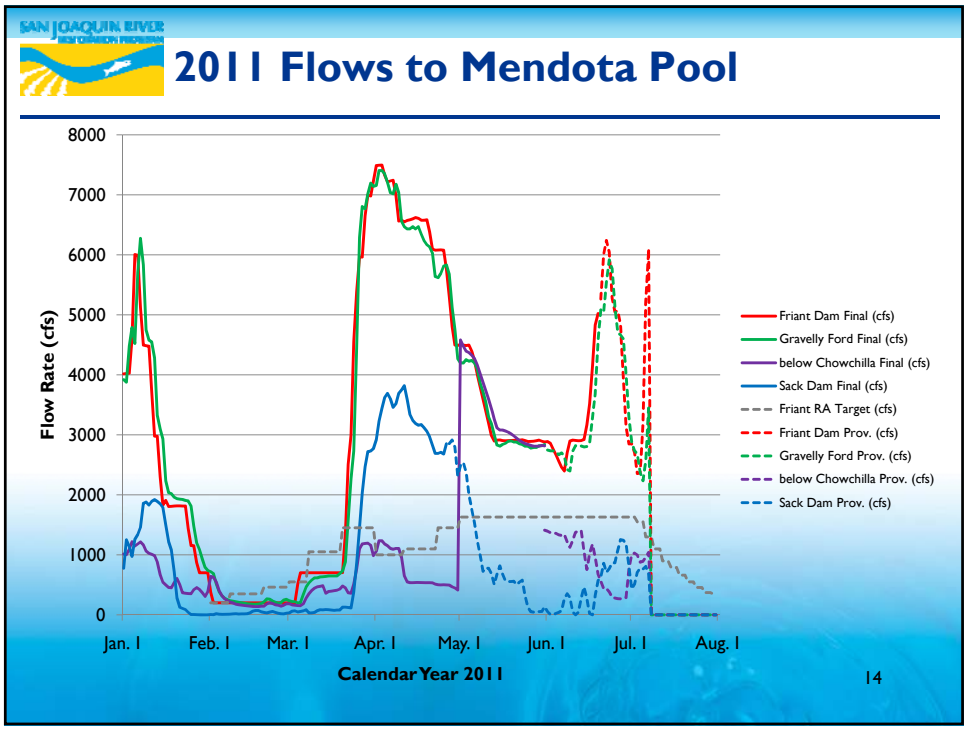
SAN JOAQUIN RIVER
2011 Flows to Mendota Pool
8000
7000
6000
5000
4000
3000
2000
1000
0
Flow Rate (cfs)
Jan. 1
Feb. 1
Mar. 1
Apr. 1
May. 1
Jun. 1
Jul. 1
Aug. 1
Calendar Year 2011
Friant Dam Final (cfs)
Gravelly Ford Final (cfs)
below Chowchilla Final (cfs)
Sack Dam Final (cfs)
Friant RA Target (cfs)
Friant Dam Prov. (cfs)
Gravelly Ford Prov. (cfs)
below Chowchilla Prov. (cfs)
Sack Dam Prov. (cfs)
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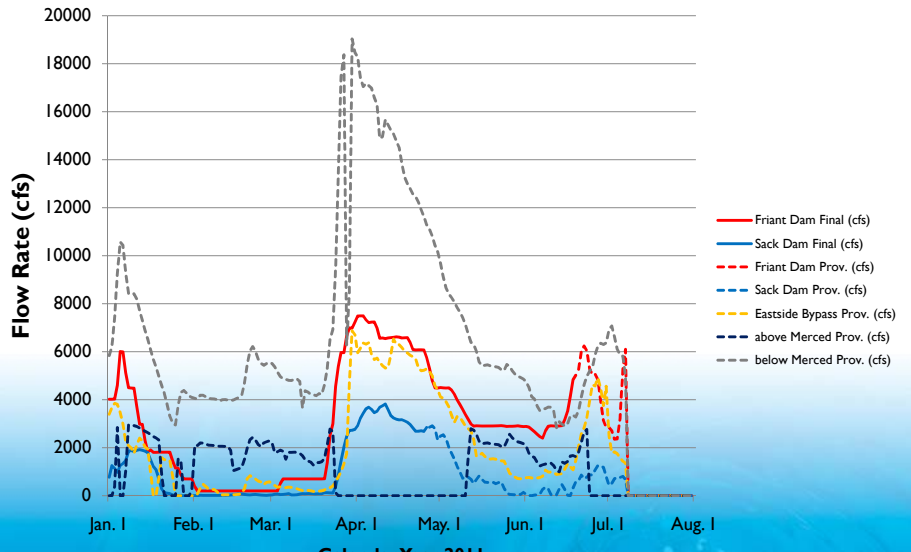
2011 Flows below Mendota Pool



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Questions?

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Monitoring and Analysis Plan

Erin Rice
Reclamation

July 7, 2011
Restoration Goal Technical Feedback Group Meeting
Turlock

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Outline

- Background/ Settlement Requirements
- Annual Planning/Reporting Schedule
- Monitoring & Analysis Plan Outline

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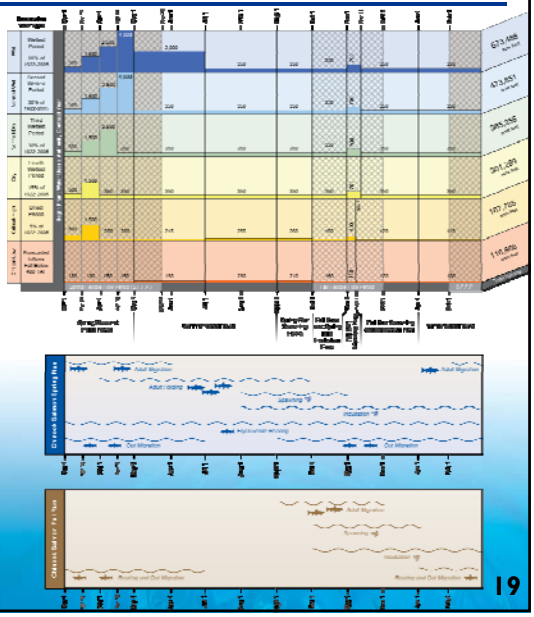
Background

- SJRRP is a comprehensive long-term effort to restore:
  - flows
  - self-sustaining Chinook salmon fishery
  - while reducing or avoiding adverse water supply impacts



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Settlement Requirements

- Channel and Structural Improvements
- Restoration Flows
- Reintroduction of Salmonids
- Interim Research Program and Releases
- Water Management

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Interim Flows Monitoring

- Interim Flows to collect relevant data concerning physical and biological parameters.
  - Monitoring network/ analytical tools/ studies
  - Data collection
  - Data analysis
  - Planning/reporting

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Monitoring & Analysis Planning

- During multi-year Interim Research Program, revise activities based on results
- Process for agency collaboration
- Describe how studies fit together

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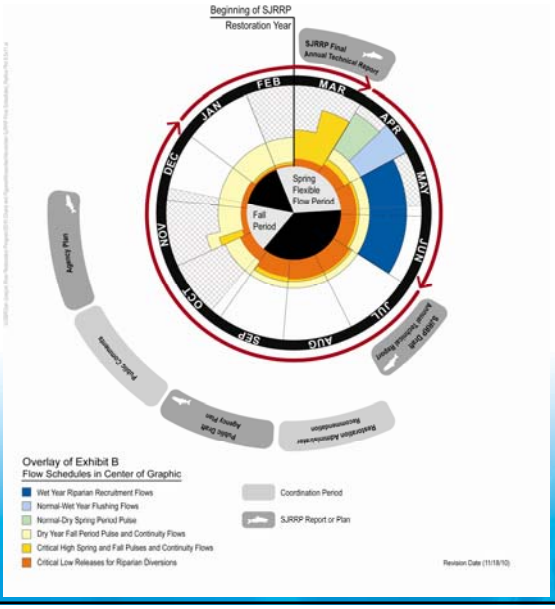
Planning and Reporting Schedule



Upcoming Milestones:

Draft 1 2011 ATR: late July

2012 MAP public comment: Sep30-Oct 28

2012 MAP: Nov 18

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2012 Monitoring and Analysis Plan Outline

Monitoring and Analysis Plan

1. Introduction	2. Background	3. Monitoring Network Development	4. Analytical Toolkit Development
5. Studies Summary	6. Conclusions	Appendixes	

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MAP Outline

1. Introduction

Presents the Implementing Agencies' monitoring and analysis activities(***Studies***) for the next year of SJRRP.

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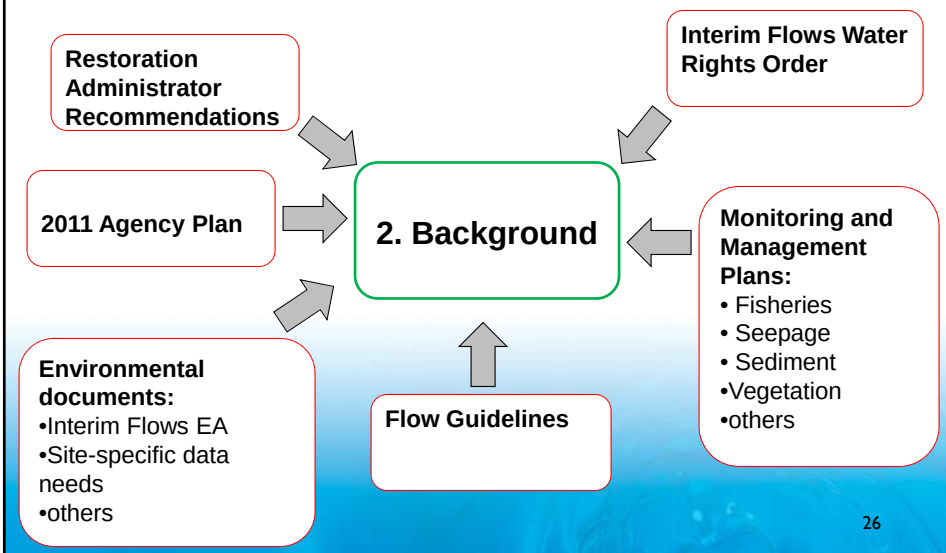
MAP Outline



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MAP Outline

3. Monitoring Network Development

4. Analytical Toolkit Development

Planned improvements to help address SJRRP information needs

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MAP Outline

2. Background

Appendixes
- Proposals

5. Studies Summary

Narrative justifying planned study implementation for the next year.

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MAP Outline

6. Conclusions

- Monitoring and analysis implementation for next year.
- Expected progress towards addressing information needs.

future ATRs

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Conclusions

MAP functions:

- Document sources SJRRP information needs to be addressed through monitoring and analysis
- Describe how different activities fit together
- Provide justification for planned implementation
- Rely on management plans to direct activities
- Process for public input into SJRRP monitoring and analysis

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Quantifying the Mobility of the Coarse Surface Layer as it Pertains to Chinook Salmon Habitat

Presented By

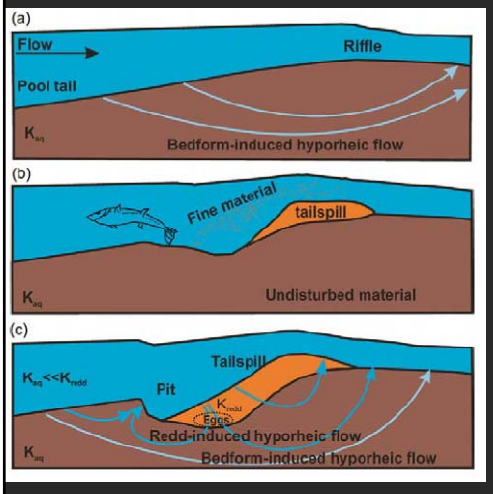
Matt Meyers, P.G.

Project Managers

Dave Encinas, P.E.
DWR South Central Region

Tom Dunne, Ph.D.
UCSB's Bren School

SJRRP | Relevance



Source: Tonina and Buffington 2009

Importance of Bed Texture
- Coarsened bed
  1) Traps fine sediment
  2) Reinforces bed surface
- Excessive fine sediment impairs
  1) Incubation
  2) Emergence

Importance of Bed Mobility
- Ventilates substrate (Incubation)
- Ability to build a redd (Adult)

Link to Altered Sediment Supply & Flow
- Friant Dam broke sediment conveyance system
  → sediment influx halted
- Friant Dam reduced peak flows
  → winnows more mobile material
  → coarsens bed surface
  → traps fines
- A "flushing" flow must exceed bed resistance

SJRRP | TAC

Interim Flow Monitoring Recommendations

18. …"(1) determine whether gravel addition would be a beneficial restoration action, and (2) whether the availability of gravel suitable for salmon spawning will change in response to restoration actions or flood flow events."

19. …"(1) determine whether gravel addition would substantially improve predicted egg-to-emergence success, (2) whether the quality of gravel suitable for salmon spawning changes in the future in response to Restoration Flows or flood flow events."

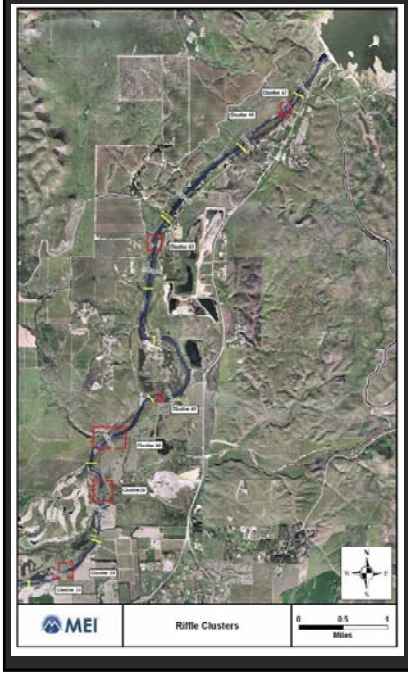
26. "Document channel bed mobilization thresholds in riffles, bars, and pool tails…tracer rocks and scour chains/cores should be installed in a variety of alluvial deposits in Reach 1…"

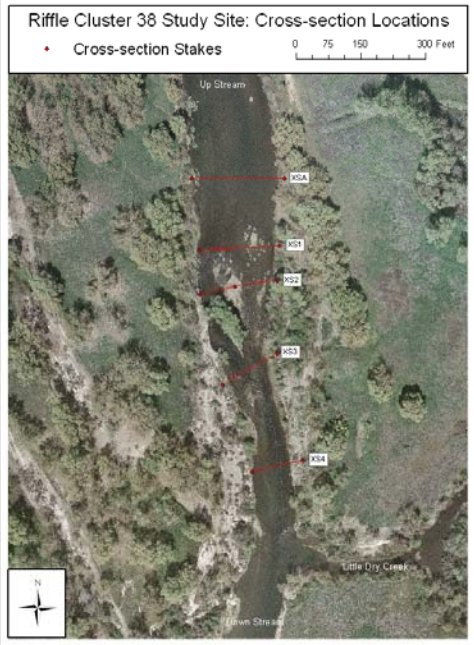
SJRRP | Process

Study Plans & Goals

1) Calculate bed surface resistance
   i. Predict flow capable of mobilizing bed
   ii. Refine spawnable area estimate
   iii. A calibrated sediment transport model
2) Methods
   i. Bed Material Characterization
      a. Pebble counts
      b. Bed Photos
      c. Bulk samples
   ii. Topographic Monitoring
   iii. Tracer Surveys
   iv. Force Gauge Measurements
   v. ADCP Surveys
   vi. Scour Chains

SJRRP | Study Sites

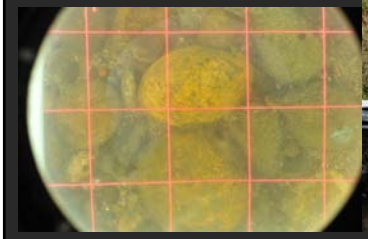




SJRRP | Bed Surface

Photo-cone (above)

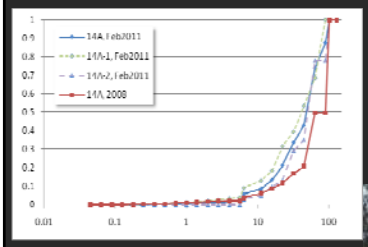
Photo-bucket (below)



Bed Photography

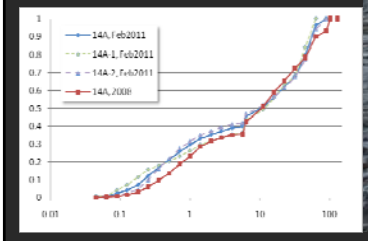
- Used to calculate percent sand, packing, and grain size distribution.
- Grid formed by the pink string is 10 cm by 10 cm.
- These photographs are reduced in size, the original larger images allow for detecting finer details (e.g. sand grains).

SJRRP | Depth Discrete Samples



Surface sample CDF (above)

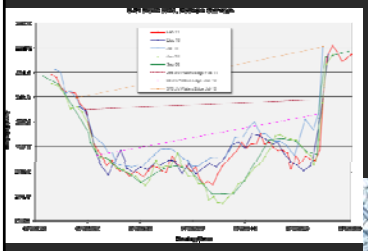
Subsurface sample CDF (below)



Sediment Sampling

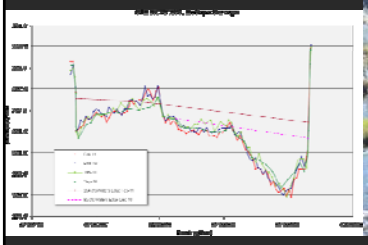
- Used to calculate grain size distribution of the coarsened surface layer, subsurface, and estimate bed load composition.
- Can also quantify change in texture resulting from:
  - Fine sediment accumulation
  - Flushing flows

SJRRP | Erosion & Deposition



Dynamic geometry (above)

Stable geometry (below)



Channel Geometry Monitoring

- Repeated channel spanning topographic cross-section surveys
- Used to measure net deposition or erosion
- Change may impact habitat conditions:
  a. Flow conditions (e.g. depth, velocity)
  b. Bed texture and mobility (i.e. sand content & looseness)
  c. Exposure of eggs to abrasive flows

SJRRP | Tracer Monitoring

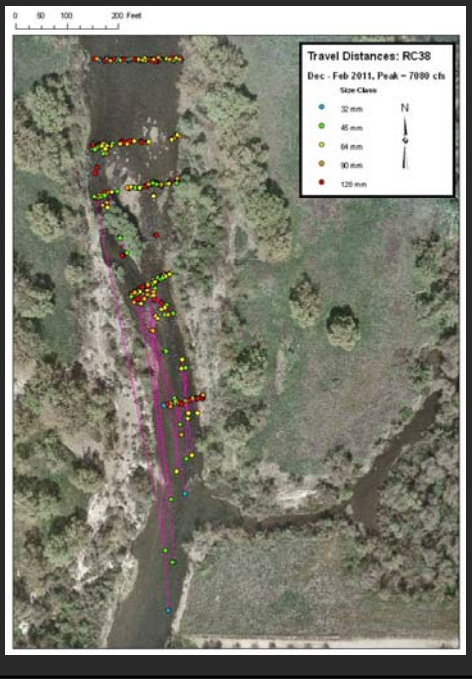
Summer 2010 RFID tracer study (above)

Bed Mobility Monitoring

- RFID tagged gravel & cobbles
- Construct, measure, place, locate, & survey
- Observations include:
  a. Distance traveled & depositional patterns
  b. Lateral & longitudinal differences
  c. Effect of tracer characteristics (e.g. size, mass, etc.)

Riffle Cluster 40, after 7,000 cfs (right)

SJRRP | Transport Distance



Riffle Cluster 38 after 7,000 cfs

Major differences in:

- Transport distances
- Amount mobilized

Deposition patterns may suggest:

- Riffle length and slope alteration?
  - Steeper or shallower slope?
  - Longer or shorter riffle?
- Lack of bedform maintenance?
  - Pool shallowing?
  - Limited sediment supply to riffles?

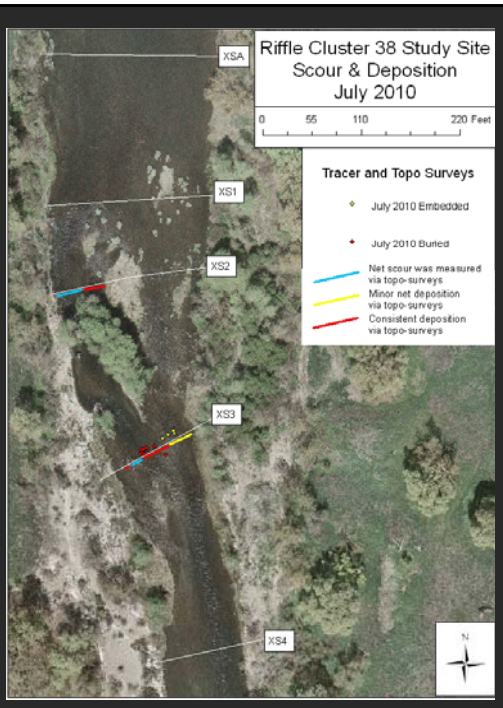
SJRRP | Scour & Deposition

Agreement between measures

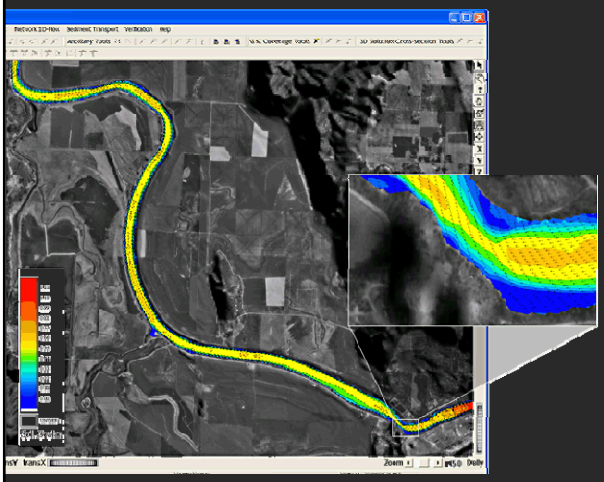
- Use tracers and repeat topo-surveys to corroborate results
- Channel geometry is active even at relatively moderate flows
- Localized channel geometry alteration

Future to include results from:

- Heightened flow conditions
  - March 2011 (8,200 cfs)
    - Tracers
    - Scour & Deposition
    - Texture
    - Channel geometry
    - Friction angles



SJRRP | Extension of Results

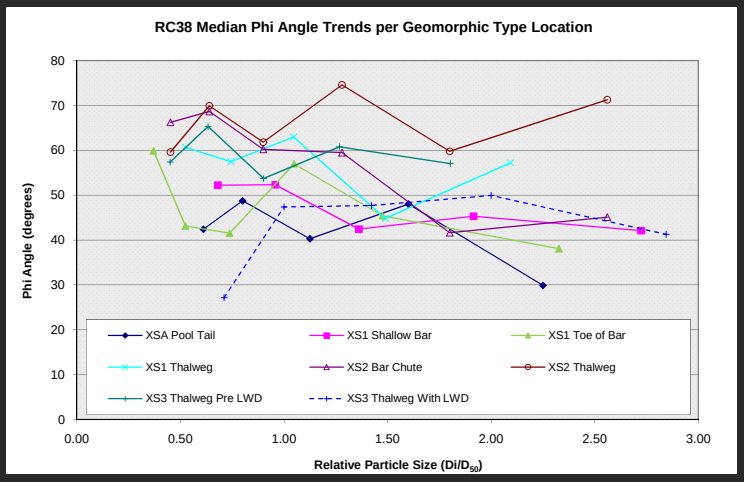


Source: USGS

Anticipated Usefulness

1. Determine area maintained by flushing at different flow levels
2. Quantify the extent of habitat under differing flow scenarios
3. Quantify the degree to which other physical factors (e.g. flow depth or velocity) limit spawnable area
4. Determine critical areas in need of management action to enhance habitat conditions
5. Extend sediment transport model to determine:
   a. The relationship between bed load sand flux and fine sediment accumulation in a redd; and
   b. Appropriate habitat enhancing alternatives for different scenarios

SJRRP | Bed Reinforcement



Comparison Force Gauge Measurements

1) Variance with particle size, location, & time
2) Reduced resistance resulting from increased bed material supply (XS3)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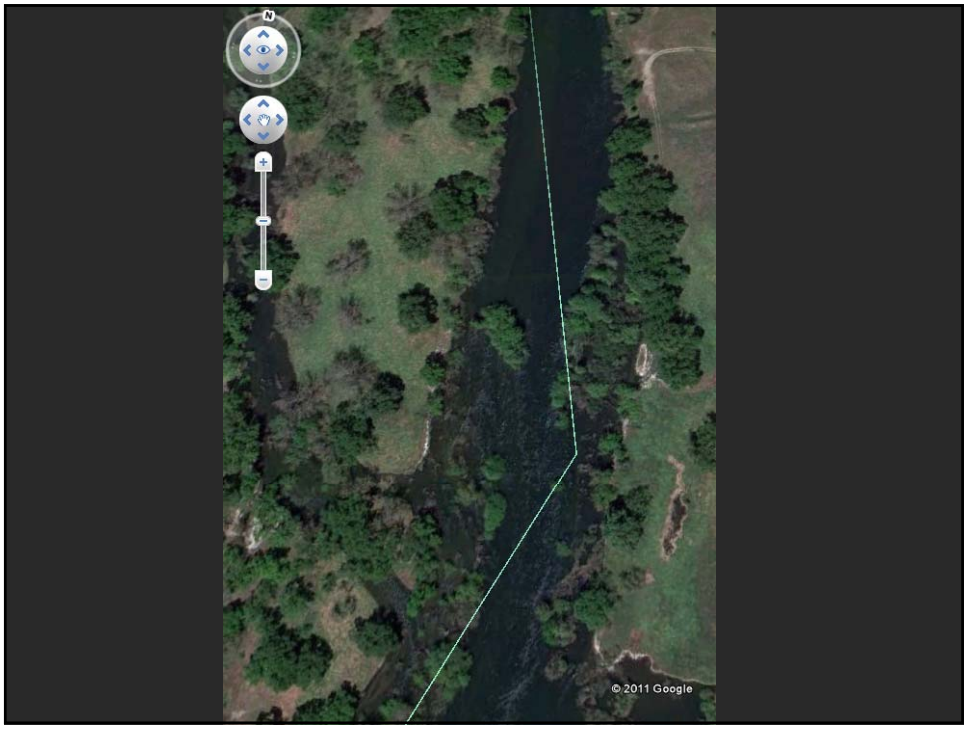

Seepage Projects

Katrina Harrison
Reclamation

July 7, 2011
Restoration Goal Technical Feedback Group Meeting
Turlock

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Outline

- Operations
- Seepage Management
- Seepage Projects

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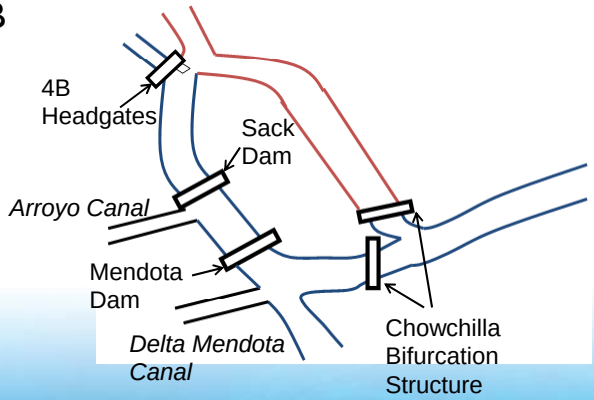
Operations

- Reaches 2A – 4B
- Water Supply
- Flood control bypasses



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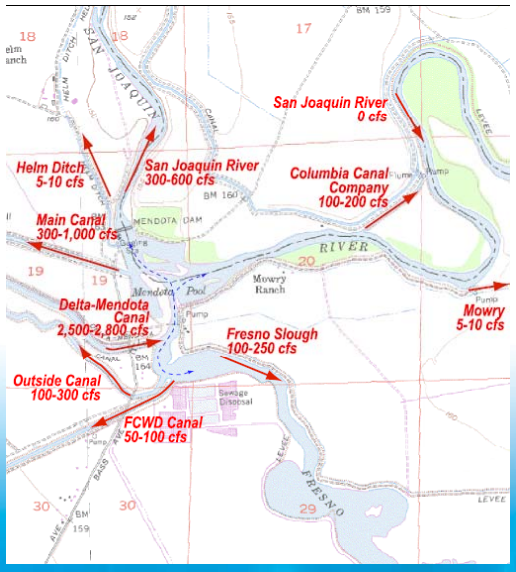
Mendota Pool Sources of Water



- Restoration Releases
- San Joaquin Deliveries
- Pine Flat Flood Releases
- DMC Deliveries
- Agricultural Returns
- Groundwater Pumping

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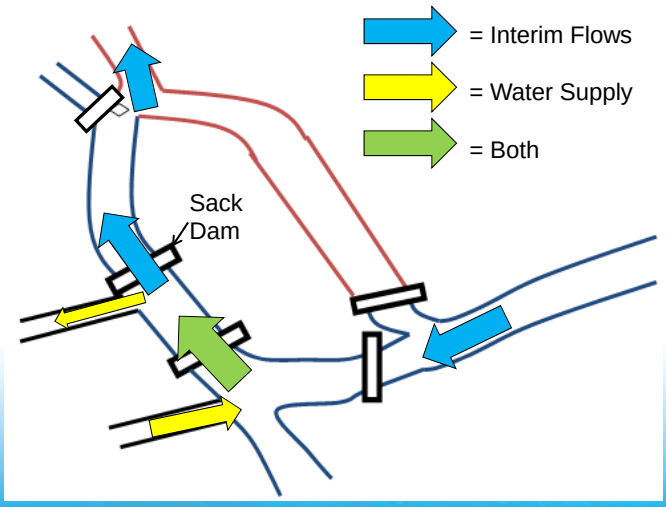
Flow Scenarios (1 of 3)

- Interim Flows
- DMC Deliveries to Mendota Pool and Arroyo Canal



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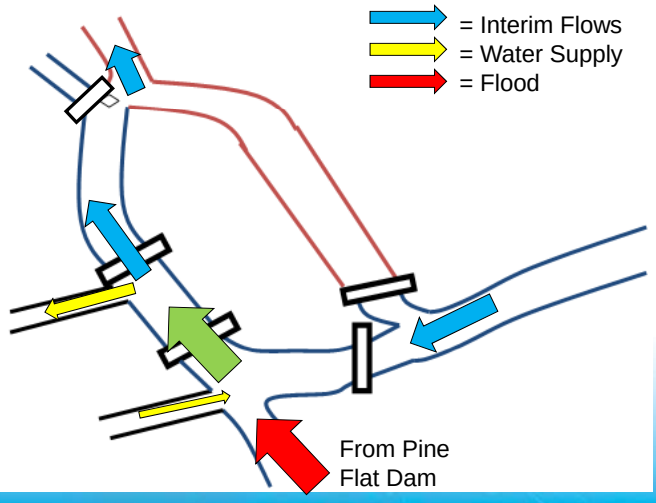
Flow Scenarios (2 of 3)

- Interim Flows
- DMC Deliveries to Mendota Pool and Arroyo Canal
- Flood Flows from Pine Flat Dam



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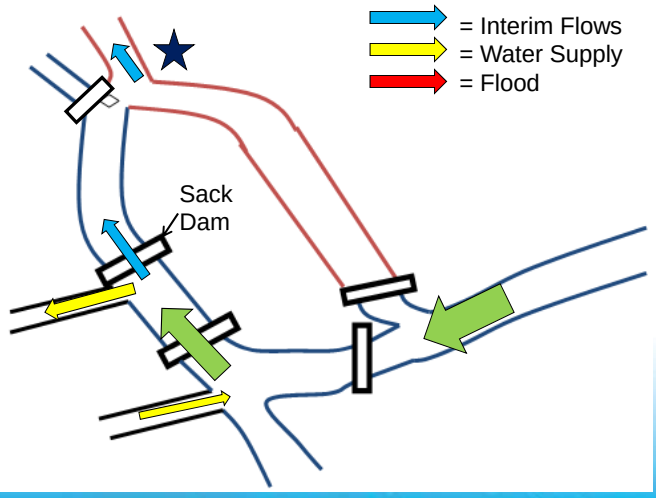
Flow Scenarios (3 of 3)

- Interim Flows
- DMC Deliveries to Mendota Pool and Arroyo Canal
- Downstream seepage constraints



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Seepage Management

- Convey flows
- Reduce Interim Flows to the extent necessary to address any material adverse impacts to third parties from groundwater seepage caused by such flows that the Secretary identifies based on the monitoring program of the Secretary

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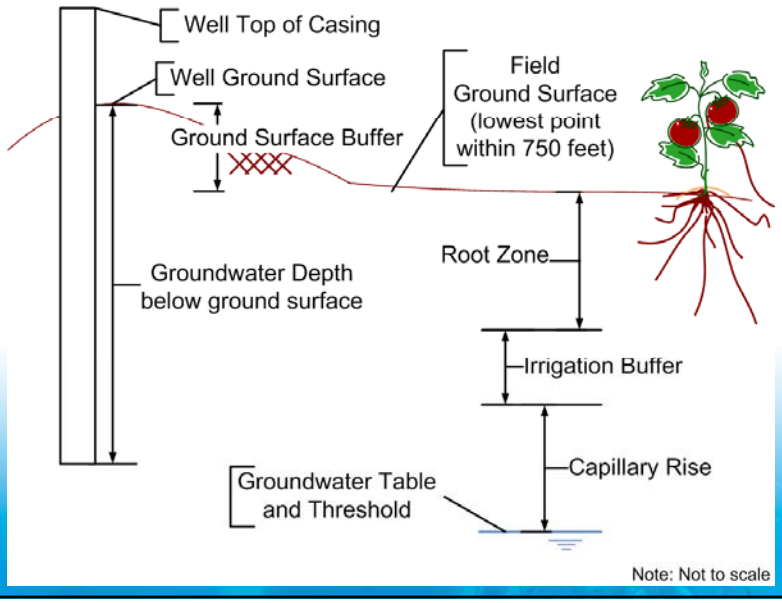
Seepage Management



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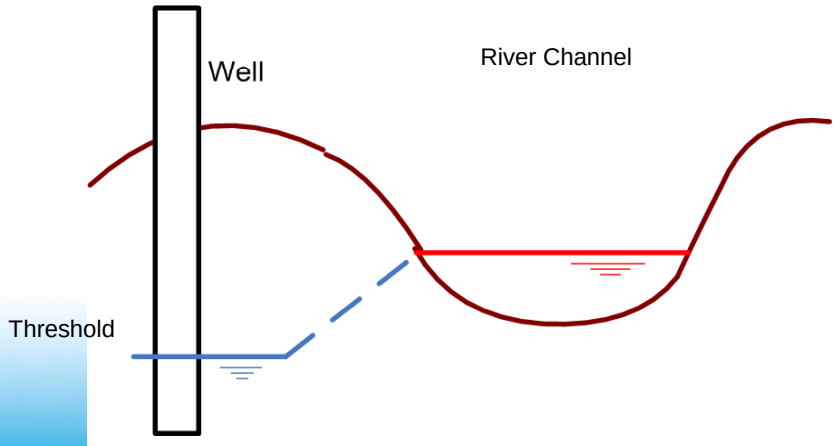
Flow Constraints



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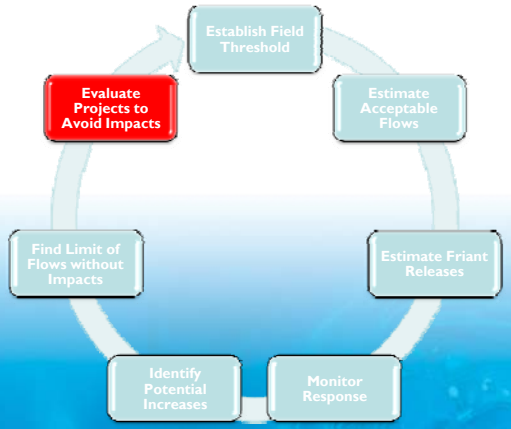
Seepage Avoidance Approach

- Hold flows below level of impacts
- Implement projects to allow increased flows



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Current Status

- Seepage Project Handbook
  - Set expectations, procedures, and timelines for installation of seepage projects
- Identify parcel groups
  - Break project area into manageable chunks
- Chose first tier projects

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Seepage Project Handbook

- Introduction
- Site Evaluation
- Plan Formulation
- Data Collection
- Design
- Environmental Compliance
- Construction
- Financial Assistance

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Plan Formulation

1) Divide project area into parcel groups
2) Initial existing data collection
3) Develop list of potential projects for a parcel group
4) Site Evaluation
5) Final Alternative

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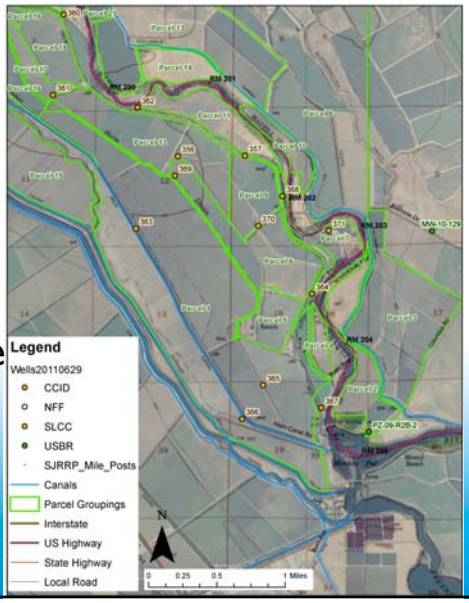
Parcel Groupings

- Criteria for initial Parcel Grouping:
  - Ownership
  - Topography
  - Infrastructure
  - Level of flow where impacts may occur
  - Soil Texture



Existing Data Collection

- Data includes:
  - Location information
  - Identified as historical seepage locations
  - Groundwater monitoring
  - Seepage observed from 2011 floods
  - Elevation
  - 1D hydraulic modeling

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Existing Data Collection

Parcel Group 1

Reach: 3
River Mile: 203
Bank: Left
Area (acres): 1218

Review:
- ☐ No Further considerations for seepage
- ☐ No present concerns, continued monitoring
- ☐ Historical seepage or flooding observed, evaluation required
- ☐ Interim Flows seepage, flooding, or shallow groundwater observed

Status:

Identified as parcel having historical seepage by: Landowner, RMC

Nearby Monitoring Wells: 365, 366, 363, 369, 361, 367

Shallowest Groundwater Level Measured: 4.8 feet below ground surface
Measured on 8/17/2010 in Monitoring Well 364

Shallowest Groundwater Level Observed in 2011 (depth of surface ponding):
Approximate Max Elevation (NAVD 88): Max Flow (cfs):

First Tier Parcel Groups

- First tier parcel group criteria:
  - Observed 2011 seepage
  - District manager observed historical seepage
  - Shallowest nearby groundwater level above 4 feet, unaffected by irrigation

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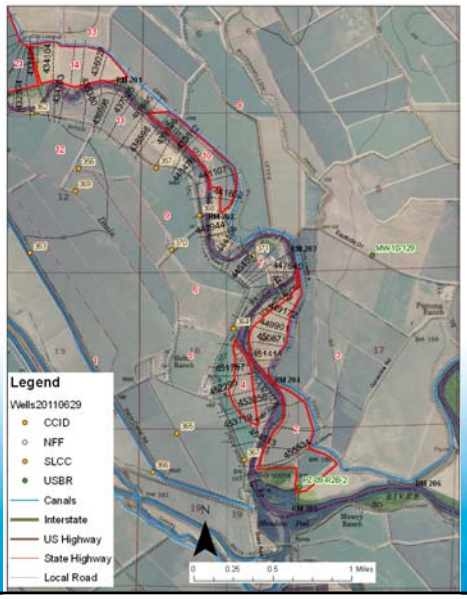
First Tier Parcel Groups – Part 1



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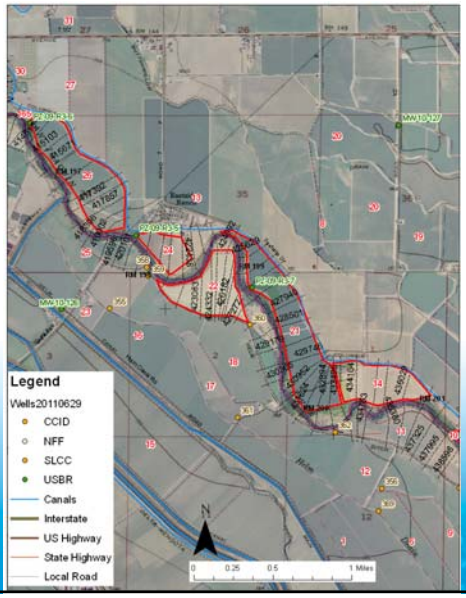
Priority Parcel Groups – Part 2



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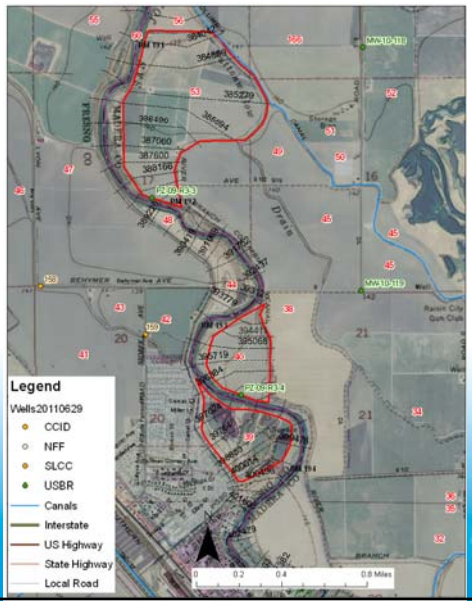
Priority Parcel Groups – Part 3



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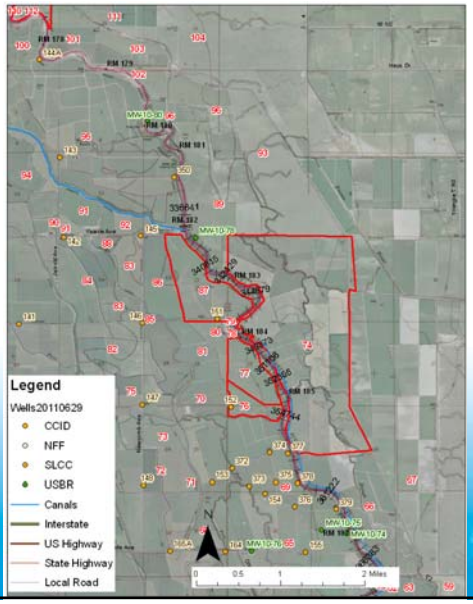
Priority Parcel Groups – Part 4



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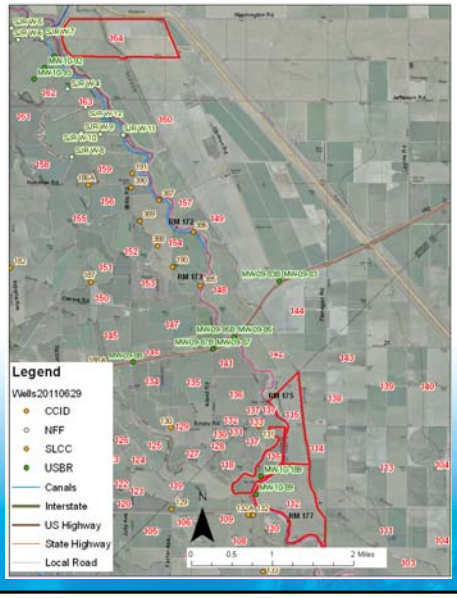
Priority Parcel Groups – Part 5



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Prioritization Methods

- Prioritize by calculated Friant release flow from HEC-RAS and groundwater threshold assuming flat groundwater table
- Identify 5-10 parcel groups to tackle this year
- Install, then choose groups for next year

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Initial Alternatives

- List of Potential Seepage Projects:
- Real Estate
  - Easements
  - Acquisition
- Physical
  - Interceptor drains
  - Slurry walls
  - Drainage ditches
  - Shallow well pumping
  - Conveyance improvements

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Initial Alternatives

- Depend on site-specific conditions such as:
- Infrastructure
- Soil texture
- Cultural resources
- Endangered species
- Historical hydrology
- Potential Crops

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Site Evaluation

- Fieldwork to gather data including:
  - Hydraulic Conductivity
  - Groundwater
  - Surface Water
  - Soil Texture
  - Water Quality

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Final Alternative

- Considerations and selection criteria for final alternative include:
  - Design/Feasibility
  - Suitability to Site Conditions
  - Landowner Acceptability
  - Cost
  - Environmental Compliance
  - Project Agreement

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Challenges

- Ownership
- Operations and Maintenance
- Water Discharge
- Water Rights
- Long-term Monitoring
- Cost-share
- Terms of an Agreement

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Questions?

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Closing and Next Meeting

- Restoration Goal TFG meetings to be held approximately every 2 months
- To discuss future meeting topics, please contact Erin Rice: erice@usbr.gov.

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