The Restoration Administrator, as of April 11, 2013, recommends increasing releases from Friant Dam for Interim Flows and riparian diversions to 1060 cfs on April 12, 2013. To date, groundwater levels in monitoring wells adjacent to the Eastside Bypass continue to restrict flows below Sack Dam to 0 cfs. The combined release from Friant Dam including Interim Flow and riparian releases will be increased to 1060 cfs on April 12, 2013 at 3:00 pm.

As of April 12, 2013:

1. Channel conveyance: Flow rates are below known conveyance thresholds.

2. Operations Conference Call: During the week of April 8 the call has been held for daily discussion of demand in Mendota Pool. Operators have raised concerns regarding the amount of exchangeable demand available in Mendota Pool. Currently Mendota Pool demand is approximately 1036 cfs. If demand remains at this level through Thursday April 18, this allows the full 1060 cfs release from Friant (784 cfs at the pool) to be recaptured with an additional 500 cfs providing the remaining demand from the Delta Mendota Canal (DMC).

3. Seepage Hotline Calls: The seepage hotline has received no calls in Water Year 2013.

4. Real-time wells: Groundwater monitoring well levels are below thresholds. These wells do not restrict releases.

5. Priority wells: Weekly groundwater measurements in priority wells, Table 2, indicate the groundwater level is above the threshold in MW-10-95. This restricts releases below Sack Dam at this time.

6. Flow Stabilization: Flows between Friant Dam and Mendota Pool are relatively stable, following the last change to 700 cfs at Friant Dam on Friday April 5.

7. Projected Groundwater Level Increases: Projected groundwater levels indicate levels may rise above the threshold in one well, based on the proposed increase in flow (Table 4) and groundwater measurements made the week ending April 6, 2013.

8. Levees: The LSJLD has not identified any concerns.

9. Water Districts: The SJRECWA and member agencies have identified concerns including the lack of exchangeable demand in Mendota Pool, and water quality in the lower DMC at flows <500 cfs, as described in part 2 above.

Analysis

Mendota Pool Inflows: Water users have identified water quality concerns if Delta Mendota Canal flows drop below 500 cfs. Interim Flows into Mendota Pool at a 1060 cfs release are estimated at 784 cfs based on the Settlement Exhibit B loss assumptions. Groundwater exchange
into Mendota Pool is currently at 57 cfs. Total inflows next week are predicted to be approximately 1341 cfs.

Mendota Pool Demands: Currently exchange contractor demand in Mendota Pool is approximately 651 cfs. Operational diversions currently provide 385 cfs of demand but will increase to 625 cfs of demand prior to April 18. This sums to a total demand of 1341 cfs by late next week.

Table 1: Approximate Predicted Mendota Pool Mass Balance

<table>
<thead>
<tr>
<th>Sources</th>
<th>Demand 4/12/2013</th>
<th>Demand 4/18/2013*</th>
<th>Inflow Sources 4/12/2013</th>
<th>Inflow Sources 4/18/2013*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mendota Pool Demand¹</td>
<td>651</td>
<td>716²</td>
<td>DMC Flows 750²</td>
<td>500</td>
</tr>
<tr>
<td>Westlands</td>
<td>100</td>
<td>100</td>
<td>SJRRP 399</td>
<td>784</td>
</tr>
<tr>
<td>Meyers Water Bank</td>
<td>25</td>
<td>25</td>
<td>Pump-in 57</td>
<td>57</td>
</tr>
<tr>
<td>James ID</td>
<td>70</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCID- in lieu of groundwater</td>
<td>190</td>
<td>360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panoche WD</td>
<td>0</td>
<td>50 (pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLCC- in lieu of groundwater</td>
<td>0</td>
<td>(pending)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCID routing to lower SJR</td>
<td>0</td>
<td>Contingency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1036</td>
<td>1341</td>
<td>1206</td>
<td>1341</td>
</tr>
</tbody>
</table>

*Estimated

1. Total of demand including Exchange contractors, Tranquility, Department of Fish and Wildlife, etc. Excludes recapture agreements set up by SJRRP.

2. DMC flows exceed orders today, to regain elevation in Mendota Pool.

3. Anticipated increase of at least 64 cfs by Thursday, April 18. If demand does not increase, SJRRP will exchange water with SLCC, or route water through CCID’s system to the lower river.

Priority well MW-10-95 (Reach 4B1 Eastside Bypass) measurements show depths to groundwater at 1.43 feet above the threshold (3/30/13 measurement). No water from the San Joaquin River currently reaches the Eastside Bypass. The projected water surface elevation in the Eastside Bypass adjacent to this well with 10 cfs in the channel is 92.7 feet above sea level. The threshold elevation in MW-10-95 is 92.8 feet above sea level. This does not provide enough of a gradient (0.1 feet) to allow groundwater levels to drain below the threshold. This well restricts releases past Sack Dam to 0 cfs at this time.
Data

Table 2 shows the groundwater depth in 7 realtime wells as of April 11, 2013 and manual measurements from field staff as reported in the weekly groundwater report with a publish date of April 6, 2013 (or March 30, 2013 where noted). Reclamation publishes the weekly groundwater report with manual measurements via electronic well sounder and recent flow data on the SJRRP website at: http://www.restoresjr.net/flows/Groundwater/Groundwater.html. To calculate field depths, Reclamation adds ground surface buffers and lateral gradient buffers to measured groundwater depths in the well. A negative ground surface buffer indicates the well is above the field. See Figure 1 for a visual depiction and equation 1 for a mathematical one.

\[
Field \ Depth_{Current} = D_{Well} + GSB_{uffer} + LG_{Buffer}
\] (1)

<table>
<thead>
<tr>
<th>Well</th>
<th>Reach</th>
<th>1 - Measured Groundwater Depth in Well (feet bgs)</th>
<th>2 - Ground Surface Buffer (feet)</th>
<th>3 - Lateral Gradient Buffer (feet)</th>
<th>4 - Field GW Depth (feet bgs)</th>
<th>5 - Field Threshold (feet bgs)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-9</td>
<td>2A</td>
<td>8.0</td>
<td>-3.7</td>
<td>2.5</td>
<td>6.8</td>
<td>5.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-47</td>
<td>2A</td>
<td>8.25</td>
<td>-3.5</td>
<td>3.3</td>
<td>8.05</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MA-4</td>
<td>2A</td>
<td>11.7</td>
<td>-6.1</td>
<td>4.6</td>
<td>10.2</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-49B</td>
<td>2A</td>
<td>5.5</td>
<td>-1.7</td>
<td>2.4</td>
<td>6.2</td>
<td>4.5</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-54B</td>
<td>2B</td>
<td>14.2</td>
<td>-7.9</td>
<td>5.5</td>
<td>11.8</td>
<td>10.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-55B</td>
<td>2B</td>
<td>8.3</td>
<td>-3.7</td>
<td>3.0</td>
<td>7.6</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R2B-1</td>
<td>2B</td>
<td>-</td>
<td>-1.3</td>
<td>0.0</td>
<td>-1.3</td>
<td>5.0</td>
<td>-</td>
</tr>
<tr>
<td>PZ-09-R2B-2</td>
<td>2B</td>
<td>8.6</td>
<td>-3.9</td>
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<td>4.7</td>
<td>4.5</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R3-5</td>
<td>3</td>
<td>11.8</td>
<td>-1.2</td>
<td>0.0</td>
<td>10.6</td>
<td>5.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R3-6</td>
<td>3</td>
<td>10.6</td>
<td>-1.5</td>
<td>0.0</td>
<td>9.1</td>
<td>4.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R3-7</td>
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<td>0.0</td>
<td>8.7</td>
<td>3.5</td>
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<td>MW-10-75</td>
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<td>6.3</td>
<td>Acceptable</td>
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<tr>
<td>MW-11-130</td>
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<td>0.0</td>
<td>0.0</td>
<td>0</td>
<td>5.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-87B</td>
<td>4A</td>
<td>-</td>
<td>-1.9</td>
<td>1.0</td>
<td>-0.9</td>
<td>4.2</td>
<td>-</td>
</tr>
<tr>
<td>MW-10-89</td>
<td>4A</td>
<td>13.4</td>
<td>-3.4</td>
<td>0.0</td>
<td>10</td>
<td>7.6</td>
<td>-</td>
</tr>
<tr>
<td>MW-10-92</td>
<td>4A</td>
<td>5.9</td>
<td>-2.6</td>
<td>0.0</td>
<td>3.3</td>
<td>5.0</td>
<td>Above Threshold</td>
</tr>
<tr>
<td>MW-10-90</td>
<td>4B1</td>
<td>6.3</td>
<td>0.8</td>
<td>0.0</td>
<td>7.1</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-10-94</td>
<td>4B1</td>
<td>7.8*</td>
<td>0.0</td>
<td>1.0</td>
<td>1</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-10-95</td>
<td>4B1</td>
<td>3.6*</td>
<td>-2.2</td>
<td>1.0</td>
<td>-1.2</td>
<td>5.0</td>
<td>Above Threshold</td>
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<tr>
<td>MW-11-142</td>
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<td>0.0</td>
<td>0.0</td>
<td>5.4</td>
<td>4.0</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

bgs = below ground surface; GW = groundwater; *3/30/13 Report

Table 3 shows the anticipated flow rates used to evaluate future groundwater depths. Reclamation calculated losses from Friant Dam to the Mendota Pool based on the long-term pattern established by Exhibit B.
<table>
<thead>
<tr>
<th>Table 3: Anticipated Change in Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recent Flows</strong></td>
</tr>
<tr>
<td><strong>(cfs)</strong></td>
</tr>
<tr>
<td>Reach 1</td>
</tr>
<tr>
<td>Reach 2A</td>
</tr>
<tr>
<td>Reach 2B</td>
</tr>
<tr>
<td>Reach 3</td>
</tr>
<tr>
<td>Reach 4A</td>
</tr>
<tr>
<td>Reach 4B1 (ESB)</td>
</tr>
</tbody>
</table>

Table 4 shows the current and maximum rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figures 1 and 2. Field depths are calculated by taking the most recent measurements from Table 1, adding the ground surface and the lateral gradient buffer, and subtracting the maximum predicted stage increase, as shown below in Equation 2.

\[
\text{Field Depth}_{\text{Predicted}} = \text{Field Depth}_{\text{Current}} - \text{WSEI}_{\text{Max Increase}}
\]  

(2)

See Figure 4 and the last pages for the locations of these monitoring wells and the rating curves for each of the key wells from the Mussetter Engineering, Inc., 2008 San Joaquin HEC-RAS Model Documentation Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2. These rating curves are used to determine the maximum predicted increase in water surface elevation, as shown in Figure 1.

![Figure 1: One to one surface to groundwater relationship for Increase in Stage Method](image-url)
**DRAFT SJRRP Flow Bench Evaluation**

April 12, 2013

**Table 4: Predicted Groundwater Levels for Key Wells – Increase in Stage Method**

<table>
<thead>
<tr>
<th>Well</th>
<th>Reach</th>
<th>1 - Measured Groundwater Depth in Well (feet bgs)</th>
<th>2 - Ground Surface Buffer (feet)</th>
<th>3 - Lateral Gradient Buffer (feet)</th>
<th>4 - Field GW Depth (feet bgs)</th>
<th>6 - Maximum Predicted WSEL Increase (feet)</th>
<th>7 - Predicted Shallowest GW Depth (feet bgs)</th>
<th>5 - Field Threshold (feet bgs)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-9</td>
<td>2A</td>
<td>8.0</td>
<td>-3.7</td>
<td>2.5</td>
<td>6.8</td>
<td>0.6</td>
<td>6.2</td>
<td>5.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-47</td>
<td>2A</td>
<td>8.3</td>
<td>-3.5</td>
<td>3.3</td>
<td>8.1</td>
<td>0.6</td>
<td>7.5</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MA-4</td>
<td>2A</td>
<td>11.7</td>
<td>-6.1</td>
<td>4.6</td>
<td>10.2</td>
<td>1.0</td>
<td>9.2</td>
<td>7.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-49B</td>
<td>2A</td>
<td>5.5</td>
<td>-1.7</td>
<td>2.4</td>
<td>6.2</td>
<td>1.0</td>
<td>5.3</td>
<td>4.5</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-09-54B</td>
<td>2B</td>
<td>14.2</td>
<td>-7.9</td>
<td>5.5</td>
<td>11.8</td>
<td>1.2</td>
<td>10.6</td>
<td>10.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R2B-1</td>
<td>2B</td>
<td>-</td>
<td>-1.3</td>
<td>0.0</td>
<td>-</td>
<td>0.3</td>
<td>-</td>
<td>5.0</td>
<td>-</td>
</tr>
<tr>
<td>PZ-09-R2B-2</td>
<td>2B</td>
<td>8.6</td>
<td>-3.9</td>
<td>0.0</td>
<td>4.7</td>
<td>0.0</td>
<td>-</td>
<td>4.5</td>
<td>Acceptable</td>
</tr>
<tr>
<td>PZ-09-R3-5</td>
<td>3</td>
<td>11.8</td>
<td>-1.2</td>
<td>0.0</td>
<td>10.6</td>
<td>0.0</td>
<td>10.6</td>
<td>5.0</td>
<td>Acceptable</td>
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<td>PZ-09-R3-6</td>
<td>3</td>
<td>10.6</td>
<td>-1.5</td>
<td>0.0</td>
<td>9.1</td>
<td>0.0</td>
<td>9.1</td>
<td>4.0</td>
<td>Acceptable</td>
</tr>
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<td>8.7</td>
<td>0.0</td>
<td>8.7</td>
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<td>Acceptable</td>
</tr>
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<td>MW-10-75</td>
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<td>0.2</td>
<td>10.6</td>
<td>0.0</td>
<td>10.6</td>
<td>6.3</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-11-130</td>
<td>4A</td>
<td>-</td>
<td>0.0</td>
<td>0.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>5.0</td>
<td>-</td>
</tr>
<tr>
<td>MW-09-87B</td>
<td>4A</td>
<td>-</td>
<td>-1.9</td>
<td>1.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>4.2</td>
<td>-</td>
</tr>
<tr>
<td>MW-10-89</td>
<td>4A</td>
<td>13.4</td>
<td>-3.4</td>
<td>0.0</td>
<td>10.0</td>
<td>0.0</td>
<td>10.0</td>
<td>7.6</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

Bgs = below ground surface; GW = groundwater; WSEL = water surface elevation.
Table 4 shows the predicted maximum rise in groundwater based on the elevation of the water surface in the river and the conceptual model shown in Figure 3. Reclamation uses this drainage method where current groundwater levels are higher than thresholds without flows in the San Joaquin River. A predicted water surface elevation (WSEL) above (or within 0.3 feet) of the threshold elevation does not allow drainage and therefore restricts flows.

Table 5: Predicted Groundwater Elevation for Key Wells – Drainage Method

<table>
<thead>
<tr>
<th>Well</th>
<th>Reach</th>
<th>10 - Existing Field GW Elevation (feet)</th>
<th>11 - Predicted WSEL (feet)</th>
<th>12 - Threshold Elevation (feet)</th>
<th>Drainage Method Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-10-55B</td>
<td>2B</td>
<td>154.4</td>
<td>157.4</td>
<td>158.0</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-10-92</td>
<td>4A</td>
<td>98.6</td>
<td>98.0</td>
<td>98.4</td>
<td>Acceptable</td>
</tr>
<tr>
<td>MW-10-90</td>
<td>4B1</td>
<td>95.0</td>
<td>94.2</td>
<td>95.1</td>
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<tr>
<td>MW-10-95</td>
<td>4B1</td>
<td>95.3</td>
<td>92.7</td>
<td>92.8</td>
<td>Does not allow drainage</td>
</tr>
</tbody>
</table>

Bgs = below ground surface; GW = groundwater; WSEL = water surface elevation
Figure 3: Conceptual Model for Drainage Method

Figure 4: Key Monitoring Well Locations
MW-09-87B

Flow (cfs)

Water Surface Elevation (feet)

0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000

90 95 100 105 110 115 120

MW-10-89

Flow (cfs)

Water Surface Elevation (feet)

0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000

90 95 100 105 110 115 120