BASE LOADING ON THE STATE WATER PROJECT

SOUTHERN CALIFORNIA WATER DIALOGUE

MARCH 22, 2017

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MANAGER OF WATER RESOURCES
SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT
IS THE DROUGHT OVER?

U.S. Drought Monitor
California

March 14, 2017
(Released Thursday, Mar. 16, 2017)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th>Intensity</th>
<th>None</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>76.54</td>
<td>23.46</td>
<td>8.24</td>
<td>1.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Last Week</td>
<td>76.54</td>
<td>23.46</td>
<td>8.24</td>
<td>1.10</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3 Months Ago</td>
<td>12.16</td>
<td>87.84</td>
<td>73.04</td>
<td>60.27</td>
<td>42.80</td>
<td>21.04</td>
</tr>
<tr>
<td>Start of Calendar Year 1/1/2017</td>
<td>18.07</td>
<td>81.93</td>
<td>67.51</td>
<td>54.02</td>
<td>38.17</td>
<td>18.31</td>
</tr>
<tr>
<td>Start of Water Year 9/7/2016</td>
<td>0.00</td>
<td>100.00</td>
<td>83.59</td>
<td>62.27</td>
<td>42.80</td>
<td>21.04</td>
</tr>
<tr>
<td>One Year Ago</td>
<td>0.43</td>
<td>99.57</td>
<td>93.28</td>
<td>73.84</td>
<td>55.31</td>
<td>34.74</td>
</tr>
</tbody>
</table>

Intensity:
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brian Fuchs
National Drought Mitigation Center
MAJOR FLOODING
Through Tuesday Night
- Lives threatened
- Rivers overflow
- Property damage
- Mud and rock slides
- Melting snow

AccuWeather

RIVER OF MOISTURE
FLOODING
DEVASTATING FLOODING
EXCESSIVE SNOW

Vieira's Resort
RUSTY ANCHOR
PRECIPITATION FOR SWP

North Sierra Precipitation: 8-Station Index, March 21, 2017

- Current Daily Precip: 79.2
- Percent of Average for this Date: 201%
- 1982-1983 (wettest) 98.5
- 1997-1998 82.4
- 2015-2016 Daily Precip 57.9
- Average (1922-1998) 60.0
- 2014-2015 Daily Precip 37.2
- 1976-1977 (2nd driest & driest thru Aug) 19.0
SNOW FOR SWP

California Snow Water Content, March 21, 2017, Percent of April 1 Average

North
- Percent of Average for this Date: 138%
- 1982-1983 (max)
- 2015-2016
- Average
- 2014-2015 (min)

Central
- Percent of Average for this Date: 168%
- 1982-1983 (max)
- 2015-2016
- Average
- 2014-2015 (min)

South
- Percent of Average for this Date: 164%
- 1982-1983 (max)
- 2015-2016
- Average
- 2014-2015 (min)
WATER RESOURCES

- Local Rain: 72%
- SWP (No. CA Rain): 23%
- Recycled: 5%

San Bernardino: 232,100
Rialto-Colton: 12,000
Yucaipa: 9,000
Riverside North: 9,000

(Lytle Creek & Bunker Hill)
San Bernardino Basin Area Three Station Precipitation Index

Historic Average (1931-Present)  
Safe Yield Average (1934-1960)  
Current WY (2016-17), 28.53 inches

1992-1993 (wettest)  
1992-1993  
76.9

1992-1993 (wettest)  
1992-1993  
76.9

2001-2002 (driest)  
2001-2002  
7.0
STILL BELOW AVERAGE FOR THE YEAR

San Bernardino Basin Area Three Station Precipitation Index

Average Annual Precipitation (in.)

Cumulative Departure from Safe Yield Period Avg (in.)

Historic Average (1931-Present)

Safe Yield Period Avg (1934-1960)

Cumulative Departure from Safe Yield Period Avg

Average of Lytle Creek / Big Bear (SAR) / Mill Creek - Precip Data
Cumulative Change in Storage for the SBBA with and without SWP Water

- Cumulative Change in Storage (CCIS)
- CCIS without SWP
Cumulative Change in Storage for the Rialto-Colton Basin with and without SWP Water

Cumulative Change in Storage (CCIS)

- CCIS Without SWP
Cumulative Change in Storage for the Yucaipa Basin with and without SWP Water

Cumulative Change in Storage as compared to Base Year 1993

Cumulative Change in Storage (CCIS) vs. CCIS Without SWP

SWP Treatment Plant Completed 2005
WHAT IF DROUGHTS LAST LONGER?

A 200-year drought? Evidence from tree rings shows that drought was historically much more widespread in the American West than now, while the 20th century was wetter than normal. Percentage of the West affected by drought from 800 A.D. to 2000:

Medieval megadroughts: The West experienced two abnormally dry periods lasting close to 200 years each during the Middle Ages.

1850: California becomes state

Source: E.R. Cook et al, Earth-Science Reviews
**OWOW WATERSHED-SCALE WATER MANAGEMENT CONCEPTS**

<table>
<thead>
<tr>
<th><strong>One Water One Watershed</strong> 2010 Integrated Regional Water Management Plan</th>
<th><strong>One Water One Watershed 2.0 Plan</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduced “exchange” concept of “replacement” water to upper/middle watershed for recycled water staying in river</td>
<td>Watershed Exchange Program (40,000 AFY Evaluation)</td>
</tr>
<tr>
<td>“Base Load” off of imported water</td>
<td>Wet Year Storage Program (120,000 AF Evaluation)</td>
</tr>
<tr>
<td></td>
<td>Enhanced Water Conservation at Prado Dam (10,000 AF Evaluation)</td>
</tr>
</tbody>
</table>
Lost Export Due to BiOps and Foregone Export: Water Year 2016-17

Foregone Export (Assuming Clifton Court Forebay Outage limit) = 274 TAF

- Mar 9: CCFB Outage Limit = 3,000 cfs
- Mar 15: CCFB Outage Limit = 0 cfs

Export (cfs)
- Total Actual Export
- Lost Export Due to BiOps
- Foregone Export

Mar 9: 139K
Lost Export Due to BiOps and Foregone Export: Water Year 2016-17

Foregone Export (Assuming Clifton Court Forebay Fully Operational) = 430 TAF
SARCCUP

**Storage**
(180,000)

**Dry Year Yield**
(60,000 x 3 years)
SARCCUP GROUNDWATER BANK, PHASE 1
(1,000’s AF)

- Chino Basin: 96
  \[32/\text{yr} \times 3 \text{ yr} = 96\]
- SBBA GW Basin: 60
  \[20 \times 3 = 60\]
- San Jacinto GW Basin: 19.5
  \[6.5 \times 3 = 19.5\]
- Elsinore BW Basin: 4.5
  \[1.5 \times 3 = 4.5\]
Lost Export Due to BiOps and Foregone Export: Water Year 2016-17

How do we get Southern California, us, to base load off of our investment in the SWP in wet years?

Export (cfs)