LCRA WATER MANAGEMENT PLAN

Participant Meeting
Sept. 6, 2018
Agenda

• Timeline
• Activities since July 12
• Review Aug. 10 WMP model
• Review comments received since last meeting
• Open discussion
Timeline

• May 21 – First participant meeting
• July 12 – Second participant meeting
• Sept. 6 – Third participant meeting
• Oct. 4 – Fourth participant meeting
• November – Fifth participant meeting
• December – WMP before LCRA Board for approval
• Early 2019 – Plan submitted to TCEQ
Recent Activities

• July meeting: Reviewed preliminary model assumptions and results
• July: Posted additional detail on model
  • Model input files
  • Environmental rules
• Early August: Minor model changes
Recent Activities

• Aug. 10: Posted updated model input and output, including additional output requested by environmental interests

• Late August: Posted Arbuckle Reservoir operations document

• August: Met with participant groups
Model Overview Recap

• Updated hydrology 1940-2016
• Included 2025 weather-varied demands
• Updated Austin return flows
• Added Pflugerville return flows
• Added upstream diversion locations for Garwood water right
• Included Arbuckle Reservoir
Model Overview Recap

- New interruptible stored water allocation limits (curtailment curves)
- 18-month Extraordinary Drought determination
- Wharton 107 cfs rule
- Nov. 1 evaluation date for environmental criteria
- Base-Dry trigger set to 1.8 million acre-feet of combined storage
- Bay releases limited to 50 percent of storable inflows after 25,000 acre-feet is released
## First Season
### Interruptible Stored Water Availability

<table>
<thead>
<tr>
<th>First Season – Normal</th>
<th>First Season – Less Severe Drought</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined Storage on March 1 (million acre-feet)</strong></td>
<td><strong>Combined Storage on March 1 (million acre-feet)</strong></td>
</tr>
<tr>
<td>Below 1.0</td>
<td>Below 1.1</td>
</tr>
<tr>
<td>1.0 to 1.3</td>
<td>1.1 to 1.599</td>
</tr>
<tr>
<td>Above 1.3</td>
<td>Above 1.6</td>
</tr>
</tbody>
</table>

**Interruptible Stored Water (acre-feet)**

| Below 1.0 | 0 |
| 1.0 to 1.3 | 107,100 to 178,000 |
| Above 1.3 | 178,000 |

| Below 1.1 | 0 |
| 1.1 to 1.599 | 88,200 to 136,600 |
| Above 1.6 | N/A |

*Anytime cutoff if storage drops to or below 900,000 acre-feet.*

*Anytime cutoff if storage drops to or below 950,000 acre-feet.*
## Second Season Interruptible Stored Water Availability

<table>
<thead>
<tr>
<th>Second Season – Normal</th>
<th>Second Season – Less Severe Drought</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined Storage on July 1</strong> (million acre-feet)</td>
<td><strong>Combined Storage on July 1</strong> (million acre-feet)</td>
</tr>
<tr>
<td>Below 1.0</td>
<td>Below 1.1</td>
</tr>
<tr>
<td><strong>Interruptible Stored Water (acre-feet)</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.0 to 1.55</td>
<td>1.1 to 1.599</td>
</tr>
<tr>
<td>39,700 to 66,000</td>
<td>39,700 to 47,500</td>
</tr>
<tr>
<td>Above 1.55</td>
<td>Above 1.6</td>
</tr>
<tr>
<td>66,000</td>
<td>N/A</td>
</tr>
<tr>
<td>*Anytime cutoff if storage drops to or below 900,000 acre-feet.</td>
<td>*Anytime cutoff if storage drops to or below 950,000 acre-feet.</td>
</tr>
</tbody>
</table>
Operations to Meet Downstream Demands

- Demands supplied: firm, agricultural and environmental

- Order of supply:
  1. Downstream run-of-river
  2. Arbuckle Reservoir
  3. Upstream run-of-river
  4. Highland Lakes stored water

- Arbuckle Reservoir filling sources:
  - Downstream river flows under Gulf Coast water right
  - Highland Lakes “ordered-not-diverted” releases
Arbuckle Reservoir – Bay Operations

• Use Arbuckle Reservoir to meet bay inflow obligation based on storable inflows

• Include a bypass at Arbuckle Reservoir to help meet bay Threshold

• Help meet Threshold with releases from Arbuckle Reservoir
Updates to WAM Model Since July 12

• New WRAP executable – July 2018 version
• Updated Inks Lake area/capacity relationship
• Removed duplicate record used in the calculation of STP firm water backup
# Model Results Recap

<table>
<thead>
<tr>
<th></th>
<th>July 12 WAM</th>
<th>Aug. 10 WAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum combined storage (acre-feet)</td>
<td>624,573</td>
<td>610,221</td>
</tr>
<tr>
<td>Percent of months storage is above 900,000 acre-feet</td>
<td>97 percent</td>
<td>97 percent</td>
</tr>
</tbody>
</table>
## Model Results Recap

Water for agricultural irrigation:

<table>
<thead>
<tr>
<th>Para Description</th>
<th>July 12 WAM (years out of 77)</th>
<th>Aug. 10 WAM (years out of 77)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full supply both 1st and 2nd season</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Full supply 1st season</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Curtailed 1st season</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>No stored water 1st season</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Full supply second season</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Curtailed 2nd season</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>No stored water second season</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>
## Model Results Recap

### Attainment of instream flows at Wharton:

<table>
<thead>
<tr>
<th></th>
<th>July 12 WAM (percent)</th>
<th>Aug. 10 WAM (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base-Average</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Base-Dry</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>Subsistence</td>
<td>99.6</td>
<td>99.5</td>
</tr>
</tbody>
</table>

### Attainment of bay inflows:

<table>
<thead>
<tr>
<th></th>
<th>July 12 WAM (percent)</th>
<th>Aug. 10 WAM (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBHE 4</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>MBHE 3</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>MBHE 2</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>MBHE 1</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Threshold</td>
<td>94</td>
<td>94</td>
</tr>
</tbody>
</table>
Comments Received Since July Meeting

- Requests for additional information/documentation
- Comments regarding model input and assumptions
- Other comments
Comments Received – Information Requests

- Provide additional documentation
- Clarify total amounts supplied to agricultural users
- Clarify how much water is supplied to agricultural users from specific sources
Comments Received – Information Requests

• Why is water for hydroelectric power not included as a demand?
• How are downstream losses accounted for?
• How is lost water from stored water releases accounted for?
• Request for model results showing lake elevations
• Request for information about Garwood
• Clarify proposed change to Extraordinary Drought criteria
Comments Received – Information Requests

• Request for model summary outputs for environmental indicators for 1950s drought period
• Provide information on Wharton instream flow compliance
• Provide an analysis of pulse flows under the 2015 WMP
• Provide information on proposed bay-rainfall relief
Comments Received – Input/Assumptions

• Austin direct reuse should be adjusted
• Austin return flow factor should vary in hot/dry versus normal years
• Recognize conservation efforts
• Model Decker Lake with a three-foot operating range
• Revisit assumptions for the distribution of water in lakes Buchanan and Travis
Comments Received – Input/Assumptions

• Support weather-varied approach for demands
• Request an increase in second crop reliability
• How will Arbuckle supply be accounted for in supply decisions?
• Maintain interruptible stored water levels from 2015 WMP but allow Arbuckle to be a substitute supply to customers
Comments Received – Input/Assumptions

- Use hot/dry year demands for all years
- Plan for year 2030
- Create an automatic adjustment in year 2025
- Increase minimum storage to 750,000 acre-feet
- Increase storage level for mandatory cutoff of interruptible agricultural supplies
- Impose criteria for a minimum amount of inflows in order for LCRA to supply water to agricultural uses
Comments Received – Input/Assumptions

• Alternate approach for Wharton criteria when combined storage is below 900,000 acre-feet
• Alternate approach to proposed rule limiting releases to no more than 50 percent of amount above 25,000 acre-feet per month
• Concern with adding a third evaluation date for environmental flow criteria
Other Comments Received

• How is rainfall/runoff report being used by LCRA for inflow prediction?

• How is LCRA considering gains and losses related to groundwater/surface water interaction?

• What action is LCRA taking to protect groundwater inflows to the Colorado River from being diminished as a result of pumping of aquifers?

• How is LCRA incorporating changes in land use and development that are contributing to reduced runoff?
Other Comments Received

- How is LCRA’s water business compensated for water used to generate hydroelectric power?
- How much revenue does LCRA make from generation of hydroelectric power?
- How do LCRA decision makers handle the apparent conflict of interest between water needs and hydroelectricity?
- Concern about access to water in Highland Lakes for emergency use
Next Steps

• Additional comments requested by Thursday, Sept. 13
  - Submit comments to LCRAWMP@lcra.org
• LCRA staff updating model
• Oct. 4 – Fourth participant meeting
  - Review revised model