2019 Annual Operating Plan

MWDOC Joint Board Workshop
June 5, 2019

2019 AOP - Highlights

2018: Balanced Supplies and Demands
Maintained high end-of-year storage reserves (~2.5 MAF)

2019: Prepared for a Range of Future Conditions

<table>
<thead>
<tr>
<th>SWP Allocation</th>
<th>Demands</th>
<th>Water Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>Normal</td>
<td>Balanced</td>
</tr>
<tr>
<td>Break Even: ~40% SWP Allocation</td>
<td>~2.5 MAF</td>
<td></td>
</tr>
</tbody>
</table>

Adaptive Operations

Meeting Member Agency Demands
Background
- Adheres to the Administrative Code
- Provides a framework for strategic operations and continued reliability
- Communicates expected future operations to member agencies and partners

2018: Adapting to Changing Conditions

January 3, 2018
April 2, 2018
Early 2018: High Deliveries of SWP Supplies (~75% Blends)

April-May 2018: Minimized Deliveries of SWP Supplies (~0% Blends)
June-December 2018: Moderate Deliveries of SWP Supplies (~25-35% Blends)

Maintained High End-of-Year Storage Reserves

Emergency Storage

Dry-Year Storage
2019: Prepared for a Range of Conditions

Operating Principles

- Meet member agency demands
- Meet water quality requirements
- Manage storage according to WSDM principles
- Manage maintenance and shutdowns
- Meet blending objectives
- Maximize hydroelectric power production
### 2019 Supply and Demand Balance

*Does not include transfers or other WSDM actions; agricultural adjustments also not included*

#### Water Surplus and Drought Management Plan

Provide guidelines to prioritize the use of storage in shortage conditions and the replenishment of storage in surplus conditions
Manage Storage per WSDM Principles

WSDM Plan – Surplus Action Priorities

<table>
<thead>
<tr>
<th>Priority</th>
<th>Surplus Action (Fill)</th>
<th>In-Region</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DVL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Flex Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Conjunctive Use / Cyclic Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SWP Carryover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Lake Mead ICS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Banking Programs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Priority is not meant to be a strict order
- Store water for most effective use in future droughts
- Priority can be adapted to current conditions

Manage Storage per WSDM Principles

WSDM Plan – Drought Action Priorities

<table>
<thead>
<tr>
<th>Priority</th>
<th>Drought Action (Withdraw)</th>
<th>In-Region</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DVL</td>
<td></td>
<td>Groundwater</td>
</tr>
<tr>
<td>2</td>
<td>Banking Programs</td>
<td></td>
<td>Groundwater</td>
</tr>
<tr>
<td>3</td>
<td>Lake Mead ICS</td>
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<td>Flex Storage</td>
<td></td>
<td>Surface</td>
</tr>
</tbody>
</table>

Priority is not meant to be a strict order
- Take water strategically to be better prepared for future droughts
- Priority can be adapted to current conditions
**2019 Storage Fill Strategy**

**Surplus Conditions**

Storage Fill (Thousand Acre-Feet)

- **DVL**: Fill the remaining capacity in DVL
- **Lake Mead ICS**: Additional put in Lake Mead ICS
- **CUP/Cyclic**: Fill according to max put capacity
- **Banking Programs**: Fill according to the max put capacity
- **Lake Mead ICS**: Initial put in Lake Mead ICS

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**2019 Storage Take Strategy**

**Shortage Conditions**

Storage Fill (Thousand Acre-Feet)

- **DVL**: Create space in reservoir for additional operational flexibility
- **Banking**: Max take capacity
- **SWP Carryover CUP**: Initial amount
- **SWP Carryover**: Available take capacity
- **DVL**: Amount needed to meet demands in areas that can only receive water from SWP
- **Lake Mead ICS**: Down to one-third of dry-year capacity
- **DVL**: Go to 8-pump flow on CRA & drought actions
- **DVL**: Remaining amount above emergency storage
- **Flex Storage**: Preserve for last, meeting remaining system demands
Putting It All Together
2019 WSDM Strategy Implementation

Continued Reliability
Managing the System
Ready for 2019 and Beyond

Deliveries of Water in Metropolitan’s System in an Emergency
Concept
Providing options after a significant emergency

- Emergency deliveries of agency water in Metropolitan’s system should be considered in a proactive and measured way, rather than ad-hoc after a significant natural disaster or emergency.

Water System Reliability
Addressing seismic vulnerabilities and system resiliency

- **Infrastructure Reliability**
  - Rehabilitation of prestressed concrete cylinder pipe
  - Seismic upgrades of treatment plants and conveyance systems

- **Emergency Response**
  - In-house manufacturing and construction capability
  - Emergency communications
  - Mutual assistance agreements with partners
Maintaining Water Deliveries during Emergencies – Current Options

- Utilize flexibility in Metropolitan’s system to deliver water from multiple supply sources, feeders and/or reservoirs
- Utilize interconnections or operating agreements with other agencies

Maintaining Water Deliveries during Emergencies – Potential Future Option

- Agencies may benefit from a proactive approach for utilizing Metropolitan’s system during emergencies
- Approach would only be used if there is no other way to deliver water to a portion of the agency service area
- Approach would not substitute for local agencies to take steps to improve emergency preparedness
Emergency Scenario

- An area within Metropolitan’s system is out of service for a prolonged period after an earthquake
- There are no other delivery options for part of the impacted area
- Metropolitan’s system could be used to supply a portion of the local system that has no other delivery options, subject to specific conditions, until repairs are complete

Emergency Example: One Agency

[Diagram showing normal operations and agency A water supply]
Emergency Example: One Agency

Agency A
Damage Zone
Emergency Operations
MWD Water Treatment Plant

Agency A fed with water thru MWD system

= Service Connection

Emergency Example: Two Agencies

Normal Operations
MWD Water Treatment Plant

Agency B
Agency A

= Service Connection

= Service Connection

Agency A Water Supply
Agency A Water Supply
Emergency Example: Two Agencies

Emergency Operations

MWD Water Treatment Plant

Damage Zone

Agencies A and B fed with Agency A’s water thru MWD system

No Flow

Agency B

Agency A

= Service Connection

Agency A Water Supply

Proposed Concept: Conditions for Emergency Water Deliveries

- Provide member agencies with the option of using Metropolitan’s system for agency water deliveries in an emergency, under specific conditions

- Board and member agency feedback is essential for policy development

- “Emergency” definition
  - Metropolitan is physically unable to make deliveries to a member agency service connection for a specified period after an emergency, as determined by Metropolitan’s General Manager
Proposed Concept: Conditions for Emergency Water Deliveries (cont.)

- Use of Metropolitan’s system for emergency deliveries
- Ability to serve
- Water quality standards and liability
- Indemnification

Proposed Concept: Conditions for Emergency Water Deliveries (cont.)

- System integrity
- Compensation
- Operational requirements
- Term for emergency deliveries
Summary

- Emergency water deliveries in Metropolitan’s system should be considered in a proactive and measured way before a major emergency.
- Emergency deliveries must not displace other agency efforts to prepare for emergencies.
- Amendments to Metropolitan’s Administrative Code would be required.