How Modeling and Design Criteria Inform Operations Planning and Water Management Implementation

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Operating Rules

- Operating rules guide operators in handling specific situations
- Described by parameters such as stage, flow, storage, environmental conditions
- Development of operating rules must account for what information will be available to an operator at the time a decision has to made and must be physically practical to implement
- Operating decisions must be made in the context of uncertainty about the future
- Use of operator judgement, operator discretion, operational flexibility
What is a CERP Operating Manual?

- What are Differences between Water Control Manuals, Operation and Maintenance Manuals, CERP Operating Manuals
- Provides day-to-day water management for all foreseeable conditions affecting a project or system
- Contains regulation schedules, water management instructions, and operating criteria for project operation
- Includes provisions for collection, analysis, and dissemination of data
- Ensure goals and purposes of the Plan (CERP) are achieved

(Guidance Memorandum 5 – Operating Manuals)
Regulation Schedule Examples – WCA No. 3A


Table 7-2
Minimum Monthly Delivery Schedule At Shark River Slough

<table>
<thead>
<tr>
<th>Month</th>
<th>Acre-Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>22,000</td>
</tr>
<tr>
<td>Feb</td>
<td>9,000</td>
</tr>
<tr>
<td>Mar</td>
<td>4,000</td>
</tr>
<tr>
<td>Apr</td>
<td>1,700</td>
</tr>
<tr>
<td>May</td>
<td>1,700</td>
</tr>
<tr>
<td>Jun</td>
<td>5,000</td>
</tr>
<tr>
<td>Jul</td>
<td>7,400</td>
</tr>
<tr>
<td>Aug</td>
<td>12,200</td>
</tr>
<tr>
<td>Sep</td>
<td>39,000</td>
</tr>
<tr>
<td>Oct</td>
<td>67,000</td>
</tr>
<tr>
<td>Nov</td>
<td>59,000</td>
</tr>
<tr>
<td>Dec</td>
<td>32,000</td>
</tr>
</tbody>
</table>

Figure 7-3

ZONE A
ZONE B
ZONE C
ZONE D
ZONE E

ZONE A: Flood Releases
ZONE B: Upper Transition, Wet Season
ZONE C: Upper Transition, Dry Season
ZONE D: Lower Transition
ZONE E: Rainfall Formula Only

MCR-3A Operational Guidelines

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Open full.</td>
</tr>
<tr>
<td>B</td>
<td>S-333 Open; Discharge 45% of computed flow. S-333 Closed; Discharge at least 75% of computed flow (up to 100% if desired by EBP).</td>
</tr>
<tr>
<td>C</td>
<td>S-333 Open; Discharge 45% of computed flow. S-333 Closed; Discharge 45% of computed flow plus all or part of S-333's amount if desired by EBP.</td>
</tr>
<tr>
<td>D</td>
<td>S-333 Open; Discharge 45% of computed flow. S-333 Closed; Discharge 45% of computed flow plus all or part of S-333's amount if desired by EBP.</td>
</tr>
<tr>
<td>E</td>
<td>Discharge 45% of computed flow whether S-333 is open or closed.</td>
</tr>
</tbody>
</table>

Maximum allowable discharge: Discharge up to 50% of computed flow when permitted by this agreement. Same as Zone B.

Same as Zone B.
CERP Operating Manuals

- Consist of System Operating Manual (SOM) and Project Operating Manuals (POM)
- USACE and SFWMD, in consultation with other Federal, State, tribal, and local governments, jointly develop and approve
- Consistent with reservation or allocation of water for natural system and savings clause, reflect operational criteria used in this identification
- Significant changes to Operating Manuals require notice and opportunity for public comment

(Guidance Memorandum No. 5; Programmatic Regulations)
CERP Project Operating Manuals

Figure 5-2 Phasing of the Project Operating Manual

* These factors may also generate modifications to the POM during Long-Term Operations and Maintenance.
Multipurpose Water Resource Projects

- Compromise is basic factor in multipurpose project design and operation
- Conflicts often arise among demands for various project purposes
- Operating rules often define how balancing is done
- Operating rules often inherently include tradeoffs

(Linsley and Franzini, 1979; Jain and Singh, 2003; EarthTech, 2005)
Corps of Engineers Multipurpose Planning and Management

- Planning is multi-objective
  - A good planning study always has several planning objectives

- Projects are multipurpose
  - Purposes may include navigation, flood damage reduction, ecosystem restoration, water supply, recreation

For Ecological Sustainability: 12 to 15.5 ft-NGVD

For Dike Stability: < 17.25 ft-NGVD (LORS, 2008)

Flood Control

Water Supply, Navigation

**Top of Dike (Elevation 32.3 – 45.6’)**

12-15.5’ variation = healthy littoral and submerged grass beds

Littoral Wetland (Elevation 11-15’)

Submerged Grass Beds (Elevation 10-12’)

Deep Pelagic Zone (Elevation < 10’)

OWW Project depth based on 12.56' lake stage

Not to Scale
Modeling and Operations

- Alternative plans developed in Planning Process
- Hydrologic simulation models used to evaluate alternatives
- Practical real-time operating rules depend upon modeling that adequately represents project features and operations
- CERP Operating Manuals should provide operating criteria consistent with assumptions used in the modeling
- Operating rules should capture the intent of the modeling

(Guidance Memorandum No. 5, EarthTech, 2005)
Design and Operations

- Modeling evaluates benefits over the long term
- Real-time Operational actions limited by information available in the short term
- Operators need operating rules based on short term surrogates that guide them toward achieving long term goals
- Design capacity of project features provides operational limits
- CEPP PIR Draft POM – Operating criteria based on Alt 4R2 modeling assumptions, specific operational criteria will be developed prior to changes in operation of CEPP/C&SF structures

(EarthTech, 2005; CEPP PIR, 2014)
Operational Flexibility and Adaptive Management (AM)

- Operational flexibility used in real-time operations
- Operational flexibility and Adaptive Management not synonymous
- Operational flexibility can be a tool in Adaptive Management
Operational Flexibility and Adaptive Management

- Real time operations versus testing hypothesis
- Spatial and temporal scale issues for use in Adaptive Management
- Can monitoring measure these changes?
- Feedback loop from monitoring and assessment
  - Example - CERP System Status Report (SSR)
Adaptive Management

- AM recommendations within scope of CERP Operating Manuals can be implemented using existing operational flexibility
- Otherwise, additional analysis, coordination, public review, NEPA documentation may be required
- CEPP POM will be developed in coordination with and consistent with the CEPP Adaptive Management Plan
- CEPP AM Plan specified RECOVER will work with Water Managers on monitoring, information, and triggers for POM to inform operational adjustments to meet goals and objectives over long term

(CEPP PIR, 2014; GM 5)
Thank You