OROVILLE DAM CITIZENS ADVISORY COMMISSION

Meeting 19
March 7, 2025

Hosted by the California Natural Resources Agency

CALIFORNIA NATURAL RESOURCES AGENCY

ITEM 1
WELCOME AND COMMISSION UPDATES

ROLL CALL

- Secretary of the California Natural Resources Agency
- California State Assembly
- California State Senate
- Director of the Department of Water Resources
- Director of the Office of Emergency Services
- Director of the Department of Parks and Recreation
- CHP Butte County Field Division Appointee
- City of Oroville Appointees
- County of Butte Appointees
- County of Sutter Appointees
- County of Yuba Appointees
- Butte County Sheriff Appointee
- Sutter County Sheriff Appointee
- Yuba County Sheriff Appointee

OPENING REMARKS CONTINUED

ITEM 2

LEGISLATIVE REPORT PROCESS

Report and Content Mandated by SB 955

The commission must publish a report once every three years that provides the following:

1. An overview of ongoing maintenance and improvements made at the dam and its site.
2. A register of communications received from the department and other parties to the Commission.
3. Notice of upcoming plans made by the department for the dam and its site.
4. An overview of flood management projects on the Feather River affecting public safety and flood risk reduction.

Report 1: Sept 2019 to July 2022

Oroville Dam
Citizens Advisory Commission Report

CALIFORNIA NATURAL RESOURCES AGENCY

CALIFORNIA DEPARTMENT OF WATER RESOURCES

CALIFORNIA NATURAL RESOURCES AGENCY

We are pleased to submit this first triennial report to the Legislature on the work of the Oroville Dam Citizens Advisory Commission.

The Commission was born of a public safety emergency in February 2017. In record-breaking storms that year, the Dam's main spillway and the emergency spillway suffered significant damage, and approximately 188,000 people downstream were evacuated on an emergency basis. The Dam was never compromised, and the spillways have been repaired and improved over the last five years. However, the emergency and the fear and concerns it raised made plain the critical importance of those managing the Oroville facilities to strengthen communication and information sharing with those who live, work, and recreate in this area.

Since its creation by the Legislature and Governor in 2018, the Commission has established a regularly scheduled forum where people from communities surrounding California's second-largest reservoir are updated on activities and ongoing safety efforts at the reservoir. These meetings allow local officials and residents to ask questions and offer input to the government officials who manage that reservoir and its Dam, and its associated facilities.

Meeting for at least two hours at a time, multiple times a year, the wide spectrum of representatives on the Commission have delved into subjects of keen concern to Oroville area residents: status of efforts by the Department of Water Resources (DWR) to complete improvements after the 2017 spillways incident; efforts to revamp the federal rules that guide flood control operations at Oroville Dam; assessments of downstream risk in major winter storms; and DWR's operations and maintenance practices. The Commission has made site visits, convened technical experts on an array of topics, and provided local residents opportunities to ask frank questions of high-level State decision makers.

As chair and vice chair of the Commission, we are grateful to those who have taken the time to raise concerns and offer input to the Commission. We also appreciate all of those in local, State, and federal government; academia; and the private sector who have shared their expertise. Lake Oroville plays a large role in California's economy and environment, and dam operators balance multiple needs that include flood control, water supply, environmental needs, electricity generation, and recreation. Maintaining safe operations of the Dam and reservoir as all these needs are met is essential. In the wake of the 2017 spillway incident, community questions and concerns regarding safety continue to be voiced. The role of the Commission as a forum to discuss and address these concerns remains vital.

The work of the Commission is ongoing, dynamic, and essential to ensure trust among State agencies and local communities. We are committed to listening to and working to address, as best possible, the questions and concerns of Oroville-area citizens, and we will encourage our successors to do so as well. Together we can continue to foster open dialogue that ensures the safety and effective operation of Lake Oroville.

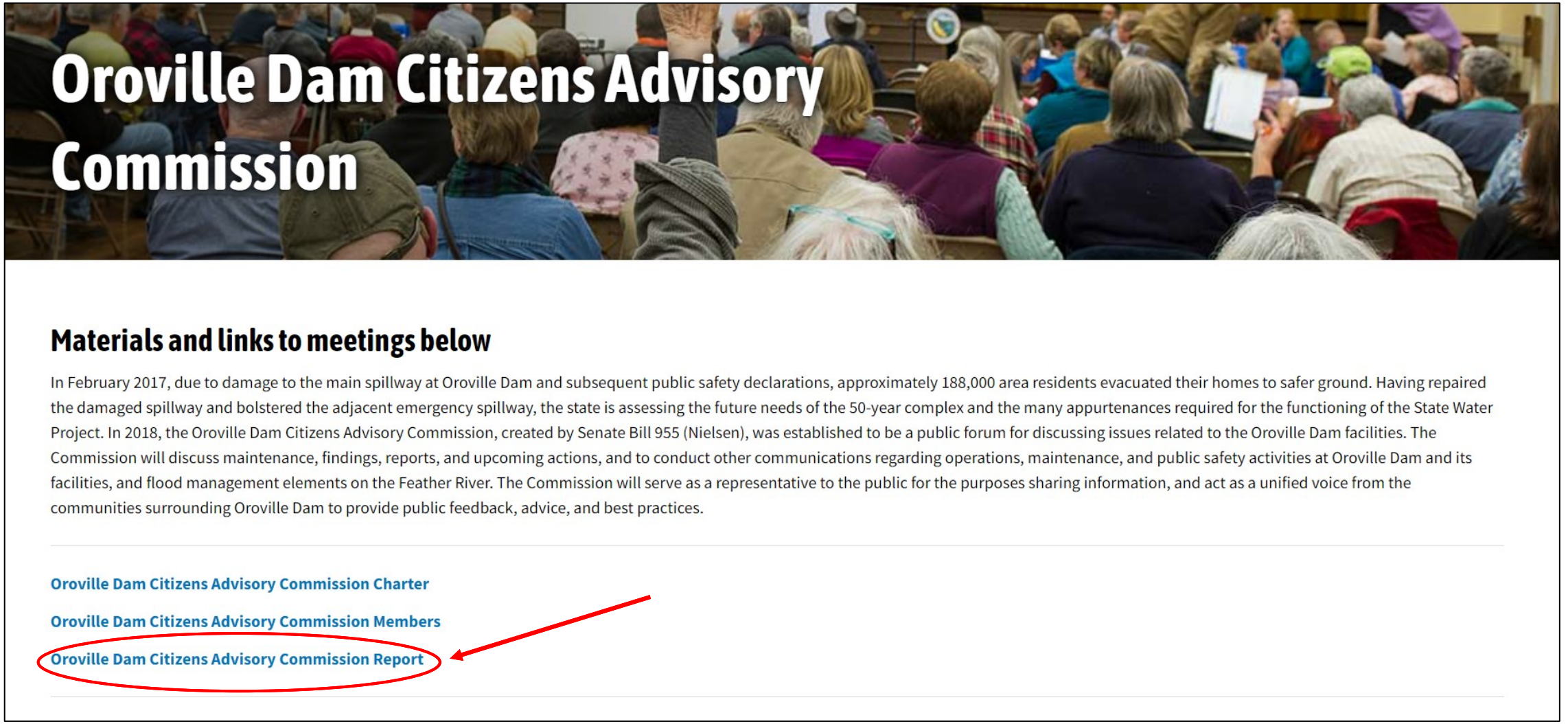
Sincerely,

California Secretary for Natural Resources, Wade Crowfoot, Chair

California State Senator, Jim Nielsen, Vice Chair

Commission Report

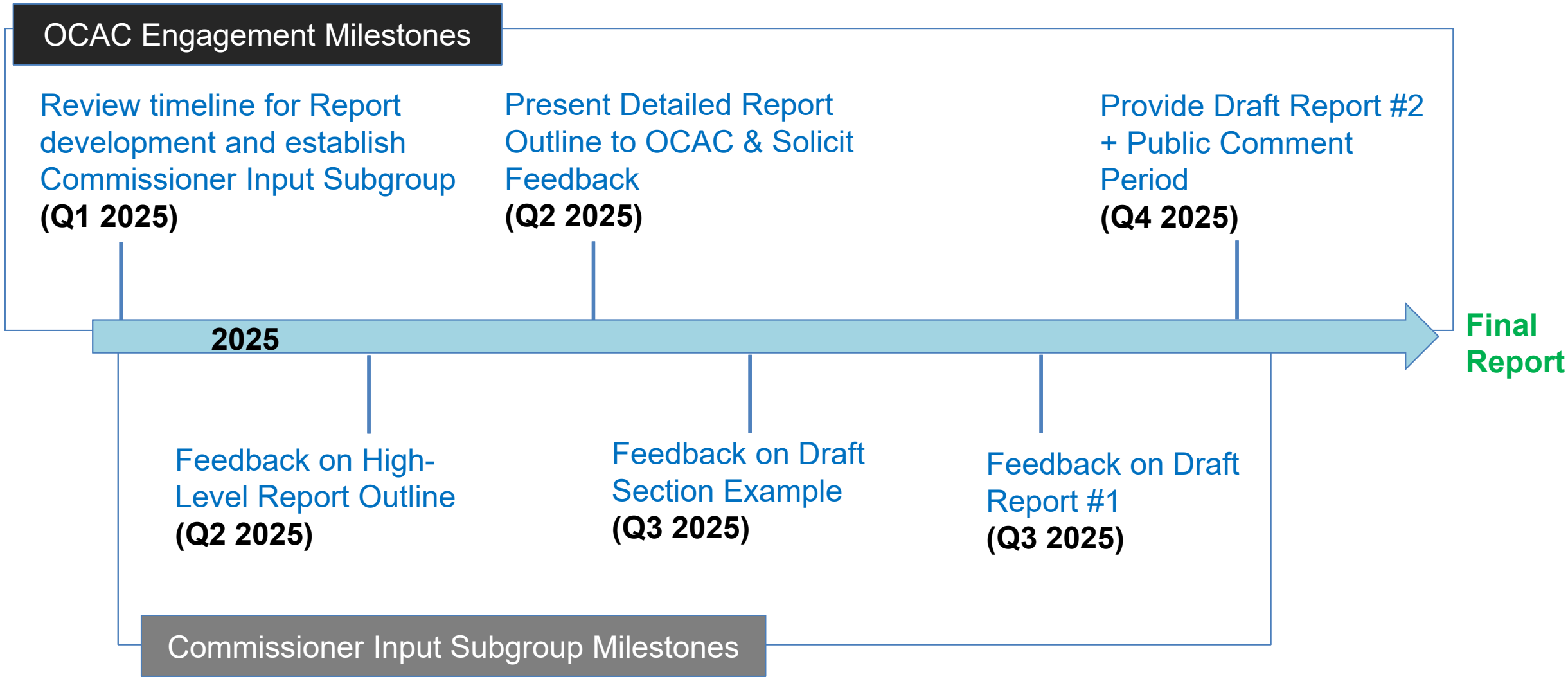
- Click “Oroville Dam Citizens Advisory Commission Report” on the main page to be taken to the Report landing page.



Commission Report 2
October 2022 to Fall 2025

- Report will cover ten meetings from fall 2022 through fall 2025.
- Will pull content from OCAC meeting presentations and summaries.
- Report will be shared with OCAC Commissioners for feedback at both outline and draft report stages.
- Will also utilize a Commissioner Input Subgroup for feedback and to ensure report meets legislative intent.

Commission Report 2 Development & Commissioner Input Timeline



ITEM 3

CITY OF OROVILLE LEVEE

Oroville Levee Status Update about National Levee Safety Program One-Time Levee Screening

Image: Kern River Levee Adjacent to Kern County Water Agency Canal (Kern County), Nov. 2023.

Oroville Citizens Advisory Commission
Mar. 7, 2025

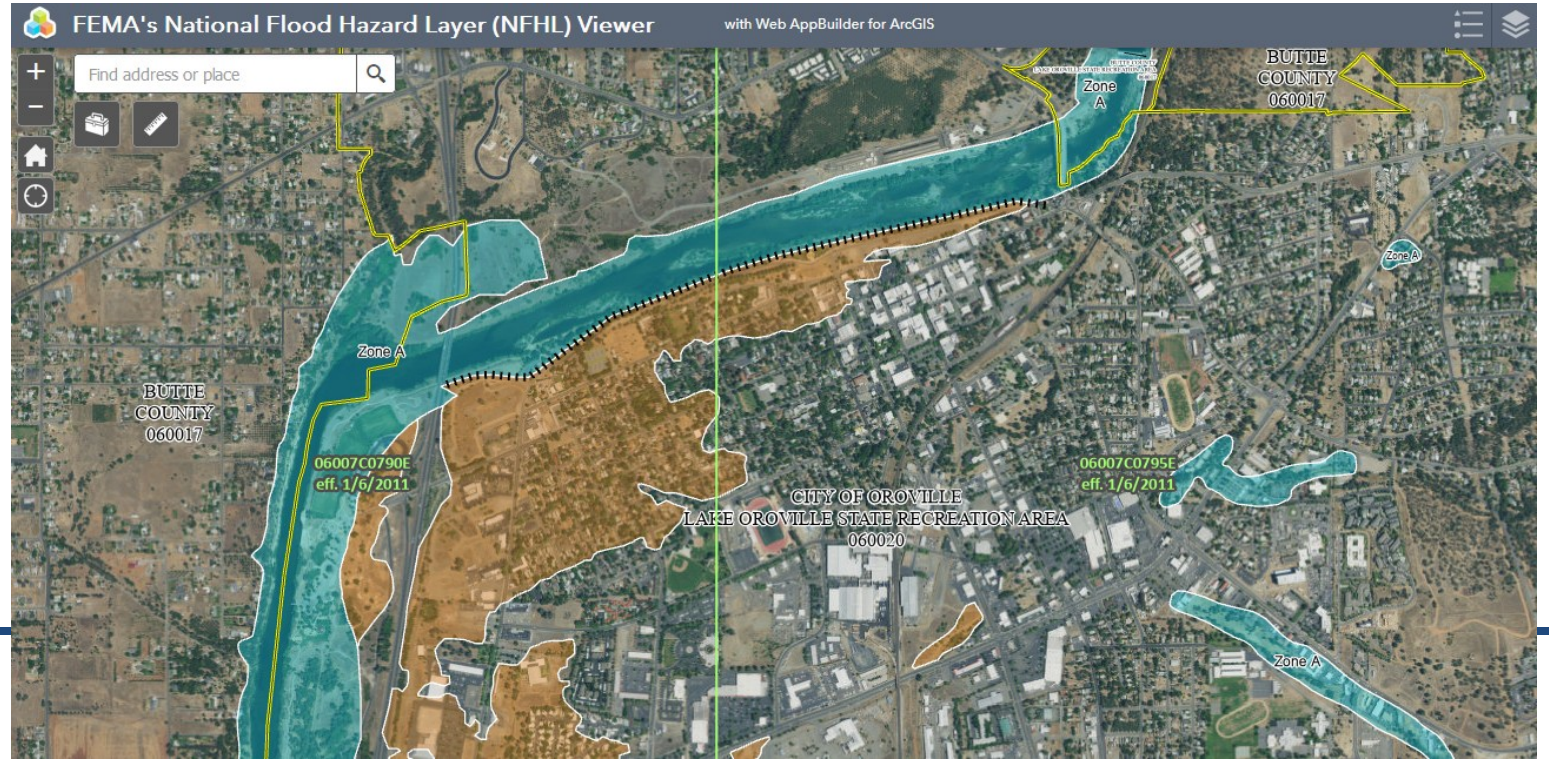
Michael Bessette, P.E.
Executive Director
Sutter Butte Flood Control Agency

AGENDA

- City of Oroville Levee Integrity Concerns
- Potential Impacts
- Items to Consider
- USACE Levee Safety Inspection
- Questions/Comments

CITY OF OROVILLE LEVEE INTEGRITY AND INTERIOR DRAINAGE CONCERNS

- Existing levee directly downstream from Oroville Dam has history of seepage and boils
- Levee not part of the State Plan of Flood Control or USACE
- Southern industrial area has history of drainage issues/flooding during times of high water in Feather River



Potential Impacts

- Public safety and evacuation concerns (Hwy 70)
- 100-year FEMA remapping – SFHA building requirements
  - Construct at or above Base Flood Elevation
  - Mandatory flood insurance
  - Status of FEMA remapping?
- SB5 (2007) 200-year State of California ULOP/ULDC requirements
  - Must make 'Findings' prior to approving development permits or parcel maps

ITEMS TO CONSIDER

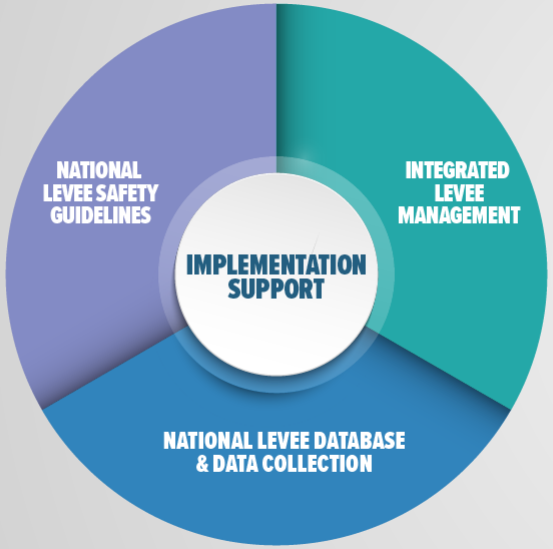
- Identify local funding source for advancing improvements
- Identify City lead representative
  - Appoint staff; Contractual relationship with private consultant; Contractual relationship with SBFCA (Services Agreement)
- Review Recommendations in 2015 HDR Engineering Study
- Pursue State/Federal funding assistance

National Levee Safety Program

A levee is a human-made barrier with the primary purpose of reducing the frequency of flooding to a portion of the floodplain, sometimes referred to as a levee system.

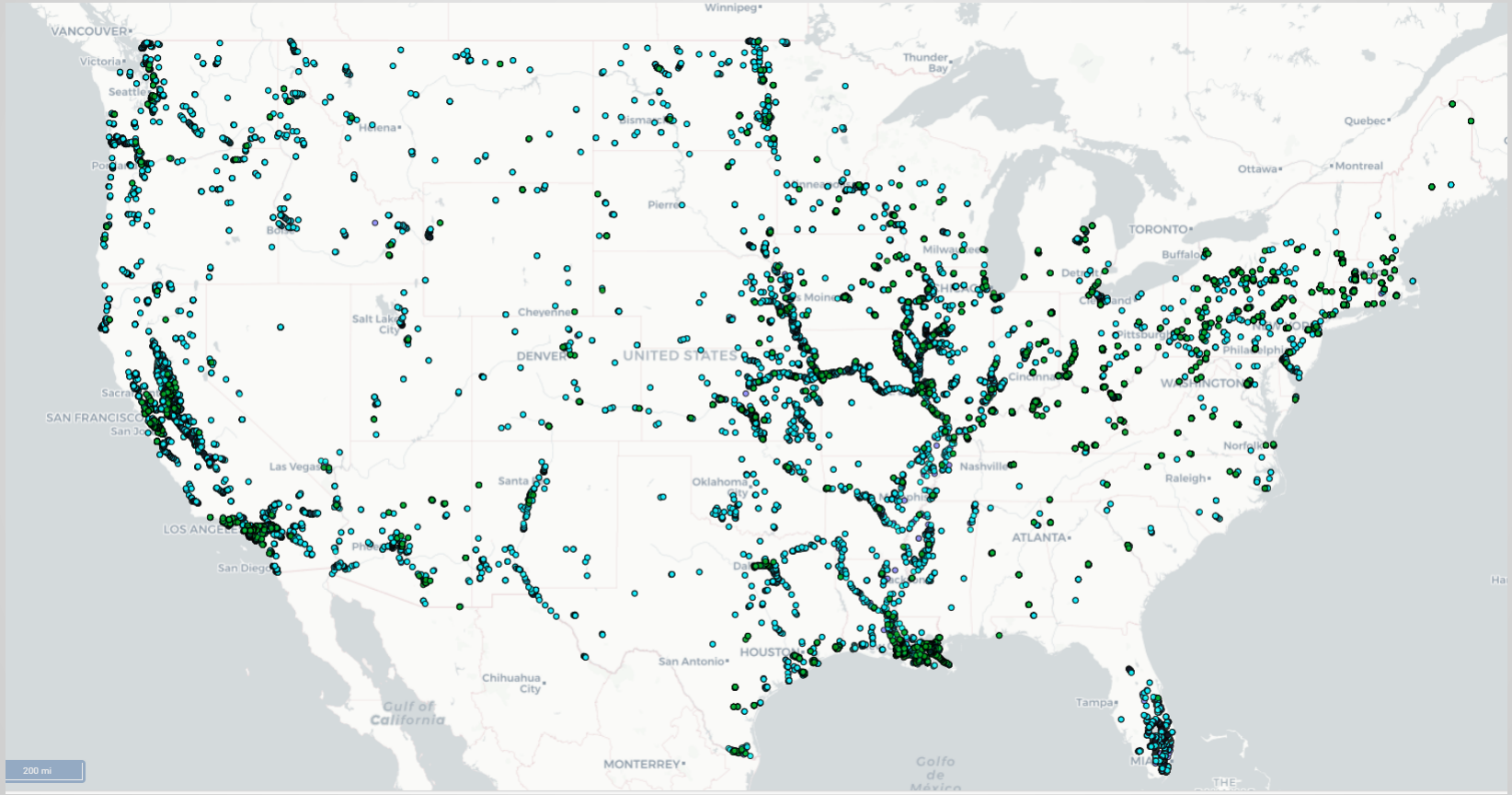
Image: Example of levee protecting roadway.

Major Components of NLSP



- National Levee Safety Guidelines
- Integrated Levee Management
- ***National Levee Database & Data Collection***

Levee Systems in the USACE NLD



CALIFORNIA DEPARTMENT OF
WATER RESOURCES

One-Time Levee Review

- Collection of Available Data Sources
- Site Visit/Inspection: General Levee Condition and Inform Risk Assessment
- Screening Risk Assessments:
  - Flood Loading
  - Expected Levee Performance
  - Consequences of Levee Breach and Overtopping

Image: Cosumnes River levee, looking upstream (Sacramento County), Feb. 2024.

Example of One-Time Review Recommendations

- Nov. 2023 the USACE conducted its first one-time levee screening for one levee system (about 2 miles) on the Kern River
- Feb. 2024 the USACE completed their report, with recommendations, on actions to improve the performance of this levee system

Kern River North Levee - Greater Bakersfield
NLD System ID 150005212810

Recommended Actions
List in priority order

#	Recommendation	Impact	Responsible Party	Cost Range*
1	Repair animal burrows prior to next flood season. Improve or implement a formal animal control plan.	Reduce likelihood of poor levee performance. (Internal Erosion PFM)	Kern County Water Agency	$15-$130K annually
2	Address current low point overtopping location on levee. Consider raising to within approximately 2 feet of the levee crest and reinforcing the overtopping location, to be retained as a controlled overtopping location at the downstream end of levee.	Reduce the likelihood of flooding into the leveed area.	Kern County Water Agency	$100K-$200K for earthen closure. $1.3M-$4.3M for stoplog closure.
3	Consider hydrologic and hydraulic analysis to better understand outflow from Isabella, diversion flows, and inundation along the urban corridor.	Reduce uncertainty in understanding of flood hazard.	Kern County Water Agency in partnership with USACE, State, etc.	*No Cost Estimate Available*
4	Consider installation of a permanent telemeter stage gauge to measure flows through the City of Bakersfield.	Reduce uncertainty in understanding of flood hazard.	City of Bakersfield	*No Cost Estimate Available*
5	Develop a plan for flood fighting to address riverine scour and BEP. Include likely levee locations as examples for where these issues may occur.	Reduce likelihood of poor levee performance.	Kern County Water Agency	$3.7K-$54K
6	Develop (or locate) an Emergency Action Plan (EAP) for the levee to be shared and kept on file with the County emergency operations center. ▪ Identify and include haul and access roads for performing flood fighting at various levee location access points. ▪ Reach out and coordinate with the company(ies) operating behind the levee, and work to include them in the Storm Patrol Plan call tree.	Reduce potential consequences from flood inundation.	Kern County Water Agency, Kern County EM	$340K
7	Develop a material stockpile of flood fight materials that is readily available at the site. (Sand, sandbags, rock armoring, etc.)	Reduce likelihood of poor levee performance.	Kern County Water Agency	*No Cost Estimate Available*
8	Continue maintenance and repair of surficial erosion rilling along the levee alignment.	Routine Levee O&M	Kern County Water Agency	*No Cost Estimate Available*

**Cost Estimates developed from "Summary of Costs Associated with Levee-related Activities" dated November 2023. Available at www.leveesafety.org.*

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Image: Example of recommended actions w/ cost ranges for Kern River levee system.

Next Steps for Oroville Levee

- Data is needed for any action concerning the Oroville levee
- The USACE one-time levee review (screening) is the next step
- In Dec. 2024, DWR and USACE scheduled engineers to inspect the levee on May 7-8, 2025
- Final recommendations from this technical screening should be complete in the Fall of 2025
- These results can be shared with this Commission
- City of Oroville applied to USACE Section 165 Continuing Authorities Program for funding

Questions & Answers

ITEM 4

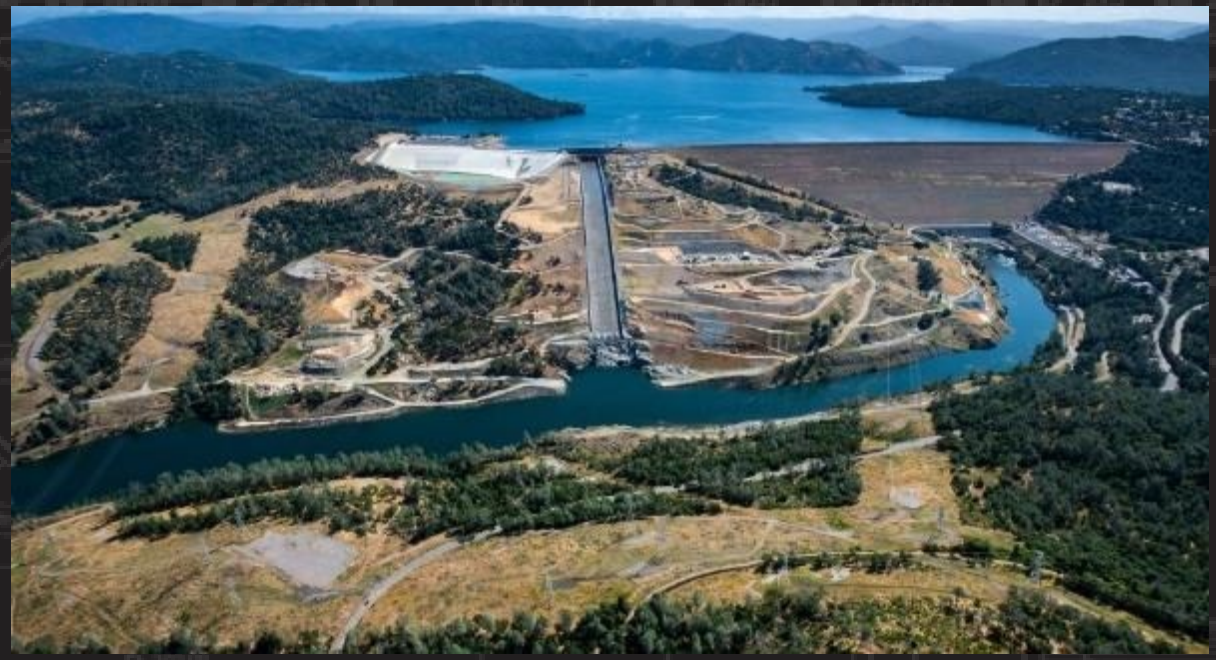
WATER CONTROL MANUAL 101

WATER CONTROL MANUALS

Jenny Fromm, P.E.
Chief, Water Management
Sacramento District

Oroville Citizens Advisory Commission Meeting

Date: 07 MAR 2025



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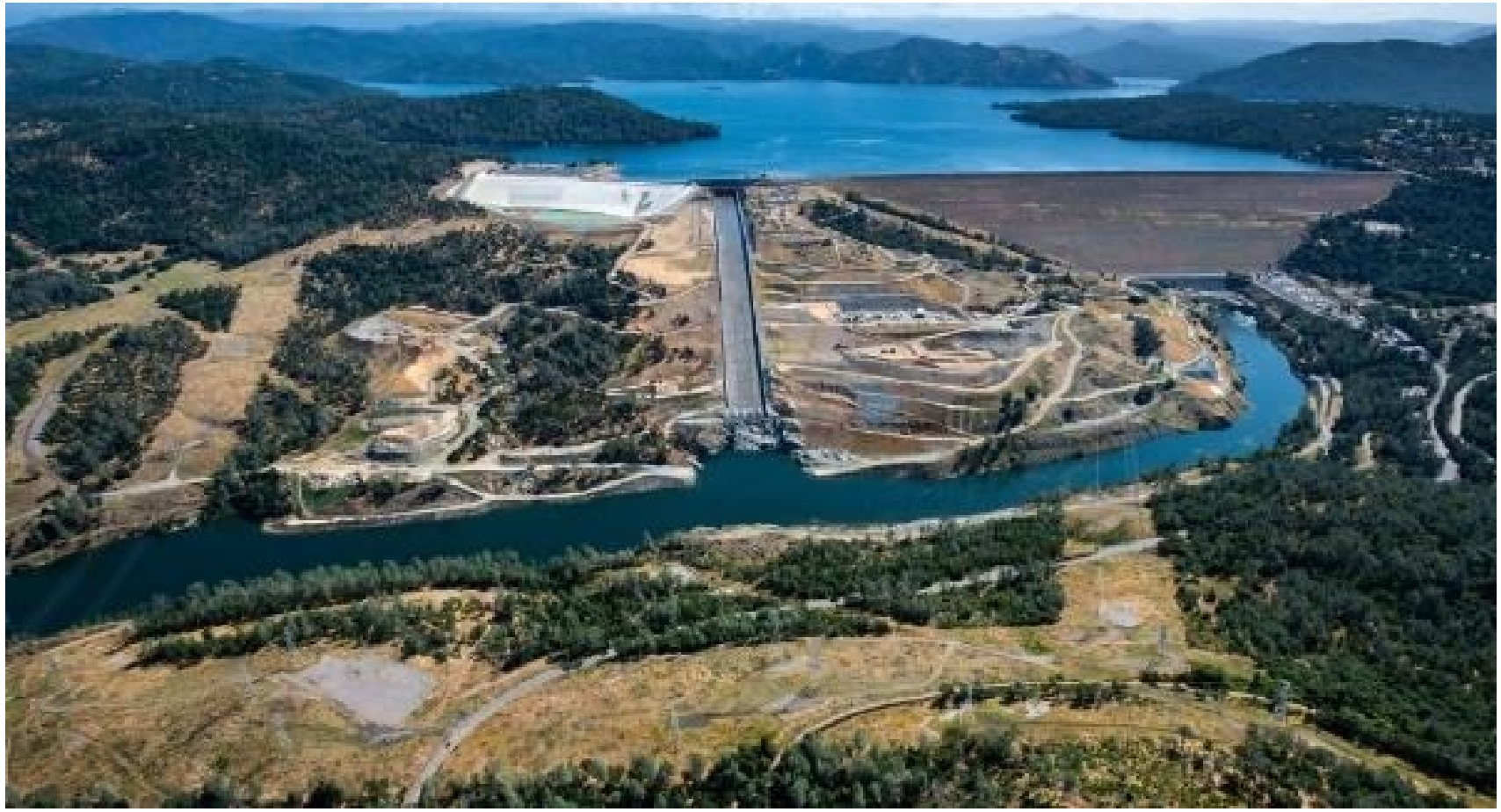
AGENDA

- USACE Authority
- Water Control Manual Overview
- Oroville Dam-Lake Water Control Plan
- Water Control Manual Update Process
- Questions



CORPS AUTHORITY FOR MANAGEMENT OF FLOOD CONTROL SPACE

Section 7 of the Flood Control Act of 1944 (58 Stat. 890, 33 U.S.C. 709)

- Prescribe rules and regulations in the interest of flood control

- The project owner is responsible for real-time implementation of the water control plan, but the Corps has authority to determine flood releases in the flood control space with input from the owner.

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USACE WATER MANAGEMENT

Basic objectives of water control management

- Operate to authorized purposes and laws
- Maintain structural and operational integrity
- Avoid risk to public health and safety, life, and property

USACE is responsible for water control management at USACE-owned projects

USACE is also responsible for prescribing flood control and navigation regulations and guidance at non-USACE projects

- Dams owned and operated in non-flood space by other entity
- Special acts of Congress
- FERC conditions
- Other agreements

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WATER CONTROL MANUAL (WCM)

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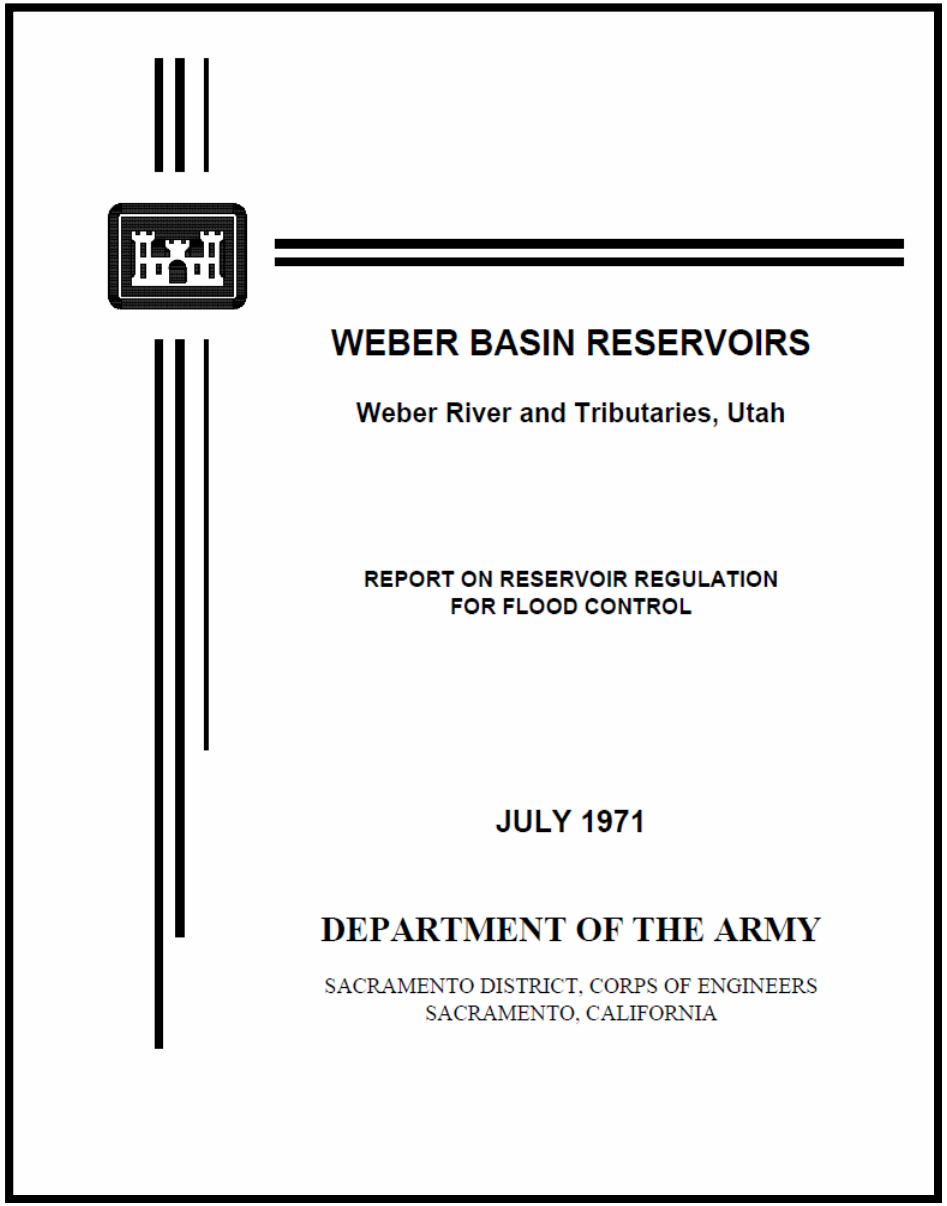
Guiding document that specifies how the Corps operates reservoir with flood control space

- Provides operational instruction to personnel involved in managing the reservoir – including emergency situations
- Prevents loss of institutional knowledge
- Ensures unbiased operations and that the mission's priorities are transparent to the public
- Sometimes called a Reservoir Regulation Manual
  - Standing Instructions to Dam Operators (Appendix A)
  - Water Control Diagram
  - Emergency Spillway Release Diagram*

*Only if gated spillway



WEBER BASIN RESERVOIRS

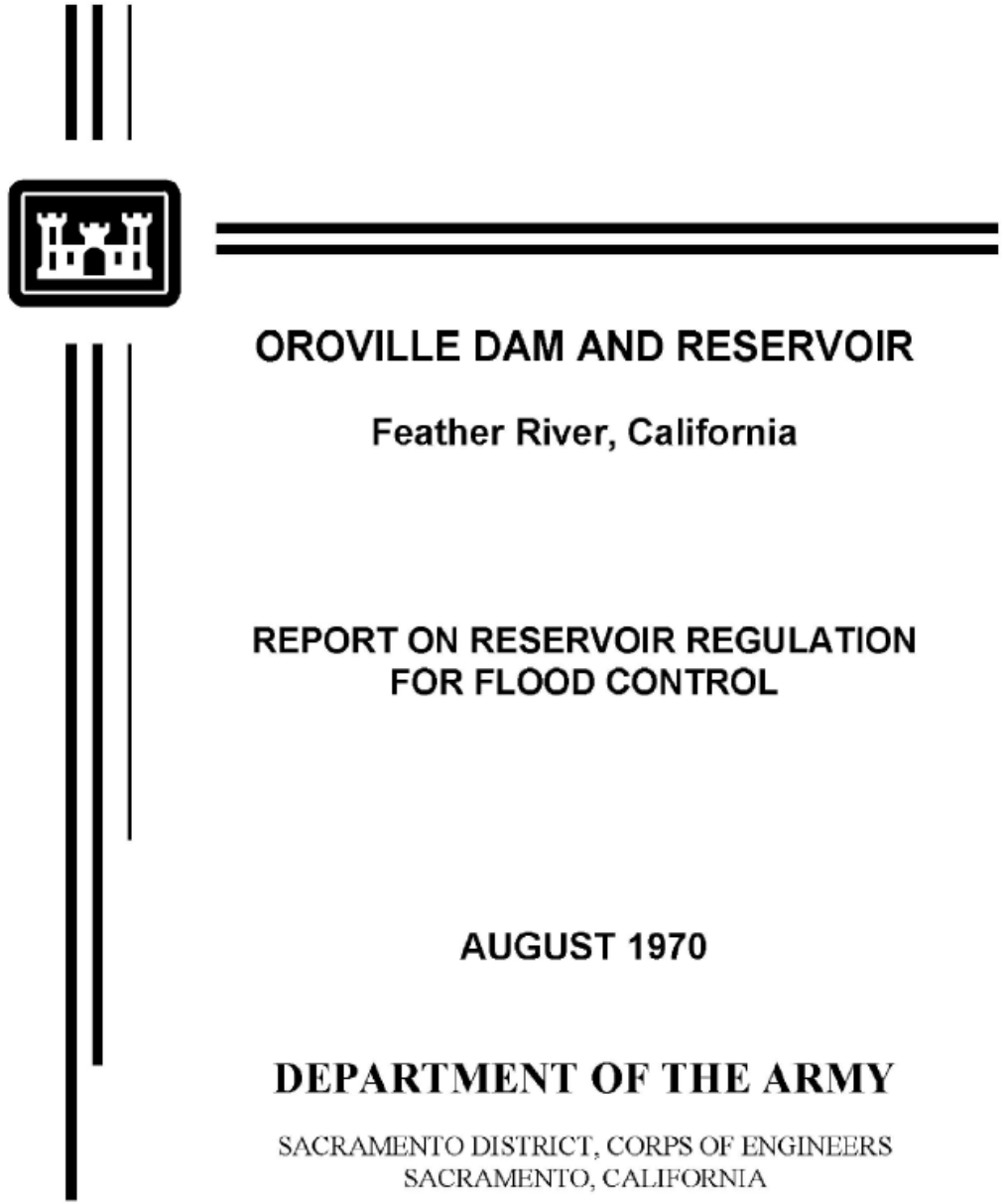
Weber River and Tributaries, Utah

REPORT ON RESERVOIR REGULATION FOR FLOOD CONTROL

JULY 1971

DEPARTMENT OF THE ARMY

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA



WCM TERMINOLOGY

A water control manual includes

- Description and history of the project
- Information about the watershed
- **Water control plan** (operations plan)

The water control plan (WCP) describes how the project is to be operated to meet its authorized purposes

– Graphical representation of WCP is the water control diagram
– The water control diagram shows the flood control space and release requirements, based on the time of year and state of the watershed

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PREPARATION OF WATER CONTROL MANUALS

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Key Engineering Regulations for Water Management:

- ER 1110-2-240, Water Control Management (May 2016)
- EM 1110-2-3600, Management of Water Control Systems (Oct 2017)
- ER 1110-2-8156, Preparation of Water Control Manuals (Sep 2018)
- ER 1110-2-1400, Reservoir/Water Control Management (May 2016)
- ER 1110-2-1941, Drought Contingency Plans (Feb 2018)
- ER 1110-2-8154, Water Quality Management (May 2018)
- ER 1110-2-1400, Reservoir/Water Control Management (May 2016)

Other Key Pertinent Regulations:

- ER 1110-2-1156, Safety of Dams - Policy and Procedures

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PREPARATION OF WATER CONTROL MANUALS

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"The main purpose of a manual is for day-to-day use in water control for essentially all foreseeable conditions affecting project or a system."

Required Chapters in a Water Control Manual

I	Introduction
II	Description of Project
III	History of Project
IV	Watershed Characteristics
V	Data Collection and Communication Network
VI	Hydrologic Forecast
VII	Water Control Plan
VIII	Effect of Water Control Plan
IX	Water Control Management

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CHAPTER 7 – WATER CONTROL PLAN

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"Rule Curve" – Defines the "rule" for water managers to follow during different times of the year. Manages the Flood Control Pool operations, but has direct impacts to Water Conservation Pool, Dam Safety operations, environmental, power supply, and Legal authority.

"Rule Curve" aka Water Control Diagram

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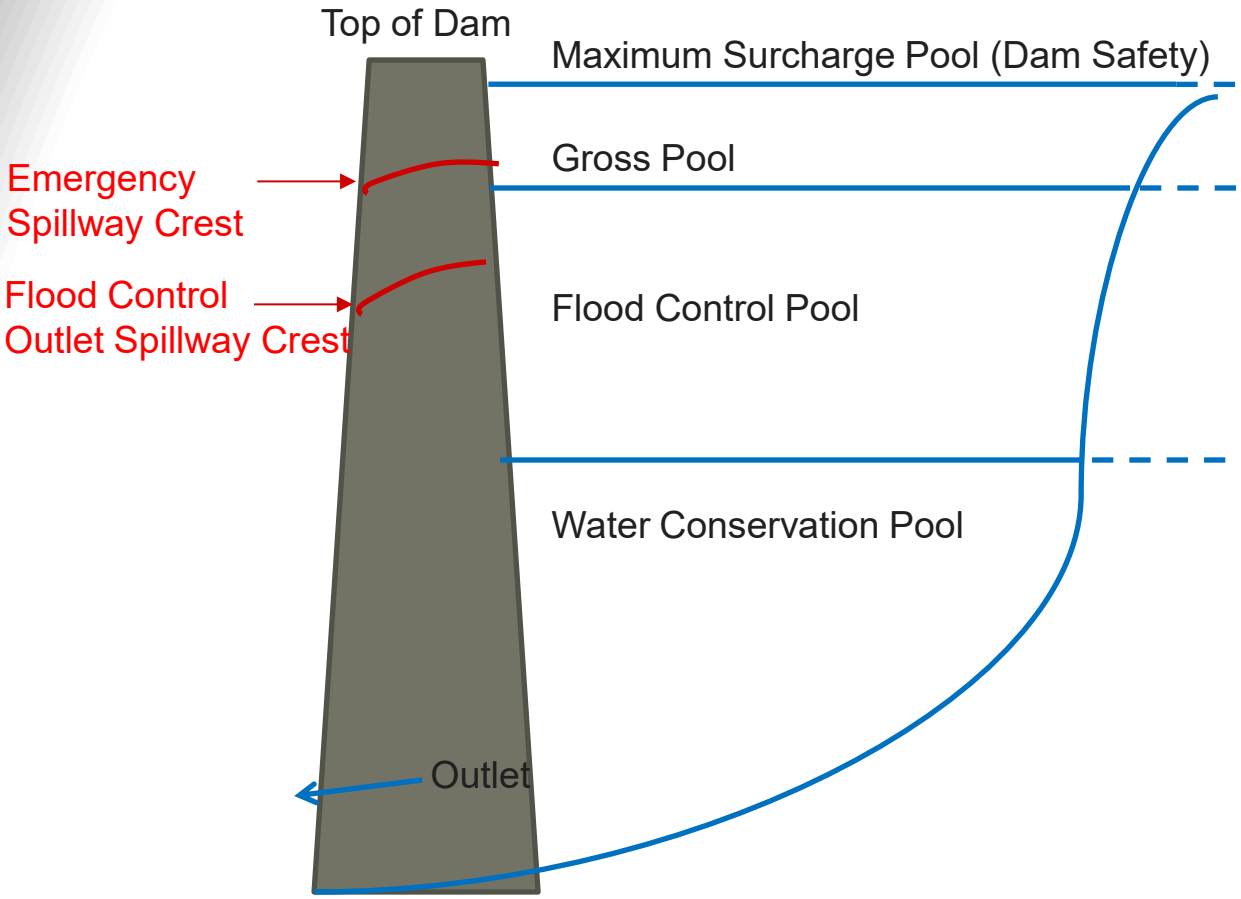
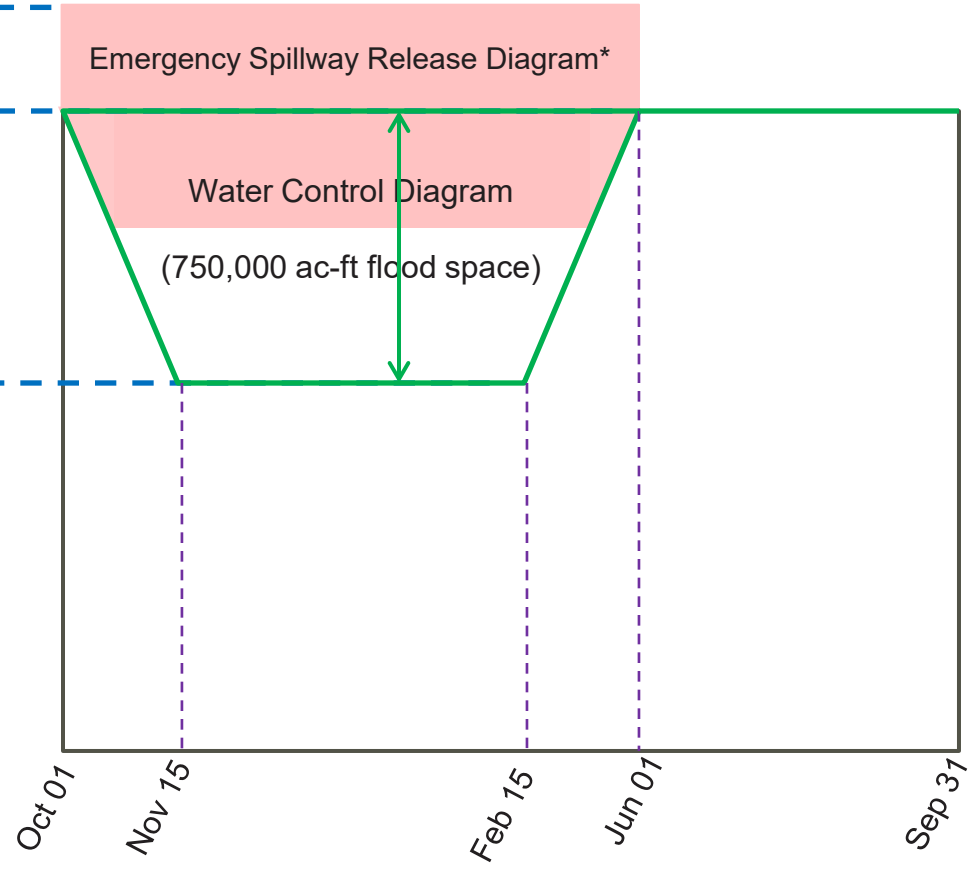
RESERVOIR OPERATING ZONES

Simplified picture of a Reservoir



Simplified Water Control Diagram

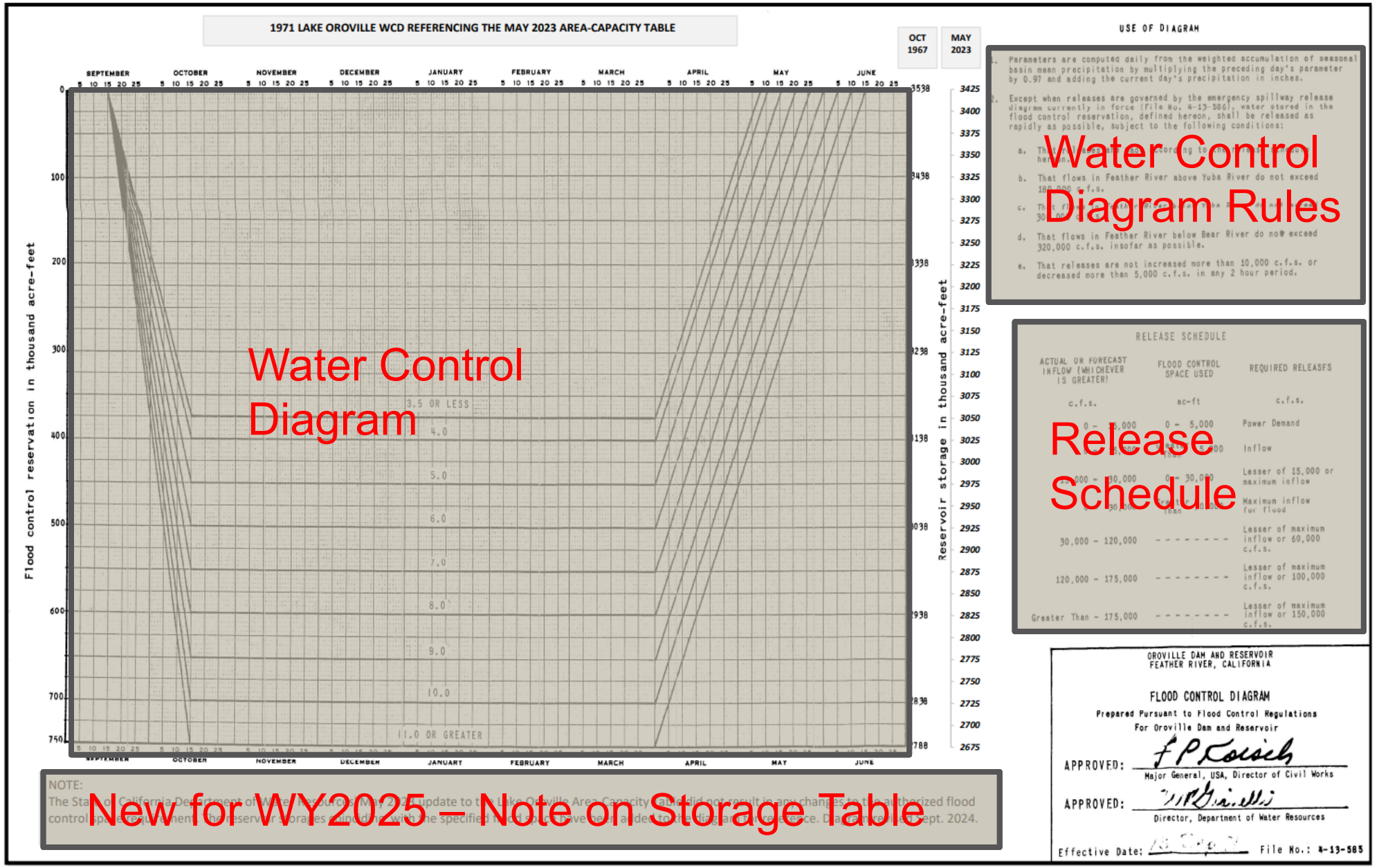


Note: NOT TO SCALE

*Only if gated spillway

OROVILLE DAM-LAKE WCD

US Army Corps



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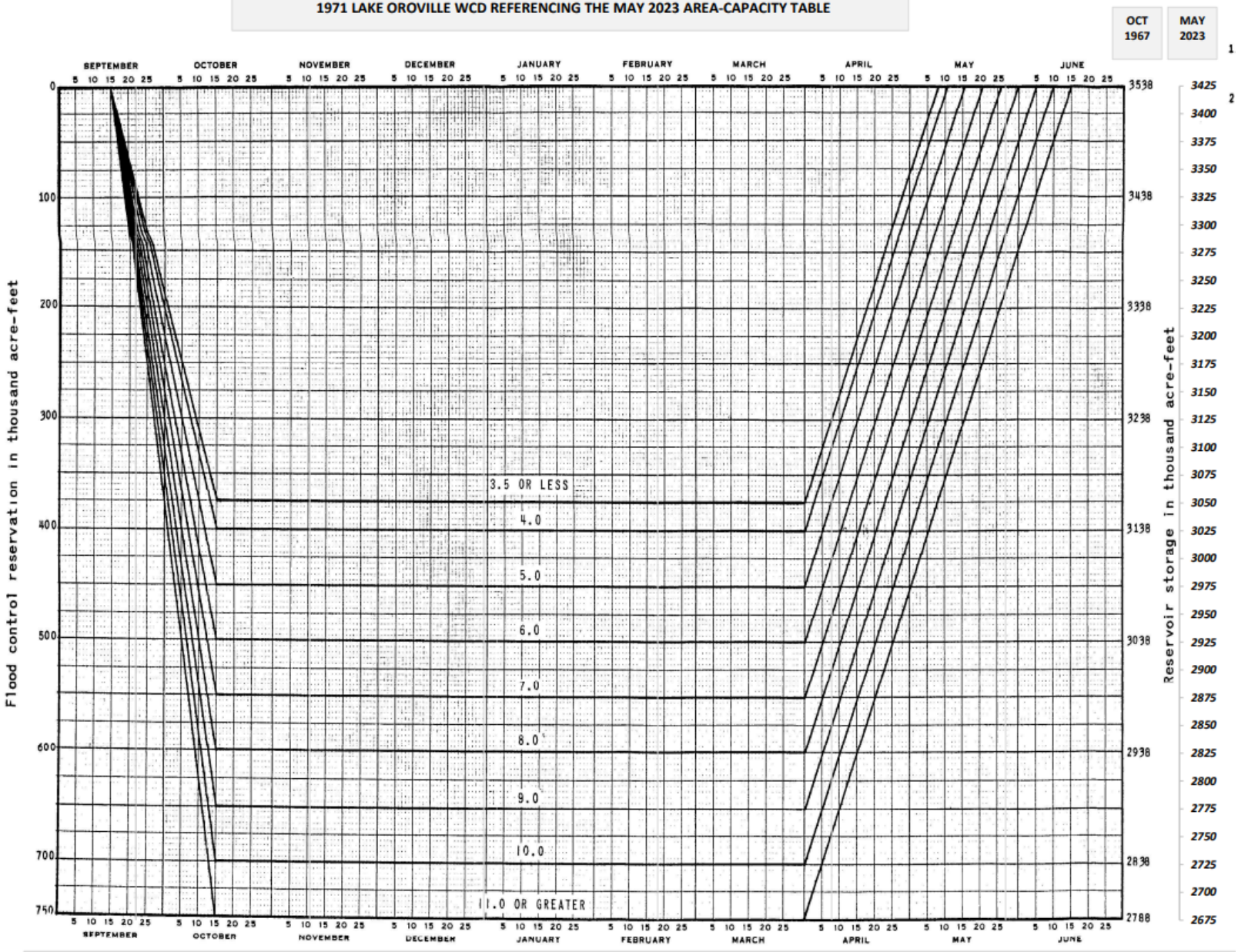
OROVILLE DAM-LAKE WCD



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OROVILLE DAM-LAKE WCD

USE OF DIAGRAM

1. Parameters are computed daily from the weighted accumulation of seasonal basin mean precipitation by multiplying the preceding day's parameter by 0.97 and adding the current day's precipitation in inches.

2. Except when releases are governed by the emergency spillway release diagram currently in force (File No. 4-13-586), water stored in the flood control reservation, defined hereon, shall be released as rapidly as possible, subject to the following conditions:

   a. That releases are made according to the release schedule hereon.

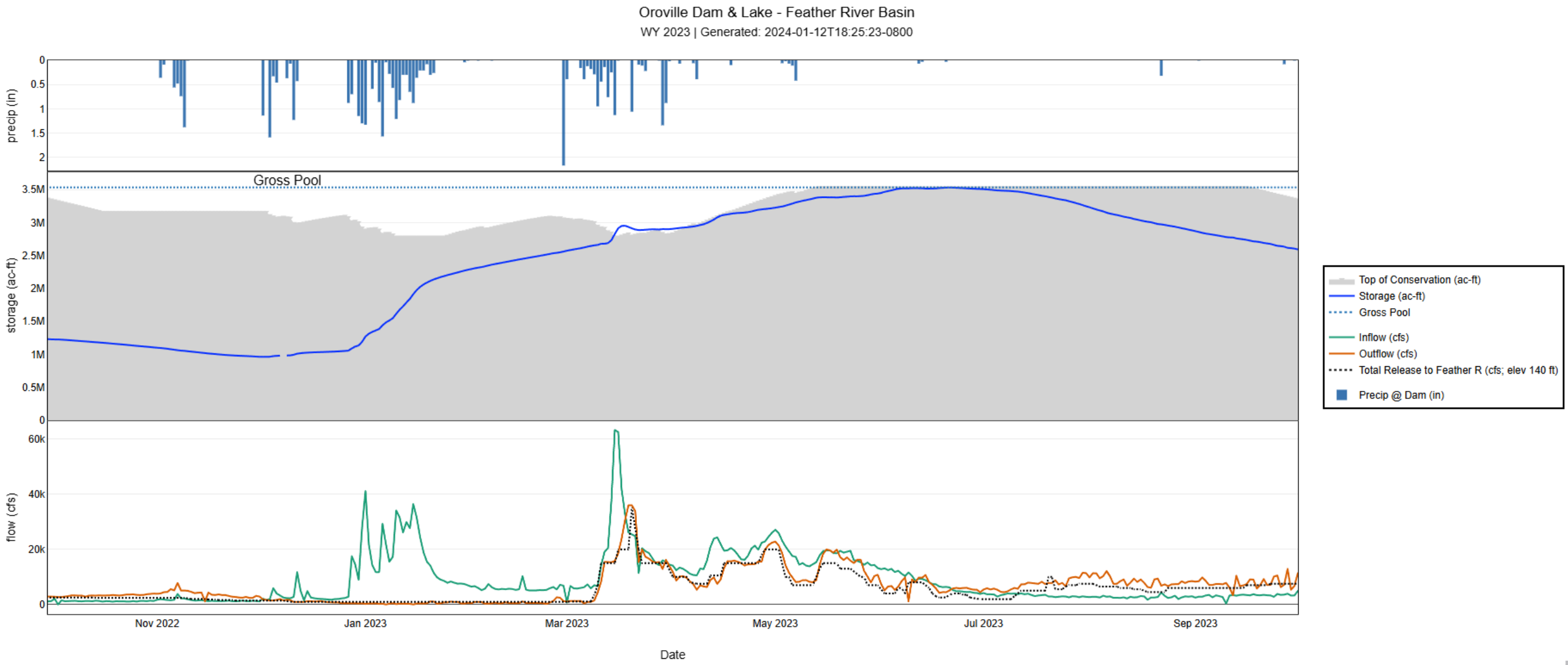
   b. That flows in Feather River above Yuba River do not exceed 180,000 c.f.s.

   c. That flows in Feather River below Yuba River do not exceed 300,000 c.f.s.

   d. That flows in Feather River below Bear River do not exceed 320,000 c.f.s. insofar as possible.

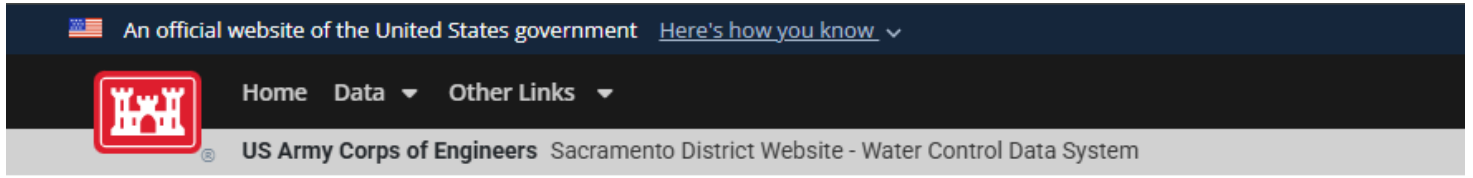
   e. That releases are not increased more than 10,000 c.f.s. or decreased more than 5,000 c.f.s. in any 2 hour period.

ACTUAL STORAGE VS RULE CURVE OROVILLE DAM-LAKE WY2023



https://www.spk-wc.usace.army.mil/

FLOOD CONTROL REPORT
OROVILLE DAM-LAKE 07 MAR 2024



/ Data / Reports / Daily / California Flood Control Requirements

Report

Corps of Engineers Flood Control Requirements for California Reservoirs
Data Ending 2400 hours 07 MAR 2024
Report Generated 11 MAR 2024 @ 0628

	---- Sacramento Valley ----						
	Storages					Flood Control Parameters	
	Gross Pool (acft)	Top of Conservation (acft)***	Actual Res (acft)	% of Gross Pool	Above Top of Conserv (acft)(**)	Rain (in)	Snow (acft)
Shasta:	4,552,100	3,606,215	3,832,628	84	226,413(24)	398268 CFS	
Black Butte:	136,200	37,823	53,254	39	15,431(16)	8.23	---
East Park:	50,900		48,917	96			
Stony Gorge:	50,000		42,625	85			
Oroville:	3,538,000	2,850,392	2,969,089	84	118,697(17)	9.75	---
New Bullards:	966,000	796,000	808,151	84	12,151(7)	----	---
Indian Valley:	300,600	260,600	239,300	80	-21,300(0)	----	---
Folsom:	966,823					Forecasted Volumes****	
07MAR2024 18		610,873	649,742	67	38,869(11)	12,002;	23,184; 34,261; 62,493
08MAR2024 12		617,166	649,191	67	32,025(9)	11,192;	21,627; 32,262; 73,477
08MAR2024 18		617,166	649,191	67	32,025(9)	10,727;	21,162; 32,168; 70,971
No Forecast							
No Forecast							
BASIN TOTALS	10,469,900	7,551,029	8,551,797	82	1,000,768(34)		
TOTAL FLOOD SPACE ENCROACHED					372,693		
w/US Storages	11,124,200		8,820,062	79			

https://www.spk-wc.usace.army.mil/

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OROVILLE DAM-LAKE WCD

RELEASE SCHEDULE

ACTUAL OR FORECAST INFLOW (WHICHEVER IS GREATER)	FLOOD CONTROL SPACE USED	REQUIRED RELEASES
c.f.s.	ac-ft	c.f.s.
0 - 15,000	0 - 5,000	Power Demand
0 - 15,000	Greater Than 5,000	Inflow
15,000 - 30,000	0 - 30,000	Lesser of 15,000 or maximum inflow
0 - 30,000	Greater Than 30,000	Maximum inflow for flood
30,000 - 120,000	- - - - - - - - -	Lesser of maximum inflow or 60,000 c.f.s.
120,000 - 175,000	- - - - - - - - -	Lesser of maximum inflow or 100,000 c.f.s.
Greater Than - 175,000	- - - - - - - - -	Lesser of maximum inflow or 150,000 c.f.s.

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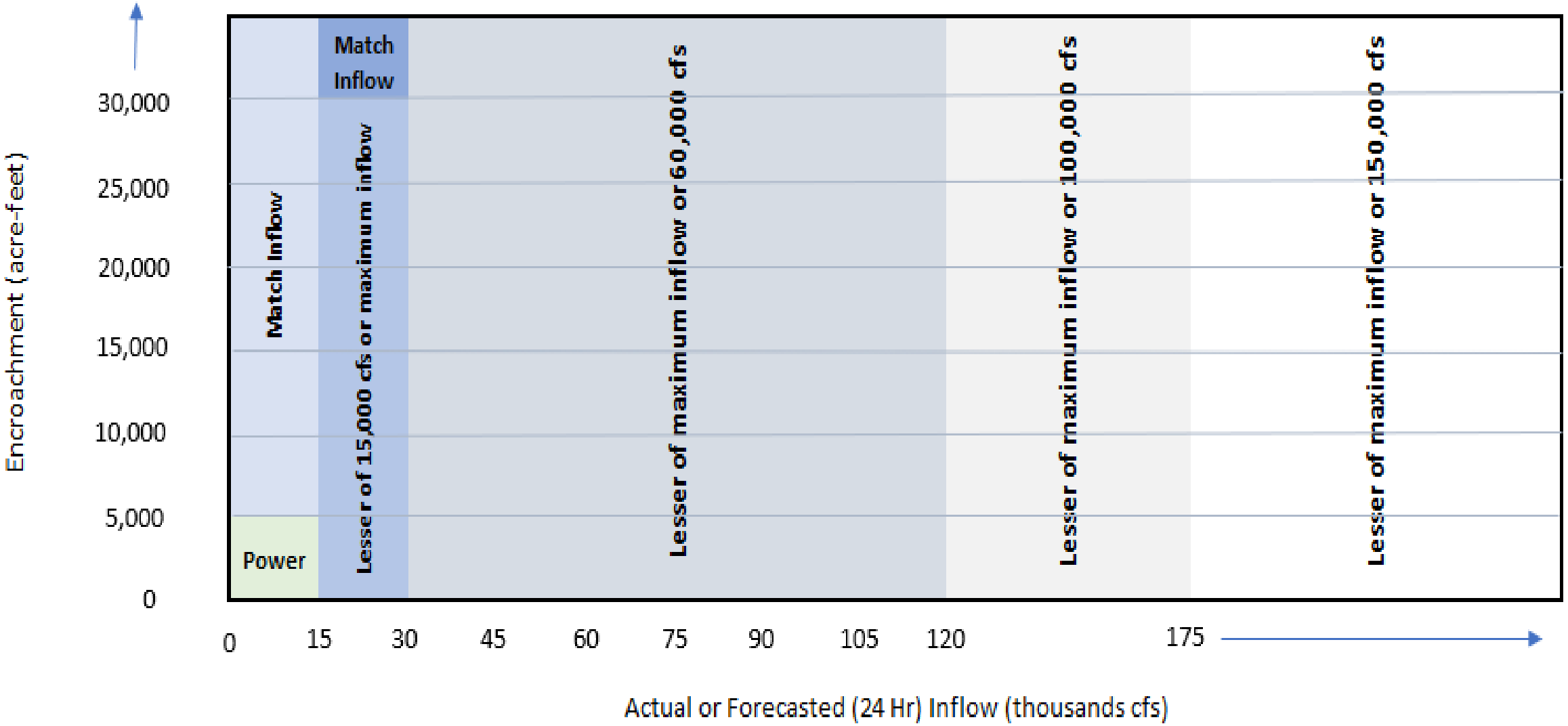
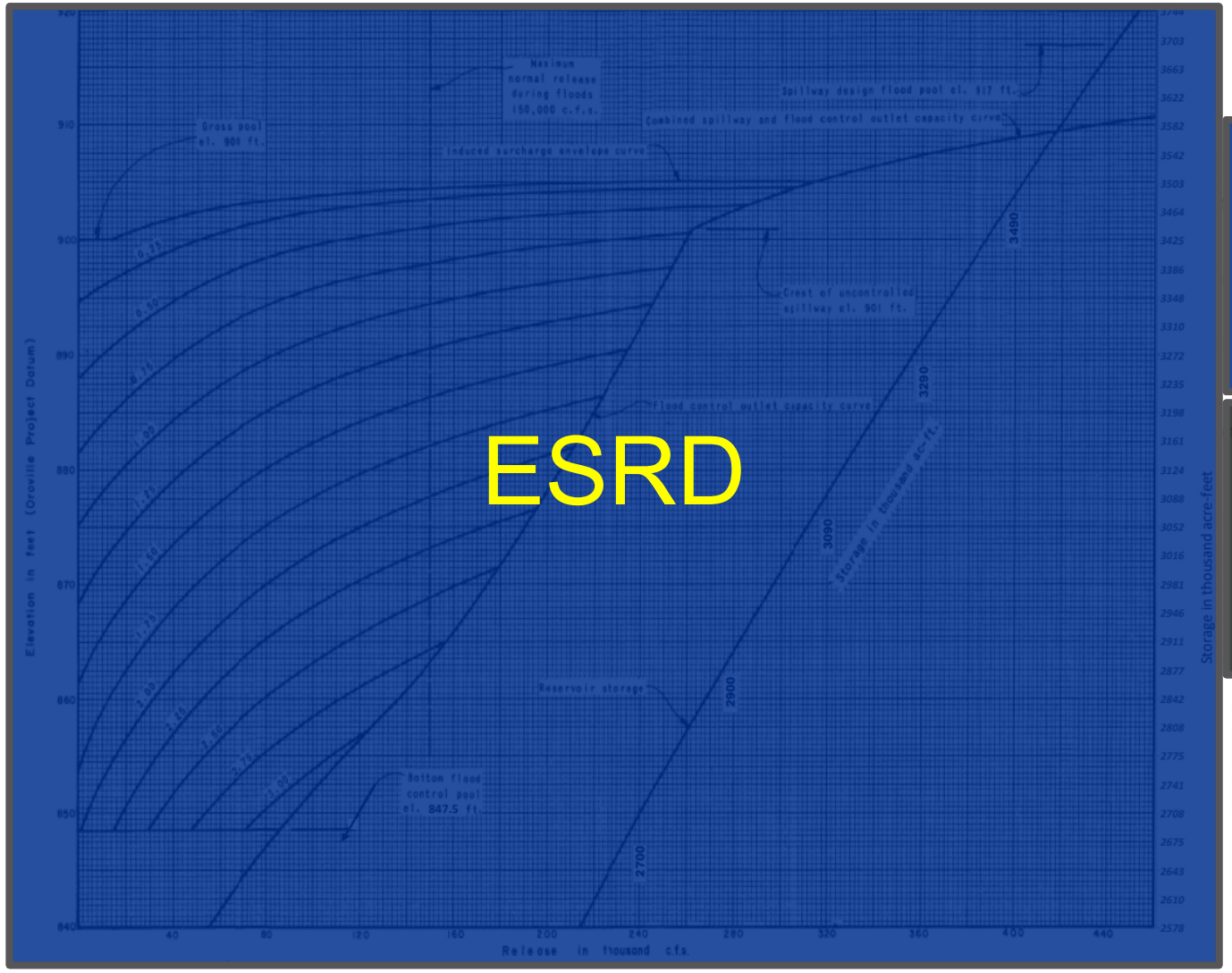
OROVILLE DAM-LAKE WCD



OROVILLE DAM-LAKE EMERGENCY SPILLWAY RELEASE DIAGRAM (ESRD)

US Army Corps of Engineers

1971 LAKE OROVILLE ESRD REFERENCING THE MAY 2023 AREA-CAPACITY TABLE



ESRD rules

OPERATING INSTRUCTIONS

Follow regular flood control regulation schedule until larger releases are required by these schedules.

Adjust the spillway release so that the rate of change of reservoir elevation for the following hour will not exceed the rate of rise or fall for the preceding hour as indicated by the curves.

After the reservoir elevation starts to fall, maintain current gate openings until the flow has been reduced to 150,000 c.f.s.

Once operation of the spillway has begun, spillway release changes shall be made only in accordance with the above criteria.

Notes

NOTES:

1. Parameter values are the rate of rise in reservoir elevation in feet during preceding hour.
2. Spillway crest elevation 813.5 feet. Maximum reservoir elevation 901 feet.
3. Discharge through the flood control outlet is controlled by eight 17.6' x 33.0' gates with an additional 1730 feet of uncontrolled spillway above elevation 901 feet.

Prepared by MVB

OROVILLE DAM AND RESERVOIR
Feather River, California

EMERGENCY SPILLWAY RELEASE DIAGRAM

Prepared Pursuant to Flood Control Regulations for Oroville Dam and Reservoir

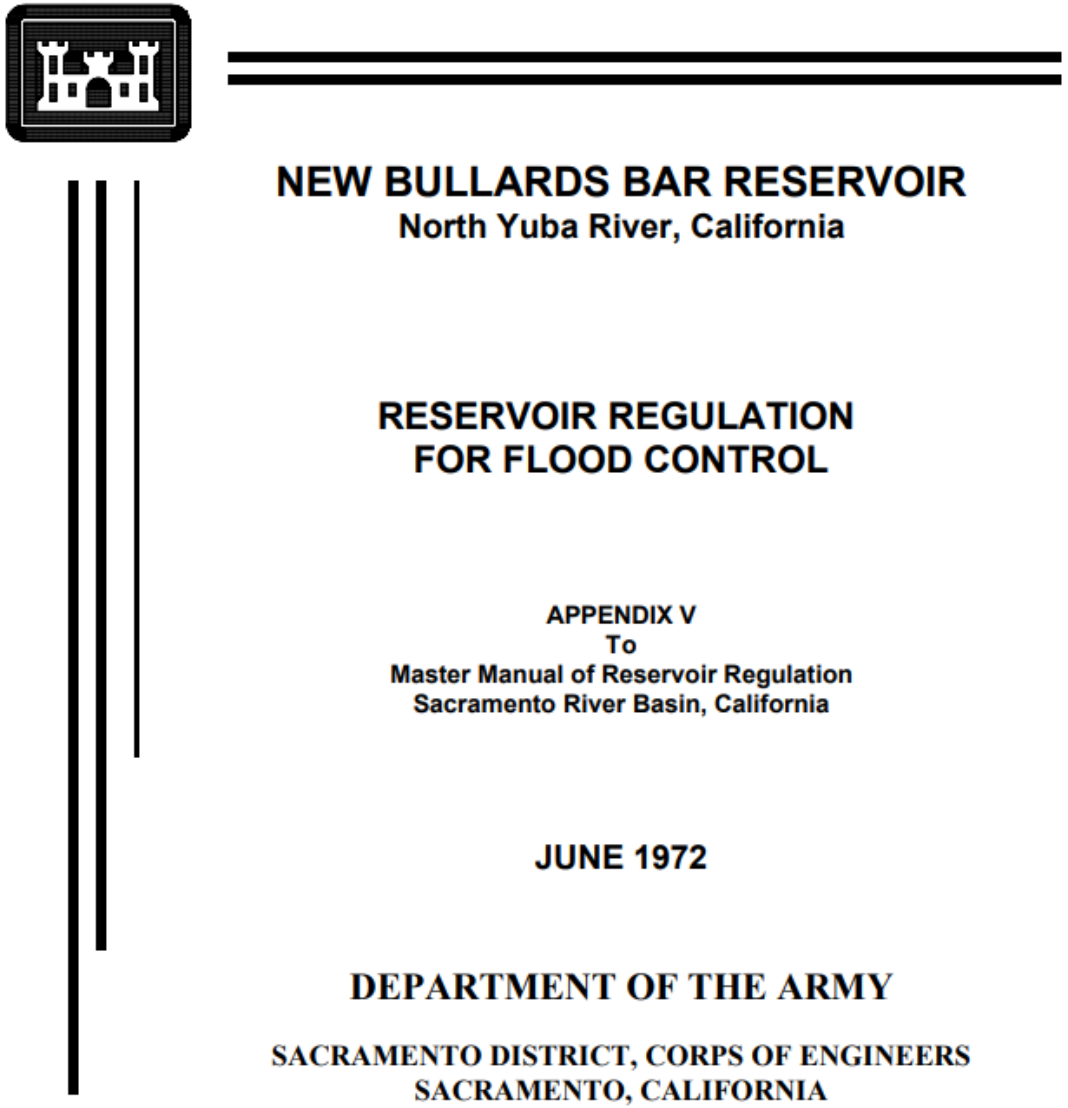
APPROVED: L P Koisch
Major General, U.S.A., Director of Civil Works

APPROVED: W.E. Granelli
Director, Department of Water Resources

Effective Date: 13 Sep 71 File No: 4-13-586

Revised October 2024

CHART A-2



NEW BULLARDS BAR RESERVOIR
North Yuba River, California

RESERVOIR REGULATION
FOR FLOOD CONTROL

APPENDIX V
To
Master Manual of Reservoir Regulation
Sacramento River Basin, California

JUNE 1972

DEPARTMENT OF THE ARMY

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

WCM UPDATE JUSTIFICATION

Water control manual should be reviewed regularly and updated when information is outdated

- Administrative
  - Points of contact
  - Activity/developments in watershed
  - Hydrologic data to add to period-of-record analyses
  - Updates to USACE standards
- Comprehensive
  - Revisions to water control plan

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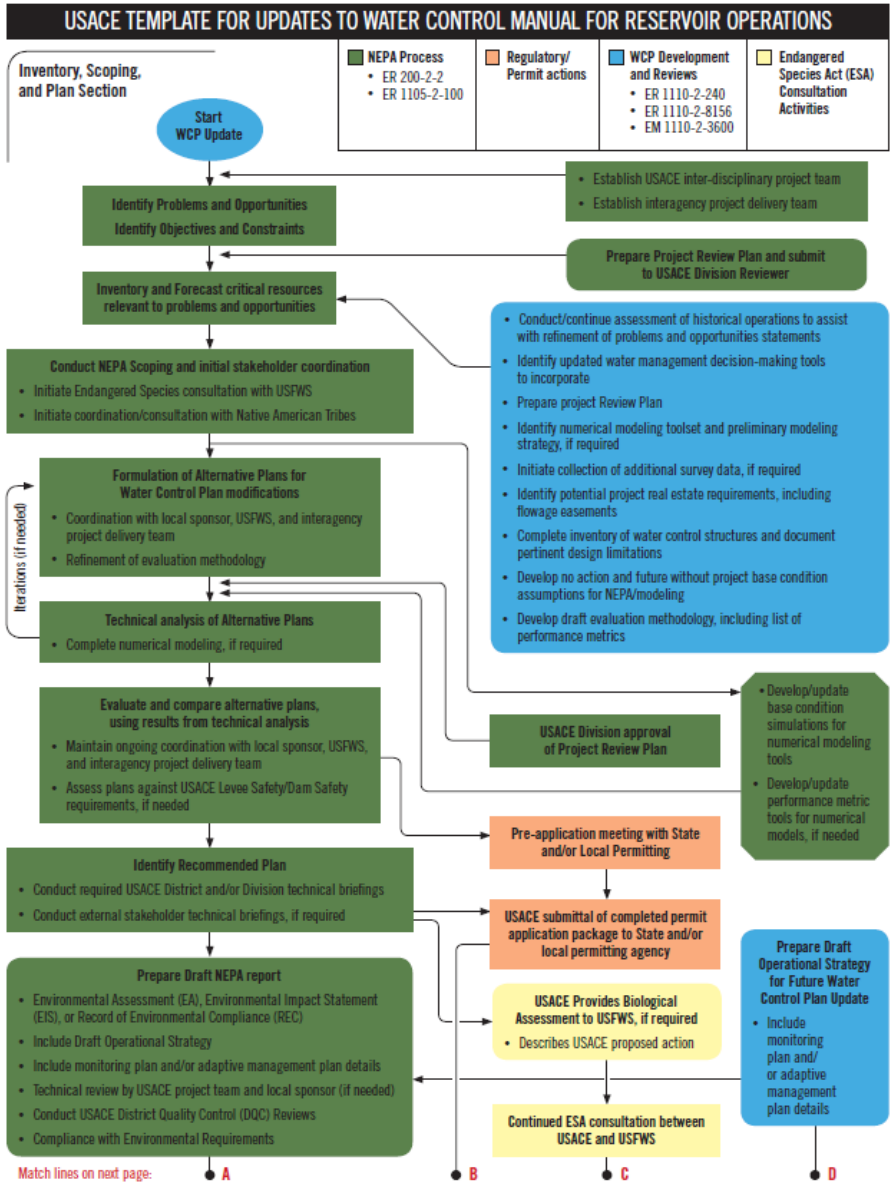
USACE WCM UPDATE PROCESS

44



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USACE WCM UPDATE PROCESS

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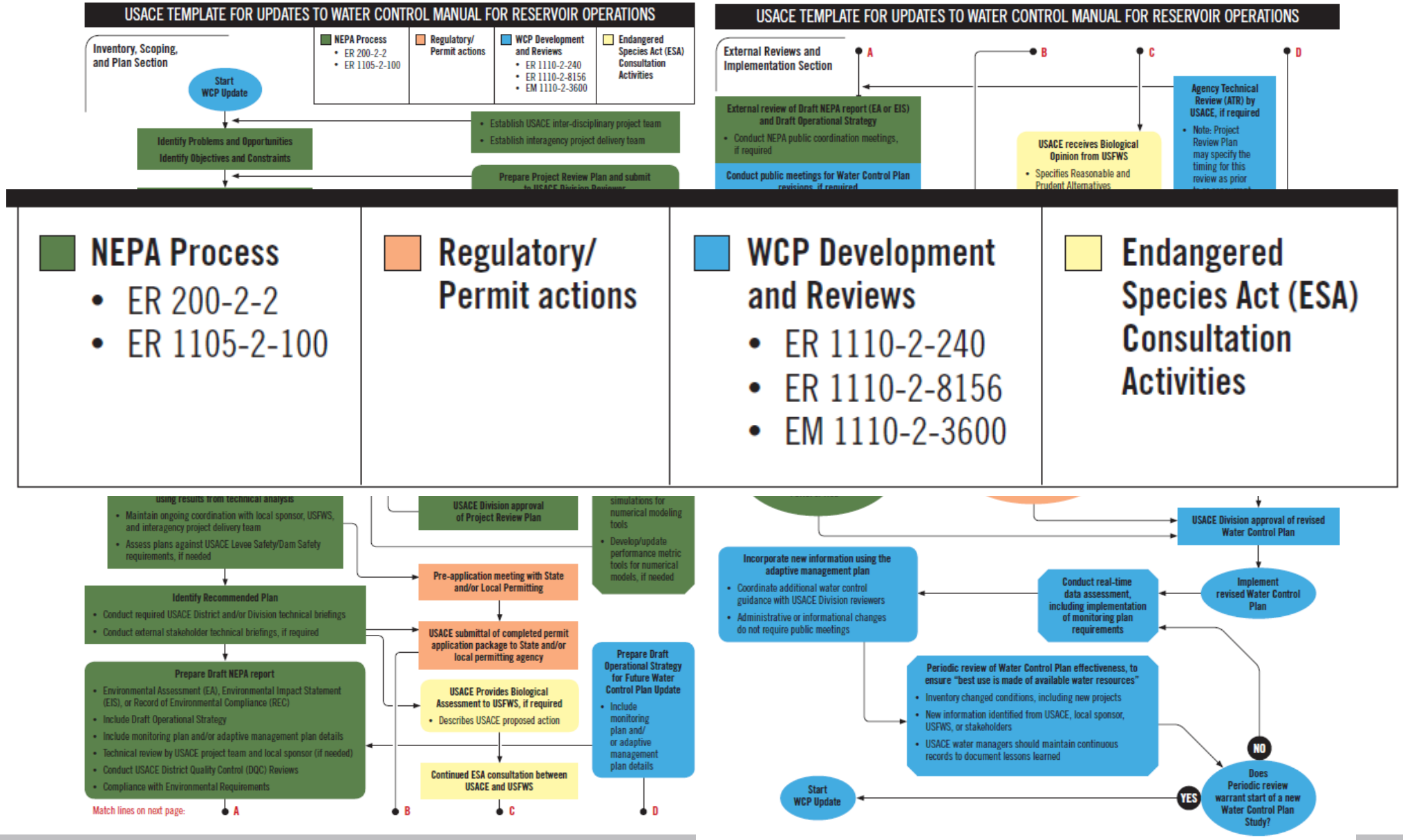

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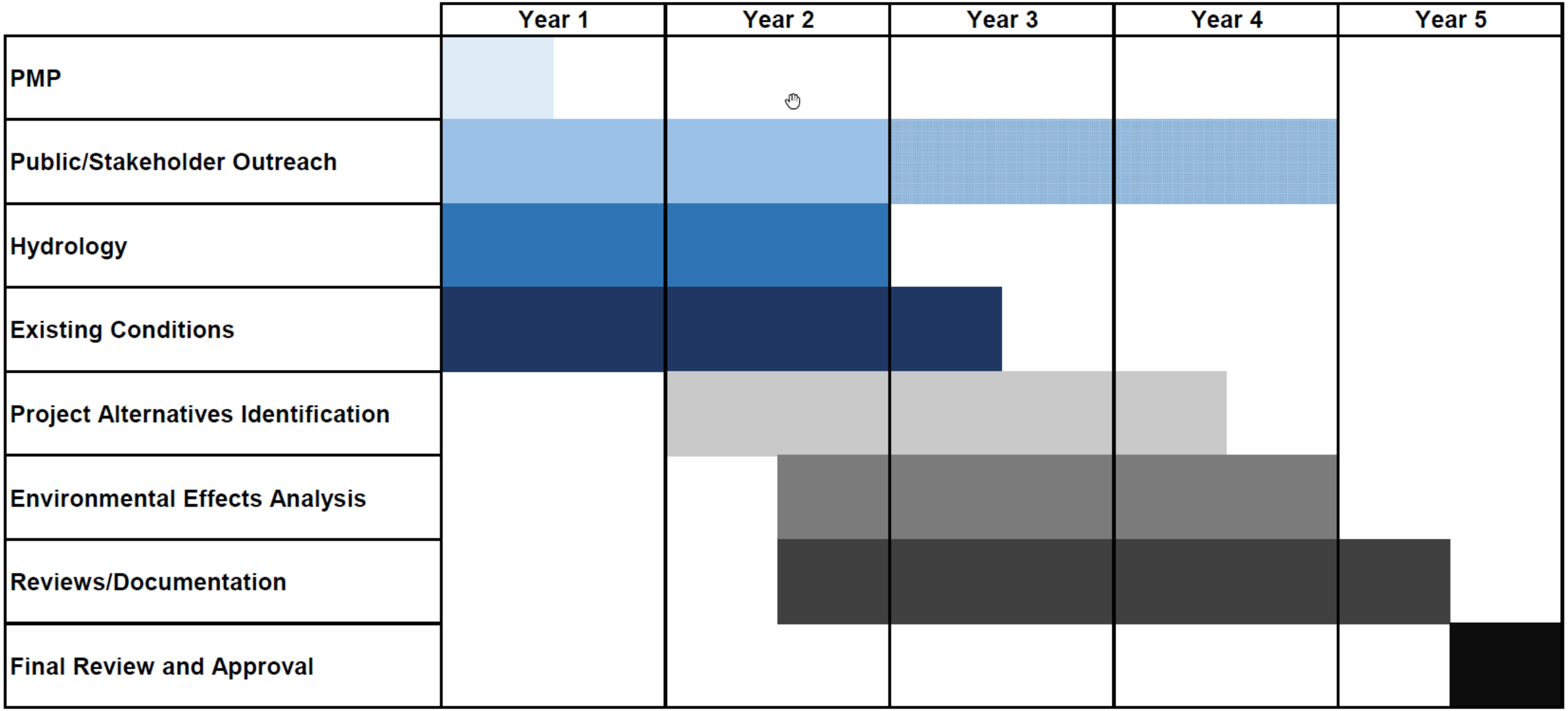

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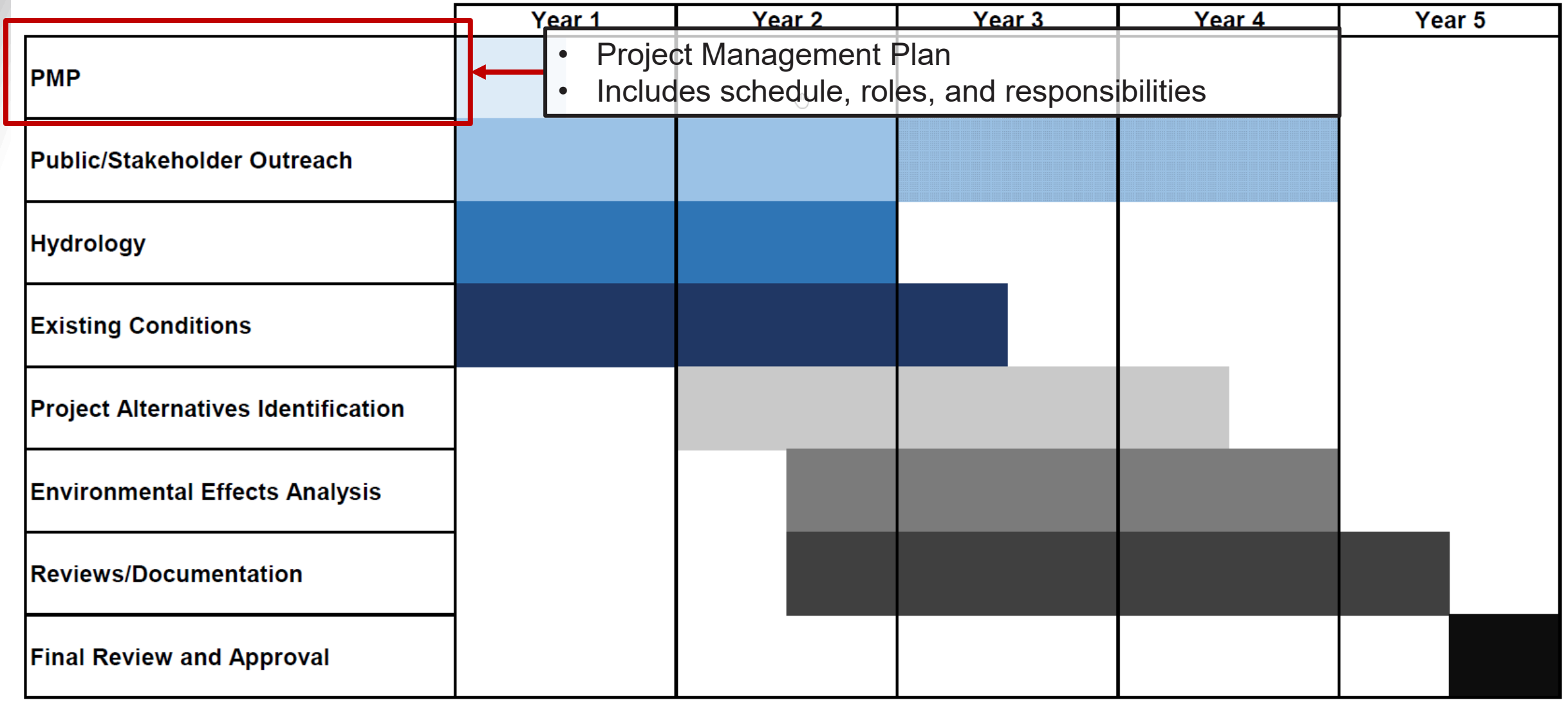

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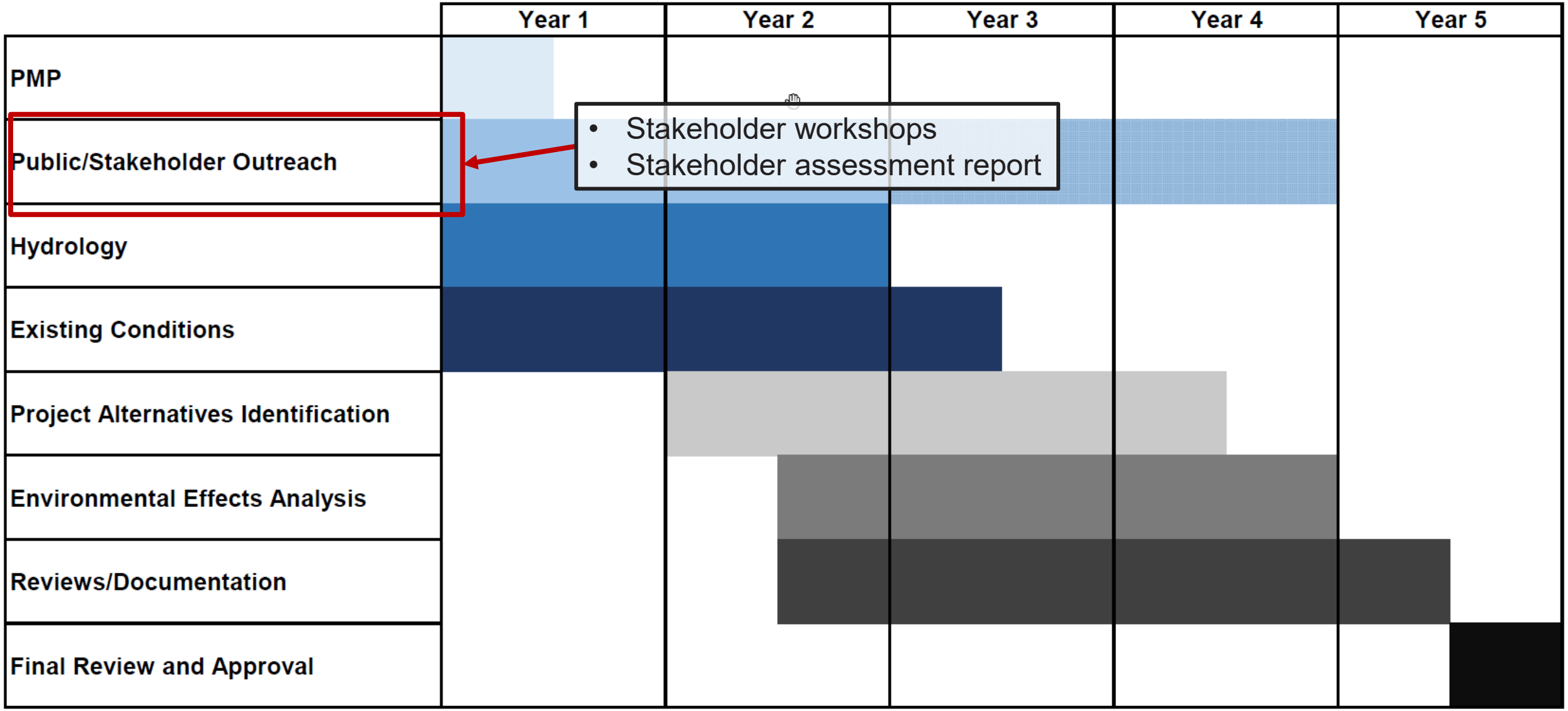

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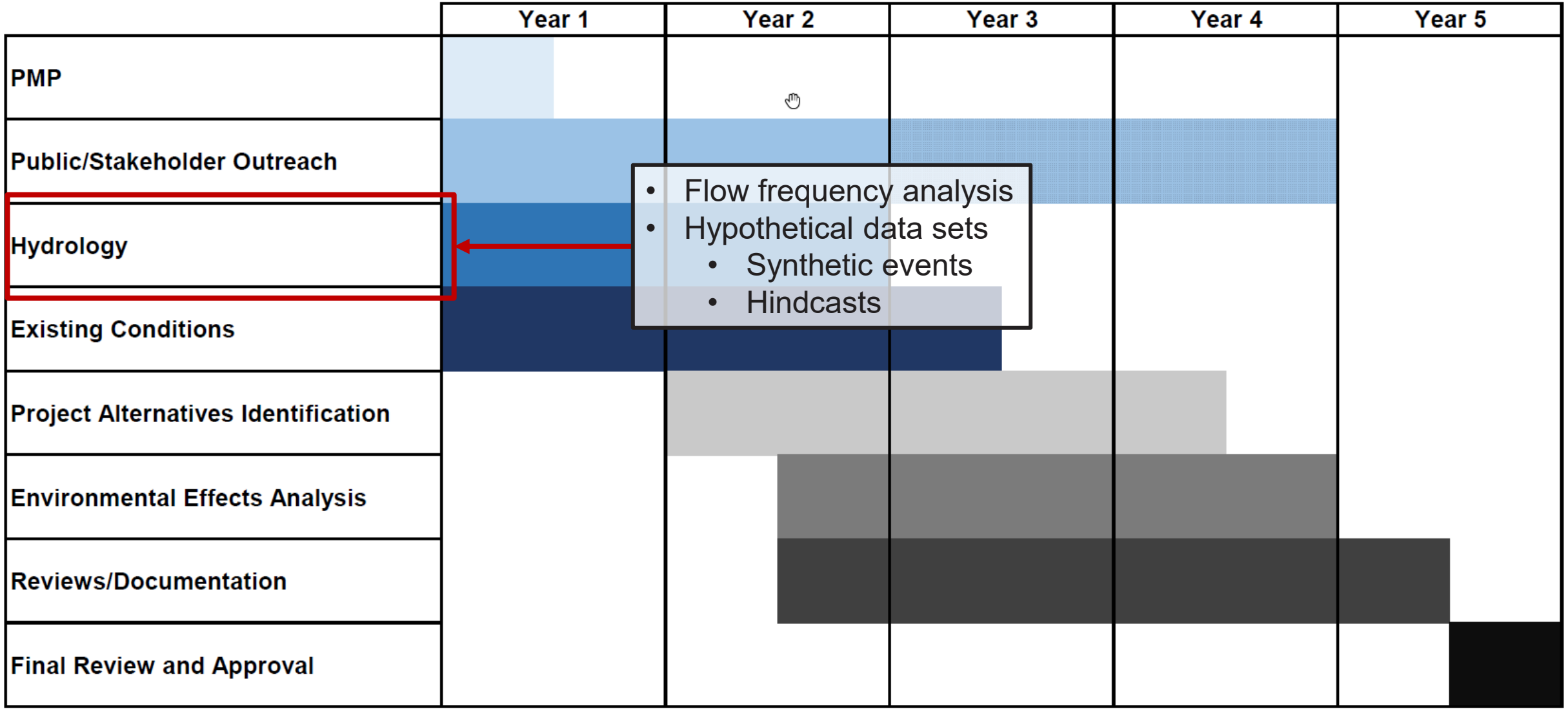

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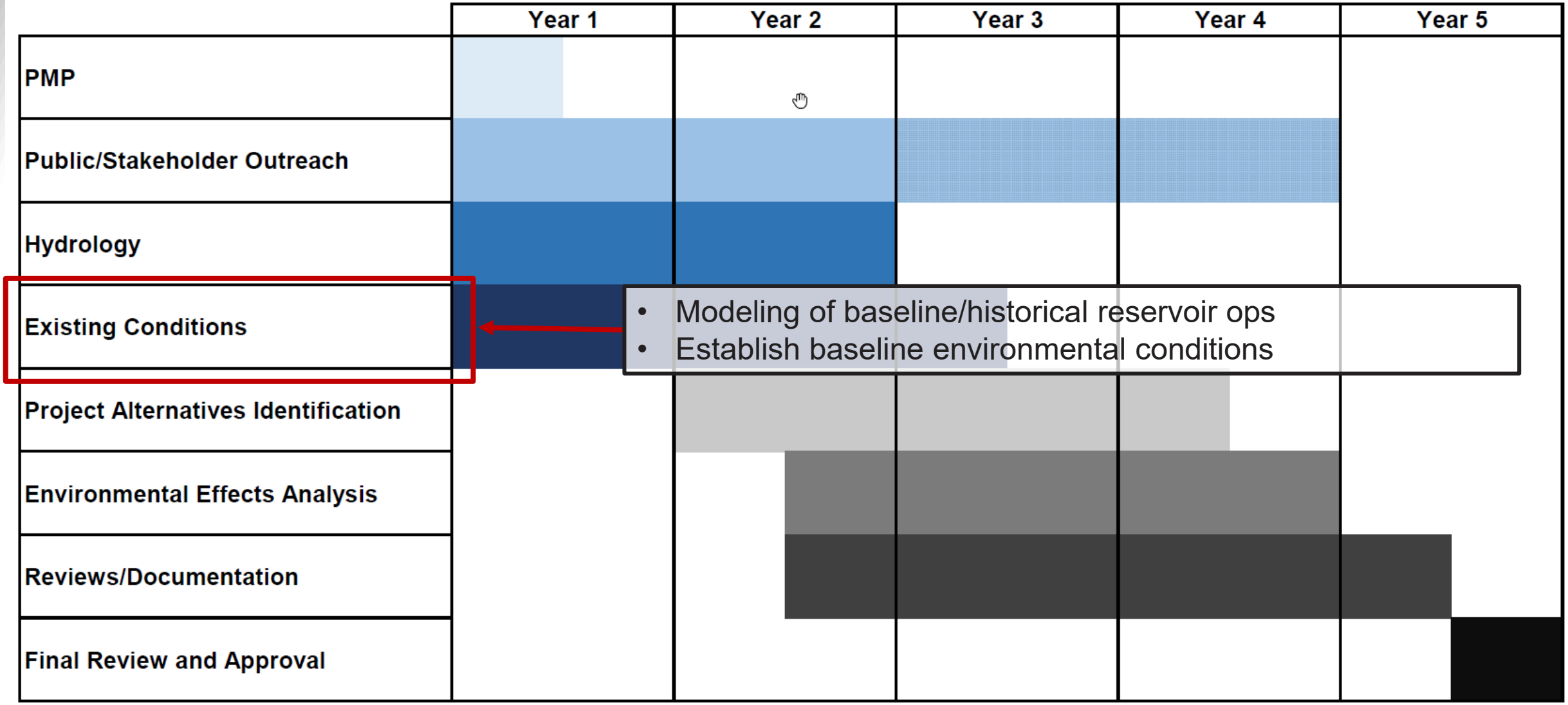

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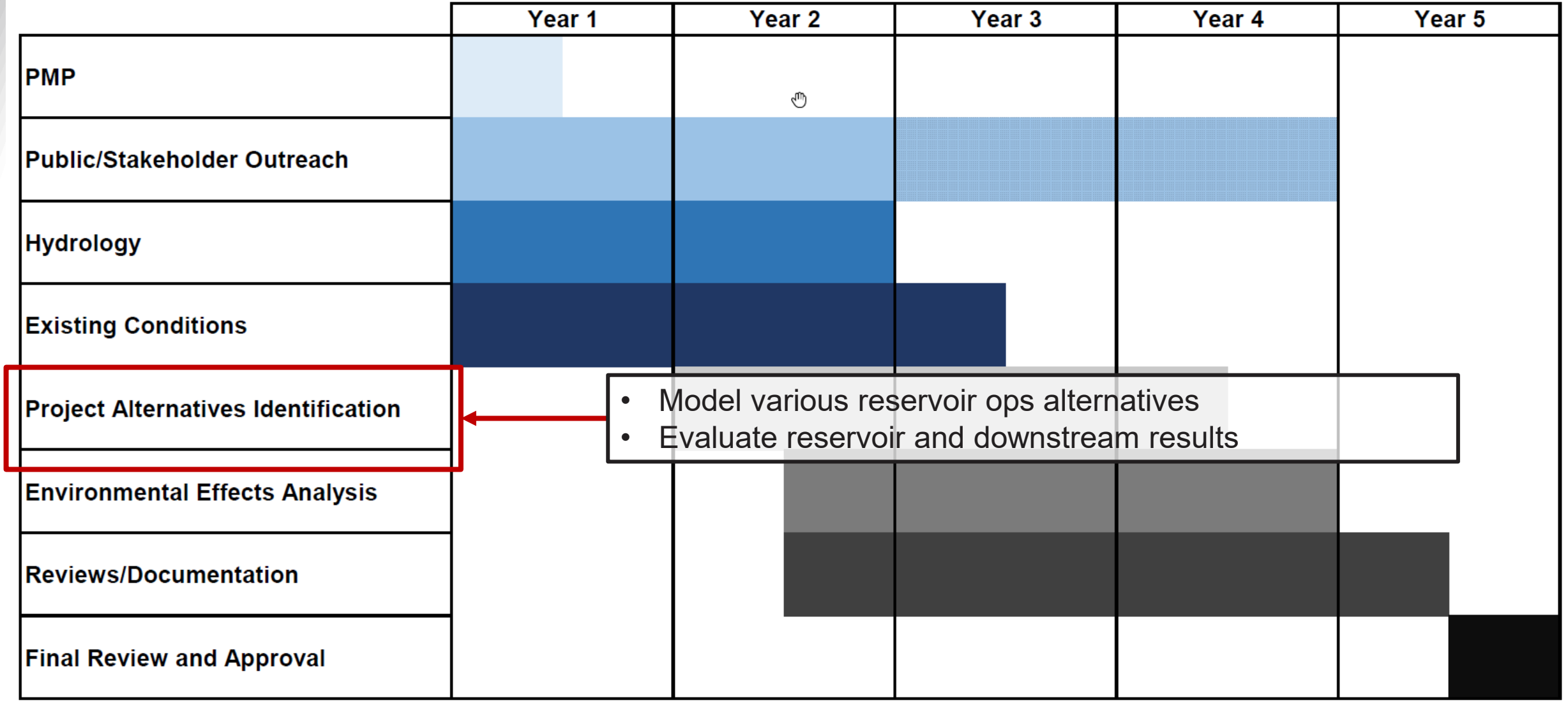

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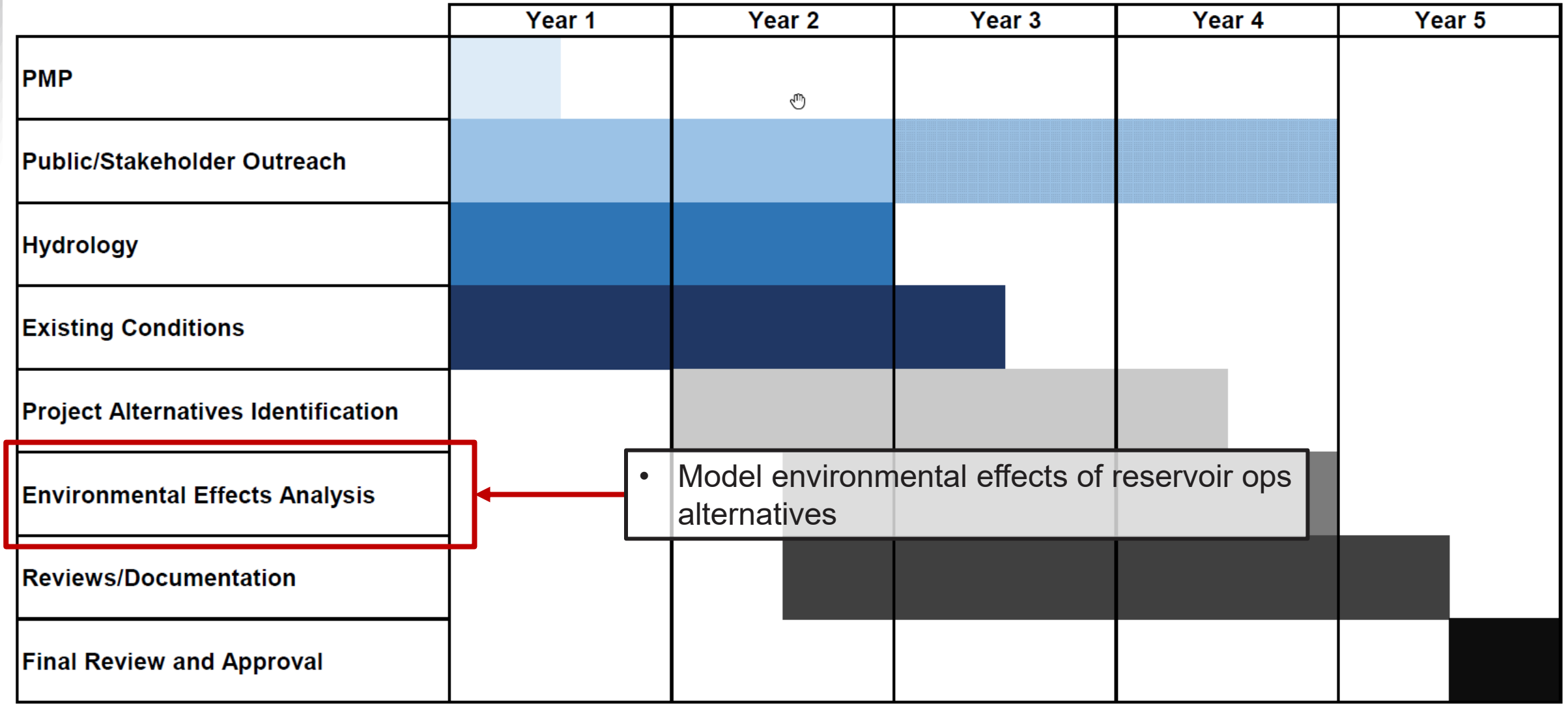

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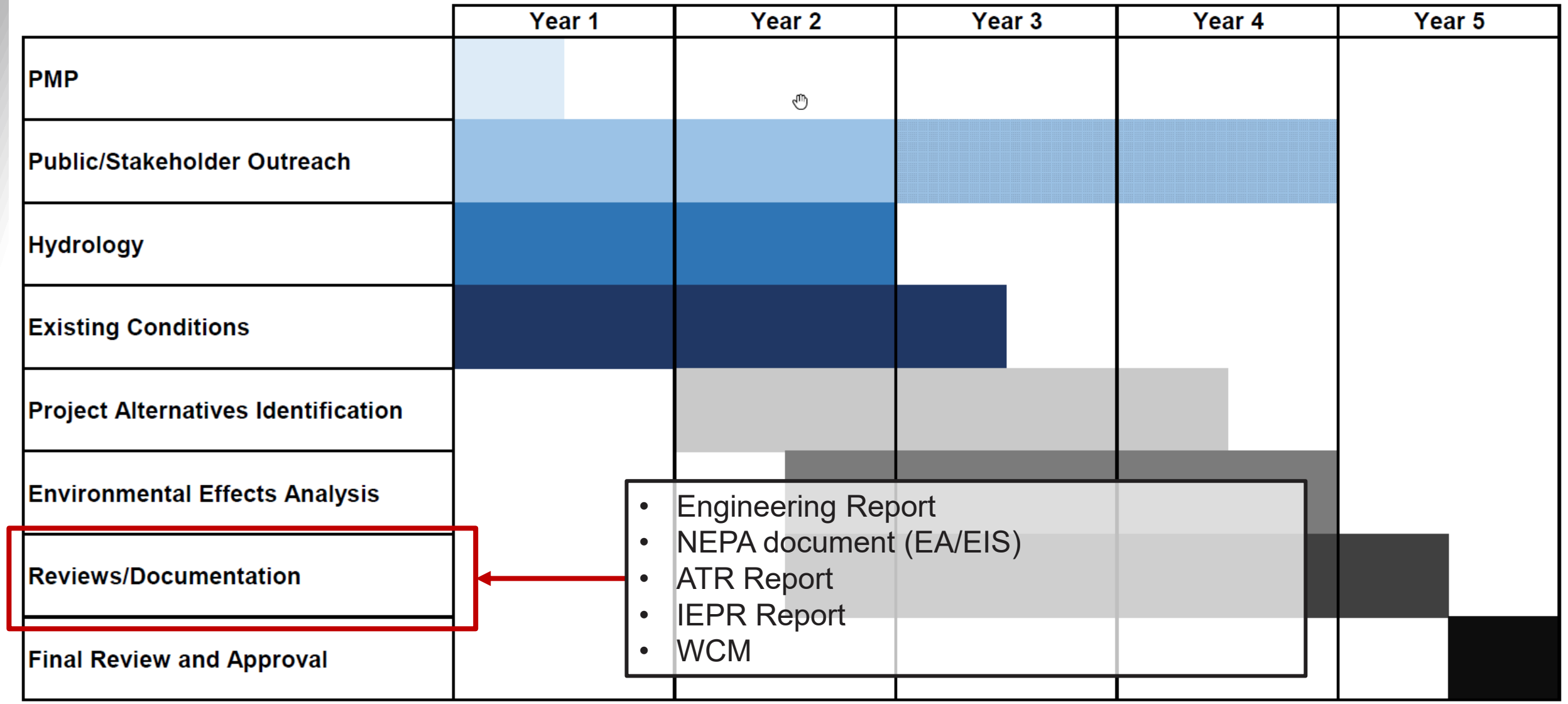

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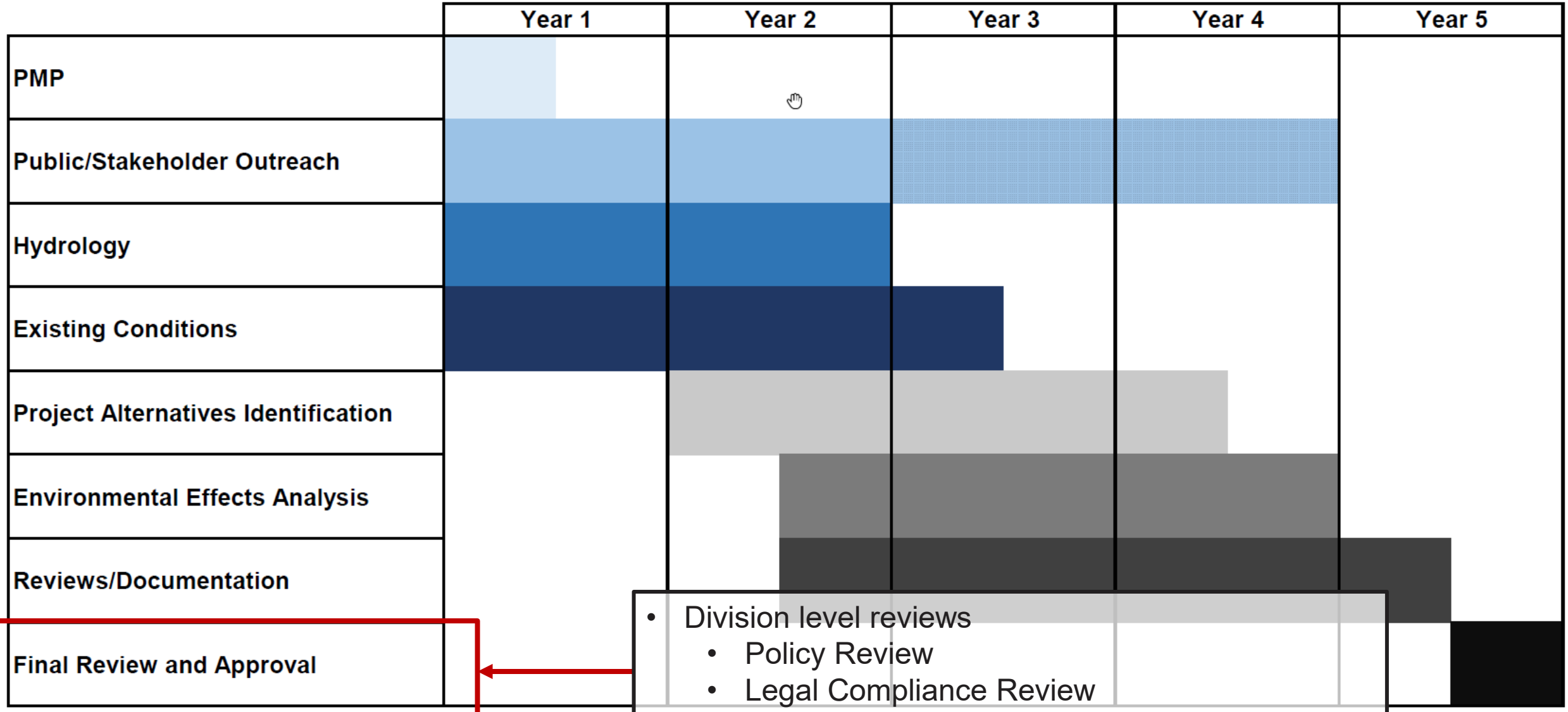

- Division level reviews
  - Policy Review
  - Legal Compliance Review
- Approved by Division Commander

WATER CONTROL MANUAL UPDATES IN WY2025

- Construction
  - Schafer Dam-Success Lake
  - Isabella Dam-Lake
  - Folsom Dam-Lake

- Administrative Update
  - Merced County Stream Group
    - Burns Dam-Reservoir
    - Bear Dam-Reservoir
    - Owens Dam-Reservoir
    - Mariposa Dam-Reservoir

- Comprehensive Update
  - Black Butte Dam-Lake
  - New Hogan Dam-Lake
  - Hidden Dam-Hensley Lake
  - Terminus Dam-Lake Kaweah
  - Pine Flat Dam-Lake
  - Truckee System – Martis Creek, Prosser, Boca, and Stampede
  - Buchanan Dam-Eastman Lake

- FIRO Pilot Study
  - New Bullards Bar Dam-Reservoir
  - Oroville Dam-Lake

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FOR ADDITIONAL INFORMATION

For additional information on the New Bullards Bar and Oroville Dams Water Control Manual Updates, visit the project web page by using this QR code.

Email us questions or comments at
NBB-Oroville-WCMupdates@usace.army.mil

OROVILLE DAM DOWNSTREAM LEVEE RISK DISCUSSION

FOR:
OROVILLE CITIZENS ADVISORY COMMITTEE

Erik James PE, PG, GE
District Levee Safety Program Manager
Chief of Levee Safety
Sacramento District

Date: 7 March 2025

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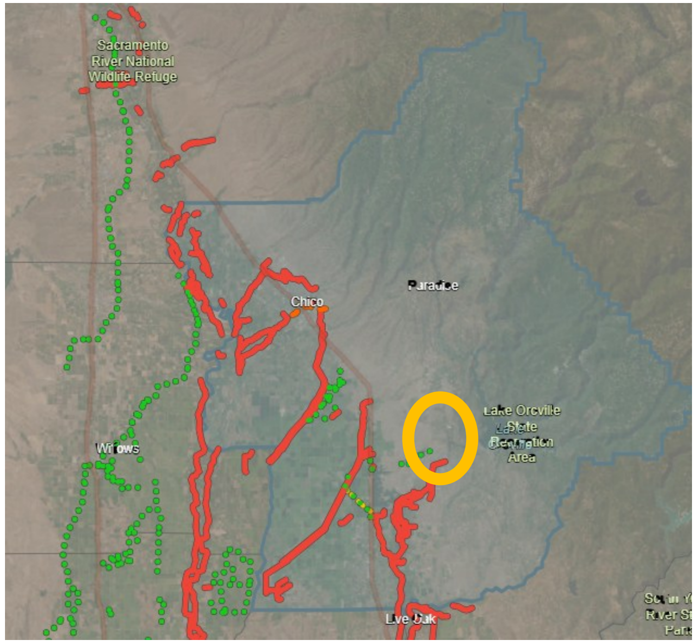
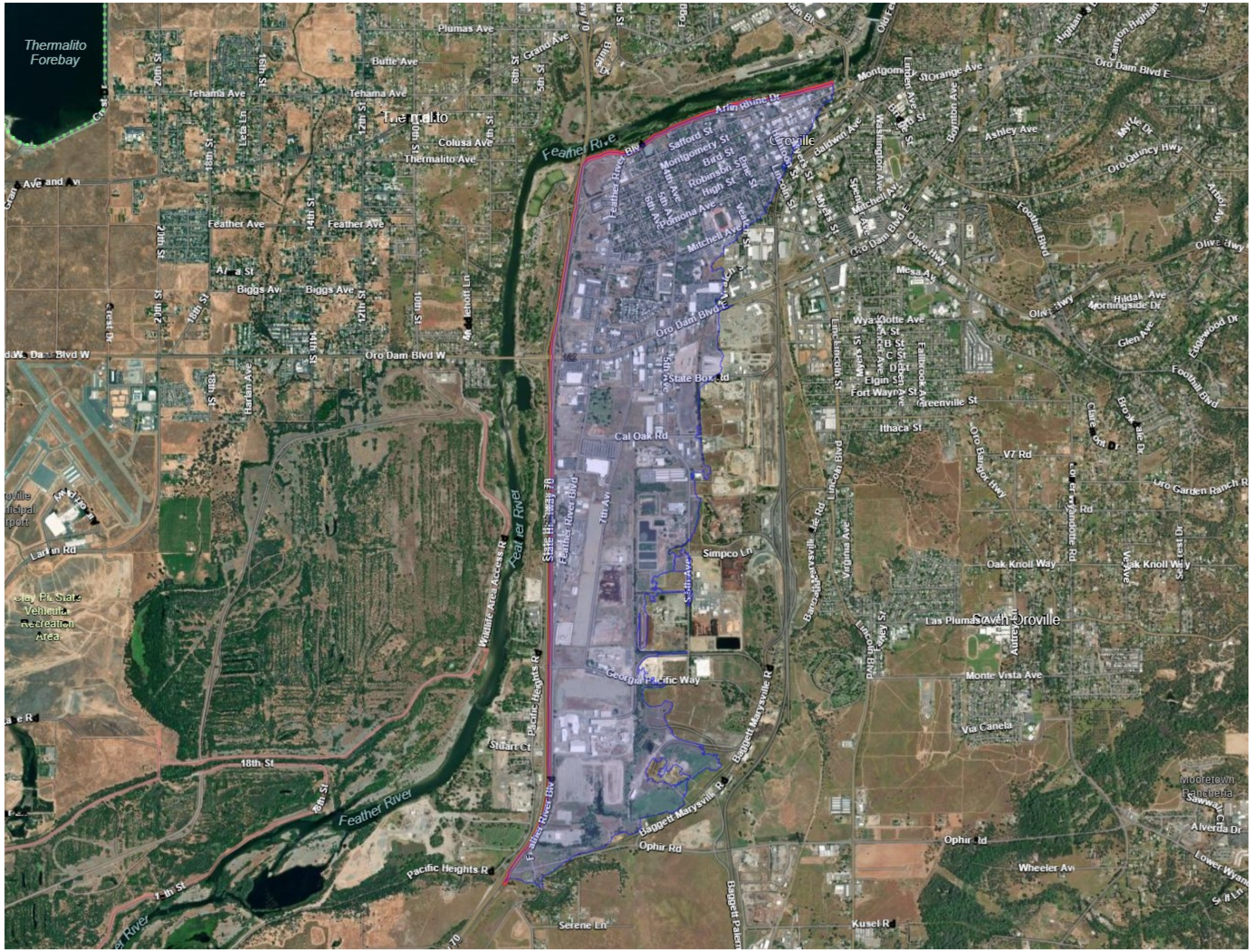
LEVEES OF BUTTE COUNTY AND OROVILLE

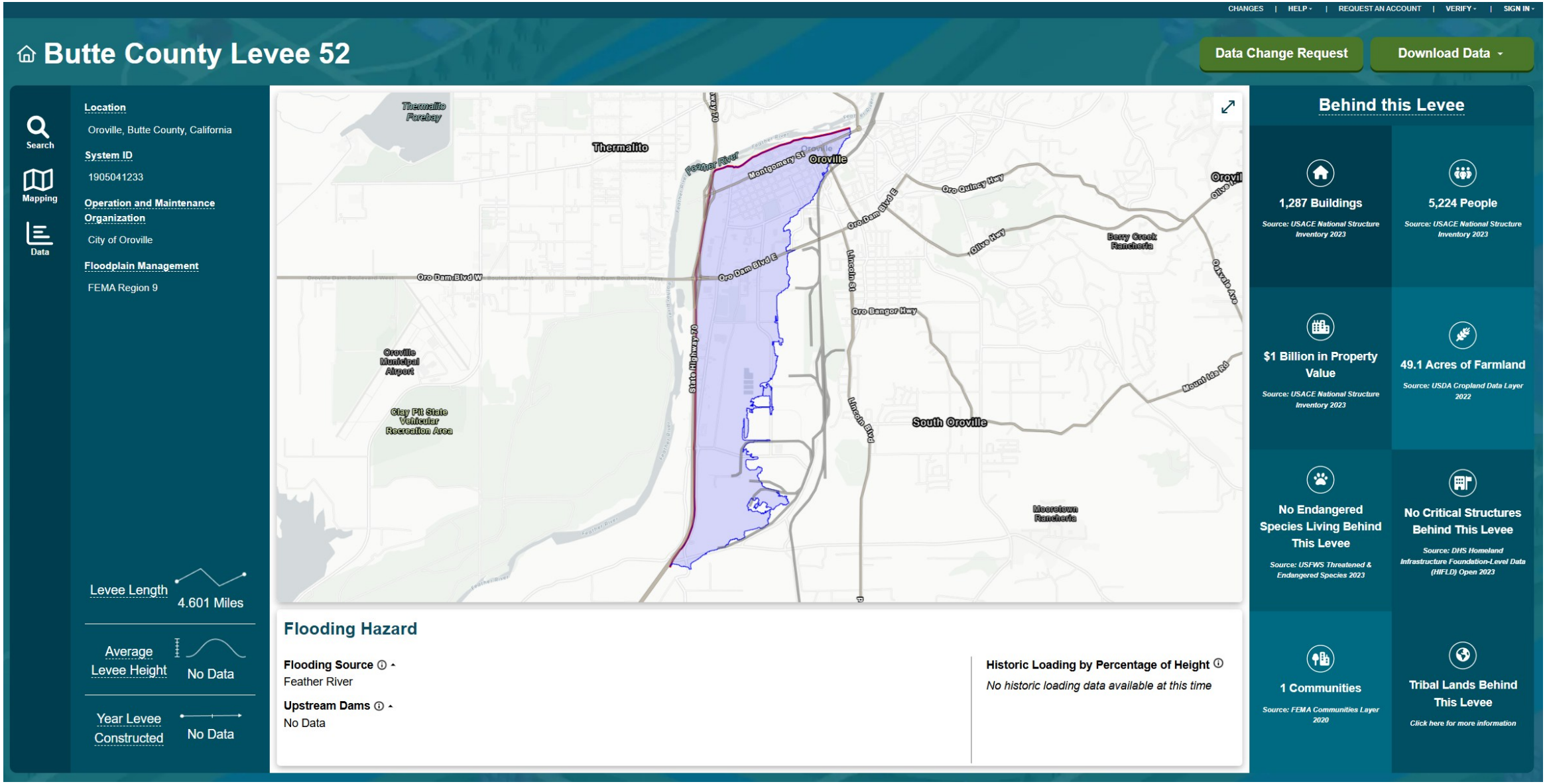




Levee System Information is taken from the National Levee Database

Publicly available at:
https://levees.sec.usace.army.mil/levees/1905041233

OROVILLE LEVEE – NLD PUBLIC ACCESS



SITE VISIT AND RISK ASSESSMENT

- The Corps of Engineers will conduct a site visit and risk assessment of the Oroville levees.

- Local municipalities and agencies can request a one-time risk assessment at no cost, funded by the National Levee Safety Program

SITE VISIT DETAILS

A team from the national Corps HQ Levee Safety Program will conduct the site visit of the levee, accompanied by representatives from the Sacramento District, and state and local officials.

The site visit is scheduled for the second week of May

The Corps team will walk the levee length and make observations of the embankment and surrounding area to look for indications of its performance

RISK ASSESSMENT

Following the site visit, the Corps team will conduct a **risk assessment** with a team of expert hydraulic and geotechnical engineers, geologists, and economists experienced with dams and levees.

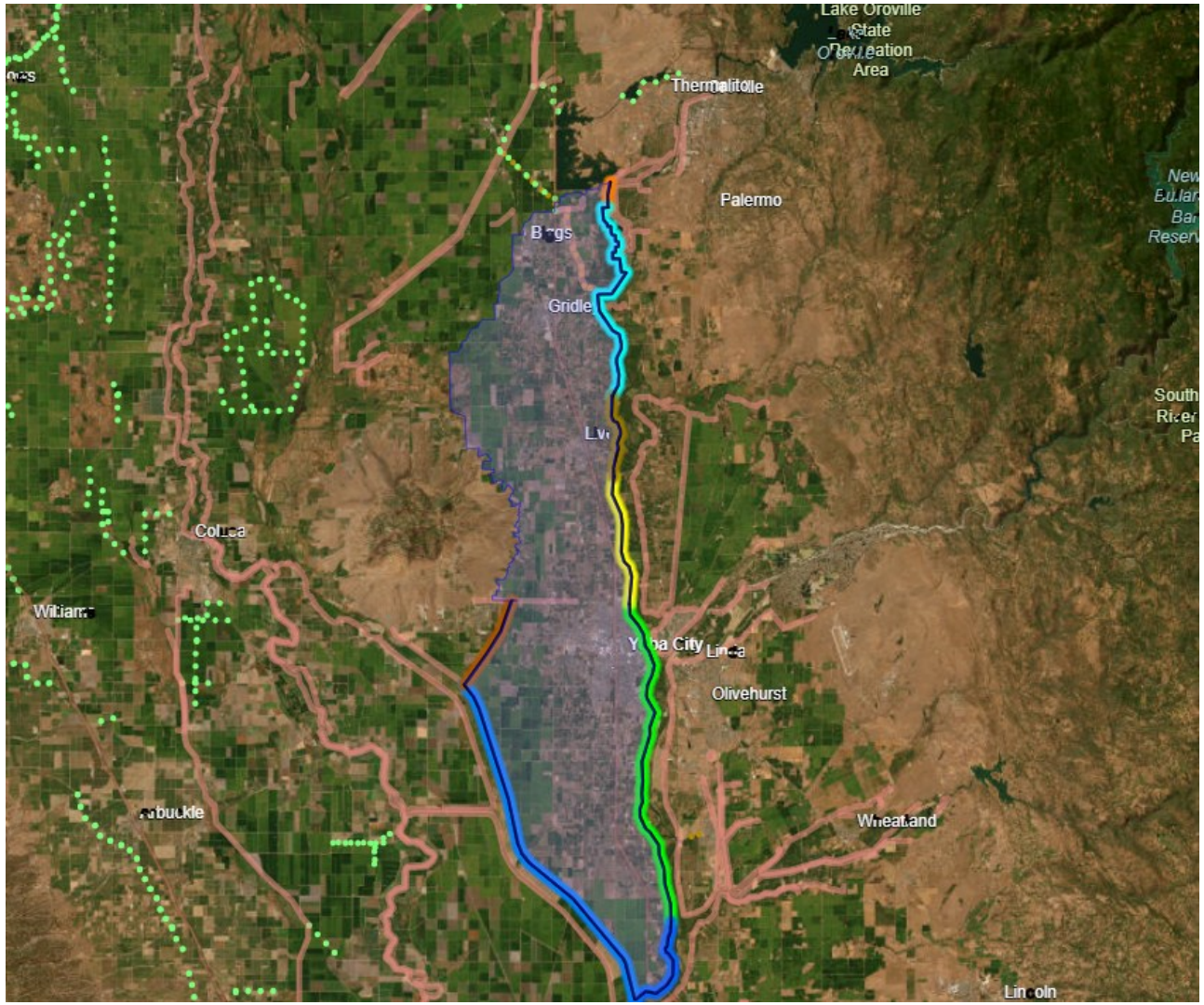
The risk assessment will be **based on the available information**, inducing records from local agencies, pictures and notes from the site visit, aerial photos, and topographic maps.

RISK ASSESSMENT

The risk assessment will determine the **likelihood of inundation** behind the levee due to a breach.

The outcome will **inform the local community** about the risk they face due to the levee from flooding of the Feather River

DOWNSTREAM RISK - WEST FEATHER RIVER SYSTEM



- Feather River - Hamilton West Levee - south of Afterbay outflow dam
- LD 1 - Sutter County - Unit 1
- LD 1 - Sutter County - Unit 2
- LD 9 - Sutter County
- Maintenance Area 07
- Maintenance Area 16 (RD 0777 - Live Oak)
- Sutter Bypass - East Levee - south of Wadsworth Canal
- Wadsworth Canal - Unit 1, left bank

PREVIOUS RISK ASSESSMENTS ON WEST FEATHER RIVER

Current risk assessment completed in September 2016

- After completion of most of the SBFCA work
- Prior to additional work by SBFCA, and the Corps-led work in partnership with SBFCA and the Central Valley Flood Protection Board
- Pre-Oroville Spillway Incident in 2018

Findings of the 2016 risk assessment

- Risk has been reduced but risk remains **very high**
- **The risk is not evenly distributed across the entire leveed Sutter-Butte system**
- Subsequent levee work by SBFCA and the Corps will have reduced that.
- **Rapid drawdown failure** due to fluctuation of river levels was **not considered a credible failure mode** for the West Feather River levees

CURRENT RISK ASSESSMENT ON WEST FEATHER RIVER

The current risk is being **reassessed** with a new Corps-led Levee Safety Program risk assessment later this year.

This **will include** the information gained after the Oroville Spillway Incident **and** include the work that **SBFCA and the Corps have completed** after the existing risk assessment was finalized.

MEETING 20 AGENDA

PROPOSED TOPICS

- FIRO Report
- CNRFC's inflow forecasting for CA reservoirs
- State investments in snow runoff forecasting
- Legislative Report Update

FEEDBACK DUE DATES

- CNRA will circulate proposed Action Item Tracker updates and proposed Meeting 19 Agenda by March 17
- Commissioner feedback **April 4**

ITEM 5
PUBLIC COMMENT

The Oroville Dam Citizens Advisory Commission will now take public comment.

We appreciate your input.

ITEM 6
ADJOURN

Commission Meeting #20

June 2025