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RECLAMATION

Managing Water in the West

Revised Plan of Operations for New Melones

U.S. Department of the Interior
Bureau of Reclamation

ED_000909_00006836-00002

Outline

- Plan Goals
- Plan Components
- Modeling Assumptions
- Modeling Results
- Next Steps

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PLAN GOALS:

Revised Plan of Operations

- Provide a sustainable plan for the reservoir
- Meet fish needs related to water rights and ESA
  - Avoid jeopardy for Central Valley steelhead DPS and not adversely modify critical habitat
  - Address the needs of multiple fish species in the Stanislaus River
- Operate for prior water rights and CVP contract obligations
- Manage salinity at Vernalis and dissolved oxygen on the Stanislaus River

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PLAN COMPONENTS:

In-stream Flow Management Periods

I. February 1st – April 14th
   - Release volumes based on natural hydrology

II. April 15th – June 30th
   - Base flow with flexible block of water that varies by year type

III. July 1st – September 30th
   - Summer flow managed for salinity at Vernalis and dissolved oxygen in the Stanislaus River

IV. October 1st – January 31st
   - Base flow with flexible block of water that varies by year type

Note: Flows from February 1st – April 14th will be bounded by a daily minimum of 200 cfs and a daily maximum 3000 cfs. Monthly averages will be capped at 1500 cfs.

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PLAN COMPONENTS:

Low Storage Protection

- Plan Period I:
  - If the end-of-January storage is above 1300 TAF, then release volume from February 1-April 14 will be at the higher range of the natural hydrology
  - If the end-of-January storage is below 1300 TAF, then release volume from February 1-April 14 will be at the lower range of the natural hydrology

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PLAN COMPONENTS:

Low Storage Protection

- Plan Periods II and III:
  - Beginning with the April 1st forecast, if the projected end-of-September storage is below 450 TAF, flows will be maintained at 150 cfs starting April 15th through the end of September or until the forecast improves
- Plan Period IV:
  - If the actual end-of-September storage is below 450 TAF, flows will be maintained at 150 cfs until February 1st

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PLAN COMPONENTS:

Water Deliveries

- Prior Water Rights Holders: OID/SSJID
  - 1988 Stipulation Agreement
- CVP Contract Deliveries:
  - NMI 0-1,400 = 0 TAF (M&I) *WYT = Critical*
  - NMI 1,400-1,800 = 49 TAF (49 Ag, 0 M&I) *WYT = Dry*
  - NMI >1,800 = 155 TAF *WYT = Dry – Wet*

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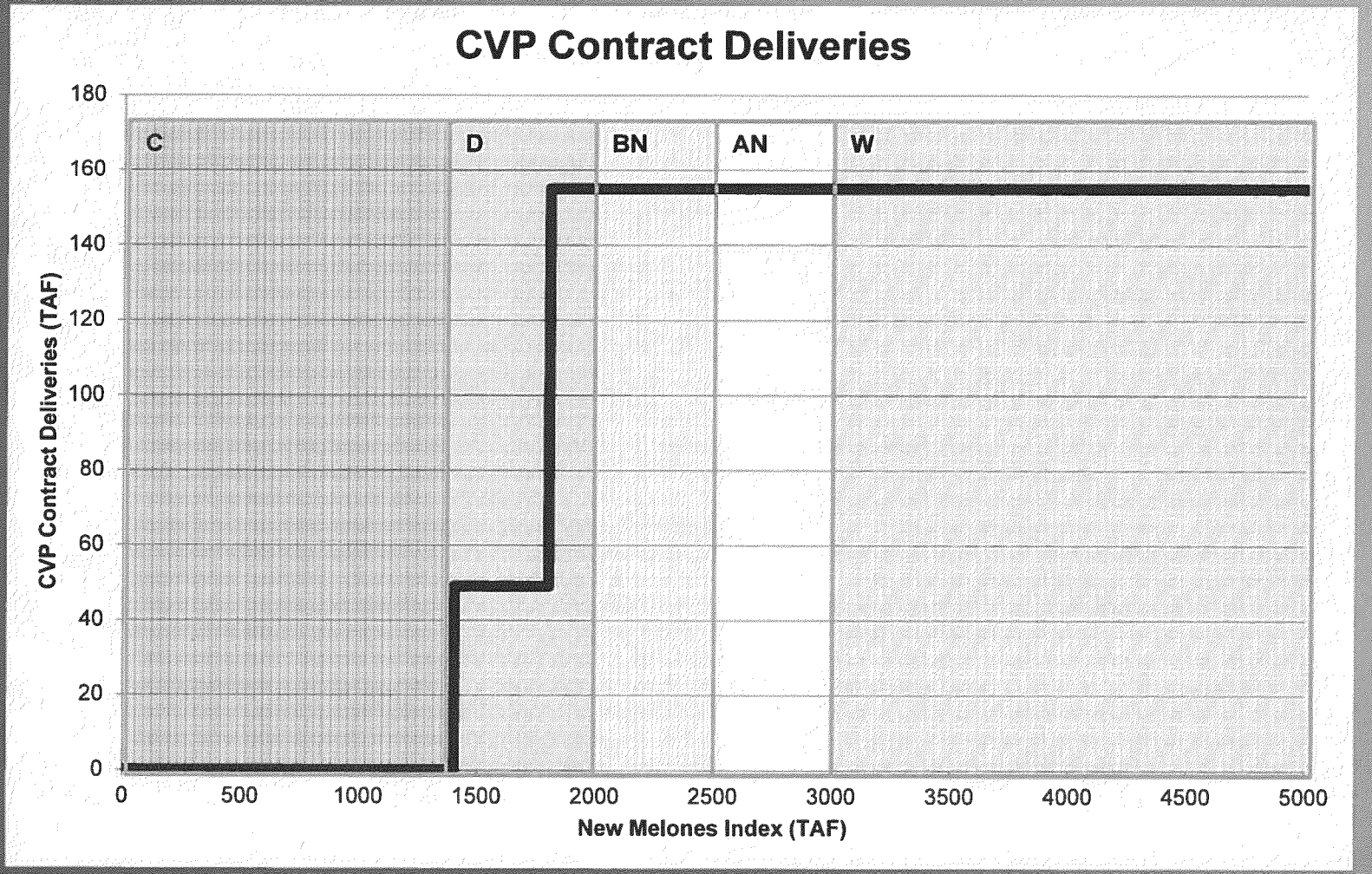
PLAN COMPONENTS:

Water Deliveries



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MODEL ASSUMPTIONS:

CalSim Flow Algorithm

- Scheduled flows in CalSim include:
  - Base flows
  - Flexible blocks of water (distributed monthly)
  - Releases for dissolved oxygen
- Resulting flows from CalSim include:
  - Scheduled flows
  - Releases for salinity at Vernalis
  - Flood control releases

Note: When simulated storage reaches dead pool, flows are reduced due to unavailable storage

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MODEL ASSUMPTIONS:

Base (or *Minimum*) Flows

Minimum Average Monthly Flow (cfs)	Water Year Types					
	Low Storage*	C	D	BN	AN	W
Feb	*200*	*200*	*200*	*200*	*200*	*200*
Mar	*200*	*200*	*200*	*200*	*200*	*200*
Apr 1-14	*200*	*200*	*200*	*200*	*200*	*200*
Apr 15-30	150	200	200	400	800	800
May	150	200	200	400	800	800
Jun	150	200	200	250	250	800
Jul	150	200	200	250	250	250
Aug	150	200	200	250	250	250
Sep	150	200	200	250	250	250
Oct	150	200	200	250	300	400
Nov	150	200	200	200	200	300
Dec	150	200	200	200	200	300
Jan	150	200	200	200	200	300

Flexible blocks are intended to be distributed based on real time conditions of the system through a multi-agency operations group.

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MODEL ASSUMPTIONS:

Base (or *Minimum*) Flows

Flexible Blocks (TAF)

Minimum Average Monthly Flow (cfs)	Water Year Types					
	S					
Feb						
Mar	200	200	200	200	200	200
Apr 1-14	200	200	200	200	200	200
		35 TAF	44 TAF	72 TAF	77 TAF	101 TAF
Apr 15-30	150	200	200	450	800	800
May	150	200	200	450	800	800
Jun	150	200	200	250	500	500
Jul	150	200	200	250	250	250
Aug	150	200	200	250	250	250
Sep	150	200	200	250	250	250
		20 TAF	25 TAF	30 TAF	30 TAF	30 TAF
Oct	150	200	200	250	300	400
Nov	150	200	200	250	300	300
Dec	150	200	200	250	300	300
Jan	150	200	200	250	300	300

Flexible blocks are intended to be distributed based on real time conditions of the system through a multi-agency operations group.

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MODEL ASSUMPTIONS:

CalSim Scheduled Flows

Average Monthly Flow (cfs)	Water Year Types					
	Low Storage	C	D	BN	AN	W
Feb*	N/A	N/A	N/A	N/A	N/A	N/A
Mar*	N/A	N/A	N/A	N/A	N/A	N/A
Apr 1-14*	N/A	N/A	N/A	N/A	N/A	N/A
Apr 15-30	150	394	449	802	1229	1367
May	150	588	698	1204	1658	1934
Jun	150	255	255	255	250	800
Jul	150	265	265	265	250	250
Aug	150	283	283	283	250	250
Sep	150	249	249	250	250	250
Oct	150	525	607	738	788	888
Nov	150	200	200	200	200	300
Dec	150	200	200	200	200	300
Jan	150	200	200	200	200	300

*N/A denotes operation controlled by natural hydrology (Plan Period I)

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MODEL ASSUMPTIONS:

CalSim Scheduled Flows

Average Monthly Flow (cfs)	Water Year Types					
	Low Storage	C	D	BN	AN	W
Feb*	N/A	N/A	N/A	N/A	N/A	N/A
Mar*	N/A	N/A	N/A	N/A	N/A	N/A
Apr 1-14*	N/A	N/A	N/A	N/A	N/A	N/A
Apr 15-30	[illegible]	394	[illegible]	[illegible]	[illegible]	1367
May	150	986	658	1204	1058	1934
Jun	150	255	255	255	250	800
Jul	150	265	265	265	250	250
Aug	150	283	283	283	250	250
Sep	150	249	249	250	250	250
Oct	150	525	607	738	788	888
Nov	150	200	200	200	200	300
Dec	150	200	200	200	200	300
Jan	150	200	200	200	200	300

April-June Flexible Block was distributed evenly between April 15-May 30

October-January Flexible Block was distributed evenly October 1-October 31

*N/A denotes operation controlled by natural hydrology (Plan Period I)

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MODEL RESULTS:

CalSim Resulting Flows

Average Monthly Flow (cfs)	Water Year Types					
	Low Storage	C	D	BN	AN	W
Feb	467	467	462	740	877	1993
Mar	472	472	457	623	834	2817
Apr	454	849	817	1122	1454	1822
May	316	591	718	1216	1664	1997
Jun	150	283	262	260	271	1407
Jul	150	317	271	272	265	878
Aug	143	283	285	283	283	918
Sep	143	249	249	250	274	1764
Oct	151	607	688	738	882	2078
Nov	150	200	200	200	219	1054
Dec	150	230	238	202	337	1491
Jan	183	200	200	212	703	2034

Note: CalSim results differ from scheduled flows due to flood control releases, salinity releases for Vernalis and insufficient storage

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MODEL RESULTS:

Water Year Type Comparisons

Water Year Type (WYT) by New Melones Index	WYT Frequency using CalSim Results	Average Annual RPO Releases March-February (TAF)
Critical (Including Low Storage Years)	17%	231
Dry	21%	286
Below Normal	27%	369
Above Normal	27%	489
Wet	8%	1222

Note: CalSim determines the New Melones Index in March using perfect foresight

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MODEL RESULTS:

Result Highlights for New Melones

Parameter	Occurrences in CalSim Results (# of years)	Frequency (%)
Full Capacity (2.4 MAF)	2	2%
95% of Full Capacity	6	7%
Flood Release*	10	12%
Low Storage Trigger: Plan Period I (January Storage < 1300 MAF)	34	41%
Low Storage Trigger: Plan Periods II, III and IV (Projected or Actual Storage < 450 TAF)	7	9%
"Dead Pool" (80 TAF)	1 (1992)	1%

*Indicates years when the New Melones flood pool was reached. This differs from the full capacity years because the flood pool of 1.97 MAF Oct-Feb is reached in some years when the reservoir does not fill to 2.4 MAF

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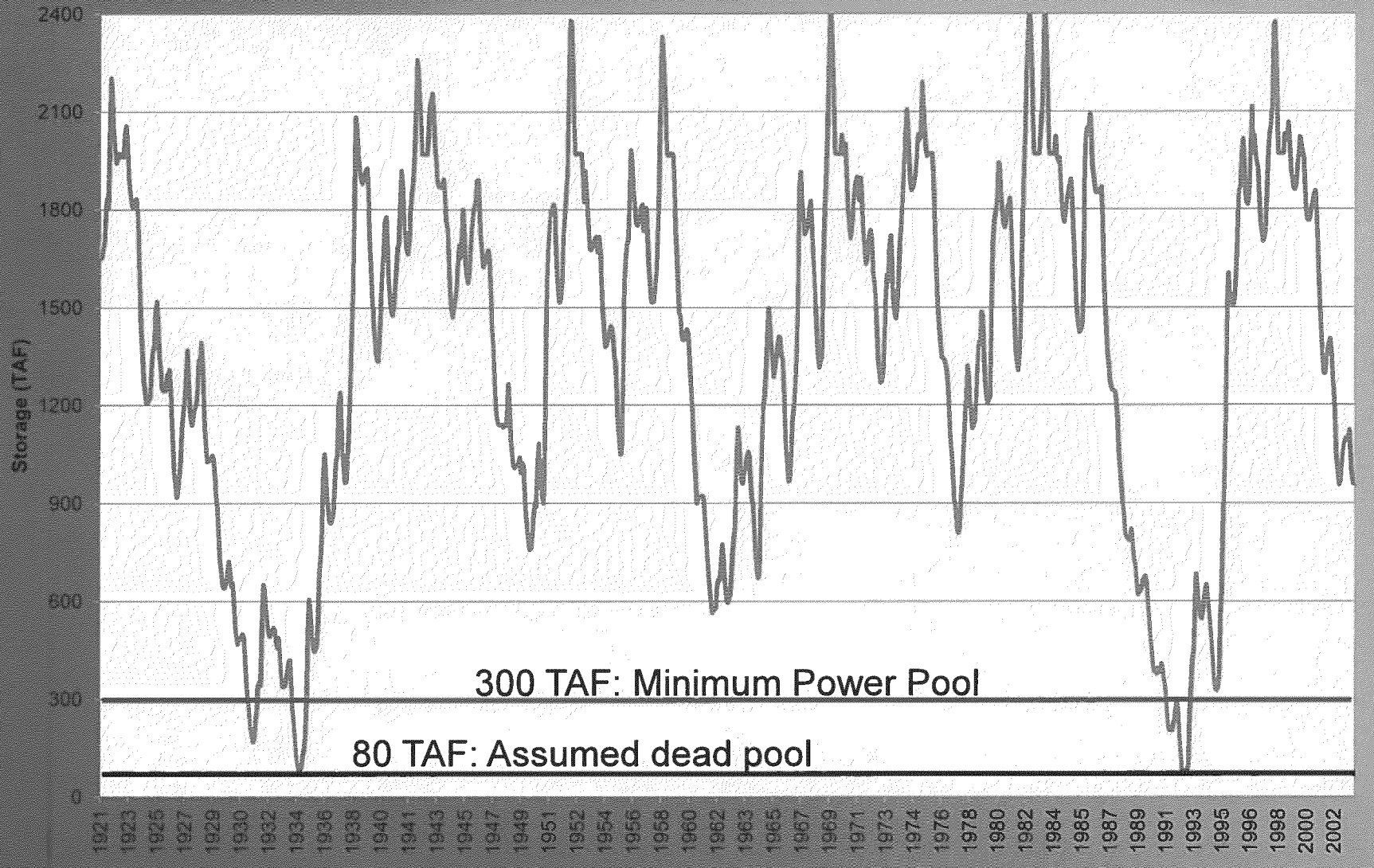
MODEL RESULTS:

Revised Plan of Operation: New Melones Storage



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NEXT STEPS:

Technical Tasks

- Temperature modeling
- Floodplain inundation
- Case studies using forecasts
- Operations plan document

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NEXT STEPS:

Areas for Further Refinement

- New Melones Index definition
- Natural flow variability for Plan Period I
- Flow scheduling in low storage years for Plan Periods II, III and IV
- Transition periods for CVP allocations
- Non-operational components:
  - Habitat restoration
  - Gravel placement
  - Others
- Integration with other project operations and programs within the San Joaquin River basin

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Questions and Comments

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MODEL ASSUMPTIONS:

Notable CalSim Assumptions to Date

- CalSim uses a monthly timestep, therefore all flows are scheduled monthly
- CalSim simulates the operation from Oct 1921-Sept 2003
- Forecasted storage is based on perfect foresight and designated allocations – this would be closest to a 50% exceedance forecast
- Water year type designations (except low storage designations) are determined in March, therefore October-February follow the previous year type
- OID/SSJID deliveries are based on projected demand with a maximum of the stipulation volume (not the full stipulation volume)
- OID/SSJID conservation account is not considered
- Required flows are met at both Goodwin and Ripon

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