Lake Okeechobee Water Shortage Management
New Proposed Methodology

Presented by

Model Application and Support Unit
Hydrologic and Environmental Systems Modeling (HESM)
South Florida Water Management District

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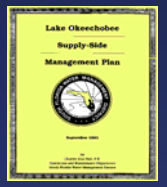
Weaknesses in SSM 1991



- Data (Rainfall, ET and Water Use) used is outdated and assumes “normal” conditions
- Lake Okeechobee water budget does not consider tributary inflows
- Application of the method was complicated
- Use of reference stage
- Borrowing Concept

Objective

- Describe the Lake Okeechobee Water Shortage Management (LOWSM) Plan
- Evaluate LOWSM

Goals for the New Methodology (LOWSM)

- Update data used in the methodology
- Revise data to be more realistic for drought conditions
- Make methodology adaptive to changing drought conditions
- Simplify implementation of the methodology

Elements of LOWSM

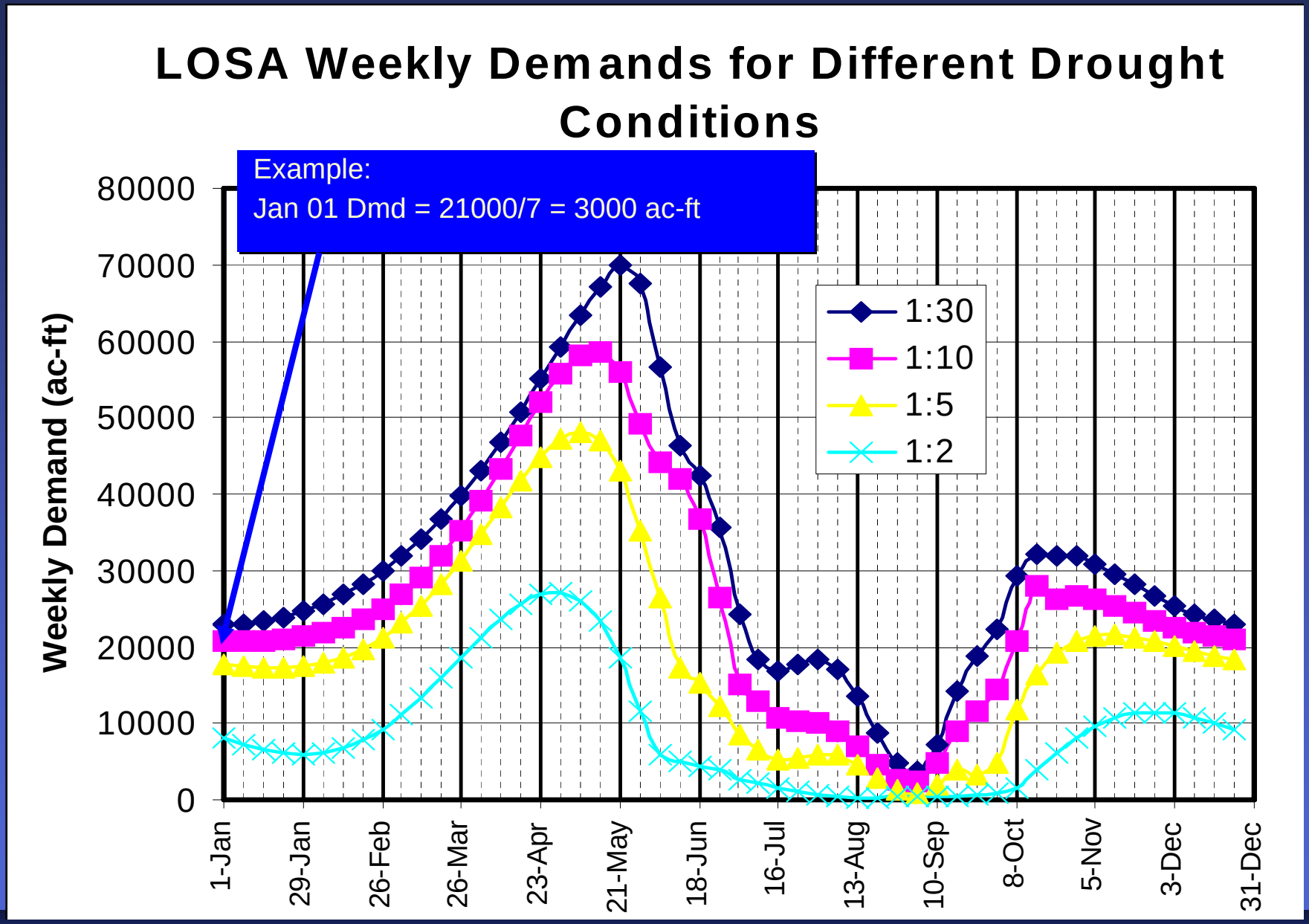
- Calendar-based Water Shortage Triggering Line
- Phased Cutbacks Calendar-based Lines
- Set of weekly LOSA demands to be met (function of the drought severity)

LOWSM Methodology

- Weekly demands were obtained by aggregating daily simulated LOSA supplemental (LOK) demands from the SFWMM LEC2005EC simulation and performing frequency analysis
- The 1 in 10 condition has been selected for this analysis
- Calculate daily demand based on selected hydrologic condition (such as 1 in 10) weekly demand (assuming deliveries to LOSA are made 7 days a week)

Daily Demand = Weekly Demand/7

Weekly Demands



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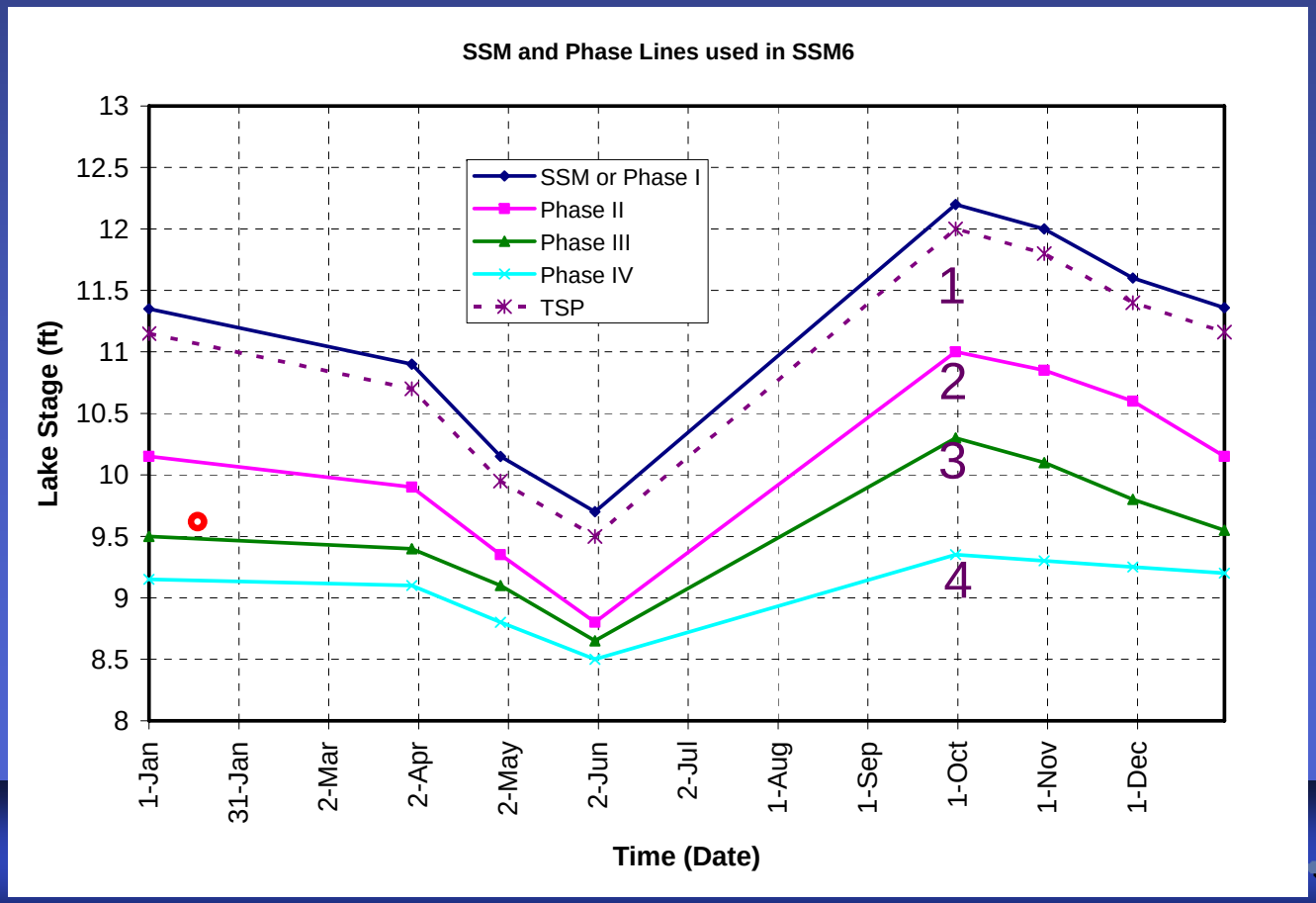
LOWSM Methodology *(contd.)*

- Determine maximum delivery based on the phase on which LOK stage falls

Maximum Delivery = Daily Demand(1:10) * (1- CB)



Phase	CB (%)
1	15
2	30
3	45
4	60

Example: LOK stg = 9.3 ft
Jan 01 Dmd = 3000 *.55 = 1650 ac-ft

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LOWSM Methodology *(contd.)*

- Delivery is the minimum of the model simulated daily demand and a maximum delivery

  Delivery = Min (Maximum Delivery, Daily Simulated Demand)

  Example: Daily Model Simulated Demand = 1400 ac -ft

  Delivery = Min (1650, 1400) = 1400 ac-ft

  Example: Daily Model Simulated Demand = 1800 ac -ft

  Delivery = Min (1650, 1800) = 1650 ac-ft

Proposed Trggering and Phase Lines

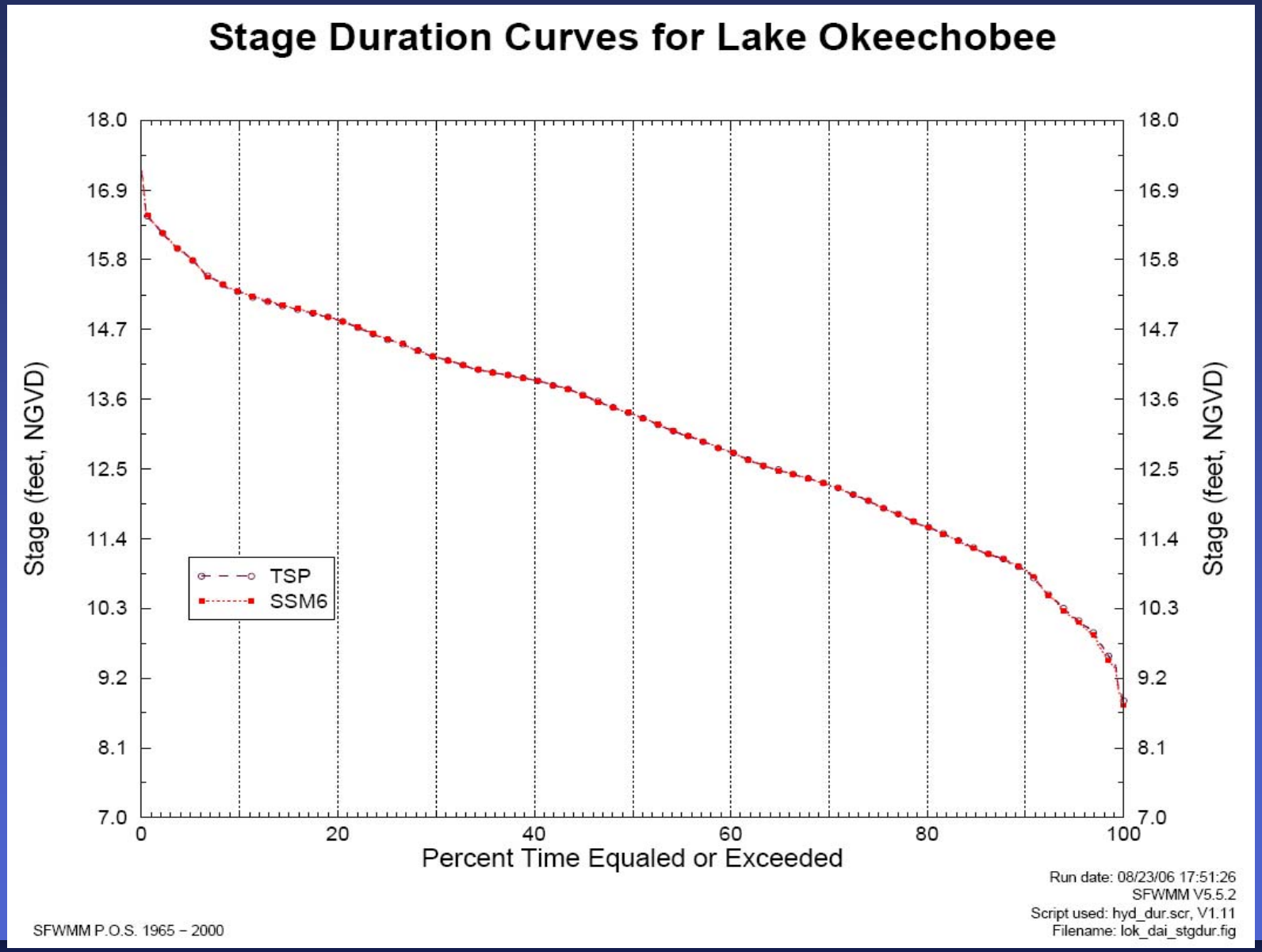
Criteria:

- New methodology shall equal or improve performance of the LORSS TSP
- Major water shortage activation, on the average, once every 10 years
- Play with cutback volumes through out the dry season
- Perform sensitivity analysis – by changing the level of phase lines

Results

- Compare LORSS and LOWSM (SSM6) simulations

Results – TSP vs. LOWSM



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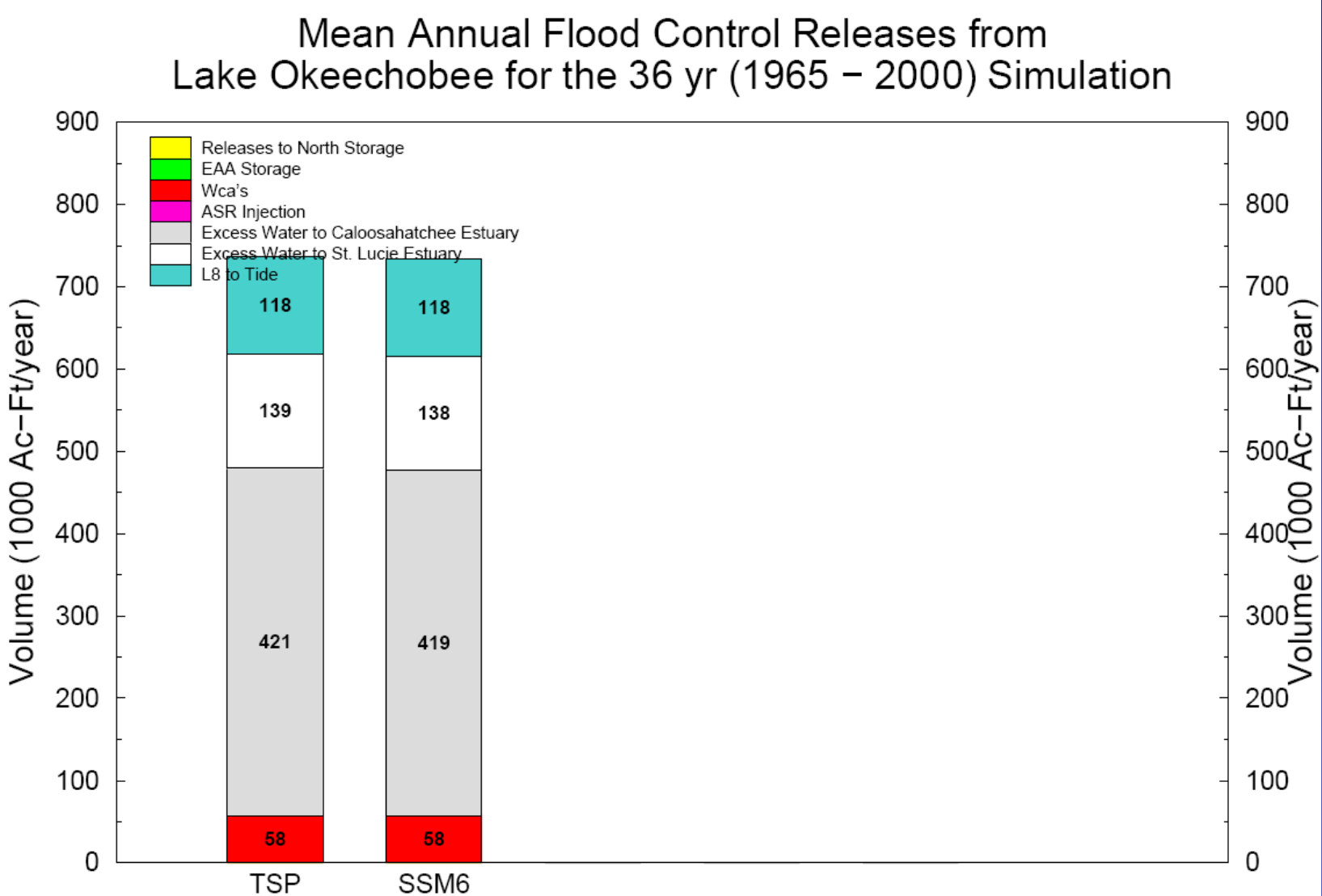
Results – TSP vs. LOWSM



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Results – TSP vs. LOWSM

TSP

Start Date	End Date	Duration	Days since Prior Event
6/1/1967	6/18/1967	18	0
4/7/1968	6/3/1968	58	293
5/4/1971	7/23/1971	**81**	**1064**
12/16/1972	12/22/1972	7	511
12/26/1972	1/22/1973	28	3
3/18/1973	3/26/1973	9	54
4/6/1973	7/31/1973	**117**	**10**
3/24/1974	7/3/1974	102	235
4/3/1976	4/6/1976	4	639
4/10/1976	6/4/1976	56	3
4/11/1977	9/5/1977	**148**	**310**
4/11/1981	6/2/1982	**418**	**1313**
6/6/1985	7/25/1985	50	1099
8/1/1985	8/6/1985	6	6
5/17/1986	5/21/1986	5	283
5/24/1986	6/16/1986	24	2
5/10/1989	10/5/1989	**149**	**1058**
2/9/1990	8/15/1990	188	126
12/19/2000	12/31/2000	13	3778

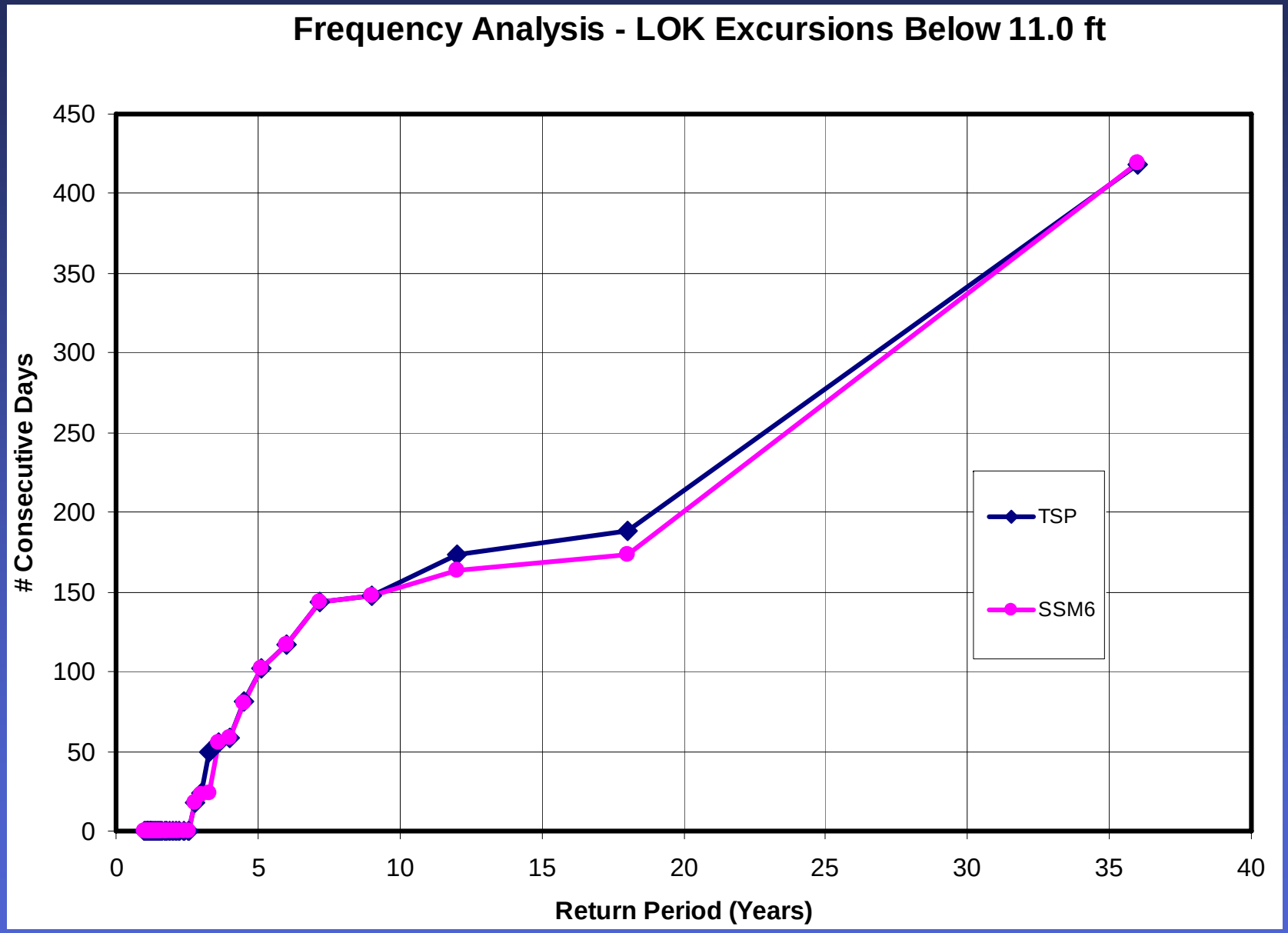
7/20/1981 8.843

SSM6

Start Date	End Date	Duration	Days since Prior Event
6/1/1967	6/18/1967	18	0
4/7/1968	6/3/1968	58	293
5/4/1971	7/22/1971	**80**	**1064**
12/15/1972	1/25/1973	42	511
3/18/1973	3/26/1973	9	51
4/6/1973	7/31/1973	**117**	**10**
3/24/1974	7/3/1974	102	235
4/3/1976	4/7/1976	5	639
4/10/1976	6/4/1976	56	2
4/11/1977	9/5/1977	**148**	**310**
4/11/1981	6/3/1982	**419**	**1313**
6/7/1985	6/30/1985	24	1099
7/8/1985	7/8/1985	1	7
7/20/1985	7/23/1985	4	11
8/3/1985	8/5/1985	3	10
5/18/1986	5/19/1986	2	285
5/25/1986	6/16/1986	23	5
5/10/1989	10/6/1989	**150**	**1058**
2/12/1990	2/17/1990	6	128
2/23/1990	3/2/1990	8	5
3/5/1990	8/15/1990	164	2
12/20/2000	12/31/2000	12	3779

7/20/1981 8.768

Results – TSP vs. LOWSM



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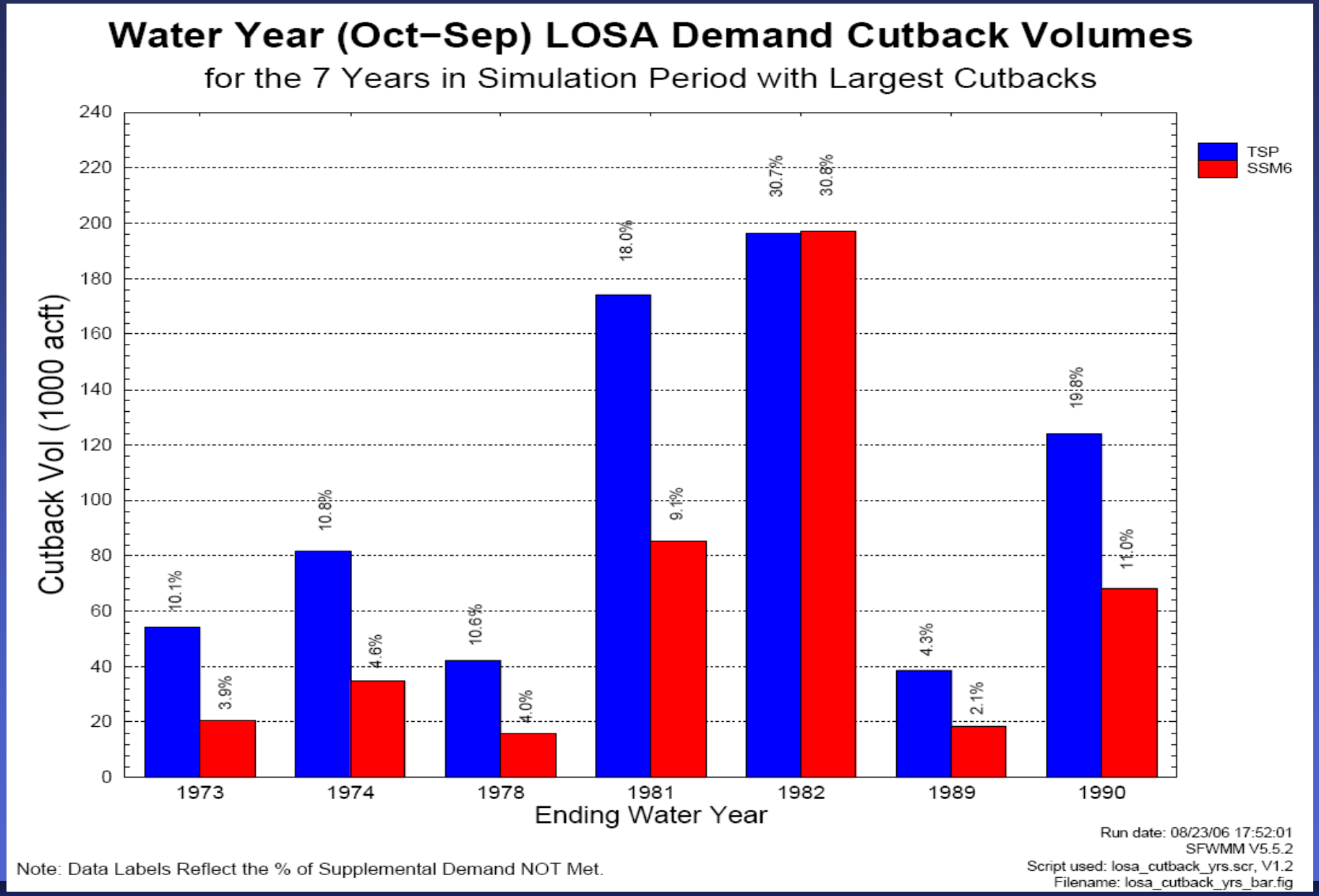

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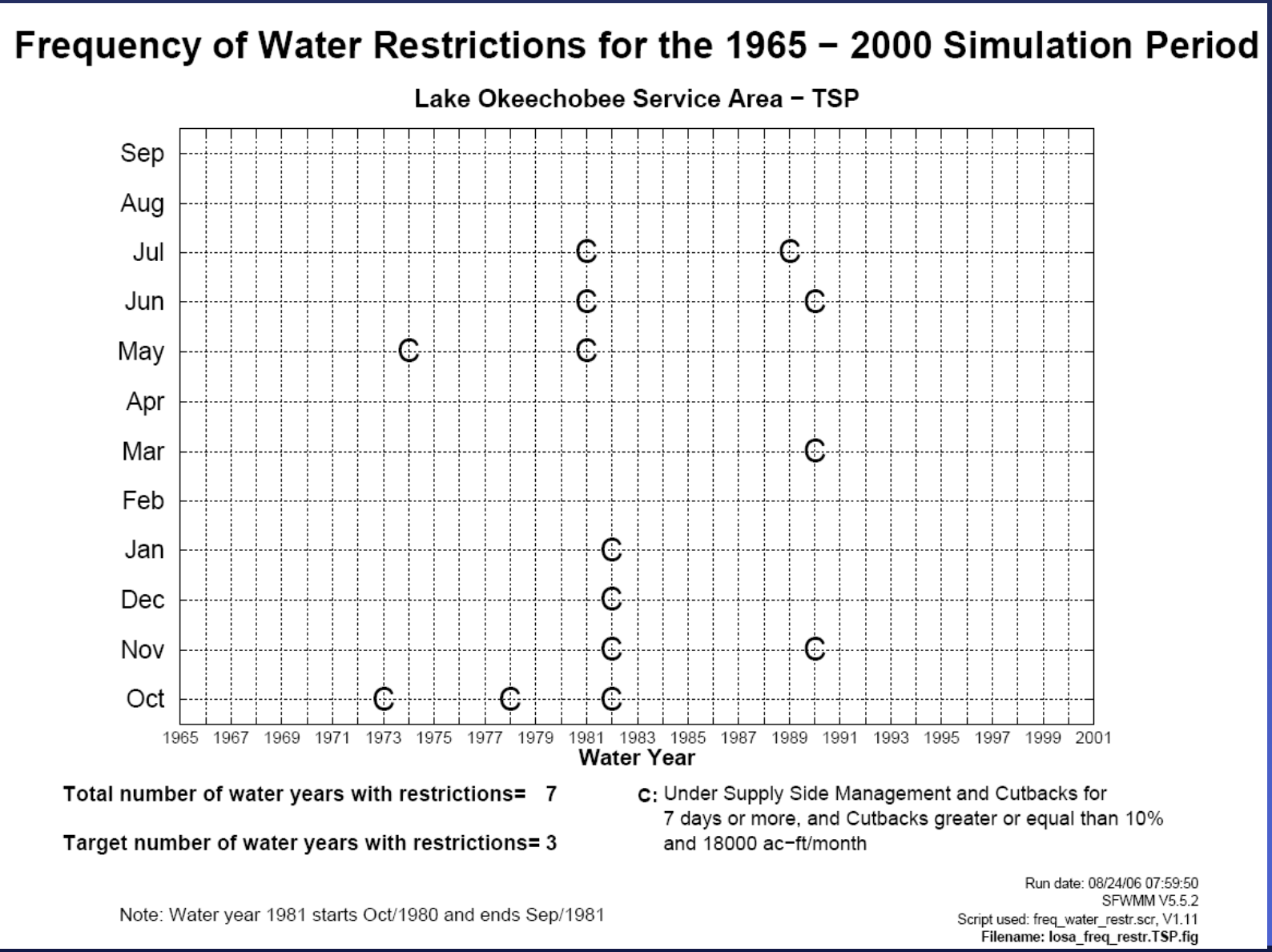
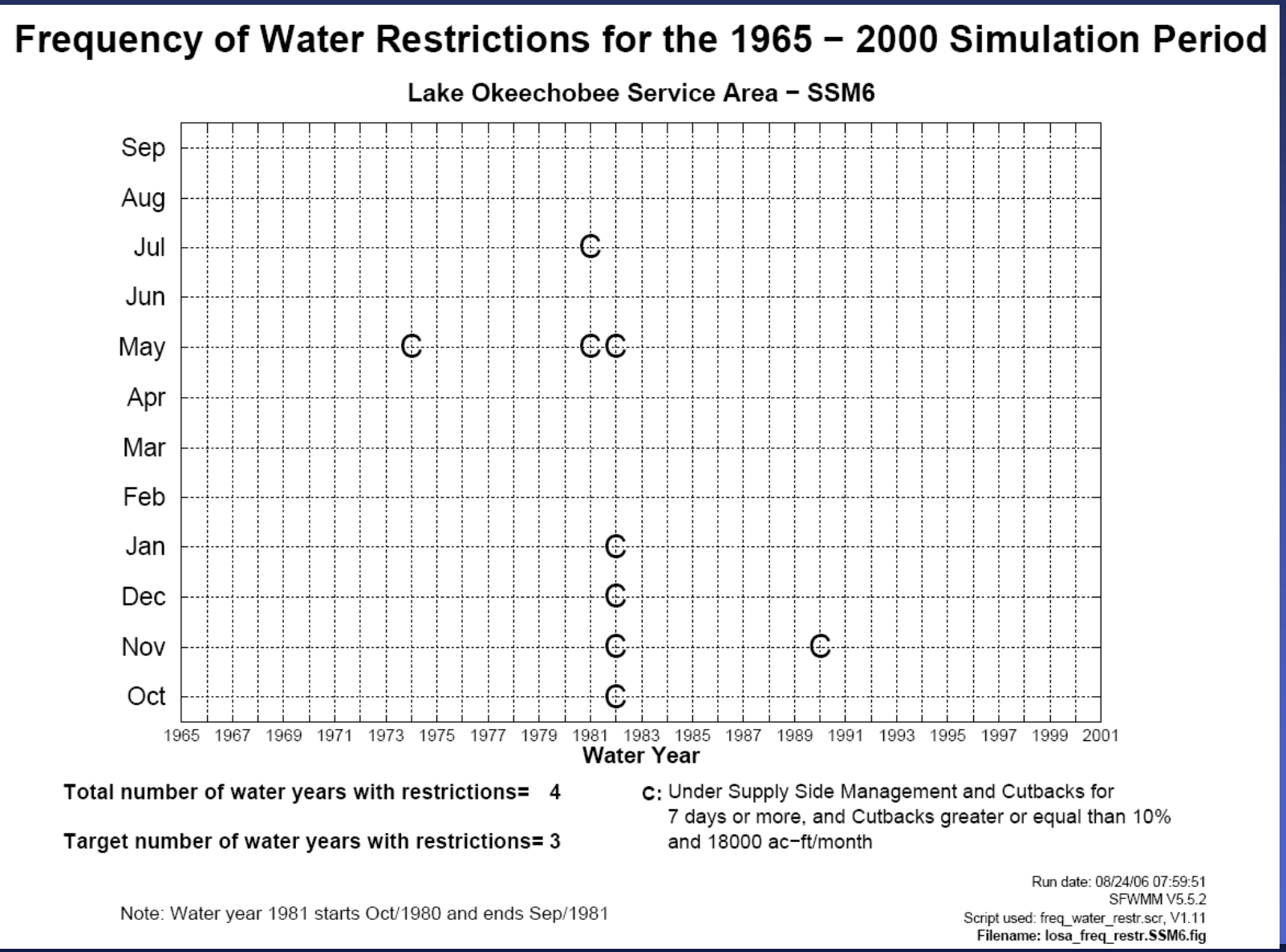


 # months with 7 or more days of CB's
And %CB > 10 = 35

Results – TSP vs. LOWSM



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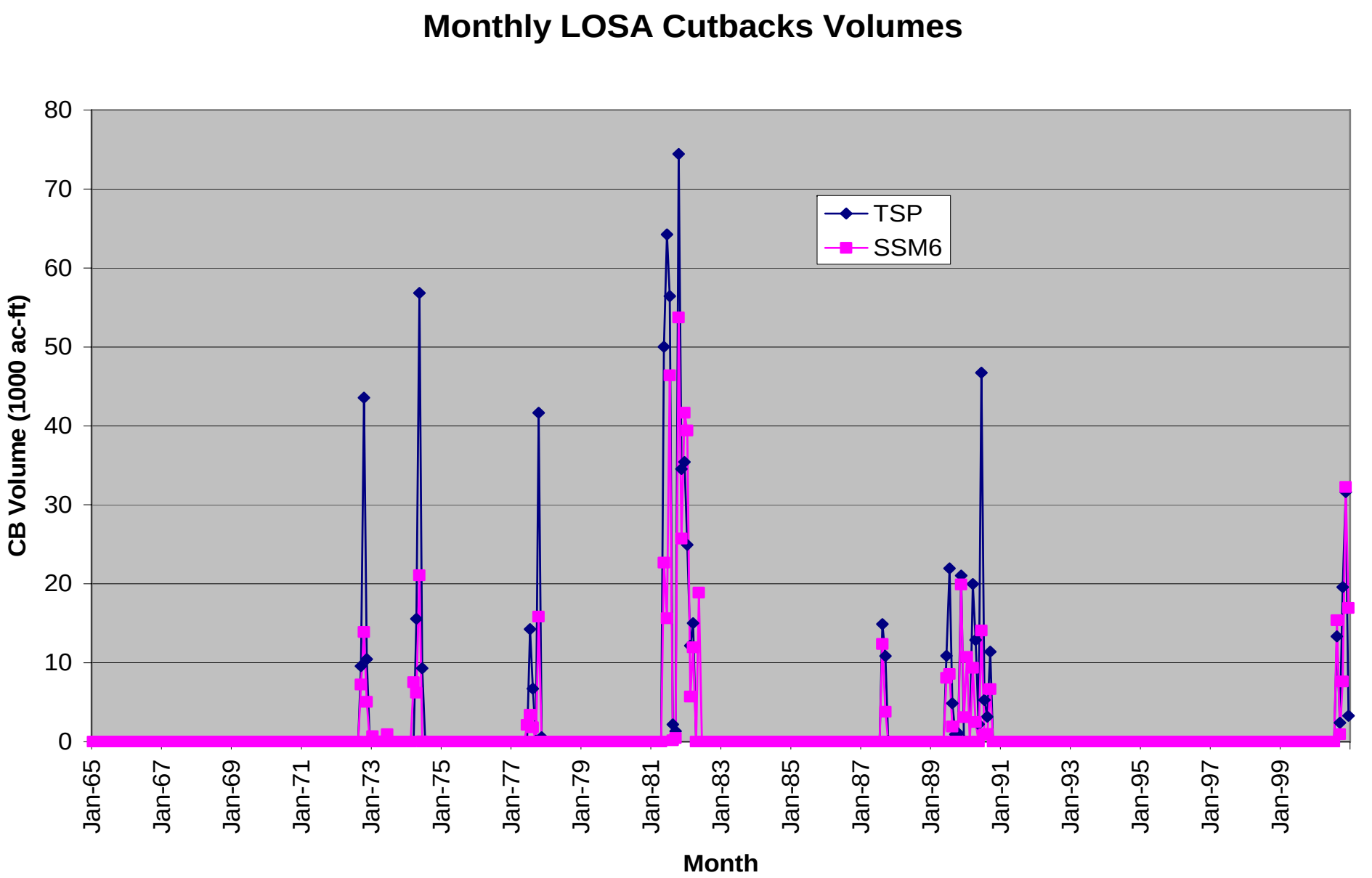
Results – TSP vs. LOWSM



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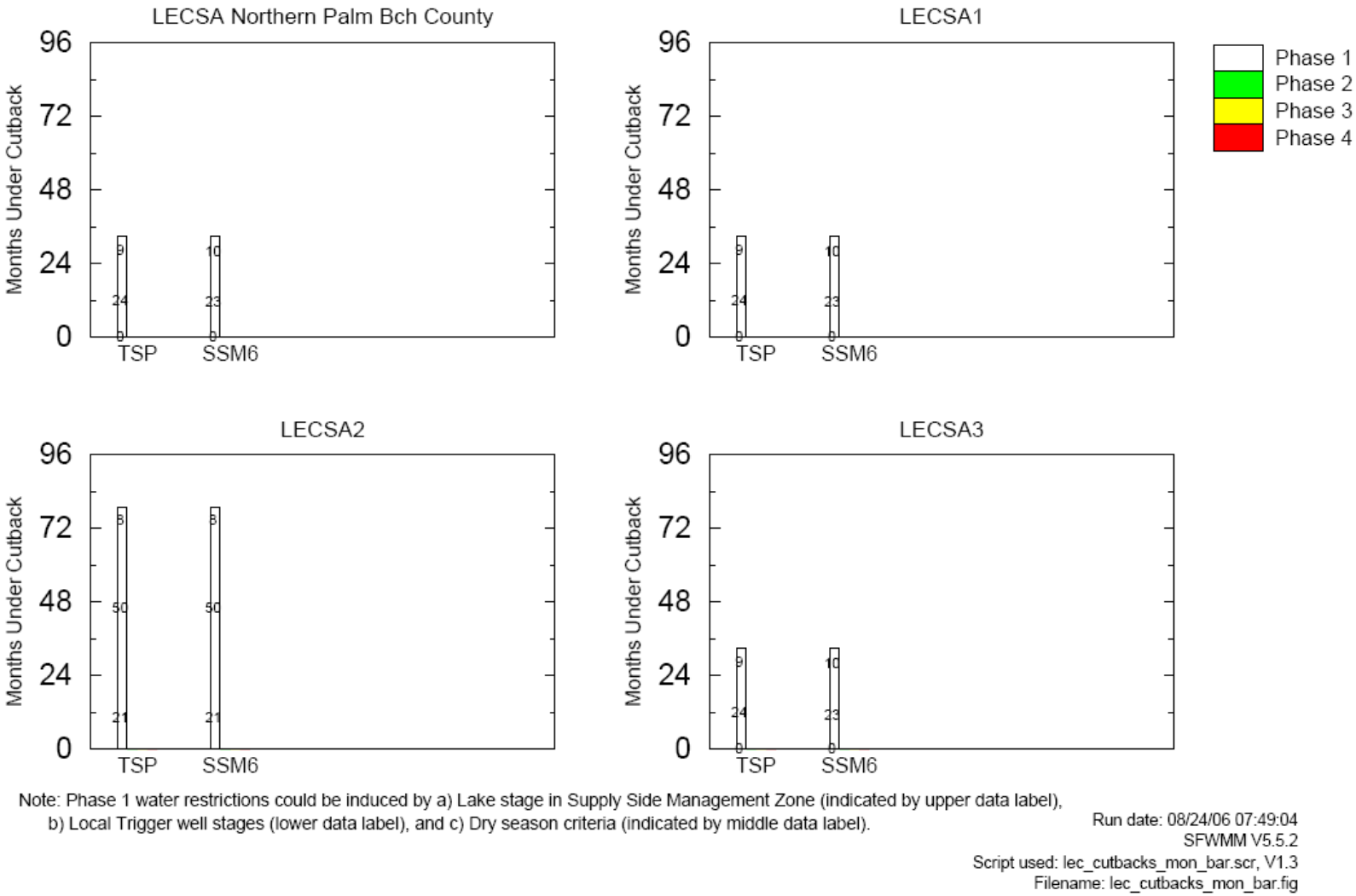
Results – TSP vs. LOWSM



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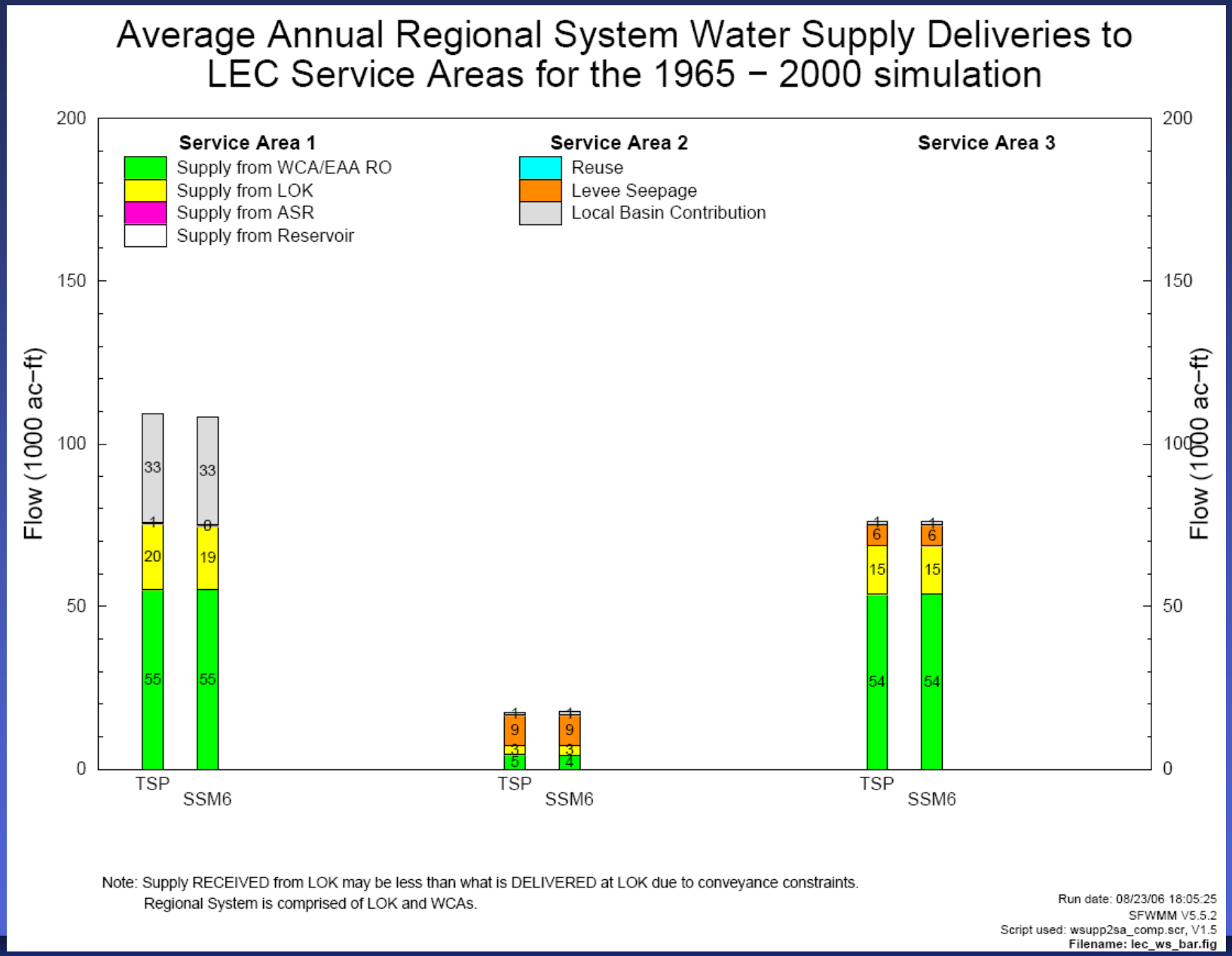
Results – TSP vs. LOWSM



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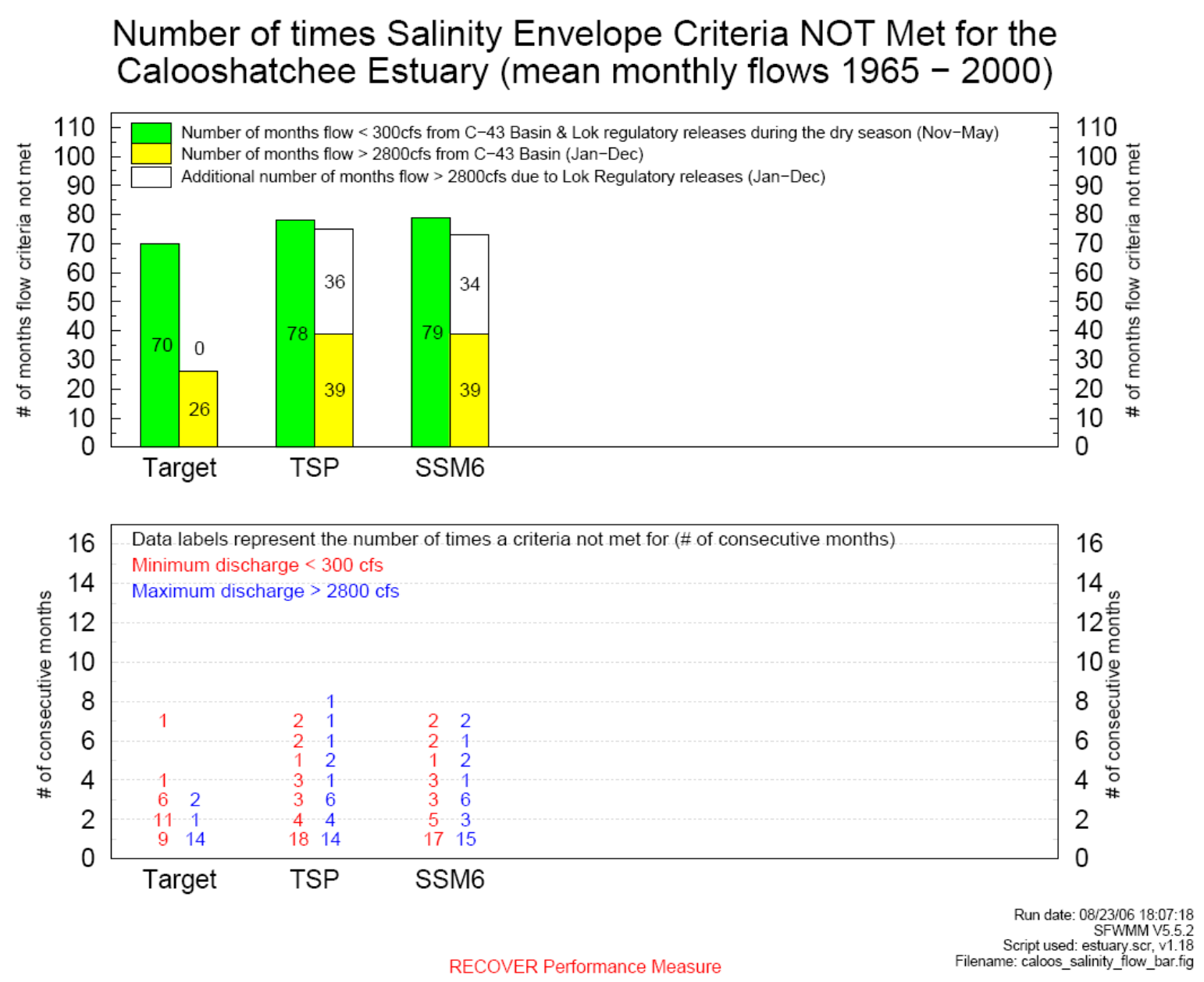
Results – TSP vs. LOWSM



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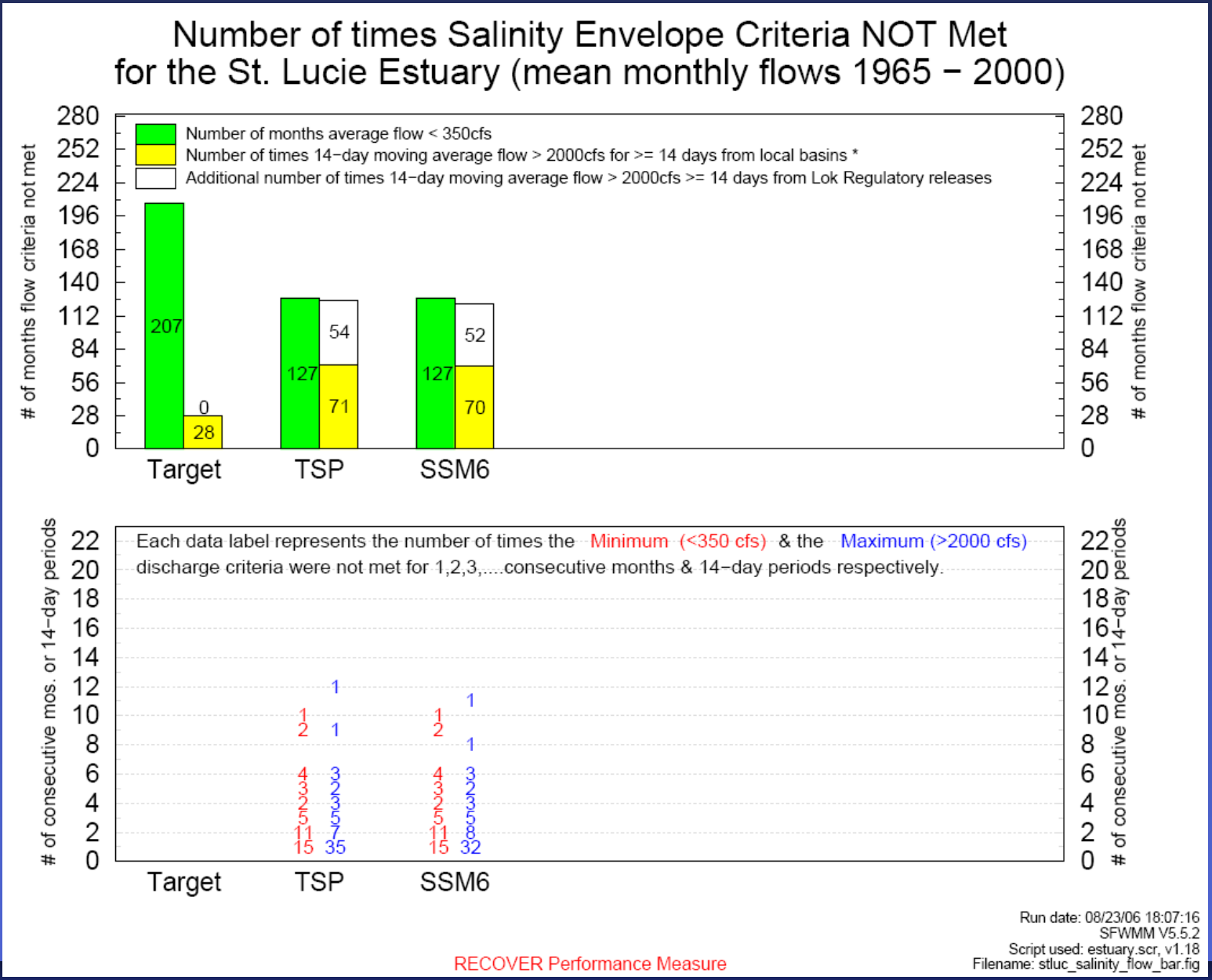
Results – TSP vs. LOWSM



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Questions?

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