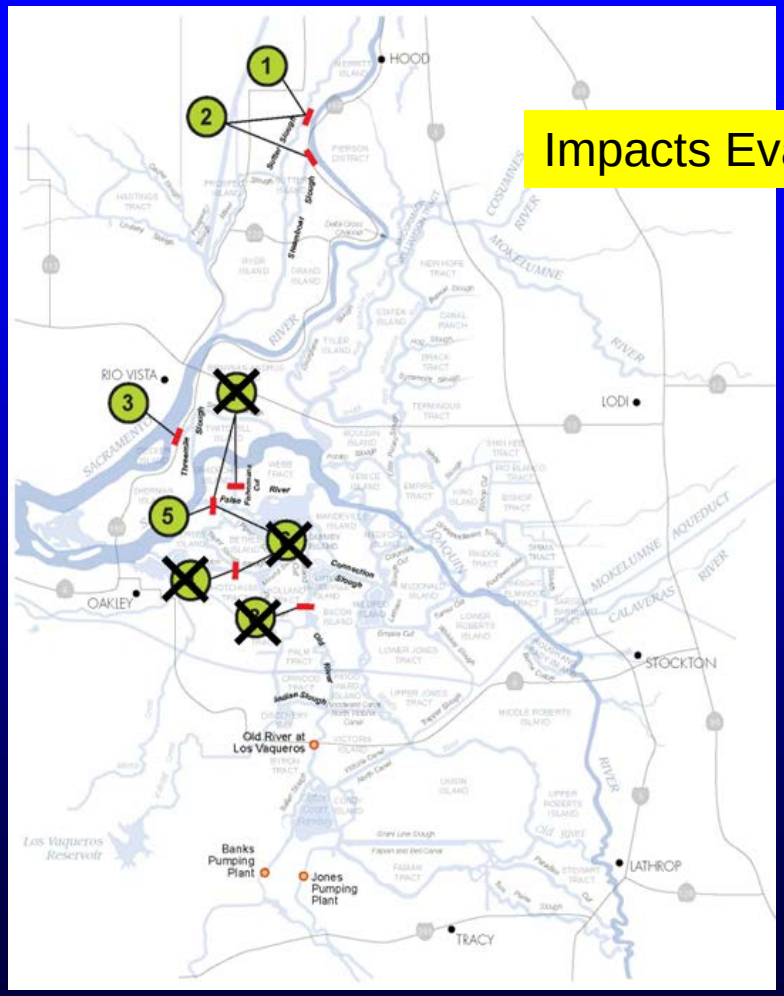
Top ~~Ten~~ Seven Insights from the 2014 Delta Drought Modeling

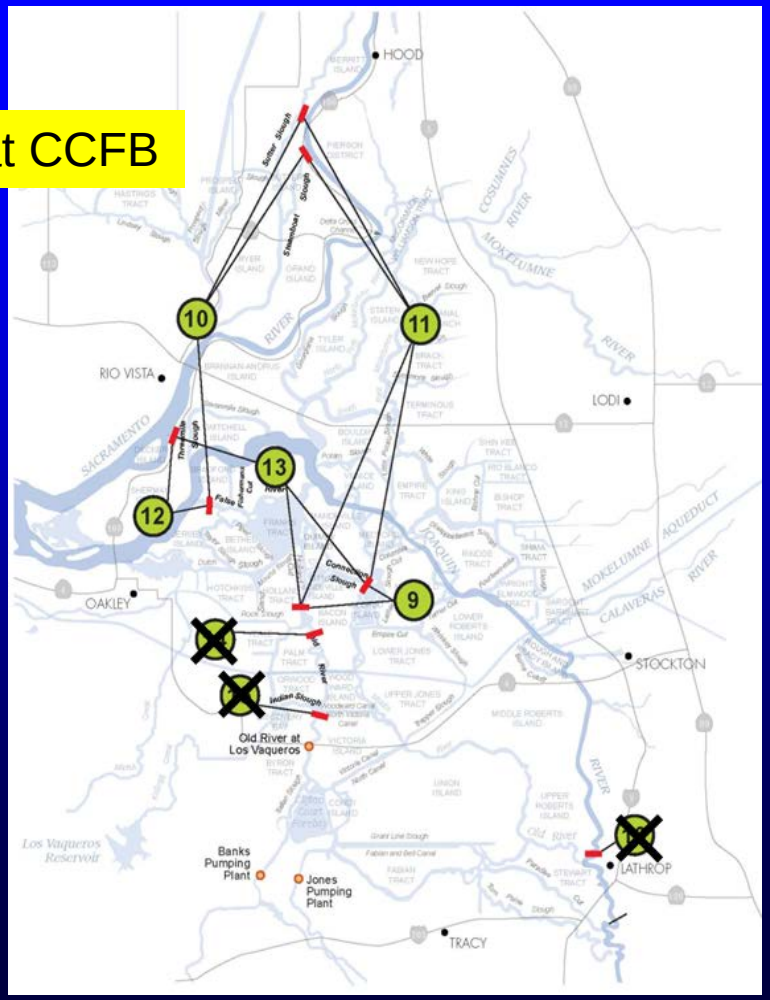
Municipal Water Quality Investigations Annual Meeting
July 30, 2014

Tara Smith
Chief , Delta Modeling Section

1 Don’t Throw Away the Old Studies!



Impacts Evaluated at CCFB



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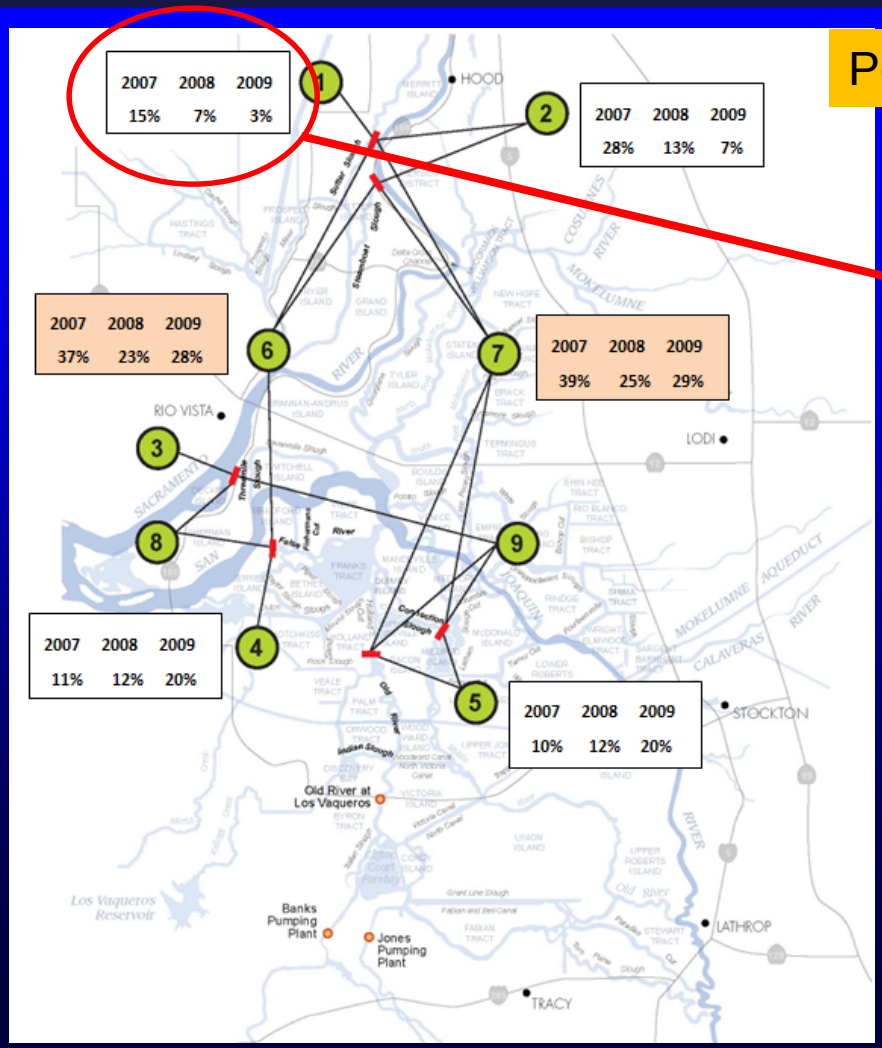


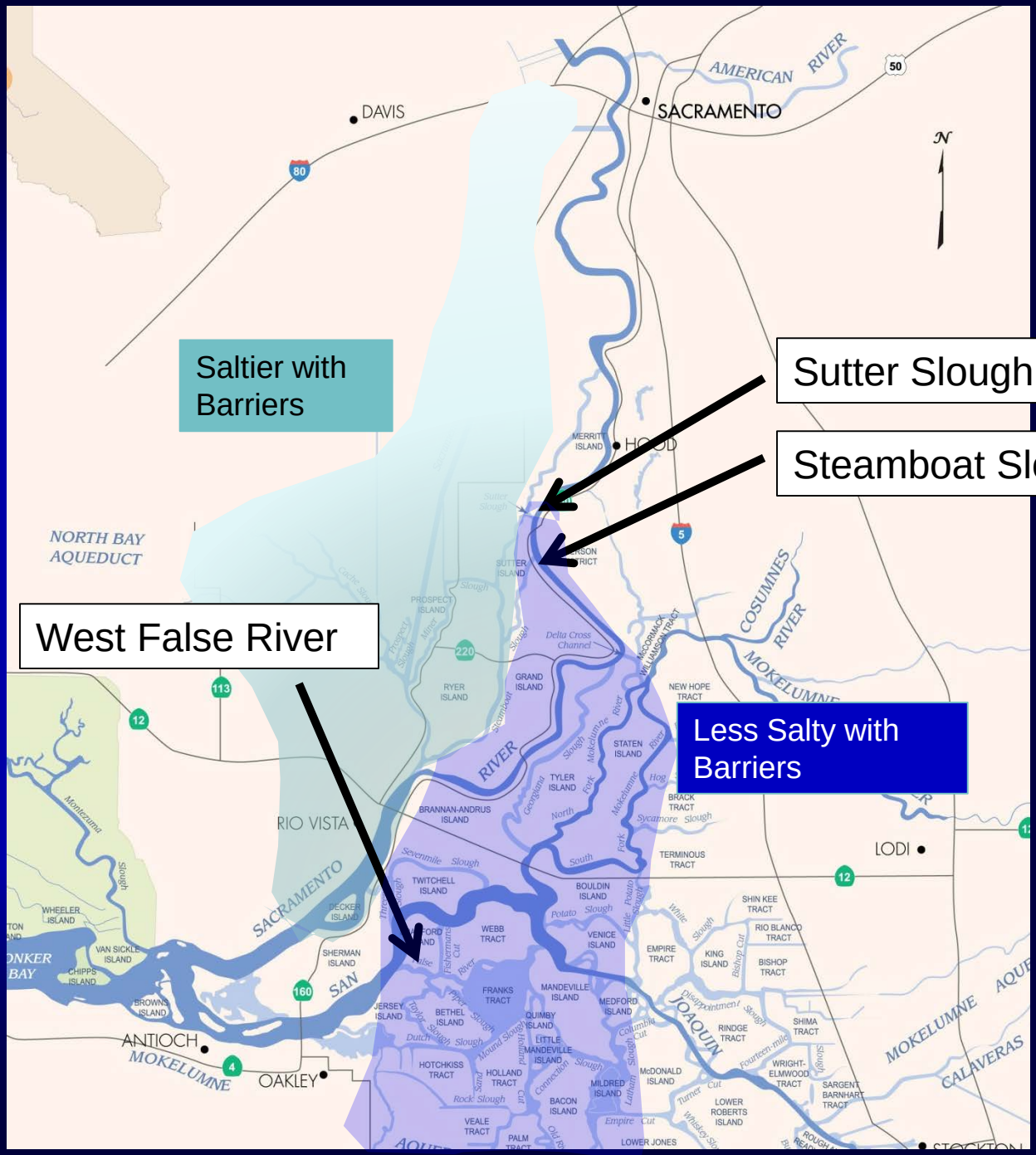
Percentage Salinity Improvement at CCFB

2007	2008	2009
15%	7%	3%

Checked Impacts with 2014 Forecast

1

General Pattern of Salinity Impacts



2 Forecasts – Let Me Count the Ways

Modeling Forecasts Don't Predict the Future!

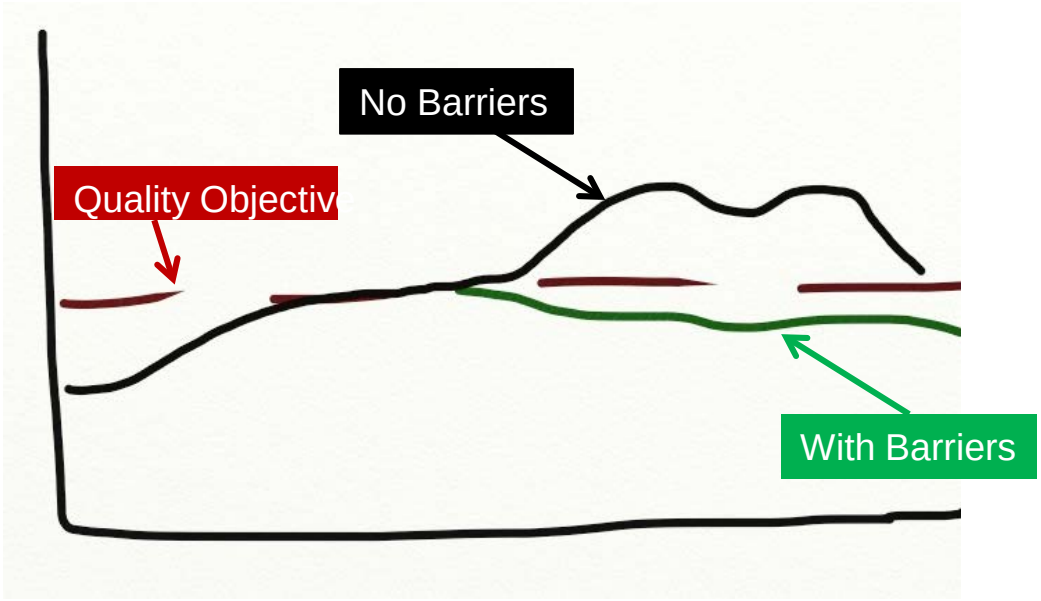
- Precipitation Changes
- Operations/Uses will vary

Review Results knowing the Assumptions in the Modeling Runs.

2 Forecasts – Let Me Count the Ways

Minimum Releases

Early Forecast
Location in Central/South Delta
Minimum Releases

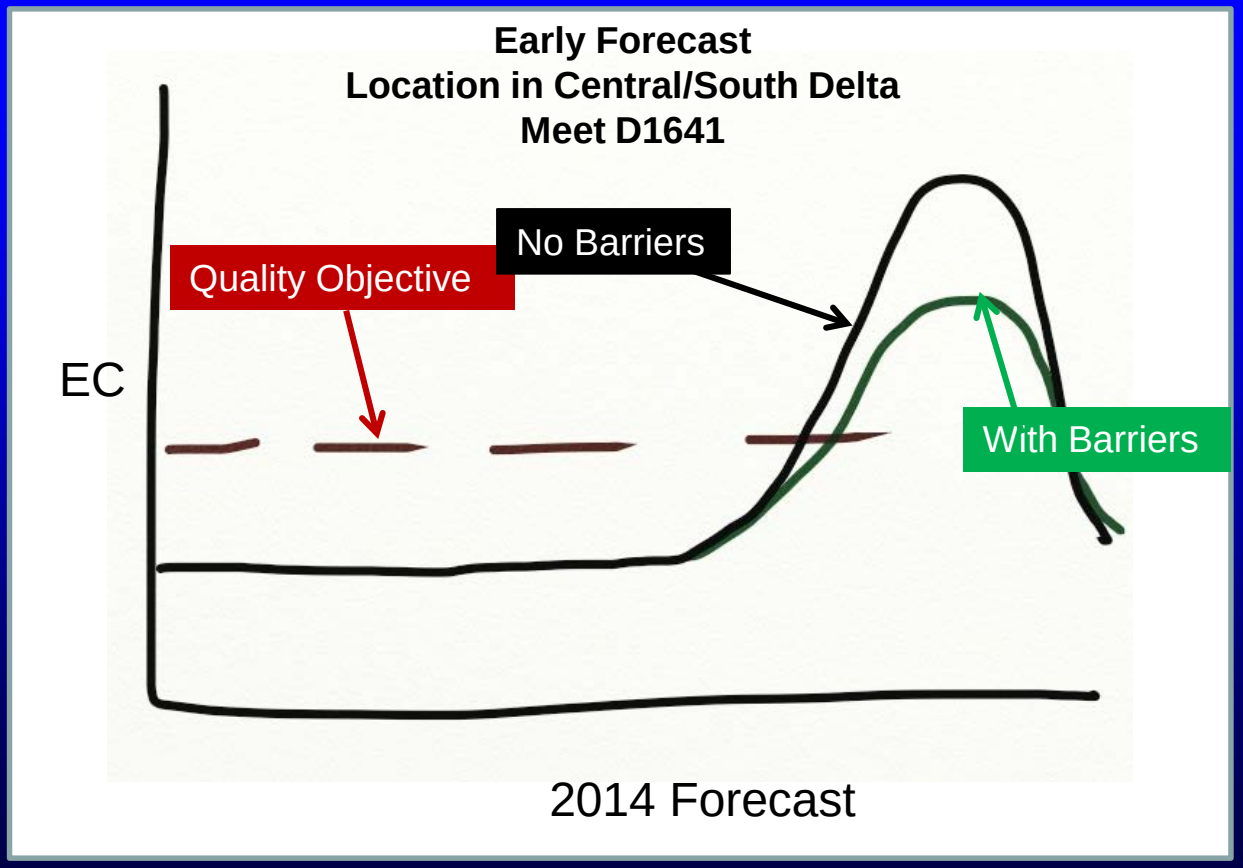


2014 Forecast

Minimum Releases – Release Storage over Time

2 Forecasts – Let Me Count the Ways

Meet D-1641

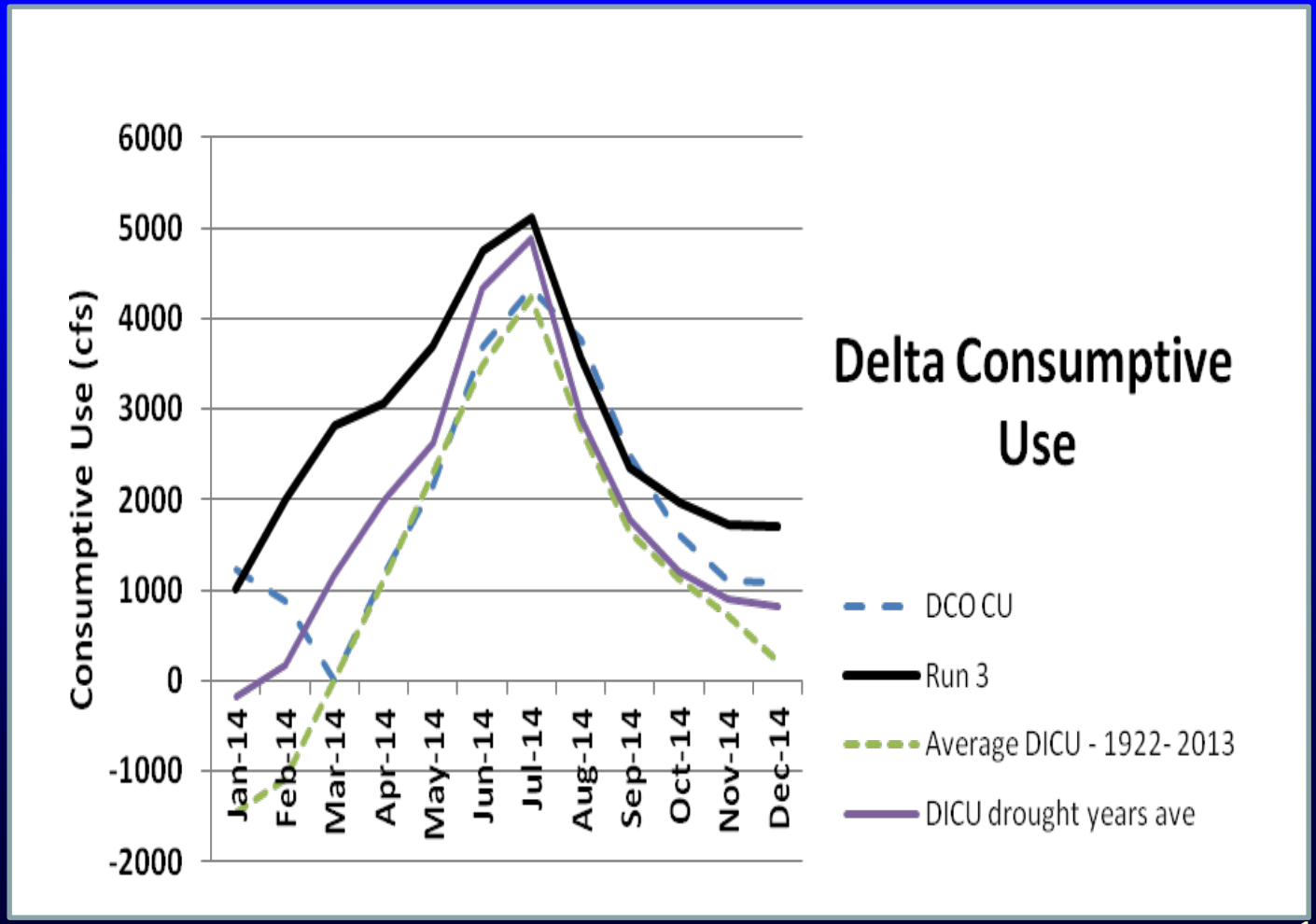


Meet WQ Objectives Until Run Out of Reservoir Storage

3 Will the Real Consumptive Use Please Stand Up

Delta Consumptive Use

- CU Has Large Impact in Drought
- Also Uncertainty



3 Will the Real Consumptive Use Please Stand Up

Simple Flow Balance Example

Inflows	- Exports	- In Delta Use	= Net Delta Outflow Index
8500	- 1500	- 4500	= 2500

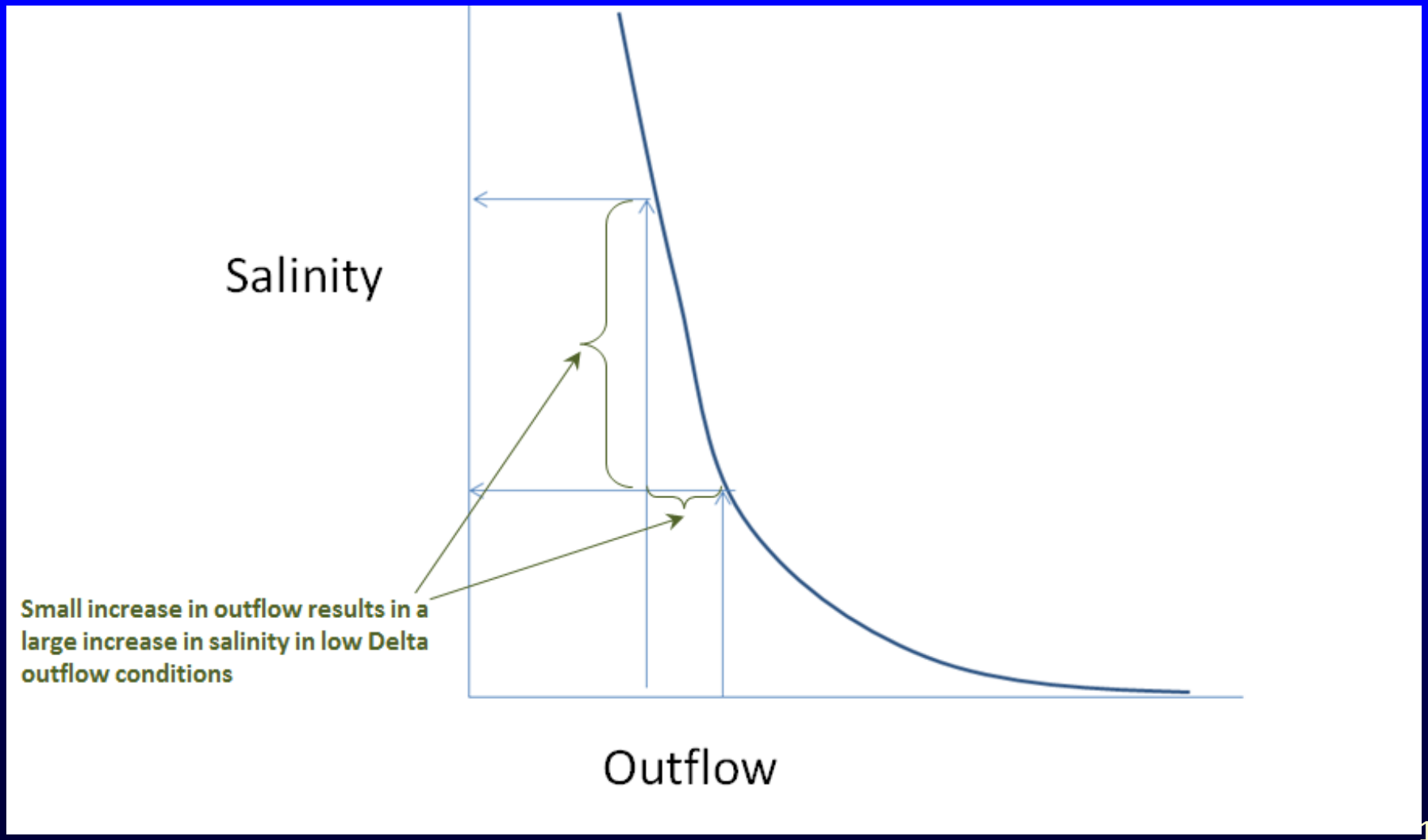
A Difference of 1000 cfs can have a huge impact on salinity intrusion

CU Matters!

Yoga For Delta Models

Models Not Calibrated for Extreme Drought – Outside of Historical Record

Yoga For Delta Models



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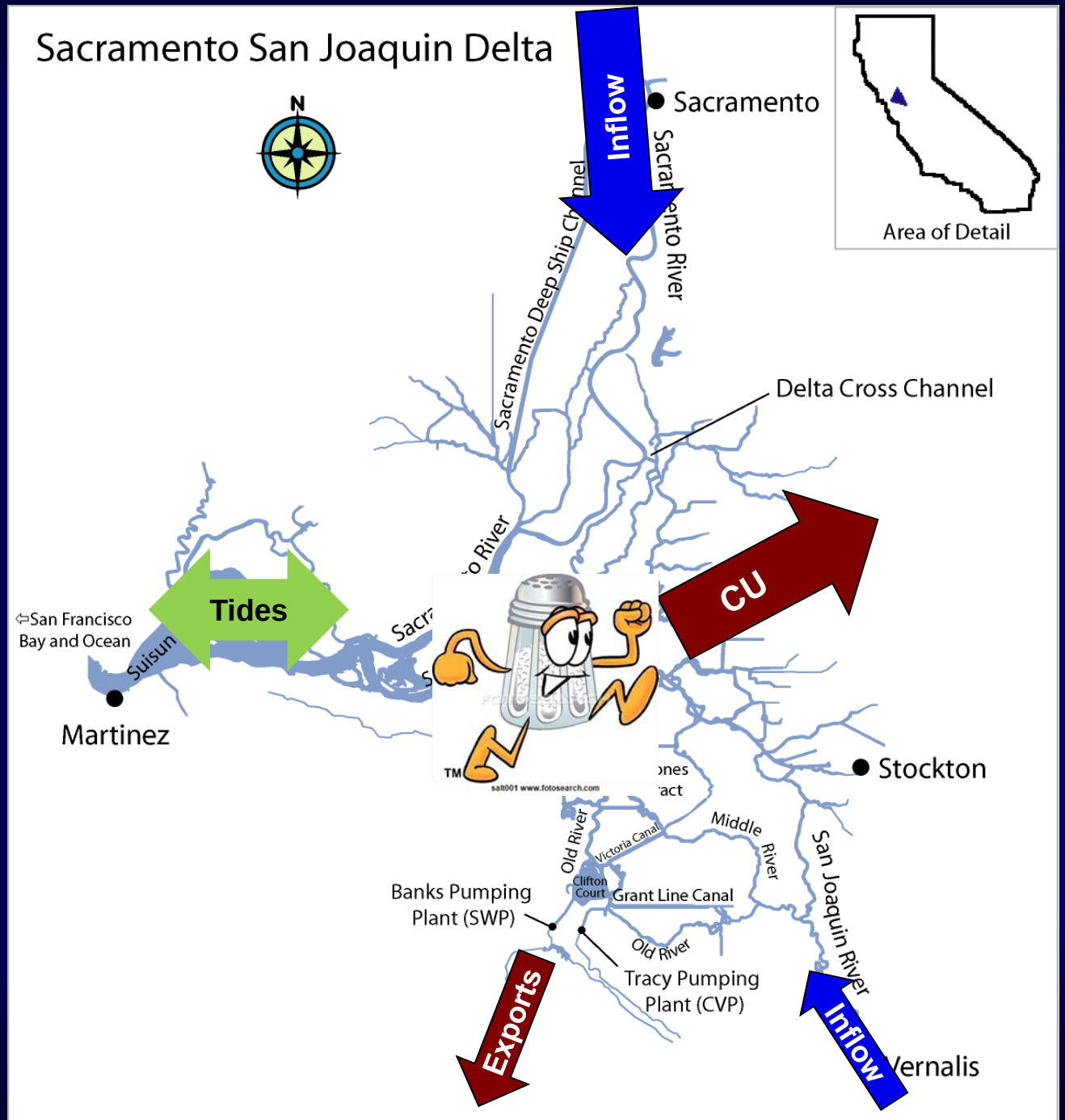
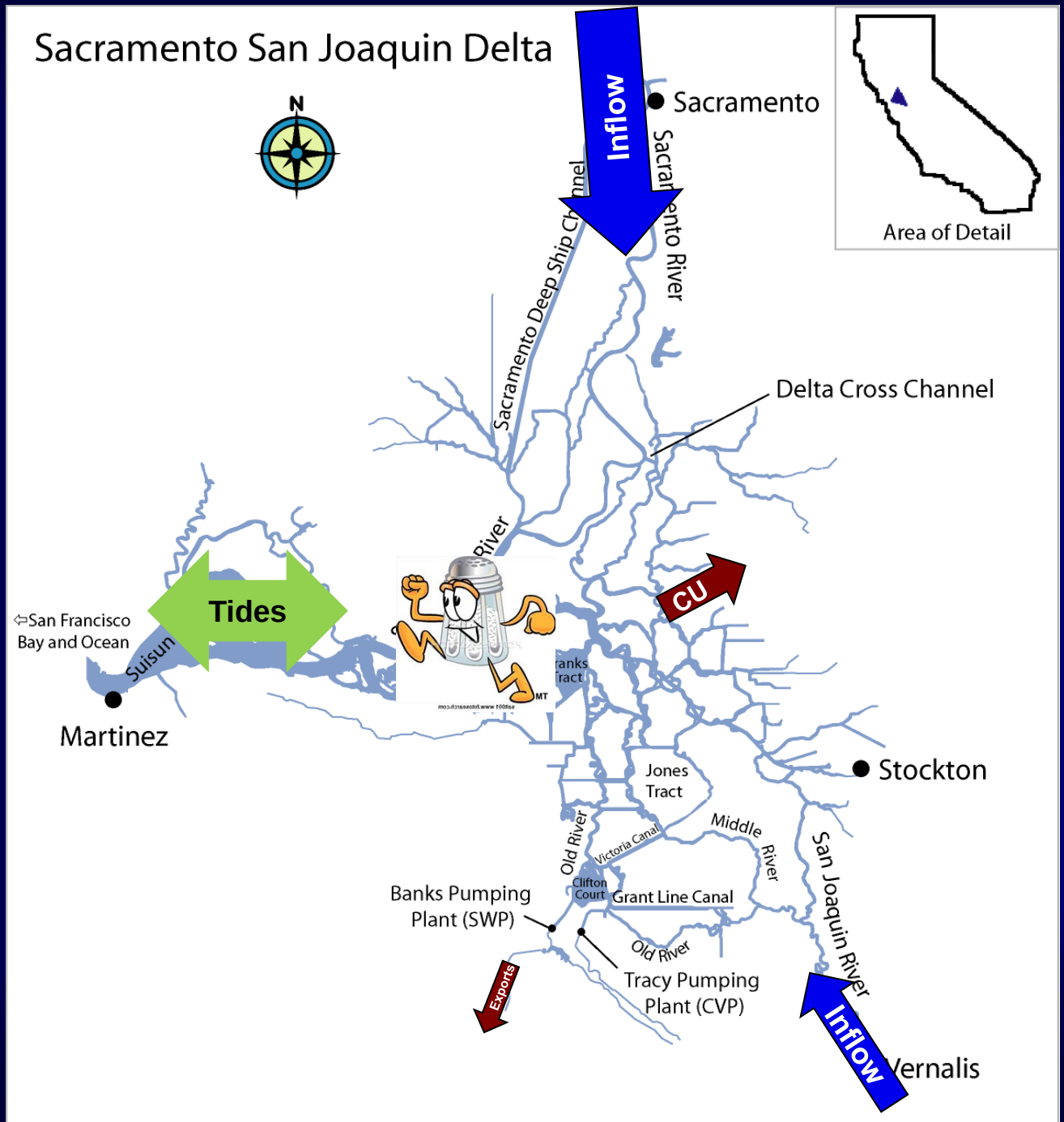

Sacramento San Joaquin Delta
N
Inflow
Sacramento
Sacramento River
Sacramento Deep Ship Channel
Area of Detail
Delta Cross Channel
CU
Tides
San Francisco Bay and Ocean
Suisun
Martinez
Stockton
Old River
Victoria Canal
Middle River
San Joaquin River
Clifton Court
Grant Line Canal
Banks Pumping Plant (SWP)
Old River
Tracy Pumping Plant (CVP)
Exports
Inflow
Vernalis

5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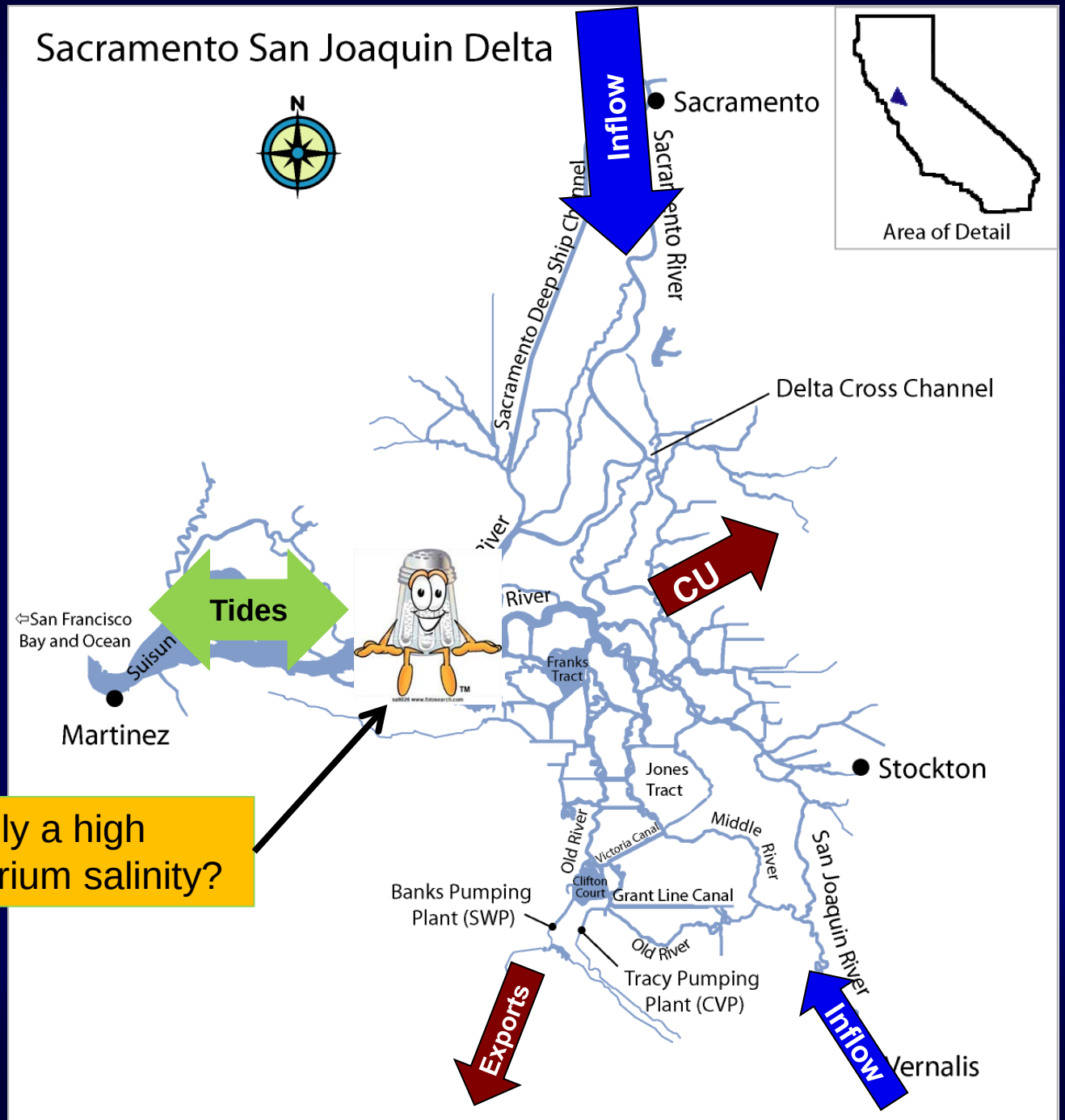


Possibly a high equilibrium salinity?

It’s Not Just Salinity

- Fish Spawning and Migration
- Water Levels Near Barrier Sites
- Bromide and Organic Carbon
- Velocities

Lots of Model Output to Analyze

Quality Versus Quantity

Net Delta Outflow Needed to Meet D-1641 Objectives for Various Alternatives

Objective	Without Emergency Barriers	Emergency Barriers	NDO Difference(positive indicates water savings with barriers)
Emmaton	3657 cfs	3893 cfs	-236 cfs
Relaxed	3045 cfs	2769 cfs	
NDO Difference (positive indicates water savings with relaxed objectives)	612 cfs	1124 cfs	

If you meet all D1641 Objectives – Including Emmaton – There is a water cost with the barriers

Quality Versus Quantity

Net Delta Outflow Needed to Meet D-1641 Objectives for Various Alternatives

Objective	Without Emergency Barriers	Emergency Barriers	NDO Difference(positive indicates water savings with barriers)
Emmaton	3657 cfs	3893 cfs	-236 cfs
Relaxed	3045 cfs	2769 cfs	276 cfs
NDO Difference (positive indicates water savings with relaxed objectives)	612 cfs	1124 cfs	

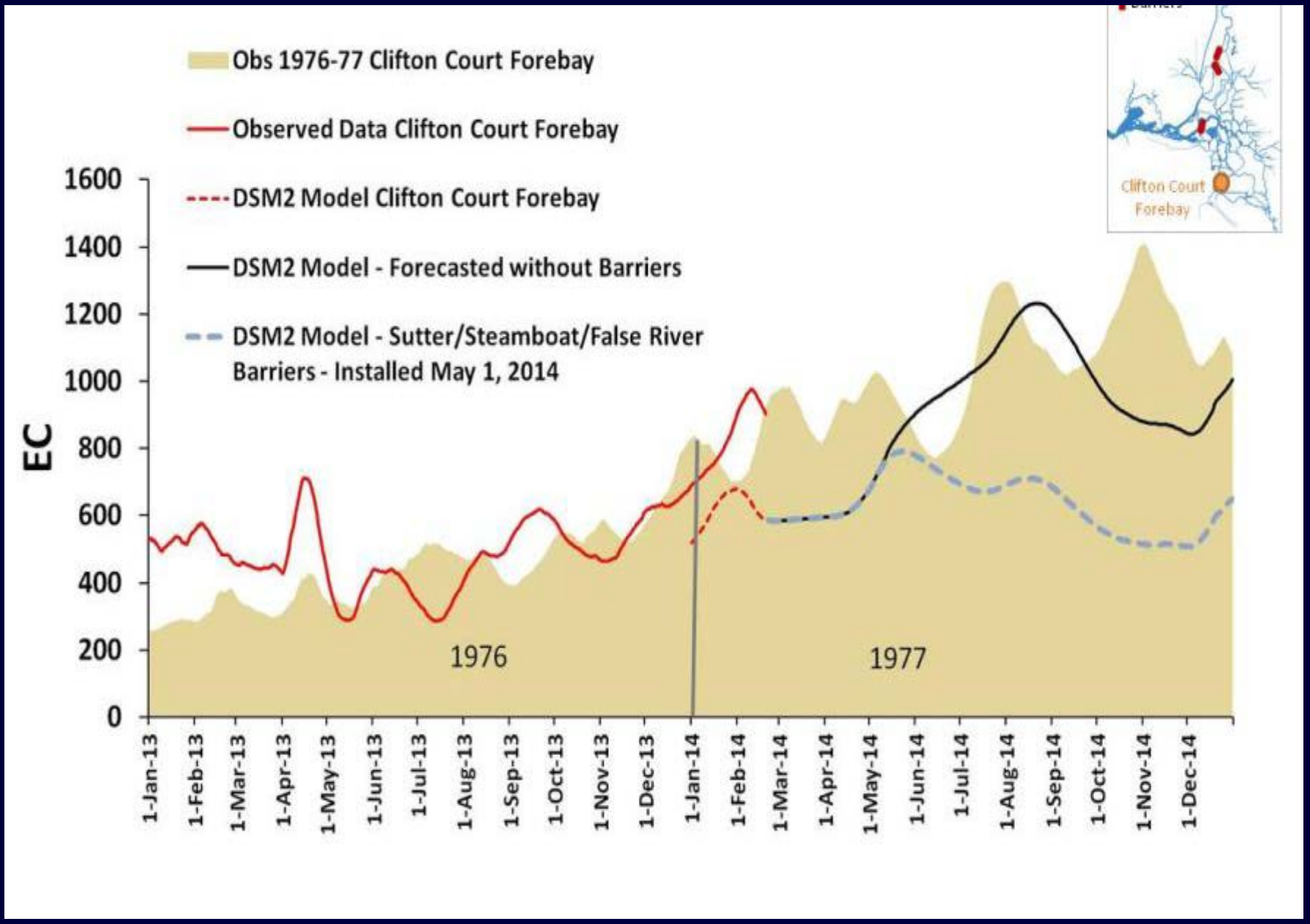
If you relax the Emmaton objective and keep the barriers, there is a water savings

Quality Versus Quantity

Net Delta Outflow Needed to Meet D-1641 Objectives for Various Alternatives

Objective	Without Emergency Barriers	Emergency Barriers	NDO Difference(positive indicates water savings with barriers)
Emmaton	3657 cfs	3893 cfs	-236 cfs
Relaxed	3045 cfs	2769 cfs	276 cfs
NDO Difference (positive indicates water savings with relaxed objectives)	612 cfs		

If you relax the Emmaton objective with no barriers there is a water savings. However, water quality degrades at the export locations


Obs 1976-77 Clifton Court Forebay
Observed Data Clifton Court Forebay
DSM2 Model Clifton Court Forebay
DSM2 Model - Forecasted without Barriers
DSM2 Model - Sutter/Steamboat/False River Barriers - Installed May 1, 2014
Clifton Court Forebay
EC
1600
1400
1200
1000
800
600
400
200
0
1976
1977
1-Jan-13
1-Feb-13
1-Mar-13
1-Apr-13
1-May-13
1-Jun-13
1-Jul-13
1-Aug-13
1-Sep-13
1-Oct-13
1-Nov-13
1-Dec-13
1-Jan-14
1-Feb-14
1-Mar-14
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