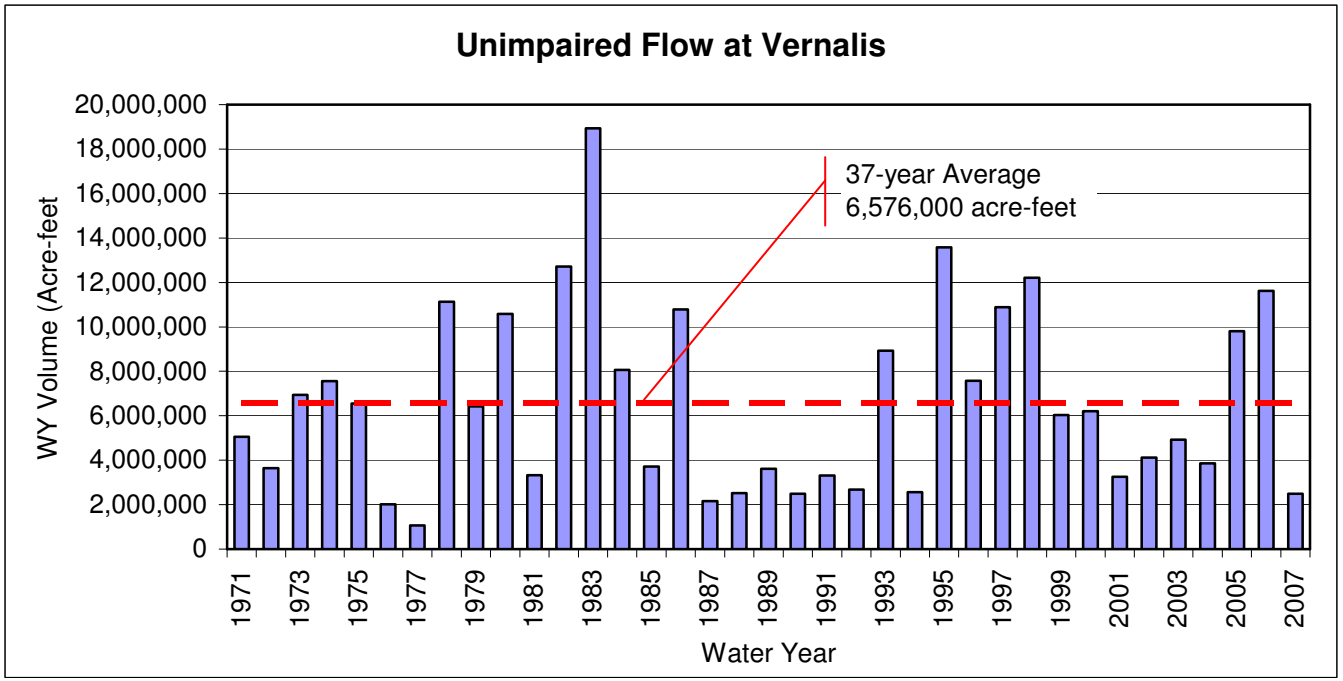
San Joaquin River Hydrology

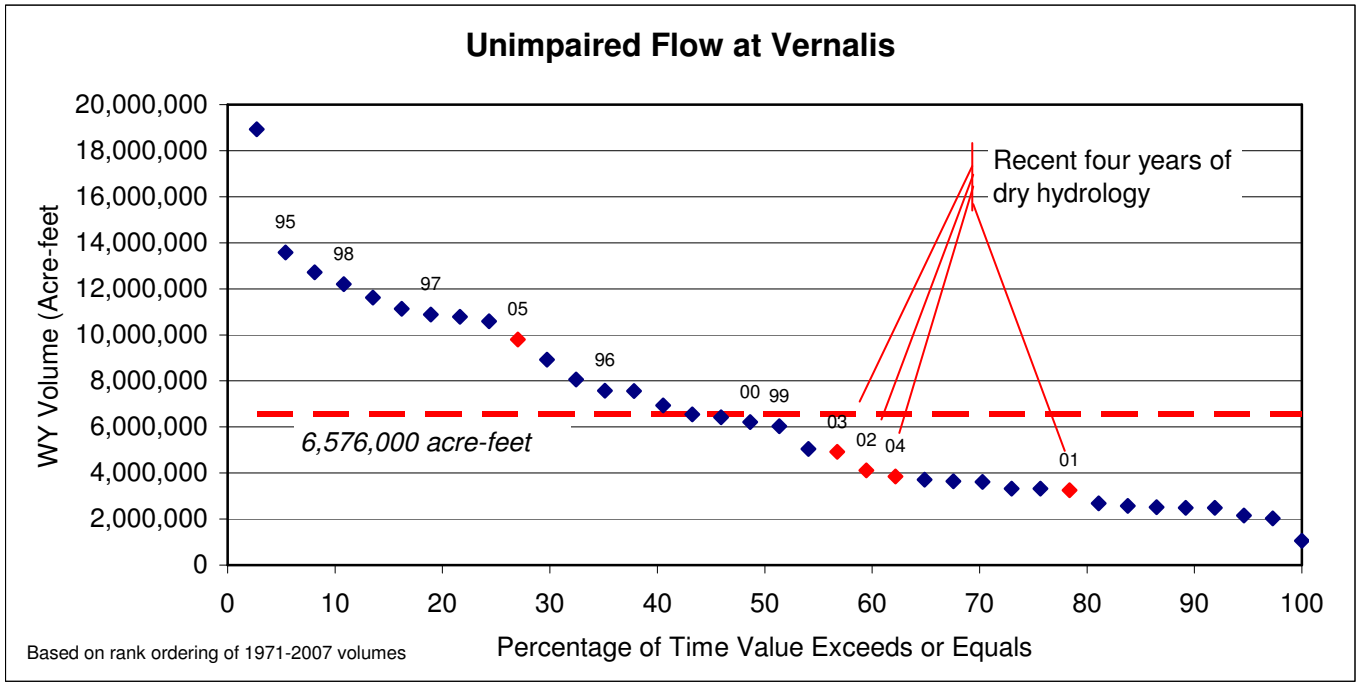
Summary of Memorandum prepared for
San Joaquin River Group Authority

San Joaquin River Hydrology

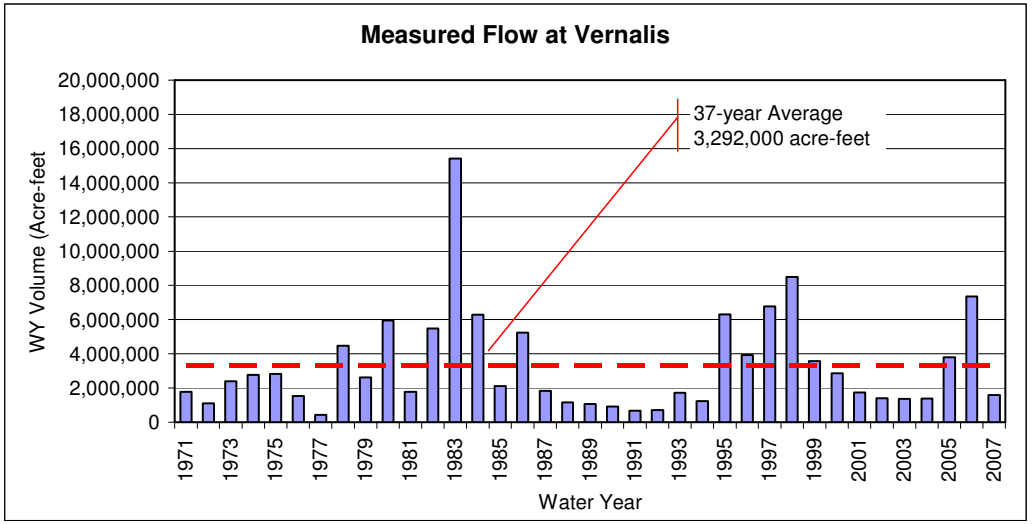


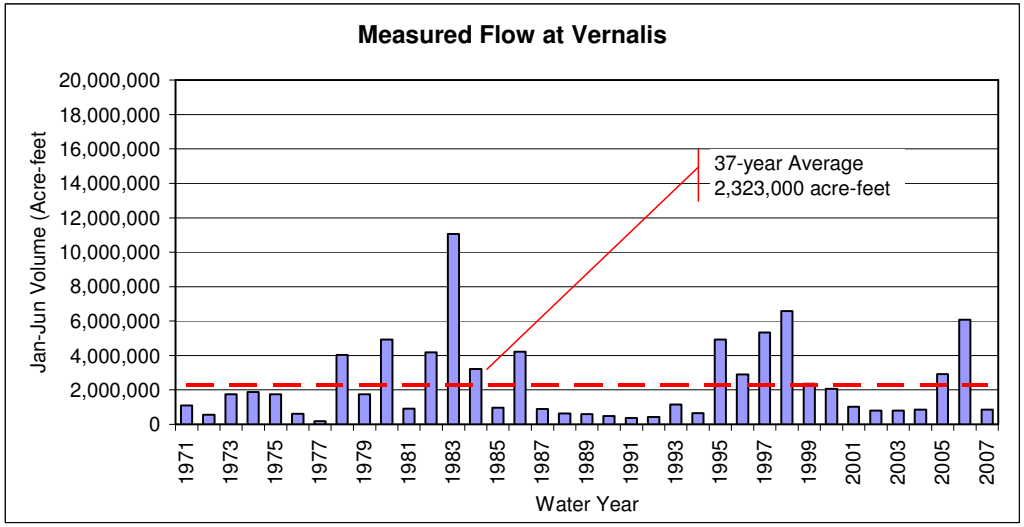
The unimpaired runoff at Vernalis is a conceptual parameter representing the calculated unimpaired runoff at the San Joaquin River's major tributaries' foothill reservoirs (e.g., near New Melones Reservoir), added to runoff of the San Joaquin Valley's minor streams and valley floor, plus overflows into the San Joaquin River from the Kings River. The parameter, as computed at Vernalis, is a general indication of the surface runoff in the basin but does not include depletions within the basin.

San Joaquin River Hydrology

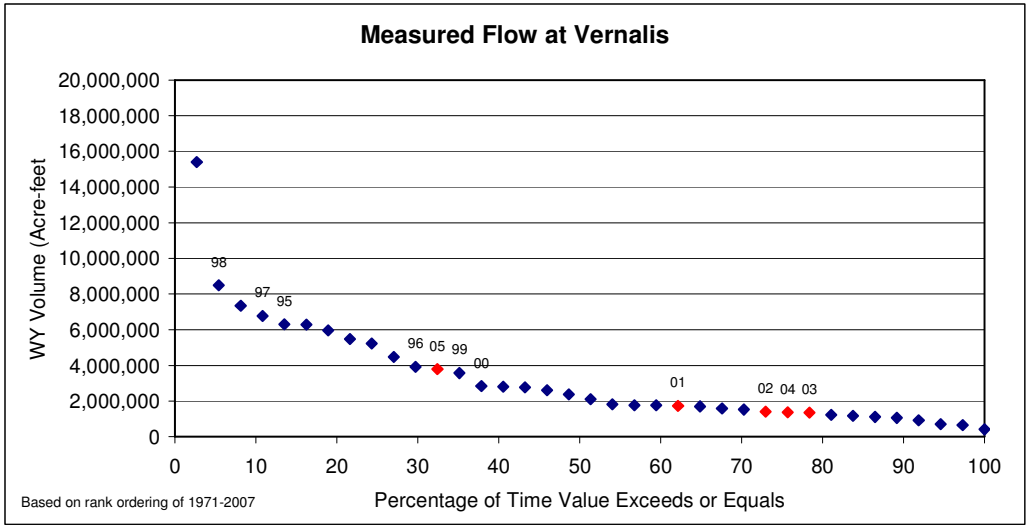


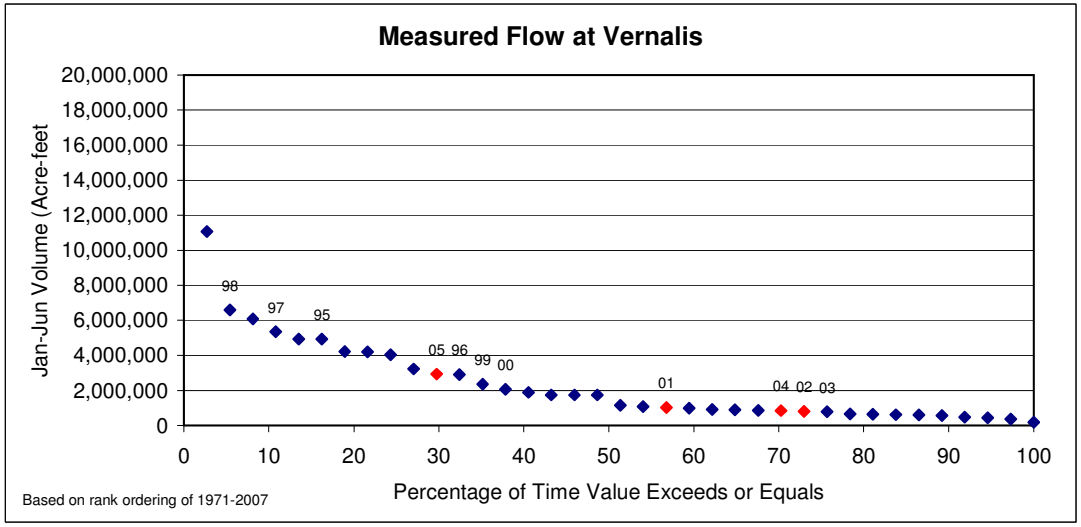
San Joaquin River Hydrology



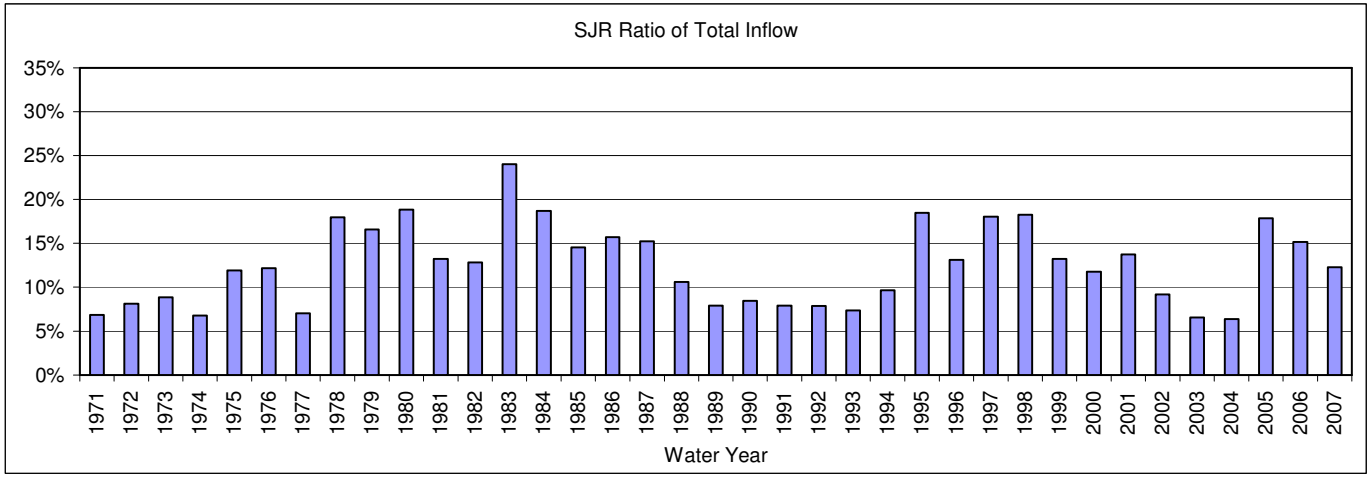


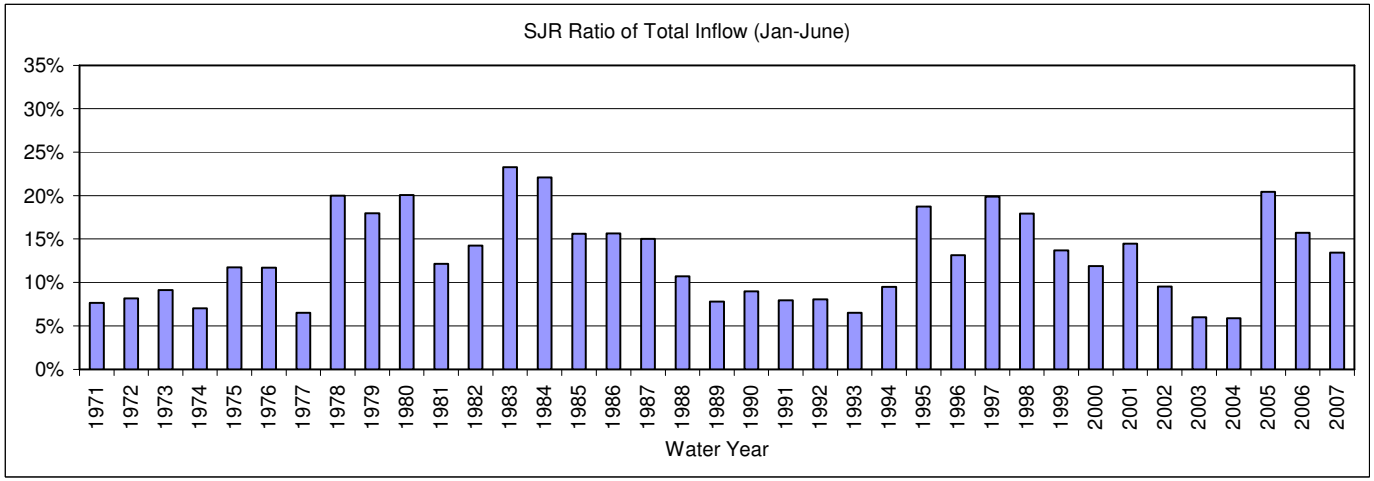
San Joaquin River Hydrology





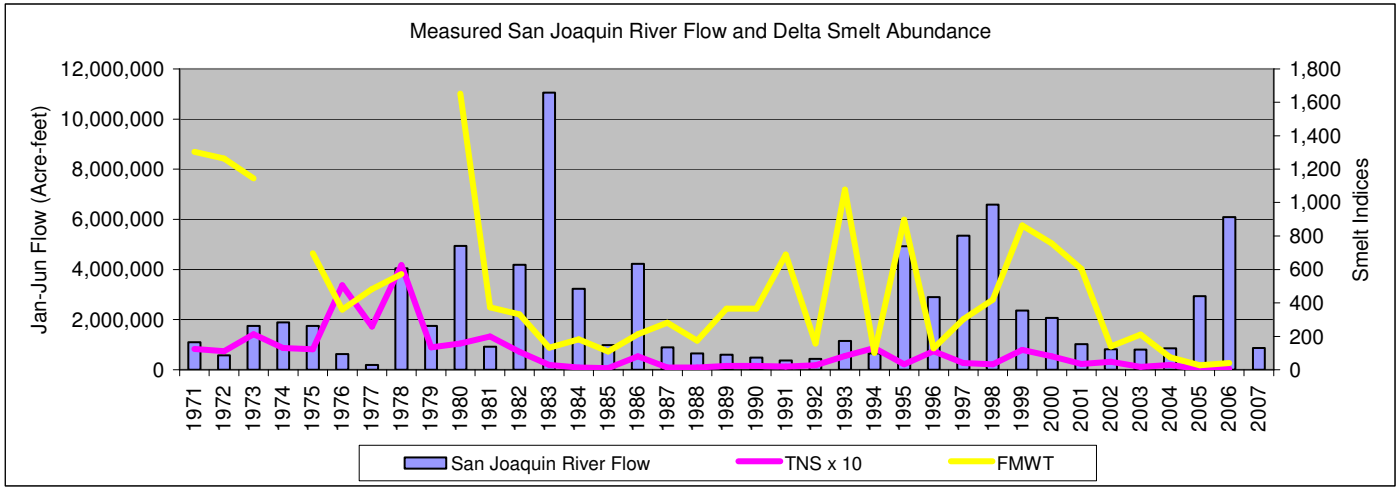
San Joaquin River Hydrology

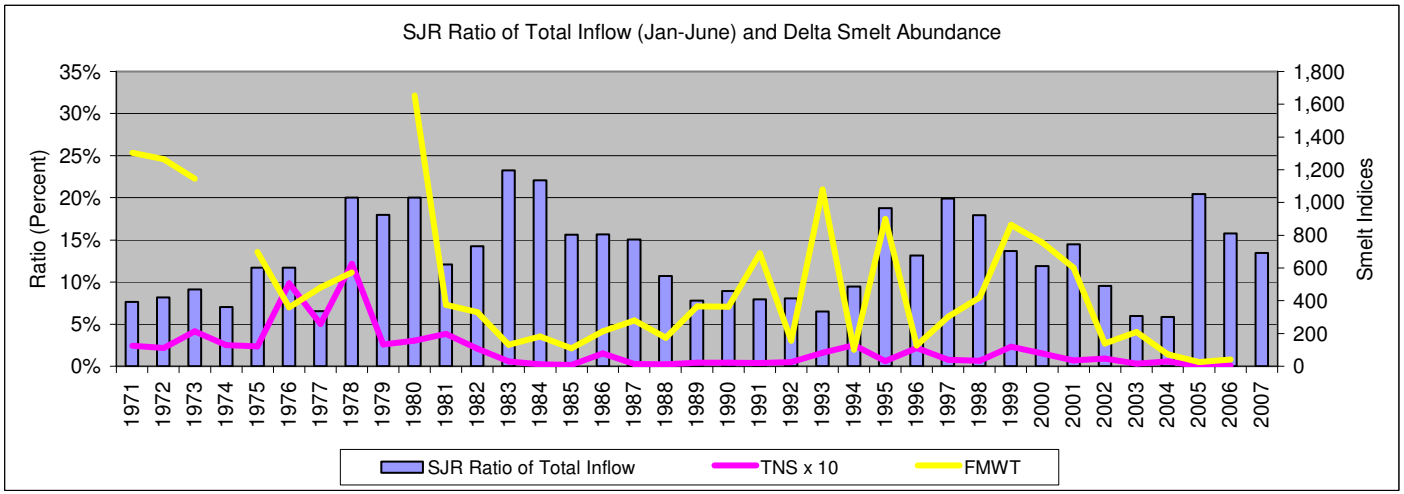




The ratio represents the numeric result of San Joaquin River measured flow (Vernalis) divided by the sum of that flow, Sacramento River flow (Sacramento) and Yolo Bypass flow.

San Joaquin River Hydrology





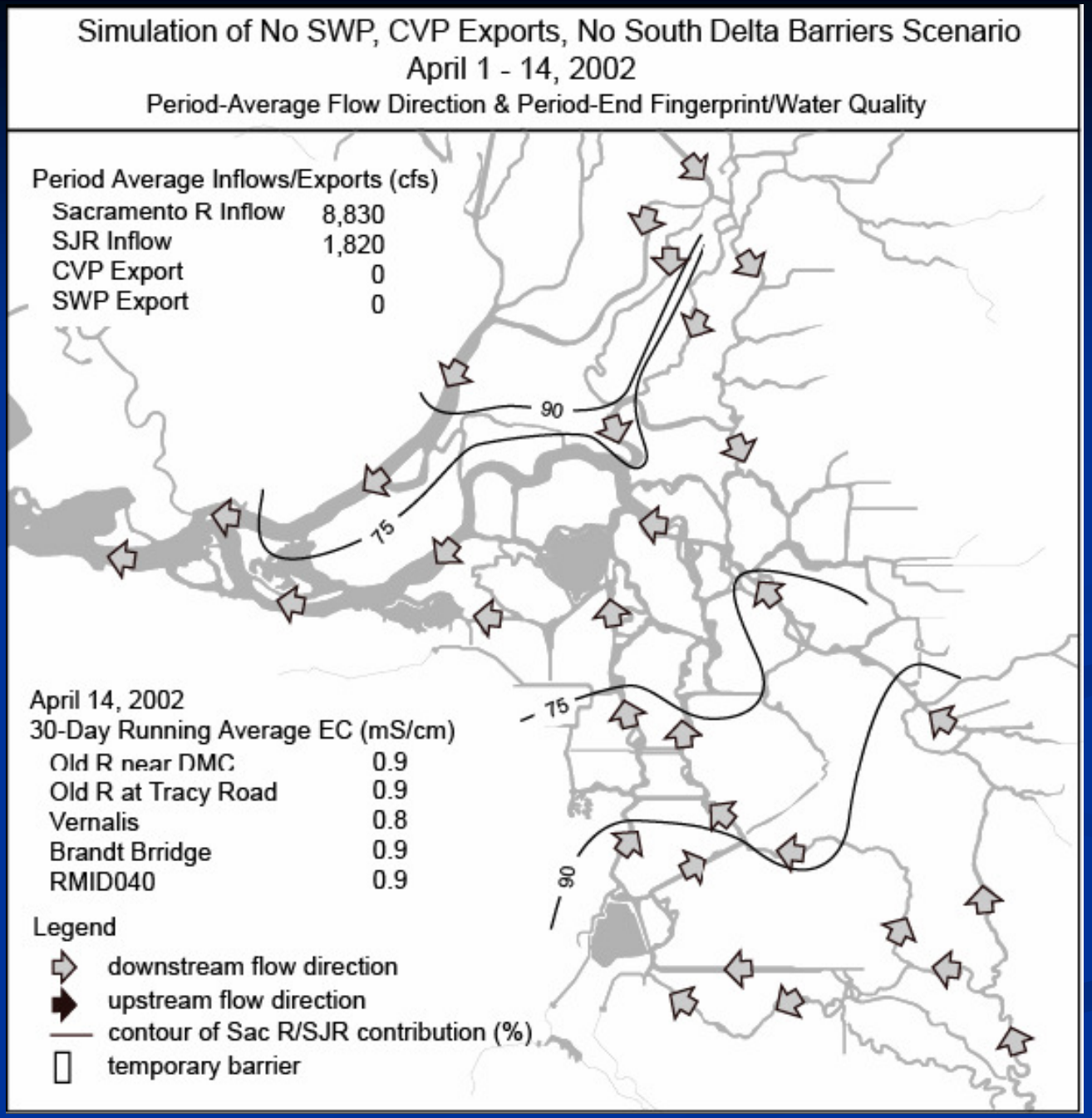
Smelt Abundance Indices: "Petition to the State of California Fish and Game Commission and Supporting Information for Listing the Delta Smelt (Hypomesus transpacificaus) as an Endangered Species under the California Endangered Species Act", The Bay Institute, etal., February 7, 2007. Table 1.

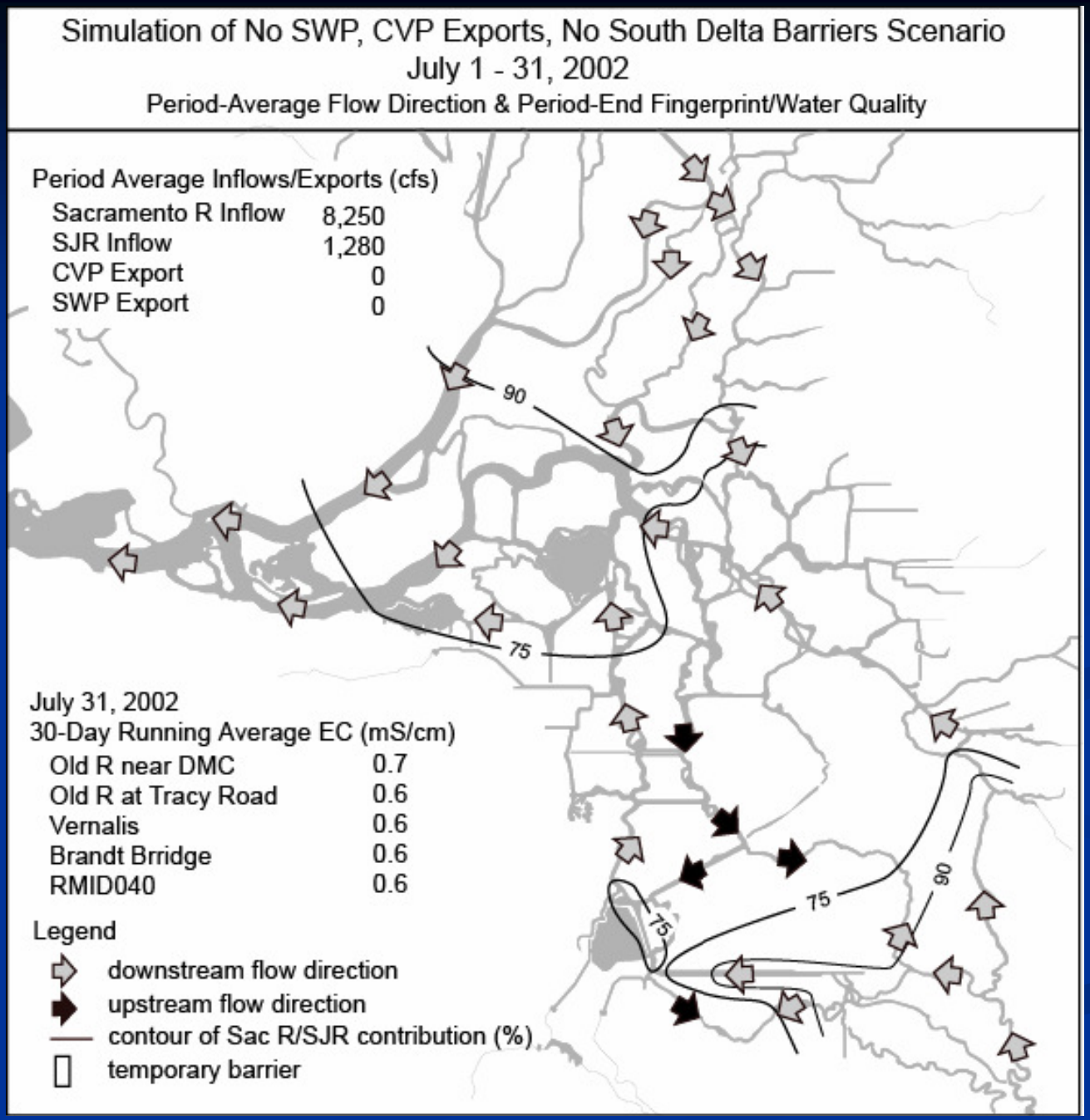
Consideration of the Pelagic Organism Decline in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

San Joaquin River Group Authority

The 2002 San Joaquin Valley water year hydrologic classification was "Dry."

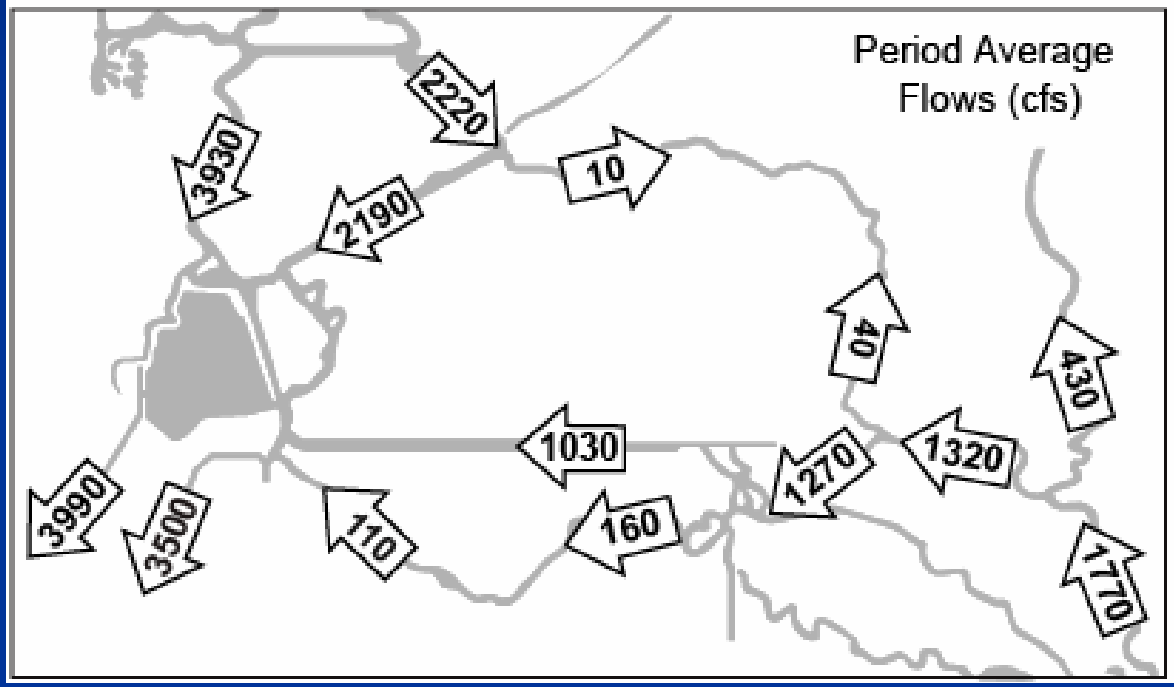
- The classification index was 2,341,004 MAF
- Unimpaired Vernalis flow was 4,119,915 MAF.
- The ratio of SJR flow to total inflow (Sac + SJR) was 10%.
- Total exports (CCC + CFB + JPP) were 5,499,327 MAF.


Simulation of No SWP, CVP Exports, No South Delta Barriers Scenario
April 1 - 14, 2002
Period-Average Flow Direction & Period-End Fingerprint/Water Quality
Period Average Inflows/Exports (cfs)
Sacramento R Inflow 8,830
SJR Inflow 1,820
CVP Export 0
SWP Export 0
90
75
75
90
April 14, 2002
30-Day Running Average EC (mS/cm)
Old R near DMC 0.9
Old R at Tracy Road 0.9
Vernalis 0.8
Brandt Brridge 0.9
RMID040 0.9
Legend
downstream flow direction
upstream flow direction
contour of Sac R/SJR contribution (%)
temporary barrier


Simulation of No SWP, CVP Exports, No South Delta Barriers Scenario
July 1 - 31, 2002
Period-Average Flow Direction & Period-End Fingerprint/Water Quality
Period Average Inflows/Exports (cfs)
Sacramento R Inflow 8,250
SJR Inflow 1,280
CVP Export 0
SWP Export 0
90
75
July 31, 2002
30-Day Running Average EC (mS/cm)
Old R near DMC 0.7
Old R at Tracy Road 0.6
Vernalis 0.6
Brandt Brridge 0.6
RMID040 0.6
75
75
90
Legend
downstream flow direction
upstream flow direction
contour of Sac R/SJR contribution (%)
temporary barrier

April 1-14, 2002

Historical Conditions



Key Simulation Information

No barriers installed

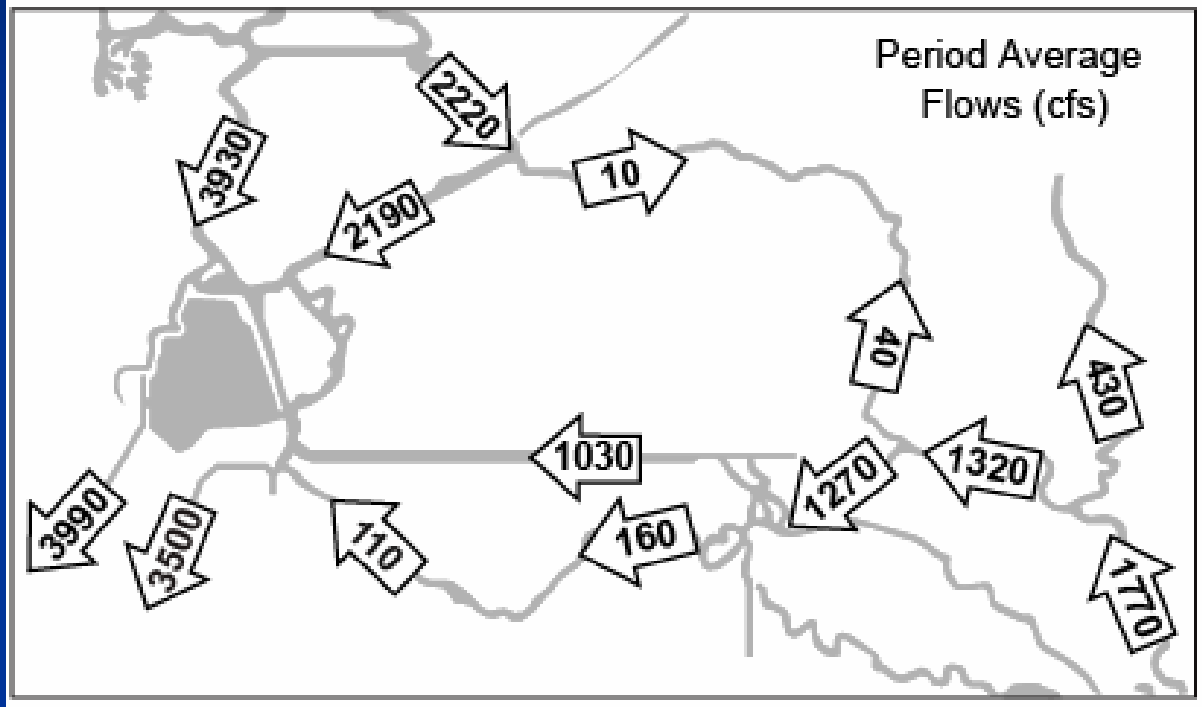
SJR Inflow (avg)	1,820 cfs
CVP Export (avg)	3,500 cfs
SWP Export (avg)	3,990 cfs

30-Day Running Average EC at end of period (mS/cm)

Old R near DMC	0.7
Old R at Tracy Road	0.9
Vernalis	0.8
Brandt Brridge	0.9
RMID040	0.9

April 1-14, 2002. Historical Conditions

Maximizing San Joaquin River as Source (no barriers installed)



Key Simulation Information

No barriers installed

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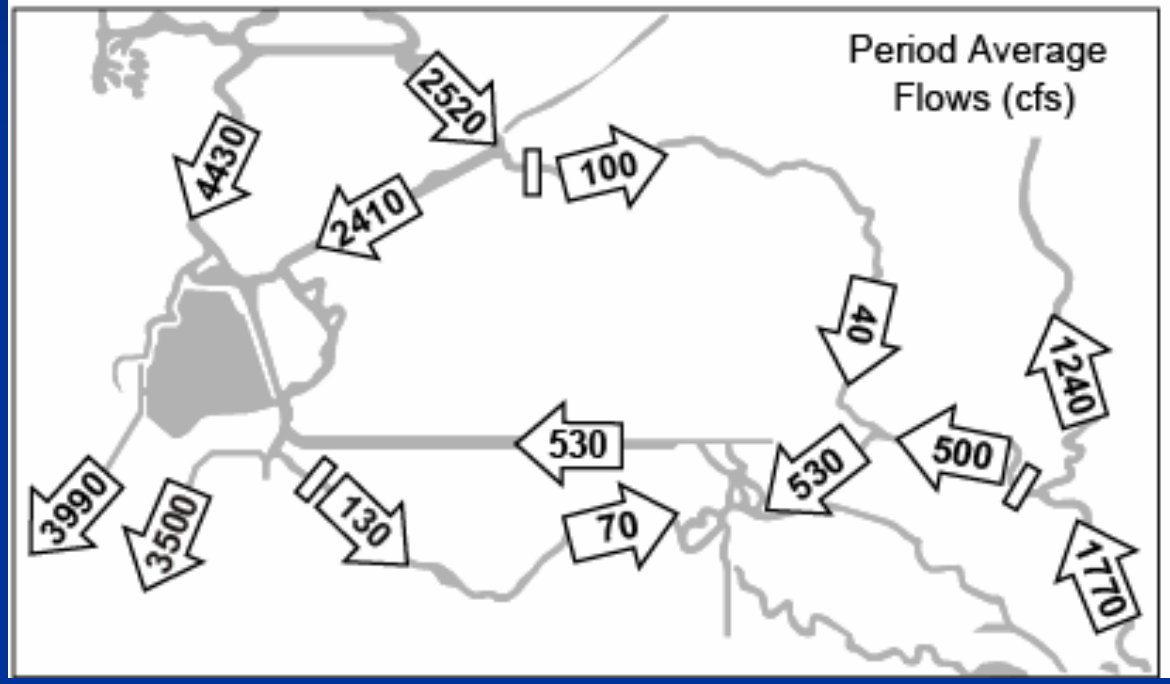
30-Day Running Average EC at end of period (mS/cm)

Old R near DMC	0.7
Old R at Tracy Road	0.9
Vernalis	0.8
Brandt Brridge	0.9
RMID040	0.9

April 1-14, 2002. Historical Conditions

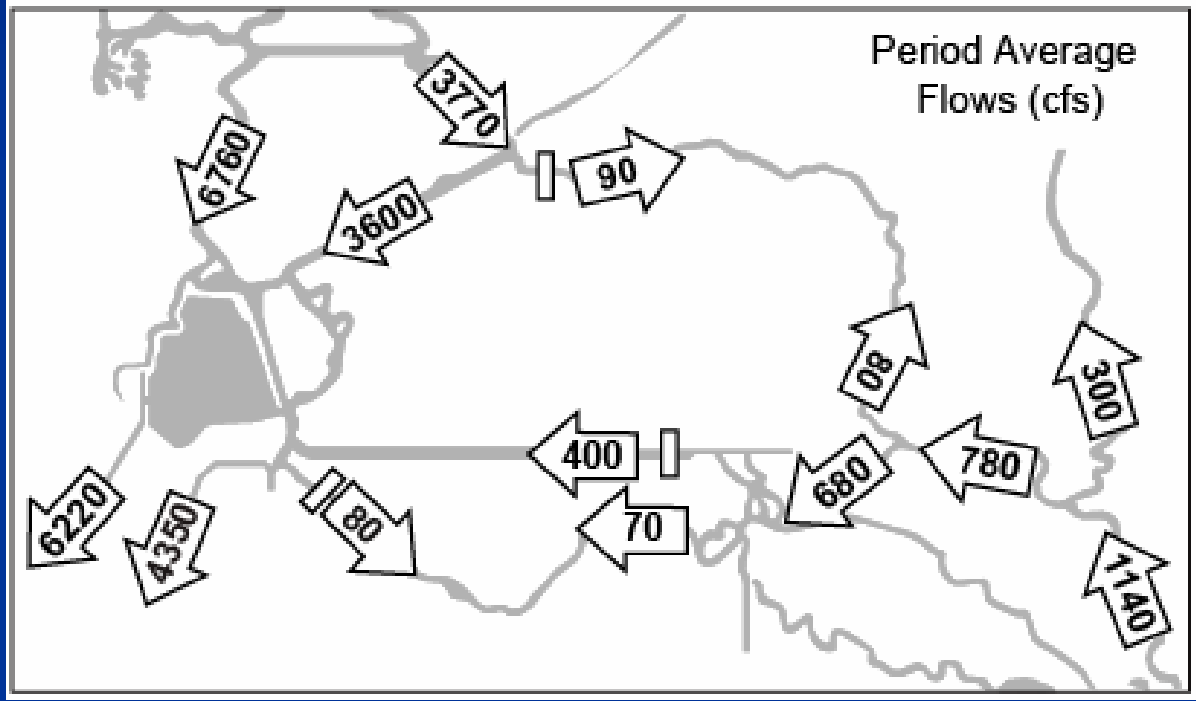
Maximizing Sacramento River as Source
(Old River, Old River at Head, Middle River barriers installed)



Key Simulation Information	
Old River, Old River at Head, Middle River barriers in	
SJR Inflow	1,820 cfs
CVP Export	3,500 cfs
SWP Export	3,990 cfs
30-Day Running Average EC at end of period (mS/cm)	
Old R near DMC	0.6
Old R at Tracy Road	0.8
Vernalis	0.8
Brandt Brridge	0.9
RMID040	0.8

July 1-31, 2002

Historical Conditions



Key Simulation Information

Old River, Grantline Canal, Middle River barriers in

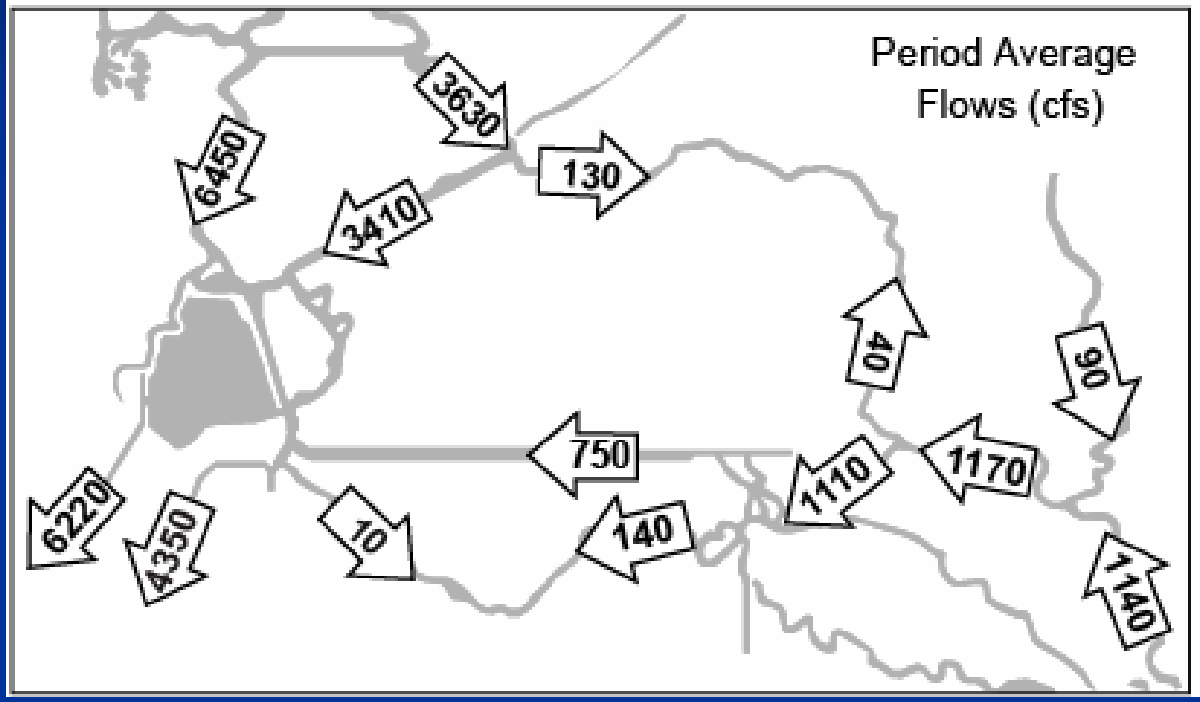
SJR Inflow (avg)	1,280 cfs
CVP Export (avg)	4,350 cfs
SWP Export (avg)	6,220 cfs

30-Day Running Average EC at end of period (mS/cm)

Old R near DMC	0.3
Old R at Tracy Road	0.6
Vernalis	0.6
Brandt Brridge	0.6
RMID040	0.6

July 1-31, 2002. Historical Conditions

Maximizing San Joaquin River as Source (no barriers installed)



Key Simulation Information

No barriers installed

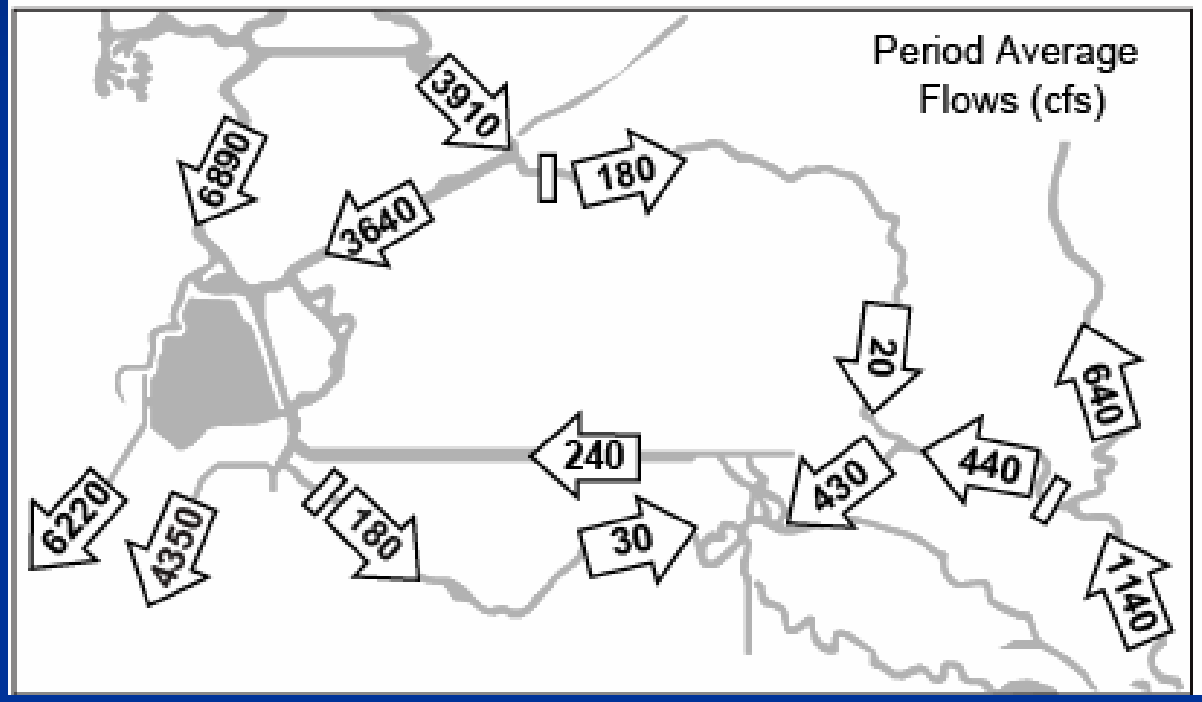
SJR Inflow (avg)	1,280 cfs
CVP Export (avg)	4,350 cfs
SWP Export (avg)	6,220 cfs

30-Day Running Average EC at end of period (mS/cm)

Old R near DMC	0.4
Old R at Tracy Road	0.6
Vernalis	0.6
Brandt Brridge	0.6
RMID040	0.6

July 1-31, 2002. Historical Conditions

Maximizing Sacramento River as Source
(Old River, Old River at Head, Middle River barriers installed)



Key Simulation Information
Old River, Old River at Head,
Middle River barriers installed

SJR Inflow (avg)	1,280 cfs
CVP Export (avg)	4,350 cfs
SWP Export (avg)	6,220 cfs

30-Day Running Average EC
at end of period (mS/cm)

Old R near DMC	0.3
Old R at Tracy Road	0.4
Vernalis	0.6
Brandt Brridge	0.6
RMID040	0.4

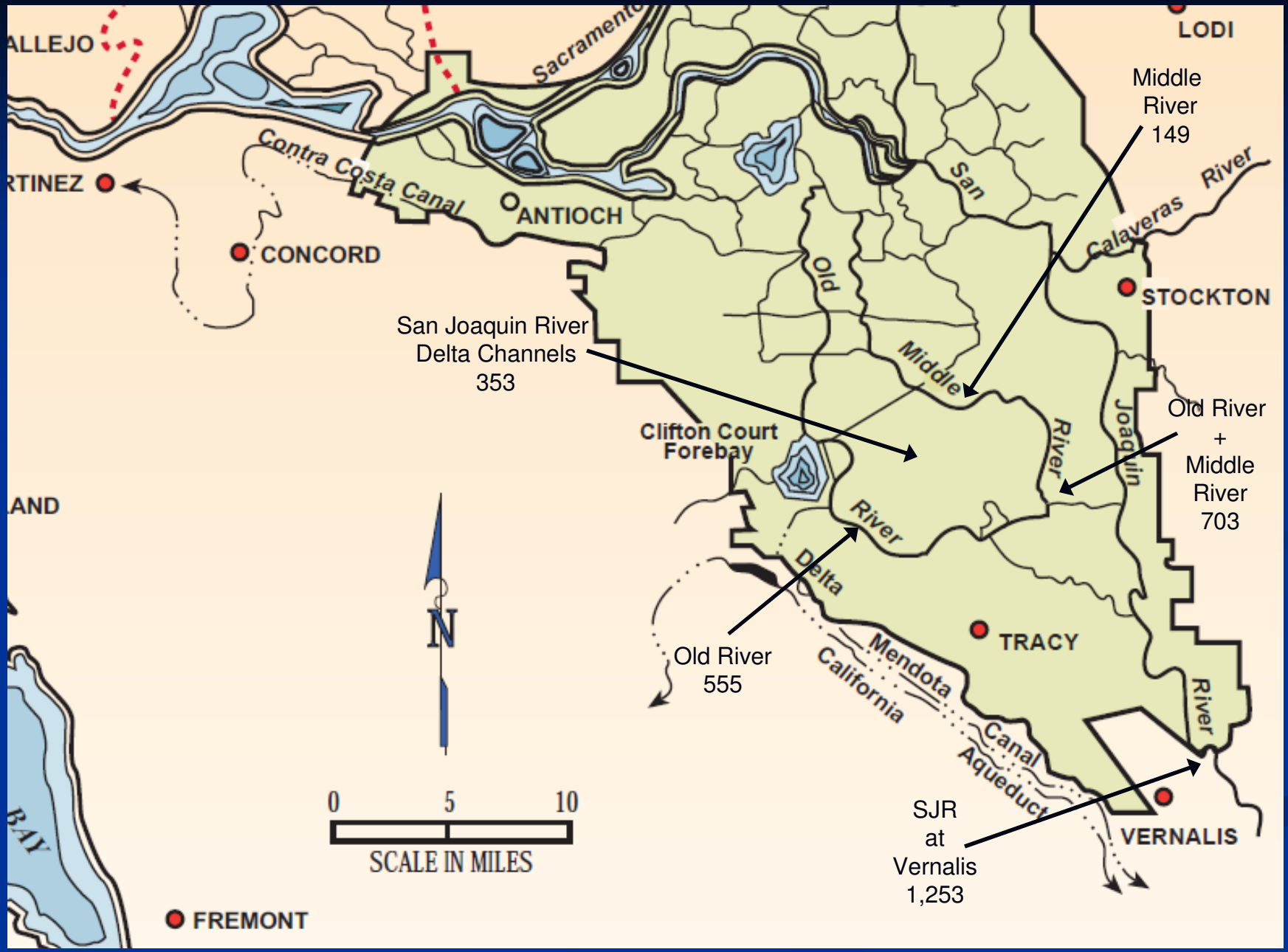
In 1972, the United States Bureau of Reclamation mapped the water rights in the South Delta.

Reclamation listed appropriative water rights and distinguished between lands that it could and could not assume had riparian water rights.

The Division of Water Rights is using the same maps in their South Delta Salinity project.

The SJRGA examined the Reclamation maps depicting Union Island, Roberts Island, and the San Joaquin River from Vernalis to Old River.

Sacramento-San Joaquin Delta, with Diversions Pursuant to Water Rights in cfs



April 1-14, 2002. Flow remaining after satisfying Delta water rights.

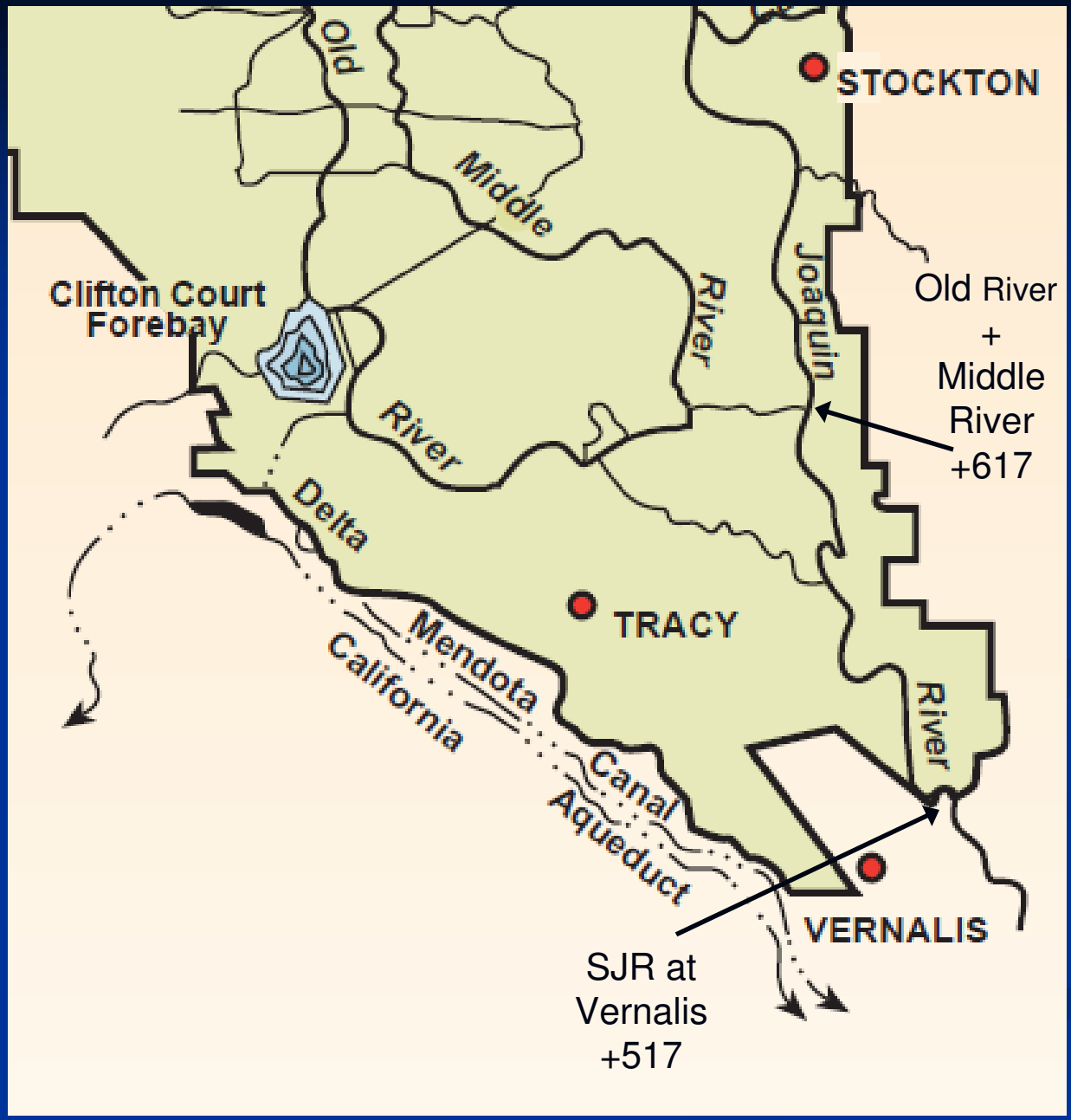
Historical conditions.

No barriers.

SJR inflow: 1,820 cfs

CVP Export: 3,500 cfs

SWP Export: 3,990 cfs



April 1-14, 2002. Flow remaining after satisfying Delta water rights.

- Historical conditions.
- Maximizing San Joaquin River as Source.
- No barriers.
- SJR inflow: 1,820 cfs
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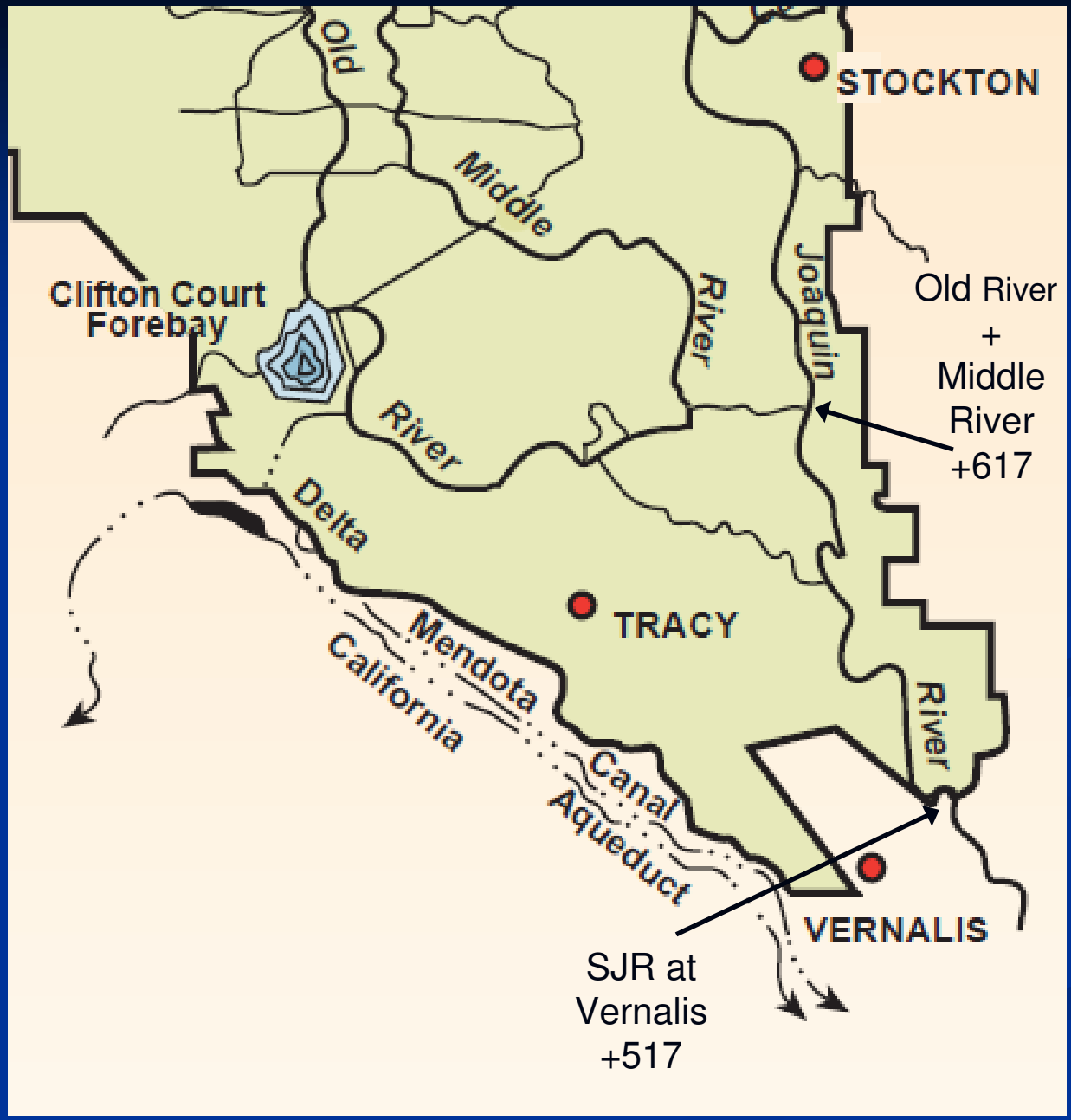

April 1-14, 2002. Flow remaining after satisfying Delta water rights.

- Historical conditions.
- Maximizing Sacramento River as Source.
- Barriers installed.
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- CVP Export: 3,500 cfs
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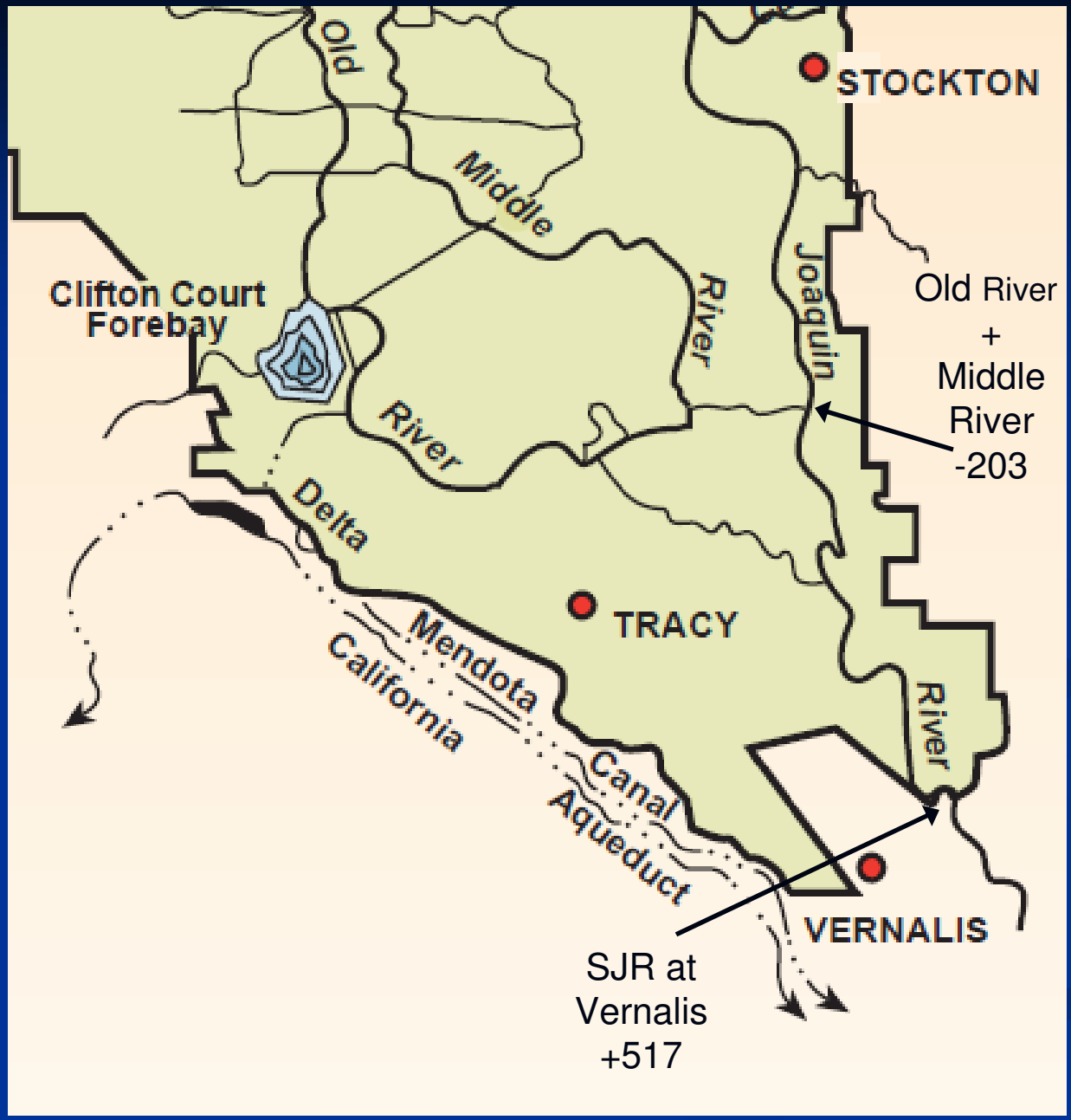


July 1-31, 2002. Flow remaining after satisfying Delta water rights.

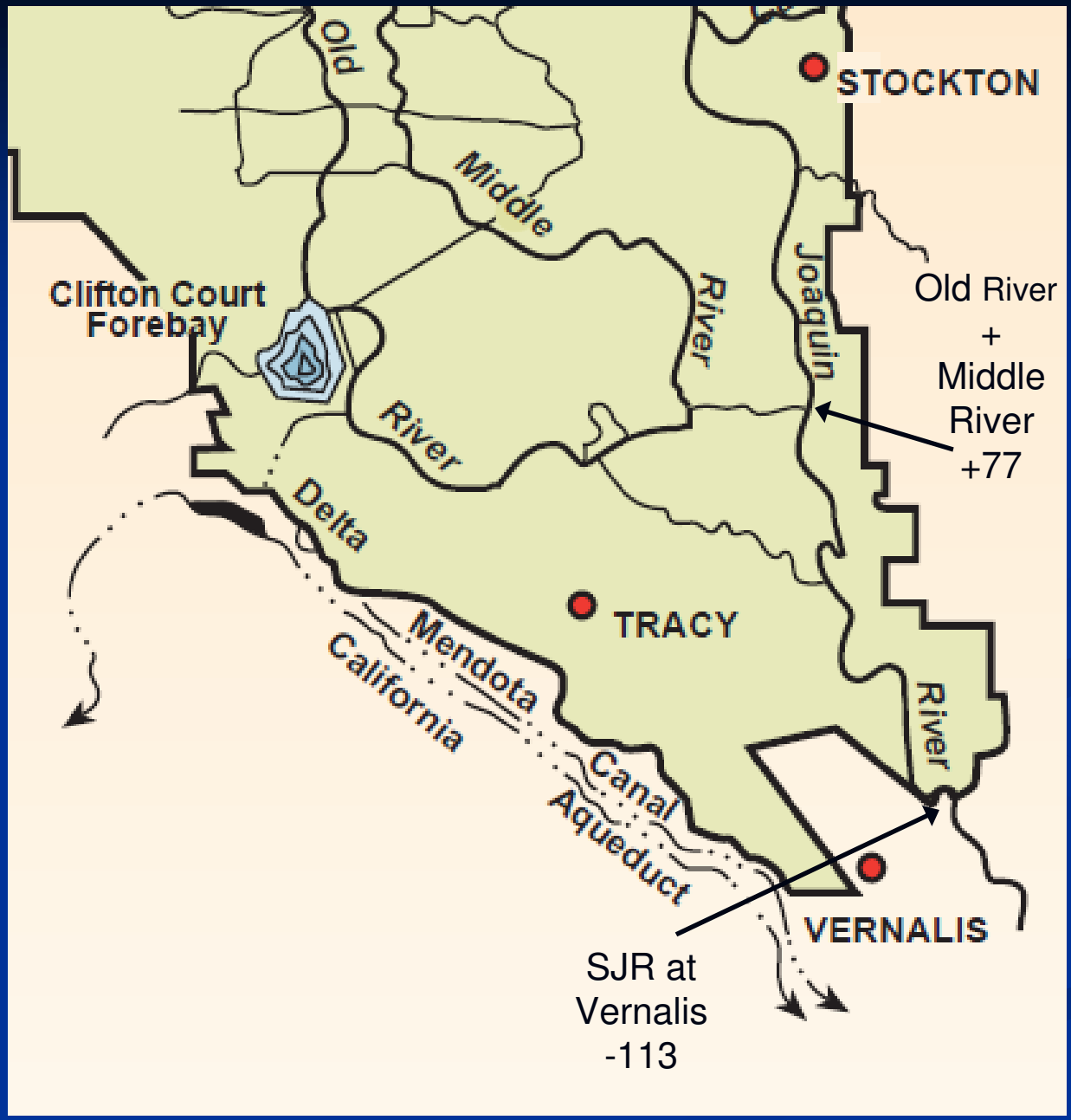
Historical conditions.

Barriers installed.

SJR inflow: 1,280 cfs

CVP Export: 4,350 cfs

SWP Export: 6,220 cfs



July 1-31, 2002. Flow remaining after satisfying Delta water rights.

- Historical conditions.
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- No barriers.
- SJR inflow: 1,280 cfs
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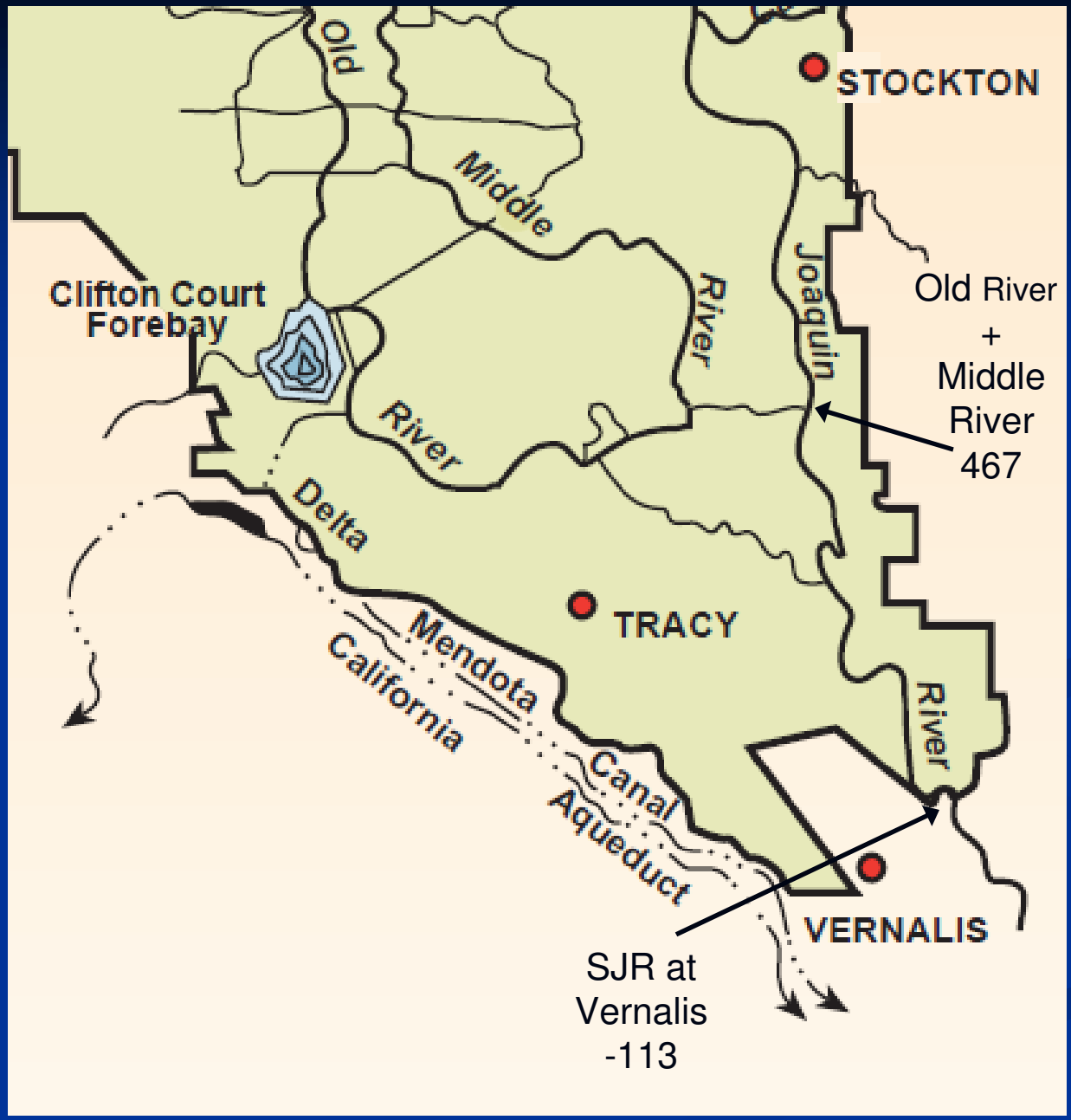

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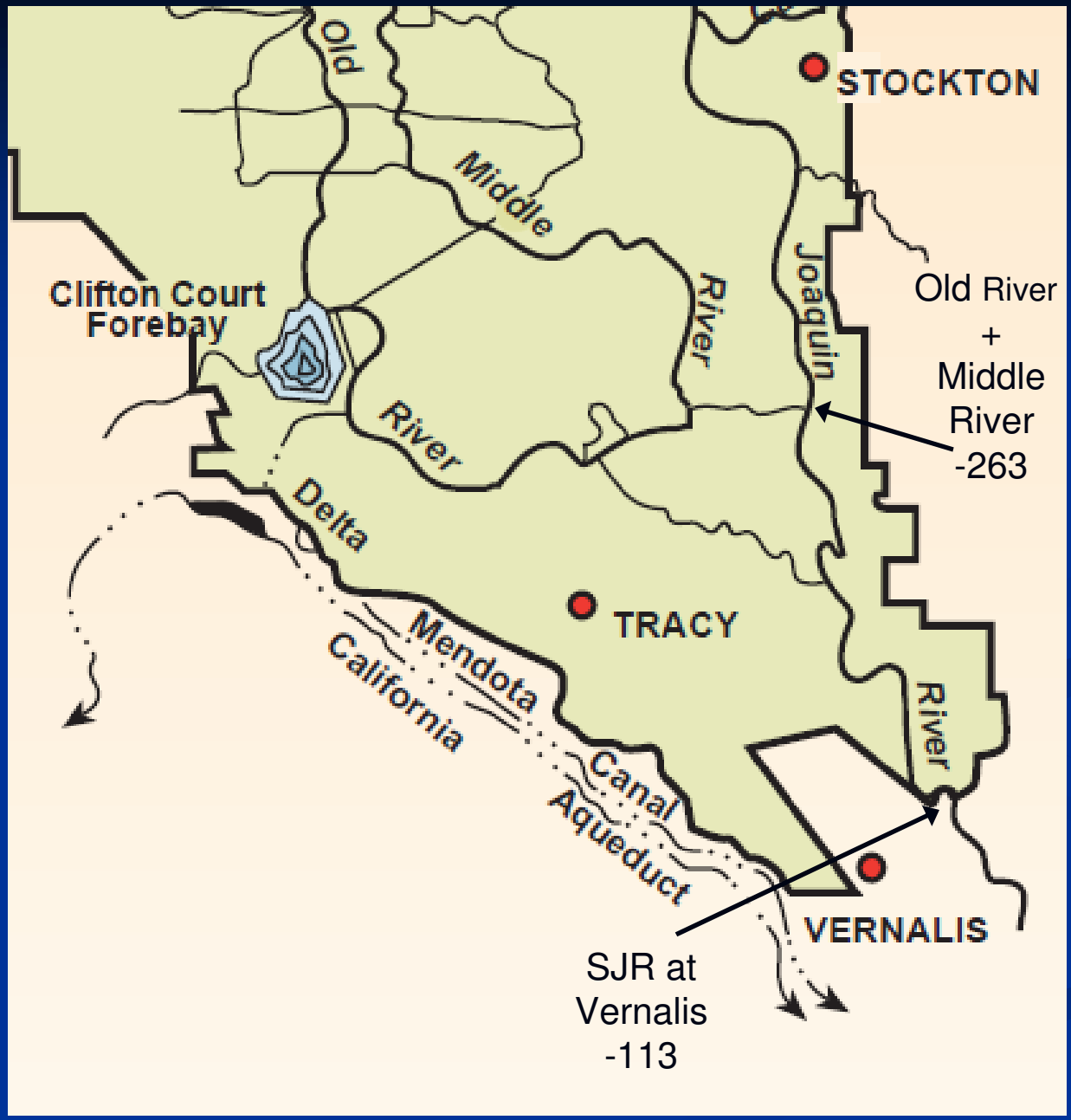

OBSERVATIONS

- For April 1-14, 2002, San Joaquin River inflow at Vernalis exceeded the amount of water Delta water right holders could divert by 517 cfs.
- By July 1-31, 2002, the amount of water Delta water right holders could divert exceeded San Joaquin River inflow by 113 cfs.
- Barriers elevate reverse flows in Old and Middle River.
- Barriers reduce the amount of flow available to water right holders.
- Barriers increase flow in the San Joaquin River below the Head of Old River.
- Barriers prevent reverse flows in the San Joaquin River below the Head of Old River in July.