Study of Flow Rates in South Delta Under Various OMR Conditions

DSM2 User Group Meeting

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Delta Modeling Section

California Department of Water Resources

Acknowledgements

- Nicky Sandhu
- Tara Smith
- Paul Hutton

Background and Objectives

- Requested by Deputy Director Jerry Johns
- To study flow rates in the channels in South Delta
- Help understand the causes of high entrainment when OMR (Old & Middle River) flow approaches -6000 cfs or higher (OMR Flow = Channel (106 + 144 - 145)
- Special attention to ‘reverse flow condition’, which means here the flow in a channel becomes uni-directional toward the export.

Model Assumptions

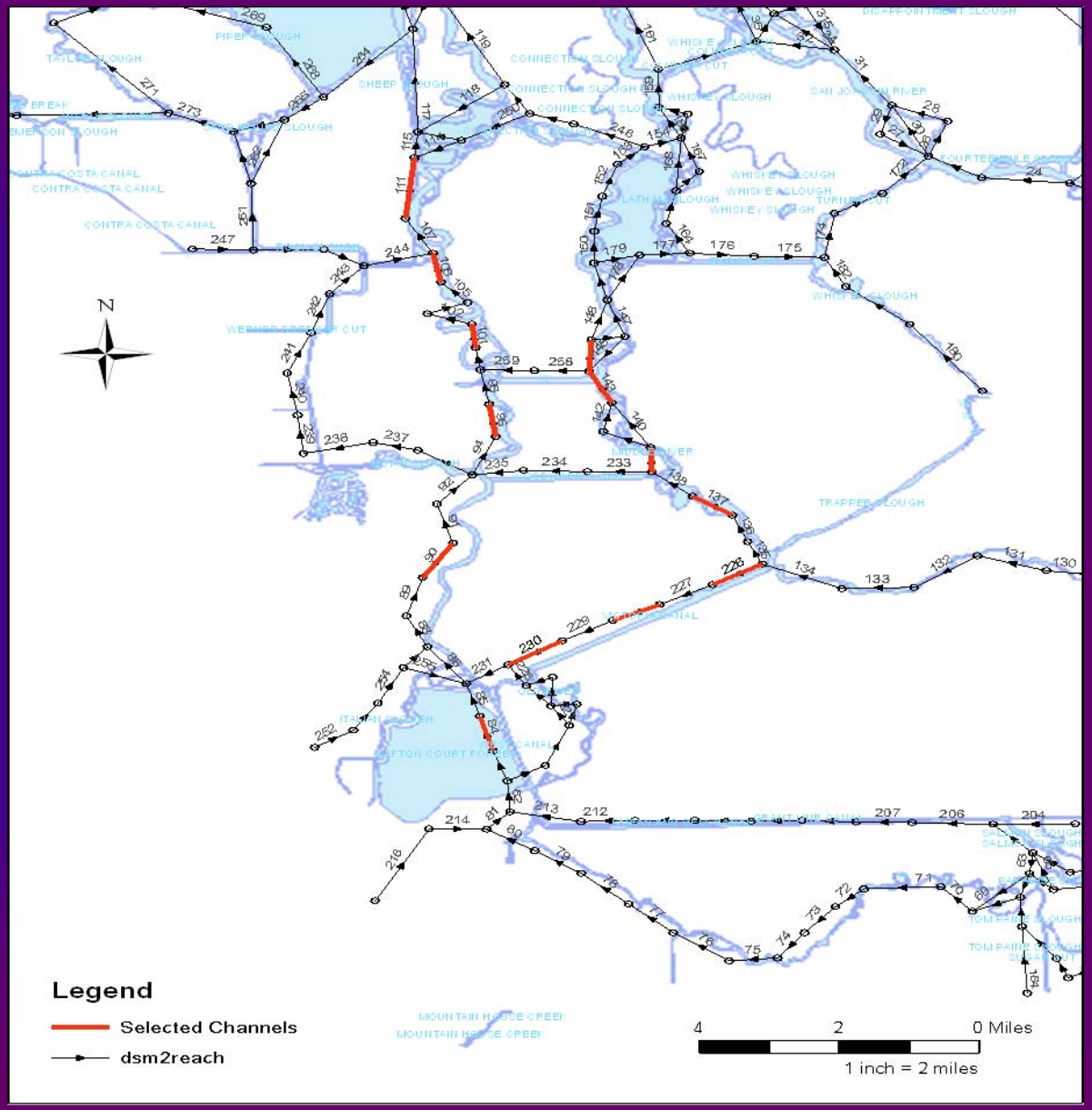
- The Delta hydrology and operations are contrived as follows to provide a constant OMR water balance*:
  - No South Delta gate operation
  - NO DICU
  - No pumping from NBA and CCWD
  - DCC gates remain closed
  - CCFB gates closed – no Banks pumping
  - Use Jones Pumping Plant diversion to create different OMR flows
  - Historical tidal condition from 1/1/1990 to 12/31/1990
  - DSM2 Version 8.

  * this was originally proposed by Paul Hutton for a study of tidal effects on OMR flow

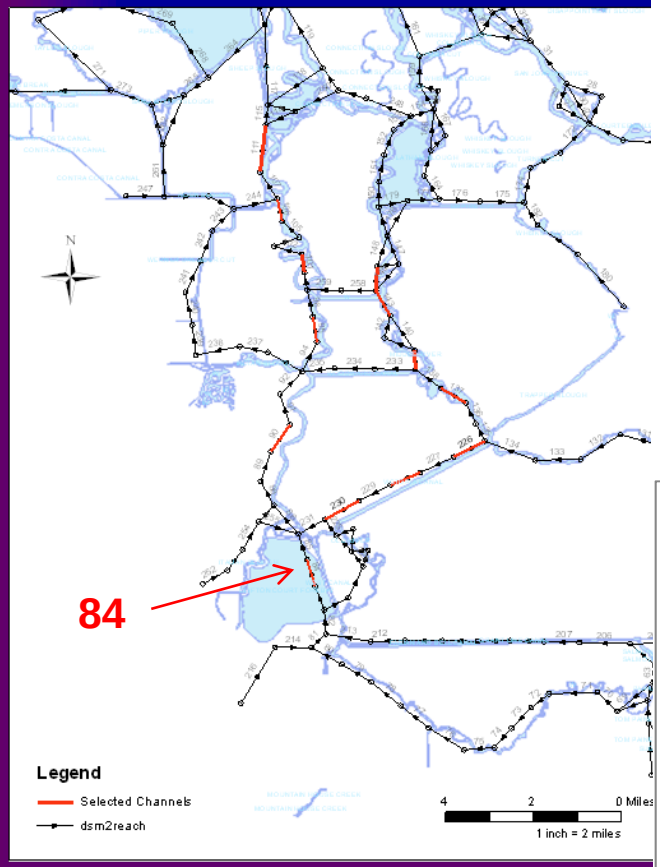
Simulation Scenarios

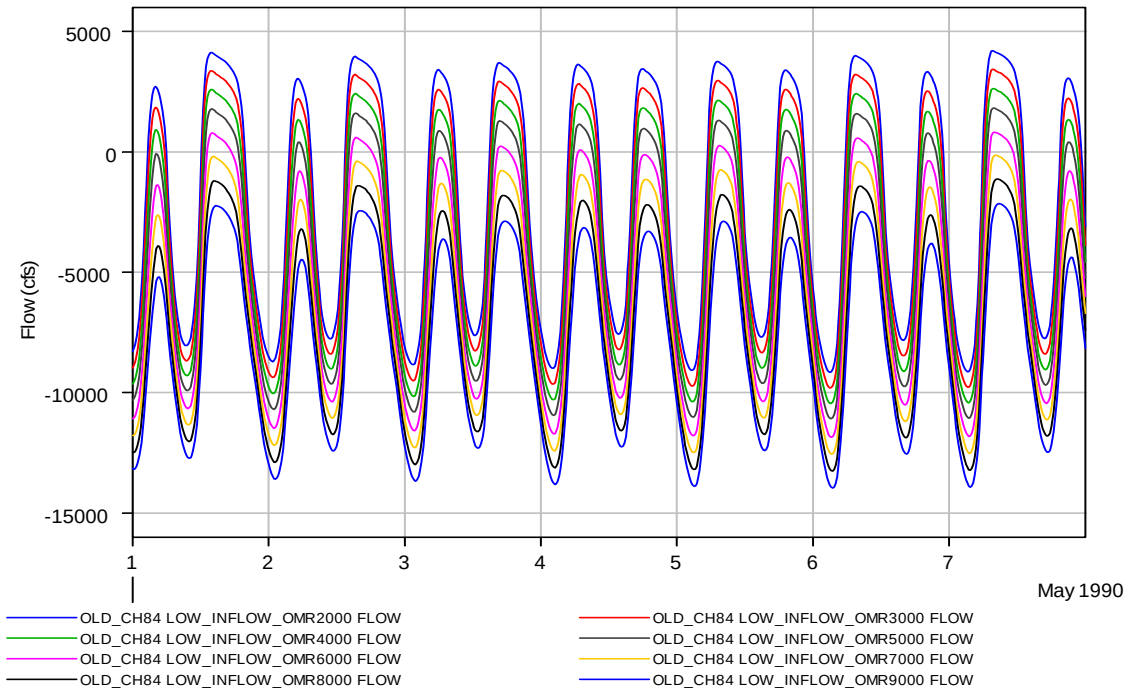
	Scenario	Jones (cfs)	Vernalis (cfs)	Sac River (cfs)	Yolo (cfs)	ESS (cfs)
Low Inflow	OMR -2000 cfs	3000	800	10000	10	100
	OMR -3000 cfs	4000	800	10000	10	100
	OMR -4000 cfs	5000	800	10000	10	100
	OMR -5000 cfs	6000	800	10000	10	100
	OMR -6000 cfs	7200	800	10000	10	100
	OMR -7000 cfs	8300	800	10000	10	100
	OMR -8000 cfs	9400	800	10000	10	100
	OMR -9000 cfs	10500	800	10000	10	100
High Inflow***	OMR -2000 cfs	3000	800	52000	11000	4000
	OMR -3000 cfs	4000	800	52000	11000	4000
	OMR -4000 cfs	5000	800	52000	11000	4000
	OMR -5000 cfs	6000	800	52000	11000	4000
	OMR -6000 cfs	7200	800	52000	11000	4000
	OMR -7000 cfs	8300	800	52000	11000	4000
	OMR -8000 cfs	9400	800	52000	11000	4000
	OMR -9000 cfs	10500	800	52000	11000	4000

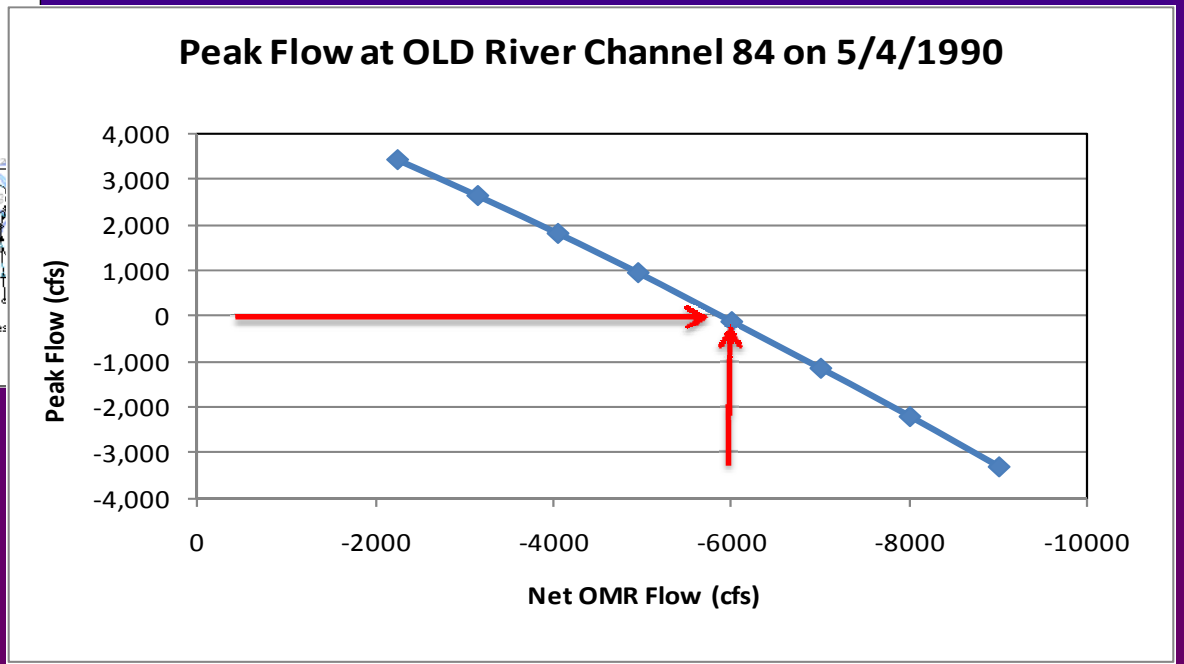
Output Locations



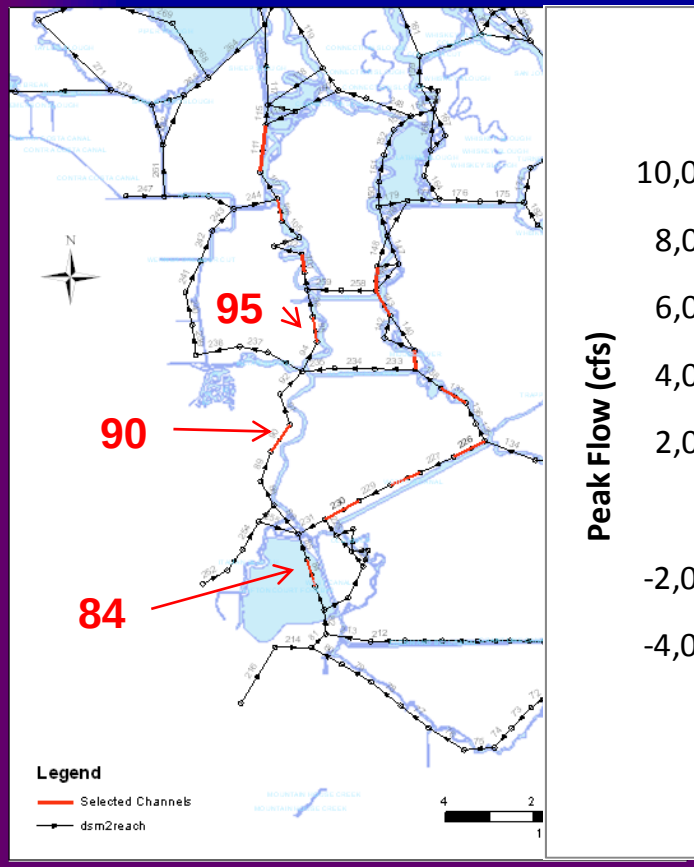
Flow Results

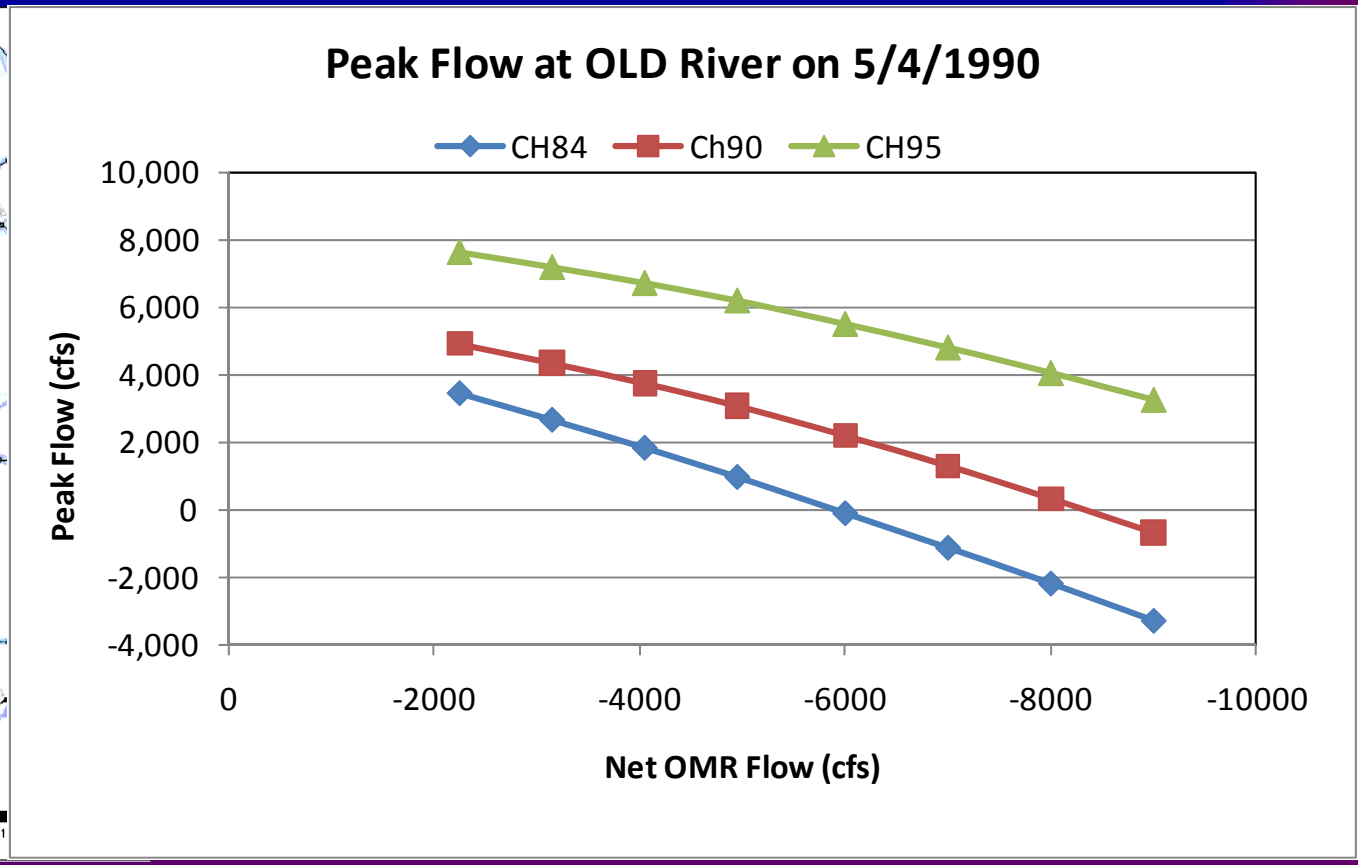




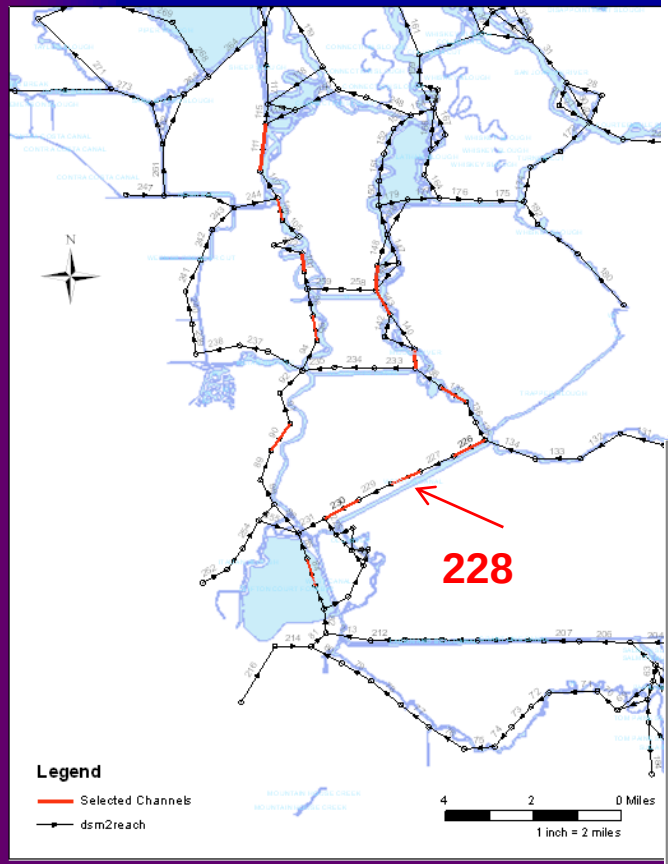


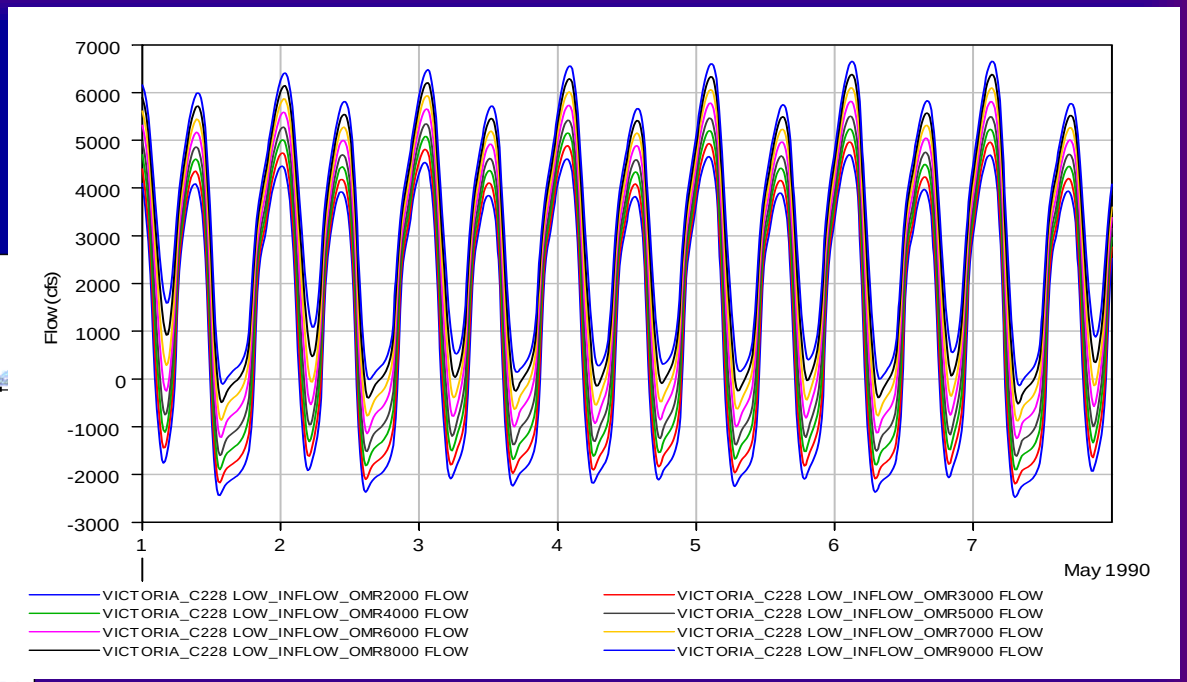
Old River Flow Results

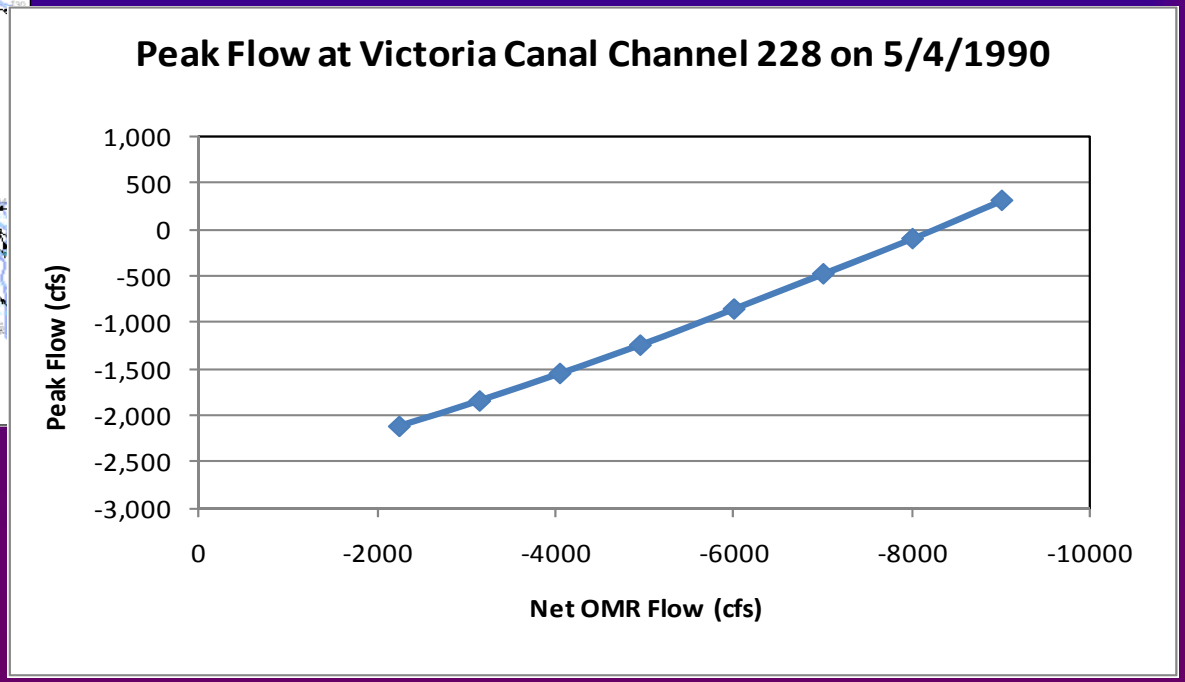




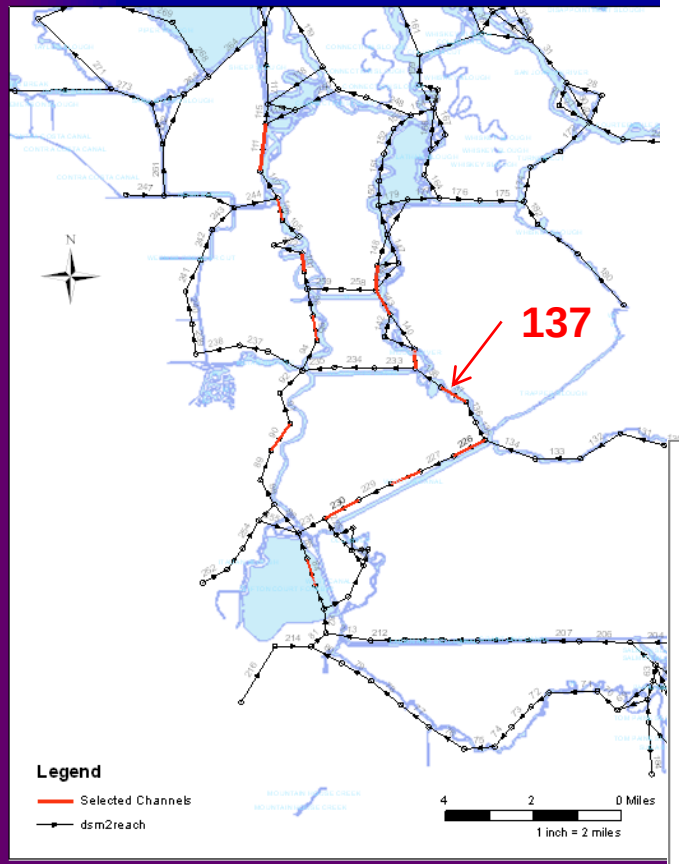
Victoria Canal

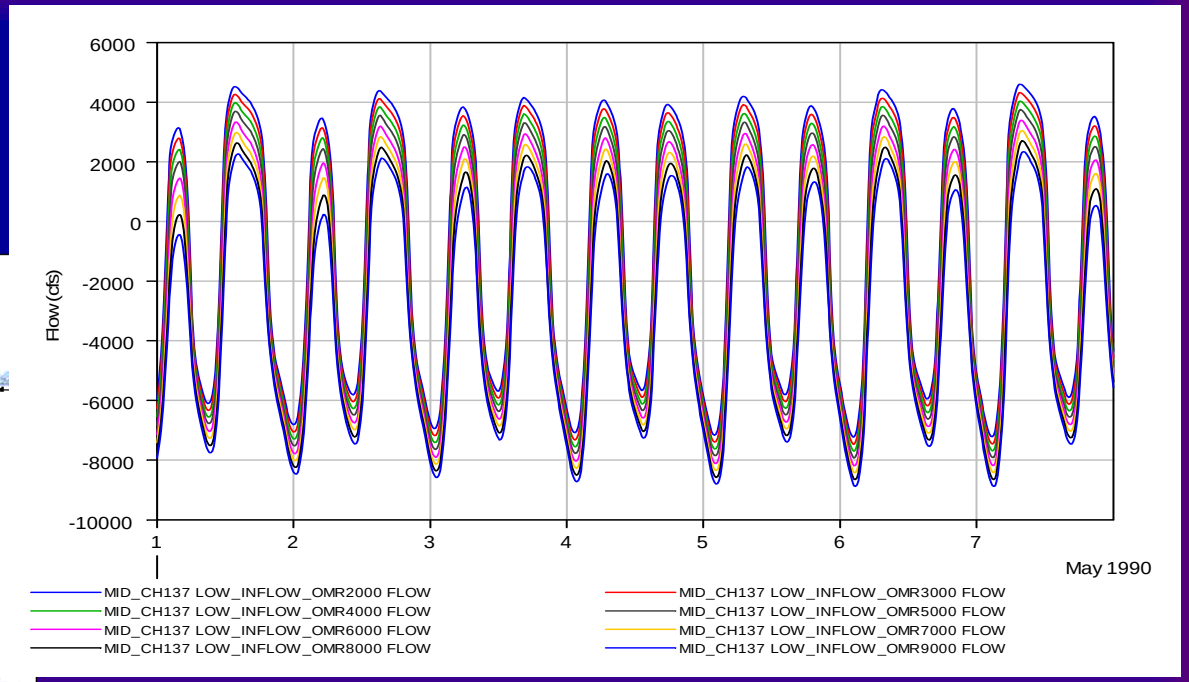


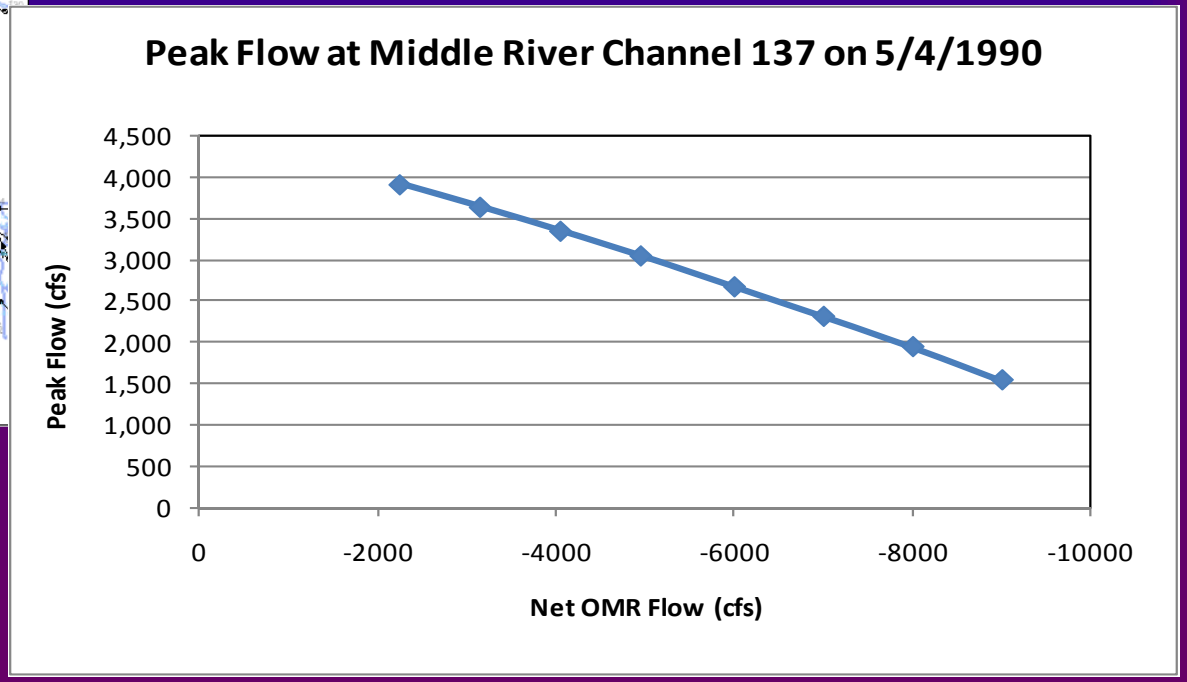




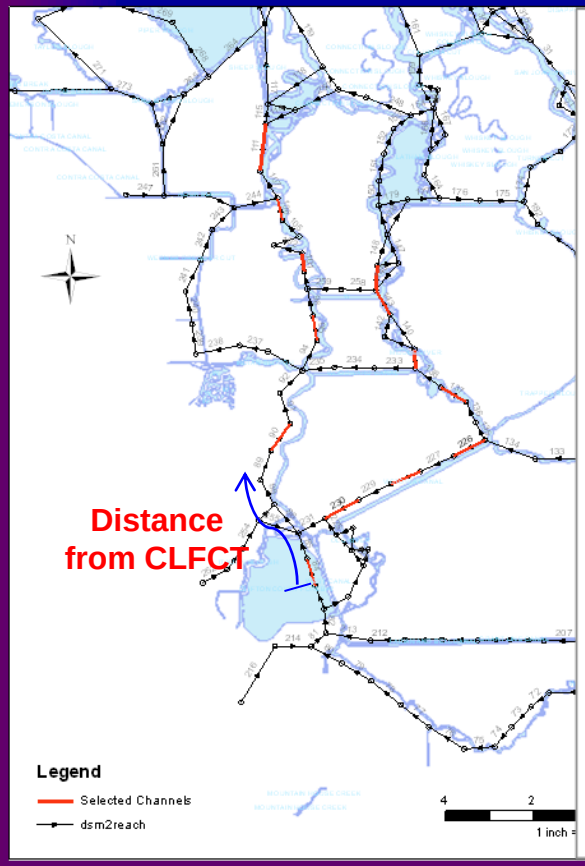
Middle River

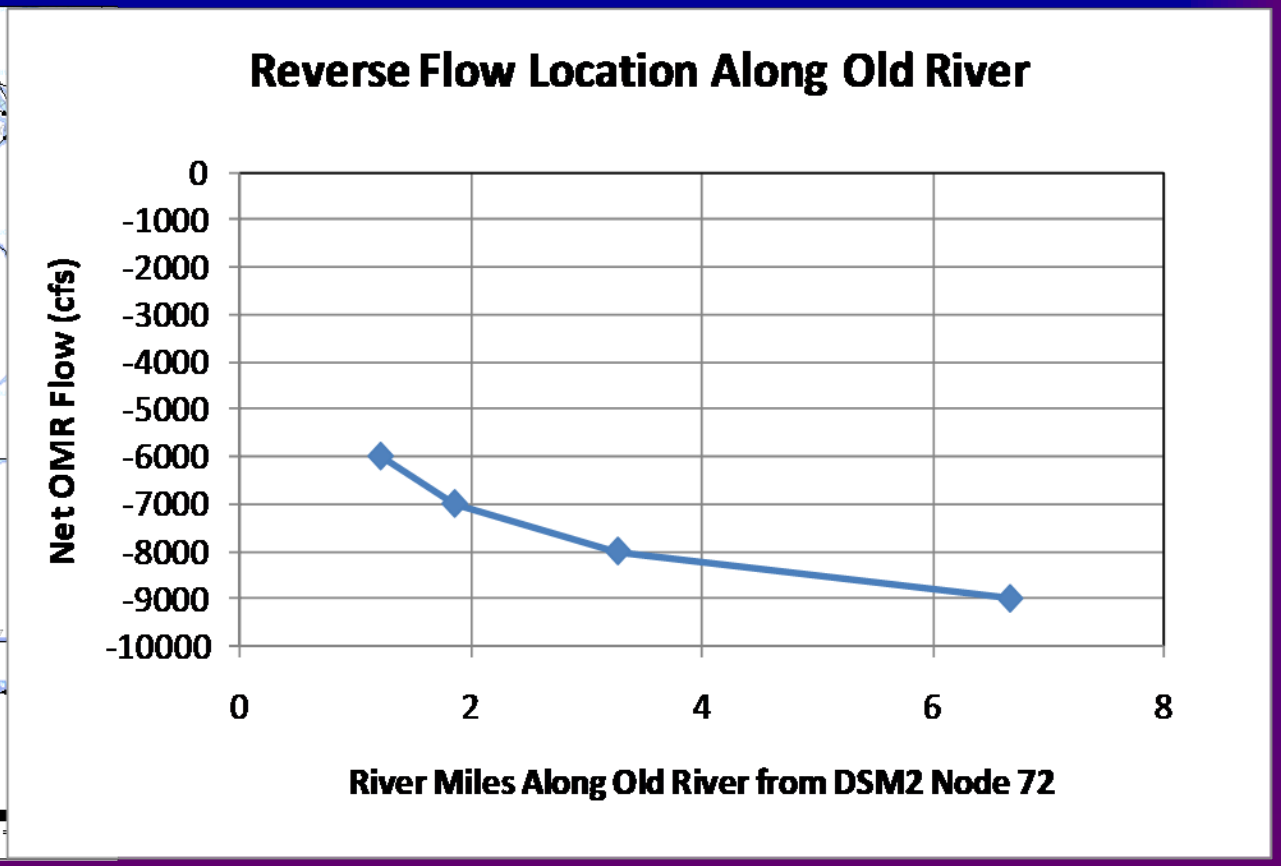






Reverse Flow Location along Old River





Preliminary Findings

- Results were illustrated using peak flows on 5/4/1990.
  - The peak flows are attenuated in a linear fashion with increased negative OMR flows.
  - Reverse flow conditions were limited to channel 84 near Clifton Court Forebay with OMR flow at -6000 cfs.
  - Reverse flow conditions extended to Old River channel 90 and Victoria Canal channel 228 for OMR flows of -8000 cfs.
  - Reverse flow conditions almost never occur in Middle River.
- Statistical analysis of the whole simulation period may give a better picture of the worst case scenario.

Questions?