Salton Sea Ecosystem Restoration Plan Inflows/Modeling Working Group

June 28, 2005

Ontario, CA

Agenda

- Recap of previous meeting
- Summary of Mexicali meeting
- Approach for addressing future uncertainty
- Historic and projected salt loading assumptions
- Hydrologic model update
- Assignments for next meeting
- Upcoming workgroup meeting schedule

Recap of Previous Meeting

- Finalized QSA Inflows
- Discussed approach to Mexico Inflows under No Action
- Agreed on approach to refining historic hydrology for local watershed inflows
- Discussed two approaches to variability
  - Stochastic – Probability
  - Deterministic – Scenario
- Continued discussion on model development

Summary of Mexicali Meeting

- June 20, 2005 – Mexicali
- Mexico Representatives
  - Comision Estatal de Servicios Publicos (CESPM)
  - Secretaria de Infrastructura de Desarollo Urbano (SIDUE)
  - Comision Estatal de Agua(CEA)
- US Representatives
  - DWR
  - SWRCB – RWQCB
  - CAL EPA

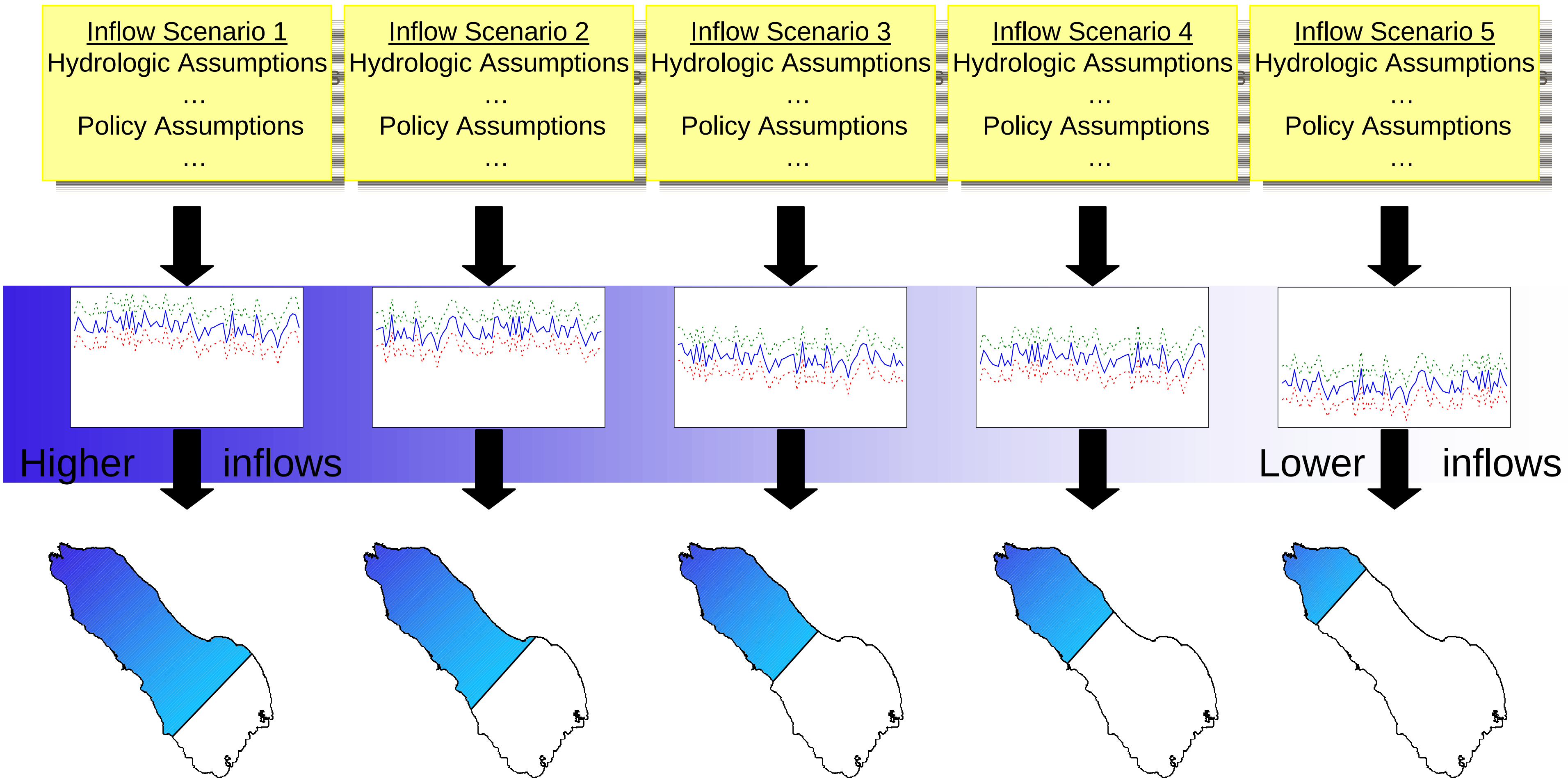
Topics Covered

- Brief presentation on Salton Sea project and need for inflow projections
- Available land use plans and population projections
- Future planning for water supply in Mexico
  - Long-term study underway to consider alternatives for using New River water supply
  - Current process for pipeline project – no water supply identified
- Wastewater management in Mexicali
- Plan for future communications

Review Approach for Addressing Future Uncertainty

- Why is it important?
- How will results be used?
- Review approaches previously discussed
- Differences between approaches
- A hybrid approach for scenarios

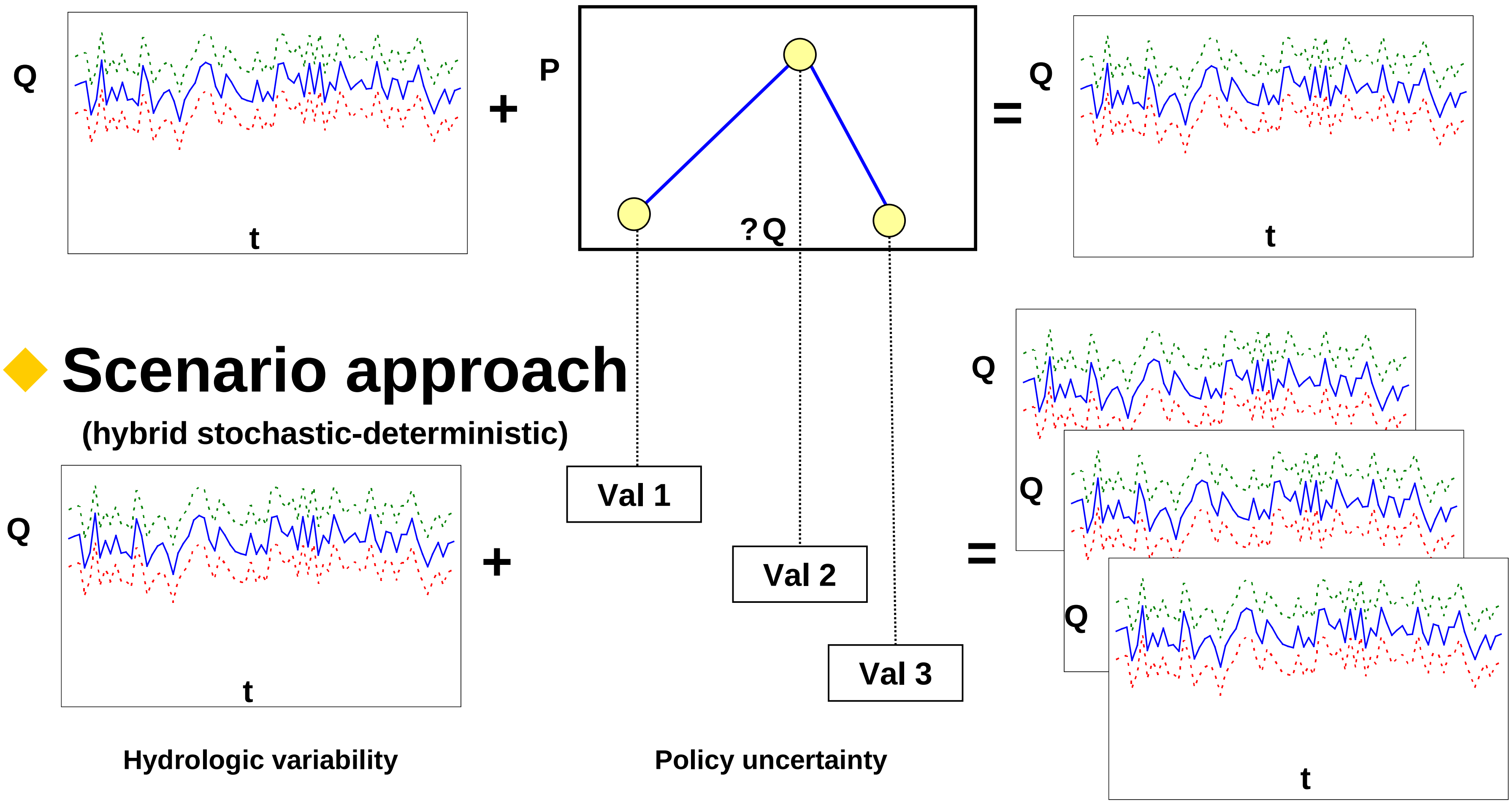
Use of Future Inflow Scenarios



**** Sample only. Shown is an *example* for the North Sea configuration. Similar process will be applied for all Salton Sea Restoration configurations.**

Comparison of Approaches

- **Distribution approach** (fully stochastic)



- **Scenario approach**

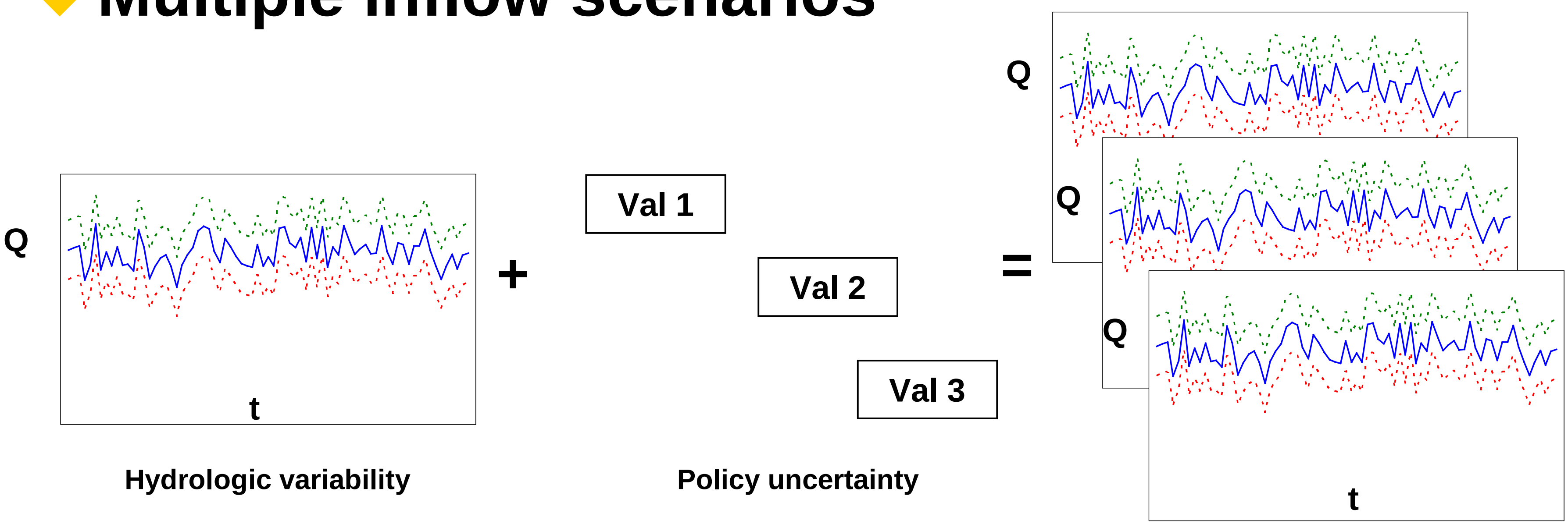
(hybrid stochastic-deterministic)

Comparison Approaches (Cont'd)

- Distribution Approach
  - Characterizes uncertainty prior to assessing alternative decisions
  - Requires estimates of probability distributions
  - One Monte-Carlo analysis would describe full range
  - May not adequately provide information to readers of document for full disclosure
  - May not be able to defend selection of distributions under CEQA
  - Aggregates uncertainty by imbedding within analysis
- Scenario Approach
  - "Scenarios" are objective and simply define "plausible", discrete futures
  - Multiple scenarios used to define range of assumed futures
  - Identifies uncertainties outside of model to allow discussion

Hybrid Approach Means...

- Uncertainty organized by inflow sources
- Stochastic approach to hydrology variability
- Deterministic approach to policy uncertainty
- Multiple inflow scenarios



Preliminary Table of Inflow Scenarios

- See table

Historic Salt Loads to the Salton Sea

- Salt load accompanies every inflow source
- Historically, salt dissolved from newly inundated lands
- Re-calibration of historic hydrology requires inter-related calibration of Sea salinity
- Historic period is considered 1950-1999 consistent with SSAM
- Data sources?

Historic Salinity of Salton Sea Inflow Sources

- **All-American Canal**
  - **Mean TDS (1970-99) = 771 mg/l (Source: IID, 2002)**
  - **Range of approximately 450-850 mg/l during 1973-98 (Source: IID, 2002)**
  - **Historical (1987–1998) average = 747 mg/L (Source: IID, 2002)**
- **New River**
  - **International Boundary**
    - Mean TDS (1970-99) = 3,894 mg/l (Source: IID, 2002)
  - **IID Surface Drains**
    - Mean TDS (1970-99) = 2,116 mg/l (Source: IID, 2002)
  - **Outlet to Sea**
    - Mean TDS (1970-99) = 2,997 mg/l (Source: IID, 2002)
  - **SSAM utilizes source data from IID; varies by year**
  - **Data sources: IID, 2002 and others?**
    - USGS No. 10255550 contains periodic measurements 1963-1992

Historic Salinity of Salton Sea Inflow Sources

- **Alamo River**
  - **International Boundary**
    - Mean TDS (1970-99) = 3,191 mg/l (Source: IID, 2002)
  - **IID Surface Drains**
    - Mean TDS (1970-99) = 2,375 mg/l (Source: IID, 2002)
  - **SSAM utilizes source data from IID; varies by year**
  - **Data sources: IID, 2002 and others?**
    - USGS No. 10254670 contains periodic measurements 1969-1994
- **IID Direct Drains to Sea**
  - **Similar in salinity as IID drains to New and Alamo Rivers?**

Historic Salinity of Salton Sea Inflow Sources

- **Coachella Canal**
  - **Mean TDS (1987-99) = 748 mg/l (Source: CVWD, 2002)**
  - **Range of approximately 585 – 1,077 mg/l (Source: CVWD, 2002)**
- **Whitewater River/CVSC**
  - **Mean TDS (1987-99) = 1,474 mg/l (Source: CVWD, 2002)**
  - **Range of approximately 1,068 – 1,830 mg/l (Source: CVWD, 2002)**
- **CVWD Direct Drains to Sea**
  - **Mean TDS (1987-99) = 1,970 mg/l (Source: CVWD, 2002)**
  - **Range of approximately 530 – 8,312 mg/l (Source: CVWD, 2002)**
- **Coachella Valley groundwater discharge to Sea?**

Historic Salinity of Salton Sea Inflow Sources

- **Other inflow sources**
  - **San Felipe Creek**
  - **Salt Creek**
  - **Ungaged local watershed runoff**
  - **Local groundwater inflows**
    - Loeltz (1975) found TDS range of 1,400 mg/l (deep wells) to 8,420 mg/l (shallow wells; ET influence)
    - Lower TDS found near San Felipe Cr (deep wells)
    - 2,000 – 5,000 mg/l TDS may be reasonable range

Projected Salt Loading Assumptions

- Mexico contributions
  - SSAM assumes same as historic (~557,000 tons/yr)
- Imperial contributions
  - IIDSS simulations projected delivered water from All-American Canal at 879 mg/l TDS
  - Future salt loads projected through simulation of IIDSS (~3,374,000 tons/yr)
  - Adjustments made in SSAM for Entitlement Enforcement (now IOP)
- Coachella contributions
  - CVWD management plan simulations projected delivered water from Coachella Canal at 879 mg/l TDS
  - Future salinities of drains and CVSC projected between 2,400 – 2,900 mg/l TDS with management plan implementation
  - Groundwater discharge to Sea at approximately 2,100 mg/l TDS
  - Declining groundwater levels will cause Sea to recharge groundwater and result in outlet for salt from the Sea
  - Unknown salt load with revised CVWD inflow values

Projected Salt Loading Assumptions

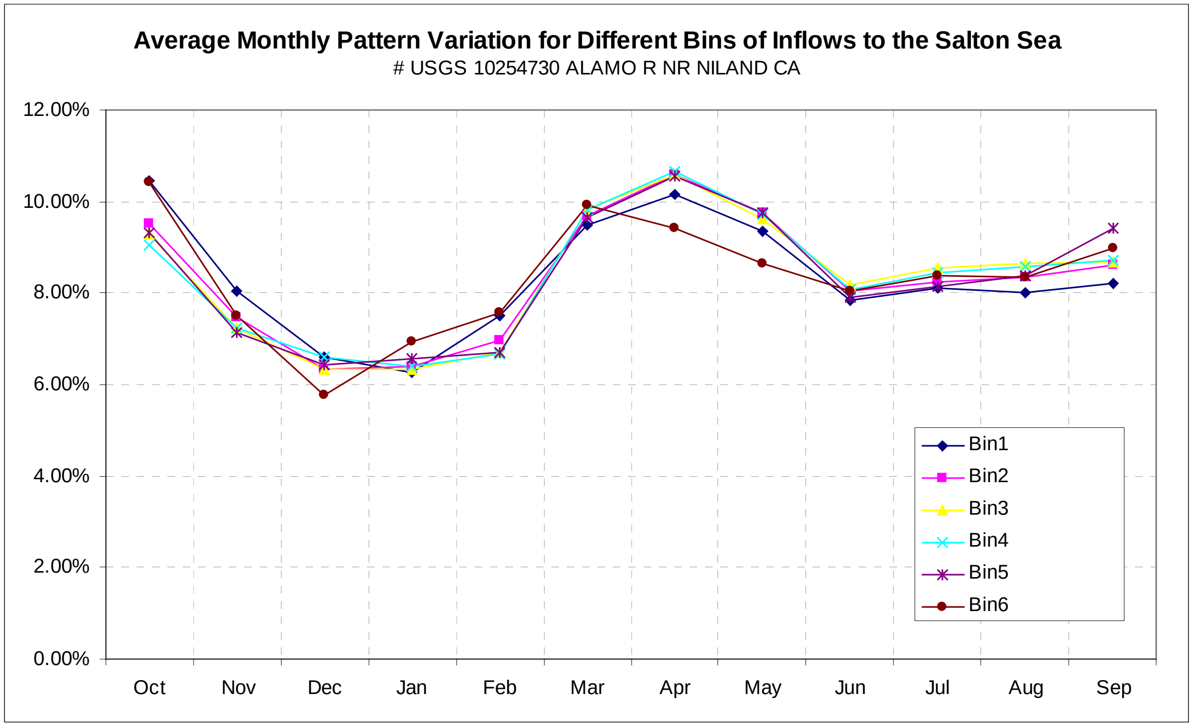
- Local inflow salt loads
  - Assume same as historic
- Historic salt precipitation within Sea has been estimated between 700,000 and 1,200,000 tons/yr
  - Higher value is equivalent to approximately 25% of salt load

Hydrologic Model Update

- Prototype model being tested
- Method for downscaling of annual flows to monthly flows in progress
- Documentation of algorithms to be initiated
- Calibration to begin once historic inflow and salt load assumptions finalized

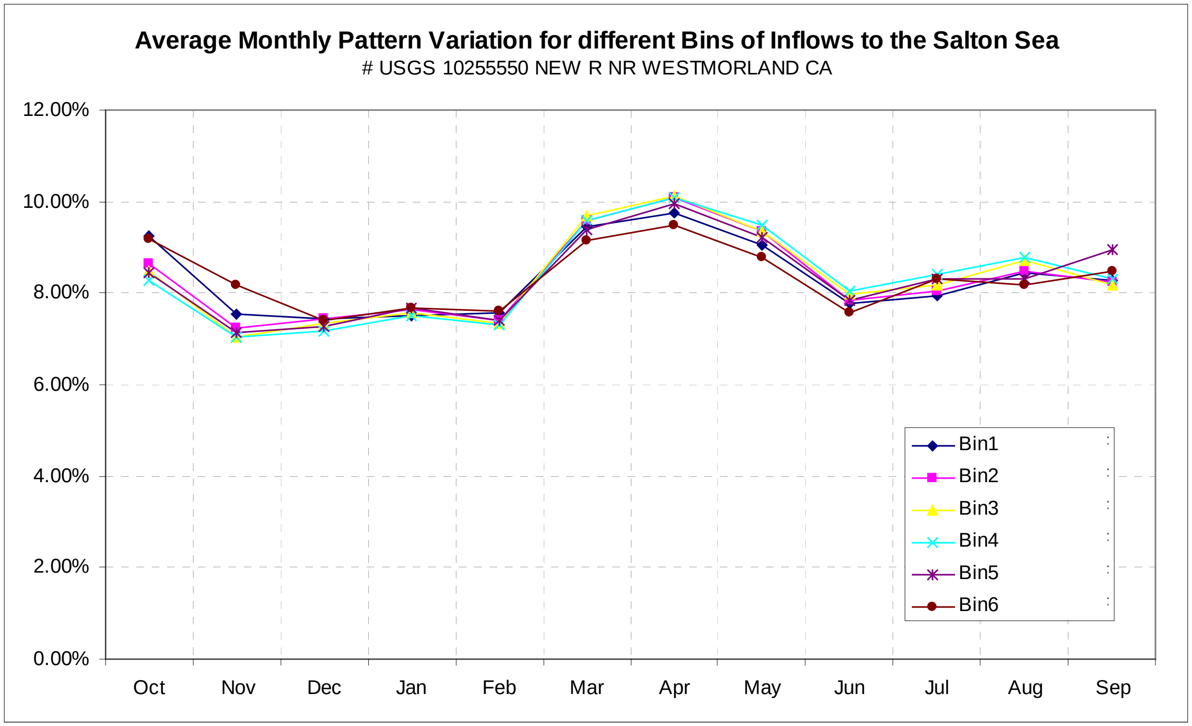
Alamo and New River Monthly Flow Patterns

- Alamo River monthly patterns found to be relatively insensitive to total annual flows



Alamo and New River Monthly Flow Patterns (cont'd)

- New River exhibits even less monthly variability



Next Steps