

**Periodic Review of the 1995 Water  
Quality Control Plan for the San  
Francisco Bay/Sacramento-San  
Joaquin Delta Estuary**

**Comments of**

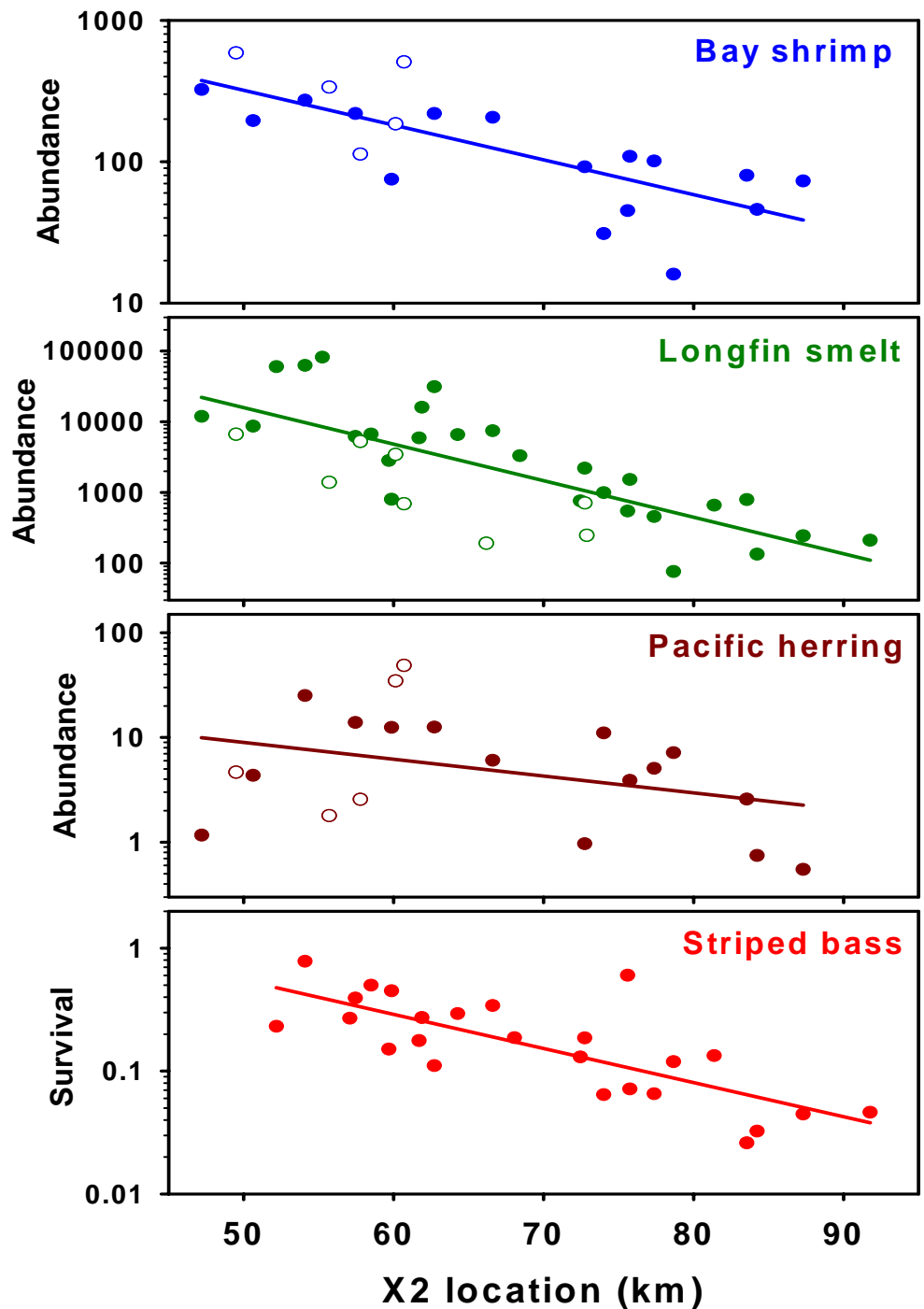
**The Bay Institute**

**on the**

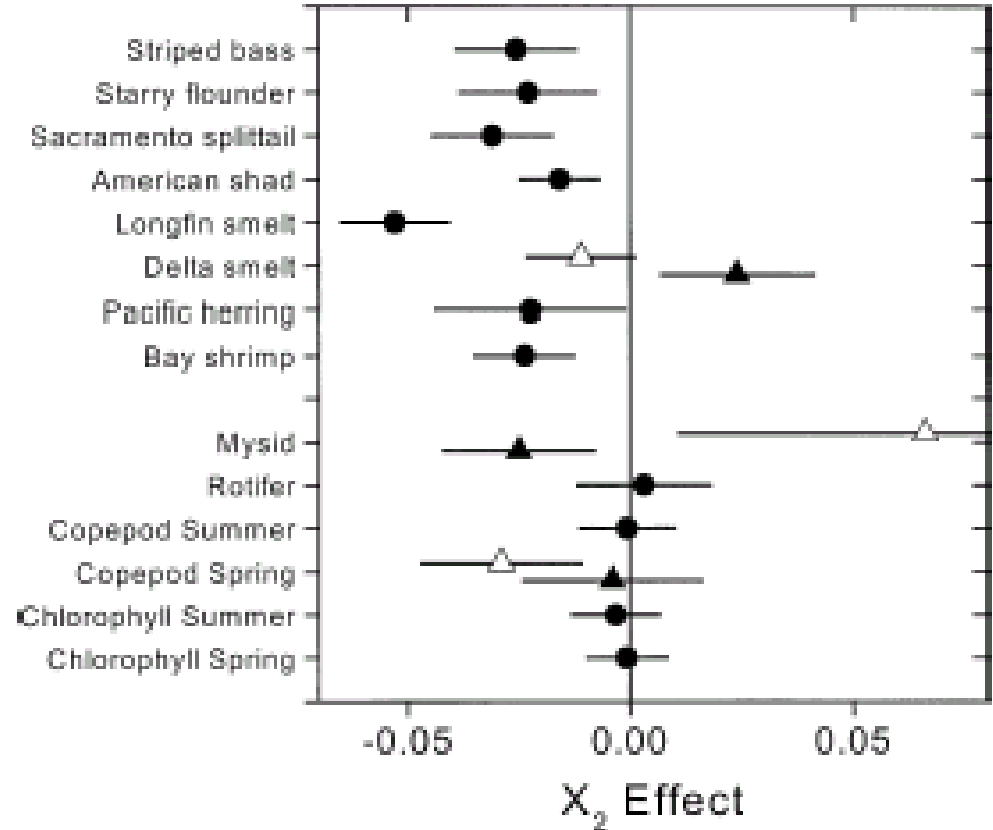
**Delta Outflow Objective**

**January 12, 2005**

**Abundance and survival of many fish and invertebrate species is correlated with springtime Delta outflow and X2.**



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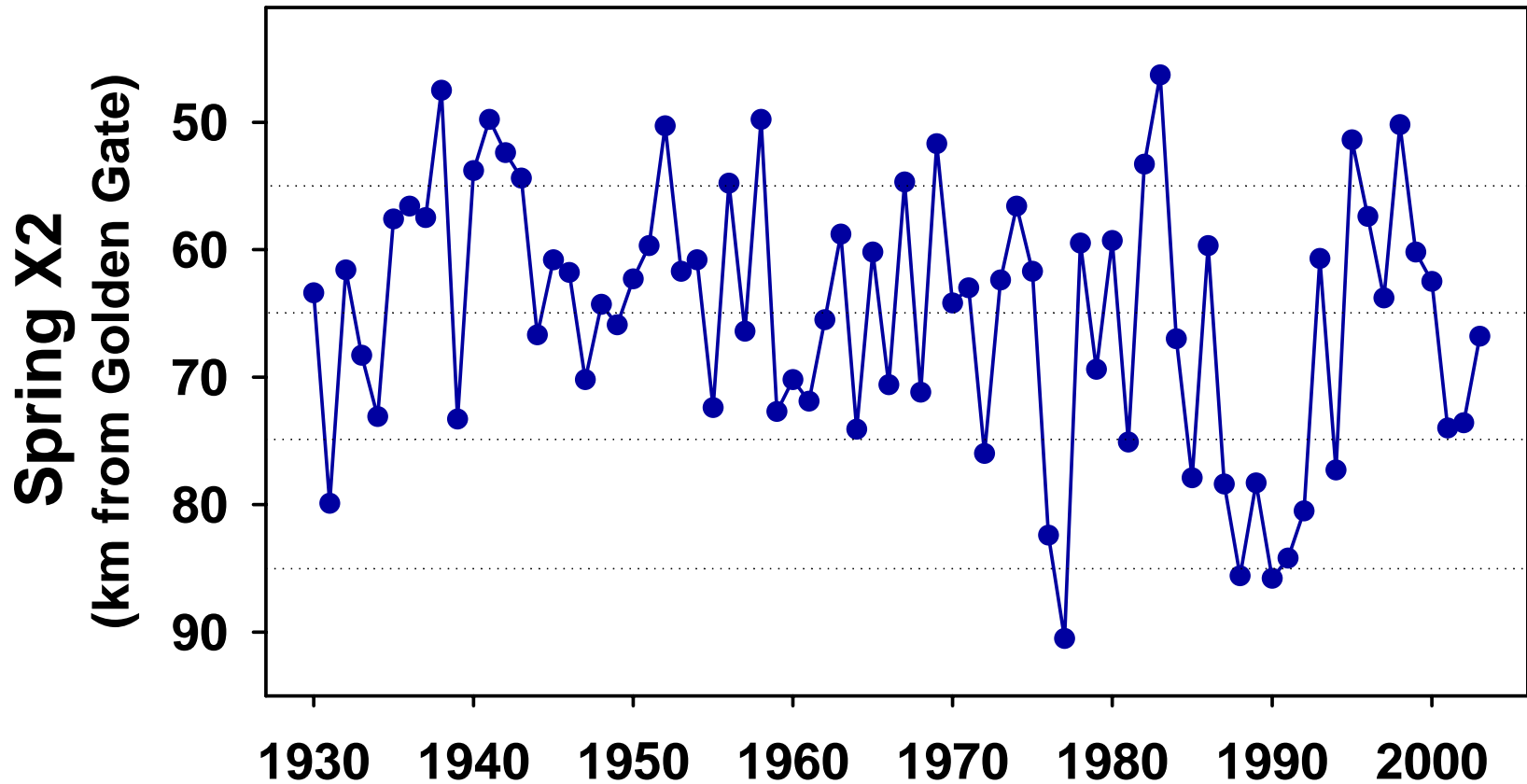


From Kimmerer, W. 2002b. Physical, biological, and management responses to variable freshwater flow into the San Francisco Bay estuary. *Estuaries* 25:1275-1290.

# Conclusions and Recommendations

- **The X2-abundance relationship underlying the February-June Delta outflow objective continues to be strong and statistically significant.**
- **The February-June Delta outflow objective provides broad ecosystem level protections.**
- **Any further reductions in outflow would adversely impact habitat and aquatic organisms.**

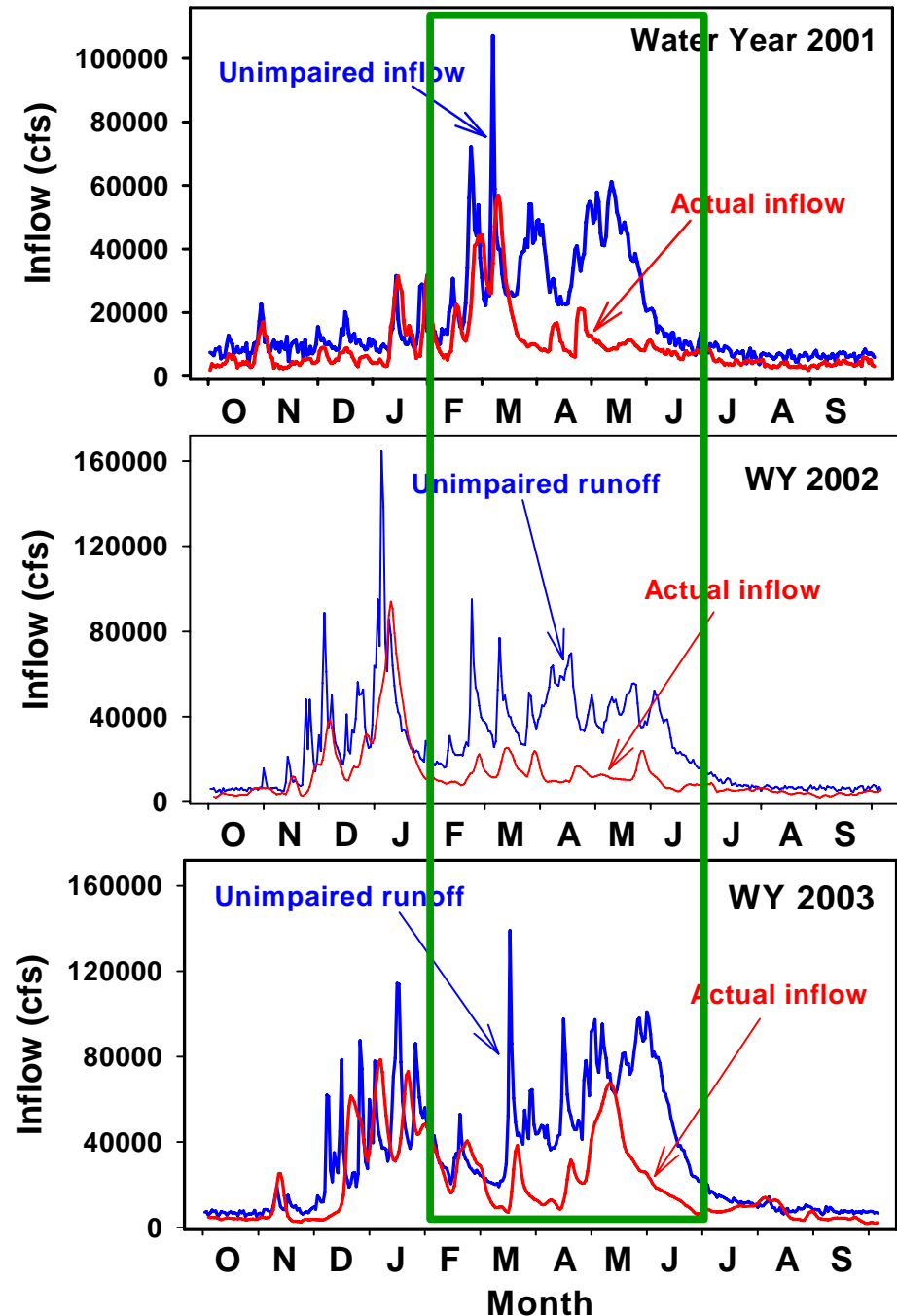
# Springtime X2 varies from year to year and from month to month.



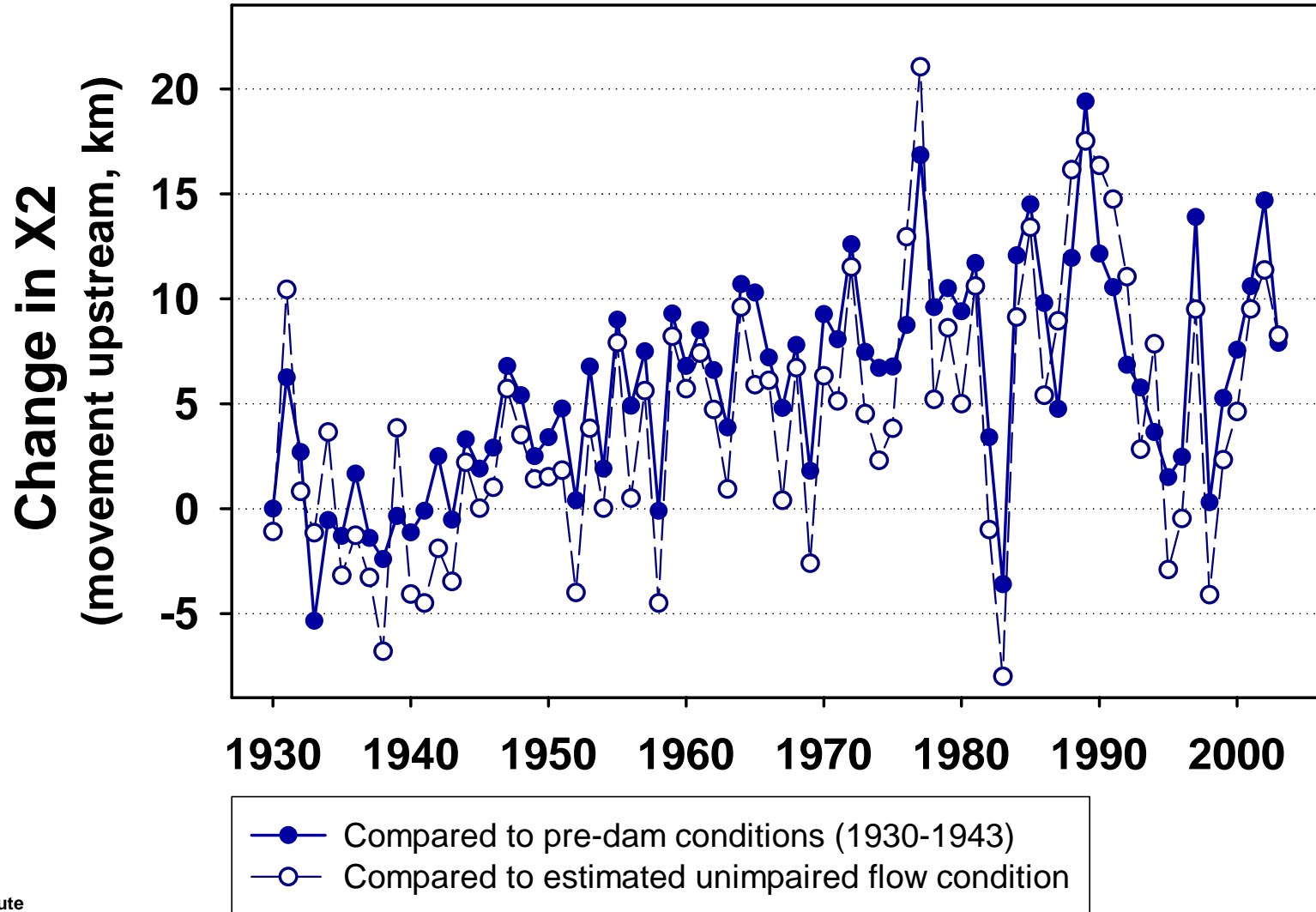
Upstream and in-Delta water project operations have the greatest effects on:

- amounts
- timing
- variability

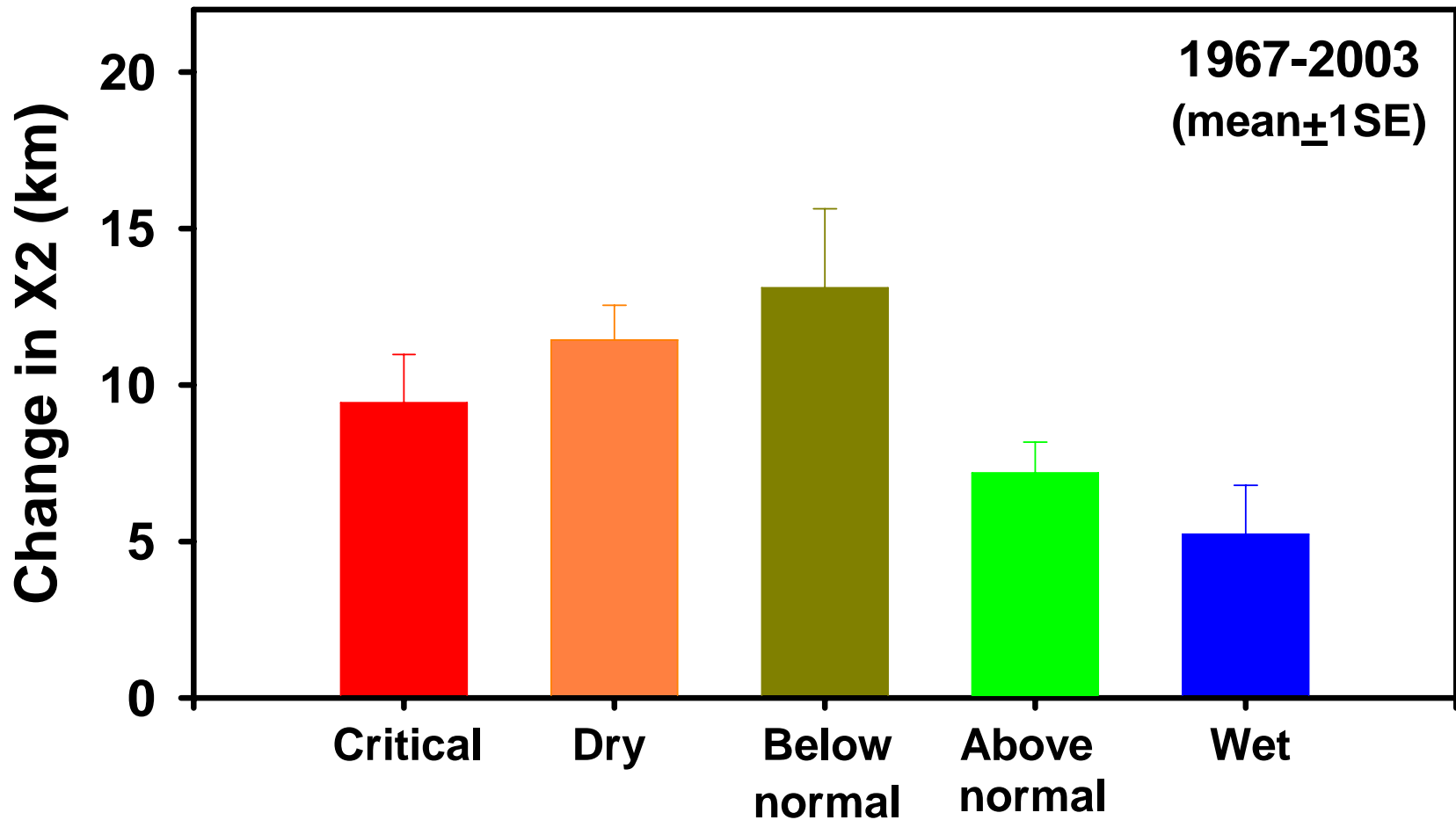
of freshwater inflows to the San Francisco estuary during the late-winter and spring.



# Compared to pre-dam and unimpaired conditions, springtime X2 has been shifted upstream.

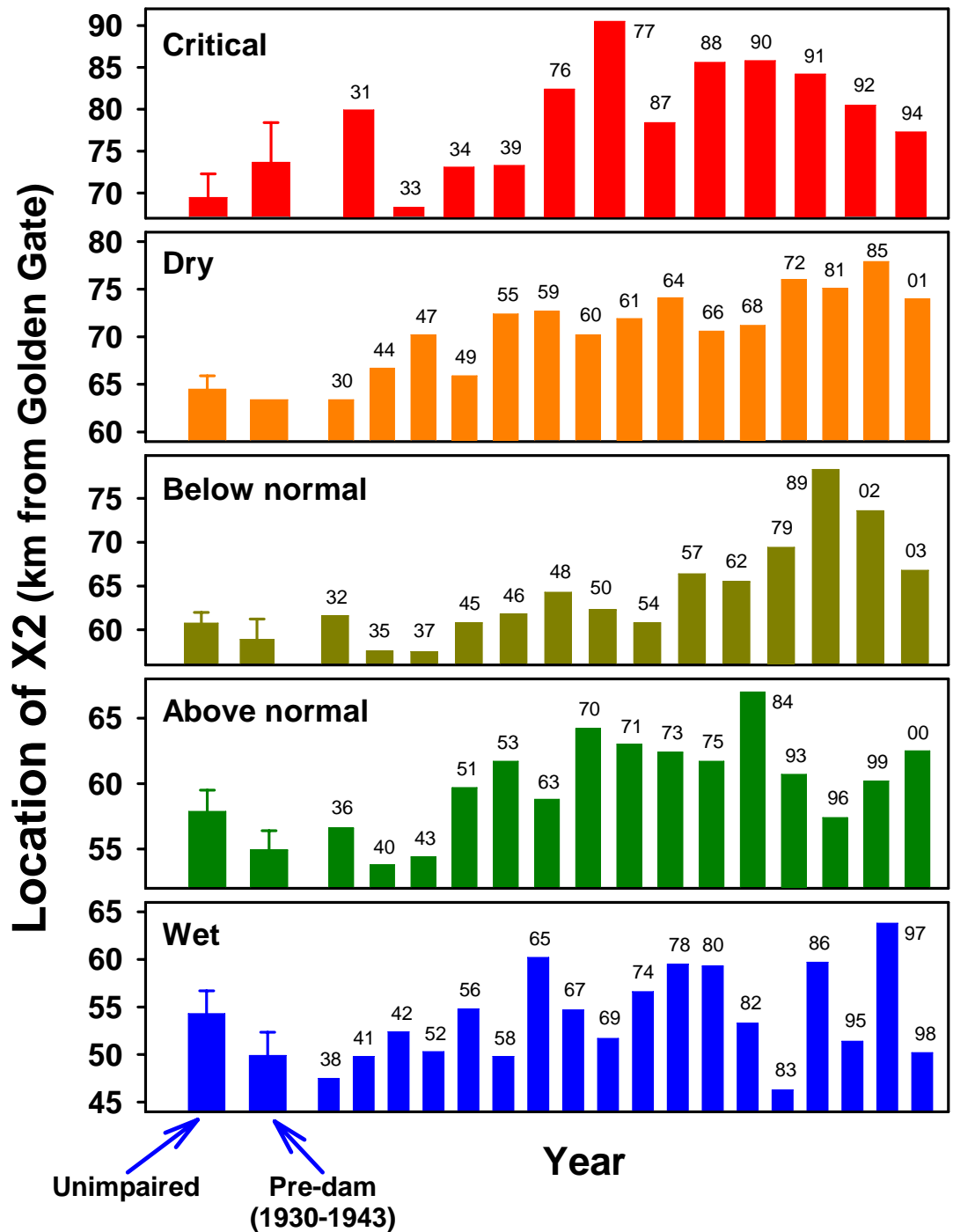


# The upstream shift of X2 has occurred in all water year types.



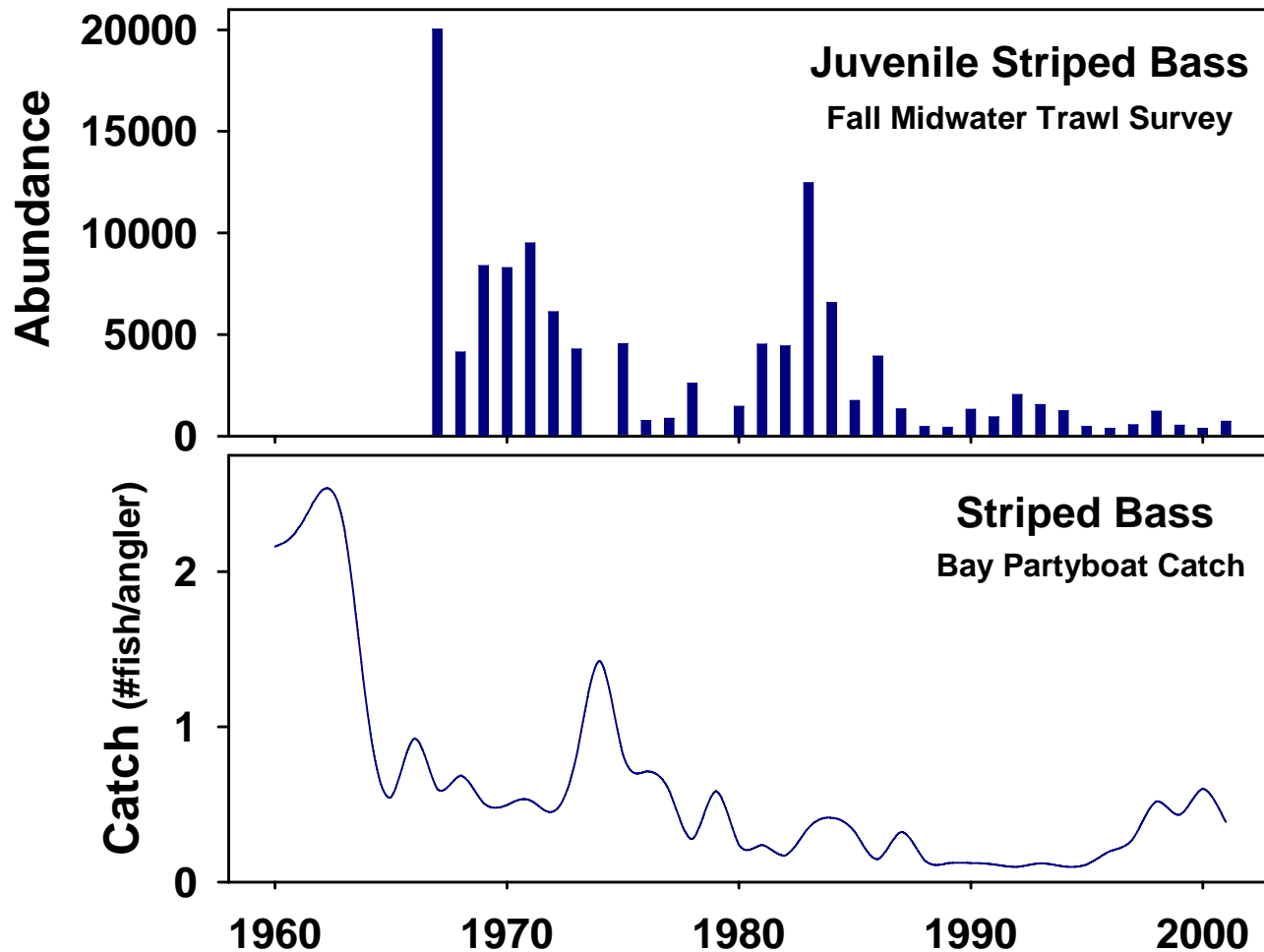


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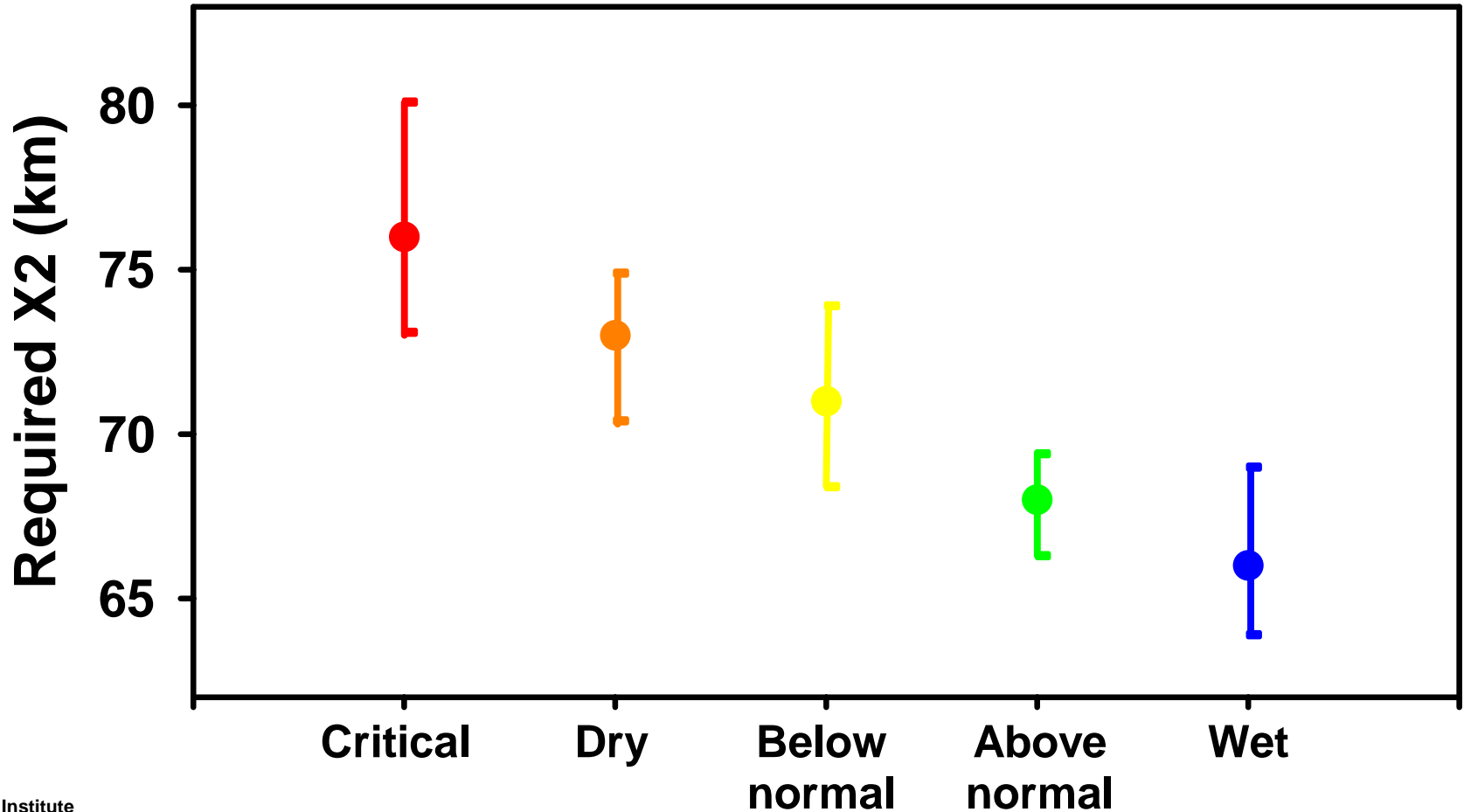


**Delta outflow objective was based on 1971.5 LOD.**

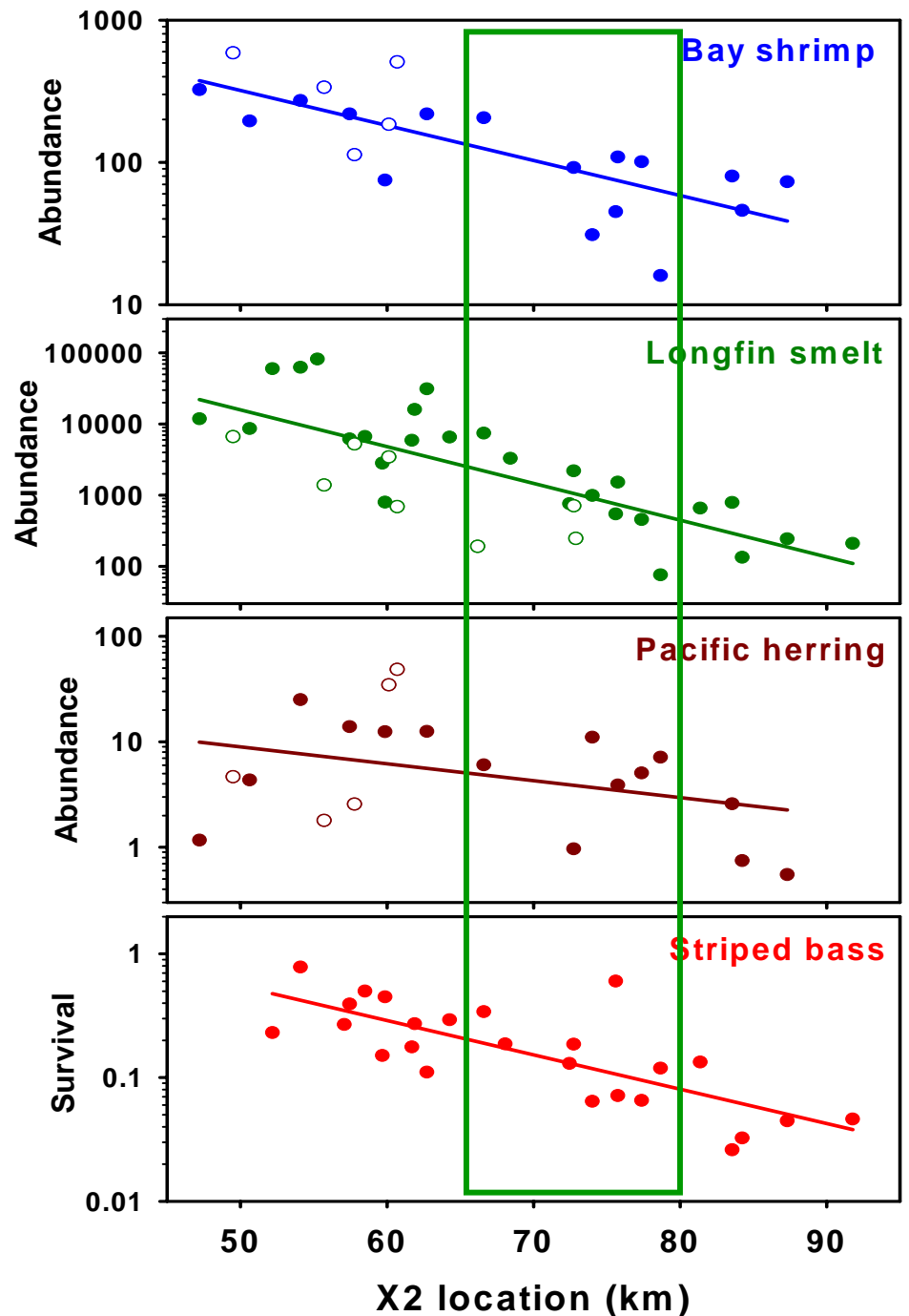
**By the late 1960s and early 1970s, populations of several fish species were already declining.**



# Minimum flows to meet the Delta Outflow Objective average just 35% of unimpaired flows and result in springtime X2 values of 65-80 km.

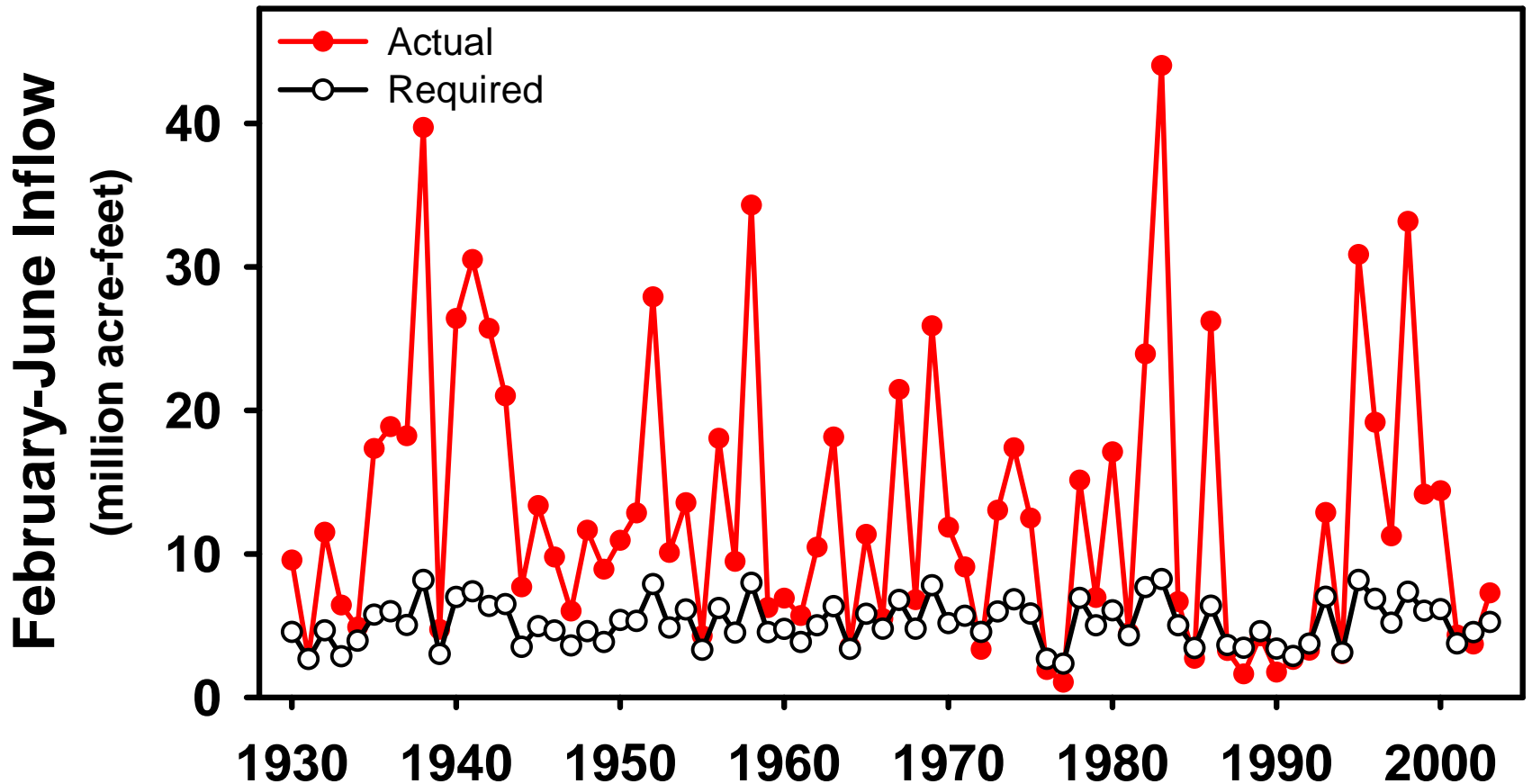


**These X2 conditions correspond to “fair” to “poor” estuarine habitat conditions.**



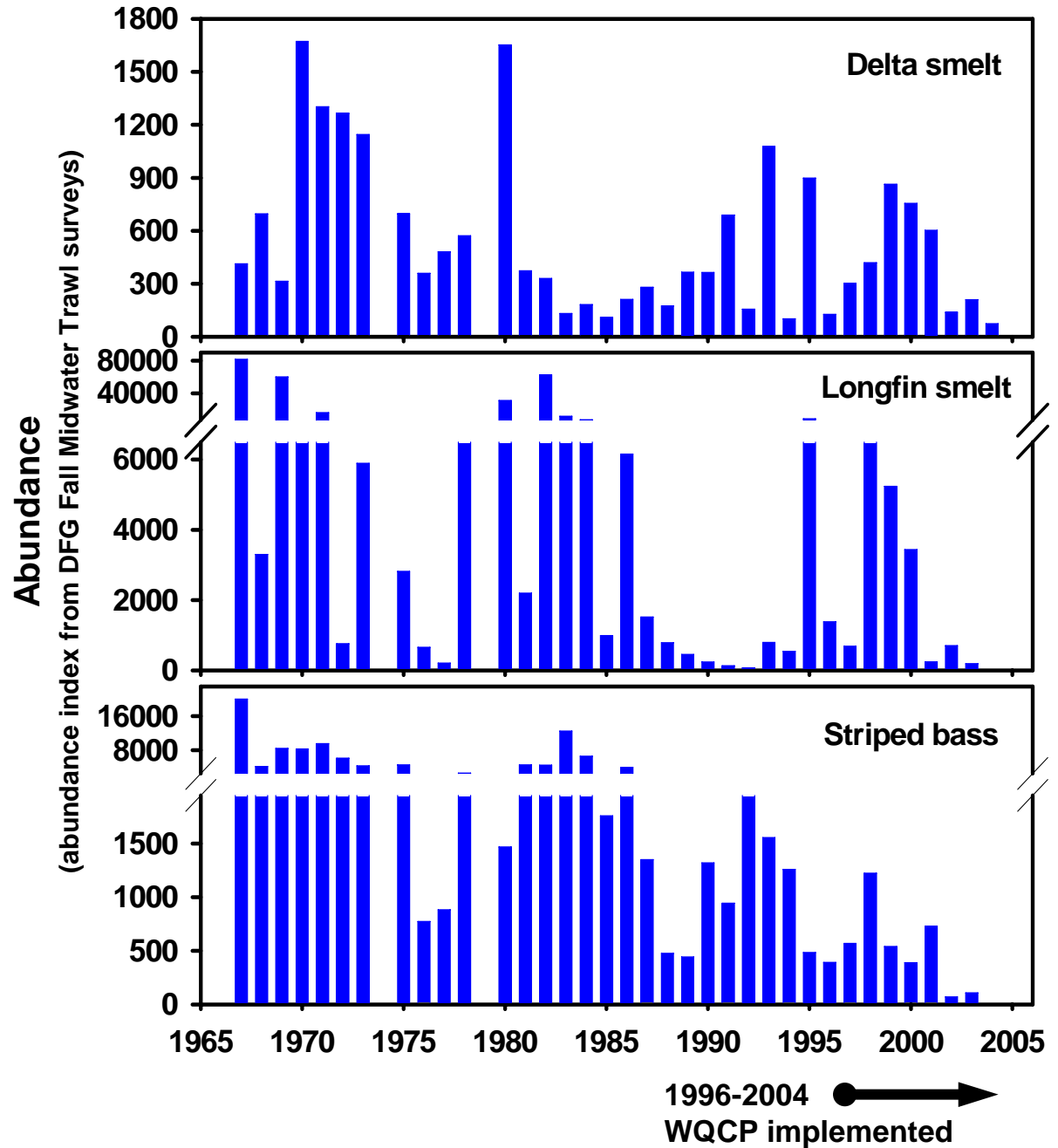
**In most years outflows exceed the minimum  
Delta outflow objective.**

**Flows in excess of the objective have beneficial  
effects on estuarine habitat and species.**



**From 2001 to 2003, Delta outflows just met the objective requirements.**

**Estuarine species populations declined to record low levels.**

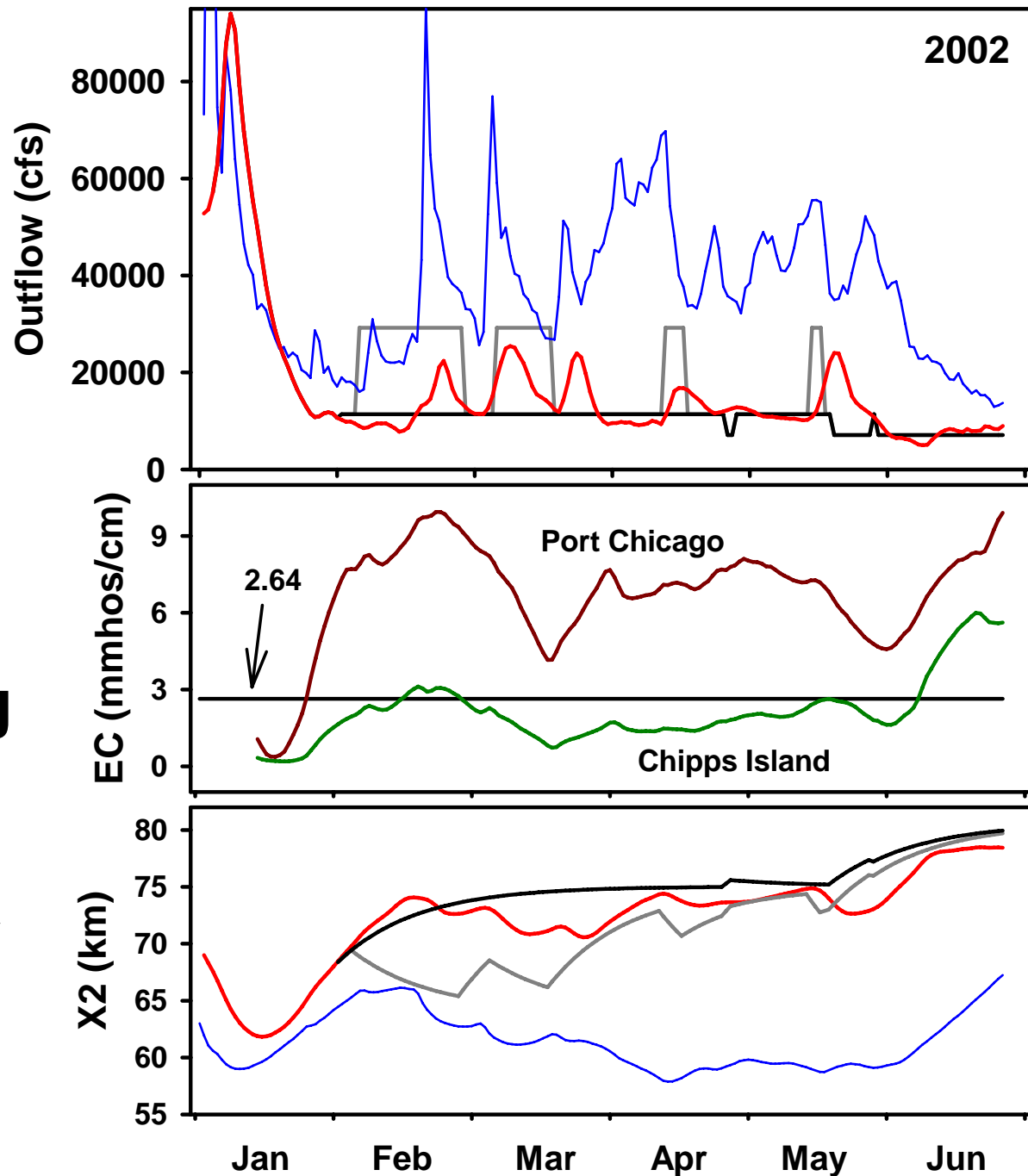


# Conclusions and Recommendations

- **Delta Outflow Objective should be revised to maintain February-June flow and X2 conditions at a 1956-1968 LOD**
  - **Estuarine habitat conditions and species abundance were already impaired by early 1970s.**
  - **Recent population declines in estuarine species occurred during years with minimally required outflows.**
  - **Currently unprotected but ecologically important excess flows are at risk from proposed increases in Delta exports and upstream diversions.**
- **Recognize benefits to estuarine habitat and species of excess outflows avoid reductions.**

**In 2002, use of the Port Chicago EC trigger eliminated high flows in all four months specified by the PMI.**

**Alternative compliance using EC resulted in flows below the minimum outflow target.**



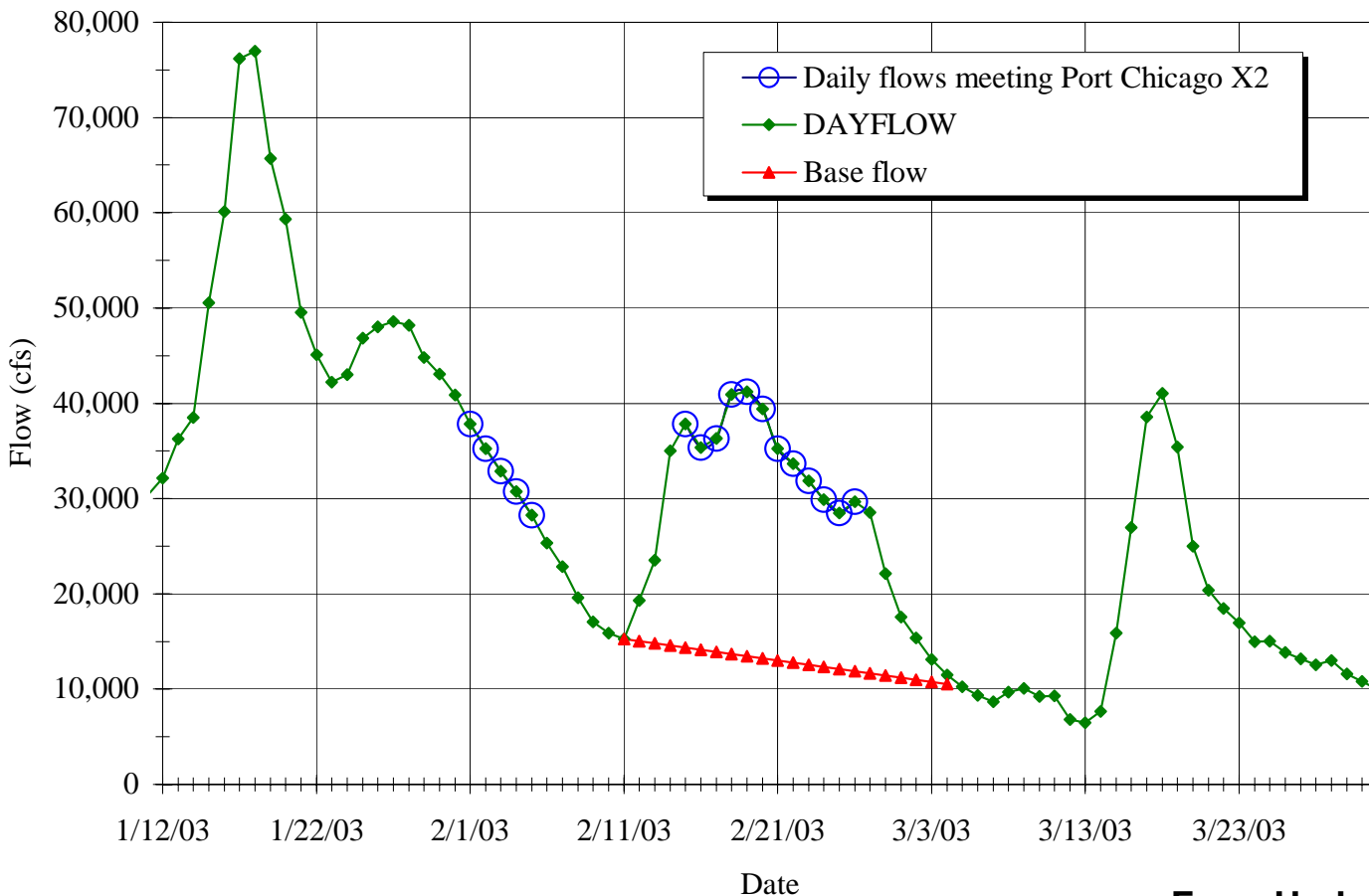


# Conclusions and Recommendations

- **Review and revise the “three ways to win” compliance methodology to ensure desired X2 location and variability are achieved.**
  - **Use of daily and/or 14-day average EC in lieu of flow**
  - **Port Chicago “trigger” for the high flow objective**
- **Consider eliminating the Port Chicago EC trigger for February and March.**

# Alternative water management strategies for complying with Delta outflow objectives can avoid extreme flow fluctuations and upstream impacts.

## Delta Outflow - February 2003



# Conclusions and Recommendations

- **Delta outflow objective should not be revised based on concerns regarding upstream impacts.**
- **Modify CVP and SWP water rights permits to require an operational protocol that avoids upstream impacts**
- **Revisit water rights permits of non-project water users to add terms and conditions to help avoid these impacts.**