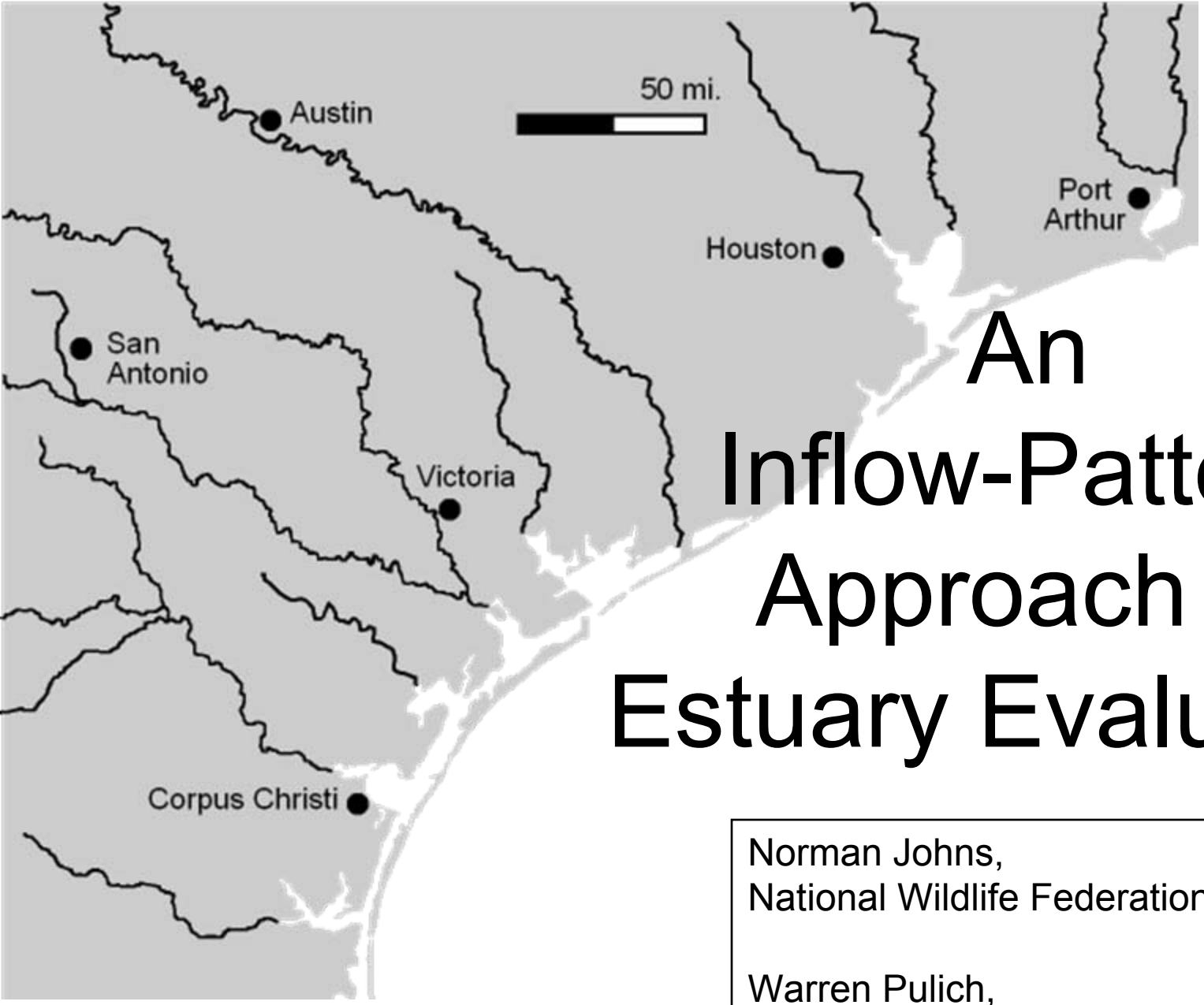
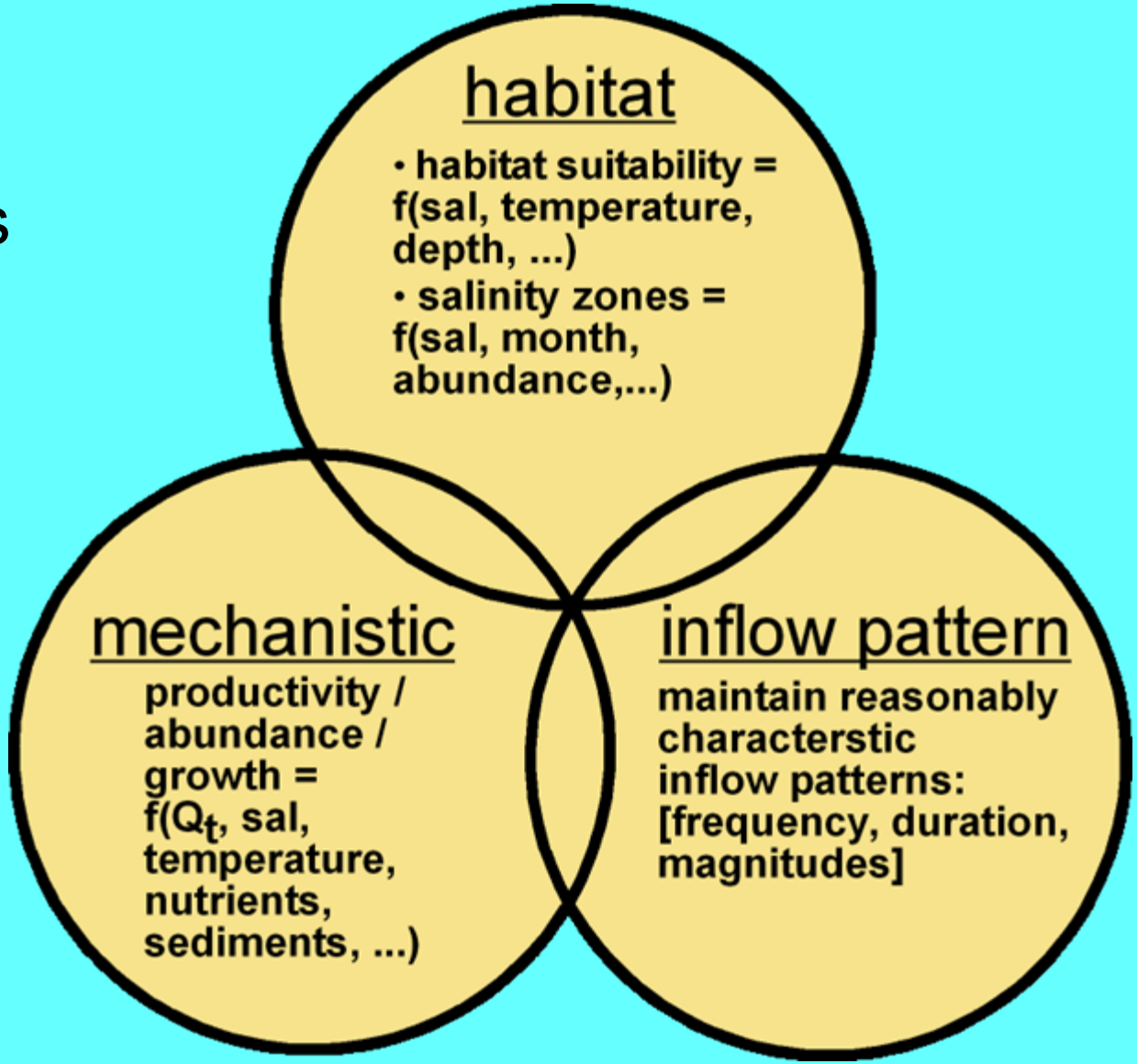


An Inflow-Pattern Approach to Estuary Evaluation

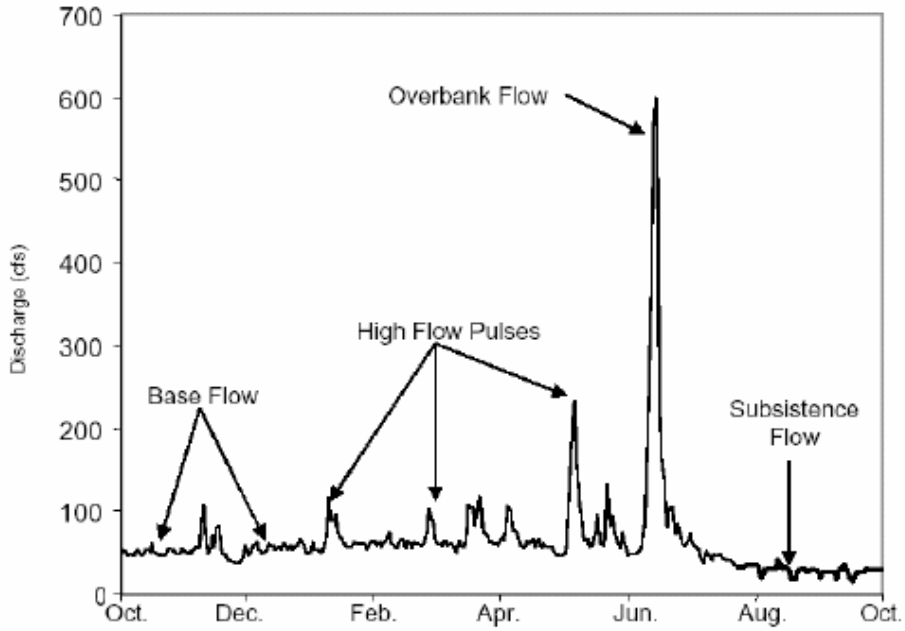
Norman Johns,
National Wildlife Federation

Warren Pulich,
Texas State University

Major Scientific Approaches to Texas Estuary Inflows Evaluation [Proposed]

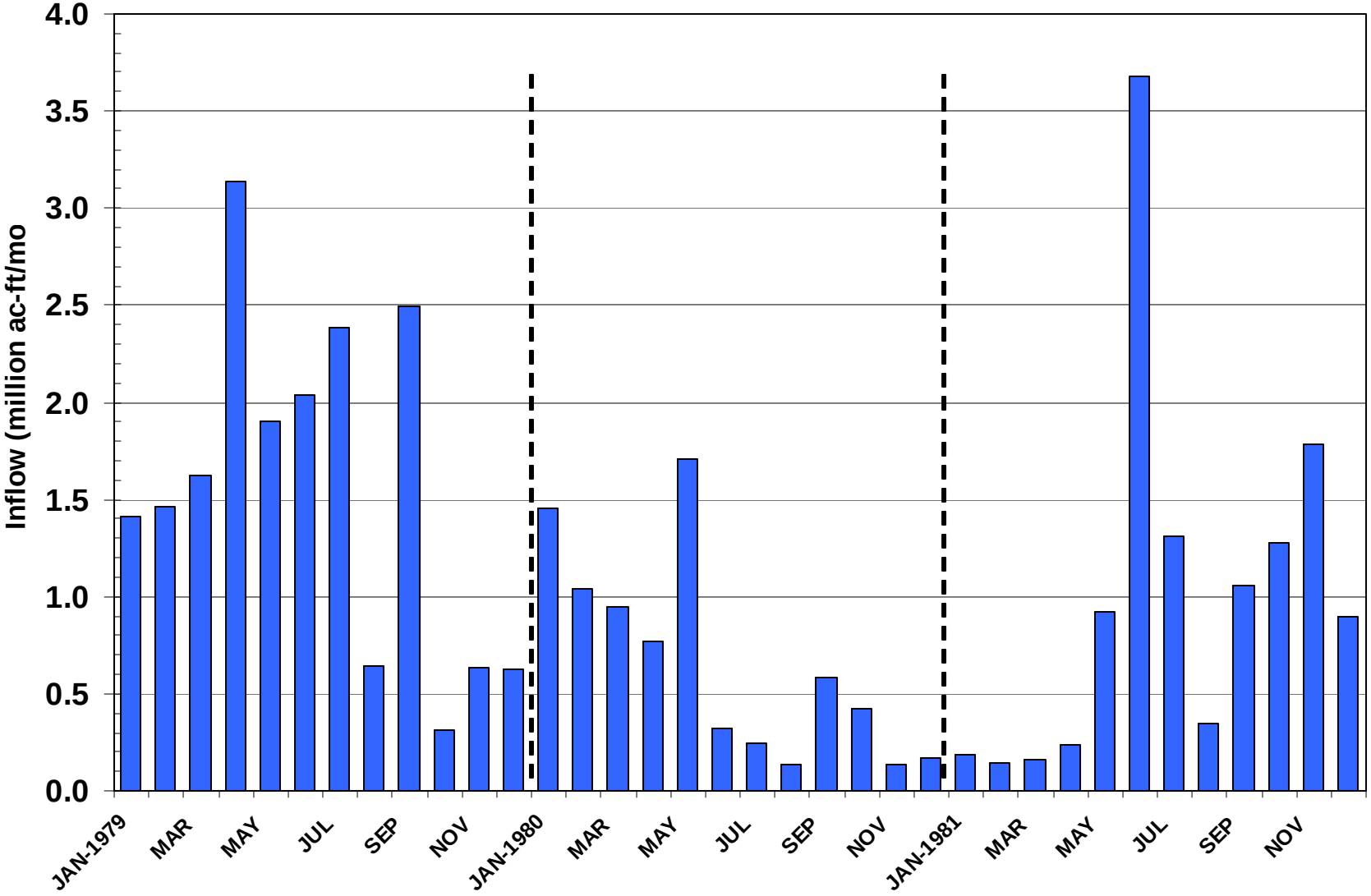


Instream Flow Components



Galveston Bay Inflow Variablility

(TWDB historic inflow data set)



National Wildlife Federation's method for assessing freshwater inflows to Texas estuaries.

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3) Evaluate / Rank Scenario Inflows
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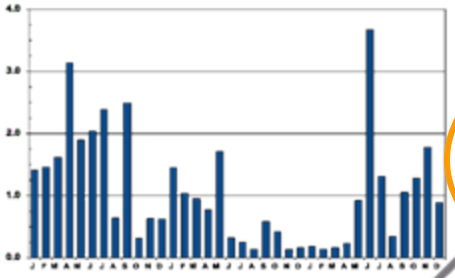

Spring Freshwater Pulse

Low Inflows Criteria

a) TxEMP excerpts
- mechanistic

b) Statistics
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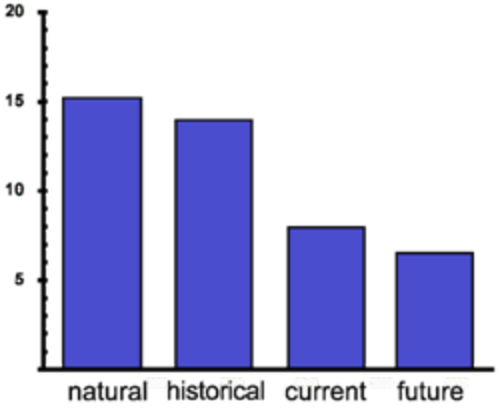
- Historical

c) Salinity maintenance inflow (e.g. ->25ppt)



"ecologically relevant criteria"

Periods of peak abundance.

Estuary	Blue Crab	Brown Shrimp	White Shrimp	Atlantic Croaker	Gulf Menhaden
Galveston	Mar-Aug	May-Sep	Jul-Dec	Mar-Aug	
Matagorda	Feb-Jun	Apr-Jul	Jul-Nov		Apr-Jun, Aug-Oct
Guadalupe	Jan - Jun	Apr - Sep	Jul - Dec	Feb - Jul	
Nueces	Mar-Jul	Apr-Jul	Jul-Nov	Jan-May	Apr-Jun

<u>Studies reinforcing ecological relevance of “spring” freshwater pulse inflow</u>:

- 2002 Nueces Freshwater Inflow Needs Study (FINS)

- 2006 Matagorda Bay FINS

- 2007-8 Matagorda Bay MBHE Biostats

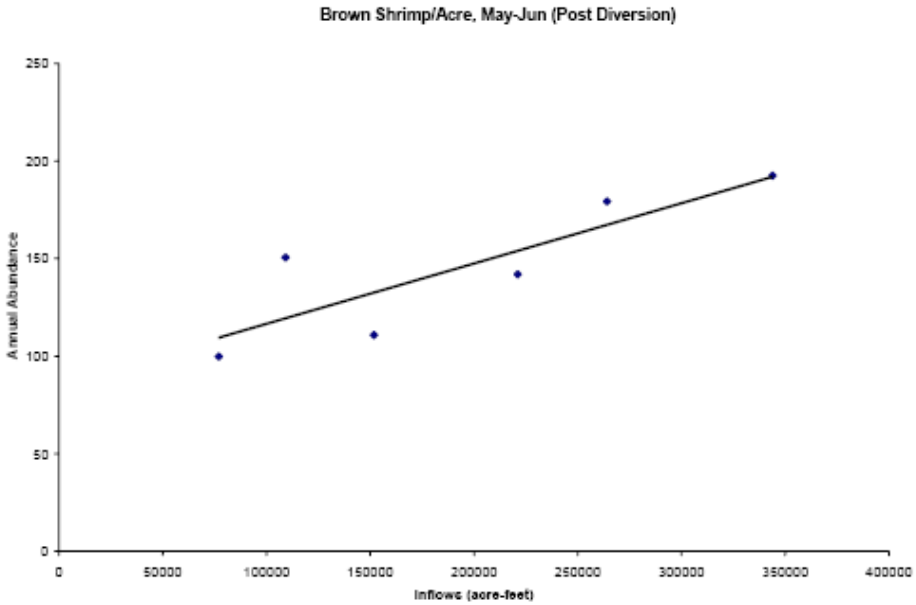


Figure 3.15 Relationship between Annual Brown Shrimp Abundance and May-June Inflows.

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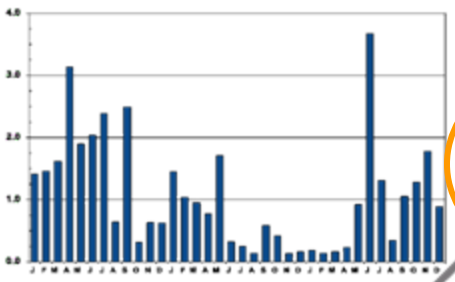

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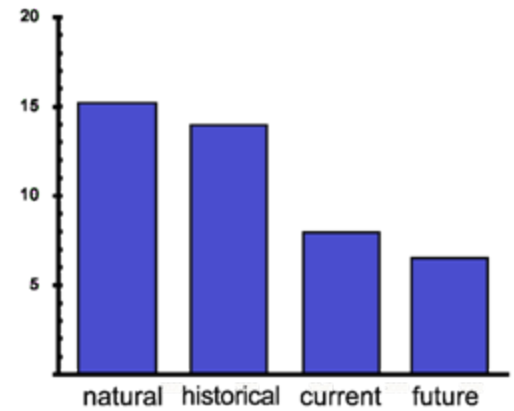
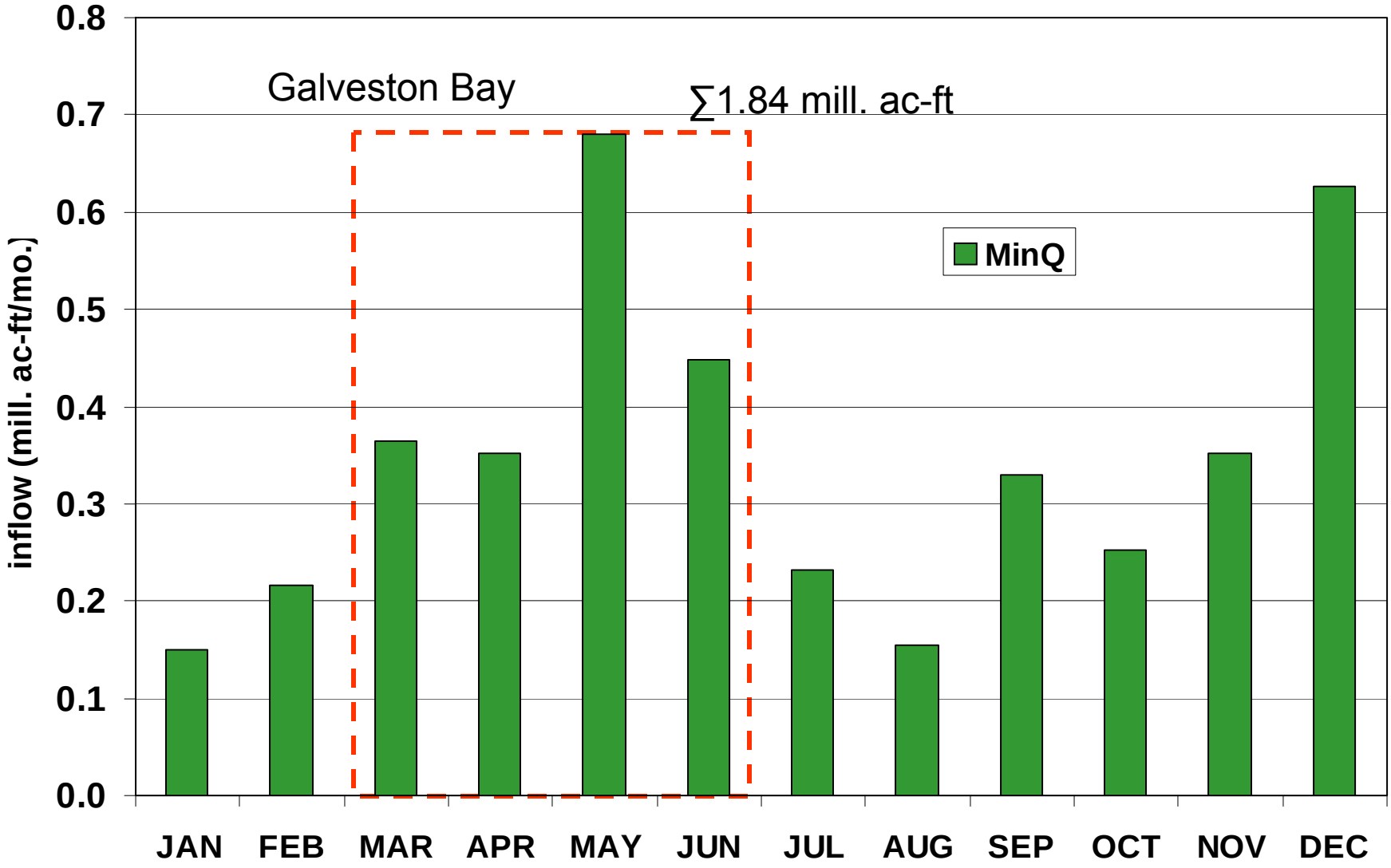
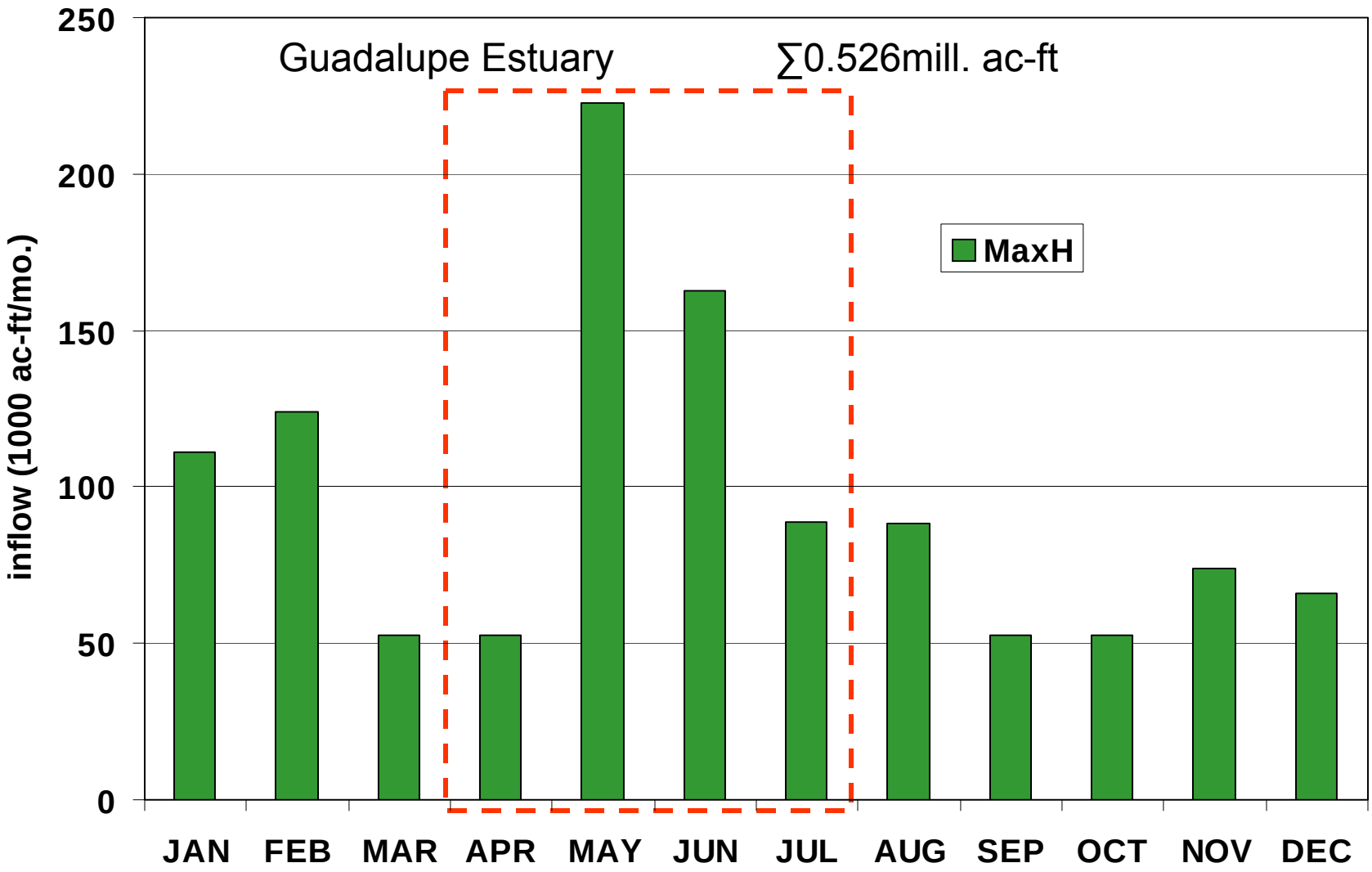


Galveston Bay Freshwater Inflow Criteria & Derivation of NWF's Spring Pulse Assessment



Guadalupe Estuary Freshwater Inflow Criteria & Derivation of NWF's Spring Pulse Assessment



National Wildlife Federation's method for assessing freshwater inflows to Texas estuaries.

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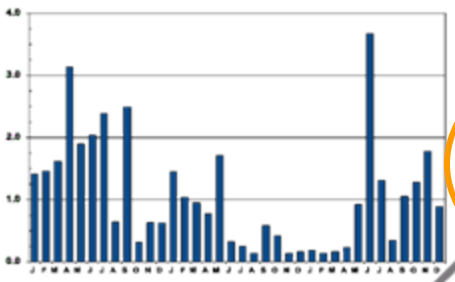

Spring Freshwater Pulse

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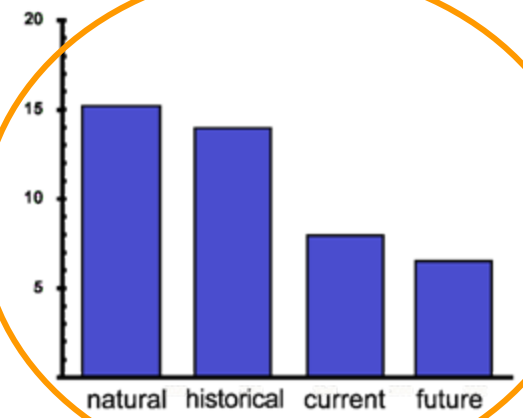
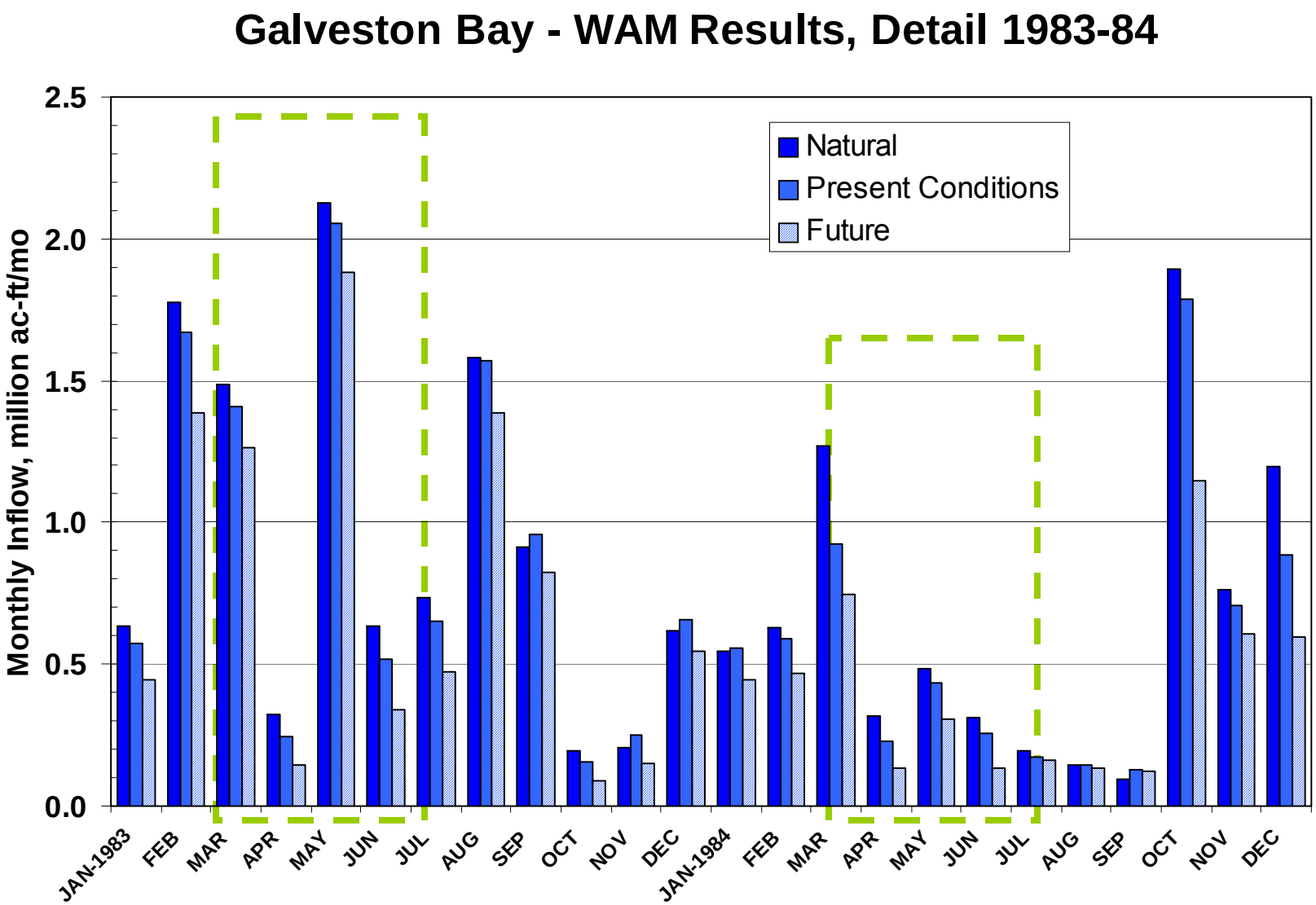


Spring freshwater pulse criteria

Step 3: Evaluate / Rank Scenario Inflows
based on occurence of key hydro-ecological events



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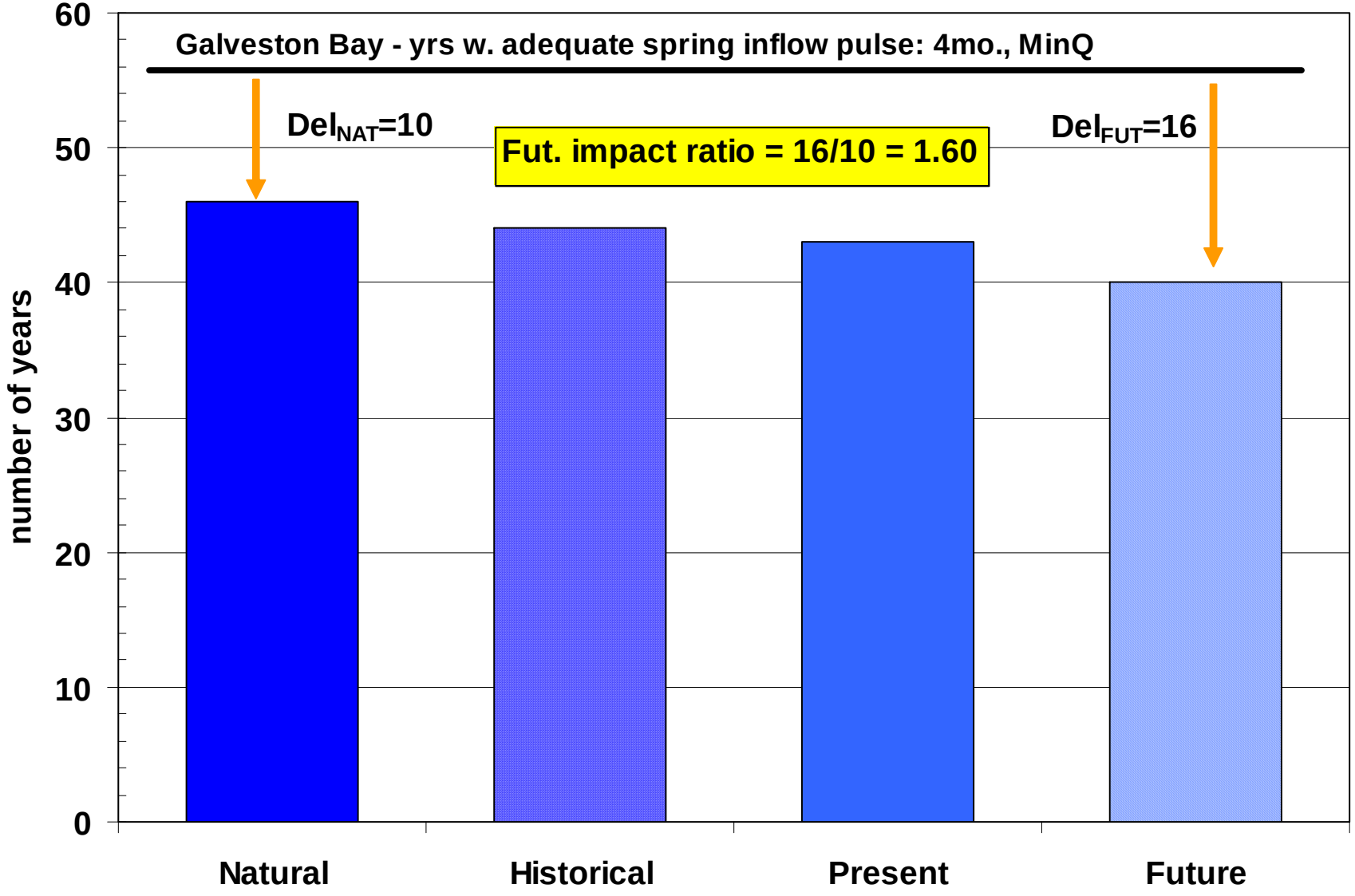

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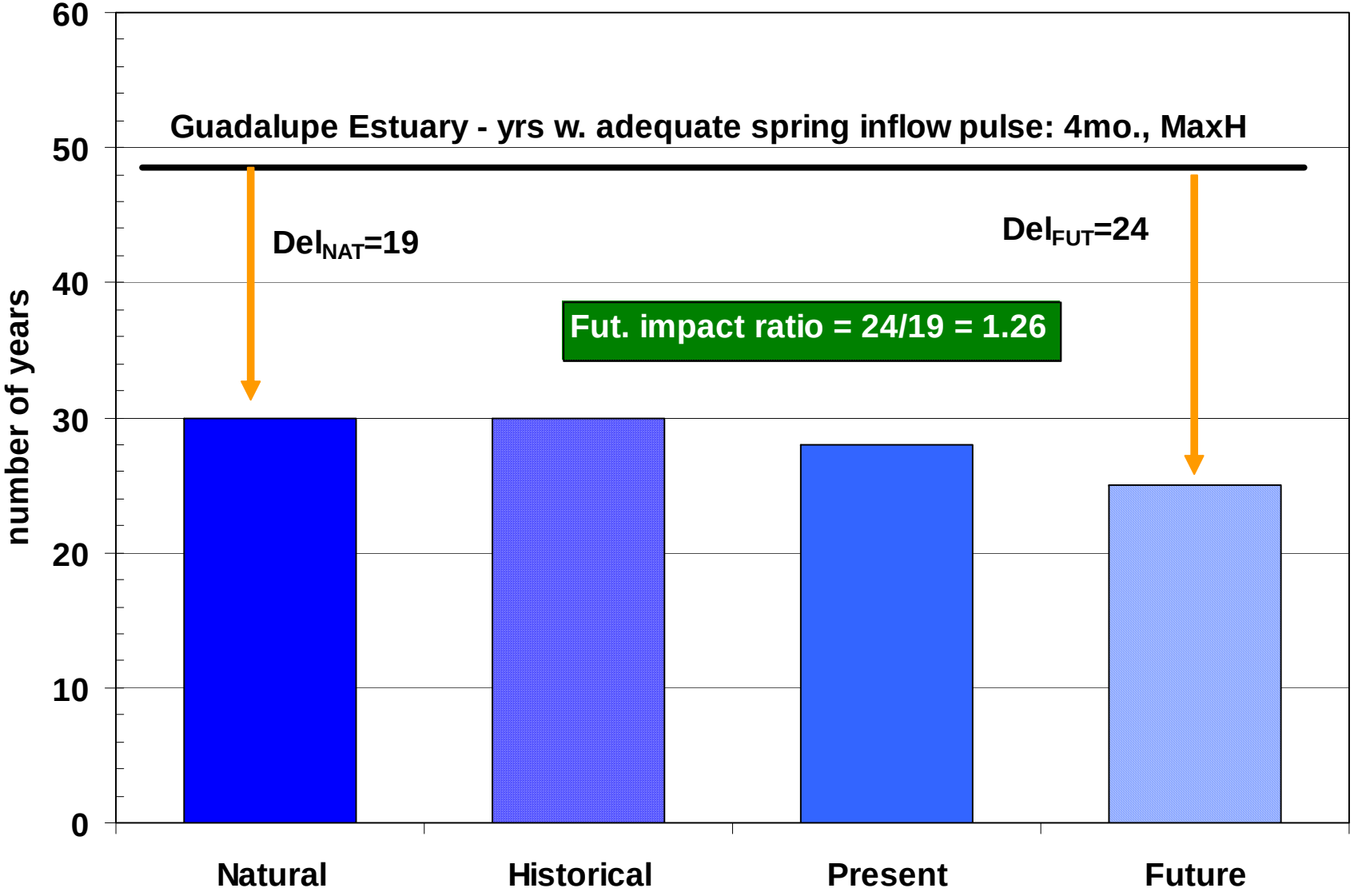
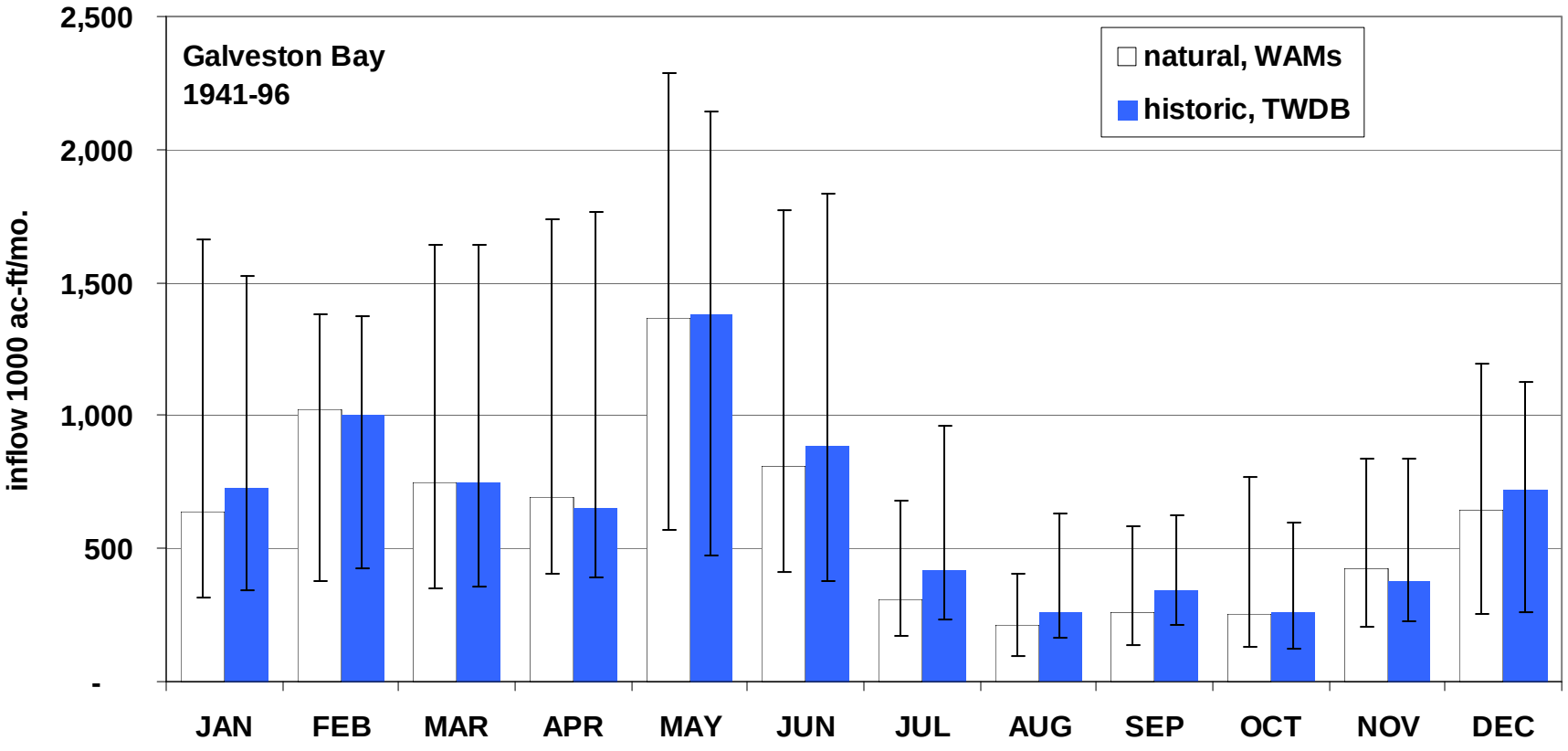
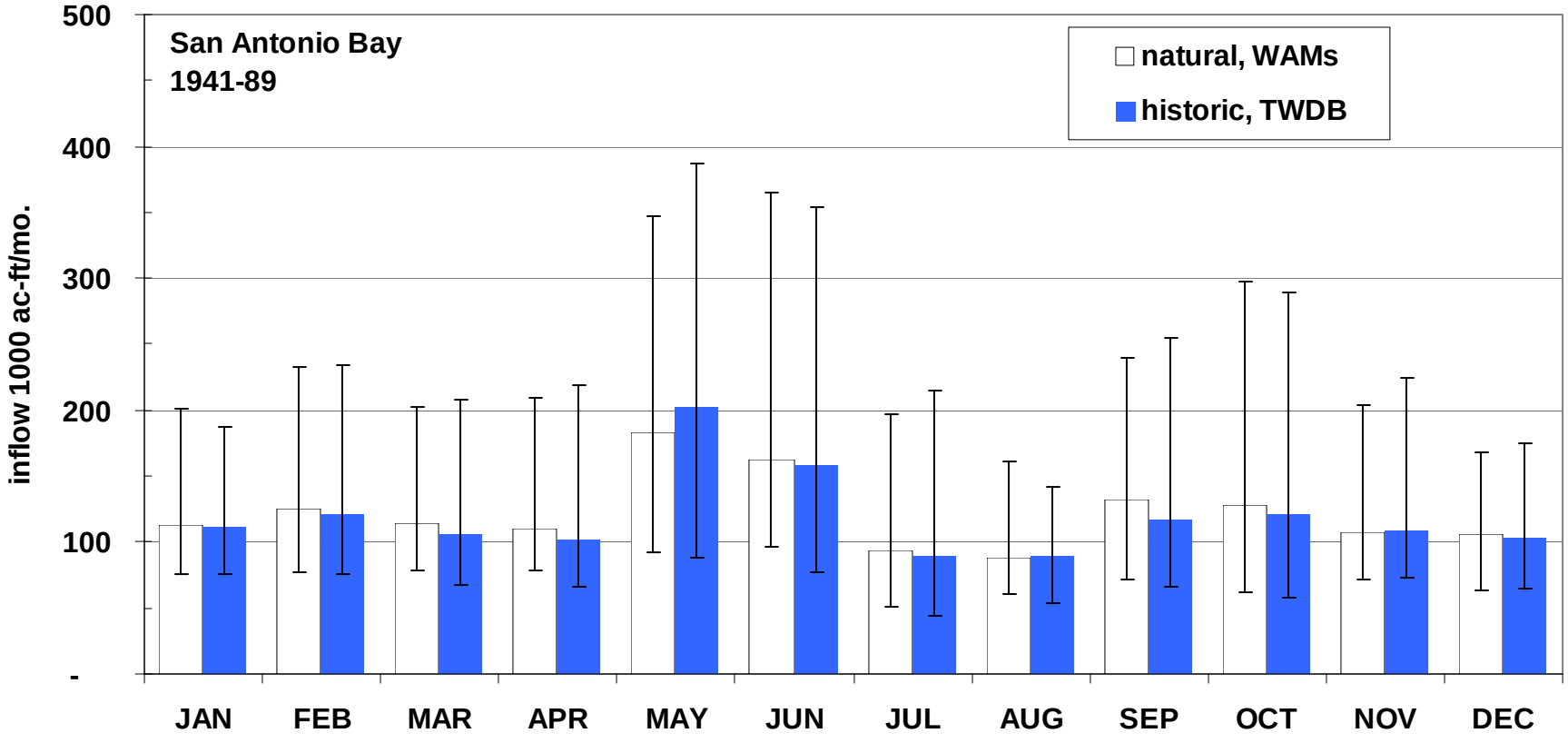


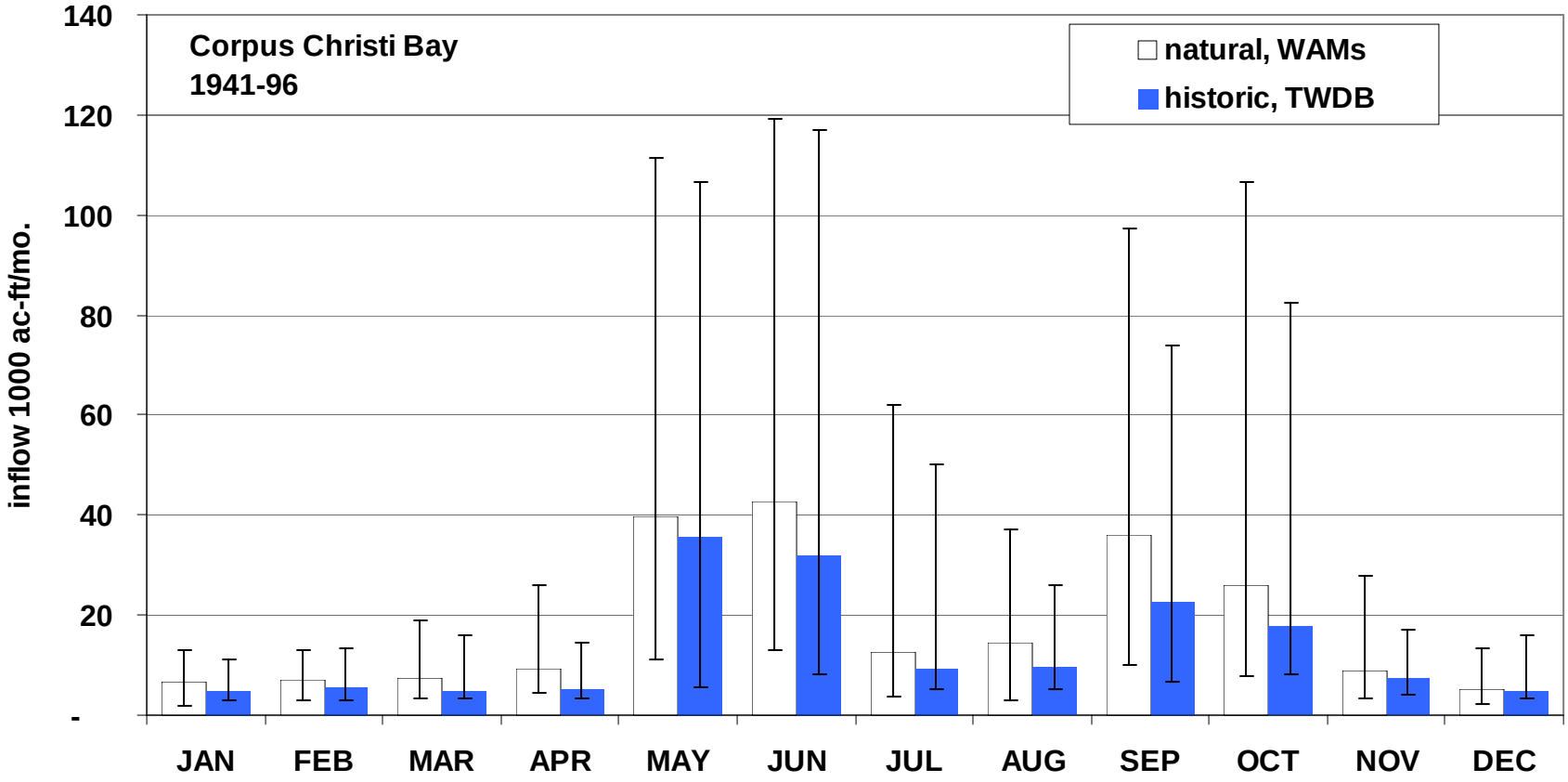
Galveston Bay - Freshwater Inflow Patterns



Guadalupe Estuary - Freshwater Inflow Patterns



Nueces Estuary - Freshwater Inflow Patterns



National Wildlife Federation's method for assessing freshwater inflows to Texas estuaries.

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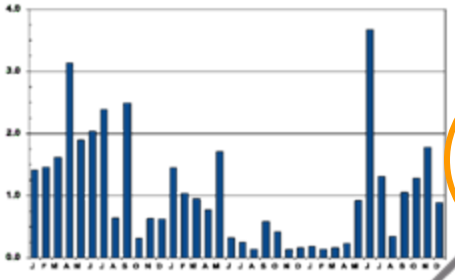

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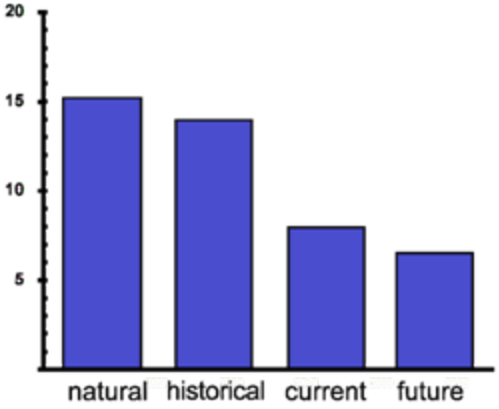

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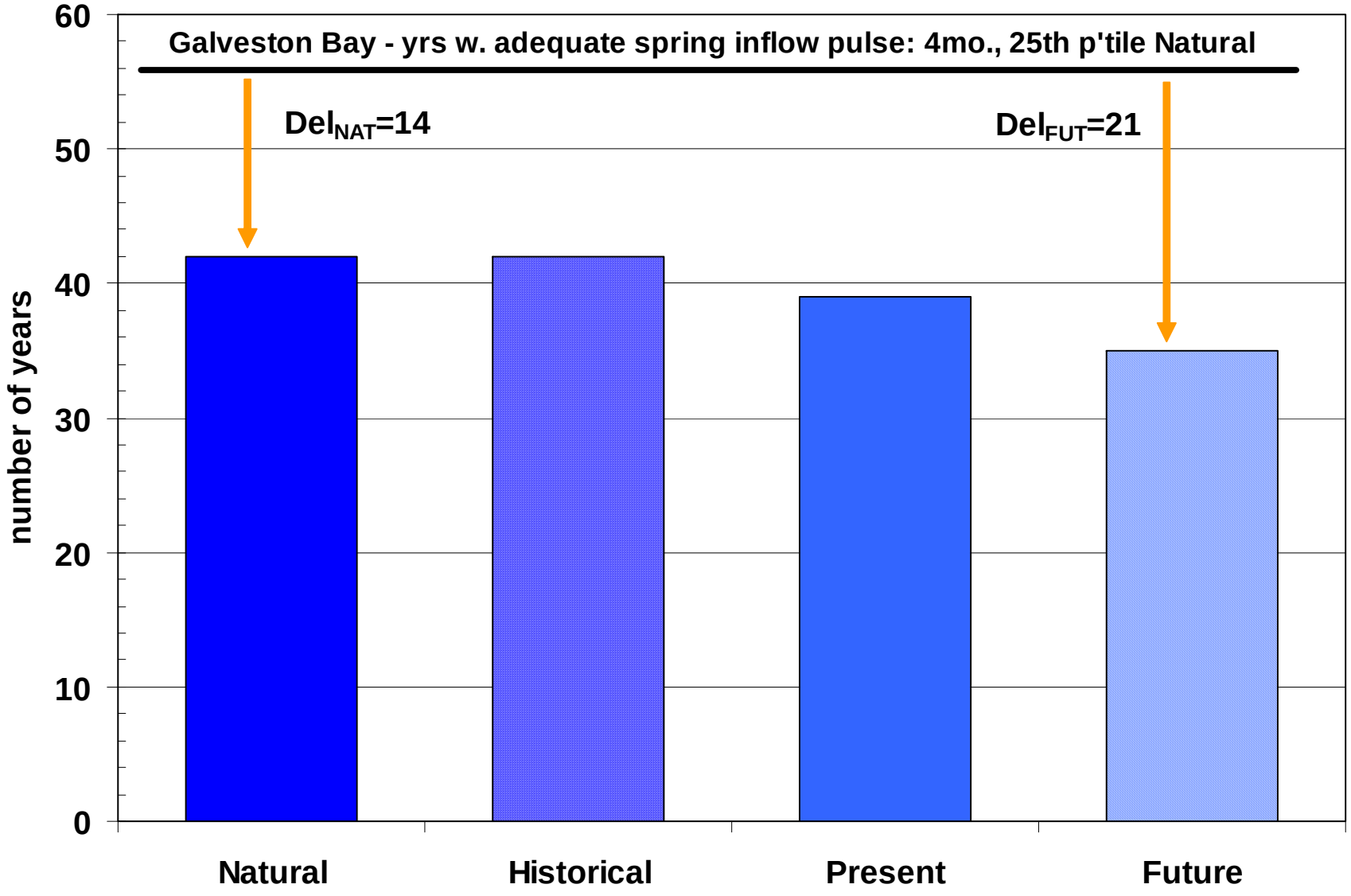

Development of low-inflow criteria

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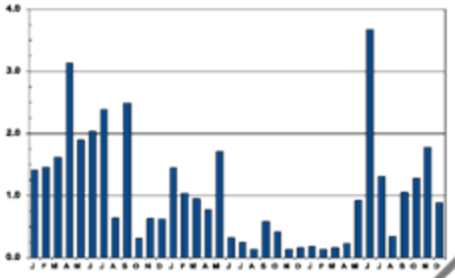

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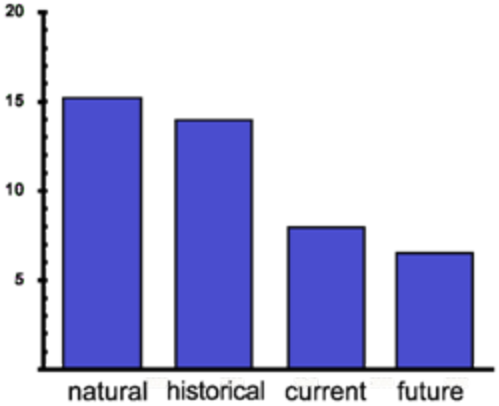
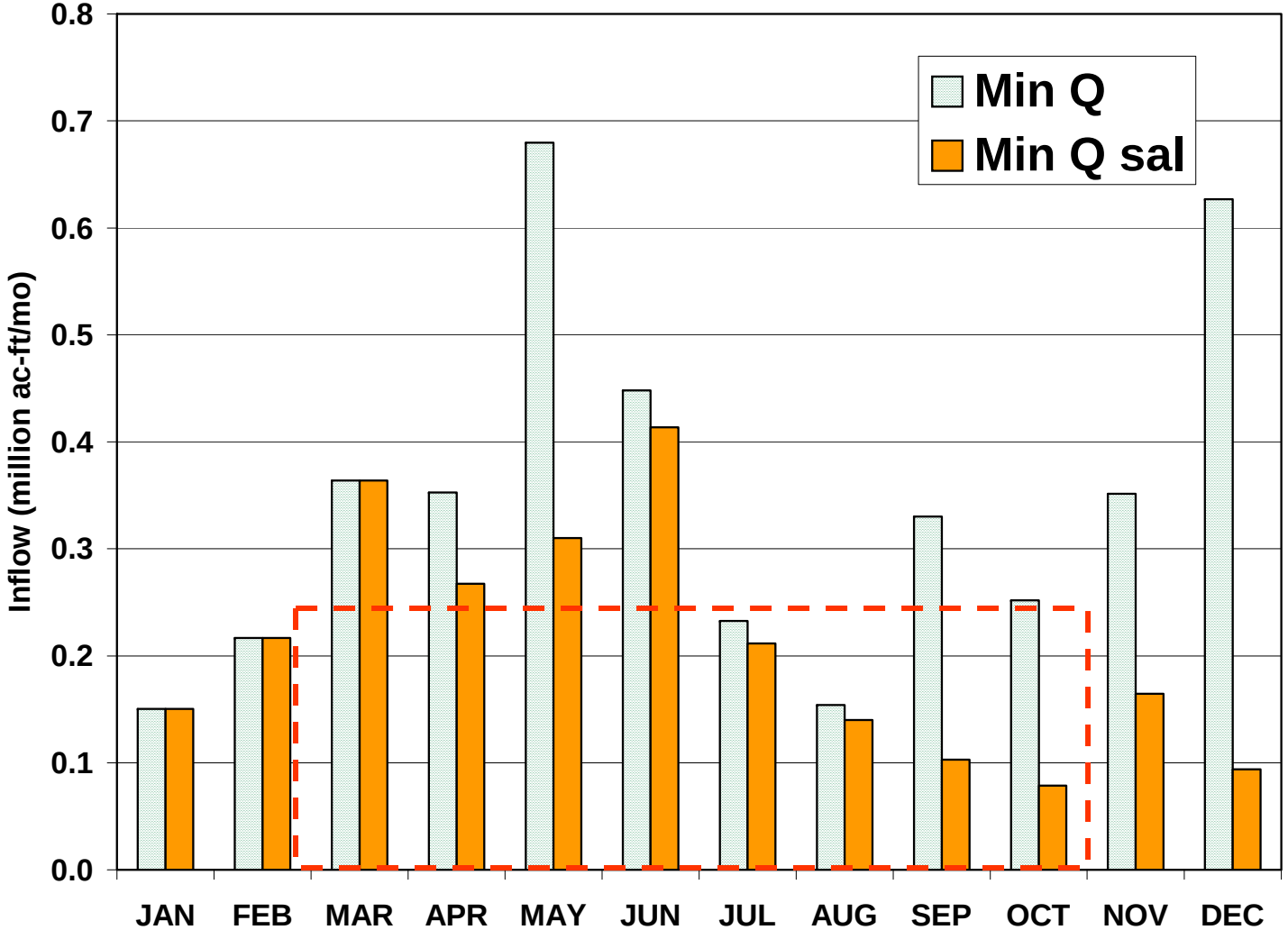


Galveston Bay - Freshwater Inflow Criteria & Derivation of NWF's Low Flow Criteria



low inflow criteria

Step 3: Evaluate / Rank Scenario Inflows
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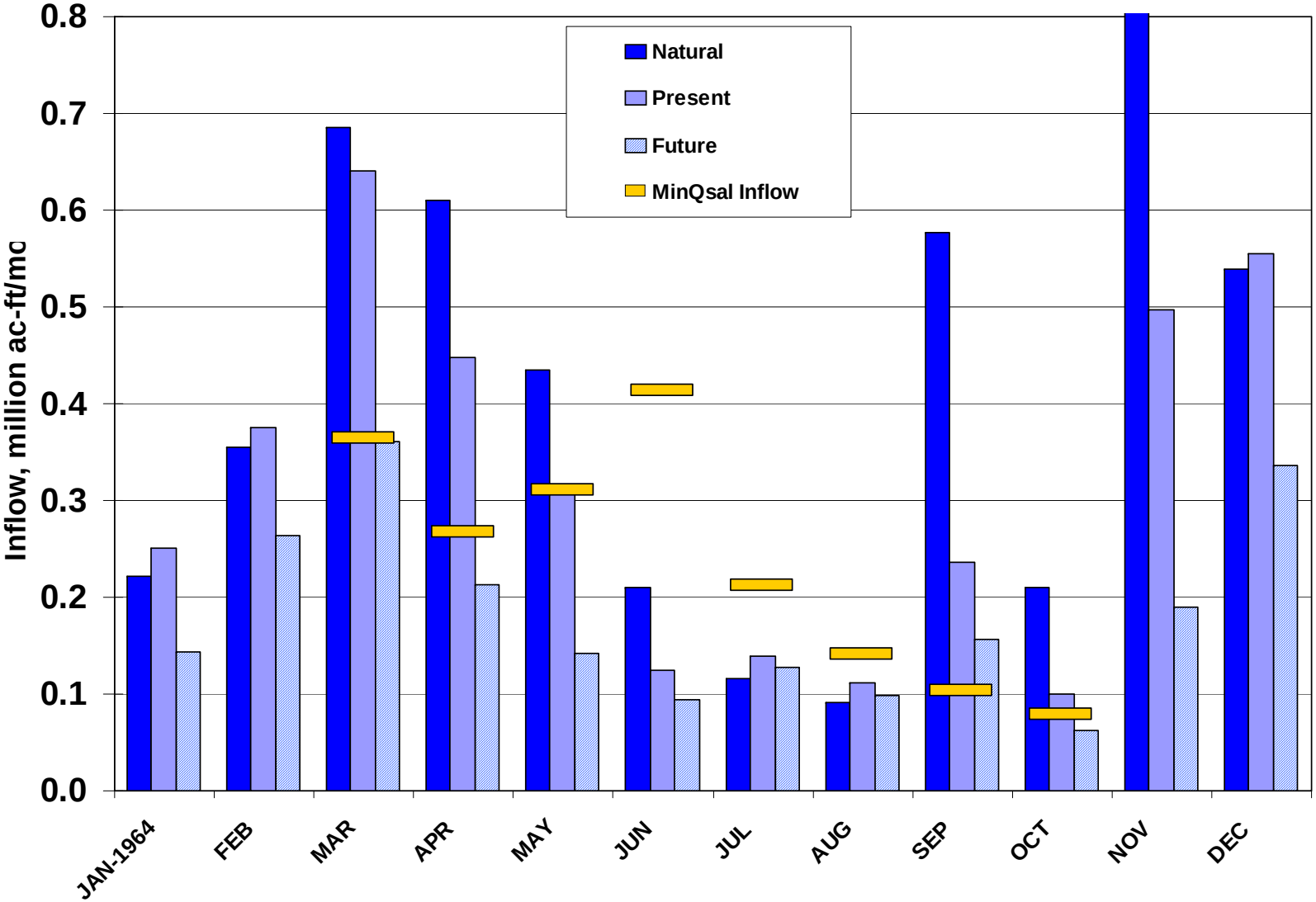

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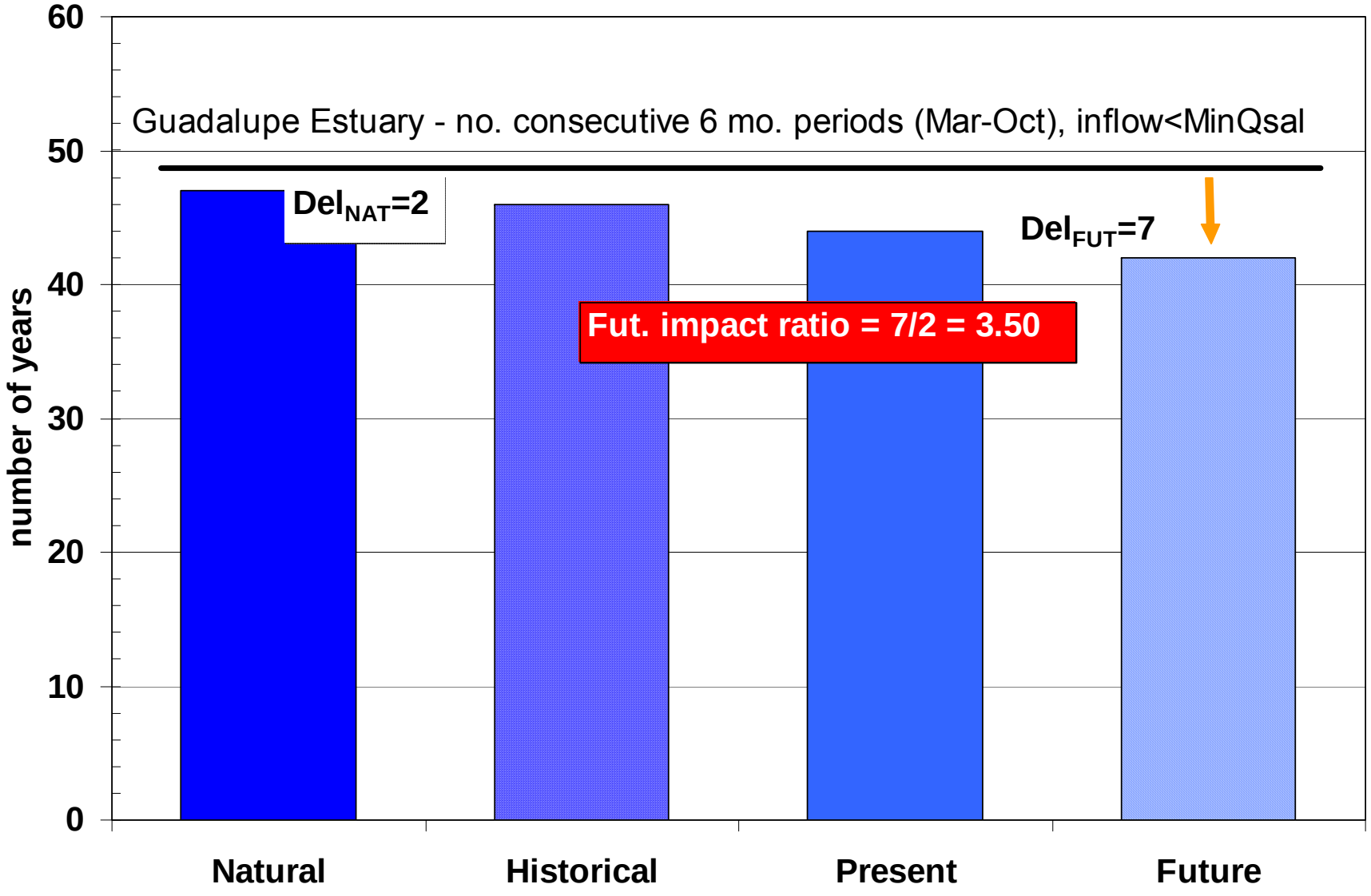

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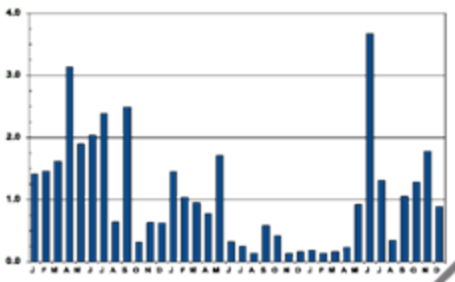

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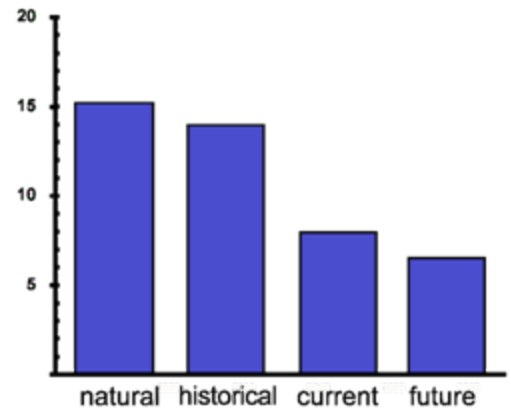
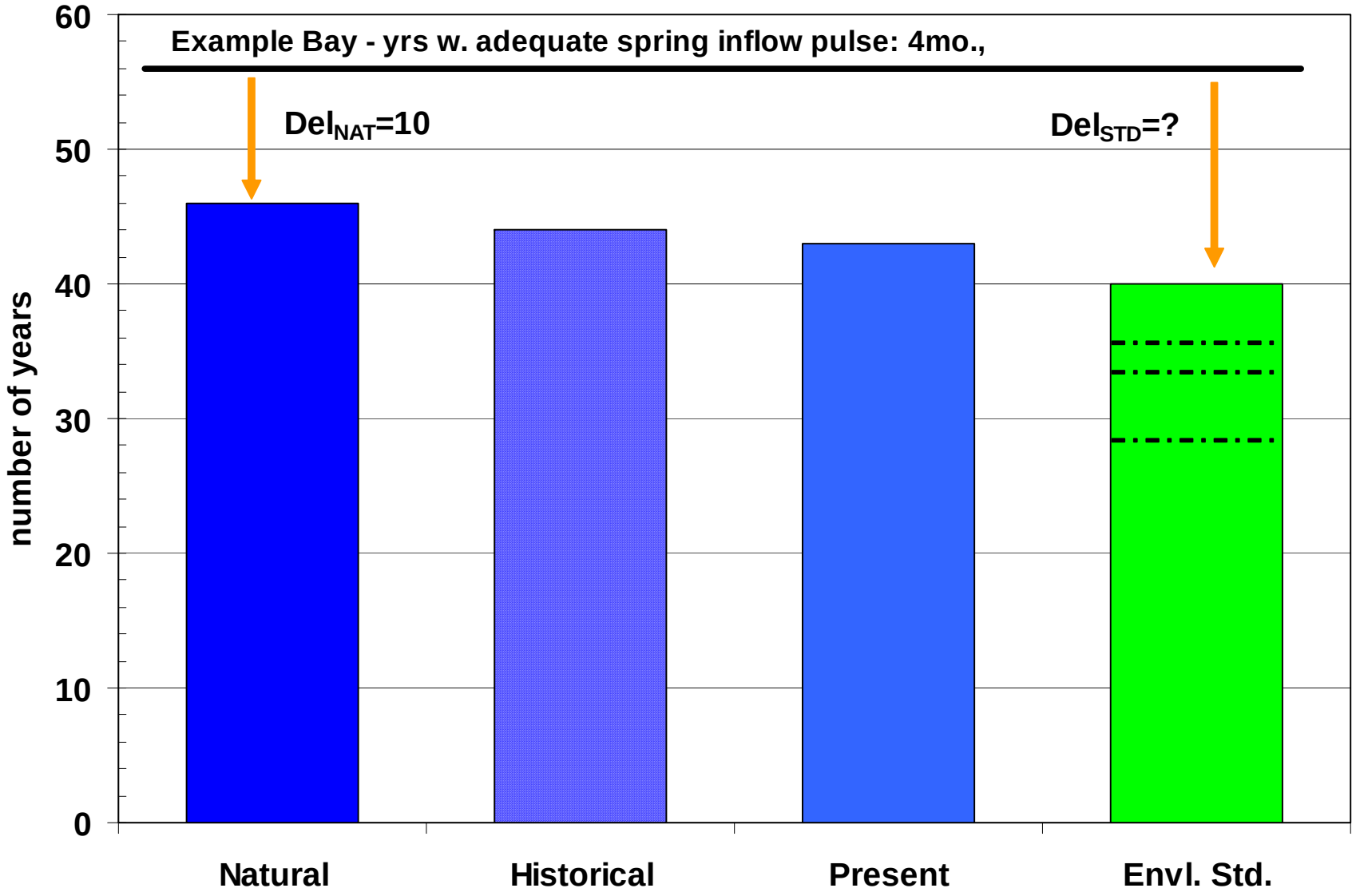


An Inflow Standard based on occurrence of key hydro-ecological events



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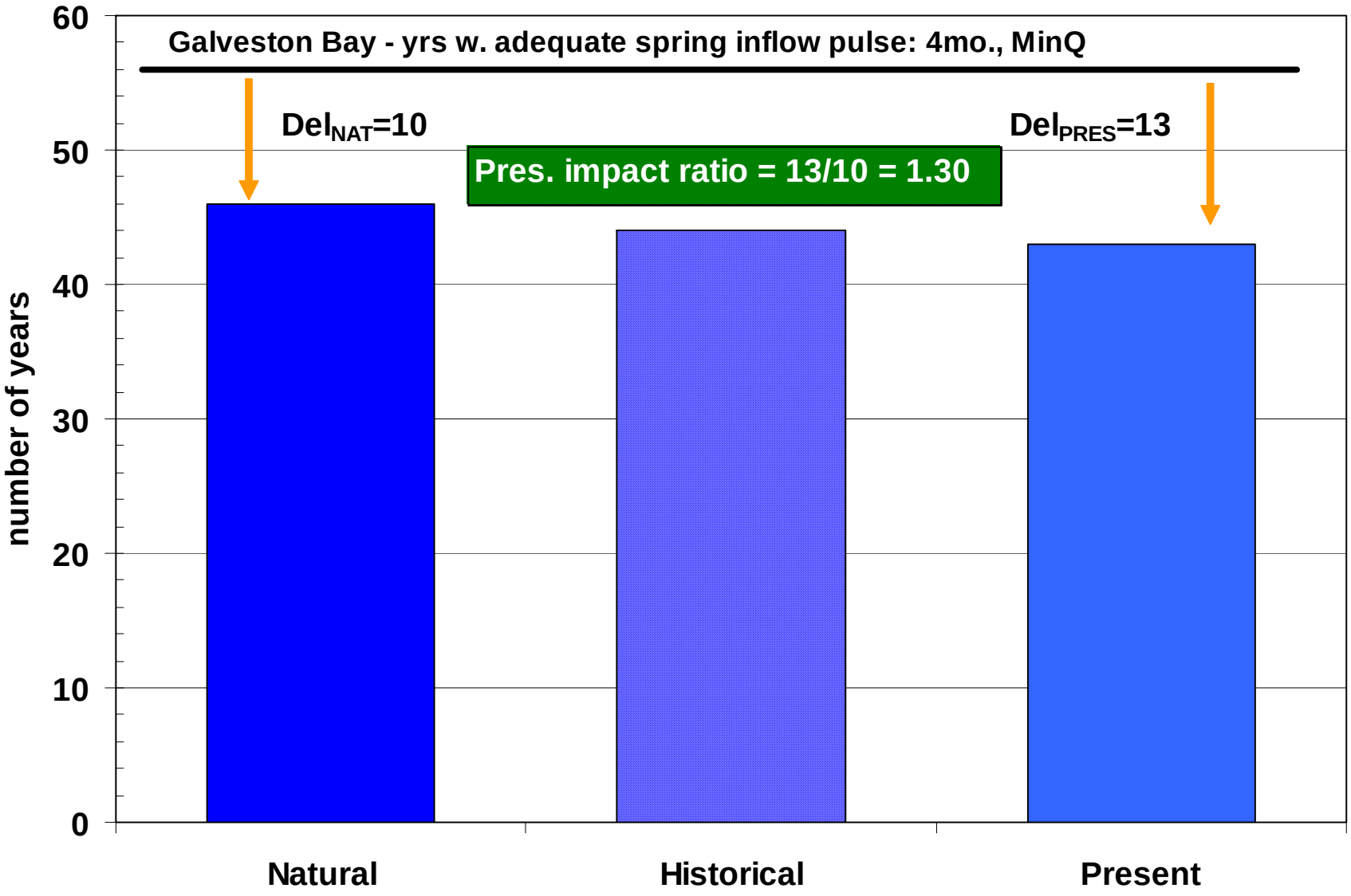

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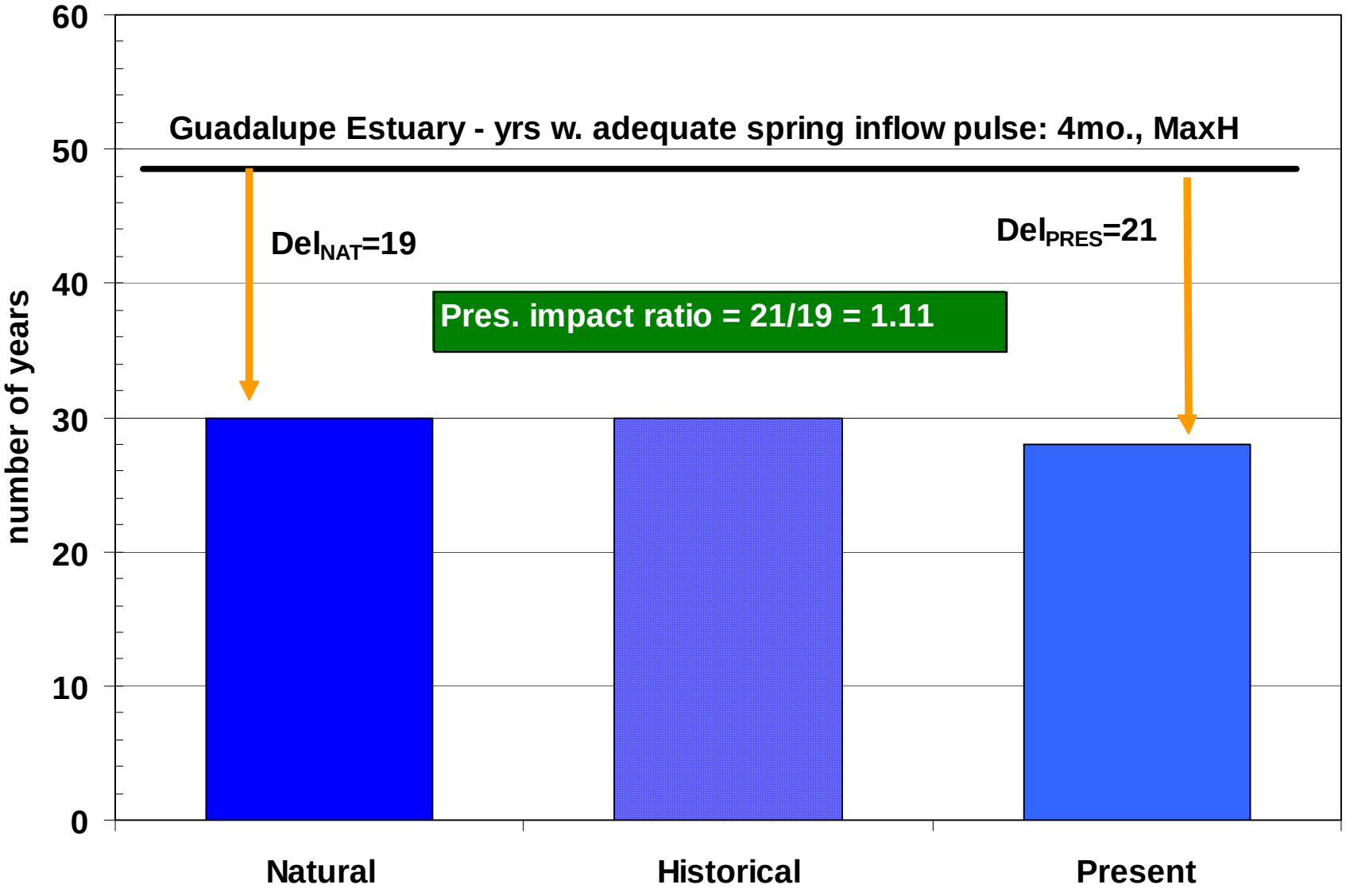

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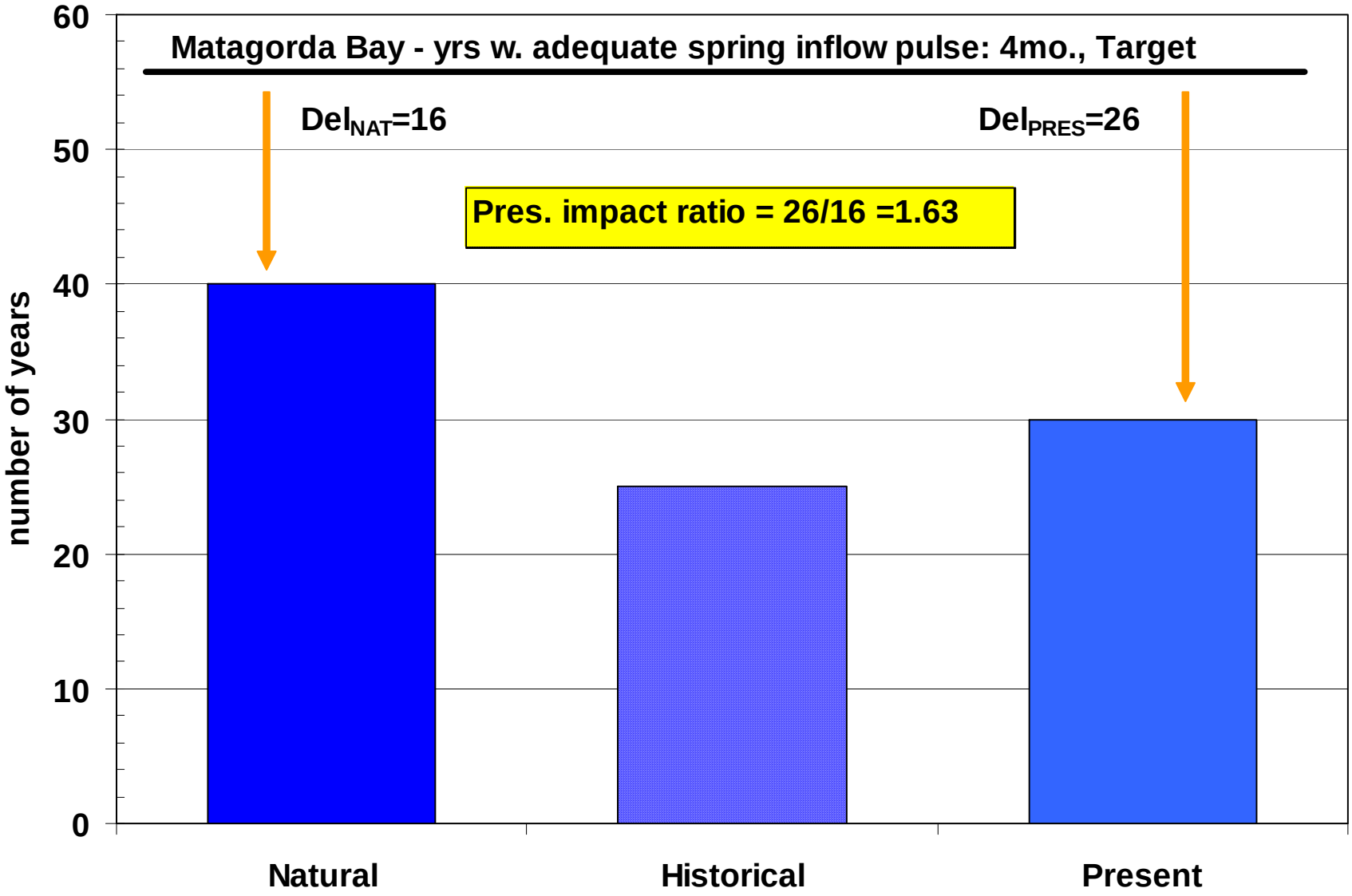

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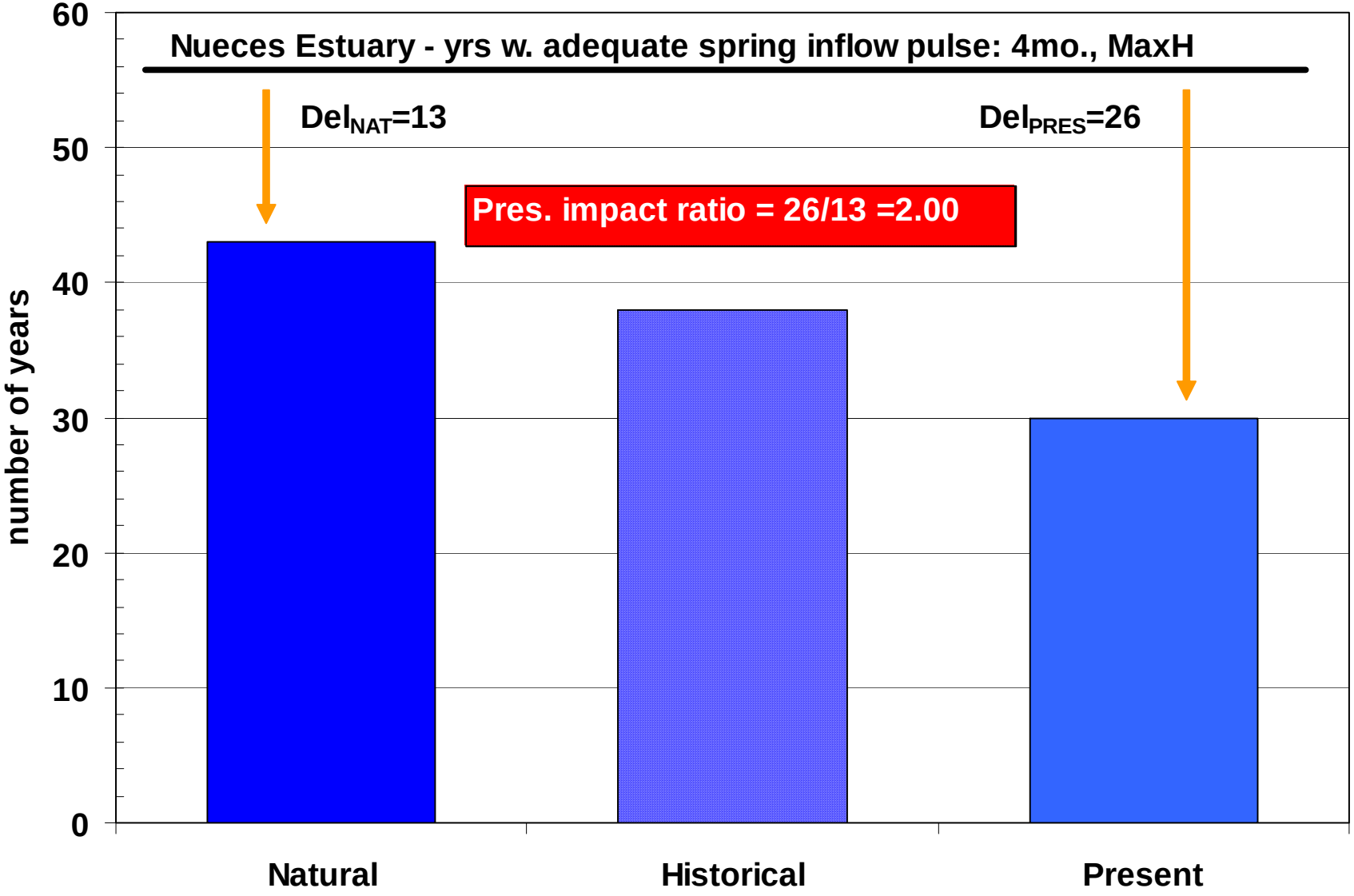
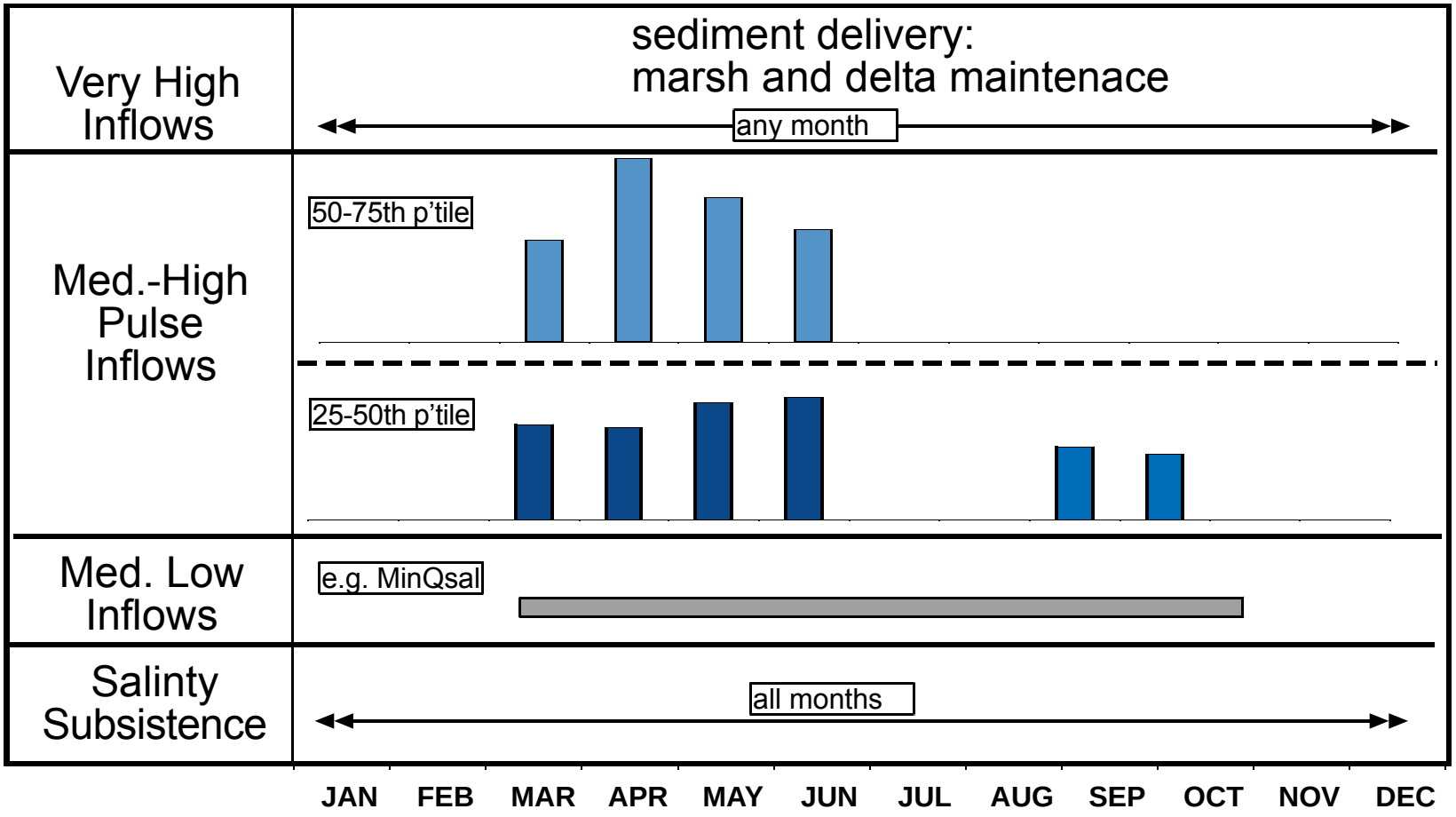
For Discussion-
possible estuary inflows framework