

A Possible Consolidated Approach to Estuary Inflows for Galveston

Bay

**Presentation to Trinity/San Jacinto/Galveston
Bay Basin & Bay Area Stakeholder Committee**

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National Wildlife Federation
March 18, 2010



Regime group

Key Species **Salinity Zone** Analysis (Chap. 3)

Seas. / Month		Trinity	San Jacinto	Coastal	Total
Winter	Dec				
	Jan	253,260	131,320	84,420	469,000
	Feb				
Spring	Mar				
	Apr	742,000	302,000	455,000	1,500,000
	May				
Summer	Jun				
	Jul	205,000	257,000	196,000	659,000
	Aug	205,000	257,000	196,000	659,000
Fall	Sep				
	Oct	141,000	250,000	244,000	635,000
	Nov	141,000			
	Total	1,687,260	1,197,320	1,175,420	3,922,000

Conditional

group

comments, page 196

Table 4 Alternative Recommendation for Freshwater Inflows for the Galveston Bay System

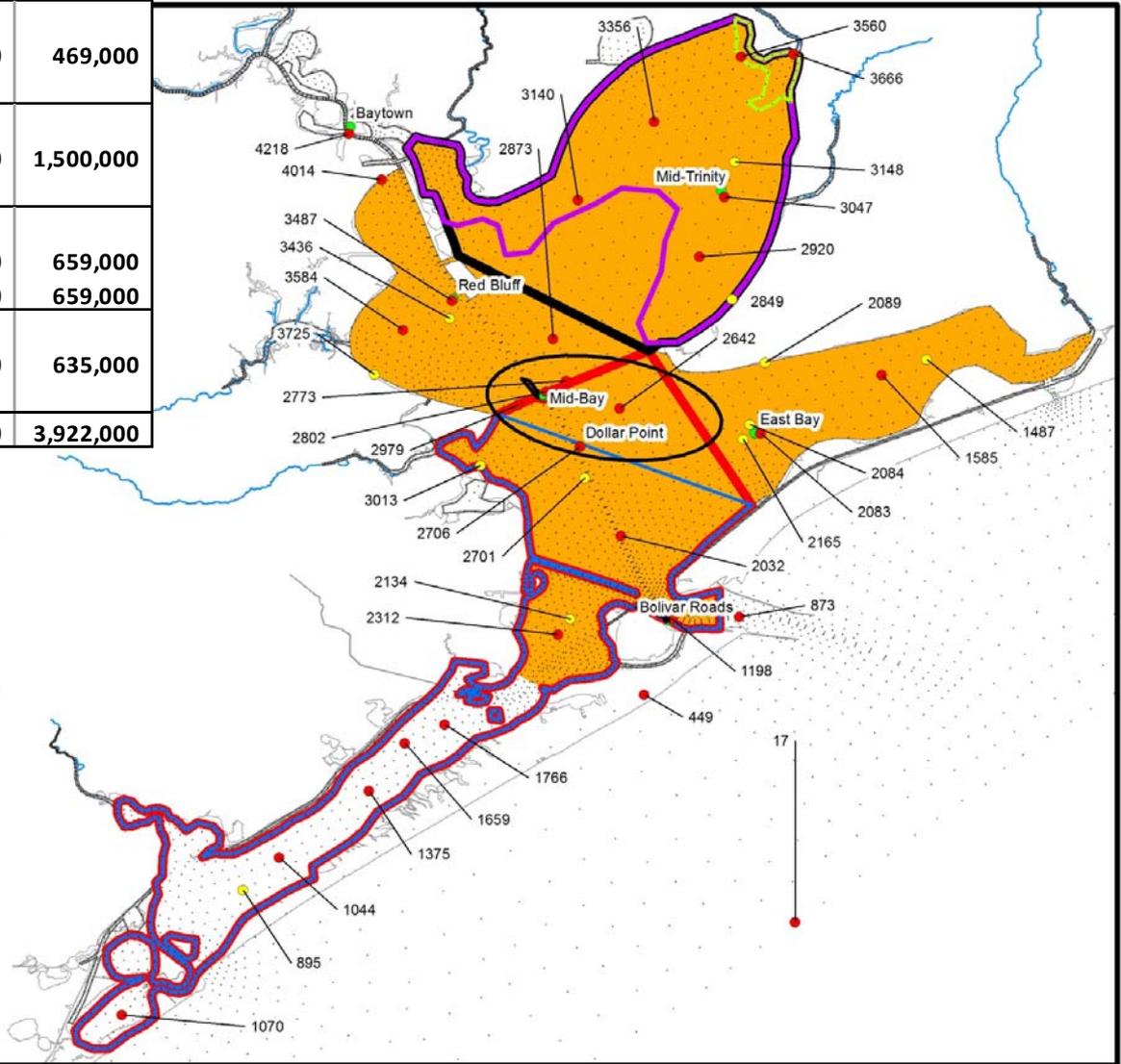
Inflow Scenario	Quantity Needed (acre-feet/year)	Historical Frequency	Target Frequency
Max H	5.2 mi		0%
Min Q	4.2 million	70%	60%
Min Q-Sal	2.5 million	82%	75%
Min Historic	1.8 million	98%	90%

State Method

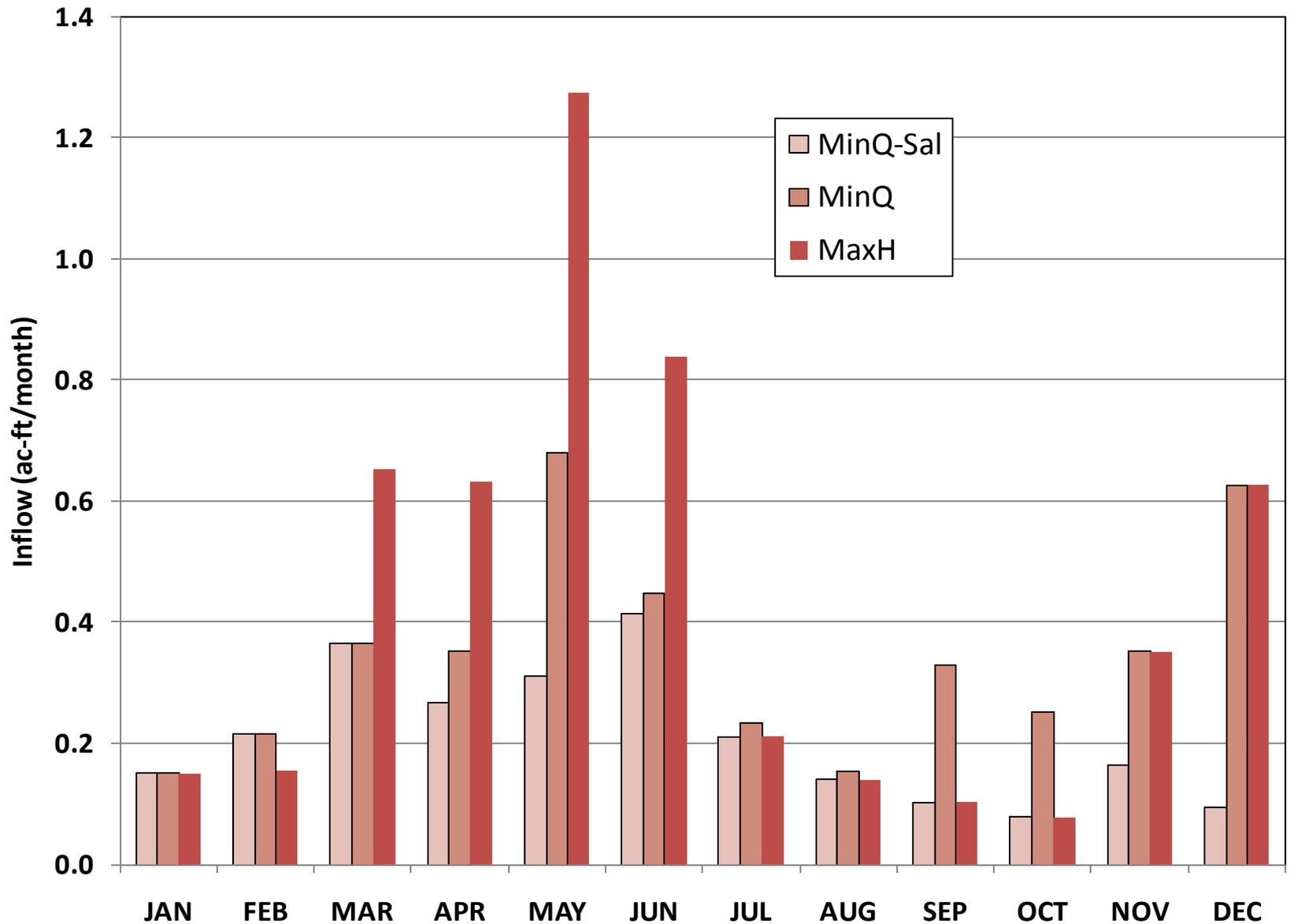
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-  Oyster
-  Wild Celery
-  Atlantic Rangia
-  Blue Catfish
-  Mantis Shrimp
-  Pinfish
-  Gulf Menhaden
-  TxBLEND



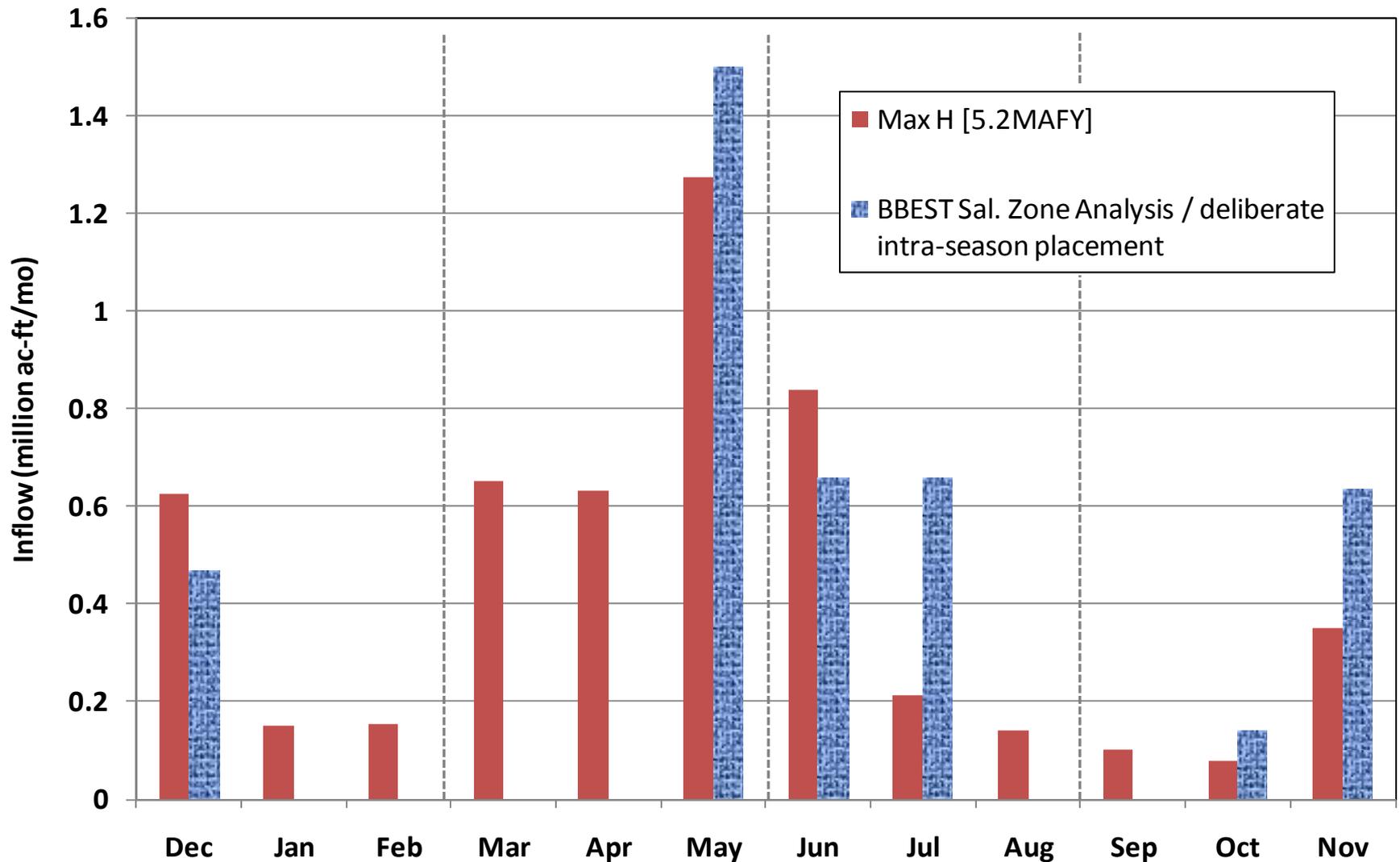
Galveston Bay Inflow Criteria: State Methodology

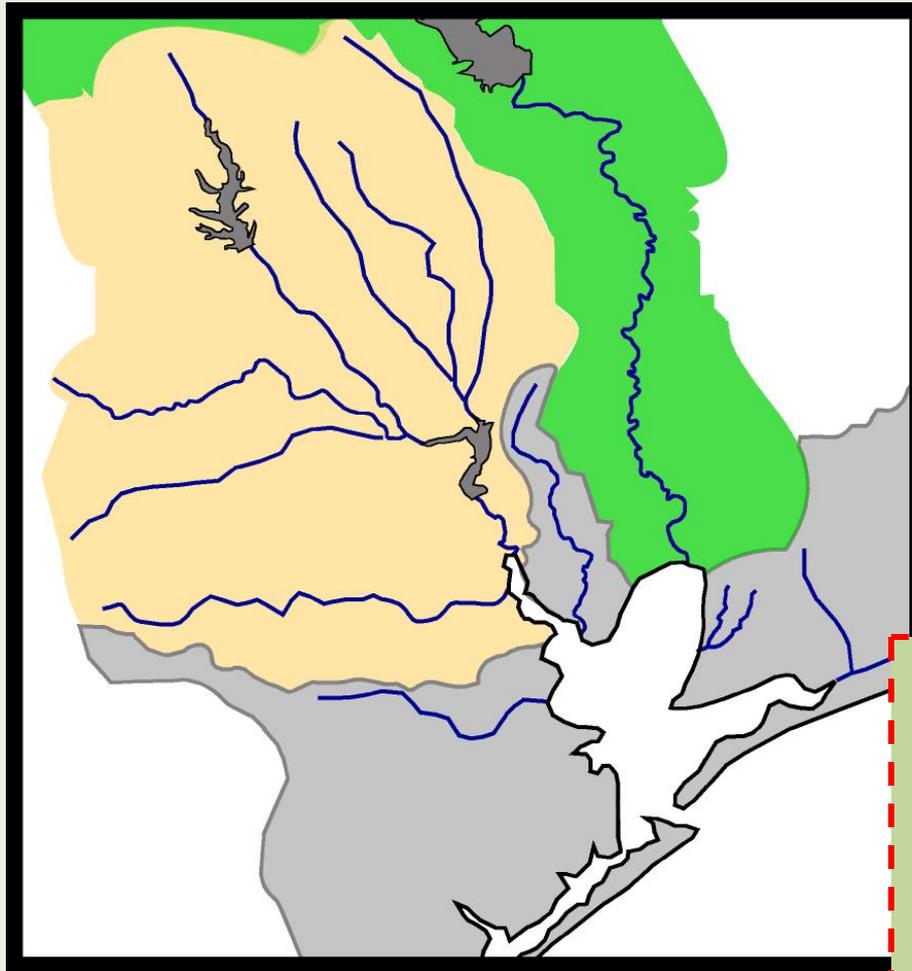


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Galveston Bay: Compare Monthly Inflow Volumes of Various Methods Salinity Zone vs. State Method (MaxH)





-  Trinity basin
-  San Jacinto basin
-  Coastal basins

Hydrology-Based Environmental Flow Regime (HEFR) Method. Derive regime elements from historical inflow data. [SAC Bay & Estuary Guidance, Sec. 4.3.1]

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Table 4

Alternative Recommendation for Freshwater Inflows for the Galveston Bay System

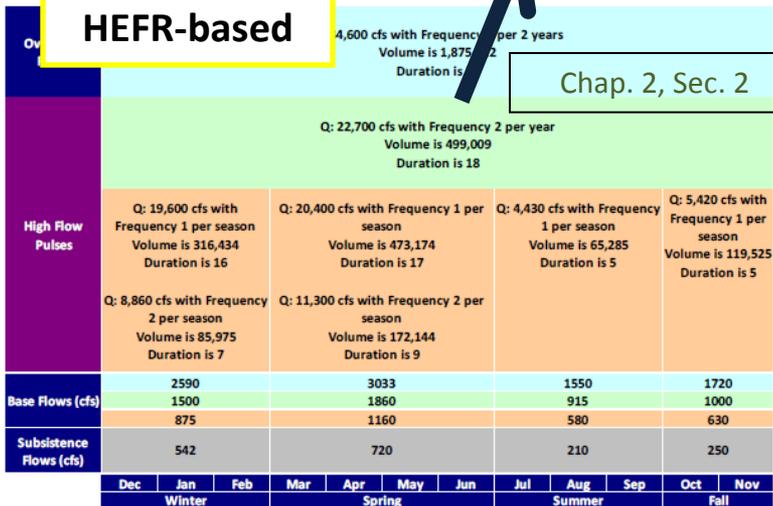
Inflow Scenario	Quantity Needed (acre-feet/year)	Historical Frequency	Target Frequency
Max H	5.2 million	66%	50%
Min Q	4.2 million	70%	
Min Q-Sal	4.5 million	82%	75%
	4.8 million	98%	90%

State Method

Compare

CONSOLIDATE

HEFR-based

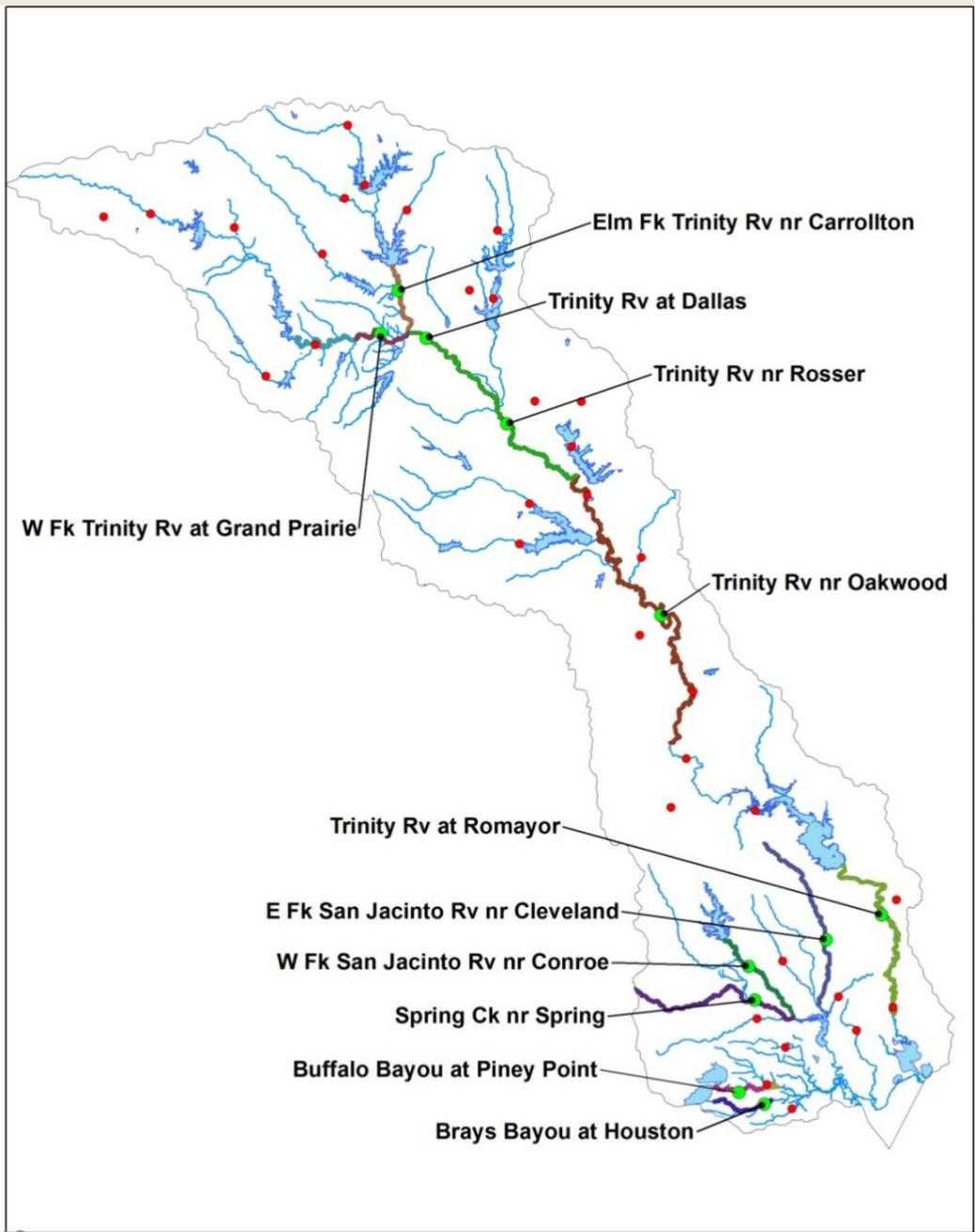


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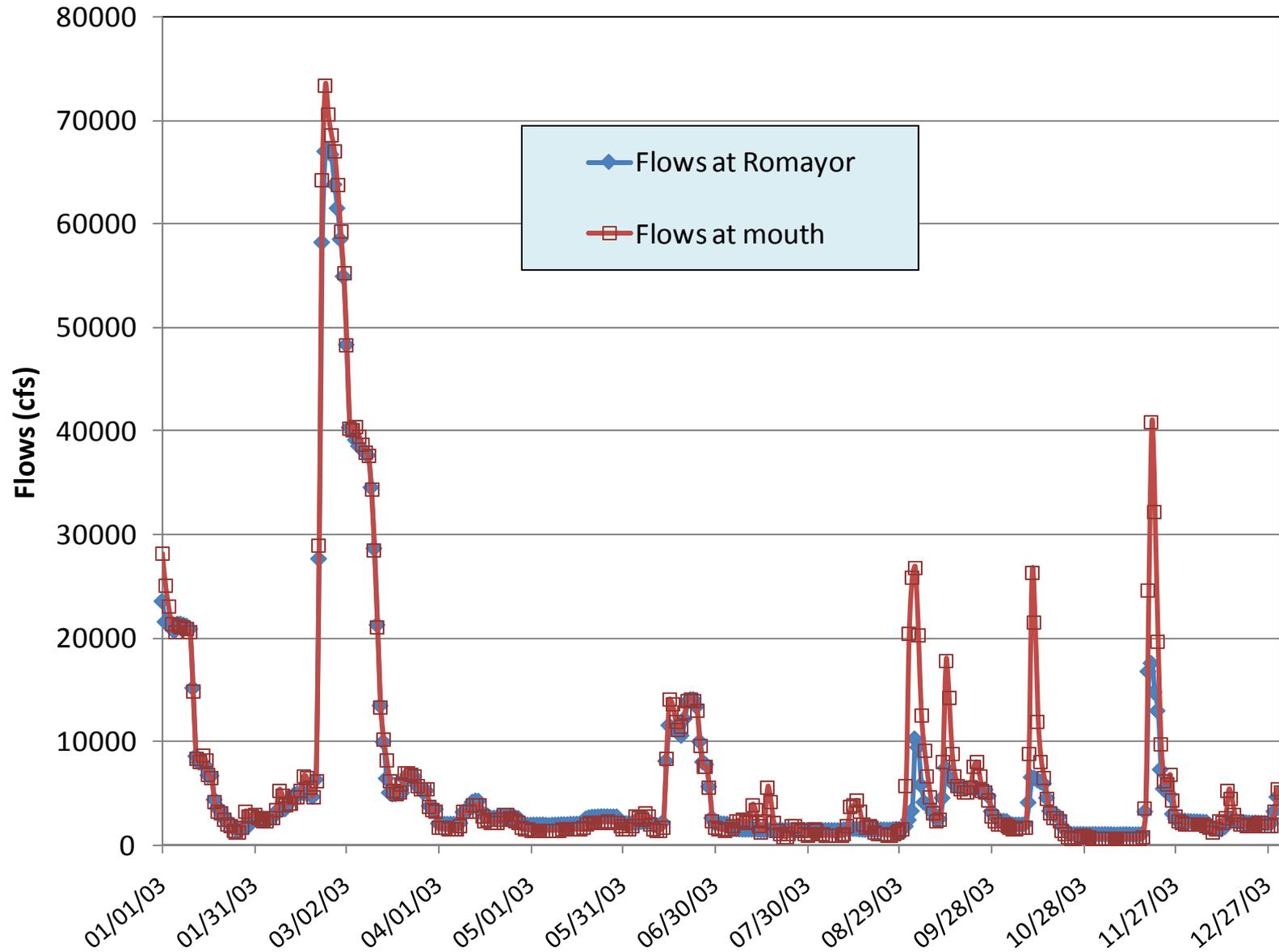
Figure 19 Flow Recommendations for Trinity River at Romayor

Hydrologic Conditions	Wet
	Average
	Dry
	Subsistence

High Flow Pulse Characteristics	F = Frequency (per season)
	D = Duration (days)
	Q = Peak Flows (cfs)
	V = Volume (ac-ft)



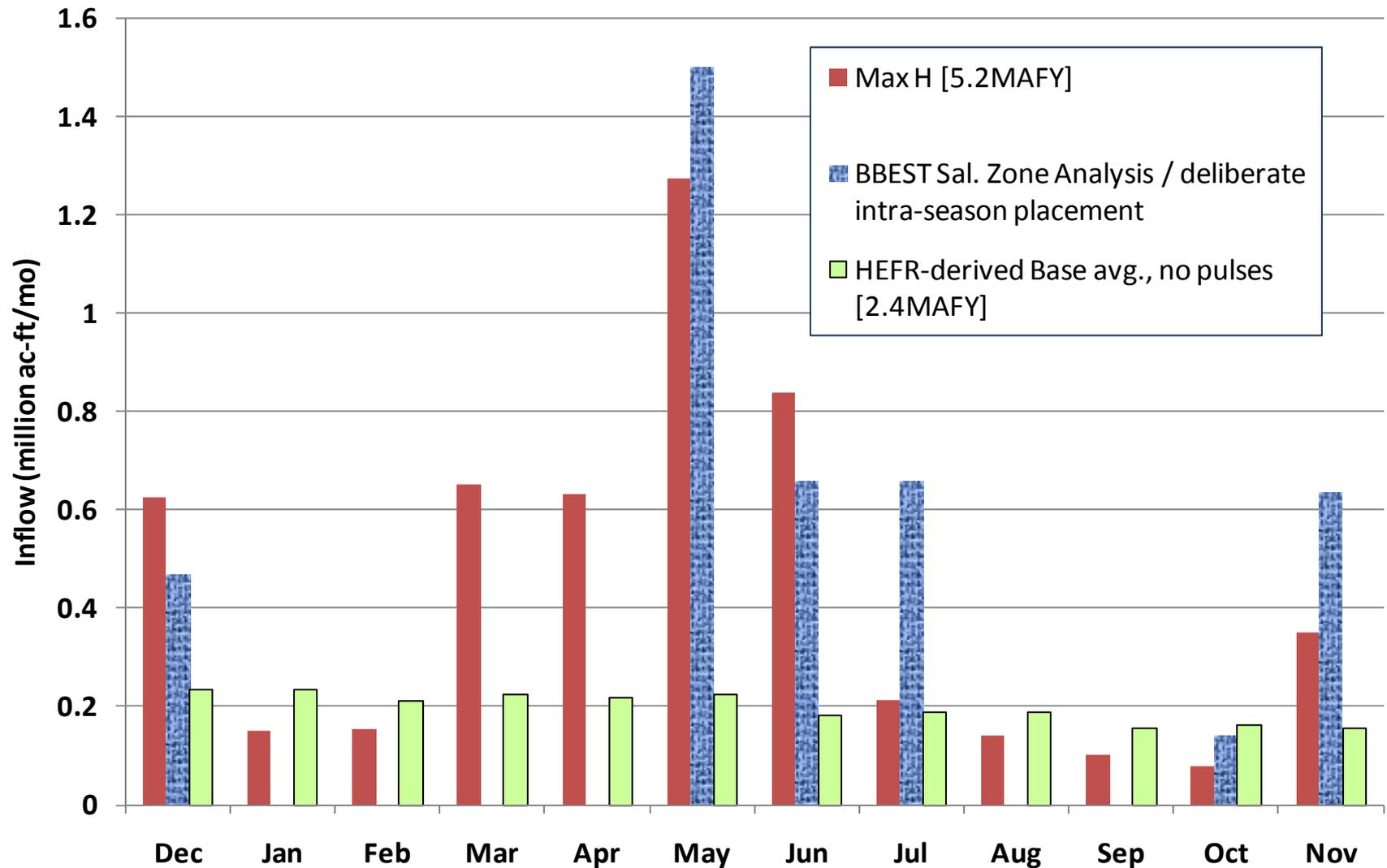
Trinity River - Compare Flows at Romayor vs. River Mouth: 2003



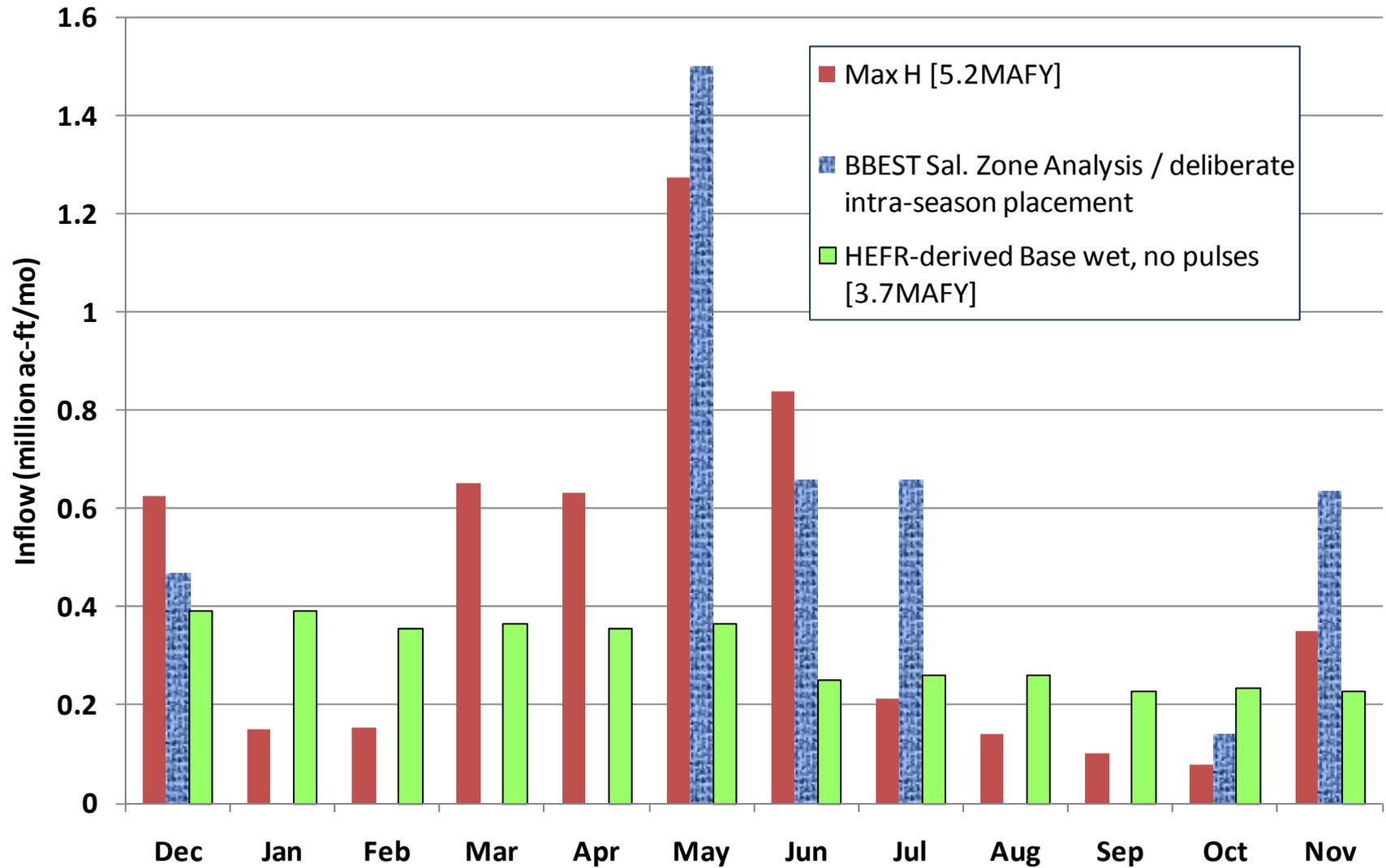
Example HEFR-Derived Inflow matrix: whole Trinity drainage

Overbank Flows	Q: 66,150 cfs with Frequency 1 per 2 years Volume is 2,399,592 Duration is 34											
	Q: 35,290 cfs with Frequency 2 per year Volume is 935,130 Duration is 19											
High Flow Pulses	Q: 24,400 cfs with Frequency 1 per season Volume is 564,924 Duration is 14			Q: 24,810 cfs with Frequency 1 per season Volume is 745,299 Duration is 17			Q: 9,593 cfs with Frequency 1 per season Volume is 144,730 Duration is 6			Q: 17,940 cfs with Frequency 1 per season Volume is 227,898 Duration is 7		
	Q: 12,660 cfs with Frequency 2 per season Volume is 205,319 Duration is 7			Q: 9,180 cfs with Frequency 2 per season Volume is 87,869 Duration is 6			Q: 3,892 cfs with Frequency 2 per season Volume is 18,794 Duration is 3			Q: 6,935 cfs with Frequency 2 per season Volume is 44,533 Duration is 3		
	3782(62.9%)			3784(67.1%)			2351(48.1%)			1970(37.6%)		
	2091(73.7%)			2077(78.5%)			1638(64.0%)			1318(49.3%)		
Base Flows (cfs)	1370(82.5%)			1457(87.8%)			1166(79.8%)			852(61.0%)		
	533			993			661			191		
Subsistence Flows (cfs)	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	Winter			Spring			Summer			Fall		

Galveston Bay: Compare Monthly Inflow Volumes of Various Methods Salinity Zone / HEFR-based / MaxH



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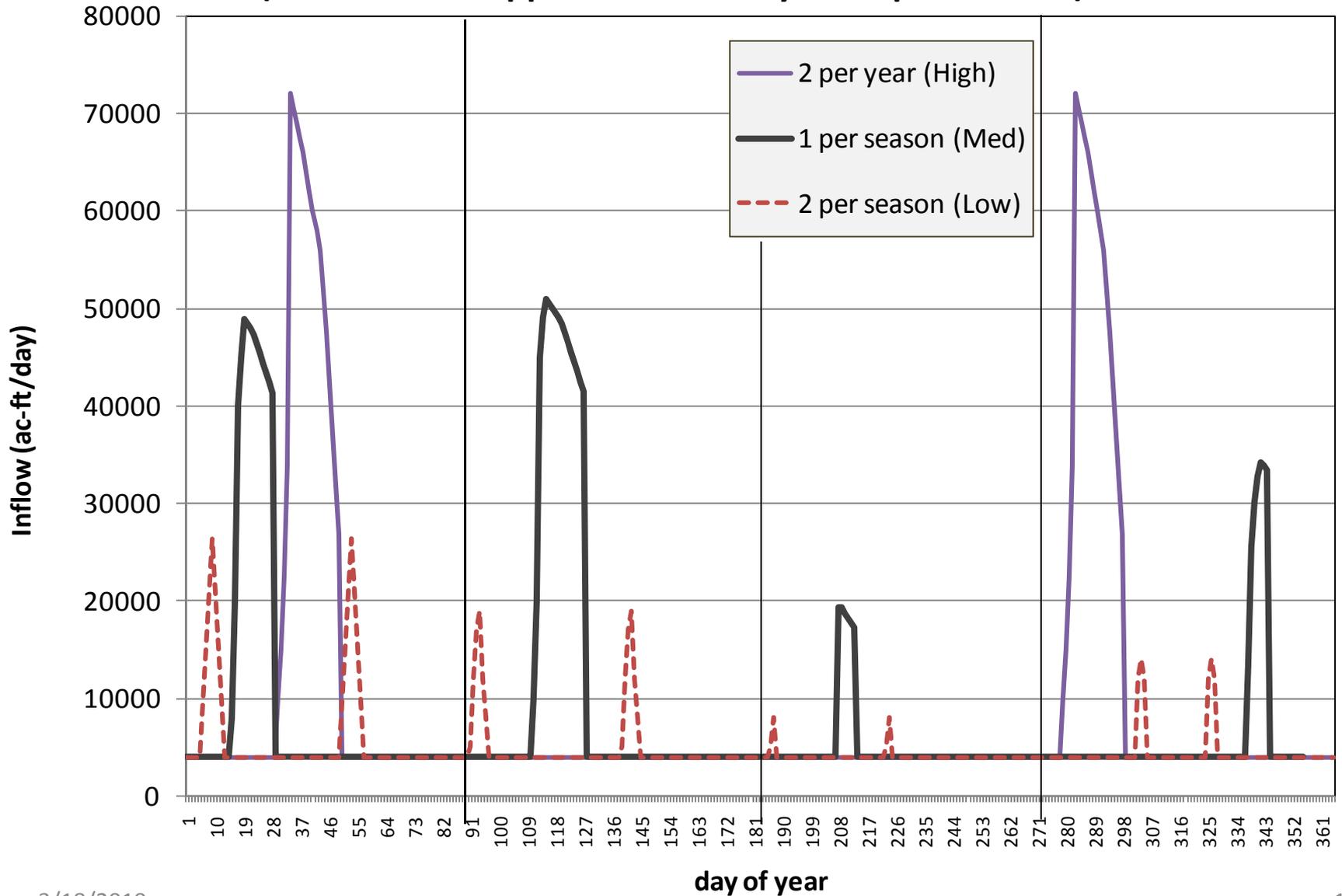
“... inflow pulses provide inflow variability, conditions thought to be needed to sustain oyster reef health, improve benthic conditions and provide suitable marsh, shellfish and finfish habitat.”

[SAC Bay & Estuary Guidance, Sec. 4.3.1]

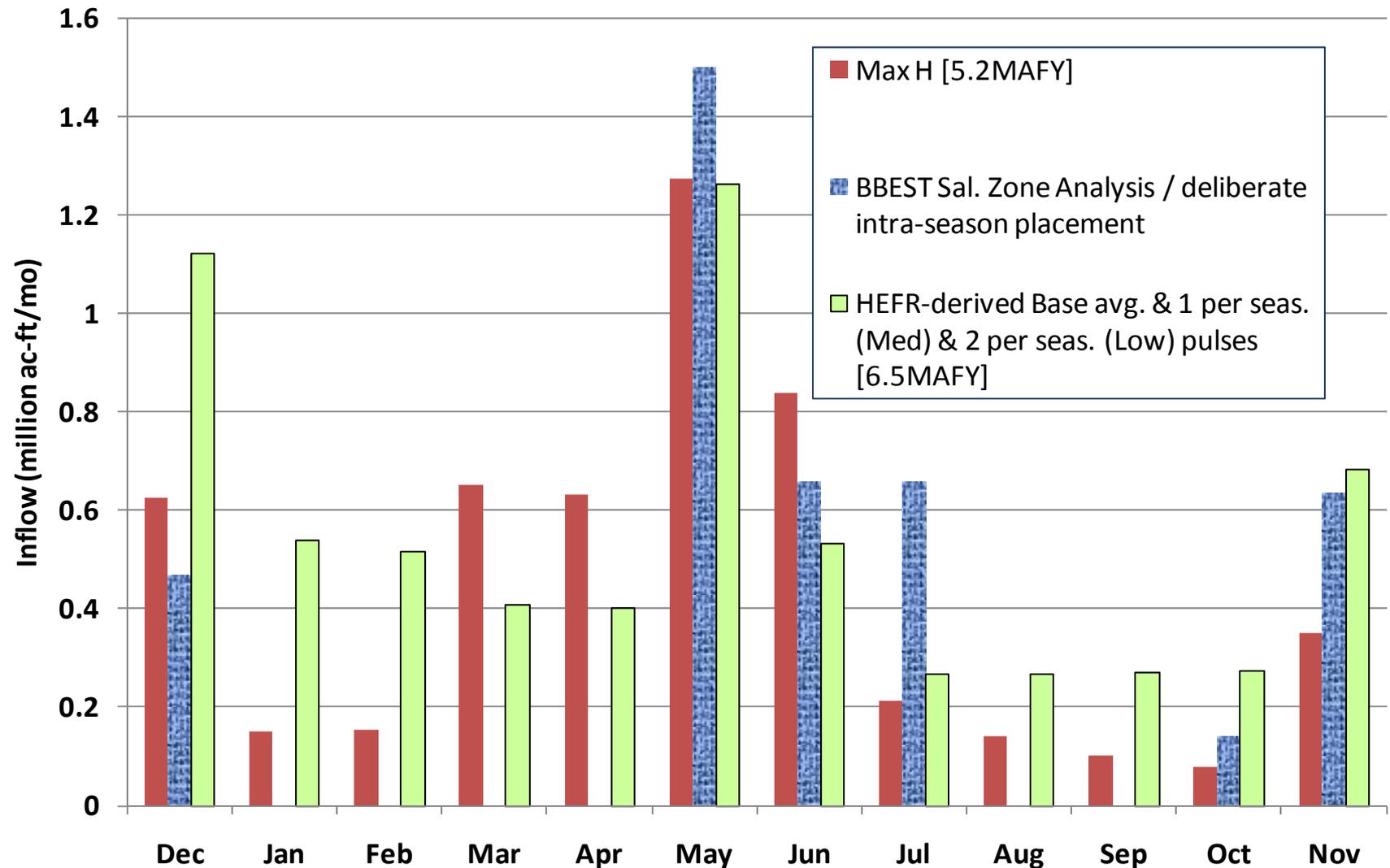
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	<p>Q: 12,660 cfs with Frequency 2 per season Volume is 205,319 Duration is 7</p>			<p>Q: 9,180 cfs with Frequency 2 per season Volume is 87,869 Duration is 6</p>			<p>Q: 3,892 cfs with Frequency 2 per season Volume is 18,790 Duration is 3</p>			<p>Q: 6,935 cfs with Frequency 2 per season Volume is 44,533 Duration is 3</p>			Low
	3782(62.9%)			3784(67.1%)			2351(48.1%)			1970(37.6%)			
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HEFR-derived High Flow Pulse Tiers (illustration of approximate Trinity basin pulses sizes)

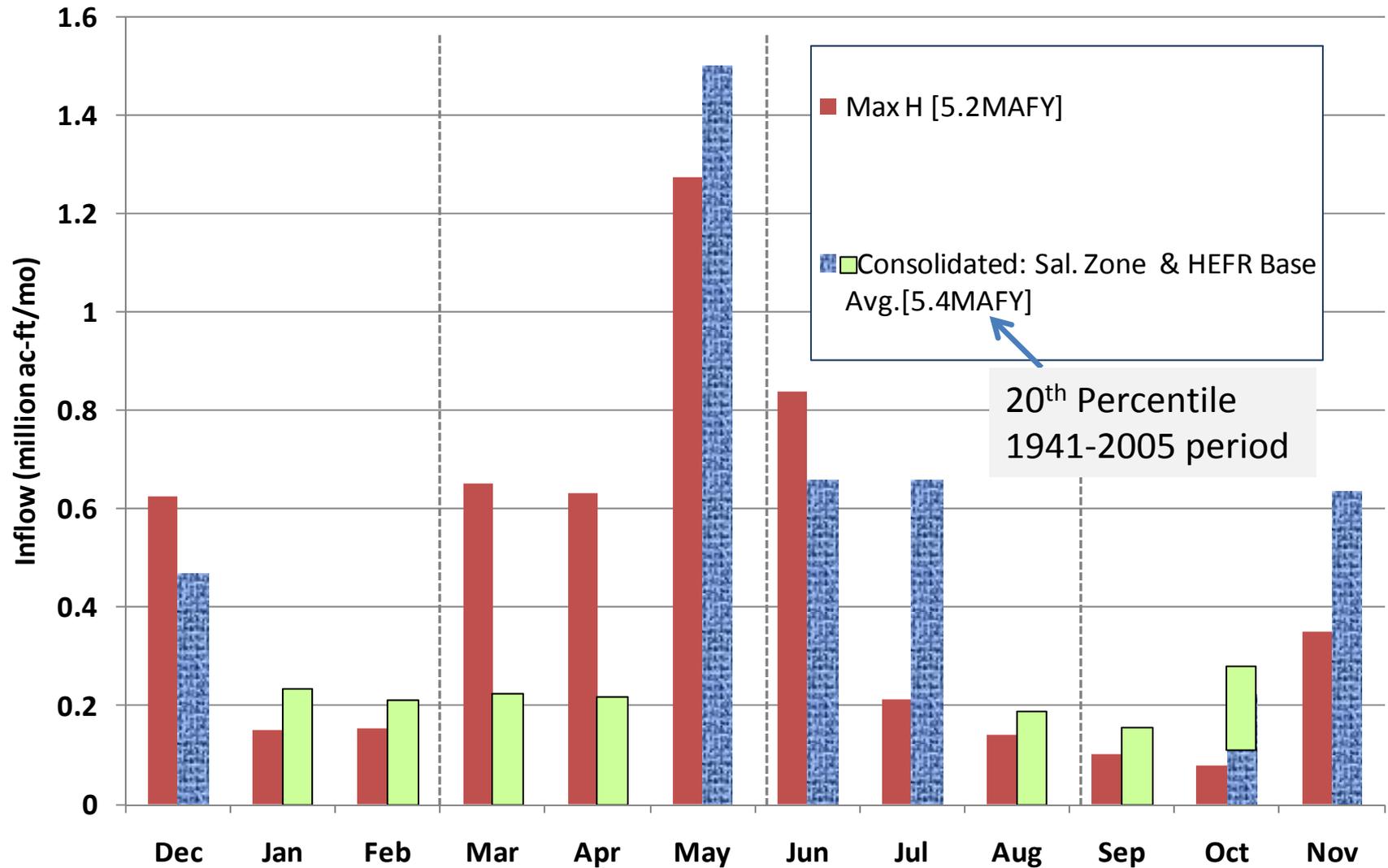


Galveston Bay: Compare Monthly Inflow Volumes of Various Methods Salinity Zone / HEFR-based / MaxH

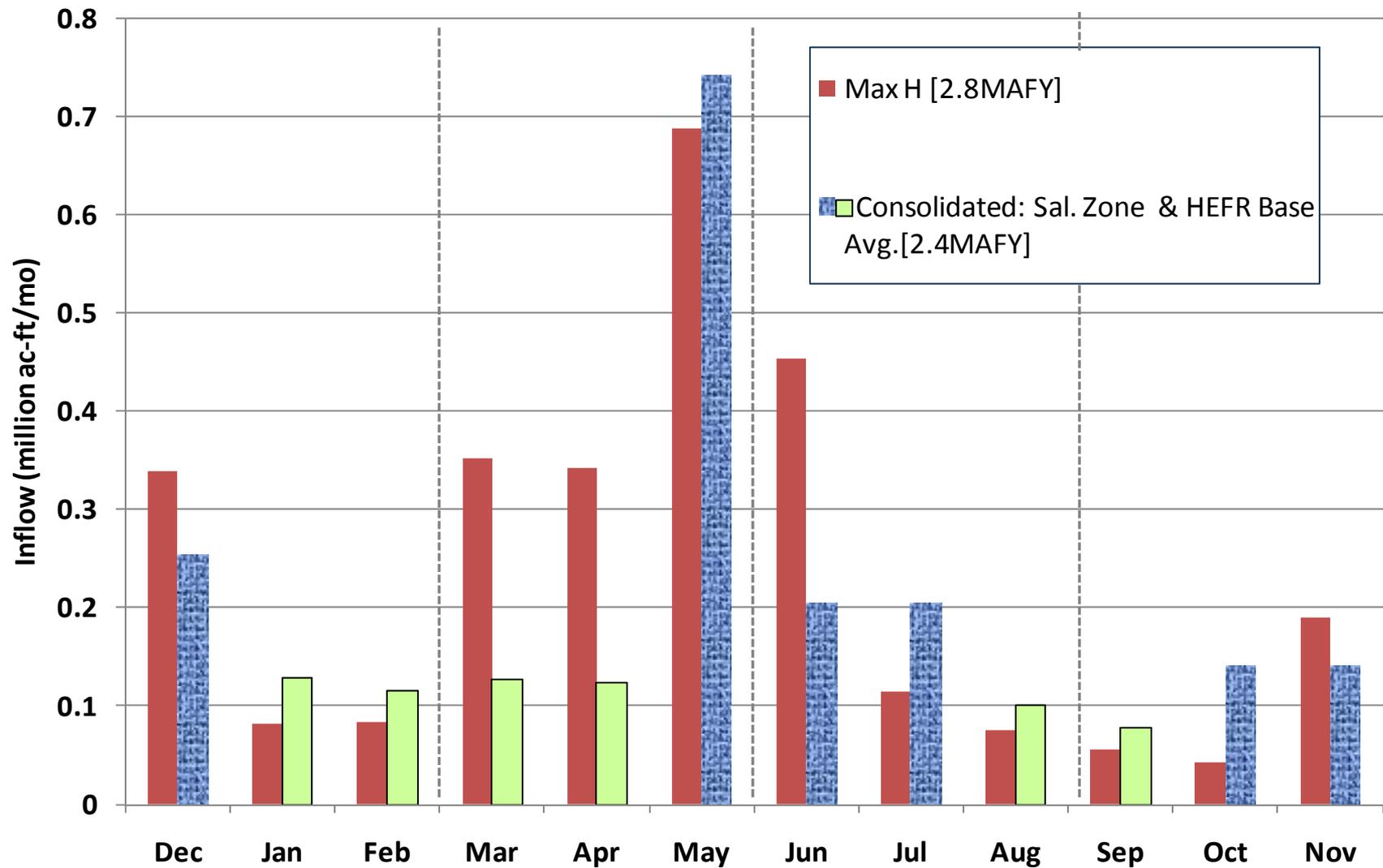


Galveston Bay: Compare Monthly Inflow Volumes of Various Methods

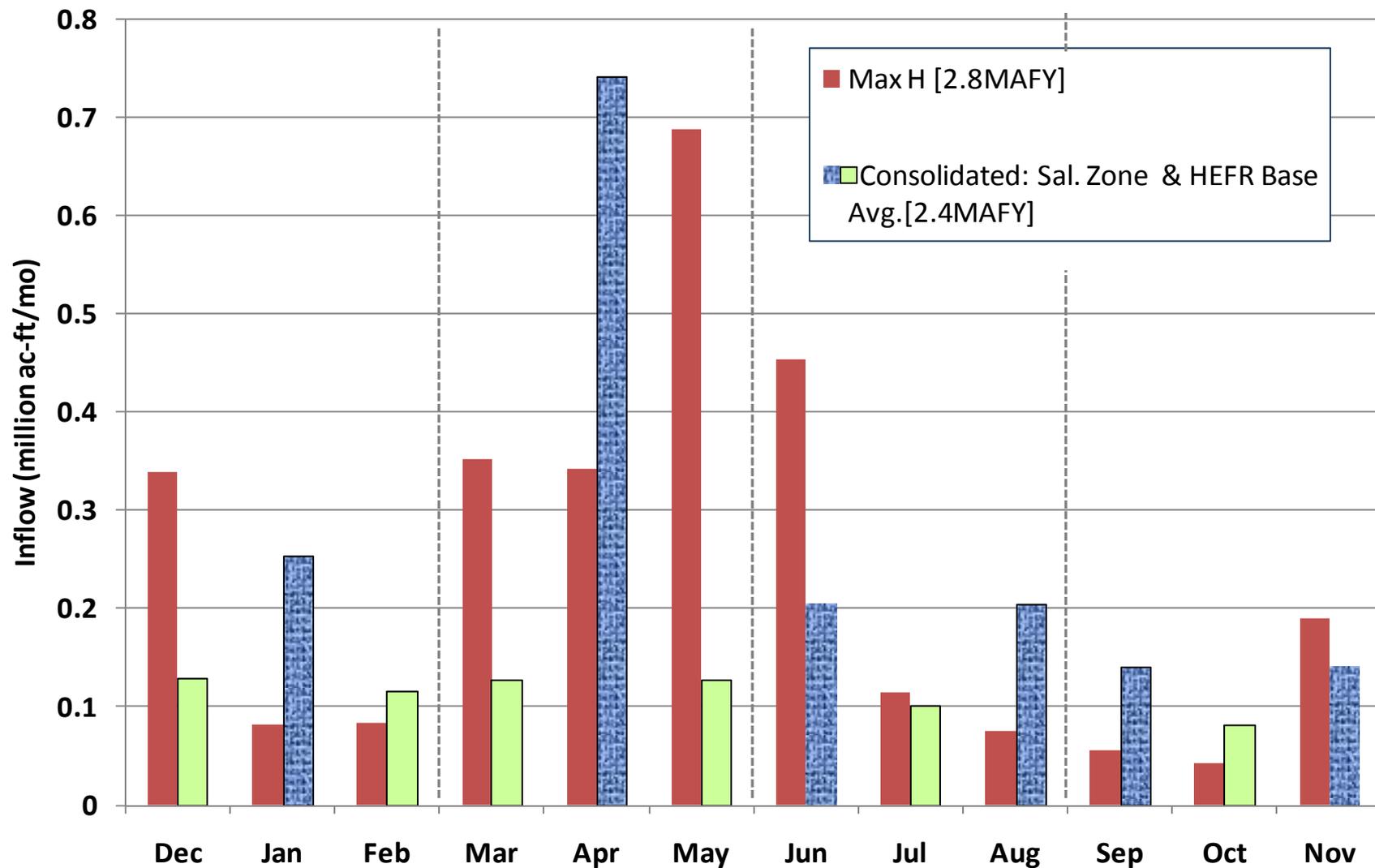
Salinity Zone / HEFR-based / MaxH



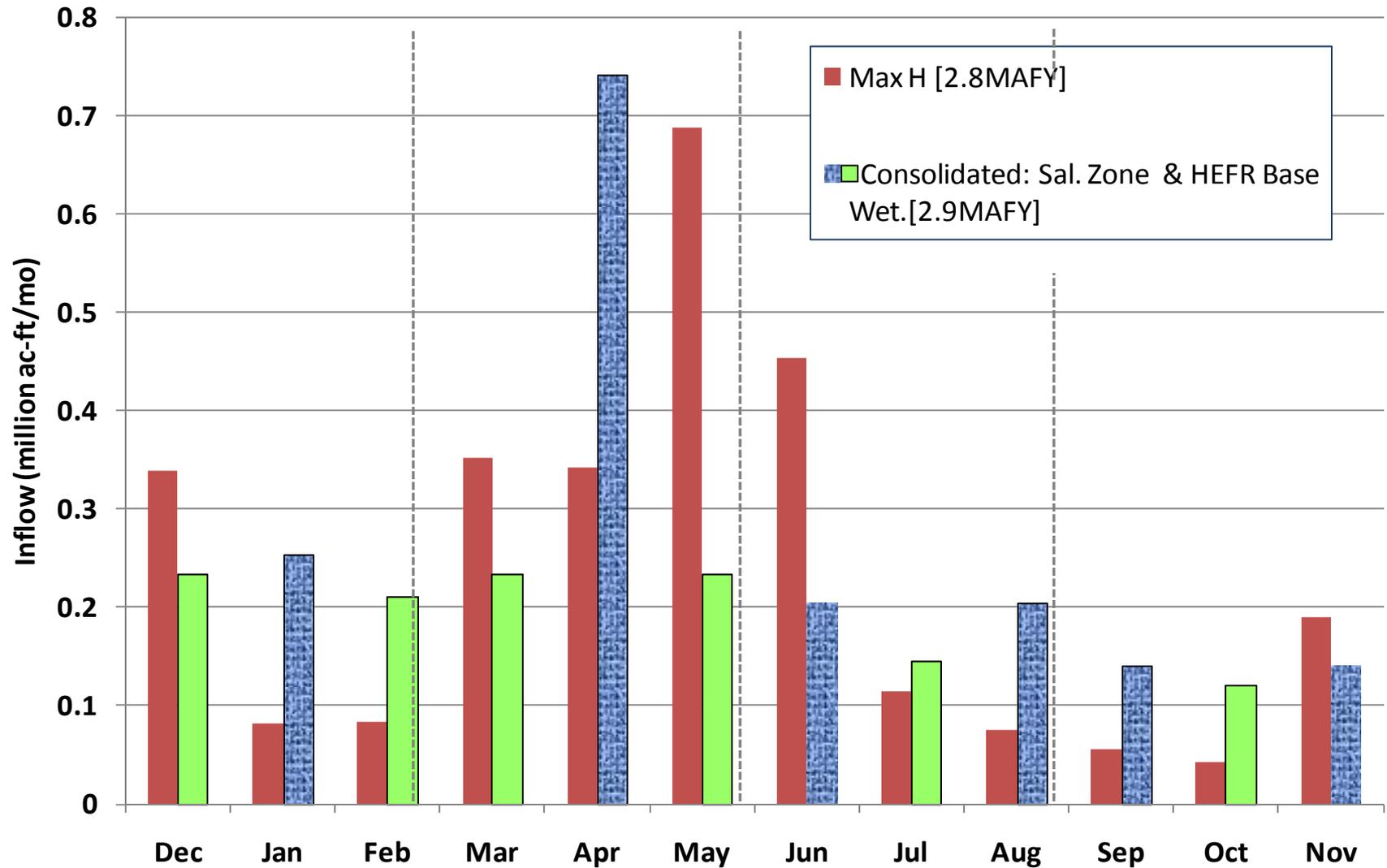
Trinity Basin Portion: Compare Monthly Inflow Volumes of Various Methods Salinity Zone / HEFR-based / MaxH



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Trinity Basin Portion: Compare Monthly Inflow Volumes of Various Methods Salinity Zone / HEFR-based / MaxH



Conclusions

- the BBEST's salinity-zone inflow recommendations can be consolidated with HEFR-based inflows to arrive at inflows comparable in volume to the States' Methodology.
- there is reasonable seasonal alignment between the State Methodology recommendations and a consolidated approach based on BBEST methods.
- protecting proposed instream flow regimes, including base flows & high flow pulse components, also appears to provide reasonable mid-level estuary inflows.

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