

Environmental Flow Regime Trinity and San Jacinto Rivers

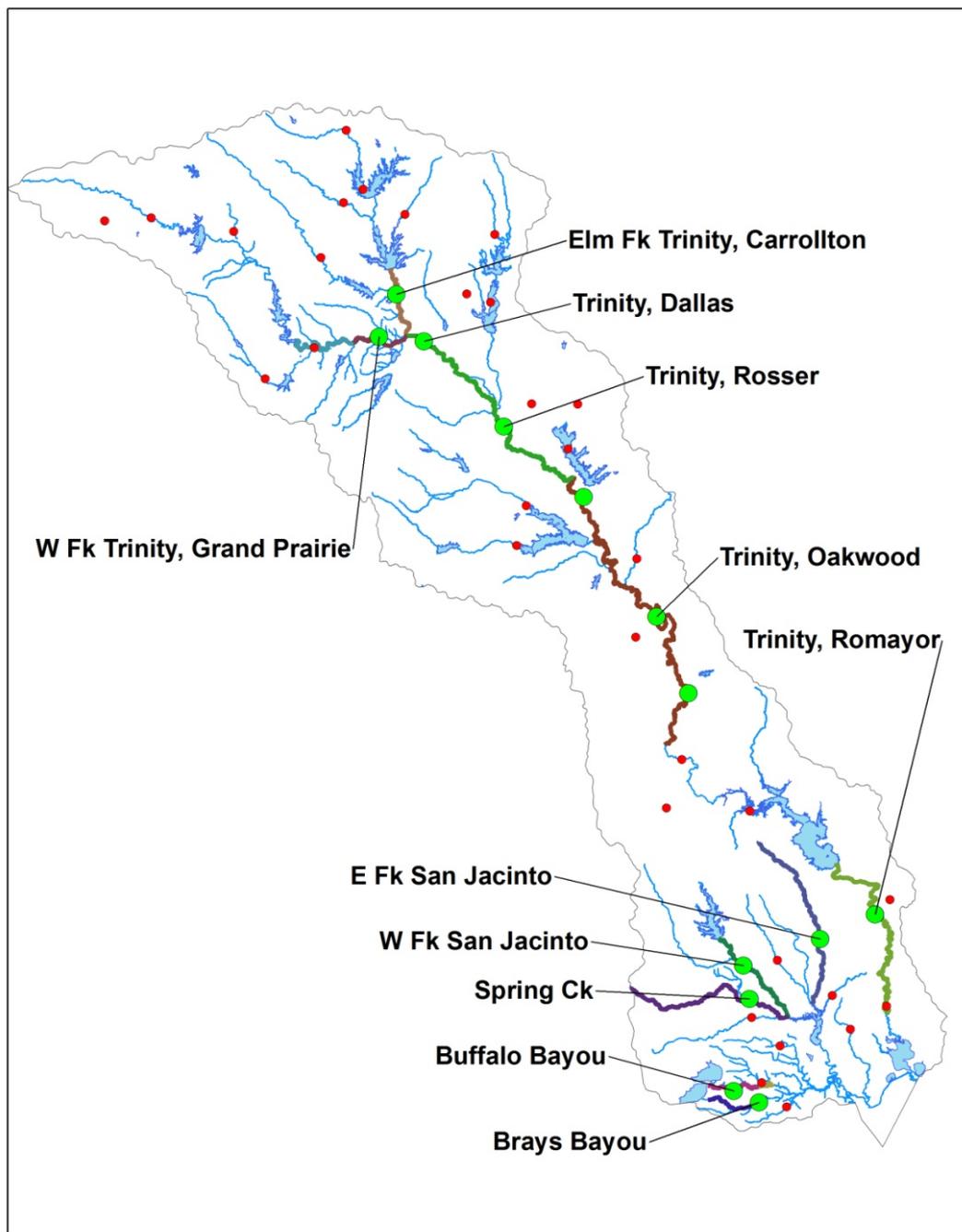
**Presentation to the
Texas Environmental Flows Science Advisory Committee**

January 13, 2010

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Trungale, and Woody Woodrow

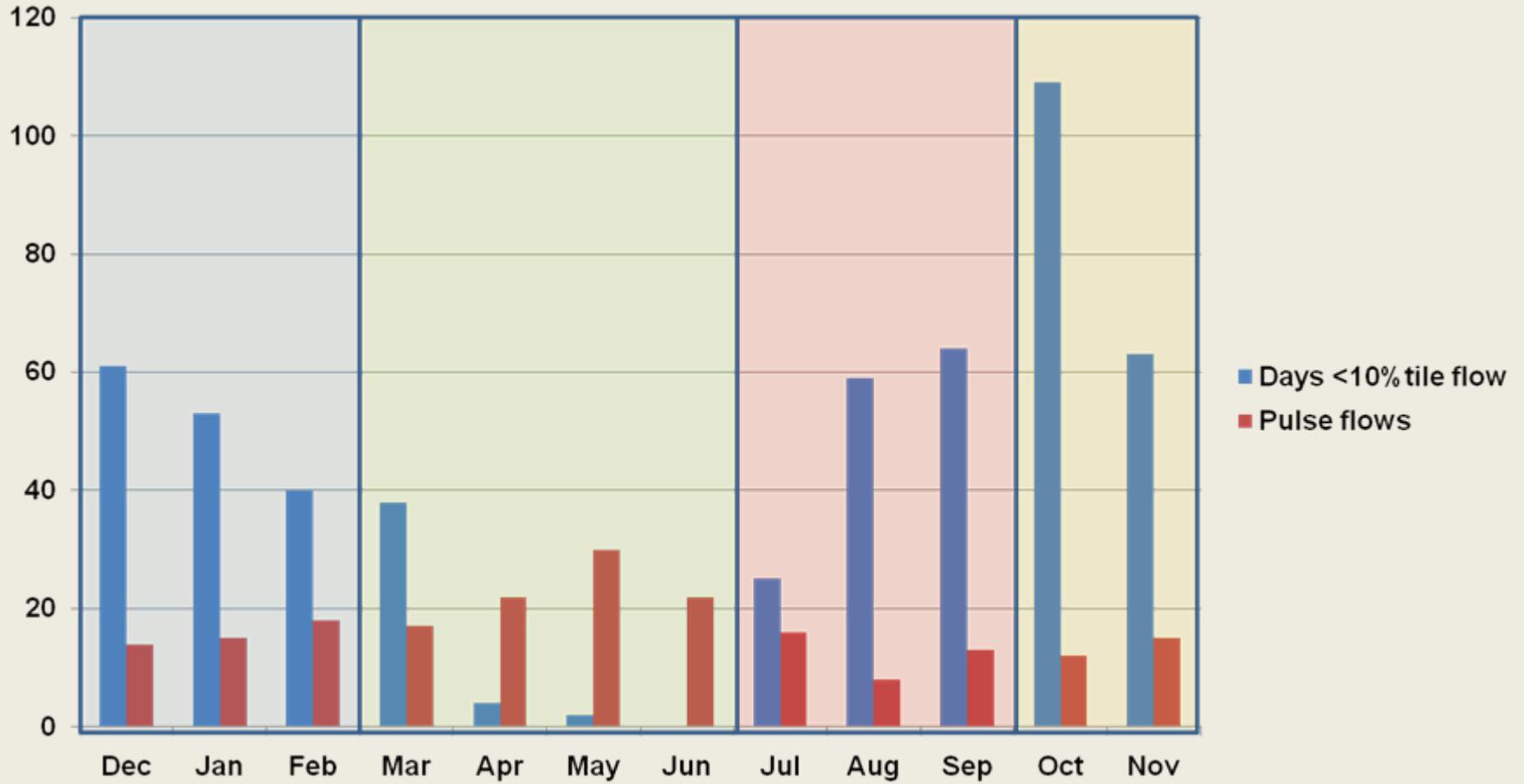
NAS (2005) Science of Instream Flows

- *“Hydrology and Hydraulics.* The convention of instream flow science is changing ... to a range of flows that account for seasonal and inter-annual variation, magnitude, timing, frequency, and rate of change (IFC, 2002; Poff et al., 1997; Postel and Richter, 2003).
- These hydrologic attributes translate into different levels of flow: subsistence flows, base flows, high flow pulses, and overbank flows.” pg. 33

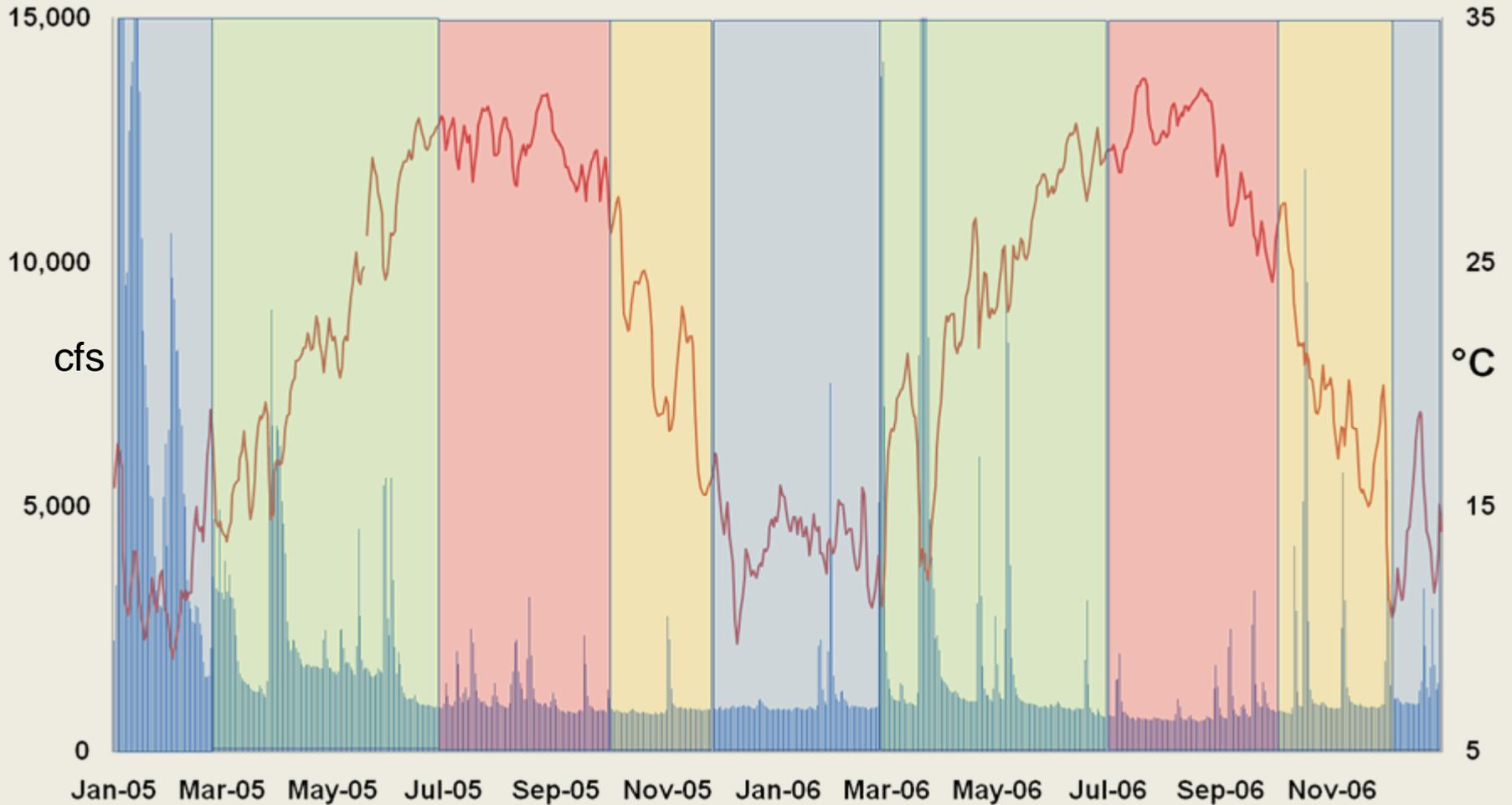


Trinity at Rosser

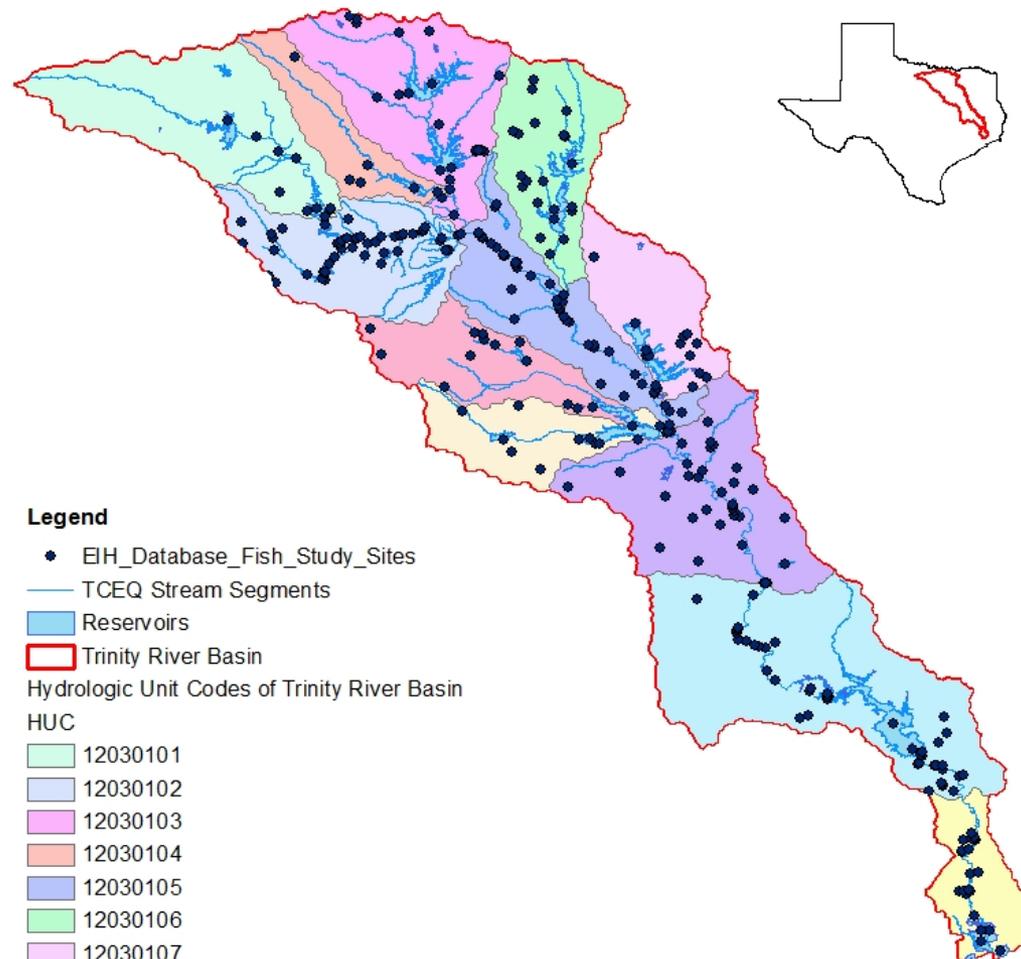
Season selection



Trinity at Rosser

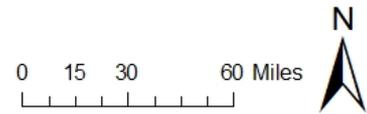


EIH Trinity River Database Fish Study Sites



Legend

- ◆ EH_Database_Fish_Study_Sites
 - TCEQ Stream Segments
 - Reservoirs
 - ▭ Trinity River Basin
- Hydrologic Unit Codes of Trinity River Basin
- HUC
- 12030101
 - 12030102
 - 12030103
 - 12030104
 - 12030105
 - 12030106
 - 12030107
 - 12030108
 - 12030109
 - 12030201
 - 12030202
 - 12030203



Dry Base Flow (25th percentile)

Shallow riffles and pools

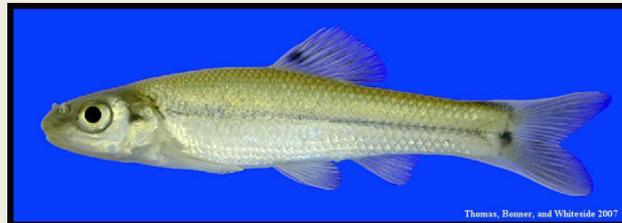
- **Blacktail shiners, juvenile flathead and channel catfish**
- **Riffle-adapted invertebrates**



Normal Base Flow (35th percentile)

Pools and backwaters

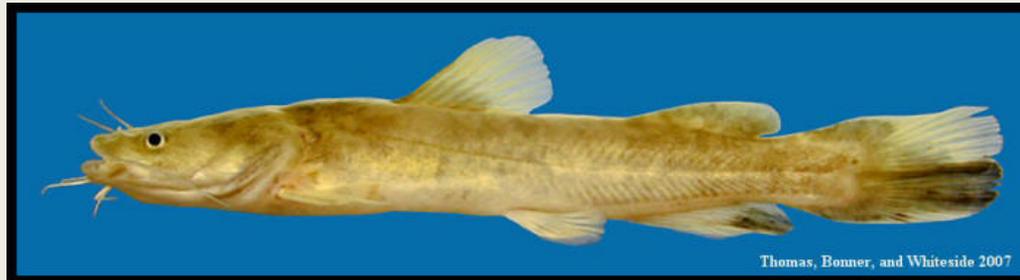
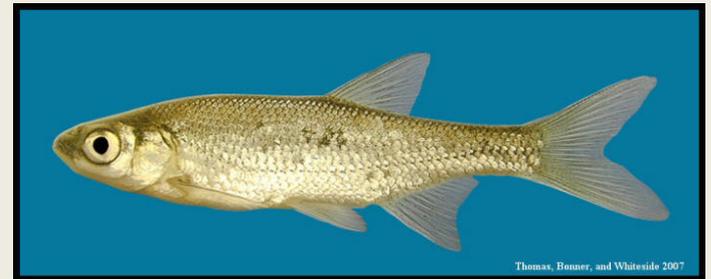
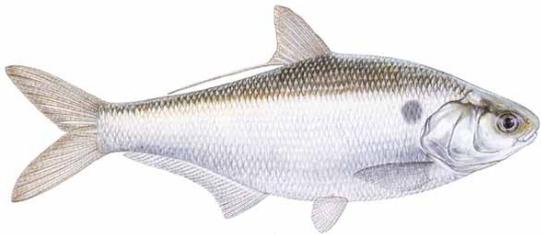
- Bullhead minnow, largemouth bass, bluegill sunfish
- Water stored in stream banks supports shoreline plants



Wet Base Flow (50th percentile)

Deep pools and runs

- Golden shiner, gizzard shad, flathead catfish
- Water stored in stream banks



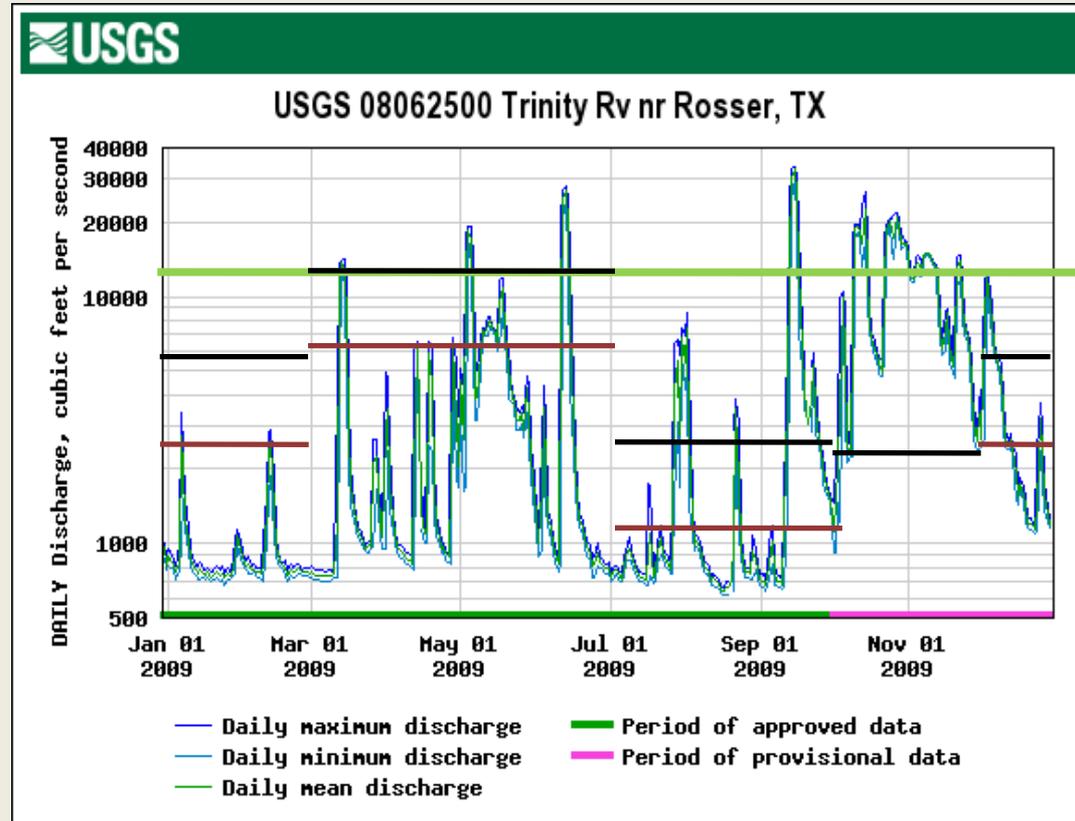
East Fork San Jacinto at Cleveland

25th percentile daily average flow (1940-2009)



Pulse Flows

- Spawning triggered
- Seeds deposited and germinating for riparian plants
- Water into tributaries, sloughs, backwaters, and riparian zones
- Saturation of high banks
- Woody debris moved



- Very High Pulse 1/season
- Low Pulse 2/season
- High Pulse 1/season

Trinity at Romayor

50th percentile daily average flow



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30°06'54.85" N 94°48'30.66" W elev 28 ft

Trinity River at Oakwood

Aug 19, 1985, flow=641 cfs



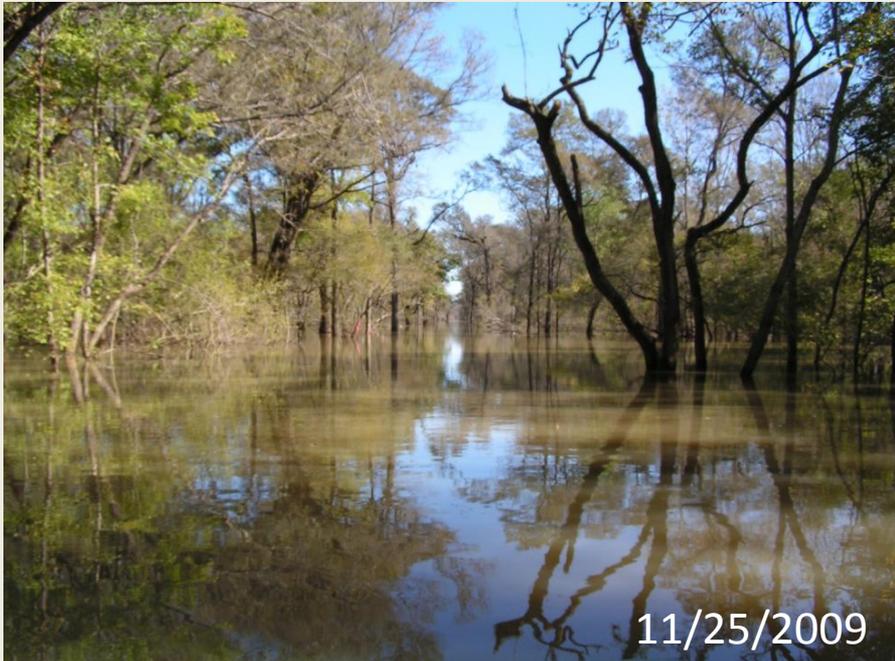
**Trinity at Oakwood –Oct.17, 1994-Feb. 7, 1995
(unpublished NWF analysis)**





9/9/2009

11.02.2009



11/25/2009

Trinity nr Oakwood

- Overbank flow near 60,000 cfs
- Flow over 20,000 cfs for 25 days

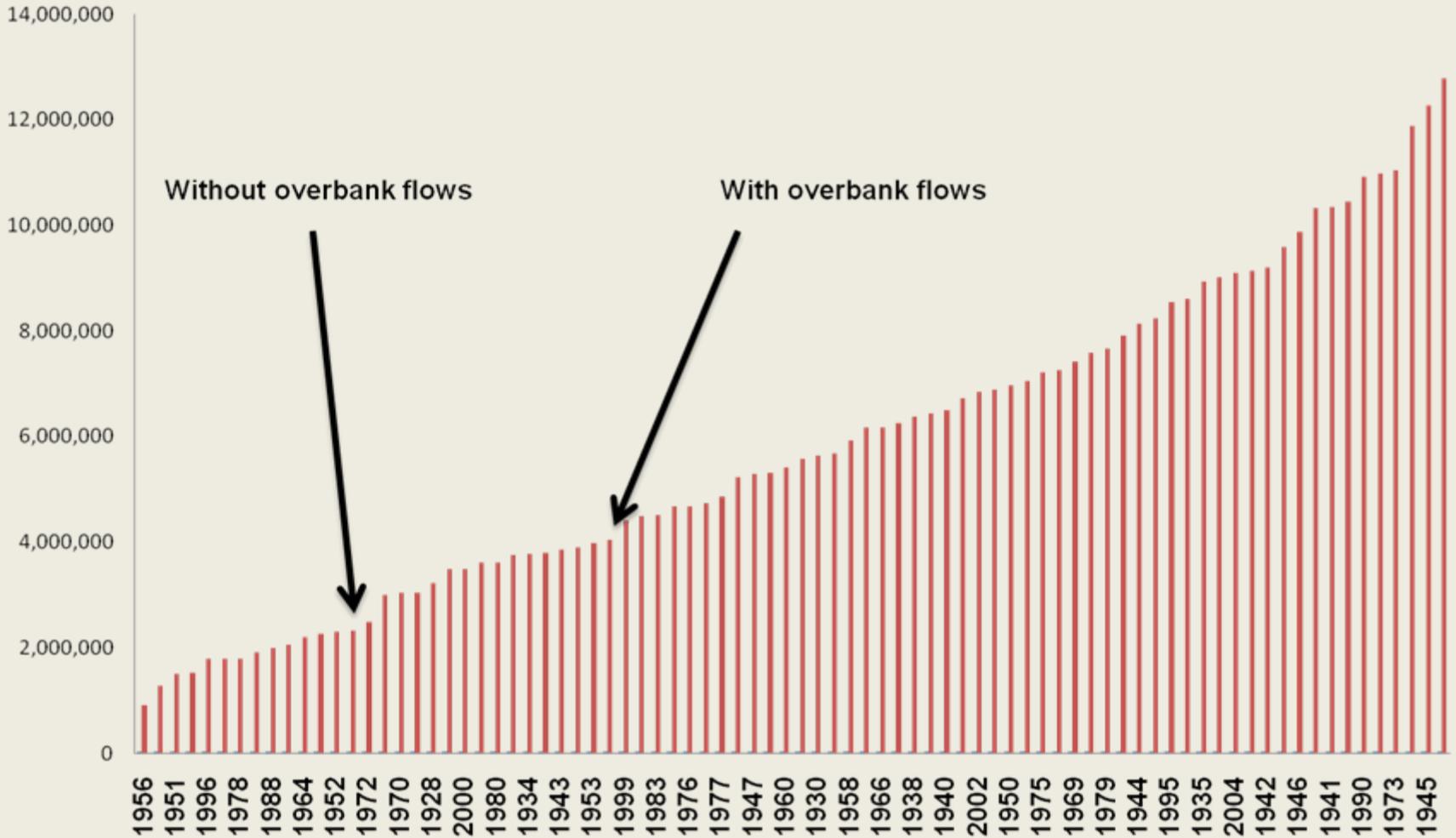
Overbank Flows

- **Gar spawn, juveniles and larvae dispersed into isolated water bodies**
- **Water, sediment, nutrients nourish floodplain**
- **Scouring and depositional features created and maintained**
- **Adjacent water bodies flushed, recolonized by aquatic species**
- **Maintains plants in their respective hydrologic habitat**



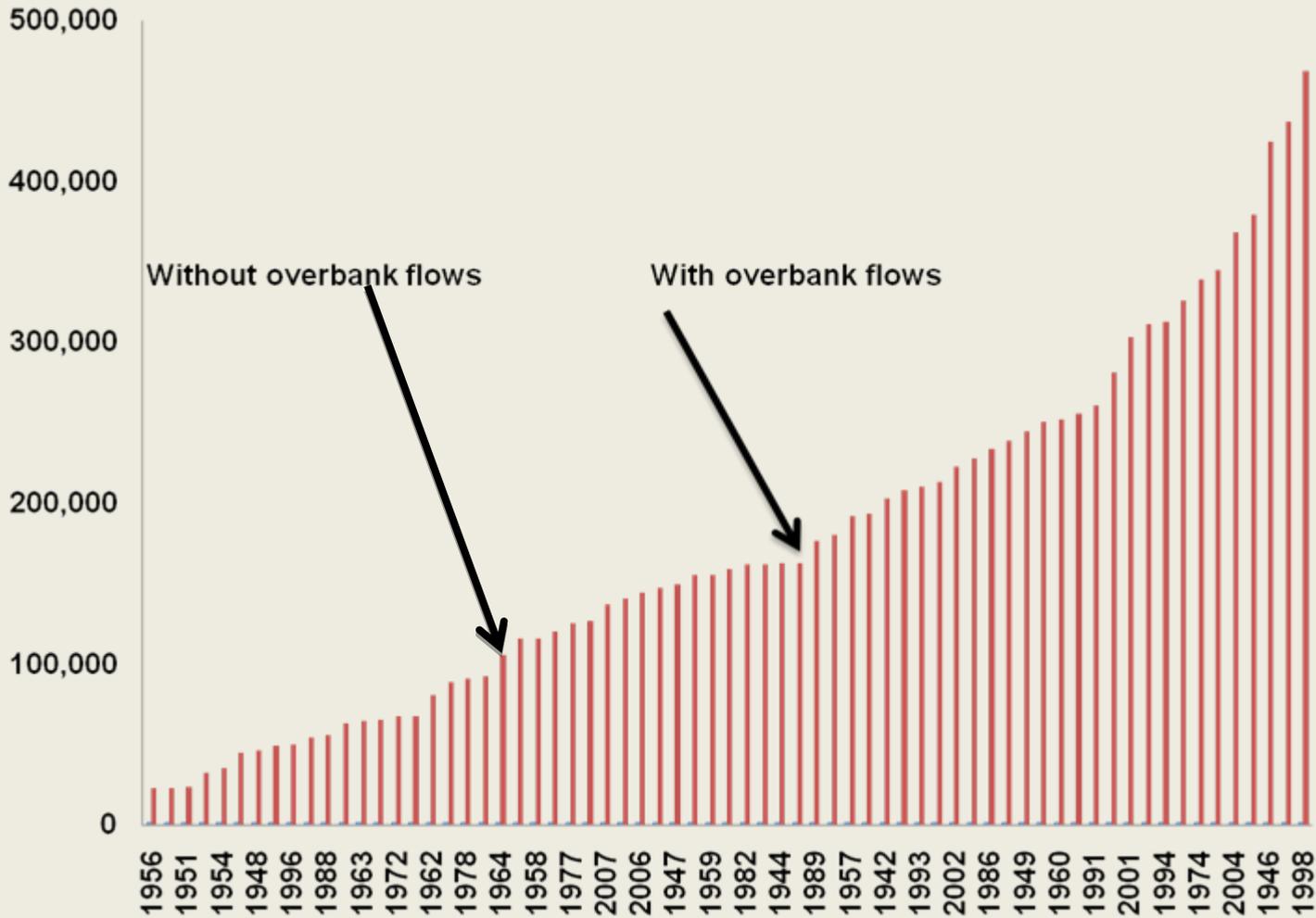
Trinity at Romayor

Total annual flow (acre-ft)



East Fork San Jacinto at Cleveland

Total annual flow (acre-ft)



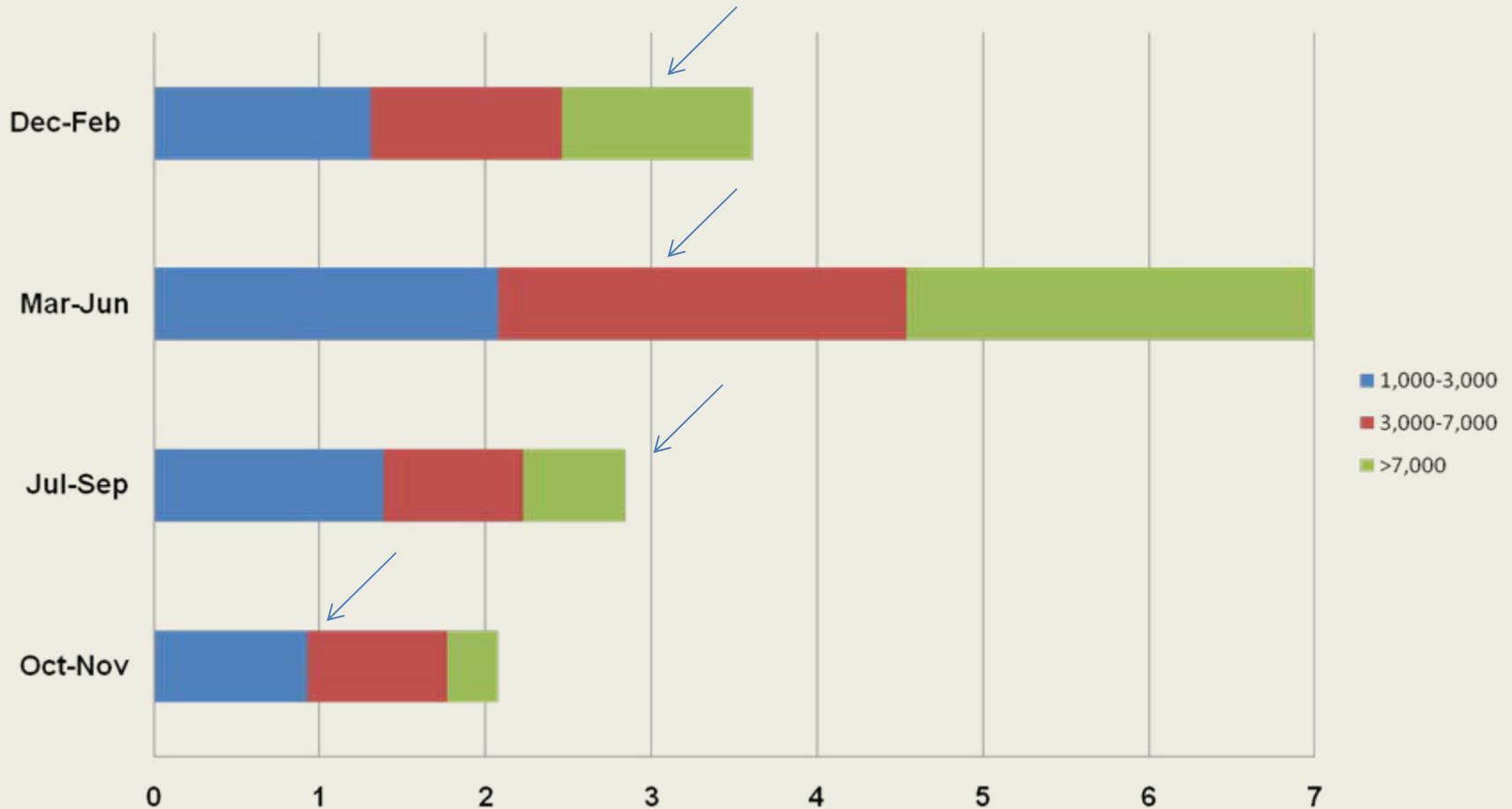
Trinity at Rosser

(Percent occurrence of subsistence and base flows from 10/87 to present)

	Subsistence	Dry	Normal	Wet
Winter	0	0	<.1	16
Spring	0	0	2	38
Summer	0	0	0	1
Fall	0	0	0	2

Trinity at Rosser

Mean number of pulses (1939-1952)



Uncertainty

Decreases – with subsistence and base flows greater than flow regime recommendation

Increases – with subsistence and base flows lower than flow regime recommendation

Increases – with distance from flow regime site on the Trinity River

Increases – in tributaries

Questions

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