

Evaluation of Environmental Flow Recommendations in the Sabine River Basin WAM

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Background

Goals and Objectives

- Evaluate the frequency of attainment of SN BBEST environmental flow recommendations
- Determine potential impacts of these recommendations on future/existing water permit applications and potential amendments
- Determine potential impacts of these recommendations on water levels in the Toledo Bend Reservoir

Background

- Water Availability Model (WAM)
- Simulating Water Use Scenarios
 - Full Authorization
 - Current Use
- Sabine River Basin
 - Current water use is significantly less than the full authorization amounts
 - Potential projects to meet future water demands
 - Increase permitted amount at Toledo Bend Reservoir
 - Construct a new reservoir downstream of Lake Tawakoni (proposed Mineola Reservoir) or on Big Sandy Creek (proposed Big Sandy Reservoir)

Background

- SN BBEST Environmental Flow Recommendations

		Qp: 28,700 cfs with Frequency 1 per year Volume is 931,140			
		Qp: 20,600 cfs with Frequency 1 per season Volume is 690,800 Duration is 17	Qp: 16,500 cfs with Frequency 1 per season Volume is 483,992 Duration is 21	Qp: 7,360 cfs with Frequency 1 per season Volume is 175,009 Duration is 14	Qp: 8,960 cfs with Frequency 1 per season Volume is 249,617 Duration is 17
Base Flows (cfs)		15400	6680	1120	1110
		5870	1590	656	615
		1460	857	478	478
		479	279	241	241
Subsistence Flows (cfs)	Translation of seasonal subsistence flows into environmental flow standards and permit conditions should not result in more frequent occurrence of flows less than the recommended seasonal subsistence values as a result of the issuance of new surface water appropriations or amendments.				

- Overbank Flows
- High-Flow Pulses (Upper and Lower)
- Base Flows
- Subsistence Flows

Methodology

Methodology

- Convert SN BBEST Environmental Flow Recommendations to equivalent daily volumes and compare them to available monthly flows
- Establish classification rules
 - An Overbank Flow counts towards any High-Flow Pulse requirements during the season in which it occurs
 - An Upper High-Flow Pulse counts in place of one Lower High-Flow Pulse during the season in which it occurs
 - When available daily volume does not satisfy High-Flow Pulse or Overbank Flow criteria, a Base Flow is applied
 - When available daily volume does not satisfy Base Flow criteria, a Subsistence Flow is applied

Results

Results

Table 1: SN BBEST Environmental Flow Recommendations – Impacts on Toledo Bend Reservoir (Hydropower Pool at 168 feet)

Conditions	Firm Yield (ac-ft)	Environmental Flow Impact (ac-ft)	SRA-TX Firm Yield* (ac-ft)
Base Model	1,909,000	-	954,500
Subsistence Flows	1,870,000	(39,000)	915,500
Subsistence and Base Flows	1,674,000	(235,000)	719,500
Subsistence, Base, and Pulse Flows	1,292,000	(617,000)	337,500
Subsistence, Base, Pulse, and Overbank Flows	1,236,000	(673,000)	281,500

*SRA-TX currently holds a water rights permit for 750,000 ac-ft/yr

Results

Table 2: SN BBEST Environmental Flow Recommendations – Impacts on Mineola Reservoir

Conditions	Firm Yield (ac-ft)	Environmental Flow Impact (ac-ft)
Base Model	182,000	-
Subsistence Flows	169,000	(13,000)
Subsistence and Base Flows	153,000	(29,000)
Subsistence, Base, and Pulse Flows	136,000	(46,000)
Subsistence, Base, Pulse, and Overbank Flows	136,000	(46,000)

Results

Table 3: SN BBEST Environmental Flow Recommendations – Impacts on Big Sandy Reservoir

Conditions	Firm Yield (ac-ft)	Environmental Flow Impact (ac-ft)
Base Model	51,000	-
Subsistence Flows	50,000	(1,000)
Subsistence and Base Flows	35,000	(16,000)
Subsistence, Base, and Pulse Flows	27,000	(24,000)
Subsistence, Base, Pulse, and Overbank Flows	24,000	(27,000)

Thank You

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