

*Stream Flow Assessment for  
Regional and State Water  
Planning*



**Texas Water Development Board  
Jan 2004**

**Brazos G RWPG, Agenda Item 7.7(a), 3/23/04**

# *Concurrent Stream and Instream Flow Studies*

- Texas Instream Flow Program - SB2 required, 3 agencies with review by the National Academy of Sciences
- TPWD Instream Flow Study - focuses on instream flows and environmental impacts
- TWDB Stream Flow Assessment - assesses impact of WMS on stream flow

# *Setting the Stage*



- **PURPOSE** - Provide the regions information on naturalized, current (Runs 3 & 8), and future stream flows (Run 3)
- No analysis/determination of environmental needs
- For use in 2007 State Water Plan

# *Requested Input from the Regions*



- Comment on the proposed methodology
- Recommend 3-5 control points per basin per region
- Selection of statistics and format of results

# *Timeline*



- Naturalized and Current stream flows completed about June 1, 2004. Request written input by end of March.
- Initially Prepared Plan (IPP) due June 1, 2005
- Future stream flow assessment will be prepared during the 120 day review period for the IPP & submitted to RWPG

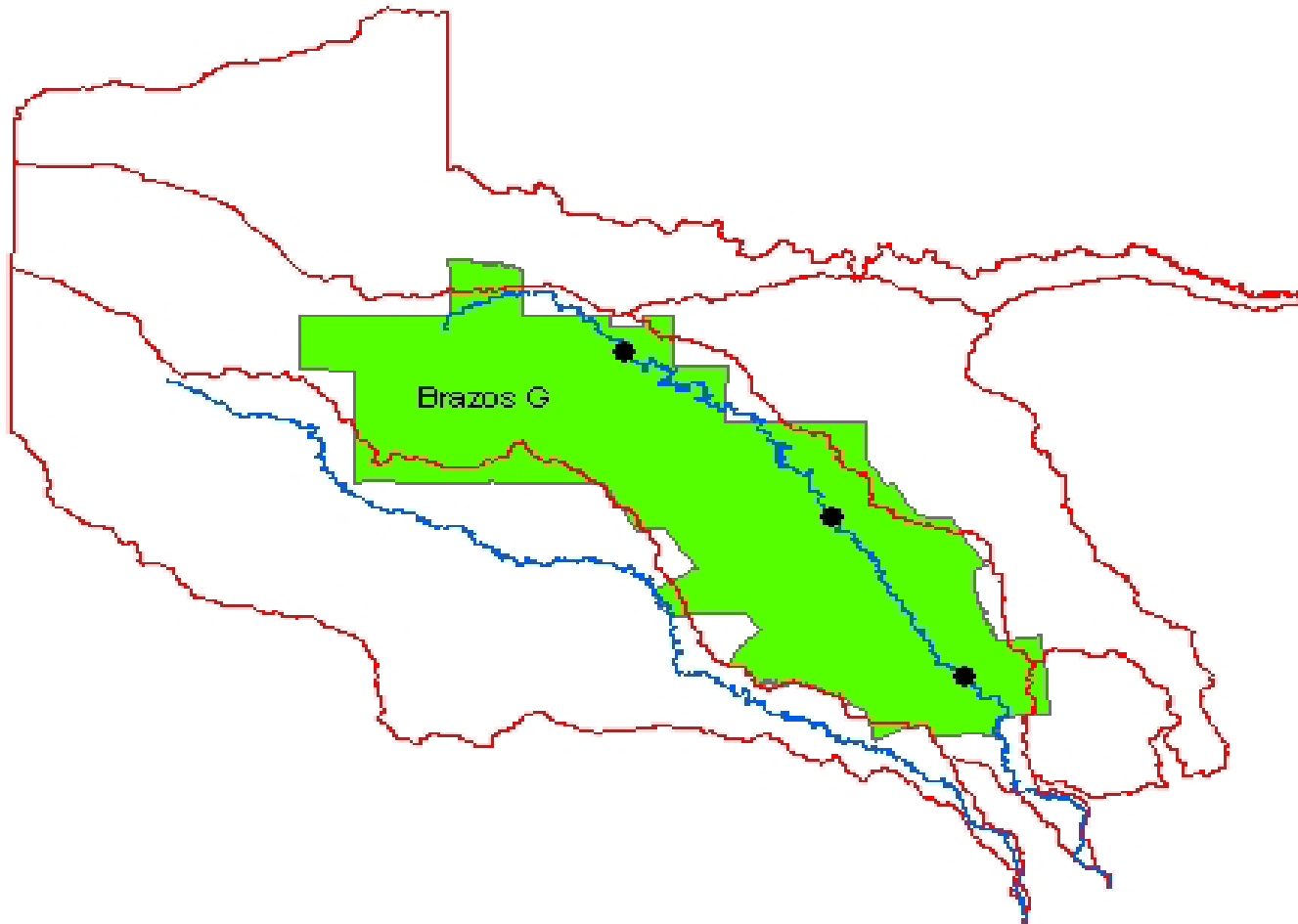
# *Technical Discussion*



Barney Austin

Texas Water Development Board

# *Region G*



# *The Plan - It Is All About Flows*

- Select locations for assessment, and model and evaluate stream flow at selected locations (control points) under various scenarios
- Two-Phase approach:
  - Phase I: assess flows under natural and current conditions
  - Phase II: assess flows under future conditions including proposed water management strategies

# *Method - Phase I*

- Select 3 - 5 control points for stream flow assessment
- At selected control points, evaluate flow data under natural and current conditions
- Provide the flow assessment results to the Planning Groups

## *Method - Phase II*



- Identify the proposed strategies that may impact stream flow
- At selected control points, develop and evaluate flow data with implementation of these proposed strategies
- Provide the flow assessment results to the Planning Groups

# *Derivation of Flow Data*

- Use TCEQ Water Availability Model (WAM) to derive monthly flow data
- WAM flow data under various scenarios:
  - naturalized flow data
  - current conditions: Run8 (maximum diversion, term permit, return flow) and Run3 (authorized diversion, no term permit, no return flow) regulated flow data
  - Future condition: Run3 regulated flow data with proposed strategies

# *Flow Assessment*

- Compare current Run8 and Run3 flows with the naturalized flow
- Compare future Run3 flow with the naturalized and current flows
- Compare flows using meaningful statistics.
  - e.g. 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup> percentiles, and mean
- Plot annual flow hydrographs

# *Input From Planning Groups*

- Determine the specific location of control points for stream flow analyses
- Recommend statistics to describe flow status
- Help to identify the strategies that may affect stream flow

# *Information Revealed by This Analysis*



- How stream flow has changed
- How stream flow will likely change in response to the proposed strategies

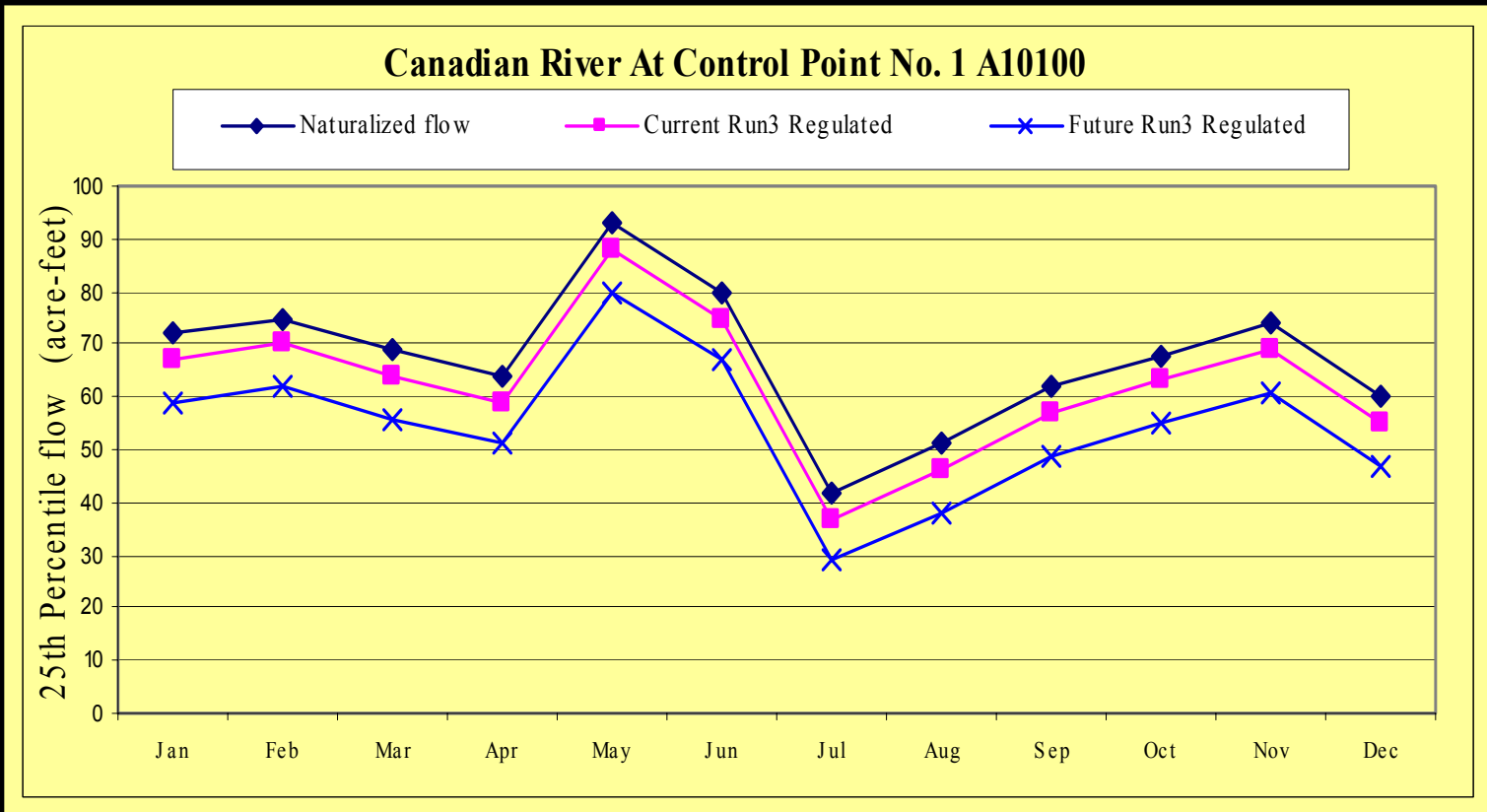
# Example of Comparison Result Presentation - Table

- Table

Table Current Run8 Regulated Flow in Percentiles													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
<b>Canadian RiverAt Control Point No. 1 A10060</b>													
10%	3.7	3.6	4.1	1.8	9.2	9.1	3.5	26.0	6.0	2.7	3.7	2.8	371
25%	6.1	5.8	5.0	4.3	13.2	29.9	43.5	89.5	16.8	5.3	6.2	5.2	502
50%	9.5	10.6	8.5	9.7	43.1	116.5	97.4	136.8	89.1	27.4	13.0	10.2	750
Mean	14.5	16.0	18.0	29.9	102.9	170.4	203.1	195.4	128.5	61.5	25.5	17.0	983
<b>Canadian RiverAt Control Point No. 2 A10100</b>													
10%	19.5	17.6	19.5	18.4	20.6	26.8	23.5	20.4	19.8	19.5	18.0	18.7	365
25%	20.4	18.7	20.6	20.2	24.1	39.9	31.9	25.3	21.0	19.7	18.5	18.9	441
50%	22.4	20.5	22.7	26.9	47.3	69.2	63.1	41.3	24.2	22.3	22.0	22.0	611
Mean	25.3	23.9	32.0	64.5	153.6	193.8	132.0	73.7	112.7	67.8	54.8	24.4	958

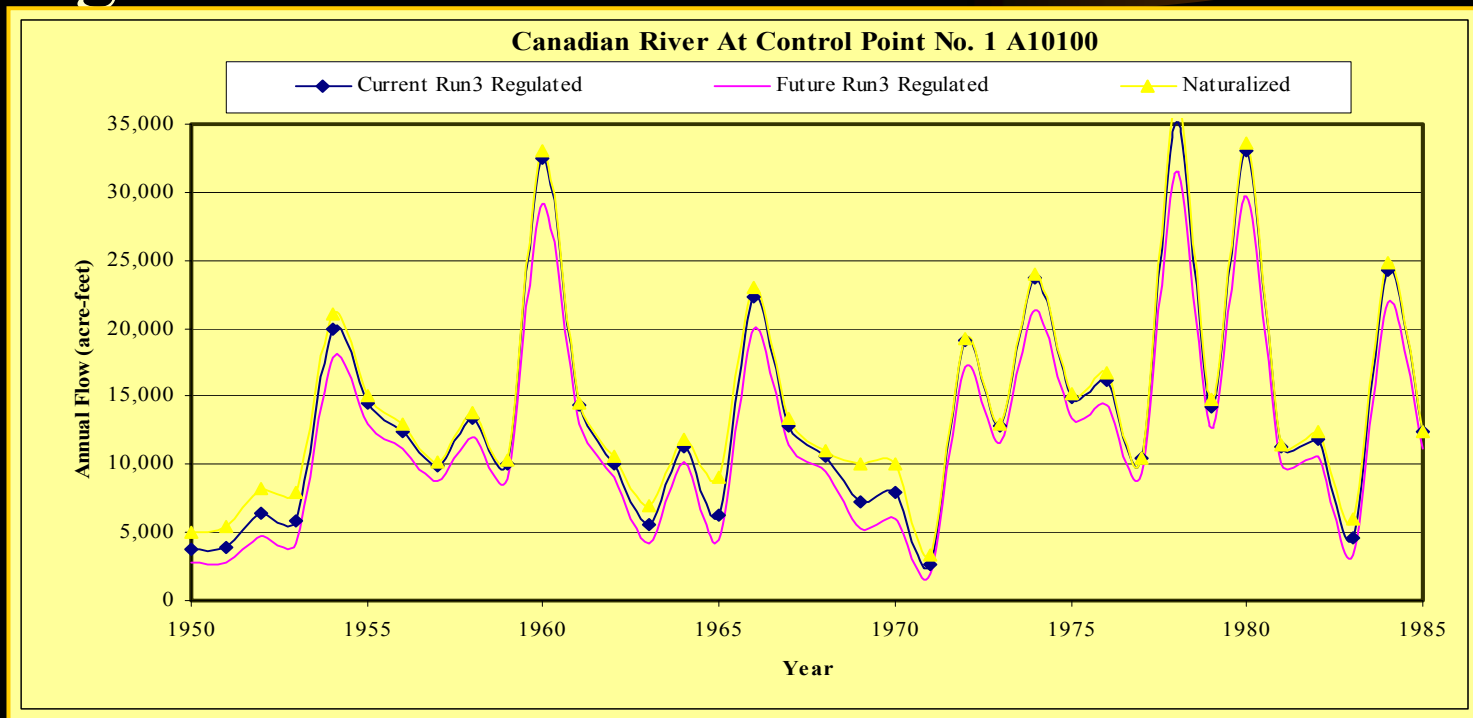
# Example of Comparison Result Presentation - Figure 1

- Figure



# Example of Comparison Result Presentation - Figure 2

- Figure - continue





The End

## WAM

- A monthly water budget model determining the surface water quantity shared by the water users according to prior appropriation system in Texas.
- Naturalized Flow: estimated river flows which would naturally occur if there were no significant human water uses.
- Regulated Flow: sum of the appropriated flow and un-appropriated flow at a river location.

## WAM Runs

- Run 1: Full authorized diversion; assumed return flows; no term permit; authorized capacity parameters.
- Run 3: Full authorized diversion; no return flow; no term permit; authorized capacity parameters.
- Run 8: Max use for last 10 years; term permits; assumed return flow; Year 2000 capacity parameters.