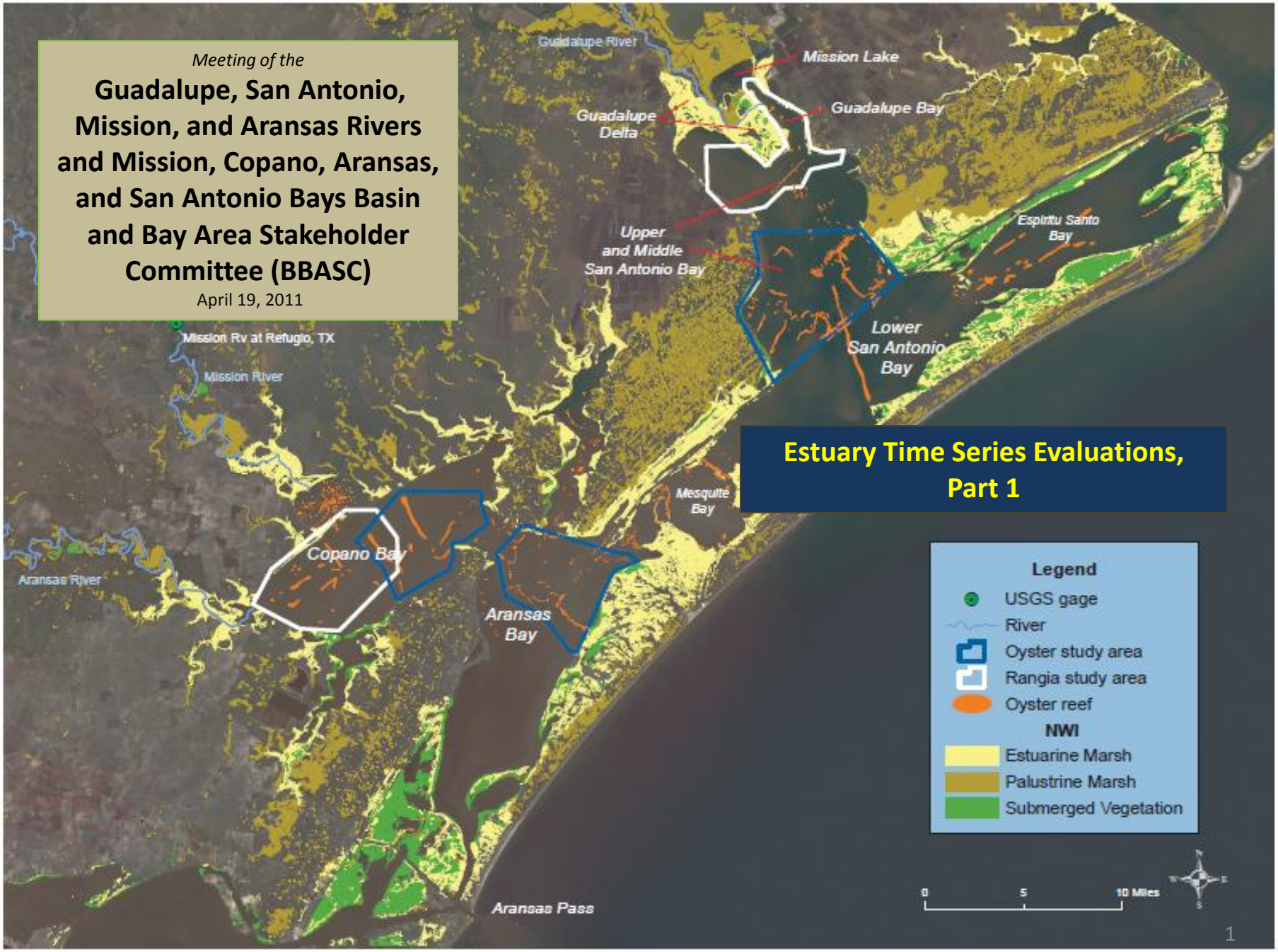
Meeting of the

Guadalupe, San Antonio, Mission, and Aransas Rivers and Mission, Copano, Aransas, and San Antonio Bays Basin and Bay Area Stakeholder Committee (BBASC)

April 19, 2011



Estuary Time Series Evaluations, Part 1

ROAD MAP

Topics:

1) Review of Estuary Criteria / Need for Time Series Evaluations

2) Evaluation approach

3) Results of Analyses

a) Attainment for the G1 criteria for rangia clams

b) Attainment for the G2 criteria for oysters

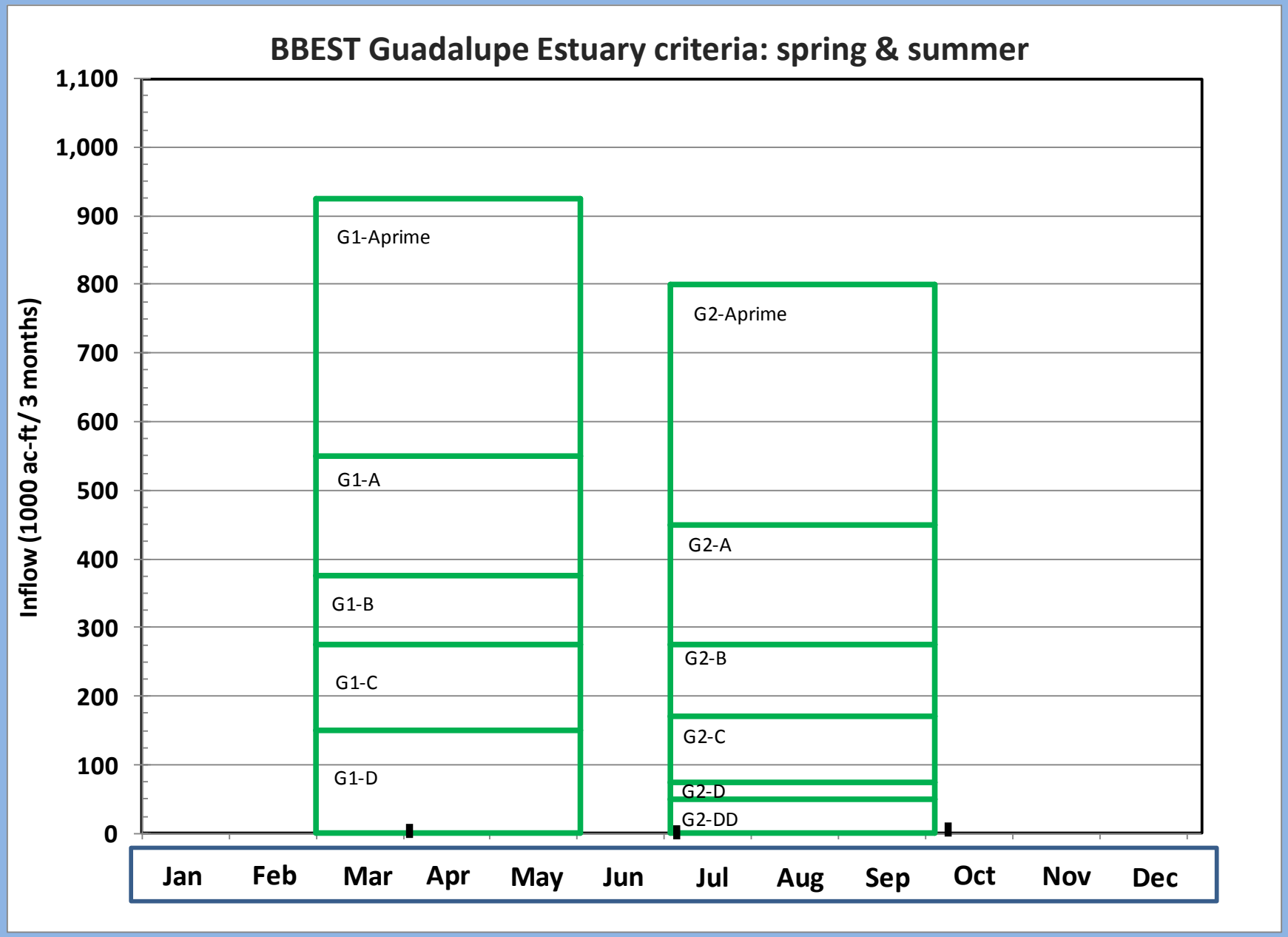
4) Summary

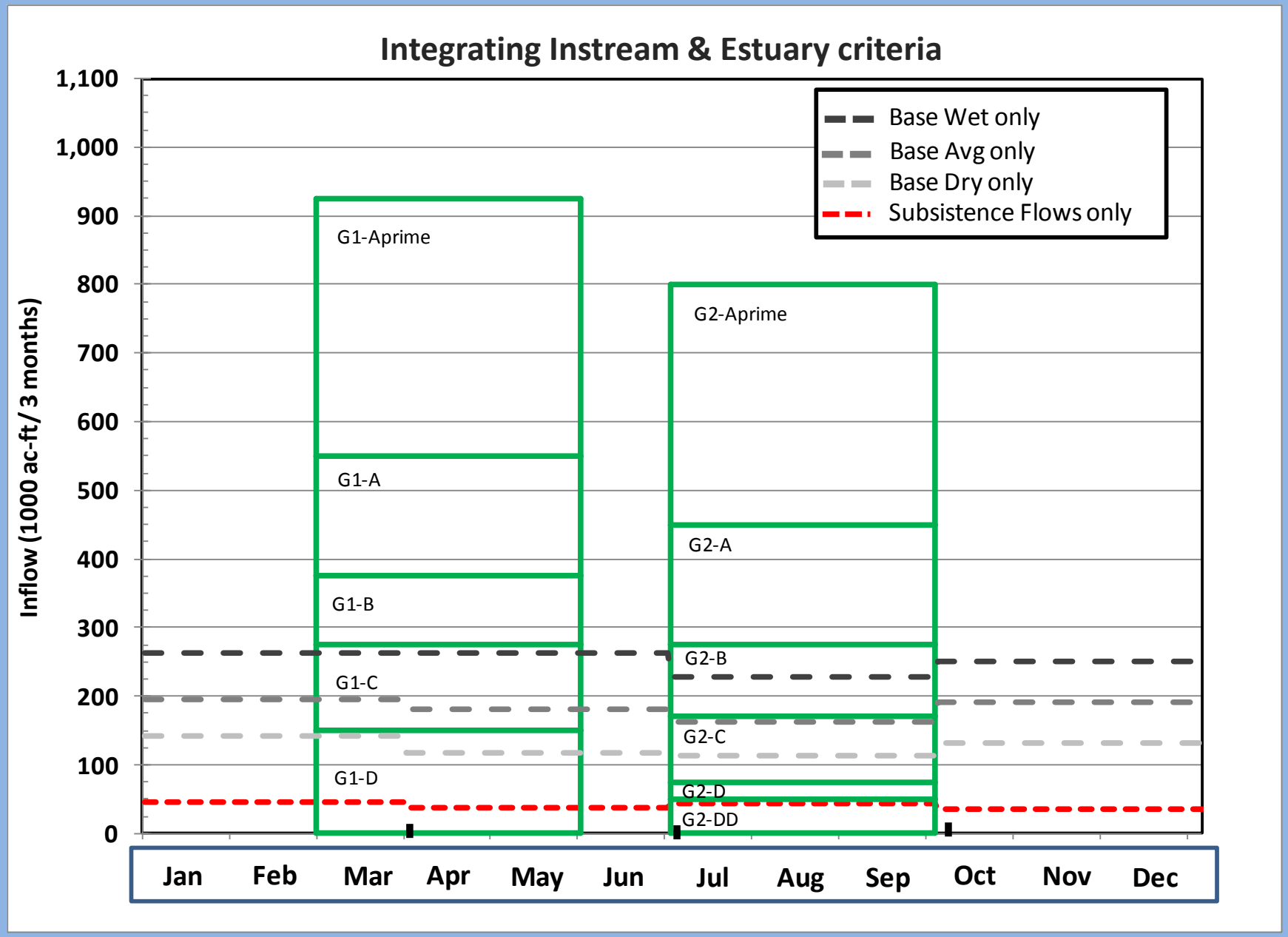
5) Next steps

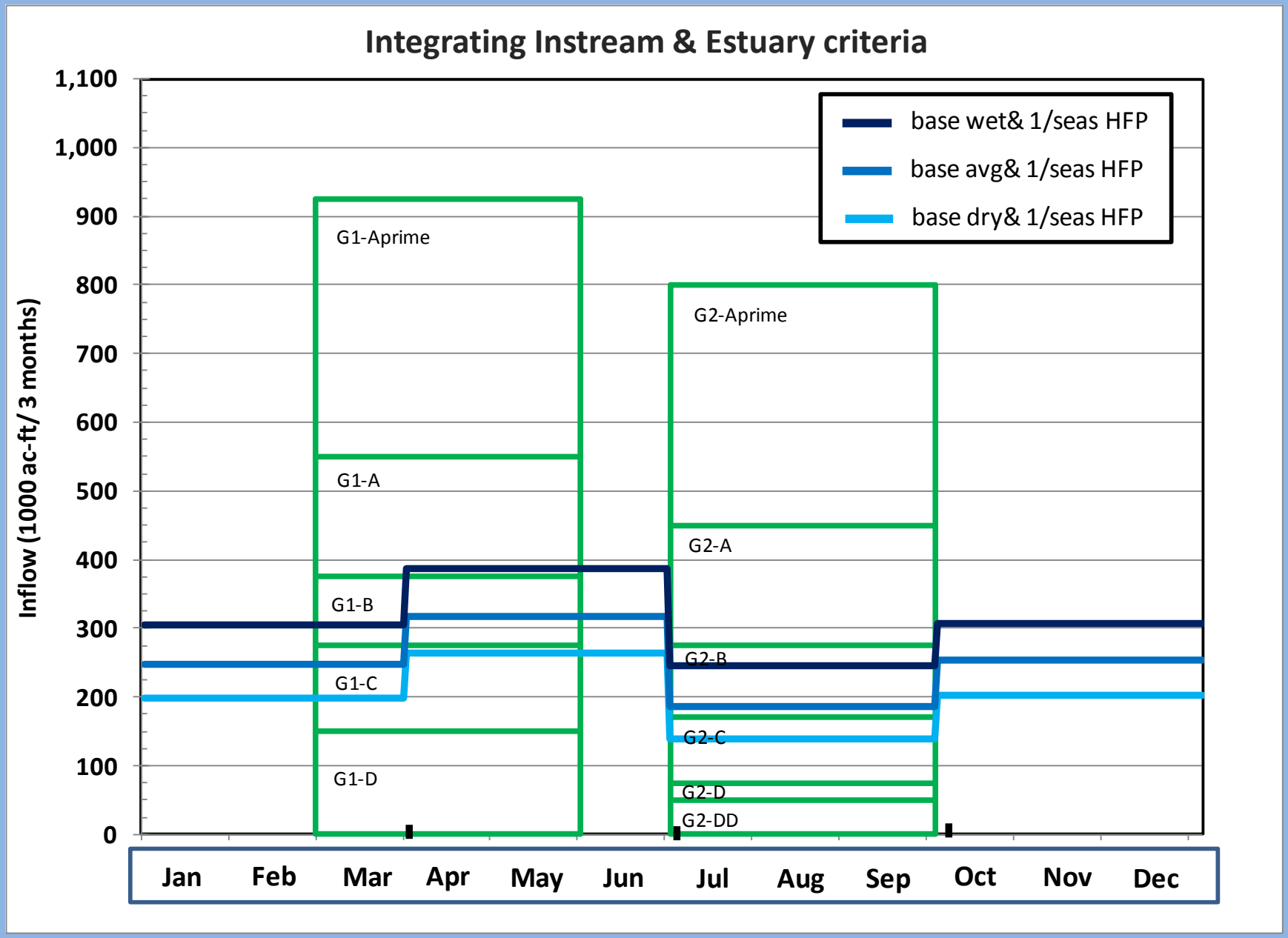
The BBEST Criteria

Table 6.1-17

Guadalupe Estuary Criteria - Volumes				
	Inflow Criteria Volumes, suite G1 for Rangia clams		Inflow Criteria Volumes, suite G2 for Eastern oysters	
Criteria level	Feb. (1000 ac-ft/mon)	Mar.-May (1000 ac-ft/3mon)	June (1000 ac-ft/mon)	July-Sept. (1000 ac-ft/3mon)
G1-Aprime, G2-Aprime	n/a	550-925	n/a	450-800
G1-A, G2-A	n/a	375-550	n/a	275-450
G1-B, G2-B	n/a	275-375	n/a	170-275
G1-C, G2-C	≥75	150-275	≥40	75-170
G1-CC, G2-CC	0 - 75	150-275	0 - 40	75-170
G1-D, G2-D	n/a	0 - 150	n/a	50-75
G1-DD, G2-DD	n/a	n/a	n/a	0-50
Mission-Aransas Estuary Criteria - Volumes				
	Inflow Criteria Volumes, set MA1 for Rangia clams		Inflow Criteria Volumes, set MA2 for Eastern oysters	
Criteria level	Feb.	Mar.-May	June	July-Sept.
MA2 - Aprime	n/a	n/a	n/a	500-1000


BBEST Guadalupe Estuary criteria: spring & summer
Inflow (1000 ac-ft/ 3 months)
1,100
1,000
900
800
700
600
500
400
300
200
100
0
G1-Aprime
G1-A
G1-B
G1-C
G1-D
G2-Aprime
G2-A
G2-B
G2-C
G2-D
G2-DD
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Integrating Instream & Estuary criteria
Inflow (1000 ac-ft/ 3 months)
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Base Wet only
Base Avg only
Base Dry only
Subsistence Flows only
G1-Aprime
G1-A
G1-B
G1-C
G1-D
G2-Aprime
G2-A
G2-B
G2-C
G2-D
G2-DD
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Integrating Instream & Estuary criteria
Inflow (1000 ac-ft/ 3 months)
1,100
1,000
900
800
700
600
500
400
300
200
100
0
base wet& 1/seas HFP
base avg& 1/seas HFP
base dry& 1/seas HFP
G1-Aprime
G1-A
G1-B
G1-C
G1-D
G2-Aprime
G2-A
G2-B
G2-C
G2-D
G2-DD
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

The BBEST Criteria

Table 6.1-17

Guadalupe Estuary Criteria - Volumes				
	Inflow Criteria Volumes, suite G1 for Rangia clams		Inflow Criteria Volumes, suite G2 for Eastern oysters	
Criteria level	Feb. (1000 ac-ft/mon)	Mar.-May (1 ft	June	July-Sept.
G1-Aprime, G2-Aprime	n/a	5		
G1-A, G2-A	n/a	3		
G1-B, G2-B	n/a	2		
G1-C, G2-C	≥75	1		
G1-CC, G2-CC	0 - 75	1		
G1-D, G2-D	n/a			
G1-DD, G2-DD	n/a			

Mission-Aransas Estuary Criteria - Volumes				
	Inflow Criteria Volumes, set MA1 for Rangia clams		Inflow Criteria Volumes, set MA2 for Eastern oysters	
Criteria level	Feb.	Mar.-May	June	July-Sept.
MA2 - Aprime	n/a	n/a	n/a	500-1000

2 Sets, G1 and G2 (spring and summer, for Rangia & oysters)

each set is multi-tiered

each criteria is a 3 month sum of inflow volume (w./wo. antec.)

attainment goals of each criteria are either : a) individual, b) joint with another (e.g. G2-A and G2-B)

Table 6.1-18

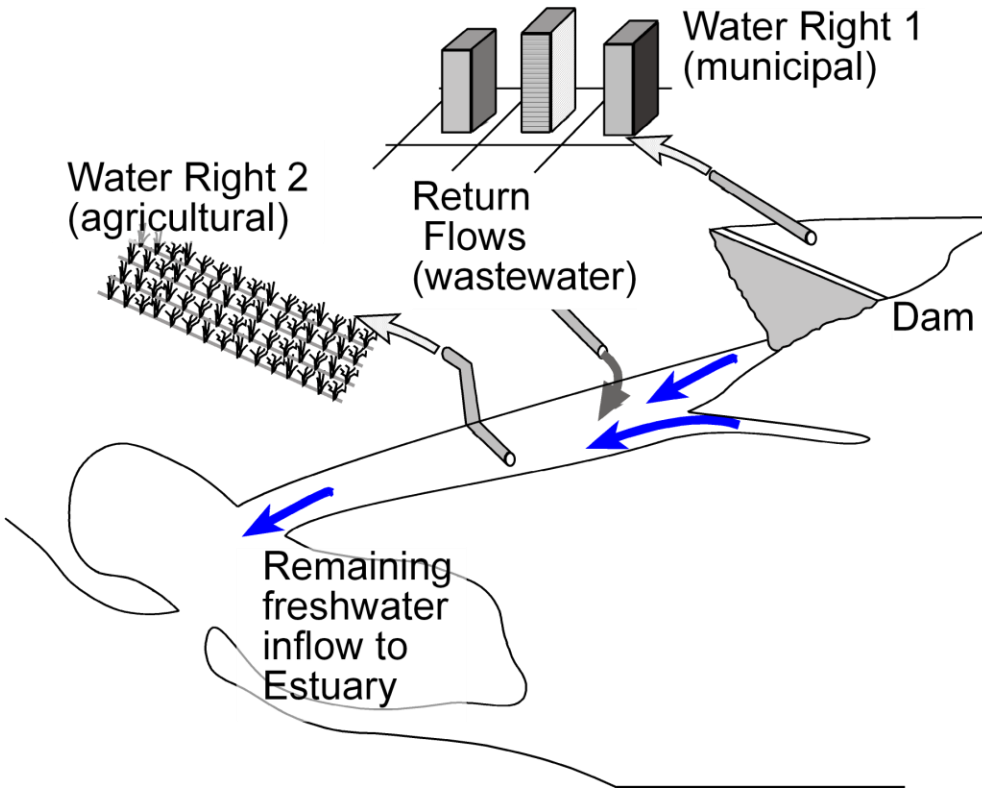
Guadalupe Estuary Criteria -Attainment Recommendations			
Criteria level	Specification	Inflow Criteria Attainment, G1 suite for Rangia clams	Inflow Criteria Attainment, G2 suite for Eastern oysters
	ment, G - Aprime	G1-Aprime at least 12% of years	G2-Aprime at least 12% of years
	ainment, G - A	G1-A at least 12 % of years	G2-A at least 17 % of years
	Attainment, G - A & G - B combined	G1-A and G1-B combined at least 17% of years	G2-A and G2-B combined at least 30% of years
	& G - CC	G1-C and G1-CC equal to or greater than 19% of years. G1-CC no more than 2/3 of total	G2-C and G2-CC equal to or greater than10% of years. G2-CC no more than 1/6 of total
	G1- D	no more than 9% of years	n/a
	2- DD	n/a	G2-D no more than 6% of years
	D & G2- ed	n/a	G2-D and G2-DD combined no more than 9% of years

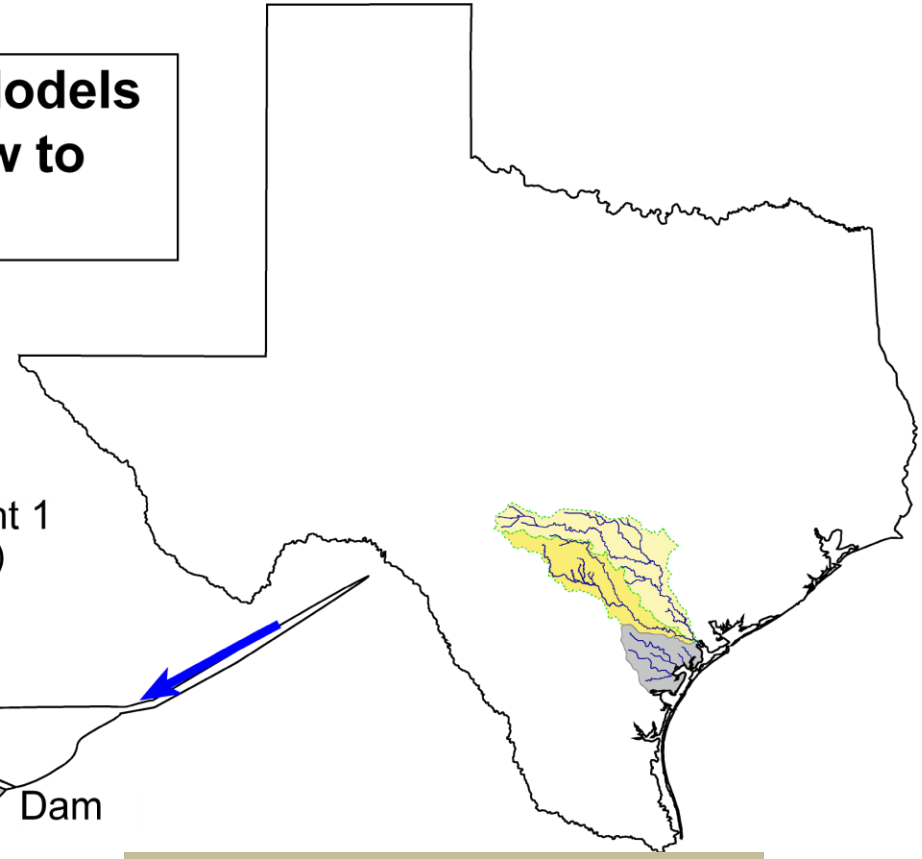
Mission-Aransas Estuary Criteria -Attainment Recommendations			
Criteria level	Specification	Inflow Criteria Attainment, set MA1 for Rangia clams	Inflow Criteria Attainment, set MA2 for Eastern oysters
MA-Aprime	Attainment MA-Aprime	n/a	MA2-Aprime at least 2% of years

Time Series of Inflows to Guadalupe Estuary
Scenarios utilized (thus far) – principal characteristics

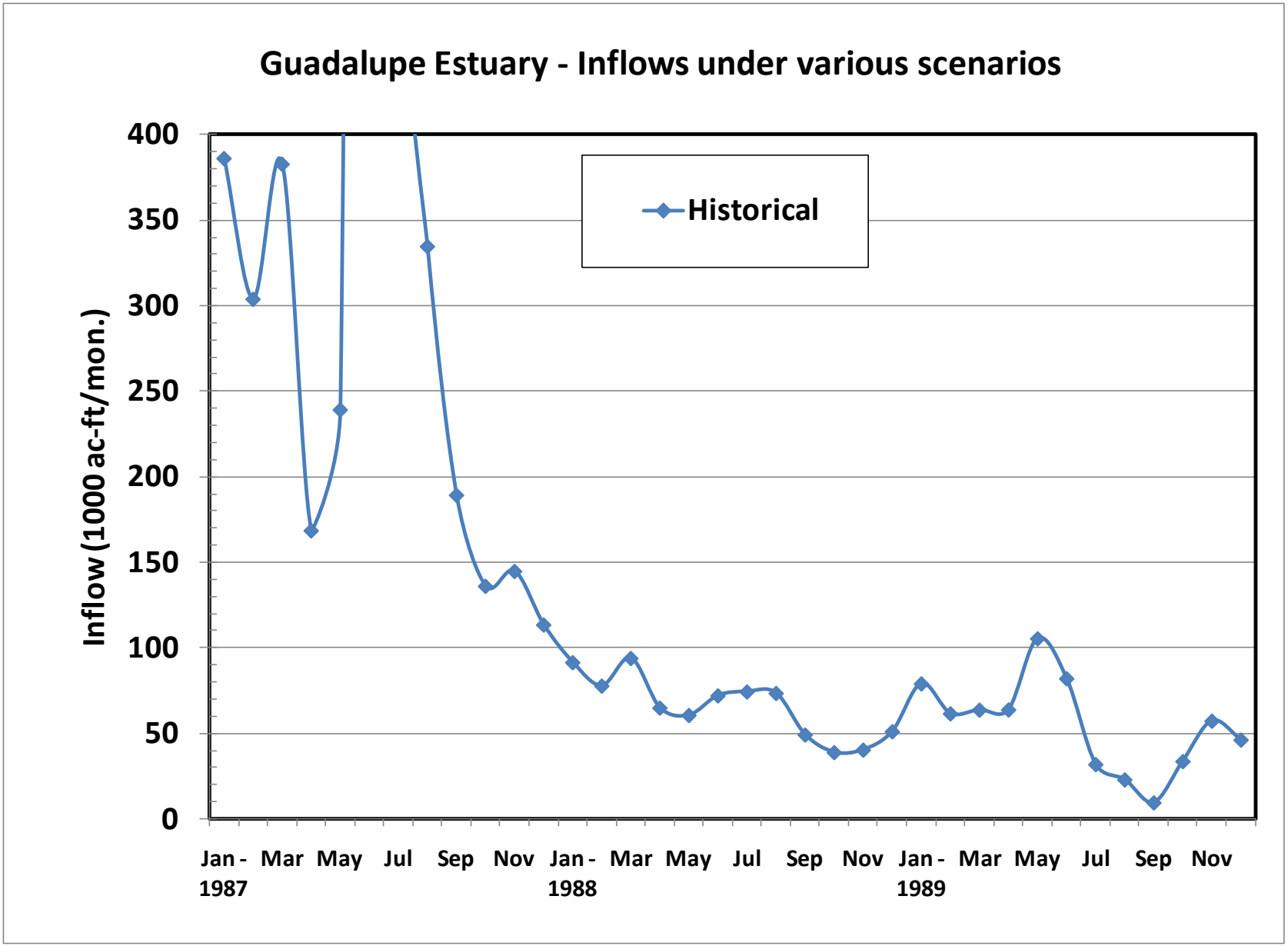
	Natural	Historical	Present	Region L	TCEQ Run3
Surface water use/demands	0	historical, transient	max. last 10yr, constant	Full use, constant	Full use, constant
WW Returns	0	historical, transient	min. last 5 yr, constant	recent ('96?) levels, constant	0
Edwards Aq. use / mgmt.	0	historical, transient	SB 3 , constant w. drought mgmt.	SB 3 , constant w. drought mgmt.	SB 3 , constant w. drought mgmt.
Data source	model	data	model	model	model
Period of record	1934-1989	1941 - 2009	1934-1989	1934-1989	1934-1989

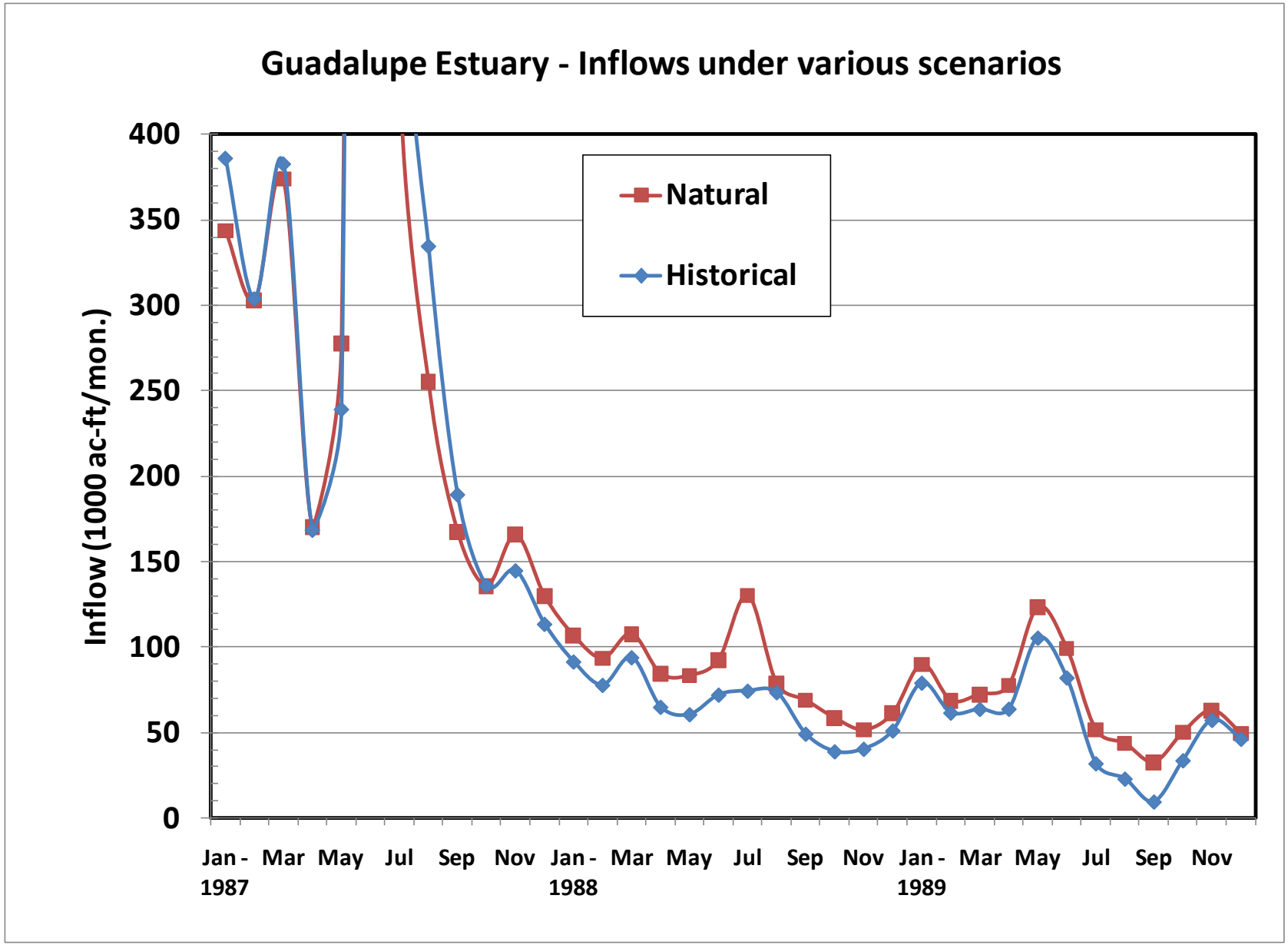
Texas Water Availability Models (WAMs) to predict inflow to estuaries.

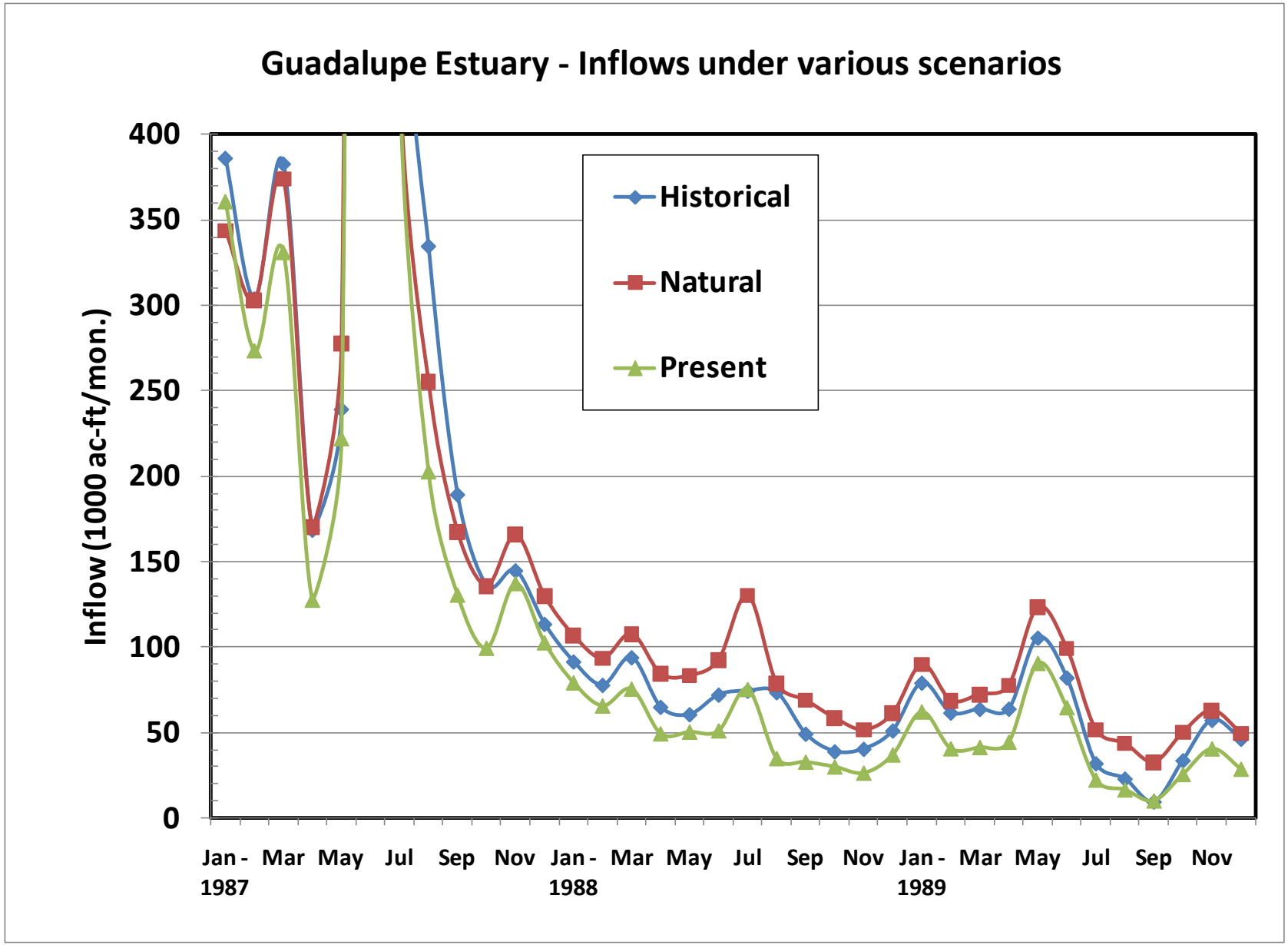


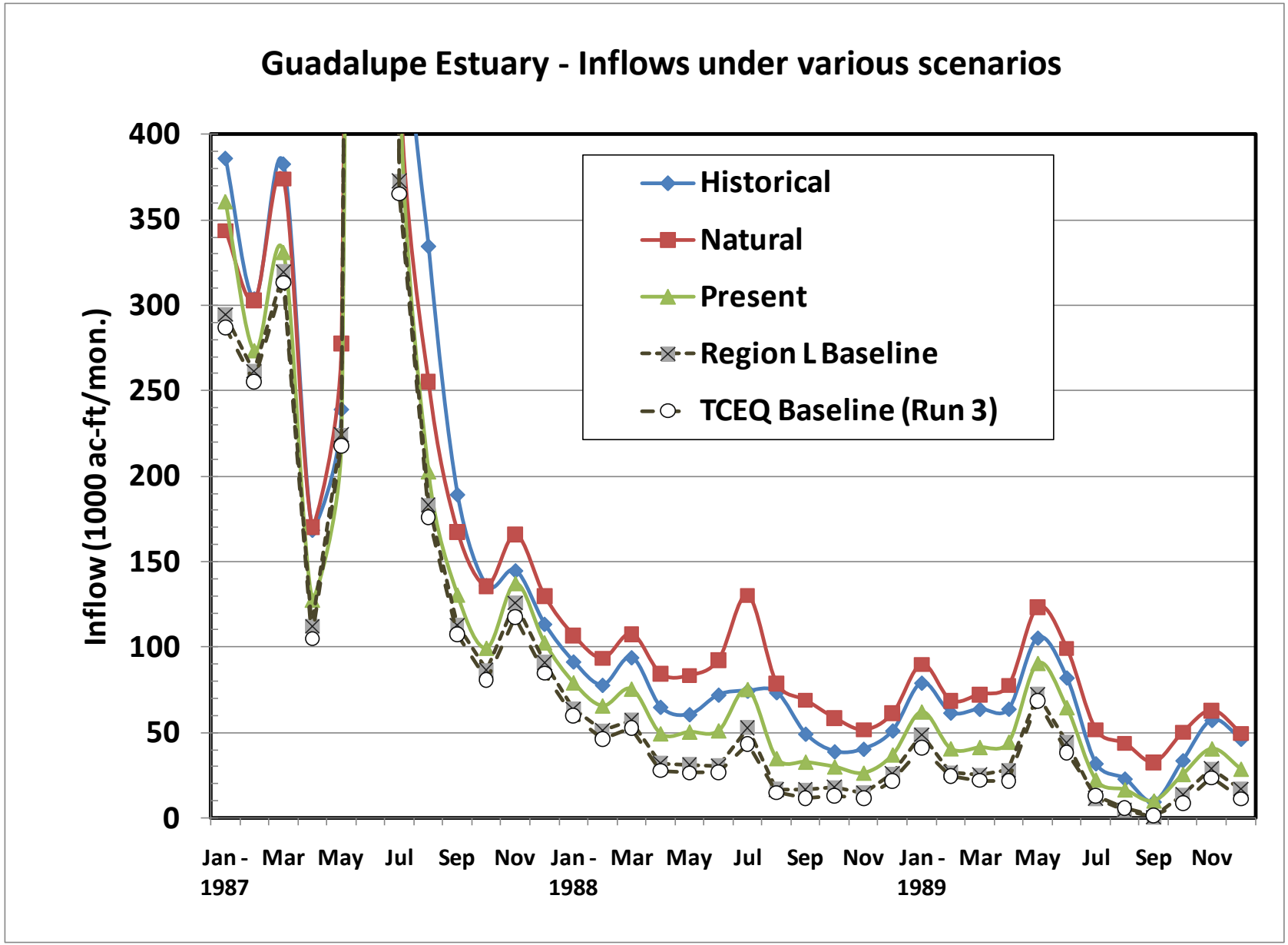


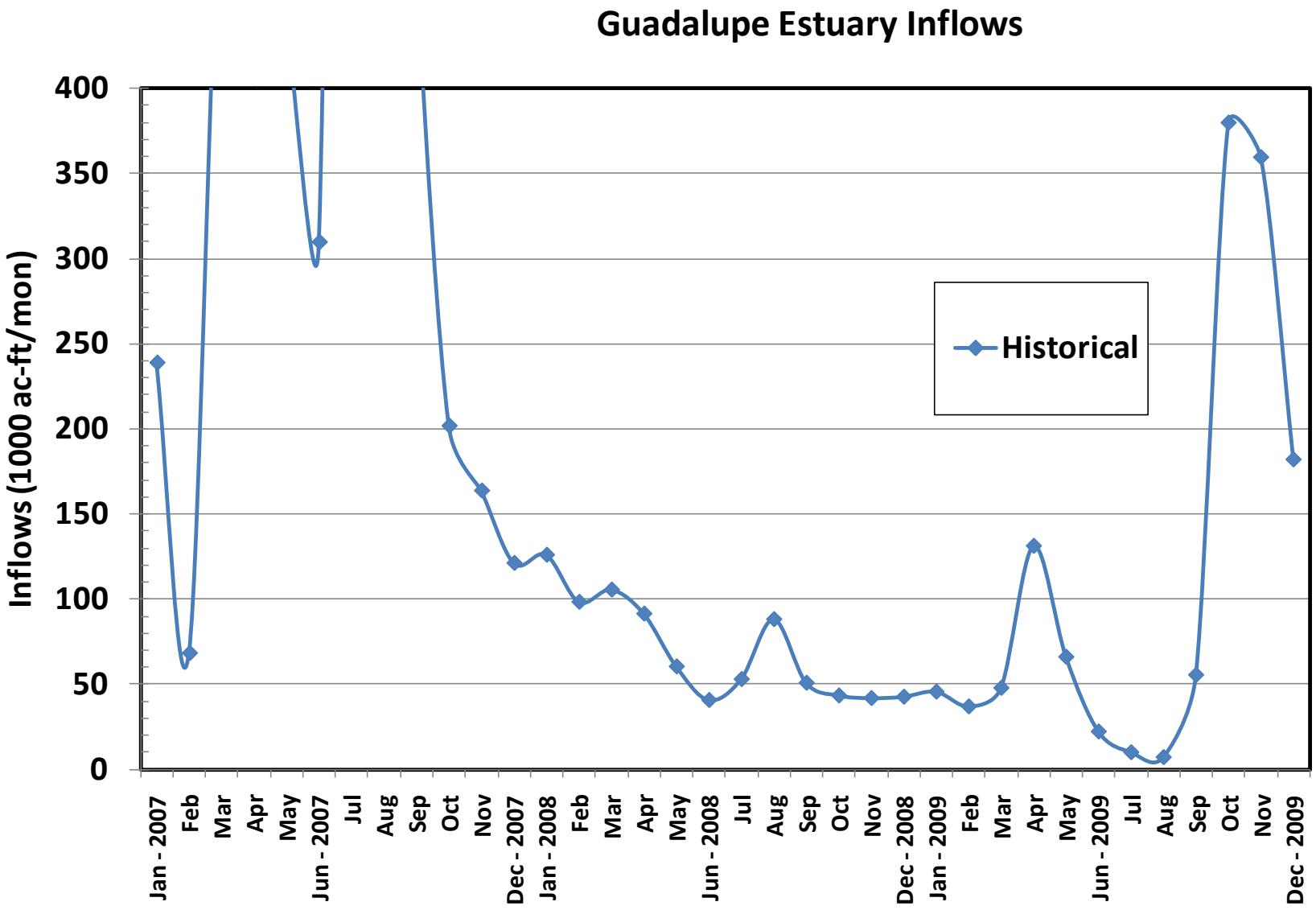
The WAM is a prediction / retrodiction tool.
Forecast Present or Future water use / management conditions with
past climate and runoff.

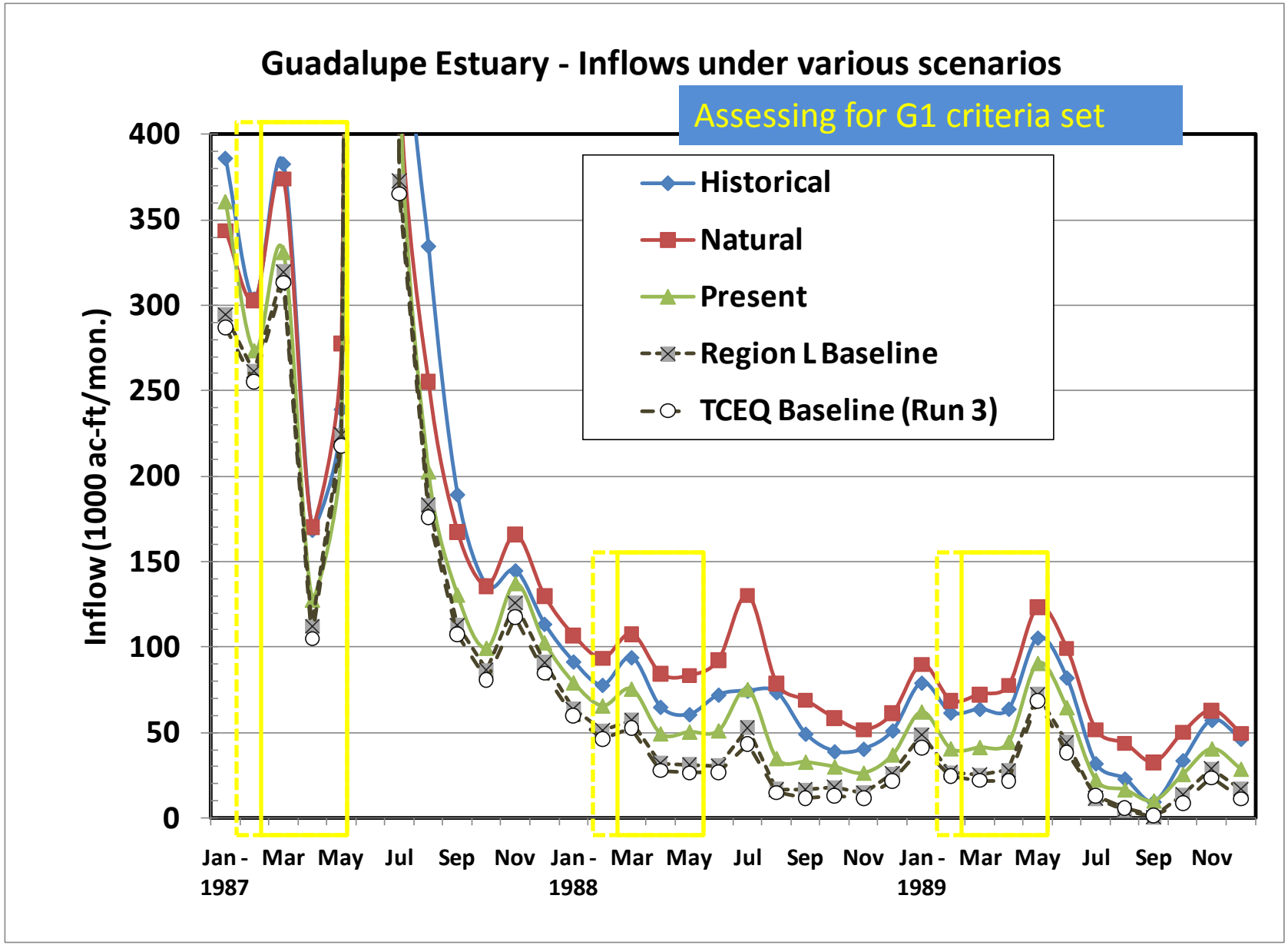

Guadalupe Estuary - Inflows under various scenarios
Historical
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov

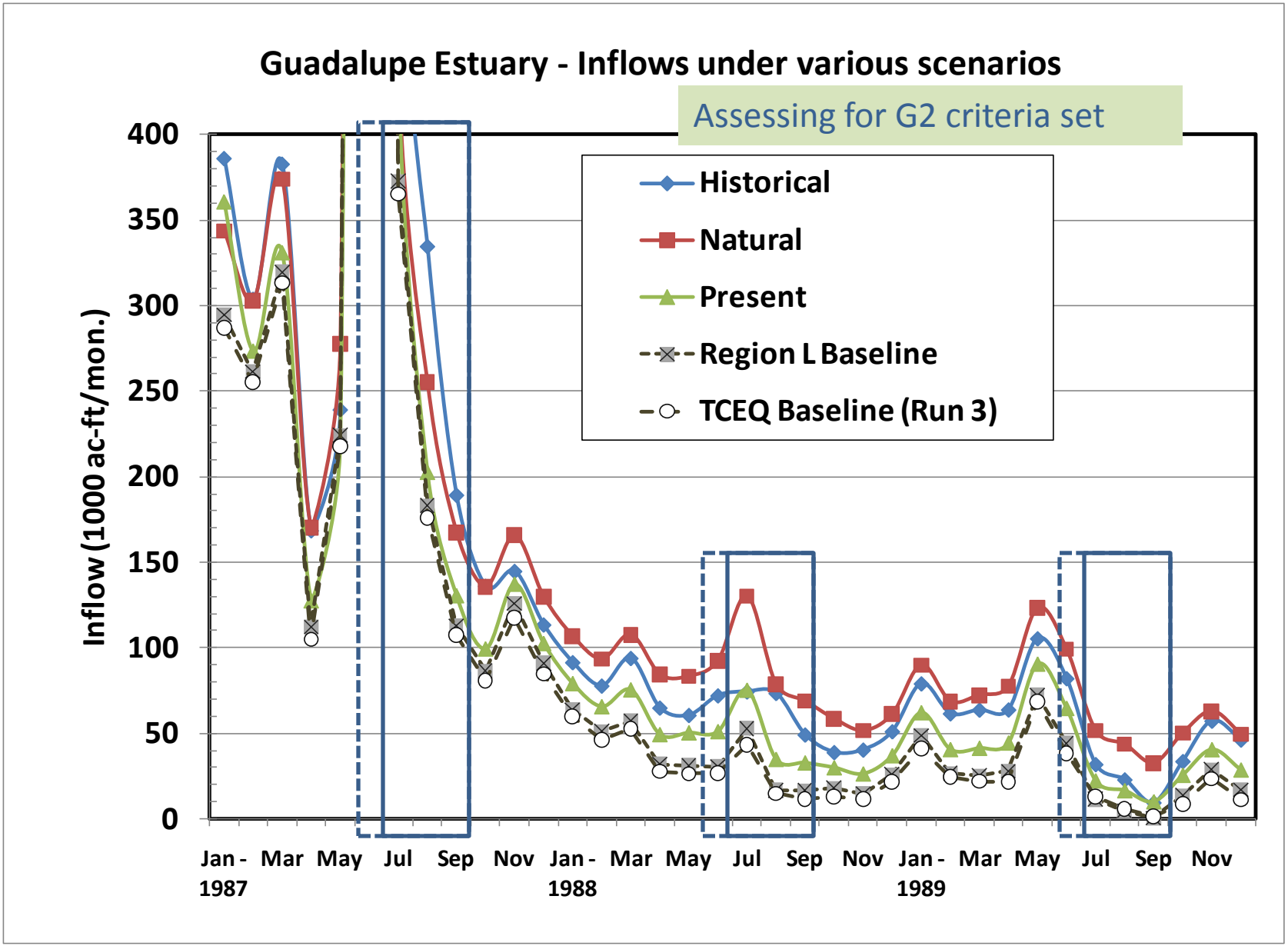

Guadalupe Estuary - Inflows under various scenarios
Natural
Historical
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov


Guadalupe Estuary - Inflows under various scenarios
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Historical
Natural
Present
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov


Guadalupe Estuary - Inflows under various scenarios
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Historical
Natural
Present
Region L Baseline
TCEQ Baseline (Run 3)
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov


Guadalupe Estuary Inflows
Inflows (1000 ac-ft/mon)
400
350
300
250
200
150
100
50
0
Historical
Jan - 2007
Feb
Mar
Apr
May
Jun - 2007
Jul
Aug
Sep
Oct
Nov
Dec - 2007
Jan - 2008
Feb
Mar
Apr
May
Jun - 2008
Jul
Aug
Sep
Oct
Nov
Dec - 2008
Jan - 2009
Feb
Mar
Apr
May
Jun - 2009
Jul
Aug
Sep
Oct
Nov
Dec - 2009


Guadalupe Estuary - Inflows under various scenarios
Assessing for G1 criteria set
Historical
Natural
Present
Region L Baseline
TCEQ Baseline (Run 3)
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov


Guadalupe Estuary - Inflows under various scenarios
Assessing for G2 criteria set
Historical
Natural
Present
Region L Baseline
TCEQ Baseline (Run 3)
Inflow (1000 ac-ft/mon.)
400
350
300
250
200
150
100
50
0
Jan - 1987
Mar
May
Jul
Sep
Nov
Jan - 1988
Mar
May
Jul
Sep
Nov
Jan - 1989
Mar
May
Jul
Sep
Nov

ROAD MAP

Topics:

1) Review of Estuary Criteria / Need for Time Series Evaluations

2) Evaluation approach

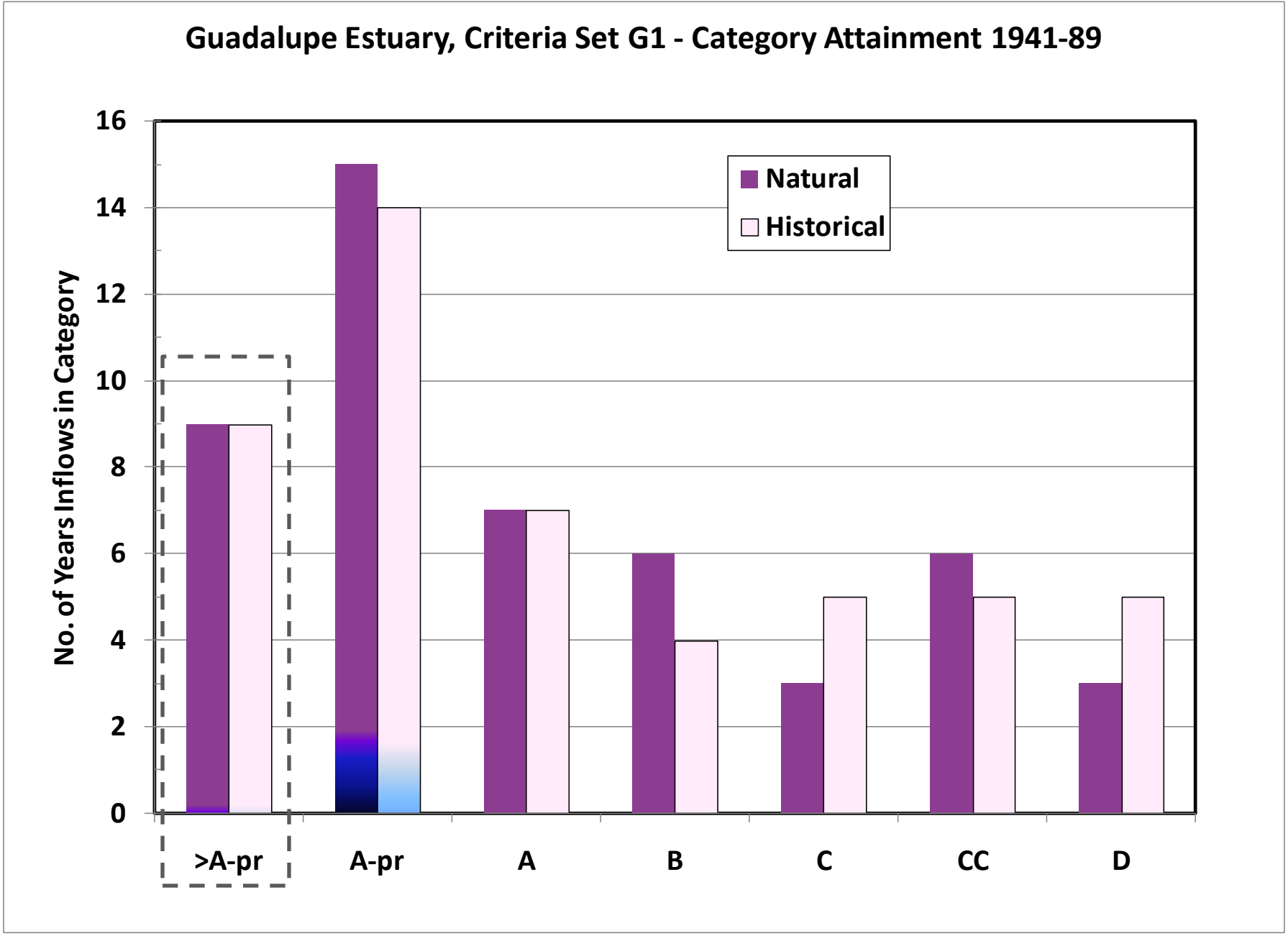
3) Results of Analyses

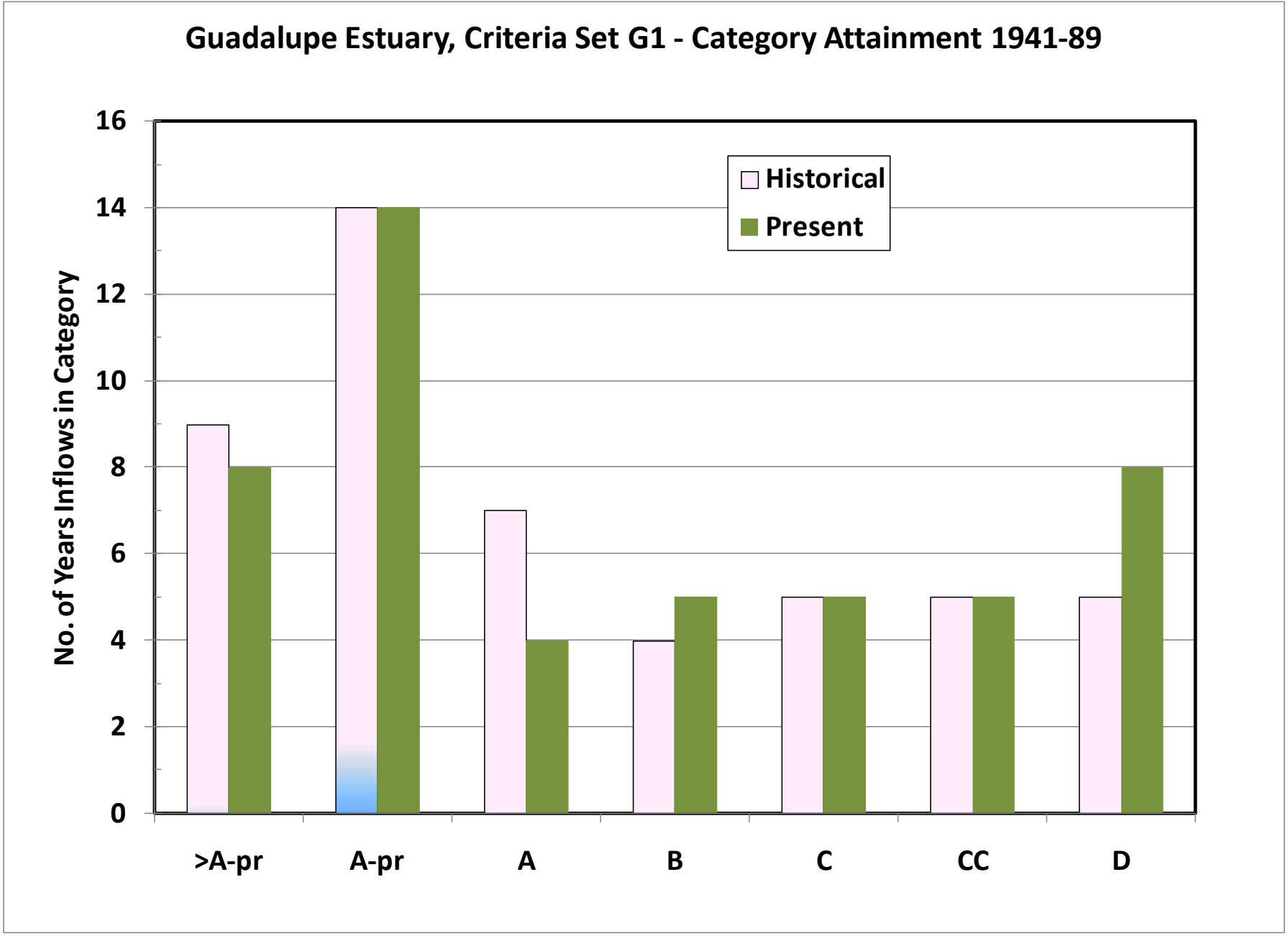
a) Attainment for the G1 criteria for rangia clams

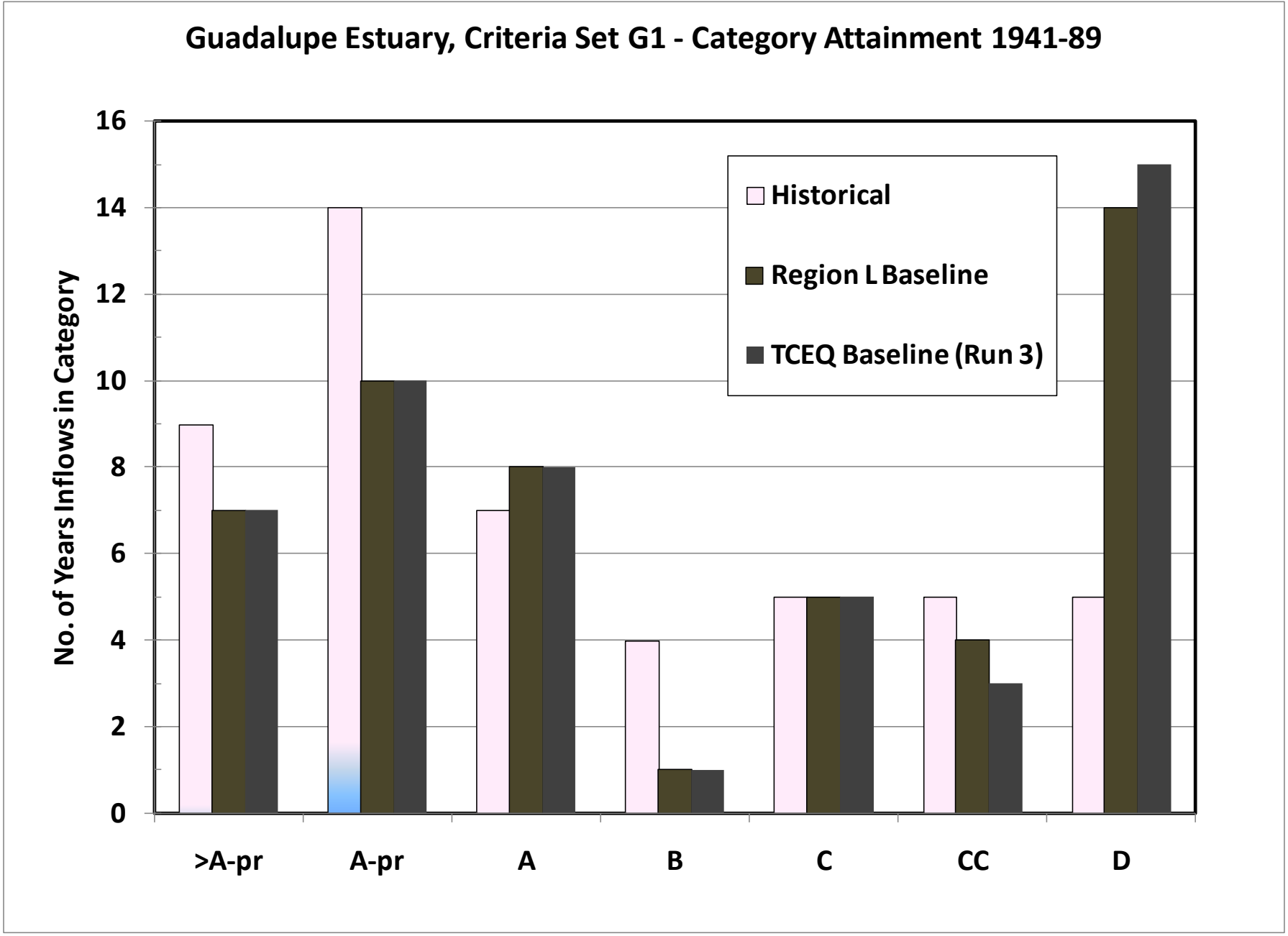
b) Attainment for the G2 criteria for oysters

4) Summary

5) Next steps


Guadalupe Estuary, Criteria Set G1 - Category Attainment 1941-89
No. of Years Inflows in Category
16
14
12
10
8
6
4
2
0
Natural
Historical
>A-pr
A-pr
A
B
C
CC
D


Guadalupe Estuary, Criteria Set G1 - Category Attainment 1941-89
No. of Years Inflows in Category
16
14
12
10
8
6
4
2
0
Historical
Present
>A-pr
A-pr
A
B
C
CC
D


Guadalupe Estuary, Criteria Set G1 - Category Attainment 1941-89
No. of Years Inflows in Category
16
14
12
10
8
6
4
2
0
Historical
Region L Baseline
TCEQ Baseline (Run 3)
>A-pr
A-pr
A
B
C
CC
D

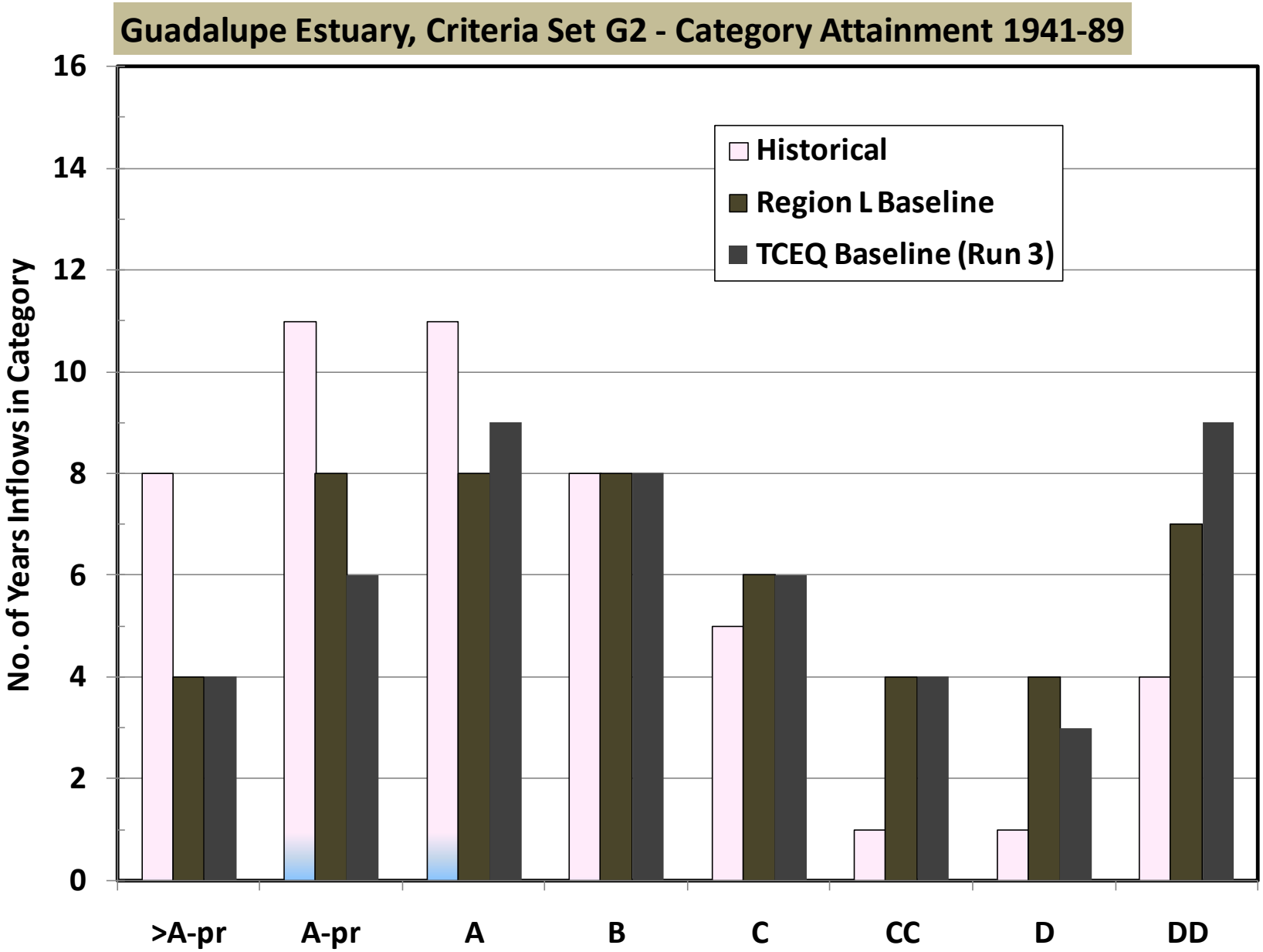
Summary – Attainment of G1 Springtime Criteria (Rangia)

Counts	Criteria G1 Attainment (no. years)							
Scenario	>A-pr	A-pr	A	B	C	CC	D	sum
Natural	9	15	7	6	3	6	3	49
Historical	9	14	7	4	5	5	5	49
Present	8	14	4	5	5	5	8	49
Region L Baseline	7	10	8	1	5	4	14	49
TCEQ Baseline (Run 3)	7	10	8	1	5	3	15	49

see Tables 4.5-3 & 4.5-6		>12%	>12%				<=9%
Attain. - Singles	Single G1 criteria attainment (% of yrs.)						
Scenario	>A-pr	A-pr	A	B	C	CC	D
Natural		30.6%	14.3%	12.2%	6.1%	12.2%	6.1%
Historical		28.6%	14.3%	8.2%	10.2%	10.2%	10.2%
Present		28.6%	8.2%	10.2%	10.2%	10.2%	16.3%
Region L Baseline		20.4%	16.3%	2.0%	10.2%	8.2%	28.6%
TCEQ Baseline (Run 3)		20.4%	16.3%	2.0%	10.2%	6.1%	30.6%

see Table 4.5-3			>17%		>=19%	<=2/3	
Attain. - Joints	Joint G1 criteria attainment (% of yrs. and fractions)						
Scenario	>A-pr		A & B		C & CC	frac. CC	
Natural			26.5%		18.4%	66.7%	
Historical			22.4%		20.4%	50.0%	
Present			18.4%		20.4%	50.0%	
Region L Baseline			18.4%		18.4%	44.4%	
TCEQ Baseline (Run 3)			18.4%		16.3%	37.5%	

Color coding convention
-OK, met criteria
-Near miss. (rounding; p-o-record)
-Not met, but departure not great
-Very bad


Guadalupe Estuary, Criteria Set G2 - Category Attainment 1941-89
No. of Years Inflows in Category
16
14
12
10
8
6
4
2
0
Historical
Region L Baseline
TCEQ Baseline (Run 3)
>A-pr
A-pr
A
B
C
CC
D
DD

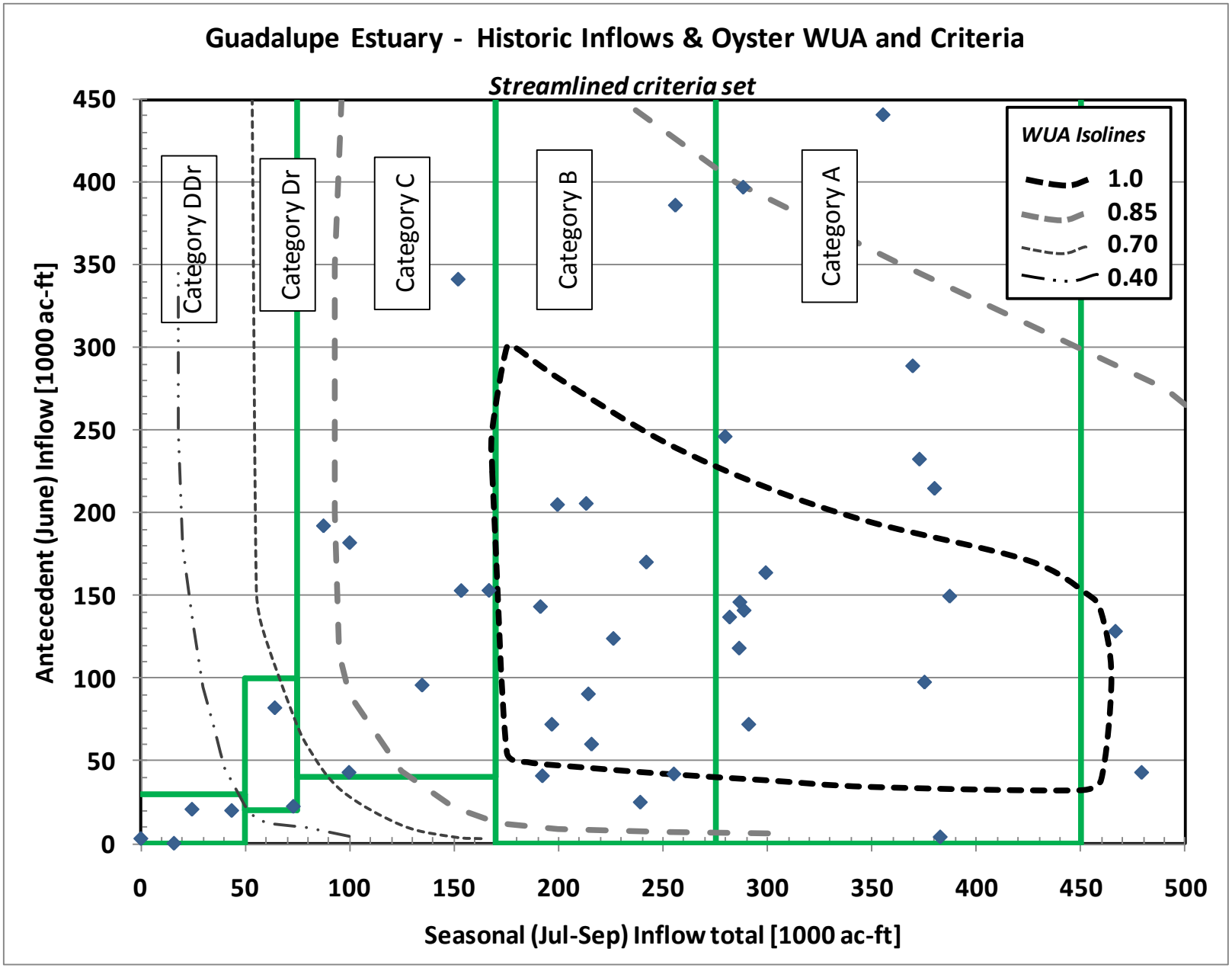
Summary – Attainment of G2 Summer Criteria (oysters)

Counts	Criteria G2 Attainment (no. years)								
Scenario	>A-pr	A-pr	A	B	C	CC	D	DD	sum
Natural	9	11	15	7	3	2	2	0	49
Historical	8	11	11	8	5	1	1	4	49
Present	5	11	8	10	8	1	1	5	49
Region L Baseline	4	8	8	8	6	4	4	7	49
TCEQ Baseline (Run 3)	4	6	9	8	6	4	3	9	49

see Tables 4.5-2; 4.5-4		>12%	>17%				<=6%	
Attain. - Singles	Single G2 criteria attainment (% of yrs.)							
Scenario	>A-pr	A-pr	A	B	C	CC	D	DD
Natural		22.4%	30.6%	14.3%	6.1%	4.1%	4.1%	0.0%
Historical		22.4%	22.4%	16.3%	10.2%	2.0%	2.0%	8.2%
Present		22.4%	16.3%	20.4%	16.3%	2.0%	2.0%	10.2%
Region L Baseline		16.3%	16.3%	16.3%	12.2%	8.2%	8.2%	14.3%
TCEQ Baseline (Run 3)		12.2%	18.4%	16.3%	12.2%	8.2%	6.1%	18.4%

see Table 4.5-2			>=30%		>10%	<=1/6	<=9%	
Attain. - Joints	Joint G2 criteria attainment (% of yrs. and fractions)							
Scenario	>A-pr		A & B		C & CC	frac. CC	D & DD	
Natural			44.9%		10.2%	40.0%	4.1%	
Historical			38.8%		12.2%	16.7%	10.2%	
Present			36.7%		18.4%	11.1%	12.2%	
Region L Baseline			32.7%		20.4%	40.0%	22.4%	
TCEQ Baseline (Run 3)			34.7%		20.4%	40.0%	24.5%	

Color coding convention	
	-OK, met criteria
	-Near miss. (rounding; p-o-record)
	-Not met, but departure not great
	-Very bad

To be continued …

Time Series analyses approach