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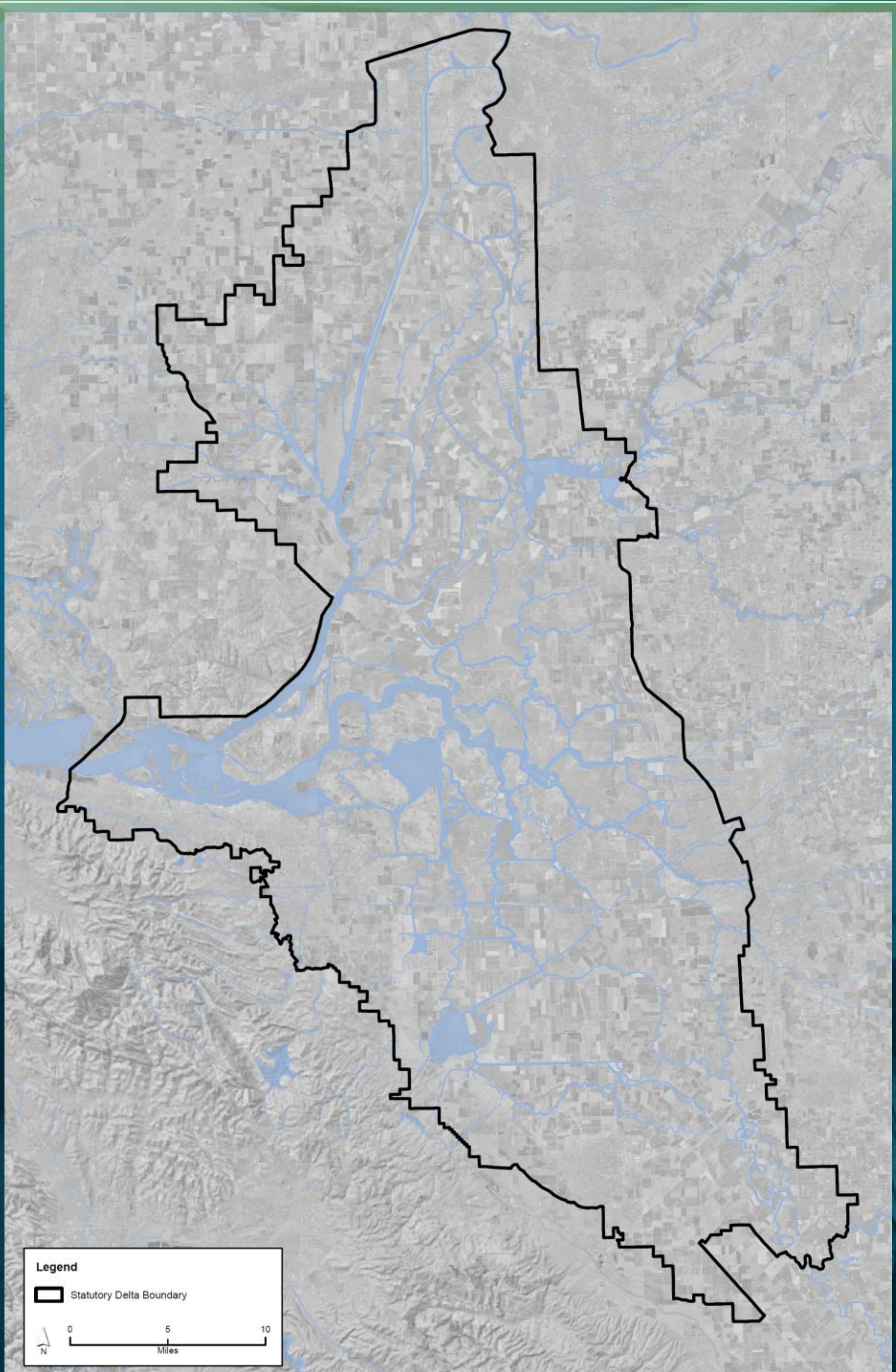
South Delta Habitat Working Group

Meeting 5
Lathrop City Hall, Lathrop CA
February 17, 2012

Agenda

1. Review of Working Group purpose and progress to date
2. Overview of the "Corridors Document":
   a) Screening-level technical analyses
   b) Key "intermediate outcomes"
3. Preliminary findings for Flood & Ecosystem:
   a) Corridors suggestive of additional examination
   b) Identified Issues & Key Understandings
4. Next Steps

The Delta



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Goal of the South Delta Habitat Working Group

"To identify opportunities where actions in the South Delta are compatible for achieving both ecosystem and flood management improvements"

South Delta Habitat Working Group Process

- 5 Working Group meetings to date
- Discussion topics:
  - Historic South Delta Environment
  - Existing conditions
  - Opportunities for habitat restoration through flood mitigation
    - Levee setbacks
    - Bypass expansion
  - Rationale for restoration activities and their connection to the BDCP
- Development of Working Group “Corridor Objectives”
- Identification of corridors for further screening
- Screening-level evaluation of corridors

Who Has Participated?

- Over 100 individuals representing:
  - Delta landowners
  - Local and regional governments
  - Reclamation districts
  - Recreation interests
  - State and Federal resource agencies
  - Environmental concerns
  - State and federal water contractors

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What we have learned

- Flood management is of paramount importance
- Opportunities for integrated flood management and habitat improvement exist
- Water quality is important
- Sense of place is critical to the identity of the South Delta
  - Agriculture
  - Recreation
  - Community

and should inform any restoration/flood management activities.

Flood and Restoration Actions that can be Integrated

- Levee Modifications
  - Height increase
  - Setbacks
- Flood Bypasses / Easements
- Dredging
- Floodproofing

- Habitat Restoration
  - Floodplain habitat
  - Tidal marsh habitat
  - Riparian habitat
  - Channel margin habitat
- Modified Operations
  - Fish passage barriers
  - Flows

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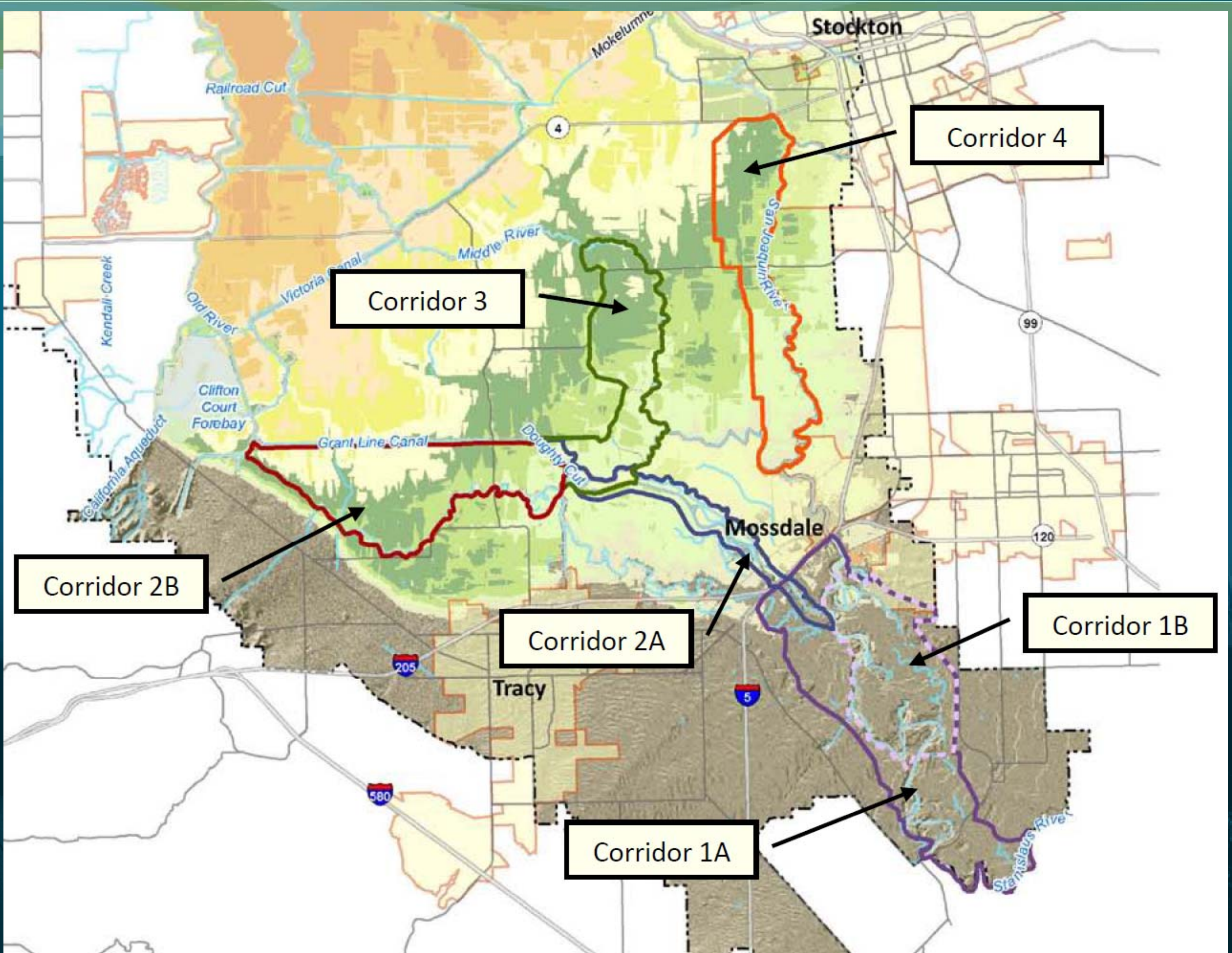
South Delta Corridors



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Overview of Corridors Document

- Background on Working Group planning process
- Description of Corridors
- Existing Conditions information:
  - Physical Setting
  - Human Infrastructure (by corridor footprint)
  - Levees & Flood Conveyance
  - Habitats
  - Geomorphology
  - Water Quality
- Screening-level technical analysis results
- Background information on evaluation process

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Screening-level technical analyses

- Hydraulic Model (Corps' software)
  - **Flood outcomes**: water surface elevations; (unsteady flow routing: attenuation; differing flow distributions)
  - Floodplain inundation (area in relation to discharge)

- Hydrologic Model (Corps' software)
  - Identified the flows that create floodplain inundation to benefit:
    - Salmon & splittail
    - Food production (for floodplain areas, not marsh)

- Elevation Relationships (LiDAR data)
  - Tidal marsh extent
- Estimation of Riparian and Agriculture
  - Based on general assumptions

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Estimated Habitat Areas

Corridor	Existing Conditions	Corridor-Conditions								
				Assumed Corridor Land Cover/Habitats						
	Existing Footprint *(Total Existing Area between Levees; river excluded)*	**New Corridor Footprint** *(Additional Area between Levees above Existing; river excluded)*	**Corridor Footprint** *(Total Area between Levees; river excluded)*	**Tidal Wetlands** *(includes SLR accommodation, tidal marsh and shallow subtidal)*		**Riparian Forest**		**Flood-Tolerant Agriculture**		**Length of Channel Margin Habitat Created** *(miles; RB vs LB defined; add active and passive for corridor totals)*
	acres	acres	acres	acres	percent of new corridor footprint	acres	percent of new corridor footprint	acres	percent of new corridor footprint	Passive	Active
1A	2,524	9,217	11,741	-	0%	8,219	70%	3,522	30%	16 on RB & 16 on LB (32 total both banks)	-
1B	1,593	3,787	5,380	-	0%	3,228	60%	2,152	40%	8.5 (RB only)	-
2A	1,189	1,100	2,289	-	0%	1,145	50%	1,145	50%	0.0	-
Fabian Tract	484	6,487	6,971	6,710	96%	235	3%	26	0%	11.5 (one bank; multpl. chls.)	-
2B	1,673	7,587	9,260	6,710	72%	2,295	25%	255	3%	11.5 (one bank; multpl. chls.)	-
3	706	4,468	5,174	3,530	68%	1,480	29%	164	3%	11 on LB	11 on RB
4	252	5,629	5,881	3,820	65%	2,061	35%	-	0%	12 on LB	12 on RB

Note: Because Corridor 2B is comprised of both Fabian Tract and Paradise Cut, areas for Fabian Tract are shown for clarity.

Estimated Habitat Areas

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Inundated Habitat Criteria

Key Organism	Life Stage	Season	Minimum Duration	Frequency	Ecologically-Relevant Flow (cfs)	Sources
Sacramento Splittail (*Pogonichthys macrolepidotus*)	Spawning and rearing	Feb. 1 – May 31	21 days	At least once every 4 years	11,600	Sommer et al., 1997; ACOE, 2002; Williams et al., 2009
Chinook salmon (*Oncorhynchus tshawytscha*)	Rearing	Dec. 1 – May 31	14 days	At least once every 4 years	15,550	Sommer et al., 2001a; ACOE, 2002

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Estimated Floodplain Inundation Areas

Corridor	Existing Conditions			Corridor Conditions - with Sea Level Rise, existing flow regime				
	Existing Corridor Footprint *(Total Existing Area between Levees; river excluded)*	**Inundated Floodplain Habitat** *assuming Salmon Threshold, 15,500 cfs*	**Inundated Floodplain Habitat** *assuming Splittail Threshold, 11,600 cfs*	**New Corridor Footprint** *(Total Area between Levees; river excluded)*	**Inundated Floodplain Habitat** *assuming Salmon Threshold, 15,500 cfs*		**Inundated Floodplain Habitat** *assuming Splittail Threshold, 11,600 cfs*	
	acres	acres	acres	acres	acres	Percent of new corridor footprint	acres	Percent of new corridor footprint
1A	2,524	910	412	11,741	2,673	23%	1,023	9%
1B	1,593	532	213	5,380	1,372	26%	692	13%
2A	1,189	46	11	2,289	777	34%	445	19%
Fabian Tract	484	29	5	6,710	6,118	91%	5,950	89%
2B	1,673	75	16	8,999	6,895	77%	6,395	71%
3	706	88	33	5,174	3,996	77%	3,481	67%
4	252	26	8	5,881	4,337	74%	3,816	65%

Increase in Ecologically-Relevant Inundation (acres)

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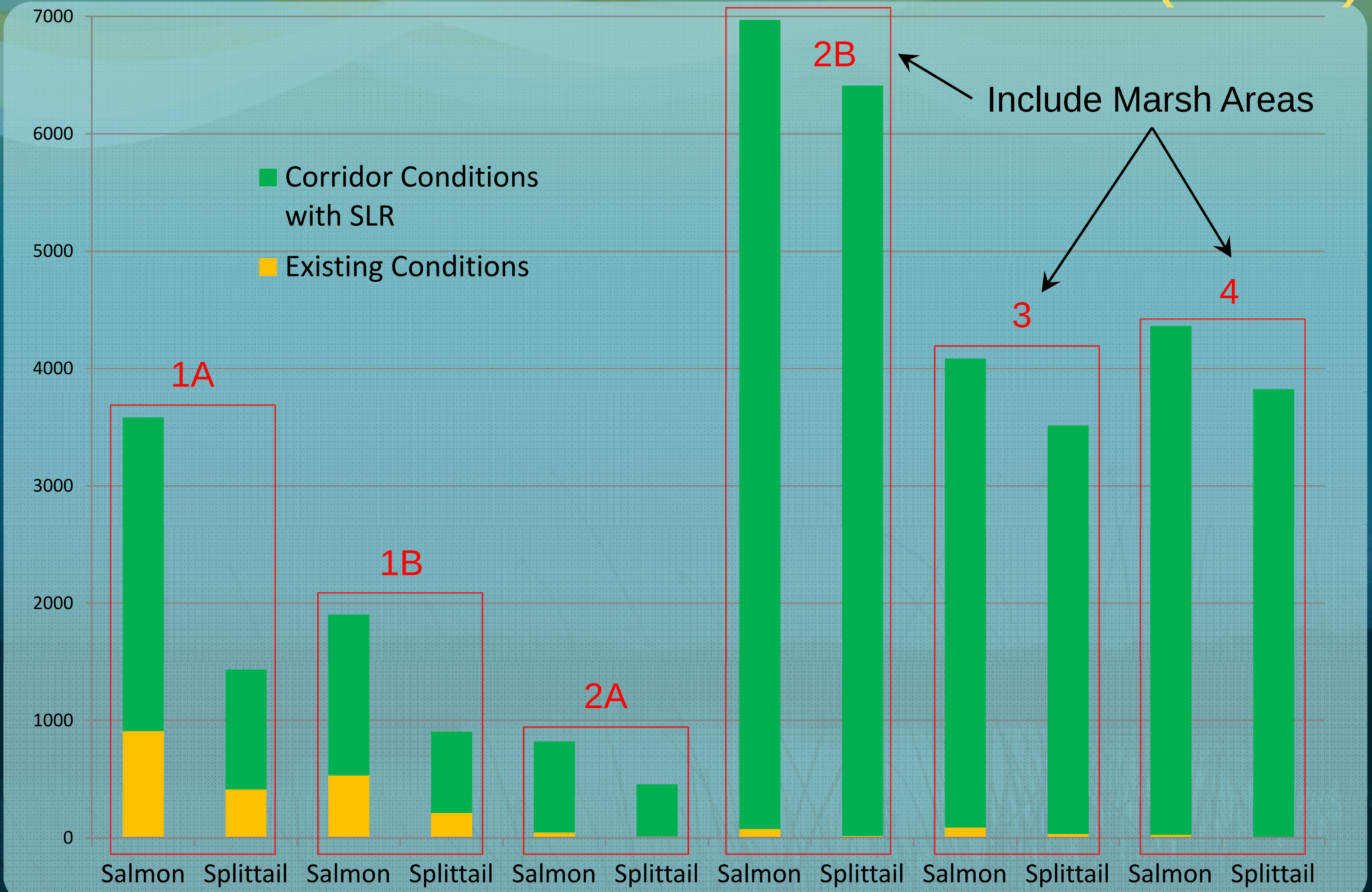

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South Delta Corridor Evaluations

Ecosystem Team

Bruce DiGennaro (Facilitator)	ESSEX
Eric Ginney (Coach)	ESA PWA
Jeremy Thomas	NewFields
Michelle Orr	ESA PWA
Ted Sommer	DWR
Cathy Marcinkevage	NOAA Fisheries
Josh Israel	USBR
Christine Joab	RWQCB
Will Stringfellow	UOP
Mike Hoover	USFWS
John Cain	AR
Ron Melcer	DWR
Shengjun Wu	DWR
Deanna Sereno	CCWD

Flood Team

Betty Andrews (Coach)	ESA PWA
Mark Tompkins	NewFields
Michael Mierzwa	DWR
Scott Woodland	DWR
Joe Bartlett	DWR
Ron Melcer	DWR
Bob Scarborough	DWR
Steve Cimperman	DWR
Samson Haile-Selassie	DWR
Ray McDowell	DWR
Chris Neudeck	KSN Eng.
Mike Archer	MBK Eng.

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Flood Evaluation Overview

- Six hydraulic model runs evaluated
- Each model included one or more "corridors"
- Run results used to assess expected outcomes
- Both positive and negative outcomes evaluated
- Outcomes assessed relative to Working Group flood objectives (focus on urban / urbanizing areas)

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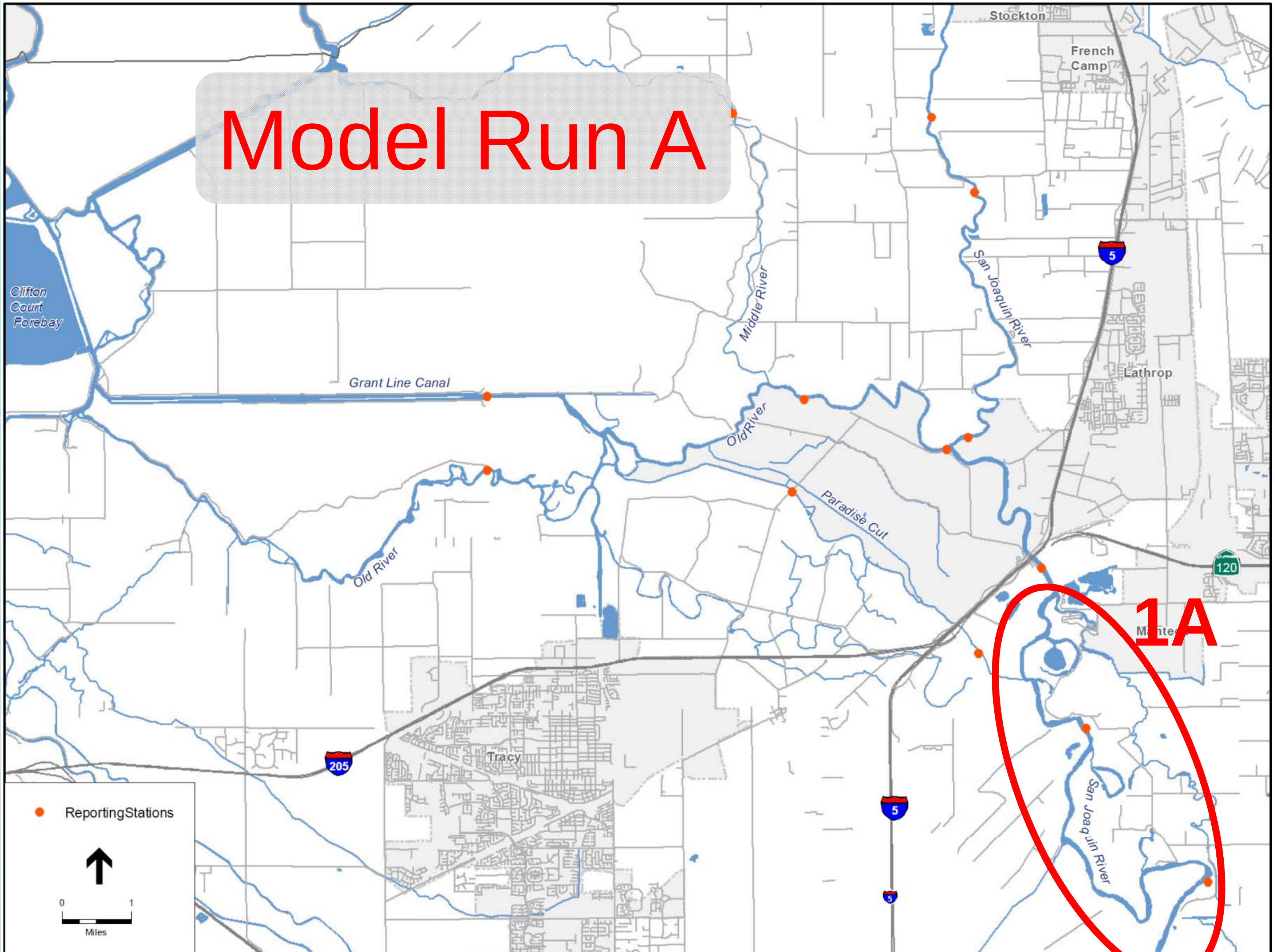
Flood Model Runs

Model Run	Corridors					
	1A	1B	2A	2B	3	4
A	X					
B						X
C	X		X			
D	X					X
E		X	X	X		
F			X		X	

Flood Model Runs



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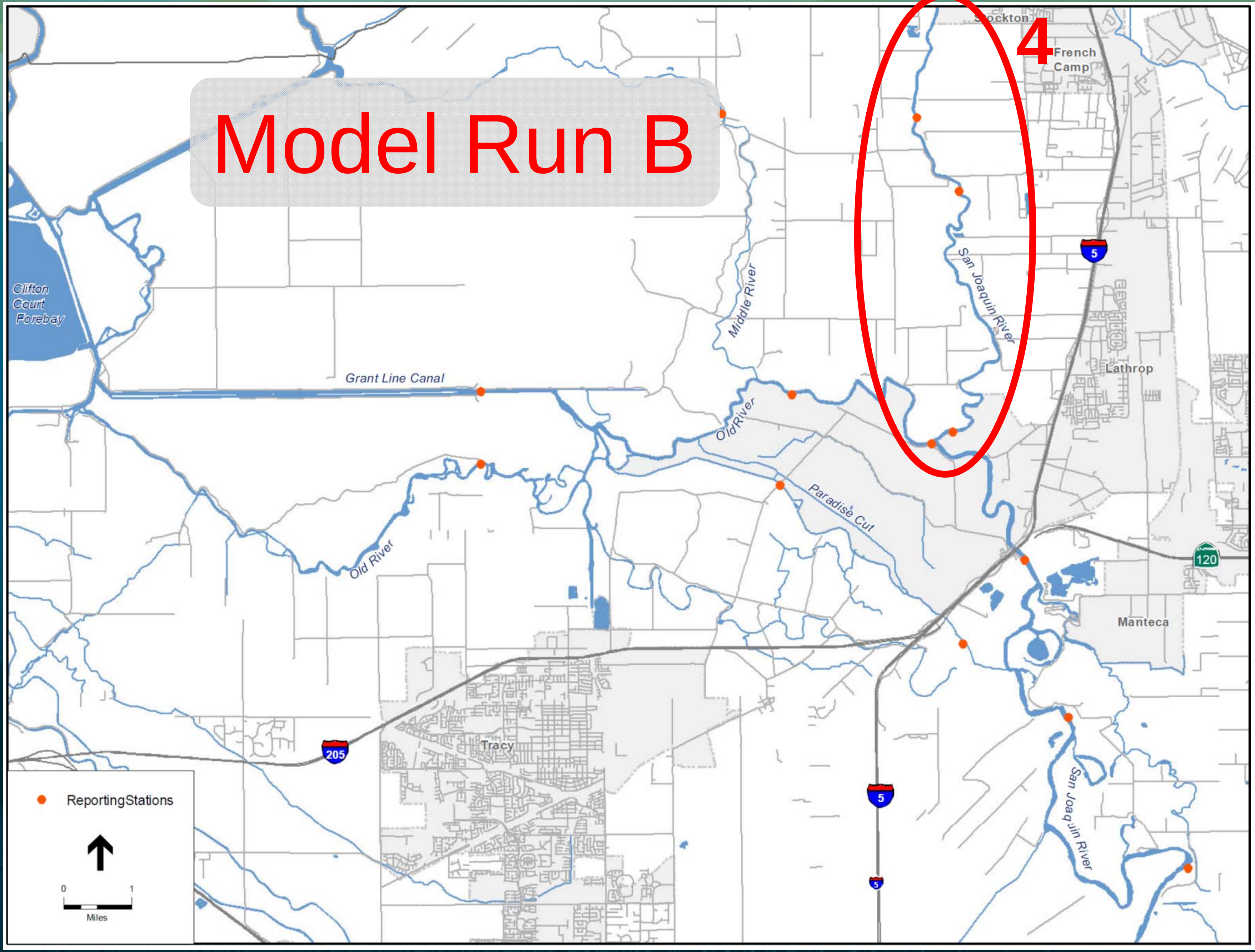
FLOOD MODEL RUNS



FLOOD MODEL RUNS

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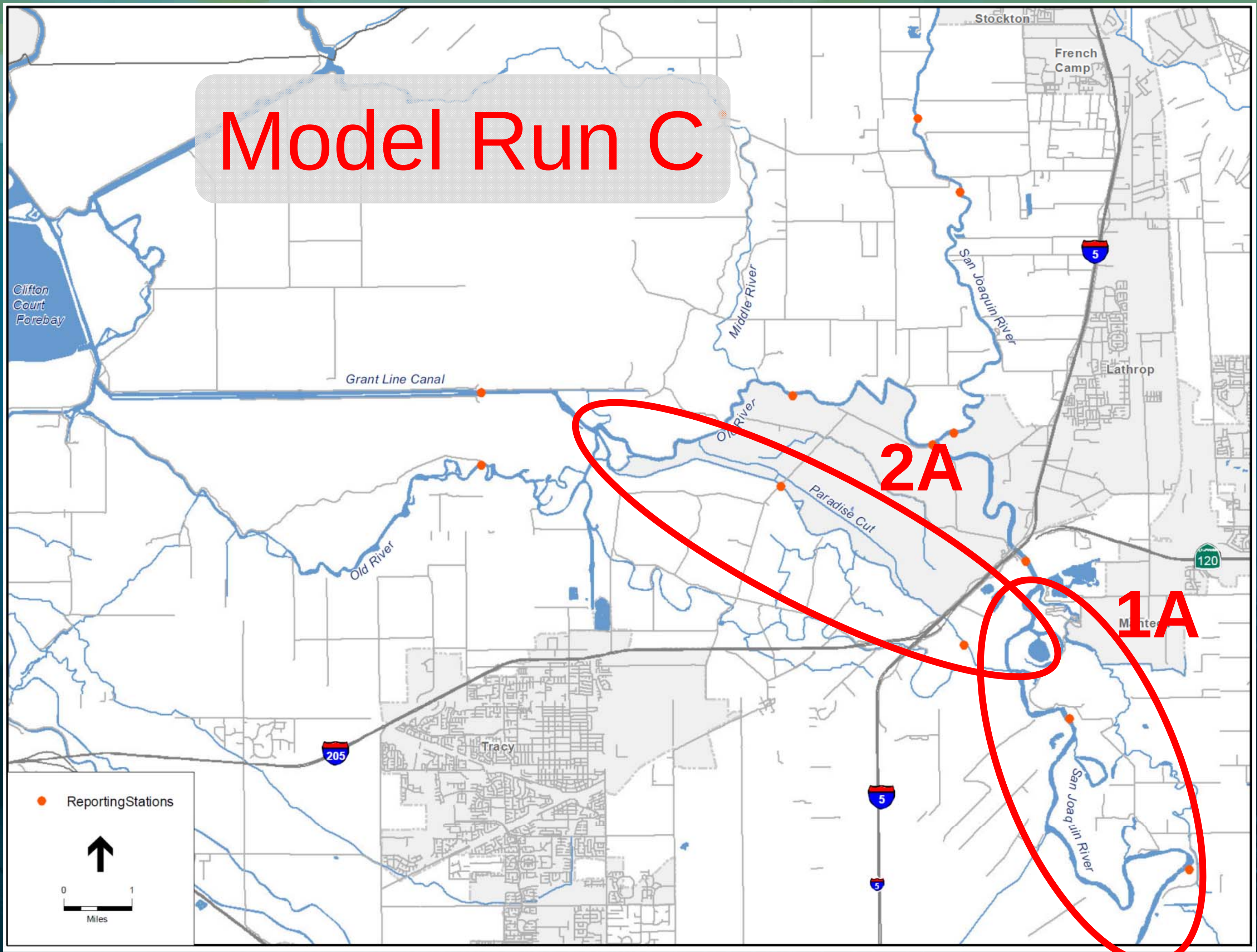

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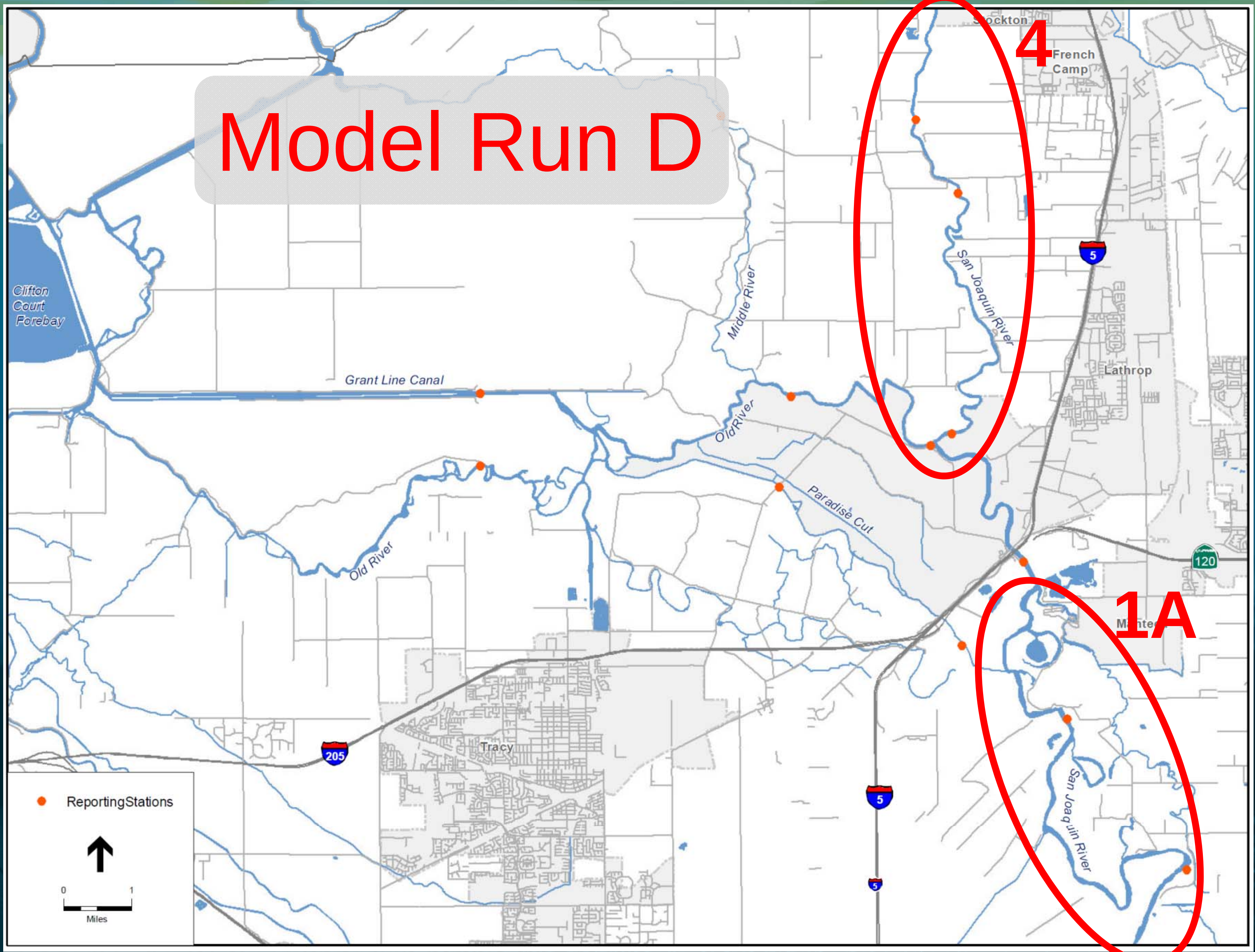
FLOOD MODEL RUNS



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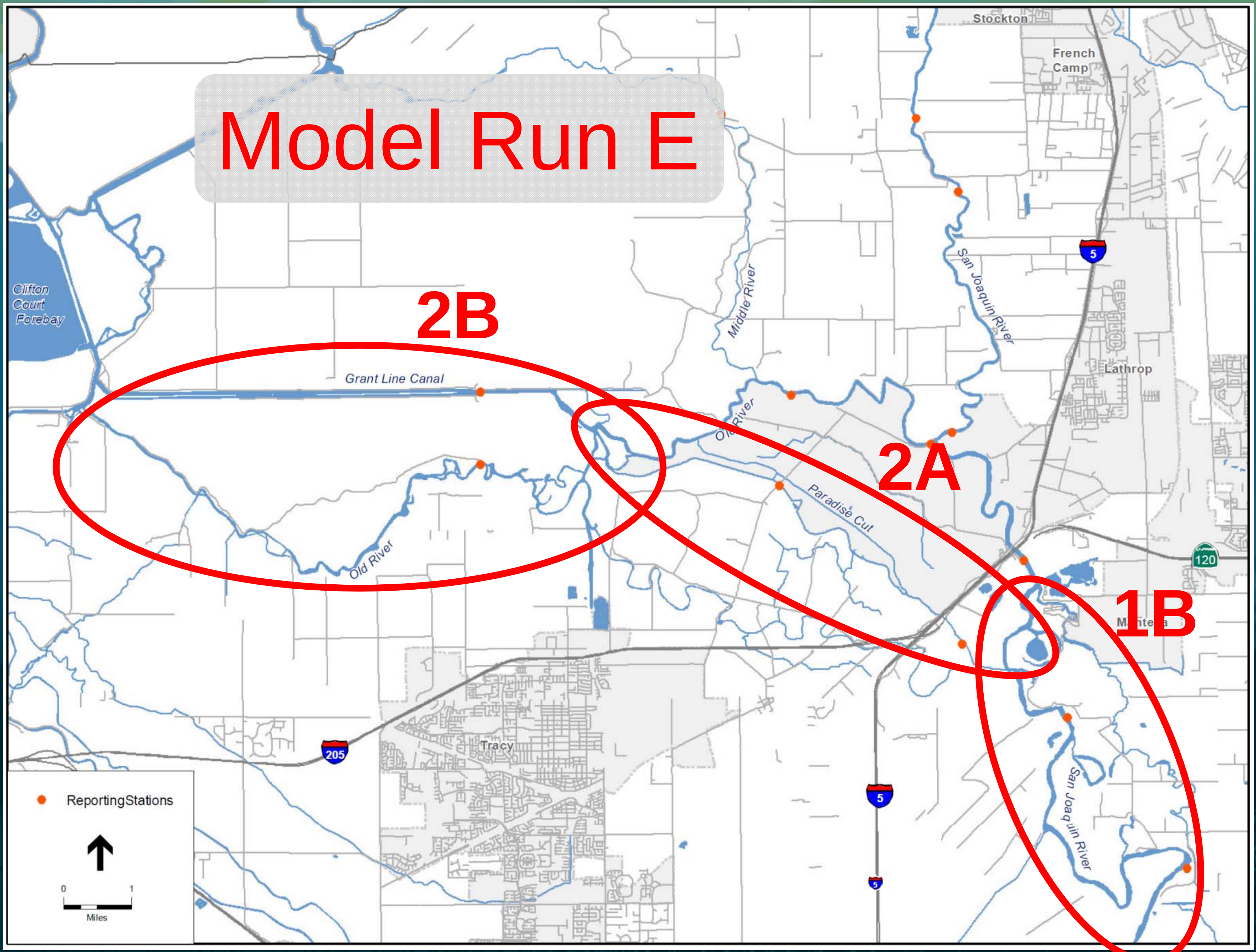

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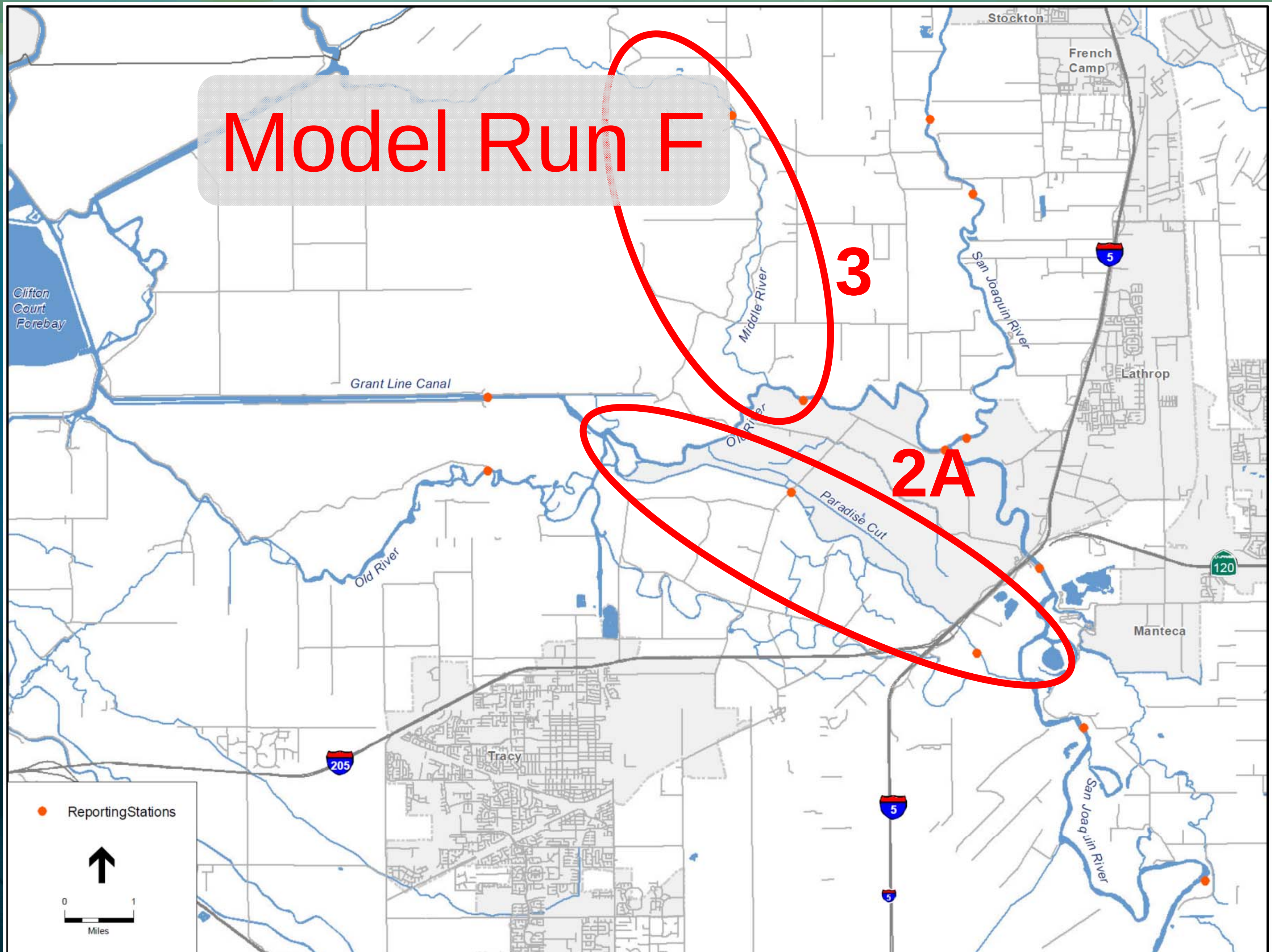
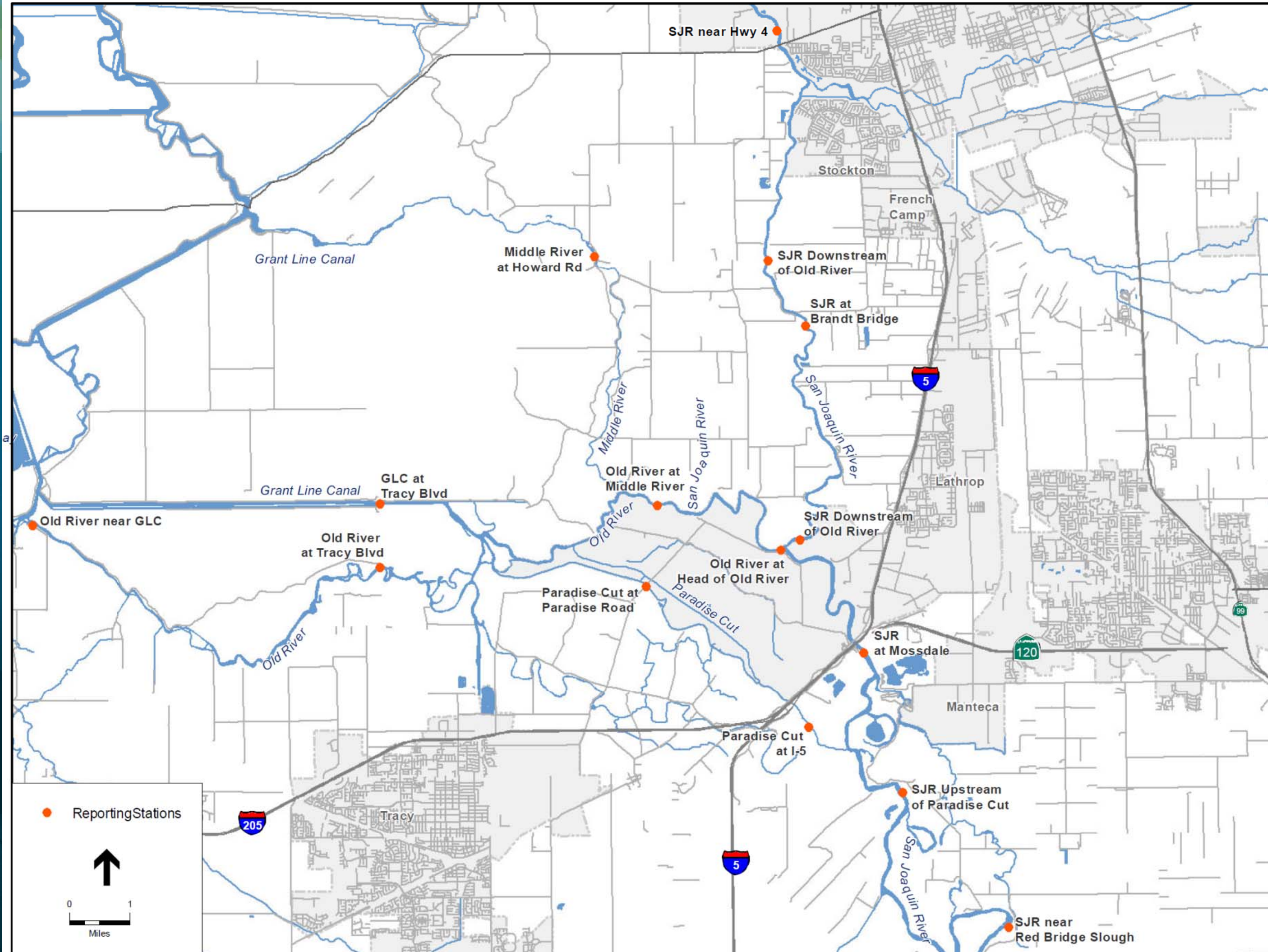


Flood Reporting Locations



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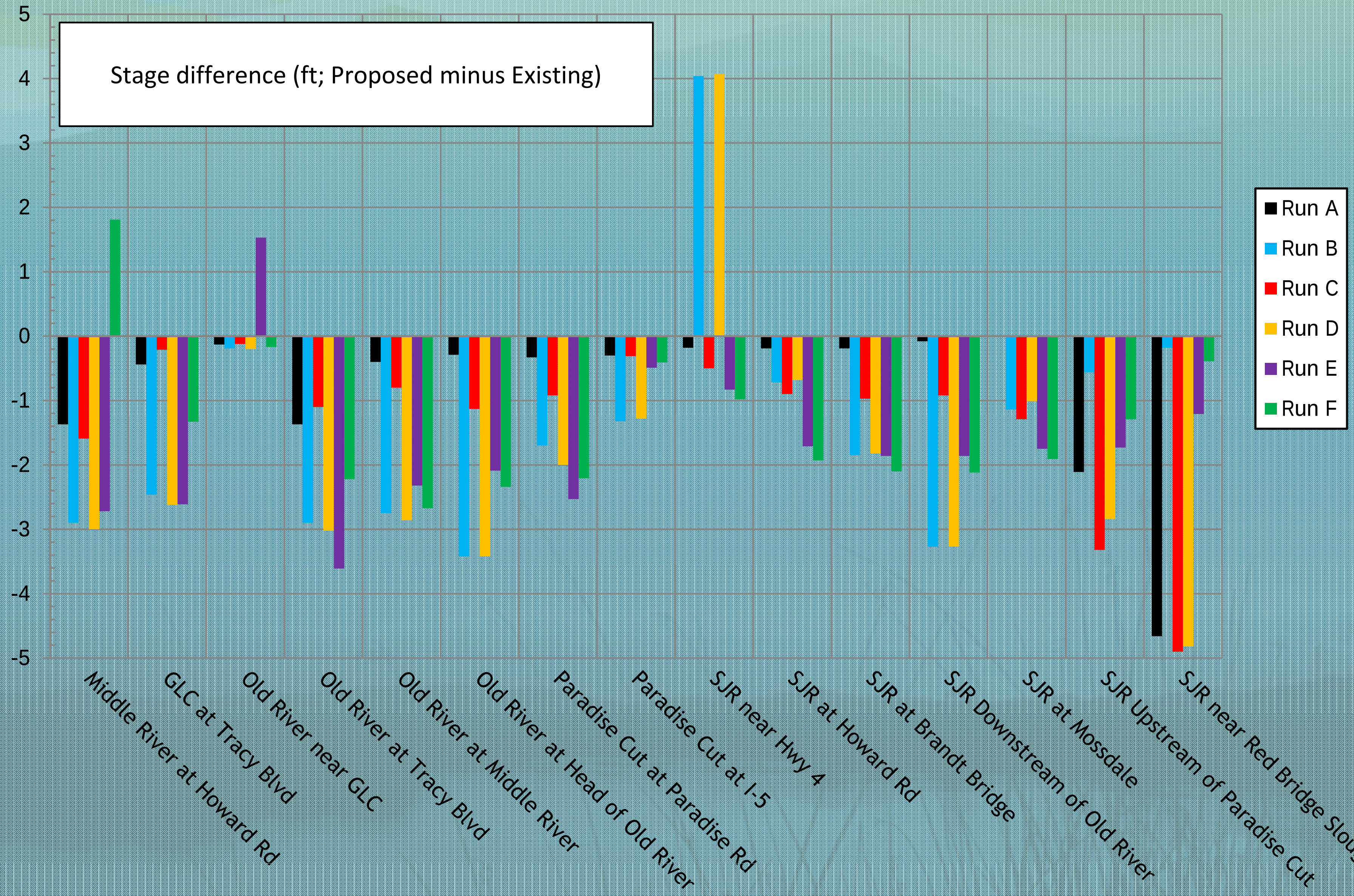
Modeling results overview



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EVALUATION RESULTS FROM WORKSHOP

Outcomes for South Delta Corridors Flood Evaluations		Scale	SCORING without SLR			
Standard Outcome Code	Outcome (brief descriptor)	(0, L,M,S)	Magnitude	Certainty	Worth	Risk
	Run A					
P1F	reduce stage in flood objective locations	0	1	4	M	
N1F	Increased stage	S	1	3		M
	Run B					
P1F	Decreased stage	L	4	4	H	
N1F	Increased stage	S	4	3		H
	Run C					
P1F	Decreased stage	L	2	4	H	
	Run D					
P1F	Decreased stage	L	4	4	H	
N1F	Increased stage	S	4	3		H
	Run E					
P1F	Decreased stage	L	3	4	H	
N1F	Increased stage	0	2	3		M
	Run F					
P1F	Decreased stage	L	3	4	H	
N1F	Increased stage	0	3	2		M

Two model runs showed high worth; lower or no negative stage outcomes:

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	Run C					
P1F	Decreased stage	L	2	4	H	
	Run D					
P1F	Decreased stage	L	4	4	H	
N1F	Increased stage	S	4	3		H
	Run E					
P1F	Decreased stage	L	3	4	H	
N1F	Increased stage	0	2	3		M
	Run F					
P1F	Decreased stage	L	3	4	H	
N1F	Increased stage	0	3	2		M

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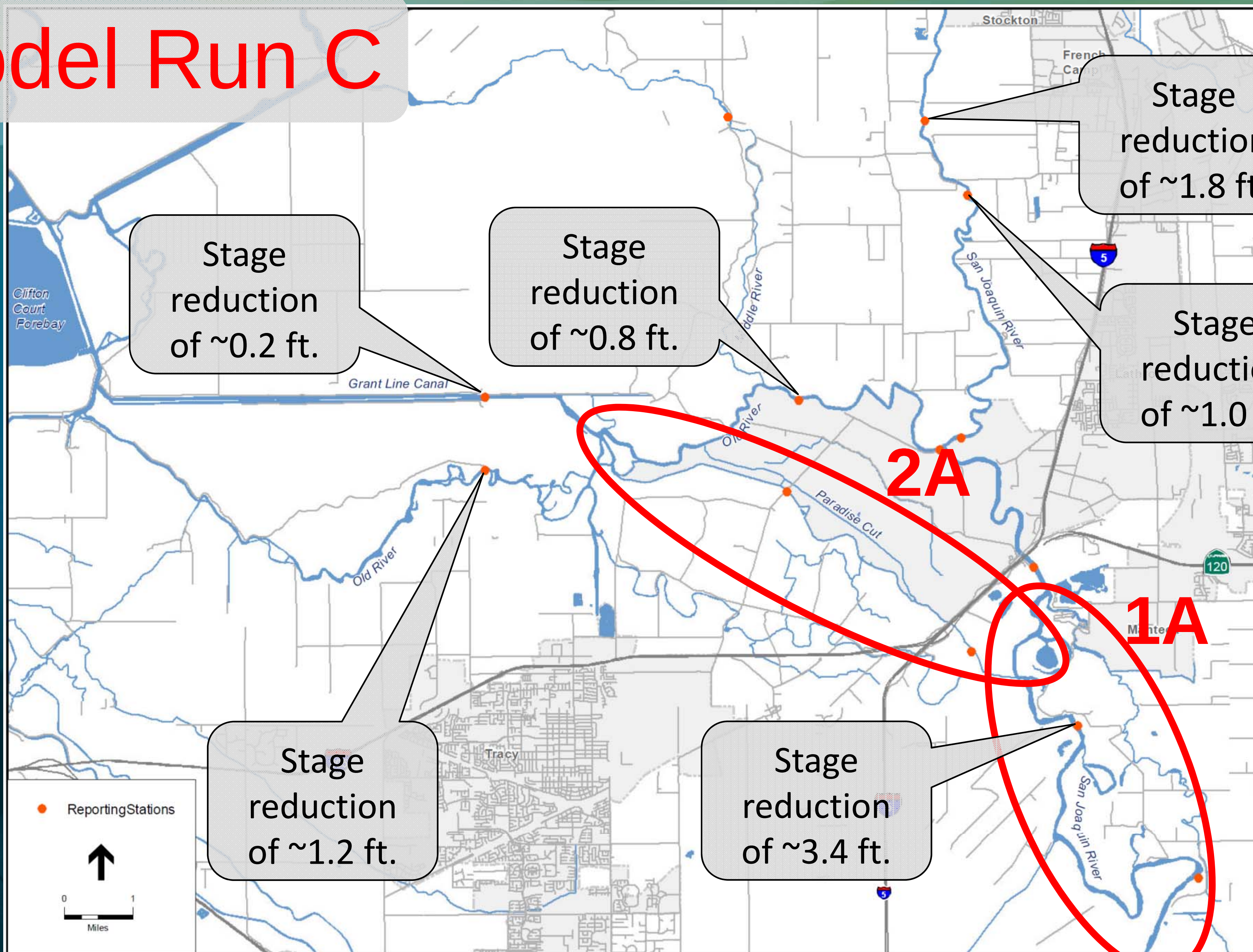
Flood Evaluation Results

Model Run C



FLOOD EVALUATION RESULTS

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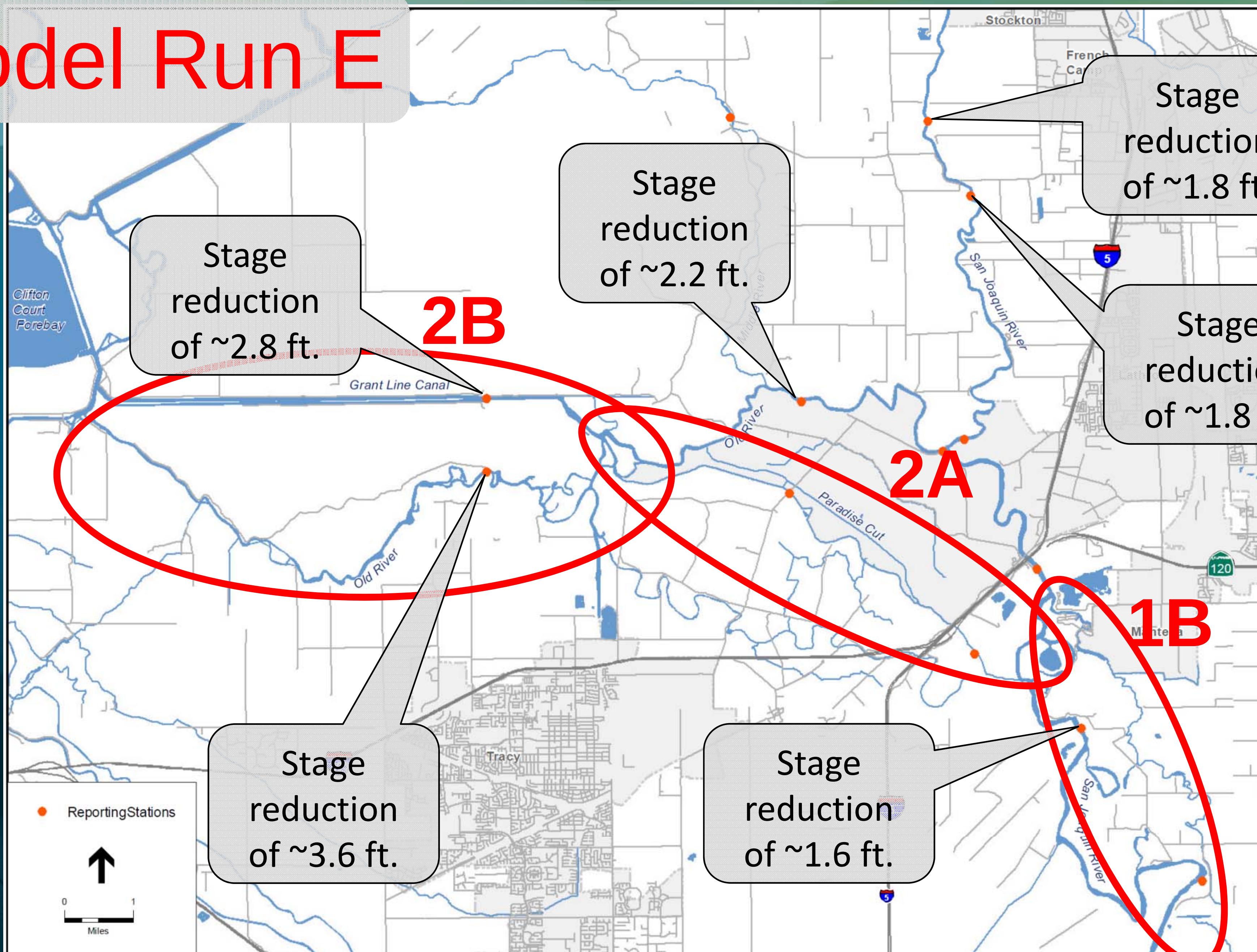
Model Run E



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Ecological Evaluation Overview

- Experts screened corridors relative to the Working Group Objectives. Time limitations and illness restricted the teams.
- Specific ecological outcomes assessed (positive and negative)
- Per the charter and suggestion of the evaluators, the group considered:
  - With and without changed hydrology (SJ River Restoration Program; State Board, etc)
  - With and without Isolated Old River Corridor (IORC)
  - With and without Head of Old River Barrier (HORB)
  - With and Without "Sub-Tidal Marsh areas" after construction
- Results presented today are for conditions *assuming optimization;* mostly the addition of barriers.

Ecological Magnitude & Certainty of Outcomes

Magnitude combines scale of action with extent of effects on populations, productivity, habitats

Certainty combines level of understanding about cause-effect relationships, predictability of the ecosystem processes, and extent to which addresses important cause-effect relationships identified in the models

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Ecological Magnitude

4 - High: major population level effect (natural productivity, abundance, spatial distribution and/or genetic and life history diversity).

3 - Medium: minor population effect or effect on large area (regional) or multiple patches of habitat.

2 - Low: effect limited to small fraction of population, addresses productivity and diversity in a minor way, or limited habitat effects.

1 - Minimal or zero: Conceptual model indicates little or no effect.

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Ecological Certainty

4 - High: Understanding is high + outcome is largely unconstrained by variability in ecosystem dynamics, other external factors, or is expected to confer benefits under conditions or times when model indicates greatest importance.

3 - Medium: Understanding is high but outcome is dependent on other highly variable ecosystem processes or uncertain external factors – OR – Understanding is medium and outcome is largely unconstrained by variability in ecosystem dynamics or other external factors

2 - Low: Understanding is medium and outcome is greatly dependent on highly variable ecosystem processes or other external factors – OR – Understanding is low and outcome is largely unconstrained by variability in ecosystem dynamics or other external factors

1 - Minimal or zero: Understanding is lacking – OR – Understanding is low and outcome is greatly dependent on highly variable ecosystem processes or other external factors

Outcomes Summarized as Worth & Risk

Is it Worthwhile?

		Certanity			
		1	2	3	4
Magnitude	1	*Low*	*Low*	*Med*	*Med*
	2	*Low*	*Med*	*Med*	*High*
	3	*Med*	*Med*	*High*	*High*
	4	*Med*	*High*	*High*	*High*

How Risky is it?

		Certanity			
		1	2	3	4
Magnitude	1	*Med*	*Med*	*Low*	*Low*
	2	*High*	*Med*	*Med*	*Low*
	3	*High*	*High*	*Med*	*Med*
	4	*High*	*High*	*High*	*Med*

Roll-up weights

Value between..	..and	Rank
1	1.5	Low
1.5	2.5	Med
2.5	3	High

EXAMPLE

WORTH		RISK	
Grade	Numeric	Grade	Numeric
Med	2		
Med	2		
High	3		
WORTH		**RISK**	
Med	**2.3**	#N/A	**0.0**

BDCP
Bay Delta Conservation Plan

Ecological Evaluation Results

	WORTH	RISK
Corridor 1A	HIGH 2.6	MEDIUM 2.0
Corridor 1B	MEDIUM (X)	MEDIUM (X)
Corridor 2A	HIGH 2.6	MEDIUM 2.0
Corridor 2B	MEDIUM 1.5	HIGH 3.0
Corridor 3	LOW (X)	MEDIUM (X)
Corridor 4	MEDIUM 1.6	HIGH 3.0

BDCP
BAY DELTA CONSERVATION PLAN

Key Issues

1. San Joaquin River Hydrology drives outcomes on floodplain habitats; actions can be taken to mitigate, to some degree.
2. Barriers and isolated corridors would be critical to reducing risk in certain Corridors 2B, 3, or 4.
3. Details regarding barriers and isolation near conveyance facilities must be further examined (HORB & IORC).
4. Water Quality (temp; food production; M&I supply/export, etc) – pending more data & evaluation
5. Entrainment – assessment preliminary and very conceptual because of lack of particle tracking data

Which corridors are looking promising?

Preliminary findings:

- Corridor combinations can create substantial habitat and habitat continuity for terrestrial, avian, and certain aquatic species.
- Flood evaluation suggests Corridors 1A, 2A, 2B.
- Ecological evaluation suggests Corridors 1A & 2A have highest benefit levels (worth); 1B, 2B, & 4 rank moderate.
- Flood & Ecosystem benefits “coexist” in Corridors 1A, 2A & 2B—and provide continuity.

What's next?

- Additional examination of Corridors 1A, 2A, 2B
- More-focused outreach to:
  - Local and regional governments
  - Reclamation & Levee Districts
  - Water providers
  - Flood agencies
  - Environmental interests
- Coordination with on-going flood management efforts in region