Flood Risk Resilience: Adapting to Climate Change in the Lower San Joaquin River Basin

CALIFORNIA EXTREME PRECIPITATION SYMPOSIUM

JUNE 22, 2021

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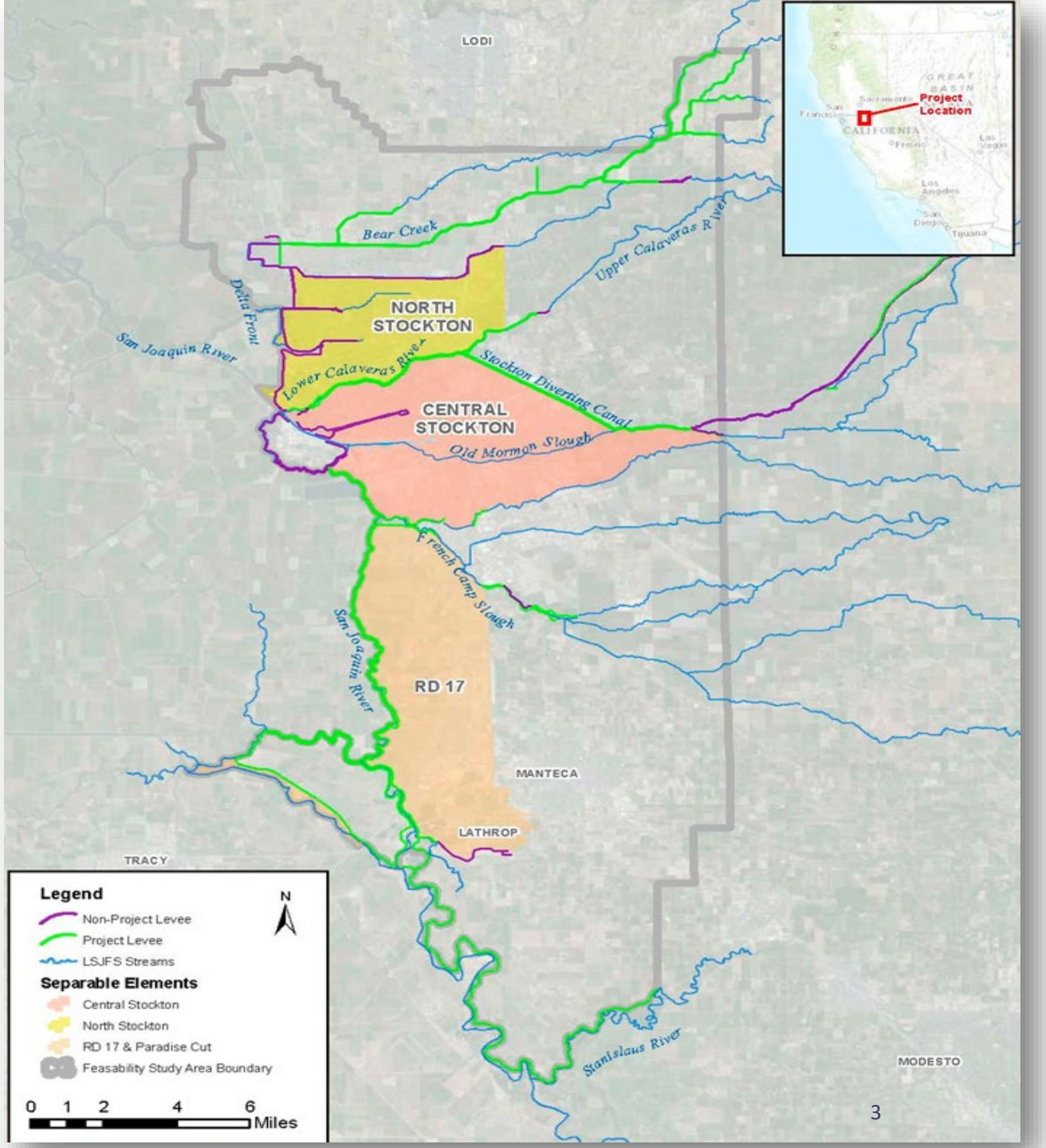
SJAFCA

Presentation Outline

- *Overview of Agency*
- *Lower San Joaquin Regional Context*
- *Climate Change Impacts in the Lower San Joaquin River Basin*
  - *San Joaquin River Main Stem*
  - *New Hogan Reservoir*
- *Policy Considerations*
- *Planning for Climate Resilience*
  - *San Joaquin River Main Stem*
  - *North/Central Stockton*
- *Conclusions*

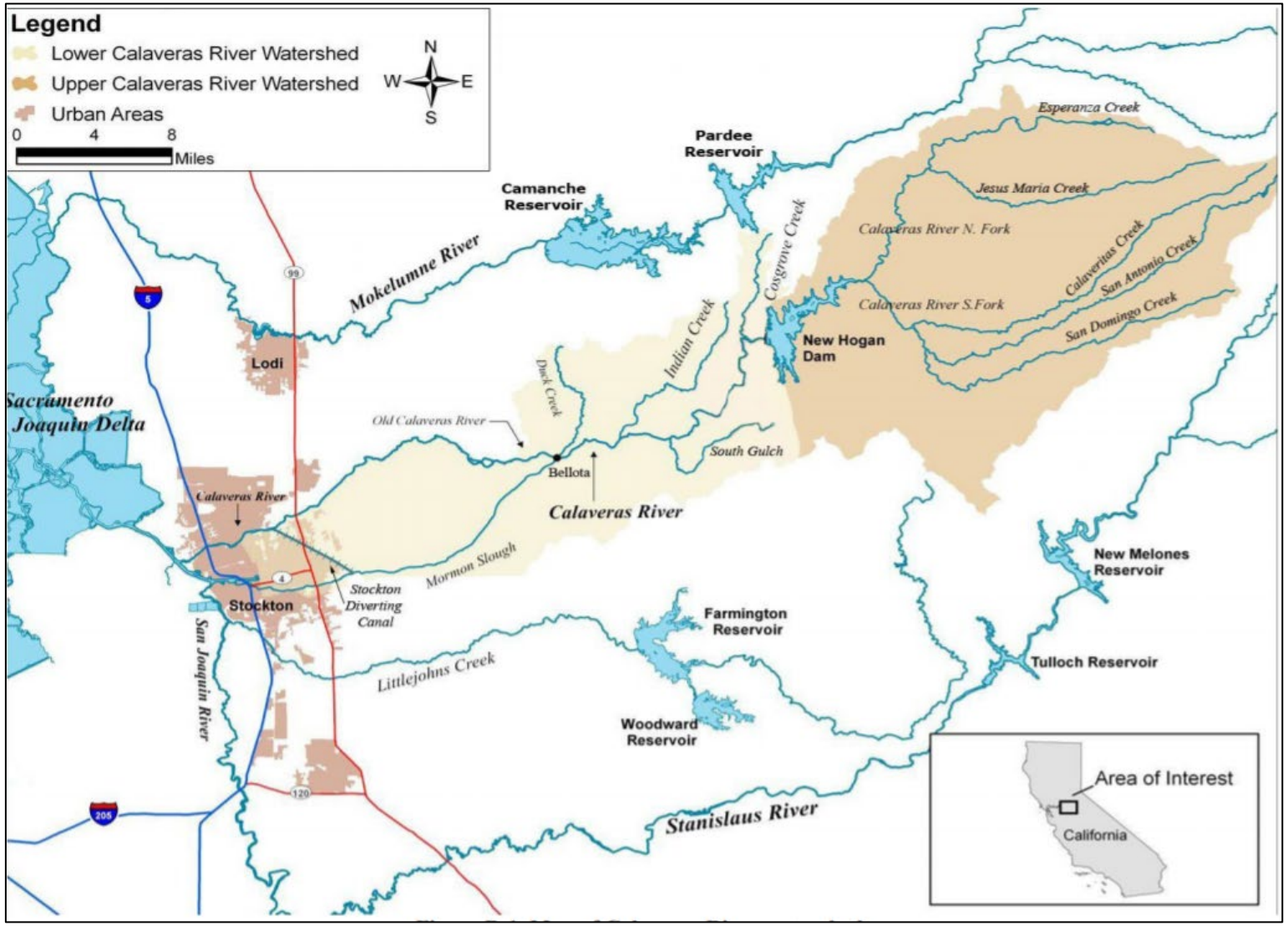
Stockton Diverting Canal, 1958

SJAFCA BOUNDARY

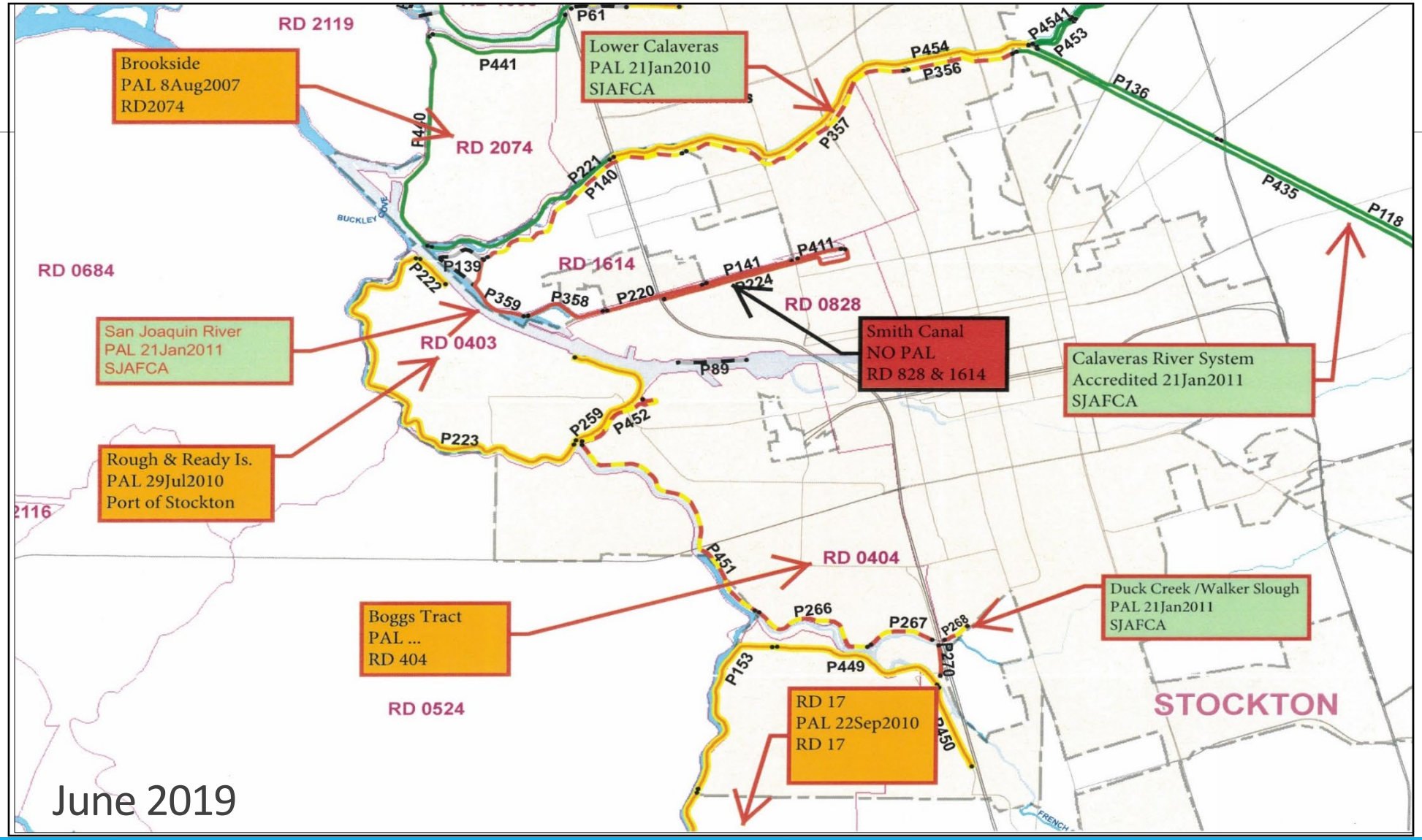


Overview of Watersheds

- Calaveras Watershed
- San Joaquin River Watershed
- Mokelumne River Basin
- Farmington Reservoir



RDs within SJFACA Boundary



June 2019

Mission

To reduce flood risk for the Cities of Stockton, Lathrop and Manteca and some adjacent unincorporated County areas

SJAFCA
San Joaquin Area FLOOD CONTROL Agency

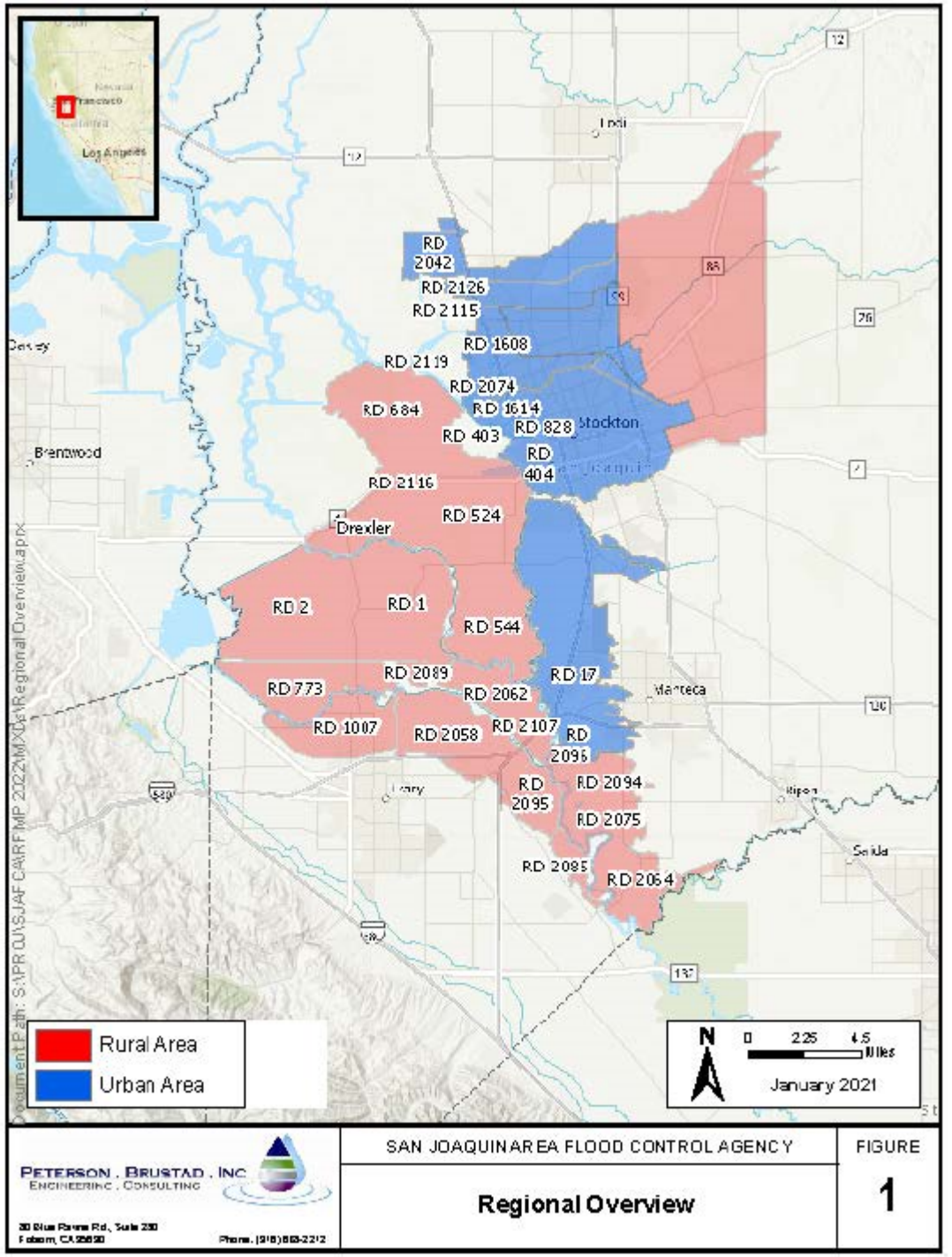
Governance

Nine member Board of Directors

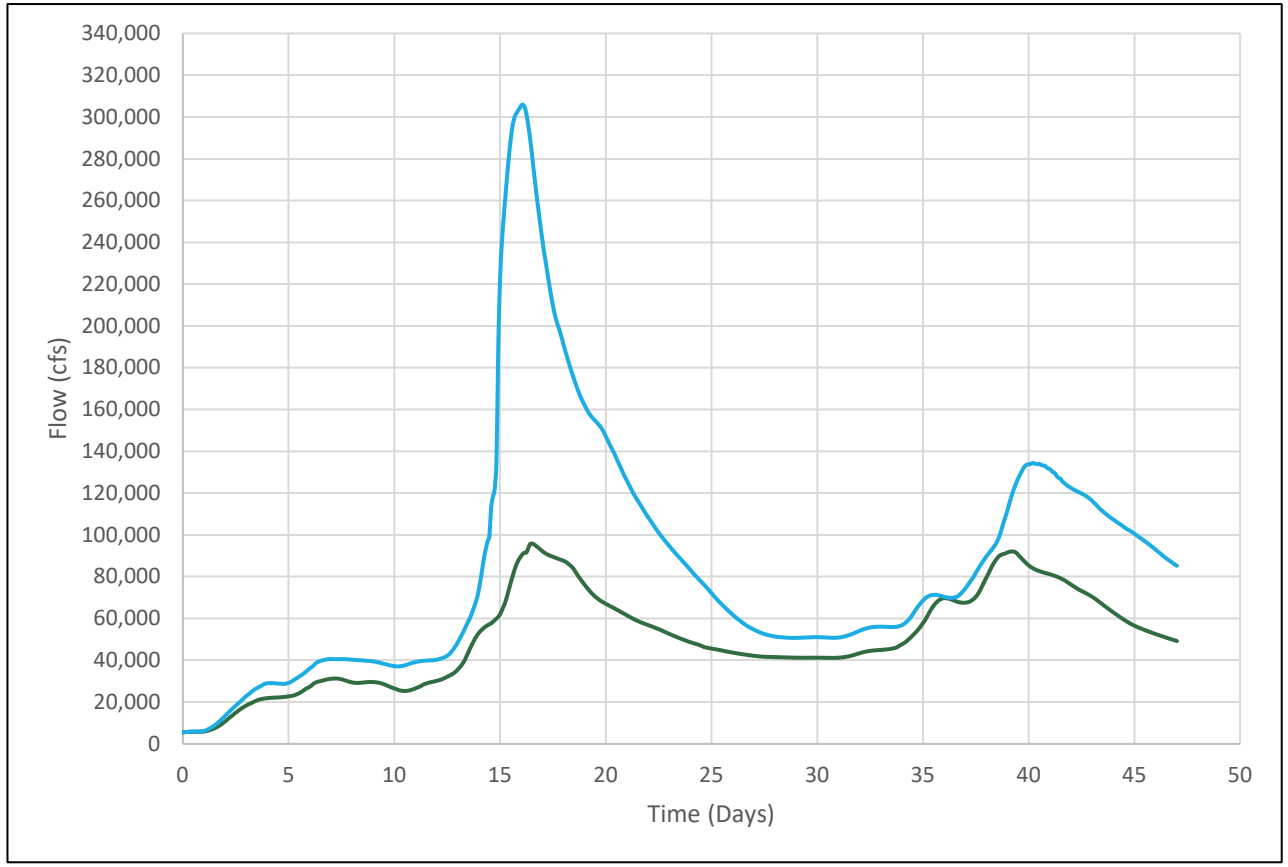
- One member of the San Joaquin County Flood Control & Water Conservation District
- One member of the County Board of Supervisors
- Two members from Stockton City Council
- Two members from Lathrop City Council
- Two members from Manteca City Council
- One member of the public

Lower San Joaquin Regional Context

- *Approx. 25% urban/75% rural (based on acreage)*
  - *LSJ/DS Region Population: ~500,000*
  - *County Population: ~760,000*
- *SJAFCA Member Agencies*
  - *Cities of Stockton, Lathrop, and Manteca*
  - *San Joaquin County*
- *LMAs*
  - *San Joaquin County Flood Control & Water Conservation District*
  - *29 different Reclamation Districts*



Climate Change Impacts: San Joaquin River Main Stem



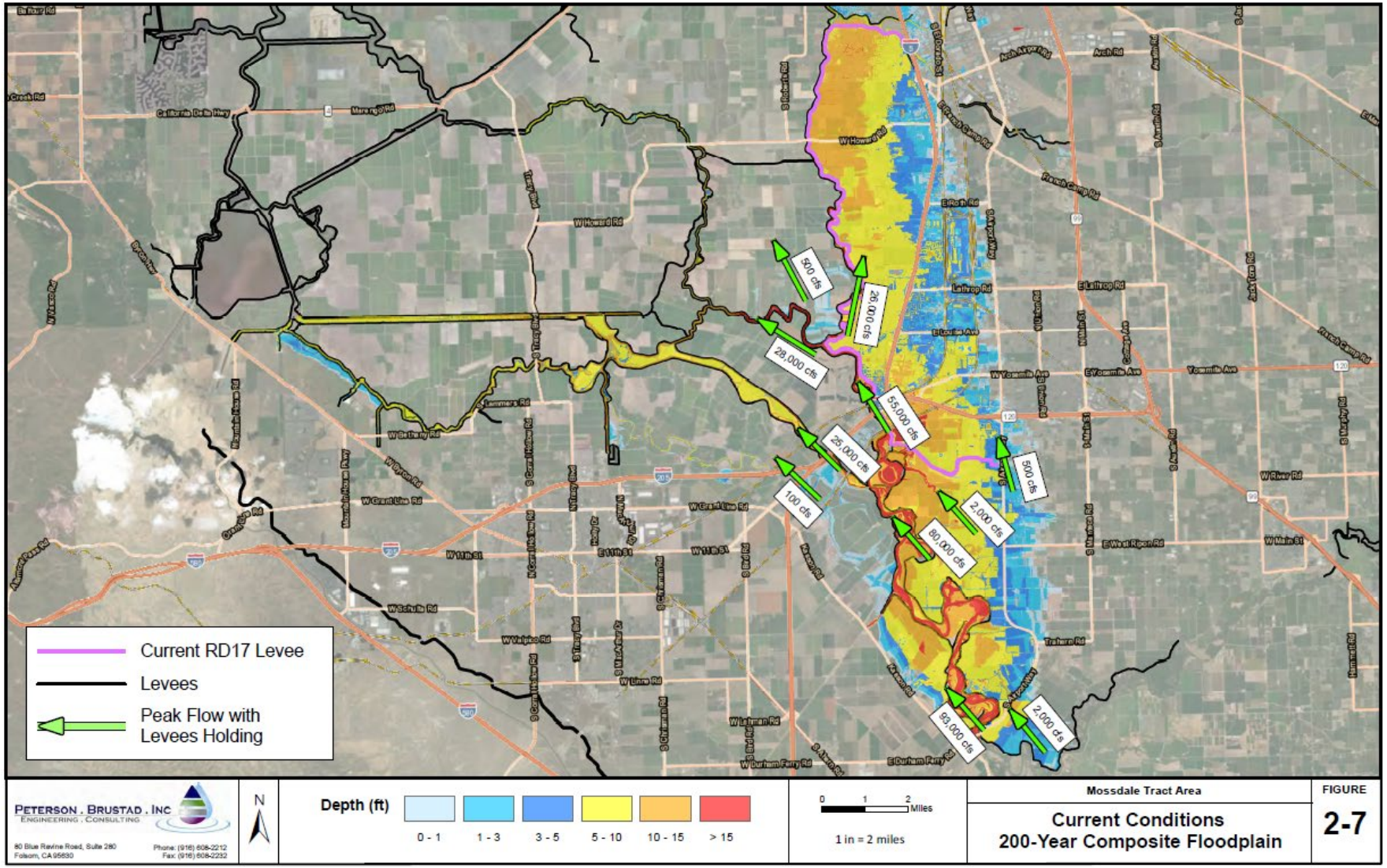
200yr Hydrograph at Vernalis: Existing vs. Projected 2065

Return Period (year)	Existing Peak Flows (cfs)	CVFPP Projected 2065 Peak Flows (cfs)
10	43,900	47,700
25	49,100	80,600
50	64,500	115,600
100	81,600	203,700
200	101,300	310,100
500	136,400	503,500

- *DWR 2017 CVFPP climate change analyses predicted extreme hydrologic impacts to the Lower San Joaquin River*
- *200-year peak flow at Vernalis projected to triple by 2065*

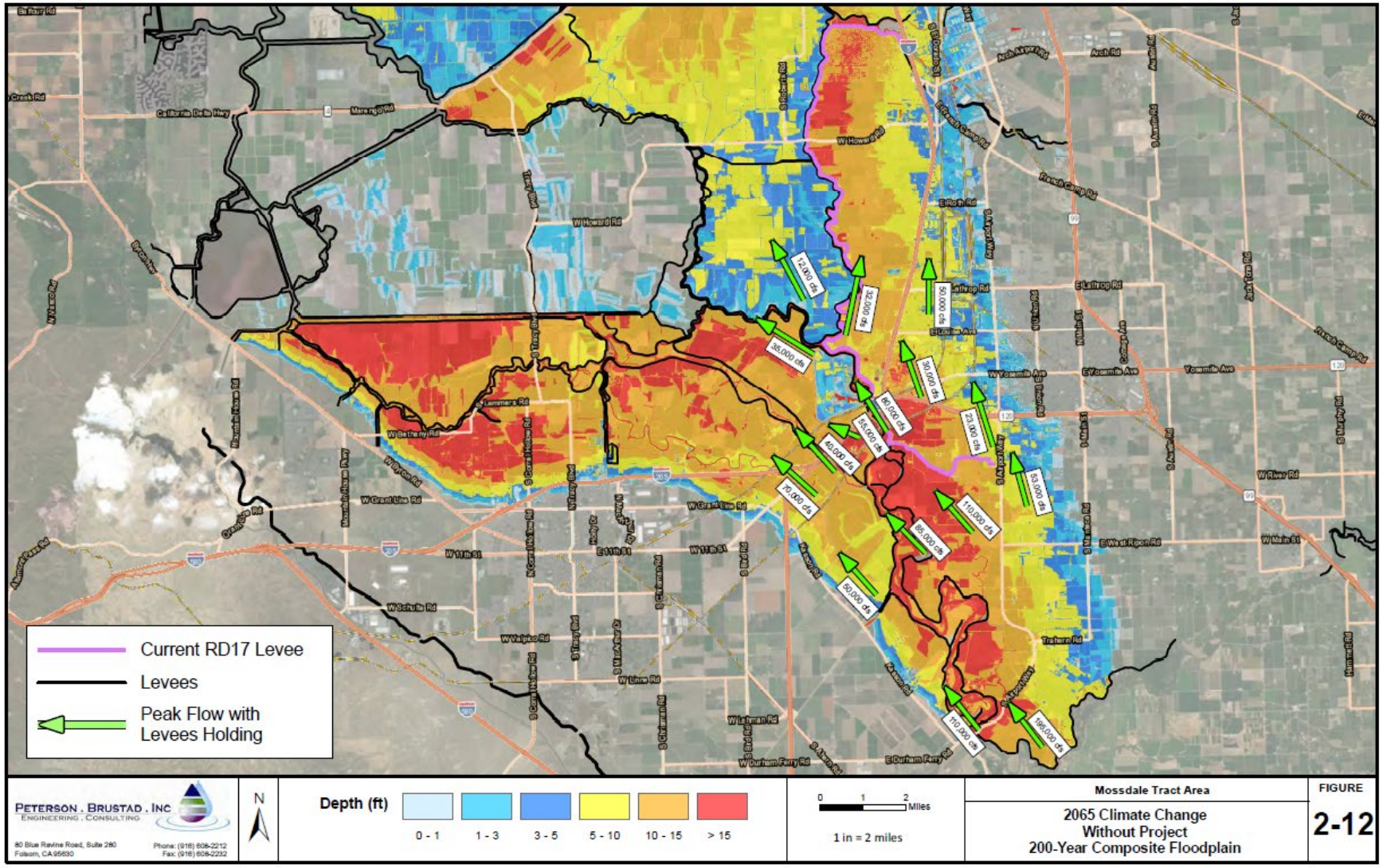
Climate Change Impacts: San Joaquin River Main Stem

- *200-year Floodplain under current climate conditions*
- *Peak flow at Vernalis = 101,300 cfs*



Climate Change Impacts: San Joaquin River Main Stem

- *200-year Floodplain under CVFPP 2065 climate conditions*
- *Peak flow at Vernalis = 310,100 cfs*



***Floodplain results predate the RD 2062 levee improvements. According to RD 2062, the Stewart Tract will not flood during the 2040 and 2065 scenarios.

Climate Change Impacts: San Joaquin River Main Stem

Population and Infrastructure at Risk

Example: Mossdale Tract

- *Current Population ~45,000*
- *15,450 structures*
- *45 Critical Facilities including:*
  - *Hospitals (200 beds)*
  - *Prisons (1,500 inmates)*
  - *32 Schools (9,000 students)*
  - *4 fire stations*
  - *2 police stations*
  - *2 WWTPs*
  - *Interstate 5, Hwy 120, & 2 major railroads*

Impacts to Mossdale Tract

Analysis Year	Expected Annual Damages ($/yr)	Expected Annual Life Loss (lives/yr)
2018	$47,000	1.27
2065	$170,000	6.65
% Increase due to Climate Change	260%	425%

*Assumes no development or population growth between 2018 & 2065
**Assumes no flood risk reduction projects are built

Climate Change Impacts: New Hogan Reservoir

- *DWR's 2017 CVFPP estimates that climate change may have extreme impacts on New Hogan Reservoir and the downstream Mormon Slough system*
  - *Downstream Channel Capacity:* ***12,500-16,000 cfs***
  - *Current 200yr Outflow from New Hogan:* ***12,500cfs***
  - *CVFPP 2065 Projected 200yr Outflow from New Hogan:* ***38,000 cfs***
- *Climate change projections estimate uncontrolled spilling from New Hogan Dam on the order of* ***3x the downstream channel capacity***
  - *CVFPP estimated it would take approx.* ***42 TAF*** *of new flood storage to accommodate a future 200-year climate change event*

Climate Change Impacts: New Hogan Reservoir

Population and Infrastructure at Risk

Downtown Stockton

- *Located 30-miles downstream of New Hogan*
- *Population: 300,000+*
- *Severely Disadvantaged Community*

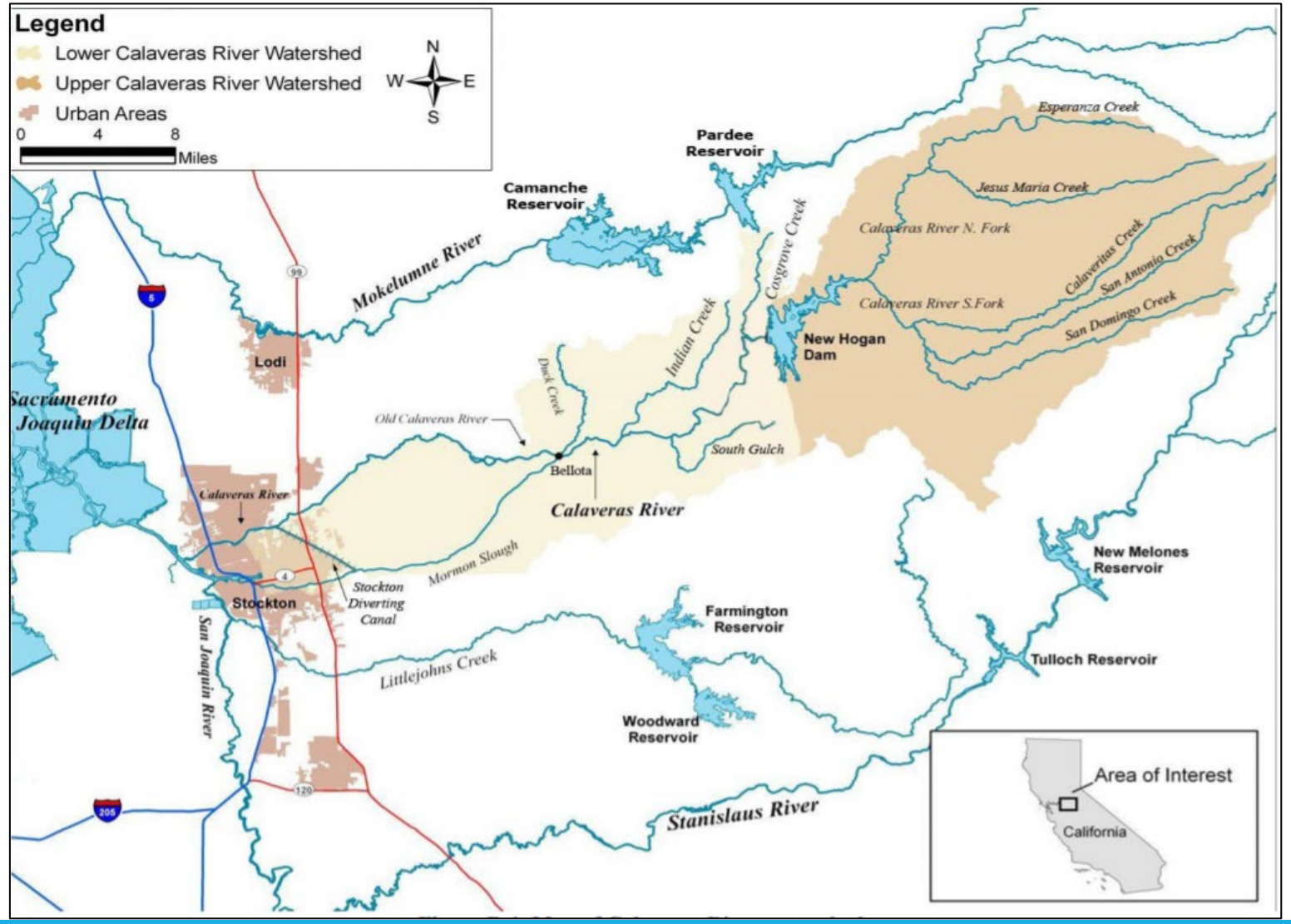
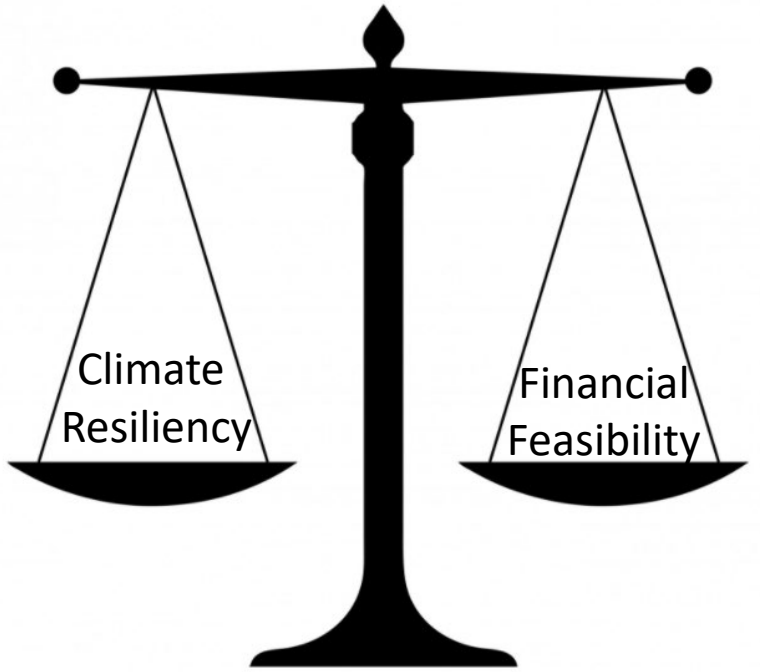


Figure Source: SEWD Habitat Conservation Plan

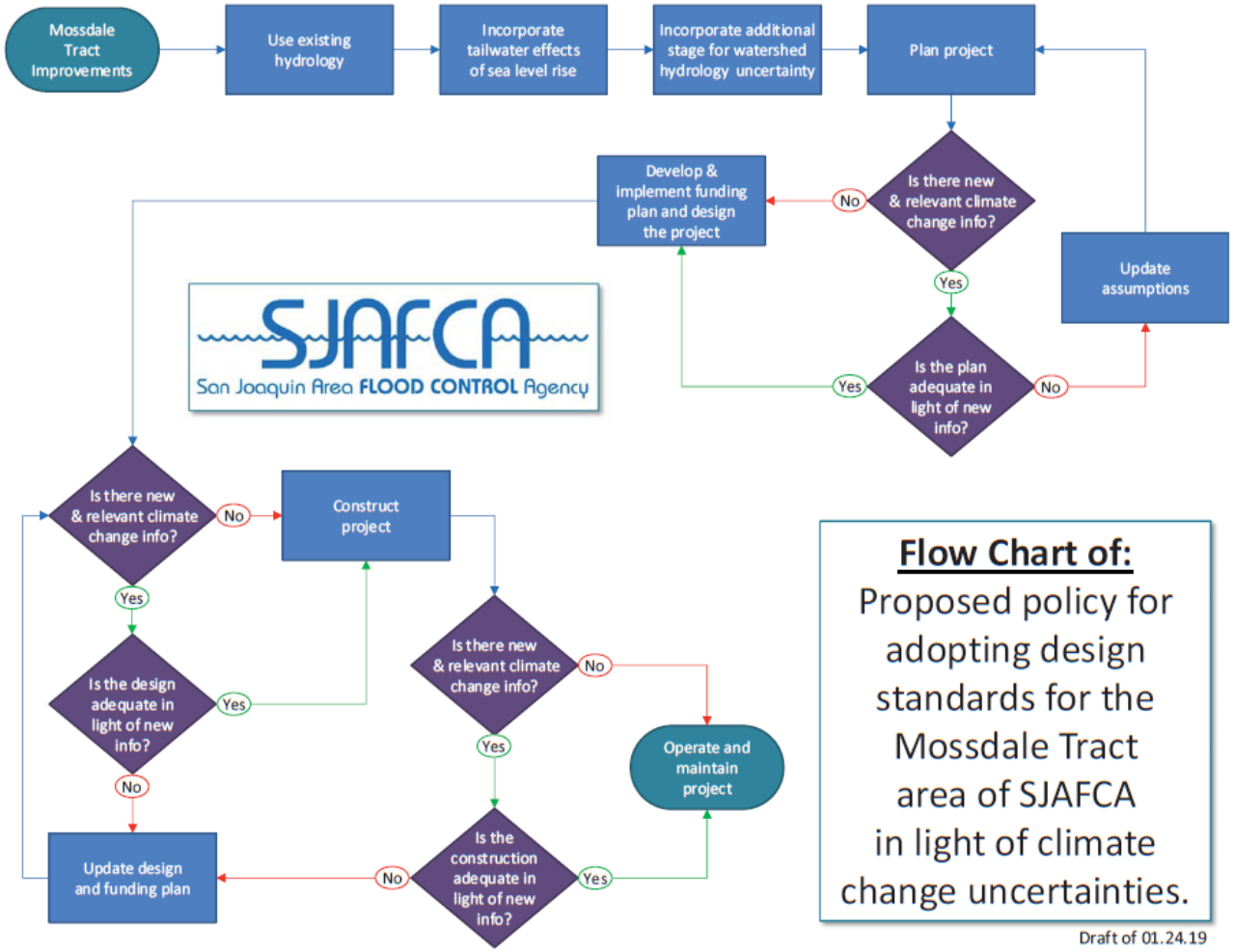
Policy Considerations

- *Lower San Joaquin Region has greatest potential for increased flood flows of all Central Valley Regions based on 2017 CVFPP climate change analyses*
- *Coupled With Flows In the Calaveras*
- *CC projections are for planning purposes, but what do we do with projects currently in design?*
- *SJAFCA implemented its Climate Change Policy to incorporate additional project resiliency*



SJAFCA Climate Change Adaptation Policy

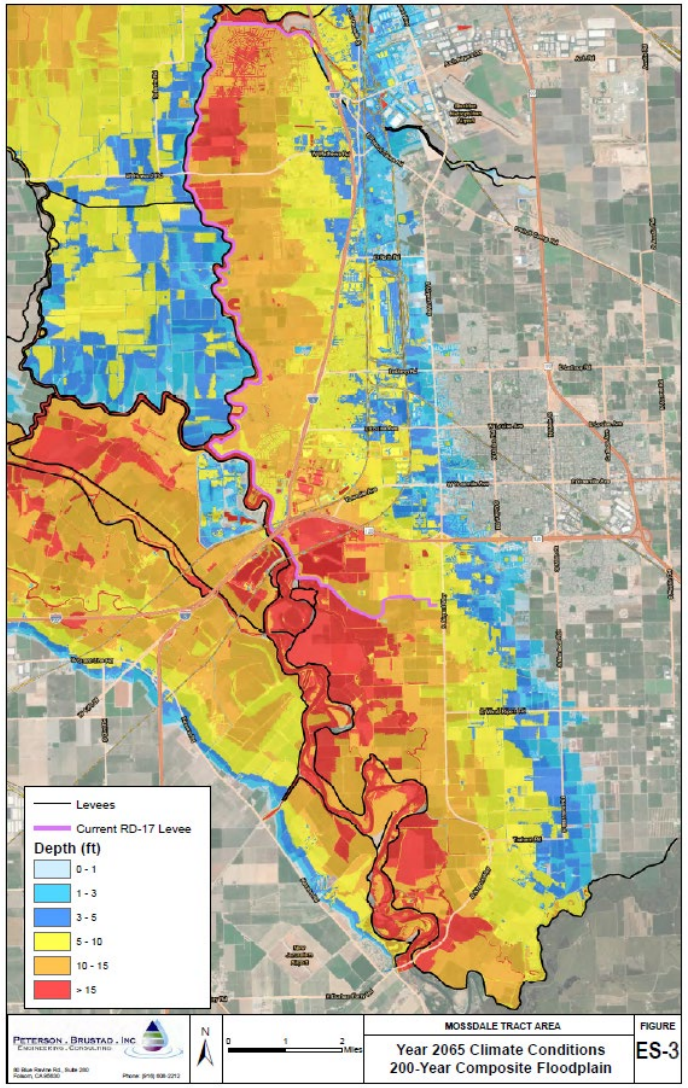
- *SJAFCA Adopted Climate Change Policy in 2019*
- *Incorporates factor of safety to address uncertainty in climate change flood flow projections and in sea level rise*
- *Includes plans to acquire the necessary real estate to support potential future levee raises and/or extensions based on the 2065 climate change hydrology presented in the 2017 CVFPP*
- *Policy provides for periodic review and update as the state of the science progresses.*



Planning for Climate Resilience: San Joaquin River Main Stem

Mossdale Tract ULDC Improvements

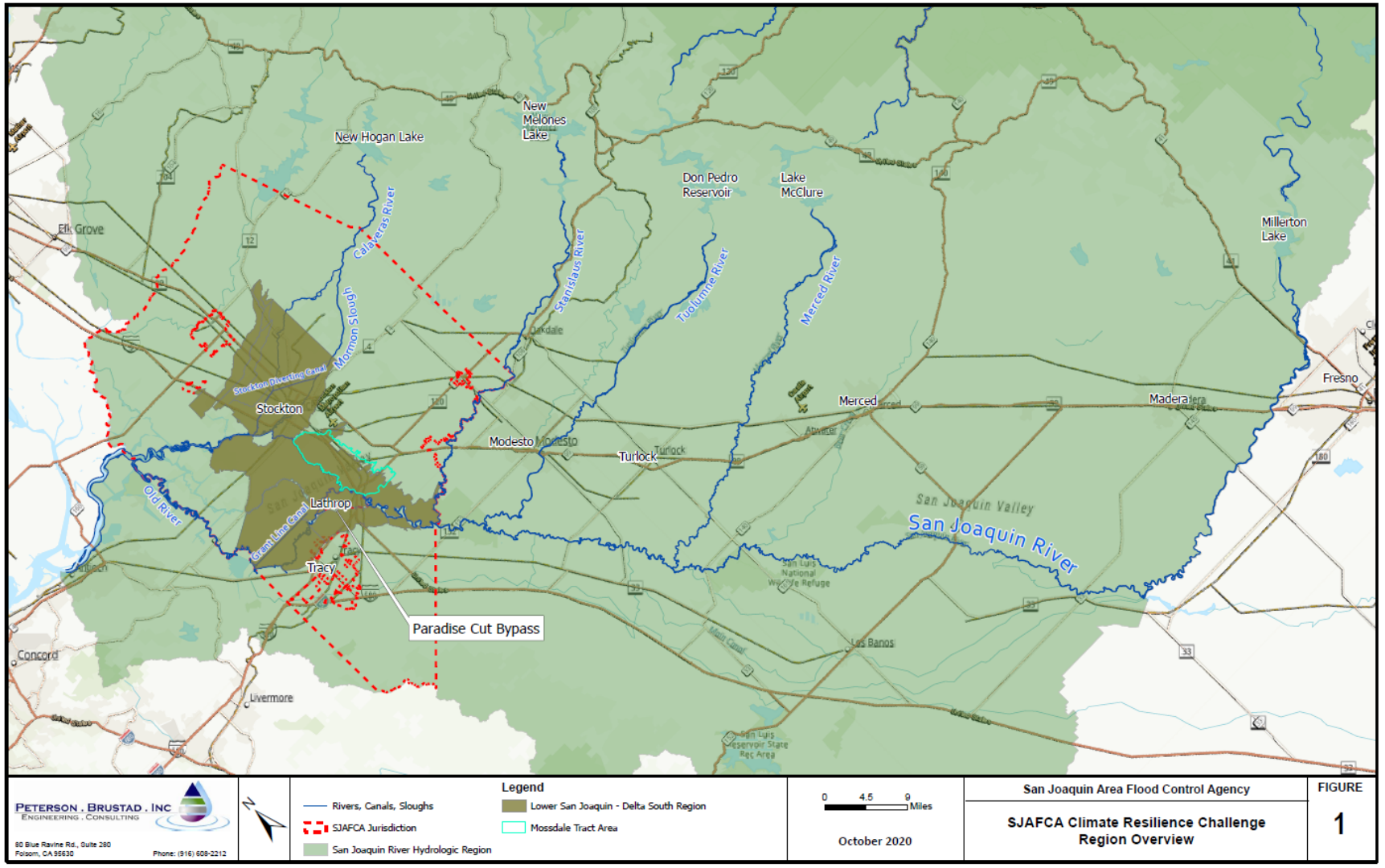
- *"Adequate Progress" to continue*
- *Priority Work*
  - *Complete Mossdale UFRR study*
  - *Initiate and complete a federal feasibility study*
  - *Complete ULOP project design*
  - *Complete permitting and ROW acquisition*
  - *Secure funding/financing*
    - *Complete formation of local funding program*
    - *Secure State/federal funding*



Planning for Climate Resilience: San Joaquin River Main Stem

Regional Improvements

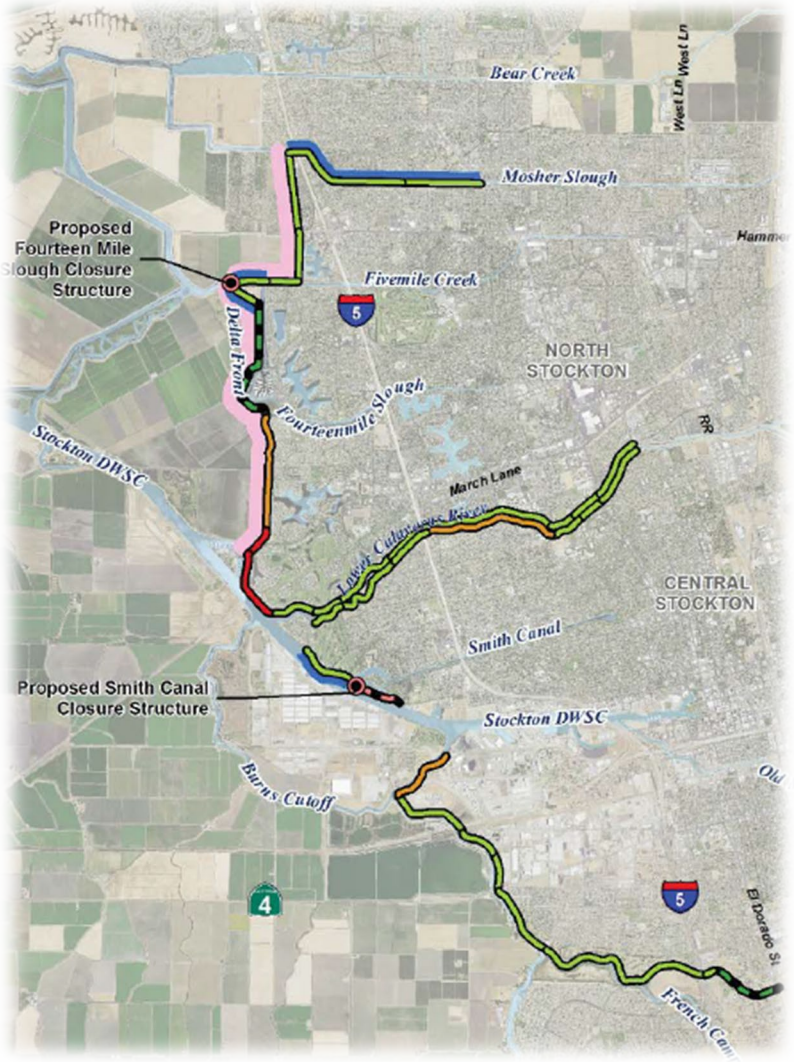
- *Improvements and/or Re-Operation at Upstream Reservoirs*
- *Paradise Cut Flood Bypass*
- *Upstream Transitory Storage Opportunities*



Planning for Climate Resilience: North/Central Stockton

Implementation of USACE Lower San Joaquin River Project

- *LSJRFS Completed in 2018*
- *PPA signed in 2020 along with New Start Construction designation*
- *Design of 1st segment underway*
  - *Construction scheduled to begin in 2022*
- *Remaining reaches to undergo design and construction through 2029*



Planning for Climate Resilience: North/Central Stockton

New Hogan Reservoir Climate Resiliency and Multi-Benefit Flood Risk Reduction Feasibility Study

- *Currently seeking funding to initiate study*
- *Additional work beyond the USACE LSJRP can serve to further reduce flood risk for North & Central Stockton*
  - *Mormon Slough/Calaveras River system improvements*
- *Flood Risk Reduction Goals:*
  - *200-yr LOP under current hydrologic conditions*
  - *Climate resilience for projected future flow increases coming from New Hogan Reservoir*
- *Project Opportunities:*
  - *Climate Resilience*
  - *FloodMAR*
  - *Ecosystem Restoration*
  - *Flood Risk Reduction for Severely Disadvantaged Community*

Project Feature	Flood Risk Reduction	Climate Resilience	Non-Structural Measures	Flood-MAR	Water Supply Reliability	Ecosystem Restoration	Recreation Enhancement	Benefits to Severely Disadvantaged Community
New Hogan Reservoir Forecast Informed Reservoir Operations (FIRO)	◆	◆	◆	◆	◆			◆
New Hogan Reservoir Storage Augmentation	◆	◆		◆	◆		◆	◆
New Hogan Reservoir Flood-MAR Diversions	◆	◆		◆	◆	◆		◆
Mormon Bypass Channel	◆	◆				◆	◆	◆
Improvements to Existing SPFC Levees	◆	◆						◆

Conclusions

- *Climate change analyses predict extreme hydrologic impacts to the Lower San Joaquin River Basin & Mormon Slough*
- *SJAFCA's Climate Change Adaptation Policy has provided guidance to projects that are currently in planning and design phases; this policy will continue to evolve as climate science progresses*
- *The Lower San Joaquin River Basin has a number of ongoing projects that incorporate climate resilience*
- *Support and coordination amongst our partners at the local, State, and federal level will remain a key factor in successfully mitigating climate change impacts through advancement of climate resilient flood risk reduction projects*

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Questions?

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