August 14, 2023
Monthly Members Meeting
Minutes

Agencies and Members in Attendance:
Alameda County - Hank Ackerman, Rohin Saleh (retired), Kees Nederhoff (consultant)
Contra Costa County- Mark Boucher, Claudia Gemberling, Tim Jensen
Marin - Judd Goodman
City of Petaluma - Gina Petnic
Sonoma Water - Carlos Diaz
Zone 7 - James Carney, Elke Rank, Jeff Tang
Santa Cruz Zone 7 - Antonella Gentile
Valley Water - Katie Muller, Erin Baker, Sara Duckler (retired)
SFJPA - Tess Byler
Vallejo San - Natalie Muradian
Army Corps - Holly Costa
BAFPAA Staff - Jennifer Krebs

1. Admin Updates
    a. MOU - Still awaiting Marin and Alameda County. Both agencies hope to bring the MOUs to their respective boards in September.
    b. Environmental Permitting Commitee rescheduled for Tuesday, September 19, 2023 at 2:30

2. NOAA Climate Resilience Regional Challenge - Discussion of proposals
    a. Deltares lead effort with High Tide Inc, Integral Consulting Inc, Tracy Communication, Aquaflows, USGS, and BCDC. Presentation by Hank, Rohin, Kees, Grant for Track 1, Planning
        i. This proposal will follow work already done for Alameda County, and work around the Bay.
        ii. Modeling will be open-source in the public domain. It will build upon the same model used by USGS/COSMOS that goes into AQPI forecasting.
        iii. The project builds on the BCDC ART project.
        iv. Presentation follows with contact information for Kees and Rohin.
        v. Team is asking for confirmation that BAFPAA members support this effort. Letters of support will be needed if NOAA requests a full proposal, which would be later this fall.

    b. Other efforts -
        i. Central Coast applying for both Track 1 and Track 2 funding.
        ii. San Mateo is considering both Track 1 and Track 2.
        iii. SCC is putting together a large Track 2 effort, with SFEP.
        iv. SFJPA is working on a Track 2 effort.

3. Committee Updates
    a. Environmental Permitting - Antonella, Katie and Len will discuss the Governors Letter of 8/4 and permitting ramifications.

4. Other Groups
    a. SFEP IC - Tess is new BAFPAA rep

5. Future project presentations - reach out to Carlos or Jen if you have something to add to the list
    a. Aaron Fulton, SW
    b. Safer 2, working on design and permitting - SFJPA
    c. CHARG White Papers
    d. Pajaro Winter Storms
    e. CCC - Lower Walnut Creek

6. Treasurer's report - 2023/2024 annual fees coming in.

7. Next Meeting - September 11, 2023 1:30

Update of coastal-riverine study Alameda Flood Control District & discussion NOAA grant opportunity

Hank Ackerman	Alameda County Flood Control District
Rohin Saleh	Aquaflows Engineering
Kees Nederhoff	Deltares USA

August 14, 2023 – BAFPAA meeting

Contents

- **Introduction**

- **San Francisco Bay Community Modeling**
  - Background & how it started
  - Sea level rise and extreme water level work

- **NOAA Climate Resilience Regional Challenge** (2023)
  - Grant opportunity to fill study gaps
  - Our concept and Letter of Intent (LoI)

Deltares background

- **Dutch non-profit organization**
  - Exact sciences, integrated with social sciences
  - 850 staff: 20% Ph.D.'s, 40% M.Sc.'s
  - Science, experimental facilities and open-source software
  - 100 years experience (founded in 1927)

- **Annual turnover of $100 million**
  - Serving the public and private sectors
  - Dutch government (50%) and remaining (international) (50%)

- Separate US non-profit: **Deltares USA Inc.**

How did it start?

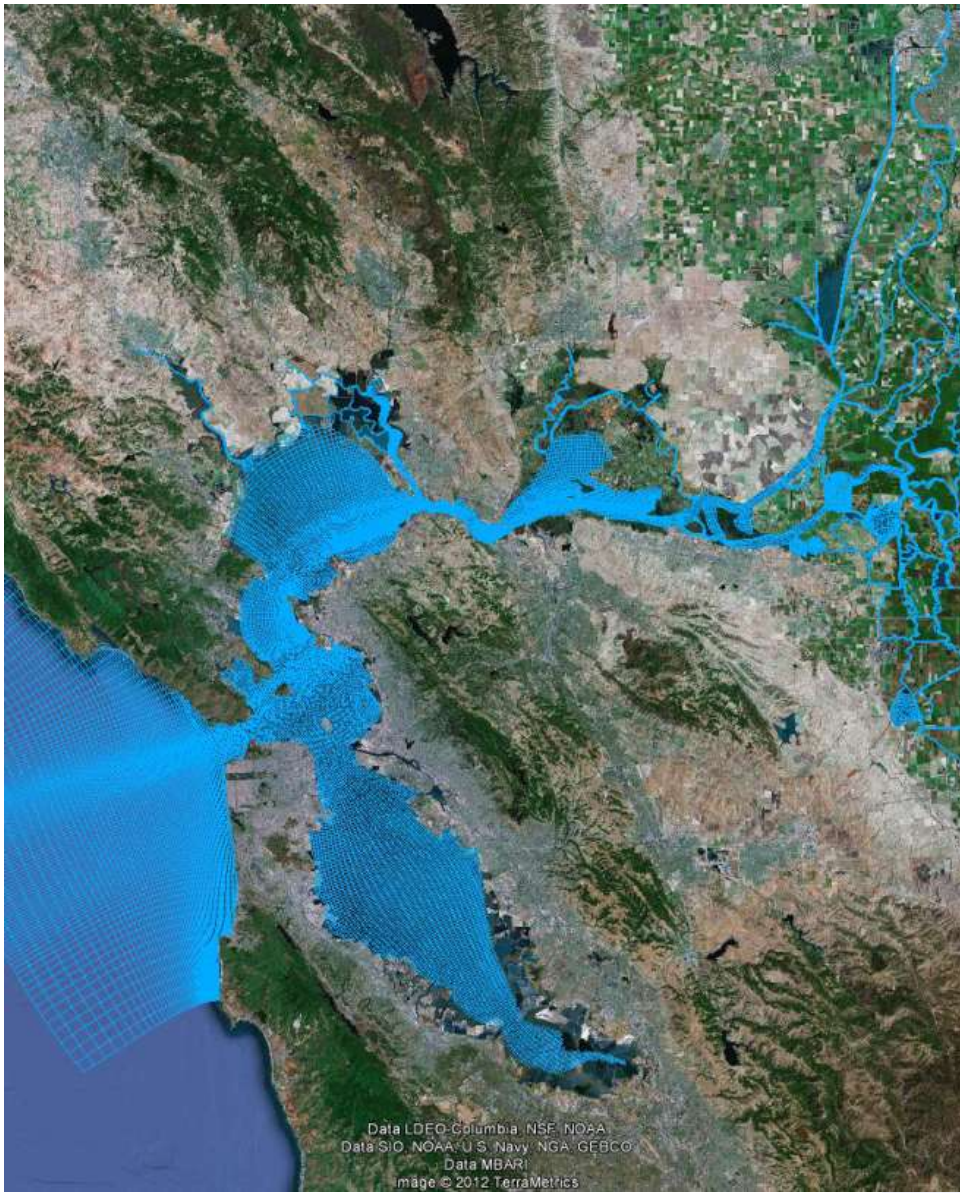
- Delft3D modelling of San Francisco Bay-Delta **goes back to 2006** as part of USGS science collaboration that goes back to ~2000.

- **Delft3D** is trusted by **30,000+ members** worldwide from academia to consultancy

- **CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem**
  - Impact of *climate change* scenarios on San Francisco Bay-Delta eco-system (water quality, eco-systems, etc)
  - **Funding**: 8 MUSD funded by CalFed and USGS (2011-2016)

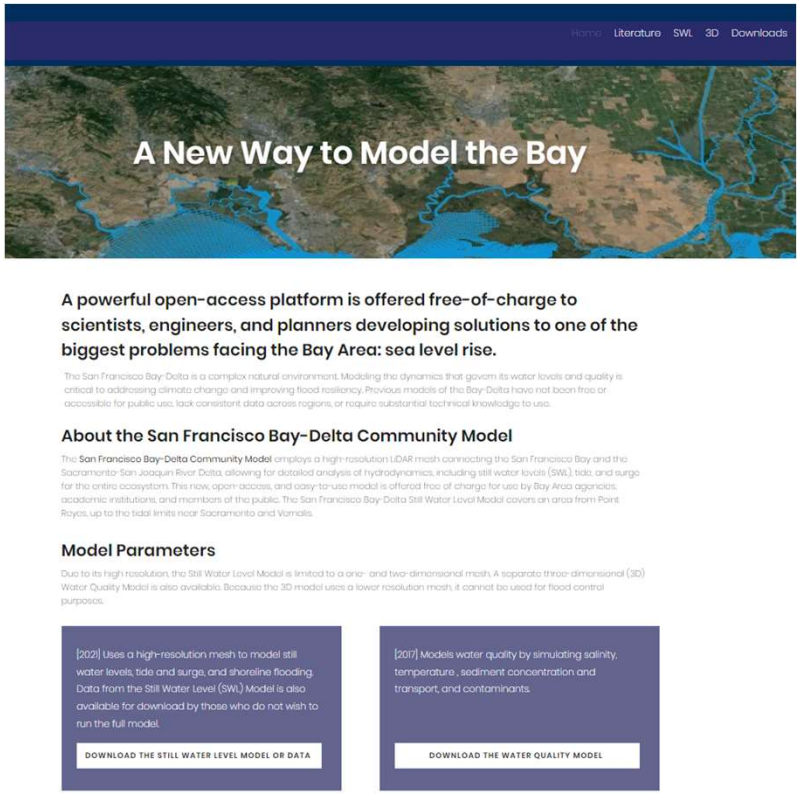
USGS science for a changing world

Deltares Enabling Delta Life



Community modeling website: 2014-onwards

- Community model is available online: http://www.d3d-baydelta.org/
- **Creative Commons Attribution**-Share Alike 4.0 International License
- *"Our vision is to support the development of a open source , open access, web-based infrastructure around the SFBD "*
- Models and software available **free of charge.**



Deltares USA

Sea level rise challenge in San Francisco Bay

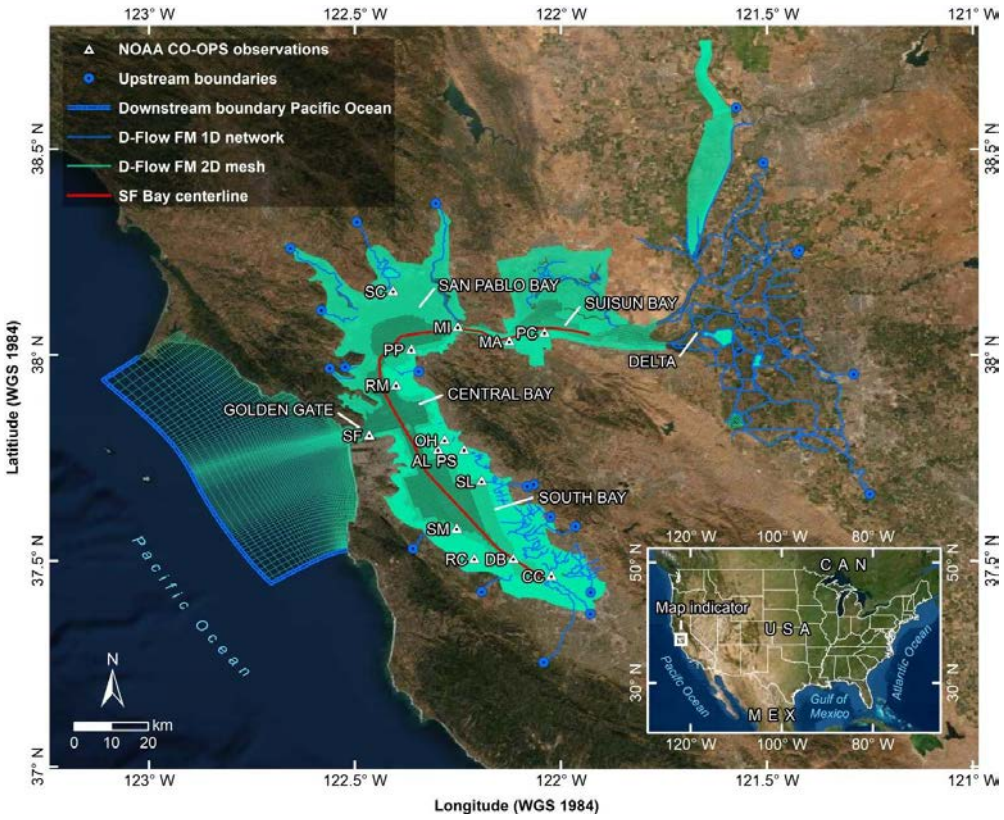
- Sea level rise in the U.S. will be, on average, 25-30 cm (10-12 in) higher in the next 30 years, equivalent to SLR over the last century (Sweet et al., 2022). In California, over 600,000 people and $200 billion in property value will be at risk by 2100 (6% of GDP).

- The San Francisco Bay and Delta is one of the largest estuaries on the U.S. West Coast and coastal communities are connected via low topographies. This situation requires a **regional approach**.

- **Challenges with some of the previous work and models**:
  1. Lack of a consistent, reliable and accessible model that we can all use. Most available models are based on proprietary software with limited support or private model schematizations
  2. Limited model domain and/or short term statistics which makes it difficult to apply for Flood Control.

- We needed an open-source & open-access model for all: **Delft3D San Francisco Bay Community Model** www.d3d-baydelta.org

Next generation of the Community Model: SFBD-SWL

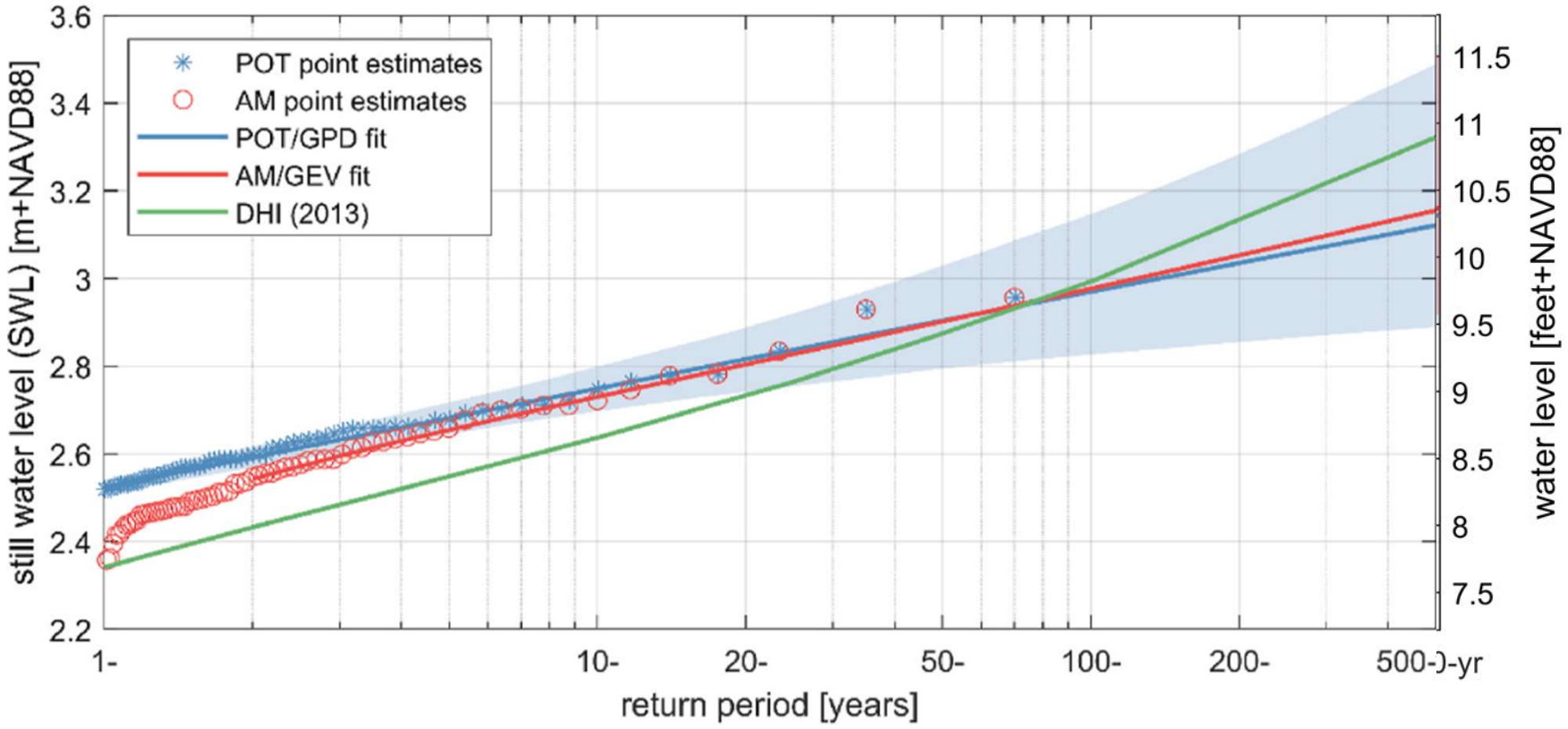


This new model has several advantages:

- **1D-2D hydrodynamic model** with subgrid features for efficient and accurate model simulations (RMSE ~ 3 inches)
- **Open-source** Delft3D Flexible Mesh and **open-access** model setup. All available via www.d3d-baydelta.org
- Used operationally for **forecasting** of high-water levels by **NOAA** and **USGS** as part of the AQPI project
- Used for reanalysis by Deltares USA and Flood Control District to perform **70-years** of continuous simulation for a robust estimate of extreme values and return periods statistics
- Relevant **engineering-scale** features included and **scientifically** peer-reviewed in Nederhoff et al. (2021)

Deltares USA

Extreme value analysis to determine high water levels are based on POT/GPD instead of AM/GEV



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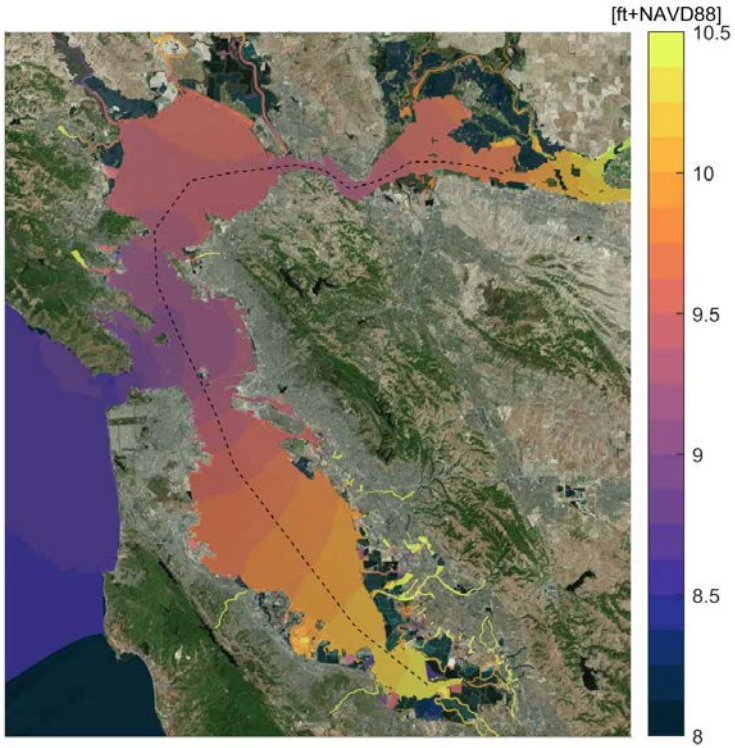
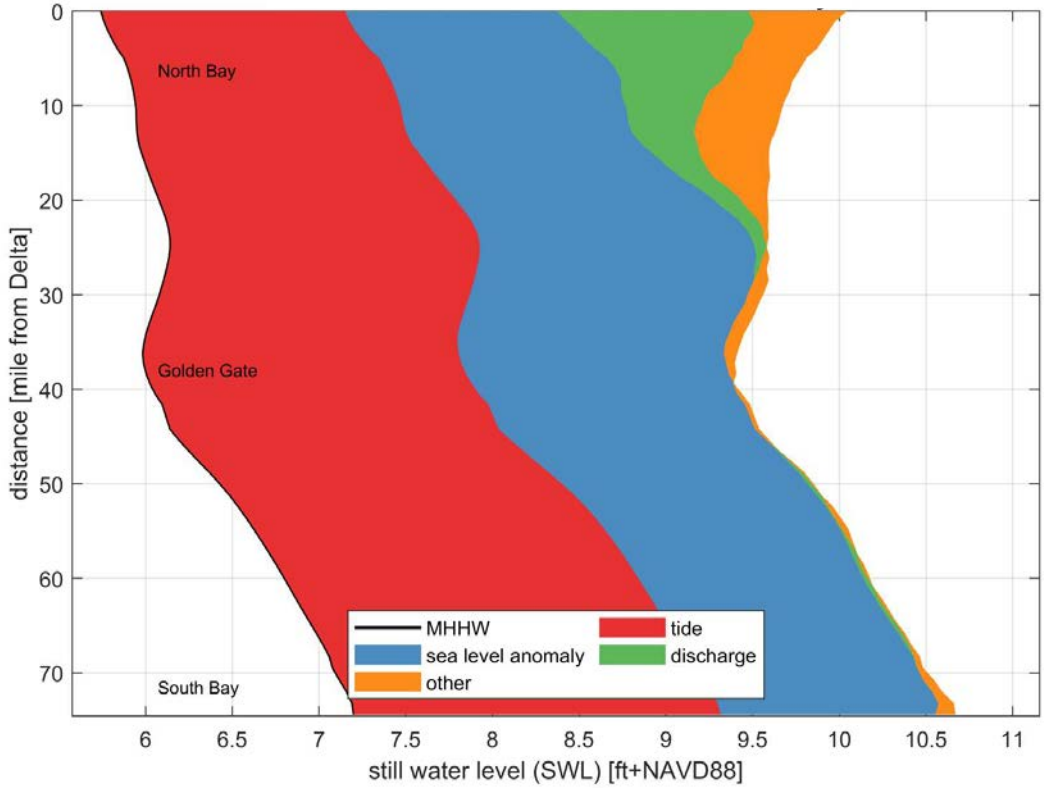
Values provided at Alameda (NOAA station #9414750)

1–100-year extremes in the Bay reach 8 to 10.5 ft and are largely driven by tide + anomalies from the Pacific





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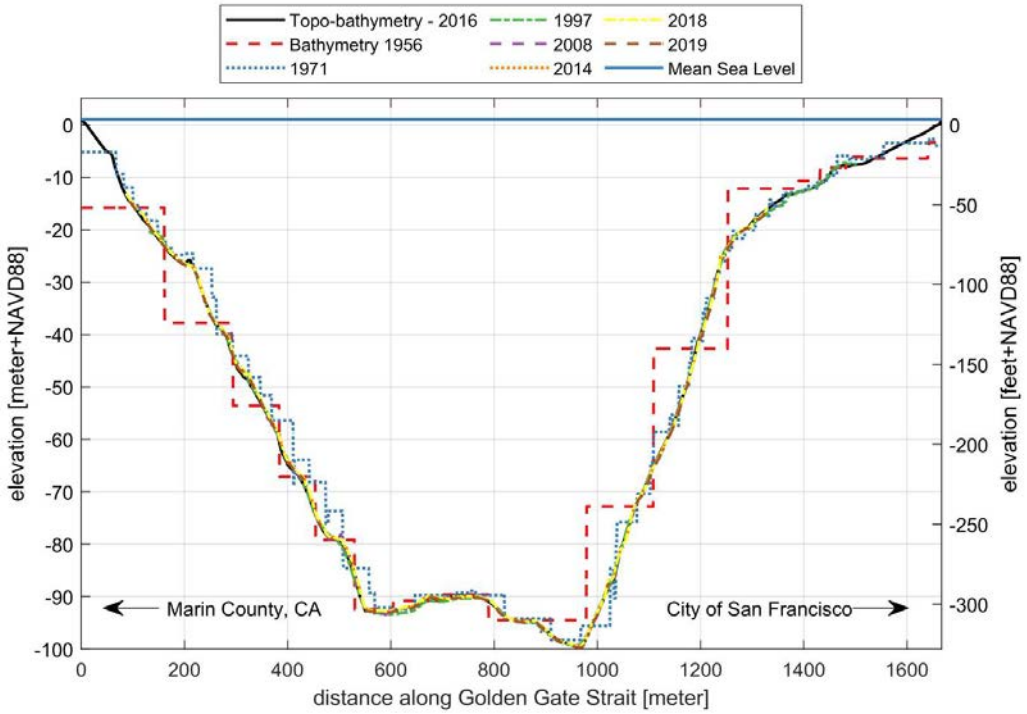
For more details see Nederhoff et al. (2021) in Coastal Engineering

Golden Gate Strait is not a tidal restrictor for SF Bay and Delta. This means that the Bay is a demand-driven system

- This finding identifies the focus of mitigation strategies for sea level rises and coastal flood control projects in SF Bay

- **Extreme still water levels in the Bay are expected to change due to**
  - Relative sea level rise
  - Impact of local projects on tidal amplification (next slides)

- However, no net volume impact due to coastal projects.



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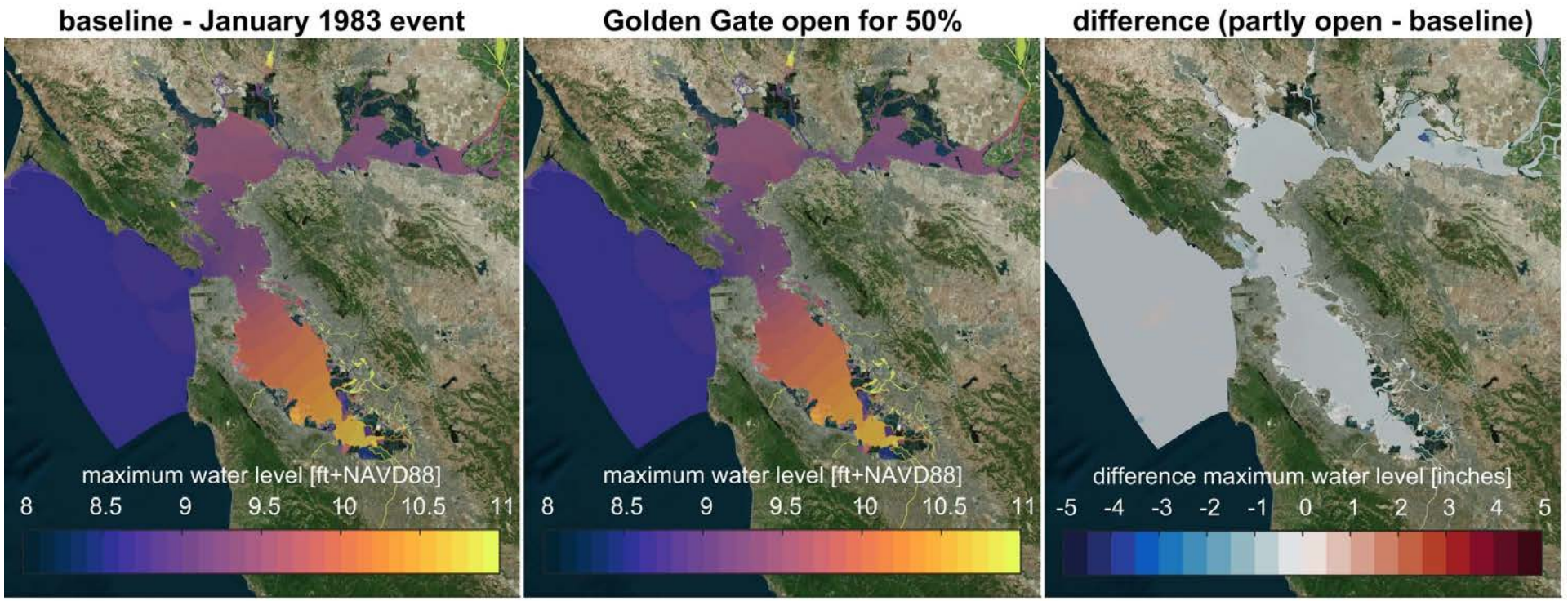
Extremes tidal events are hardly affected when large parts of the Golden Gate are restricted (here 50%)

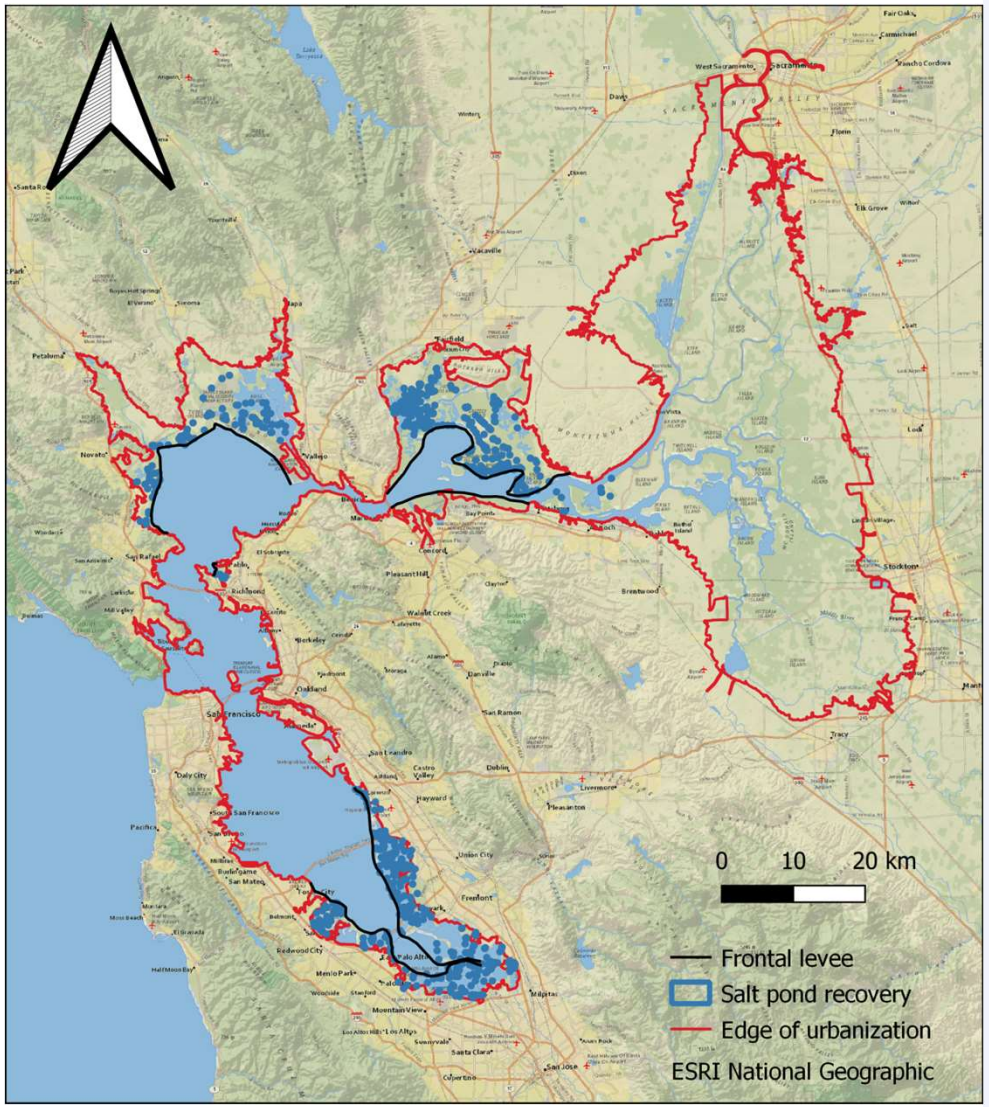


Salt ponds restoration projects can mitigate the impacts of coastal flood protection projects

- **Soft: salt pond recovery**
  - 740 breaches in frontal & internal salt ponds & salt marsh levees.
  - 300 feet wide and lower to MLW

- **Hard: edge of urbanization**
  - Line covering the location of buildings
  - Continuous impermeable infinity high seawall
  - Mimics ongoing efforts for flood protection

- Previous work assumed coastal protection projects to be **constructed at the front** of the Bay instead of edge of urbanization



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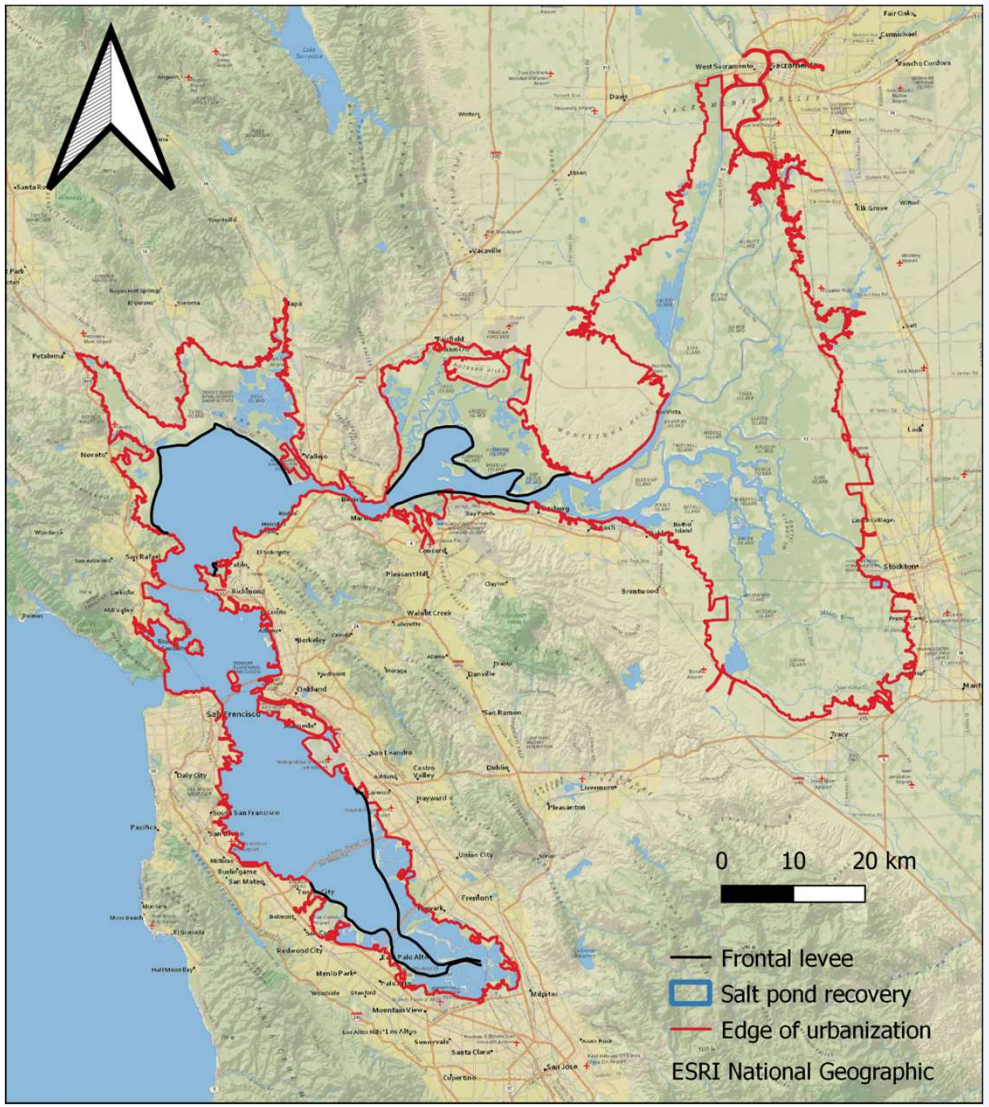
Differences noticeable

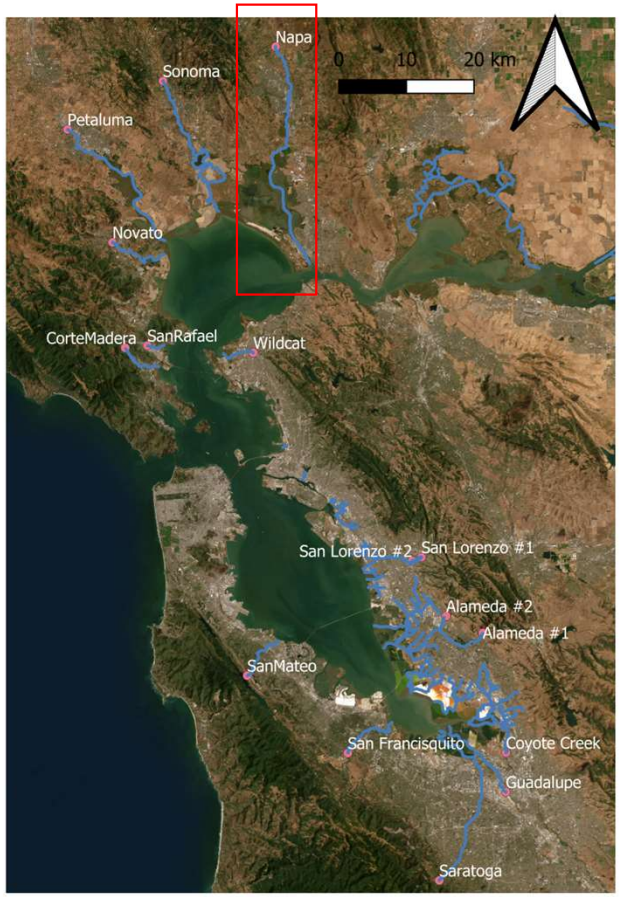
- Locally frontal levee is up to 6 miles **more bay-ward** compared to the edge of urbanization

- Differences especially large for
  - Lower South Bay
  - Suisun Bay
  - Part of San Pablo Bay

- Hard and soft structures influence tidal amplification and thus extremes in the Bay. The effects are **very case-dependent**. Model result indicates that tidal extremes varies from **6 to 10 inches.** Marsh restoration projects in San Francisco Bay can mitigate the impacts of coastal protection projects for existing 100-year Bay event.
  - Previous findings > 2 ft



Inflow stations for extreme value analysis of tidal-riverine extremes around the San Francisco Bay



Joint Probability of Tidal & Riverine Extreme Events

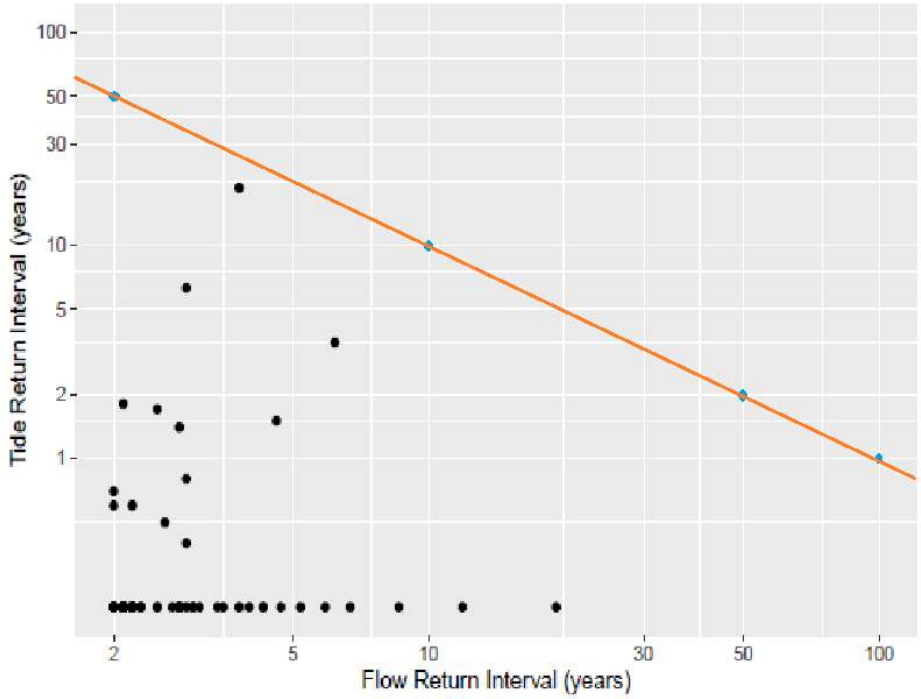
- Considering a 100 year event, can we assume that they are **independent**?

  - Multiplication Rule for *Independent Events*

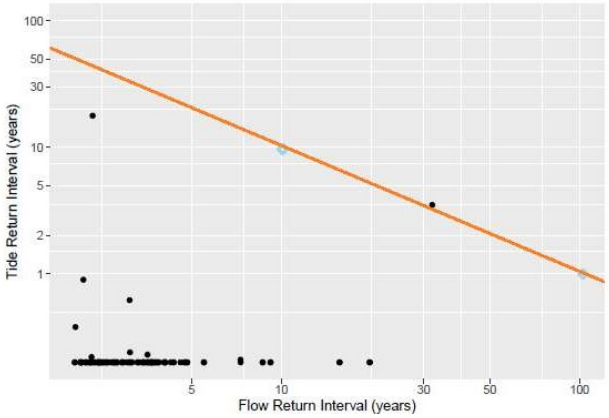
$$P(A \cap B) = P(A) \cdot P(B)$$

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

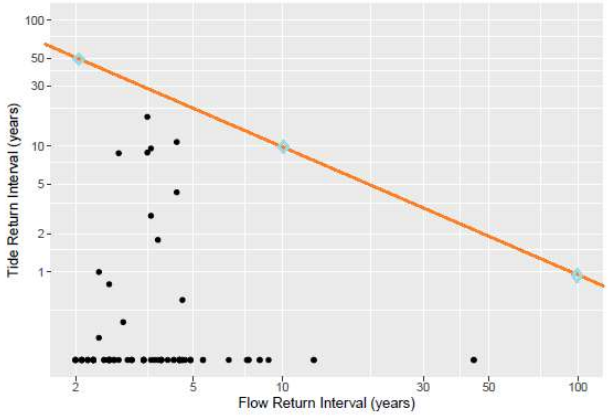
- Or should we assume they are **dependent**?



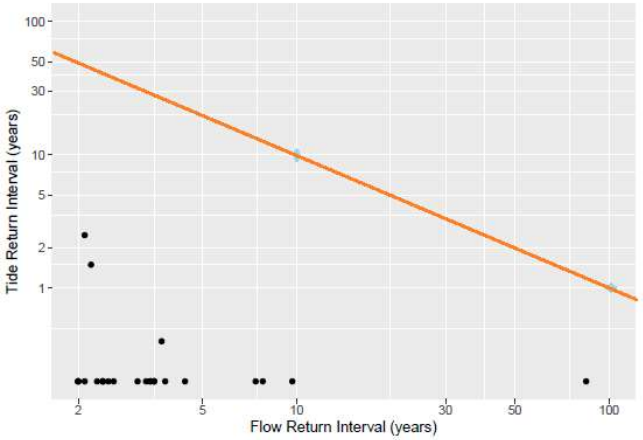
Alameda Creek



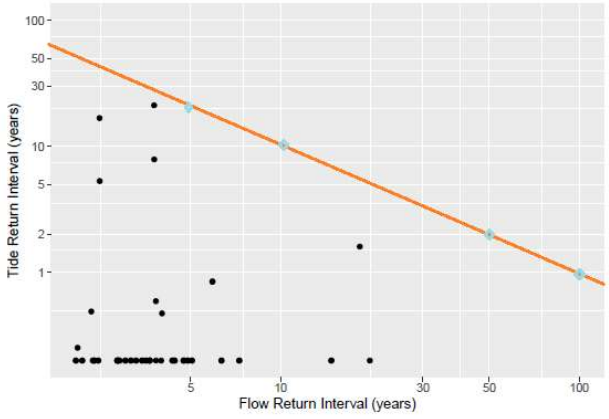
Dry Creek



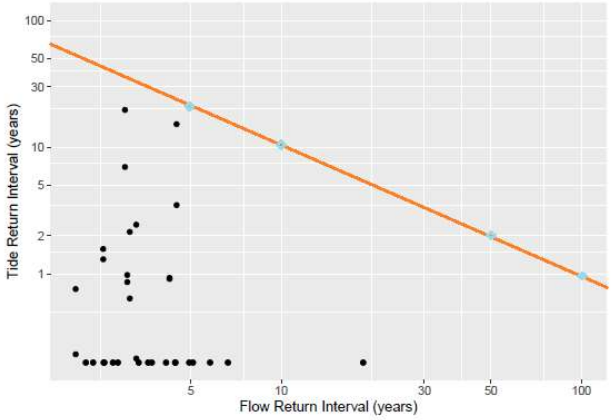
San Lorenzo Creek



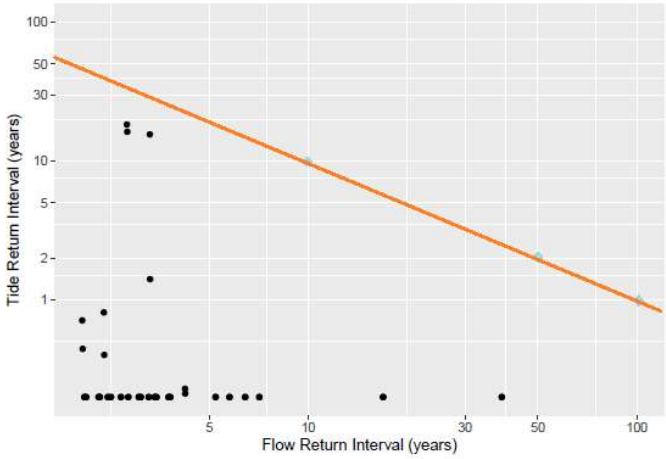
Coyote Creek



Corte Madera Creek

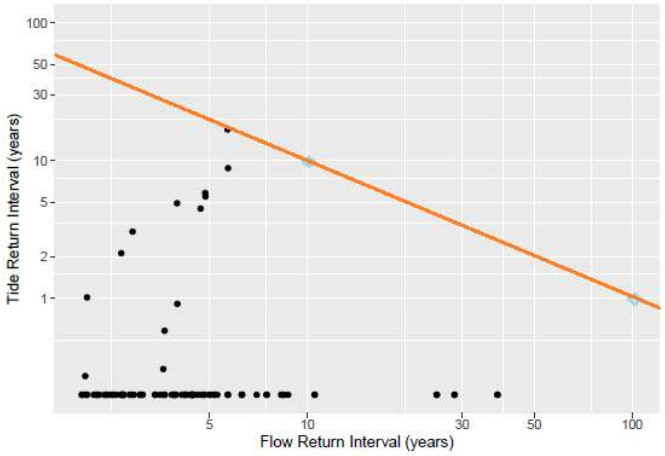


Walnut Creek

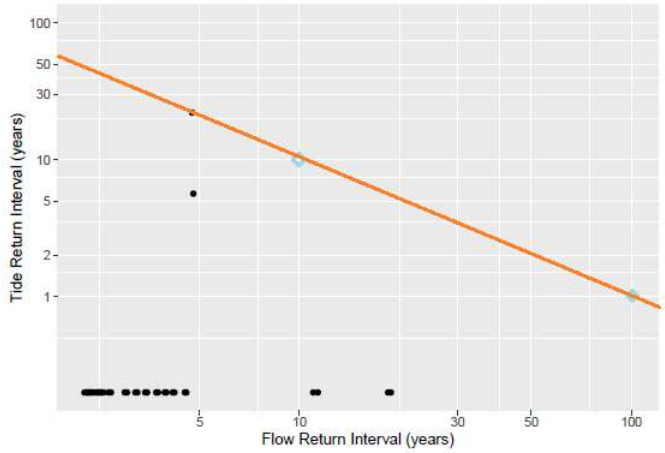


Wildcat Creek

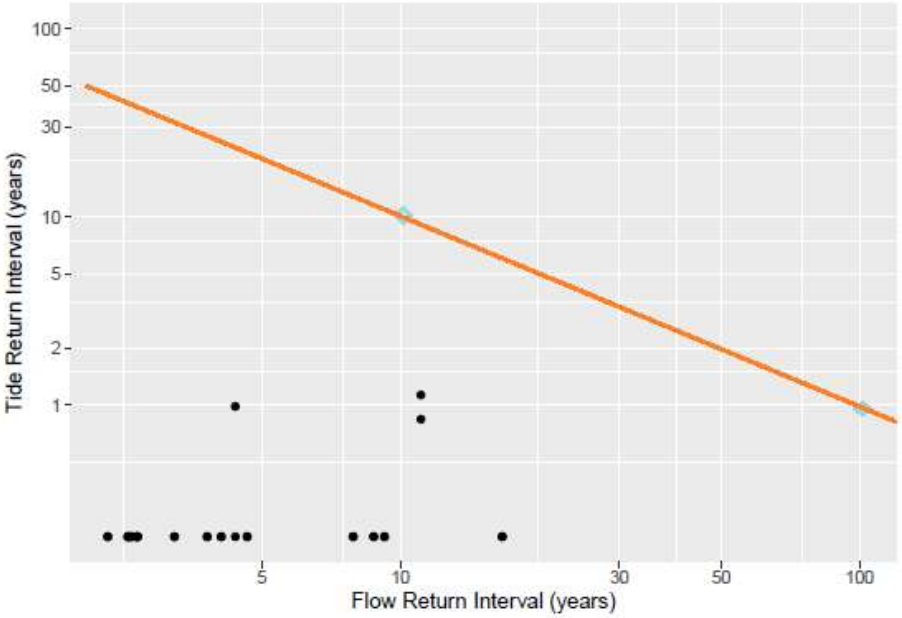
Deltares USA



Matadero Creek

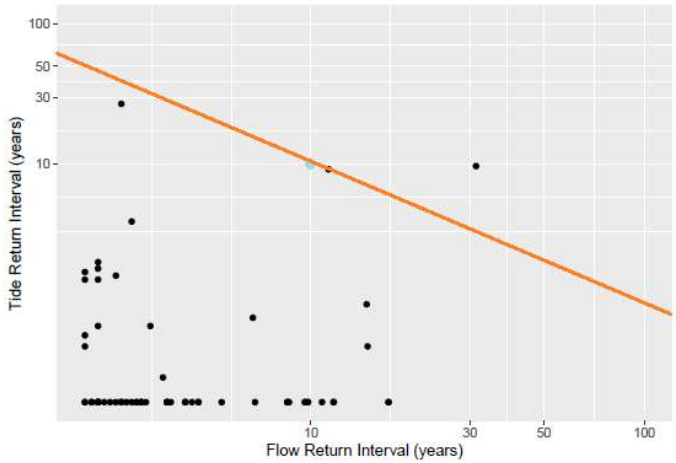


Rheem Creek

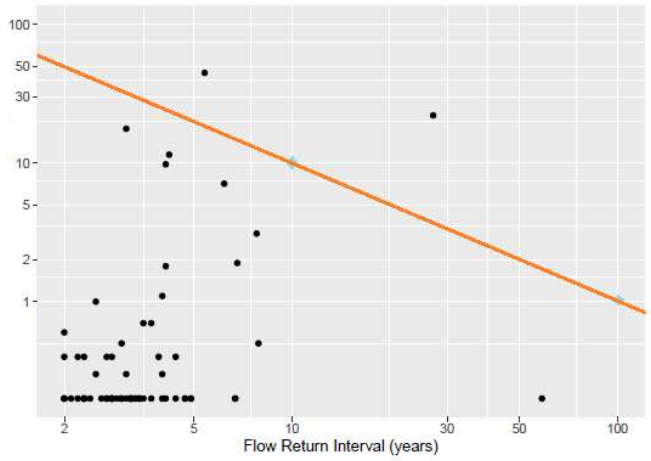


Guadalupe River

Voettekst van de presentatie



Novato Creek



Napa River

Consideration of tidal extremes due to long slough systems in addition to the effects of salt ponds

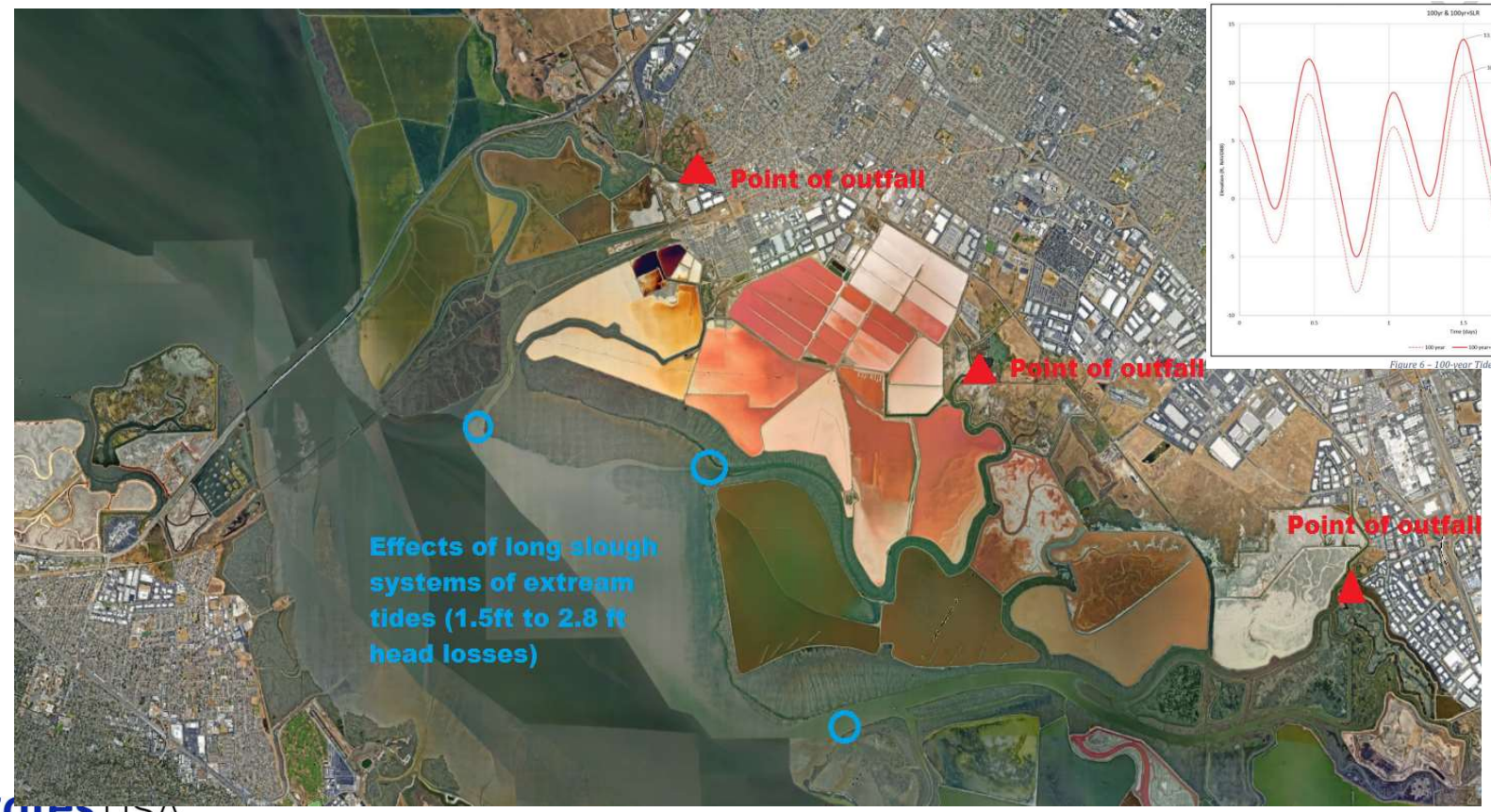
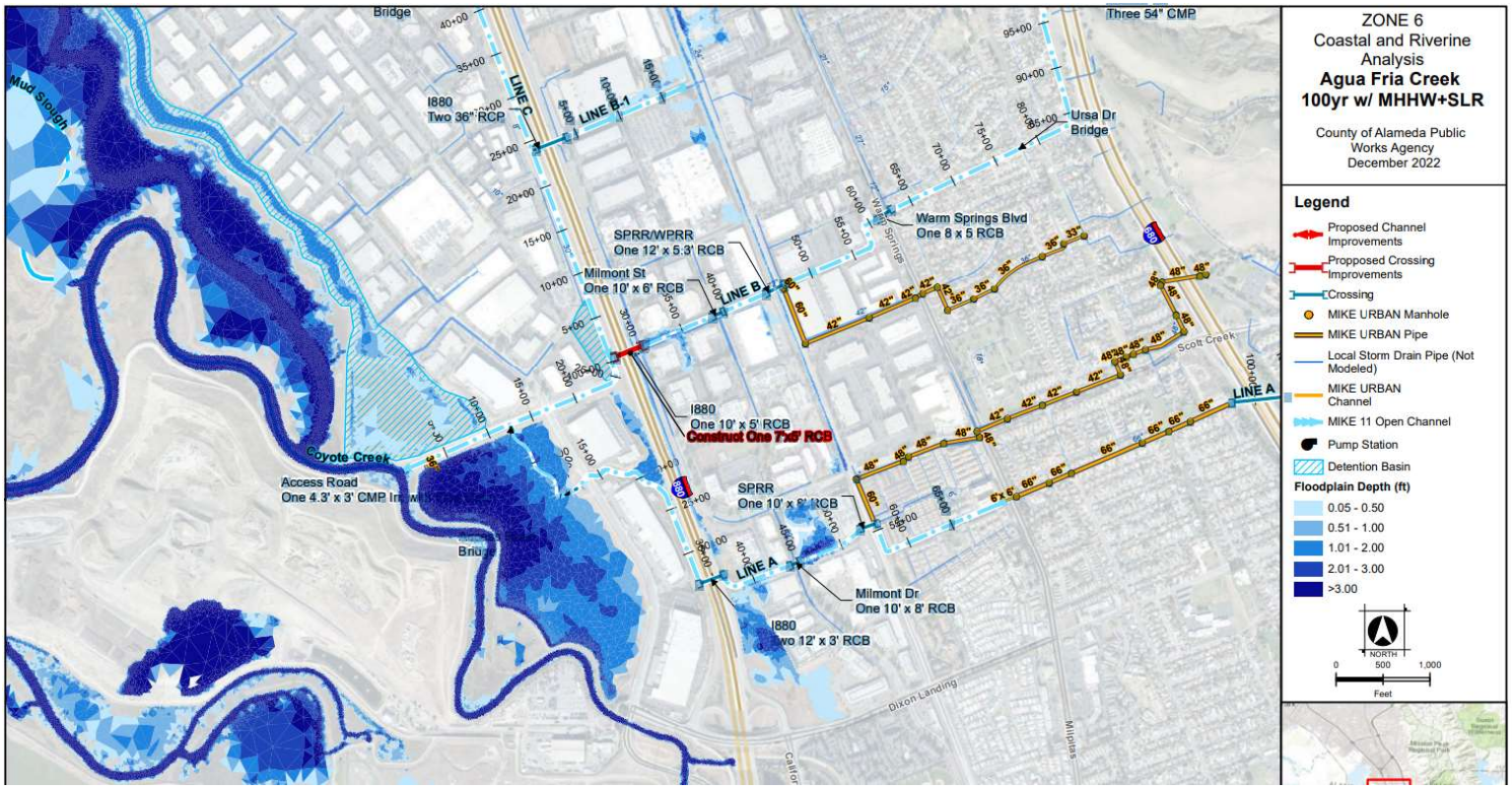


Figure 6 – 100-year Tide Cycle

Example of implications of long slough system on flood hazards



Future: additional studies to be performed

- **Improvements of Hazard Assessment:** account for slough-riverine (open-channel) with the same accuracy as coastal area to improve accuracy of analysis

- **Impact assessments**: analysis of current and anticipated impacts, identification of particularly susceptible populations, infrastructures, and computation of damages due to extreme weather occurrences and rising sea levels

- **Outreach to communities:** share results and gather input + feedback on mitigation and adaptation strategy given current and future hazards and impacts with the people

- **Strategy:** developed with relevant partners and stakeholders a regional climate resilience strategy that is adaptive given the uncertain future of SLR and social-economic changes.

- **Capacity building:** training programs and workshops to build the capacity of local governments, organizations, and community groups and especially flood control districts for climate adaptation

NOAA Climate Resilience Regional Challenge

- Approximately **$575 million** is being made available through the Climate Resilience Regional Challenge for projects that **build the resilience of coastal communities** to extreme weather and other impacts of climate change.

- The focus of this program is on **collaborative approaches** to achieving resilience in coastal regions. Selected grants will address **risk reduction**, **regional collaboration**, **equity**, and **building enduring capacity for adaptation**.

- There are two separate but simultaneous funding tracks. Funding for both tracks will be spent over the next five years.
  - Track One: **Regional Collaborative Building and Strategy Development**
  - Track Two: Implementation of Resilience and Adaptation Actions

- Deadline for **Letter of Intent (LoI) is August 21.** Full proposal will follow after positive response LOI.

General concept for San Francisco Bay

- Our vision is to **build upon previous work from CHARG** (SF Bay Coastal Hazards Adaptation Resiliency Group) + others. Aim to strengthen the region's capacity to thrive amid climate change

- Opportunity for BAFPAA members to receive support for mitigation on sea level rise impacts. **A lot of work has been done, but there are still missing pieces**. This provides opportunity for CHARG/BAFBAA to get for what they need and move forward with building the knowledge basis for implementation, responding and adapting to SLR.

- **Partners**: Deltares (lead), HighTide Inc., Integral Consulting Inc., Tracy Communication, Aquaflows, US. Geological Survey (USGS), BCDC

Deltares USA

Discussion

- **Feedback** on the general direction - Q&A.
- **Interest** in pursuing?

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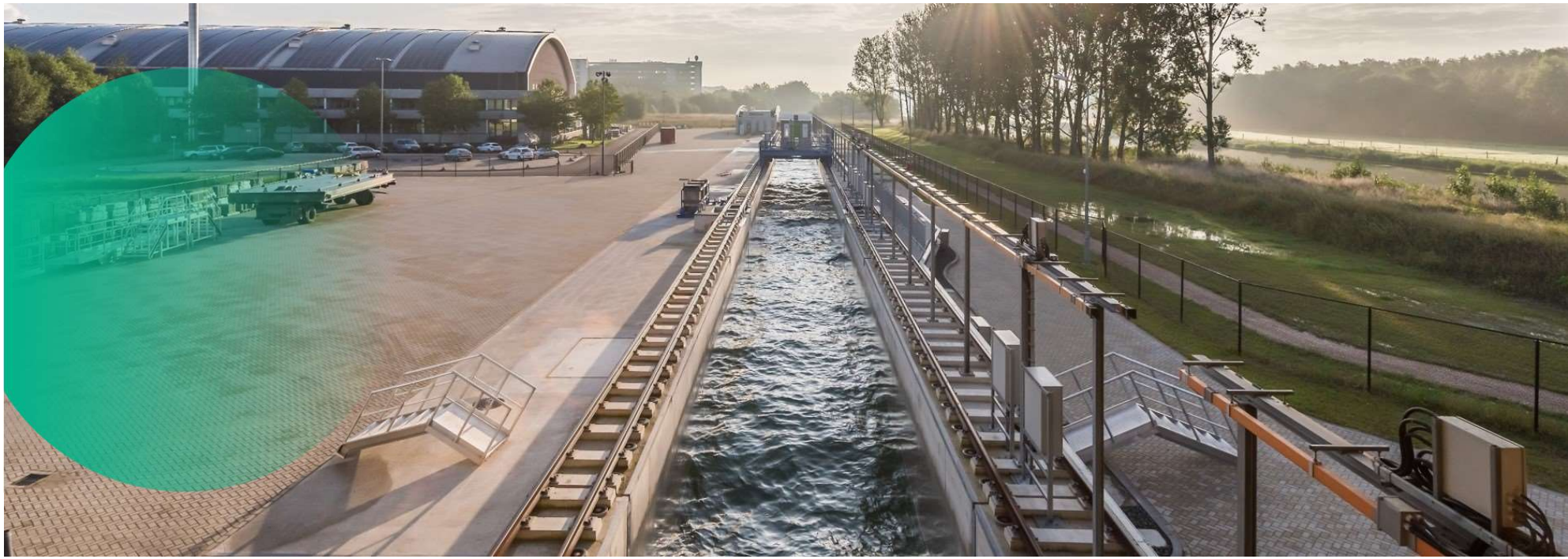

Details on the 5 tasks we were envisioning

	Overview / Objectives	Analysis / Approach	Deliverables	Long Term Impact
T1 Revitalize	• Project kick-off • Scoping & structuring workplan • Revitalize CHARG Regional Resiliency Group • Data and info collection	• Engage CHARG team, define roles, & set up monthly mtgs • Discovery phase with comprehensive literature, data, & regulatory review	• Final workplan • CHARG restructure complete • Data and info library on website	• CHARG is robust and set up to be sustainable for many years • A data and information repository are publicly available
T2 Model Risk	• Enhance existing vulnerability and risk assessment processes	• Refine Delft3D's advanced modelling capabilities to account for compound flooding and tipping points for levels of service and capacity	• Results will be made available via a web-viewer which shows risks coupled with impacts to disadvantaged communities and infrastructure	• Web tool can feed hazard and exposure data to other apps (ex. tool which can calculate damages before and after mitigation measures
T3 Outreach	• Equity and Inclusion Outreach and Engagement to ensure that the voices of underserved individuals are heard and that their needs are prioritized	• Partner with local EJ orgs for Focus groups and public workshops to share findings and gather feedback	• Meeting materials • Survey results	• Underrepresented communities feel heard and understand their risk and how to prepare • Resources to ensure equity
T4 Strategy	• Climate Resilience Strategy Development	• Develop regional climate resilience strategy as an actionable and flexible tool for funding and implementation of adaptation strategies	• Plan will be available online as a PDF and as an interactive storymap	• The living document to be updated by CHARG based on monitoring of progress metrics
T5 Capacity	• Capacity Building for Climate Adaptation	• Develop training programs and workshops • Use a train the trainer structure	• Training materials and sustainability plan for training program	• Ensure that communities have the resources to implement resilience strategies

Deltares USA