



Nature-based infrastructure for enhancing climate resiliency of groundwater resources in South Florida: An integrated modeling approach

First Group Meeting

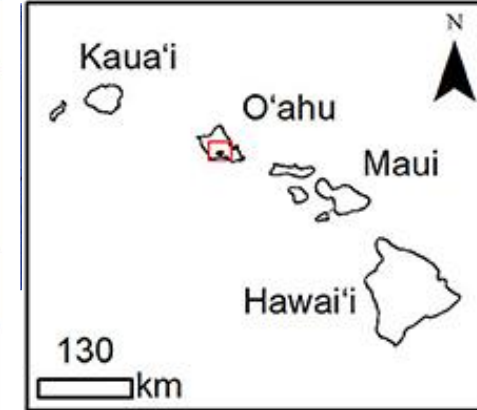
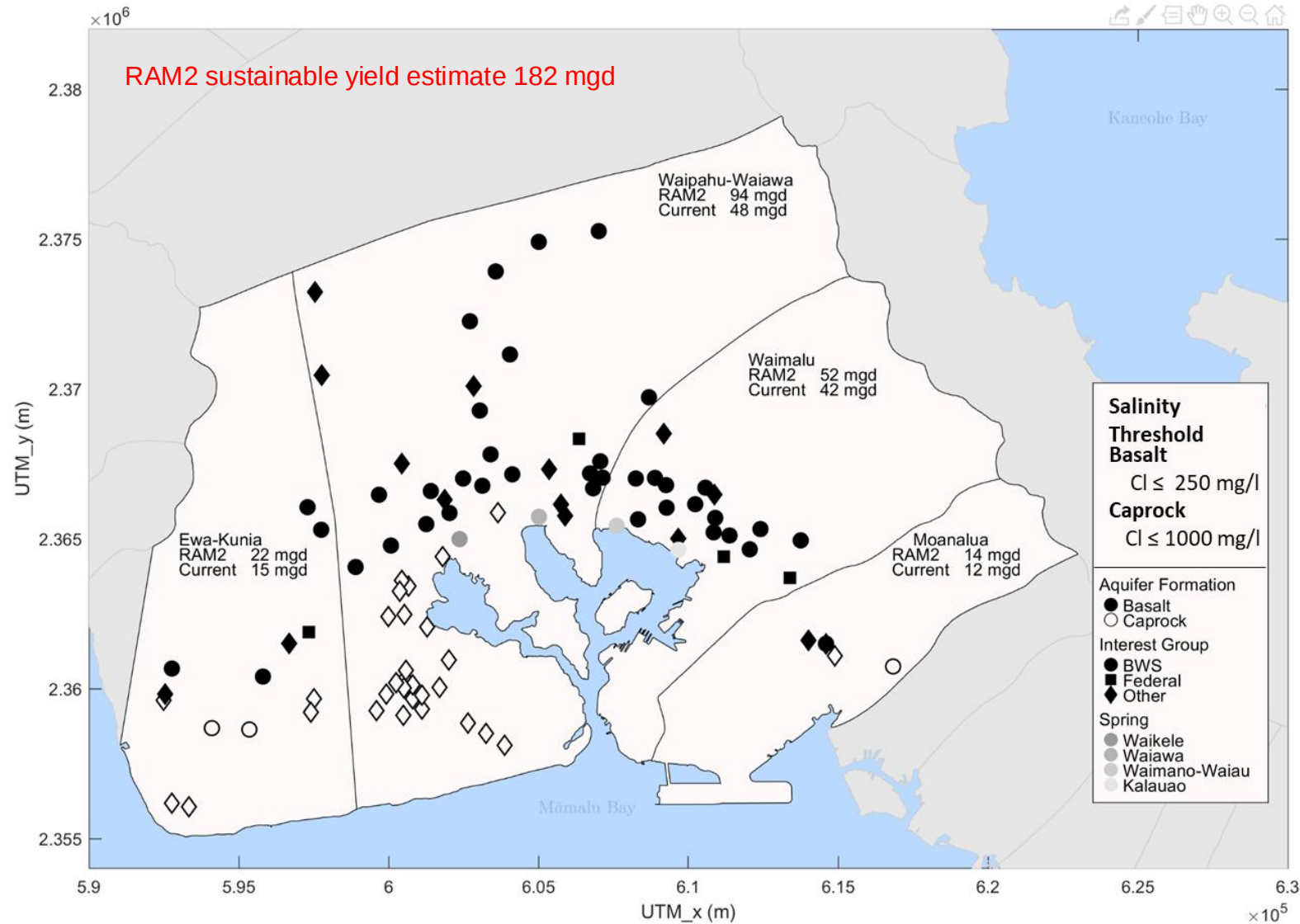
November 20, 2024

Agenda

1. Introduction of team's members
2. Background information and project introduction by Ahmed
3. Research plan presentation by Mewcha
4. Research plan discussion
5. Plan our immediate next steps

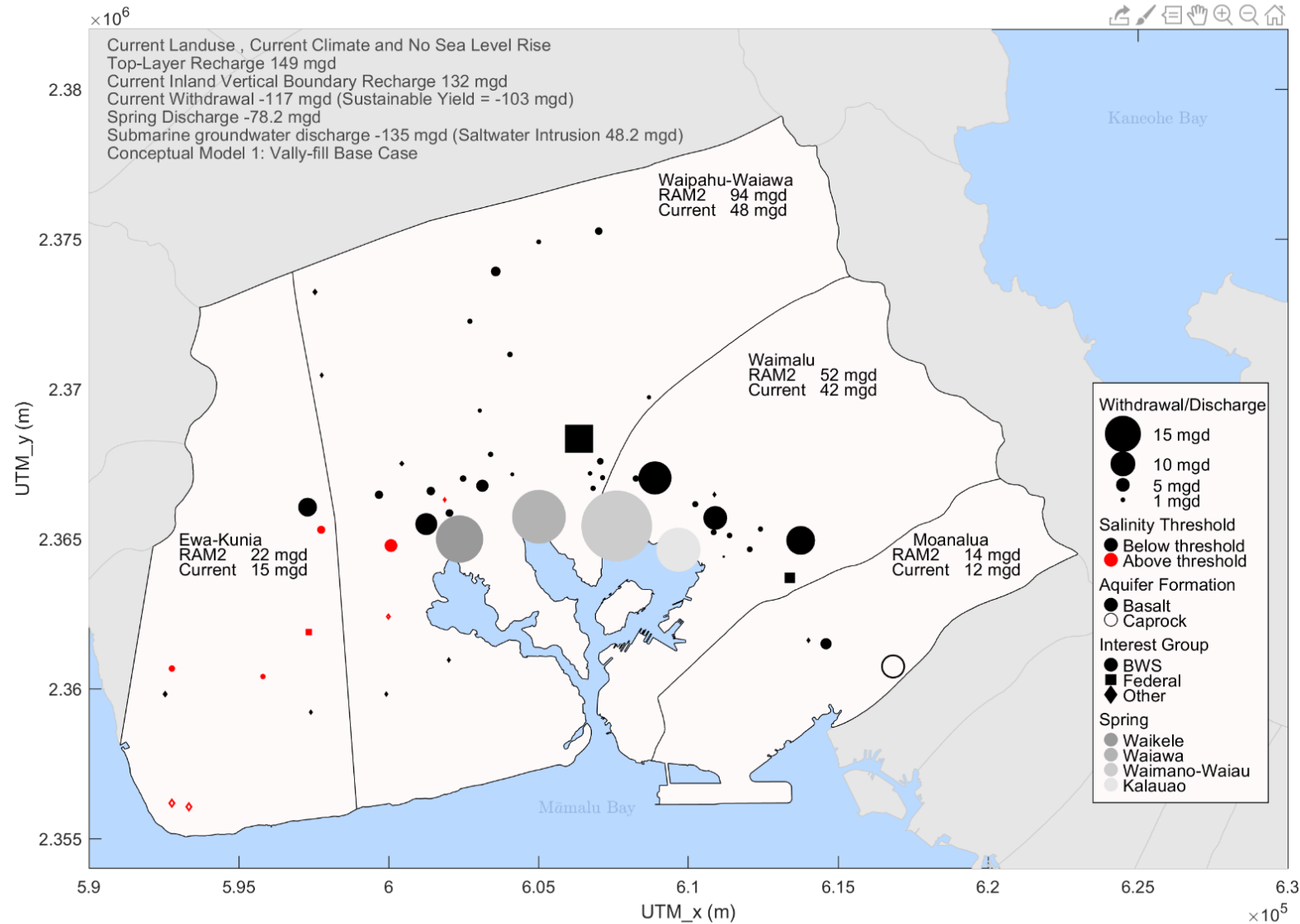
Pearl Harbor aquifer serves more than half of Hawai'i population

- Current fresh groundwater pumping 117 mgd



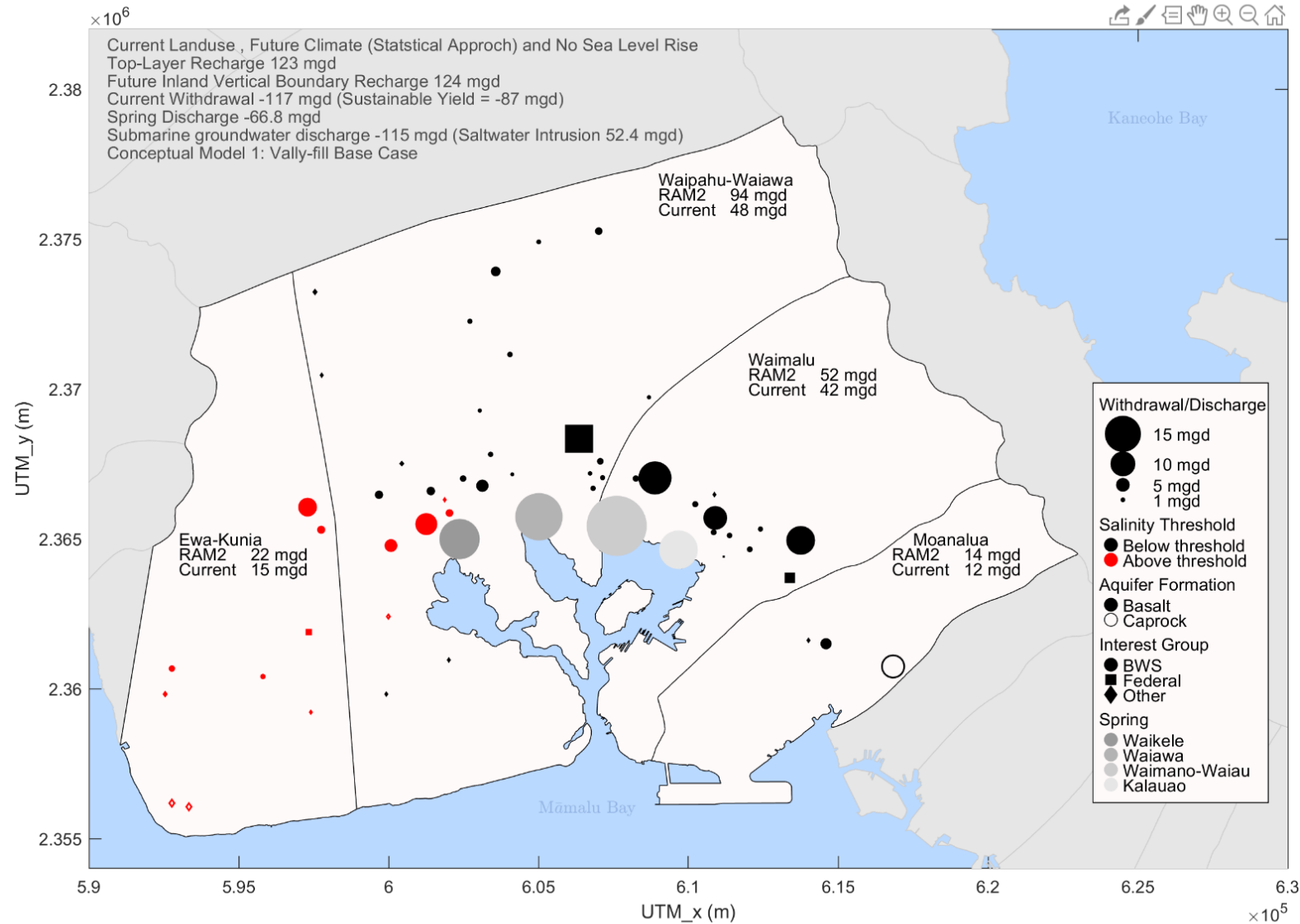
How will the future look like with current withdrawal?

- Projected fresh groundwater 103 mgd (↓ 12%)



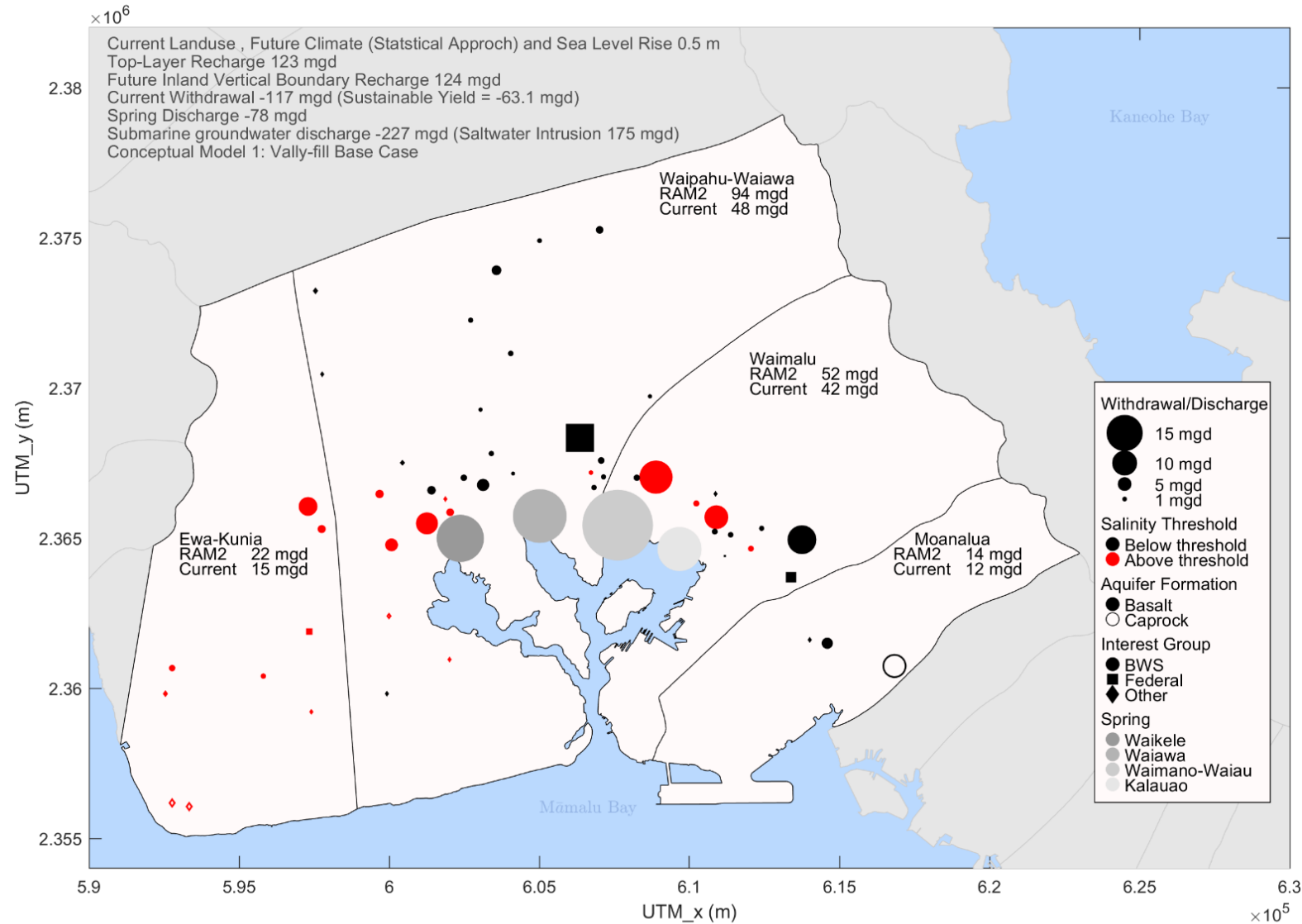
... and climate change impact on recharge ?

- Projected fresh groundwater 87 mgd (↓ 26%)



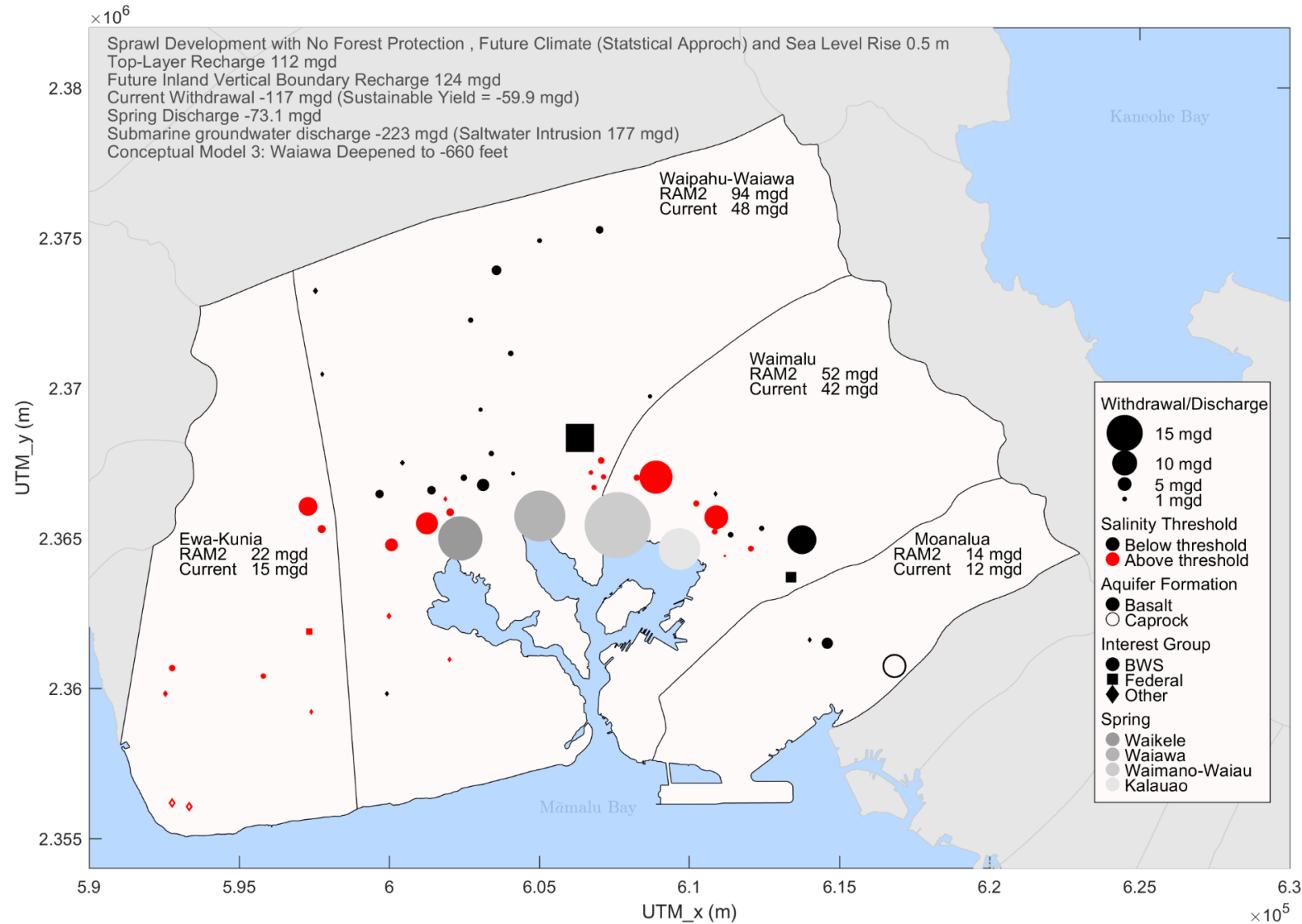
... and climate change impact on recharge and sea-level rise ?

- Projected fresh groundwater 63 mgd (↓ 46%)



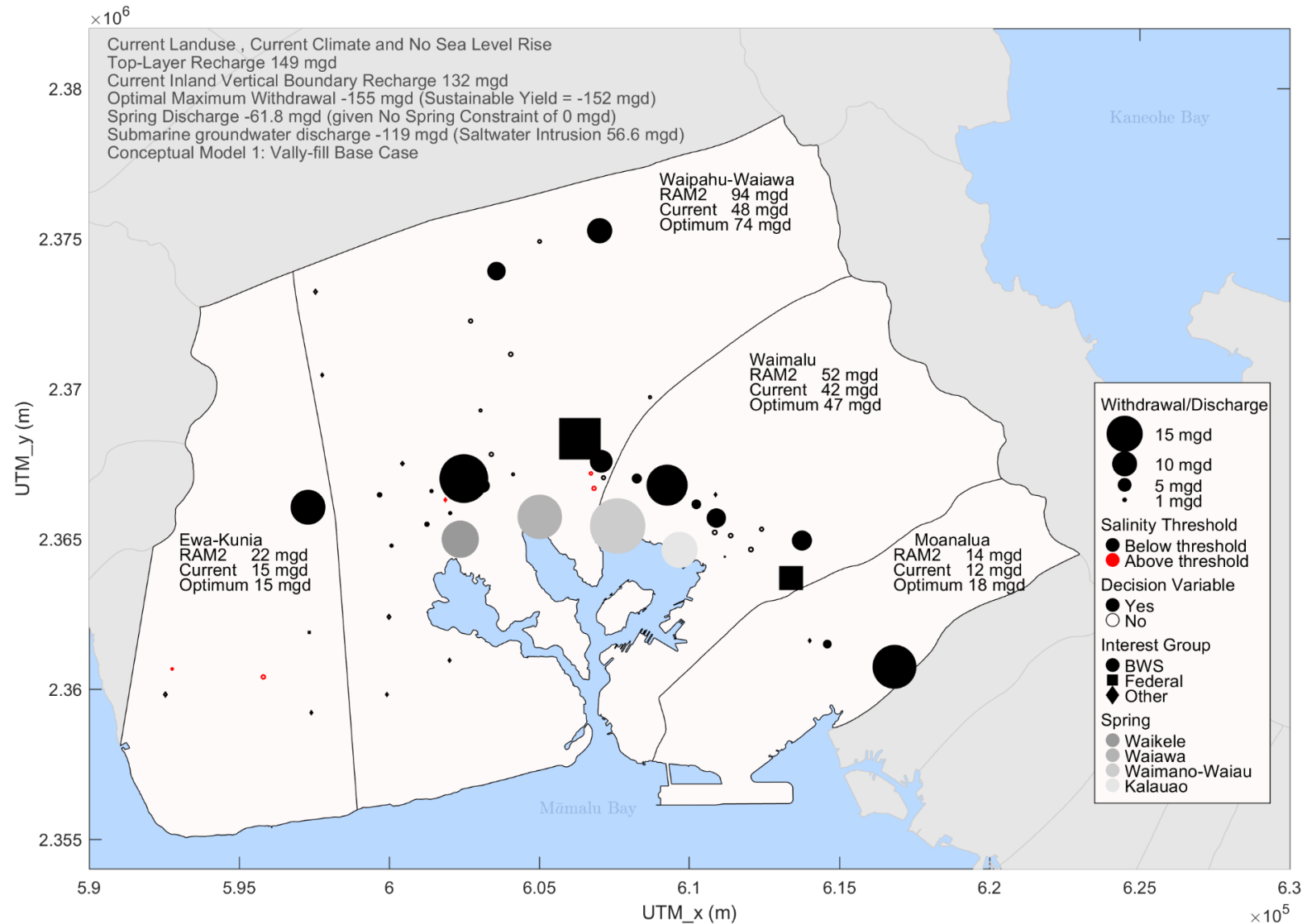
... and climate change and suboptimal land-use management?

- Projected fresh groundwater 61 mgd (↓ 48%)



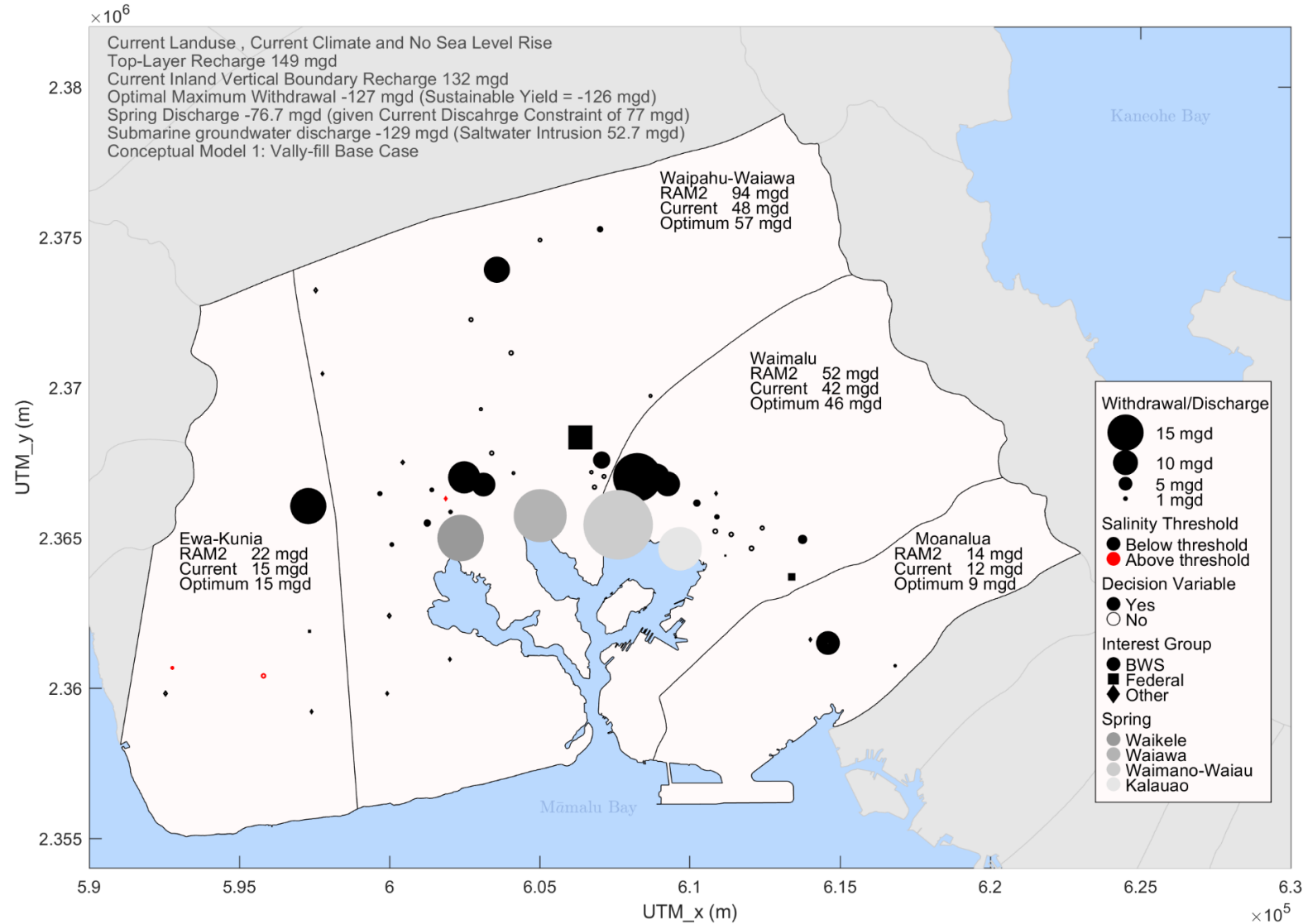
How will the future look like with optimal withdrawal?

- Projected fresh groundwater 152 mgd (↑ 30%)



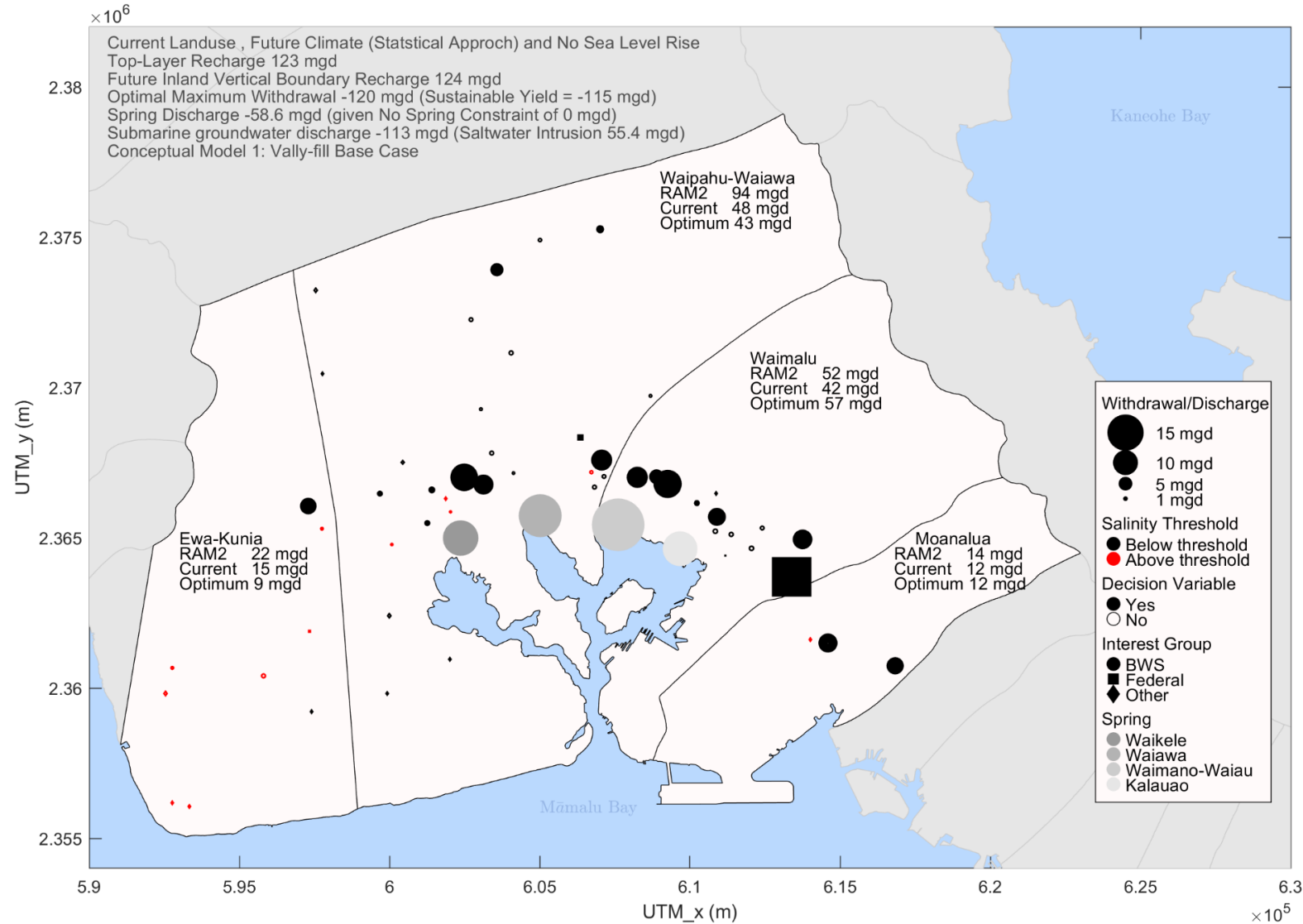
... and with constraining spring discharge to current level?

- Projected fresh groundwater 127 mgd ($\uparrow$ 8% vs. $\downarrow$ 12%)



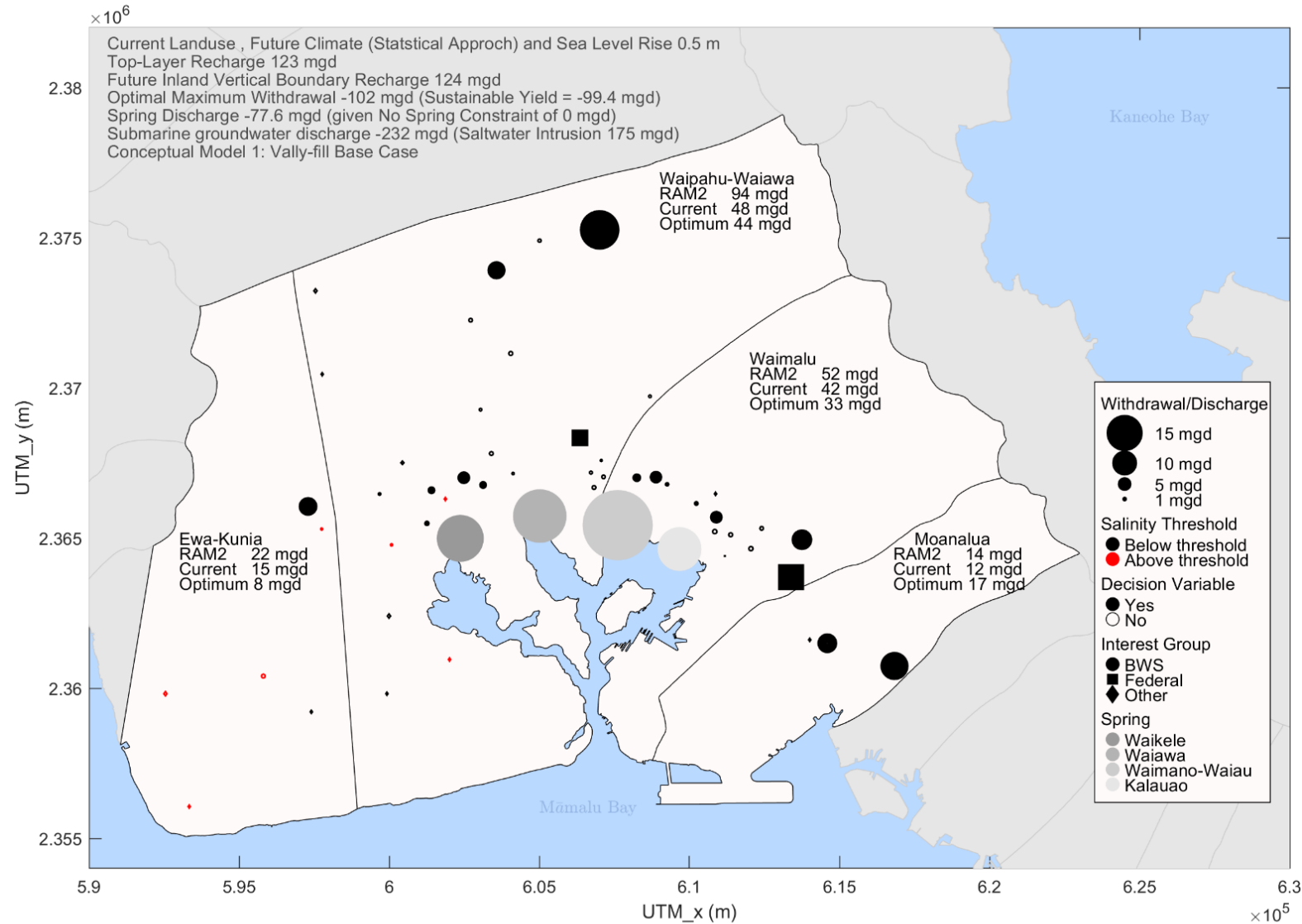
... and climate change impact on recharge ?

- Projected fresh groundwater 115 mgd (↓ 2% vs. ↓ 26%)

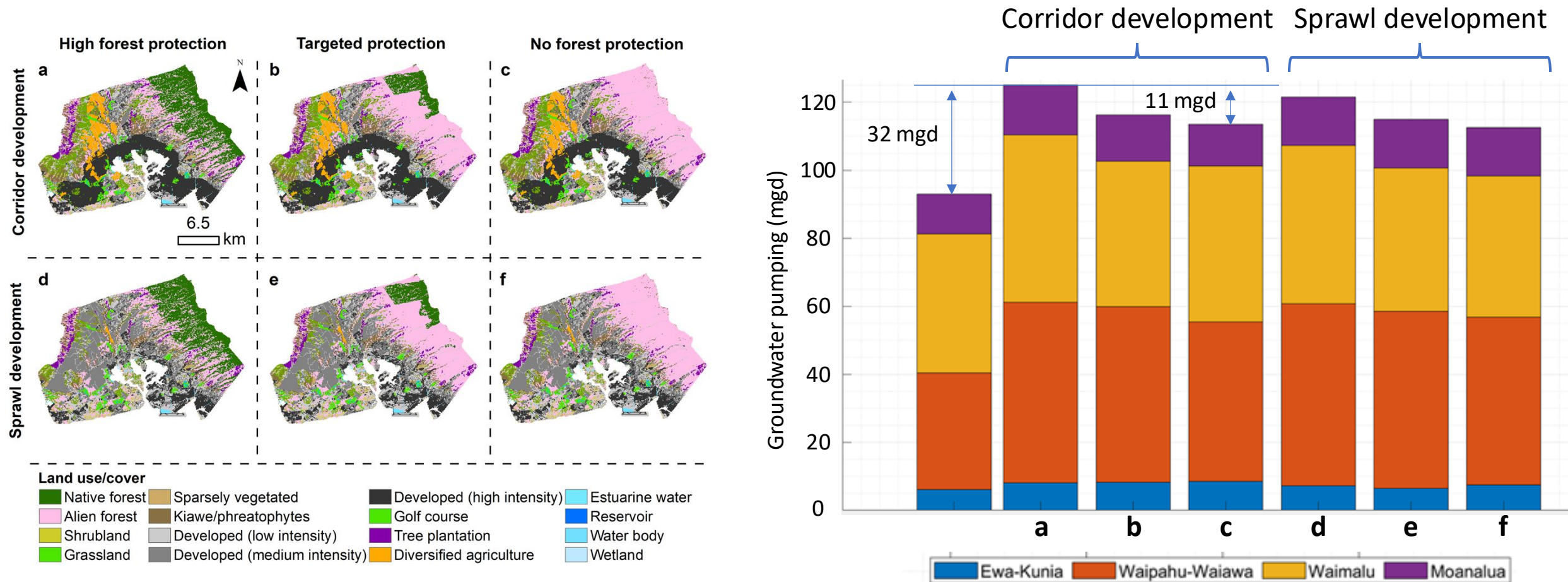


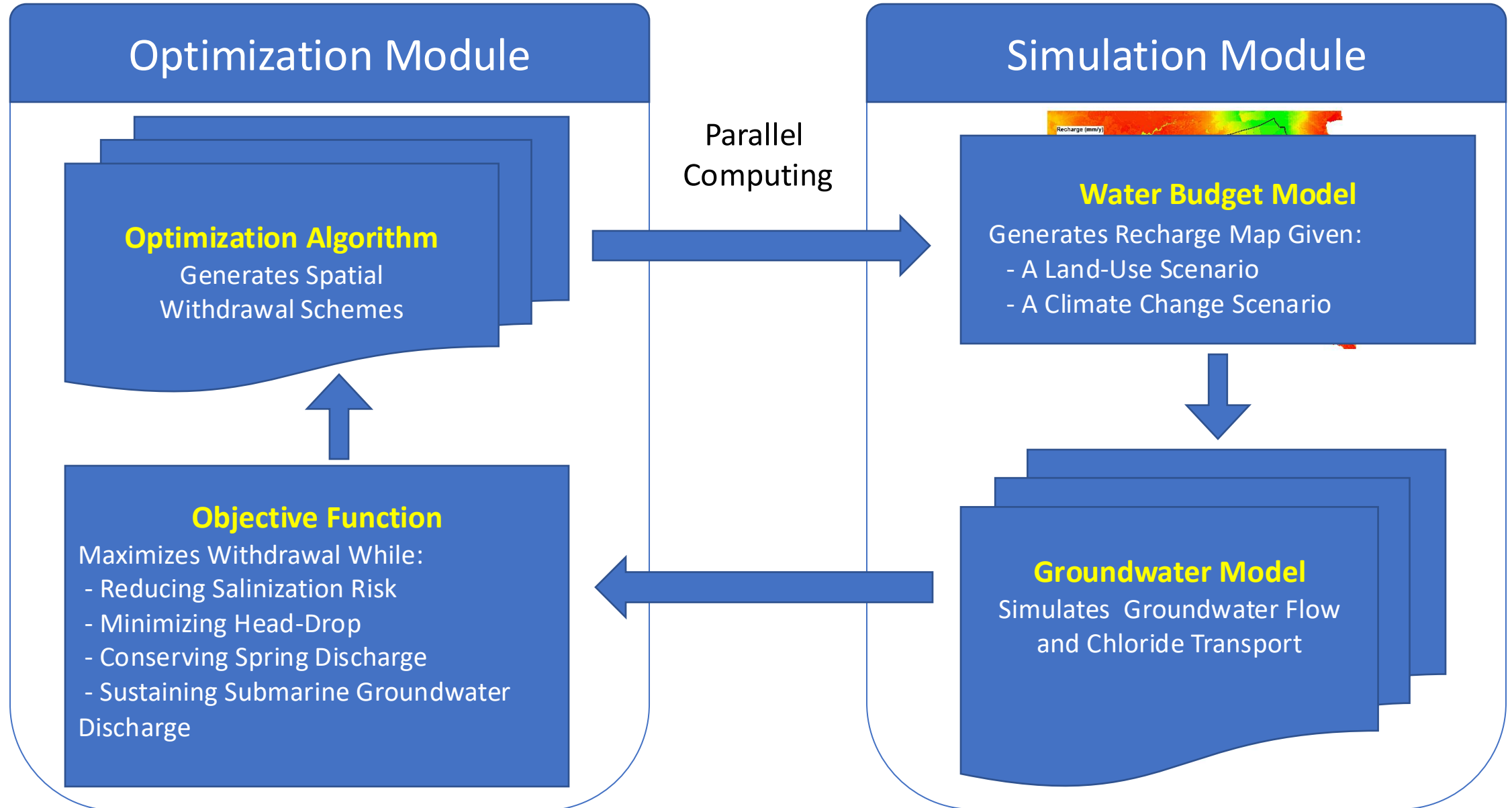
... and climate change impact on recharge and sea-level rise?

- Projected fresh groundwater 99 mgd (↓ 15% vs. ↓ 46%)

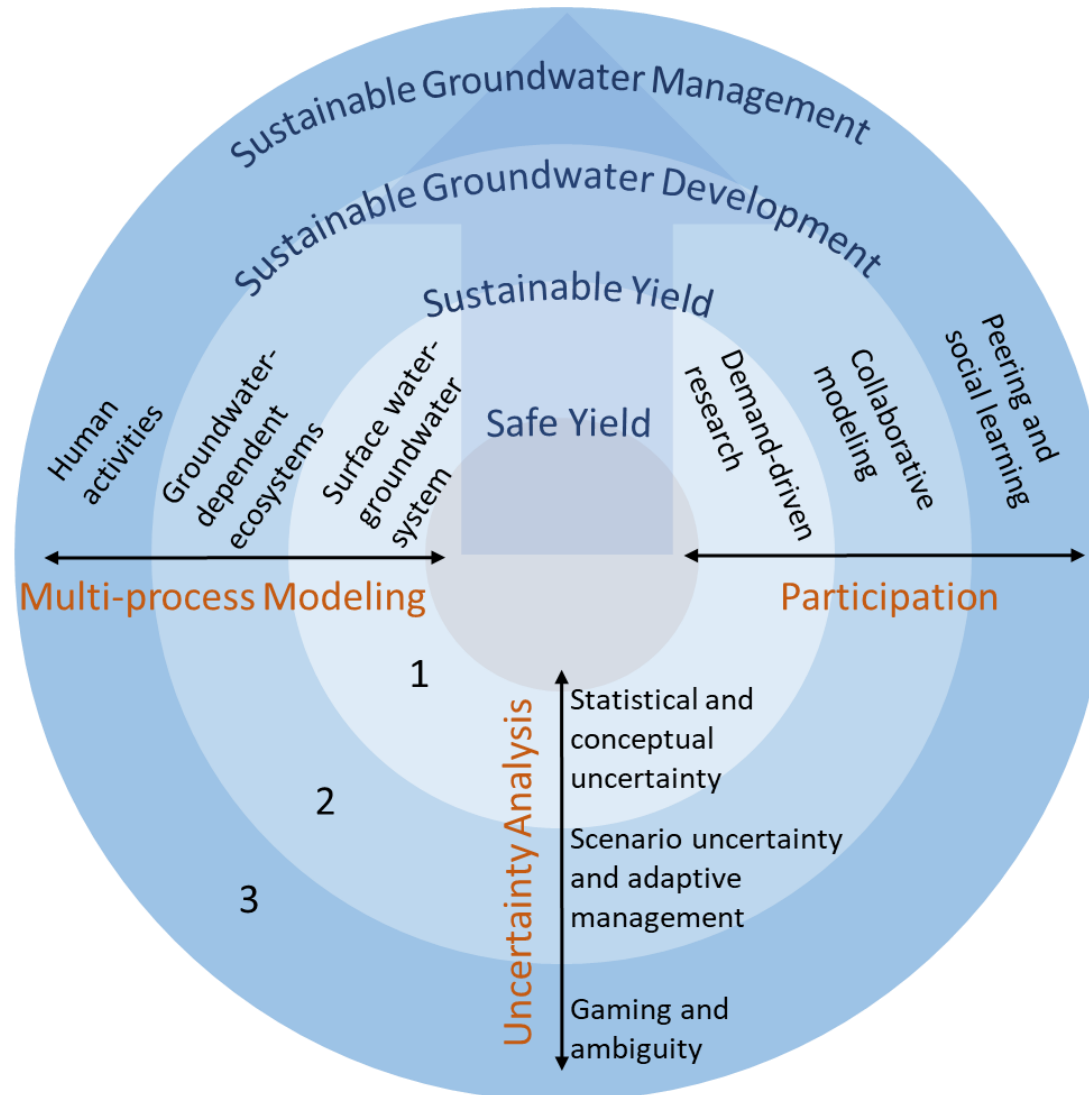


Reducing the impact of climate change with nature-based solutions and best management practices





Integrated modeling approach incorporating multi-process modeling, participation, and the uncertainty of our scientific knowledge



Nature-based infrastructure for enhancing climate resiliency of groundwater resources in South Florida



Ebrahim
Ahmadisharaf, FSU



Ahmed Elshall,
WCE and TWS



Mewcha
Gebremedhin, WCE



Shelly Krueger, UF



Rachel Rotz, TWS



Seneshaw
Tsegaye, WCE



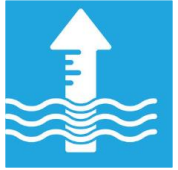
Ming Ye, FSU



USGS Caribbean-Florida Water Science Center



South Florida hydrologic system is dynamic, complex and vulnerable to the climate change impacts



Sea-level rise



Changing
precipitation patterns



Rapid socioeconomic
development



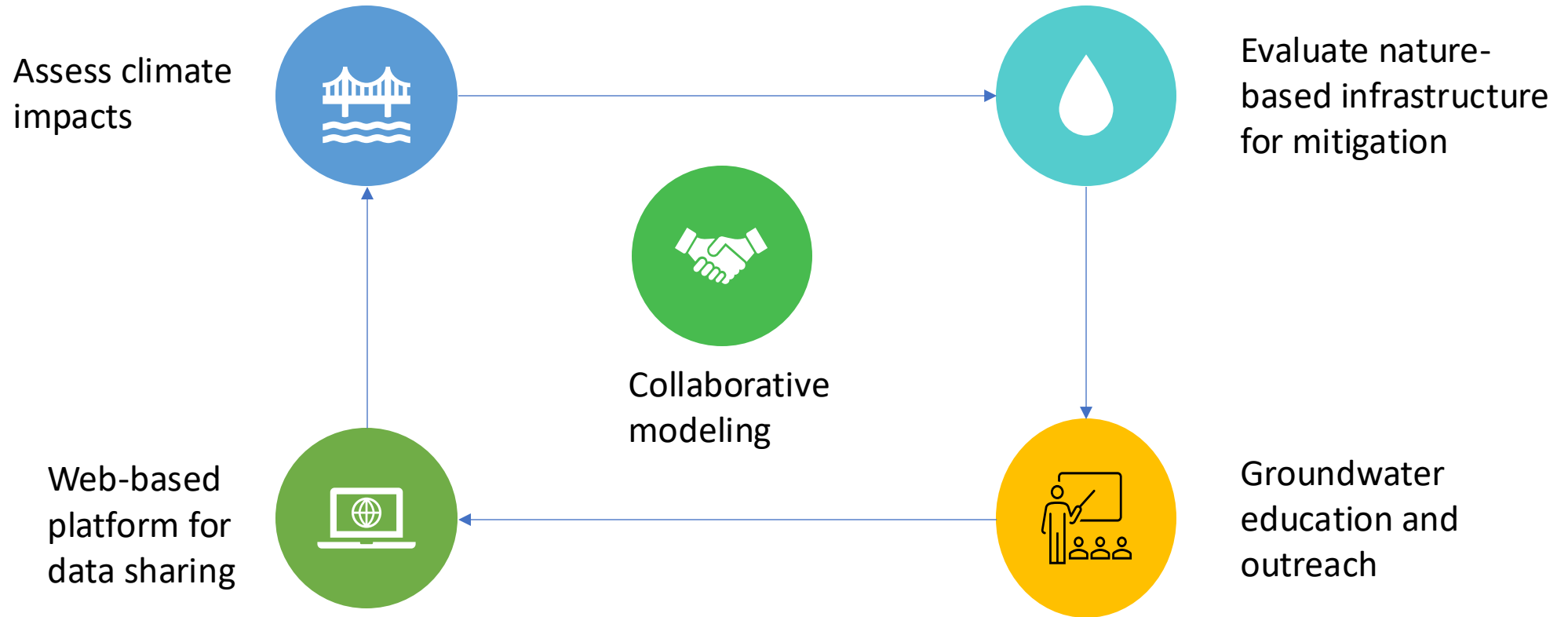
Credit: Brent Thomas



Credit: Florida Fish and Wildlife (FWC)

FWC approves plan in 2020 to suspend wild oyster harvest from Apalachicola Bay for 5 years

Integrated modeling approach based on participatory water governance framework



Roles and Responsibilities: Team of 5 PIs, no-cost collaborator, postdoc and undergrad student

- **Elshall**: Adoption and update of the BISECT model for SW-GW modeling.
- **Tsegaye**: Evaluating and prioritizing nature-based solutions and development of decision support system
- **Rotz**: Collaborative modeling by working closely with SFWMD
- **Ye**: Uncertainty analysis for decision-making support
- **Ahmadisharaf**: Developing climate scenarios and surface water modeling
- **Krueger**: Community engagement and outreach
- **Gebremedhin**: Project-engine
- **Undergrad student**: Developing and populating the web-based platform