



**National Aeronautics and
Space Administration**

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

NASA Sea Level Change Team: A Framework For Transitioning Research to Action

Ben Hamlington

Research Scientist
NASA Jet Propulsion Laboratory
Team Lead NASA Sea Level Change Team

NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



Vinogradova et al., 2023

The NASA Sea Level Change Team (N-SLCT) recently celebrated its 10th birthday.

2014-2016: Interdisciplinary team for an interdisciplinary challenge, sealevel.nasa.gov

2016-2020: Focus on sea level projections, engagement with practitioners

2020-2024: Integrated knowledge development and information delivery

2024-2028: New structure focused on transition of science and observation to action

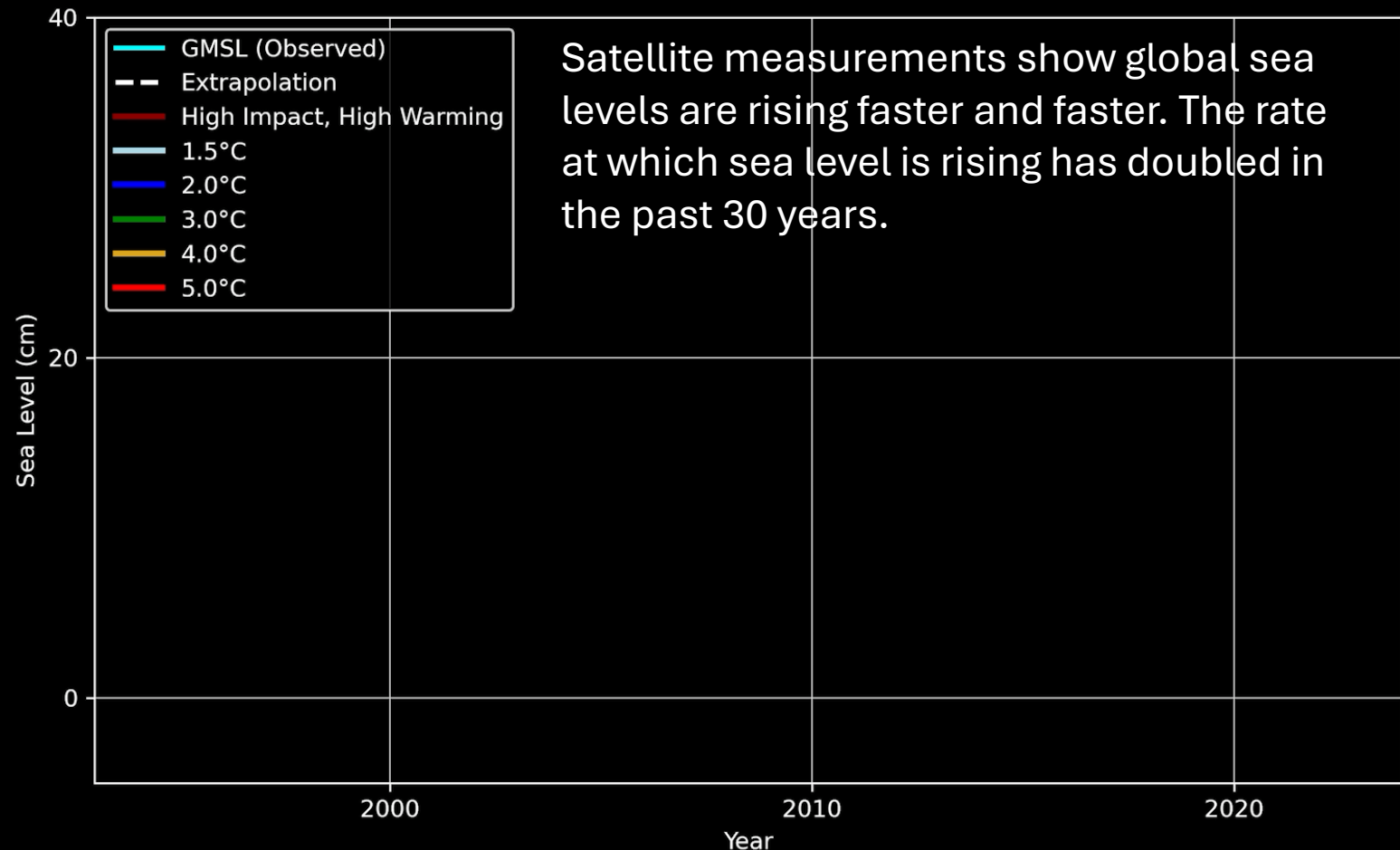
Longevity and continuity of the team has led to maturity of approach and established a consistent external presence.

NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



Foundation: Global satellite observations of sea level and associated processes

EXAMPLE:
Lengthening records of sea level change and associated processes provide an opportunity to assess the trajectory of present and near-term sea level rise both globally and regionally.



NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK

Observe &
Monitor

Interpret &
Analyze

Integrate &
Predict

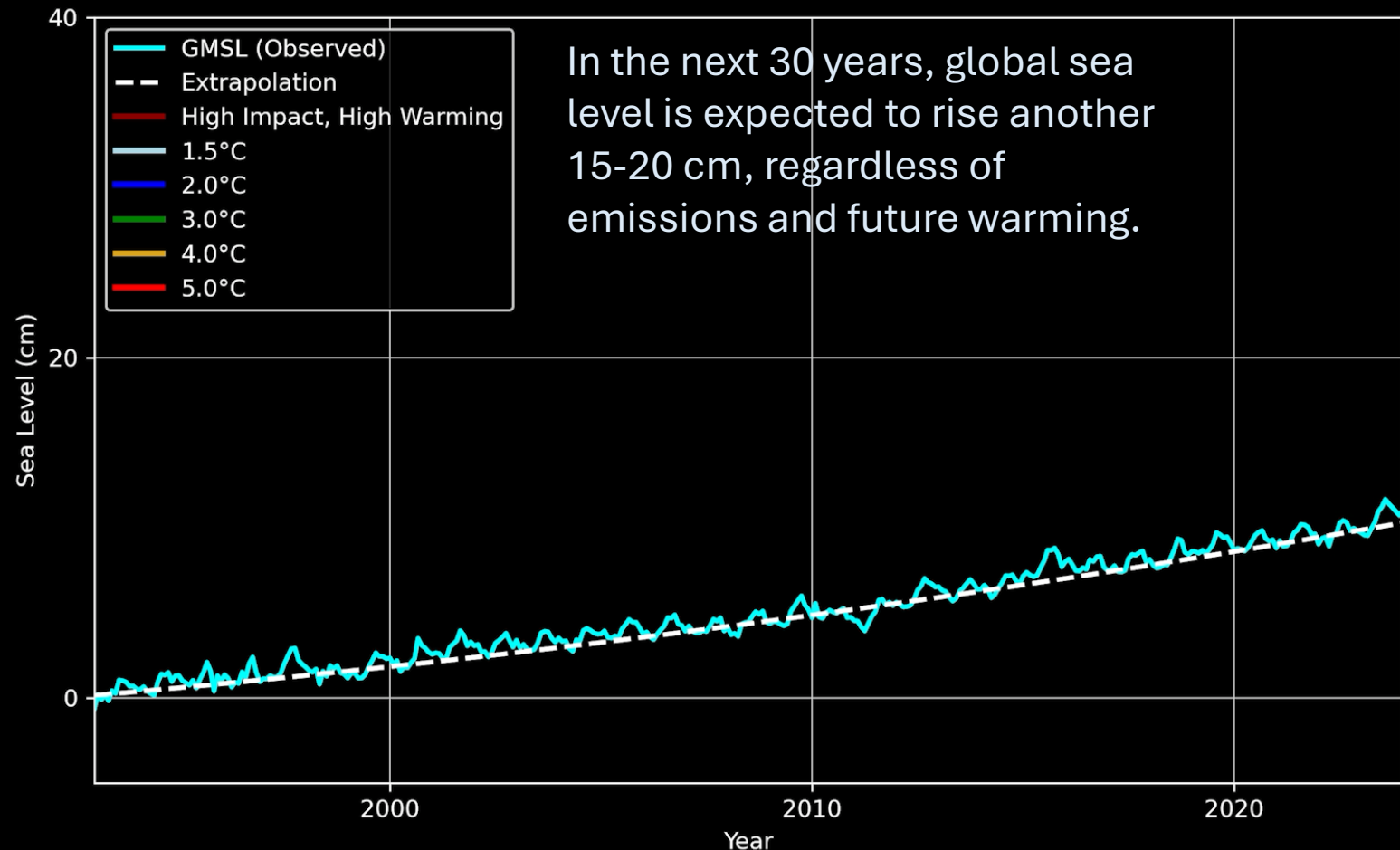
Translate to
Actions

Address
User Needs

EXAMPLE: Observations and models agree on certain global sea level rise in the next three decades.

Comparison can be done regionally and provide more certainty to planners on future sea level rise.

Includes information on specific processes contributing to relative sea level.



NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



Observations
Baseline Data
Dynamical Models
Statistical Models
Long-term Projections
Short-term Predictions
Process Descriptions
Coastal Impacts

At a specific time in the future:

1. Frequency: How often will water be on land?
2. Severity: How deep will it be?
3. Duration: How long will it stay there?
4. Impact: What will it interact with once it's there?
5. Certainty: How well do we know all of the above?

The “End User”: Very broad range of users on local, state, national and international levels.

NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK

Observe &
Monitor

Interpret &
Analyze

Integrate &
Predict

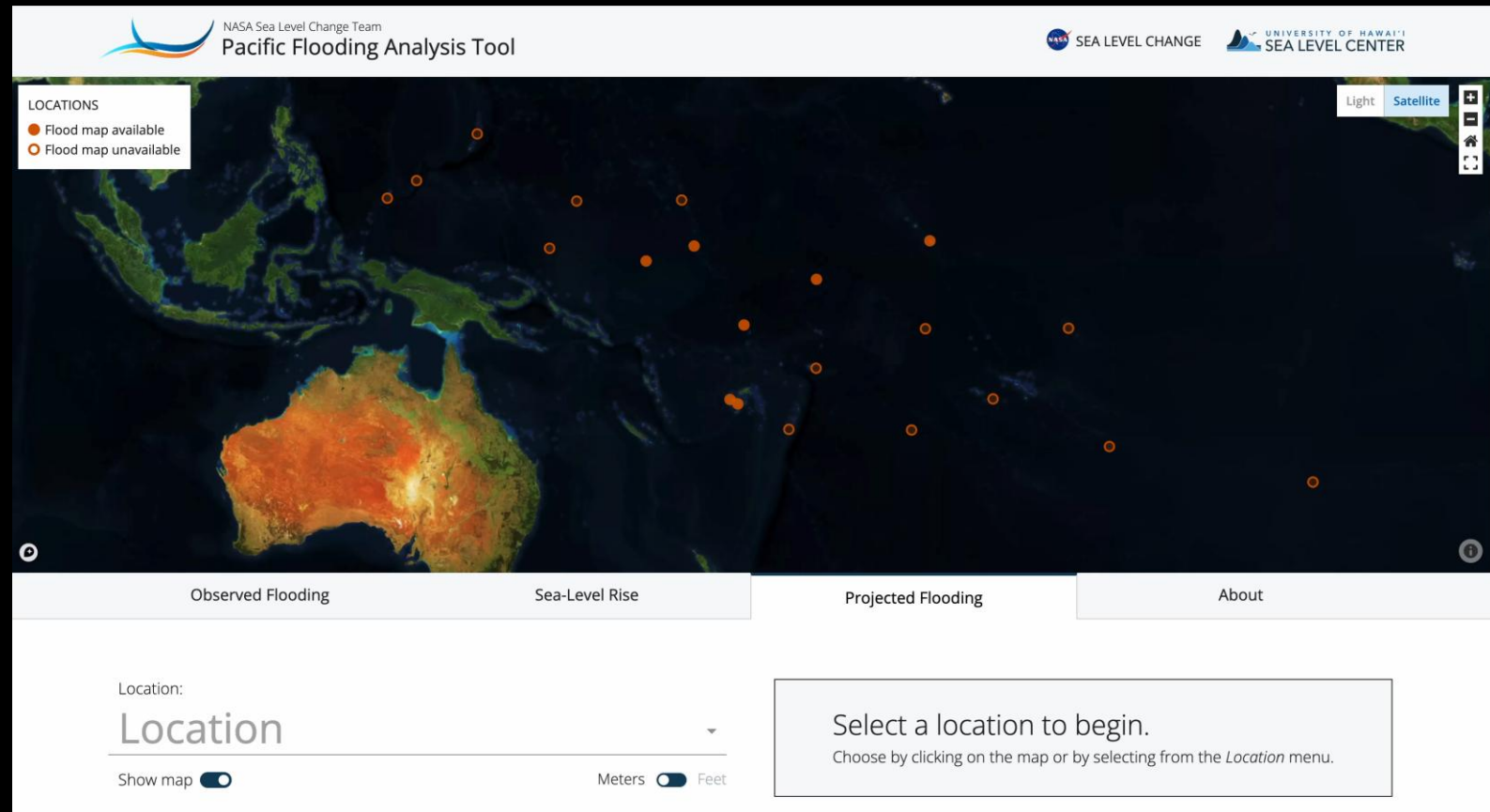
Translate to
Actions

Address
User Needs

Example: Pacific Flooding Analysis Tool

**Determine location and
number of days of future
high-tide flooding by
combining:**

- Long-term projections
- Near-term trajectories
- Hourly-to-Multidecadal Variability
- Tidal Predictions
- Sea Level Datums
- High-Resolution (1m) Digital Elevation Models



<https://sealevel.nasa.gov/flooding-analysis-tool-pacific-islands>

NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK

Observe &
Monitor

Interpret &
Analyze

Integrate &
Predict

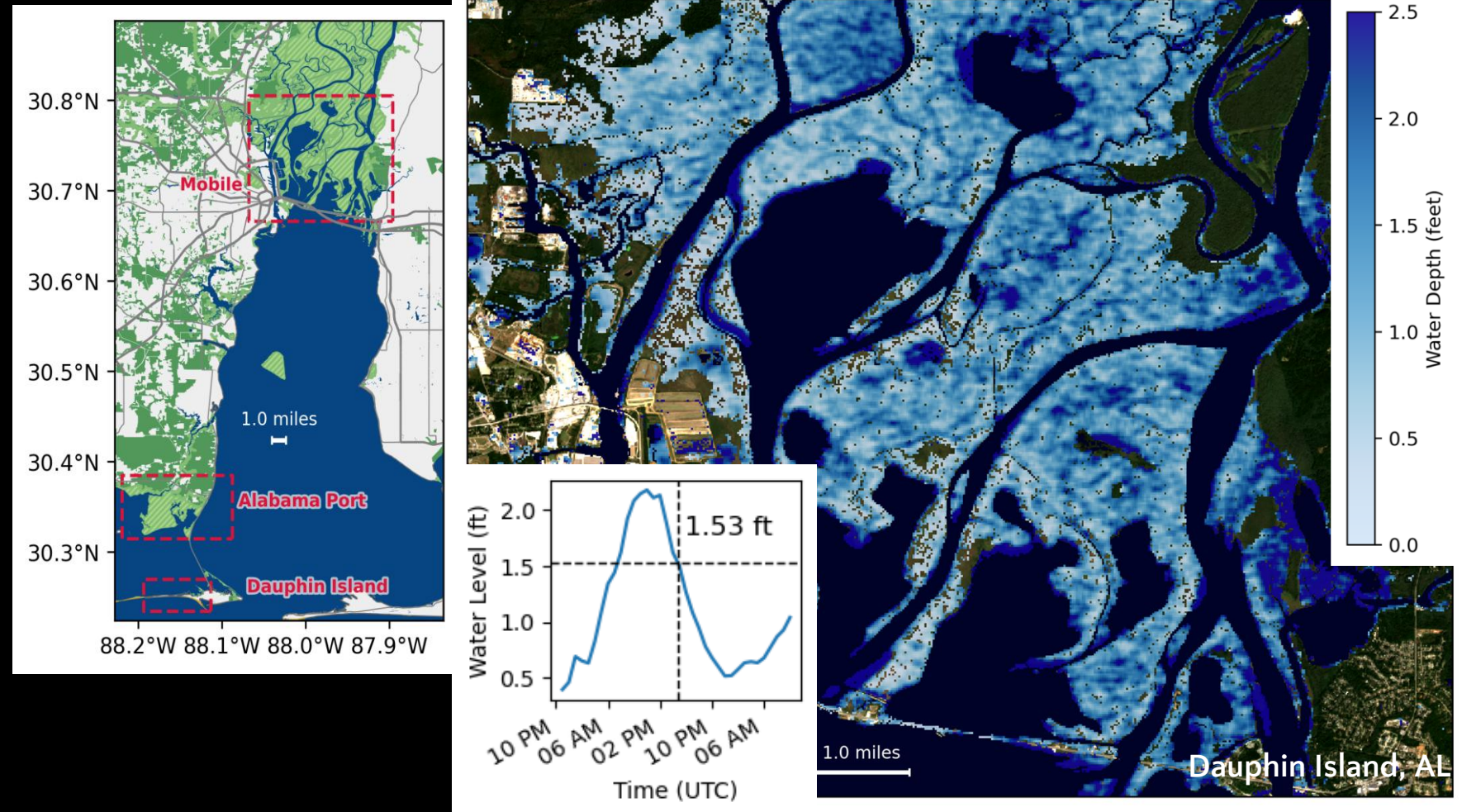
Translate to
Actions

Address
User Needs

Example: SWOT Flood Depth

Determine flood depth of high-water events in U.S. by combining:

- SWOT Coastal Water Level
- Tide Gauge Data
- Tidal Predictions
- Sea Level Datums
- High-Resolution (1m) Digital Elevation Models



NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK

Observe &
Monitor

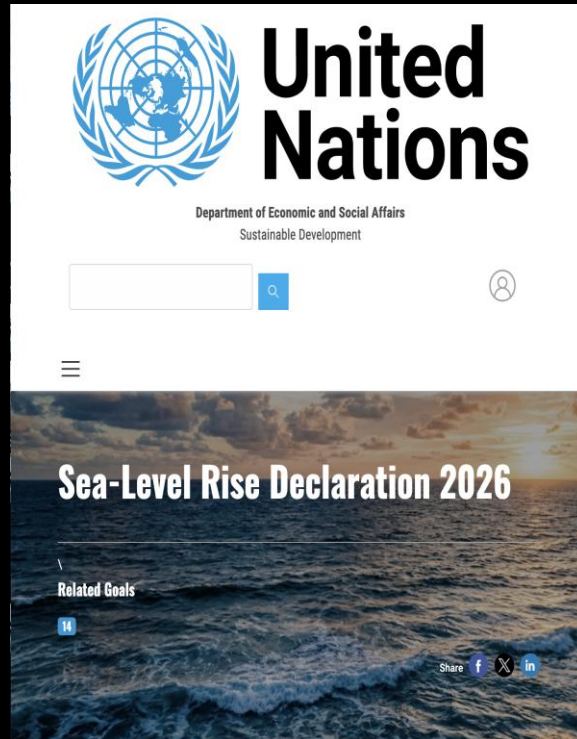
Interpret &
Analyze

Integrate &
Predict

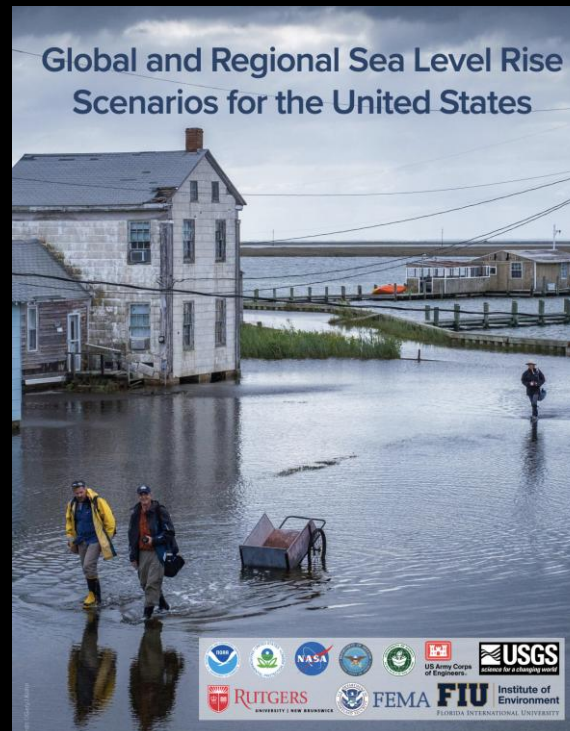
Translate to
Actions

Address
User Needs

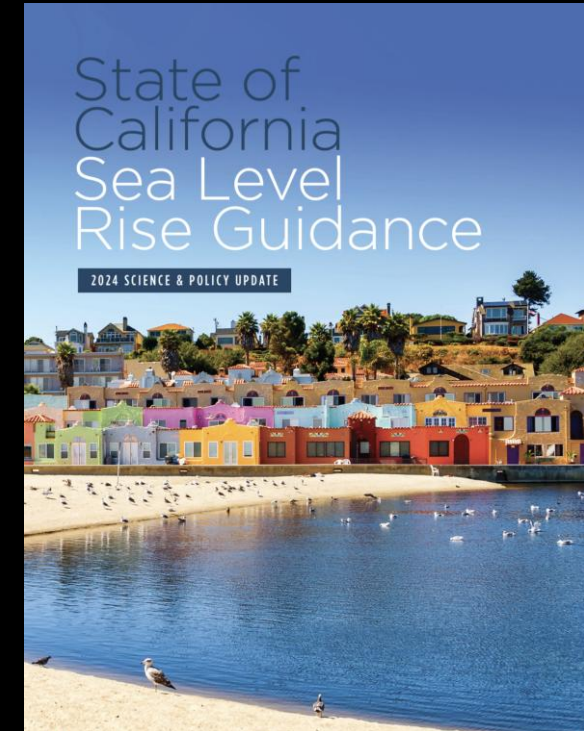
International



National



State



- The foundational science doesn't change → differences in delivery and presentation come from politics, time horizon, geographical location, precedent.
- Create pathways and partnerships to determine what is needed, find solutions, deliver and sustain.

NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



NASA SEA LEVEL FLOW OF INFORMATION WITHIN SCIENCE-TO-ACTION FRAMEWORK



1. Visibility → Consistent presence at sealevel.nasa.gov + engage
2. No Confusion → Avoid overlap, improve coordination when possible
3. Scale → Target partners with a large network
4. Impact → Identify Entry Points and Pursue High Impact Partnerships
5. Deliver → Don't oversell, be informed and deliver what is asked for
6. Sustain → Support and maintain