Workshop Summary & Closing Remarks

Sea Level Hotspots from Florida to Maine
Drivers, Impacts and Adaptation

April 23 – 25 | Norfolk, VA

sponsored by:

NOAA US CLIVAR NASA

Image credit: Amy McGovern

Workshop Key Questions

1. What are the efforts already in place and aimed at mitigating effects of sea level rise and improving overall coastal resilience?
2. Where are we with the science? What do we know about the drivers, the uncertainty, and the future of sea level rise?
3. What are the tools and monitoring resources currently available?
4. What are the best practices for linking scientific information with decision-making support tools? What are the gaps that need to be addressed?

Key points

Adaptation Efforts

- Three pillars: policy, design, protection
- Most adaptation efforts requires detailed assessment at the local level;
- 30 - 50 years timescales (utilities lifespan); Homeowners require short time-scales
- Implementation involves picking one SLR projection, and associated risk levels; Multiple scenarios useful; Guidance needed; Implementation with shorter lifespan more forgiving;
- Probabilistic information is useful for communicating to stakeholders. Engineers convert information into risk.
- Conducting scenario and cost analysis

Current Challenges to Adaptation Efforts

- Elevated costs of adaptation efforts vs. lack of sustained funding from federal, and state government
- Sustained community dialogues
- Stakeholders often don't distinguish between sea level rise and other reasons for coastal flooding (e.g., precipitation); Awareness development and recognition
- Stakeholder fatigue
- Lack of political will
  - Timescales of adaptation efforts (30-50 yrs)
  - Constituent involvement required
  - Preventive adaptation efforts vs. Disaster relief funding
- Regional characteristics
  - e.g FL geology; Mid-Atlantic predominantly rural; NE landscape characteristics
- Accelerated population growth

Key points

Science Information

- Sea level change varies in space and time, and affected by multiple drivers (GIA, ocean dynamics, heat content, and mass changes etc.);
- Long-term uncertainty are sensitive to parameters input, specially associated with melting ice sheets;
- In next 20 years, scenarios are well constrained;
- Uncertainty in SLR projections relatively narrow over 20 yrs time-frame; regional uncertainty larger than global uncertainty due to ocean dynamics
- Response of the coastal landscape to SLR is a dynamic process
- Community moving from synthesis reports into synthesis products
- Important to acknowledge the complexity of adaptive systems, with various sectors, multiple planning agencies, interconnected web of decisions
- Assessments of vulnerability can benefit from employing simulation and computational decision searching analysis

Key points

Web-based tools

- NASA Sea Level Change Portal
- NOAA web-based tools
- USGS coastal change hazards portals
- VIMS sea level report cards

Observation networks

- Tide gauges
- New sensor technology
- Citizen scientists and open data phone applications

Decision support tools

- Statistical framework to help with the decision process and evaluate risk to cascading impacts

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4. **What are the best practices for linking scientific information with decision-making support tools? What are the gaps that need to be addressed?**

Needed improvements

- No additional projections, and less uncertainty if possible, please….
- Additional educational resources on how to deal with uncertainty
- Atlas 14 updates in support of better rainfall estimates
- Improve coverage and availability of coastal hydrologic data (e.g. rainfall)
- Establishing coherent set of standards for SLR
- Clear guidance for engineers has to be created; increase availability of resources aimed at educating engineers
- Better storm frequency and surge projections
- Centralized Nuisance flooding and King Tides information Tool
    - Communicating the breakdown of nuisance level flooding into components: SLR + Ocean Dynamics + atm conditions

Research Needs

- Explore role of integrated model approaches in reducing uncertainty
- Formalize and advance the field of decision science;
- Advance the science field of climate adaptation;
- Improved observational and modeling capabilities to improve characterizations and reduce decision relevant uncertainty;
- Drivers of interannual variability (storminess, natural climate variation);
- Interaction between tidal range and erosion processes;
- Improve subseasonal to interannual sea level (King Tides) forecasts;
- Assess effectiveness of green infrastructure in improving resilience;
- Better definition on relationship between groundwater and SLR;
- Improved understanding on compound flooding probabilities (e.g. intense rain + coastal surge);
- Improved understanding of feedback between ecosystem health and sea level rise;

Recommendations

- Foster sustained opportunities for sea level information exchange
- Maintain current network of sea level observations, and implement new observations of coupled nature human systems in support of long-term records
- End-user driven tool development
- Public engagement (e.g. Savannah case study, citizen science apps)
- Sustainable funding opportunities for adaptation science and efforts
    - Explore opportunities for making research funds available to local adaptation level
    - Implement research grants taylored to identifying talent within adaptation professionals, and reward it
- Inventory of adaptation projects
- Assess hazard information using experiments (e.g., Judgement and Decision Making type)
- Catalog and improve understanding of the mapping of preferences (e.g., risk tolerance) to hazard characterization and communication

Recommendations

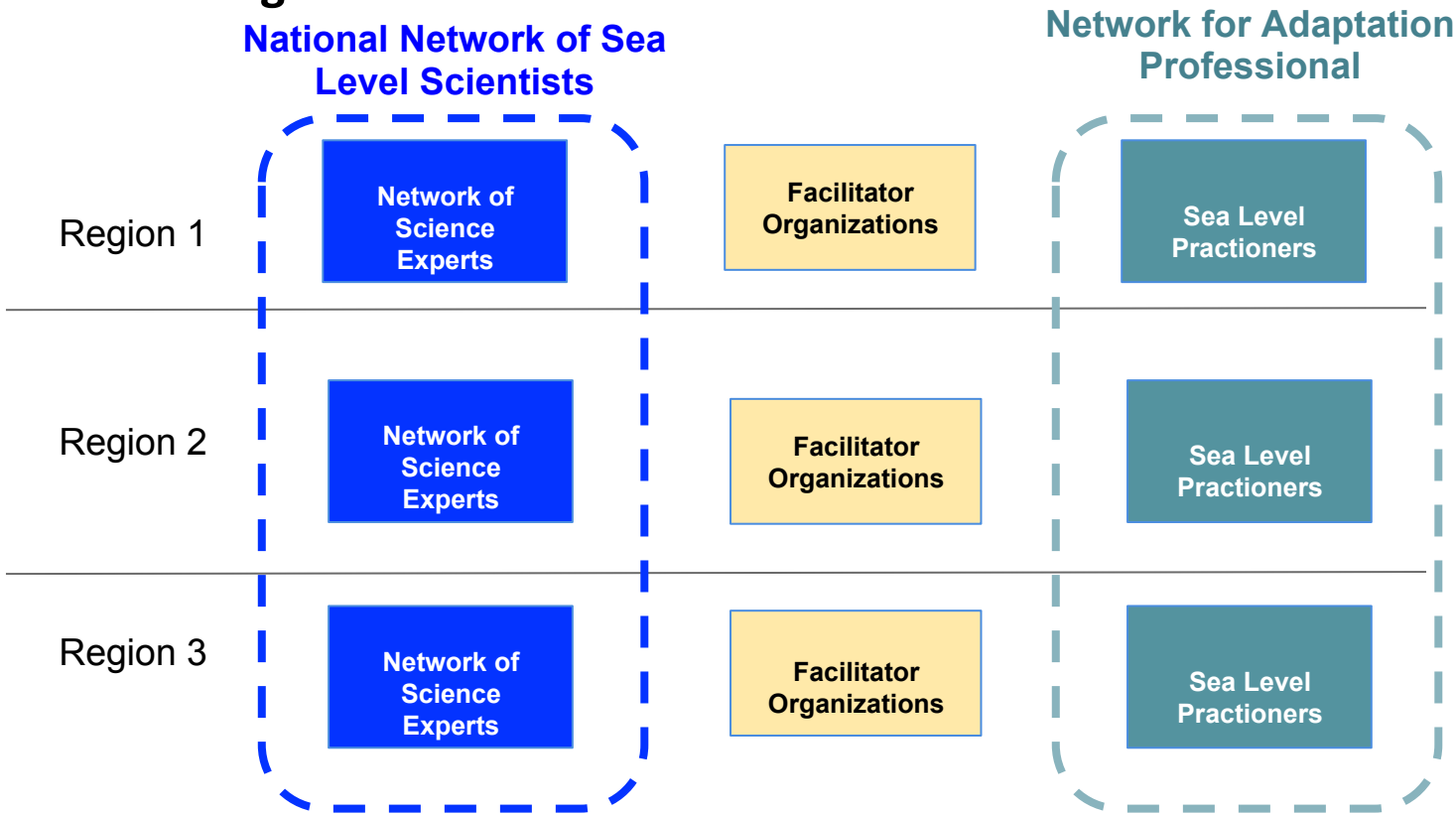
- Need to establish a clear institutionalized framework to move science information into actionable decision making support tools
- Establishing Regional Networks for Adaptation Efforts
  - Why?
    - There is no one size fits all
    - Addressing hyper local issues inherent to particular locations: ground-water modeling; compound flooding assessments; storm surge vulnerabilities
    - Support municipalities with limited resources and low availability with technical capacity
  - Successful examples:
    - Efforts in the Tampa Bay area
    - South Florida Climate Compact
    - New York City Panel on Climate Change
  - How? Joint co-production proposals process
  - What it is?

Science and Decision Making Framework

Regional Level

Science and Decision Making Framework

National Level



- **Need for establishing a network for the exchange of the state-of-the science information on sea level changes relevant to the U.S.**

e.g. American Society of Adaptation Professionals

Plenary Discussion

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