

FY24 Strategic Initiatives Research and Technology Development (SRTD)

An Architecture for Science and Applications Needs at the Coastal Interface - The Fulcrum of Lateral Exchanges between Land and Sea

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Strategic Focus Area: Earth System Science and Application Architecture Development (ESSAD) | Strategic Initiative Leader: Jessica L Neu

Background and Objectives

The objective has been to bring together a diverse set of scientists, modelers, technologists and systems engineer, at different career levels, to consider an integrated approach for developing an observing system to address the coastal interface in preparation for the 2027 Earth Science Decadal Survey (ESDS). It is anticipated that the upcoming ESDS will involve ever increasing complexity of Earth system science and an increasing trend toward science for societal benefits. To that effect, this project aims to address the grand Earth system science challenge of the coastal interface. Current technology and systems are limited in their ability to address this question.

Significance/Benefits to JPL and NASA

This project is advancing the Earth Science and Technology Directorate’s (ESTD - 8X) initiative goals by assessing the scientific and technical landscape and formulating a system architecture to help more strongly position JPL to address a grand Earth system science challenge, and its mission-to-information landscape that can contribute to national decision-support needs. Such an architecture will prepare JPL to advance science and applications - in terms of observables, model and decision support infrastructures - for the 2027 ESDS. Further, it promotes cross-organization collaboration, enables knowledge transfer between and within organizations, and trains/evaluates the next generation of scientists, technologists, and science system engineers.

Approach and Results

The approach of the project team has been to engage with science and application stakeholders spanning the land-sea continuum to provide input on their scientific needs, goals, objectives, as well as gaps in the current observational systems and model frameworks at the coast. This is the last year of the project, which has succeeded in 1) internally fostering collaborations and bridging science disciplines which have been historically siloed for coastal science and applications; 2) building capacity at JPL in terms of coasts; 3) engaging the community and building new partnerships; 4) formulating observing/information systems necessary to address coastal challenges; 5) ultimately providing a foundation and key documents to inform the 2027 ESDS. Success to these items is demonstrated by our deliverables and follow-on activities.

A draft SATM has been developed and will continue to be refined as we further engage with stakeholders, as well as the key figure that provides a visual representation of the SATM (Figure 1). We have had leadership within the community and participation at key community meetings. Several paper publications have been submitted or are in preparation.

Follow-on activities include:

- 3 IIPs
- Several ROSES proposals
- Direct NASA HQ funds for a coastal user needs assessment and community workshop
- Direct NASA HQ funds for the Earth Science to Action Coastal Zone Pilot Project
- Direct HQ funds for an ESTO Coastal Zone Digital Twin
- 830 Office Next Decadal Survey Activity on “Coastal Impacts and Adaptation”

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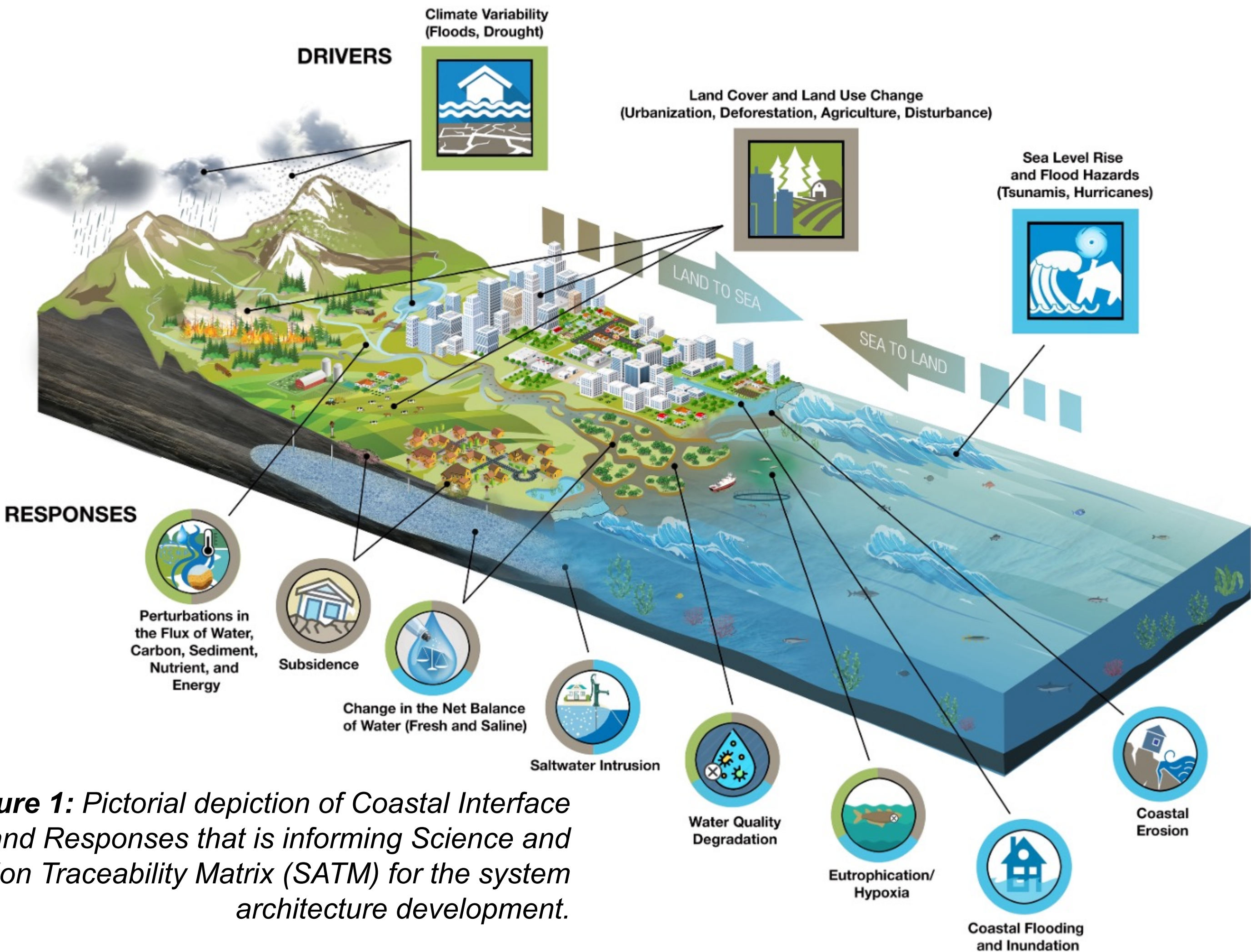


Figure 1: Pictorial depiction of Coastal Interface Drivers and Responses that is informing Science and Application Traceability Matrix (SATM) for the system architecture development.

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