

FY23 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 | **Strategic Initiative Leader:** Jessica L Neu

Background & 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 2027-2037 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 developing an end-to-end 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 2027-2037 Earth Science Decadal Survey. 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 stakeholders (internal and external) 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. A draft SATM from Year 1 was refined and reformulated to match the emerging landscape oriented around "coastal resilience", including the NASA coastal resilience program, White House SOST coastal resilience workshop report, and coastal resilience interagency working group. We will continue to refine the SATM as we engage with stakeholders, as well as the key figure that provides a visual representation of the SATM (Figure 1).

Within the SRTD team we have created tiger teams oriented around themes that emerged from the SATM, which align with the 8X societal benefit thrust areas. These tiger teams focus on key activities necessary to develop peer-reviewed paper publication and/or community reports in preparation for the 2027 DS. The tiger teams include 1) coastal freshwater availability; 2) sea level and sea level impacts at the coast; 3) coastal biodiversity - largely focusing on aquatic (vegetated and non-vegetated) ecosystems as the Biodiversity SRTD is focused on terrestrial ecosystems; 4) coastal oceanography; 5) greenhouse gases at the coast.

We continue to engage and build partnerships established in Year 1, including the U.S. Global Change Research Program (USGCRP) Coasts Interagency Group and the individual agencies that comprise this group, such as DOE, EPA, NOAA, etc.

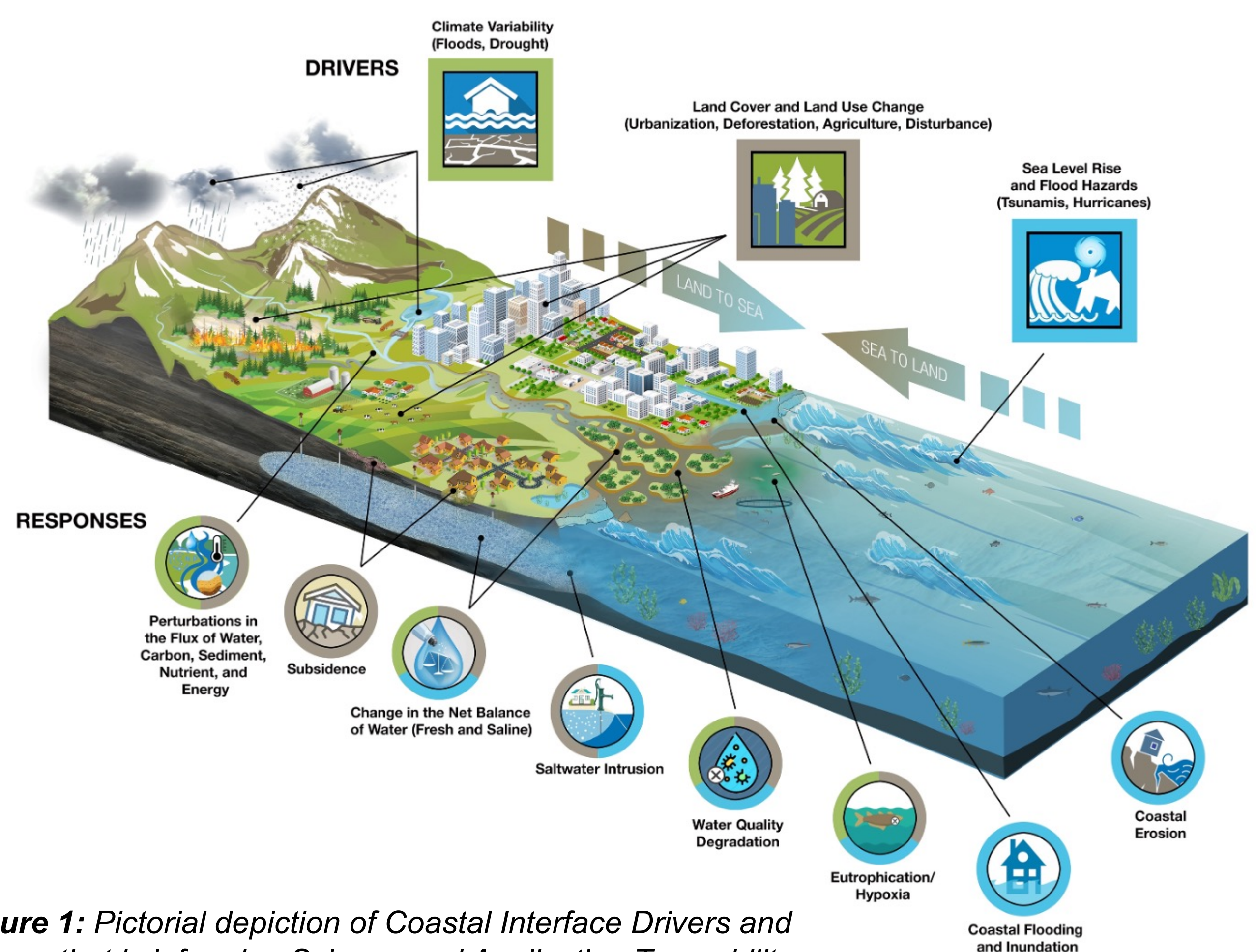


Figure 1: Pictorial depiction of Coastal Interface Drivers and Responses that is informing Science and Application Traceability Matrix (SATM) for the system architecture development.

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