Vital signs of resilience

Dani Boudreau & Jeff Crooks  ♦  Dec 2018  ♦  Port
Visualizing the future

Scenario A: Lake Tijuana

Scenario B: The Sea Around Us

Scenario C: Salt of the Earth

Scenario D: Marsh Madness

More extreme river flow events

Decreased tidal prism

Increased tidal prism

Fewer extreme river flow events
Scenarios, monitoring, & decisions

Current Management Practices

Monitor
When to act?

New Management Practices

Monitor
Right decision?
Ecosystem Monitoring
Assessing “Vital Signs”

• Water
  • temperature, salinity, dissolved oxygen, turbidity, pH, depth

• Weather

• Nutrients / Chlorophyll a

• Topography / Bathymetry

• Surface Elevation Tables (SETs)

• Soil Properties (e.g., salinity)

• Vegetation

• Fish and Invertebrates

• Birds

Los Peñasquitos Lagoon
South San Diego Bay
Tijuana Estuary
Water Temperature at Tijuana River NERR

Evidence of tropicalization?
The research station that monitors water conditions in the Tijuana River Estuary every 15 minutes, sending information to a satellite on Sept. 5, 2017.
Adaptive Restoration
Tijuana Estuary Tidal Restoration Project (TETRP)
Assessing tidal marsh resilience to sea-level rise at broad geographic scales with multi-metric indices
The CDMO is excited to announce the launch of our new **SWMP Mobile application**. Near real-time SWMP data is now available on your smartphone or tablet at: [www.nerrsdata.org/mobile](http://www.nerrsdata.org/mobile)

Our **Data Export System** has been updated and now has enhanced graphing capabilities! Want to easily export or graph data? If so, check out our [Data Export System](http://www.nerrsdata.org/mobile)!
Long-term monitoring

- Track short-term variability / long-term change
- Act as early warning system
- Gauge ecosystem responses to management action (or inaction)
- Parameterize models
- Provide background data for projects
- Stimulate new research ideas
Assessing tidal marsh resilience to sea-level rise at broad geographic scales with multi-metric indices

Figure 1: Diagram of the 5 major components in the MARS indices.

Table 2: Color-coded results for metric categories and overall MARS index scores at 16 study sites.

<table>
<thead>
<tr>
<th>State</th>
<th>Marsh Name and National Estuarine Research Reserve</th>
<th>Marsh Elevation</th>
<th>Elevation Change</th>
<th>Sediment Supply</th>
<th>Tidal Range</th>
<th>Sea Level Rise</th>
<th>Overall Resilience</th>
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Resilience to Sea Level Rise

Low | High
Vegetation / Sediment

PERL Protocol—Line Intercept
NERR Protocols – Transect w/Quadrats