



Monitoring ocean acidification in the southern California rocky intertidal

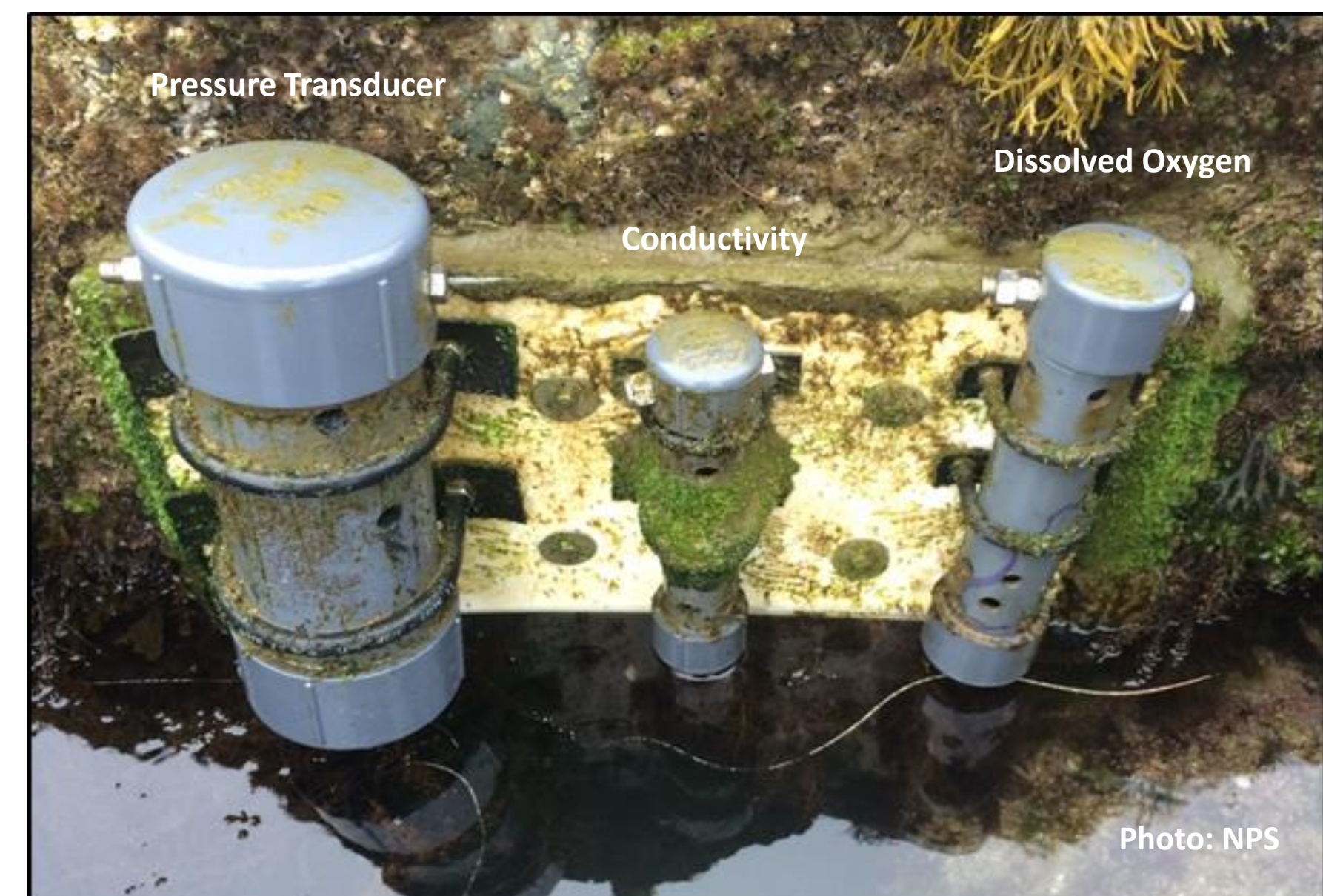
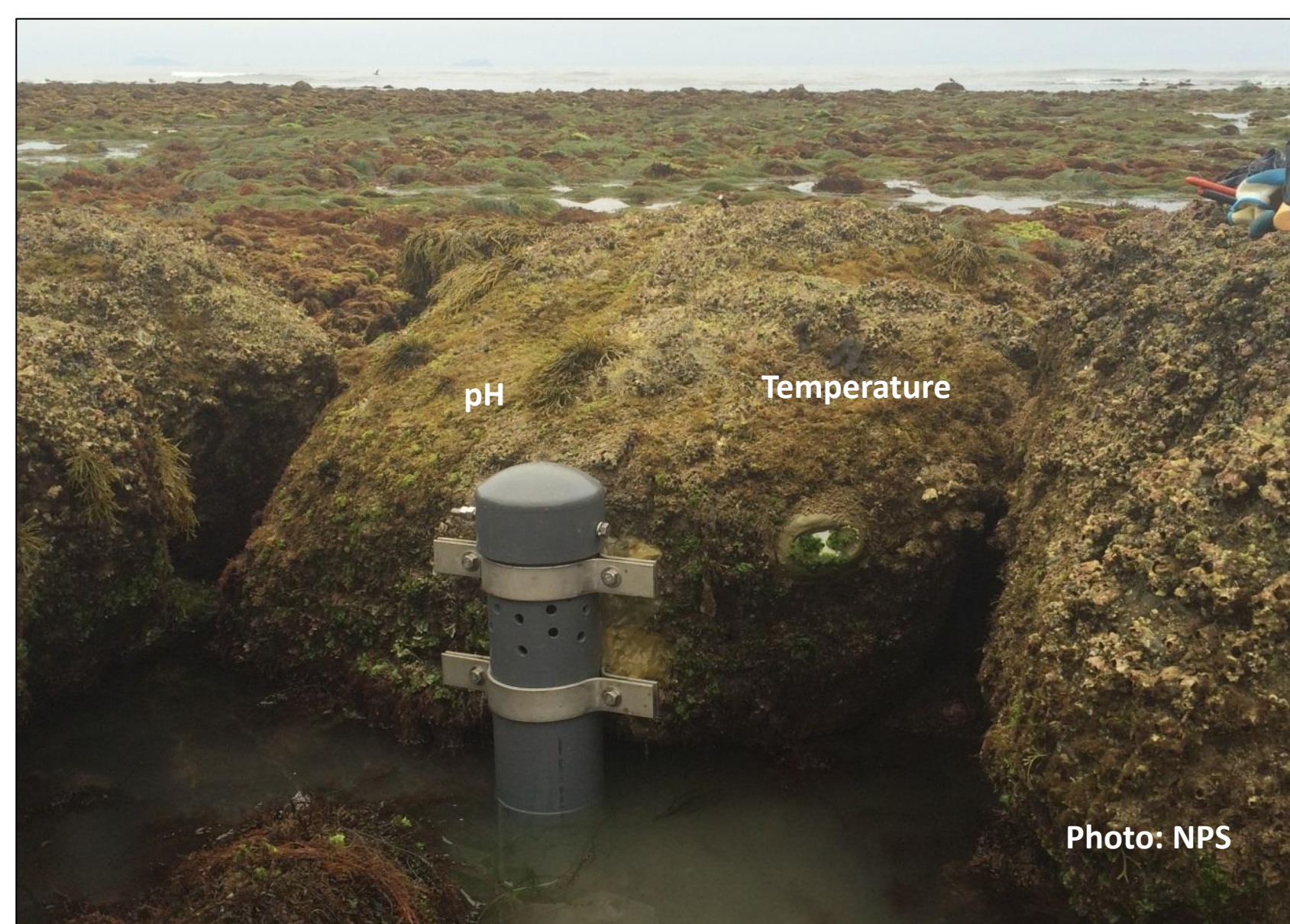
Keith Lombardo, Southern California Research Learning Center
Stephen Whitaker, Channel Islands National Park



Research & Management Goals

- Characterize geographic variation in intertidal pH on the West Coast of North America using SeaFET pH Sensors.
- Establish baseline measurements for carbonate system parameters in Park Service marine units.
- Identify OA impacts on vital NPS resources using paired long-term biological and chemical data.
- Collaborate with regional partners to establish shared research methodology.

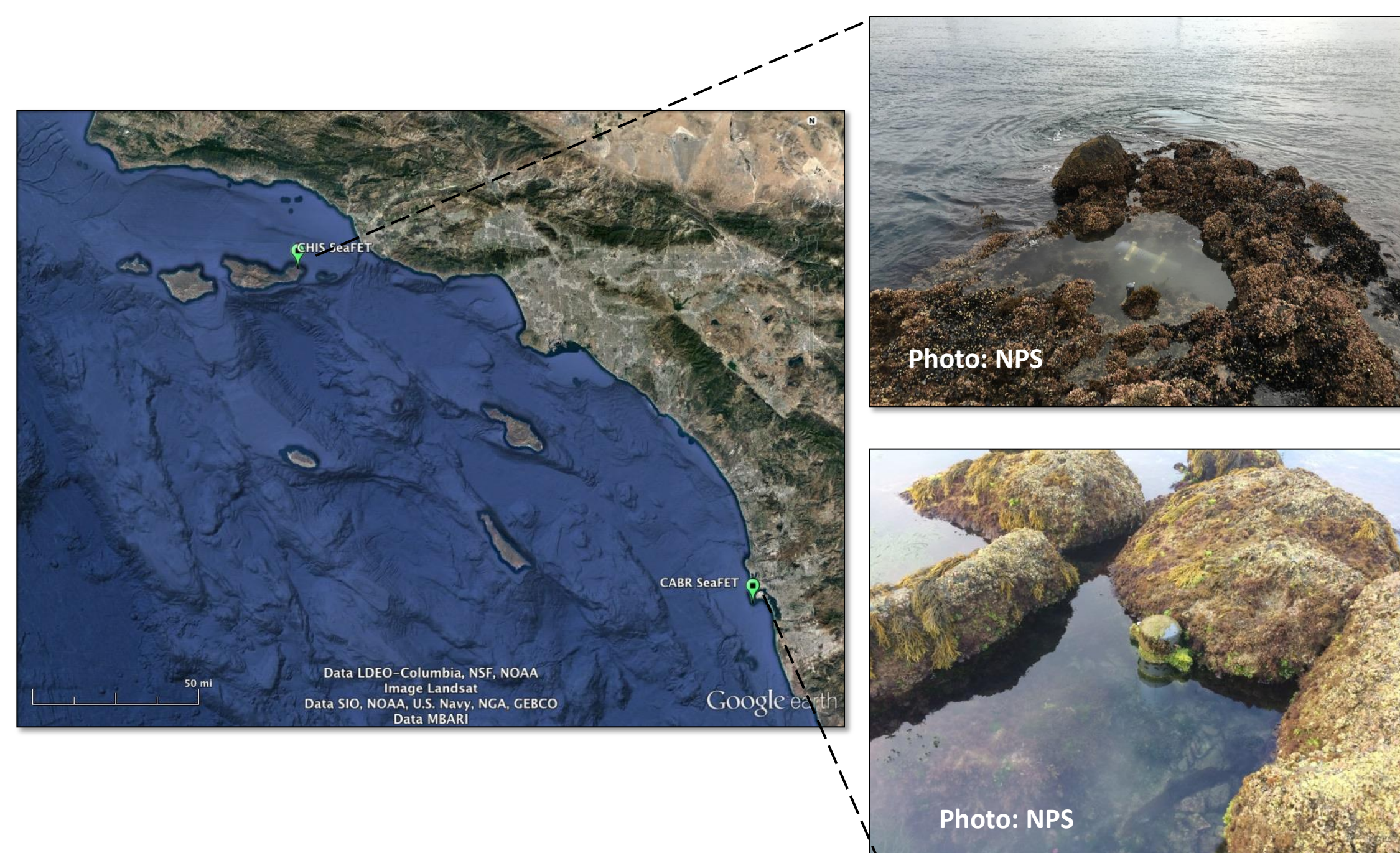
Methodology



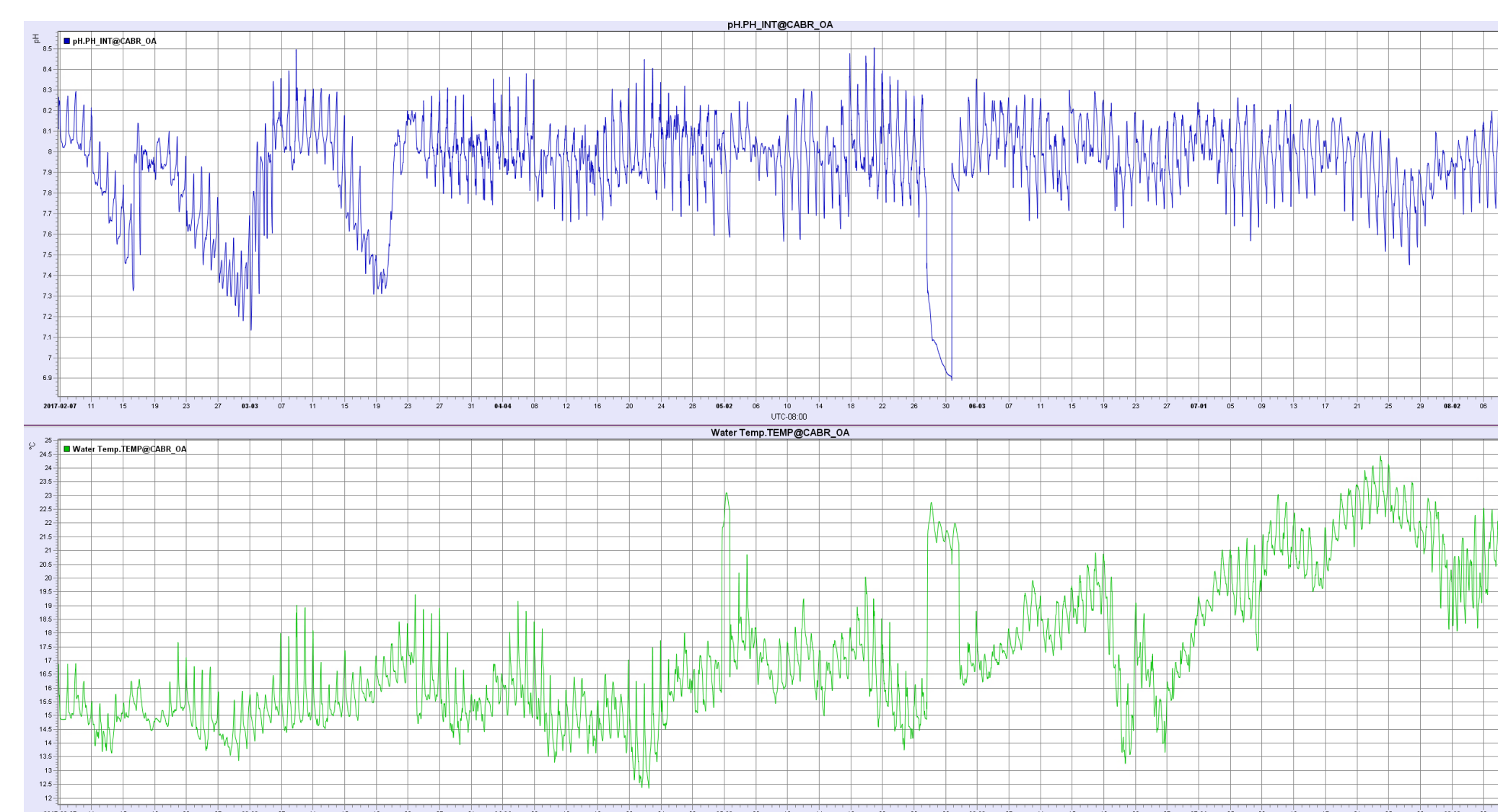
- All instruments run on a 30-minute interval and are swapped with a freshly calibrated instrument on a quarterly basis.
- Discrete bottle samples are taken at the beginning and end of deployment. Samples are fixed and analyzed for salinity, pH, and total alkalinity.
- Dissolved oxygen sensors are calibrated with a 'benchtop' 100% saturation procedure.

NPS OA Monitoring Network

Mediterranean Network



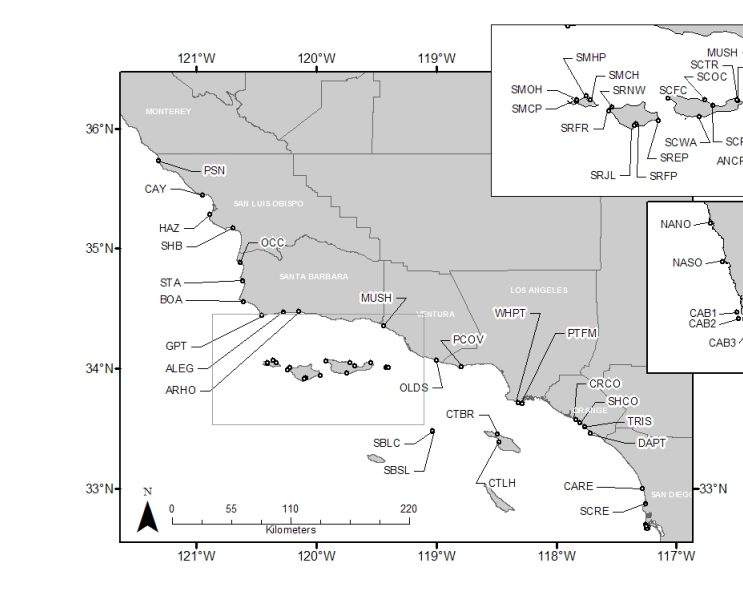
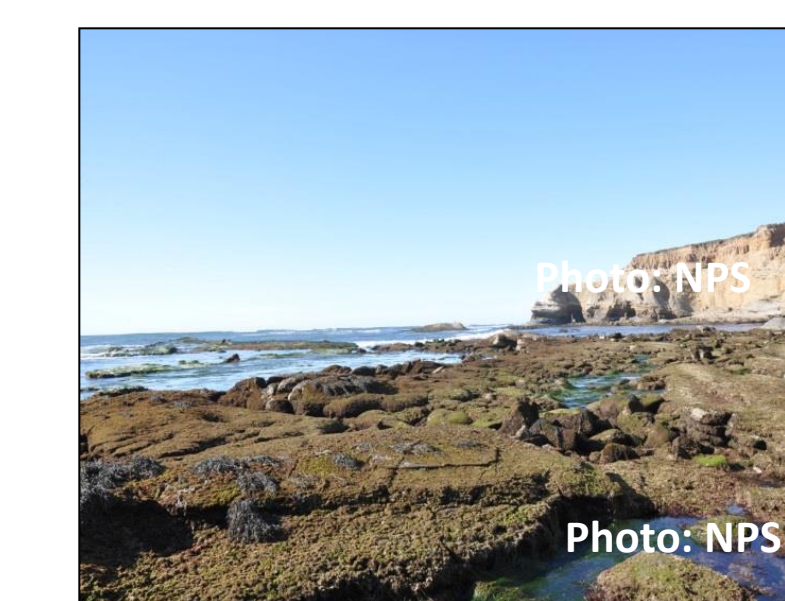
- In 2016, Cabrillo NM & Channel Islands NP installed SeaFET, DO and conductivity sensors & all were co-located in MARINE (pacificrockyintertidal.org) long-term monitoring plots.
- Monitoring design initiated and field tested at Olympic NP (2010-Present) and expanded to include San Juan NHP in 2015.



Above: Example of pH & temperature data (raw, uncorrected) from Cabrillo NM, San Diego (February to August 2017).

Future Directions

- Continue pH and temperature data collection at all existing intertidal sites.
- Assess and analyze previously collected data from all sites.
- Potential new sensor installations: Navy Base Point Loma, San Clemente Island and Redwoods National & State Parks.
- Continued biological data collection at MARINE sites across the western North American coast.



Collaborations

- The primary goal of the Southern California Research Learning Center is to connect the research community with National Park units and facilitate scientific collaborations.
- Areas of potential collaborations include linking intertidal pH and sub-tidal pH data, examining impact of pH changes on intertidal biology and ecology, and using community science data to support emerging management issues and research projects.

