National Park Service
U.S. Department of the Interior
San Francisco Bay Area Network
Inventory and Monitoring Program
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Coastal Biophysical Inventory of the San Francisco Bay Area Network (SFAN)

Importance: *The rocky intertidal zone has a tremendous diversity of plants and animals that are sensitive indicators of environmental change.*

The intertidal zone is a narrow band between land and sea that is bounded by high and low tides. Wave-swept rocky shores are rich in species that are sensitive to conditions such as salinity and temperature, making them good indicators of environmental shifts. Besides contributing to long-term intertidal monitoring along the Pacific coast by the Multi-Agency Rocky Intertidal Network (MARINe) and the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), the National Park Service (NPS) does rapid assessments of the intertidal zone in San Francisco Bay Area coastal parks, partly to help prepare for and respond to oil spills.



Ochre stars are among the many intertidal organisms that could be damaged by a chemical spill. (© Joseph Kinyon)

Inventory Methods: *NPS inventories intertidal zone species and their rocky habitat at Point Reyes National Seashore and Golden Gate National Recreation Area.*



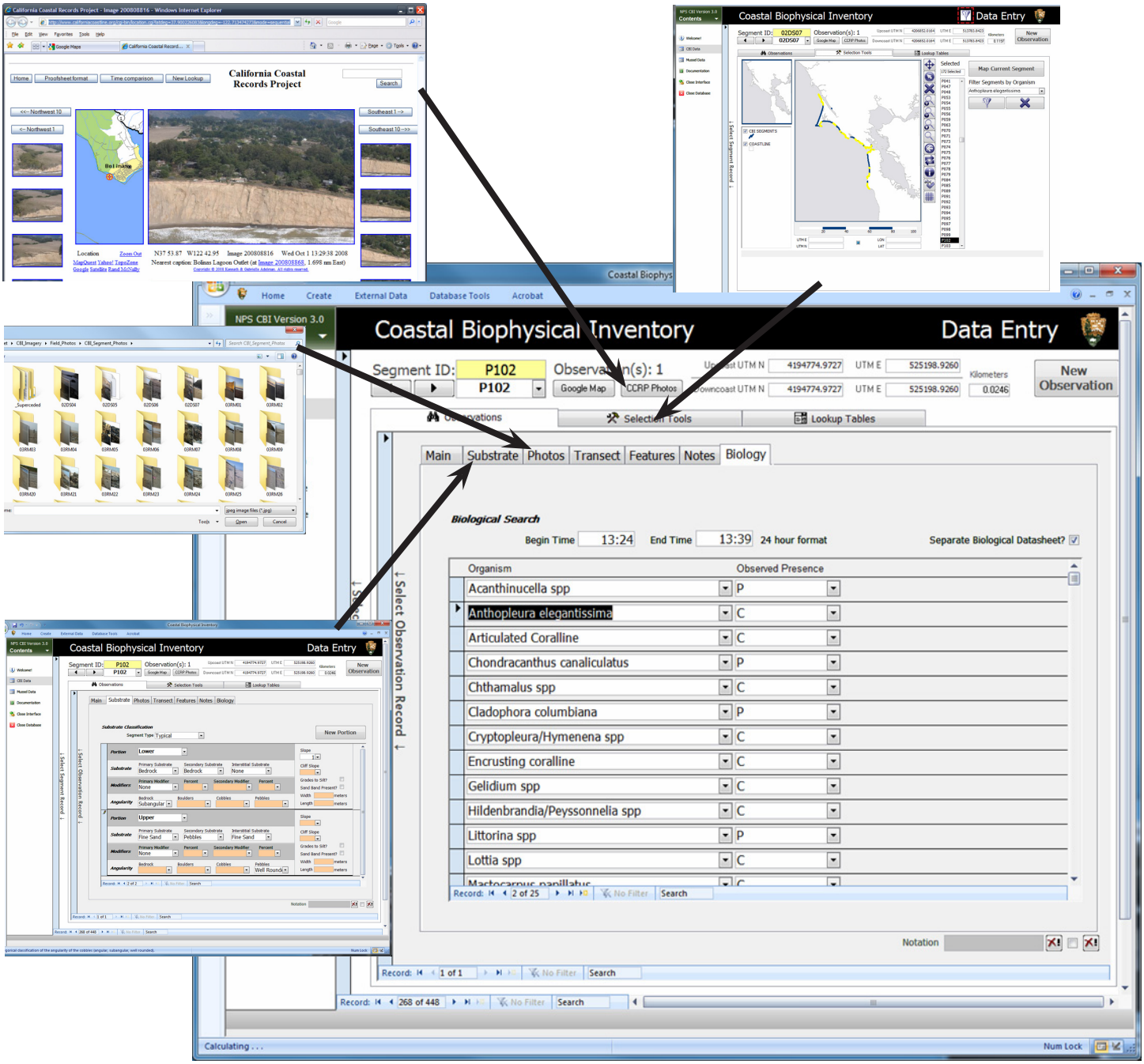
A biologist records baseline information about the biology and geology of the intertidal zone at Point Reyes

The Coastal Biophysical Inventory's rapid assessments yield quantitative snapshots of the geology and biology of a large shoreline. Coastal segments are categorized by rock type such as sandy beach or rocky shoreline, and surveyed for intertidal species such as algae, barnacles, mussels, sea anemones and sea stars. This information could help NPS staff survey key intertidal species more efficiently, assess areas damaged by oil spills and other catastrophes, and prioritize areas to protect, including animal breeding grounds and areas where oil collects. Estimating damage quickly is critical to securing emergency funds.

Status and Trends: *The baseline Coastal Biophsical Inventory and database are complete. This information was used to help assess the intertidal impact of the 2007 Cosco Busan oil spill in the San Francisco Bay.*

NPS staff and PISCO researchers inventoried 100 miles of coastline in Point Reyes and Golden Gate. They classified approximately 450 sections of coastline into coastal segments by rock type, and noted the presence of more 138 types of organisms. In coastline dominated by boulders or bedrock, they identified more than 75 different organisms in less than 10 minutes, including a variety of algae, kelp, barnacles, crabs, fish, limpets, mussels, sea anemones and seastars.

Keeping track of such a large amount of information requires a dedicated database where maps, photos, and data are linked, and where resource managers from multiple agencies can get information by location, organism, geology, or time (see below). The Coastal Biophsical Inventory was used to characterize the oiled shoreline after the Cosco Busan oil spill in November 2007, including the extent and abundance of intertidal plants and animals, as well as the degree of oil contamination. About 385 acres of rocky intertidal habit were exposed to oil, of which about 25 were moderately-to-heavily oiled while the rest were lightly-to -very lightly oiled. As of October 2009, there was no remaining discernable damage to most of the affected shoreline habitat.



Coastal Biophysical Inventory database users can see all inventoried coastal segments, and can select any segment to see ground-level and aerial images as well as detailed information about the habitat and the organisms living there. In the screen shot above, the yellow segments show where the aggregating anemone *Anthopleura elegantissima* was observed.

Additional Resources:

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