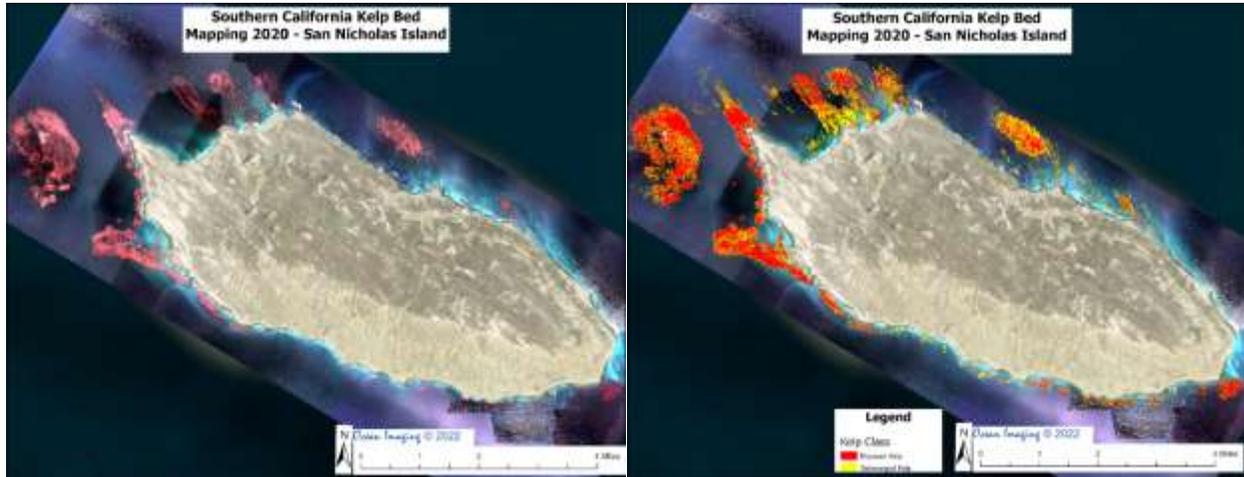


Ocean Imaging

June 2021 - Ocean Imaging Completes Latest Round of Projects to Map Kelp Off the Coast of California



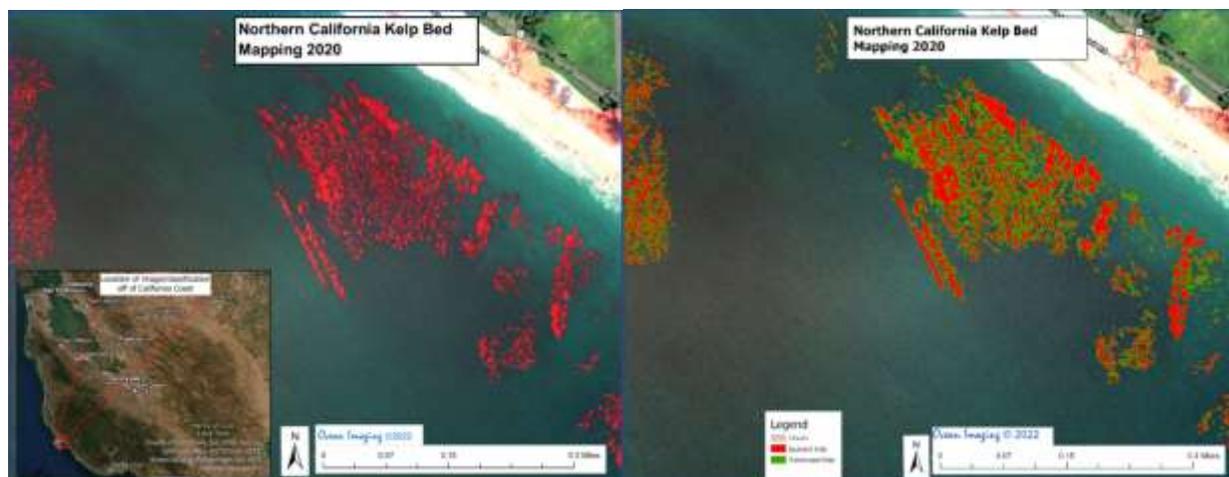
High-resolution multispectral imagery of San Nicolas Island and the surrounding *Macrocystis* kelp beds rendered using the red, green and near-infrared bands (left). The thematic map identifying the exposed (red) and submerged (yellow) kelp is shown on the right.. The map is in GIS format so the kelp bed coverage can be computed and compared from year to year.

Giant Kelp (*Macrocystis pyrifera*) and Bull Kelp (*Nereocystis*) forests along the west coast of North America and around the world are a valuable resource and provide a critical habitat and nursery grounds to hundreds of marine species such as seals, sea urchins, abalone, sea otters, octopuses as well as numerous fish species. These underwater oases are well known for their rich biodiversity and carbon storing capacity. These large brown algae can grow up to a foot a day but can also be nearly wiped out by a single storm. Recently kelp beds along the Northern California Coast have been in decline, but some have been making a comeback over the past year.

Ocean Imaging (OI) has been mapping kelp around the world since the late 1990s. Starting back in 2001, OI has continuously helped map and monitor the health of these important U.S. West Coast ecosystems for such organizations as NASA, the California Department of Fish and Wildlife, the Oregon Department of Fish and Wildlife, Sea Grant, The Nature Conservancy, the West Coast Ocean Alliance and the U.S. Navy. OI has also conducted research on developing algorithms to derive actual kelp biomass from aerial multispectral imagery in Alaska and Oregon. Additional research through NASA funding resulted in the first-ever worldwide map of kelp forests derived from satellite imagery.

Between January and June of 2021, OI completed the latest set of kelp mapping projects funded by West Coast Ocean Alliance, The Nature Conservancy and U.S. Navy to document kelp beds from Point Loma, San Diego, California to north of San Francisco. For the West Coast Ocean Alliance, OI utilized multispectral image data from several different satellite sensors to generate thematic maps of kelp canopy coverage for the Point Loma kelp bed.

Imagery from the Landsat series of satellites (Landsat 4, Landsat 5, Landsat 7 and Landsat 8), RapidEye and Sentinel 2 satellites were used to map the annual kelp presence from 1982-2020. For The Nature Conservancy and U.S. Navy, OI used high-resolution, multispectral aerial imagery to map kelp beds around San Nicolas Island and over 2,400 miles of coastline along Northern California for 2020. OI plans to continue to map these valuable habitats to monitor their prevalence and health for years to come.



A look at a kelp bed off the coast of California south of San Francisco. The multispectral imagery acquired in the fall of 2020 is rendered using the red, green and near-infrared bands (left). This band combination allows the exposed kelp to appear bright red. The thematic map identifying the exposed (red) and submerged (green) kelp is shown on the right.