4. What are the levels of human activities that may adversely influence living resource quality and how are they changing?

Table App.C.4.1. Data presented to the living resources experts at the workshop on June 1, 2016 to update status and trends assessments for Channel Islands National Marine Sanctuary (CINMS).
**Denotes graphs that were received after the expert workshops and were not available for experts to view during the status and trend workshop.

Indicator	Source	Figure #	Habitat	Data Summary
Spatial distribution fishing pressure	Pondella et al. 2015	App.C.4.1	Kelp forest (rocky reef)	Status: Fishing pressure highest at Anacapa, south side of Santa Cruz Island, and west side of San Miguel Island.
Recreational fishing (CPFV) activity and landings	Chen et al. 2015b	App.C.4.2	Sandy bottom, kelp forest, deep seafloor, pelagic	Trend: Activity levels and landings in 2011 and 2012 have returned to the levels seen in the early 2000s.
Commercial fishing landings	Leeworthy et al. 2014a	App.C.4.4	Sandy bottom, kelp forest, deep seafloor, pelagic	Trend: Decreasing landings: market squid, sardine, and anchovy; stable landings: sea urchin, spiny lobster, and prawn and shrimp; increasing landings: crabs.
Halibut landings and vessels	CDFW	App.C.4.5**	Sandy bottom, deep seafloor	Trend: No clear trend in landings of halibut or number of vessels landing halibut.
Commercial crab landings and participation levels	CDFW	App.C.4.6	Sandy bottom, deep seafloor	Trend: Commercial landings of rock crabs increasing since 2010; number of fisherman landing crab increasing since 2008.
Spatial distribution recreational activity	Chen et al. 2015c	App.C.4.7	Rock intertidal, sandy beach	Status: Islands experience a low level of recreational use compared to mainland.
Visitation at Frenchy's Cove	CINP	App.C.4.8	Rocky intertidal	Status: Low levels compared to mainland. Trend: Decreasing over available time series.
Rate of human-caused disturbance to seabirds	Robinette et al. 2015	App.C.4.9	Pelagic	Status: Low rate at Santa Cruz Island compared to mainland (may have missed disturbance from other activities like kayaking along coast and in sea caves).
Whale entanglement reports	NMFS WCRO PRD	App.C.4.10	Pelagic	Status: More reports of whale entanglement. Trend: Increasing from 2009 to 2015.
Whale entanglement risk	Saez et al. 2013	App.C.4.11	Pelagic	Status: July to December is a period of elevated risk of entanglement for multiple whale species in gear from set net and trap fisheries.
Amount and location of shipping traffic	MSWGSS 2016; Moore et al. 2018	App.C.4.12	Pelagic	Status: Location of highest shipping activity changes significantly among years 2008, 2010, 2013, and 2015.
Amount of ambient low frequency noise	J. Hildebrand, SIO UCSD, unpubl. data	App.C.4.13**	Pelagic	Status: Recent levels lower than the highest levels observed from 2007 to 2008 Trend: Decreased from 2008 to 2010, increased from 2010 to 2013, and stable from 2013 to 2015.
Marine debris abundance	Ribic et al. 2012	App.C.4.14	Beach	Status: abundance of marine debris on mainland beaches lower than earlier (1999-2001). Trend: stable 2003-07, no recent data available.
Marine debris abundance and	Gilfillan et al. 2009	App.C.4.15, App.C4.16	Pelagic	Status: Micro-debris in more than 50 percent of samples, no relationship between particle

location				density and distance from shore. Trend: Stable from 1984 to 2007, no recent data available.
Oil and gas production	NMFS NWFSC	App.C.4.17	Pelagic	Status: Lower level of activity than in 1980s and 1990s. Trend: Steady decline since mid-1990s, stable in last five years.
Research permit activity	CDFW	App.C.4.18	Rocky intertidal, kelp forest, deep seafloor, pelagic	Status: Most permits issued research in kelp forest, rocky intertidal, and pelagic habitats. Trend: Decline in number of research permits issued by CDFW from 2010 to 2016.

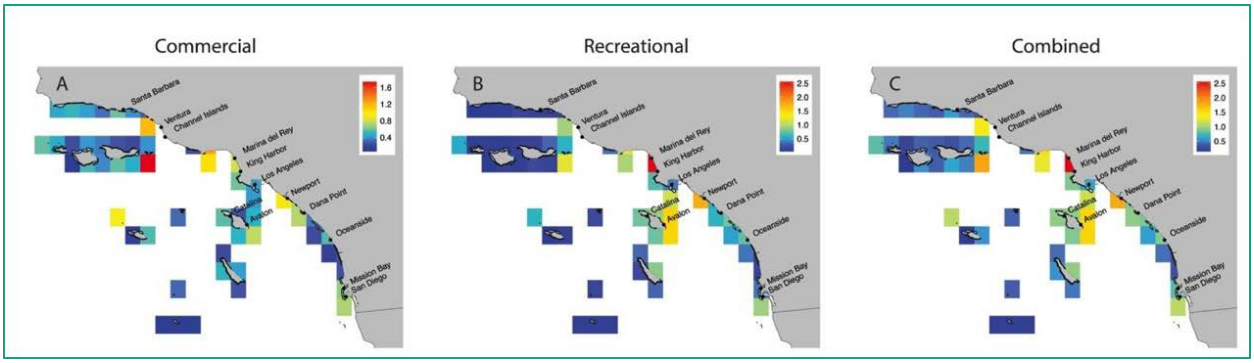

Figure App.C.4.1. Spatial distribution of the fishing pressure index on shallow rocky reef for (A) commercial, (B) recreational Commercial Passenger Fishing Vessels (CPFVs), and (C) the combined fisheries for years 1980 to 2009. The fishing pressure index was calculated as tons per year harvest rates per amount of reef area in each block (MT/yr/km^2). The colors indicate areas with high (red) versus low (blue) fishing harvest rates per square kilometer reef area. Only data for CDFW fishing blocks that contain shallow (< 30 meters depth) rocky reefs are shown. Figure: Pondella et al. 2016