MLPA Master Plan Science Advisory Team

Outputs from Bioeconomic Model Evaluations of MLPA Blue Ribbon Task Force's Recommended Marine Protected Area Proposals: Deletion Analysis

January 7, 2011 DRAFT

Table 3. Deletion Analysis. This table shows the biomass increase and biomass increase per area derived from the UC Santa Barbara (UCSB) bioeconomic model for each marine protected area (MPA) in proposals recommended by the Marine Life Protection Act (MLPA) Blue Ribbon Task Force for the north coast study region, including the Revised Round 3 North Coast Regional Stakeholder Group MPA Proposal (RNCP) and the North Coast Enhanced Compliance Alternative MPA Proposal (ECA). To explore a range of assumptions, the UCSB model runs this analysis with two management scenarios: maximum sustainable yield (MSY)-type and unsuccessful management outside of the MPAs. The ***biomass increase*** is the contribution of an individual proposed MPA to the overall biomass in the external MPA array, expressed as a percentage of the equilibrium biomass with the full proposed MPA array. A biomass increase of 1 indicates that the MPA is contributing 1% to the overall biomass in the study region (for example, allowing fishing within that MPA would reduce biomass by 1%). ***Biomass increase per area*** is the contribution of an individual proposed MPA to the overall biomass in the external MPA array, accounting for the area of the MPA. This is calculated as the percent increase in biomass per square kilometer of habitat protected. For both metrics, negative numbers indicate that the MPA is reducing equilibrium biomass. Negative numbers are rare but can occur when opening an MPA draws fishing effort away from other, more productive, locations. For deletion analysis, the Master Plan Science Advisory Team (SAT) modeled populations of six species: Black rockfish, brown rockfish, cabezon, redtail surfperch, red abalone, and red sea urchin. Biomass increase and biomass increase per area are averaged across these species.

MPA Proposal	MPA Name	Biomass increase for MSY-type management	Biomass increase per area for MSY-type management	Biomass increase for unsuccessful management	Biomass increase per area for unsuccessful management
RNCP	Big Flat SMCA	0.0904	0.0887	1.015	0.995
RNCP	Mattole Canyon SMR	0.659	0.4526	5.0726	3.4839
RNCP	Point Cabrillo SMR	0.3949	0.6984	1.3066	2.311
RNCP	Point St. George Reef Offshore SMCA	0.1135	0.2982	0.3821	1.0042
RNCP	Pyramid Point SMCA	0	0	0	0
RNCP	Reading Rock SMCA	0	0	0	0
RNCP	Reading Rock SMR	0.6839	1.4455	4.2172	8.9132
RNCP	Samoa SMCA	0	0	0	0
RNCP	Sea Lion Gulch SMR	1.776	0.3089	10.2443	1.7816
RNCP	South Cape Mendocino SMR	0.8359	0.123	4.4719	0.6581
RNCP	Ten Mile Beach SMCA	0	0	0	0
RNCP	Ten Mile SMR	1.6606	0.5384	6.6447	2.1544
RNCP	Vizcaino SMCA	0	0	0	0
ECA	Big Flat Nearshore SMCA	0.0089	0.0427	0.1289	0.621

MPA Proposal	MPA Name	Biomass increase for MSY-type management	Biomass increase per area for MSY-type management	Biomass increase for unsuccessful management	Biomass increase per area for unsuccessful management
ECA	Big Flat Offshore SMCA	0.1109	0.1238	1.3112	1.4636
ECA	Mattole Canyon SMR	0.6479	0.445	4.468	3.0687
ECA	Point Cabrillo SMR	0.3879	0.6861	1.1853	2.0964
ECA	Point St. George Reef Offshore SMCA	0.113	0.2971	0.3145	0.8266
ECA	Pyramid Point Nearshore SMCA	0	0	0	0
ECA	Pyramid Point Offshore SMCA	1.1813	0.1718	5.2171	0.7588
ECA	Reading Rock SMCA	0.5732	0.1829	6.0754	1.9391
ECA	Reading Rock SMR	0.6828	1.4431	4.7332	10.0038
ECA	Samoa Nearshore SMCA	0	0	0	0
ECA	Samoa Offshore SMCA	0.2603	0.1073	1.4845	0.6123
ECA	Sea Lion Gulch SMR	1.7612	0.3063	9.0795	1.5791
ECA	Skip Wollenberg / Ten Mile SMCA	0	0	0	0
ECA	Skip Wollenberg / Ten Mile SMR	1.6557	0.5368	5.9476	1.9284
ECA	South Cape Mendocino SMR	0.8403	0.1237	4.0203	0.5916
ECA	Vizcaino Nearshore SMCA	0	0	0	0
ECA	Vizcaino Offshore SMCA	1.2262	0.4105	5.1166	1.7127