California MLPA Master Plan Science Advisory Team

Report to the California Fish and Game Commission: Bioeconomic Model Evaluations of Revised Third Round SCRSG MPA Proposals and MLPA Integrated Preferred Alternative Marine Protected Area Proposal for South Coast Study Region

December 8, 2009

Overview of Modeling Approach

Bioeconomic model analyses of the revised Round 3 marine protected area (MPA) proposals developed by the South Coast Regional Stakeholder Group (SCRSG) and the MLPA South Coast Integrated Preferred Alternative MPA Proposal (IPA) were performed by the UC Davis (UCD) and UC Santa Barbara (UCSB) modeling research groups. A description of each of the models, the inputs, outputs and assumptions, and the differences between the two models can be found in “Draft Methods Used to Evaluate Marine Protected Area Proposals in the MLPA South Coast Study Region” [Chapter 8 and Appendix B]. Briefly, each group simulated population dynamics and calculated long-term equilibrium estimates of conservation value (i.e., biomass) and economic value (i.e., fishery yield and/or profit) for each MPA proposal (including Proposal 0, the existing MPAs) and each of eight species (ocean whitefish, black surfperch, opaleye, kelp bass, kelp rockfish, California sheephead, California halibut, and red sea urchin) under three different future fishery management scenarios (unsuccessful management, Maximum Sustainable Yield (MSY)-type management and conservative management). As in rounds 2 and 3, both modeling research groups conducted evaluations using both the original fishing fleet model, in which fishers go to patches where they can catch the most fish, and a revised fleet model, which also accounts for the distance from port, reducing fishing in remote patches. Primary evaluation results are reported only for the original model to maintain consistency with previous evaluations, but key differences observed in the results obtained from the revised fleet model are also noted when applicable.

Detailed, spatially explicit model outputs, including maps for each response variable and sub-regional summaries of key statistics for each species, proposal, and management scenario are available online (http://www.dfg.ca.gov/mlpa/). Here, we report overall results only, focusing on the mean (averaged across all species) conservation value and economic value for each proposal under each management scenario.

Key Findings

Results of the evaluations followed the same general trends exhibited in the previous rounds: In the “unsuccessful management” scenario, there is a positive correlation between the conservation value (biomass) and economic value (fishery yield) of each MPA proposal. By contrast, in the “MSY-type management” and “conservative management” scenarios, there were negative correlations between conservation value and economic value, so proposals with high conservation value had lower economic value. These patterns were consistent across both models, using both the original fleet model and the revised fleet model. In round 2, the UCSB revised fleet model results exhibited a slightly different pattern for the unsuccessful management scenario, in which the correlation between conservation and economic value

switched from positive to somewhat negative. This pattern also emerged to some extent in the round 3 results, but did not affect proposal rankings as dramatically as in the round 2 results.

The overall rankings generally followed these patterns (where > indicates values “greater than”, and the names of each revised SCRSG proposal from Round 3 are abbreviated as "P1R", "P2R", and "P3R", the no-action alternative is "P0" and the MLPA South Coast Integrated Preferred Alternative MPA Proposal is "IPA"; bracketed terms are nearly equal):

Conservation Value: P3R > P1R > IPA > P2R > P0

Economic Value (Unsuccessful Management – except UCSB model with the revised fleet model): P3R > [P1R, IPA] > P2R > P0

Economic Value (Unsuccessful Management – UCSB model with revised fleet model): P3R > IPA > P0 > P2R > P1R

Economic Value (MSY-type Management or Conservative Management): P0 > P2R > IPA > P1R > P3R

These overall rankings reflect the general trend that proposals with greater total area in MPAs had higher conservation value in all scenarios and greater economic value with unsuccessful fishery management, but lower economic value with effective management. Thus, for the two more conservative management scenarios (MSY-type management and conservative management), there is a tradeoff between improving conservation value and maintaining fishery yield. This arises because in those scenarios, yield typically would be highest if there were no new MPAs relative to P0. By contrast, if fishery management is unsuccessful, overall yield is predicted to be quite low, even with the existing MPAs in P0, and there is no tradeoff between economic and conservation value in that scenario.

It also is important to note that the difference between MPA proposals in either economic or conservation value within a given management scenario is dwarfed by the differences among the future fishery management scenarios. For example, there is a difference of 8 percent between the projected conservation value of P3R and P0 (the highest and lowest biomass production, respectively) under unsuccessful management in the UCD original fleet model, but a difference of 52 percent between the projected conservation value of P3R under unsuccessful fishery management and conservative fishery management relative to P0. Thus, future management success will have a strong bearing on the performance of any MPA network.

How can proposals be improved to increase conservation value and fishery yield?

There were tight correlations (both negative and positive) between overall economic value and conservation value across all three management scenarios in both models. In other words, the results from the bioeconomic modeling evaluation of revised SCRSG proposals fall along a

relatively straight line for each management scenario, indicating that there is a direct relationship between economic and conservation value. Moreover, the results for revised proposals from round 3, the IPA, and rounds 1 and 2 all fall along the same relatively straight lines for each management scenario. This result reflects the fundamental similarity across the proposals in terms of MPA placement (i.e., most proposals have MPAs in similar locations). The differences in proposal performance (their location along the line) appear to reflect differences in the relative sizes and levels of protection of the MPAs in those locations. For example, under MSY-type management a proposal which protects large amounts of habitat will tend fall along one end of the line (i.e., with higher fish biomass and lower fishery yield), while a proposal with less habitat protected will tend to fall along the opposite end of the continuum (i.e., with lower fish biomass and greater potential fishery yield).

While the results of the bioeconomic modeling evaluations tend to fall more-or-less along a straight line that indicates a direct relationship between biomass and fishery production, they are not constrained to lie *exactly* on the line, and it is possible to identify proposals that fall either above (i.e., better performance) or below (i.e., worse performance) the line defined by the full suite of proposals from all rounds. For example, P1R, P2R, and the IPA fall slightly below the line defined by the other proposals from rounds 1 and 2, indicating that they afford slightly lower economic value for a given level of conservation value. This result is most noticeable in the UCD results for MSY-type management and the UCSB results for unsuccessful management. By contrast, P3R tends to fall directly on the line, indicating that it is no better or worse than other proposals providing a similar level of either conservation or economic return.

Both the UCSB and UCD models produce information about each MPA in each proposal. The information may be used to evaluate whether a particular MPA is attaining a desired level of biomass production (or supporting a desired level of fishery yield nearby). The models also produce two sets of maps showing predicted changes in larval supply under each proposal. The first type of map shows the change in larval supply to each location (as a percentage of larval supply predicted for Proposal 0). The second type of map shows the change in larval production at each location; that is, which locations produce higher numbers of larvae that successfully settle to downstream locations (again, expressed as a percentage of larval production under Proposal 0). Together, these maps can reveal which MPAs are particularly successful in improving connectivity with the MPA network, and which locations are predicted to benefit most from increased larval production inside MPAs. Diagrams of larval connectivity for each species (available online) can be used to determine sources that likely supply locations that appear to be undersupplied on the maps of larval supply. Increasing the size of MPAs in source areas (or adjusting their boundaries to include more of the suitable habitat type) could improve larval supply to the 'downstream' locations, improving the performance of MPA proposals.

Additionally, both modeling groups undertake a deletion analysis, in which each MPA in a proposal is sequentially removed, one-at-a-time, and conservation value is recalculated. The difference between the biomass *with* and *without* a given MPA is an indication of that MPA's relative ***contribution*** to the MPA network. When this difference is divided by the amount of habitat protected by the MPA, it gives a measure of that MPA's ***efficiency*** in achieving

conservation goals. Comparing these “deletion” statistics from MPAs in similar locations across the proposals should reveal whether changing the size, shape, or level of protection in a given MPA could improve its performance and thus its contribution to the network. In particular, high efficiencies indicate areas where protecting an additional unit of habitat is likely to cause relatively large increases in biomass.

Given the general similarities of the three revised Round 3 MPA proposals and the IPA, there are not large differences in the larval production/larval supply and contribution/efficiency results from the deletion analysis. For example, the model results for MPAs in the Point Dume area were quite similar across proposals. However, a few key results are notable. In reviewing these results, keep in mind that results from UCSB and UCD are qualitatively very similar, but that the UCD results typically exhibit larger differences among MPAs because they were generated with a higher fishing rate (unsuccessful management, versus MSY-type management for the larval production and deletion analysis statistics from UCSB). Additionally, the pending Military Closures on San Clemente Island are essentially identical across proposals and always have very high values for contribution. Thus, it is instructive to compare deletion values across proposals in terms of their value relative to the pending Military Closures.

In P1R, most MPAs exhibit similar larval production for all species, except for the Ocean Beach and Palos Verdes SMRs, which have relatively low larval production for California halibut. However, the deletion analysis suggests that the Palos Verdes SMR is one of the most valuable MPAs in the proposal, and that the Laguna, Long Point, and Blue Cavern SMRs all had high efficiency.

In P2R, the Palos Verdes and Laguna SMRs covered relatively little habitat for the modeled species and thus had small increases in larval production. The Point Dume SMCA and Sunset Cliffs SMR had the highest value in this proposal, but no MPA had especially high efficiency except for Blue Cavern SMR.

In contrast to the other proposals, P3R had several additional MPAs in other locations and slightly different configuration for some MPAs in locations shared with P1R and P2R. In particular, the Palos Verdes SMR in P3R had higher larval production and contribution (and, in the UCSB model, high efficiency) to the network than the equivalent MPA in the other two proposals. The Mishopsno SMCA and pending San Nicolas Military Closure, not appearing in the other proposals, also stood out as having high contributions, while the Laguna SMR had larval production similar to that in P1R. Overall P3R had higher contribution values relative to the two pending military closures at San Clemente Island than the other proposals.

In the IPA, the Laguna and Ocean Beach SMRs had high contribution, and the Laguna SMR had relatively high efficiency. By contrast, the IPA Palos Verdes SMR had relatively poor performance relative to the MPA in that area in P1R and P3R. Most other MPAs in the IPA performed similarly to their analogues in the other proposals; for example, the Point Dume SMR and Swami's SMCA had larval production and contribution values similar to those of the same MPAs in P3R.

This broad summary of the deletion and larval production/larval supply results is not comprehensive, and careful examination of the maps and tables (available online) can provide additional information on MPAs not mentioned here. In general, MPA configurations that exhibit high values for larval production and network contribution are likely to contribute more to the conservation goals of the Marine Life Protection Act.

Conclusion

There is a clear and consistent ranking in expected conservation value across the three revised Round 3 MPA proposals developed by the SCRSG, with P3R giving the highest expected conservation value under all management scenarios for both models. The ranking for expected economic value is not as consistent; it depends on the success of future conventional management efforts and on the future cost of travel to distant fishing grounds. However, the general result is that P2R had the highest expected economic value unless management is unsuccessful outside of the MPAs, in which case P3R had the highest expected economic value. P1R and the IPA tended to exhibit intermediate levels of both conservation and economic value, regardless of future management.

California MLPA Master Plan Science Advisory Team
Outputs from Bioeconomic Model Evaluation of Revised SCRSG MPA Proposals and MLPA South Coast IPA: Biomass
December 7, 2009

Bioeconomic Model Evaluations Table 1. Biomass predicted for each of eight species for evaluations of revised South Coast Regional Stakeholder (SCRSG) marine protected area (MPA) proposals (P1R, P2R, P3R) and the Marine Life Protection Act (MLPA) South Coast Integrated Preferred Alternative (IPA) using UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. The total biomass of each species is estimated at equilibrium for each square kilometer of the study region. Values are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Biomass is predicted for the entire MLPA South Coast Study Region (SCSR) and several subregions: (1) South mainland (SM): Mexico to Long Beach, (2) North Mainland (NM): Long Beach to Point Conception, (3) North Channel Islands (NCI): San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands, and (4) South Channel Islands (SCI): Santa Barbara, Santa Catalina, San Clemente, and San Nicolas islands.

Table 1a. Biomass estimated from UC Santa Barbara model

Species	MPA Array	Biomass SCSR Total	Biomass South Mainland	Biomass North Mainland	Biomass North Channel Islands	Biomass South Channel Islands
Ocean Whitefish	P0	0.39	0.44	0.40	0.47	0.31
Ocean Whitefish	P1R	0.41	0.46	0.42	0.47	0.35
Ocean Whitefish	P2R	0.41	0.45	0.42	0.47	0.35
Ocean Whitefish	P3R	0.43	0.46	0.45	0.47	0.37
Ocean Whitefish	IPA	0.41	0.46	0.42	0.47	0.35
Black Surfperch	P0	0.45	0.36	0.50	0.54	0.41
Black Surfperch	P1R	0.49	0.54	0.51	0.51	0.41
Black Surfperch	P2R	0.47	0.43	0.52	0.53	0.43
Black Surfperch	P3R	0.51	0.48	0.55	0.50	0.50
Black Surfperch	IPA	0.48	0.48	0.51	0.52	0.42
Opaleye	P0	0.42	0.48	0.49	0.50	0.32
Opaleye	P1R	0.45	0.51	0.53	0.52	0.36
Opaleye	P2R	0.45	0.51	0.52	0.52	0.36
Opaleye	P3R	0.48	0.53	0.55	0.53	0.40
Opaleye	IPA	0.45	0.51	0.52	0.52	0.36
Kelp Bass	P0	0.41	0.47	0.45	0.50	0.32
Kelp Bass	P1R	0.44	0.51	0.50	0.51	0.37
Kelp Bass	P2R	0.43	0.49	0.48	0.50	0.36
Kelp Bass	P3R	0.47	0.51	0.53	0.51	0.41
Kelp Bass	IPA	0.44	0.50	0.49	0.50	0.37

Species	MPA Array	Biomass SCSR Total	Biomass South Mainland	Biomass North Mainland	Biomass North Channel Islands	Biomass South Channel Islands
Kelp Rockfish	P0	0.37	0.47	0.42	0.43	0.26
Kelp Rockfish	P1R	0.39	0.50	0.46	0.43	0.30
Kelp Rockfish	P2R	0.39	0.49	0.44	0.43	0.30
Kelp Rockfish	P3R	0.43	0.52	0.50	0.44	0.35
Kelp Rockfish	IPA	0.39	0.49	0.46	0.43	0.30
Sheephead	P0	0.41	0.48	0.44	0.48	0.33
Sheephead	P1R	0.44	0.51	0.48	0.48	0.36
Sheephead	P2R	0.44	0.50	0.47	0.48	0.36
Sheephead	P3R	0.47	0.51	0.53	0.49	0.40
Sheephead	IPA	0.44	0.50	0.48	0.48	0.36
Red Sea Urchin	P0	0.49	0.48	0.43	0.53	0.50
Red Sea Urchin	P1R	0.51	0.49	0.47	0.54	0.53
Red Sea Urchin	P2R	0.51	0.48	0.46	0.53	0.52
Red Sea Urchin	P3R	0.53	0.49	0.50	0.55	0.56
Red Sea Urchin	IPA	0.51	0.49	0.46	0.54	0.52
Halibut	P0	0.45	0.45	0.38	0.52	0.63
Halibut	P1R	0.45	0.47	0.39	0.51	0.64
Halibut	P2R	0.45	0.46	0.39	0.51	0.63
Halibut	P3R	0.47	0.46	0.42	0.51	0.66
Halibut	IPA	0.45	0.46	0.39	0.51	0.64

Table 1b. Biomass estimated from UC Davis model

Species	MPA Array	Biomass SCSR Total	Biomass South Mainland	Biomass North Mainland	Biomass North Channel Islands	Biomass South Channel Islands
Ocean Whitefish	P0	0.40	0.40	0.42	0.44	0.35
Ocean Whitefish	P1R	0.42	0.43	0.44	0.45	0.38
Ocean Whitefish	P2R	0.42	0.42	0.44	0.45	0.38
Ocean Whitefish	P3R	0.44	0.43	0.47	0.47	0.41
Ocean Whitefish	IPA	0.42	0.42	0.44	0.45	0.38
Black Surfperch	P0	0.43	0.36	0.44	0.52	0.38
Black Surfperch	P1R	0.48	0.56	0.48	0.49	0.40
Black Surfperch	P2R	0.46	0.46	0.46	0.50	0.41
Black Surfperch	P3R	0.50	0.49	0.51	0.47	0.51
Black Surfperch	IPA	0.46	0.50	0.46	0.49	0.41

Species	MPA Array	Biomass SCSR Total	Biomass South Mainland	Biomass North Mainland	Biomass North Channel Islands	Biomass South Channel Islands
Opaleye	P0	0.34	0.36	0.35	0.39	0.30
Opaleye	P1R	0.37	0.40	0.39	0.40	0.34
Opaleye	P2R	0.37	0.39	0.38	0.40	0.34
Opaleye	P3R	0.41	0.42	0.44	0.43	0.39
Opaleye	IPA	0.37	0.39	0.39	0.40	0.35
Kelp Bass	P0	0.41	0.41	0.41	0.47	0.37
Kelp Bass	P1R	0.45	0.47	0.46	0.49	0.43
Kelp Bass	P2R	0.44	0.45	0.45	0.48	0.42
Kelp Bass	P3R	0.49	0.49	0.52	0.51	0.47
Kelp Bass	IPA	0.45	0.46	0.46	0.49	0.42
Kelp Rockfish	P0	0.21	0.23	0.22	0.25	0.18
Kelp Rockfish	P1R	0.21	0.25	0.22	0.23	0.18
Kelp Rockfish	P2R	0.21	0.24	0.22	0.23	0.18
Kelp Rockfish	P3R	0.23	0.25	0.25	0.23	0.20
Kelp Rockfish	IPA	0.21	0.24	0.22	0.23	0.18
Sheephead	P0	0.38	0.38	0.38	0.43	0.34
Sheephead	P1R	0.43	0.46	0.44	0.45	0.39
Sheephead	P2R	0.42	0.43	0.42	0.45	0.38
Sheephead	P3R	0.46	0.46	0.49	0.47	0.44
Sheephead	IPA	0.42	0.44	0.43	0.45	0.39
Red Sea Urchin	P0	0.62	0.65	0.59	0.66	0.59
Red Sea Urchin	P1R	0.64	0.67	0.63	0.66	0.62
Red Sea Urchin	P2R	0.63	0.66	0.61	0.66	0.62
Red Sea Urchin	P3R	0.66	0.67	0.66	0.66	0.64
Red Sea Urchin	IPA	0.64	0.66	0.62	0.66	0.62
Halibut	P0	0.21	0.18	0.19	0.28	0.33
Halibut	P1R	0.20	0.18	0.18	0.26	0.32
Halibut	P2R	0.20	0.17	0.18	0.26	0.32
Halibut	P3R	0.21	0.17	0.20	0.26	0.34
Halibut	IPA	0.20	0.17	0.18	0.26	0.32

California MLPA Master Plan Science Advisory Team

Outputs from Bioeconomic Model Evaluation of Revised SCRSG MPA Proposals and MLPA South Coast IPA: Fishery Yield

December 7, 2009

Bioeconomic Model Evaluations Table 2. Fishery yield predicted for each of eight species for evaluations of revised South Coast Regional Stakeholder (SCRSG) marine protected area (MPA) proposals (P1R, P2R, P3R) and the Marine Life Protection Act (MLPA) South Coast Integrated Preferred Alternative (IPA) using UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Fishery yield is the total harvest of each species in each square kilometer. Fishery yield is predicted for the entire MLPA South Coast Study Region (SCSR) and several subregions: (1) South mainland (SM): Mexico to Long Beach, (2) North Mainland (NM): Long Beach to Point Conception, (3) North Channel Islands (NCI): San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands, and (4) South Channel Islands (SCI): Santa Barbara, Santa Catalina, San Clemente, and San Nicolas islands.

Table 2a. Fishery yield estimated from UC Santa Barbara model

Species	MPA Array	Yield - SCSR Total	Yield - South Mainland	Yield - North Mainland	Yield - North Channel Islands	Yield – South Channel Islands
Ocean Whitefish	P0	1.00	1.00	1.00	1.00	1.00
Ocean Whitefish	P1R	0.98	0.97	0.92	0.97	1.10
Ocean Whitefish	P2R	0.98	0.96	0.92	0.99	1.08
Ocean Whitefish	P3R	0.97	0.88	0.89	1.06	1.18
Ocean Whitefish	IPA	0.98	0.96	0.92	1.00	1.09
Black Surfperch	P0	1.00	1.00	1.00	1.00	1.00
Black Surfperch	P1R	0.88	0.92	0.92	0.65	0.99
Black Surfperch	P2R	0.92	0.92	0.92	0.80	0.99
Black Surfperch	P3R	0.84	0.82	0.78	0.72	0.98
Black Surfperch	IPA	0.91	0.92	0.92	0.74	0.99
Opaleye	P0	1.00	1.00	1.00	1.00	1.00
Opaleye	P1R	1.01	0.89	1.00	0.89	1.13
Opaleye	P2R	1.01	0.96	1.00	0.98	1.10
Opaleye	P3R	1.01	0.90	0.93	1.11	1.30
Opaleye	IPA	1.01	0.90	1.00	0.99	1.13
Kelp Bass	P0	1.00	1.00	1.00	1.00	1.00
Kelp Bass	P1R	0.98	0.94	0.95	0.87	1.11
Kelp Bass	P2R	0.98	0.95	0.96	0.92	1.08
Kelp Bass	P3R	0.95	0.84	0.87	1.01	1.22
Kelp Bass	IPA	0.98	0.91	0.95	0.93	1.10
Kelp Rockfish	P0	1.00	1.00	1.00	1.00	1.00
Kelp Rockfish	P1R	0.98	0.89	0.97	0.87	1.04
Kelp Rockfish	P2R	0.99	0.95	0.96	0.95	1.03
Kelp Rockfish	P3R	0.98	0.86	0.90	1.02	1.15
Kelp Rockfish	IPA	0.99	0.90	0.96	0.94	1.04

Species	MPA Array	Yield - SCSR Total	Yield - South Mainland	Yield - North Mainland	Yield - North Channel Islands	Yield – South Channel Islands
Sheephead	P0	1.00	1.00	1.00	1.00	1.00
Sheephead	P1R	0.98	0.93	0.95	0.83	1.10
Sheephead	P2R	0.98	0.92	0.96	0.92	1.07
Sheephead	P3R	0.96	0.80	0.89	1.00	1.21
Sheephead	IPA	0.98	0.90	0.95	0.92	1.09
Red Sea Urchin	P0	1.00	1.00	1.00	1.00	1.00
Red Sea Urchin	P1R	0.96	0.89	0.93	0.97	1.05
Red Sea Urchin	P2R	0.97	0.91	0.95	1.02	1.03
Red Sea Urchin	P3R	0.93	0.82	0.85	1.04	1.09
Red Sea Urchin	IPA	0.96	0.90	0.94	1.01	1.04
Halibut	P0	1.00	1.00	1.00	1.00	1.00
Halibut	P1R	0.98	0.97	0.95	0.98	1.01
Halibut	P2R	0.98	0.96	1.00	0.99	1.01
Halibut	P3R	0.96	0.91	0.89	0.97	1.05
Halibut	IPA	0.98	0.95	0.96	0.98	1.01

Table 2b. Fishery yield estimated from UC Davis model

Species	MPA Array	Yield - SCSR Total	Yield - South Mainland	Yield - North Mainland	Yield - North Channel Islands	Yield - South Channel Islands
Ocean Whitefish	P0	1.00	1.00	1.00	1.00	1.00
Ocean Whitefish	P1R	1.02	1.08	0.99	0.97	0.95
Ocean Whitefish	P2R	1.02	1.07	0.99	0.97	0.95
Ocean Whitefish	P3R	1.10	1.14	0.99	0.89	0.93
Ocean Whitefish	IPA	1.03	1.08	0.99	0.96	0.95
Black Surfperch	P0	1.00	1.00	1.00	1.00	1.00
Black Surfperch	P1R	0.68	1.00	0.84	0.86	0.89
Black Surfperch	P2R	0.85	1.00	0.90	0.90	0.90
Black Surfperch	P3R	0.75	1.00	0.79	0.77	0.71
Black Surfperch	IPA	0.78	1.00	0.88	0.90	0.89
Opaleye	P0	1.00	1.00	1.00	1.00	1.00
Opaleye	P1R	1.10	1.14	1.00	0.95	0.99
Opaleye	P2R	1.08	1.11	1.01	0.97	1.00
Opaleye	P3R	1.38	1.35	1.01	0.89	0.94
Opaleye	IPA	1.11	1.14	1.01	0.95	0.99

Kelp Bass	P0	1.00	1.00	1.00	1.00	1.00
Kelp Bass	P1R	0.94	1.10	0.98	0.95	0.97
Kelp Bass	P2R	0.99	1.07	0.98	0.96	0.97
Kelp Bass	P3R	1.13	1.19	0.96	0.85	0.90
Kelp Bass	IPA	1.00	1.09	0.98	0.95	0.97
Kelp Rockfish	P0	1.00	1.00	1.00	1.00	1.00
Kelp Rockfish	P1R	0.89	1.11	1.00	0.98	1.00
Kelp Rockfish	P2R	1.03	1.08	1.00	0.97	1.00
Kelp Rockfish	P3R	1.19	1.25	1.04	0.98	1.02
Kelp Rockfish	IPA	1.00	1.10	1.00	0.98	1.00
Sheephead	P0	1.00	1.00	1.00	1.00	1.00
Sheephead	P1R	0.94	1.10	0.97	0.95	0.96
Sheephead	P2R	1.03	1.07	0.97	0.95	0.95
Sheephead	P3R	1.20	1.19	0.96	0.82	0.90
Sheephead	IPA	1.04	1.09	0.97	0.93	0.95
Red Sea Urchin	P0	1.00	1.00	1.00	1.00	1.00
Red Sea Urchin	P1R	0.99	1.04	0.94	0.88	0.90
Red Sea Urchin	P2R	1.02	1.02	0.96	0.91	0.91
Red Sea Urchin	P3R	1.08	1.07	0.91	0.79	0.84
Red Sea Urchin	IPA	1.02	1.03	0.95	0.91	0.91
Halibut	P0	1.00	1.00	1.00	1.00	1.00
Halibut	P1R	0.97	1.03	0.98	0.97	0.99
Halibut	P2R	0.99	1.03	0.98	0.97	1.00
Halibut	P3R	1.00	1.09	0.99	0.97	0.96
Halibut	IPA	0.99	1.04	0.98	0.97	0.99

California MLPA Master Plan Science Advisory Team

Outputs from Bioeconomic Model Evaluations of Revised SCRSG MPA Proposals and MLPA South Coast Integrated Preferred Alternative: Individual MPA Results

December 7, 2009

Table 3a. MPA by MPA results for Existing MPAs (P0). Biomass, self-recruitment and self-persistence generated for the existing marine protected areas (MPAs) in the Marine Life Protection Act Initiative (MLPA) South Coast Study Region (SCSR) from the UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Values of biomass are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Self-recruitment is the proportion of settling larvae in an MPA that were produced within that MPA. This metric provides information on the relative isolation of the MPA from other larval sources. Values of self-recruitment are between 0 and 1, where a value of 0 indicates that a population is totally isolated. Self-persistence is the degree to which an MPA is self-sustaining. It is calculated based on larval production and the proportion of larvae produced within an MPA that return to that MPA. Values of self-persistence that are less than or equal to 1 are dependent on larvae from elsewhere, while values greater than 1 are self-sufficient.

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Abalone Cove SMP	Black Surfperch	0.0004	0.0001	1.0000	1.0000	3.3260
Abalone Cove SMP	Halibut	0.0004	0.0001	0.0010	0.0032	0.0038
Abalone Cove SMP	Kelp Bass	0.0007	0.0002	0.0007	0.0059	0.0123
Abalone Cove SMP	Kelp Rockfish	0.0007	0.0001	0.0005	0.0026	0.0032
Abalone Cove SMP	Ocean Whitefish	0.0004	0.0001	0.0006	0.0019	0.0054
Abalone Cove SMP	Opaleye	0.0006	0.0002	0.0005	0.0029	0.0052
Abalone Cove SMP	Red Sea Urchin	0.0003	0.0002	0.0004	0.0016	0.0066
Abalone Cove SMP	Sheephead	0.0007	0.0002	0.0010	0.0060	0.0141
Anacapa Island SMCA	Black Surfperch	0.0030	0.0013	1.0000	1.0000	4.0000
Anacapa Island SMCA	Halibut	0.0026	0.0005	0.0315	0.0026	0.0258
Anacapa Island SMCA	Kelp Bass	0.0085	0.0038	0.0552	0.0140	0.0497
Anacapa Island SMCA	Kelp Rockfish	0.0098	0.0013	0.0795	0.0155	0.0426
Anacapa Island SMCA	Ocean Whitefish	0.0042	0.0016	0.0162	0.0079	0.0243
Anacapa Island SMCA	Opaleye	0.0077	0.0035	0.1143	0.0243	0.0991
Anacapa Island SMCA	Red Sea Urchin	0.0038	0.0021	0.0133	0.0057	0.0277
Anacapa Island SMCA	Sheephead	0.0074	0.0033	0.0441	0.0098	0.0378

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Anacapa Island SMR	Black Surfperch	0.0086	0.0039	1.0000	1.0000	4.0000
Anacapa Island SMR	Halibut	0.0043	0.0010	0.0066	0.0084	0.0145
Anacapa Island SMR	Kelp Bass	0.0086	0.0032	0.0060	0.0198	0.0271
Anacapa Island SMR	Kelp Rockfish	0.0095	0.0022	0.0068	0.0236	0.0239
Anacapa Island SMR	Ocean Whitefish	0.0050	0.0017	0.0051	0.0120	0.0189
Anacapa Island SMR	Opaleye	0.0081	0.0028	0.0118	0.0357	0.0490
Anacapa Island SMR	Red Sea Urchin	0.0048	0.0027	0.0048	0.0123	0.0240
Anacapa Island SMR	Sheephead	0.0078	0.0030	0.0053	0.0155	0.0212
Batiquitos Lagoon SMP	Halibut	0.0003	0.0001	0.0010	0.0020	0.0021
Big Sycamore Canyon SMR	Halibut	0.0067	0.0010	0.0094	0.0118	0.0141
Bolsa Chica SMP	Halibut	0.0008	0.0001	0.0011	0.0059	0.0043
Cardiff-San Elijo SMCA	Black Surfperch	0.0042	0.0017	1.0000	1.0000	2.6009
Cardiff-San Elijo SMCA	Halibut	0.0027	0.0005	0.0112	0.0184	0.0163
Cardiff-San Elijo SMCA	Kelp Bass	0.0038	0.0014	0.0034	0.0084	0.0124
Cardiff-San Elijo SMCA	Kelp Rockfish	0.0038	0.0006	0.0029	0.0032	0.0030
Cardiff-San Elijo SMCA	Ocean Whitefish	0.0023	0.0009	0.0058	0.0168	0.0285
Cardiff-San Elijo SMCA	Opaleye	0.0028	0.0009	0.0005	0.0006	0.0007
Cardiff-San Elijo SMCA	Red Sea Urchin	0.0013	0.0010	0.0033	0.0114	0.0219
Cardiff-San Elijo SMCA	Sheephead	0.0038	0.0013	0.0019	0.0043	0.0065
Carrington Point SMR	Black Surfperch	0.0270	0.0122	1.0000	1.0000	4.0000
Carrington Point SMR	Halibut	0.0211	0.0043	0.0555	0.0496	0.0579
Carrington Point SMR	Kelp Bass	0.0270	0.0097	0.0424	0.0517	0.0912
Carrington Point SMR	Kelp Rockfish	0.0236	0.0053	0.0140	0.0465	0.0565
Carrington Point SMR	Ocean Whitefish	0.0170	0.0057	0.0269	0.0326	0.0701
Carrington Point SMR	Opaleye	0.0191	0.0062	0.0115	0.0271	0.0420
Carrington Point SMR	Red Sea Urchin	0.0160	0.0090	0.0224	0.0278	0.0824
Carrington Point SMR	Sheephead	0.0240	0.0090	0.0277	0.0393	0.0690
Crystal Cove SMCA	Black Surfperch	0.0025	0.0008	1.0000	1.0000	3.2018
Crystal Cove SMCA	Halibut	0.0032	0.0007	0.0098	0.0116	0.0192
Crystal Cove SMCA	Kelp Bass	0.0049	0.0019	0.0131	0.0210	0.0643
Crystal Cove SMCA	Kelp Rockfish	0.0042	0.0008	0.0093	0.0096	0.0141
Crystal Cove SMCA	Ocean Whitefish	0.0026	0.0010	0.0079	0.0157	0.0509
Crystal Cove SMCA	Opaleye	0.0048	0.0015	0.0162	0.0162	0.0397
Crystal Cove SMCA	Red Sea Urchin	0.0024	0.0010	0.0070	0.0120	0.0510
Crystal Cove SMCA	Sheephead	0.0047	0.0016	0.0134	0.0156	0.0583

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Dana Point SMCA	Black Surfperch	0.0010	0.0003	1.0000	1.0000	2.3679
Dana Point SMCA	Halibut	0.0004	0.0001	0.0012	0.0022	0.0023
Dana Point SMCA	Kelp Bass	0.0010	0.0005	0.0016	0.0024	0.0032
Dana Point SMCA	Kelp Rockfish	0.0009	0.0001	0.0009	0.0010	0.0008
Dana Point SMCA	Ocean Whitefish	0.0005	0.0003	0.0014	0.0015	0.0025
Dana Point SMCA	Opaleye	0.0010	0.0003	0.0014	0.0015	0.0017
Dana Point SMCA	Red Sea Urchin	0.0003	0.0005	0.0008	0.0020	0.0052
Dana Point SMCA	Sheephead	0.0010	0.0004	0.0026	0.0030	0.0043
Doheny Beach SMCA	Black Surfperch	0.0011	0.0003	1.0000	1.0000	3.6733
Doheny Beach SMCA	Halibut	0.0008	0.0001	0.0017	0.0007	0.0006
Doheny Beach SMCA	Kelp Bass	0.0013	0.0006	0.0021	0.0009	0.0023
Doheny Beach SMCA	Kelp Rockfish	0.0011	0.0002	0.0011	0.0003	0.0003
Doheny Beach SMCA	Ocean Whitefish	0.0007	0.0003	0.0019	0.0007	0.0030
Doheny Beach SMCA	Opaleye	0.0012	0.0004	0.0014	0.0007	0.0014
Doheny Beach SMCA	Red Sea Urchin	0.0010	0.0004	0.0031	0.0004	0.0025
Doheny Beach SMCA	Sheephead	0.0013	0.0005	0.0035	0.0010	0.0031
Doheny SMCA	Black Surfperch	0.0011	0.0003	1.0000	1.0000	2.4608
Doheny SMCA	Halibut	0.0008	0.0001	0.0017	0.0029	0.0029
Doheny SMCA	Kelp Bass	0.0013	0.0006	0.0021	0.0058	0.0090
Doheny SMCA	Kelp Rockfish	0.0011	0.0002	0.0011	0.0025	0.0023
Doheny SMCA	Ocean Whitefish	0.0007	0.0003	0.0019	0.0043	0.0083
Doheny SMCA	Opaleye	0.0012	0.0004	0.0014	0.0034	0.0048
Doheny SMCA	Red Sea Urchin	0.0010	0.0004	0.0031	0.0031	0.0074
Doheny SMCA	Sheephead	0.0013	0.0005	0.0035	0.0074	0.0123
Farnsworth Bank SMCA	Ocean Whitefish	0.0023	0.0011	0.0050	0.0042	0.0052
Farnsworth Bank SMCA	Red Sea Urchin	0.0041	0.0023	0.0082	0.0066	0.0116
Footprint SMR	Ocean Whitefish	0.0034	0.0012	0.0043	0.0062	0.0178
Footprint SMR	Red Sea Urchin	0.0031	0.0017	0.0039	0.0049	0.0217
Gull Island SMR	Black Surfperch	0.0170	0.0077	1.0000	1.0000	4.0000
Gull Island SMR	Halibut	0.0094	0.0023	0.0276	0.0172	0.0340
Gull Island SMR	Kelp Bass	0.0188	0.0069	0.0177	0.0118	0.0179
Gull Island SMR	Kelp Rockfish	0.0209	0.0046	0.0212	0.0234	0.0270
Gull Island SMR	Ocean Whitefish	0.0120	0.0042	0.0201	0.0150	0.0343
Gull Island SMR	Opaleye	0.0159	0.0054	0.0195	0.0182	0.0261
Gull Island SMR	Red Sea Urchin	0.0115	0.0065	0.0163	0.0118	0.0404
Gull Island SMR	Sheephead	0.0178	0.0069	0.0263	0.0198	0.0311

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Harris Point SMR	Black Surfperch	0.0151	0.0069	1.0000	1.0000	4.0000
Harris Point SMR	Halibut	0.0132	0.0026	0.0504	0.0295	0.0460
Harris Point SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Harris Point SMR	Kelp Rockfish	0.0163	0.0030	0.0101	0.0265	0.0287
Harris Point SMR	Ocean Whitefish	0.0265	0.0085	0.0249	0.0366	0.0536
Harris Point SMR	Opaleye	0.0149	0.0049	0.0109	0.0213	0.0301
Harris Point SMR	Red Sea Urchin	0.0244	0.0140	0.0199	0.0339	0.0624
Harris Point SMR	Sheephead	0.0179	0.0070	0.0285	0.0327	0.0531
Judith Rock SMR	Black Surfperch	0.0100	0.0045	1.0000	1.0000	4.0000
Judith Rock SMR	Halibut	0.0013	0.0003	0.0076	0.0022	0.0050
Judith Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Judith Rock SMR	Kelp Rockfish	0.0064	0.0008	0.0050	0.0029	0.0022
Judith Rock SMR	Ocean Whitefish	0.0047	0.0016	0.0156	0.0057	0.0112
Judith Rock SMR	Opaleye	0.0060	0.0018	0.0140	0.0114	0.0136
Judith Rock SMR	Red Sea Urchin	0.0046	0.0026	0.0110	0.0044	0.0123
Judith Rock SMR	Sheephead	0.0068	0.0025	0.0107	0.0051	0.0061
La Jolla SMCA	Black Surfperch	0.0013	0.0006	1.0000	1.0000	4.0000
La Jolla SMCA	Halibut	0.0016	0.0003	0.0064	0.0102	0.0090
La Jolla SMCA	Kelp Bass	0.0017	0.0007	0.0021	0.0057	0.0066
La Jolla SMCA	Kelp Rockfish	0.0015	0.0002	0.0014	0.0016	0.0012
La Jolla SMCA	Ocean Whitefish	0.0007	0.0003	0.0013	0.0086	0.0120
La Jolla SMCA	Opaleye	0.0010	0.0004	0.0007	0.0012	0.0012
La Jolla SMCA	Red Sea Urchin	0.0006	0.0003	0.0009	0.0056	0.0087
La Jolla SMCA	Sheephead	0.0015	0.0006	0.0011	0.0033	0.0038
Laguna Beach SMCA	Black Surfperch	0.0020	0.0007	1.0000	1.0000	3.3639
Laguna Beach SMCA	Halibut	0.0022	0.0005	0.0058	0.0177	0.0199
Laguna Beach SMCA	Kelp Bass	0.0033	0.0013	0.0059	0.0200	0.0701
Laguna Beach SMCA	Kelp Rockfish	0.0025	0.0005	0.0057	0.0147	0.0229
Laguna Beach SMCA	Ocean Whitefish	0.0017	0.0007	0.0051	0.0112	0.0599
Laguna Beach SMCA	Opaleye	0.0030	0.0010	0.0133	0.0315	0.0817
Laguna Beach SMCA	Red Sea Urchin	0.0016	0.0011	0.0046	0.0105	0.0634
Laguna Beach SMCA	Sheephead	0.0031	0.0011	0.0073	0.0182	0.0763

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Niguel SMCA	Black Surfperch	0.0014	0.0006	1.0000	1.0000	2.7154
Niguel SMCA	Halibut	0.0014	0.0003	0.0034	0.0064	0.0064
Niguel SMCA	Kelp Bass	0.0018	0.0008	0.0029	0.0119	0.0227
Niguel SMCA	Kelp Rockfish	0.0017	0.0003	0.0032	0.0095	0.0106
Niguel SMCA	Ocean Whitefish	0.0010	0.0005	0.0028	0.0073	0.0194
Niguel SMCA	Opaleye	0.0018	0.0006	0.0050	0.0171	0.0312
Niguel SMCA	Red Sea Urchin	0.0015	0.0008	0.0044	0.0102	0.0285
Niguel SMCA	Sheephead	0.0018	0.0007	0.0046	0.0136	0.0282
Painted Cave SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Painted Cave SMCA	Halibut	0.0020	0.0004	0.0094	0.0048	0.0204
Painted Cave SMCA	Kelp Bass	0.0000	0.0000	0.0002	0.0003	0.0417
Painted Cave SMCA	Kelp Rockfish	0.0001	0.0000	0.0001	0.0004	0.0373
Painted Cave SMCA	Ocean Whitefish	0.0008	0.0004	0.0037	0.0021	0.0254
Painted Cave SMCA	Opaleye	0.0000	0.0000	0.0002	0.0004	0.0437
Painted Cave SMCA	Red Sea Urchin	0.0008	0.0004	0.0034	0.0013	0.0330
Painted Cave SMCA	Sheephead	0.0000	0.0000	0.0001	0.0002	0.0249
Point Fermin SMP	Black Surfperch	0.0011	0.0005	1.0000	1.0000	2.3461
Point Fermin SMP	Halibut	0.0004	0.0001	0.0010	0.0016	0.0019
Point Fermin SMP	Kelp Bass	0.0010	0.0005	0.0011	0.0043	0.0051
Point Fermin SMP	Kelp Rockfish	0.0009	0.0001	0.0006	0.0015	0.0011
Point Fermin SMP	Ocean Whitefish	0.0005	0.0002	0.0004	0.0018	0.0021
Point Fermin SMP	Opaleye	0.0010	0.0003	0.0006	0.0015	0.0018
Point Fermin SMP	Red Sea Urchin	0.0007	0.0004	0.0005	0.0019	0.0026
Point Fermin SMP	Sheephead	0.0010	0.0004	0.0011	0.0041	0.0049
Refugio SMCA	Black Surfperch	0.0040	0.0013	1.0000	1.0000	2.7558
Refugio SMCA	Halibut	0.0026	0.0006	0.0060	0.0033	0.0037
Refugio SMCA	Kelp Bass	0.0048	0.0015	0.0025	0.0026	0.0031
Refugio SMCA	Kelp Rockfish	0.0052	0.0008	0.0036	0.0087	0.0076
Refugio SMCA	Ocean Whitefish	0.0028	0.0010	0.0029	0.0018	0.0028
Refugio SMCA	Opaleye	0.0049	0.0013	0.0034	0.0049	0.0059
Refugio SMCA	Red Sea Urchin	0.0018	0.0012	0.0014	0.0013	0.0031
Refugio SMCA	Sheephead	0.0053	0.0018	0.0038	0.0026	0.0038

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Richardson Rock SMR	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Richardson Rock SMR	Halibut	0.0011	0.0001	0.0082	0.0013	0.0029
Richardson Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Richardson Rock SMR	Kelp Rockfish	0.0007	0.0003	0.0007	0.0005	0.0016
Richardson Rock SMR	Ocean Whitefish	0.0240	0.0068	0.0263	0.0235	0.0273
Richardson Rock SMR	Opaleye	0.0005	0.0002	0.0016	0.0023	0.0107
Richardson Rock SMR	Red Sea Urchin	0.0229	0.0134	0.0231	0.0272	0.0349
Richardson Rock SMR	Sheephead	0.0005	0.0003	0.0008	0.0005	0.0032
San Diego-Scripps SMCA	Black Surfperch	0.0001	0.0000	1.0000	1.0000	3.5576
San Diego-Scripps SMCA	Halibut	0.0008	0.0001	0.0031	0.0045	0.0040
San Diego-Scripps SMCA	Kelp Bass	0.0004	0.0001	0.0008	0.0016	0.0049
San Diego-Scripps SMCA	Kelp Rockfish	0.0003	0.0001	0.0004	0.0009	0.0014
San Diego-Scripps SMCA	Ocean Whitefish	0.0002	0.0001	0.0004	0.0028	0.0056
San Diego-Scripps SMCA	Opaleye	0.0003	0.0001	0.0003	0.0005	0.0010
San Diego-Scripps SMCA	Red Sea Urchin	0.0001	0.0001	0.0003	0.0024	0.0058
San Diego-Scripps SMCA	Sheephead	0.0004	0.0001	0.0003	0.0009	0.0028
Santa Barbara Island SMR	Black Surfperch	0.0025	0.0011	1.0000	1.0000	4.0000
Santa Barbara Island SMR	Halibut	0.0032	0.0003	0.0820	0.0086	0.0326
Santa Barbara Island SMR	Kelp Bass	0.0088	0.0038	0.0840	0.0210	0.1247
Santa Barbara Island SMR	Kelp Rockfish	0.0082	0.0009	0.0568	0.0068	0.0190
Santa Barbara Island SMR	Ocean Whitefish	0.0096	0.0035	0.0478	0.0235	0.0666
Santa Barbara Island SMR	Opaleye	0.0076	0.0033	0.0696	0.0157	0.0843
Santa Barbara Island SMR	Red Sea Urchin	0.0086	0.0048	0.0386	0.0151	0.0684
Santa Barbara Island SMR	Sheephead	0.0074	0.0031	0.0583	0.0171	0.0930
Scorpion SMR	Black Surfperch	0.0037	0.0016	1.0000	1.0000	4.0000
Scorpion SMR	Halibut	0.0028	0.0006	0.0210	0.0046	0.0352
Scorpion SMR	Kelp Bass	0.0101	0.0042	0.0578	0.0234	0.0878
Scorpion SMR	Kelp Rockfish	0.0116	0.0015	0.0571	0.0210	0.0512
Scorpion SMR	Ocean Whitefish	0.0094	0.0035	0.0210	0.0172	0.0487
Scorpion SMR	Opaleye	0.0092	0.0039	0.0789	0.0303	0.1150
Scorpion SMR	Red Sea Urchin	0.0085	0.0046	0.0170	0.0122	0.0550
Scorpion SMR	Sheephead	0.0086	0.0035	0.0332	0.0128	0.0468

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Skunk Point SMR	Black Surfperch	0.0020	0.0009	1.0000	1.0000	4.0000
Skunk Point SMR	Halibut	0.0027	0.0005	0.0042	0.0063	0.0056
Skunk Point SMR	Kelp Bass	0.0030	0.0011	0.0025	0.0031	0.0049
Skunk Point SMR	Kelp Rockfish	0.0029	0.0004	0.0011	0.0023	0.0022
Skunk Point SMR	Ocean Whitefish	0.0015	0.0005	0.0017	0.0027	0.0048
Skunk Point SMR	Opaleye	0.0023	0.0008	0.0015	0.0033	0.0046
Skunk Point SMR	Red Sea Urchin	0.0014	0.0008	0.0014	0.0021	0.0056
Skunk Point SMR	Sheephead	0.0027	0.0011	0.0023	0.0036	0.0057
South Laguna Beach SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	3.6727
South Laguna Beach SMCA	Halibut	0.0004	0.0001	0.0008	0.0028	0.0028
South Laguna Beach SMCA	Kelp Bass	0.0001	0.0000	0.0001	0.0022	0.0126
South Laguna Beach SMCA	Kelp Rockfish	0.0000	0.0001	0.0001	0.0025	0.0061
South Laguna Beach SMCA	Ocean Whitefish	0.0000	0.0000	0.0001	0.0012	0.0123
South Laguna Beach SMCA	Opaleye	0.0001	0.0000	0.0003	0.0044	0.0198
South Laguna Beach SMCA	Red Sea Urchin	0.0000	0.0000	0.0001	0.0009	0.0116
South Laguna Beach SMCA	Sheephead	0.0001	0.0000	0.0002	0.0022	0.0158
South Point SMR	Black Surfperch	0.0120	0.0052	1.0000	1.0000	4.0000
South Point SMR	Halibut	0.0075	0.0014	0.0435	0.0098	0.0187
South Point SMR	Kelp Bass	0.0168	0.0060	0.0145	0.0061	0.0095
South Point SMR	Kelp Rockfish	0.0177	0.0028	0.0087	0.0057	0.0063
South Point SMR	Ocean Whitefish	0.0120	0.0041	0.0189	0.0109	0.0217
South Point SMR	Opaleye	0.0133	0.0043	0.0159	0.0099	0.0143
South Point SMR	Red Sea Urchin	0.0116	0.0063	0.0159	0.0085	0.0252
South Point SMR	Sheephead	0.0148	0.0054	0.0140	0.0072	0.0109

Table 3b. MPA by MPA results for Revised South Coast Regional Stakeholder Group (SCRSG) MPA Proposal 1 (P1R). Biomass, self-recruitment and self-persistence generated for each of the MPAs in P1R from the UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Values of biomass are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Self-recruitment is the proportion of settling larvae in an MPA that were produced within that MPA. This metric provides information on the relative isolation of the MPA from other larval sources. Values of self-recruitment are between 0 and 1, where a value of 0 indicates that a population is totally isolated. Self-persistence is the degree to which an MPA is self-sustaining. It is calculated based on larval production and the proportion of larvae produced within an MPA that return to that MPA. Values of self-persistence that are less than or equal to 1 are dependent on larvae from elsewhere, while values greater than 1 are self-sufficient.

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Anacapa Island SMCA	Black Surfperch	0.0030	0.0013	1.0000	1.0000	4.0000
Anacapa Island SMCA	Halibut	0.0026	0.0005	0.0308	0.0026	0.0238
Anacapa Island SMCA	Kelp Bass	0.0087	0.0039	0.0524	0.0128	0.0497
Anacapa Island SMCA	Kelp Rockfish	0.0099	0.0012	0.0740	0.0147	0.0393
Anacapa Island SMCA	Ocean Whitefish	0.0043	0.0016	0.0156	0.0076	0.0243
Anacapa Island SMCA	Opaleye	0.0078	0.0036	0.1056	0.0231	0.0990
Anacapa Island SMCA	Red Sea Urchin	0.0038	0.0021	0.0129	0.0056	0.0277
Anacapa Island SMCA	Sheephead	0.0075	0.0034	0.0418	0.0090	0.0378
Anacapa Island SMR	Black Surfperch	0.0086	0.0039	1.0000	1.0000	4.0000
Anacapa Island SMR	Halibut	0.0043	0.0010	0.0064	0.0084	0.0137
Anacapa Island SMR	Kelp Bass	0.0090	0.0035	0.0059	0.0191	0.0271
Anacapa Island SMR	Kelp Rockfish	0.0098	0.0021	0.0065	0.0228	0.0227
Anacapa Island SMR	Ocean Whitefish	0.0051	0.0017	0.0050	0.0118	0.0189
Anacapa Island SMR	Opaleye	0.0084	0.0029	0.0112	0.0350	0.0490
Anacapa Island SMR	Red Sea Urchin	0.0049	0.0028	0.0048	0.0122	0.0240
Anacapa Island SMR	Sheephead	0.0081	0.0032	0.0052	0.0149	0.0212
Begg Rock SMR	Ocean Whitefish	0.0068	0.0021	0.0030	0.0102	0.0111
Begg Rock SMR	Red Sea Urchin	0.0075	0.0043	0.0033	0.0119	0.0141
Blue Cavern SMR	Black Surfperch	0.0017	0.0008	1.0000	1.0000	4.0000
Blue Cavern SMR	Halibut	0.0025	0.0005	0.0096	0.0057	0.0173
Blue Cavern SMR	Kelp Bass	0.0054	0.0022	0.0074	0.0095	0.0519
Blue Cavern SMR	Kelp Rockfish	0.0044	0.0009	0.0092	0.0097	0.0244
Blue Cavern SMR	Ocean Whitefish	0.0034	0.0012	0.0090	0.0065	0.0311
Blue Cavern SMR	Opaleye	0.0047	0.0019	0.0139	0.0157	0.0774
Blue Cavern SMR	Red Sea Urchin	0.0025	0.0014	0.0064	0.0040	0.0289
Blue Cavern SMR	Sheephead	0.0045	0.0019	0.0062	0.0070	0.0379
Cabrillo SMR	Black Surfperch	0.0102	0.0046	1.0000	1.0000	4.0000
Cabrillo SMR	Halibut	0.0006	0.0001	0.0017	0.0018	0.0020
Cabrillo SMR	Kelp Bass	0.0012	0.0006	0.0003	0.0008	0.0008
Cabrillo SMR	Kelp Rockfish	0.0012	0.0002	0.0004	0.0004	0.0003
Cabrillo SMR	Ocean Whitefish	0.0005	0.0002	0.0003	0.0014	0.0014
Cabrillo SMR	Opaleye	0.0006	0.0003	0.0001	0.0003	0.0003
Cabrillo SMR	Red Sea Urchin	0.0004	0.0003	0.0002	0.0008	0.0008
Cabrillo SMR	Sheephead	0.0013	0.0007	0.0003	0.0009	0.0009
Carpinteria Salt Marsh SMR	Halibut	0.0004	0.0001	0.0007	0.0037	0.0036

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Carrington Point SMR	Black Surfperch	0.0270	0.0122	1.0000	1.0000	4.0000
Carrington Point SMR	Halibut	0.0212	0.0040	0.0543	0.0487	0.0544
Carrington Point SMR	Kelp Bass	0.0280	0.0104	0.0416	0.0499	0.0912
Carrington Point SMR	Kelp Rockfish	0.0245	0.0052	0.0135	0.0453	0.0545
Carrington Point SMR	Ocean Whitefish	0.0174	0.0059	0.0262	0.0320	0.0701
Carrington Point SMR	Opaleye	0.0199	0.0066	0.0111	0.0265	0.0420
Carrington Point SMR	Red Sea Urchin	0.0163	0.0091	0.0220	0.0274	0.0824
Carrington Point SMR	Sheephead	0.0249	0.0095	0.0271	0.0377	0.0690
Cat Harbor SMCA	Black Surfperch	0.0006	0.0002	1.0000	1.0000	3.2052
Cat Harbor SMCA	Halibut	0.0009	0.0002	0.0038	0.0052	0.0063
Cat Harbor SMCA	Kelp Bass	0.0014	0.0005	0.0014	0.0042	0.0100
Cat Harbor SMCA	Kelp Rockfish	0.0013	0.0003	0.0018	0.0032	0.0043
Cat Harbor SMCA	Ocean Whitefish	0.0007	0.0002	0.0017	0.0027	0.0077
Cat Harbor SMCA	Opaleye	0.0014	0.0004	0.0025	0.0048	0.0114
Cat Harbor SMCA	Red Sea Urchin	0.0005	0.0002	0.0009	0.0016	0.0070
Cat Harbor SMCA	Sheephead	0.0013	0.0004	0.0011	0.0030	0.0075
Dana Point SMCA	Black Surfperch	0.0055	0.0019	1.0000	1.0000	2.9046
Dana Point SMCA	Halibut	0.0071	0.0018	0.0164	0.0232	0.0266
Dana Point SMCA	Kelp Bass	0.0080	0.0034	0.0114	0.0200	0.0533
Dana Point SMCA	Kelp Rockfish	0.0068	0.0011	0.0117	0.0156	0.0214
Dana Point SMCA	Ocean Whitefish	0.0042	0.0021	0.0116	0.0132	0.0617
Dana Point SMCA	Opaleye	0.0077	0.0024	0.0182	0.0241	0.0613
Dana Point SMCA	Red Sea Urchin	0.0025	0.0020	0.0072	0.0104	0.0567
Dana Point SMCA	Sheephead	0.0077	0.0030	0.0184	0.0230	0.0693
Del Mar SMR	Black Surfperch	0.0120	0.0054	1.0000	1.0000	4.0000
Del Mar SMR	Halibut	0.0111	0.0025	0.0420	0.0743	0.0702
Del Mar SMR	Kelp Bass	0.0104	0.0045	0.0112	0.0157	0.0270
Del Mar SMR	Kelp Rockfish	0.0090	0.0017	0.0075	0.0070	0.0076
Del Mar SMR	Ocean Whitefish	0.0080	0.0030	0.0167	0.0432	0.0831
Del Mar SMR	Opaleye	0.0064	0.0026	0.0017	0.0013	0.0028
Del Mar SMR	Red Sea Urchin	0.0066	0.0038	0.0127	0.0263	0.0564
Del Mar SMR	Sheephead	0.0093	0.0042	0.0042	0.0073	0.0129

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Emerald Bay SMCA	Black Surfperch	0.0019	0.0006	1.0000	1.0000	2.4303
Emerald Bay SMCA	Halibut	0.0008	0.0001	0.0028	0.0029	0.0074
Emerald Bay SMCA	Kelp Bass	0.0029	0.0013	0.0034	0.0054	0.0102
Emerald Bay SMCA	Kelp Rockfish	0.0022	0.0005	0.0041	0.0063	0.0067
Emerald Bay SMCA	Ocean Whitefish	0.0012	0.0006	0.0029	0.0032	0.0073
Emerald Bay SMCA	Opaleye	0.0027	0.0010	0.0046	0.0067	0.0113
Emerald Bay SMCA	Red Sea Urchin	0.0021	0.0011	0.0050	0.0039	0.0149
Emerald Bay SMCA	Sheephead	0.0024	0.0010	0.0029	0.0040	0.0076
Farnsworth SMCA	Black Surfperch	0.0028	0.0013	1.0000	1.0000	4.0000
Farnsworth SMCA	Halibut	0.0038	0.0006	0.0264	0.0118	0.0266
Farnsworth SMCA	Kelp Bass	0.0083	0.0034	0.0149	0.0105	0.0399
Farnsworth SMCA	Kelp Rockfish	0.0076	0.0012	0.0238	0.0091	0.0193
Farnsworth SMCA	Ocean Whitefish	0.0098	0.0035	0.0203	0.0199	0.0536
Farnsworth SMCA	Opaleye	0.0075	0.0031	0.0283	0.0137	0.0522
Farnsworth SMCA	Red Sea Urchin	0.0085	0.0047	0.0164	0.0142	0.0522
Farnsworth SMCA	Sheephead	0.0071	0.0030	0.0147	0.0107	0.0414
Footprint SMR	Ocean Whitefish	0.0034	0.0013	0.0041	0.0060	0.0178
Footprint SMR	Red Sea Urchin	0.0032	0.0018	0.0038	0.0048	0.0217
Gull Island SMR	Black Surfperch	0.0170	0.0077	1.0000	1.0000	4.0000
Gull Island SMR	Halibut	0.0094	0.0021	0.0271	0.0172	0.0323
Gull Island SMR	Kelp Bass	0.0196	0.0074	0.0169	0.0114	0.0179
Gull Island SMR	Kelp Rockfish	0.0216	0.0045	0.0199	0.0230	0.0262
Gull Island SMR	Ocean Whitefish	0.0123	0.0044	0.0193	0.0146	0.0343
Gull Island SMR	Opaleye	0.0166	0.0057	0.0185	0.0177	0.0261
Gull Island SMR	Red Sea Urchin	0.0117	0.0066	0.0159	0.0116	0.0404
Gull Island SMR	Sheephead	0.0184	0.0073	0.0254	0.0189	0.0311
Harris Point SMR	Black Surfperch	0.0151	0.0069	1.0000	1.0000	4.0000
Harris Point SMR	Halibut	0.0133	0.0024	0.0494	0.0292	0.0435
Harris Point SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Harris Point SMR	Kelp Rockfish	0.0169	0.0029	0.0096	0.0258	0.0276
Harris Point SMR	Ocean Whitefish	0.0271	0.0088	0.0243	0.0360	0.0536
Harris Point SMR	Opaleye	0.0154	0.0052	0.0103	0.0209	0.0301
Harris Point SMR	Red Sea Urchin	0.0250	0.0142	0.0196	0.0335	0.0624
Harris Point SMR	Sheephead	0.0184	0.0073	0.0277	0.0312	0.0531

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Helo SMR	Black Surfperch	0.0132	0.0057	1.0000	1.0000	4.0000
Helo SMR	Halibut	0.0074	0.0013	0.0226	0.0096	0.0176
Helo SMR	Kelp Bass	0.0121	0.0041	0.0117	0.0126	0.0195
Helo SMR	Kelp Rockfish	0.0119	0.0018	0.0087	0.0193	0.0203
Helo SMR	Ocean Whitefish	0.0094	0.0033	0.0165	0.0110	0.0383
Helo SMR	Opaleye	0.0115	0.0035	0.0162	0.0266	0.0414
Helo SMR	Red Sea Urchin	0.0084	0.0044	0.0117	0.0081	0.0388
Helo SMR	Sheephead	0.0147	0.0053	0.0144	0.0106	0.0193
Judith Rock SMR	Black Surfperch	0.0100	0.0045	1.0000	1.0000	4.0000
Judith Rock SMR	Halibut	0.0014	0.0002	0.0075	0.0022	0.0046
Judith Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Judith Rock SMR	Kelp Rockfish	0.0066	0.0008	0.0047	0.0027	0.0020
Judith Rock SMR	Ocean Whitefish	0.0048	0.0017	0.0149	0.0056	0.0112
Judith Rock SMR	Opaleye	0.0063	0.0019	0.0134	0.0112	0.0135
Judith Rock SMR	Red Sea Urchin	0.0046	0.0026	0.0107	0.0044	0.0123
Judith Rock SMR	Sheephead	0.0071	0.0026	0.0103	0.0050	0.0061
Kashtayit SMP	Black Surfperch	0.0012	0.0004	1.0000	1.0000	3.8197
Kashtayit SMP	Halibut	0.0027	0.0006	0.0072	0.0038	0.0043
Kashtayit SMP	Kelp Bass	0.0018	0.0006	0.0010	0.0005	0.0024
Kashtayit SMP	Kelp Rockfish	0.0021	0.0004	0.0012	0.0013	0.0045
Kashtayit SMP	Ocean Whitefish	0.0011	0.0004	0.0014	0.0002	0.0028
Kashtayit SMP	Opaleye	0.0018	0.0005	0.0011	0.0009	0.0043
Kashtayit SMP	Red Sea Urchin	0.0012	0.0005	0.0012	0.0001	0.0033
Kashtayit SMP	Sheephead	0.0020	0.0007	0.0011	0.0002	0.0025
La Jolla Cove SMR	Black Surfperch	0.0013	0.0006	1.0000	1.0000	4.0000
La Jolla Cove SMR	Halibut	0.0016	0.0003	0.0062	0.0097	0.0085
La Jolla Cove SMR	Kelp Bass	0.0018	0.0007	0.0021	0.0056	0.0066
La Jolla Cove SMR	Kelp Rockfish	0.0015	0.0002	0.0013	0.0016	0.0012
La Jolla Cove SMR	Ocean Whitefish	0.0007	0.0003	0.0012	0.0084	0.0120
La Jolla Cove SMR	Opaleye	0.0011	0.0004	0.0007	0.0011	0.0012
La Jolla Cove SMR	Red Sea Urchin	0.0006	0.0003	0.0009	0.0055	0.0087
La Jolla Cove SMR	Sheephead	0.0016	0.0007	0.0011	0.0032	0.0038

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
La Jolla South SMCA	Black Surfperch	0.0427	0.0194	1.0000	1.0000	4.0000
La Jolla South SMCA	Halibut	0.0016	0.0004	0.0065	0.0064	0.0122
La Jolla South SMCA	Kelp Bass	0.0062	0.0025	0.0033	0.0049	0.0048
La Jolla South SMCA	Kelp Rockfish	0.0077	0.0011	0.0049	0.0046	0.0035
La Jolla South SMCA	Ocean Whitefish	0.0038	0.0015	0.0039	0.0154	0.0165
La Jolla South SMCA	Opaleye	0.0047	0.0019	0.0048	0.0054	0.0058
La Jolla South SMCA	Red Sea Urchin	0.0029	0.0016	0.0026	0.0080	0.0084
La Jolla South SMCA	Sheephead	0.0073	0.0034	0.0037	0.0074	0.0077
La Jolla South SMR	Black Surfperch	0.0356	0.0161	1.0000	1.0000	4.0000
La Jolla South SMR	Halibut	0.0013	0.0002	0.0084	0.0053	0.0166
La Jolla South SMR	Kelp Bass	0.0071	0.0032	0.0037	0.0063	0.0064
La Jolla South SMR	Kelp Rockfish	0.0070	0.0010	0.0028	0.0021	0.0016
La Jolla South SMR	Ocean Whitefish	0.0029	0.0011	0.0023	0.0102	0.0105
La Jolla South SMR	Opaleye	0.0041	0.0017	0.0020	0.0022	0.0022
La Jolla South SMR	Red Sea Urchin	0.0029	0.0017	0.0021	0.0074	0.0077
La Jolla South SMR	Sheephead	0.0064	0.0030	0.0029	0.0058	0.0058
Laguna SMR	Black Surfperch	0.0039	0.0018	1.0000	1.0000	4.0000
Laguna SMR	Halibut	0.0104	0.0024	0.0281	0.0369	0.0649
Laguna SMR	Kelp Bass	0.0093	0.0037	0.0156	0.0302	0.1112
Laguna SMR	Kelp Rockfish	0.0066	0.0018	0.0125	0.0243	0.0413
Laguna SMR	Ocean Whitefish	0.0053	0.0019	0.0161	0.0196	0.1127
Laguna SMR	Opaleye	0.0074	0.0029	0.0292	0.0449	0.1210
Laguna SMR	Red Sea Urchin	0.0036	0.0020	0.0102	0.0116	0.0824
Laguna SMR	Sheephead	0.0088	0.0035	0.0188	0.0272	0.1171
Lisiqsihi SMR	Black Surfperch	0.0071	0.0031	1.0000	1.0000	4.0000
Lisiqsihi SMR	Halibut	0.0034	0.0009	0.0057	0.0033	0.0110
Lisiqsihi SMR	Kelp Bass	0.0081	0.0030	0.0108	0.0193	0.0254
Lisiqsihi SMR	Kelp Rockfish	0.0093	0.0010	0.0086	0.0056	0.0049
Lisiqsihi SMR	Ocean Whitefish	0.0050	0.0017	0.0079	0.0052	0.0151
Lisiqsihi SMR	Opaleye	0.0071	0.0023	0.0088	0.0121	0.0153
Lisiqsihi SMR	Red Sea Urchin	0.0044	0.0023	0.0063	0.0039	0.0150
Lisiqsihi SMR	Sheephead	0.0080	0.0030	0.0104	0.0149	0.0203

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Long Point SMR	Black Surfperch	0.0005	0.0002	1.0000	1.0000	4.0000
Long Point SMR	Halibut	0.0016	0.0003	0.0071	0.0022	0.0155
Long Point SMR	Kelp Bass	0.0022	0.0008	0.0057	0.0019	0.0397
Long Point SMR	Kelp Rockfish	0.0015	0.0005	0.0068	0.0028	0.0188
Long Point SMR	Ocean Whitefish	0.0018	0.0006	0.0072	0.0024	0.0308
Long Point SMR	Opaleye	0.0019	0.0007	0.0128	0.0028	0.0518
Long Point SMR	Red Sea Urchin	0.0012	0.0006	0.0044	0.0012	0.0257
Long Point SMR	Sheephead	0.0019	0.0007	0.0058	0.0017	0.0348
Los Penasquitos Marsh SMR	Black Surfperch	0.0004	0.0002	1.0000	1.0000	4.0000
Los Penasquitos Marsh SMR	Halibut	0.0005	0.0001	0.0018	0.0056	0.0047
Los Penasquitos Marsh SMR	Kelp Bass	0.0009	0.0004	0.0015	0.0037	0.0070
Los Penasquitos Marsh SMR	Kelp Rockfish	0.0006	0.0001	0.0008	0.0016	0.0016
Los Penasquitos Marsh SMR	Ocean Whitefish	0.0004	0.0001	0.0008	0.0047	0.0085
Los Penasquitos Marsh SMR	Opaleye	0.0006	0.0002	0.0005	0.0009	0.0013
Los Penasquitos Marsh SMR	Red Sea Urchin	0.0003	0.0002	0.0006	0.0027	0.0058
Los Penasquitos Marsh SMR	Sheephead	0.0008	0.0003	0.0006	0.0021	0.0040
Lover's Cove SMCA	Black Surfperch	0.0004	0.0001	1.0000	1.0000	2.9075
Lover's Cove SMCA	Halibut	0.0006	0.0001	0.0043	0.0010	0.0037
Lover's Cove SMCA	Kelp Bass	0.0017	0.0007	0.0045	0.0024	0.0152
Lover's Cove SMCA	Kelp Rockfish	0.0012	0.0001	0.0041	0.0022	0.0053
Lover's Cove SMCA	Ocean Whitefish	0.0009	0.0003	0.0058	0.0017	0.0104
Lover's Cove SMCA	Opaleye	0.0011	0.0004	0.0039	0.0013	0.0064
Lover's Cove SMCA	Red Sea Urchin	0.0006	0.0003	0.0035	0.0009	0.0083
Lover's Cove SMCA	Sheephead	0.0014	0.0006	0.0038	0.0018	0.0119
Mikiw SMCA	Black Surfperch	0.0054	0.0019	1.0000	1.0000	1.9832
Mikiw SMCA	Halibut	0.0032	0.0009	0.0063	0.0057	0.0065
Mikiw SMCA	Kelp Bass	0.0054	0.0019	0.0032	0.0042	0.0045
Mikiw SMCA	Kelp Rockfish	0.0053	0.0009	0.0029	0.0087	0.0065
Mikiw SMCA	Ocean Whitefish	0.0032	0.0015	0.0044	0.0030	0.0038
Mikiw SMCA	Opaleye	0.0059	0.0015	0.0056	0.0102	0.0106
Mikiw SMCA	Red Sea Urchin	0.0054	0.0028	0.0069	0.0054	0.0102
Mikiw SMCA	Sheephead	0.0060	0.0023	0.0042	0.0038	0.0045

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Ocean Beach Pier SMCA	Black Surfperch	0.0018	0.0008	1.0000	1.0000	2.4633
Ocean Beach Pier SMCA	Halibut	0.0004	0.0001	0.0017	0.0018	0.0013
Ocean Beach Pier SMCA	Kelp Bass	0.0008	0.0004	0.0004	0.0007	0.0008
Ocean Beach Pier SMCA	Kelp Rockfish	0.0008	0.0001	0.0005	0.0004	0.0003
Ocean Beach Pier SMCA	Ocean Whitefish	0.0003	0.0001	0.0004	0.0012	0.0015
Ocean Beach Pier SMCA	Opaleye	0.0005	0.0002	0.0007	0.0006	0.0006
Ocean Beach Pier SMCA	Red Sea Urchin	0.0003	0.0002	0.0003	0.0007	0.0009
Ocean Beach Pier SMCA	Sheephead	0.0007	0.0004	0.0004	0.0008	0.0010
Ocean Beach SMR	Black Surfperch	0.0486	0.0220	1.0000	1.0000	4.0000
Ocean Beach SMR	Halibut	0.0032	0.0005	0.0148	0.0147	0.0183
Ocean Beach SMR	Kelp Bass	0.0106	0.0049	0.0041	0.0075	0.0081
Ocean Beach SMR	Kelp Rockfish	0.0106	0.0014	0.0045	0.0030	0.0026
Ocean Beach SMR	Ocean Whitefish	0.0069	0.0027	0.0076	0.0230	0.0273
Ocean Beach SMR	Opaleye	0.0063	0.0026	0.0055	0.0069	0.0075
Ocean Beach SMR	Red Sea Urchin	0.0062	0.0036	0.0062	0.0155	0.0189
Ocean Beach SMR	Sheephead	0.0102	0.0049	0.0050	0.0107	0.0112
Painted Cave SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Painted Cave SMCA	Halibut	0.0020	0.0004	0.0092	0.0048	0.0189
Painted Cave SMCA	Kelp Bass	0.0000	0.0000	0.0001	0.0003	0.0417
Painted Cave SMCA	Kelp Rockfish	0.0001	0.0000	0.0001	0.0004	0.0356
Painted Cave SMCA	Ocean Whitefish	0.0008	0.0004	0.0036	0.0020	0.0254
Painted Cave SMCA	Opaleye	0.0000	0.0000	0.0001	0.0004	0.0437
Painted Cave SMCA	Red Sea Urchin	0.0008	0.0004	0.0033	0.0013	0.0330
Painted Cave SMCA	Sheephead	0.0000	0.0000	0.0001	0.0001	0.0249
Palos Verdes SMR	Black Surfperch	0.0157	0.0071	1.0000	1.0000	4.0000
Palos Verdes SMR	Halibut	0.0021	0.0004	0.0070	0.0033	0.0182
Palos Verdes SMR	Kelp Bass	0.0096	0.0038	0.0127	0.0493	0.0685
Palos Verdes SMR	Kelp Rockfish	0.0096	0.0013	0.0102	0.0166	0.0148
Palos Verdes SMR	Ocean Whitefish	0.0068	0.0024	0.0135	0.0293	0.0440
Palos Verdes SMR	Opaleye	0.0076	0.0027	0.0071	0.0186	0.0252
Palos Verdes SMR	Red Sea Urchin	0.0058	0.0034	0.0110	0.0252	0.0428
Palos Verdes SMR	Sheephead	0.0092	0.0038	0.0100	0.0337	0.0475

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Point Conception SMR	Black Surfperch	0.0089	0.0040	1.0000	1.0000	4.0000
Point Conception SMR	Halibut	0.0112	0.0019	0.0399	0.0118	0.0183
Point Conception SMR	Kelp Bass	0.0053	0.0009	0.0037	0.0018	0.0038
Point Conception SMR	Kelp Rockfish	0.0079	0.0016	0.0051	0.0178	0.0260
Point Conception SMR	Ocean Whitefish	0.0114	0.0043	0.0107	0.0081	0.0269
Point Conception SMR	Opaleye	0.0067	0.0024	0.0069	0.0149	0.0293
Point Conception SMR	Red Sea Urchin	0.0104	0.0058	0.0085	0.0062	0.0310
Point Conception SMR	Sheephead	0.0071	0.0014	0.0053	0.0015	0.0044
Point Fermin SMCA	Black Surfperch	0.0010	0.0005	1.0000	1.0000	2.1902
Point Fermin SMCA	Halibut	0.0004	0.0001	0.0010	0.0015	0.0018
Point Fermin SMCA	Kelp Bass	0.0011	0.0005	0.0011	0.0041	0.0049
Point Fermin SMCA	Kelp Rockfish	0.0009	0.0001	0.0005	0.0014	0.0011
Point Fermin SMCA	Ocean Whitefish	0.0004	0.0002	0.0004	0.0017	0.0020
Point Fermin SMCA	Opaleye	0.0010	0.0003	0.0005	0.0014	0.0017
Point Fermin SMCA	Red Sea Urchin	0.0002	0.0002	0.0002	0.0012	0.0016
Point Fermin SMCA	Sheephead	0.0010	0.0005	0.0011	0.0038	0.0047
Povuu'nga Komiik SMR	Halibut	0.0011	0.0002	0.0016	0.0074	0.0054
Richardson Rock SMR	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Richardson Rock SMR	Halibut	0.0011	0.0001	0.0080	0.0012	0.0026
Richardson Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Richardson Rock SMR	Kelp Rockfish	0.0007	0.0002	0.0006	0.0005	0.0014
Richardson Rock SMR	Ocean Whitefish	0.0248	0.0072	0.0258	0.0233	0.0273
Richardson Rock SMR	Opaleye	0.0005	0.0003	0.0015	0.0022	0.0107
Richardson Rock SMR	Red Sea Urchin	0.0236	0.0137	0.0230	0.0270	0.0349
Richardson Rock SMR	Sheephead	0.0005	0.0003	0.0007	0.0004	0.0032
San Clemente Pending Military Closure 1	Black Surfperch	0.0263	0.0119	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 2	Black Surfperch	0.0129	0.0055	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 1	Halibut	0.0007	0.0002	0.0067	0.0033	0.0337
San Clemente Pending Military Closure 2	Halibut	0.0026	0.0006	0.0276	0.0115	0.0495
San Clemente Pending Military Closure 1	Kelp Bass	0.0291	0.0124	0.0550	0.0676	0.0966
San Clemente Pending Military Closure 2	Kelp Bass	0.0313	0.0120	0.0907	0.0587	0.1272
San Clemente Pending Military Closure 1	Kelp Rockfish	0.0306	0.0039	0.0962	0.0530	0.0501
San Clemente Pending	Kelp Rockfish	0.0275	0.0032	0.1054	0.0308	0.0324

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Military Closure 2						
San Clemente Pending Military Closure 1	Ocean Whitefish	0.0241	0.0085	0.0296	0.0376	0.0405
San Clemente Pending Military Closure 2	Ocean Whitefish	0.0269	0.0092	0.0935	0.0433	0.0546
San Clemente Pending Military Closure 1	Opaleye	0.0280	0.0114	0.1018	0.0976	0.1443
San Clemente Pending Military Closure 2	Opaleye	0.0274	0.0102	0.1226	0.0828	0.1692
San Clemente Pending Military Closure 1	Red Sea Urchin	0.0266	0.0151	0.0322	0.0345	0.0400
San Clemente Pending Military Closure 2	Red Sea Urchin	0.0254	0.0137	0.0792	0.0332	0.0487
San Clemente Pending Military Closure 1	Sheephead	0.0238	0.0103	0.0426	0.0552	0.0761
San Clemente Pending Military Closure 2	Sheephead	0.0248	0.0095	0.0611	0.0397	0.0787
San Elijo Lagoon SMR	Black Surfperch	0.0001	0.0001	1.0000	1.0000	4.0000
San Elijo Lagoon SMR	Halibut	0.0010	0.0002	0.0037	0.0068	0.0064
San Elijo Lagoon SMR	Kelp Bass	0.0005	0.0002	0.0004	0.0025	0.0060
San Elijo Lagoon SMR	Kelp Rockfish	0.0003	0.0002	0.0002	0.0008	0.0011
San Elijo Lagoon SMR	Ocean Whitefish	0.0002	0.0001	0.0005	0.0050	0.0134
San Elijo Lagoon SMR	Opaleye	0.0004	0.0001	0.0000	0.0000	0.0000
San Elijo Lagoon SMR	Red Sea Urchin	0.0001	0.0001	0.0003	0.0030	0.0090
San Elijo Lagoon SMR	Sheephead	0.0004	0.0002	0.0002	0.0011	0.0028
Santa Barbara Island SMR	Black Surfperch	0.0025	0.0011	1.0000	1.0000	4.0000
Santa Barbara Island SMR	Halibut	0.0032	0.0003	0.0802	0.0083	0.0297
Santa Barbara Island SMR	Kelp Bass	0.0090	0.0039	0.0775	0.0189	0.1247
Santa Barbara Island SMR	Kelp Rockfish	0.0083	0.0008	0.0519	0.0063	0.0169
Santa Barbara Island SMR	Ocean Whitefish	0.0098	0.0036	0.0453	0.0226	0.0666
Santa Barbara Island SMR	Opaleye	0.0077	0.0034	0.0625	0.0144	0.0842
Santa Barbara Island SMR	Red Sea Urchin	0.0087	0.0048	0.0374	0.0148	0.0684
Santa Barbara Island SMR	Sheephead	0.0075	0.0032	0.0541	0.0156	0.0930
Scorpion SMR	Black Surfperch	0.0037	0.0016	1.0000	1.0000	4.0000
Scorpion SMR	Halibut	0.0028	0.0005	0.0205	0.0045	0.0327
Scorpion SMR	Kelp Bass	0.0102	0.0043	0.0554	0.0216	0.0878
Scorpion SMR	Kelp Rockfish	0.0118	0.0015	0.0538	0.0199	0.0473
Scorpion SMR	Ocean Whitefish	0.0095	0.0036	0.0203	0.0166	0.0487
Scorpion SMR	Opaleye	0.0093	0.0039	0.0730	0.0288	0.1149
Scorpion SMR	Red Sea Urchin	0.0086	0.0047	0.0166	0.0120	0.0550

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Scorpion SMR	Sheephead	0.0087	0.0037	0.0317	0.0118	0.0468
Skunk Point SMR	Black Surfperch	0.0020	0.0009	1.0000	1.0000	4.0000
Skunk Point SMR	Halibut	0.0027	0.0005	0.0042	0.0061	0.0051
Skunk Point SMR	Kelp Bass	0.0031	0.0012	0.0024	0.0029	0.0049
Skunk Point SMR	Kelp Rockfish	0.0030	0.0004	0.0011	0.0022	0.0021
Skunk Point SMR	Ocean Whitefish	0.0016	0.0006	0.0016	0.0026	0.0048
Skunk Point SMR	Opaleye	0.0024	0.0009	0.0015	0.0032	0.0046
Skunk Point SMR	Red Sea Urchin	0.0014	0.0008	0.0014	0.0021	0.0056
Skunk Point SMR	Sheephead	0.0028	0.0012	0.0023	0.0034	0.0057
South Point SMR	Black Surfperch	0.0120	0.0051	1.0000	1.0000	4.0000
South Point SMR	Halibut	0.0076	0.0013	0.0426	0.0096	0.0174
South Point SMR	Kelp Bass	0.0175	0.0063	0.0138	0.0059	0.0095
South Point SMR	Kelp Rockfish	0.0183	0.0027	0.0082	0.0055	0.0060
South Point SMR	Ocean Whitefish	0.0123	0.0042	0.0180	0.0107	0.0217
South Point SMR	Opaleye	0.0138	0.0045	0.0146	0.0097	0.0143
South Point SMR	Red Sea Urchin	0.0118	0.0064	0.0155	0.0084	0.0252
South Point SMR	Sheephead	0.0153	0.0057	0.0134	0.0069	0.0109
Sumo SMCA	Black Surfperch	0.0050	0.0023	1.0000	1.0000	4.0000
Sumo SMCA	Halibut	0.0109	0.0023	0.0141	0.0174	0.0239
Sumo SMCA	Kelp Bass	0.0060	0.0024	0.0071	0.0209	0.0608
Sumo SMCA	Kelp Rockfish	0.0068	0.0013	0.0059	0.0111	0.0232
Sumo SMCA	Ocean Whitefish	0.0037	0.0013	0.0050	0.0047	0.0198
Sumo SMCA	Opaleye	0.0052	0.0019	0.0070	0.0178	0.0482
Sumo SMCA	Red Sea Urchin	0.0033	0.0018	0.0037	0.0032	0.0187
Sumo SMCA	Sheephead	0.0059	0.0024	0.0064	0.0137	0.0439
Tijuana River Mouth SMCA	Black Surfperch	0.0033	0.0016	1.0000	1.0000	2.4304
Tijuana River Mouth SMCA	Halibut	0.0020	0.0004	0.0072	0.0105	0.0076
Tijuana River Mouth SMCA	Kelp Bass	0.0016	0.0007	0.0018	0.0085	0.0104
Tijuana River Mouth SMCA	Kelp Rockfish	0.0014	0.0002	0.0000	0.0001	0.0001
Tijuana River Mouth SMCA	Ocean Whitefish	0.0008	0.0003	0.0005	0.0026	0.0033
Tijuana River Mouth SMCA	Opaleye	0.0009	0.0003	0.0000	0.0000	0.0000
Tijuana River Mouth SMCA	Red Sea Urchin	0.0007	0.0004	0.0004	0.0014	0.0018
Tijuana River Mouth SMCA	Sheephead	0.0019	0.0009	0.0006	0.0022	0.0028
Umuqpat SMCA	Black Surfperch	0.0029	0.0010	1.0000	1.0000	3.0948
Umuqpat SMCA	Halibut	0.0049	0.0012	0.0148	0.0126	0.0191
Umuqpat SMCA	Kelp Bass	0.0067	0.0025	0.0173	0.0205	0.0762
Umuqpat SMCA	Kelp Rockfish	0.0054	0.0010	0.0114	0.0102	0.0159
Umuqpat SMCA	Ocean Whitefish	0.0047	0.0018	0.0131	0.0176	0.0541

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Umuqpat SMCA	Opaleye	0.0063	0.0020	0.0198	0.0143	0.0401
Umuqpat SMCA	Red Sea Urchin	0.0040	0.0020	0.0109	0.0161	0.0588
Umuqpat SMCA	Sheephead	0.0063	0.0022	0.0177	0.0146	0.0680

Table 3c. MPA by MPA results for Revised South Coast Regional Stakeholder Group (SCRSG) MPA Proposal 2 (P2R). Biomass, self-recruitment and self-persistence generated for each of the MPAs in P2R from the UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Values of biomass are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Self-recruitment is the proportion of settling larvae in an MPA that were produced within that MPA. This metric provides information on the relative isolation of the MPA from other larval sources. Values of self-recruitment are between 0 and 1, where a value of 0 indicates that a population is totally isolated. Self-persistence is the degree to which an MPA is self-sustaining. It is calculated based on larval production and the proportion of larvae produced within an MPA that return to that MPA. Values of self-persistence that are less than or equal to 1 are dependent on larvae from elsewhere, while values greater than 1 are self-sufficient.

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Abalone Cove SMCA	Black Surfperch	0.0024	0.0011	1.0000	1.0000	4.0000
Abalone Cove SMCA	Halibut	0.0039	0.0006	0.0092	0.0044	0.0069
Abalone Cove SMCA	Kelp Bass	0.0042	0.0017	0.0039	0.0109	0.0235
Abalone Cove SMCA	Kelp Rockfish	0.0039	0.0008	0.0027	0.0046	0.0058
Abalone Cove SMCA	Ocean Whitefish	0.0030	0.0011	0.0042	0.0056	0.0186
Abalone Cove SMCA	Opaleye	0.0034	0.0013	0.0026	0.0052	0.0100
Abalone Cove SMCA	Red Sea Urchin	0.0023	0.0013	0.0028	0.0036	0.0155
Abalone Cove SMCA	Sheephead	0.0040	0.0016	0.0054	0.0116	0.0272
Anacapa Island SMCA	Black Surfperch	0.0030	0.0013	1.0000	1.0000	4.0000
Anacapa Island SMCA	Halibut	0.0026	0.0005	0.0308	0.0026	0.0243
Anacapa Island SMCA	Kelp Bass	0.0086	0.0039	0.0530	0.0131	0.0497
Anacapa Island SMCA	Kelp Rockfish	0.0099	0.0012	0.0749	0.0149	0.0391
Anacapa Island SMCA	Ocean Whitefish	0.0043	0.0016	0.0156	0.0077	0.0243
Anacapa Island SMCA	Opaleye	0.0078	0.0036	0.1068	0.0232	0.0990
Anacapa Island SMCA	Red Sea Urchin	0.0038	0.0021	0.0130	0.0057	0.0277
Anacapa Island SMCA	Sheephead	0.0074	0.0034	0.0422	0.0092	0.0378
Anacapa Island SMR	Black Surfperch	0.0086	0.0039	1.0000	1.0000	4.0000

Anacapa Island SMR	Halibut	0.0043	0.0010	0.0064	0.0085	0.0139
Anacapa Island SMR	Kelp Bass	0.0089	0.0034	0.0059	0.0193	0.0271
Anacapa Island SMR	Kelp Rockfish	0.0097	0.0021	0.0066	0.0230	0.0227
Anacapa Island SMR	Ocean Whitefish	0.0051	0.0017	0.0050	0.0118	0.0189
Anacapa Island SMR	Opaleye	0.0083	0.0029	0.0112	0.0351	0.0490
Anacapa Island SMR	Red Sea Urchin	0.0048	0.0027	0.0048	0.0122	0.0240
Anacapa Island SMR	Sheephead	0.0080	0.0032	0.0052	0.0151	0.0212
Begg Rock SMR	Ocean Whitefish	0.0068	0.0021	0.0030	0.0103	0.0111
Begg Rock SMR	Red Sea Urchin	0.0074	0.0043	0.0034	0.0120	0.0141
Bird Rock SMCA	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Bird Rock SMCA	Halibut	0.0002	0.0001	0.0006	0.0003	0.0019
Bird Rock SMCA	Kelp Bass	0.0008	0.0003	0.0010	0.0013	0.0069
Bird Rock SMCA	Kelp Rockfish	0.0006	0.0001	0.0012	0.0013	0.0030
Bird Rock SMCA	Ocean Whitefish	0.0012	0.0004	0.0030	0.0022	0.0082
Bird Rock SMCA	Opaleye	0.0007	0.0003	0.0018	0.0021	0.0096
Bird Rock SMCA	Red Sea Urchin	0.0009	0.0005	0.0021	0.0012	0.0074
Bird Rock SMCA	Sheephead	0.0007	0.0003	0.0009	0.0010	0.0051
Blue Cavern SMR	Black Surfperch	0.0015	0.0007	1.0000	1.0000	4.0000
Blue Cavern SMR	Halibut	0.0023	0.0004	0.0090	0.0052	0.0144
Blue Cavern SMR	Kelp Bass	0.0045	0.0018	0.0065	0.0084	0.0449
Blue Cavern SMR	Kelp Rockfish	0.0037	0.0007	0.0081	0.0084	0.0211
Blue Cavern SMR	Ocean Whitefish	0.0022	0.0008	0.0061	0.0044	0.0232
Blue Cavern SMR	Opaleye	0.0039	0.0016	0.0124	0.0138	0.0682
Blue Cavern SMR	Red Sea Urchin	0.0017	0.0009	0.0044	0.0027	0.0214
Blue Cavern SMR	Sheephead	0.0038	0.0016	0.0054	0.0061	0.0329
Bolsa Chica SMCA	Halibut	0.0011	0.0002	0.0016	0.0077	0.0056
Cabrillo SMR	Black Surfperch	0.0102	0.0046	1.0000	1.0000	4.0000
Cabrillo SMR	Halibut	0.0006	0.0001	0.0018	0.0019	0.0020
Cabrillo SMR	Kelp Bass	0.0012	0.0006	0.0003	0.0008	0.0008
Cabrillo SMR	Kelp Rockfish	0.0012	0.0002	0.0004	0.0004	0.0003
Cabrillo SMR	Ocean Whitefish	0.0005	0.0002	0.0003	0.0014	0.0014
Cabrillo SMR	Opaleye	0.0006	0.0003	0.0001	0.0003	0.0003
Cabrillo SMR	Red Sea Urchin	0.0004	0.0003	0.0002	0.0008	0.0008
Cabrillo SMR	Sheephead	0.0013	0.0006	0.0003	0.0009	0.0009
Campus Point SMR	Black Surfperch	0.0121	0.0053	1.0000	1.0000	4.0000
Campus Point SMR	Halibut	0.0058	0.0010	0.0169	0.0069	0.0129
Campus Point SMR	Kelp Bass	0.0104	0.0034	0.0101	0.0115	0.0148
Campus Point SMR	Kelp Rockfish	0.0102	0.0014	0.0075	0.0172	0.0150
Campus Point SMR	Ocean Whitefish	0.0084	0.0029	0.0148	0.0104	0.0305
Campus Point SMR	Opaleye	0.0099	0.0030	0.0145	0.0244	0.0327
Campus Point SMR	Red Sea Urchin	0.0075	0.0040	0.0106	0.0078	0.0310

Campus Point SMR	Sheephead	0.0128	0.0045	0.0126	0.0100	0.0147
Carrington Point SMR	Black Surfperch	0.0270	0.0122	1.0000	1.0000	4.0000
Carrington Point SMR	Halibut	0.0212	0.0040	0.0544	0.0491	0.0552
Carrington Point SMR	Kelp Bass	0.0277	0.0102	0.0417	0.0503	0.0912
Carrington Point SMR	Kelp Rockfish	0.0242	0.0051	0.0135	0.0458	0.0544
Carrington Point SMR	Ocean Whitefish	0.0173	0.0059	0.0262	0.0322	0.0701
Carrington Point SMR	Opaleye	0.0198	0.0065	0.0112	0.0266	0.0420
Carrington Point SMR	Red Sea Urchin	0.0162	0.0091	0.0221	0.0276	0.0824
Carrington Point SMR	Sheephead	0.0246	0.0094	0.0271	0.0380	0.0690
Del Mar SMR	Black Surfperch	0.0049	0.0022	1.0000	1.0000	4.0000
Del Mar SMR	Halibut	0.0090	0.0020	0.0351	0.0729	0.0691
Del Mar SMR	Kelp Bass	0.0072	0.0031	0.0093	0.0157	0.0281
Del Mar SMR	Kelp Rockfish	0.0058	0.0012	0.0058	0.0071	0.0075
Del Mar SMR	Ocean Whitefish	0.0066	0.0024	0.0139	0.0415	0.0823
Del Mar SMR	Opaleye	0.0046	0.0019	0.0022	0.0025	0.0040
Del Mar SMR	Red Sea Urchin	0.0053	0.0030	0.0104	0.0249	0.0560
Del Mar SMR	Sheephead	0.0064	0.0028	0.0036	0.0076	0.0140
Farnsworth SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Farnsworth SMCA	Halibut	0.0006	0.0001	0.0041	0.0011	0.0021
Farnsworth SMCA	Kelp Bass	0.0001	0.0000	0.0002	0.0001	0.0070
Farnsworth SMCA	Kelp Rockfish	0.0001	0.0001	0.0002	0.0001	0.0022
Farnsworth SMCA	Ocean Whitefish	0.0067	0.0024	0.0141	0.0129	0.0297
Farnsworth SMCA	Opaleye	0.0001	0.0000	0.0003	0.0001	0.0096
Farnsworth SMCA	Red Sea Urchin	0.0060	0.0033	0.0116	0.0096	0.0291
Farnsworth SMCA	Sheephead	0.0001	0.0000	0.0002	0.0001	0.0075
Footprint SMR	Ocean Whitefish	0.0034	0.0013	0.0042	0.0061	0.0178
Footprint SMR	Red Sea Urchin	0.0032	0.0018	0.0038	0.0049	0.0217
Gull Island SMR	Black Surfperch	0.0170	0.0077	1.0000	1.0000	4.0000
Gull Island SMR	Halibut	0.0094	0.0022	0.0271	0.0173	0.0327
Gull Island SMR	Kelp Bass	0.0193	0.0072	0.0170	0.0115	0.0179
Gull Island SMR	Kelp Rockfish	0.0215	0.0044	0.0201	0.0232	0.0261
Gull Island SMR	Ocean Whitefish	0.0122	0.0044	0.0194	0.0147	0.0343
Gull Island SMR	Opaleye	0.0165	0.0057	0.0187	0.0177	0.0261
Gull Island SMR	Red Sea Urchin	0.0116	0.0065	0.0160	0.0117	0.0404
Gull Island SMR	Sheephead	0.0182	0.0072	0.0255	0.0191	0.0311
Harris Point SMR	Black Surfperch	0.0151	0.0069	1.0000	1.0000	4.0000
Harris Point SMR	Halibut	0.0133	0.0025	0.0495	0.0293	0.0441
Harris Point SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Harris Point SMR	Kelp Rockfish	0.0168	0.0029	0.0097	0.0260	0.0275
Harris Point SMR	Ocean Whitefish	0.0270	0.0087	0.0242	0.0362	0.0536
Harris Point SMR	Opaleye	0.0153	0.0051	0.0104	0.0210	0.0301

Harris Point SMR	Red Sea Urchin	0.0247	0.0141	0.0197	0.0337	0.0624
Harris Point SMR	Sheephead	0.0183	0.0072	0.0278	0.0315	0.0531
Judith Rock SMR	Black Surfperch	0.0100	0.0045	1.0000	1.0000	4.0000
Judith Rock SMR	Halibut	0.0014	0.0003	0.0075	0.0022	0.0047
Judith Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Judith Rock SMR	Kelp Rockfish	0.0066	0.0008	0.0047	0.0027	0.0020
Judith Rock SMR	Ocean Whitefish	0.0048	0.0017	0.0149	0.0056	0.0112
Judith Rock SMR	Opaleye	0.0062	0.0019	0.0135	0.0113	0.0136
Judith Rock SMR	Red Sea Urchin	0.0046	0.0026	0.0108	0.0044	0.0123
Judith Rock SMR	Sheephead	0.0071	0.0026	0.0104	0.0050	0.0061
La Jolla SMR	Black Surfperch	0.0013	0.0006	1.0000	1.0000	4.0000
La Jolla SMR	Halibut	0.0016	0.0003	0.0063	0.0097	0.0084
La Jolla SMR	Kelp Bass	0.0018	0.0007	0.0021	0.0056	0.0066
La Jolla SMR	Kelp Rockfish	0.0015	0.0002	0.0013	0.0016	0.0012
La Jolla SMR	Ocean Whitefish	0.0007	0.0003	0.0012	0.0084	0.0120
La Jolla SMR	Opaleye	0.0011	0.0004	0.0007	0.0011	0.0012
La Jolla SMR	Red Sea Urchin	0.0006	0.0003	0.0009	0.0056	0.0087
La Jolla SMR	Sheephead	0.0016	0.0006	0.0011	0.0032	0.0038
Laguna North SMCA	Black Surfperch	0.0028	0.0009	1.0000	1.0000	3.2740
Laguna North SMCA	Halibut	0.0048	0.0009	0.0144	0.0157	0.0230
Laguna North SMCA	Kelp Bass	0.0060	0.0023	0.0151	0.0233	0.0961
Laguna North SMCA	Kelp Rockfish	0.0049	0.0010	0.0103	0.0115	0.0204
Laguna North SMCA	Ocean Whitefish	0.0031	0.0012	0.0089	0.0155	0.0627
Laguna North SMCA	Opaleye	0.0059	0.0018	0.0181	0.0183	0.0602
Laguna North SMCA	Red Sea Urchin	0.0024	0.0012	0.0070	0.0121	0.0592
Laguna North SMCA	Sheephead	0.0057	0.0020	0.0154	0.0171	0.0882
Laguna SMR	Black Surfperch	0.0030	0.0014	1.0000	1.0000	4.0000
Laguna SMR	Halibut	0.0043	0.0007	0.0116	0.0099	0.0166
Laguna SMR	Kelp Bass	0.0059	0.0024	0.0099	0.0203	0.0469
Laguna SMR	Kelp Rockfish	0.0044	0.0007	0.0081	0.0135	0.0147
Laguna SMR	Ocean Whitefish	0.0034	0.0012	0.0103	0.0130	0.0403
Laguna SMR	Opaleye	0.0046	0.0018	0.0177	0.0304	0.0502
Laguna SMR	Red Sea Urchin	0.0024	0.0013	0.0068	0.0078	0.0292
Laguna SMR	Sheephead	0.0057	0.0023	0.0122	0.0188	0.0490
Laguna South SMCA	Black Surfperch	0.0028	0.0010	1.0000	1.0000	3.0935
Laguna South SMCA	Halibut	0.0038	0.0007	0.0087	0.0164	0.0154
Laguna South SMCA	Kelp Bass	0.0044	0.0018	0.0066	0.0197	0.0614
Laguna South SMCA	Kelp Rockfish	0.0036	0.0008	0.0067	0.0175	0.0281
Laguna South SMCA	Ocean Whitefish	0.0023	0.0010	0.0064	0.0118	0.0562
Laguna South SMCA	Opaleye	0.0041	0.0013	0.0106	0.0296	0.0862
Laguna South SMCA	Red Sea Urchin	0.0014	0.0010	0.0041	0.0092	0.0495

Laguna South SMCA	Sheephead	0.0042	0.0016	0.0103	0.0217	0.0778
Lover's Cove SMCA	Black Surfperch	0.0004	0.0001	1.0000	1.0000	2.9568
Lover's Cove SMCA	Halibut	0.0004	0.0001	0.0031	0.0010	0.0034
Lover's Cove SMCA	Kelp Bass	0.0010	0.0007	0.0027	0.0025	0.0152
Lover's Cove SMCA	Kelp Rockfish	0.0009	0.0001	0.0030	0.0022	0.0050
Lover's Cove SMCA	Ocean Whitefish	0.0005	0.0003	0.0030	0.0017	0.0104
Lover's Cove SMCA	Opaleye	0.0011	0.0004	0.0040	0.0013	0.0065
Lover's Cove SMCA	Red Sea Urchin	0.0006	0.0003	0.0036	0.0009	0.0083
Lover's Cove SMCA	Sheephead	0.0009	0.0006	0.0024	0.0019	0.0119
Ocean Beach Pier SMCA	Black Surfperch	0.0018	0.0008	1.0000	1.0000	2.5182
Ocean Beach Pier SMCA	Halibut	0.0004	0.0001	0.0017	0.0021	0.0015
Ocean Beach Pier SMCA	Kelp Bass	0.0008	0.0003	0.0004	0.0007	0.0008
Ocean Beach Pier SMCA	Kelp Rockfish	0.0008	0.0001	0.0005	0.0004	0.0004
Ocean Beach Pier SMCA	Ocean Whitefish	0.0003	0.0001	0.0004	0.0012	0.0015
Ocean Beach Pier SMCA	Opaleye	0.0005	0.0002	0.0007	0.0006	0.0006
Ocean Beach Pier SMCA	Red Sea Urchin	0.0003	0.0002	0.0003	0.0007	0.0009
Ocean Beach Pier SMCA	Sheephead	0.0007	0.0003	0.0004	0.0008	0.0010
Painted Cave SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Painted Cave SMCA	Halibut	0.0020	0.0004	0.0092	0.0048	0.0192
Painted Cave SMCA	Kelp Bass	0.0000	0.0000	0.0001	0.0003	0.0417
Painted Cave SMCA	Kelp Rockfish	0.0001	0.0000	0.0001	0.0004	0.0355
Painted Cave SMCA	Ocean Whitefish	0.0008	0.0004	0.0036	0.0020	0.0254
Painted Cave SMCA	Opaleye	0.0000	0.0000	0.0001	0.0004	0.0437
Painted Cave SMCA	Red Sea Urchin	0.0008	0.0004	0.0033	0.0013	0.0330
Painted Cave SMCA	Sheephead	0.0000	0.0000	0.0001	0.0001	0.0249
Point Conception SMR	Black Surfperch	0.0233	0.0105	1.0000	1.0000	4.0000
Point Conception SMR	Halibut	0.0150	0.0030	0.0478	0.0179	0.0282
Point Conception SMR	Kelp Bass	0.0100	0.0023	0.0054	0.0055	0.0101
Point Conception SMR	Kelp Rockfish	0.0120	0.0025	0.0066	0.0289	0.0352
Point Conception SMR	Ocean Whitefish	0.0168	0.0060	0.0159	0.0117	0.0318
Point Conception SMR	Opaleye	0.0109	0.0036	0.0090	0.0229	0.0387
Point Conception SMR	Red Sea Urchin	0.0153	0.0086	0.0131	0.0096	0.0368
Point Conception SMR	Sheephead	0.0144	0.0039	0.0085	0.0049	0.0117
Point Dume SMCA	Black Surfperch	0.0078	0.0035	1.0000	1.0000	4.0000
Point Dume SMCA	Halibut	0.0123	0.0025	0.0160	0.0195	0.0265
Point Dume SMCA	Kelp Bass	0.0079	0.0031	0.0095	0.0280	0.0683
Point Dume SMCA	Kelp Rockfish	0.0091	0.0017	0.0081	0.0163	0.0281

Point Dume SMCA	Ocean Whitefish	0.0058	0.0021	0.0078	0.0075	0.0286
Point Dume SMCA	Opaleye	0.0069	0.0025	0.0095	0.0232	0.0541
Point Dume SMCA	Red Sea Urchin	0.0052	0.0029	0.0060	0.0051	0.0270
Point Dume SMCA	Sheephead	0.0079	0.0032	0.0087	0.0188	0.0494
Point Vicente SMR	Black Surfperch	0.0022	0.0010	1.0000	1.0000	4.0000
Point Vicente SMR	Halibut	0.0038	0.0006	0.0125	0.0053	0.0125
Point Vicente SMR	Kelp Bass	0.0050	0.0020	0.0093	0.0160	0.0444
Point Vicente SMR	Kelp Rockfish	0.0047	0.0008	0.0063	0.0057	0.0095
Point Vicente SMR	Ocean Whitefish	0.0028	0.0011	0.0104	0.0055	0.0274
Point Vicente SMR	Opaleye	0.0041	0.0016	0.0092	0.0112	0.0278
Point Vicente SMR	Red Sea Urchin	0.0022	0.0012	0.0075	0.0035	0.0246
Point Vicente SMR	Sheephead	0.0045	0.0019	0.0088	0.0121	0.0362
Richardson Rock SMR	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Richardson Rock SMR	Halibut	0.0011	0.0001	0.0080	0.0012	0.0027
Richardson Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Richardson Rock SMR	Kelp Rockfish	0.0007	0.0002	0.0006	0.0005	0.0014
Richardson Rock SMR	Ocean Whitefish	0.0247	0.0071	0.0257	0.0233	0.0273
Richardson Rock SMR	Opaleye	0.0005	0.0003	0.0015	0.0022	0.0107
Richardson Rock SMR	Red Sea Urchin	0.0233	0.0136	0.0230	0.0271	0.0349
Richardson Rock SMR	Sheephead	0.0005	0.0003	0.0007	0.0004	0.0032
San Clemente Pending Military Closure 2	Black Surfperch	0.0129	0.0055	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 1	Black Surfperch	0.0263	0.0119	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 2	Halibut	0.0026	0.0006	0.0279	0.0117	0.0502
San Clemente Pending Military Closure 1	Halibut	0.0007	0.0002	0.0068	0.0034	0.0342
San Clemente Pending Military Closure 2	Kelp Bass	0.0311	0.0119	0.0914	0.0594	0.1272
San Clemente Pending Military Closure 1	Kelp Bass	0.0288	0.0122	0.0552	0.0681	0.0966
San Clemente Pending Military Closure 2	Kelp Rockfish	0.0274	0.0032	0.1058	0.0312	0.0322
San Clemente Pending Military Closure 1	Kelp Rockfish	0.0303	0.0038	0.0964	0.0536	0.0500
San Clemente Pending Military Closure 2	Ocean Whitefish	0.0267	0.0091	0.0939	0.0435	0.0546
San Clemente Pending Military Closure 1	Ocean Whitefish	0.0240	0.0084	0.0298	0.0376	0.0405
San Clemente Pending Military Closure 2	Opaleye	0.0273	0.0102	0.1232	0.0832	0.1693
San Clemente Pending Military Closure 1	Opaleye	0.0278	0.0113	0.1019	0.0978	0.1443

San Clemente Pending Military Closure 2	Red Sea Urchin	0.0252	0.0136	0.0796	0.0334	0.0487
San Clemente Pending Military Closure 1	Red Sea Urchin	0.0263	0.0150	0.0324	0.0346	0.0400
San Clemente Pending Military Closure 2	Sheephead	0.0246	0.0095	0.0617	0.0401	0.0787
San Clemente Pending Military Closure 1	Sheephead	0.0235	0.0102	0.0429	0.0556	0.0761
Santa Barbara Island SMR	Black Surfperch	0.0025	0.0011	1.0000	1.0000	4.0000
Santa Barbara Island SMR	Halibut	0.0032	0.0003	0.0807	0.0085	0.0304
Santa Barbara Island SMR	Kelp Bass	0.0089	0.0038	0.0786	0.0194	0.1247
Santa Barbara Island SMR	Kelp Rockfish	0.0083	0.0008	0.0527	0.0064	0.0168
Santa Barbara Island SMR	Ocean Whitefish	0.0098	0.0036	0.0455	0.0228	0.0666
Santa Barbara Island SMR	Opaleye	0.0077	0.0034	0.0630	0.0145	0.0843
Santa Barbara Island SMR	Red Sea Urchin	0.0086	0.0048	0.0377	0.0150	0.0684
Santa Barbara Island SMR	Sheephead	0.0074	0.0032	0.0548	0.0159	0.0930
Scorpion SMR	Black Surfperch	0.0037	0.0016	1.0000	1.0000	4.0000
Scorpion SMR	Halibut	0.0028	0.0005	0.0205	0.0046	0.0333
Scorpion SMR	Kelp Bass	0.0102	0.0043	0.0559	0.0221	0.0878
Scorpion SMR	Kelp Rockfish	0.0117	0.0015	0.0543	0.0202	0.0470
Scorpion SMR	Ocean Whitefish	0.0095	0.0036	0.0203	0.0168	0.0487
Scorpion SMR	Opaleye	0.0093	0.0039	0.0738	0.0289	0.1149
Scorpion SMR	Red Sea Urchin	0.0086	0.0046	0.0167	0.0121	0.0550
Scorpion SMR	Sheephead	0.0087	0.0036	0.0320	0.0121	0.0468
Skunk Point SMR	Black Surfperch	0.0020	0.0009	1.0000	1.0000	4.0000
Skunk Point SMR	Halibut	0.0027	0.0005	0.0042	0.0062	0.0052
Skunk Point SMR	Kelp Bass	0.0031	0.0012	0.0024	0.0030	0.0049
Skunk Point SMR	Kelp Rockfish	0.0029	0.0004	0.0011	0.0022	0.0021
Skunk Point SMR	Ocean Whitefish	0.0015	0.0006	0.0016	0.0027	0.0048
Skunk Point SMR	Opaleye	0.0024	0.0008	0.0015	0.0032	0.0046
Skunk Point SMR	Red Sea Urchin	0.0014	0.0008	0.0014	0.0021	0.0056
Skunk Point SMR	Sheephead	0.0028	0.0011	0.0023	0.0035	0.0057
South Point SMR	Black Surfperch	0.0120	0.0051	1.0000	1.0000	4.0000
South Point SMR	Halibut	0.0076	0.0013	0.0428	0.0097	0.0177
South Point SMR	Kelp Bass	0.0173	0.0062	0.0139	0.0060	0.0095
South Point SMR	Kelp Rockfish	0.0181	0.0027	0.0083	0.0055	0.0060

South Point SMR	Ocean Whitefish	0.0123	0.0042	0.0181	0.0107	0.0217
South Point SMR	Opaleye	0.0137	0.0045	0.0148	0.0097	0.0143
South Point SMR	Red Sea Urchin	0.0117	0.0064	0.0156	0.0084	0.0252
South Point SMR	Sheephead	0.0152	0.0057	0.0134	0.0070	0.0109
Sunset Cliffs SMR	Black Surfperch	0.0486	0.0220	1.0000	1.0000	4.0000
Sunset Cliffs SMR	Halibut	0.0032	0.0006	0.0149	0.0210	0.0239
Sunset Cliffs SMR	Kelp Bass	0.0104	0.0047	0.0041	0.0087	0.0097
Sunset Cliffs SMR	Kelp Rockfish	0.0105	0.0015	0.0045	0.0040	0.0034
Sunset Cliffs SMR	Ocean Whitefish	0.0068	0.0026	0.0076	0.0275	0.0349
Sunset Cliffs SMR	Opaleye	0.0062	0.0026	0.0055	0.0082	0.0092
Sunset Cliffs SMR	Red Sea Urchin	0.0061	0.0036	0.0062	0.0179	0.0234
Sunset Cliffs SMR	Sheephead	0.0100	0.0048	0.0051	0.0124	0.0132

Table 3d. MPA by MPA results for Revised South Coast Regional Stakeholder Group (SCRSG) MPA Proposal 3 (P3R). Biomass, self-recruitment and self-persistence generated for each of the MPAs in P3R from the UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Values of biomass are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Self-recruitment is the proportion of settling larvae in an MPA that were produced within that MPA. This metric provides information on the relative isolation of the MPA from other larval sources. Values of self-recruitment are between 0 and 1, where a value of 0 indicates that a population is totally isolated. Self-persistence is the degree to which an MPA is self-sustaining. It is calculated based on larval production and the proportion of larvae produced within an MPA that return to that MPA. Values of self-persistence that are less than or equal to 1 are dependent on larvae from elsewhere, while values greater than 1 are self-sufficient.

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Anacapa Island SMCA	Black Surfperch	0.0030	0.0013	1.0000	1.0000	4.0000
Anacapa Island SMCA	Halibut	0.0026	0.0005	0.0299	0.0023	0.0229
Anacapa Island SMCA	Kelp Bass	0.0088	0.0040	0.0500	0.0120	0.0497
Anacapa Island SMCA	Kelp Rockfish	0.0101	0.0012	0.0689	0.0131	0.0361
Anacapa Island SMCA	Ocean Whitefish	0.0043	0.0017	0.0152	0.0074	0.0243
Anacapa Island SMCA	Opaleye	0.0079	0.0037	0.0972	0.0211	0.0989
Anacapa Island SMCA	Red Sea Urchin	0.0039	0.0021	0.0125	0.0055	0.0277
Anacapa Island SMCA	Sheephead	0.0076	0.0035	0.0400	0.0084	0.0378
Anacapa Island SMR	Black Surfperch	0.0086	0.0039	1.0000	1.0000	4.0000
Anacapa Island SMR	Halibut	0.0044	0.0010	0.0063	0.0078	0.0133
Anacapa Island SMR	Kelp Bass	0.0094	0.0037	0.0059	0.0187	0.0271
Anacapa Island SMR	Kelp Rockfish	0.0104	0.0022	0.0063	0.0214	0.0216
Anacapa Island SMR	Ocean Whitefish	0.0052	0.0018	0.0049	0.0116	0.0189

Anacapa Island SMR	Opaleye	0.0088	0.0032	0.0106	0.0340	0.0490
Anacapa Island SMR	Red Sea Urchin	0.0050	0.0028	0.0047	0.0120	0.0240
Anacapa Island SMR	Sheephead	0.0084	0.0034	0.0051	0.0145	0.0212
Batiquitos Lagoon SMR	Halibut	0.0003	0.0001	0.0010	0.0019	0.0019
Blue Cavern SMR	Black Surfperch	0.0015	0.0007	1.0000	1.0000	4.0000
Blue Cavern SMR	Halibut	0.0023	0.0004	0.0088	0.0051	0.0155
Blue Cavern SMR	Kelp Bass	0.0047	0.0019	0.0060	0.0089	0.0519
Blue Cavern SMR	Kelp Rockfish	0.0038	0.0007	0.0073	0.0086	0.0225
Blue Cavern SMR	Ocean Whitefish	0.0022	0.0008	0.0058	0.0053	0.0272
Blue Cavern SMR	Opaleye	0.0041	0.0017	0.0109	0.0144	0.0774
Blue Cavern SMR	Red Sea Urchin	0.0017	0.0009	0.0042	0.0034	0.0252
Blue Cavern SMR	Sheephead	0.0039	0.0016	0.0051	0.0065	0.0379
Bolsa Chica SMR	Halibut	0.0011	0.0002	0.0015	0.0073	0.0053
Cabrillo SMR	Black Surfperch	0.0127	0.0058	1.0000	1.0000	4.0000
Cabrillo SMR	Halibut	0.0008	0.0001	0.0026	0.0024	0.0026
Cabrillo SMR	Kelp Bass	0.0019	0.0009	0.0004	0.0011	0.0011
Cabrillo SMR	Kelp Rockfish	0.0020	0.0002	0.0005	0.0004	0.0003
Cabrillo SMR	Ocean Whitefish	0.0007	0.0003	0.0004	0.0019	0.0019
Cabrillo SMR	Opaleye	0.0010	0.0005	0.0001	0.0004	0.0004
Cabrillo SMR	Red Sea Urchin	0.0007	0.0004	0.0003	0.0010	0.0010
Cabrillo SMR	Sheephead	0.0021	0.0010	0.0004	0.0012	0.0012
Carrington Point SMR	Black Surfperch	0.0270	0.0122	1.0000	1.0000	4.0000
Carrington Point SMR	Halibut	0.0218	0.0040	0.0544	0.0452	0.0522
Carrington Point SMR	Kelp Bass	0.0290	0.0109	0.0408	0.0484	0.0912
Carrington Point SMR	Kelp Rockfish	0.0259	0.0053	0.0131	0.0429	0.0525
Carrington Point SMR	Ocean Whitefish	0.0177	0.0061	0.0257	0.0313	0.0701
Carrington Point SMR	Opaleye	0.0209	0.0072	0.0108	0.0256	0.0420
Carrington Point SMR	Red Sea Urchin	0.0167	0.0092	0.0216	0.0271	0.0824
Carrington Point SMR	Sheephead	0.0257	0.0100	0.0266	0.0365	0.0690
Dana Point SMCA	Black Surfperch	0.0049	0.0017	1.0000	1.0000	2.4933
Dana Point SMCA	Halibut	0.0040	0.0011	0.0096	0.0144	0.0172
Dana Point SMCA	Kelp Bass	0.0065	0.0030	0.0084	0.0151	0.0293
Dana Point SMCA	Kelp Rockfish	0.0057	0.0008	0.0077	0.0097	0.0094
Dana Point SMCA	Ocean Whitefish	0.0033	0.0018	0.0082	0.0094	0.0257
Dana Point SMCA	Opaleye	0.0064	0.0021	0.0112	0.0142	0.0261
Dana Point SMCA	Red Sea Urchin	0.0019	0.0017	0.0050	0.0077	0.0254
Dana Point SMCA	Sheephead	0.0062	0.0026	0.0139	0.0179	0.0385
Farnsworth SMR	Black Surfperch	0.0068	0.0030	1.0000	1.0000	4.0000
Farnsworth SMR	Halibut	0.0088	0.0021	0.0465	0.0263	0.0620
Farnsworth SMR	Kelp Bass	0.0206	0.0084	0.0305	0.0194	0.0787
Farnsworth SMR	Kelp Rockfish	0.0187	0.0040	0.0368	0.0170	0.0417

Farnsworth SMR	Ocean Whitefish	0.0161	0.0059	0.0331	0.0266	0.0947
Farnsworth SMR	Opaleye	0.0186	0.0075	0.0394	0.0192	0.0782
Farnsworth SMR	Red Sea Urchin	0.0134	0.0073	0.0250	0.0181	0.0871
Farnsworth SMR	Sheephead	0.0175	0.0072	0.0261	0.0175	0.0718
Footprint SMR	Ocean Whitefish	0.0035	0.0013	0.0041	0.0059	0.0178
Footprint SMR	Red Sea Urchin	0.0032	0.0018	0.0037	0.0047	0.0217
Gull Island SMR	Black Surfperch	0.0170	0.0077	1.0000	1.0000	4.0000
Gull Island SMR	Halibut	0.0096	0.0021	0.0268	0.0162	0.0315
Gull Island SMR	Kelp Bass	0.0203	0.0079	0.0164	0.0110	0.0179
Gull Island SMR	Kelp Rockfish	0.0230	0.0046	0.0192	0.0217	0.0253
Gull Island SMR	Ocean Whitefish	0.0125	0.0045	0.0189	0.0143	0.0343
Gull Island SMR	Opaleye	0.0173	0.0062	0.0173	0.0170	0.0261
Gull Island SMR	Red Sea Urchin	0.0119	0.0066	0.0156	0.0115	0.0404
Gull Island SMR	Sheephead	0.0190	0.0076	0.0248	0.0182	0.0311
Harris Point SMR	Black Surfperch	0.0151	0.0069	1.0000	1.0000	4.0000
Harris Point SMR	Halibut	0.0136	0.0024	0.0496	0.0271	0.0421
Harris Point SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Harris Point SMR	Kelp Rockfish	0.0179	0.0030	0.0093	0.0243	0.0264
Harris Point SMR	Ocean Whitefish	0.0277	0.0092	0.0240	0.0355	0.0536
Harris Point SMR	Opaleye	0.0162	0.0057	0.0099	0.0201	0.0300
Harris Point SMR	Red Sea Urchin	0.0256	0.0144	0.0194	0.0331	0.0624
Harris Point SMR	Sheephead	0.0190	0.0077	0.0272	0.0302	0.0531
Judith Rock SMR	Black Surfperch	0.0100	0.0045	1.0000	1.0000	4.0000
Judith Rock SMR	Halibut	0.0014	0.0002	0.0074	0.0020	0.0044
Judith Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Judith Rock SMR	Kelp Rockfish	0.0071	0.0008	0.0045	0.0024	0.0018
Judith Rock SMR	Ocean Whitefish	0.0049	0.0017	0.0146	0.0055	0.0112
Judith Rock SMR	Opaleye	0.0066	0.0021	0.0125	0.0109	0.0135
Judith Rock SMR	Red Sea Urchin	0.0047	0.0026	0.0105	0.0043	0.0123
Judith Rock SMR	Sheephead	0.0074	0.0028	0.0101	0.0049	0.0061
Lachusa SMCA	Black Surfperch	0.0077	0.0035	1.0000	1.0000	4.0000
Lachusa SMCA	Halibut	0.0094	0.0021	0.0116	0.0153	0.0208
Lachusa SMCA	Kelp Bass	0.0081	0.0032	0.0090	0.0256	0.0527
Lachusa SMCA	Kelp Rockfish	0.0095	0.0016	0.0076	0.0145	0.0235
Lachusa SMCA	Ocean Whitefish	0.0058	0.0021	0.0074	0.0070	0.0219
Lachusa SMCA	Opaleye	0.0071	0.0026	0.0086	0.0212	0.0417
Lachusa SMCA	Red Sea Urchin	0.0052	0.0029	0.0056	0.0049	0.0208
Lachusa SMCA	Sheephead	0.0080	0.0033	0.0083	0.0173	0.0381
Laguna Beach SMR	Black Surfperch	0.0040	0.0018	1.0000	1.0000	4.0000
Laguna Beach SMR	Halibut	0.0135	0.0031	0.0321	0.0475	0.0730
Laguna Beach SMR	Kelp Bass	0.0100	0.0040	0.0150	0.0296	0.1296

Laguna Beach SMR	Kelp Rockfish	0.0070	0.0021	0.0131	0.0284	0.0568
Laguna Beach SMR	Ocean Whitefish	0.0058	0.0020	0.0161	0.0200	0.1396
Laguna Beach SMR	Opaleye	0.0080	0.0031	0.0303	0.0490	0.1600
Laguna Beach SMR	Red Sea Urchin	0.0039	0.0021	0.0103	0.0120	0.1033
Laguna Beach SMR	Sheephead	0.0094	0.0037	0.0192	0.0281	0.1448
Long Point SMR	Black Surfperch	0.0005	0.0002	1.0000	1.0000	4.0000
Long Point SMR	Halibut	0.0013	0.0002	0.0057	0.0016	0.0122
Long Point SMR	Kelp Bass	0.0021	0.0008	0.0051	0.0017	0.0293
Long Point SMR	Kelp Rockfish	0.0015	0.0004	0.0060	0.0024	0.0146
Long Point SMR	Ocean Whitefish	0.0015	0.0005	0.0060	0.0018	0.0254
Long Point SMR	Opaleye	0.0018	0.0007	0.0106	0.0024	0.0358
Long Point SMR	Red Sea Urchin	0.0010	0.0005	0.0037	0.0010	0.0212
Long Point SMR	Sheephead	0.0018	0.0007	0.0053	0.0016	0.0273
Matlahuayl SMR	Black Surfperch	0.0050	0.0022	1.0000	1.0000	4.0000
Matlahuayl SMR	Halibut	0.0020	0.0004	0.0076	0.0127	0.0112
Matlahuayl SMR	Kelp Bass	0.0035	0.0015	0.0043	0.0055	0.0066
Matlahuayl SMR	Kelp Rockfish	0.0032	0.0004	0.0029	0.0017	0.0013
Matlahuayl SMR	Ocean Whitefish	0.0017	0.0006	0.0031	0.0083	0.0120
Matlahuayl SMR	Opaleye	0.0021	0.0008	0.0013	0.0011	0.0012
Matlahuayl SMR	Red Sea Urchin	0.0015	0.0008	0.0024	0.0055	0.0087
Matlahuayl SMR	Sheephead	0.0031	0.0014	0.0022	0.0031	0.0038
Mishopsno SMCA	Black Surfperch	0.0080	0.0036	1.0000	1.0000	4.0000
Mishopsno SMCA	Halibut	0.0355	0.0086	0.0911	0.1849	0.2122
Mishopsno SMCA	Kelp Bass	0.0117	0.0047	0.0128	0.0362	0.0877
Mishopsno SMCA	Kelp Rockfish	0.0121	0.0029	0.0070	0.0394	0.0663
Mishopsno SMCA	Ocean Whitefish	0.0074	0.0029	0.0269	0.0352	0.1399
Mishopsno SMCA	Opaleye	0.0094	0.0035	0.0070	0.0272	0.0580
Mishopsno SMCA	Red Sea Urchin	0.0067	0.0037	0.0190	0.0215	0.1340
Mishopsno SMCA	Sheephead	0.0133	0.0058	0.0181	0.0281	0.0938
Mugu Lagoon SMRMA	Halibut	0.0030	0.0006	0.0039	0.0034	0.0035
Naples SMR	Black Surfperch	0.0094	0.0041	1.0000	1.0000	4.0000
Naples SMR	Halibut	0.0070	0.0011	0.0132	0.0068	0.0088
Naples SMR	Kelp Bass	0.0078	0.0026	0.0044	0.0063	0.0073
Naples SMR	Kelp Rockfish	0.0074	0.0011	0.0037	0.0110	0.0088
Naples SMR	Ocean Whitefish	0.0062	0.0021	0.0086	0.0061	0.0091
Naples SMR	Opaleye	0.0072	0.0022	0.0066	0.0157	0.0185
Naples SMR	Red Sea Urchin	0.0055	0.0029	0.0067	0.0054	0.0102
Naples SMR	Sheephead	0.0100	0.0036	0.0066	0.0066	0.0086
Newport Coast SMCA	Black Surfperch	0.0028	0.0009	1.0000	1.0000	2.9953
Newport Coast SMCA	Halibut	0.0051	0.0011	0.0150	0.0139	0.0232
Newport Coast SMCA	Kelp Bass	0.0058	0.0023	0.0134	0.0186	0.0673

Newport Coast SMCA	Kelp Rockfish	0.0048	0.0010	0.0091	0.0088	0.0133
Newport Coast SMCA	Ocean Whitefish	0.0034	0.0014	0.0091	0.0139	0.0466
Newport Coast SMCA	Opaleye	0.0058	0.0018	0.0159	0.0134	0.0373
Newport Coast SMCA	Red Sea Urchin	0.0030	0.0014	0.0077	0.0114	0.0485
Newport Coast SMCA	Sheephead	0.0055	0.0020	0.0141	0.0134	0.0606
North Catalina SMR	Black Surfperch	0.0047	0.0021	1.0000	1.0000	4.0000
North Catalina SMR	Halibut	0.0017	0.0003	0.0158	0.0039	0.0295
North Catalina SMR	Kelp Bass	0.0154	0.0063	0.0370	0.0243	0.0896
North Catalina SMR	Kelp Rockfish	0.0130	0.0017	0.0588	0.0226	0.0383
North Catalina SMR	Ocean Whitefish	0.0084	0.0031	0.0271	0.0139	0.0605
North Catalina SMR	Opaleye	0.0135	0.0056	0.0884	0.0432	0.1537
North Catalina SMR	Red Sea Urchin	0.0065	0.0035	0.0226	0.0101	0.0658
North Catalina SMR	Sheephead	0.0129	0.0054	0.0342	0.0206	0.0743
Painted Cave SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Painted Cave SMCA	Halibut	0.0021	0.0004	0.0090	0.0043	0.0182
Painted Cave SMCA	Kelp Bass	0.0000	0.0000	0.0001	0.0002	0.0417
Painted Cave SMCA	Kelp Rockfish	0.0001	0.0000	0.0001	0.0004	0.0341
Painted Cave SMCA	Ocean Whitefish	0.0008	0.0004	0.0035	0.0019	0.0254
Painted Cave SMCA	Opaleye	0.0000	0.0000	0.0001	0.0003	0.0437
Painted Cave SMCA	Red Sea Urchin	0.0008	0.0004	0.0032	0.0013	0.0330
Painted Cave SMCA	Sheephead	0.0000	0.0000	0.0001	0.0001	0.0249
Palos Verdes SMR	Black Surfperch	0.0228	0.0103	1.0000	1.0000	4.0000
Palos Verdes SMR	Halibut	0.0099	0.0019	0.0310	0.0173	0.0509
Palos Verdes SMR	Kelp Bass	0.0235	0.0097	0.0367	0.0745	0.1489
Palos Verdes SMR	Kelp Rockfish	0.0232	0.0038	0.0276	0.0336	0.0413
Palos Verdes SMR	Ocean Whitefish	0.0190	0.0069	0.0488	0.0461	0.1019
Palos Verdes SMR	Opaleye	0.0191	0.0072	0.0291	0.0417	0.0794
Palos Verdes SMR	Red Sea Urchin	0.0156	0.0088	0.0366	0.0352	0.0941
Palos Verdes SMR	Sheephead	0.0219	0.0092	0.0327	0.0541	0.1148
Point Conception SMR	Black Surfperch	0.0292	0.0132	1.0000	1.0000	4.0000
Point Conception SMR	Halibut	0.0181	0.0037	0.0530	0.0199	0.0332
Point Conception SMR	Kelp Bass	0.0136	0.0036	0.0064	0.0077	0.0131
Point Conception SMR	Kelp Rockfish	0.0156	0.0033	0.0072	0.0343	0.0408
Point Conception SMR	Ocean Whitefish	0.0204	0.0073	0.0187	0.0134	0.0345
Point Conception SMR	Opaleye	0.0141	0.0047	0.0095	0.0268	0.0440
Point Conception SMR	Red Sea Urchin	0.0187	0.0104	0.0154	0.0112	0.0402
Point Conception SMR	Sheephead	0.0198	0.0060	0.0101	0.0068	0.0152
Point Dume SMR	Black Surfperch	0.0072	0.0032	1.0000	1.0000	4.0000
Point Dume SMR	Halibut	0.0052	0.0015	0.0076	0.0111	0.0284
Point Dume SMR	Kelp Bass	0.0087	0.0033	0.0110	0.0431	0.0681
Point Dume SMR	Kelp Rockfish	0.0102	0.0016	0.0087	0.0167	0.0196

Point Dume SMR	Ocean Whitefish	0.0052	0.0018	0.0078	0.0115	0.0277
Point Dume SMR	Opaleye	0.0077	0.0027	0.0083	0.0269	0.0411
Point Dume SMR	Red Sea Urchin	0.0046	0.0024	0.0061	0.0090	0.0273
Point Dume SMR	Sheephead	0.0085	0.0033	0.0102	0.0340	0.0538
Richardson Rock SMR	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Richardson Rock SMR	Halibut	0.0011	0.0001	0.0080	0.0011	0.0025
Richardson Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Richardson Rock SMR	Kelp Rockfish	0.0007	0.0002	0.0006	0.0004	0.0013
Richardson Rock SMR	Ocean Whitefish	0.0256	0.0075	0.0257	0.0231	0.0273
Richardson Rock SMR	Opaleye	0.0005	0.0003	0.0014	0.0020	0.0107
Richardson Rock SMR	Red Sea Urchin	0.0244	0.0139	0.0229	0.0268	0.0349
Richardson Rock SMR	Sheephead	0.0005	0.0003	0.0007	0.0004	0.0032
San Clemente Pending Military Closure 2	Black Surfperch	0.0129	0.0055	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 1	Black Surfperch	0.0263	0.0119	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 2	Halibut	0.0026	0.0006	0.0270	0.0110	0.0482
San Clemente Pending Military Closure 1	Halibut	0.0007	0.0002	0.0066	0.0031	0.0328
San Clemente Pending Military Closure 2	Kelp Bass	0.0321	0.0123	0.0869	0.0564	0.1272
San Clemente Pending Military Closure 1	Kelp Bass	0.0304	0.0131	0.0536	0.0661	0.0966
San Clemente Pending Military Closure 2	Kelp Rockfish	0.0283	0.0031	0.1004	0.0282	0.0295
San Clemente Pending Military Closure 1	Kelp Rockfish	0.0321	0.0039	0.0928	0.0496	0.0470
San Clemente Pending Military Closure 2	Ocean Whitefish	0.0275	0.0096	0.0918	0.0428	0.0546
San Clemente Pending Military Closure 1	Ocean Whitefish	0.0248	0.0089	0.0292	0.0373	0.0405
San Clemente Pending Military Closure 2	Opaleye	0.0283	0.0106	0.1152	0.0785	0.1691
San Clemente Pending Military Closure 1	Opaleye	0.0295	0.0122	0.0961	0.0945	0.1443
San Clemente Pending Military Closure 2	Red Sea Urchin	0.0260	0.0139	0.0777	0.0329	0.0487
San Clemente Pending Military Closure 1	Red Sea Urchin	0.0275	0.0154	0.0319	0.0343	0.0400
San Clemente Pending Military Closure 2	Sheephead	0.0256	0.0098	0.0591	0.0379	0.0787
San Clemente Pending Military Closure 1	Sheephead	0.0250	0.0110	0.0422	0.0536	0.0761
San Diego-Scripps	Black Surfperch	0.0004	0.0002	1.0000	1.0000	4.0000

Coastal SMCA						
San Diego-Scripps Coastal SMCA	Halibut	0.0020	0.0004	0.0077	0.0116	0.0116
San Diego-Scripps Coastal SMCA	Kelp Bass	0.0013	0.0005	0.0019	0.0021	0.0100
San Diego-Scripps Coastal SMCA	Kelp Rockfish	0.0009	0.0002	0.0010	0.0012	0.0025
San Diego-Scripps Coastal SMCA	Ocean Whitefish	0.0012	0.0005	0.0025	0.0067	0.0160
San Diego-Scripps Coastal SMCA	Opaleye	0.0009	0.0004	0.0007	0.0006	0.0019
San Diego-Scripps Coastal SMCA	Red Sea Urchin	0.0010	0.0005	0.0019	0.0041	0.0116
San Diego-Scripps Coastal SMCA	Sheephead	0.0011	0.0004	0.0008	0.0011	0.0057
San Elijo Lagoon SMR	Black Surfperch	0.0001	0.0001	1.0000	1.0000	4.0000
San Elijo Lagoon SMR	Halibut	0.0010	0.0002	0.0037	0.0054	0.0047
San Elijo Lagoon SMR	Kelp Bass	0.0005	0.0002	0.0004	0.0019	0.0040
San Elijo Lagoon SMR	Kelp Rockfish	0.0003	0.0002	0.0002	0.0005	0.0007
San Elijo Lagoon SMR	Ocean Whitefish	0.0002	0.0001	0.0004	0.0041	0.0089
San Elijo Lagoon SMR	Opaleye	0.0004	0.0002	0.0000	0.0000	0.0000
San Elijo Lagoon SMR	Red Sea Urchin	0.0001	0.0001	0.0003	0.0026	0.0060
San Elijo Lagoon SMR	Sheephead	0.0004	0.0002	0.0002	0.0009	0.0018
San Nicolas Alpha Area Military Closure	Black Surfperch	0.0768	0.0347	1.0000	1.0000	4.0000
San Nicolas Alpha Area Military Closure	Halibut	0.0064	0.0015	0.0215	0.0208	0.0518
San Nicolas Alpha Area Military Closure	Kelp Bass	0.0554	0.0216	0.0717	0.0682	0.0943
San Nicolas Alpha Area Military Closure	Kelp Rockfish	0.0597	0.0094	0.0632	0.0628	0.0561
San Nicolas Alpha Area Military Closure	Ocean Whitefish	0.0306	0.0099	0.0205	0.0562	0.0660
San Nicolas Alpha Area Military Closure	Opaleye	0.0519	0.0187	0.0819	0.0758	0.1038
San Nicolas Alpha Area Military Closure	Red Sea Urchin	0.0333	0.0188	0.0211	0.0584	0.0751
San Nicolas Alpha Area Military Closure	Sheephead	0.0411	0.0163	0.0505	0.0754	0.0989
Santa Barbara Island SMR	Black Surfperch	0.0025	0.0011	1.0000	1.0000	4.0000
Santa Barbara Island SMR	Halibut	0.0032	0.0003	0.0787	0.0077	0.0284
Santa Barbara Island SMR	Kelp Bass	0.0091	0.0039	0.0719	0.0174	0.1247

Santa Barbara Island SMR	Kelp Rockfish	0.0084	0.0008	0.0474	0.0055	0.0151
Santa Barbara Island SMR	Ocean Whitefish	0.0100	0.0037	0.0442	0.0219	0.0666
Santa Barbara Island SMR	Opaleye	0.0078	0.0034	0.0563	0.0130	0.0842
Santa Barbara Island SMR	Red Sea Urchin	0.0088	0.0048	0.0364	0.0145	0.0684
Santa Barbara Island SMR	Sheephead	0.0075	0.0033	0.0507	0.0145	0.0930
Scorpion SMR	Black Surfperch	0.0037	0.0016	1.0000	1.0000	4.0000
Scorpion SMR	Halibut	0.0029	0.0005	0.0200	0.0041	0.0315
Scorpion SMR	Kelp Bass	0.0104	0.0044	0.0533	0.0203	0.0878
Scorpion SMR	Kelp Rockfish	0.0120	0.0014	0.0507	0.0179	0.0439
Scorpion SMR	Ocean Whitefish	0.0097	0.0037	0.0198	0.0161	0.0487
Scorpion SMR	Opaleye	0.0094	0.0041	0.0679	0.0266	0.1149
Scorpion SMR	Red Sea Urchin	0.0087	0.0047	0.0161	0.0118	0.0550
Scorpion SMR	Sheephead	0.0088	0.0037	0.0304	0.0112	0.0468
Skunk Point SMR	Black Surfperch	0.0020	0.0009	1.0000	1.0000	4.0000
Skunk Point SMR	Halibut	0.0028	0.0005	0.0042	0.0057	0.0049
Skunk Point SMR	Kelp Bass	0.0032	0.0013	0.0023	0.0028	0.0049
Skunk Point SMR	Kelp Rockfish	0.0031	0.0004	0.0010	0.0020	0.0019
Skunk Point SMR	Ocean Whitefish	0.0016	0.0006	0.0016	0.0026	0.0048
Skunk Point SMR	Opaleye	0.0025	0.0009	0.0014	0.0031	0.0046
Skunk Point SMR	Red Sea Urchin	0.0015	0.0008	0.0013	0.0020	0.0056
Skunk Point SMR	Sheephead	0.0029	0.0012	0.0022	0.0033	0.0057
South La Jolla Reefs SMR	Black Surfperch	0.0784	0.0355	1.0000	1.0000	4.0000
South La Jolla Reefs SMR	Halibut	0.0033	0.0007	0.0166	0.0148	0.0374
South La Jolla Reefs SMR	Kelp Bass	0.0158	0.0072	0.0079	0.0161	0.0168
South La Jolla Reefs SMR	Kelp Rockfish	0.0160	0.0024	0.0082	0.0083	0.0064
South La Jolla Reefs SMR	Ocean Whitefish	0.0095	0.0037	0.0080	0.0380	0.0439
South La Jolla Reefs SMR	Opaleye	0.0096	0.0040	0.0069	0.0081	0.0086
South La Jolla Reefs SMR	Red Sea Urchin	0.0091	0.0052	0.0072	0.0267	0.0318
South La Jolla Reefs SMR	Sheephead	0.0145	0.0070	0.0065	0.0150	0.0153
South Point SMR	Black Surfperch	0.0120	0.0051	1.0000	1.0000	4.0000
South Point SMR	Halibut	0.0077	0.0013	0.0425	0.0090	0.0167
South Point SMR	Kelp Bass	0.0181	0.0067	0.0132	0.0057	0.0095
South Point SMR	Kelp Rockfish	0.0193	0.0027	0.0079	0.0050	0.0056

South Point SMR	Ocean Whitefish	0.0125	0.0044	0.0176	0.0104	0.0217
South Point SMR	Opaleye	0.0144	0.0049	0.0139	0.0094	0.0143
South Point SMR	Red Sea Urchin	0.0120	0.0065	0.0151	0.0082	0.0252
South Point SMR	Sheephead	0.0158	0.0060	0.0129	0.0067	0.0109
Swami's SMCA	Black Surfperch	0.0132	0.0060	1.0000	1.0000	4.0000
Swami's SMCA	Halibut	0.0075	0.0013	0.0306	0.0362	0.0389
Swami's SMCA	Kelp Bass	0.0081	0.0035	0.0058	0.0113	0.0211
Swami's SMCA	Kelp Rockfish	0.0073	0.0014	0.0047	0.0048	0.0052
Swami's SMCA	Ocean Whitefish	0.0058	0.0022	0.0135	0.0303	0.0645
Swami's SMCA	Opaleye	0.0051	0.0021	0.0008	0.0012	0.0017
Swami's SMCA	Red Sea Urchin	0.0047	0.0026	0.0107	0.0194	0.0463
Swami's SMCA	Sheephead	0.0075	0.0034	0.0034	0.0068	0.0128
Tijuana River Mouth SMCA	Black Surfperch	0.0056	0.0026	1.0000	1.0000	2.3230
Tijuana River Mouth SMCA	Halibut	0.0038	0.0007	0.0133	0.0190	0.0142
Tijuana River Mouth SMCA	Kelp Bass	0.0028	0.0013	0.0028	0.0111	0.0143
Tijuana River Mouth SMCA	Kelp Rockfish	0.0025	0.0004	0.0001	0.0001	0.0001
Tijuana River Mouth SMCA	Ocean Whitefish	0.0014	0.0005	0.0009	0.0034	0.0045
Tijuana River Mouth SMCA	Opaleye	0.0015	0.0006	0.0000	0.0000	0.0000
Tijuana River Mouth SMCA	Red Sea Urchin	0.0012	0.0007	0.0006	0.0019	0.0025
Tijuana River Mouth SMCA	Sheephead	0.0032	0.0015	0.0010	0.0029	0.0038
UCSB SMR	Black Surfperch	0.0131	0.0057	1.0000	1.0000	4.0000
UCSB SMR	Halibut	0.0071	0.0011	0.0207	0.0060	0.0122
UCSB SMR	Kelp Bass	0.0125	0.0043	0.0113	0.0112	0.0148
UCSB SMR	Kelp Rockfish	0.0126	0.0016	0.0084	0.0158	0.0141
UCSB SMR	Ocean Whitefish	0.0095	0.0033	0.0161	0.0101	0.0305
UCSB SMR	Opaleye	0.0119	0.0037	0.0154	0.0237	0.0327
UCSB SMR	Red Sea Urchin	0.0085	0.0045	0.0114	0.0076	0.0310
UCSB SMR	Sheephead	0.0151	0.0055	0.0140	0.0096	0.0147

Table 3e. MPA by MPA results for the MLPA South Coast Preferred Alternative (IPA). Biomass, self-recruitment and self-persistence generated for each of the MPAs in the IPA from the UC Santa Barbara (UCSB) and UC Davis (UCD) bioeconomic models. Values of biomass are scaled relative to total unfished biomass such that values of 0 indicate no biomass and values of 1 indicate maximum unfished biomass. Self-recruitment is the proportion of settling larvae in an MPA that were produced within that MPA. This metric provides information on the relative isolation of the MPA from other larval sources. Values of self-recruitment are between

0 and 1, where a value of 0 indicates that a population is totally isolated. Self-persistence is the degree to which an MPA is self-sustaining. It is calculated based on larval production and the proportion of larvae produced within an MPA that return to that MPA. Values of self-persistence that are less than or equal to 1 are dependent on larvae from elsewhere, while values greater than 1 are self-sufficient.

MPA Name	Species	Biomass (UCSB)	Biomass (UCD)	Self-recruitment (UCSB)	Self-recruitment (UCD)	Self-persistence (UCD)
Abalone Cove SMCA	Black Surfperch	0.0024	0.0011	1.0000	1.0000	4.0000
Abalone Cove SMCA	Halibut	0.0039	0.0006	0.0091	0.0043	0.0068
Abalone Cove SMCA	Kelp Bass	0.0043	0.0017	0.0039	0.0108	0.0235
Abalone Cove SMCA	Kelp Rockfish	0.0039	0.0008	0.0027	0.0045	0.0058
Abalone Cove SMCA	Ocean Whitefish	0.0030	0.0011	0.0042	0.0056	0.0186
Abalone Cove SMCA	Opaleye	0.0034	0.0013	0.0026	0.0052	0.0100
Abalone Cove SMCA	Red Sea Urchin	0.0023	0.0013	0.0028	0.0036	0.0155
Abalone Cove SMCA	Sheephead	0.0040	0.0017	0.0054	0.0115	0.0272
Anacapa Island SMCA	Black Surfperch	0.0030	0.0013	1.0000	1.0000	4.0000
Anacapa Island SMCA	Halibut	0.0026	0.0005	0.0306	0.0026	0.0238
Anacapa Island SMCA	Kelp Bass	0.0086	0.0039	0.0524	0.0130	0.0497
Anacapa Island SMCA	Kelp Rockfish	0.0099	0.0012	0.0740	0.0148	0.0390
Anacapa Island SMCA	Ocean Whitefish	0.0043	0.0016	0.0155	0.0077	0.0243
Anacapa Island SMCA	Opaleye	0.0078	0.0036	0.1055	0.0230	0.0990
Anacapa Island SMCA	Red Sea Urchin	0.0038	0.0021	0.0129	0.0056	0.0277
Anacapa Island SMCA	Sheephead	0.0075	0.0034	0.0417	0.0091	0.0378
Anacapa Island SMR	Black Surfperch	0.0086	0.0039	1.0000	1.0000	4.0000
Anacapa Island SMR	Halibut	0.0043	0.0010	0.0064	0.0084	0.0137
Anacapa Island SMR	Kelp Bass	0.0090	0.0034	0.0059	0.0192	0.0271
Anacapa Island SMR	Kelp Rockfish	0.0098	0.0021	0.0065	0.0229	0.0226
Anacapa Island SMR	Ocean Whitefish	0.0051	0.0017	0.0050	0.0118	0.0189
Anacapa Island SMR	Opaleye	0.0084	0.0030	0.0112	0.0350	0.0490
Anacapa Island SMR	Red Sea Urchin	0.0049	0.0028	0.0048	0.0122	0.0240
Anacapa Island SMR	Sheephead	0.0081	0.0032	0.0051	0.0150	0.0212
Arrow Point to Lion Head Point SMCA	Black Surfperch	0.0032	0.0010	1.0000	1.0000	2.7238
Arrow Point to Lion Head Point SMCA	Halibut	0.0016	0.0003	0.0056	0.0042	0.0134
Arrow Point to Lion Head Point SMCA	Kelp Bass	0.0054	0.0024	0.0065	0.0094	0.0277
Arrow Point to Lion Head Point SMCA	Kelp Rockfish	0.0047	0.0010	0.0087	0.0114	0.0153
Arrow Point to Lion Head	Ocean Whitefish	0.0025	0.0012	0.0063	0.0057	0.0223

Point SMCA						
Arrow Point to Lion Head Point SMCA	Opaleye	0.0056	0.0019	0.0111	0.0129	0.0378
Arrow Point to Lion Head Point SMCA	Red Sea Urchin	0.0021	0.0012	0.0051	0.0042	0.0265
Arrow Point to Lion Head Point SMCA	Sheephead	0.0048	0.0019	0.0059	0.0071	0.0214
Begg Rock SMR	Ocean Whitefish	0.0068	0.0021	0.0030	0.0102	0.0111
Begg Rock SMR	Red Sea Urchin	0.0075	0.0043	0.0033	0.0119	0.0141
Bird Rock SMCA	Ocean Whitefish	0.0005	0.0002	0.0013	0.0009	0.0041
Bird Rock SMCA	Red Sea Urchin	0.0004	0.0002	0.0009	0.0005	0.0037
Blue Cavern SMR	Black Surfperch	0.0017	0.0008	1.0000	1.0000	4.0000
Blue Cavern SMR	Halibut	0.0025	0.0004	0.0095	0.0055	0.0164
Blue Cavern SMR	Kelp Bass	0.0054	0.0022	0.0074	0.0096	0.0519
Blue Cavern SMR	Kelp Rockfish	0.0044	0.0009	0.0092	0.0096	0.0240
Blue Cavern SMR	Ocean Whitefish	0.0029	0.0011	0.0077	0.0056	0.0272
Blue Cavern SMR	Opaleye	0.0047	0.0019	0.0139	0.0157	0.0774
Blue Cavern SMR	Red Sea Urchin	0.0022	0.0012	0.0055	0.0035	0.0252
Blue Cavern SMR	Sheephead	0.0045	0.0019	0.0062	0.0070	0.0379
Bolsa Chica SMCA	Halibut	0.0001	0.0000	0.0001	0.0020	0.0014
Bolsa Chica SMR	Halibut	0.0011	0.0001	0.0015	0.0055	0.0041
Cabrillo SMR	Black Surfperch	0.0102	0.0046	1.0000	1.0000	4.0000
Cabrillo SMR	Halibut	0.0006	0.0001	0.0017	0.0019	0.0020
Cabrillo SMR	Kelp Bass	0.0012	0.0006	0.0003	0.0008	0.0008
Cabrillo SMR	Kelp Rockfish	0.0012	0.0002	0.0004	0.0004	0.0003
Cabrillo SMR	Ocean Whitefish	0.0005	0.0002	0.0003	0.0014	0.0014
Cabrillo SMR	Opaleye	0.0006	0.0003	0.0001	0.0003	0.0003
Cabrillo SMR	Red Sea Urchin	0.0004	0.0003	0.0002	0.0008	0.0008
Cabrillo SMR	Sheephead	0.0013	0.0006	0.0003	0.0009	0.0009
Campus Point SMR	Black Surfperch	0.0131	0.0057	1.0000	1.0000	4.0000
Campus Point SMR	Halibut	0.0070	0.0011	0.0209	0.0069	0.0129
Campus Point SMR	Kelp Bass	0.0119	0.0040	0.0115	0.0115	0.0148
Campus Point SMR	Kelp Rockfish	0.0117	0.0016	0.0086	0.0171	0.0151
Campus Point SMR	Ocean Whitefish	0.0093	0.0032	0.0163	0.0103	0.0305
Campus Point SMR	Opaleye	0.0114	0.0034	0.0162	0.0243	0.0327
Campus Point SMR	Red Sea Urchin	0.0083	0.0044	0.0116	0.0078	0.0310
Campus Point SMR	Sheephead	0.0145	0.0052	0.0142	0.0099	0.0147
Carrington Point SMR	Black Surfperch	0.0270	0.0122	1.0000	1.0000	4.0000
Carrington Point SMR	Halibut	0.0213	0.0040	0.0542	0.0487	0.0544
Carrington Point SMR	Kelp Bass	0.0280	0.0103	0.0416	0.0501	0.0912
Carrington Point SMR	Kelp Rockfish	0.0245	0.0051	0.0135	0.0456	0.0543

Carrington Point SMR	Ocean Whitefish	0.0174	0.0059	0.0261	0.0320	0.0701
Carrington Point SMR	Opaleye	0.0199	0.0066	0.0111	0.0265	0.0420
Carrington Point SMR	Red Sea Urchin	0.0163	0.0091	0.0220	0.0275	0.0824
Carrington Point SMR	Sheephead	0.0248	0.0095	0.0270	0.0378	0.0690
Cat Harbor SMCA	Black Surfperch	0.0006	0.0002	1.0000	1.0000	3.2297
Cat Harbor SMCA	Halibut	0.0009	0.0002	0.0038	0.0051	0.0062
Cat Harbor SMCA	Kelp Bass	0.0014	0.0005	0.0014	0.0042	0.0101
Cat Harbor SMCA	Kelp Rockfish	0.0013	0.0003	0.0018	0.0032	0.0043
Cat Harbor SMCA	Ocean Whitefish	0.0007	0.0002	0.0017	0.0027	0.0077
Cat Harbor SMCA	Opaleye	0.0014	0.0004	0.0025	0.0048	0.0115
Cat Harbor SMCA	Red Sea Urchin	0.0005	0.0002	0.0010	0.0016	0.0071
Cat Harbor SMCA	Sheephead	0.0013	0.0004	0.0011	0.0030	0.0076
Crystal Cove SMCA	Black Surfperch	0.0028	0.0009	1.0000	1.0000	3.1507
Crystal Cove SMCA	Halibut	0.0053	0.0014	0.0159	0.0162	0.0256
Crystal Cove SMCA	Kelp Bass	0.0059	0.0022	0.0148	0.0213	0.0772
Crystal Cove SMCA	Kelp Rockfish	0.0048	0.0010	0.0100	0.0106	0.0167
Crystal Cove SMCA	Ocean Whitefish	0.0041	0.0016	0.0115	0.0154	0.0618
Crystal Cove SMCA	Opaleye	0.0058	0.0018	0.0174	0.0160	0.0451
Crystal Cove SMCA	Red Sea Urchin	0.0036	0.0018	0.0098	0.0122	0.0606
Crystal Cove SMCA	Sheephead	0.0056	0.0019	0.0150	0.0155	0.0701
Dana Point SMCA	Black Surfperch	0.0050	0.0017	1.0000	1.0000	2.7575
Dana Point SMCA	Halibut	0.0052	0.0013	0.0117	0.0170	0.0193
Dana Point SMCA	Kelp Bass	0.0064	0.0029	0.0092	0.0169	0.0381
Dana Point SMCA	Kelp Rockfish	0.0055	0.0009	0.0095	0.0125	0.0148
Dana Point SMCA	Ocean Whitefish	0.0033	0.0017	0.0088	0.0111	0.0398
Dana Point SMCA	Opaleye	0.0062	0.0020	0.0144	0.0193	0.0423
Dana Point SMCA	Red Sea Urchin	0.0019	0.0017	0.0056	0.0089	0.0381
Dana Point SMCA	Sheephead	0.0062	0.0025	0.0146	0.0197	0.0494
Farnsworth Offshore SMCA	Ocean Whitefish	0.0067	0.0024	0.0138	0.0120	0.0238
Farnsworth Offshore SMCA	Red Sea Urchin	0.0059	0.0033	0.0115	0.0091	0.0233
Farnsworth Onshore SMCA	Black Surfperch	0.0028	0.0013	1.0000	1.0000	4.0000
Farnsworth Onshore SMCA	Halibut	0.0038	0.0006	0.0263	0.0118	0.0266
Farnsworth Onshore SMCA	Kelp Bass	0.0082	0.0034	0.0149	0.0106	0.0399
Farnsworth Onshore SMCA	Kelp Rockfish	0.0076	0.0012	0.0238	0.0092	0.0192
Farnsworth Onshore SMCA	Ocean Whitefish	0.0034	0.0013	0.0071	0.0080	0.0298
Farnsworth Onshore SMCA	Opaleye	0.0075	0.0031	0.0283	0.0137	0.0522

Farnsworth Onshore SMCA	Red Sea Urchin	0.0028	0.0015	0.0054	0.0052	0.0290
Farnsworth Onshore SMCA	Sheephead	0.0071	0.0029	0.0147	0.0108	0.0414
Footprint SMR	Ocean Whitefish	0.0034	0.0013	0.0041	0.0060	0.0178
Footprint SMR	Red Sea Urchin	0.0032	0.0018	0.0038	0.0049	0.0217
Gull Island SMR	Black Surfperch	0.0170	0.0077	1.0000	1.0000	4.0000
Gull Island SMR	Halibut	0.0094	0.0021	0.0270	0.0172	0.0324
Gull Island SMR	Kelp Bass	0.0195	0.0073	0.0169	0.0114	0.0179
Gull Island SMR	Kelp Rockfish	0.0216	0.0045	0.0199	0.0231	0.0261
Gull Island SMR	Ocean Whitefish	0.0123	0.0044	0.0193	0.0146	0.0343
Gull Island SMR	Opaleye	0.0166	0.0057	0.0185	0.0177	0.0261
Gull Island SMR	Red Sea Urchin	0.0117	0.0065	0.0160	0.0117	0.0404
Gull Island SMR	Sheephead	0.0184	0.0072	0.0253	0.0190	0.0311
Harris Point SMR	Black Surfperch	0.0151	0.0069	1.0000	1.0000	4.0000
Harris Point SMR	Halibut	0.0133	0.0024	0.0494	0.0292	0.0436
Harris Point SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Harris Point SMR	Kelp Rockfish	0.0169	0.0029	0.0096	0.0259	0.0275
Harris Point SMR	Ocean Whitefish	0.0271	0.0088	0.0242	0.0361	0.0536
Harris Point SMR	Opaleye	0.0154	0.0052	0.0103	0.0209	0.0301
Harris Point SMR	Red Sea Urchin	0.0249	0.0142	0.0196	0.0336	0.0624
Harris Point SMR	Sheephead	0.0184	0.0073	0.0277	0.0313	0.0531
Judith Rock SMR	Black Surfperch	0.0100	0.0045	1.0000	1.0000	4.0000
Judith Rock SMR	Halibut	0.0014	0.0002	0.0075	0.0022	0.0046
Judith Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Judith Rock SMR	Kelp Rockfish	0.0067	0.0008	0.0047	0.0027	0.0020
Judith Rock SMR	Ocean Whitefish	0.0048	0.0017	0.0149	0.0056	0.0112
Judith Rock SMR	Opaleye	0.0063	0.0019	0.0135	0.0112	0.0135
Judith Rock SMR	Red Sea Urchin	0.0046	0.0026	0.0107	0.0044	0.0123
Judith Rock SMR	Sheephead	0.0071	0.0026	0.0103	0.0050	0.0061
Kashtayit SMP	Black Surfperch	0.0012	0.0004	1.0000	1.0000	3.8165
Kashtayit SMP	Halibut	0.0027	0.0007	0.0071	0.0055	0.0062
Kashtayit SMP	Kelp Bass	0.0018	0.0006	0.0010	0.0007	0.0032
Kashtayit SMP	Kelp Rockfish	0.0022	0.0004	0.0012	0.0018	0.0060
Kashtayit SMP	Ocean Whitefish	0.0011	0.0004	0.0014	0.0003	0.0037
Kashtayit SMP	Opaleye	0.0018	0.0006	0.0011	0.0013	0.0057
Kashtayit SMP	Red Sea Urchin	0.0007	0.0005	0.0007	0.0001	0.0040
Kashtayit SMP	Sheephead	0.0020	0.0007	0.0011	0.0004	0.0034
Laguna SMR	Black Surfperch	0.0038	0.0017	1.0000	1.0000	4.0000
Laguna SMR	Halibut	0.0104	0.0023	0.0264	0.0334	0.0545
Laguna SMR	Kelp Bass	0.0089	0.0035	0.0147	0.0276	0.1052
Laguna SMR	Kelp Rockfish	0.0063	0.0018	0.0125	0.0253	0.0452

Laguna SMR	Ocean Whitefish	0.0051	0.0018	0.0149	0.0177	0.1098
Laguna SMR	Opaleye	0.0071	0.0027	0.0292	0.0443	0.1282
Laguna SMR	Red Sea Urchin	0.0034	0.0019	0.0096	0.0105	0.0805
Laguna SMR	Sheephead	0.0084	0.0033	0.0183	0.0261	0.1168
Long Point SMR	Black Surfperch	0.0005	0.0002	1.0000	1.0000	4.0000
Long Point SMR	Halibut	0.0013	0.0002	0.0059	0.0016	0.0126
Long Point SMR	Kelp Bass	0.0021	0.0008	0.0055	0.0018	0.0293
Long Point SMR	Kelp Rockfish	0.0015	0.0004	0.0067	0.0026	0.0151
Long Point SMR	Ocean Whitefish	0.0015	0.0005	0.0062	0.0019	0.0254
Long Point SMR	Opaleye	0.0018	0.0007	0.0120	0.0026	0.0358
Long Point SMR	Red Sea Urchin	0.0010	0.0005	0.0038	0.0010	0.0212
Long Point SMR	Sheephead	0.0018	0.0007	0.0057	0.0017	0.0273
Lover's Cove SMCA	Black Surfperch	0.0004	0.0001	1.0000	1.0000	2.9371
Lover's Cove SMCA	Halibut	0.0006	0.0001	0.0043	0.0010	0.0037
Lover's Cove SMCA	Kelp Bass	0.0017	0.0007	0.0045	0.0024	0.0152
Lover's Cove SMCA	Kelp Rockfish	0.0012	0.0001	0.0041	0.0022	0.0053
Lover's Cove SMCA	Ocean Whitefish	0.0009	0.0003	0.0058	0.0017	0.0104
Lover's Cove SMCA	Opaleye	0.0011	0.0004	0.0039	0.0013	0.0065
Lover's Cove SMCA	Red Sea Urchin	0.0006	0.0003	0.0036	0.0009	0.0083
Lover's Cove SMCA	Sheephead	0.0014	0.0006	0.0038	0.0019	0.0119
Matlahuayl SMR	Black Surfperch	0.0050	0.0022	1.0000	1.0000	4.0000
Matlahuayl SMR	Halibut	0.0020	0.0004	0.0077	0.0125	0.0110
Matlahuayl SMR	Kelp Bass	0.0033	0.0014	0.0044	0.0056	0.0066
Matlahuayl SMR	Kelp Rockfish	0.0030	0.0003	0.0029	0.0017	0.0013
Matlahuayl SMR	Ocean Whitefish	0.0017	0.0006	0.0032	0.0084	0.0120
Matlahuayl SMR	Opaleye	0.0020	0.0008	0.0013	0.0011	0.0012
Matlahuayl SMR	Red Sea Urchin	0.0014	0.0008	0.0025	0.0055	0.0087
Matlahuayl SMR	Sheephead	0.0029	0.0013	0.0022	0.0032	0.0038
Naples SMCA	Black Surfperch	0.0094	0.0041	1.0000	1.0000	4.0000
Naples SMCA	Halibut	0.0068	0.0011	0.0131	0.0078	0.0093
Naples SMCA	Kelp Bass	0.0075	0.0024	0.0044	0.0064	0.0073
Naples SMCA	Kelp Rockfish	0.0069	0.0011	0.0038	0.0119	0.0094
Naples SMCA	Ocean Whitefish	0.0061	0.0020	0.0087	0.0062	0.0091
Naples SMCA	Opaleye	0.0069	0.0020	0.0070	0.0160	0.0185
Naples SMCA	Red Sea Urchin	0.0054	0.0028	0.0069	0.0055	0.0102
Naples SMCA	Sheephead	0.0097	0.0034	0.0067	0.0068	0.0086
Painted Cave SMCA	Black Surfperch	0.0000	0.0000	1.0000	1.0000	4.0000
Painted Cave SMCA	Halibut	0.0020	0.0004	0.0091	0.0048	0.0189
Painted Cave SMCA	Kelp Bass	0.0000	0.0000	0.0001	0.0003	0.0417
Painted Cave SMCA	Kelp Rockfish	0.0001	0.0000	0.0001	0.0004	0.0355
Painted Cave SMCA	Ocean Whitefish	0.0008	0.0004	0.0036	0.0020	0.0254

Painted Cave SMCA	Opaleye	0.0000	0.0000	0.0001	0.0003	0.0437
Painted Cave SMCA	Red Sea Urchin	0.0008	0.0004	0.0033	0.0013	0.0330
Painted Cave SMCA	Sheephead	0.0000	0.0000	0.0001	0.0001	0.0249
Point Conception SMR	Black Surfperch	0.0089	0.0040	1.0000	1.0000	4.0000
Point Conception SMR	Halibut	0.0112	0.0019	0.0398	0.0118	0.0183
Point Conception SMR	Kelp Bass	0.0053	0.0008	0.0037	0.0018	0.0038
Point Conception SMR	Kelp Rockfish	0.0079	0.0016	0.0051	0.0179	0.0259
Point Conception SMR	Ocean Whitefish	0.0114	0.0043	0.0106	0.0081	0.0269
Point Conception SMR	Opaleye	0.0068	0.0024	0.0069	0.0149	0.0293
Point Conception SMR	Red Sea Urchin	0.0104	0.0058	0.0085	0.0063	0.0310
Point Conception SMR	Sheephead	0.0071	0.0014	0.0052	0.0015	0.0044
Point Dume SMCA	Black Surfperch	0.0050	0.0023	1.0000	1.0000	4.0000
Point Dume SMCA	Halibut	0.0097	0.0021	0.0125	0.0161	0.0224
Point Dume SMCA	Kelp Bass	0.0059	0.0023	0.0071	0.0211	0.0608
Point Dume SMCA	Kelp Rockfish	0.0068	0.0013	0.0059	0.0112	0.0231
Point Dume SMCA	Ocean Whitefish	0.0037	0.0013	0.0049	0.0047	0.0198
Point Dume SMCA	Opaleye	0.0052	0.0019	0.0070	0.0178	0.0482
Point Dume SMCA	Red Sea Urchin	0.0033	0.0018	0.0037	0.0032	0.0187
Point Dume SMCA	Sheephead	0.0058	0.0024	0.0064	0.0139	0.0439
Point Dume SMR	Black Surfperch	0.0071	0.0031	1.0000	1.0000	4.0000
Point Dume SMR	Halibut	0.0034	0.0009	0.0057	0.0046	0.0127
Point Dume SMR	Kelp Bass	0.0080	0.0029	0.0108	0.0194	0.0254
Point Dume SMR	Kelp Rockfish	0.0093	0.0010	0.0086	0.0057	0.0048
Point Dume SMR	Ocean Whitefish	0.0050	0.0017	0.0079	0.0052	0.0151
Point Dume SMR	Opaleye	0.0071	0.0023	0.0088	0.0121	0.0153
Point Dume SMR	Red Sea Urchin	0.0044	0.0023	0.0063	0.0039	0.0150
Point Dume SMR	Sheephead	0.0079	0.0030	0.0103	0.0150	0.0203
Point Vicente SMR	Black Surfperch	0.0022	0.0010	1.0000	1.0000	4.0000
Point Vicente SMR	Halibut	0.0038	0.0006	0.0124	0.0052	0.0123
Point Vicente SMR	Kelp Bass	0.0050	0.0020	0.0092	0.0158	0.0444
Point Vicente SMR	Kelp Rockfish	0.0047	0.0008	0.0063	0.0057	0.0095
Point Vicente SMR	Ocean Whitefish	0.0028	0.0011	0.0103	0.0055	0.0274
Point Vicente SMR	Opaleye	0.0041	0.0016	0.0091	0.0112	0.0278
Point Vicente SMR	Red Sea Urchin	0.0022	0.0012	0.0074	0.0034	0.0246
Point Vicente SMR	Sheephead	0.0045	0.0019	0.0088	0.0120	0.0362
Richardson Rock SMR	Black Surfperch	0.0002	0.0001	1.0000	1.0000	4.0000
Richardson Rock SMR	Halibut	0.0011	0.0001	0.0080	0.0012	0.0027
Richardson Rock SMR	Kelp Bass	0.0000	0.0000	0.0000	0.0000	0.0000
Richardson Rock SMR	Kelp Rockfish	0.0007	0.0002	0.0006	0.0005	0.0014
Richardson Rock SMR	Ocean Whitefish	0.0249	0.0071	0.0257	0.0233	0.0273
Richardson Rock SMR	Opaleye	0.0005	0.0003	0.0015	0.0022	0.0107

Richardson Rock SMR	Red Sea Urchin	0.0235	0.0136	0.0230	0.0270	0.0349
Richardson Rock SMR	Sheephead	0.0005	0.0003	0.0007	0.0004	0.0032
San Clemente Pending Military Closure 1	Black Surfperch	0.0263	0.0119	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 2	Black Surfperch	0.0129	0.0055	1.0000	1.0000	4.0000
San Clemente Pending Military Closure 1	Halibut	0.0007	0.0002	0.0067	0.0033	0.0337
San Clemente Pending Military Closure 2	Halibut	0.0026	0.0006	0.0275	0.0115	0.0496
San Clemente Pending Military Closure 1	Kelp Bass	0.0290	0.0123	0.0550	0.0678	0.0966
San Clemente Pending Military Closure 2	Kelp Bass	0.0312	0.0120	0.0907	0.0589	0.1272
San Clemente Pending Military Closure 1	Kelp Rockfish	0.0306	0.0038	0.0961	0.0532	0.0499
San Clemente Pending Military Closure 2	Kelp Rockfish	0.0275	0.0032	0.1053	0.0309	0.0321
San Clemente Pending Military Closure 1	Ocean Whitefish	0.0241	0.0085	0.0296	0.0376	0.0405
San Clemente Pending Military Closure 2	Ocean Whitefish	0.0269	0.0092	0.0933	0.0434	0.0546
San Clemente Pending Military Closure 1	Opaleye	0.0280	0.0114	0.1017	0.0975	0.1443
San Clemente Pending Military Closure 2	Opaleye	0.0274	0.0102	0.1225	0.0827	0.1693
San Clemente Pending Military Closure 1	Red Sea Urchin	0.0265	0.0151	0.0323	0.0346	0.0400
San Clemente Pending Military Closure 2	Red Sea Urchin	0.0253	0.0137	0.0793	0.0333	0.0487
San Clemente Pending Military Closure 1	Sheephead	0.0237	0.0103	0.0426	0.0553	0.0761
San Clemente Pending Military Closure 2	Sheephead	0.0248	0.0095	0.0612	0.0399	0.0787
San Diego-Scripps Coastal SMCA	Black Surfperch	0.0004	0.0002	1.0000	1.0000	4.0000
San Diego-Scripps Coastal SMCA	Halibut	0.0020	0.0004	0.0077	0.0119	0.0119
San Diego-Scripps Coastal SMCA	Kelp Bass	0.0012	0.0005	0.0021	0.0022	0.0100
San Diego-Scripps Coastal SMCA	Kelp Rockfish	0.0009	0.0002	0.0011	0.0013	0.0026
San Diego-Scripps Coastal SMCA	Ocean Whitefish	0.0012	0.0004	0.0026	0.0069	0.0160
San Diego-Scripps Coastal SMCA	Opaleye	0.0009	0.0004	0.0008	0.0006	0.0019

San Diego-Scripps Coastal SMCA	Red Sea Urchin	0.0010	0.0005	0.0019	0.0041	0.0116
San Diego-Scripps Coastal SMCA	Sheephead	0.0011	0.0004	0.0009	0.0012	0.0057
San Elijo Lagoon SMR	Black Surfperch	0.0001	0.0001	1.0000	1.0000	4.0000
San Elijo Lagoon SMR	Halibut	0.0010	0.0002	0.0037	0.0054	0.0046
San Elijo Lagoon SMR	Kelp Bass	0.0005	0.0002	0.0004	0.0020	0.0040
San Elijo Lagoon SMR	Kelp Rockfish	0.0003	0.0002	0.0002	0.0005	0.0007
San Elijo Lagoon SMR	Ocean Whitefish	0.0002	0.0001	0.0005	0.0041	0.0089
San Elijo Lagoon SMR	Opaleye	0.0004	0.0001	0.0000	0.0000	0.0000
San Elijo Lagoon SMR	Red Sea Urchin	0.0001	0.0001	0.0003	0.0026	0.0060
San Elijo Lagoon SMR	Sheephead	0.0004	0.0002	0.0002	0.0009	0.0018
Santa Barbara Island SMR	Black Surfperch	0.0025	0.0011	1.0000	1.0000	4.0000
Santa Barbara Island SMR	Halibut	0.0032	0.0003	0.0799	0.0083	0.0298
Santa Barbara Island SMR	Kelp Bass	0.0090	0.0038	0.0777	0.0191	0.1247
Santa Barbara Island SMR	Kelp Rockfish	0.0083	0.0008	0.0519	0.0063	0.0168
Santa Barbara Island SMR	Ocean Whitefish	0.0098	0.0036	0.0452	0.0227	0.0666
Santa Barbara Island SMR	Opaleye	0.0077	0.0034	0.0625	0.0144	0.0842
Santa Barbara Island SMR	Red Sea Urchin	0.0087	0.0048	0.0375	0.0149	0.0684
Santa Barbara Island SMR	Sheephead	0.0074	0.0032	0.0541	0.0157	0.0930
Scorpion SMR	Black Surfperch	0.0037	0.0016	1.0000	1.0000	4.0000
Scorpion SMR	Halibut	0.0028	0.0005	0.0204	0.0045	0.0327
Scorpion SMR	Kelp Bass	0.0102	0.0043	0.0554	0.0219	0.0878
Scorpion SMR	Kelp Rockfish	0.0118	0.0015	0.0538	0.0200	0.0469
Scorpion SMR	Ocean Whitefish	0.0095	0.0036	0.0202	0.0167	0.0487
Scorpion SMR	Opaleye	0.0093	0.0039	0.0730	0.0287	0.1149
Scorpion SMR	Red Sea Urchin	0.0086	0.0047	0.0166	0.0120	0.0550
Scorpion SMR	Sheephead	0.0087	0.0036	0.0317	0.0120	0.0468
Skunk Point SMR	Black Surfperch	0.0020	0.0009	1.0000	1.0000	4.0000
Skunk Point SMR	Halibut	0.0027	0.0005	0.0041	0.0061	0.0051
Skunk Point SMR	Kelp Bass	0.0031	0.0012	0.0024	0.0029	0.0049
Skunk Point SMR	Kelp Rockfish	0.0029	0.0004	0.0011	0.0022	0.0021
Skunk Point SMR	Ocean Whitefish	0.0016	0.0006	0.0016	0.0026	0.0048
Skunk Point SMR	Opaleye	0.0024	0.0009	0.0015	0.0032	0.0046
Skunk Point SMR	Red Sea Urchin	0.0014	0.0008	0.0014	0.0021	0.0056
Skunk Point SMR	Sheephead	0.0028	0.0011	0.0023	0.0034	0.0057
South La Jolla SMCA	Ocean Whitefish	0.0025	0.0009	0.0019	0.0099	0.0128

South La Jolla SMCA	Red Sea Urchin	0.0023	0.0013	0.0017	0.0068	0.0094
South La Jolla SMR	Black Surfperch	0.0637	0.0288	1.0000	1.0000	4.0000
South La Jolla SMR	Halibut	0.0024	0.0005	0.0119	0.0122	0.0290
South La Jolla SMR	Kelp Bass	0.0119	0.0053	0.0063	0.0136	0.0141
South La Jolla SMR	Kelp Rockfish	0.0117	0.0016	0.0068	0.0070	0.0054
South La Jolla SMR	Ocean Whitefish	0.0056	0.0021	0.0053	0.0215	0.0225
South La Jolla SMR	Opaleye	0.0070	0.0029	0.0059	0.0073	0.0077
South La Jolla SMR	Red Sea Urchin	0.0053	0.0031	0.0047	0.0152	0.0158
South La Jolla SMR	Sheephead	0.0109	0.0051	0.0052	0.0128	0.0130
South Point SMR	Black Surfperch	0.0120	0.0051	1.0000	1.0000	4.0000
South Point SMR	Halibut	0.0076	0.0013	0.0425	0.0096	0.0174
South Point SMR	Kelp Bass	0.0174	0.0063	0.0138	0.0059	0.0095
South Point SMR	Kelp Rockfish	0.0183	0.0027	0.0082	0.0055	0.0059
South Point SMR	Ocean Whitefish	0.0123	0.0042	0.0180	0.0107	0.0217
South Point SMR	Opaleye	0.0138	0.0045	0.0146	0.0097	0.0143
South Point SMR	Red Sea Urchin	0.0118	0.0064	0.0155	0.0084	0.0252
South Point SMR	Sheephead	0.0153	0.0057	0.0134	0.0069	0.0109
Swami's SMCA	Black Surfperch	0.0132	0.0060	1.0000	1.0000	4.0000
Swami's SMCA	Halibut	0.0075	0.0013	0.0310	0.0371	0.0398
Swami's SMCA	Kelp Bass	0.0077	0.0033	0.0060	0.0116	0.0211
Swami's SMCA	Kelp Rockfish	0.0069	0.0013	0.0048	0.0051	0.0055
Swami's SMCA	Ocean Whitefish	0.0057	0.0021	0.0139	0.0309	0.0645
Swami's SMCA	Opaleye	0.0050	0.0020	0.0009	0.0012	0.0017
Swami's SMCA	Red Sea Urchin	0.0046	0.0026	0.0110	0.0196	0.0463
Swami's SMCA	Sheephead	0.0072	0.0032	0.0035	0.0070	0.0128
Tijuana River Mouth SMCA	Black Surfperch	0.0123	0.0056	1.0000	1.0000	4.0000
Tijuana River Mouth SMCA	Halibut	0.0028	0.0005	0.0097	0.0155	0.0113
Tijuana River Mouth SMCA	Kelp Bass	0.0017	0.0008	0.0018	0.0087	0.0117
Tijuana River Mouth SMCA	Kelp Rockfish	0.0014	0.0002	0.0000	0.0001	0.0001
Tijuana River Mouth SMCA	Ocean Whitefish	0.0009	0.0003	0.0005	0.0026	0.0037
Tijuana River Mouth SMCA	Opaleye	0.0009	0.0004	0.0000	0.0000	0.0000
Tijuana River Mouth SMCA	Red Sea Urchin	0.0007	0.0004	0.0004	0.0014	0.0020
Tijuana River Mouth SMCA	Sheephead	0.0019	0.0009	0.0006	0.0022	0.0031

California MLPA Master Plan Science Advisory Team

Outputs from Bioeconomic Model Evaluations of Revised SCRSG MPA Proposals and MLPA South Coast Integrated Preferred Alternative: MPA Deletion Evaluations

December 7, 2009

Table 4a. Marine protected area (MPA) deletion results for the Revised South Coast Regional Stakeholder Group MPA Proposal 1 (P1R). This table reports the results of an MPA deletion analysis, in which each MPA in a proposal is sequentially removed, one-at-a-time, and the equilibrium biomass of the system is recalculated. The "Effect on biomass" reflects the amount of biomass lost when the MPA is removed. It is calculated as the difference between the biomass with the MPA and the biomass without the MPA divided by the biomass with the MPA and multiplied by 100. A large number means that the MPA contributes greatly to the MPA network, a small number means it is less important. The "Efficiency of effect on biomass" is the "effect on biomass" divided by the area of habitat being protected. It is a measure of the efficiency of the MPA at increasing biomass. Large numbers here suggest places where protecting an additional unit of habitat is likely to result in the greatest increase in overall biomass. UCSB results are from an MPA deletion analysis run under MSY-type management. UCD results are from an MPA deletion analysis run under unsuccessful management. Results are averaged across all species.

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Povuu'nga Komiik SMR	0.0023	0.0118	-0.1601	-0.5802
Laguna SMR	0.2760	0.2074	3.6967	2.7965
Mikiw SMCA	0.0612	0.0378	0.1496	0.1397
Kashtayit SMP	0.0073	0.0102	-0.0716	-0.1239
Point Fermin SMCA	0.0000	0.0000	0.0070	0.0348
La Jolla Cove SMR	0.0153	0.0419	0.3674	0.4600
Farnsworth SMCA	0.2959	0.3178	2.1184	2.1078
Sumo SMCA	0.3461	0.2252	2.1286	1.4175
Ocean Beach Pier SMCA	0.0022	0.0083	-0.0068	-0.0411
Lover's Cove SMCA	0.0333	0.4151	0.4782	7.1733
Point Conception SMR	0.1047	0.0506	1.1157	0.5646
Helo SMR	0.5171	0.2595	2.1442	0.8836
Lisiqsihi SMR	0.5287	0.4924	1.9942	2.1492
Dana Point SMCA	0.0000	0.0000	0.1331	0.0893
Long Point SMR	0.0082	0.0548	0.5070	4.3759
Blue Cavern SMR	0.1032	0.2720	1.4076	3.4378
San Clemente Pending Military Closure 1	1.4554	0.2278	7.5896	0.9645
San Clemente Pending Military Closure 2	1.6136	0.5288	3.9842	1.4939
Palos Verdes SMR	0.6013	0.2918	4.1620	1.1735
La Jolla South SMCA	0.2579	0.0489	1.5026	0.3959
Begg Rock SMR	0.0579	0.0218	0.1478	0.0554

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Umuqpat SMCA	0.0720	0.0709	0.0866	0.1651
Cabrillo SMR	0.0573	0.0472	0.8111	0.4827
Tijuana River Mouth SMCA	-0.0002	-0.0001	-0.0102	-0.0048
Del Mar SMR	0.1804	0.0581	2.2648	0.7597
Ocean Beach SMR	0.2566	0.0418	2.3096	0.2891
Cat Harbor SMCA	0.0000	0.0000	0.0432	0.4781
Emerald Bay SMCA	0.0259	0.0813	0.0543	0.2908
La Jolla South SMR	0.2269	0.0522	2.0561	0.4679

Table 4b. Marine protected area (MPA) deletion results for the Revised South Coast Regional Stakeholder Group MPA Proposal 2 (P2R). This table reports the results of an MPA deletion analysis, in which each MPA in a proposal is sequentially removed, one-at-a-time, and the equilibrium biomass of the system is recalculated. The "Effect on biomass" reflects the amount of biomass lost when the MPA is removed. It is calculated as the difference between the biomass with the MPA and the biomass without the MPA divided by the biomass with the MPA and multiplied by 100. A large number means that the MPA contributes greatly to the MPA network, a small number means it is less important. The "Efficiency of effect on biomass" is the "effect on biomass" divided by the area of habitat being protected. It is a measure of the efficiency of the MPA at increasing biomass. Large numbers here suggest places where protecting an additional unit of habitat is likely to result in the greatest increase in overall biomass. UCSB results are from an MPA deletion analysis run under MSY-type management. UCD results are from an MPA deletion analysis run under unsuccessful management. Results are averaged across all species.

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Laguna SMR	0.1876	0.2678	1.8215	2.6322
Point Vicente SMR	0.1884	0.3896	1.0560	2.2823
Abalone Cove SMCA	0.0874	0.1554	0.8930	2.1527
Cabrillo SMR	0.0592	0.0488	0.9153	0.5447
Point Conception SMR	0.2182	0.0538	3.0194	0.7619
Blue Cavern SMR	0.0916	0.2793	1.3098	3.6580
Campus Point SMR	0.4616	0.2582	2.1148	0.9648
Point Dume SMCA	0.5227	0.2632	3.2714	1.6555
Del Mar SMR	0.1103	0.0520	2.0422	0.7875
Bird Rock SMCA	0.0116	0.2248	0.2467	4.8018
Lover's Cove SMCA	0.0064	0.0803	0.4766	7.1505

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Ocean Beach Pier SMCA	0.0025	0.0091	0.0110	0.0671
Begg Rock SMR	0.0561	0.0211	0.1589	0.0596
San Clemente Pending Military Closure 2	1.6179	0.5302	4.4810	1.6802
San Clemente Pending Military Closure 1	1.4540	0.2276	8.3466	1.0607
Farnsworth SMCA	0.0974	0.2479	0.3161	0.8272
La Jolla SMR	0.0153	0.0420	0.4009	0.5020
Sunset Cliffs SMR	0.2561	0.0418	3.1468	0.3635

Table 4c. Marine protected area (MPA) deletion results for the Revised South Coast Regional Stakeholder Group MPA Proposal 3 (P3R). This table reports the results of an MPA deletion analysis, in which each MPA in a proposal is sequentially removed, one-at-a-time, and the equilibrium biomass of the system is recalculated. The "Effect on biomass" reflects the amount of biomass lost when the MPA is removed. It is calculated as the difference between the biomass with the MPA and the biomass without the MPA divided by the biomass with the MPA and multiplied by 100. A large number means that the MPA contributes greatly to the MPA network, a small number means it is less important. The "Efficiency of effect on biomass" is the "effect on biomass" divided by the area of habitat being protected. It is a measure of the efficiency of the MPA at increasing biomass. Large numbers here suggest places where protecting an additional unit of habitat is likely to result in the greatest increase in overall biomass. UCSB results are from an MPA deletion analysis run under MSY-type management. UCD results are from an MPA deletion analysis run under unsuccessful management. Results are averaged across all species.

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
San Diego-Scripps Coastal SMCA	0.0159	0.0410	-0.0924	-0.2389
Farnsworth SMR	0.5180	0.2911	3.2280	1.8240
North Catalina SMR	0.6231	0.9418	2.2389	2.6143
Long Point SMR	0.0093	0.0725	0.3265	3.4305
Blue Cavern SMR	0.0943	0.2877	0.9472	2.3727
Cabrillo SMR	0.0643	0.0422	0.8818	0.4436
Tijuana River Mouth SMCA	-0.0003	-0.0001	-0.1829	-0.0552
San Clemente Pending Military Closure 2	1.6116	0.5281	2.9113	1.0916
San Clemente Pending Military Closure 1	1.5063	0.2357	6.3590	0.8081
Point Conception SMR	0.2899	0.0583	3.1125	0.6377
Palos Verdes SMR	1.3738	0.3832	5.6457	1.5155
South La Jolla Reefs SMR	0.5185	0.0519	3.9717	0.3310
San Nicolas Alpha Area Military Closure	2.5882	0.1887	8.7085	0.5272
Point Dume SMR	0.5487	0.4369	4.2795	1.7605

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Swami's SMCA	0.1847	0.0783	1.3203	0.5920
Newport Coast SMCA	0.0380	0.0376	0.0813	0.1410
Lachusa SMCA	0.5340	0.3126	2.6600	1.5665
Matlahuayl SMR	0.0538	0.0647	0.3241	0.4058
Dana Point SMCA	0.0000	0.0000	0.1060	0.1028
UCSB SMR	0.5413	0.2751	1.4479	0.6606
Mishopsno SMCA	0.5891	0.1290	6.5386	1.1555
Laguna Beach SMR	0.2770	0.1620	3.1184	1.8601
Naples SMR	0.2471	0.1524	1.4581	0.7475

Table 4d. Marine protected area (MPA) deletion results for the MLPA South Coast Integrated Preferred Alternative (IPA). This table reports the results of an MPA deletion analysis, in which each MPA in a proposal is sequentially removed, one-at-a-time, and the equilibrium biomass of the system is recalculated. The "Effect on biomass" reflects the amount of biomass lost when the MPA is removed. It is calculated as the difference between the biomass with the MPA and the biomass without the MPA divided by the biomass with the MPA and multiplied by 100. A large number means that the MPA contributes greatly to the MPA network, a small number means it is less important. The "Efficiency of effect on biomass" is the "effect on biomass" divided by the area of habitat being protected. It is a measure of the efficiency of the MPA at increasing biomass. Large numbers here suggest places where protecting an additional unit of habitat is likely to result in the greatest increase in overall biomass. UCSB results are from an MPA deletion analysis run under MSY-type management. UCD results are from an MPA deletion analysis run under unsuccessful management. Results are averaged across all species.

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Laguna SMR	0.2479	0.1831	3.2903	2.6109
Point Dume SMR	0.5247	0.4887	2.1221	2.1257
Point Vicente SMR	0.1882	0.3893	0.9499	2.0531
Naples SMCA	0.2254	0.1389	1.7930	0.9191
Dana Point SMCA	0.0000	0.0000	0.1354	0.1253
Point Dume SMCA	0.3400	0.2359	2.1271	1.4862
San Diego-Scripps Coastal SMCA	0.0154	0.0397	-0.0684	-0.1770
Abalone Cove SMCA	0.0885	0.1573	0.8433	2.0329
Matlahuayl SMR	0.0503	0.0606	0.3898	0.4881
South La Jolla SMCA	0.0084	0.0252	0.0994	0.2209

MPA Name	Effect on Biomass (UCSB)	Efficiency of Effect on Biomass (UCSB)	Effect on Biomass (UCD)	Efficiency of Effect on Biomass (UCD)
Farnsworth Onshore SMCA	0.1984	0.3402	1.8462	2.7650
Farnsworth Offshore SMCA	0.0977	0.2757	0.3271	0.9698
Point Conception SMR	0.1039	0.0502	1.1740	0.5941
Bird Rock SMCA	0.0025	0.2409	0.0480	4.6820
Cabrillo SMR	0.0587	0.0483	0.8745	0.5204
Blue Cavern SMR	0.0994	0.2694	1.3720	3.4369
Begg Rock SMR	0.0565	0.0213	0.1527	0.0572
San Clemente Pending Military Closure 1	1.4571	0.2280	7.8481	0.9973
Campus Point SMR	0.5173	0.2629	1.9725	0.8999
Lover's Cove SMCA	0.0334	0.4166	0.4906	7.3595
San Clemente Pending Military Closure 2	1.6150	0.5293	4.0901	1.5336
Swami's SMCA	0.1774	0.0752	1.6398	0.7353
Tijuana River Mouth SMCA	0.0618	0.0278	0.2404	0.0836
South La Jolla SMR	0.4041	0.0518	3.8772	0.4076
Kashtayit SMP	0.0000	0.0000	-0.0872	-0.1092
Long Point SMR	0.0090	0.0697	0.5216	5.4811
Cat Harbor SMCA	0.0000	0.0000	0.0420	0.4653