

## Impacts of ocean climate variability on biodiversity of pelagic forage species in an upwelling ecosystem

Jarrold A. Santora\*, Elliott L. Hazen, Isaac D. Schroeder, Steven J. Bograd, Keith M. Sakuma, John C. Field

\*Corresponding author: jsantora@ucsc.edu

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Table S1: Taxa, group classification list and their frequency of occurrence (positive trawls) utilized in the calculation of biodiversity indices.

Group	Scientific name	Common name	Frequency Occurrence
YOY.rockfish	<i>Sebastes auriculatus</i>	Brown rockfish	13.1%
YOY.rockfish	<i>Sebastes aurora</i>	Aurora rockfish	0.1%
YOY.rockfish	<i>Sebastes babcocki</i>	Redbanded rockfish	0.1%
YOY.rockfish	<i>Sebastes crameri</i>	Darkblotched rockfish	2.5%
YOY.rockfish	<i>Sebastes dallii</i>	Calico rockfish	0.1%
YOY.rockfish	<i>Sebastes diploproa</i>	Splitnose rockfish	64.1%
YOY.rockfish	<i>Sebastes elongatus</i>	Greenstriped rockfish	0.4%
YOY.rockfish	<i>Sebastes entomelas</i>	Widow rockfish	23.3%
YOY.rockfish	<i>Sebastes flavidus</i>	Yellowtail rockfish	14.7%
YOY.rockfish	<i>Sebastes goodei</i>	Chilipepper	30.2%
YOY.rockfish	<i>Sebastes hopkinsi</i>	Squarespot rockfish	7.9%
YOY.rockfish	<i>Sebastes jordani</i>	Shortbelly rockfish	57.2%
YOY.rockfish	<i>Sebastes levis</i>	Cowcod	3.8%
YOY.rockfish	<i>Sebastes melanops</i>	Black rockfish	5.2%
YOY.rockfish	<i>Sebastes melanostomus</i>	Blackgill rockfish	0.2%
YOY.rockfish	<i>Sebastes miniatus</i>	Vermillion rockfish	0.2%
YOY.rockfish	<i>Sebastes mystinus</i>	Blue rockfish	16.7%
YOY.rockfish	<i>Sebastes paucispinis</i>	Bocaccio	11.1%
YOY.rockfish	<i>Sebastes pinniger</i>	Canary rockfish	16.4%
YOY.rockfish	<i>Sebastes rastrelliger</i>	Grass rockfish	0.7%
YOY.rockfish	<i>Sebastes ruberrimus</i>	Yelloweye rockfish	0.4%
YOY.rockfish	<i>Sebastes rufus</i>	Bank rockfish	1.3%
YOY.rockfish	<i>Sebastes saxicola</i>	Stripetail rockfish	24.0%
YOY.rockfish	<i>Sebastes semicinctus</i>	Halfbanded rockfish	9.0%
YOY.rockfish	<i>Sebastes serranoides</i>	Olive rockfish	1.8%
YOY.rockfish	<i>Sebastes wilsoni</i>	Pygmy rockfish	8.3%
YOY.rockfish	<i>Sebastes zacentrus</i>	Sharpchin rockfish	1.2%
YOY.rockfish	<i>Sebastomus spp</i>	Rosefish group	3.1%
YOY.rockfish	<i>Sebastes caurinus complex</i>	Copper rockfish complex	11.6%
YOY.rockfish	<i>Sebastes emphaeus</i>	Puget sound rockfish	0.5%
YOY.groundfish	<i>Liparididae</i>	Snailfish	2.0%
YOY.groundfish	<i>Lycodapus mandibularis</i>	Pallid eelpout	3.4%
YOY.groundfish	<i>Anarrhichthys ocellatus</i>	Wolf eel	1.8%
YOY.groundfish	<i>Anoplopoma fimbria</i>	Sablefish	0.8%
YOY.groundfish	<i>Atheresthes stomias</i>	Arrowtooth flounder	0.4%
YOY.groundfish	<i>Citharichthys sordidus</i>	Pacific sanddab	63.3%
YOY.groundfish	<i>Citharichthys stigmaeus</i>	Seckled sanddab	4.8%
YOY.groundfish	<i>Cottidae</i>	Sculpin	4.8%

YOY.groundfish	<i>Glyptocephalus zachirus</i>	Rex sole	21.4%
YOY.groundfish	<i>Hexagrammidae</i>	Greenling	1.4%
YOY.groundfish	<i>Lyopsetta exilis</i>	Slender sole	18.9%
YOY.groundfish	<i>Merluccius productus</i>	Pacific hake	59.6%
YOY.groundfish	<i>Microstomus pacificus</i>	Dover sole	10.0%
YOY.groundfish	<i>Ophiodon elongatus</i>	Lingcod	15.7%
YOY.groundfish	<i>Oxylebius pictus</i>	Painted greenling	3.8%
YOY.groundfish	<i>Platichthys stellatus</i>	Starry flounder	0.2%
YOY.groundfish	<i>Pleuronichthys spp.</i>	Turbot	5.5%
YOY.groundfish	<i>Psettichthys melanostictus</i>	Sand sole	9.0%
YOY.groundfish	<i>Rhamphocottus richardsonii</i>	Grunt sculpin	0.1%
YOY.groundfish	<i>Scorpaenichthys marmoratus</i>	Cabazon	3.5%
YOY.groundfish	<i>Microgadus proximus</i>	Pacific tomcod	3.4%
YOY.groundfish	<i>Hemilepidotus spp.</i>	Irish lord	1.6%
YOY.groundfish	<i>Stichaeidae</i>	Prickleback	3.1%
Forage	<i>Leptocephalus larva</i>	Eel larvae	0.4%
Forage	<i>Clupea pallasii</i>	Adult Pacific herring	1.3%
Forage	<i>Ammodytes hexapterus</i>	Pacific sandlance	1.2%
Forage	<i>Atherinops affinis</i>	Topsmelt	0.5%
Forage	<i>Atherinopsis californiensis</i>	Jacksmelt	1.0%
Forage	<i>Bathophilus flemingi</i>	Highfin dragonfish	0.9%
Forage	<i>Bathylagidae</i>	Blacksmelt	15.8%
Forage	<i>Bathymasteridae</i>	Ronquil	0.7%
Forage	<i>Chauliodus macouni</i>	Pacific viperfish	0.1%
Forage	<i>Cololabis saira</i>	Pacific saury	0.0%
Forage	<i>Diaphus theta</i>	California headlightfish	0.1%
Forage	<i>Gasterosteus aculeatus</i>	Threespine stickleback	0.1%
Forage	<i>Gobiidae</i>	Goby	16.7%
Forage	<i>Icichthys lockingtoni</i>	Medusafish	5.6%
Forage	<i>Icosteus aenigmaticus</i>	Ragfish	0.4%
Forage	<i>Petromyzontidae</i>	Lamprey	1.2%
Forage	<i>Leuroglossus stilbius</i>	California smoothtongue	0.1%
Forage	<i>Lyopsetta exilis</i>	Slender snipefish	57.2%
Forage	<i>Melamphaidae</i>	Bigscale	0.2%
Forage	<i>Melanostomiidae</i>	Dragonfish	0.1%
Forage	<i>Nemichthyidae</i>	Snipe eel	0.2%
Forage	<i>Paralepididae</i>	Barracudina	8.2%
Forage	<i>Peprilus simillimus</i>	Pacific Pampano	8.4%
Forage	<i>Opisthoproctidae</i>	Spookfish	0.2%
Forage	<i>Porichthys notatus</i>	Plainfin midshipman	15.8%
Forage	<i>Sygnathidae</i>	Pipefish	1.1%
Forage	<i>Synodus lucioceps</i>	California lizardfish	0.1%
Forage	<i>Tactostoma macropus</i>	Longfin dragonfish	4.7%
Forage	<i>Tarletonbeania crenularis</i>	Blue laternfish	18.2%
Forage	<i>Tetragonurus cuvieri</i>	Smalleye squaretail	0.1%
Forage	<i>Trachipterus altivelis</i>	King-of-the-salmon	8.3%
Forage	<i>Zaniolepididae</i>	Combfish	7.3%
Forage	<i>Doryteuthis opalescens</i>	Market squid	51.6%
Forage	<i>Octopoda</i>	Octopus	28.7%
Forage	<i>Argentina sialis</i>	Pacific argentine	11.2%
Forage	<i>Malacosteidae</i>	Loosejaw	1.7%
Forage	<i>Idiacanthidae</i>	Blackdragon	3.8%
Forage	<i>Eurypharyngidae</i>	Umbrellamouth gulper	0.1%
Forage	<i>Stomias atriventer</i>	Blackbelly dragonfish	0.1%
Forage	<i>Phosichthyidae</i>	Lightfish	0.3%
Forage	<i>Alloposidae</i>	Blob octopus	0.2%
Forage	<i>Oncorhynchus spp.</i>	Total YOY salmon	2.1%

Forage	<i>Teuthoidea</i>	Other squid	43.9%
Forage	<i>Myctophidae</i>	Other myctophid	37.3%
Forage	<i>Sardinops sagax</i>	Total Pacific sardine	16.2%
Forage	<i>Engraulis mordax</i>	Total northern anchovy	31.6%
Forage	<i>Osmeridae</i>	Total smelt	2.1%
Forage	<i>Scomber japonicus</i>	Total Pacific mackerel	1.7%
Forage	<i>Trachurus symmetricus</i>	Total Jack mackerel	1.1%
Crustacean	<i>Mysidacea</i>	Mysid	0.5%
Crustacean	<i>Caridea</i>	Caridean shrimp	1.1%
Crustacean	<i>Pleuroncodes planipes</i>	Pelagic red crab	0.7%
Crustacean	<i>Phyllosoma</i>	Phyllosoma	0.5%
Crustacean	<i>Pandalus jordani</i>	Pandalid shrimp	1.7%
Crustacean	<i>Bentheogennema burkenroadi</i>	Red shrimp	0.3%
Crustacean	<i>Pasiphaea pacifica</i>	Glass shrimp	4.1%
Crustacean	<i>Sergestid</i>	Sergestid	27.6%
Crustacean	<i>Euphausiacea</i>	Total krill	90.1%

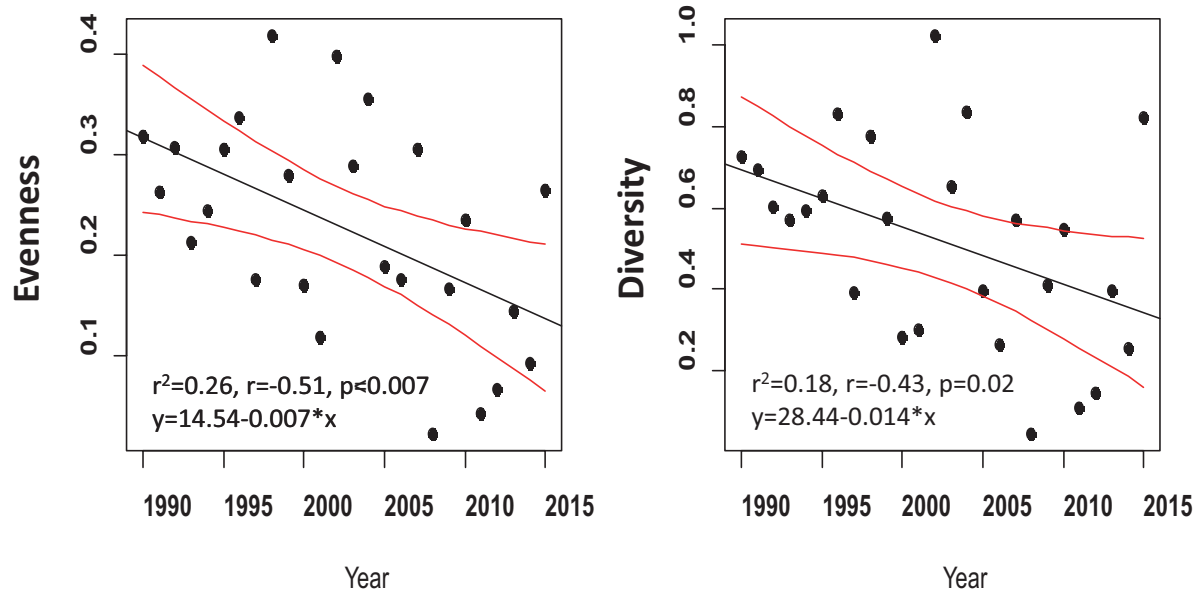


Figure S1: Long-term trends of all taxa in Monterey Bay, (a) evenness and (b) diversity.

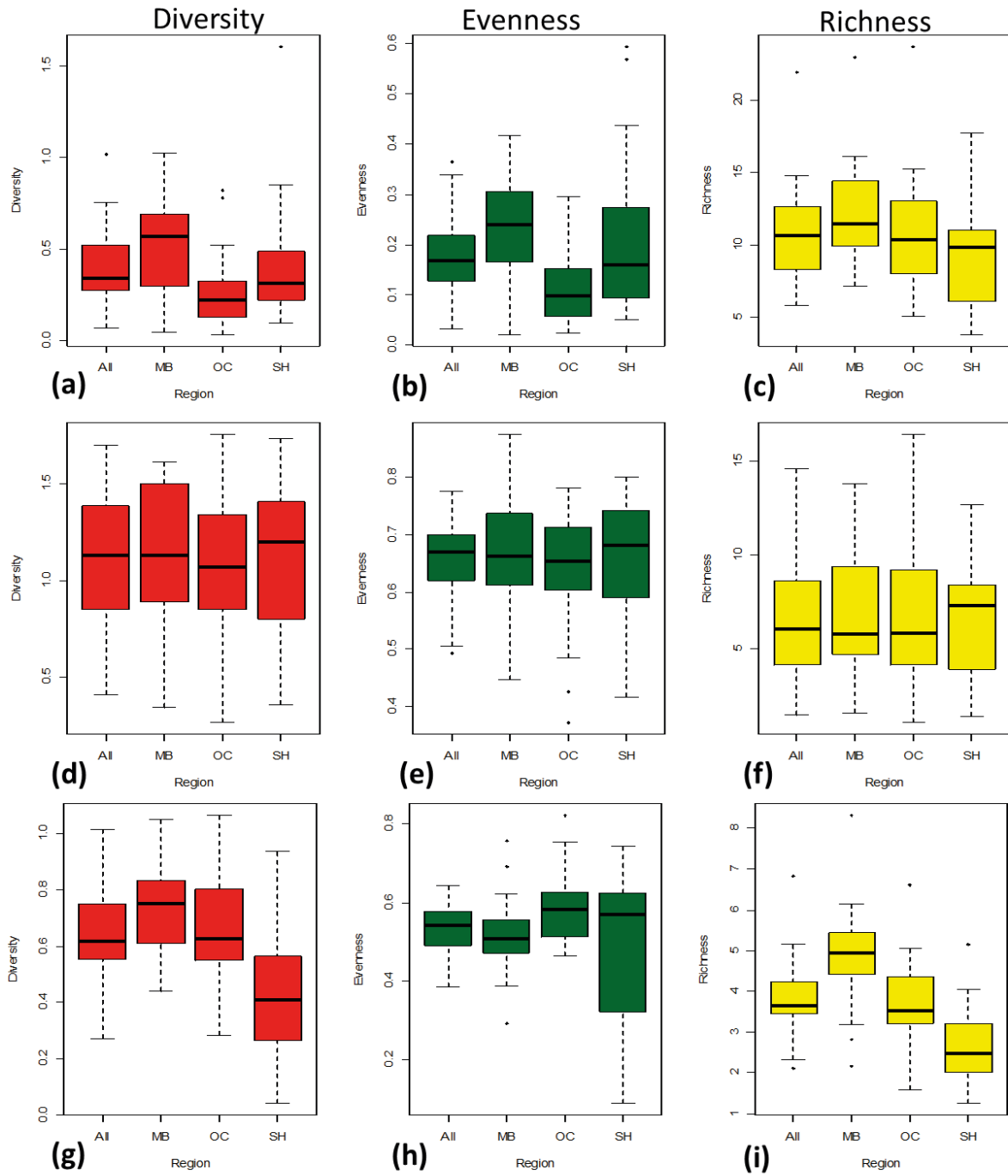


Figure S2: Regional comparison of diversity indices (box plots): (a-c) all taxa, (d-f) YOY rockfish and groundfish, and (g-i) forage species

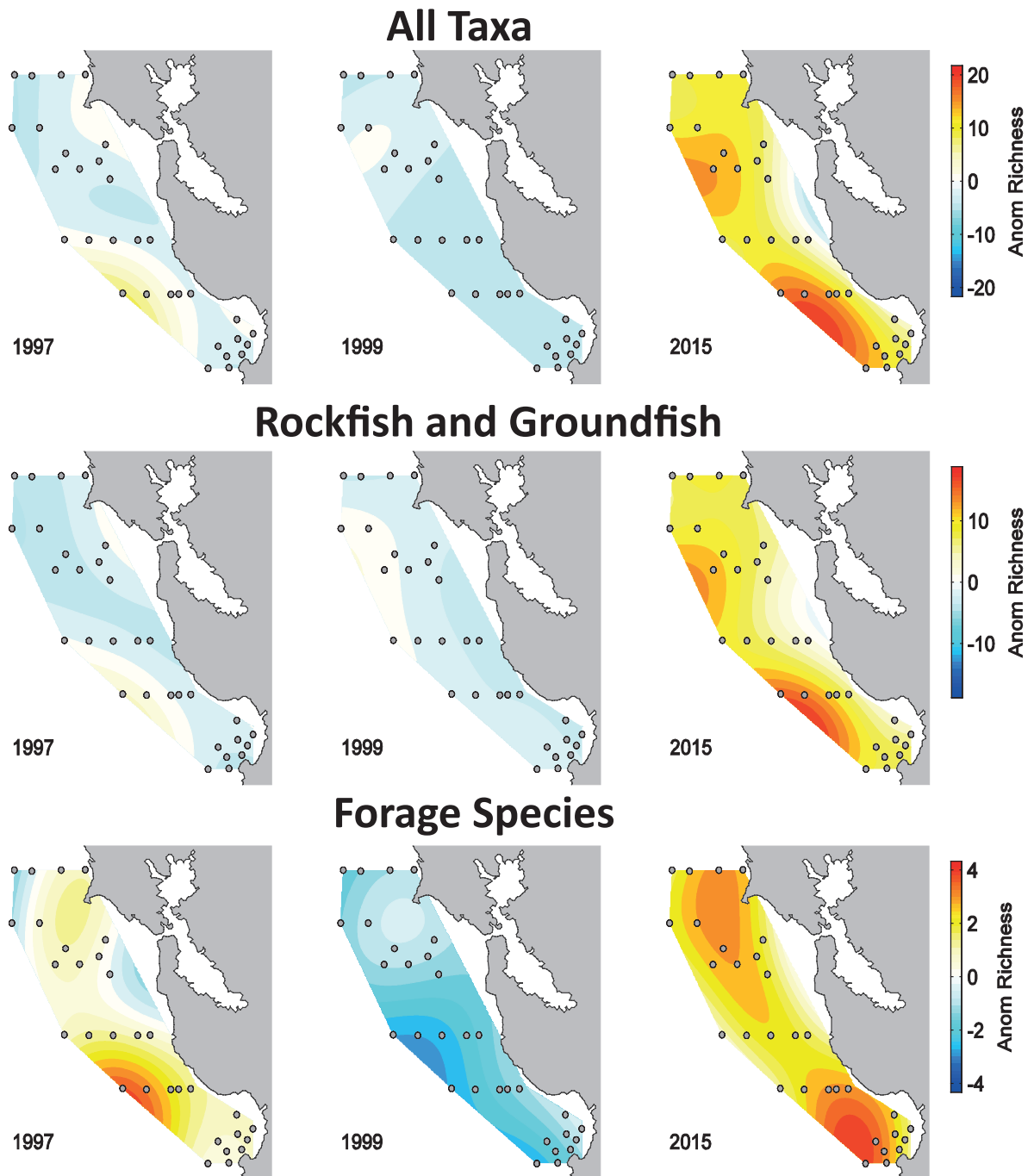


Figure S3: Spatial anomalies of species richness for (top) all taxa, (middle) YOY rockfish and groundfish and (bottom) forage species during the 1998 El Niño, 1999, La Niña and 2015 warm water blob.

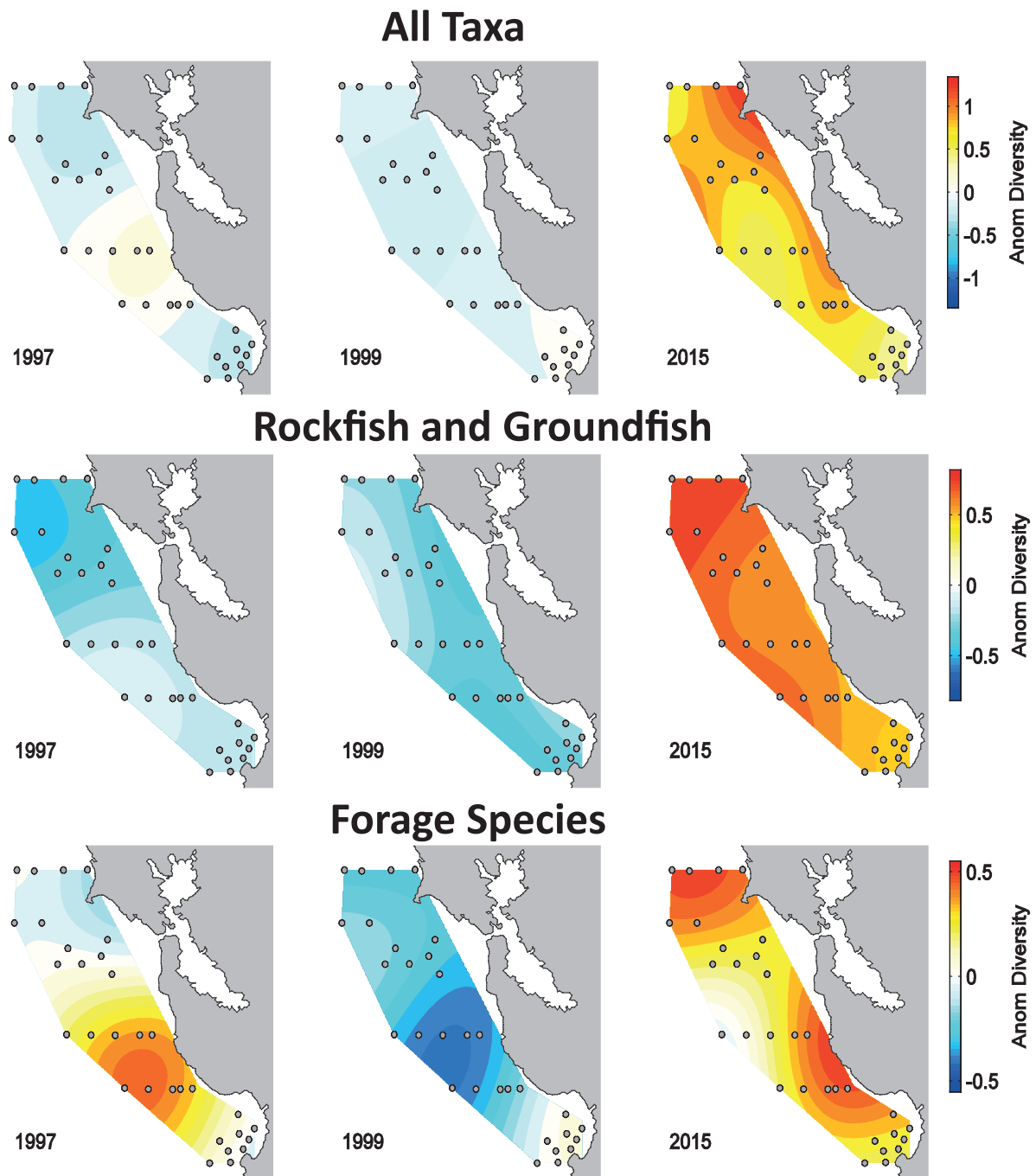


Figure S4: Spatial anomalies of diversity for (top) all taxa, (middle) YOY rockfish and groundfish and (bottom) forage species during the 1998 El Niño, 1999, La Niña and 2015 warm water blob.

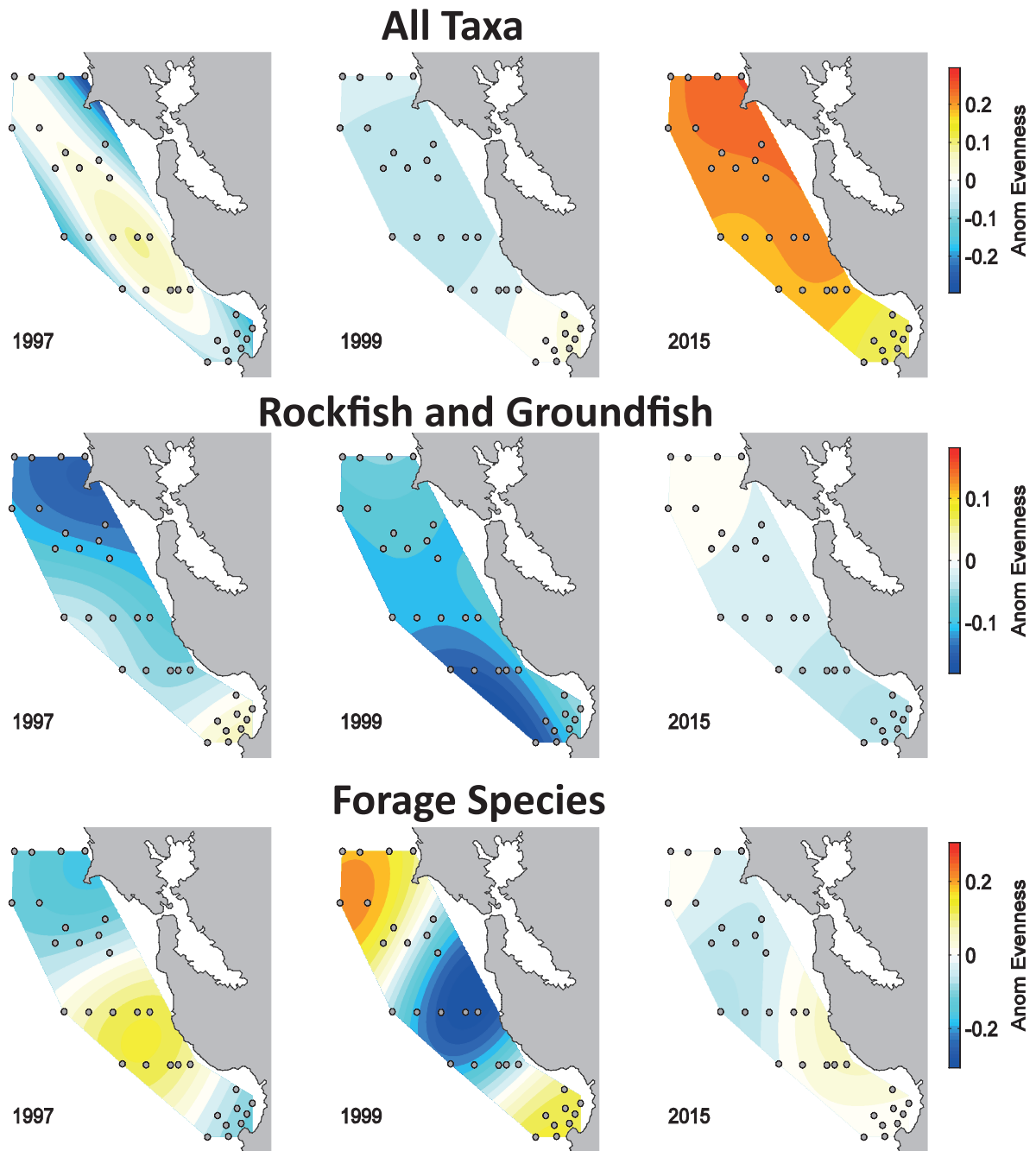


Figure S5: Spatial anomalies of evenness for (top) all taxa, (middle) YOY rockfish and groundfish and (bottom) forage species during the 1998 El Niño, 1999, La Niña and 2015 warm water blob