The following supplement accompanies the article

Decadal diet shift in yellowfin tuna *Thunnus albacares* suggests broad-scale food web changes in the eastern tropical Pacific Ocean

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Supplement. Information for all internal and terminal nodes in the 1 SE tree model and *Auxis* spp. bycatch trends.

Table S1. Summary of splits for all internal and terminal nodes in the tree model. 'Parent node' = node number, using naming criteria of Breiman et al. (1984), split into left and right child nodes; 'Sets' = numbers of purse-seine sets at each node; 'Preds' = numbers of yellowfin tuna whose diet data are partitioned at each node; 'Diversity' = diversity index ranging from 0 to 1; 'Split' = the covariate and its value splitting to the left side of each parent node, where Lat = latitude (degrees), Lon = longitude (degrees), YR = year, Qtr = quarter-of-year, PDO = Pacific Decadal Oscillation index, FL = fork length (mm), and <leaf> = terminal node; 'Pclass' = the predicted prey class comprising the greatest mean proportion weight among all prey in the diet composition of yellowfin at each node, 'Left child' = node number resulting from parent node split to the left, 'Right child' = node number resulting from parent node split to the right.

Parent node	Sets	Preds	Diversity	Split (to left)	Pclass	Left child	Right child
1	300	3122	0.80	Lat ≥ 17.335	Aux	2	3
2	74	1052	0.73	Lon < -106.74	PP	4	5
3	226	2070	0.72	Lat < -6.125	Aux	6	7
4	53	759	0.63	Lat ≥ 23.435	PP	8	9
5	21	293	0.55	Lon ≥ -106.415	Car	10	11
6	31	259	0.40	Lon < -77.685	DG	12	13
7	195	1811	0.70	YR = 2003-2005	Aux	14	15
8	32	478	0.72	PDO ≥ 1.15	EM	16	17
9	21	281	0.34	Lon ≥ -116.715	PP	18	19
10	15	194	0.73	Lon < -106.045	Car	20	21
11	6	99	0.20	Qtr < 1.5	Car	22	23
12	26	224	0.31	Lon ≥ -84.64	DG	24	25
13	5	35	0.03	<leaf>	ER	--	--
14	73	479	0.73	Lat ≥ 10.115	PP	28	29
15	122	1332	0.65	Lat < -2.725	Aux	30	31

Parent node	Sets	Preds	Diversity	Split (to left)	Pclass	Left child	Right child
16	14	239	0.44	Qtr ≥ 3.5	EM	32	33
17	18	239	0.72	YR ≥ 1994	PP	34	35
18	18	249	0.29	PDO ≥ -0.745	PP	36	37
19	3	32	0.34	<leaf>	LD	--	--
20	7	113	0.56	Lat ≥ 22.155	Vluc	40	41
21	8	81	0.40	<leaf>	Car	--	--
22	1	12	0.37	<leaf>	Vluc	--	--
23	5	87	0.09	<leaf>	Car	--	--
24	17	172	0.12	<leaf>	DG	--	--
25	9	52	0.45	<leaf>	Aux	--	--
28	32	280	0.54	Lon ≥ -118.38	PP	56	57
29	41	199	0.69	Lon ≥ -101.135	Aux	58	59
30	9	114	0.31	Lon ≥ -105.475	Vluc	60	61
31	113	1218	0.64	Lon ≥ -104.165	Aux	62	63
32	2	44	0.39	Lat < 24.85	DG	64	65
33	12	195	0.31	Lat ≥ 26.765	EM	66	67
34	13	166	0.68	PDO ≥ 0.925	PP	68	69
35	5	73	0.48	Qtr ≥ 2.5	SJ	70	71
36	17	234	0.24	Qtr ≥ 1.5	PP	72	73
37	1	15	0.33	<leaf>	Vluc	--	--
40	2	32	0.19	<leaf>	Port	--	--
41	5	81	0.39	Qtr ≥ 1.5	Vluc	82	83
56	20	186	0.31	Lon ≥ -106.81	PP	112	113
57	12	94	0.49	Lat < 11.885	Vluc	114	115
58	7	48	0.67	Lat ≥ 7.685	O.Crus	116	117
59	34	151	0.60	FL < 638.5	Aux	118	119
60	8	91	0.14	<leaf>	Vluc	--	--
61	1	23	0.00	<leaf>	Aux	--	--
62	67	617	0.57	YR ≥ 1992.5	Aux	124	125
63	46	601	0.67	Lon < -125.8	LD	126	127
64	1	25	0.08	<leaf>	DG	--	--
65	1	19	0.20	<leaf>	Vluc	--	--
66	3	51	0.51	Lat < 27	SO	132	133
67	9	144	0.22	Lon < -113.9	EM	134	135
68	3	44	0.18	<leaf>	SO	--	--
69	10	122	0.62	Lon < -108.335	PP	138	139
70	1	16	0.00	<leaf>	Vluc	--	--
71	4	57	0.33	<leaf>	SJ	--	--
72	15	199	0.19	<leaf>	PP	--	--
73	2	35	0.54	Lat ≥ 22.895	PP	146	147
82	4	64	0.22	<leaf>	Vluc	--	--
83	1	17	0.50	<leaf>	Myc	--	--
112	5	36	0.52	<leaf>	Arg	--	--
113	15	150	0.16	<leaf>	PP	--	--
114	10	76	0.37	<leaf>	Vluc	--	--
115	2	18	0.28	<leaf>	LD	--	--
116	2	21	0.30	<leaf>	DG	--	--
117	5	27	0.41	<leaf>	O.Crus	--	--
118	22	50	0.78	Lat ≥ 8.085	Vluc	236	237
119	20	101	0.44	Lat ≥ 6.2	Aux	238	239
124	60	553	0.53	Lon ≥ -83.345	Aux	248	249

Parent node	Sets	Preds	Diversity	Split (to left)	Pclass	Left child	Right child
125	7	64	0.31	<leaf>	OM	--	--
126	14	179	0.40	Lat < 12.89	Aux	252	253
127	32	422	0.56	Qtr < 2.5	LD	254	255
132	1	25	0.00	<leaf>	SO	--	--
133	2	26	0.15	<leaf>	EM	--	--
134	1	20	0.24	<leaf>	PP	--	--
135	8	124	0.12	<leaf>	EM	--	--
138	7	74	0.52	Lon ≥ -112.635	PP	276	277
139	3	48	0.57	Lat < 24.135	Port	278	279
146	1	20	0.21	<leaf>	PP	--	--
147	1	15	0.02	<leaf>	Cub	--	--
236	8	20	0.50	<leaf>	Vluc	--	--
237	14	30	0.69	<leaf>	Exo	--	--
238	13	74	0.54	Lat < 8.9	Aux	476	477
239	7	27	0.15	<leaf>	Aux	--	--
248	7	39	0.26	<leaf>	Port	--	--
249	53	514	0.50	FL ≥ 529.5	Aux	498	499
252	13	155	0.31	<leaf>	Aux	--	--
253	1	24	0.00	<leaf>	Cub	--	--
254	10	128	0.44	<leaf>	Cub	--	--
255	22	294	0.38	Lat < 6.75	LD	510	511
276	3	38	0.32	<leaf>	DG	--	--
277	4	36	0.32	<leaf>	PP	--	--
278	2	23	0.51	<leaf>	PP	--	--
279	1	25	0.17	<leaf>	Port	--	--
476	5	24	0.25	<leaf>	Vluc	--	--
477	8	50	0.40	<leaf>	Aux	--	--
498	51	463	0.46	FL < 913	Aux	996	997
499	7	51	0.36	<leaf>	Cub	--	--
510	3	28	0.51	<leaf>	Aux	--	--
511	19	266	0.31	Lon < -119.765	LD	1022	1023
996	30	176	0.61	Qtr < 1.5	Aux	1992	1993
997	34	287	0.37	<leaf>	Aux	--	--
1022	8	93	0.63	Lat ≥ 15.725	LD	2044	2045
1023	11	173	0.14	<leaf>	LD	--	--
1992	16	104	0.70	Lat < 16.66	O.Crus	3984	3985
1993	14	72	0.35	<leaf>	Aux	--	--
2044	6	50	0.59	Lon < -79.46	Cub	4088	4089
2045	2	43	0.25	<leaf>	LD	--	--
3984	15	85	0.63	Lon < -97.37	O.Crus	7968	7969
3985	1	19	0.00	<leaf>	Aux	--	--
4088	3	26	0.32	<leaf>	Aux	--	--
4089	3	24	0.22	<leaf>	Cub	--	--
7968	7	32	0.23	<leaf>	O.Crus	--	--
7969	8	53	0.59	<leaf>	Car	--	--

Bycatch trends for *Auxis* spp. in the eastern tropical Pacific Ocean. Frigate and bullet tunas *Auxis* spp. are important prey for yellowfin tuna and other pelagic predators in the ETP. *Auxis* spp. are also incidental catch of the purse-seine fishery in the ETP, and the only organisms that occur in substantial quantities in both the yellowfin diets and the fishery bycatch. The predation habits of yellowfin showed a reduction of importance of *Auxis* spp. as the principal prey between 1992-1994 and 2003-2005. We examined bycatch records for *Auxis* spp. to determine if catches per unit of effort (CPUEs) declined in concert with the predation rates of yellowfin.

We compiled bycatch records of the Inter-American Tropical Tuna Commission for all *Auxis* spp. recorded by observers onboard large vessels (>363 mt fish-carrying capacity) during 1996-2010, and numbers of sets by year and fishing method (set type) in the ETP fishery (IATTC 2010, 2011). Data for 1993-1995 were omitted because the floating-object fishery was not fully developed during those years. We treated raw catch data in biomass and numbers as in Gerrodette et al. (2012).

The nominal CPUEs for *Auxis* spp. bycatch of all fishing methods (set types) were variable year-to-year, but less so since 2000, and showed a significant declining trend ($p = 0.046$) over the time series (Fig. S1). The CPUEs should be standardized to account for the different fishing methods, but that is beyond the scope of this study. Coincidentally declining trends in predation of yellowfin tuna on *Auxis* spp. and in the bycatch per set of *Auxis* spp. lends support to the hypothesis that yellowfin tuna is an effective biological sampler of forage populations.

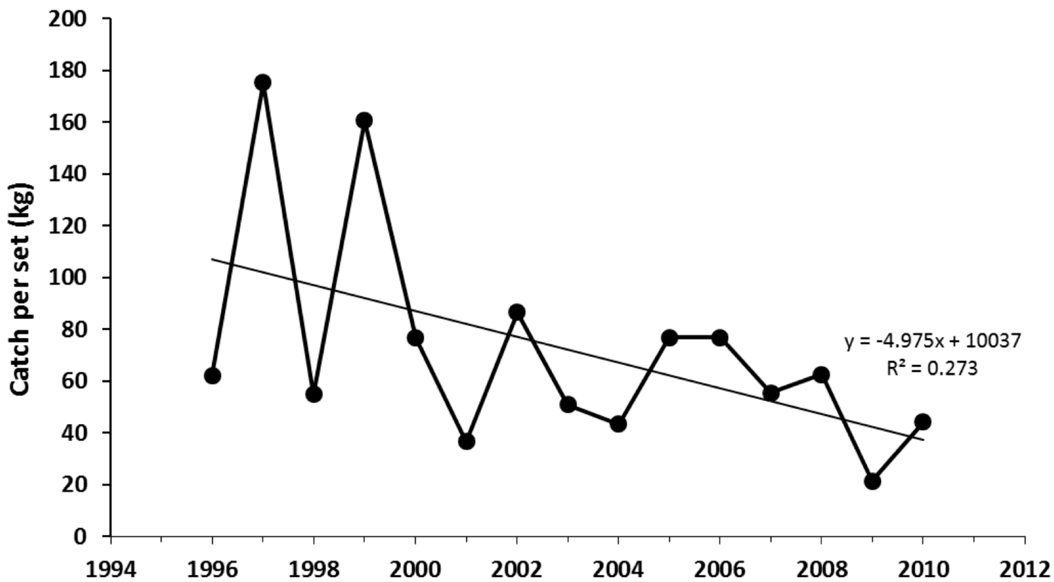

Fig. S1. Bycatch per set (all set types) of frigate and bullet tunas *Auxis* spp. by tuna purse-seine vessels (>363 mt fish-carrying capacity) in the ETP, 1996–2010.

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