

Table 1. Absolute abundance estimates for each state/region broken into the three habitat strata: Natural hard bottom, Artificial Reef, and Uncharacterized bottom, and pipeline estimates for the entire Gulf. Estimates of area coverage for natural and uncharacterized bottom, and number of structures for artificial reefs plus mean density per area or structure. SE = standard error; CV = coefficient of variation.

State/Region	Habitat Type	Total Area (km ²) or Structures	Number of Samples (<i>n</i>)	Area Sampled (km ²)	Mean Density (100m ²) or by Structure	Number	SE	CV (%)
TX	Natural	1,570	36	6.13	0.45	7,037,443	2,537,014	36
	Artificial	4,348	49			417,761	88,469	21
	<i>Large</i>	941	45		362	340,905	79,287	23
	<i>Small</i>	3,460	4		22	76,855	39,246	51
	Uncharacterized Bottom	57,535	140	6.26	0.03	14,569,830	6,663,776	46
	Total		225			22,025,035	7,130,931	32
LA	Natural	821	22	<i>n/a</i>	0.47	3,852,652	1,671,470	43
	Artificial	1,771	42		2174	3,849,325	576,234	15
	Uncharacterized Bottom	53,052	87	3.61	0.02	9,729,387	5,699,448	59
	Total		151			17,431,364	5,967,375	34
AL&MS	Natural	211	32	0.013	1.78	3,751,988	752,467	20
	Artificial	9,410	128		160	1,509,625	167,506	11
	Uncharacterized Bottom	18,500	3	0.74	0.02	3,199,472	1,625,263	51
	Total		163			8,461,085	1,798,817	21
FL	Natural & Uncharacterized	143,538	748	0.61	0.05	69,918,949	14,349,384	21
	Artificial	7,763	79		16	127,560	21,088	17
	Total		832			70,046,509	16,789,232	24
Pipelines (Gulf-wide)		26,686 linear km	27	0.49	0.019	507,661	218,961	43
Gulf of Mexico						118,471,654	17,194,438	15

Table 7. Validation analysis calculated with the mean per unit (artificial reef) or ratio estimator (natural and uncharacterized bottom) including total area or number of structures and mean density by state and habitat type. Calculations included stratifying some samples by depth and structure type, depending on state or region.

State/Region	Habitat Type	Area (km ²) or Structures	Number of Samples (n)	Mean Density (100m ²) or by Structure	Number	SE	CV (%)	Conservative CV(%)	Estimator
TX	Natural	1,570	36		5,218,915	1,390,733	27	44	
	Deep	209	11	0.09	178,682	70,111	39	65	Ratio
	Mid	953	22	0.35	3,381,753	955,545	28	47	Ratio
	Shallow	409	3	0.41	1,658,480	1,008,046	61	101	Ratio
	Artificial	12,010	31		706,327	191,728	27	45	
	Pyramids	10,902	13	11	125,300	80,777	64	107	Ratio (Structure)
	Non-Pyramids	1,108	18	524	581,027	173,881	30	50	Ratio (Structure)
	Uncharacterized Bottom	57,535	140		10,332,018	3,449,733	33	33	
	Deep	4,034	4	0.002	71,460	38,584	54	90	Ratio
	Mid-North	8,765	39	0.015	747,705	512,361	69	N/A	Ratio
	Mid-Central	6,450	22	0.033	2,159,374	2,014,526	93	N/A	Ratio
	Mid-South	6,503	16	0.005	340,824	205,910	60	N/A	Ratio
	Shallow- North	17,036	36	0.014	2,335,968	1,426,726	61	N/A	Ratio
	Shallow- Central	8,951	15	0.038	3,367,881	2,183,282	65	N/A	Ratio
	Shallow- South	5,797	8	0.023	1,308,806	856,547	65	N/A	Ratio
Total			198		16,257,260	3,724,454	23	26	
LA	Natural	821	22		3,683,745	958,570	26	43	
	Deep	105	6	0.14	151,361	51,731	34	57	Ratio
	Mid & Shallow	716	16	0.49	3,532,384	957,173	27	45	Ratio
	Artificial	1,771	42		3,849,325	1,341,617	35	58	
	Deep	93	7	710	66,046	38,272	58	96	Ratio (Structure)
	Mid	602	29	1,399	842,219	363,261	43	72	Ratio (Structure)
	Shallow	1,076	6	2,733	2,941,060	1,290,935	44	73	Ratio (Structure)
	Uncharacterized Bottom	53,052	65		11,043,973	4,024,820	36	61	
	Deep	5,348	3	0.01	406,320	387,513	95	159	Ratio
	Mid	19,077	11	0.02	3,756,598	2,715,533	72	120	Ratio
	Shallow	28,627	51	0.02	6,881,055	2,945,317	43	71	Ratio
Total			129		18,577,043	4,349,479	23	39	
AL/MS	Natural	211	32	1.78	3,751,988	752,467	20	N/A	
	Artificial	9,410	128	160	1,509,625	167,506	11	N/A	
	Uncharacterized Bottom	18,500	3	0.02	4,425,687	1,730,961	39	N/A	Ratio
	Total		163		9,687,300	1,894,859	20	N/A	
FL	Natural & Uncharacterized	143,538	748		66,121,747	13,296,205	20	N/A	
	NW Region- Deep	1,662	26	0.01	92,360	92,214	100	N/A	Ratio
	NW Region- Mid	2,060	29	0.004	85,274	85,757	101	N/A	Ratio
	NW Region- Shallow	3,553	52	0.05	1,859,201	1,298,879	70	N/A	Ratio
	Mid Region- Deep	3,759	4	-	-	-	-	N/A	Ratio
	Mid Region- Mid	12,113	20	0.12	15,114,169	8,521,792	56	N/A	Ratio
	Mid Region- Shallow	33,977	425	0.11	37,891,216	9,203,445	24	N/A	Ratio
	Southern Region- Deep	12,189	25	-	-	-	-	N/A	Ratio
	Southern Region- Mid	37,043	37	0.01	3,510,529	2,532,121	72	N/A	Ratio
	Southern Region- Shallow	37,180	130	0.02	7,568,998	3,368,997	45	N/A	Ratio
	Artificial	7,763	84	16	123,377	20,016	16	N/A	Ratio (Structure)
Total			832		66,245,124	13,296,220	20	N/A	
Pipelines (Gulf-wide)	26,686 linear km		27	0.021	546,988	358,761	64	N/A	Ratio
Gulf of Mexico					111,313,716				
TX, MS, AL, FL					92,736,673	13,942,031	15	15	
Louisiana*					18,577,043	4,349,479	23	39	

Table 5b. Re-analysis of FL estimate per SEFSC request incorporating the random forest model.

State/Region	Habitat Type	Total Area (km ²) or Structures	Number of Samples (<i>n</i>)	Area Sampled (km ²)	Mean Density (100m ²) or by Structure	Number	SE	CV (%)
TX	Natural	1,570	36	6.13	0.45	7,037,443	2,537,014	36
	Artificial	4,348	49			417,761	88,469	21
	<i>Large</i>	941	45		362	340,905	79,287	23
	<i>Small</i>	3,460	4		22	76,855	39,246	51
	Uncharacterized Bottom	57,535	140	6.26	0.03	14,569,830	6,663,776	46
	Total		225			22,025,035	7,130,931	32
LA	Natural	821	22	<i>n/a</i>	0.47	3,852,652	1,671,470	43
	Artificial	1,771	42		2174	3,849,325	576,234	15
	Uncharacterized Bottom	53,052	87	3.61	0.02	9,729,387	5,699,448	59
	Total		151			17,431,364	5,967,375	34
AL&MS	Natural	211	32	0.013	1.78	3,751,988	752,467	20
	Artificial	9,410	128		160	1,509,625	167,506	11
	Uncharacterized Bottom	18,500	3	0.74	0.02	3,199,472	1,625,263	51
	Total		163			8,461,085	1,798,817	21
FL	Natural & Uncharacterized	143,538	748	0.61	0.03	48,124,414	10,437,839	22
	Artificial	7,763	79		16	127,560	21,088	17
	Total		832			48,251,974	10,437,861	22
Pipelines (Gulf-wide)		26,686 linear km	27	0.49	0.019	507,661	218,961	43
Gulf of Mexico						96,677,119	13,969,084	14

Table 7b. Re-analysis of FL estimate per SEFSC request incorporating the random forest model.

State/Region	Habitat Type	Area (km ²) or Structures	Number of Samples (n)	Area Sampled (km ²)	Mean Density (100m ²) or by Structure	Number	SE	CV (%)	Conservative CV(%)	Estimator
TX	Natural	1,570	36	6.13		5,218,915	1,390,733	27	44	
	Deep	209	11		0.09	178,682	70,111	39	65	\hat{E}_{SEFSC}
	Mid	953	22		0.35	3,381,753	955,545	28	47	\hat{E}_{SEFSC}
	Shallow	409	3		0.41	1,658,480	1,008,046	61	101	\hat{E}_{SEFSC}
	Artificial	12,010	31			706,327	191,728	27	45	
	Pyramids	10,902	13		11	125,300	80,777	64	107	$\hat{E}_{SEFSC(p2yr)}$
	Non-Pyramids	1,108	18		524	581,027	173,881	30	50	\hat{E}_{SEFSC}
	Uncharacterized Bottom	57,535	140	6.22		10,332,018	3,449,733	33	33	
	Deep	4,034	4	1.35	0.002	71,460	38,584	54	90	\hat{E}_{SEFSC}
	Mid-North	8,765	39	1.75	0.015	747,705	512,361	69	N/A	\hat{E}_{SEFSC}
	Mid-Central	6,450	22	1.05	0.033	2,159,374	2,014,526	93	N/A	\hat{E}_{SEFSC}
	Mid-South	6,503	16	0.92	0.005	340,824	205,910	60	N/A	\hat{E}_{SEFSC}
	Shallow- North	17,036	36	0.51	0.014	2,335,968	1,426,726	61	N/A	\hat{E}_{SEFSC}
	Shallow- Central	8,951	15	0.38	0.038	3,367,881	2,183,282	65	N/A	\hat{E}_{SEFSC}
	Shallow- South	5,797	8	0.25	0.023	1,308,806	856,547	65	N/A	\hat{E}_{SEFSC}
	Total			198			16,257,260	3,724,454	23	26
LA	Natural	821	22	N/A		3,683,745	958,570	26	43	
	Deep	105	6		0.14	151,361	51,731	34	57	\hat{E}_{SEFSC}
	Mid & Shallow	716	16		0.49	3,532,384	957,173	27	45	\hat{E}_{SEFSC}
	Artificial	1,771	42			3,849,325	1,341,617	35	58	
	Deep	93	7		710	66,046	38,272	58	96	\hat{E}_{SEFSC}
	Mid	602	29		1,399	842,219	363,261	43	72	\hat{E}_{SEFSC}
	Shallow	1,076	6		2,733	2,941,060	1,290,935	44	73	\hat{E}_{SEFSC}
	Uncharacterized Bottom	53,052	65	2.42		11,043,973	4,024,820	36	61	
	Deep	5,348	3	0.68	0.01	406,320	387,513	95	159	\hat{E}_{SEFSC}
	Mid	19,077	11	0.85	0.02	3,756,598	2,715,533	72	120	\hat{E}_{SEFSC}
	Shallow	28,627	51	0.89	0.02	6,881,055	2,945,317	43	71	\hat{E}_{SEFSC}
Total			129			18,577,043	4,349,479	23	39	
AL/MS	Natural	211	32	0.01	1.78	3,751,988	752,467	20	N/A	
	Artificial	9,410	128		160	1,509,625	167,506	11	N/A	
	Uncharacterized Bottom	18,500	3	0.74	0.02	4,425,687	1,730,961	39	N/A	\hat{E}_{SEFSC}
	Total			163			9,687,300	1,894,859	20	N/A
FL	Natural & Uncharacterized	143,538	748	0.61		46,921,038	10,300,890	37	N/A	
	Red Snapper low probability	92,616				14,653,325	5,462,227		N/A	
	NW Region- Deep	1,557	13	0.009	0.000	0	0		N/A	\hat{E}_{SEFSC}
	NW Region- Mid	1,148	17	0.014	0.007	81,238	82,058	101%	N/A	\hat{E}_{SEFSC}
	NW Region- Shallow	2,009	23	0.024	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Mid Region- Deep	3,295	2	0.001	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Mid Region- Mid	3,013	0	-	-	0	0		N/A	\hat{E}_{SEFSC}
	Mid Region- Shallow	19,460	77	0.052	0.271	5,265,679	2,616,464	50%	N/A	\hat{E}_{SEFSC}
	Southern Region- Deep	9,871	15	0.010	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Southern Region- Mid	18,358	13	0.013	0.315	5,786,192	3,859,150	67%	N/A	\hat{E}_{SEFSC}
	Southern Region- Shallow	33,905	53	0.048	0.104	3,520,216	2,844,339	81%	N/A	\hat{E}_{SEFSC}
	Red Snapper probable	28,065				15,454,698	5,838,704		N/A	
	NW Region- Deep	98	7	0.005	0.211	20,614	20,410	99%	N/A	\hat{E}_{SEFSC}
	NW Region- Mid	693	7	0.006	0.000	0	0		N/A	\hat{E}_{SEFSC}
	NW Region- Shallow	1,145	11	0.008	1.847	2,115,089	2,118,505	100%	N/A	\hat{E}_{SEFSC}
	Mid Region- Deep	419	2	0.001	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Mid Region- Mid	4,026	10	0.009	1.057	4,256,027	3,042,427	71%	N/A	\hat{E}_{SEFSC}
	Mid Region- Shallow	8,030	138	0.107	1.021	8,199,695	4,479,071	55%	N/A	\hat{E}_{SEFSC}
	Southern Region- Deep	1,928	6	0.004	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Southern Region- Mid	9,383	10	0.016	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Southern Region- Shallow	2,343	49	0.038	0.368	863,273	532,486	62%	N/A	\hat{E}_{SEFSC}
	Red Snapper high probability	22,858				16,813,015	6,494,764		N/A	
	NW Region- Deep	8	6	0.004	0.000	0	0		N/A	\hat{E}_{SEFSC}
	NW Region- Mid	220	5	0.004	0.000	0	0		N/A	\hat{E}_{SEFSC}
	NW Region- Shallow	399	18	0.016	0.635	253,470	227,876	90%	N/A	\hat{E}_{SEFSC}
	Mid Region- Deep	45	0	-	-	0	0		N/A	\hat{E}_{SEFSC}
	Mid Region- Mid	5,074	10	0.011	1.418	7,195,848	5,984,849		N/A	\hat{E}_{SEFSC}
	Mid Region- Shallow	6,487	210	0.174	1.424	9,236,065	2,510,522	27%	N/A	\hat{E}_{SEFSC}
	Southern Region- Deep	390	4	0.003	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Southern Region- Mid	9,301	14	0.014	0.000	0	0		N/A	\hat{E}_{SEFSC}
	Southern Region- Shallow	932	28	0.022	0.137	127,631	94,323	74%	N/A	\hat{E}_{SEFSC}
	Artificial	7,763	84		16	123,377	20,125	16	N/A	\hat{E}_{SEFSC}
Total			832			47,044,415	10,300,910	22	N/A	
Pipelines (Gulf-wide)		26,686 linear km	27	0.49	0.021	546,988	358,761	64	N/A	\hat{E}_{SEFSC}
Gulf of Mexico						92,113,006				
TX, MS, AL, FL						73,535,963	13,942,031	15	15	
Louisiana*						18,577,043	4,349,479	23	39	