

ESM:

Table 1.

Data table of oyster values (estuary-wide extent and biomass, mean density and mean oyster size) for all estuaries, past and present. Where both historic and present data were available and were determined to have been collected by comparable means comparative statistics are also provided. * demarcates where data were proxied from the nearest estuary within the ecoregion, and therefore represent data with lower certainty. The reference used as a proxy is listed within the references for each estuary. Proxies were only used where expert opinion deemed the proxies reasonable. In estuaries with no remaining oyster grounds (oysters functionally extinct), densities are reported as "NA" as oysters were often present, but not in reef or bed formations. Biomass is therefore also listed as <1% in these cases.

Ecoregion	NOAA Name	State	Historic reef area (Ha)	Historic extent Year	Historic Mean Density (ind/m²)	Historic Mean Density Market (indm²)	Historic Mean Oyster length (mm)	Historic Mean oyster length Market (mm)	Current reef area (Ha)	Current extent year	Total Density (ind/m²)	Density Market (indm²)	Mean Oyster length (mm)	Mean oyster length Market (mm)	% Historic extent remaining	Historic biomass total (kg x 10³)	Present biomass total (kg x 10³)	% Historic biomass remaining	References
Gulf of Maine/Bay of Fundy	Great Bay	NH	-	-	-	-	-	-	87	2003-2009	287	-	55	-	-	-	136	-	(1, 2)
Virginian	Barnegat Bay	NJ	5261	1889	18*	5*	67*	82*	0	0	NA	NA	-	-	0	880	0	<1	(3-6)
Virginian	Bogue Sound	NC	666	1886-1887	18*	5*	67*	82*	-	-	-	-	-	-	-	73	-	-	(4, 5, 7)
Virginian	Delaware Bay	NJ/DE	25149	1889/1910	18	5	67*	82*	11471	2009	16	2	57	87	46	4206	1179	28	(3-5, 8)
Virginian	Hudson River/Raritan Bay	NY/NJ	1660	1886-1887	18*	5*	67*	82*	402	1983/2010	16*	2*	57*	87*	24	278	41	15	(4, 5, 8-11)
Virginian	Ingram/ Fleets Bays	VA	-	-	-	-	-	-	83	1980	69	-	-	-	-	-	17	-	(12, 13)
Virginian	James River	VA	4467	1910	19	5	67	82	2410	1998-2006	-	-	-	-	54	535	200	37	(4, 14)
Virginian	Long Island Sound	NY/CT	13267	1886-1887	18*	5*	67*	82*	-	-	-	-	-	-	-	2219	-	-	(3-5)
Virginian	Lynnhaven River	VA	-	-	-	-	-	-	5	2004-2006	-	-	-	-	-	-	9	-	(15)

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Carolinian	Broad River	SC	51	1890	-	-	-	-	622	2006-2008	1229	240	43	75	-	-	968	-	(24, 25)
Carolinian	Charleston Harbor	SC	27	1890	-	-	-	-	574	2006-2008	1229	240	43	75	-	-	88	-	(24, 25)
Carolinian	New River	NC	126	1886-1887	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(7)
Carolinian	Ossabaw Sound	GA	71	1891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(23)
Carolinian	Savannah River	GA/SC	62	1890/1891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(23, 25)
Carolinian	St. Andrew/St. Simons Sounds	GA	185	1891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(23)
Carolinian	St. Catherines/Sapelo Sounds	GA	271	1891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(23)
Carolinian	St. Helena Sound	SC	48	1890	-	-	-	-	401	2006-2008	1229	240	43	75	-	-	625	-	(24, 25)
Carolinian	Stono/ North Edisto Rivers	SC	115	1890	-	-	-	-	199	2006-2008	1229	240	43	75	-	-	309	-	(24, 25)
Floridian	Biscayne Bay	FL	-	-	-	-	-	-	0	2005-2006	NA	NA	-	-	-	-	0	<1	(26)

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Floridian	Caloosahatchee River	FL	-	-	-	-	-	-	1	2010	-	-	-	-	-	-	-	-	(27)
Floridian	Charlotte Harbor	FL	-	-	-	-	-	-	97	2010	-	-	-	-	-	-	-	-	(27)
Floridian	Indian River	FL	-	-	-	-	-	-	90	2007/ 2010	-	-	-	-	-	-	-	-	(27, 28)
Floridian	N. Ten Thousand Islands	FL	-	-	-	-	-	-	28	>2000	-	-	-	-	-	-	-	-	(27)
Floridian	Rookery Bay	FL	-	-	-	-	-	-	10	>2000	-	-	-	-	-	-	-	-	(27)
Floridian	Sarasota Bay	FL	-	-	-	-	-	-	23	2010	102‡*	3*	35*	83*	-	-	4	-	(27, 28)
Floridian	Tampa Bay	FL	-	-	-	-	-	-	18	2010	102‡	3	35*	83*	-	-	3	-	(27, 28)
Northern Gulf of Mexico	Apalachee Bay	FL	-	-	-	-	-	-	1535	2010	158‡*	23*	51*	90*	-	-	1296	-	(27, 28)
Northern Gulf of Mexico	Apalachicola Bay	FL	2695	1915	15	5	65	94	3491	1990- 2010	158‡	23	51	90	130	465	2947	634	(28-30)
Northern Gulf of Mexico	Aransas Bay	TX	3885	1891	58*	30*	81*	91*	482	2007	23	8	65	93	12	4249	134	3	(31-34)

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Northern Gulf of Mexico	Atchafalaya/Vermilion Bays	LA	8050	1905	31	5	71	105	-	-	-	-	-	-	-	3545	-	-	(35, 36)
Northern Gulf of Mexico	Barataria Bay	LA	-	-	-	-	-	-	1028	2010	6	1	57	93	-	-	45	-	(37)
Northern Gulf of Mexico	Breton/Chandeleur Sounds	LA	5427	1898	31*	5*	69*	87*	4525	2010	6	0	51	93	83	1697	119	7	(35, 37, 38)
Northern Gulf of Mexico	Calcasieu Lake	LA	-	-	-	-	-	-	1581	2010	18	7	57	93	-	-	357	-	(37)
Northern Gulf of Mexico	Choctawhatchee Bay	FL	-	-	-	-	-	-	89	2010	68‡	16	57	90	-	-	45	-	(27, 28)
Northern Gulf of Mexico	Corpus Christi Bay	TX	3367	1891	58*	30*	81*	91*	290	2007	3	0	54	98	9	3683	6	<1	(31-34) ‡‡
Northern Gulf of Mexico	Galveston Bay	TX	12950	1891	58*	30*	81*	91*	10795	1995	8	2	62	99	83	14165	1027	7	(31-33, 39) ††

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Northern Gulf of Mexico	Laguna Madre (Upper and Lower, and Baffin Bay)	TX	777	1891	58*	30*	81*	91*	68	2007	1	0	53	85	9	850	0.5	<1	(31-34) ††
Northern Gulf of Mexico	Matagorda Bay	TX	16679	1907/1915	58	30	81	91	2229	2011	10	2	54	94	13	18243	159	1	(31, 33, 40) ††
Northern Gulf of Mexico	Mobile Bay	AL	1151	1894	29	14	75	87	1045	1968/1995	11	3	51*	90*	91	498	98	20	(28, 41-43)
Northern Gulf of Mexico	Pensacola Bay	FL	-	-	-	-	-	-	3144	2010	68‡	16	57	90	-	-	1585	-	(28)
Northern Gulf of Mexico	Sabine Lake	TX/LA	259	1891	58*	30*	81*	91*	480	2010	41	14	69	99	185¶¶	283	301	106	(31-33, 37) §§
Northern Gulf of Mexico	San Antonio Bay	TX	2590	1891	58*	30*	81*	91*	2158	~2000	8	2	57	98	83	2833	147	5	(31, 33, 34) ††
Northern Gulf of Mexico	St. Andrew Bay	FL	-	-	-	-	-	-	890	2010	230	19	44	90	-	-	660	-	(27, 28)

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Northern Gulf of Mexico	Suwannee River	FL	-	-	-	-	-	-	2138	2010	68‡	16	57	90	-	-	1078	-	(27, 28)
Northern Gulf of Mexico	Terrebonne/Timbalier Bays	LA	-	-	-	-	-	-	1177	2010	17	1	57	93	-	-	80	-	(37)
Northern Gulf of Mexico	West Mississippi Sound	MS/LA	3391	1898/1911	31	5	69	87	6490	2010/1973	2	0	57	93	191	1061	84	8	(35, 37, 38)
Southern California Bight	Newport Bay	CA	-	-	-	-	-	-	0	2011	NA	NA	-	-	0	-	0	-	(44)
Northern California	Elkhorn Slough	CA	2	1929	116*	-	35*	-	0	2010	NA	NA	-	-	0	0.5	0	<1	(45-47)
Northern California	San Francisco Bay	CA	3251	1893	116*	-	35*	-	0	2006	NA	NA	-	-	0	801	0	<1	(46, 48, 49)
O.W.V.C.	Humboldt Bay	CA	137	1935	116*	-	35*	-	0	2007	NA	NA	-	-	0	34	0	<1	(34, 46, 50)
O.W.V.C.	Netarts Bay	OR	-	-	-	-	-	-	4	2011	33	-	34	-	-	-	0.007	-	
O.W.V.C.	Willapa Bay	WA	6225†††	~1850	116*	-	35*	-	0	2011	NA	NA	-	-	0	1533	0	0	(44, 46, 51, 52)

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O.W.V.C.	Yaquina Bay	OR	27	1895	116	-	35	-	-	-	-	-	-	-	-	7	-	-	(46, 53)

† Baylor's survey of Virginia's oyster beds incorporated significant portions of unproductive grounds (4). Here we apply a correction factor of 47% of mapped area to be oyster grounds as determined by the US Army Corps of Engineers through comparing Baylor's survey with other more exclusive surveys of oyster grounds (54). Only tributaries deemed by expert judgement to be similar to James River and Tangier Sound (the locations of the alternative surveys) were handled in this way.

§ Biomass of oyster rocks estimated by Harding et al.(18), to which we added the biomass calculated to be standing on "shell and sand" and "shell and mud" as determined by Haven et al. (12).

¶ Extent was determined from aerial photography and therefore included vast areas of marsh which would not traditionally have been surveyed from river channels. We therefore included only reef areas that were within 5m of the historically surveyed channel edge. Nevertheless the historic and present extent are not directly comparable as it is unclear what definition of "oyster reef" was used historically (25).

‡ Densities are determined from the state fisheries managers' surveys of productive oyster reefs. As these productive oyster reefs represent an unknown portion of the oyster grounds mapped, we referred to a historic survey by of Matagorda bay (31), which sought to outline what proportion of oyster grounds bore oysters to determine that approximately 50% of the mapped grounds were barren. We therefore conservatively corrected the densities in these bays by a factor of 0.5 to bring the oyster density and extent measures to an appropriate scale to allow for comparison.

¶¶ Historic data represents the Texas portion of the bay only and our comparison is therefore highly conservative.

†† Shell size and density determined from Texas Parks and Wildlife dredge survey data for years 2000-2010

‡‡ Shell size and density determined from Texas Parks and Wildlife dredge survey data for years 1986-1991

§§ Shell size determined from Texas Parks and Wildlife dredge survey data for years 2006-2009

††† Historic areal extent of oyster reefs in Willapa bay was determined by digitizing historic maps by Collins (51) and Townsend (52), which illustrated both wild and cultivated beds at the time, followed by expert review of which areas marked as "cultivated" were likely to have been "natural" beds historically. This area therefore includes areas that were "cultivated" in the late 1800's.

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