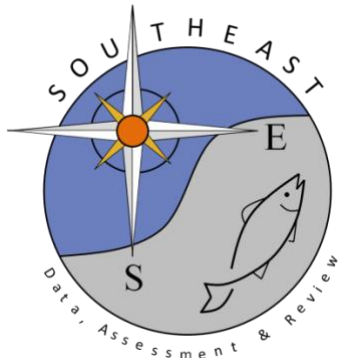


TPWD's Gulf Trawl Sample Design

Texas Parks and Wildlife Division

SEDAR87-RD-07

September 2023



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The Texas Parks and Wildlife – Coastal Fisheries Division samples five Gulf areas within the Texas Territorial Sea (shoreline to nine nautical miles offshore), where 16 samples are collected every month in each area (80 samples per month in total) (Table 1, Figure 1).

Data are collected as a stratified cluster sampling design; each Gulf area serves as non-overlapping strata with a fixed number of samples per month. A cluster sample is defined as a type of probability sample where each sample unit is a collection, or cluster, of elements. Specifically, *locations* are sampled and include every organism encountered at that location as part of the sample.

Gulf trawl sample locations are randomly selected from grids (1-minute latitude by 1-minute longitude) within the Texas Territorial Sea (Figure 1) that contain water >1.8 m deep in at least $\frac{1}{3}$ of the grid and are known to be free of obstructions. One half of the samples in each area are collected during each half (days 1-15 and 16-31) of the month to ensure good temporal distribution of samples.

Trawls are 6.1 m (20 ft) wide otter trawls with 38 mm (1.5 in) stretched nylon multifilament mesh throughout. Trawl doors are 1.2 m (48 in) long and 0.5 m (20 in) wide; and constructed of 13 mm (0.5 in) plywood with angle iron framework and iron runners.

Trawls are towed linearly, parallel to the fathom curve; direction of tow (north or south) is randomly chosen for the initial tow and alternated on subsequent tows. All tow times are 10 minutes in duration. No grid is sampled more than once per month. Sampling takes place during daytime, from 1/2 hour before sunrise to 1/2 hour after sunset.

Organisms greater than 5 mm total length, captured in the trawl or stranded on the boat deck, are identified to the lowest possible phylogenetic unit (genus and species preferred). Up to 50 randomly selected shrimp of each commercial species (brown, white and pink) are measured. Sex and female maturity stage are determined for up to 50 white shrimp.

Bottom salinity (ppt), water temperature (°C), dissolved oxygen (ppm) and turbidity [Nephelometric Units (NTU)] are measured prior to each Gulf trawl sample.

Description of Gulf Sample Areas

Gulf area off Sabine Lake. All waters located 13 nautical miles (15 statute miles) on either side of Sabine Pass from the Gulf beach shoreline to 9 nautical miles (10 statute miles) offshore (includes Louisiana waters).

Gulf area off Galveston Bay. All waters located 13 nautical miles (15 statute miles) on either side of Bolivar Pass from the Gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Matagorda and San Antonio bays. All waters located 13 nautical miles (15 statute miles) on either side of Matagorda Ship Channel from the Gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Aransas and Corpus Christi bays. All waters located 13 nautical miles (15 statute miles) on either side of Aransas Pass from the Gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

Gulf area off Lower Laguna Madre. All waters located 26 nautical miles (30 statute miles) north of the Texas-Mexico border from the Gulf beach shoreline to 9 nautical miles (10 statute miles) offshore.

TABLE 1— Number of Gulf trawl samples collected during routine monitoring by year.

Year	Sabine Pass	Bolivar Pass	Matagorda Pass	Aransas Pass	Brazos Santiago Pass	Total
1987	192	192	192	192	192	960
1988	192	192	192	192	184	952
1989	192	192	192	184	189	949
1990	192	192	192	192	192	960
1991	192	192	192	184	192	952
1992	192	192	192	184	192	952
1993	192	192	192	192	192	960
1994	192	192	187	192	192	955
1995	192	192	192	184	192	952
1996	192	192	192	192	192	960
1997	192	192	188	192	192	956
1998	192	184	184	192	192	944
1999	192	192	192	184	192	952
2000	192	189	192	192	192	957
2001	192	192	192	192	192	960
2002	192	184	192	192	192	952
2003	192	192	192	192	192	960
2004	192	185	192	192	192	953
2005	192	192	192	184	192	952
2006	192	192	191	192	192	959
2007	192	192	192	192	192	960
2008	192	192	192	192	192	960
2009	192	192	192	192	192	960
2010	192	192	192	192	192	960
2011	192	192	192	192	184	952
2012	192	192	192	192	192	960
2013	192	192	192	192	192	960
2014	192	192	192	184	192	952

TABLE 1— Continued.

Year	Sabine Pass	Bolivar Pass	Matagorda Pass	Aransas Pass	Brazos Santiago Pass	Total
2015	192	192	192	192	192	960
2016	192	192	192	192	192	960
2017	192	192	192	176	192	944
2018	192	192	187	192	176	939
2019	192	184	192	192	187	947
2020*	160	160	160	160	160	800
2021	192	192	192	192	192	960
2022	192	192	192	192	192	960

*No sampling in April and May due to COVID-19

Figure 1 – Location of Gulf areas sampled along the coast.

