

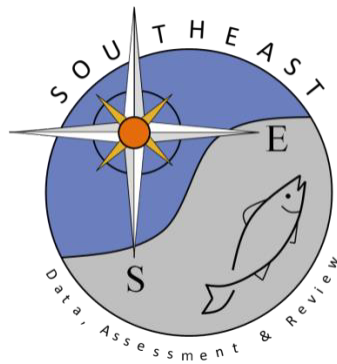
SEDAR 87 Commercial Fishery Landings and Effort Figures for White, Pink, and Brown Shrimp in the US Gulf of Mexico, 1960–2022

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SEDAR87-DW-16

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Effort Data

Historically, penaeid shrimp trawling effort in the Gulf of Mexico was estimated from landings and interview data gathered by NOAA Fisheries Service (NMFS) port agents. The total pounds landed from each trip were assigned to one or more of the statistical area/depth zone cells for which a catch per unit effort (CPUE) was also obtained. The total landings in pounds for each cell were divided by the CPUE of the cell to determine effort or days fished. These values were summed across all cells and months to provide an estimate of total effort (Gallaway et al. 2003b). This method was time consuming and did not provide precise spatial and temporal effort.

An electronic logbook (ELB) program was developed in the early 2000's by LGL Ecological Research Associates, Inc. (LGL). Vessels selected to participate must carry data recording devices, which are simple time-stamped global positioning system (GPS) units that record and store a vessel's location at 10-minute time intervals. Selected vessels were met at the dock to retrieve an SD card which stored the data from the ELB. From these time-stamped locations, vessel speed between points (i.e., stopped, towing, moving between towing points) can be estimated and then evaluated with mathematical algorithms. Thus, effort by location can be calculated for a given fishing trip.

In 2014, 3G cellular capabilities were integrated into the electronic logbook unit, which changed the name to cellular electronic logbook (cELB). With cellular integration, the data were automatically uploaded to a NOAA server when the vessel was within non-roaming cellular range. This made the process more efficient by reducing handling costs and making the information available to analysts more quickly. As of December 2020, 3G cellular technology has been phased out and the program returned to the manual retrieval of the SD cards. For more information on the Shrimp Electronic Logbook Program:

<https://www.fisheries.noaa.gov/southeast/commercial-fishing/electronic-logbook-gulf-mexico-shrimp-permit>

1. Heat maps of days fished using data from Shrimp Electronic Logbook Program

All data for Figures 1–13 were from ELB or cELB run through the Dettloff algorithm (Dettloff 2023) to calculate shrimp fishing effort. This data file consists of vessel locations collected from the ELB/cELB program from 2008–2022 that have been classified as “trawling” based on vessel speed. Heat maps of estimated effort (24 hour days fished) were created at a one nautical mile resolution. Any cell with less than 3 unique vessels is not displayed on the maps to comply with confidentiality requirements set forth by the Magnuson–Stevens Fishery Conservation and Management Act (MSA). Maps were not created for years prior to 2008 due to incomplete coverage during the initial phases of the ELB program and for years 2013 and 2014 when the program was transitioning from using ELB to cELB devices.

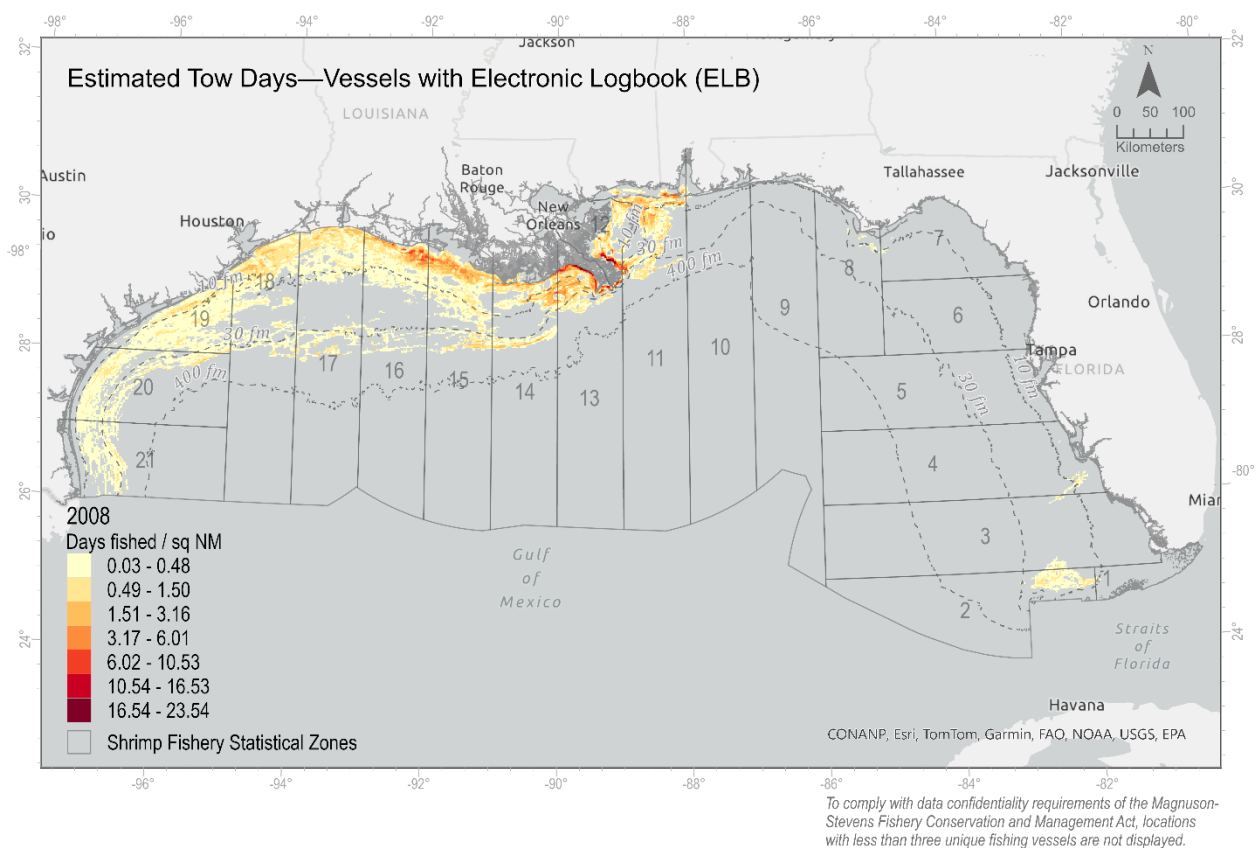


Figure 1. Summary of the number of days fished per square nautical mile that occurred in 2008 in the Gulf of Mexico using LGL ELB data from the Shrimp Electronic Logbook Program.

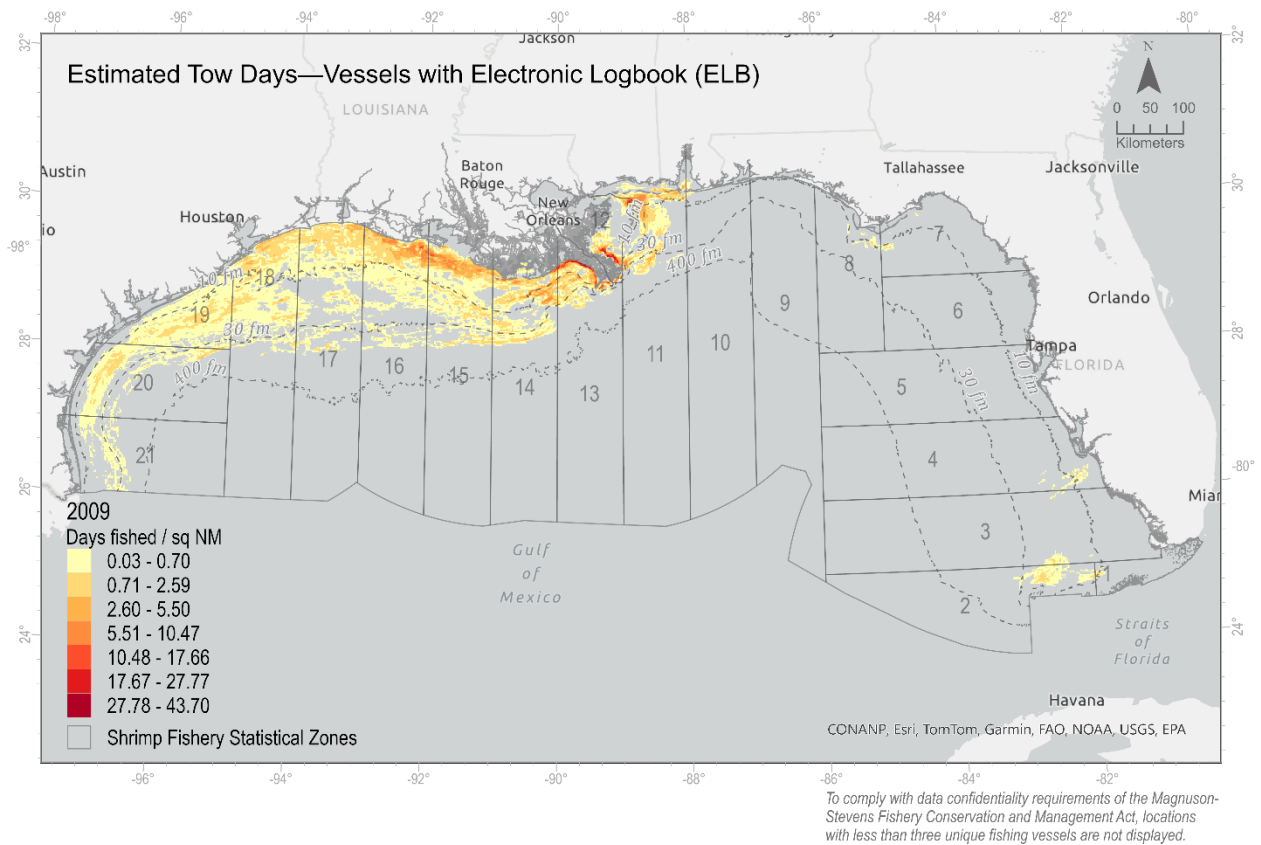


Figure 2. Summary of the number of days fished per square nautical mile that occurred in 2009 in the Gulf of Mexico using LGL ELB data from the Shrimp Electronic Logbook Program.

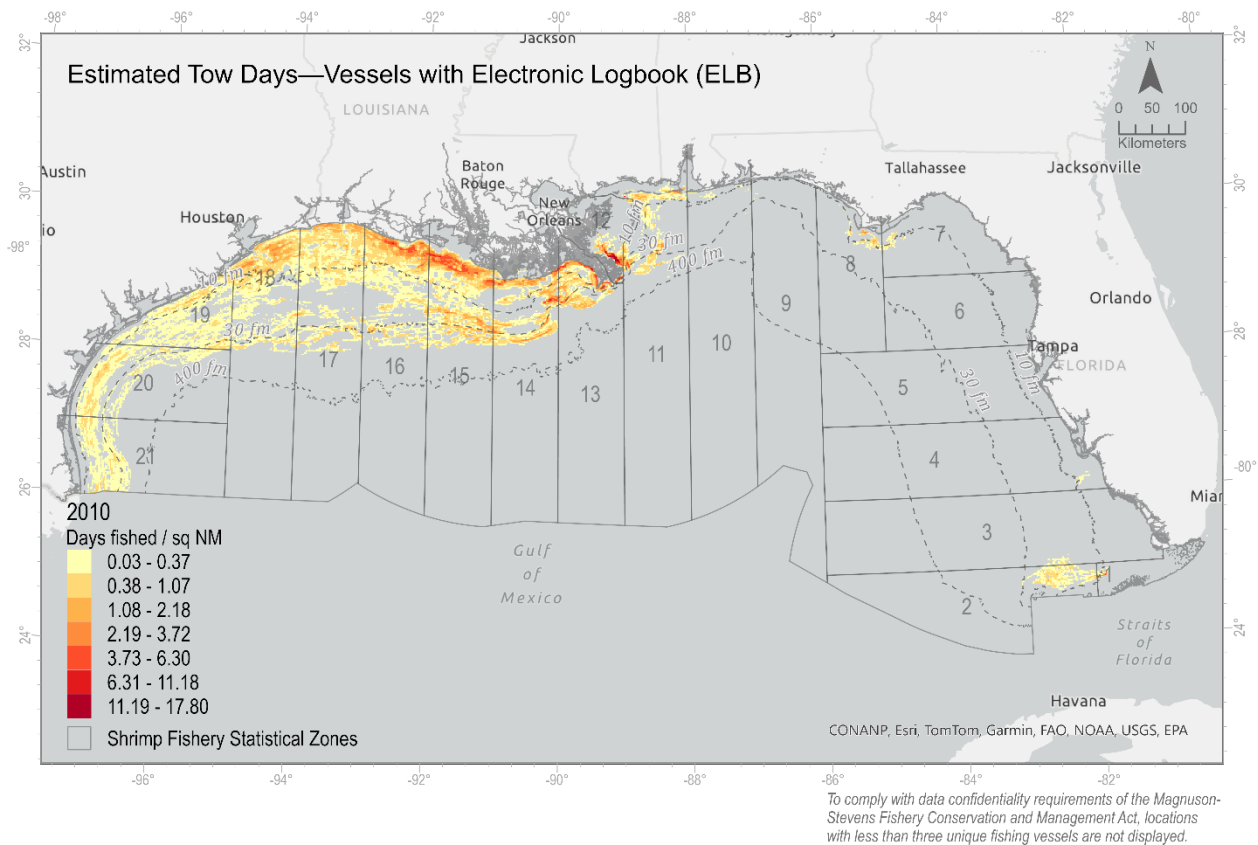


Figure 3. Summary of the number of days fished per square nautical mile that occurred in 2010 in the Gulf of Mexico using LGL ELB data from the Shrimp Electronic Logbook Program.

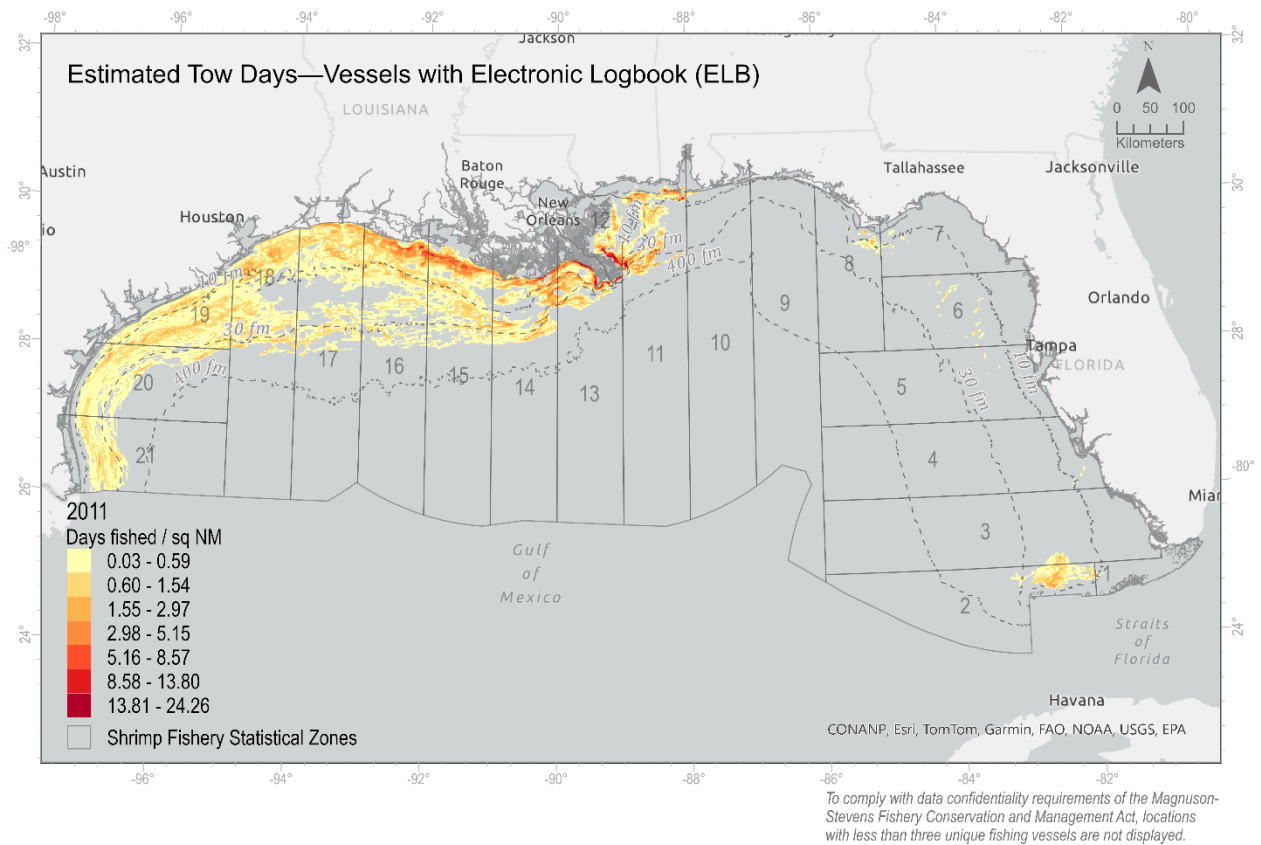


Figure 4. Summary of the number of days fished per square nautical mile that occurred in 2011 in the Gulf of Mexico using LGL ELB data from the Shrimp Electronic Logbook Program.

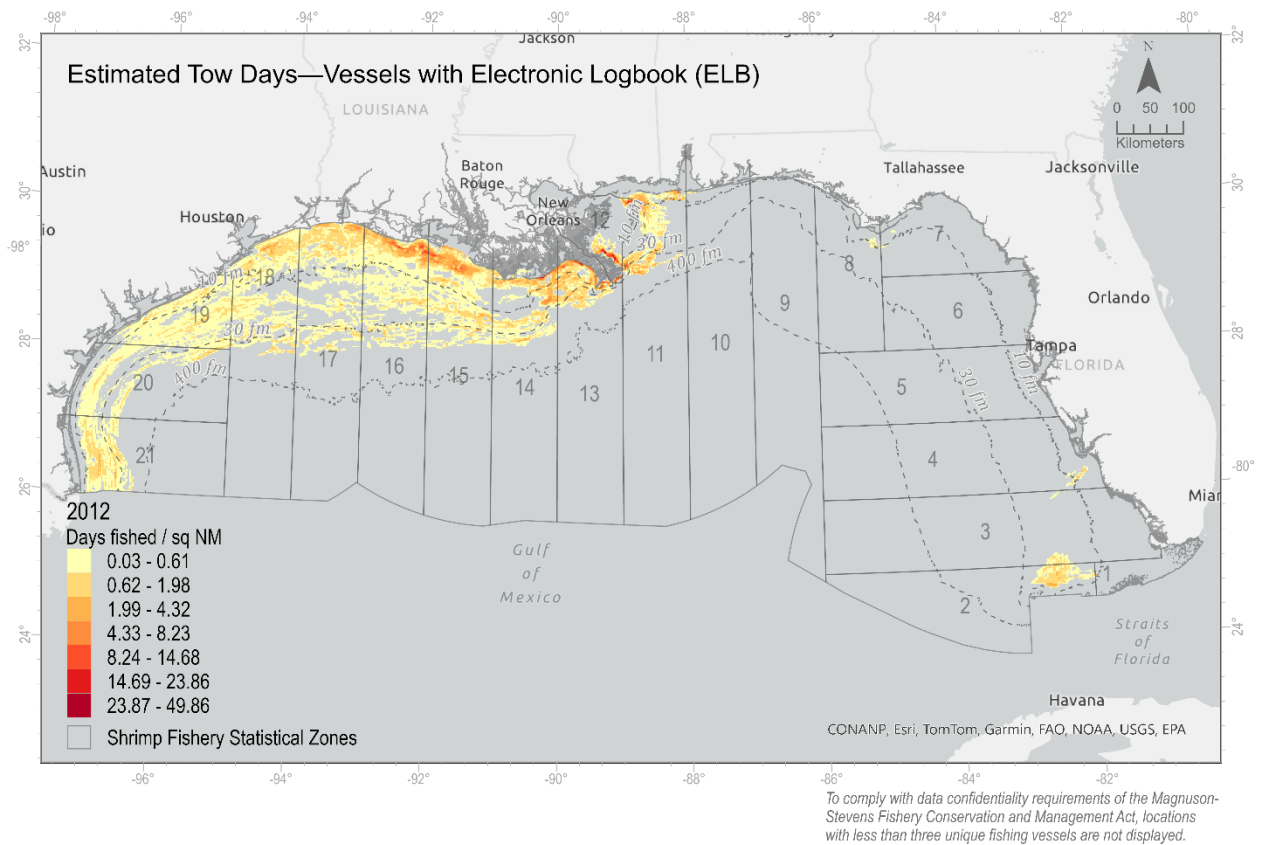


Figure 5. Summary of the number of days fished per square nautical mile that occurred in 2012 in the Gulf of Mexico using LGL ELB data from the Shrimp Electronic Logbook Program.

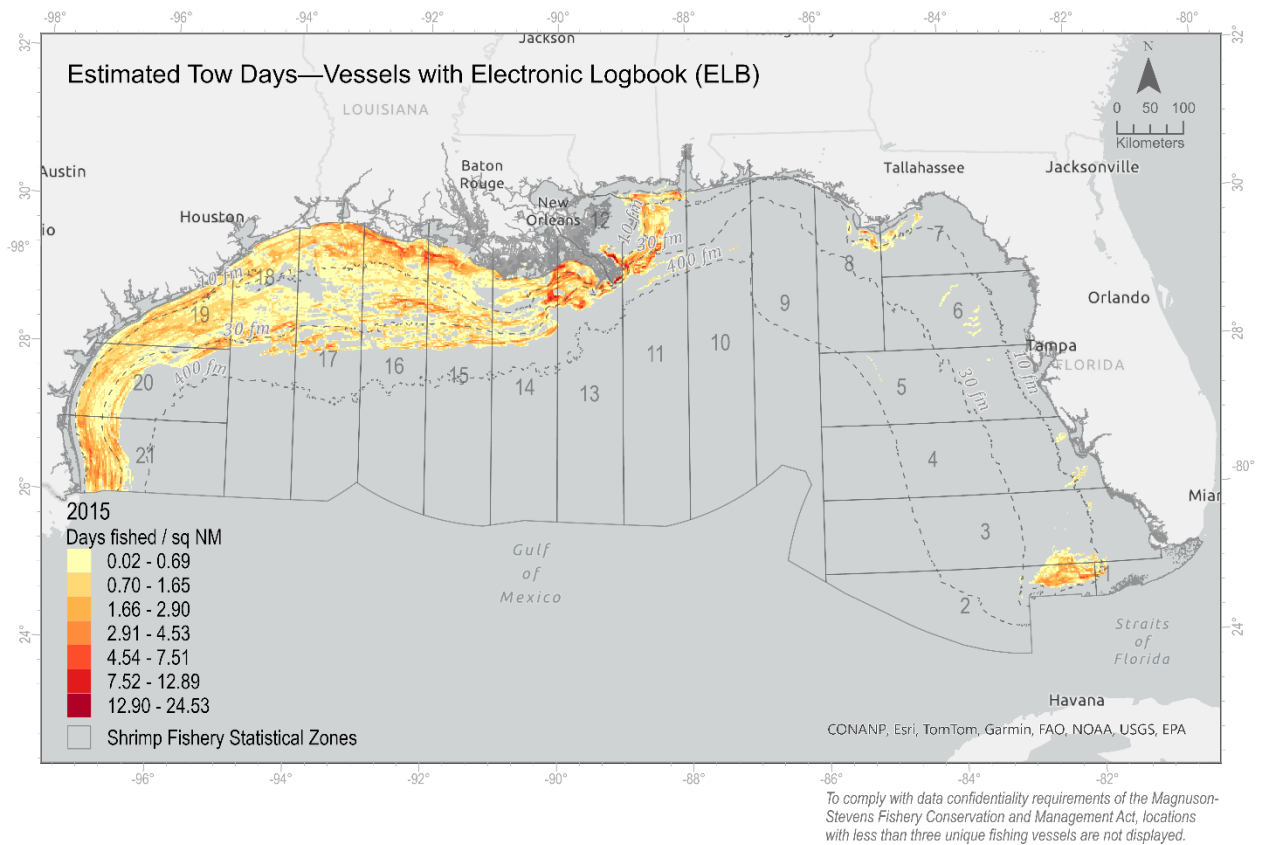


Figure 6. Summary of the number of days fished per square nautical mile that occurred in 2015 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

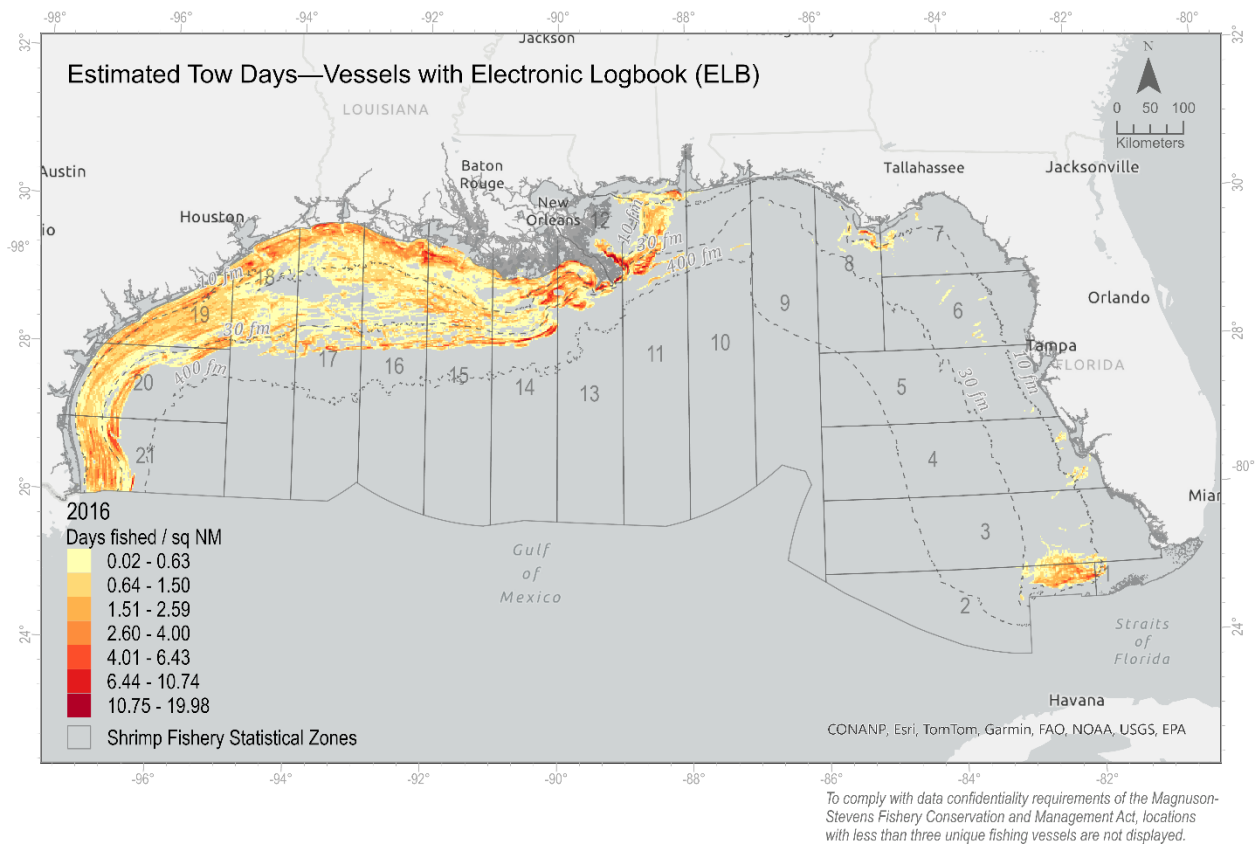


Figure 7. Summary of the number of days fished per square nautical mile that occurred in 2016 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

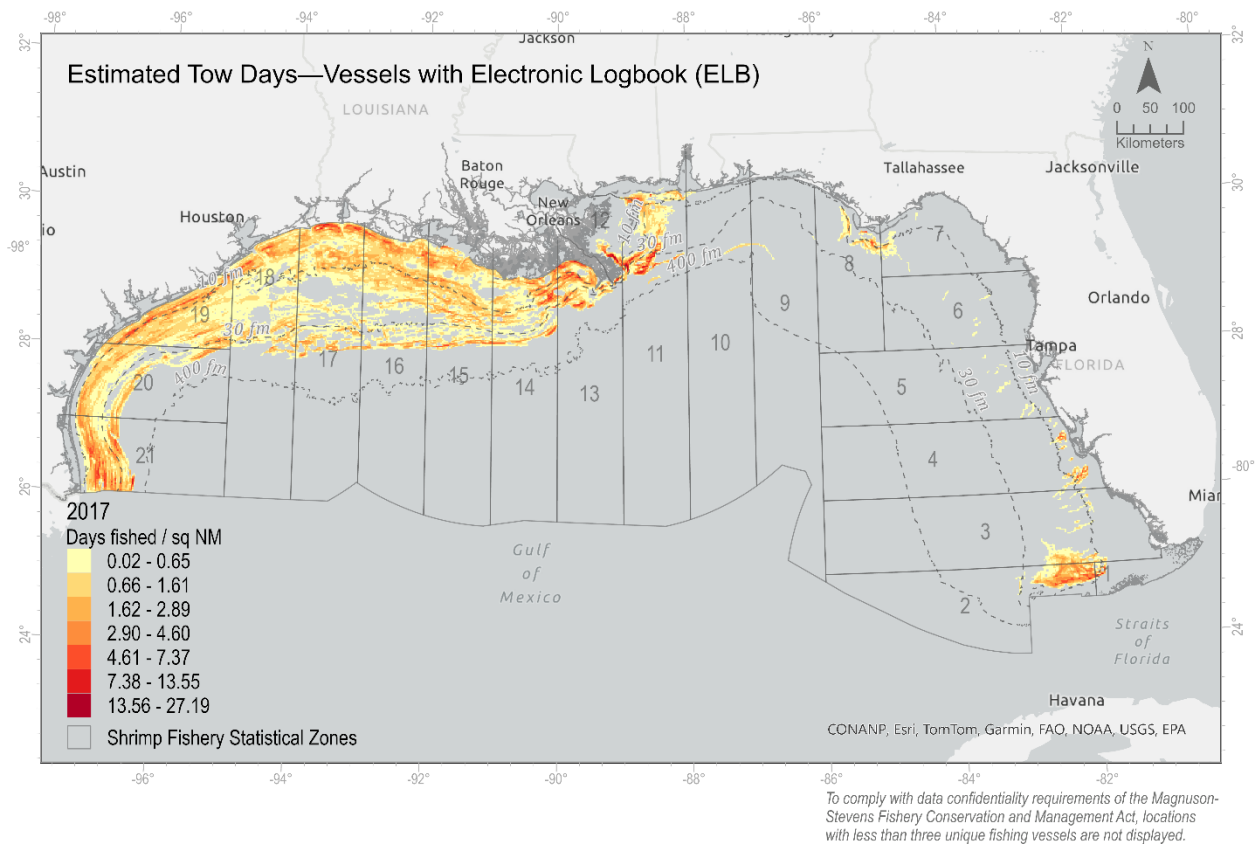


Figure 8. Summary of the number of days fished per square nautical mile that occurred in 2017 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

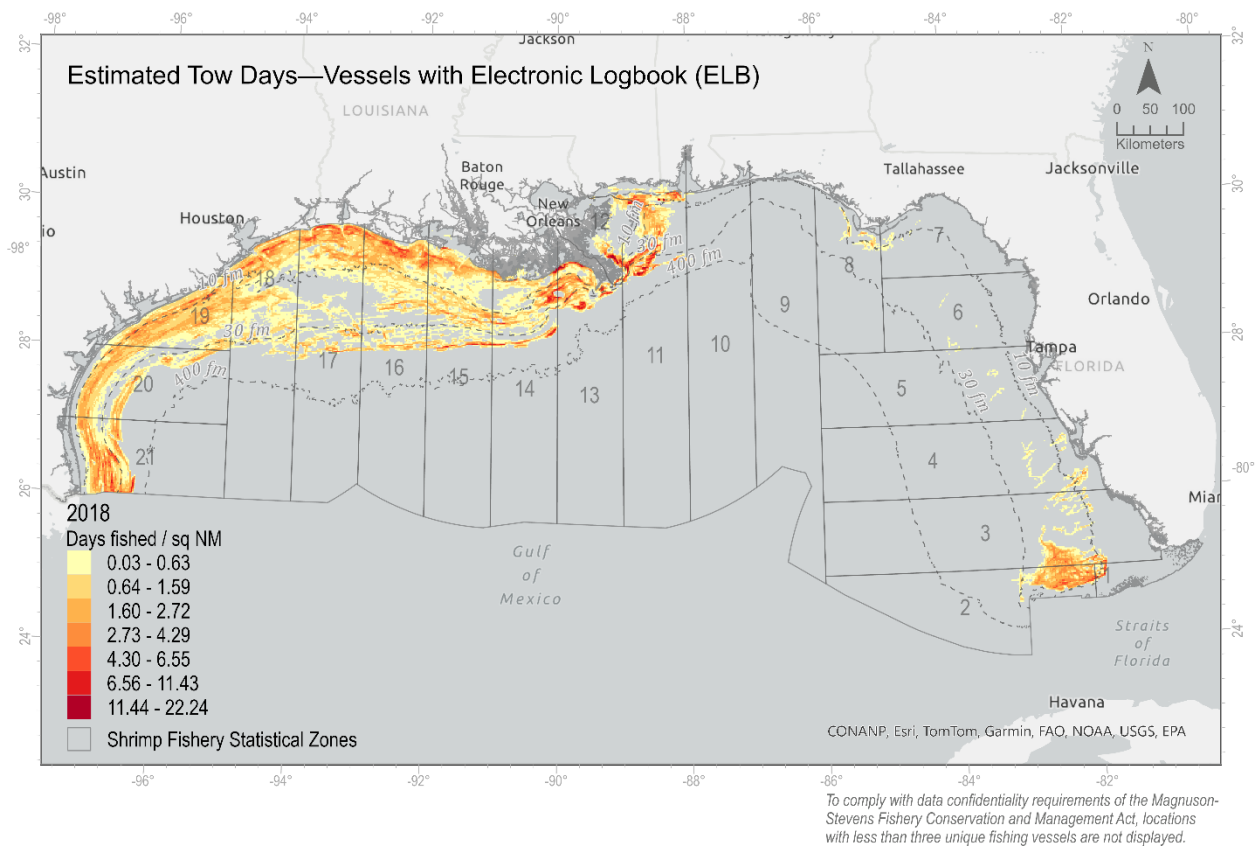


Figure 9. Summary of the number of days fished per square nautical mile that occurred in 2018 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

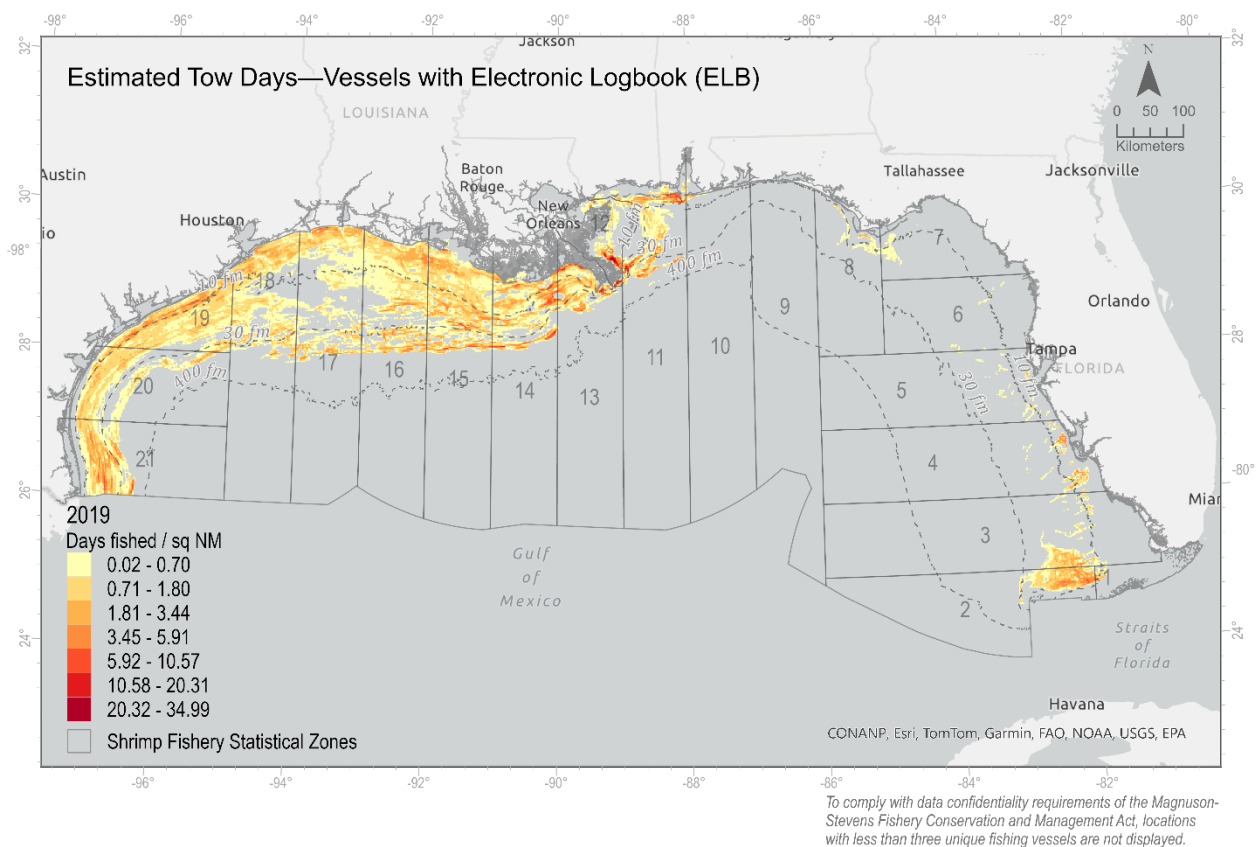


Figure 10. Summary of the number of days fished per square nautical mile that occurred in 2019 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

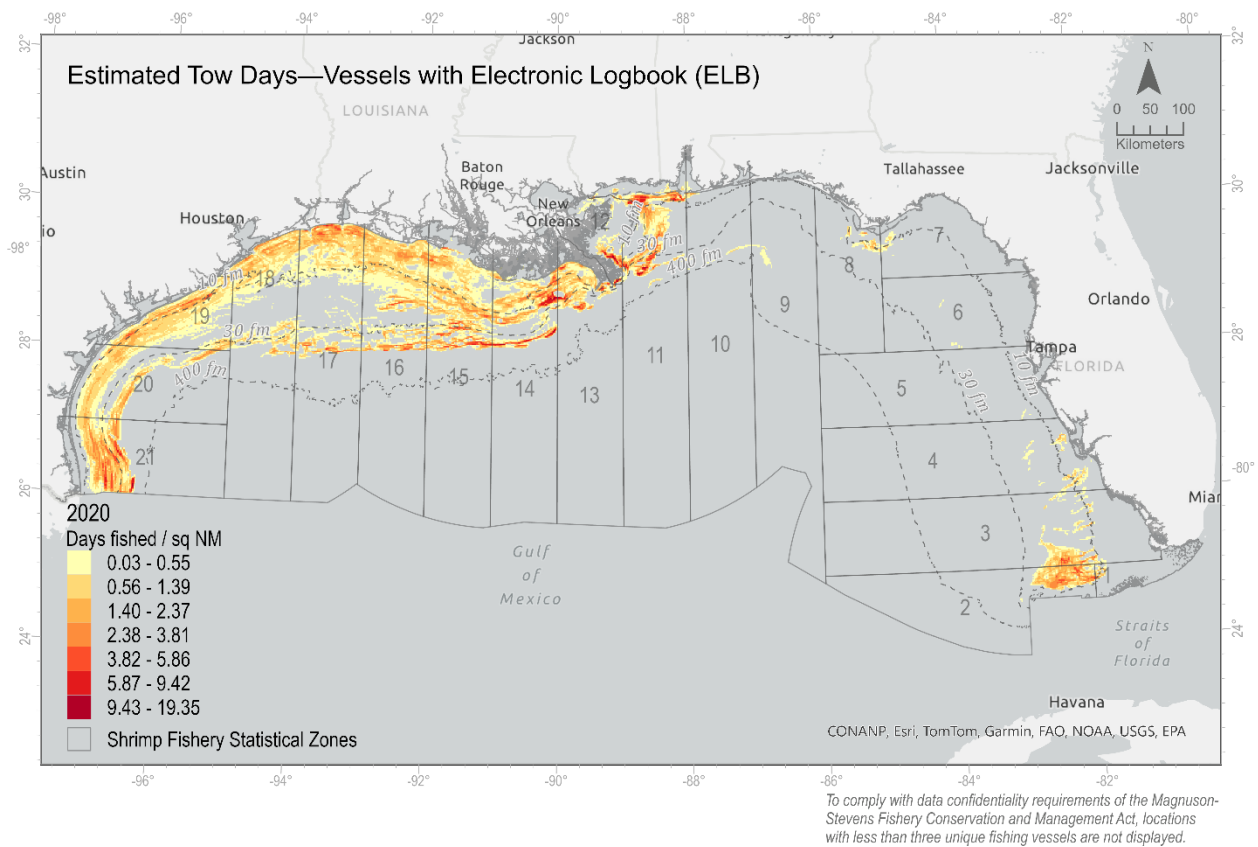


Figure 11. Summary of the number of days fished per square nautical mile that occurred in 2020 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

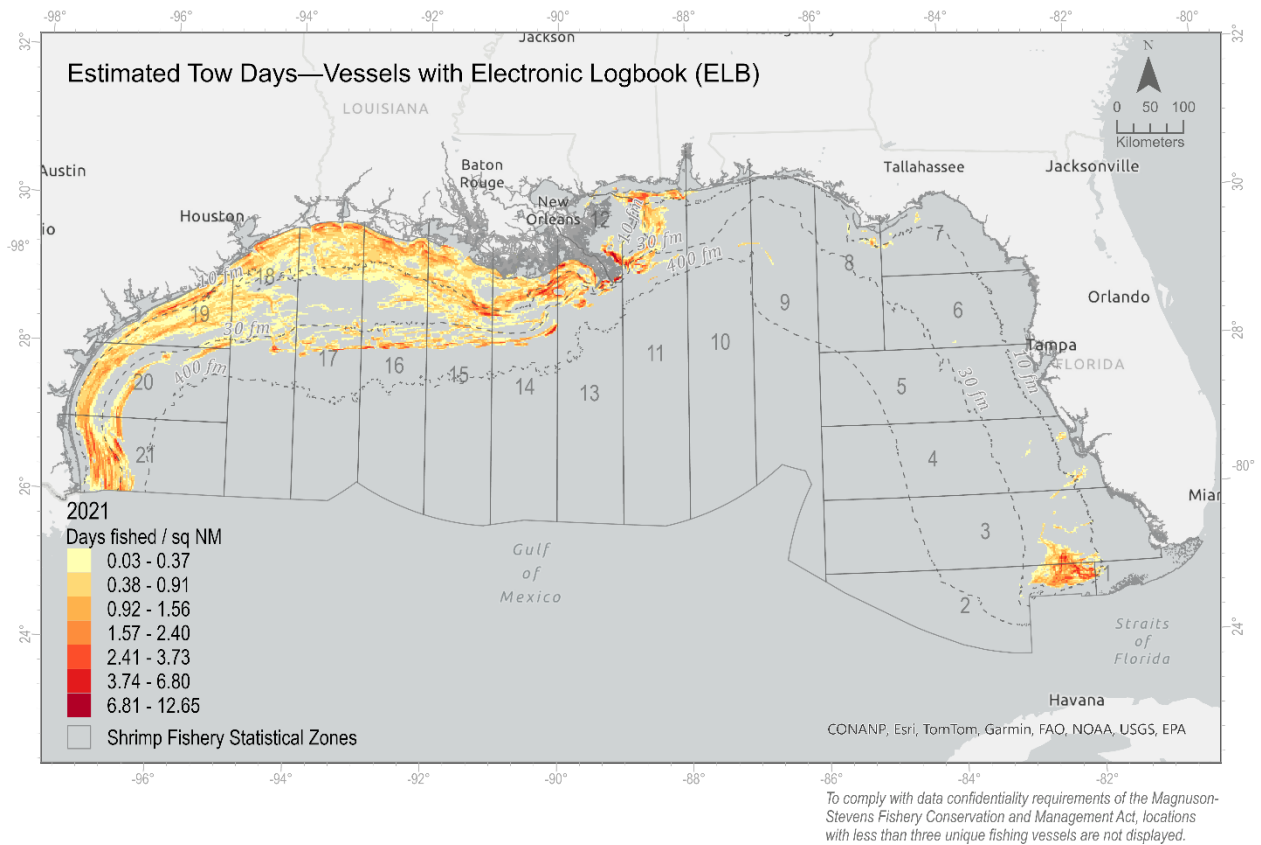


Figure 12. Summary of the number of days fished per square nautical mile that occurred in 2021 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

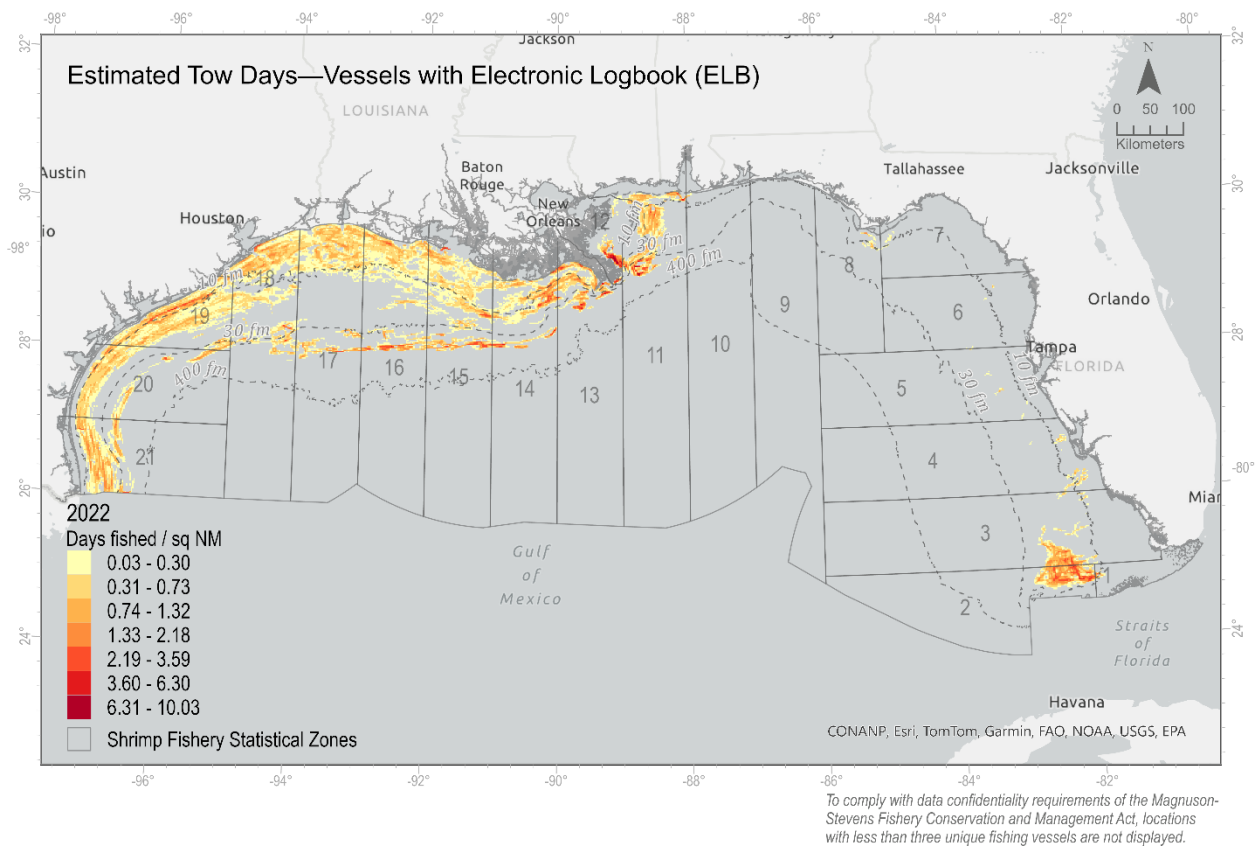


Figure 13. Summary of the number of days fished per square nautical mile that occurred in 2022 in the Gulf of Mexico using NMFS cELB data from the Shrimp Electronic Logbook Program.

2. Total effort per decade by pooled statistical/depth zones

Figures 14–18 depict total shrimp fishing effort (days fished per km²) from 1960–2014. Data obtained from the Shrimp Commerce Table (SHRCOM) were summarized into larger location cells by combining months, statistical subareas, and depths for each decade. The SHRCOM database contains data on landings and fishing effort collected by NMFS port agents from 1958–present. Every data record in the SHRCOM file is categorized spatially by statistical subarea (1–21) and 5-fathom depth zone. The data can be “pooled” or summarized into larger location cells by combining statistical subareas, and / or depths. Statistical subareas were aggregated as follows: 1–9, 2–10, 13–17, and 18–21. Likewise, 5-fathom depth zones were pooled into 4 larger zones: inshore, offshore 0–10 fm, offshore 10–30 fm, and offshore > 30 fm (Nance et al. 2008).

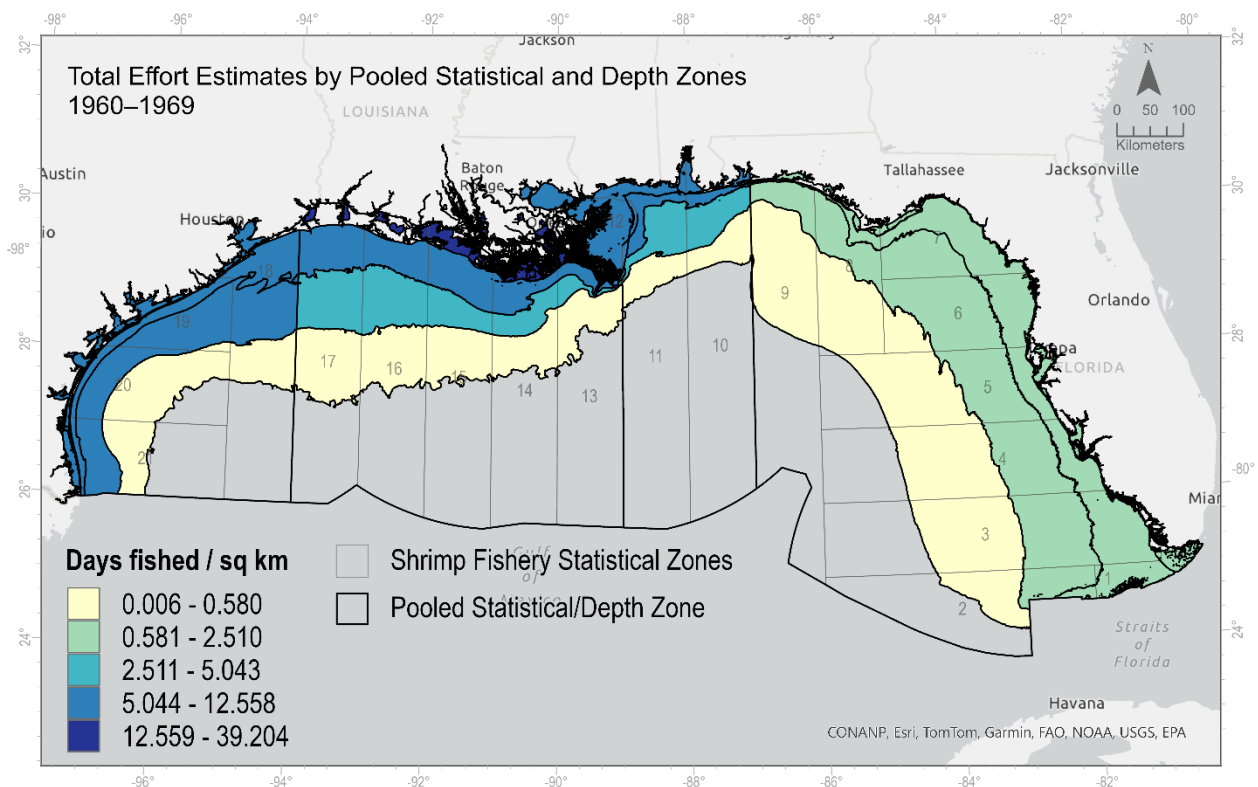


Figure 14. Total shrimp effort summarized by total days fished from 1960–1969 in the Gulf of Mexico.

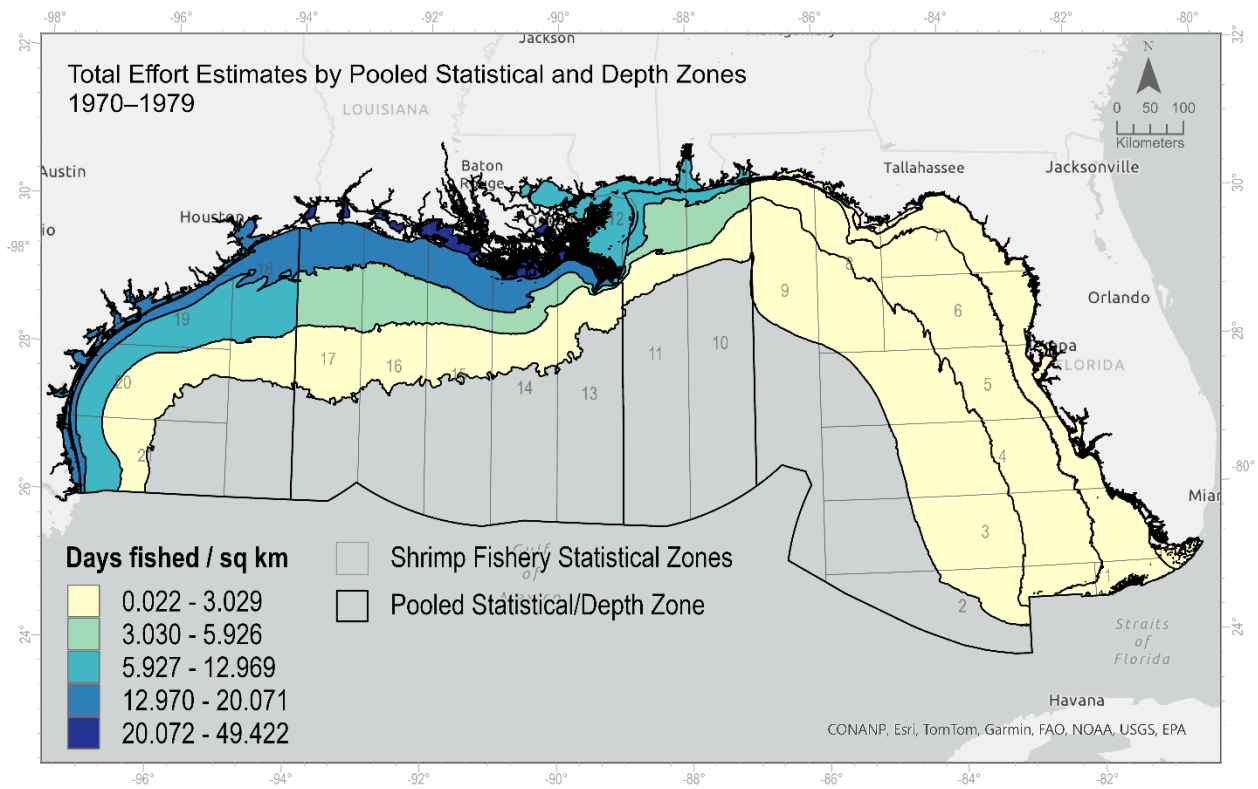


Figure 15. Total shrimp effort summarized by total days fished from 1970–1979 in the Gulf of Mexico.

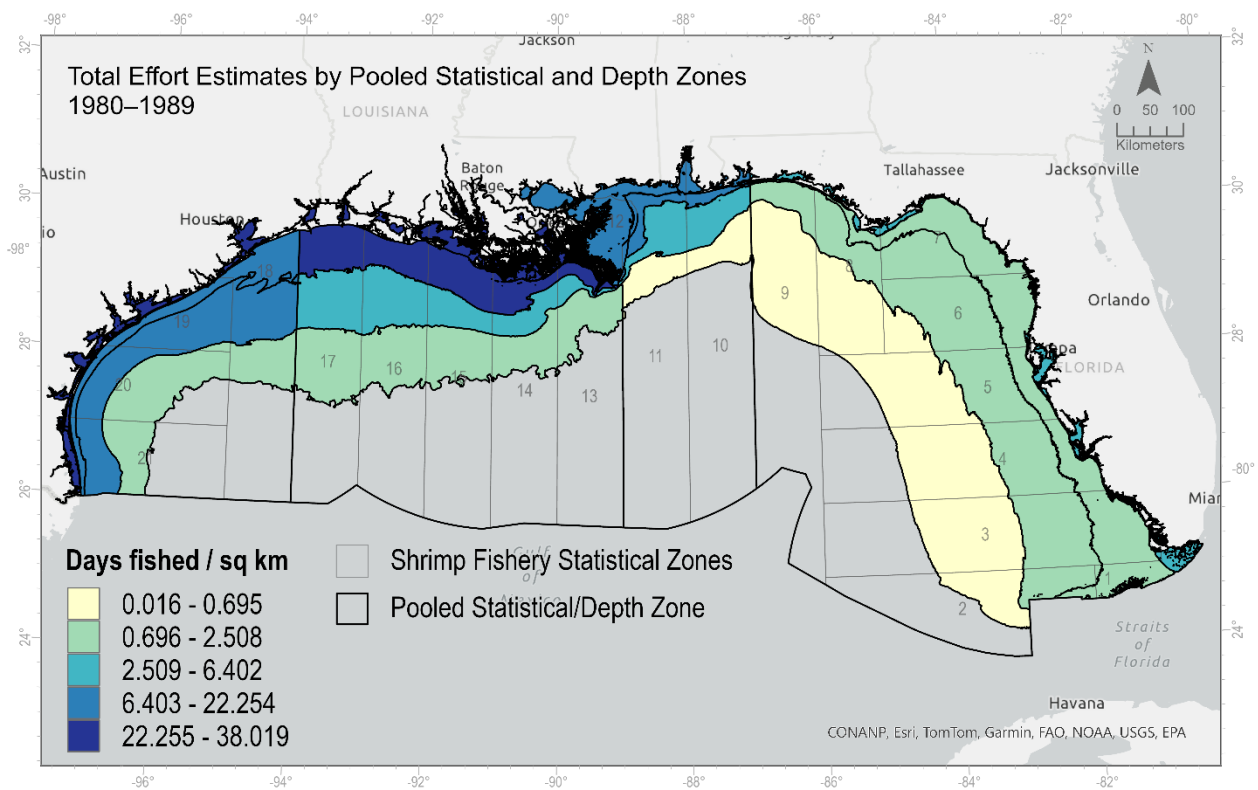


Figure 16. Total shrimp effort summarized by total days fished from 1980–1989 in the Gulf of Mexico.

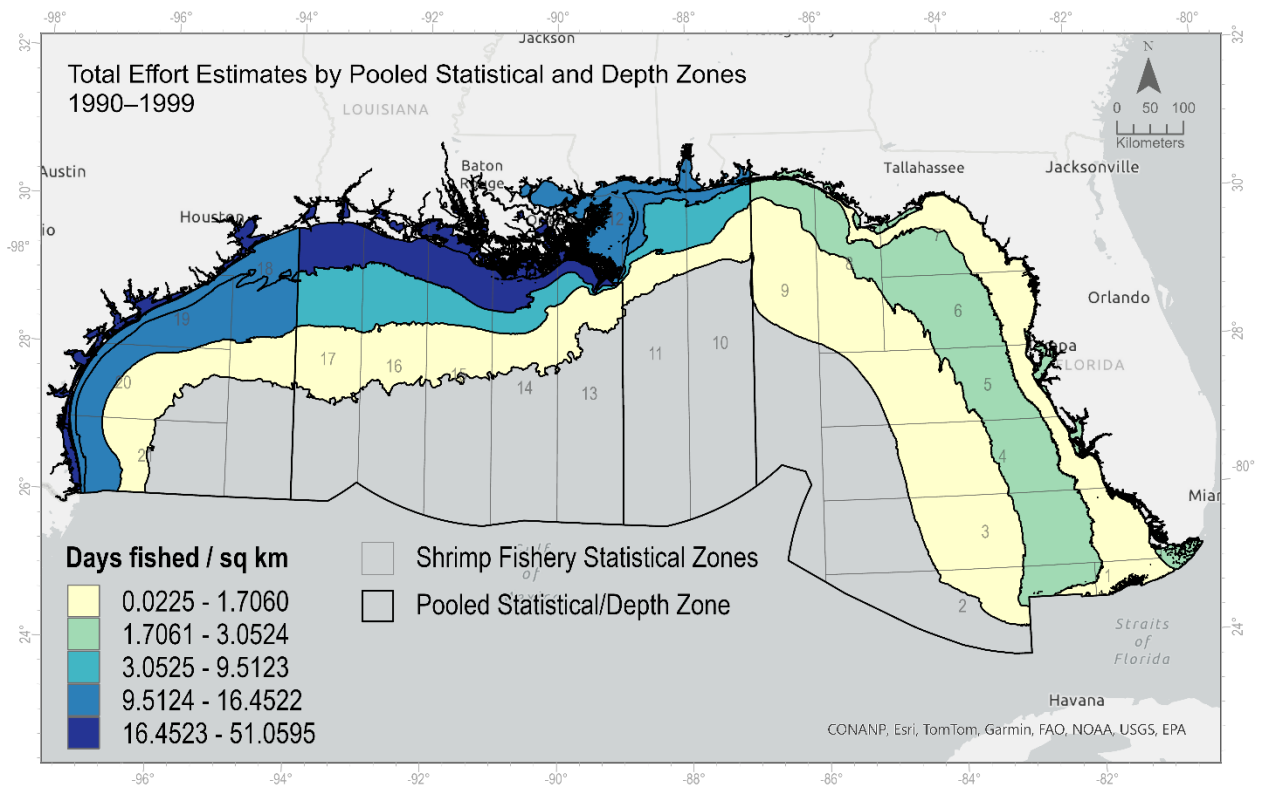


Figure 17. Total shrimp effort summarized by total days fished from 1990–1999 in the Gulf of Mexico.

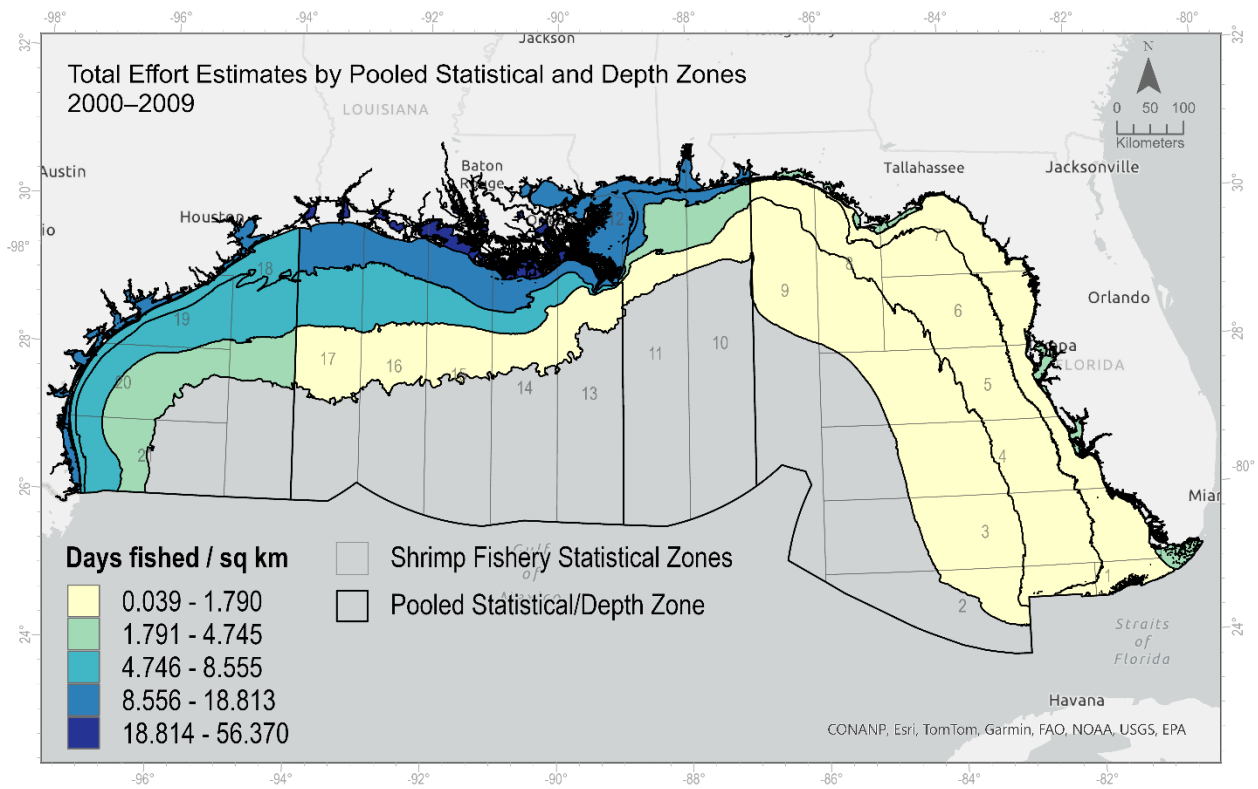


Figure 18. Total shrimp effort summarized by total days fished from 2000–2009.

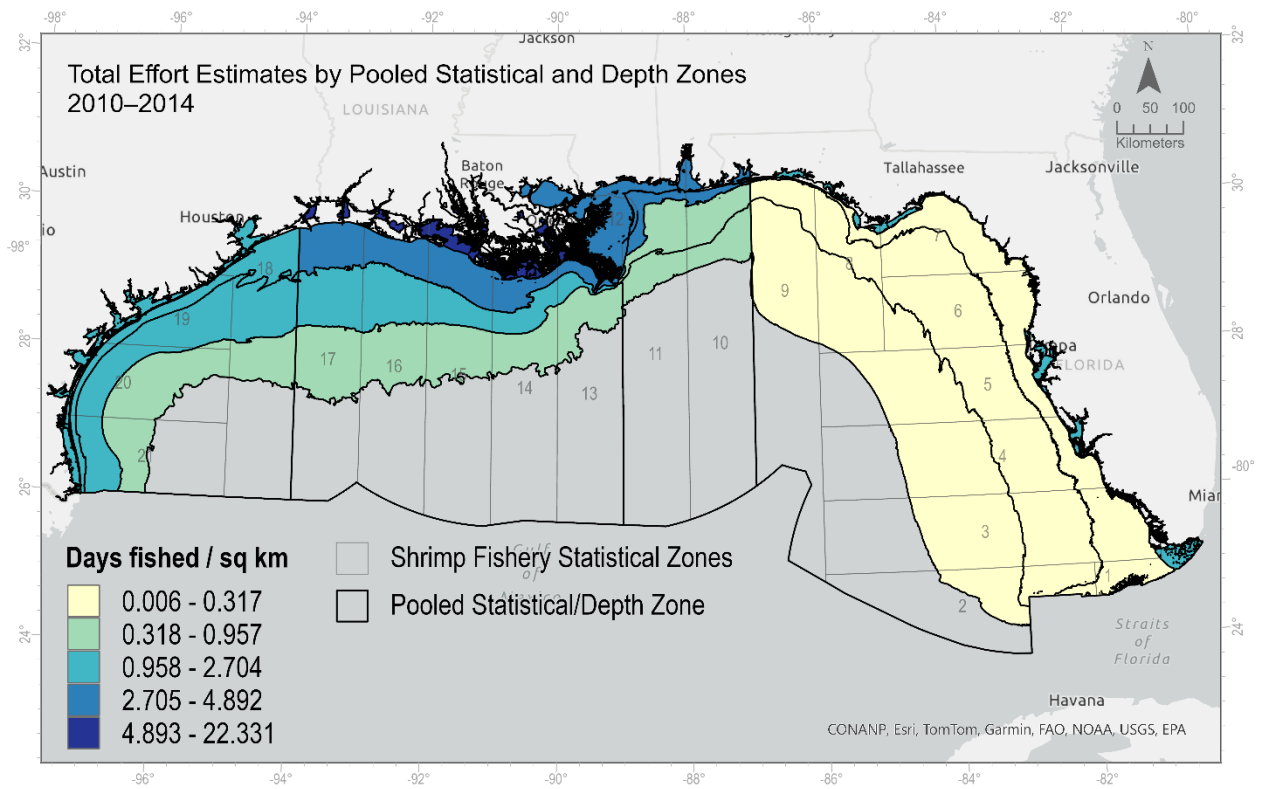


Figure 19. Total shrimp effort summarized by total days fished from 2010–2014.

Landings Data

Commercial Gulf Shrimp landings were compiled using data from several sources: the Gulf Shrimp System (GSS), an Oracle database housed at the Southeast Fisheries Science Center (SEFSC) in Miami, Florida; (2) the Gulf of Mexico Fisheries Information Network (GulfFIN) housed at the Gulf States Marine Fisheries Commission (GSMFC); and (3) Atlantic coast fishery dependent data housed at Atlantic Coastal Cooperative Statistics Program (ACCSP) (Atkinson et al. 2024).

3. Total pounds landed for brown shrimp per decade and statistical zone

Figures 20–26 depict total pounds of heads-off brown shrimp landings per decade 1960–2022, summed pounds by species, decade, and statistical zone.

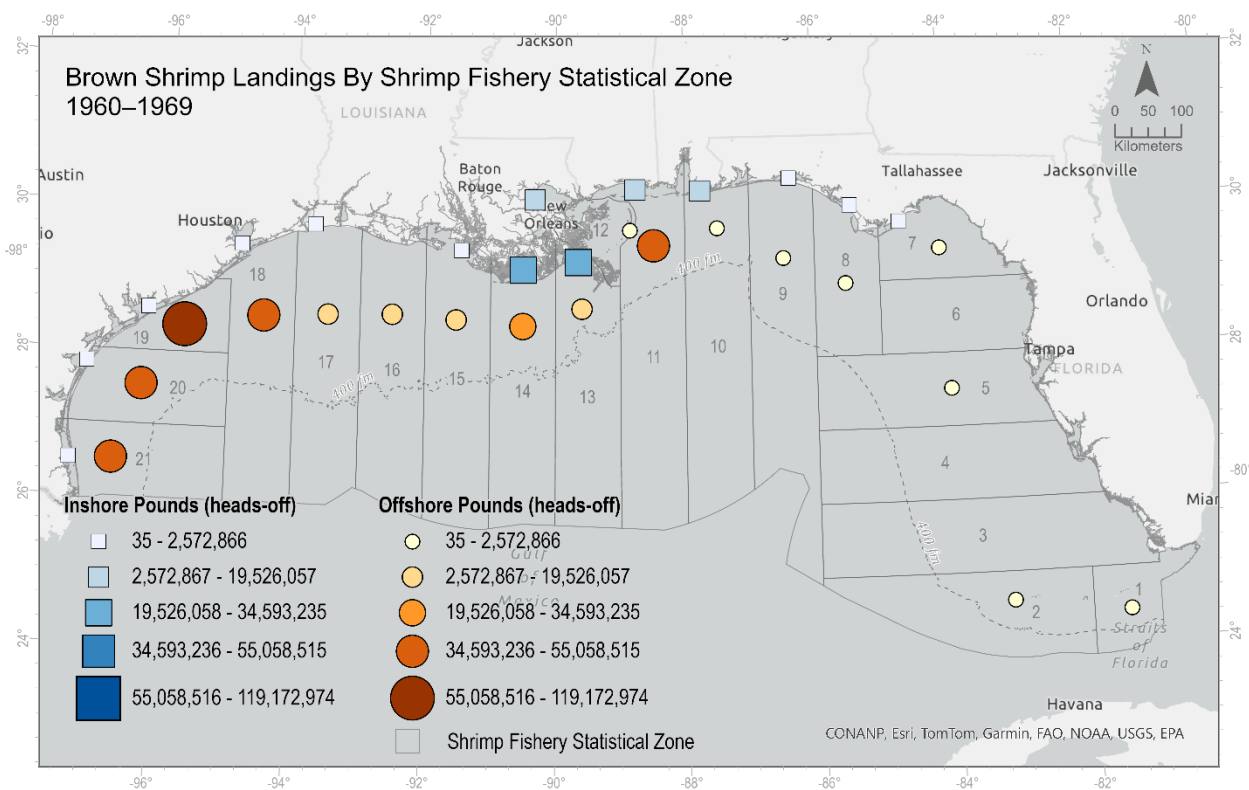


Figure 20. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 1960–1969 per statistical zone.

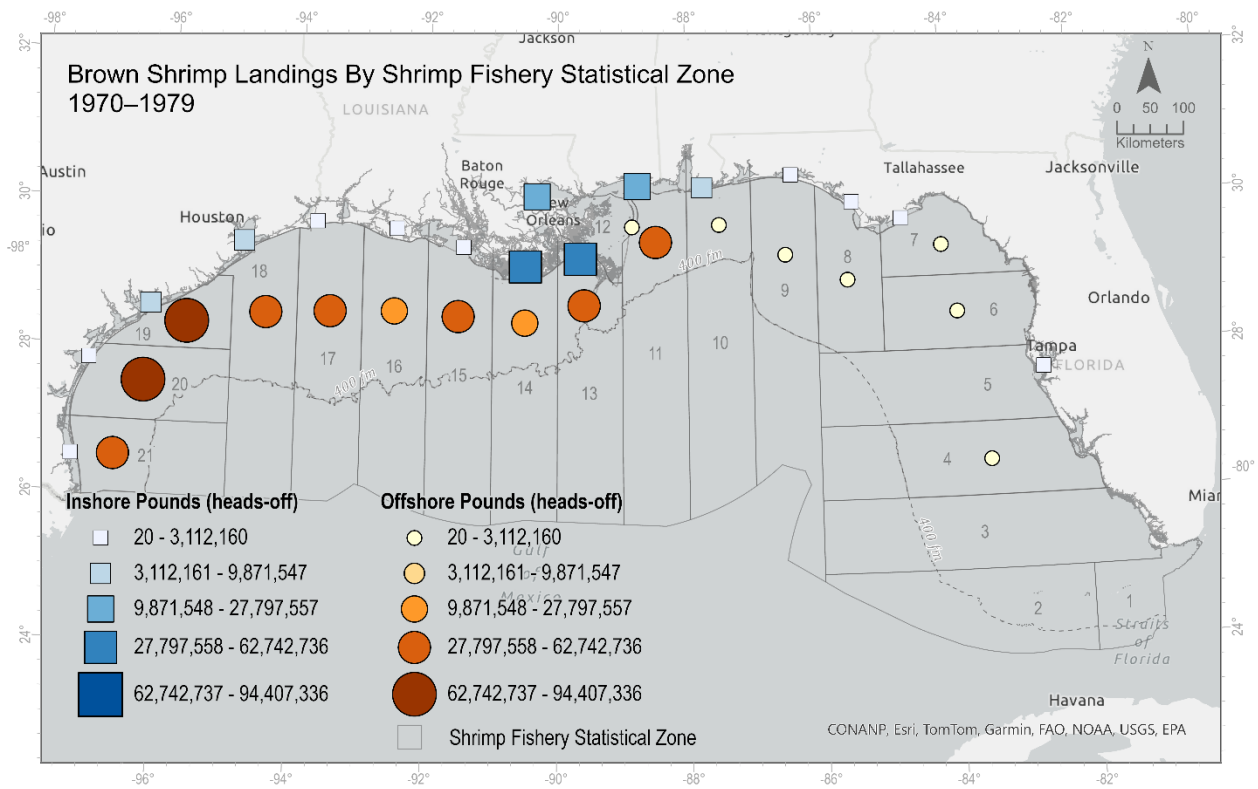


Figure 21. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 1970–1979 per statistical zone.

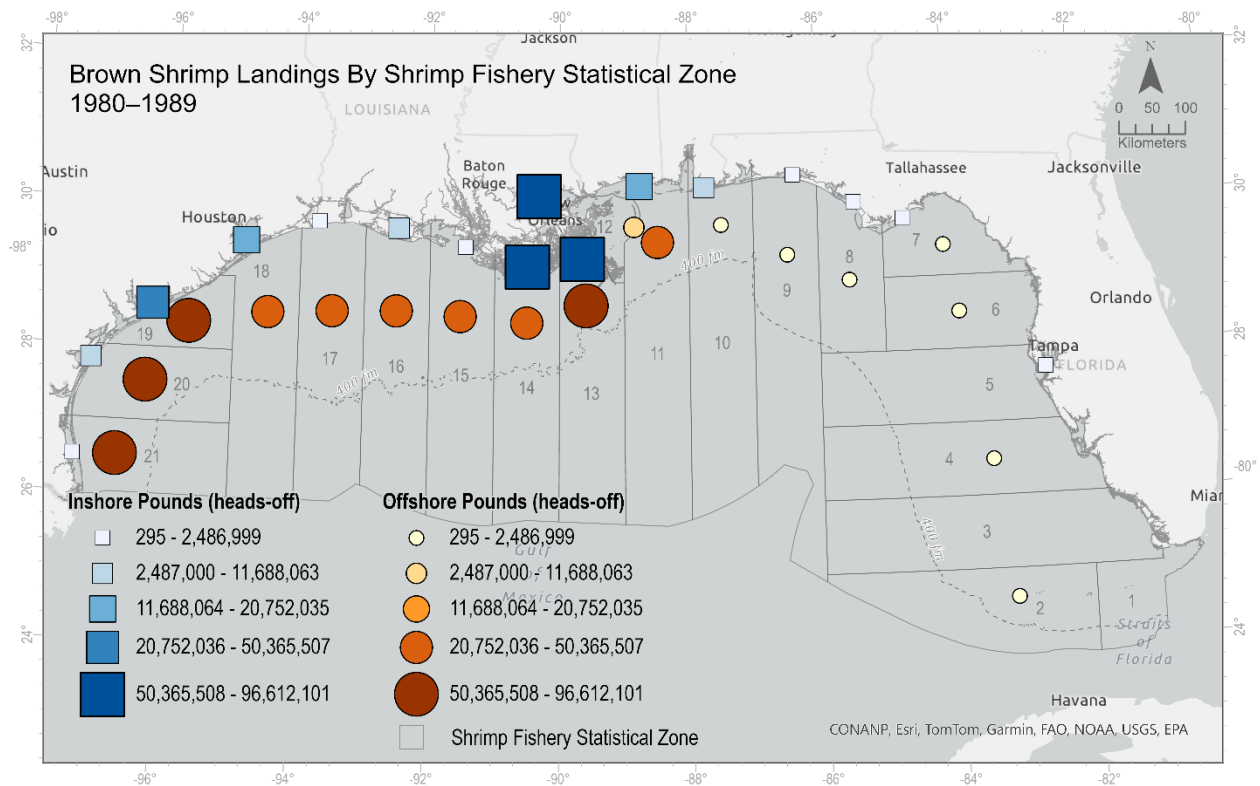


Figure 22. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 1980–1989 per statistical zone.

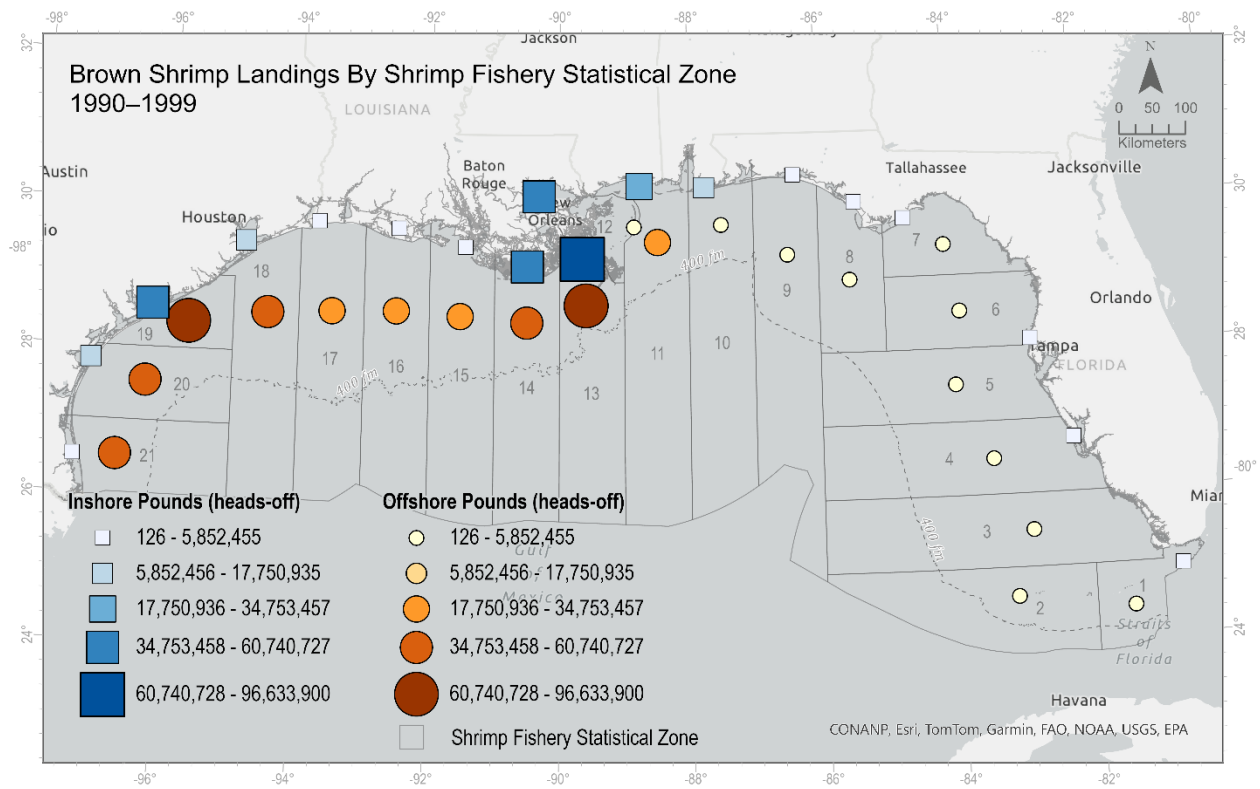


Figure 23. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 1990–1999 per statistical zone.

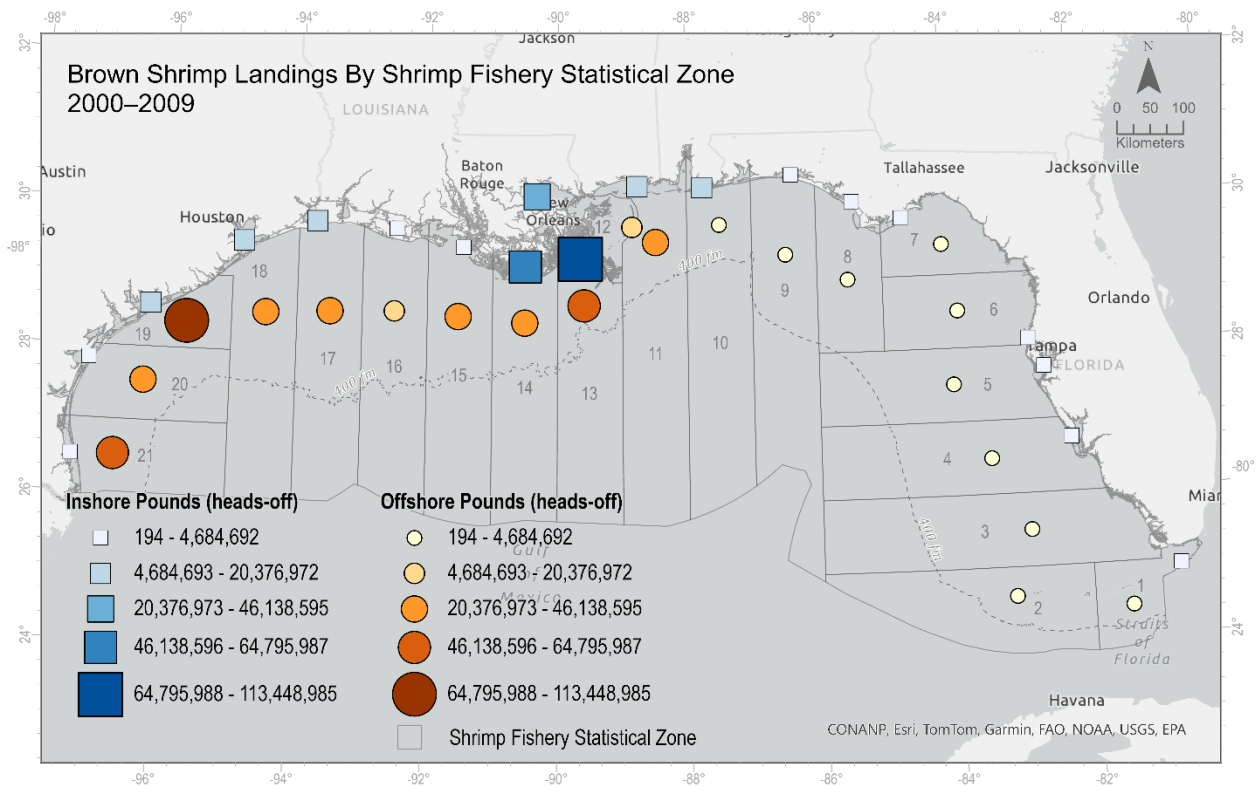


Figure 24. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 2000–2009 per statistical zone.

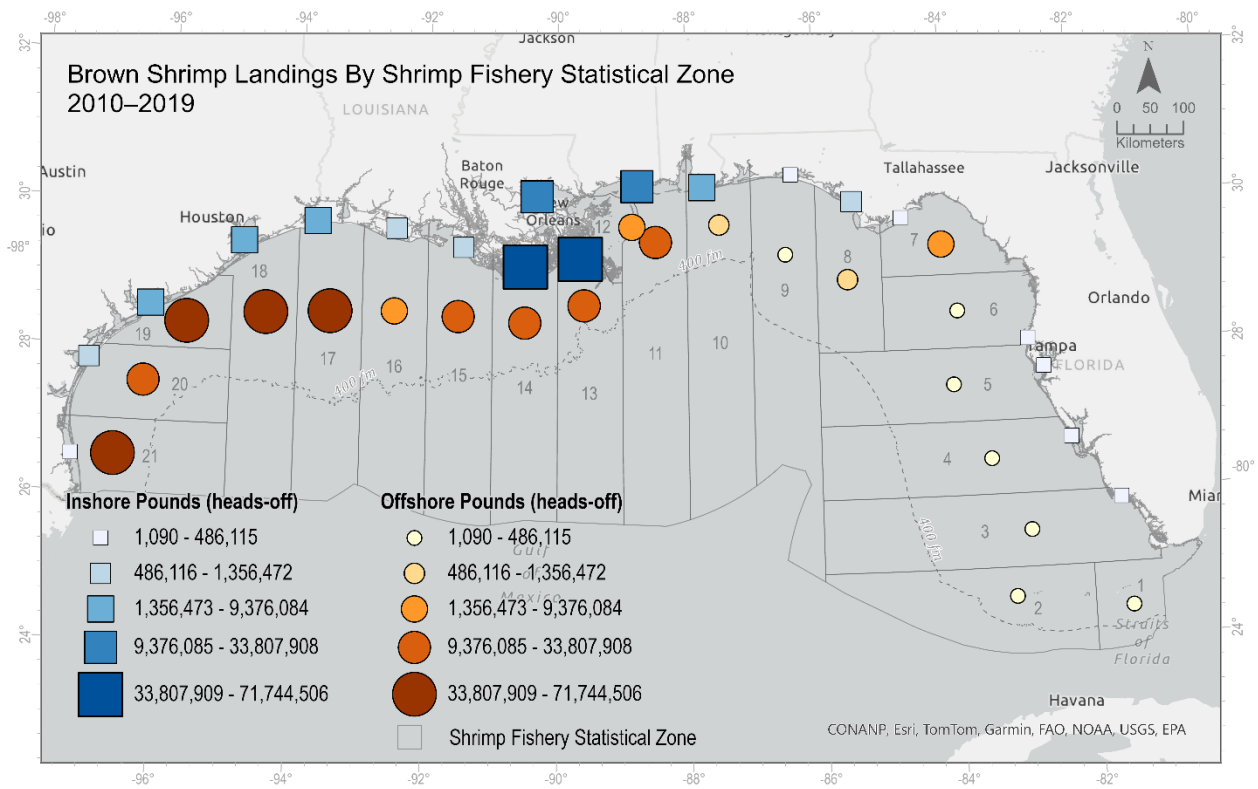


Figure 25. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 2010–2019 per statistical zone.

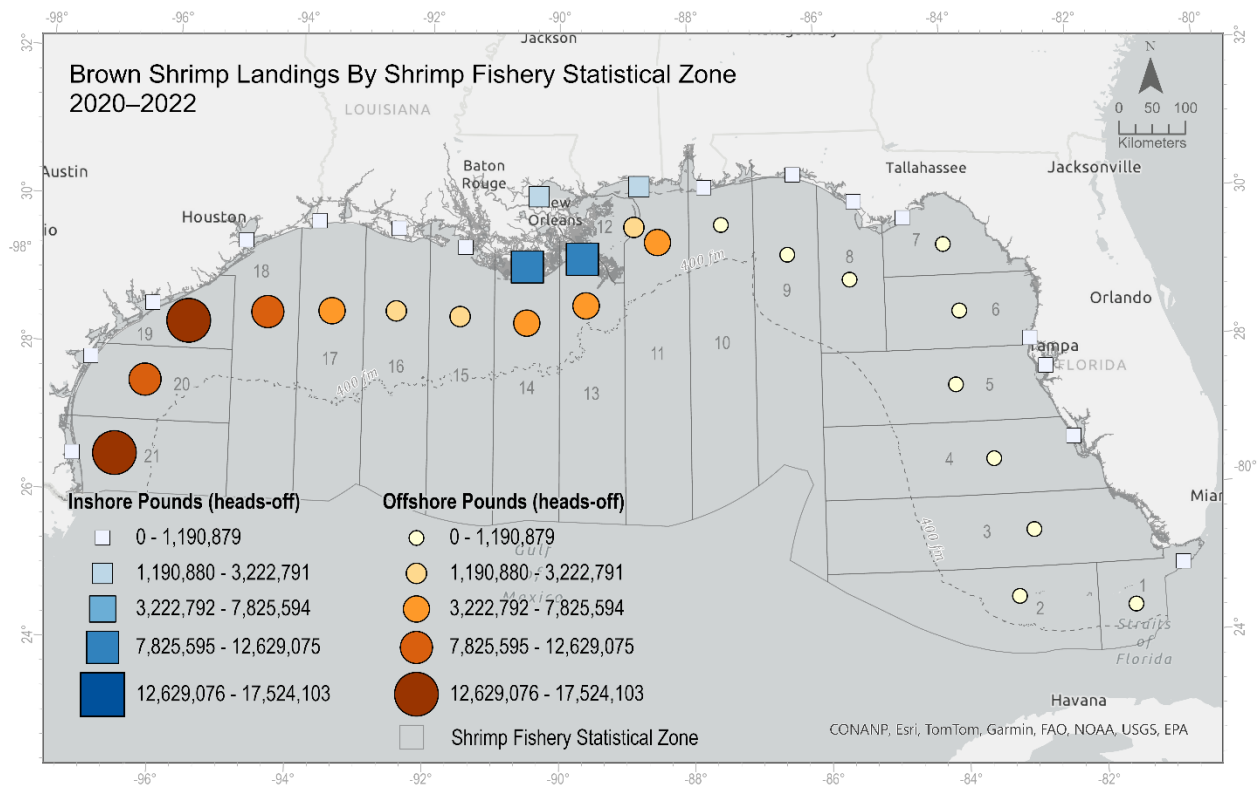


Figure 26. Total heads-off pounds landed of brown shrimp in the US Gulf of Mexico from 2020–2022 per statistical zone.

4. Total pounds landed for white shrimp per decade and statistical zone

Figures 27–33 depict total pounds of heads-off pink shrimp landings per decade 1960–2022, summed pounds by species, decade, and statistical zone.

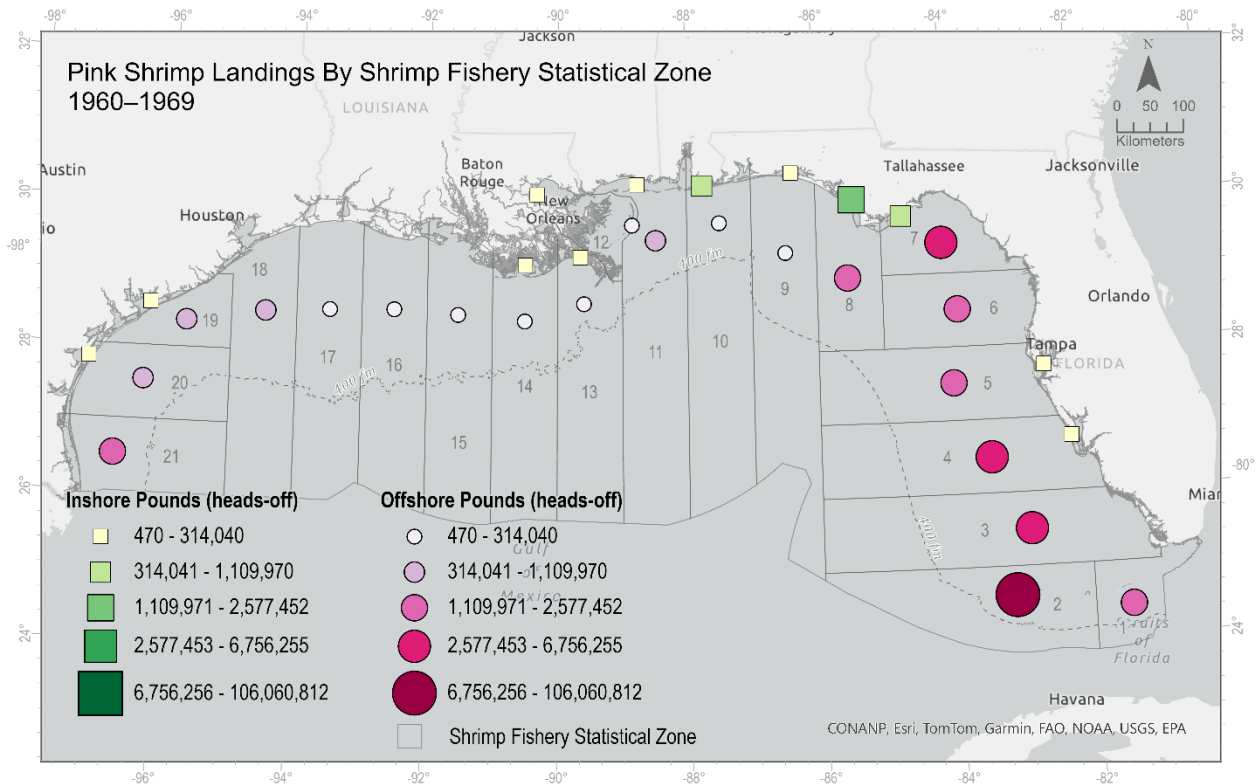


Figure 27. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 1960–1969 per statistical zone.

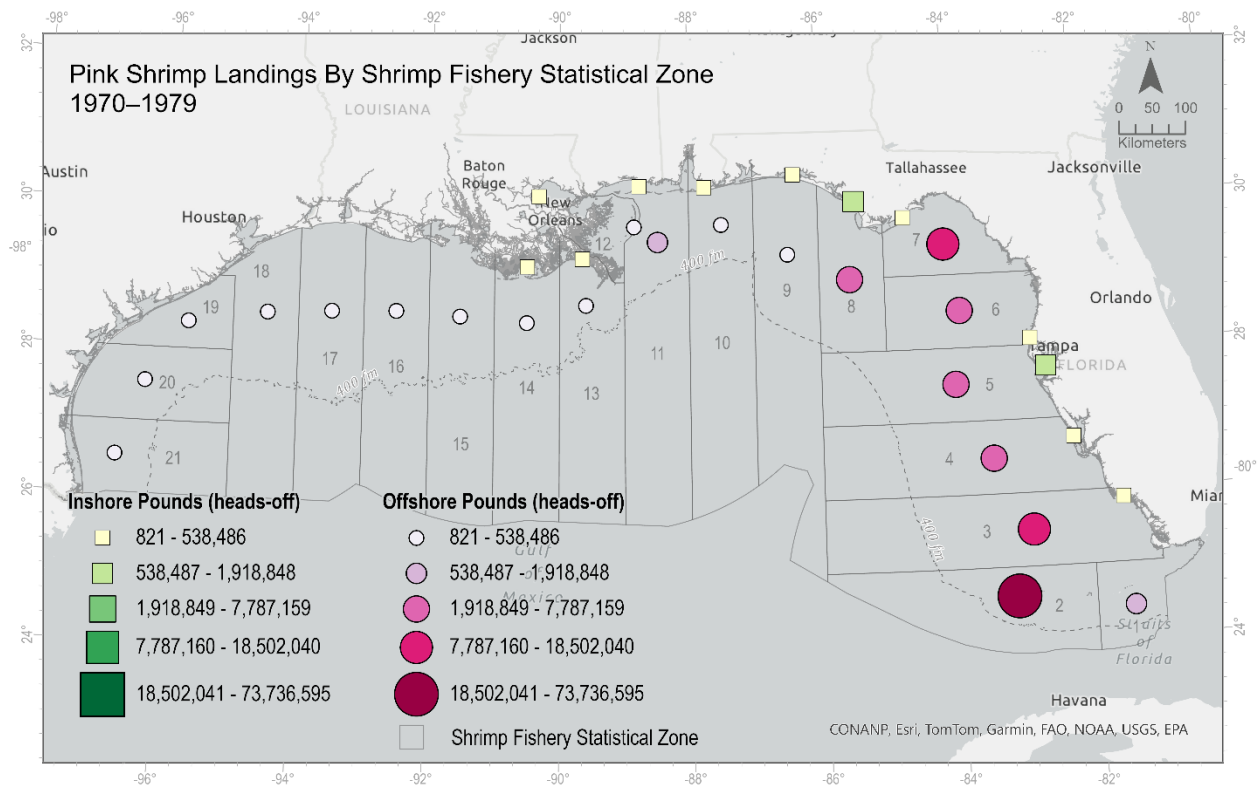


Figure 28. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 1970–1979 per statistical zone.

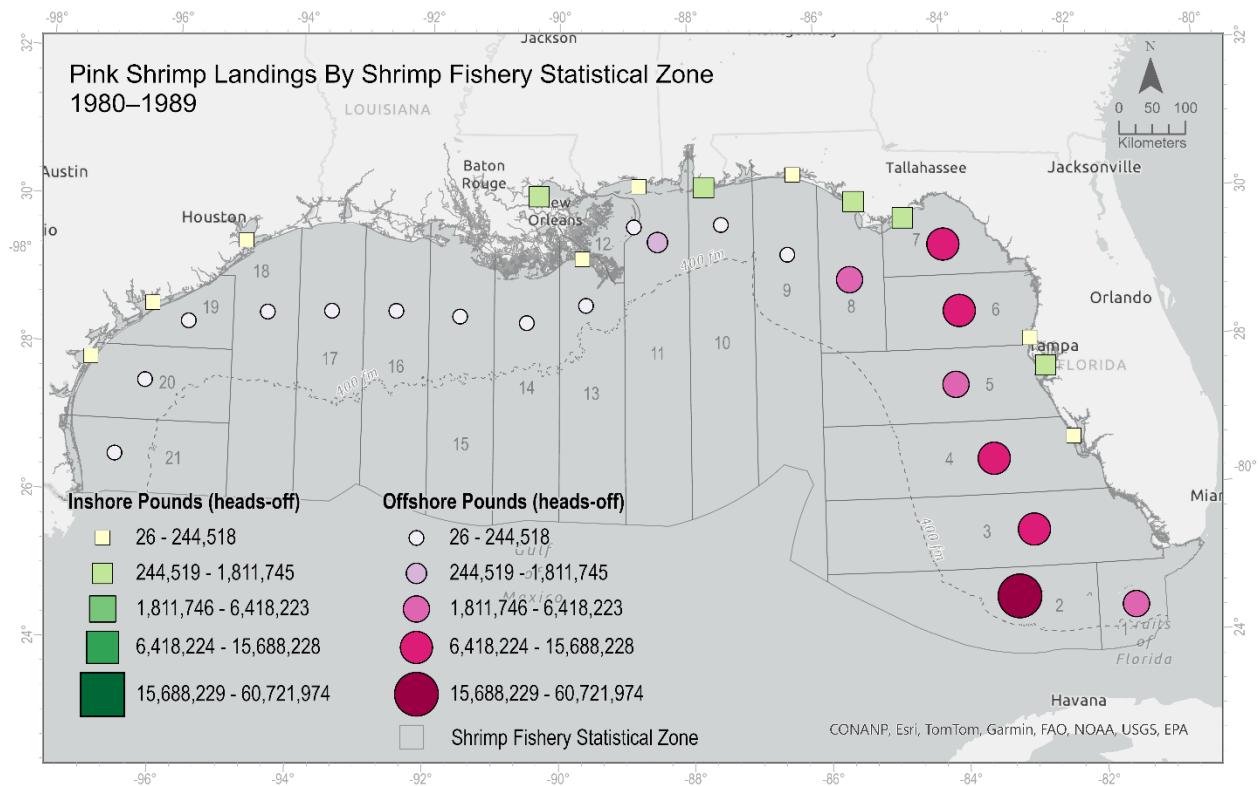


Figure 29. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 1980–1989 per statistical zone.

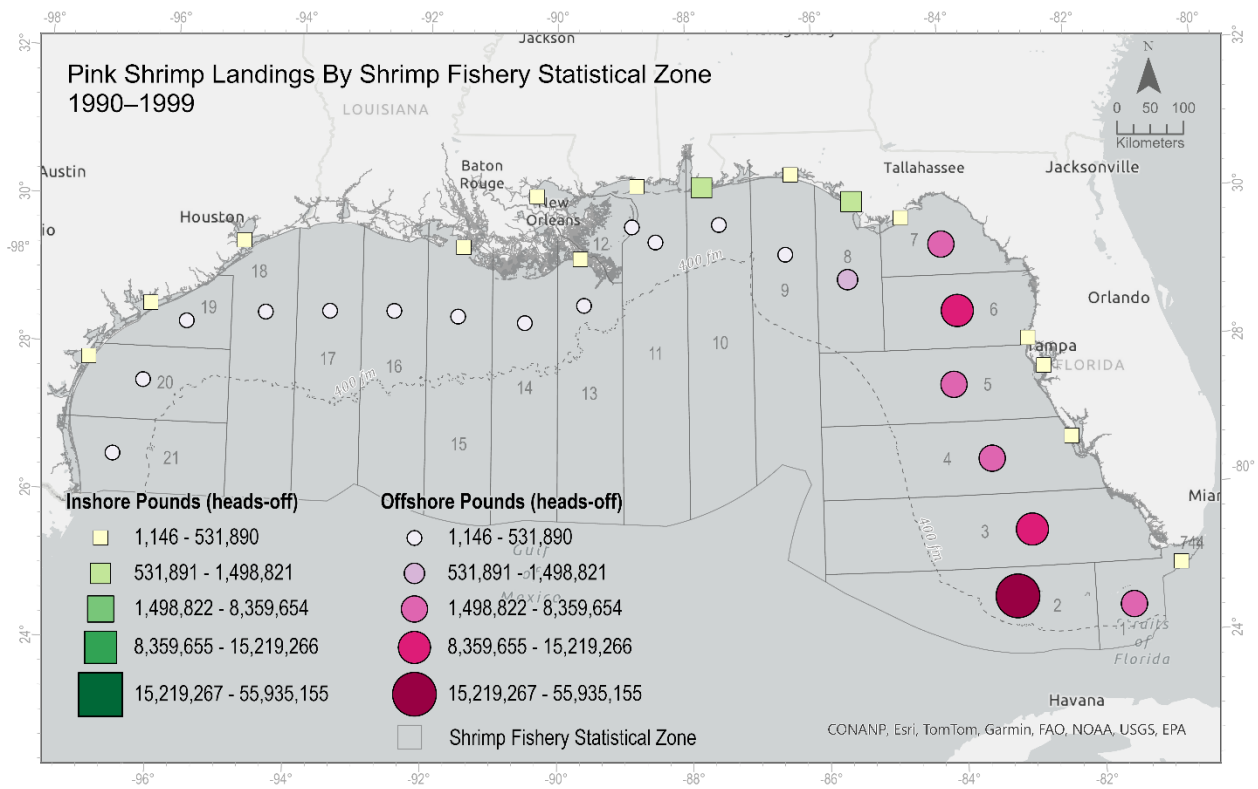


Figure 30. Total heads-off pounds landed of Pink Shrimp in the US Gulf of Mexico from 1990–1999 per statistical zone.

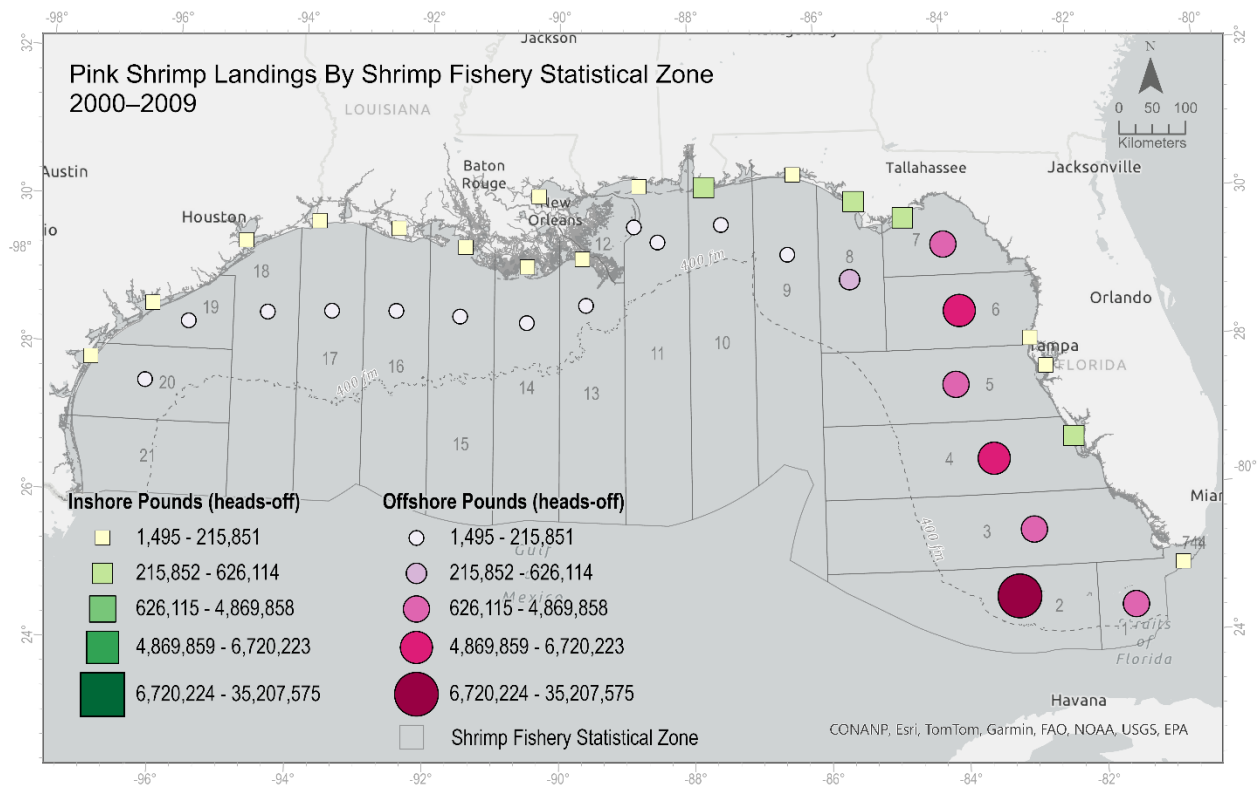


Figure 31. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 2000–2009 per statistical zone.

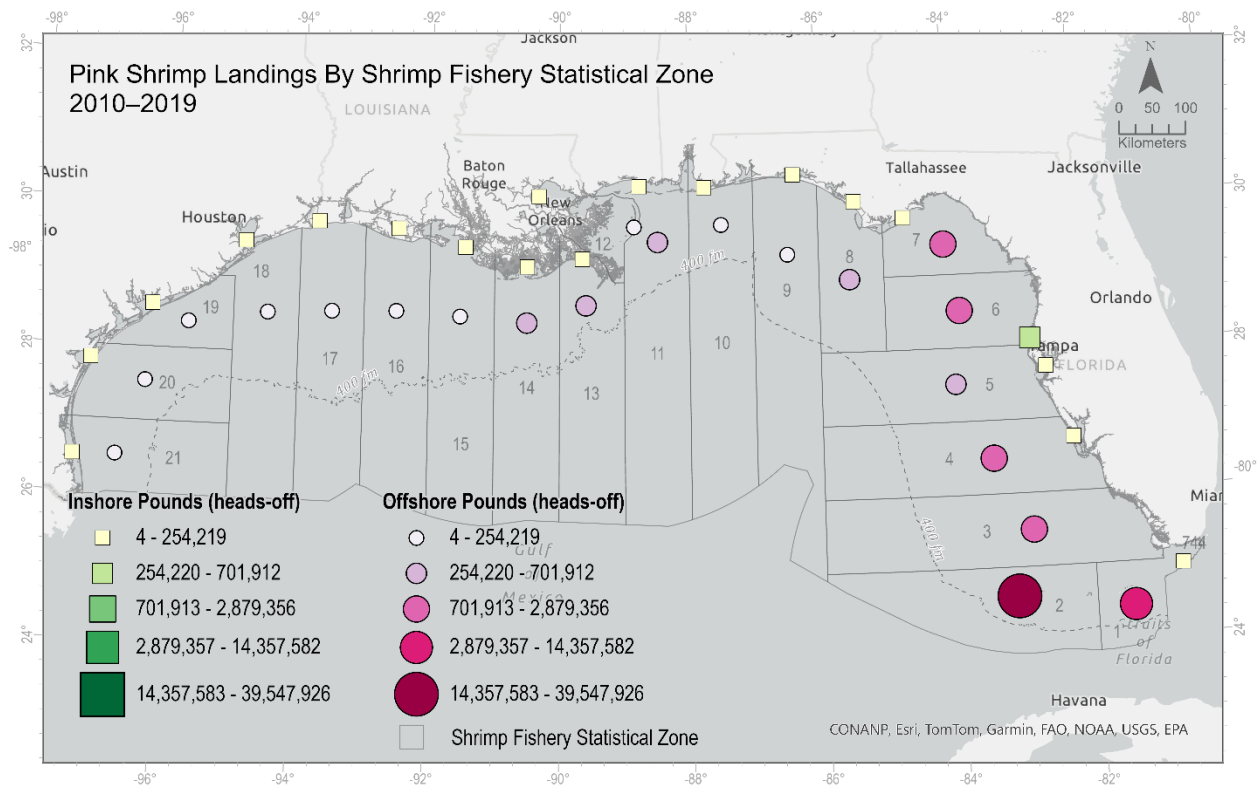


Figure 32. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 2010–2019 per statistical zone.

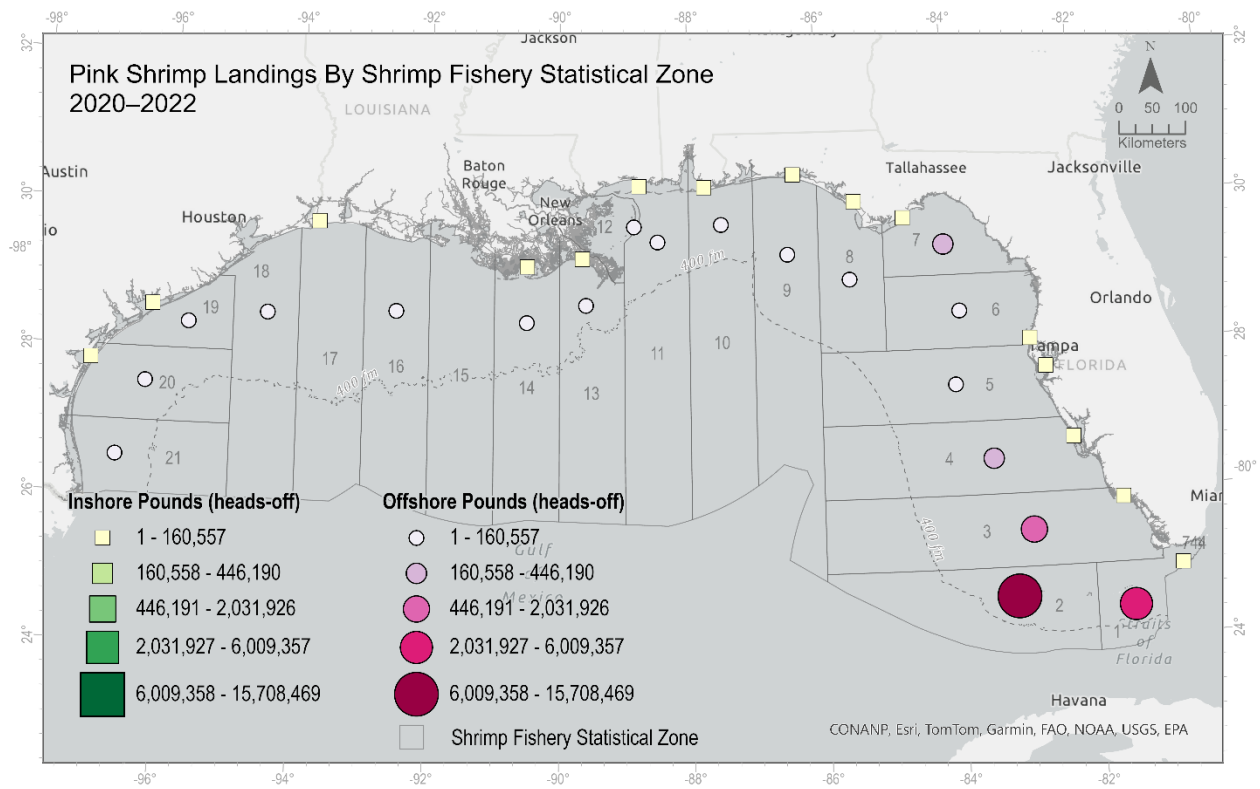


Figure 33. Total heads-off pounds landed of pink shrimp in the US Gulf of Mexico from 2020–2022 per statistical zone.

5. Total pounds landed for white shrimp per decade and statistical zone

Figures 34–40 depict total pounds of heads-off white shrimp landings per decade 1960–2022, summed pounds by species, decade, and statistical zone.

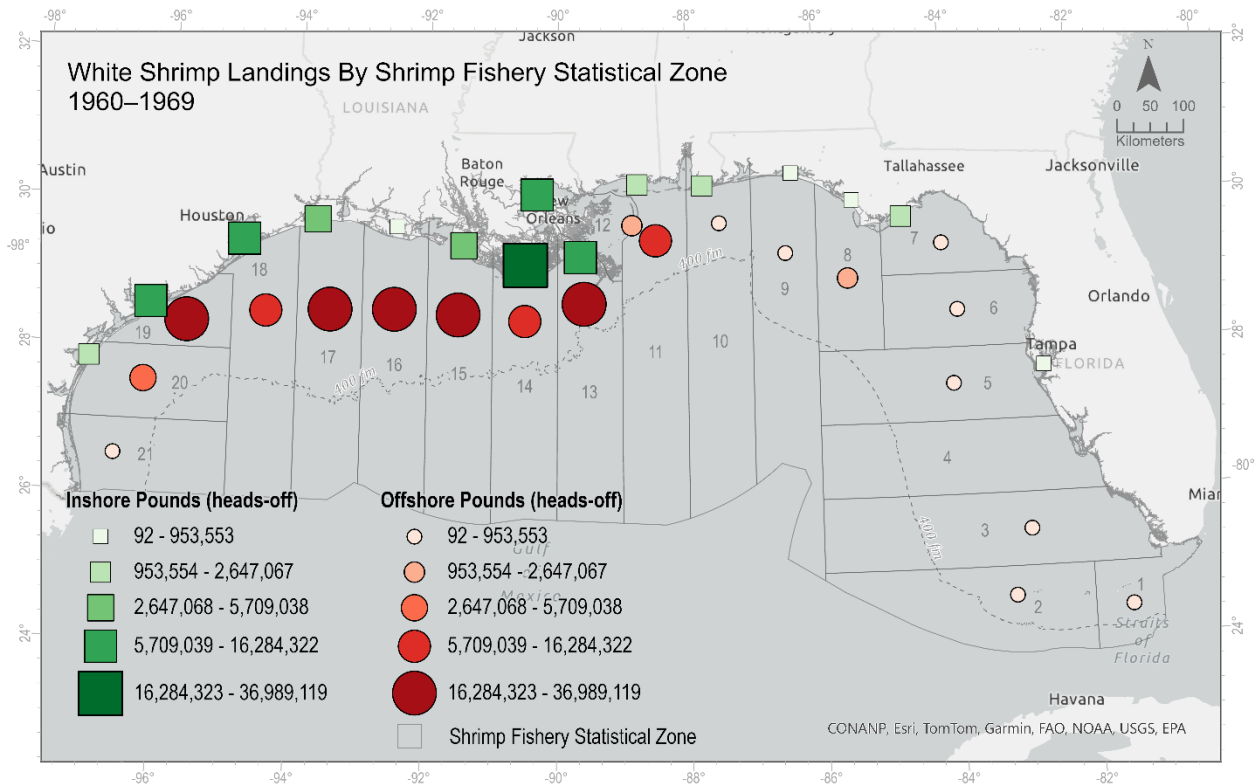


Figure 34. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 1960–1969 per statistical zone.

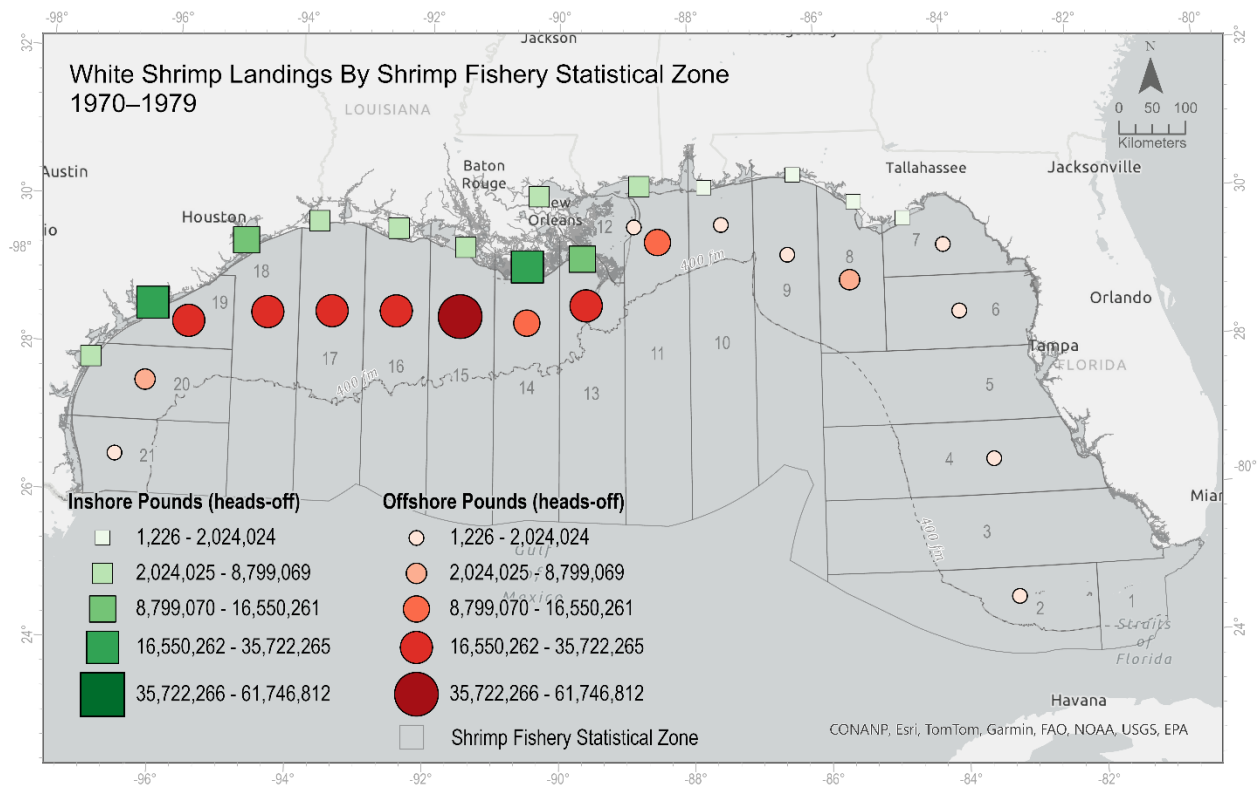


Figure 35. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 1970–1979 per statistical zone.

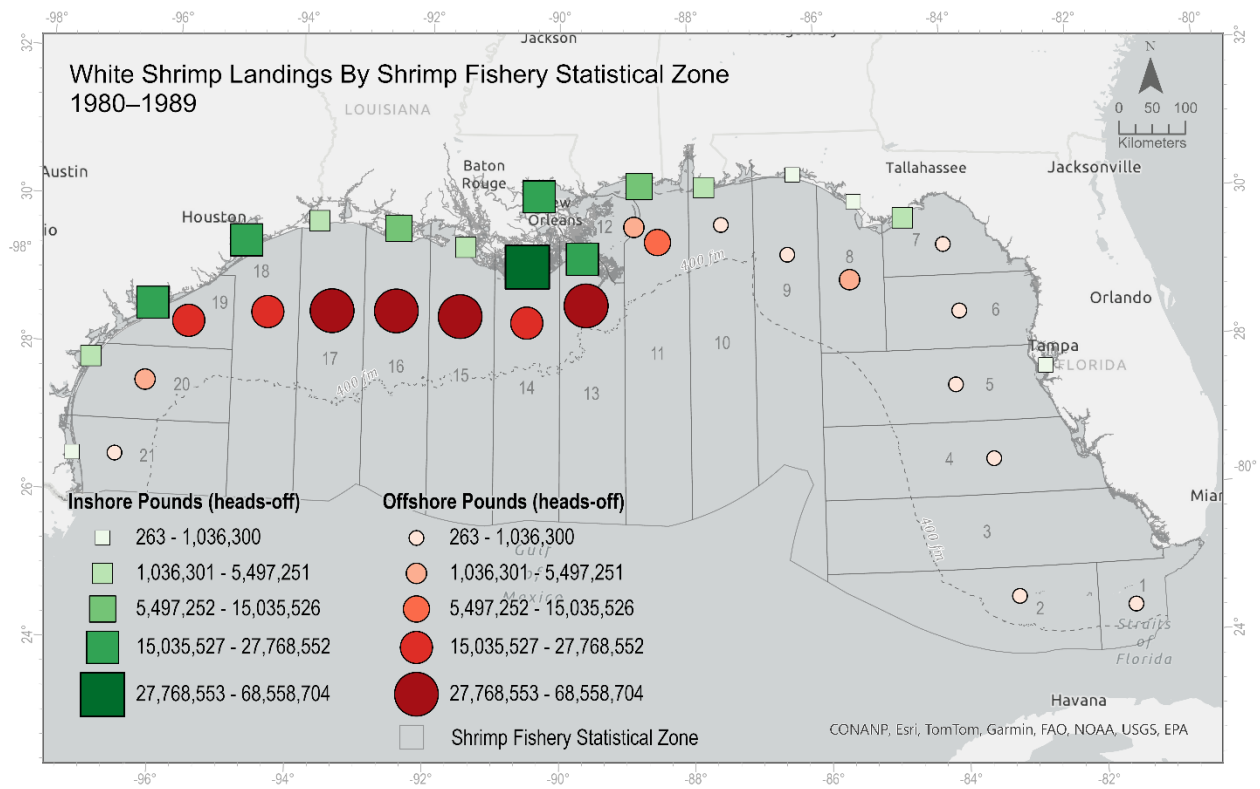


Figure 36. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 1980–1989 per statistical zone.

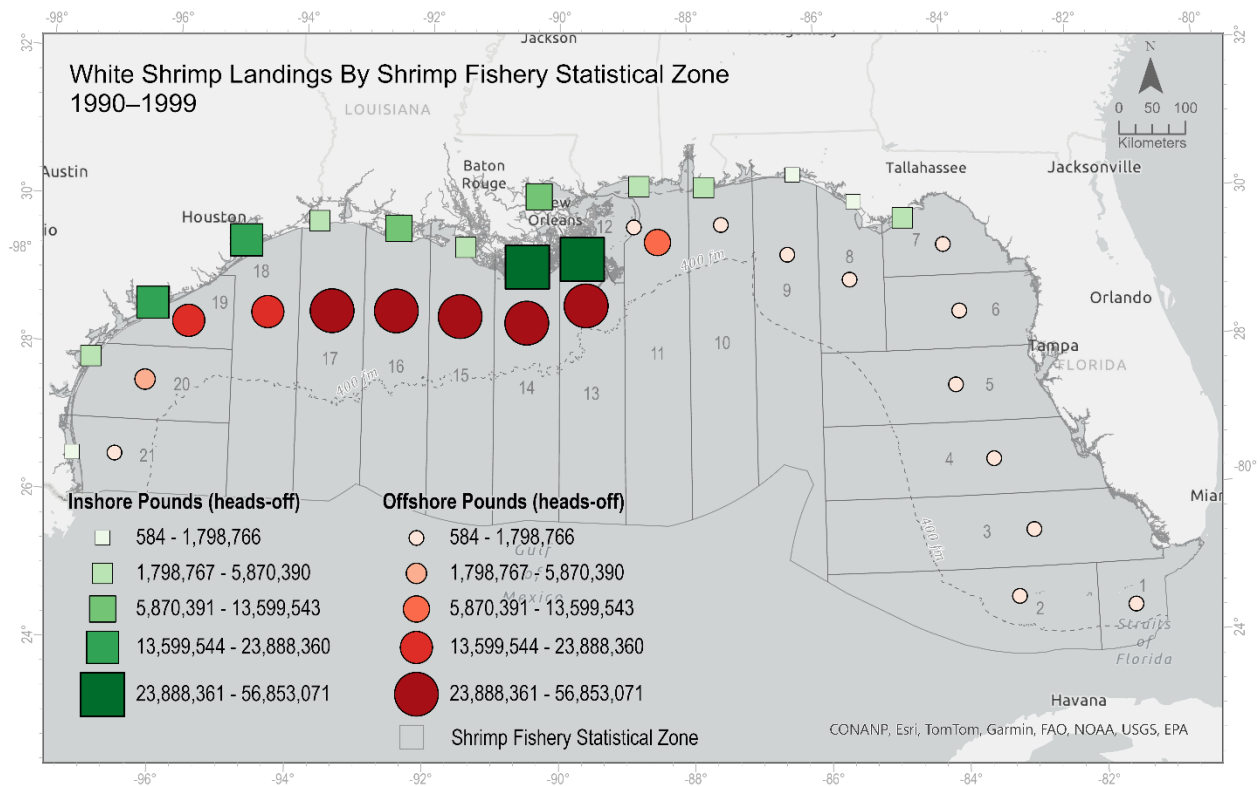


Figure 37. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 1990–1999 per statistical zone.

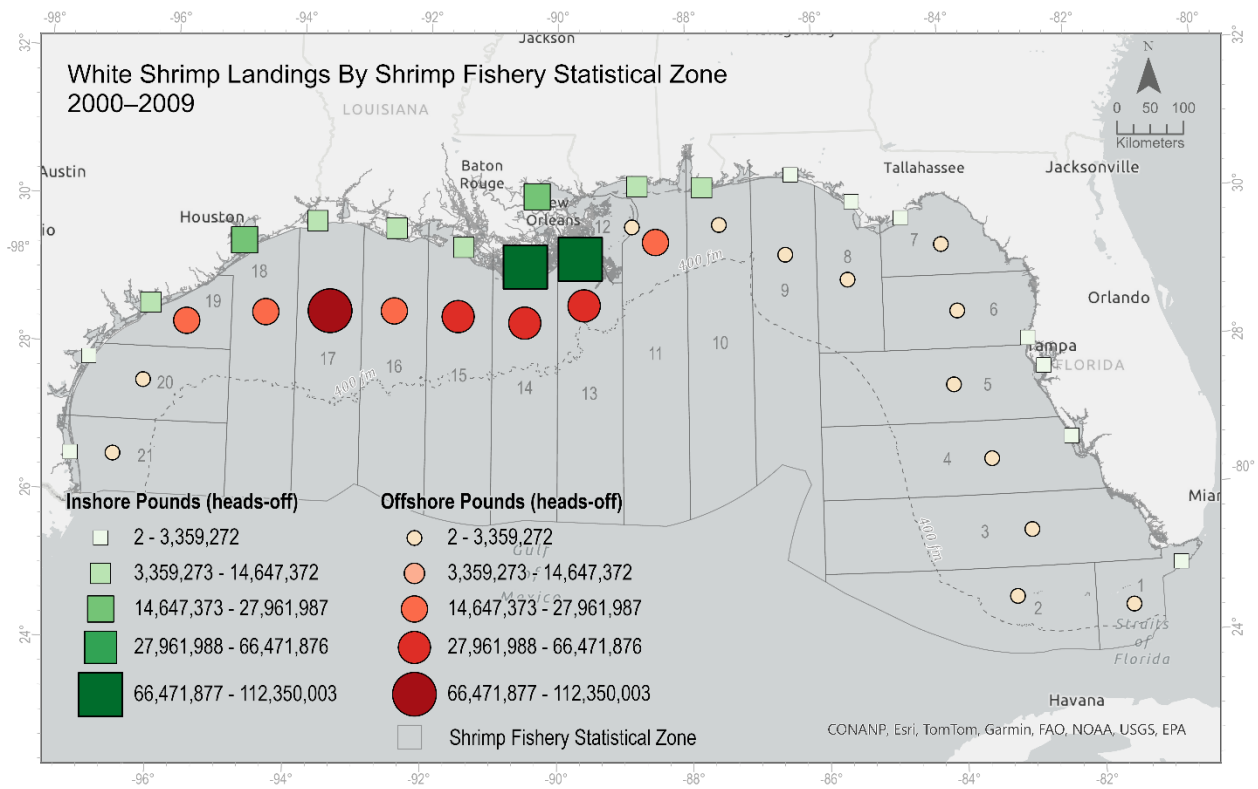


Figure 38. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 2000–2009 per statistical zone.

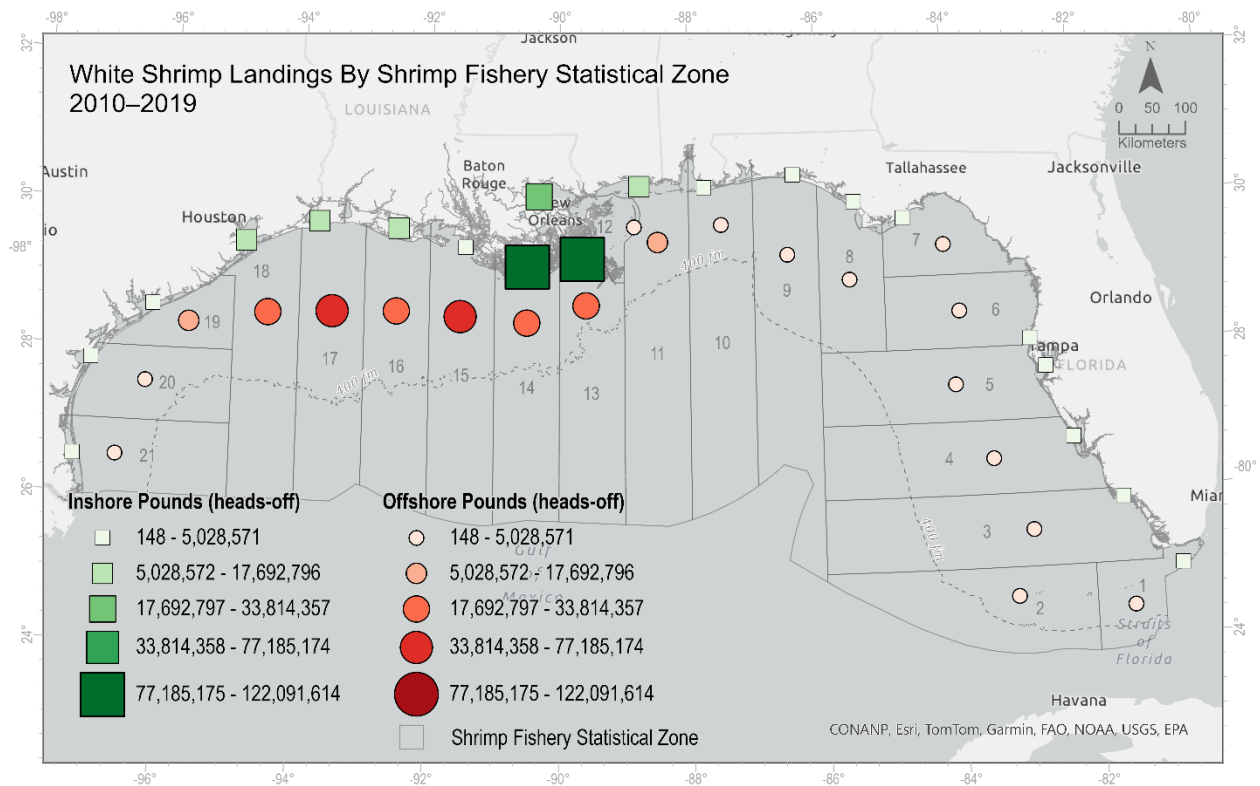


Figure 39. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 2010–2019 per statistical zone.

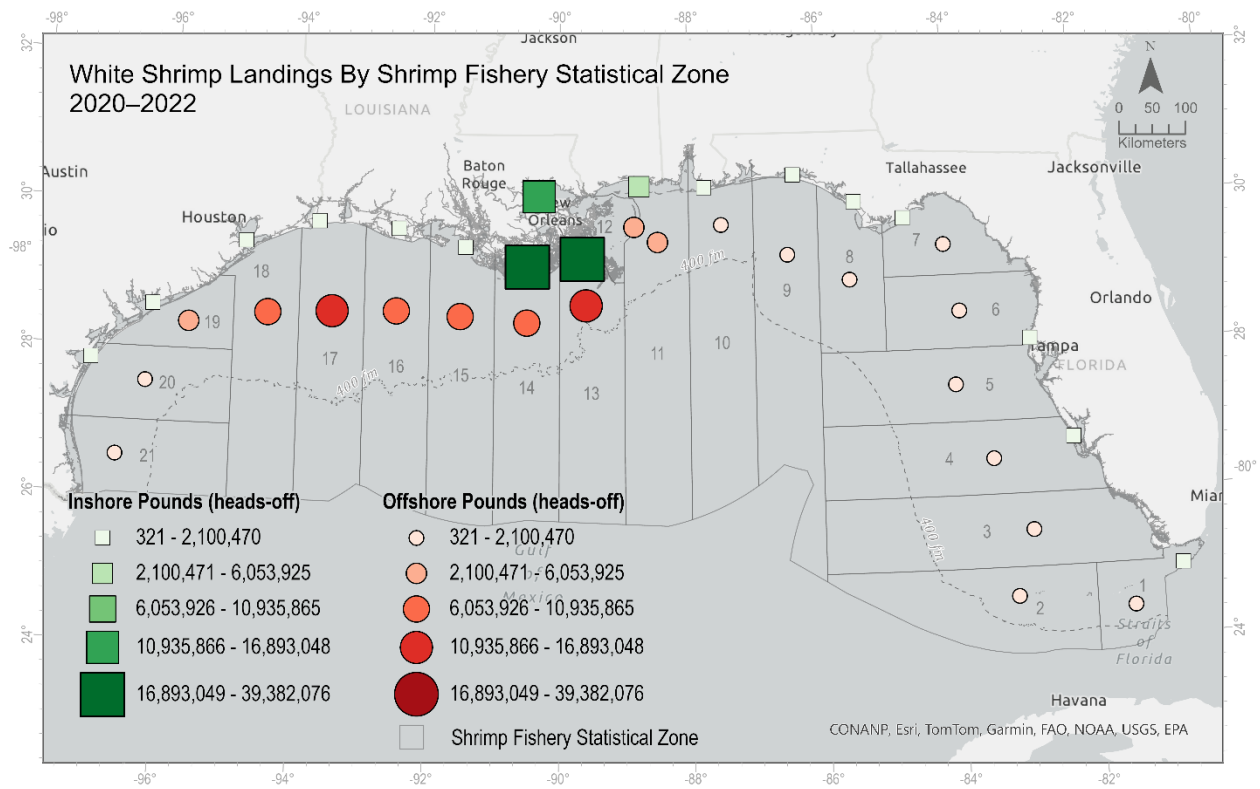


Figure 40. Total heads-off pounds landed of white shrimp in the US Gulf of Mexico from 2020–2022 per statistical zone.

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