Mississippi MarketMaker Newsletter

MISSISSIPPI STATE UNIVERSITY EXTENSION

IMPACTS OF DISASTER AND ECONOMIC EVENTS ON THE U.S. GULF OF MEXICO REGION COMMERCIAL MENHADEN FISHERY

ABSTRACT

- Dr. Posadas shows the long-term landings and values dockside prices of commercial menhaden fisheries in the U.S. Gulf of Mexico region since 1950.
- He developed and estimated economic models of the fishery in the region from 1950 to 2021.
- Using these models, he estimated the direct impacts of disaster and economic events on commercial landings and values.

KEYWORDS

- Menhaden, commercial landings, dockside values.

SUGGESTED CITATION

- Posadas, B.C. 2023. Impacts of Disaster and Economic Events on the U.S. Gulf of Mexico Region Commercial Menhaden Fishery. Mississippi MarketMaker Newsletter, Vol. 13, No. 8. Mississippi State University Extension Service. October 4, https://extension.msstate.edu/newsletters/mississippi-marketmaker.

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MENHADEN AND THEIR PREDATORS

- Menhaden plays a central role in the coastal ecosystem of the Northern Gulf of Mexico.
- They are most abundant near the Mississippi River estuary, where nutrients and plankton production are high.
- These tiny fish are a tasty snack for at least 32 different predators, including marine mammals, sea birds, sea turtles, sharks, and finfish such as mackerel, sea trout, and drum.
- Menhaden are filter feeders, meaning they consume algae, particulate matter, and small invertebrates from the water.
- They transfer energy from primary producers (algae and phytoplankton) to upper trophic levels.
- They provide predators with nutrients, vitamins, and oil, making them high-quality forage fish.
- This nutritional importance is critical in evaluating tradeoffs between menhaden harvest and their predators.
- If the Gulf menhaden fishery is held at a sustainable harvest, it may substantially positively affect both the population and their main predators.
- Overharvest, in turn, may cause a decline in predator abundance within the ecosystem.

- Source: https://www.fisheries.noaa.gov/feature-story/pathway-toward-ecosystem-based-management-gulf-menhaden

Source: SEFSC-Gulf menhaden-brandinoble

LET US START OUR MODELING EFFORT!

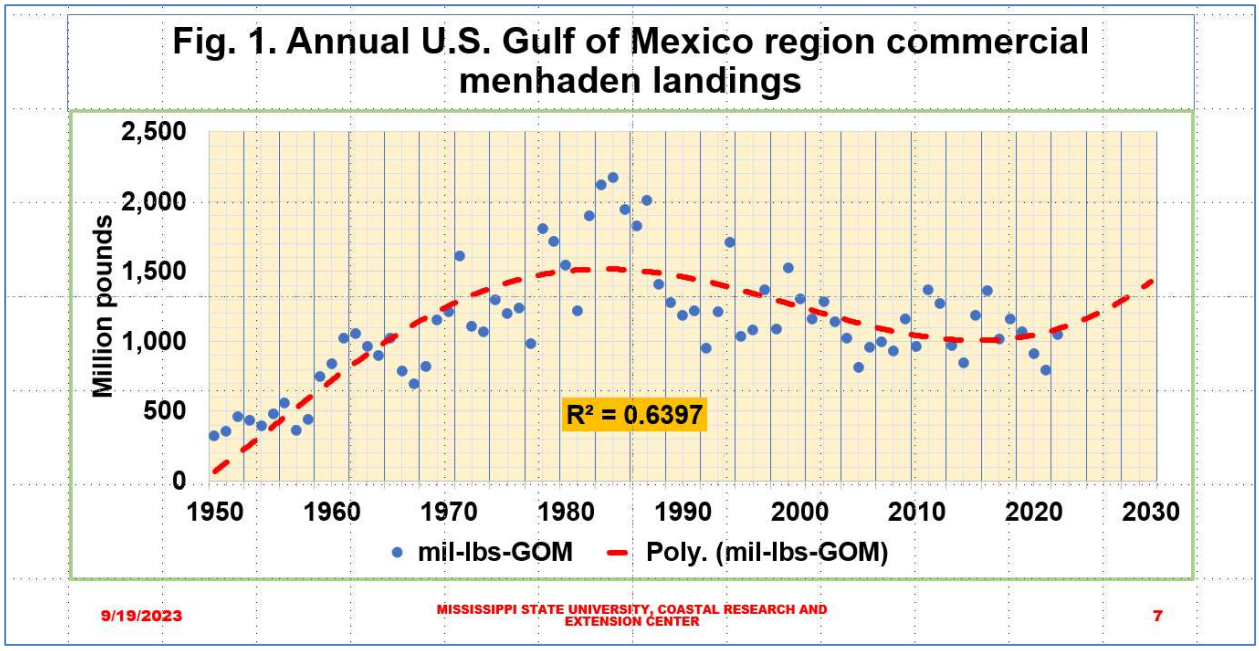
- What happens to commercial landings and values during disastrous events such as major hurricanes?
- Do economic events affect commercial landings such as recessions and trade wars?
- The global pandemic disrupted markets, reducing sales, employment, incomes, and expenditures.
- Rising diesel prices influenced fishing decisions.
- Landings and dockside values have been compiled from NOAA Fisheries' website since 1950.

U.S. COMMERCIAL FISHING ECONOMIC MODEL

- The Ordinary Least Squares (OLS) model of U.S. commercial fishing consisted of the following dependent variable:
    - Commercial landings (lb/yr),
- The OLS models of U.S. commercial fishing were estimated using the robust variance procedure of STATA-18.
- The variation inflation factor was calculated to detect the possible presence of multicollinearity.
- The marginal impacts of disaster events were computed using the margins procedure.
- The OLS model of U.S commercial fishing (lb/yr) assumed that it could be explained by the following variables: year, real dockside prices ($/lb), recession, trade war, pandemic, and Gulf natural disasters (1 or 0), unemployment rate, real diesel prices and per capita disposable income (%), and other variables.

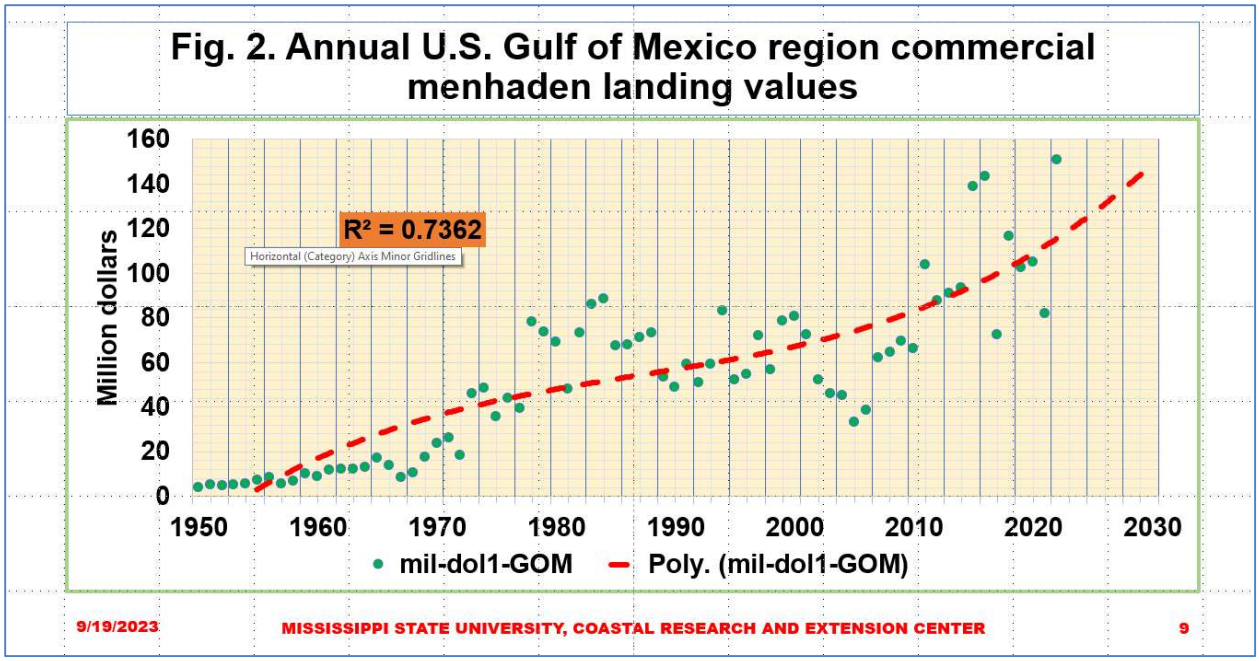
ANNUAL U.S. GULF OF MEXICO REGION COMMERCIAL MENHADEN LANDINGS

- Annual Gulf landings are shown in Fig. 1.
- Data are from the NOAA Fisheries website and marked by blue dots.
- Landings peaked in the early 1980s, dropped in 1990, and continue to slide to about one billion pounds.
- The Excel-generated polynomial trend line is shown by the red curve.



ANNUAL U.S. GULF OF MEXICO REGION COMMERCIAL MENHADEN LANDING VALUES

- Annual Gulf landing values are shown in Fig. 2.
- Data are from the NOAA Fisheries website and marked by green dots.
- Landing values peaked in early 2016 at $143 million and dropped in 2019 ($102M), 2020 ($105M), and 2021 ($81M).
- The Excel-generated polynomial trend line is shown by the red curve.



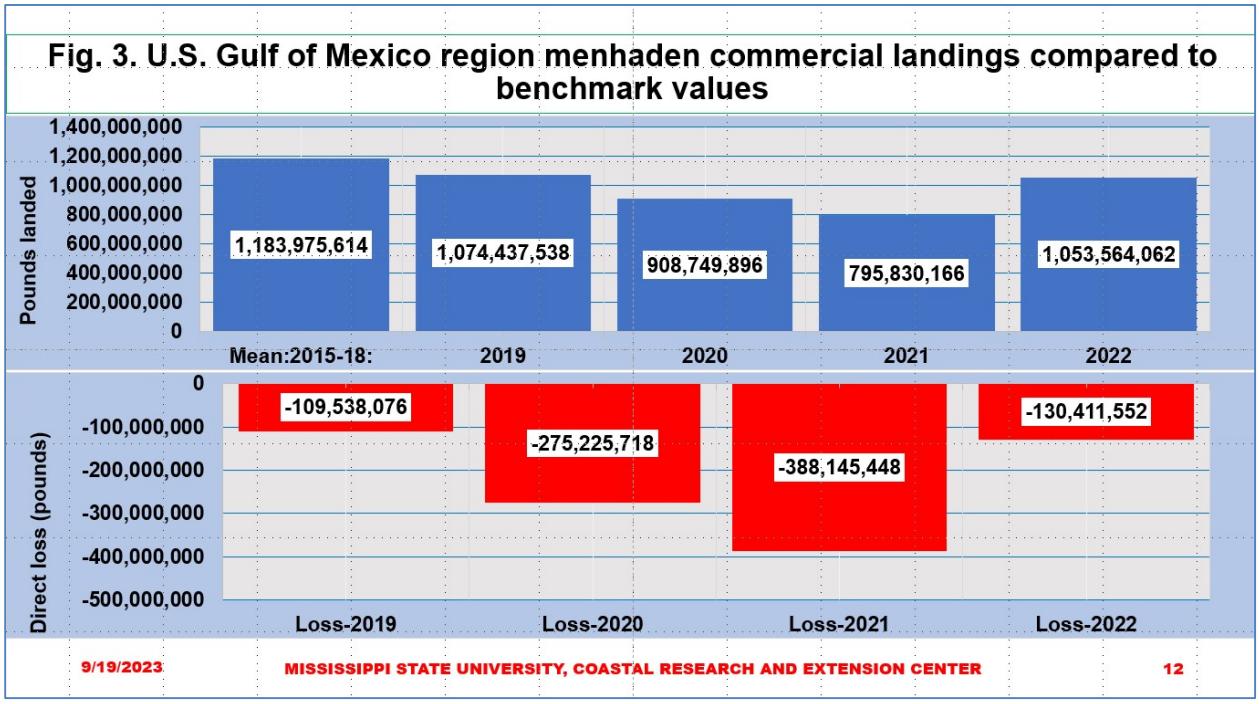
EXCEL MODEL OF COMMERCIAL MENHADEN FISHERIES

- An approach to estimating the direct fishery losses is to compare the current landings, dockside values, and prices to previous years' benchmarks.
- The benchmark years are from 2014 to 2018.
- **Direct fishery losses** occur if current values are lower than the benchmark values.
- Direct fishery losses are measured in pounds, dollars, and percent.

DIRECT LOSSES ON GULF MENHADEN COMMERCIAL LANDINGS

The economic model shown in Fig. 3 estimates total commercial losses from 2019 to 2021 as follows:

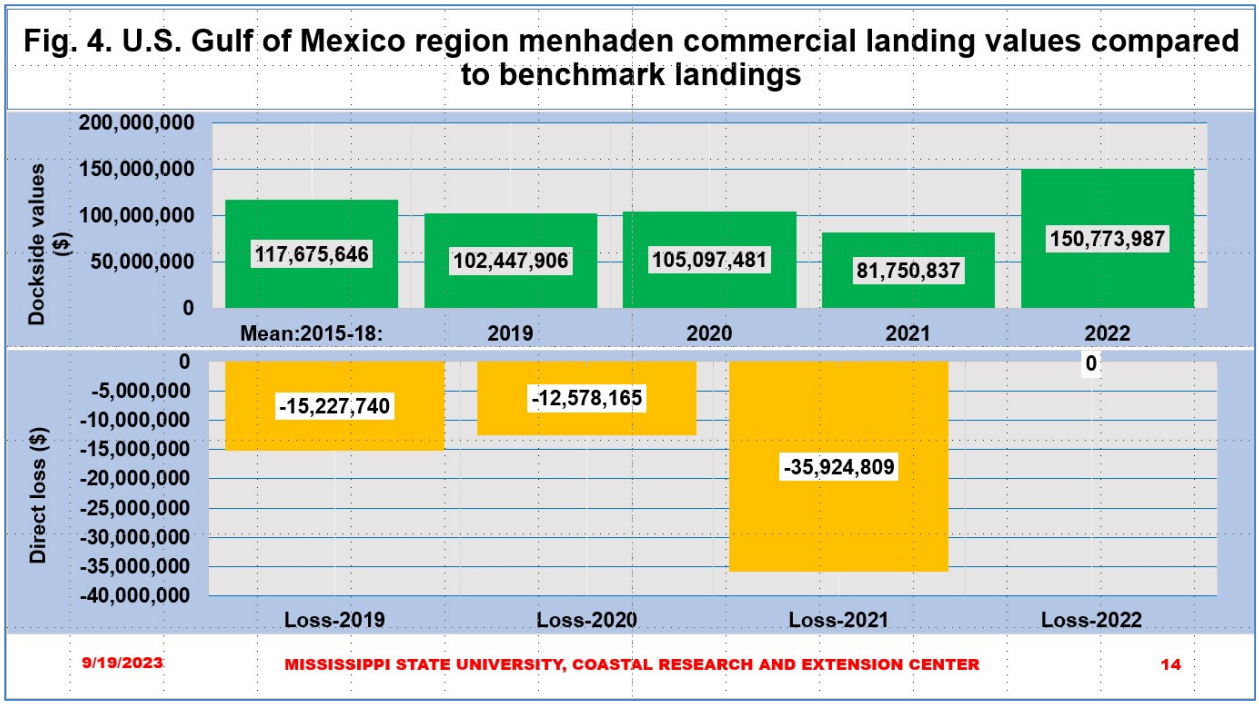
- 2019: -109 million pounds or -9%,
- 2020: -275 million pounds or -23%,
- 2021: -388 million pounds or -33%,
- 2022: -130 million pounds or -11%.



DIRECT LOSSES ON GULF COMMERCIAL MENHADEN LANDING VALUES

The economic model shown in Fig. 4 estimates total losses in commercial landing values from 2019 to 2021 as follows:

- 2019: -$15 million or -13%,
- 2020: -$12 million or -11%,
- 2021: -$35 million or -31%,
- 2022: $0 or 0%.

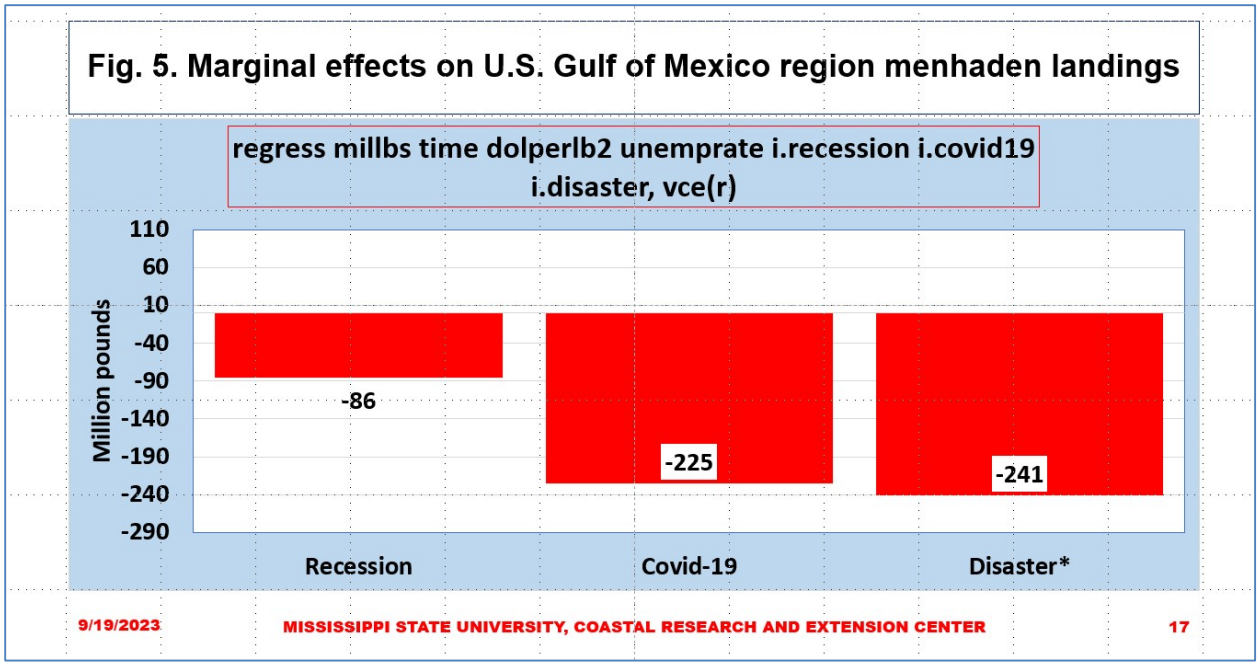


OLS MODEL OF GULF COMMERCIAL MENHADEN LANDINGS

- The Ordinary Least Squares (OLS) model of the fishery assumes that landings and values are determined by year, dockside prices, unemployment rates, real per capita disposable income growth rate, diesel prices (?), and occurrence of disasters, recessions, and global pandemic.
- Direct fishery losses occur if current values are lower than the projected values.

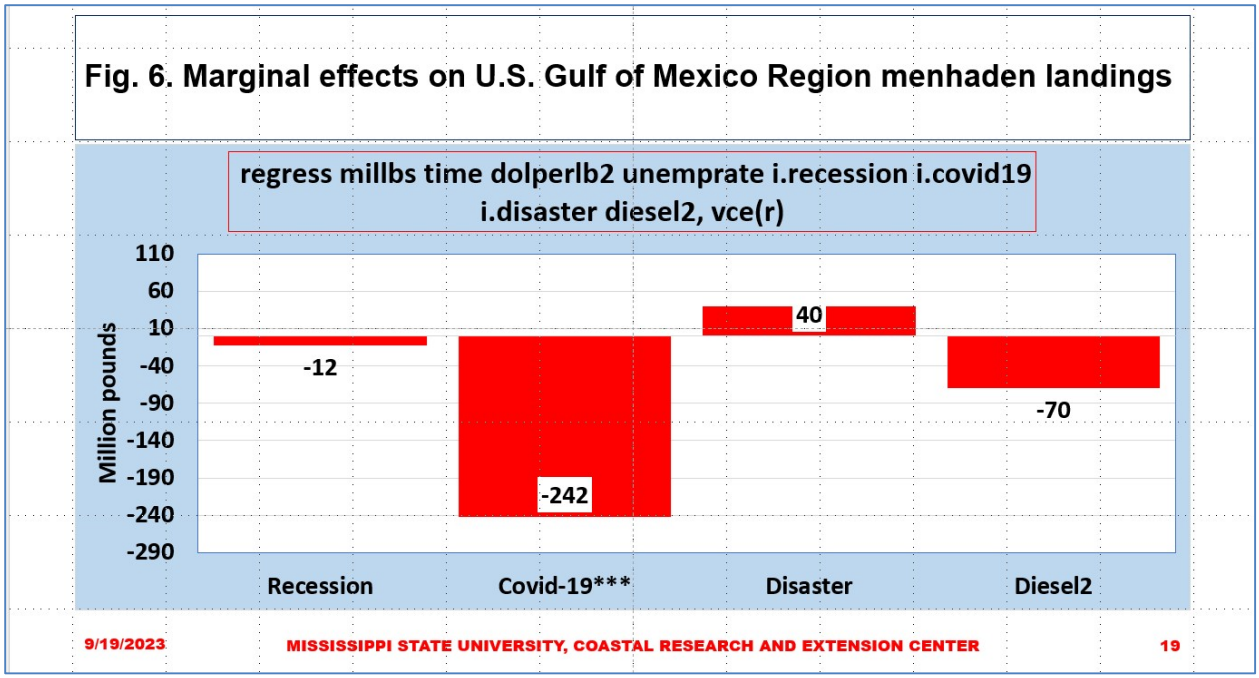
MARGINAL EFFECTS ON GULF MENHADEN COMMERCIAL LANDINGS

- The marginal impacts on Gulf commercial landings are shown in Fig. 5.
- Commercial landings tend to fall during recessions.
- The Covid-19 global pandemic significantly reduced commercial landings.
- Commercial landings considerably declined during Gulf disasters.



MARGINAL EFFECTS ON GULF MENHADEN COMMERCIAL LANDINGS

- When real diesel prices were added to the economic model, the marginal impacts on Gulf commercial landings are shown in Fig. 6.
- Commercial landings tend to fall during recessions.
- The Covid-19 global pandemic significantly reduced commercial landings.
- Commercial landings considerably declined at higher real diesel prices.



SUMMARY, LIMITATIONS, AND IMPLICATIONS

- Economic events such as recessions adversely affected commercial landings.
- The COVID-19 global pandemic significantly discouraged commercial landings.
- Rising diesel prices negatively influenced fishing decisions.