

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

ABSTRACT

- Dr. Posadas shows the long-term landings and values, and imputed dockside prices of the U.S. Gulf of Mexico region commercial blue crab fisheries since 1950.
- He developed and estimated economic models for blue crab commercial landings, dockside values and prices in the region from 1950 to 2022.
- Using these models, he estimated the direct impacts of disaster and economic events on blue crab commercial landings.

KEYWORDS

- Blue crabs, commercial landings, dockside values and prices.

SUGGESTED CITATION

- Posadas, B.C. 2023. Impacts of Disaster and Economic Events on the U.S. Gulf of Mexico Region Commercial Blue Crab Fishery. Mississippi MarketMaker Newsletter, Vol. 13, No. 9. Mississippi State University Extension Service. October 17, <https://extension.msstate.edu/newsletters/mississippi-marketmaker>.

ACKNOWLEDGEMENT

- This virtual presentation is a contribution of the Mississippi Agricultural and Forestry Experiment Station and the Mississippi State University Extension Service.
- This material is based upon work that is supported in part by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch project under accession number 081730 and
- Mississippi-Alabama Sea Grant Consortium using federal funds under Grant NA23OAR4170090 from the National Sea Grant Office, NOAA, U.S. Dept. of Commerce.
- The statements, findings, conclusions, and recommendations are those of the author and do not necessarily reflect the views of the National Sea Grant Program, NOAA, U.S. Department of Commerce.
- This is a Mississippi-Alabama Sea Grant Publication number MASGC-23-057-09.

BLUE CRABS

- The blue crab is a highly sought-after shellfish.
- Blue crabs live up and down the Atlantic Coast and in the Gulf of Mexico and are caught by both commercial and recreational fishermen.
- Its scientific name—*Callinectes sapidus*—translated from Latin means 'beautiful savory swimmer.'
- Blue crab populations naturally are highly variable from year to year. In managing blue crab fisheries, resource managers look at overall trends rather than just the number of blue crabs in any given year.
- Source: <https://www.fisheries.noaa.gov/species/blue-crab>.



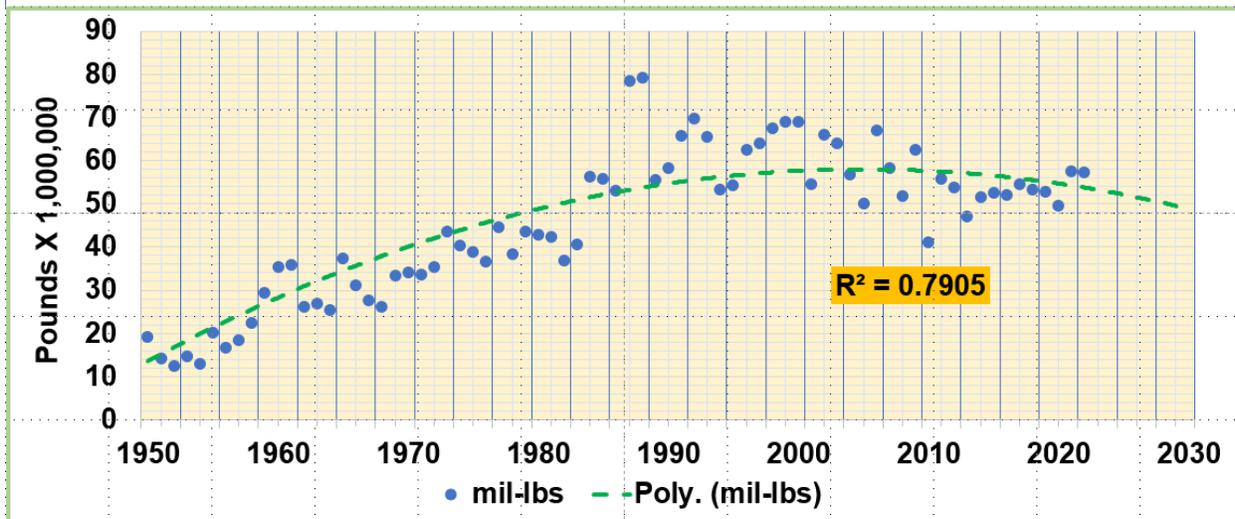
LET US START OUR MODELING EFFORT!

- 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.

ANNUAL U.S. GULF OF MEXICO REGION COMMERCIAL BLUE CRAB LANDINGS

- Annual Gulf landings are shown in Fig. 1.
- Data are from NOAA Fisheries website and marked by blue dots.
- Landings peaked in the late 1980s, early and mid-1990s, late 2000s and since then fluctuated around fifty million pounds.
- The Excel-generated polynomial trend line is shown by the green curve.

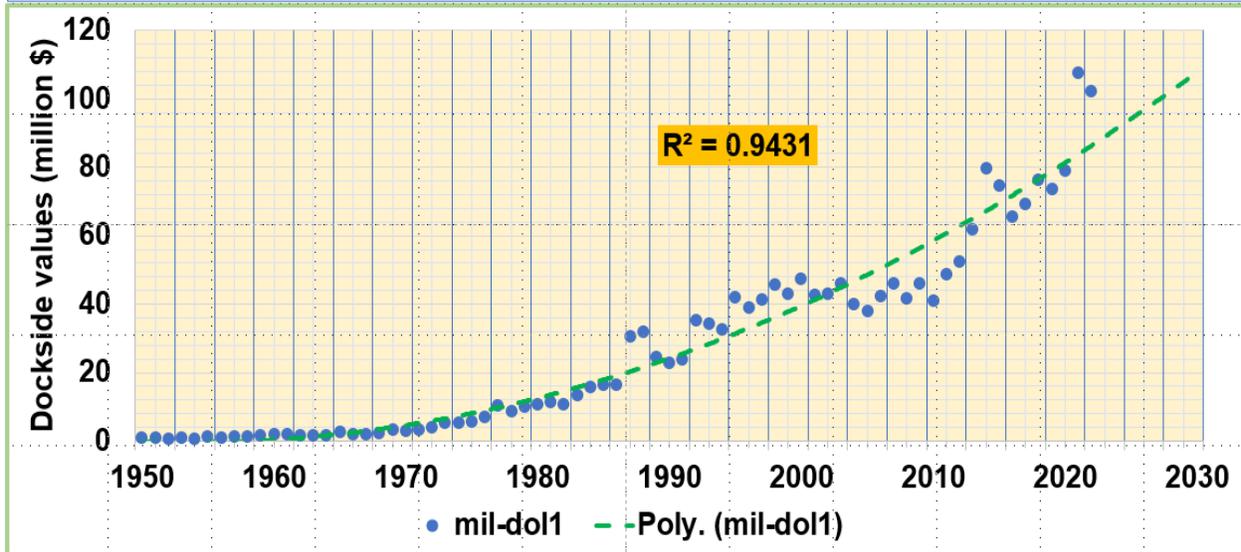
Fig. 1. Annual U.S. Gulf of Mexico region commercial blue crab landings



ANNUAL U.S. GULF OF MEXICO REGION COMMERCIAL BLUE CRAB LANDING VALUES

- Annual Gulf landing values are shown in Fig. 2.
- Data are from NOAA Fisheries website and marked by green dots.
- Landing values continued to rise reaching their peak in 2021 at \$107 million.
- The Excel-generated polynomial trend line is shown by the green curve.

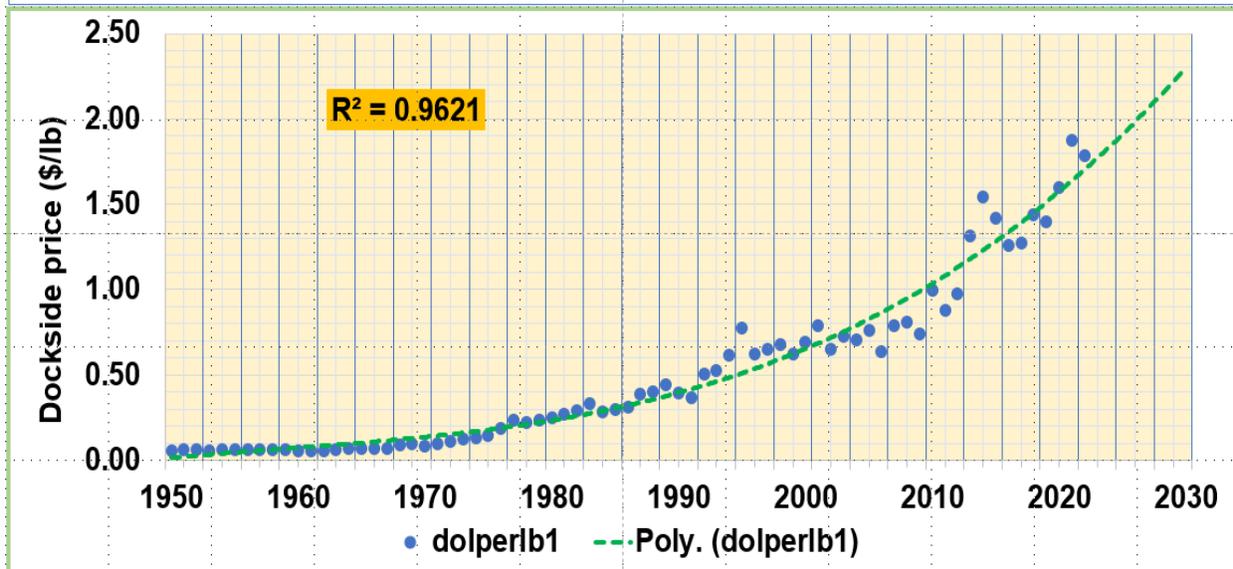
Fig. 2. Annual U.S. Gulf of Mexico region commercial blue crab landing values



ANNUAL U.S. GULF OF MEXICO REGION COMMERCIAL BLUE CRAB DOCKSIDE PRICES

- Annual Gulf dockside prices are shown in Fig. 3.
- Price data are imputed from landing values and landings and marked by green dots.
- Average dockside prices rose over time reaching a peak of \$1.87 per pound in 2021.
- The Excel-generated polynomial trend line is shown by the green curve.

Fig. 3. Annual U.S. Gulf of Mexico region commercial blue crab dockside prices



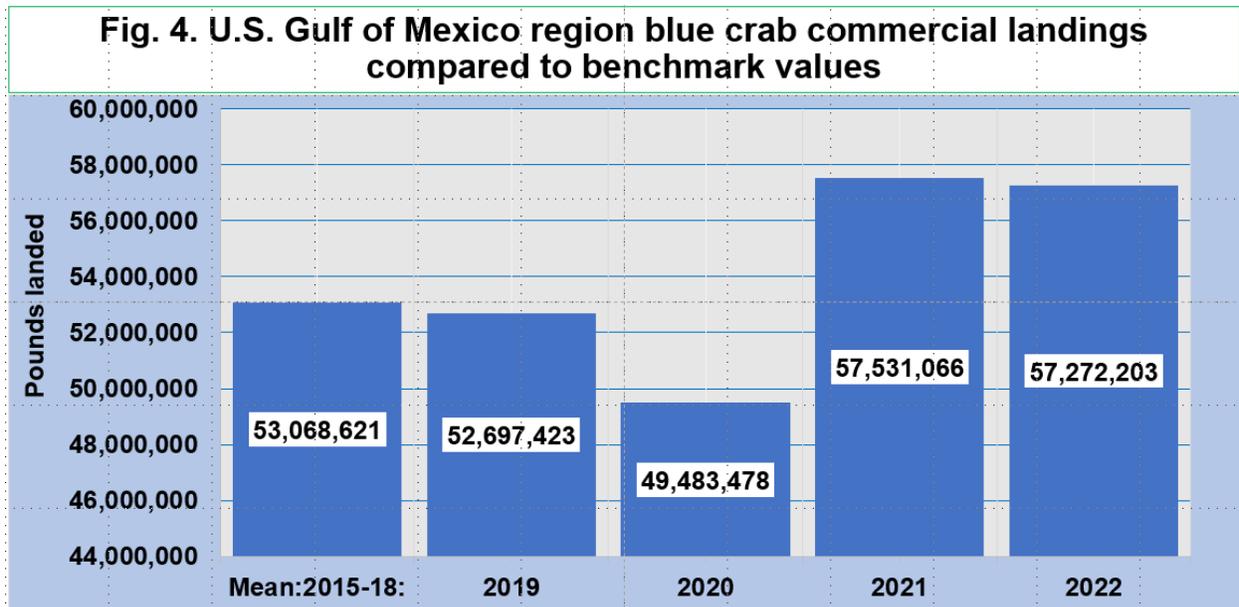
EXCEL MODEL OF COMMERCIAL BLUE CRAB FISHERIES

- 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 percentages.

DIRECT LOSSES ON GULF BLUE CRAB COMMERCIAL LANDINGS

The economic model shown by Fig. 4 estimates total commercial losses from 2019 to 2022, as follows:

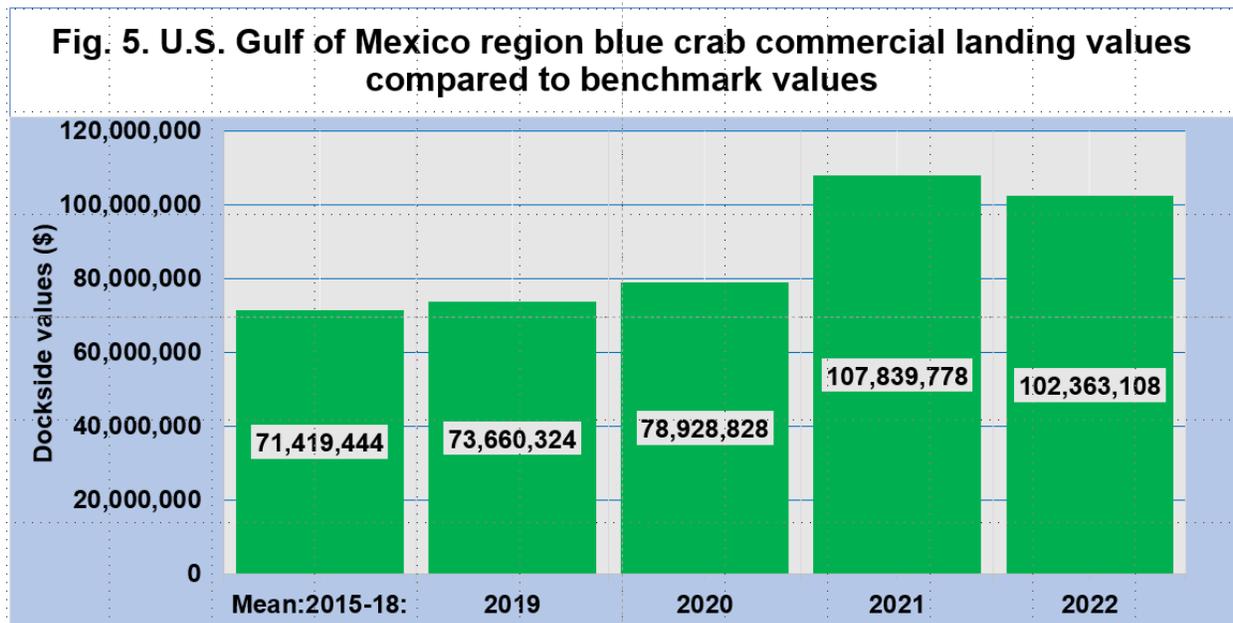
- 2019: -0.37 million pounds or -1%,
- 2020: -3.58 million pounds or -7%,
- 2021: 0 million pounds or 0%,
- 2022: 0 million pounds or 0%.



DIRECT LOSSES ON GULF COMMERCIAL BLUE CRAB LANDING VALUES

The economic model shown by Fig. 5 estimates total losses in commercial landing values from 2019 to 2022, as follows:

- 2019: \$0 million or 0%,
- 2020: \$0 million or 0%,
- 2021: \$0 million or 0%,
- 2022: \$0 million or 0%.

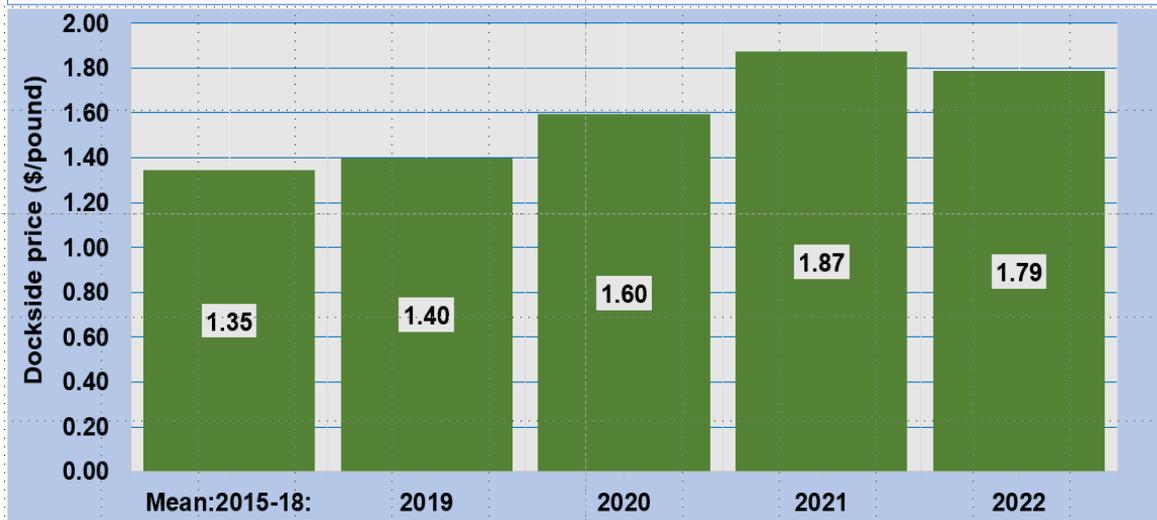


DIRECT LOSSES ON GULF COMMERCIAL BLUE CRAB DOCKSIDE PRICES

The economic model shown by Fig. 6 estimates total losses in commercial dockside prices from 2019 to 2022, as follows:

- 2019: \$0 per pound or 0%,
- 2020: \$0 per pound or 0%,
- 2021: \$0 per pound or 0%,
- 2022: \$0 per pound or 0%.

Fig. 6. U.S. Gulf of Mexico region blue crab commercial dockside prices compared to benchmark prices



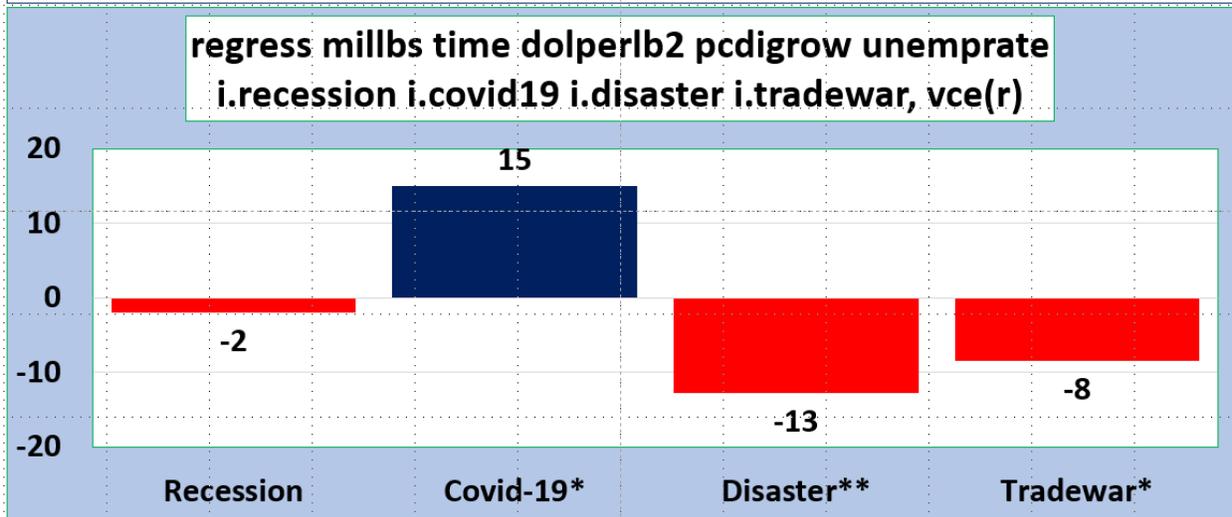
ECONOMIC MODEL OF GULF COMMERCIAL BLUE CRAB LANDINGS

- 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 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 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.
- Direct fishery losses occur if current values are lower than the projected values.

MARGINAL EFFECTS ON GULF BLUE CRAB COMMERCIAL LANDINGS

- The marginal impacts on Gulf commercial landings are shown in Fig. 7.
- Commercial landings tend to fall during recessions.
- The Covid-19 global pandemic seemed to have significantly enhanced commercial landings.
- Commercial landings greatly declined during the Gulf disasters.
- The China-US trade war discouraged blue crab landings.

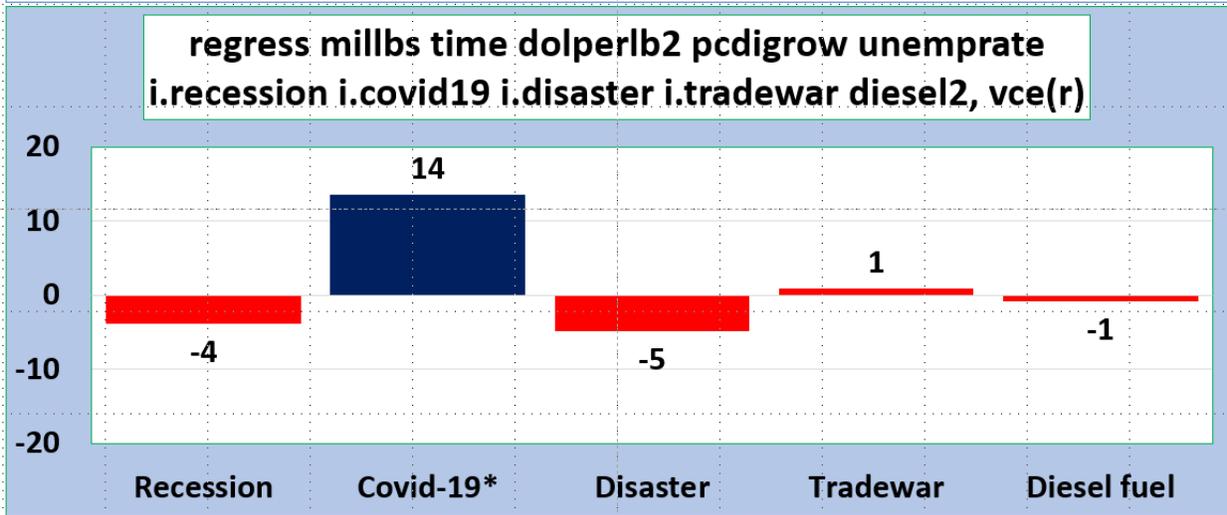
Fig. 7. Marginal effects on U.S. Gulf of Mexico Region blue crab landings



MARGINAL EFFECTS ON GULF BLUE CRAB COMMERCIAL LANDINGS

- When real diesel prices were added to the economic model, the marginal impacts on Gulf commercial landings are shown in Fig. 8.
- Commercial landings tend to fall during recessions.
- The Covid-19 global pandemic seemed to have significantly enhanced commercial landings.
- Commercial landings declined during disasters and rising diesel fuel prices.

Fig. 8. Marginal effects on U.S. Gulf of Mexico Region blue crab landings



SUMMARY, LIMITATIONS, AND IMPLICATIONS

- Economic events such as recessions adversely affected commercial landings.
- The Covid-19 global pandemic significantly seemed to have encouraged commercial landings.
- Gulf disasters discouraged commercial landings.
- Rising diesel prices negatively influenced fishing decisions.