Mississippi MarketMaker Newsletter

MISSISSIPPI STATE UNIVERSITY EXTENSION

DIRECT IMPACTS OF DISASTER AND ECONOMIC EVENTS ON UNITED STATES WHITE SHRIMP FISHERIES

ABSTRACT

Dr. Posadas shows the long-term landings, values, and imputed dockside prices of the U.S. commercial white shrimp fisheries since 1962. He developed and estimated economic models of the fisheries from 1962 to 2022. Using these models, he estimated the direct impacts of disaster and economic events on commercial landings and values.

KEYWORDS

White shrimp, United States, commercial landings, dockside values.

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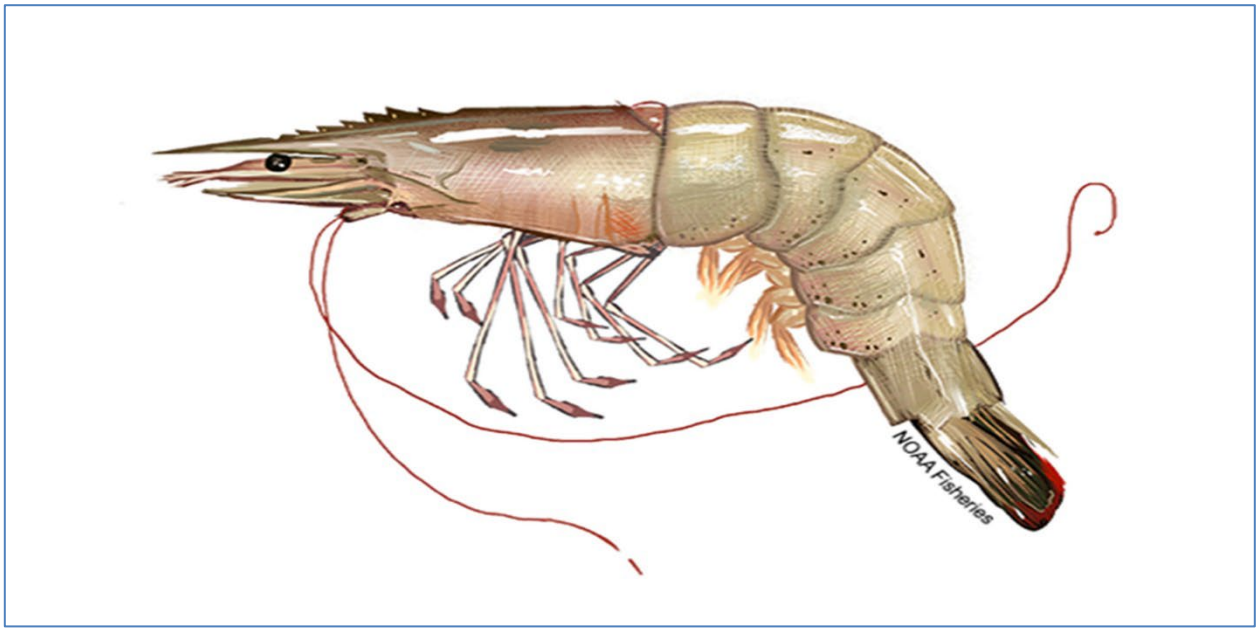
LET US START OUR MODELING EFFORT!

- What happens to commercial landings and values during disastrous events such as major hurricanes and freshwater intrusions?
- Do economic events such as recessions and trade wars affect commercial landings?
- The global pandemic disrupted markets, reducing sales, employment, incomes, and expenditures.
- Rising diesel prices influenced fishing decisions.
- The occurrence of harmful algal blooms.
- Landings and dockside values have been compiled from NOAA Fisheries' website since 1950. Data became available starting in 1962.

WHITE SHRIMP *Litopenaeus setiferus*

Northern white shrimp, Gray shrimp, Lake shrimp, Green shrimp, Common shrimp, Daytona shrimp, Southern shrimp

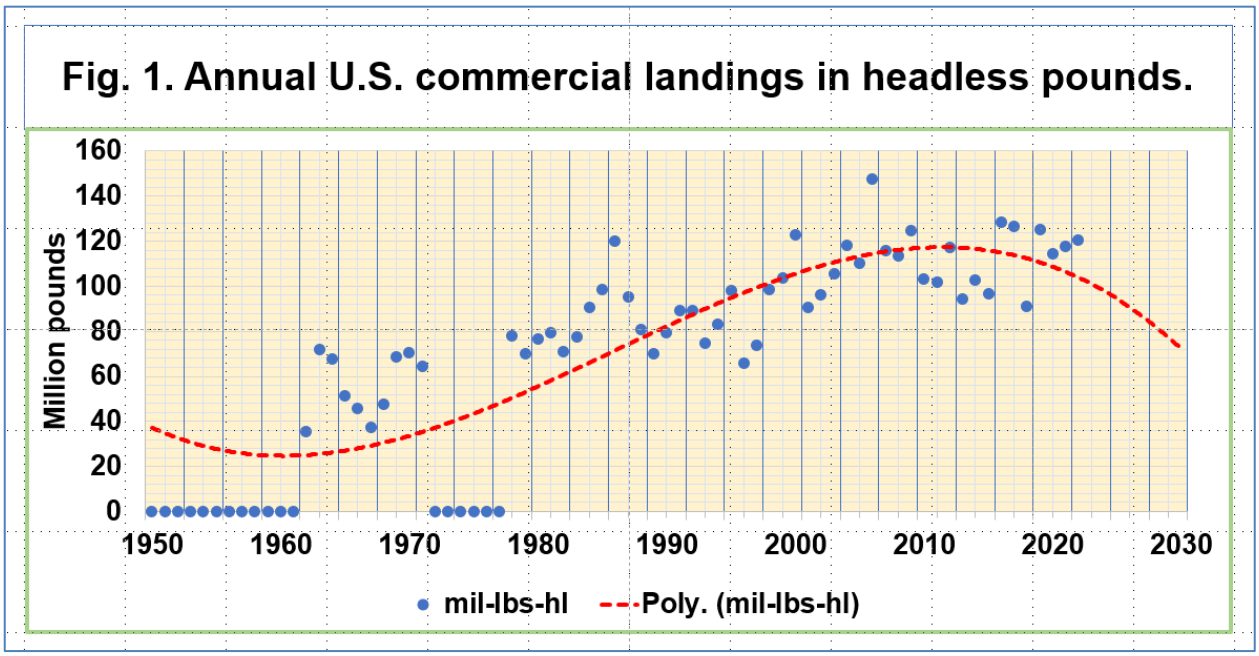
U.S. wild-caught white shrimp is a smart seafood choice because it is sustainably managed and responsibly harvested under U.S. regulations. There are two stocks of white shrimp: the Gulf of Mexico and the South Atlantic. According to the most recent stock assessments, the Gulf of Mexico stock is not overfished or subject to overfishing, and the South Atlantic stock is not overfished or subject to overfishing.



Source: https://www.fisheries.noaa.gov/species/white-shrimp.

ANNUAL U.S. WHITE SHRIMP COMMERCIAL LANDINGS

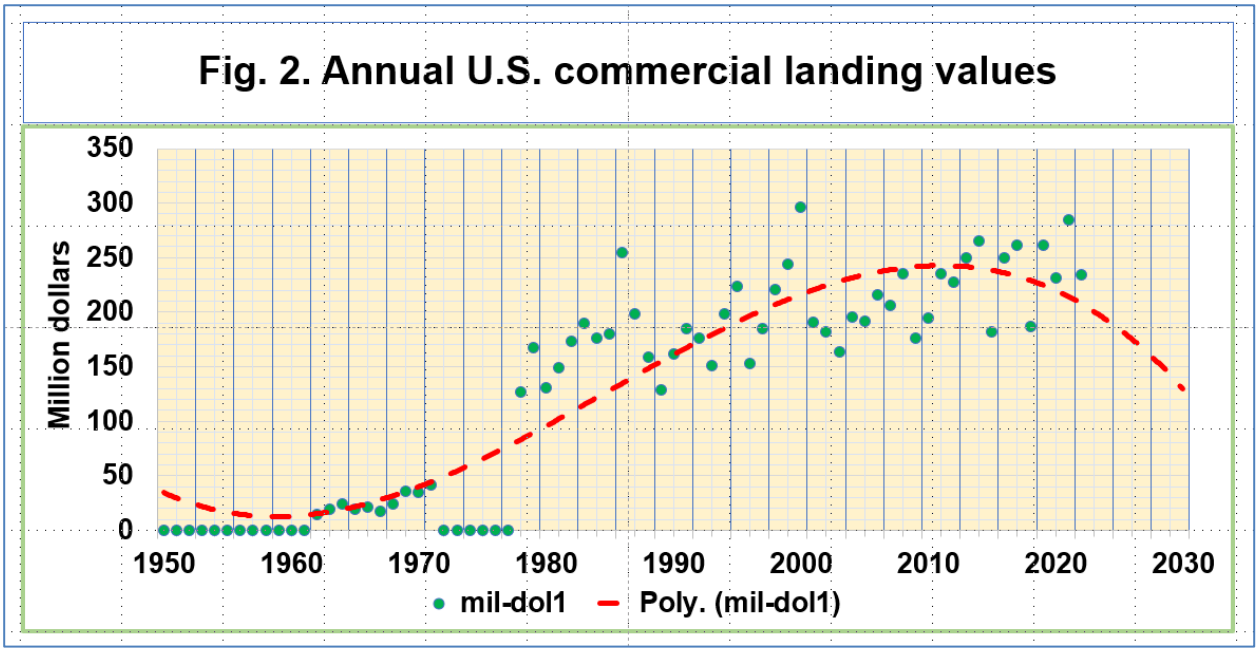
- U.S. landings (lbs/yr, headless shrimp) are shown in Fig. 1.
- Data since 1962 are from the NOAA Fisheries website and marked by blue dots.
- There were no landings data before 1962 and between 1972 and 1977.
- The red curve shows the Excel-generated polynomial trend line.



Source of raw data: NOAA Fisheries Office of Science and Technology, Commercial Landings Query, Available at www.fisheries.noaa.gov/foss, Accessed 12/05/2023.

ANNUAL U.S. WHITE SHRIMP COMMERCIAL LANDING VALUES

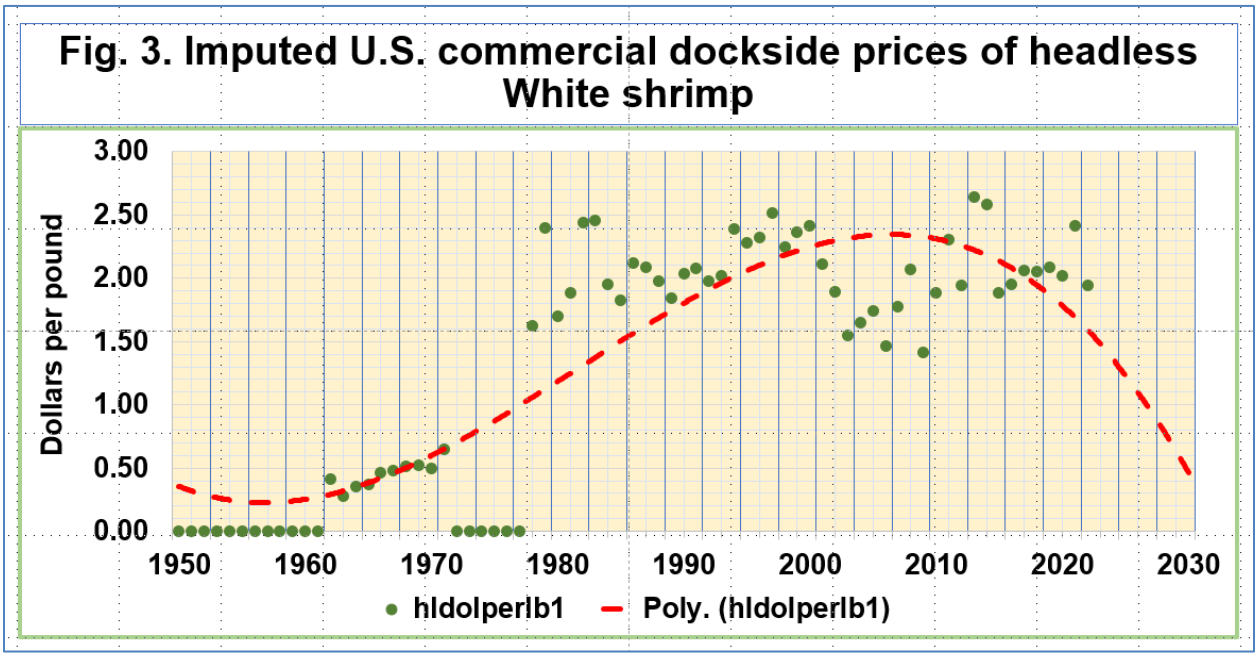
- U.S. landing values ($/yr) are shown in Fig. 2.
- Data are from the NOAA Fisheries website and marked by green dots.
- There were no landing values data before 1962 and between 1972 and 1977.
- The red curve shows the Excel-generated polynomial trend line.



Source: NOAA Fisheries Office of Science and Technology, Commercial Landings Query, Available at: www.fisheries.noaa.gov/foss, Accessed 12/05/2023.

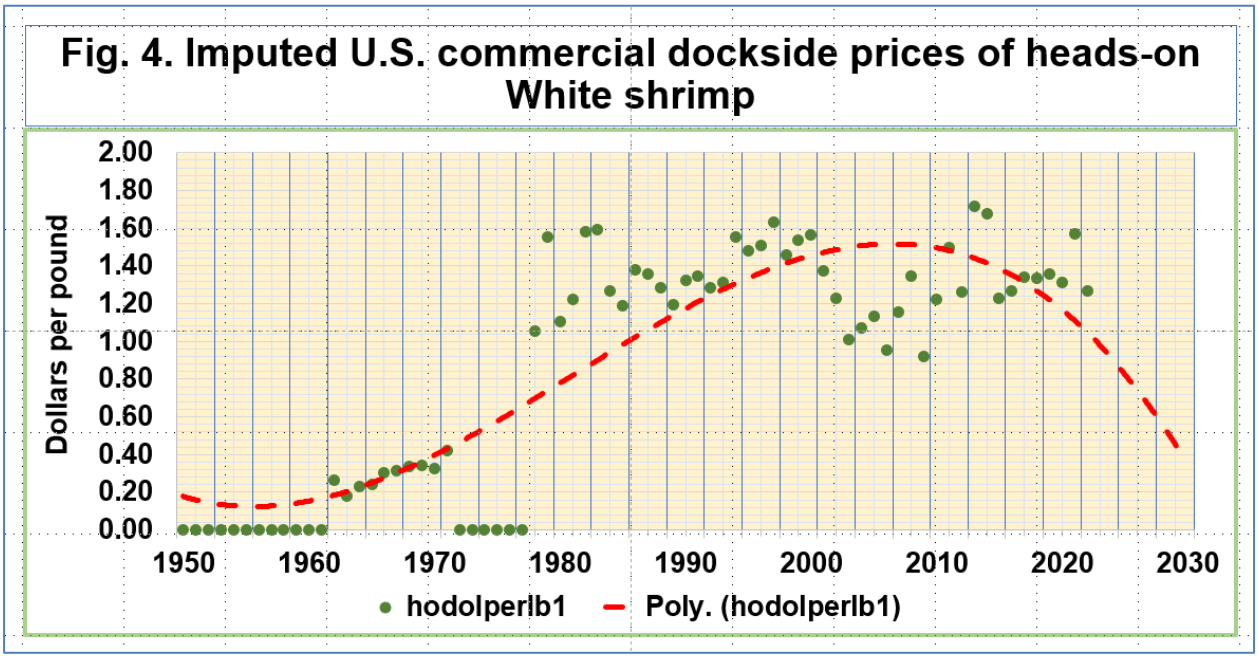
ANNUAL U.S. HEADLESS WHITE SHRIMP IMPUTED DOCKSIDE PRICES

- The imputed annual dockside prices for headless shrimp are shown in Fig. 3.
- Prices are imputed from commercial landings and landing values.
- Green dots mark imputed dockside prices.
- The red curve shows the Excel-generated polynomial trend line.
- Imputed dockside prices went down significantly in 2022 to about $1.95 per pound of headless shrimp.



IMPUTED ANNUAL U.S. HEADS-ON WHITE SHRIMP COMMERCIAL DOCKSIDE PRICES

- The imputed annual dockside prices for heads-on shrimp are shown in Fig. 4.
- Prices are imputed from commercial landings and landing values.
- Green dots mark imputed dockside prices.
- The red curve shows the Excel-generated polynomial trend line.
- Dockside prices of heads-on White shrimp continued to decline in 2022 to $1.27 per pound.



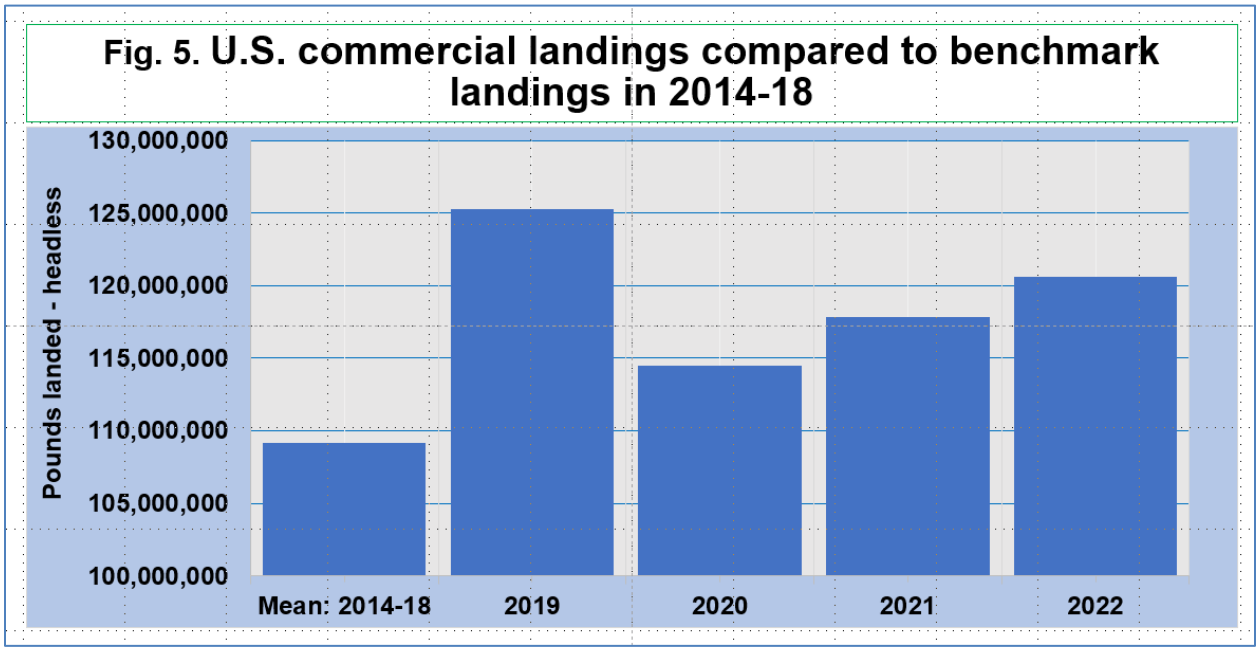
MEAN-DIFFERENCE MODEL OF COMMERCIAL WHITE SHRIMP FISHERIES

- 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 U.S. WHITE SHRIMP COMMERCIAL LANDINGS

The Mean-Difference model (Fig. 5) estimates total commercial losses from 2019 to 2022 as follows:

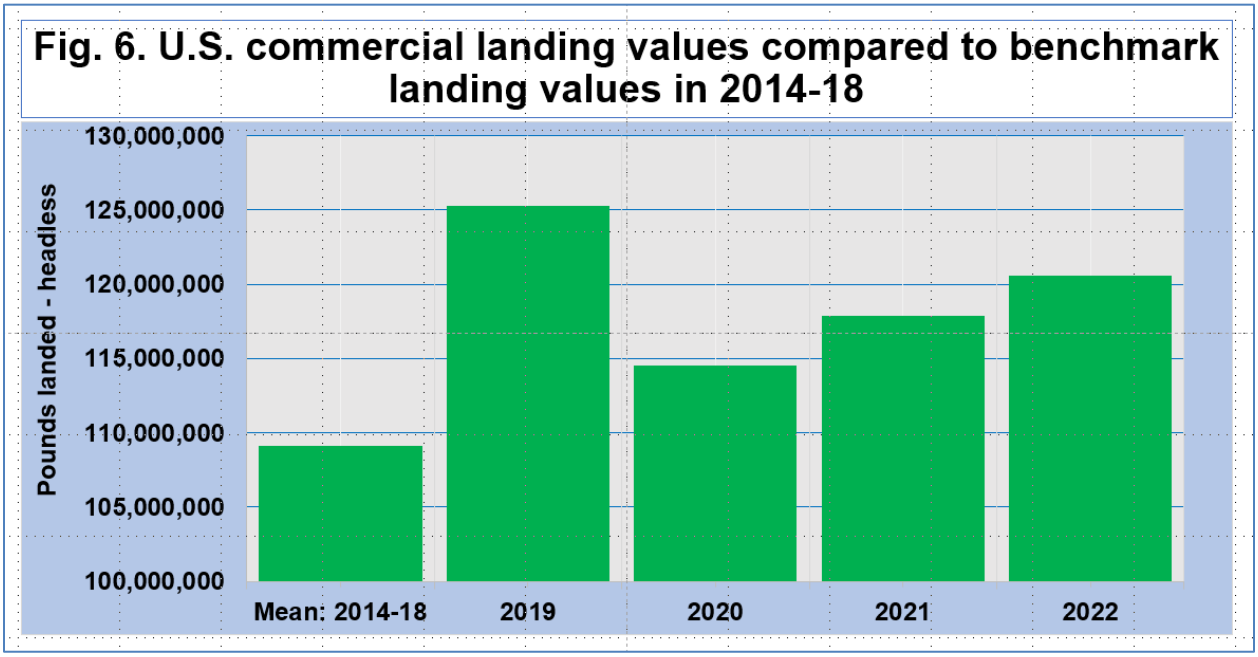
- 2019: 0 million pounds or 0%,
- 2020: 0 million pounds or 0%,
- 2021: 0 million pounds or 0%,
- 2022: 0 million pounds or 0%.



DIRECT LOSSES ON U.S. COMMERCIAL WHITE SHRIMP LANDING VALUES

The Mean-Difference model (Fig. 6) estimates total losses in commercial landing values from 2019 to 2022 as follows:

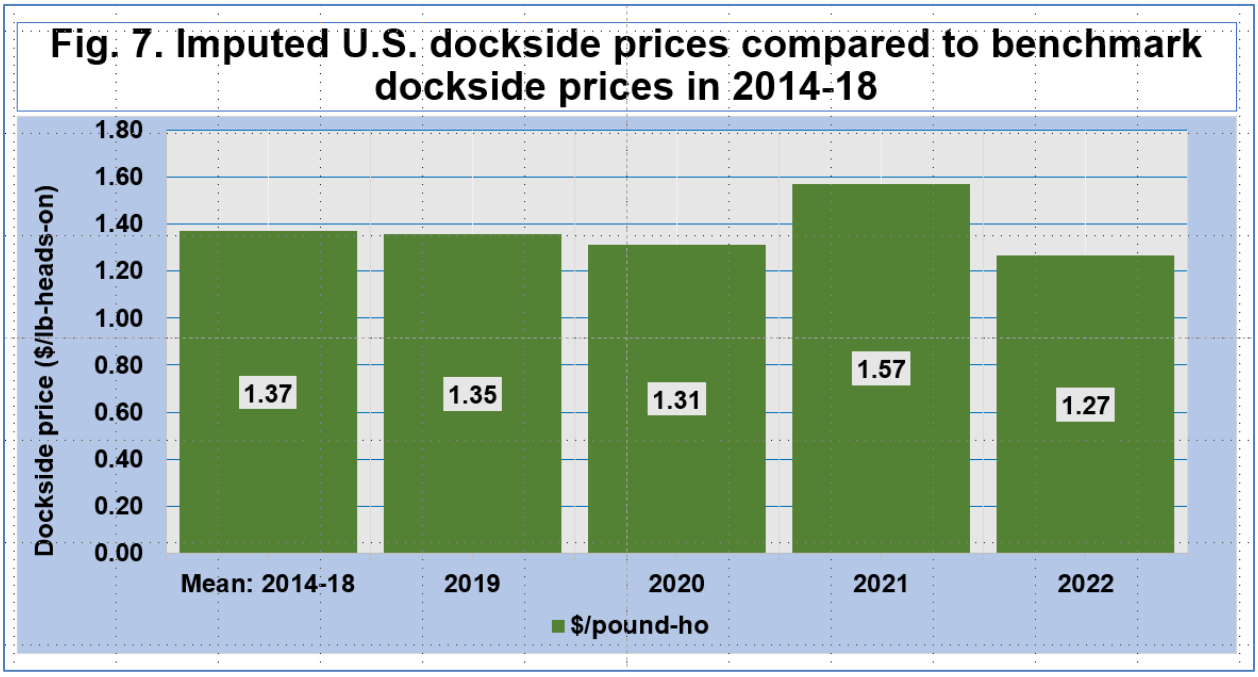
- 2019: $0 million or 0%,
- 2020: $0 million or 0%,
- 2021: $0 million or 0%,
- 2021: $0 million or 0%.



DIRECT LOSSES ON IMPUTED U.S. WHITE SHRIMP DOCKSIDE PRICES

The Mean-Difference model (Fig. 7) estimates total losses in imputed dockside prices from 2019 to 2022 as follows:

- 2019: -$0.01 per pound or -1.1%,
- 2020: -$0.06 per pound or -4.1%,
- 2021: $0.00 per pound or 0.0%,
- 2022: -$0.10 per pound or -7.6%.



ECONOMIC MODEL OF COMMERCIAL WHITE SHRIMP FISHERY

- The economic model of the fishery assumes that commercial landings and dockside values are determined by the following:
    - year, dockside prices, unemployment rates, income growth rate, and diesel prices,
    - the occurrence of disasters, recessions, and global pandemic, and
    - imposition of federal permits and shrimp moratorium.
- The economic model was 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.
- **Direct fishery losses** occur if current values are lower than the projected values.

MARGINAL EFFECTS ON WHITE SHRIMP COMMERCIAL LANDINGS

- Lower dockside prices significantly discouraged commercial fishing.
- Higher unemployment rates significantly reduced commercial landings.
- Trade wars significantly reduced commercial landings.

MARGINAL EFFECTS ON U.S. WHITE SHRIMP LANDING VALUES

- Rising dockside prices significantly enhanced landing values.
- Higher commercial landings significantly raised landing values.

MARGINAL EFFECTS ON U.S. DOCKSIDE PRICES

- Higher commercial landings significantly reduced dockside prices.
- It seems that the requirement to purchase a federal permit significantly dampened dockside price.

SUMMARY, LIMITATIONS, AND IMPLICATIONS OF MEAN-DIFFERENCE MODEL RESULTS

- Direct fishery losses occur if current values are less than the benchmark values.
- When compared to the benchmark period, commercial landings were higher in 2019, 2020, 2021, and 2023.
- A similar comparison of commercial landing values showed that values in 2019-22 were higher than the benchmark period.
- When compared to the benchmark values, the imputed dockside prices fell in 2019, 2020, and 2022.
- The fishery endured declining prices in recent years.

SUMMARY, LIMITATIONS, AND IMPLICATIONS OF THE ECONOMIC MODEL OF THE COMMERCIAL FISHERIES

- Lower dockside prices significantly discouraged commercial fishing.
- Higher unemployment significantly reduced commercial landings.
- Trade wars significantly reduced commercial landings.
- Rising dockside prices significantly enhanced landing values.
- Higher commercial landings significantly raised landing values.
- Higher commercial landings significantly reduced dockside prices.
- It seems that the requirement to purchase a federal permit significantly dampened dockside price.