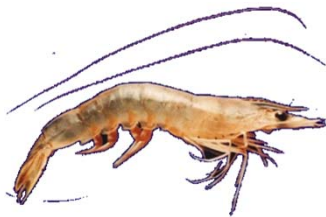


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Response to Request for Risk Assessment of Exceeding Effort Threshold Associated with Sea Turtles

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Gulf of Mexico Fisheries Management Council, Shrimp Committee
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Risk Assessment Request



On July 14, 2016 the GMFMC requested an analysis of the GOM shrimp fishery data to determine the probability of exceeding the total effort threshold (as set in the 2014 biological opinion) associated with sea turtles under each of the alternatives in Amendment 17B, Action 3.

Comparison in each case would be the number of federally permitted vessels vs total effort.

If a quantitative analysis is not possible the Council requested a qualitative assessment of the relative risk of exceeding the sea turtle related effort threshold for each alternative.

Effort in the Fishery

For the purposes of Gulf shrimp fisheries effort estimation, the COLREGS line refers to the specific political line across harbor mouths and inlets for navigation purposes.

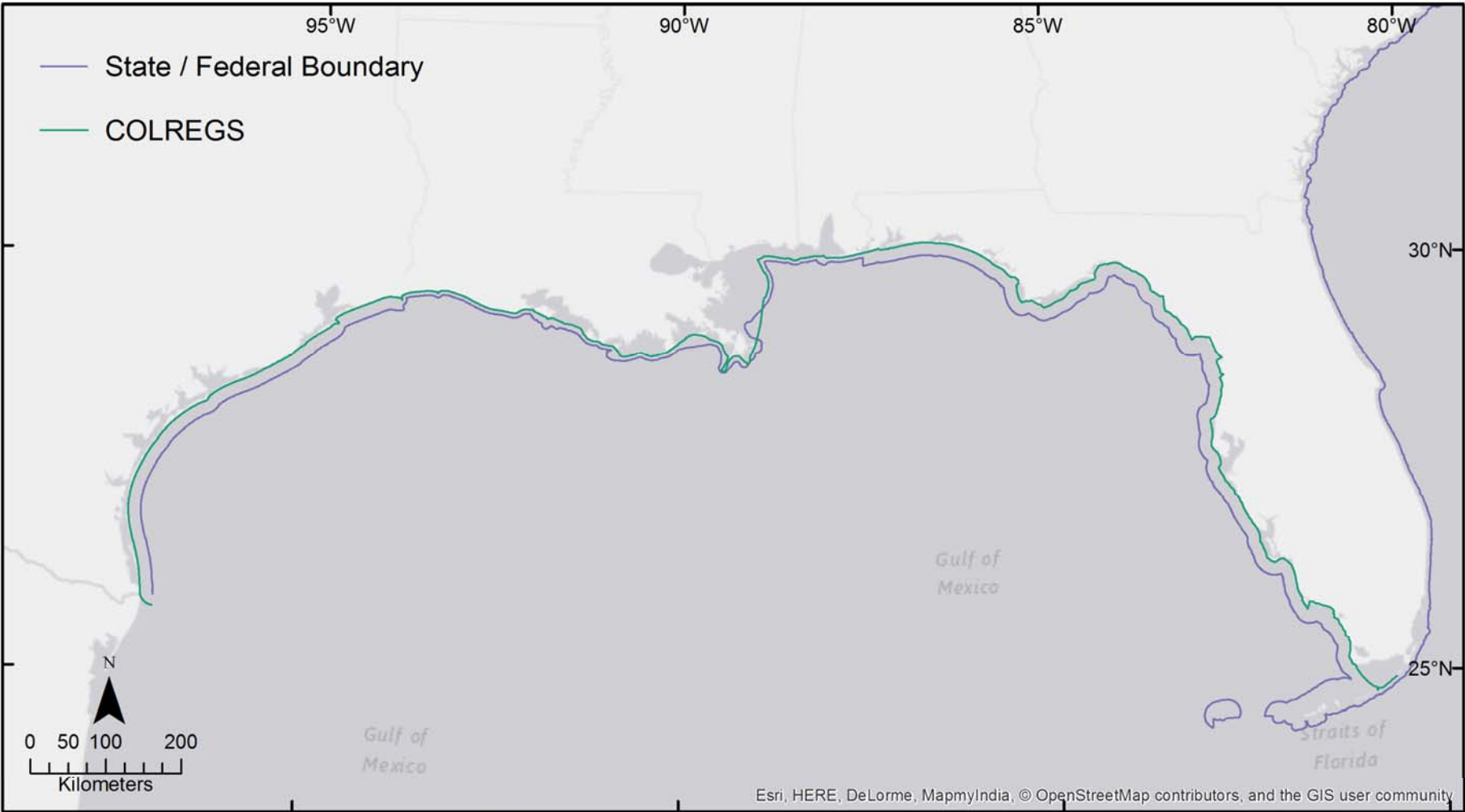
The Gulf shrimp fishery operates:

- Within the **Inshore area**, which is defined as the area from the COLREGS line shoreward
- The **Offshore area**, which is designated as being from the COLREGS line seaward

Hence: Total effort is the combination of both inshore effort and offshore effort.

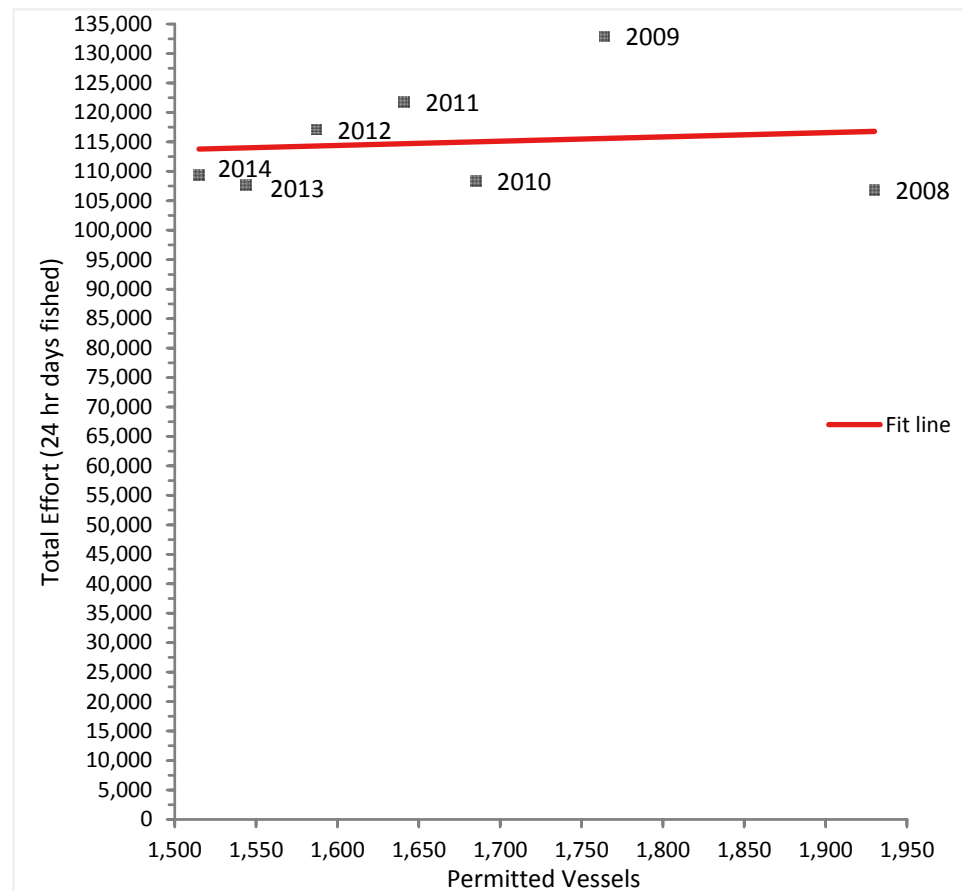
These boundaries **are not** the same as State and Federal waters.

This analysis focused on Inshore and Offshore NOT State and Federal waters.



Quantitative Analysis

- The probability of exceeding the sea turtle related threshold on total effort under the alternatives in Action 3 cannot be determined because there is no statistical relationship between the number of federally permitted vessels and total effort.



Quantitative Analysis cont.

- Even if a relationship did exist, we would not be able to reasonably predict expected total effort in the fishery because future developments in the fishery are highly uncertain, most importantly changes in shrimp prices and fuel prices.
- Lack of a relationship between **total effort** and the number of federally **permitted vessels** was expected because: 1) the number of federal permits does not limit the # of vessels participating or the amount of effort in the inshore fishery and 2) many federally permitted vessels are not active in any given year and only active vessels generate effort.
- Previous analyses examined relationships between **offshore effort** and various measures of **active vessels** (e.g., strong positive correlation between the number of federally permitted vessels active in offshore waters and offshore effort).

Background Info

- Permit Moratorium introduced in March 2007, so we analyzed data from 2008-2014.
- In order to relate total effort to federal permits, it is necessary to: 1) Link offshore effort to all vessels active in offshore waters and 2) Establish the fraction of these active vessels that have federal permits. We must also consider “latent” federally permitted vessels in our assessment.
- The turtle-related effort threshold has been set at approximately 133 thousand nominal days of fishing (i.e., the 2009 level), where a “day fished” equals 24 hours of towing time.
- Between 2008 and 2014, the effort in inshore waters ranged from 35.6 to 56.4 thousand days fished, with an average of 46.9 thousand days fished. The effort in offshore waters ranged from 60.5 to 76.5 thousand days fished, with an average of 67.9 thousand days fished

Qualitative Analysis

Scenario 1

2008-2014

The inshore and offshore fishery generated an average annual effort of 114.8 thousand days fished/year during this time

- ~ 18.2 thousand days below the 2009 turtle-related effort threshold.
- Mean number of active vessels and active permitted vessels were 1657 and 1010, respectively.
- Given mean annual offshore effort of 67.9 thousand days fished, average annual offshore effort was 41 days per active offshore vessel during this time.
- An additional 445 “average offshore” vessels would need to become active in order to exceed the effort threshold. Hence, any federal permit level above 1455 could, mathematically, lead to the effort threshold being exceeded, with all else being equal.

Qualitative Analysis

Scenario 2

Maximum Annual Effort (2009)

The inshore and offshore fishery generated a total of 133 thousand days fished during this year

- 1891 vessels active in offshore waters that year, which is the highest number of active vessels in the offshore fishery during the 2008-2014 time period.
- 1075 had a federal permit and hence could legally harvest shrimp in the EEZ.
- Any federal permit level above 1075 could lead to the threshold being exceeded if economic and biological conditions in this year are experienced in the future. It is only moderately likely the threshold would be exceeded at a permit level at or near 1075 (e.g., the 1074 permits under alternative 2).

Qualitative Analysis

Scenario 3

Most Recent Effort Year (2014)

Total effort equaled 109.3 thousand days fished during this year (35.6 thousand days fished was in inshore and 73.7 thousand days was in offshore waters).

- The number of active vessels in offshore waters was 1616, of which 987 had federal permits.
- Average offshore vessel generated 46 days fished in 2014. It would take an additional 516 “average offshore” vessels entering the fishery to exceed the threshold.
- Federal permit number greater than 1503 could exceed threshold. It is relatively likely these recent economic conditions will be experienced again in the future, and thus these average effort levels will also be experienced,
- Likelihood of exceeding the sea turtle effort related threshold is relatively high under any federal permit level above 1503.

Relative risk of exceeding the turtle effort threshold for each alternative under Action 3 in Amendment 17B to the Gulf of Mexico Shrimp Fishery Management Plan

Alternative	Number of permits	Relative Risk of exceeding sea turtle related effort threshold
1	1,295	Moderate/High
2	1,074	Moderate
3	938	Low
4	882	Low
5a	1,133	Moderate
5b	990	Low
6a	1,501	High
6b	1,470	High
6c	~1,440	High

Caveats

These are “Back of the Envelope” calculations to illustrate the general implications of permit level decisions, but there are multiple counter caveats.

Latent Effort

- Not all latent effort can be realized
- Some vessels hold moratorium permits for non-shrimping reasons
- Accounting for these unused permits would increase the number of permits the fishery can support without exceeding the sea turtle-related effort threshold.

Economic and Biological Factors

- If economic and/or biological factors improve and shrimping becomes more profitable, we expect “latent” federally-permitted and state licensed vessels to become active, and vessels already active to increase their effort. Accounting for these relationships suggests the number of federal permits would need to be lower to avoid exceeding the effort threshold.

Caveats cont.,

Predicting and Partitioning Effort Data

- Measuring, let alone predicting, effort partitioned into state and federal waters in the Gulf (food) shrimp fishery is difficult because the fishery is conducted in politically bounded state-managed inshore and offshore waters, and federally-managed offshore waters (i.e., the EEZ).
- The moratorium on permits only limits potential effort in the EEZ.
- Only the number of federal permits, and hence federally permitted vessels, is limited, not the amount of effort expended by each vessel or the amount of total effort in the fishery.



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