Effects of Increasing Penalties on Compliance with Fishing Regulations

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Abstract: Very little attention has been given to the penalty necessary to achieve compliance with fishery management laws. A penalty increase from $200 to $2,500 for shrimping in the area from 7.3-m deep water to the outer limit of the Texas Territorial Sea was imposed in 1981. Brown shrimp (*Penaeus aztecus*) and white shrimp (*Penaeus setiferus*) commercial catches and shrimping violations were used to determine if this increase reduced illegal shrimping in the closed area. Illegal landings of brown shrimp were reduced. However, violations were not eliminated. The potential profit from violating the law may be exceeding the potential fine, perhaps because of inflation.

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Effective fisheries management depends upon successfully completing several stages, including: collecting and analyzing data, selecting appropriate management measures, and effectuating and enforcing legal regulations (Gulland 1983). While much has been written concerning ways to complete the first 2 stages, little attention had been given to the latter. Financial penalties are typically used to maximize compliance with fishery laws, but with little regard to the level of penalty required to achieve compliance. This applies to the penaeid shrimp fishery in Texas. A recent change in the penalty for landing illegally caught shrimp in Texas provided the opportunity to examine the impact of increasing penalties on compliance. The penalty for landing any shrimp caught in water deeper than 7.3 m in the 9 nmi Texas Territorial Sea (TTS) during a June to mid-July closure to shrimping was increased from $200 to $2,500 on 12 June 1981. However, in water less than 7.3 m deep in the Gulf of Mexico the penalty for landing brown shrimp (*Penaeus aztecus*) remained at $200. White shrimp (*Penaeus setiferus*) caught in this shallow zone could be legally landed. The objective of this study was to determine if this penalty increase improved compliance with the Texas prohibition of shrimping within the closed (no shrimping) portion of the TTS.

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Methods

Changes in shrimping after the penalty increase were determined using commercial landings (catch) data and number of convictions in June only. Data were available only on a monthly basis, and the opening date in July varied among years. Reported brown shrimp and white shrimp commercial landings (catch) from the Gulf of Mexico off Texas (National Marine Fisheries Service (NMFS) statistical areas 18–21) in June were obtained from NMFS, Southeast Fisheries Center, Miami, Florida, for 5 years before and 4 years after the penalty increase. These data are based on landings observed by NMFS and catch locations reported by the fishermen. Landings for each species from the 0–7.3 m depth zone in all NMFS statistical areas and from the 7.3–18.3 m zones (areas 18 and 19, north of Aransas Bay) and the 7.3–27.4 m zones (areas 20 and 21, south of Corpus Christi) were compared graphically by year. If the increased penalty had no effect on the shrimpers' activity, the patterns seen before and after the increase should be similar. The number of convictions for shrimping violations in Texas Territorial Sea during each June from 1979 through 1984 was obtained from Captain William Walker, Law Enforcement Division, Texas Parks and Wildlife Department. Again, if the penalty had no effect, total convictions should not change.

Results

The penalty increase from $200 to $2,500 reduced landings of brown shrimp. However, violations were not eliminated. Reported brown shrimp and white shrimp landings in June from water beyond the 7.3-m depth area (no shrimping area) decreased dramatically and approached zero after the penalty increase (Figs. 1, 2). Reported landings of both species from within the 7.3-m depth area (where penalty was not changed) increased. Brown shrimp from this shallow area were illegal, but white shrimp landings were legal. Convictions for shrimp violations within the Territorial Sea during June declined from about 130 annually, before the 1981 penalty increase, to 39 in 1984 (Table 1). However, the number of convictions in 1983 approximated those obtained before 1981.

Discussion

Penalties must be sufficiently high to offset profits received by most fishermen who violate harvest restrictions if they are to be effective for fisheries managers. The $200 penalty was apparently exceeded by the potential profit of illegal harvest or negated by the low probability of being caught, convicted, and fined. However,

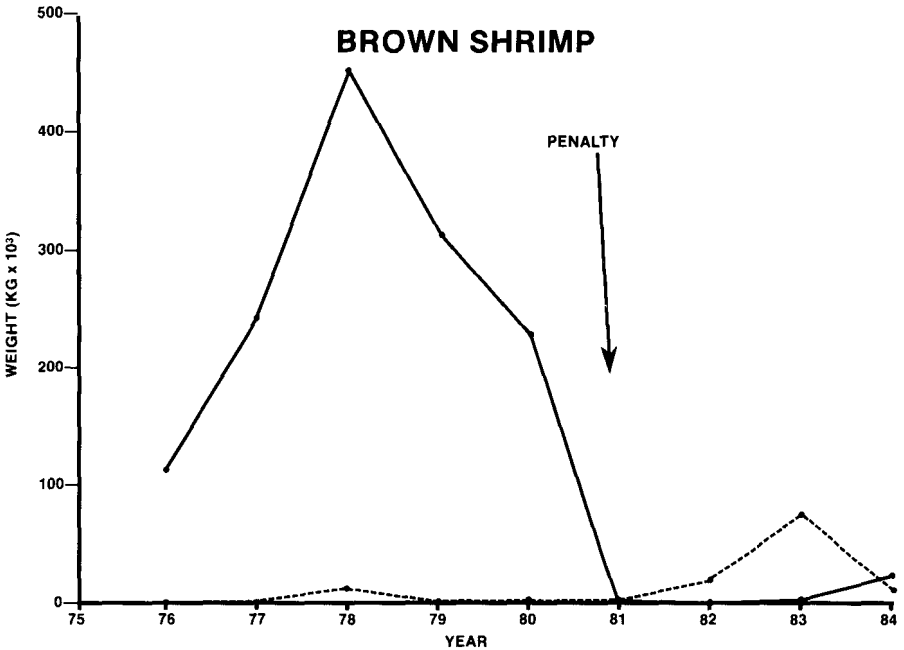

Figure 1. Weight of brown shrimp reported landed commercially from the Texas Territorial Sea from water ≤7.3-m deep (dashed line) and water ≥7.3-m deep (solid line) before and after the penalty for retaining brown shrimp beyond 7.3-m deep water was increased from $200 to $2,500.

Table 1. Number of convictions obtained from shrimping violations in June in the Texas Territorial Sea (from Capt. William Walker, Law Enforcement Division, Texas Parks and Wildlife Department).

Year	Convictions
1979	137
1980	123
1981	98
1982	78
1983	115
1984	39

Figure 2. Weight of white shrimp reported landed commercially from the Texas Territorial Sea from water ≤7.3-m deep (dashed line) and water ≥7.3-m deep (solid line) before and after the penalty for retaining brown shrimp beyond 7.3-m deep water was increased from $200 to $2,500.

the increase from $200 to $2,500 in 1981 for shrimping beyond the 7.3-m depth area within State waters appears to have been sufficiently high for 3 years to eliminate almost completely the brown shrimp harvest from this area. No data are available to determine the relative difference among the potential $2,500 fine; the potential profit from violating the law; or the probability of being caught, found guilty, fined, and actually paying the penalty. These data are necessary to determine what the penalty should be as conditions change.

The penalty increase to $2,500 was not 100% effective. Shrimp landings from the closed area with the higher penalty increased in 1984 over the previous 3 years. About 20,000 kg of brown shrimp and 7,000 kg of white shrimp were reported landed in the closed area in 1984. However, the number of convictions in 1984 was at the lowest level (39) seen during the 6-year period. This may indicate that it is again becoming profitable for some to risk being caught, prosecuted, and fined for shrimping in closed waters. Perhaps this is because inflation has increased the price of shrimp and decreased the real value of the penalty. The average price per kilogram for shrimp increased about 18% between 1981 and 1984 (Osburn et al. 1985).

The weight landed from the closed area in each year is probably an underesti-

mate. The reported estimate relies on shrimpers identifying the areas fished, and the reliability of these data is unknown. White shrimp landings support this conclusion. White shrimp landings within the 7.3-m depth area were higher after 1981 than in the previous 5 years perhaps because shrimpers reported catches from the closed area as having been made in the open area. This increase is not the result of increased shrimp availability (Fuls 1986). However, increased effort in the open area may account for increased landings, but this cannot be examined because no scientific observations of spatial distribution of effort exist.

Some of the brown shrimp landings from beyond the 7.3-m depth zone in the TTS may have been legal. The depth limits used in this study to delineate the TTS in statistical area 18 to 19 also included part of the federal Fishery Conservation Zone (FCZ) which was open to shrimping before 1981. So, shrimp caught in the FCZ in depths we considered to be totally within the TTS were legally retained. However, the amount is probably small because the surface area of the portion of the FCZ is small and shrimp were more abundant in the TTS than beyond during each June (Benefield et al. 1983).

Literature Cited

Benefield, R. L., T. J. Cody, B. E. Fuls, and P. C. Hammerschmidt. 1983. Monitoring of coastal shellfish resources, January–December 1982. Texas Parks and Wildl. Dep., Coast. Fish. Branch, Manage. Data Ser. No. 55. Austin. 75pp.

Fuls, B. E. 1986. Relative availability of white shrimp within the 18.3-m depth zone of the Gulf of Mexico. Texas Parks and Wildl. Dep., Coast. Fish. Branch, Manage. Data Ser. Austin. (in preparation).

Gulland, J. A. 1983. Managing fisheries in an imperfect world. Pages 179–194 *in* B. J. Rothschild, ed. Global fisheries perspectives for the 1980's. Springer-Verlag. N.Y. 289pp.

Osburn, H. R., G. E. Saul, and C. L. Hamilton. 1985. Trends in Texas commerical fisheries landings, 1977–1984. Texas Parks and Wildl. Dep., Coast. Fish. Branch, Manage. Data Ser. No. 84. Austin. 95pp.