Quantification of National Marine Fisheries Service Habitat Conservation Efforts in the Southeast Region of the United States

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Introduction

"All I want to do is dredge and fill one or two acres of marsh and shallow water for my housing project. Surely this small amount can't hurt anything when there are 15 million acres out there."
—*Land developer.*

"We recognize that the dredging and spoiling associated with our proposed access canal will destroy eight acres of marshland, but the Nation needs the oil and there are millions of acres of marshland out there."
—*Oil company representative.*

These are typical statements heard almost daily by National Marine Fisheries Service (NMFS) biologists when permit applicants learn from the U.S. Army Corps of Engineers that NMFS has recommended that their proposed projects be modified to reduce adverse effects on fishery habitat, or denied altogether.

Granted, most small development projects, when considered individually, would not substantially affect fishery resources. However, the collective loss associated with numerous projects raises valid questions that resource managers must answer: How much of each habitat type is proposed for destruction or alteration each year? Where is it located? How much habitat is actually permitted to be lost? What are the cumulative effects of these habitat alterations on fishery resources?

The NMFS Environmental Assessment Branch (EAB) is collecting data to help answer these questions as they relate to to NMFS involvement in the Corps of Engineers permitting program. In this paper we summarize data collected during the first year (October 1980-September 1981) that NMFS has quantified its recommendations. The need for these data is explained and the interaction between the NMFS Southeast Fisheries Center (SEFC) and Southeast Regional Office (SERO) is discussed.

Background

The NMFS Southeast Regional Office and Southeast Fisheries Center are responsible for the protection, management, and development of marine fisheries and their habitat from North Carolina to Texas and Puerto Rico and the U.S. Virgin Islands. This area, which includes both the territorial seas and the Fishery Conservation Zone out to 200 miles (Fig. 1), contains about 29,900 miles of tidal shoreline (Shalowitz, 1964) and 17.2 million acres of marsh/estuarine habitat. The more than 300 estuarine systems represent about 60 percent of the total remaining estuarine habitats in the contiguous United States, and 46 percent of the total including Alaska.

The immense importance of estuarine-marine habitat to commercial and recreational marine fisheries in the Southeast is well documented (Smith, et al., 1966; Lauff, 1967; Jackson, 1969; Douglas and Stroud, 1971; Chabreck, 1973; Thayer et al., 1975; Turner, 1977; Peters et al., 1979; Hoss and Hettler, 1981; Thayer and Ustach, 1981). The majority of species important to commercial and recreational

ABSTRACT — Fiscal year 1981 (October 1980-September 1981) was the first year the National Marine Fisheries Service quantified the cumulative acreage of habitat involved in the Corps of Engineers permit program in the Southeast Region of the United States. NMFS made recommendations on 1,380 permit applications involving 17,969 acres. Of that total, 18 percent was proposed for dredging, 36 percent for filling, and 46 percent for impounding. NMFS did not object to alteration of 4,598 acres, recommended against altering 13,371 acres, and recommended that 3,324 acres either be restored or modified from upland habitat to mitigate the losses that were permitted. NMFS recommendations were incorporated into permits in 98 percent of the cases. Compliance with permit conditions ranged from 100 percent in the Charleston and Savannah Districts to 36 percent in the Mobile District. Because NMFS recommendations are based heavily on state-of-the-art information provided by its research laboratories, the relationship between the NMFS Southeast Regional Office and Southeast Fisheries Center laboratories is discussed briefly.

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fisheries reproduce, grow, and are ultimately harvested in estuaries.

The complex of fisheries habitat, which extends from the freshwater-saltwater interface to the oceanic pelagic and benthic habitats (including inshore and offshore reefs and rocky outcroppings which support a valuable reef-fish fishery), is being threatened by many human activities. These include municipal and industrial waste disposal, water diversion through damming and channelizing, dredging and filling, real estate development, marine transportation, and mineral and energy exploration and production. Projected industrial development and population growth for the Southeast Region dictate that continued adverse effects on fisheries habitats be minimized or reversed if fisheries production is to be maintained or increased.

NMFS efforts toward conservation of estuarine habitat represent the cornerstone of marine fishery management in the Southeast Region, since about 96 percent of commercial and over 50 percent of recreational fishery landings in the Southeast Region consist of fish and shellfish that use the estuary for part or all of their lives. The commercial yield of these species in the Southeast Region was about 43 percent of U.S. landings for all fisheries for 1978-80, and included the top poundage fishery (menhaden) and the most economically valuable fishery (shrimp). The marine recreational yield constituted about 58 percent of the total recreational landings in the United States.[1]

In a typical year, the U.S. Army Corps of Engineers sends about 6,000 permit applications to the NMFS Southeast Regional Office for review. This does not include large projects authorized by Congress, such as ship and barge channels, dams, and hurricane levees. By law, NMFS is required to assess the potential impacts each project may have on fishery resources and to recommend whether the project be approved, denied, or modified. The validity of this assessment process is directly related to availability of scientific information to document the effect of habitat alterations on the productivity.

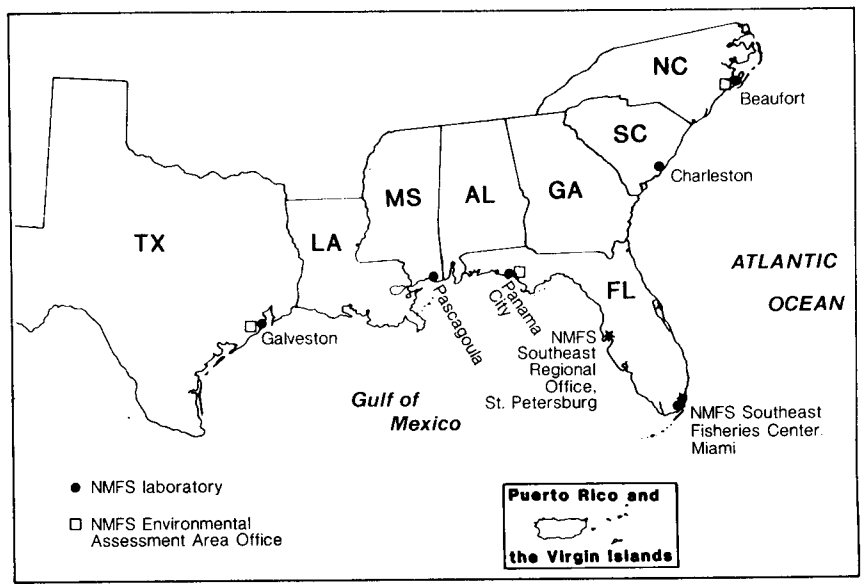

Figure 1.—Location of NMFS Laboratories, Environmental Assessment Offices, and Regional and Center headquarters in the Southeast Region.

The EAB, having no independent research capacity, relies on SEFC laboratories and state fishery agencies for information. Since available information is incomplete or imperfect, it is impossible to judge the quantitative importance of fishery habitats and to predict the potential loss to fishery production caused by alteration, loss, or degradation of habitat. Quantitative estimates of such losses cannot be made with assurance until the limits of fishery production in unaltered habitats are known.

To fulfill its environmental assessment responsibility, SERO has 14 fishery biologists strategically located in four offices (Fig. 1). Four biologists in the Galveston, Tex., office cover coastal Texas and Louisiana; five in the Panama City, Fla., office cover coastal Mississippi, Alabama, Florida, Puerto Rico, and the Virgin Islands; three in the Beaufort, N.C., office cover coastal North Carolina, South Carolina, and Georgia; and two in the Regional Office, St. Petersburg, Fla., are responsible for overall program management. Since this staff is not large enough to conduct all necessary site reviews of both the permitted and congressionally authorized projects, NMFS relies on private contractors to provide site-specific information on which to formulate recommendations.

Because the EAB's recommendations on permit applications must be based on state-of-the-art research data to be valid and defensible, there is close cooperation between EAB staff and estuarine research personnel in the SEFC. The EAB not only uses SEFC publications for data but also consults directly with researchers as the need arises. One example of this cooperation is the joint development of guidelines and criteria used by the EAB in evaluating proposed projects. Another is the technical advising and counseling

[1]Southeast Fisheries Center. 1980. AECOS, alterations of estuarine-coastal-oceanic systems, a comprehensive regional program of ecological research, monitoring and information synthesis to provide decision-makers with the scientific information needed to conserve habitats of living marine resources. Report on file at Southeast Fisheries Center, NMFS, NOAA, Miami, Fla., 64 p.

of EAB biologists by SEFC staff regarding expert testimony in court cases; SEFC staff occasionally are called on to provide scientific testimony. SEFC staff also have incorporated EAB information needs into ongoing research projects.

The SEFC Habitat Program, headquartered at the Beaufort Laboratory in North Carolina, is the major environmental research element of NMFS in the Southeast Region. This program has research efforts at both the Beaufort Laboratory and Galveston Laboratory in Texas. The Beaufort Laboratory's Division of Estuarine and Coastal Ecology provides the major NMFS support to the EAB through expert testimony in court cases and technical advice in scientific matters concerning coastal and estuarine processes. The Division conducts several closely related programs concerned with aspects of fisheries ecology in the Southeast Region and with effects of contaminants (primarily heavy metals) and habitat loss on ecologically and economically important species.

Division personnel are working under contract with the Coastal Engineering Research Center of the U.S. Army Corps of Engineers, Fort Belvoir, Va., to evaluate the potential of using submerged seagrasses to stabilize subtidal disposal areas. This effort, concerned with mitigation and enhancement, is to our knowledge the only such research now conducted by the NMFS. The Environmental Research Division at the Galveston Laboratory manages contracts concerned with the influence of energy-related activities on shrimp and reef fish in the northwestern Gulf of Mexico. Details of research activities of these and other SEFC research programs can be obtained from SEFC Program Plans published yearly by the SEFC.

In early 1980, the EAB began developing a system to document its efforts in conserving habitat in the Corps permitting program. The system, designed for computer processing, is based largely on a wide variety of information from reports of contractors, including: Permit application numbers; date and applicant's name; project type, purpose, and location; habitat type (e.g., marsh species, bottom type); area (acres) proposed to be dredged, filled, or impounded; area NMFS recommended be conserved or did not object to its being altered; and NMFS recommended mitigation or compensation. The results of the first year's attempt at quantification are summarized in the next section.

Results

For the period 1 October 1980-30 September, 1981, the EAB received 6,399 permit applications from the Corps of Engineers for review and comment. Of these, 4,651 (73 percent) were given a "no objection" response because impacts were determined to be minimal, based on guidelines and criteria developed by EAB and SEFC personnel (available from the St. Petersburg office), and 1,380 (22 percent) were assigned to contractors to gather on-site information. The remaining 368 (5 percent) were not assessed because of insufficient manpower to process them, or because the public notice indicated that the Corps of Engineers would not consider recommendations other than those concerning navigation and national security.

Table 1 summarizes NMFS habitat conservation efforts, by state, in terms of the number of permit applications assigned to contractors for field review (column 1) and the acreage of habitat involved in dredging, filling, impounding, and mitigating. Region-wide quantification of each of these categories is described briefly below.

Dredging

Nearly 3,200 acres were proposed for dredging during fiscal year 1981 (Table 1, column 2). Over 80 percent of this acreage was in three states: Louisiana (38 percent), Texas (25 percent), and Florida (18 percent). NMFS did not object to dredging 1,846 acres (column 5), but recommended against dredging 1,351 acres (column 8), the

Table 1.—Number of proposed projects and acres of habitat involved in NMFS habitat conservation efforts from October 1980 to September 1981, by state. Numbers in parentheses refer to columns discussed in text.

State	No. of permit applications (1)	Acreage proposed by applicants			Acreage NMFS allowed or did not object to			Potential acreage conserved			Mitigation recommended by NMFS	
		Dredge (2)	Fill (3)	Impound. (4)	Dredge (5)	Fill (6)	Impound. (7)	Dredge (8)	Fill (9)	Impound. (10)	Restore acreage (11)	Generate acreage (12)
Louisiana	214	1,218.4	2,786.3	5,637.9	824.0	1,590.8	0	394.4	1,195.5	5,637.9	422.9	713.0
Texas	136	798.7	971.0	1.154.6	684.1	576.3	150.5	114.6	394.7	1,004.1	1,858.9	25.5
Mississippi	53	71.9	191.7	<0.1	53.6	0.7	0	18.3	191.0	<0.1	4.0	17.0
Alabama	74	81.1	1,117.6	50.0	47.4	3.3	0	33.7	1,114.3	50.0	30.4	4.3
Florida	598	588.0	1,008.6	0.7	143.9	261.7	0	444.1	746.9	0.7	87.0	47.4
Georgia	39	181.4	30.1	0	31.1	4.9	—	150.3	25.2	—	3.1	2.7
South Carolina	134	107.4	105.4	1,451.5	30.3	8.7	0	77.1	96.7	1,451.5	4.8	9.8
North Carolina	115	130.5	45.0	41.7	25.3	16.4	26.7	105.2	28.6	15.0	42.7	0
Puerto Rico	17	20.1	179.8	0	6.5	111.5	—	13.6	68.3	—	50.9	0
Virgin Islands	0	—	—	—	—	—	—	—	—	—	—	—
Year total	1,380	3,197.5	6,435.5	8,336.4	1,846.2	2,574.3	177.2	1,351.3	3 861.2	8,159.2	2,504.7	819.7

majority of which were in Florida (33 percent) and Louisiana (29 percent).

Filling

Filling was proposed on 6,435 acres (column 3): 43 percent in Louisiana, 18 percent in Alabama, 16 percent in Florida, and 15 percent in Texas. The NMFS did not object to fill on 2,574 acres (column 9). Thus, the NMFS recommended against permit issuance on 60 percent of the acreage proposed, nearly all of which was in Louisiana (31 percent), Alabama (29 percent), Florida (19 percent), and Texas (10 percent).

Impounding

Regionwide, 8,336 acres were proposed for impounding (column 4). Except for Georgia, Puerto Rico, and the Virgin Islands, impoundments were proposed in every state and ranged from less than 0.1 acre in Mississippi to more than 5,600 acres (about 9 square miles) in Louisiana. The NMFS recommended against all but 177 acres (2 percent of total proposed), all of which were in Texas and North Carolina (column 7). The total area protected from potential impoundment was 8,159 acres.

Mitigation

To offset habitat altered or destroyed by project construction (columns 5, 6, and 7), the NMFS recommended that 2,504 acres be restored and 819 acres modified to productive estuarine habitat from nonestuarine habitat (columns 11 and 12). Seventy-four percent of the acreage recommended for restoration was in Texas; 87 percent recommended for generation was in Louisiana. An example of this habitat generation is the creation of an intertidal area by grading an upland area (Lindall et al., 1979).

Cumulative Totals

Collectively, 17,969 acres were proposed to be dredged, filled, or impounded in the region (columns 2 + 3 + 4). Over one-half (9,642 acres) was in Louisiana. The NMFS did not object to alteration of 4,598 acres (columns 5 + 6 + 7), or about 26 percent of the total proposed, but recommended against alteration of 13,371 acres (columns 8 + 9 + 10). To offset permitted habitat losses, the NMFS recommended restoration and modification of 3,324 acres (columns 11 + 12). Thus, NMFS efforts conserved 16,695 acres of habitat over the year through a combination of recommending against unnecessary alteration and recommending mitigation associated with permitted alterations (i.e., those determined by the Corps to be in the public interest).

Impact of NMFS Recommendations

Our data document for the first time the magnitude of coastal fishery habitat involved in the Federal permitting process in the southeastern region of the United States and demonstrate that substantial quantities of habitat that sustain the nation's fishery resources can be protected if NMFS recommendations are implemented. However, the summary data do not show the extent to which NMFS recommendations are followed.

Logical questions arise: Are NMFS recommendations accepted and, if so, are they incorporated into issued permits? When the recommendations are incorporated into the permits, does the permit holder comply with them?

To determine if NMFS recommendations had been incorporated, 110 permits issued in the region since 1978 were randomly selected from the Corps' seven district offices to compare the issued permits with NMFS recommendations. Each project site was visited, and the results are summarized in Table 2. Of the 110 permits reviewed in the follow-up, NMFS recommendations had been incorporated into 108 (over 98 percent). Of the 80 projects completed or underway (30 had not yet begun), at least 58 (73 percent) complied with permit conditions and 14 (18 percent) did not. Corps enforcement personnel, notified of the violations, indicated they would take appropriate action. The remaining 8 (entered in Table 2 as unknown) are permits for oil and gas development in Louisiana and have been conditioned to require restoration upon abandonment of the well site (i.e., remove spoil from the marsh and return it to the canal). In these cases, compliance cannot be determined in advance.

Our basic data represent a conservative measure of our success in protecting the fishery habitat. Knowing that the NMFS position is one of strong opposition to unnecessary alteration, an increasing number of potential permit applicants consult with NMFS (either through personal meetings or through written requests for guidelines and criteria) prior to solidifying their plans and applying for a Corps of Engineers permit. Although the amount of habitat conserved through this pre-application process cannot be measured, it is undoubtedly large.

Another area of habitat conservation not reflected in our data is NMFS

Table 2.—Summary of Corps of Engineers acceptance of NMFS recommendations and applicants' compliance with permit conditions (by Corps District).

Corps District	No. of permits reviewed	NMFS recommendations incorporated in permit		Project Status		Applicants complied with permit conditions	
		Yes	No	Completed or underway	Not yet begun	Yes	No
Galveston	14	14		8	6	7	1
New Orleans	19	19		17	2	9	Unknown
Mobile	18	17	[1]1	14	4	5	9
Jacksonville	15	14	[2]1	12	3	11	1
Savannah	5	5		3	2	3	0
Charleston	15	15		7	8	7	0
Wilmington	24	24		19	5	16	3
Total	110	108	2	80	30	58	14

[1]Wording in permit was vague, thus allowing applicant to exceed boundaries of NMFS recommendation.
[2]NMFS notified, but chose not to appeal because of mitigation measures performed by the applicant.

involvement in the review of Congressionally-authorized Federal projects, which often extend over several years from initial planning to project completion. Again, the amount of habitat conserved is difficult to measure accurately, but the acreage that can be conserved or lost is potentially large. For example, the NMFS is presently attempting to convince the Corps of Engineers to prohibit filling of nearly 2,300 acres of Nueces Bay, Tex., with spoil from the Corpus Christi Ship Channel. The habitat that could be lost in this single Federal project is more than twice that in all of the proposed permitted projects on the Texas coast from October 1980 through September 1981.

Conclusions

The NMFS has been very effective in getting its conservation recommendations included in Corps of Engineers permits, but only partially effective in achieving compliance. About one in five projects investigated were in violation of permit conditions. Among the Corps of Engineers' Districts, the percentage of violations ranged from zero in the Charleston and Savannah Districts to 64 percent (9 of 14) in the Mobile District. Violations ranged from minor discrepancies to total disregard of permit conditions (i.e., constructing the project as originally proposed, despite permit conditions). The NMFS is working with the Corps of Engineers to resolve the problem of permit violations and will continue to follow-up on at least 100 projects each year.

The cumulative acreage associated with numerous small projects is considerable, and more information is needed on the kinds of habitat involved so that trends in alteration by habitat type can be tracked. The NMFS Southeast Regional Office is presently adding this capability to the present data base and associated computer program.

Finally, the quantitative relationship between habitat and fishery production needs to be known so that the changes in fish and shellfish production resulting from habitat alteration can be accurately predicted. Research at SEFC laboratories is helping to provide this information. One commonly cited estimate of the annual value of an estuary to commercial and recreational fisheries is $100/acre, which is equal to $2,000/acre capitalized at 5 percent (Gosselink, et al., 1974). Thus, the habitat preserved as a result of NMFS recommendation is worth, on the basis of these figures, over $33 million (16,695 acres × $2,000) to the commercial and recreational fishing industries of the southeastern United States.

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