NATIONAL ESTUARINE INVENTORY

Living Marine Resources Component

West Coast

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Strategic Assessment Branch
Ocean Assessments Division
Office of Oceanography and Marine Assessment
National Ocean Service
National Oceanic and Atmospheric Administration
Rockville, MD 20852

MISSION

The Strategic Assessment Branch (SAB) is one of three branches of the Ocean Assessments Division (OAD), Office of Oceanography & Marine Assessment, National Ocean Service, National Oceanic and Atmospheric Administration. The mission of SAB is to conduct comprehensive, interdisciplinary assessments of multiple resource uses for the Nation's exclusive economic zones (EEZ) to determine marine resource development strategies that will result in maximum benefit to the Nation with minimum environmental damage or conflicts among uses. To accomplish this goal, SAB evaluates existing and projected oceanic resource demands in terms of level of use, resource availability, pollution discharges, potential environmental impacts and use conflicts, and maintains comprehensive, national inventories of coastal and oceanic resources and their existing and proposed uses. SAB develops strategic assessment methods and maintains an operational capability with which to evaluate the environmental and economic effects of national policies and management strategies affecting coastal and ocean resources.

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LIVING MARINE RESOURCES COMPONENT

INTRODUCTION

This paper describes briefly a project that is being undertaken to develop information on the distribution and abundance of living marine resources in the Nation's estuaries. Compiling this information is part of NOAA's efforts to develop a National Estuarine Inventory and a data base that can be used eventually to conduct comprehensive assessments of estuaries throughout the USA. The first major product of this effort, the National Estuarine Inventory Data Atlas, was published in November 1985 (SAB, 1985).

The atlas is the first of two volumes which presents information through maps and tables on important physical and hydrologic characteristics for 92 of the Nation's most important estuaries. The estuaries identified in this inventory account for approximately 90 percent of the estuarine water surface area along each of the three coastal regions of the contiguous USA and 90 percent of the freshwater inflow. Volume II will present land use information for each estuarine system.

Estuaries are critically important to sustaining the health of most living marine resources in the coastal areas of the USA, particularly during early life stages. It is estimated between 66-90 percent of commercially important fishes and invertebrates are estuarine dependent at one time in their life cycle. Compiling information on the distribution of living marine resources in estuaries is an important step in developing further NOAA's capabilities to conduct comprehensive assessments of the Nation's estuaries. This information will complement that already compiled in the data atlas and enable comparisons, rankings, and other analyses among species and estuaries to be conducted.

PROJECT OVERVIEW

The project is being conducted in three phases to coincide with the three coastal regions of the contiguous USA (excluding the Great Lakes). Phase one will cover the West Coast; phase two, the Gulf of Mexico; and phase three, the East Coast. The preliminary component of phase one, now underway, is to assess the overall project feasibility by compiling information on the distribution and abundance for a limited number of fishes and invertebrates for several West Coast estuaries. Information is being collected through literature reviews, consultation with local and regional fisheries experts, and use of fisheries data compiled by the National Marine Fisheres Service, U.S. Fish and Wildlife Service, and NOAA's Ocean Assessments Division (OAD) through its series of strategic assessment data atlases (Ehler and Basta, 1984). A particularly important information

source during the project's initial stages for the West Coast is species life history information compiled for OAD's Gulf of Alaska and West Coast Data Atlas. This project is also currently under way and is developing comprehensive life history information for approximately 75 coastal fishes and invertebrates. Many of these species are also found in or utilize estuaries and will be included in this present study.

Distribution and abundance data are being compiled for 10-15 species of fishes and invertebrates in nine West Coast estuaries (preliminary component of phase one). Although some species occur in more than one estuary, such as salmonids in Pacific Northwest estuaries, this repetition is necessary for comparative analyses between estuaries and regions. For example, systems that have similar physical and hydrologic characteristics will be analyzed to determine if major differences in species composition and stock size exists. However, not all species will occur in all estuaries.

Experience gained in this preliminary exercise will be valuable for finalizing overall plans to complete data compilation for each of the 92 estuaries included in the National Estuarine Inventory as well as identifying additional species and estuaries to be added to the inventory.

Selected Estuaries

Nine of the 17 West Coast estuaries in the National Estuarine Inventory, have been selected to compile preliminary data on specified fishes and invertebrates (Figure 1). They are:

1. Hood Canal
2. Grays Harbor
3. Columbia River
4. Coos Bay
5. Humboldt Bay
6. Eel River
7. San Francisco Bay
8. Santa Monica Bay
9. San Diego Bay

These estuaries were selected because they represent: (1) a wide range of physical characteristics, (2) a wide diversity of surrounding land uses, (3) the large geographic area represented by this region and its estuaries, and (4) variability in species composition.

Selecting the Species

Four criteria have been identified for selecting fishes and invertebrates to incorporate into the data base: (1) commercial value, (2) recreational value, (3) ecologic value, and (4) indicator of environmental stress. They serve as general

Figure 1. Estuarine Drainage Areas of the National Estuarine Inventory

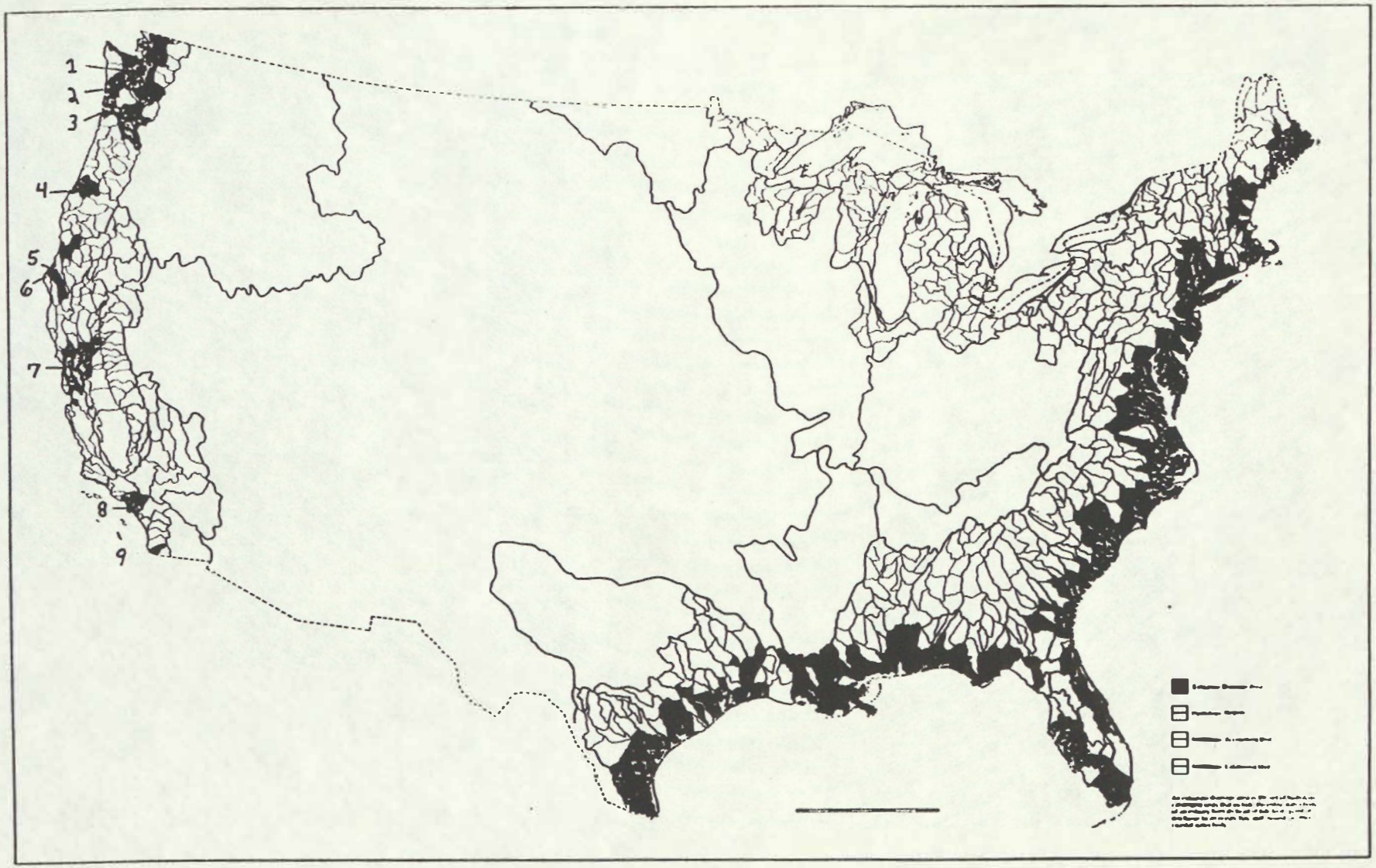


Table 1

West Coast Preliminary Species List and Selection Criteria

Species	Commercial	Recreational	Indicator	Ecological	Locally Important
Coho Salmon *Oncorhynchus kisutch*	X	X			
Sockeye Salmon *Oncorhynchus nerka*	X	X			
Chinook Salmon *Oncorhynchus tshawytscha*	X	X			
Starry Flounder *Platichthys stellatus*	X	X	X		
Pacific Herring *Clupea harengus pallasii*	X	X			
Striped Bass *Morone saxatilis*		X			
California Halibut *Paralichthys californicus*	X	X			
Kelp Bass *Paralabrax clathratus*		X			
Dungeness Crab *Cancer magister*	X	X			
Pacific Oyster *Crassostrea gigas*	X				
Pacific Littleneck Clam *Protothaca staminea*	X	X			
Pismo Clam *Tivela stultorum*		X			

guidelines for selecting species. A species may be selected by meeting an individual or combination of criteria. A final species list for West Coast estuaries will be developed after evaluating the preliminary data collected and discussions with regional experts. The species selected will aid ultimately in assessing the health of the Nation's estuaries. The preliminary species selected are listed in Table 1. Table 2 lists the West Coast "target" species identified for study in NOAA's West Coast Status and Trends monitoring program (OAD, 1986). These bottom fishes are indicators of local pollution and will be included in the final species list for the West Coast.

Table 2. Status and Trends Target Species

1.¡ Barred Sand Bass (Paralabrax nebulifer)¡
2.¡ White Croaker (Genyonemus lineatus)¡
3.¡ Hornyhead Turbot (Pleuronichthys verticalis)¡
4.¡ Diamond Turbot (Hypsopsetta guttulata)
5.¡ Spotted Turbot (Pleuronichthys ritteri)¡
6.¡ English Sole (Parophrys vetulus)¡
7.¡ Starry Flounder (Platichthys stellatus)¡
8.¡ Pacific Staghorn Sculpin (Leptocottus armatus)¡

The criteria used to select species are explained further below:

Commercial Value - The commercial value of a species is determined by reviewing catch and value statistics from the National Marine Fisheries Service. In addition, the relative commercial importance of a species within an estuary, a coastal region, and the contiguous USA is considered.

Recreational Value - A recreational species is defined as a species that fishermen specifically try to catch which may or may not be commercially important. Recreational species are being determined by consulting regional fisheries experts. In addition, for some estuaries species of local recreational value, but otherwise unimportant, will be identified.

Indicator of Environmental Stress - Species that are indicators of environmental stress are being identified from the literature, discussions with fisheries experts, and from monitoring programs such as NOAA's Status and Trends Program and the National Shellfish Register (NOAA and FDA, 1986). They are often mollusks or bottomfish that consume benthic and epibentic invertebrates. Their physiological disorders, morphological deformities, and bioaccumulation in tissues and organs of contaminants, such as metals, PAHs, and PCBs indicate pollution episodes. This criterion will aid in assessing the water and sediment quality of a specific estuary.

Ecologic Value - The ecologic value of a species is based on several attributes, including trophic level relative to food chain interactions, resource competition, relative abundance, and fraction of ecosystem biomass. This criterion permits a species to be selected based on its importance to the ecology and productivity of an estuary.

DATA TO BE COLLECTED

Data Selection

Compiling consistent species data for 92 estuaries limits the amount of information and number of fishes and invertebrates that are possible to study. Information must be readily available from existing data sources. The data being collected on each species include: (1) the salinity zone they occupy-seawater, mixing, and/or tidal fresh; (2) their temporal distribution throughout those zone(s); and (3) the species life history stage in a particular zone (example Table 3). The boundaries and salinity regimes of those zones are shown in Volume 1 of the National Estuarine Inventory Data Atlas. In addition, this preliminary study will attempt to refine the criteria for determing relative abundance . The current criteria for determining relative abundance are:

1) General Distribution - the species is usually present in this area.

2) Abundant - a moderate concentration of the species is present in this area.

3) Highly Abundant - a very high concentration of the species is present in this area.

Data Reliability

The quality of the data will vary among estuaries and species. Therefore, an attempt is being made to determine the reasonableness of the data compiled. Table 4 illustrates how data reliability will be compiled for distribution and abundance information. Three general reliability categories are defined:

1) Highly certain - Considerable sampling data available. Distribution, behavior, and preferred habitats well documented within estuary.

2) Moderately certain - Some sample data available for estuary. Distribution, preferred habitat, and behavior well documented in similar estuaries.

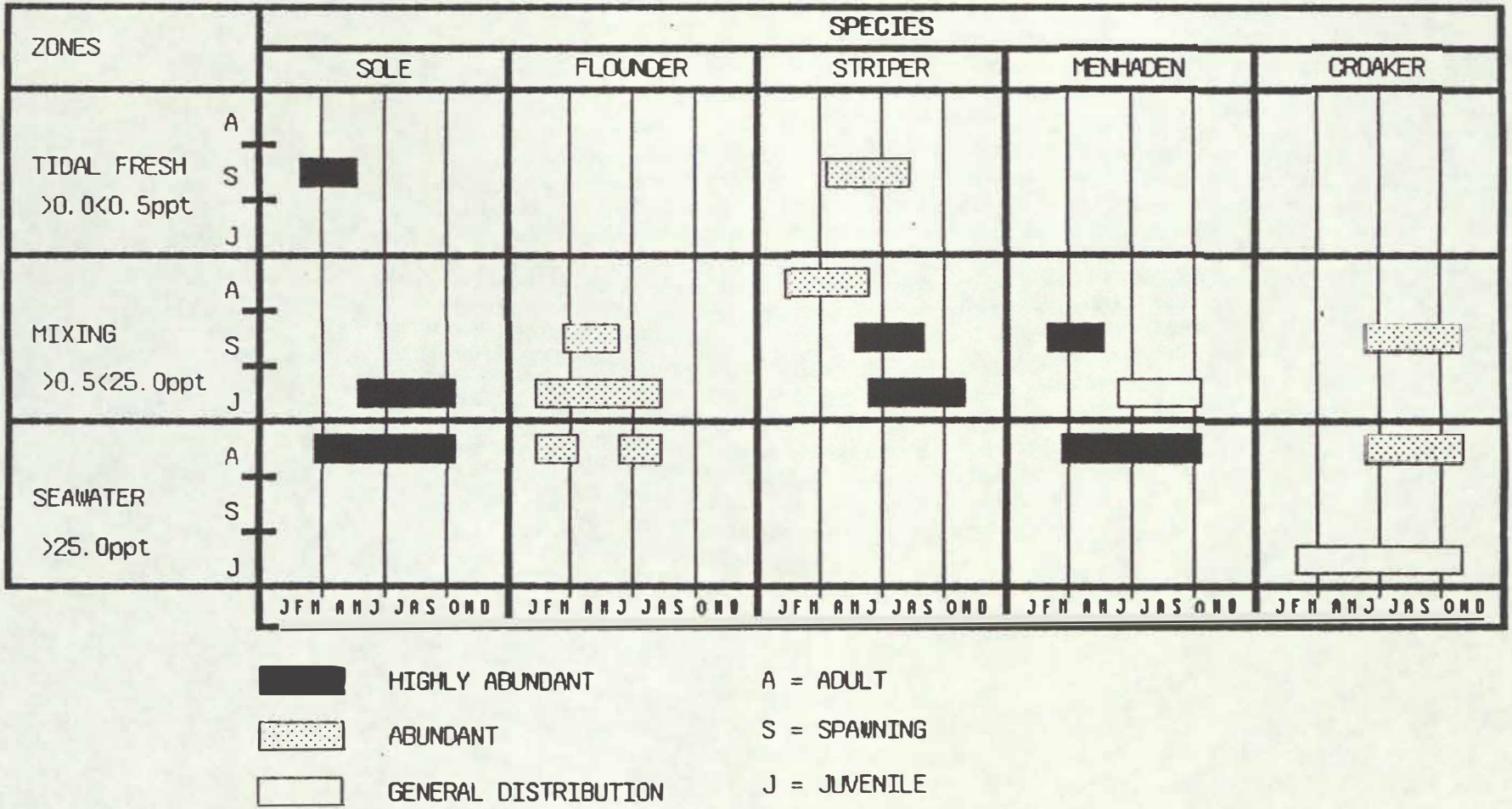
3) Reasonable inference - Little or no sampling data available. Information on behavior and preferred habitats documented in similiar estuaries.

EXAMPLE TABLE 3

REGION _____

ESTUARY _____

ID# _____



REGION _____

ESTUARY _____

ID# _____

EXAMPLE TABLE 4

SPECIES	DISTRIBUTION						ABUNDANCE					
	A		S		J		A		S		J	
	T	M W	T	M W	T	M W	T	M W	T	M W	T	M W
SOLE	■	▒	■	▒ ■	▒						▒	
FLOUNDER			▒						▒			
STRIPER	▒	▒ ▒			▒		■				▒	■
MENHADEN												
CROAKER	▒				▒	▒	▒				▒	

A = ADULT

J = JUVENILE

S = SPAWNING

T = TIDAL FRESH

M = MIXING

W = SEAWATER

■ HIGHLY CERTAIN :

Considerable sampling data available. Distribution, behavior, and preferred habitats well documented within estuary.

▒ MODERATELY CERTAIN :

Some sample data available for estuary. Distribution, preferred habitat, and behavior well documented in similar estuaries.

▒ REASONABLE INFERENCE :

Little or no sampling data available. Information on behavior and preferred habitats documented in similar estuaries.

□ NOT PRESENT

PRELIMINARY SCHEDULE

The schedule shown below is tentative. The final schedule will be developed based on the results from the preliminary work described above, available resources, and other OAD priorities.

Region	Completion Date
West Coast	
Preliminary Study	April 1986
Final	July 1986
Gulf of Mexico	December 1986
East Coast	April 1987

References

Ehler, C.N. and D.J. Basta, 1984. Strategic Assessment of Multiple Resource-Use Conflicts in the U.S. Exclusive Economic Zone. In Exclusive Economic Zones, proceedings of Ocean '84, Sept. 1984. Washington, D.C.

National Oceanic and Atmospheric Administration (NOAA) and Food and Drug Administration (FDA), 1986. 1985 National Shellfish Register of Classified Estuarine Waters. Rockville, Md.

Ocean Assessments Division (OAD), 1986. The National Status and Trends Monitoring Program for Marine Environmental Quality. Program Description 1986. National Oceanic and Atmospheric Administration (mimeo).

Strategic Assessment Branch (SAB), 1985. National Estuarine Inventory Data Atlas: Physical and Hydrologic Characteristics, Rockville, MD., National Oceanic and Atmospheric Administration.

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For Further Information, Contact

Mr. Mark E. Monaco
Strategic Assessment Branch (N/OMA31)
Ocean Assessments Division
Office of Oceanography and Marine Assessment
11400 Rockville Pike
Rockville, Md 20852
(301) 443-8844