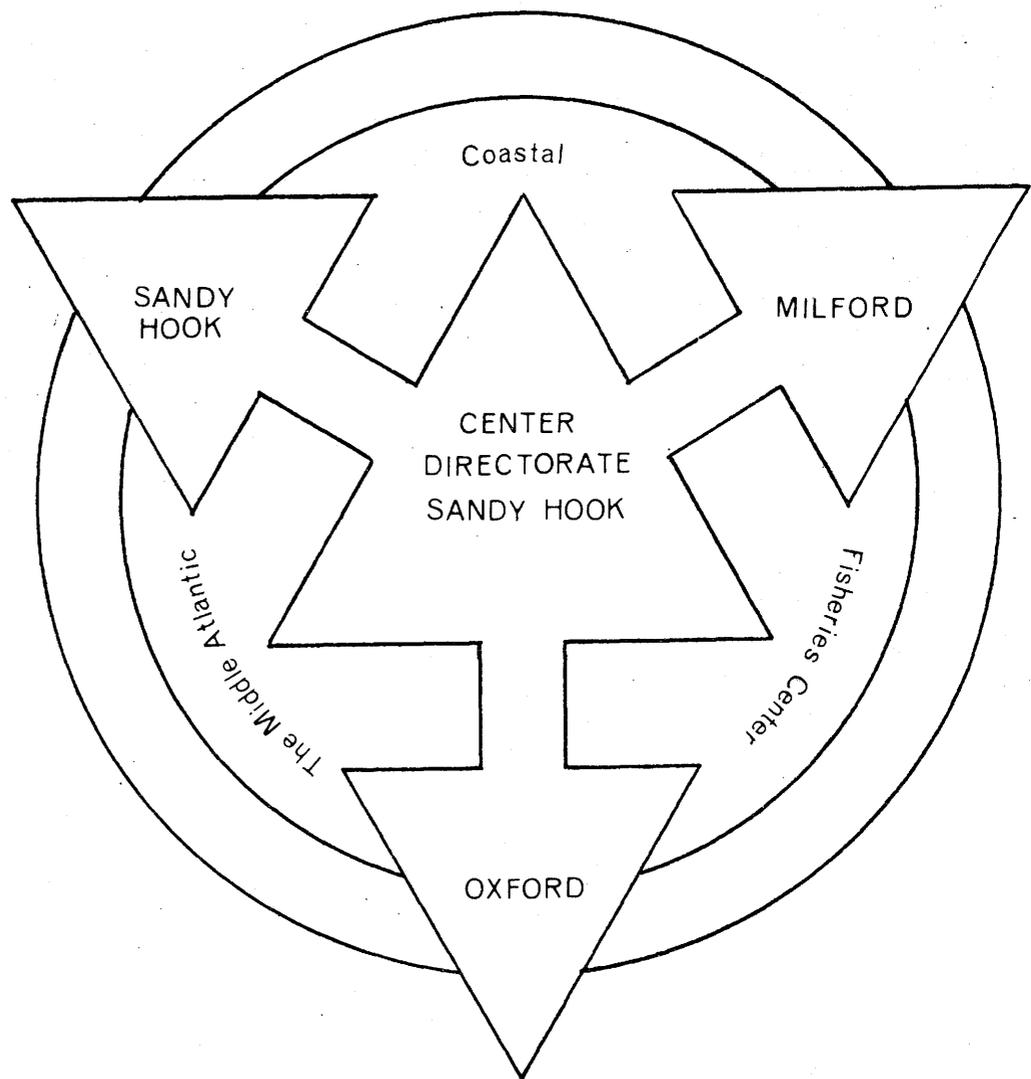




U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Region

MIDDLE ATLANTIC COASTAL FISHERIES CENTER



TASK DEVELOPMENT PLANS - FY 1977
(Submitted December 23, 1974)

Informal Report No. 45

MIDDLE ATLANTIC COASTAL
FISHERIES CENTER

TASK DEVELOPMENT PLANS
FY 1977

Submitted December 23, 1974

Informal Report No. 45



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Middle Atlantic Coastal Fisheries Center -F16
Highlands, New Jersey 07732

Date: December 23, 1974

Reply to
Attn of: Carl J. Sindermann
Center Director

Subject: FY 1977 Task Development Plans

To: Assoc. Director for Resource Research -F1
National Marine Fisheries Service
Washington, D. C. 20235

Attached are subject TDP's. Please note that in addition to the documents themselves we have included (1) an introductory statement explaining the rationale for areas of significant change, (2) a task-oriented organization chart for FY 1977, (3) a cross-walk for FY 1975, 1976, and 1977 tasks, (4) a relative ranking list of tasks, and (5) summary tabulations of task allowances.

The cross-walk diagram will be important in understanding our proposed reprogramming in Aquaculture and Recreational Fishes.

Note that we have requested increases for fiscal '77 which are "above target". Inasmuch as these are directly responsive to the Northeast Region's resource assessment and management problems inherent in the anticipated "extended jurisdiction", we hope for your endorsement of these items.

Note also that our projections for MAC-014, Mutagenic Effects of Pollutants, are at minimal funding; recent findings in this study are deemed of fundamental importance to NMFS and to NOAA. We hope therefore that internal adjustments upwards can be made upon distribution of a report now in preparation. We therefore hope for your endorsement of this TDP as being effective and productive despite current funding levels. We may elect to request an increase from MESA specifically for this task.

Attachment



A Century of Fish Conservation

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INTRODUCTION

This document contains our task development plans for FY 1977, as projected from the perspective available to us in December, 1974. There are three significant areas of change that are approached here: (1) reentry of this Center into Molluscan Aquaculture, beginning in the second half of FY 1975; (2) increases in Resource Assessment funding, following instruction received from the Associate Director for Resource Research for FY 1976 and FY 1977, and (3) potential but as yet unspecified increases in NOAA-MESA-N.Y. Bight funding for FY 1976 and FY 1977.

Concerning Molluscan Aquaculture, we have submitted TDP's showing reprogramming in the second half of FY 1975 of \$125K into Aquaculture. This amount of reprogrammed money will be annualized at \$250K in FY 1976, and will be augmented in FY 1977 by \$185K as indicated in the FY 1977 PED from the Associate Director for Resource Research.

For the second half of FY 1975 reprogrammed funds for Aquaculture are:

\$29.4K from "Contaminant Effects on Algae: (MAC013) to
"Nutrition of Shellfish" (MAC057).

\$23.1K from "Mutagenesis" (MAC014) to
"Genetics of Shellfish" (MAC056).

\$20.4K from "Rearing of Indicator Organisms" (MAC012) to
"Control of Disease" (MAC058).

\$52.1K from "Rearing of Indicator Organisms" (MAC012) to
"Spawning and Rearing of Shellfish" (MAC059).

For FY 1976 this extent of reprogramming would continue, but for the full fiscal year, so the amounts would be doubled. The \$200.0K increase for Aquaculture for FY 1977 would augment the reprogrammed amount of \$250K in the following areas:

	<u>FY76</u> <u>reprogrammed</u>	<u>FY77</u> <u>reprogrammed</u>	<u>FY77</u> <u>increase</u>	<u>Total</u> <u>FY77</u>
MAC-057 (Nutrition)	29.4	58.8	40.0	98.8
MAC-056 (Genetics)	23.1	46.2	42.0	88.2
MAC-058 (Disease)	20.4	40.8	83.0	123.8
MAC-059 (Rearing)	<u>52.1</u>	<u>104.2</u>	<u>20.0</u>	<u>124.2</u>
Totals	125.0	250.0	185.0	435.0

Concerning Resource Assessment, we have received instructions in the Program Emphasis Document to plan for an increase in FY 1976 of \$40.0K for Recreational Fisheries (MAC-005-77-RF-A) to increase Biostatistics effort. We are also proposing an increase for this same TDP of \$100.0K for FY 1977 with full justifications attached. We are splitting our MAC-002-77-SII-A task into MAC-002 and MAC-060-77-RF-A in FY 1976 as earlier proposed so that we can more easily separate our MARMAP survey II effort from our Recreational Fisheries. MAC-053-77-SI-A remains at the same level with no anticipated funding increase. However, we have established a new task FY 1975 through reimbursables with AEC which increases our Survey I capacity (MAC-065-77-SI-R) in which we anticipate a reimbursable increase in FY 1976 but no further increases beyond. We are also submitting separate TDP's (MAC-063-77-SII-A, MARMAP II: Multispecies, Coastal Assessment and MAC-064-77-RF-A, MARMAP FA: Populations Dynamics) which are outside the PED guidelines and unfunded but which we feel will be important to initiate in FY 1976. Additionally, we are submitting a TDP (MAC-071-77-RF-A, Recreational Fisheries: Forage Fish-Predator Relation) which was prepared at the specific request of the Associate Director for Resource Research.

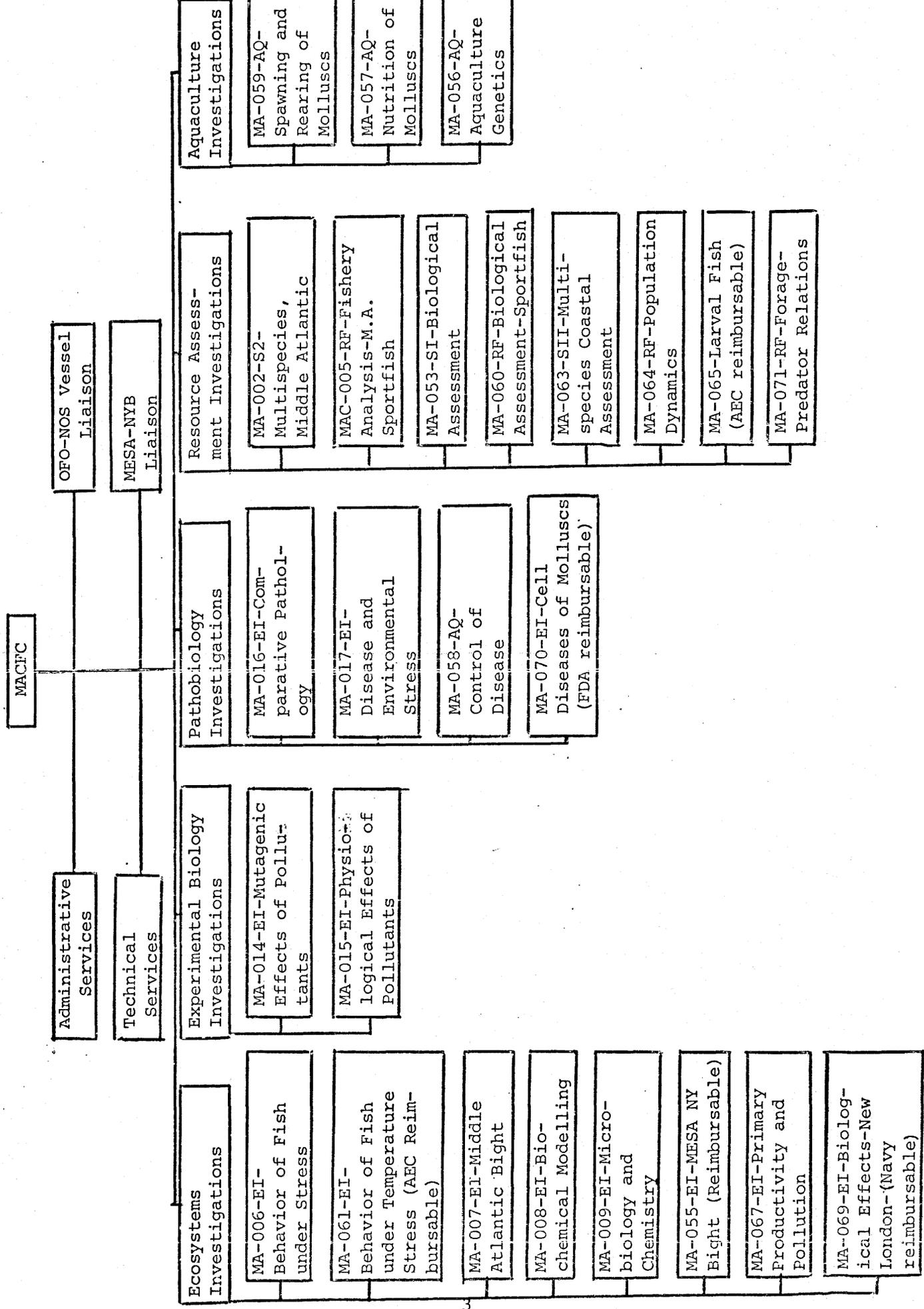
Concerning the NOAA-MESA-N.Y. Bight project funds assigned to this Center (\$382.4K for FY 1975) we have not yet received specific guidelines from the project office for increases in FY 1976 or FY 1977. We have projected in the task (MAC-055) an increase of \$247.6K for FY 1976 and a like amount in FY 1977. This TDP may have to be modified substantially in program emphasis and funding when guidelines are received from the MESA-N.Y. Bight project office. We are listing this task as a reimbursable (R) even though the source of funds is NOAA.

Concerning Item 4 of page 1 of the TDP form (Relative ranking of task within FMC) we have not ranked reimbursables, since funding is external, and we have not ranked support tasks. Ranking of other tasks assumes that projected funding for FY 1977 will be realized.

We have included a TDP for construction of a new laboratory complex and wharf at Sandy Hook. With the activation of the Gateway National Seashore, of which Sandy Hook is a part, and with reactivation of Delaware II, these construction items become of increasing importance. This TDP would be in the category of requested increases beyond PED instructions.

All reimbursable tasks have been prepared to meet guidelines established for acceptance of reimbursable funds.

We expect that our target manpower ceiling at the end of FY 1975 would be 117 FTP, down from 123 FTP at the end of FY 1974. New ceilings will be needed for our augmented aquaculture work in FY 1977.



1/ Assumes full funding of all indicated FY'77 increases.

MACFC CROSS-WALKS: FY '75 - '76 - '77: Reprogramming & Increases

Fiscal Year '75		Fiscal Year '76		Fiscal Year '77	
TDP #	Title	TDP #	Title	TDP #	Title
MAC-002	Multispecies, SI, MAB	MAC-002 MAC-060	Multispecies, SI, MAB Biological Assessment; RF	MAC-002 MAC-060	Multispecies, SI, MAB Biological Assessment; RF
MAC-005	FA; Recreational Fish	MAC-005	FA; Recreational Fish, MAB	MAC-005	FA; Recreational Fish, MAB
MAC-006	Behavior of Fish (see also MAC061)	MAC-006	EI- Behavior of Fish	MAC-006	EI- Behavior of Fish
MAC-007	EI - Mid-Atlantic Bight	MAC-007	EI- Mid-Atlantic Bight	MAC-007	EI- Mid-Atlantic Bight
MAC-008	EI - Biochemical Modelling	MAC-008	EI- Biochemical Modelling	MAC-008	EI- Biochemical Modelling
MAC-009	EI - Microbiology & Chemistry	MAC-009	EI- Microbiology & Chemistry	MAC-009	EI- Microbiology & Chemistry
MAC-012	EI - Rearing of Indicator Organisms	MAC-012	Terminate (see MAC-059)		
MAC-013	EI - Pollutants & Phytoplankton	MAC-013	Terminate (see MAC-057)		
MAC-014	EI - Mutagenic Effects	MAC-014	EI- Mutagenic Effects (MAC-056)	MAC-014	EI- Mutagenic Effects
MAC-015	EI - Physiological Effects	MAC-015	EI- Physiological Effects	MAC-015	EI- Physiological Effects
MAC-016	EI - Comp. Pathobiology	MAC-016	EI- Comp. Pathobiology (see also MA-058)	MAC-016	EI- Comp. Pathobiology
MAC-017	EI - Disease & Environm. Stress	MAC-017	EI- Disease & Environm. Stress	MAC-017	EI- Disease & Environm. Stress
MAC-024	MACFC Support	MAC-024	MACFC Support (Consolidated)	MAC-024	MACFC Support
MAC-050	Terminate (see MAC-024)				
MAC-051	Terminate (see MAC-024)				
MAC-052	Terminate (see MAC-024)				
MAC-053	SI, Biological Assessment	MAC-053	SI, Biological Assessment	MAC-053	SI, Biological Assessment
MAC-054	Terminate (see MAC-024)				
MAC-055	MESA-NYB (Reimbursable)	MAC-055	MESA-NYB (Reimbursable)	MAC-055	MESA-NYB (Reimbursable)
MAC-056	Aqu. Genetics (1/2)	MAC-056	Aqu. Genetics	MAC-056	Aqu. Genetics
MAC-057	Aqu. Nutrition of Molluscs	MAC-057	Aqu. Nutrition of Molluscs	MAC-057	Aqu. Nutrition of Molluscs
MAC-058	Aqu. Control of Disease	MAC-058	Aqu. Control of Disease	MAC-058	Aqu. Control of Disease
MAC-059	Aqu. Spawning & Rearing	MAC-059	Aqu. Spawning & Rearing	MAC-059	Aqu. Spawning & Rearing
MAC-060	(For FY '75, see MAC-002)	MAC-060	RF; Biological Assessment	MAC-060	RF; Biological Assessment
MAC-061	EI- Behavior of Fish (Reimb.)	MAC-061	EI- Behavior of Fish (Reimb.)	MAC-061	EI- Behavior of Fish (Reimb.)
MAC-065	SI, Larval Fish Studies (Reimb.)	MAC-065	SI, Larval Fish Studies (Reimb.)	MAC-063	SI, Coastal Assessment
MAC-066				MAC-064	Marmap FA; Pop. Dynamics
MAC-067	EI, Primary Productivity & Pollution	MAC-067	EI, Primary Productivity & Pollution	MAC-065	SI, Larval Fish Studies (Reimb.)
MAC-069	EI, Biol. Effects, New London (Reimbursable)	MAC-069	EI, Biol. Effects, New London (Reimbursable)	MAC-066	Construction: New Laboratory Bldg.
MAC-070	EI, Cell Diseases (FDA-Reimb.)	MAC-070	EI, Cell Diseases (FDA-Reimb.)	MAC-067	EI, Primary Productivity & Pollution
MAC-071				MAC-071	RF; Forage Fish/Predator Relations

MIDDLE ATLANTIC COASTAL FISHERIES CENTER

RELATIVE RANKING OF FY 1977 RESEARCH TASKS
(EXCLUDING REIMBURSABLES)

1. MA002 - SII - Multispecies, Middle Atlantic
2. MA064 - RF - Population Dynamics, Middle Atlantic
3. MA005 - RF - Fishery Analysis, Middle Atlantic Sportfish
4. MA007 - E1 - Environmental Change, Middle Atlantic
5. MA015 - E1 - Physiological Effects of Pollutants
6. MA017 - E1 - Disease and Environmental Stress
7. MA056 - AQ - Aquaculture Genetics
8. MA014 - E1 - Mutagenic Effects of Pollutants
9. MA006 - E1 - Behavior of Fish under Pollutant Stress
10. MA058 - AQ - Disease Control
11. MA053 - SI - Biological Assessment, Prerecruits
12. MA016 - E1 - Comparative Pathology
13. MA059 - AQ - Spawning and Rearing of Molluscs
14. MA057 - AQ - Nutrition of Molluscs
15. MA009 - E1 - Microbiology and Chemistry
16. MA060 - RF - Biological Assessment, Sportfish
17. MA008 - E1 - Biochemical Modelling
18. MA063 - SII - Multispecies, Coastal Assessment
19. MA067 - E1 - Primary Productivity and Pollution
20. MA071 - RF - Forage-Predator Relations

NMFS TASK DEVELOPMENT PLAN Within Target
SUMMARY SHEET

DATE PREPARED
Dec. 22, 1974

TDP NUMBER/TASK TITLE	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR +1 FY 1977	
	TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
MAC-002-77-II-A-1 Multispecies, MAB	280.6		176.7		180.0	
MAC-005-77-FA-A-1 Middle Atlantic Sportfish	57.0		104.6	40.0	144.6	(100.0) ¹ / ₇
MAC-006-77-EI-A-1 Behavior of fishes under stress	89.6		89.0		89.0	
MAC-007-77-EI-A-1 IEC, Middle Atlantic Bight	56.4		73.0		73.0	
MAC-008-77-EI-A-1 Biochemical Modelling, MAB	111.1		80.7		80.7	
MAC-009-77-EI-A-1 Microbiology & Chemistry, MAB	156.7		158.4		158.4	
MAC-012-77-EI-A-1 Rearing of Indicator Organisms	54.0		Terminate/Reprogrammed - 059			
MAC-013-77-EI-A-1 Pollutants & Phytoplankton Food-Chain Species	30.3		Terminate/Reprogrammed - 057			
MAC-014-77-EI-A-1 Mutagenic Effects of Pollutants	40.6		19.3		16.0	
MAC-015-77-EI-A-1 Physiological Effects of Pollutant Stress	165.9		166.4		166.4	
MAC-016-77-EI-A-1 Comparative Pathobiology	123.7		102.7		102.7	
MAC-017-77-EI-A-1 Disease & Environmental Stress	119.7		119.7		119.7	
MAC-024-77-SP-A-1 Support (MACFC)	824.3		824.3		824.3	

NMFS TASK DEVELOPMENT PLAN Within Target
SUMMARY SHEET

DATE PREPARED

Dec. 22, 1974

TDP NUMBER/TASK TITLE	CURRENT YEAR FY 19 75		BUDGET YEAR FY 19 76		BUDGET YEAR +1 FY 1977	
	TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE
	A	B	C	D	E	F
MAC-053-77-SI-A-1 MARMAP-SI-Biological Assessment	138.7		111.6		111.6	
MAC-056-77-AQ-A-1 Genetics of Shellfish	23.1		46.2		46.2	42.0
MAC-057-77-AQ-A-1 Nutrition of Shellfish	29.4		58.8		58.8	40.0
MAC-058-77-AQ-A-1 Control of Disease	20.4		40.8		40.8	83.0
MAC-059-77-AQ-A-1 Spawning & Rearing of Molluscs	52.1		104.2		104.2	20.0
MAC-060-77-RF-A-1 Biological Assessment: Sportfish			84.0 ^{1/}		84.0	
MAC-067-77-EI-A-1 Primary Prod; Pollution & Coastal Fisheries	81.6		94.8		94.8	
	2455.2		2455.2	40.0	2495.2	185.0
^{1/} Split off from MAC-002, q.v.						

**NMFS TASK DEVELOPMENT PLAN
SUMMARY SHEET**

DATE PREPARED

12/23/74

Vessel Requirements TDP NUMBER/TASK TITLE	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR +1 FY 1977	
	TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE & D	TARGET ALLOWANCE E	INCREASE & F
<u>FRS Delaware II:</u>		piggyback		piggyback		piggyback
MAC-002-SII-A-1	136	--	136	10	146	--
MAC-060-RF-A-1	--	(136)	--	(146)	--	(146)
MAC-053-SI-A--1	7	(20)	7	(120)	14	(120)
MAC-065-SI-R-1	--	(120)	--	(120)	--	(120)
MAC-055-EI-R-1	59	(20)	34	6	40	--
<u>FRS Albatross IV:</u>						
MAC-002-SII-A-1	28	--	28	--	28	--
MAC-053-SI-A-1	--	(28)	--	(28)	--	(28)
MAC-055-EI-R-1	--	(16)	--	(16)	--	(16)
<u>FRS Kelez:</u>						
MAC-055-EI-R-1	14	--	14	--	14	--
<u>FRS Xiphias (or charter)</u>						
MAC-002-SII-A-1	80	--	80	20	100	--
MAC-065-SI-R-1	36	--	36	--	36	--
<u>FRS Rorqual (or charter):</u>						
MAC-007-EI-R-1	40	--	40	--	40	--
MAC-002-SII-A-1	14	--	14	--	14	--
MAC-060-RF-A-1	--	(14)	--	(14)	--	(14)

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED
Dec. 18, 1974

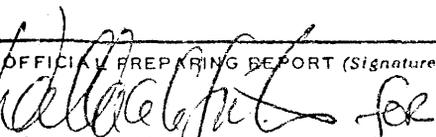
(Submit five copies by Jan. 2)

To: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK		
	A	B	C	D	BY TARGET	BY + 1 INC.	
C-002-77-SII-A					1	1	
TASK NUMBER	6. TASK TITLE						
812P1	MARMAP II - Multispecies: Middle Atlantic Bight						
ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION		
B6200	Resource Assessment Investigations				City Highlands,	State N.J.	
OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	COO LINE	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
Total Direct Labor	15	229.8		118.7		122.0	
Travel	19	5.6		5.6		5.6	
Rents, Communications, Utilities	21			1.0		1.0	
Contracts (To be let)	51						
Grants (Funds obligated)	52	2.7		20.0		20.0	
	58						
Supplies	53	10.1		14.7		14.7	
Capital Equipment	54	11.5		4.0		4.0	
Other (All other obligations)		20.9		12.7		12.7	
Total Direct Funds (Add lines 10 through 17 above.)		280.6		176.7		180.0	
Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		10		7		7	
Positions, Other (Number applicable to this Task.)		10		4		4	
Man-years, Permanent		10.4		5.6		5.6	
Man-years, Other		6.0		3.2		3.2	
Reimbursable Support (Reimbursable agreements only)							

REMARKS
MAC-022-77-SII-A will split into two tasks in FY 76 (see MAC-060-RF-A)

OFFICIAL PREPARING REPORT (Signature)  Arthur S. Mervill Director of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  Carl J. Sindermann, Center Director
--	---

NMFS VESSEL REQUIREMENTS FY 1976

1. Date: 12/23/74
 2. ID# No.: MAC-002-77-SII-A
 3. Prepared by: Arthur S. Merrill
 4. Task Title:

SEA TIME - DAYS	1975 CY (a)	BY 1976		BY+1 1977	
		(b) T.A.	(c) Incr.	(d) T.A.	(e) Incr.
NMFS 5. Delaware II	136	136	10	146	
Vessel 6. Albatross IV	28	28	--	28	
(Name) 7. Albatross ^{Albatross} (under 65 ft)	80	80	20	100	
Charter 8. Trawler	14	14	14	28	
Vessel 9.					
(type)					
10. TOTAL SEA DAYS					
Scientists 11. Maximum	8	8	4	12	
per 12. Minimum	8	8	-	8	
cruise 13. Anticipated	8	8	-	10	
(Average)					
14. 1st.					
15. 2nd.		ALL MONTHS			
Cruise 16. 3rd.					
Months 17. 4th.					

18. Vessel Priority:

a. NOAA FIV (NOS)	<u>1</u>	d. Univ. RV Charter	<u>5</u>
b. NOAA RV (NOS)	<u>6</u>	e. Existing NMFS Small Boat	<u>4</u>
c. Commercial Charter	<u>2</u>	f. New, Specialized NMFS Small Boat	<u>3</u>

19. Remarks:

piggy-backs:
 MAC-060-77-RF-A (will split from MAC-002, FY'76)
 MAC-053-77-SI-A
 MAC-065-77-SI-R (AEC-reimbursable)

NMFS TASK DEVELOPMENT PLAN

TDP NUMBER

MAC-002-77-SII-A

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
			75		76		+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	A	Conduct coastal groundfish assessment surveys (fall and spring)	X													
2	AE	Prepare and complete fisherman and cruise reports		X												
3	AE	Summarize cruise analyses comparisons				X										
4	A	Conduct monthly survey - N.Y. Apex cruise	X		X											
5	AE	Prepare monthly fishermans report	X													
6	AE	Prepare monthly cruise report	X													
7	AE	Prepare annual analysis of monthly surveys		X												
8	AE	Prepare and complete MESA reports -- based on monthly and semi-annual surveys	X													
9	AE	Delineate juvenile finfish components from historical and recent surveys		X												
0	AE	Establish indices of relative abundance of juvenile fish		X												

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

**NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS**

TDP NUMBER

MAC-002-77-SII-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Admin.)	15/5 ✓	Merrill, Arthur S.	25
Fishery Biologist (Research)	12/5 ✓	Ropes, John W.	100
Fishery Biologist (Research)	11/3	Azarovitz, Thomas T.	100
Fishery Biologist (Research)	12/1 ✓	Christensen, Darryl J.	100
Biological Lab. Tech. (Fish.)	5/9	Silverman, Malcolm J.	100
Fishery Biologist (Research)	12/4 ✓	MacKenzie, Clyde L.	100
Biological Lab. Tech. (Fish.)	6/5 ✓	McQuay, David	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

32. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

35. ACTIVITY PLAN

36. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

37. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

29 - STATEMENT OF NEED

In order to efficiently and effectively utilize the fishery resources of the middle Atlantic, an adequate data base for management decisions must be established. Resource assessment data, supplemented by existing sources, including commercial fishery statistics, can provide accurate information to accomplish this objective.

Fishery stocks in the middle Atlantic are subjected to a combined influence of increasing fishing pressures and environmental extremes. Fishing pressures have changed drastically in recent years with the influence of foreign fleets offshore and with the recent and rapid development of inshore recreational fishing. Stresses of normal environmental extremes of temperature and salinity have been compounded by a reduction in quality and area of estuarine nursery zones.

In recent years the above factors have decreased the yield or catch rate of a number of our utilized fishery resources and in unrealized ways affected unexploited stocks. Many of these fishes migrate not only within the middle Atlantic area but range along the shelf waters of the entire Atlantic coast. These facts demonstrate why a strict regional approach is not practical; and show the need for a cooperative coastwise program utilizing a joint data bank for storage of information.

Primary recipients of these data will be Federal groups and in-house personnel developing ICNAF and bilateral policies. State agencies and industry representatives (commercial and recreational) will be given requested information to assist in management decisions.

30 - ACTIVITIES PLAN

Using standard trawl gear, we will continue our sampling pattern in order to estimate and monitor numbers and distribution of all benthic fish and selected shellfish species with principal emphasis in the Middle Atlantic Bight. Since the life pattern of many inshore finfish incur migrations of not only on a coastal scale but to the offshore waters, we will continue to coordinate and refine sampling systems cooperatively carried on by Federal and State fishery laboratories both north and south of the region (from Nantucket to Cape Canaveral).

Assessment of groundfish will be based on fall and spring surveys, coast-wide in concept, particularly to monitor juvenile and adult components. Input statements on age, fecundity, growth, and stock identification will derive from other task units working on these species groups of special interest (sciaenids, flounders, etc.). As a data base of information builds up, we will begin biometrical analyses to estimate the potential yield and harvestable fractions of particular stocks.

During spring and autumn assessment cruises, extra stations are made in the MESA grid study area between Montauk Point, N. Y., and Cape May, N. J. Data from these stations are for use within the MESA investigations but are also valuable supplements to assessment studies. Monthly cruises are made in the same MESA grid area, and these data also supplement our routine assessment collections.

A data handling and processing system in common with NEFC has been developed and implemented at Sandy Hook. All coastal assessment data, after complete processing at Sandy Hook, are forwarded to NEFC, Woods Hole, for direct incorporation into the common data bank.

FY 75:

- 1) Continue to organize and conduct comprehensive and coordinated spring and autumn assessment surveys of coastal waters between Nantucket and Cape Canaveral.
- 2) Conduct pilot monthly cruises; in a corridor from Raritan Bay to the Hudson Canyon.
- 3) Refine the development of a common data handling and processing system between NEFC, MACFC, and cooperating States.
- 4) Test reliability of estimates for expressing indices of relative abundance of juvenile fish components.

FY 76:

- 1) Develop analysis capabilities with NEFC-MACFC assessment data.
- 2) Continue to conduct regular semi-annual and monthly series of stock assessment cruises.
- 3) Continue reporting sequence of fishermen and cruise reports.

FY 77:

- 1) Continued conduct of regular stock assessment cruises.
- 2) Continue series of fisherman and cruise reports.
- 3) Prepare status reports and preliminary forecasts of selected species.

31 - TASK OUTPUTS

- a. 1) Within a short time after each cruise, we will have target species information (e.g. relative abundance and distribution estimates) available for user groups.
- 2) Comprehensive papers and data reports showing distribution and abundance of exploited fish and shellfish. These data will be prepared on a regular basis to aid in developing sound NMFS management policies.

- 3) Estimates of potential yield from distribution and abundance data of unexploited fish stocks will be made available on request to industry representatives and State agencies. These are of particular interest in the development of the fishery between Capes Hatteras and Canaveral.
 - 4) Reports and research papers are planned describing environmental factors and their effect on fish distribution and year-class success.
 - 5) Once a data base is established, predictive models will be developed. These models will be continually refined with hydrographical and biological input from cruises.
- b. The long-range benefit is a reliable assessment capability permitting the development of predictive models for middle Atlantic coastal resources. The results of this program integrated with those of sister laboratories or State agencies will provide data enabling management decisions for the entire coastal range of exploited and unexploited species. Using standard collecting gear, over enough years, normal fluctuations in specific fish populations can be compared with variations attributed to impact of natural or man-made stresses. Information collected will be placed on request at the disposal of State, Federal, or international units in charge of preparing management recommendations. Catch material from standard trawl hauls not used for assessment investigations will be forwarded upon request to colleagues in NMFS, State agencies, and universities for additional study. Included in these collections are tissue samples for contaminant studies and preserved diseased fish for Ecosystems Investigations. Special collections and measurements are made in addition to the trawl hauls. Included are neuston and bongo tows for ichthyoplankton studies and standard hydrocasts for NMFS-AEG.

32 - IMPACT OF TASK AUGMENTATION

- 1) CY -- no increases anticipated.
- 2) BY -- no increases anticipated.
- 3) BY+1 -- no increases anticipated.

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

A.

- 1) Cruise Reports, R/V Dolphin, 1966-1972
- 2) Cruise Report, R/V Atlantic Twin, May 7 - June 14, 1973 -- preliminary results of coastal assessment and MESA cruise.
- 3) Cruise Report, Albatross IV, July 29 - August 6, 1973 -- preliminary results MESA cruise.
- 4) Cruise Report, Atlantic Twin, Oct. 1 - Nov. 7, 1973 -- preliminary results coastal assessment and MESA cruise.
- 5) Cruise Report, Albatross IV, Feb. 1-5, 1974 -- preliminary results MESA cruise.
- 6) Cruise Report, Atlantic Twin-Delaware II, April 1 - May 2, 1974 -- preliminary results coastal assessment and MESA cruise.
- 7) Cruise Report, Delaware II, June 3-7, 1974 -- preliminary results of monthly survey New York Bight.
- 8) Cruise Report, Delaware II, July 24-29, 1974 -- preliminary results of monthly survey, New York Bight.
- 9) Cruise Report, Delaware II, August 16-21, 1974 -- preliminary results of monthly survey, New York Bight.
- 10) Cruise Report, Delaware II, September 23-29, 1974 -- preliminary results of monthly survey, New York Bight.
- 11) Cruise Report, Delaware II-Albatross IV, Sept. 23 - Oct. 4, 1974 -- preliminary results of offshore and coastal assessment survey, Middle Atlantic and Southern New England.
- 12) Fishermens Report, Delaware II-Albatross IV, Sept. 23 - Oct. 4, 1974 -- highlights of offshore and coastal assessment survey, Middle Atlantic and Southern New England.
- 13) Cruise Report, Delaware II, October 22-28, 1974 -- preliminary results of monthly survey, New York Bight.
- 14) Cruise Report, Delaware II, November 18-25, 1974 -- preliminary results of monthly survey, New York Bight.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

Dec. 18, 1974

(Submit five copies by Jan. 2)

0: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.
MAC-095-77-RF-A					3	3

TASK NUMBER	6. TASK TITLE
8812P2	Fishery Analysis - Middle Atlantic Sportfish

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION
FB6200	Resource Assessment Investigations	City Highlands State N.J.

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	FUND CODE	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	47.4		89.6	33.1	122.7	35.0
1. Travel	19	5.2		5.2	3.0	8.2	4.0
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						50.0
4. Grants (Funds obligated)	58						
5. Supplies	53	0.3		0.3	0.8	1.1	7.0
6. Capital Equipment	54						
7. Other (All other obligations)		4.1		9.5	3.1	12.6	4.0
8. Total Direct Funds (Add lines 10 through 17 above.)		57.0		104.6	40.0	144.6	100.0
9. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		6		6	-	6	2
10. Positions, Other (Number applicable to this Task.)		2		2	4.0	6	1
11. Man-years, Permanent		2.4		5.1	-	5.1	1.6
12. Man-years, Other		1.3		1.6	2.8	4.4	0.5
13. Reimbursable Support (Reimbursable agreements only)							

REMARKS
See remarks on separate attachment relative to possible FY 77 increase.

OFFICIAL PREPARING REPORT (Signature)
Arthur S. Merrill
Arthur S. Merrill, Dir. of Investigations

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)
Carl Sinderman
-20- Carl J. Sinderman, Center Director

JUSTIFICATION FOR INCREASED FUNDING FY 77 (MAC-005-77-RF-A)

The 40 k authorized increase (FY 75) permits us to start developing a sportfish biometric subproject. An increase in funding in FY 77 will essentially allow us (1) to modestly continue to expand our biometrics capability and (2) to increase our geographic coverage for sportfish catch/effort data through State-Federal and/or other contracts. This is our highest priority request. This follows closely your suggestions and guidelines to develop management information of marine recreational significance (subgoal II-G). We are hopeful of a population dynamics task being split out by 1978 which will strongly emphasize commercial/recreational fishery impacts in the Middle Atlantic Bight as our information base increases from pilot studies (see proposed MAC-064-77-RF-A).

The MAC-064 is proposed for implementation in FY 77. It would strengthen our biometric capability greatly but this task would not allow for expansion of our catch/effort data base. With joint augmentation of MAC-005 and MAC-064 the desirable goal of inhouse and State-derived data input to an established analytical group would be achieved.

The increase request bears directly to the question of extended jurisdiction and allocation in the middle Atlantic in which the sportfish fraction of the total harvestable resource must be delineated.

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER
MAC-005-77-FA-A

NUMBER	A, E, OR M	NARRATIVE <i>(Brief descriptive phrase of activity, event, or milestone)</i>	CY		BY		BUDGET YEAR										
							+1		+2		+3		+4		+5		
			1	2	1	2	1	2	1	2	1	2	1	2	1	2	
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	E	Complete Anglers' Guide	X														
2	A	Continue liason with agencies and sportfish groups	X														
3	A	Compile sportfish statistics (Delmarva pilot-study)	X	X													
4	A	Review data processing system and incorporate refinements for timely processing sportfish-commercial fish relations	X	X													
5	A	Analyze data -- Delmarva pilot study			X	X											
6	A	Conduct sportfish impact survey (New York Apex - N. J. emphasis)			X	X											
7	AE	Prepare analysis and report -- N.J. study				X											
8	A	Continue New York Apex study -- (N.Y. emphasis)				X	X										
9	A	Prepare analysis New York Apex sportfishing					X										
10	E	Prepare report of New York Apex sportfishing					X										
11	A	Initiate and coordinate additional State-Federal sportfish catch, effort surveys					X										
12	A	Update briefing books with emphasis on those of sportfish significance			X												
13	AE	Complete newsletters to users regarding areas of fishing success, results of contests, etc.	X														

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

a. Continued at same level

b. Increase of ___% *

c. Reduction of ___%

d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-005-77-FA-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Research)	13/3	Pacheco, Anthony L.	50
Fishery Biologist (Research)	11/2	Freeman, Bruce L.	100
Physical Science Technician	9/5	Morrison, Charles N.	100
Biological Lab. Tech.	7/6	Ward, George	100
Biological Aid	5/2	Farman, Anton	100
Biometrician	12/1	Vacant (have approval from Mr. Gehringer to fill this position, FY 75)	100
Computer Programmer	12/1	Vacant (no approval to fill this badly needed position)	--

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- | | |
|---|---|
| <p>9. STATEMENT OF NEED</p> <p>10. ACTIVITY PLAN</p> <p>11. TASK OUTPUTS AND BENEFITS</p> <p>12. IMPACT OF TASK AUGMENTATION</p> <p>a. Current Year</p> <p>b. Budget Year</p> <p>c. Budget Year + 1</p> | <p>33. CRITERIA FOR TASK COMPLETION</p> <p>34. BACK-UP DOCUMENTATION</p> <p>a. Detail Documentation <i>(Provide one sentence description.)</i></p> <p>b. Related tasks and research presently being conducted.</p> <p>c. Indicate the Congressional legislative requirements.</p> <p>d. Indicate the Environmental Impact Statement (EIS) requirements.</p> |
|---|---|

29 - STATEMENT OF NEED

The NMFS has the responsibility to produce the knowledge required to maintain and utilize marine resources for the perpetual benefit of the nation. While provisions towards an understanding of the resource assessment aspects are provided for by ongoing research in the Middle Atlantic Bight, no complete measurement of the impact of the greatest predator -- man -- on the sport fish stocks is presently being made, although such measurements of removals are vital to a successful understanding and management of this portion of the living marine resources.

The NMFS must be involved with development of source information to insure a unified data base. In essence, the proportion of recreational harvest to total harvest must be determined. Since most of the stocks entering the fishery migrate across several State boundaries, comparability of information must be assured. Such assurance can be obtained by maintaining a central data bank with all inputs evaluated by a small responsible group within NMFS. Internally, we need this information for a better understanding of the population dynamics of the principally utilized stocks. This will satisfy our need to supply best estimates of the present and future status of the stocks so that international, national, and State conservation groups may develop management schemes.

30 - ACTIVITIES PLAN

Successful management of commercial and sport fish resources requires the systematic collection and analysis of commercial and sport fish catch data. This need can be most effectively answered, ultimately by use of contract reporters located at strategic ports at the periphery of the Middle Atlantic Bight. Such reporters, working several hours per day, are necessary since sport fish catch data must be collected at the dock immediately after the arrival of the vessel.

A significant portion of the data will be fed to us through services contracted with several States. Rhode Island, Connecticut, New York, and New Jersey have expressed a willingness to embark on surveys to assess their sportfish resource with Federal Support.

FY 75:

Develop liaison and contacts to determine sampling strategy, design programmatic operations, and formulate contract specifications. Conduct a one-year pilot study in the area of Ocean City, Md.

FY 76:

Conduct a pilot study of sport fishing of New York Bight Apex anticipatory to a State-Federal continuing study. Supportive sampling by MACFC staff in Delmarva selected sites for comparative biosamples of catch and complete a report of techniques and preliminary results of the pilot study.

Expand evolved technique of data acquisition and processing into input from New York, and New Jersey. Begin to analyse the data collected. Complete draft of tilefish study.

FY 77:

Complete area report and initiate coordination of State-Federal contracts for continuing sport-fishery surveys of the New York Bight. Maintain real time reporting to sportfish community of biological and biometrical findings.

31 - TASK OUTPUTS

- a) Summary data which as a minimum must consist of (a) fishing area, (b) catch by species and by number of each species, (c) effort by fishery component and vessel characteristics, capacity, endurance, etc., and (d) biological samples of individual fish. With the initiation of routine resource assessment cruises by MACFC, the implementation now of concurrent collection of biostatistics in the Bight, even if on an interim basis, is vitally needed. Estimates of total harvest for the region and for sub-areas within the area are the primary output.

Requirements of biostatistical analysis are long-term. Changes in harvest will occur from variations of year-class success, fishing pressure, or environmental degradation. The impact of each of these elements is presently speculative. Catch analysis of local stocks to determine degree of mixing, growth rates, and age composition will allow predictions of yield and development of management strategies if necessary for coastal recreational species.

- b) The task will provide statistically reliable indices to establish a base line level and subsequent variations from base line to the sport fish harvest. Accuracy of estimates will depend on degree of cooperation and coverage possible with available work force and some additional temporary positions.

32 - IMPACT OF TASK AUGMENTATION

- 1) CY -- Reprogramming of about 1 man-year effort to examine ADP system, begin programming operations and prepare functional analyses of special sportfish studies.
- 2) BY -- \$40 K increase and no approved positions to initiate biometric analyses for selected sportfish from Delmarva pilot study.
- 3) BY + 1 -- \$100 k increase and two positions to let contracts to state to augment inhouse sampling effort, expand sportfish biometric studies and incorporate biological summaries of regional commercial/recreational fish impact.

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

- a. Deuel, D. G. 1970. The 1970 salt-water angling survey. U. S. Dept. Commerce, NOAA, Natl. Mar. Fish. Serv., Curr. Fish. Statist. No. 6200, 54 pp.

Deuel, D. G. and J. R. Clark. 1968. The 1965 salt-water angling survey. U. S. Dept. Interior, Bur. Sport Fish. Wildl. Resour. Publ. 67, 51 pp.

U. S. Dept. Interior, Bur. Sport Fish. Wildl. Resour. Publ. 67, 51 pp., 1968.

1955 National Survey of Fishing and Hunting. U. S. Dept. Interior, Bur. Sport Fish. Wildl. Circ. 44, 50 pp. 1956.

1970 National Survey of Fishing and Hunting. U. S. Dept. Interior, Bur. Sport Fish. Wildl. Resour. Publ. 95, 106 pp. 1972.

Wheatland, H. A. 1973. Developing a marine sport fish statistics program. Proc. Gulf Caribb. Fish. Inst., 25th Annu. Sess., 181-184 p.

1974 Northeast Regional Salt-Water Angling Survey Conducted Through Central Office Contract. Report due near future.

- b. Beaufort laboratory studies on south Atlantic charter boat fishery and artificial reefs.
- c. None
- d. None
- e. Data on sportfish catch and participation may be used in establishing quotas of foreign harvest when interactions are discussed and allocations negotiated.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 1974

(Submit five copies by Jan. 2)

0: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

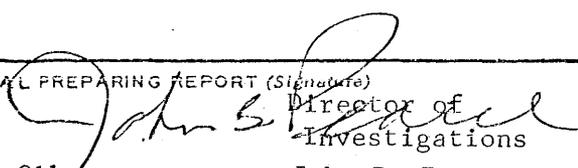
TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.
MAC-006-77-EI-A-1					9	9

TASK NUMBER	6. TASK TITLE
8818P1	Behavior of Fishes Under Environmental Stress

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION	
FB6100	Ecosystems Investigations	City Sandy Hook	State N.J.

OBJECT CLASS <small>lines 10-18. Enter all dollar values as thousands and tenths of thousands. lines 21-22. Enter as man-years and tenths of man-years.</small>	UNIT NO.	CURRENT YEAR FY 19 ⁷⁵		BUDGET YEAR FY 19 ⁷⁶		BUDGET YEAR + 1 FY 19 ⁷⁷	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	75.0		73.4		73.4	
1. Travel	19	1.8		1.8		1.8	
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						
4. Grants (Funds obligated)	58						
5. Supplies	53	6.1		7.0		7.0	
6. Capital Equipment	54						
7. Other (All other obligations)		6.7		6.8		6.8	
8. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		89.6		89.0		89.0	
9. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		5		5		5	
10. Positions, Other <small>(Number applicable to this Task.)</small>		-		-		-	
11. Man-years, Permanent		4.3		4.4		4.4	
12. Man-years, Other							
13. Reimbursable Support <small>(Reimbursable agreements only)</small>							

MARKS

OFFICIAL PREPARING REPORT (Signature)

Director of Investigations
John B. Pearce

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

-27- Carl J. Sindermann, Center Director

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-006-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

A E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR										
						+1		+2		+3		+4		+5		
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
	All activities, events and milestones are directed toward determining the impact of environmental change in the Middle Atlantic region: NMFS Goal IV Subgoal A; Objective 9															
A	Normal activity, feeding and schooling in adult weakfish.	X	X													
A	Thermal stress effects on weakfish.				X	X										
A	Normal activity, territoriality, aggression and feeding in adult tautog.	X	X													
A	Thermal stress effects on adult tautog.				X	X										
E	Completion of initial comparative studies on the thermal stress effects on representative pelagic and shelter-dependent demersal species.					X										
A	Sublethal effects of petroleum and/or selected soluble petroleum components on normal activity and feeding of tautog and juvenile bluefish or other representative pelagic or demersal species						X	X								
A	Synergistic effects of temperature and selected water-soluble petroleum components on normal activity, feeding and social interactions of tautog, juvenile bluefish or other representative pelagic and demersal species.								X	X						
M	Publication: The effects of temperature on the activity of young tautog, <u>Tautoga onitis</u> L.				X											

OUT YEAR COMMENTS

Check appropriate boxes and enter applicable percentage.)
Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-006-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
					+1		+2		+3		+4		+5	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Publication: Fish-to-fish attraction and the facilitation of feeding behavior as mediated by visual stimuli in striped mullet, <u>Mugil cephalus</u> .	X													
(Field) Correlation of winter flounder activity, movements, habitat selection and food habits with physical parameters. Comparative assessment of the feeding interrelationship between tautog and cunner.	X				X									
Completion of comparative field study on the environmental requirements and interspecific relationships of two demersal species, adult tautog and cunner.			X											
Publication: Activity, movements and feeding behavior of the cunner, <u>Tautoglabrus adspersus</u> and comparison of food habits with the coresident tautog, <u>Tautoga onitis</u> .			X											
Determination of habitat requirements of juvenile cunner, tautog and winter flounder					X			X						
Integration of field and laboratory results on the diverse life habits and normal behaviors of different species categories with findings on their response capability and probability of survival under various environmental stresses including temperature and chemical contaminants.							X							

BUDGET YEAR COMMENTS
Check appropriate boxes and enter applicable percentage. Increases usually come from programming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-006-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Res.)	13(5)	Bori L. Olla	80
Fishery Biologist (Res.)	11(1)	Anne L. Studholme	80
Fishery Biologist (Res.)	9(5)	Carol Samet	80
Fishery Biologist (Res.)	9(4)	A. Dale Martin	100
Fishery Biologist (Res.)	9(2)	Allen Bejda	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

a. Current Year

b. Budget Year

c. Budget Year + 1

29. STATEMENT OF NEED

At a time when the activities of man continue to impinge on and disrupt the natural homeostasis of marine ecosystems, it is essential that the level of confidence in assessing and predicting the effects and consequences of such activities be improved. It is only through such efforts that a rational plan of action for preserving the marine environment may be implemented. Although a significant portion of the effort of the Behavior Investigation has been directed towards the problems of thermal additions to the marine environment, its focus will now also include the effects of petroleum contamination. Currently, the acceleration in the exploitation of petroleum resources has made such a shift of prime importance (NMFS Goal IV; Subgoal A; Objective 9).

Since many marine organisms possess adaptive behaviors to overcome the stresses imposed by the environment, one approach to this problem is to study the response capabilities of marine organisms to specific contaminant stresses, e. g. temperature, petroleum and petroleum products. Quantitative studies of certain behaviors can provide sensitive indicators of stress and define limits at which behavioral adaptations can no longer compensate. The most important advantage of using behavior to measure stress is that the results often lend themselves to direct interpretations regarding environmental quality as related to possible consequences at the population and ecosystem levels. Thus, information from the laboratory may subsequently be extrapolated to predict and assess the impact of particular pollutants on natural communities.

Prior to any laboratory investigations, the normal environmental requirements of the species within the natural community must be determined. This information, gathered from field studies, serves as a basis for formulating questions and designing and performing experiments in the laboratory. Extrapolation of the results from the laboratory to the environment can proceed from a comprehensive understanding of the relationship between the species and its ecosystem.

The species studied in the Behavior Investigation are almost entirely recreational and commercial species. They are also species which, for part or all of their life, live in inshore areas where they are highly vulnerable to pollution stress.

The long-term nature of some of these studies in which normal baseline data are derived, as well as the difficulties encountered in acquiring and maintaining some of these species, have precluded many universities, private concerns and other federal laboratories from engaging in such investigations. The interests of the majority of other groups engaged in studying environmental effects have centered primarily on the use of indicator organisms from which the results are generalized for other species. However, the work of this program has clearly shown the differences in the behavioral repertoires of species renders such generalizations misleading, and when applied to the natural environment for modeling, potentially harmful.

The type of information resulting from the Behavior Investigation is and in future will be utilized by agencies within NMFS such as the Environmental Assessment Division. In addition, there is considerable interest in developing behavioral measures of stress for marine species by a variety of industrial, state and federal agencies including EPA and AEC.

30. ACTIVITIES PLAN

Laboratory:

Laboratory studies will measure, under controlled conditions, normal behaviors in selected marine fish species. Once established, these will be used as baseline information to determine the effects of particular environmental stresses. Using the techniques and approaches developed over the last several years employing thermal stress, investigations will be broadened to include the effects of petroleum and/or water soluble petroleum components on established behaviors of tautog, an inshore demersal species, juvenile bluefish, a coastal migratory pelagic species as well as other representative marine fish species.

The results of these comparative studies will then be used as a basis for investigating the synergistic effects of temperature (within normal seasonal variation) and petroleum on these species.

The studies will be conducted in specialized aquarium systems of different shapes and sizes depending on the requirements of the species. All experimental systems will have controlled light and temperature and specialized filtration systems and approximate the substrates and habitat requirement of the species under study.

The initial phase of the study will establish, under conditions corresponding to normal seasonal fluctuations of temperature, salinity and light, patterns of territoriality, activity and social interactions for tautog; levels of swimming speed and schooling for juvenile bluefish. These behaviors will be quantified for comparison with behaviors observed during periods of contaminant stress. The data, analyzed daily by statistical methods developed specifically for the program, will allow day-to-day evaluation of experimental results. Contaminant levels will be monitored at regular intervals to insure the validity of the results. Feeding observations will also be expressed in quantitative terms with measurements of amounts ingested or number of ingestions per fish, and in addition for bluefish, time to satiation and speeds attained during different periods of a feeding session. These normal measures will be compared with stress responses and will permit the detection of metabolic imbalances caused by stress.

FY 76 - Studies will determine (as outlined above) the effects of increased temperature on established normal behaviors of adult tautog and weakfish.

Field Studies:

Studies to describe and define the habitat requirements of juvenile (less than 1 year) cunner, tautog, and winter flounder will be undertaken. Measurements on these species are gathered primarily by means of underwater observation and by various collecting techniques. In addition, specialized tagging procedures related to direct observations will be utilized. These observations are made in relation to time of day, tidal and thermal changes, maturation and growth, and seasonal variation. Time and space measurements are related to specific substrates and utilization of these in the organisms's life habits.

Food habits and forage species abundance will be defined by examining the digestive tract contents which are analyzed for content and quantity. All data will be analyzed for diversity, shifts in food habits and maturation and for interspecific feeding relationships.

FY 75-76 - Studies will describe and define the normal life habits of winter flounder, an important commercial and recreational species to establish homesite requirements, feeding, and food habits, relation to substrate and seasonal movements as related to other coresident species (tautog and cunner) which occupy or share ecological niches common to a number of recreational and commercial marine fish species, using the techniques and approaches described above in addition to ultrasonic tracking.

31. TASK OUTPUTS AND BENEFITS

The primary output of both field and laboratory studies will be the comprehensive definition of normal life habits and requirements of representative marine fish species and the determination of the response capability of these species when subjected to contaminant stress. This information will result in an increase in the ability to assess and predict the potential effect of a contaminant on a given ecosystem and aid in accurately setting ecosystem guidelines to be used in any type of ecological modeling effort.

The need for such guidelines and the important role the Behavior Investigation has played in pioneering this type of effort are exemplified by the following: 1) a workshop on "Behavioral Measures of Environmental Stress" sponsored by the Marine Technology; and 2) a forthcoming session, "The Use of Behavior to Measure Stress in the Marine Environment", at the Third International Estuarine Research Federation Conference. Both of these projects, organized, chaired and edited by B. L. Olla, Senior Investigator of this Task, illustrate the national importance of this Task's efforts. The results of such projects receive wide distribution and are important to both private concerns and government agencies engaged in assessing water quality and setting permissible levels.

The inadequacies and limitations of standard test techniques which are being applied on a world-wide basis, have necessitated more comprehensive identification of organismic response to contaminants. The development,

by this Task, of methodologies which are generic in nature and can be used in the laboratory or field, or applied in and of themselves to predicting the effects of stress, are contributing significantly to the improvement of standard testing procedures. The actual data gathered by this Task can be used by a variety of concerned groups including private industrial firms, state and various government agencies (EPA, CEQ, AEC).

This program has been and will continue to be of value to recreational fishing interests. Although the research is highly scientific in nature, a number of articles in the popular media (newspapers, magazines and books related to sportfishing) have utilized these findings because of the dearth of information available on the normal life habits of many recreational species. These data are also of considerable interest and value within NMFS and will lead to more effective management of the total resource including user groups.

32. IMPACT OF TASK AUGMENTATION

No potential increases are anticipated.

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

Atema, J., S. Jacobson, J. Todd and D. Boylan. 1973. The importance of chemical signals in stimulating behavior of marine organisms: effects of altered environmental chemistry on animal communication, p. 177-197. In: G. E. Glass (ed.) Bioassay Techniques and Environmental Chemistry. Ann Arbor Science Publishers Inc., Ann Arbor, Michigan.

This paper reviews the effects of kerosene fraction of feeding attraction to food and homing in various marine organisms.

Atema, J. and L. Stein. 1974. Effects of crude oil on the feeding behavior of the lobster Homarus americanus. Environ. Pollut. 6:77-86. This paper describes interference by crude oil with chemosensory behaviors of lobster during feeding.

Coutant, C. C. 1970. Biological aspects of thermal pollution. I. Entrainment and discharge canal effects. Publ. No. 383, Ecol. Sci. Div. Oak Ridge Nat. Lab: 341-381.

This article reviews and evaluates the effects of thermal discharges on biological processes.

Jensen, A. C. 1974. Sport fisheries and offshore oil. N. Y. Fish and Game Jour. 13(1):79-112.

This paper discusses the marine sportfishery resources in the North and Middle Atlantic regions in relation to the suspected petroleum reserves.

- Krenkel, P. A. and F. L. Parker (ed.). 1969. Biological Aspects of Thermal Pollution; Proceedings. Vanderbilt University Press, Nashville, Tenn. 407 p.
This paper reviews the various sources of thermal pollution and the resulting problems in the environment.
- Lyman, H. 1974. Successful Bluefishing. International Marine Publishing Co., Camden, Maine. 112 p.
The findings of the studies on bluefish feeding and activity are used in a book of interest to sportsfishermen.
- Olla, B. L. 1971. I. The effect of temperature on the activity of adult Atlantic mackerel, Scomber scombrus. AEC Report (49-7) 3045: 1971.
This report summarizes the effects of rapid continual increases of temperature to lethal levels as well as several gradual step increases.
- Olla, B. L. 1972. II. The effect of temperature on the activity of adult Atlantic mackerel, Scomber scombrus. AEC Report (49-7) 3045: 1972.
This report summarizes the effects of high temperature acclimation followed by two gradual step increases to upper incipient lethal levels and the resultant changes in feeding levels.
- Olla, B. L. 1973. III. The effect of temperature on the activity and feeding of adult Atlantic mackerel, Scomber scombrus. Some factors to be considered in the conduct of finfish bioassays. AEC Report (49-7) 3045.
This study reports (1) the effects of identical temperature increases within preferred ranges on activity and feeding patterns of mackerel at different seasons and (2) summarizes the experimental study of behavior in light of the need for changes in bioassay methodology.
- Olla, B. L. 1974. (1) Comparative studies on the responses of young tautog, Tautoga onitis and juvenile bluefish, Pomatomus saltatrix to increasing temperatures. (2) The effect of temperature on fish-to-fish attraction in an inshore schooling species, striped mullet, Mugil cephalus. (3) The activity, habitat preference, home range and feeding in the cunner, Tautoglabrus adspersus. AEC Report (49-7) 3045.
This study reports (1) the differences in response capability of representative pelagic and demersal species types; (2) the reduction in fish-to-fish response at high sublethal temperatures; (3) the normal environmental requirements of an inshore demersal species, cunner.
- Olla, B. L. (ed.). 1975. Behavioral measures of environmental stress. In: Proceedings of the Marine Technology Society's Marine Bioassay Evaluation Workshop. In Press.
This chapter details the need for and use of behavioral measures in bioassay tests on marine organisms.
- Olla, B. L. 1975. The use of behavior to measure the effects of petroleum on marine organisms. In: The Proceedings of the Conference on Marine Environmental Implications of Offshore Drilling in the Baltimore Canyon Region of the Mid-Atlantic Coast. In manuscript.
This paper reviews the need for and use of behavior in measures assessing and predicting the effects of petroleum and/or petroleum products on marine organisms.

- Olla, B. L., A. J. Bejda and A. D. Marine. 1974. Daily activity, movements, feeding and seasonal occurrence in the tautog, Tautoga onitis. Fish. Bull., U. S. 72:27-35.
This paper describes the life habits and environmental requirements, derived from in situ observations, of the tautog.
- Olla, B. L., A. J. Bejda and A. D. Martin. 1975. Activity, movements and feeding behavior of the cunner, Tautogolabrus adspersus, and comparison of food habits with the coresident tautog, Tautoga onitis. In review.
This paper describes the life habits and environmental requirements of cunner and feeding interrelationship with tautog.
- Olla, B. L., H. M. Katz and A. L. Studholme. 1970. Prey capture and feeding motivation in the bluefish, Pomatomus saltatrix. Copeia 1970: 360-362.
This study describes the different phases of the feeding response and the effect of prey size on feeding motivation.
- Olla, B. L. and C. Samet. 1974. Fish-to-fish attraction and the facilitation of feeding behavior as mediated by visual stimuli in striped mullet, Mugil cephalus. J. Fish. Res. Board Can. 31:1621-1630.
This paper describes the role of vision in social attraction and feeding behavior of striped mullet.
- Olla, B. L., C. E. Samet, and A. L. Studholme. 1972. Activity and feeding behavior of the summer flounder (Paralichthys dentatus) under controlled laboratory conditions. Fish. Bull., U. S. 70:1127-1136.
This paper describes activity cycles, feeding and swimming patterns of adult flounder under controlled laboratory conditions.
- Olla, B. L. and A. L. Studholme. 1971. The effect of temperature on the activity of bluefish, Pomatomus saltatrix L. Biol. Bull. 141: 337-349.
This paper describes the effects of thermal stress on activity, feeding and schooling in bluefish.
- Olla, B. L. and A. L. Sthdholme. 1972. Daily and seasonal rhythms of activity in the bluefish (Pomatomus saltatrix). In: H. E. Winn and B. L. Olla (eds.). Behavior of Marine Animals: Current Perspectives in Research. Vol. 2, p. 305-325. Plenum Press, New York.
This paper describes the normal daily and seasonal activity, feeding and schooling behavior of bluefish under controlled laboratory conditions.
- Olla, B. L. and A. L. Studholme. 1975. The effect of temperature on the behavior of young tautog, Tautoga onitis (L.). Proceedings of the Ninth European Symposium on Marine Biology. In Review.
This paper describes changes in activity, territoriality, feeding and shelter - dependence of young tautog at elevated, sublethal temperature.

Olla, B. L., R. Wicklund and S. Wilk. 1969. Behavior of winter flounder in a natural habitat. *Trans. Amer. Fish. Soc.* 98:717-720.
This study describes field observations of winter flounder activity and feeding at different times of the day and at different ambient temperatures.

Parker, F. L. and P. A. Krenkel. 1970. Physical and engineering aspects of thermal pollution. CRC Press, Cleveland, Ohio.
This paper reports specific demands on aquatic environments due to the increased cooling water requirements for both thermonuclear and fossil-fueled steam electric power plants.

Ricciuti, E. R. 1973. Killers of the Seas. Walker Inc. N. Y. 308 p.
The information on bluefish feeding behavior and prey-size discrimination is used in this book written for the general public.

Sosin, M. 1973. How long can the bluefish last? pp. 66-70. In: Sportfishing 9(1), Yachting Publishing Corp., New York.
This article uses the research results of this Task in a popularized report on bluefish life habits.

Sprague, J. B. 1971. Measurement of pollutant toxicity to fish. III. Sublethal effect and "safe" concentrations. *Water Research* 1971. 5:245-266.
This paper points up need for change in bioassay methodology particularly with respect to incorporating behavioral measures.

Swedmark, M., A. Grammo and S. Kolberg. 1973. Effects of oil dispersants and oil emulsions on marine animals. *Water Research* 7:1649-1672.
This paper summarizes the results of a comparative study of the toxicity of a number of oil dispersants to a variety of marine animals.

Takahashi, F. T. and J. S. Kittredge. 1973. Sublethal Effects of the Water Soluble Component of Oil: Chemical Communication in the Marine Environment in the Microbial Degradation of Oil Pollutants, D. G. Ahearn and S. P. Meyers (eds.). Center for Wetland Resources, Louisiana State University, Publication No. LSU-SG-73-01, pp. 259-264.
This paper discusses the effects of oil on sexual and feeding in behavior, as mediated by chemoreception in the lined shore crab, Pachygrapsus crassipes.

Thermal pollution of water. Panel discussion, Fourteenth Annual Conservation Conference, National Wildlife Federation, Washington, D. C., December 1967. This paper is an analysis of problems imposed upon different environmental communities from effects of thermal additions.

U. S. Atomic Energy Commission. Nuclear reactors built, being built or planned in the United States as of June 30, 1968.
This study reports the status of thermonuclear power plants, both established and anticipated.

Zobell, C. E. 1969. Microbial modification of crude oil in the sea. pp. 317-326. In: Proceedings: Joint Conference on Prevention and Control of Oil Spills, 1969. American Petroleum Institute, New York, N. Y.

This paper discusses the microbial breakdown of a variety of crude oils under various environmental conditions.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 1974

(Submit five copies by Jan. 2)

To: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER		3. OBJECTIVE CODES				4. RANK	
MAC-007-77-EI-A-1		A	B	C	D	BY TARGET	BY + 1 INC.
						4	4
TASK NUMBER		6. TASK TITLE					
8818P2		Impact of Environmental Change, Middle Atlantic					
ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
FB6100		Ecosystems Investigations				City	State
						Sandy Hook	NJ

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	LINE NO.	CURRENT YEAR FY 19 <u>75</u>		BUDGET YEAR FY 19 <u>76</u>		BUDGET YEAR + 1 FY 19 <u>77</u>	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	43.3		67.0		67.0	
11. Travel	19	.3		.3		.3	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						
14. Grants (Funds obligated)	58						
15. Supplies	53	6.1					
16. Capital Equipment	54	1.5					
17. Other (All other obligations)		5.1		5.7		5.7	
18. Total Direct Funds (Add lines 10 through 17 above.)		56.4		73.0		73.0	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		5		5		5	
20. Positions, Other (Number applicable to this Task.)		1		3		3	
21. Man-years, Permanent		4.3		3.2		3.2	
22. Man-years, Other		2.2		2.8		2.8	
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature)  John B. Pearce Dir. of Investigatons	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  Carl J. Sindermann, Center Director
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NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER
MAC-007-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR											
							+1		+2		+3		+4		+5			
			1	2	1	2	1	2	1	2	1	2	1	2	1	2		
				A	B	C	D	E	F	G	H	I	J	K	L	M	N	
7	A	BCT baseline survey (5 quarterly cruises).																
8	A	Macrofaunal processing, analysis (500 baseline samples), quarterly reports.			X	---	X											
9	M	Report on baseline ecology of BCT area and shoreward.			X	-----	X											

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-007-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist	11/2	Robert Reid	100
Fishery Biologist	9/2	Richard McGrath	100
Fishery Biologist	7/2	David Radosh	100
Supv. Fishery Biologist (Res.)	15/2	John B. Pearce	20
Secretary/Steno	4/1	Virginia Boeckel	20

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- STATEMENT OF NEED
- ACTIVITY PLAN
- TASK OUTPUTS AND BENEFITS
- IMPACT OF TASK AUGMENTATION
 - a. Current Year
 - b. Budget Year
 - c. Budget Year + 1
- 33. CRITERIA FOR TASK COMPLETION.
- 34. BACK-UP DOCUMENTATION
 - a. Detail Documentation (Provide one sentence description.)
 - b. Related tasks and research presently being conducted
 - c. Indicate the Congressional legislative requirements.
 - d. Indicate the Environmental Impact Statement (EIS) requirements.

29. STATEMENT OF NEED

A. Principal objective to which this Task contributes: NMFS Goal IV, Subgoal A, Objective 9 - "Determine the impact of environmental change in the Middle Atlantic Region".

A. 1) a. Need or problem:

Resources of Middle Atlantic coastal waters are valued by a wide variety of user groups, who often place conflicting demands on these waters. Coastal and estuarine systems are important as feeding, spawning and/or nursery areas for 60-70% of our commercial fish species, and all shellfish resources. Waters of the New York metropolitan area also fill an important need for an estimated 15 million sport-fishermen. Sizeable industries are built around swimming, boating and aesthetic uses of the Middle Atlantic coast.

These waters also serve a number of needs (including disposal of many types of wastes, cooling of power plant generators, sand and gravel mining, commercial shipping and all other oil industry-related uses) which often have detrimental impact upon the region's renewable resources. Environmental degradation in Long Island Sound (LIS) has forced the closing of over 75,000 acres of shellfish beds. The benthos of LIS has recently experienced a "population crash" whose causes and spatial and temporal extent require study. Also at issue and needing investigation are the cumulative effects of the various dredging projects underway in LIS. Raritan Bay's (RB) commercial finfishery has dropped to a tenth of its value at the turn of the century, and several commercial shellfish have largely disappeared from areas where they were once harvested. Similar impacts, although seen in the apex of the New York Bight, have not yet affected much of the New Jersey coastal (NJC) and offshore waters. The likelihood of heavy future demands on the latter waters for waste disposal, power plant cooling, and especially oil exploration, mining, and transport, place their renewable resources in the endangered category.

Present knowledge of the area's environmental conditions, long-term fluctuations and reactions to man's activities is grossly insufficient to assure wisest management of resources. The need or problem here is fourfold:

- 1) To assess areas of present degradation in terms of types and extent of contaminants present, and effects on resources and overall ecology, with the goal of guiding management strategies for rehabilitation.
- 2) To concurrently gather baseline data on presently undegraded areas, to enable predictions of environmental impacts and to document future environmental changes and effects on resources.
- 3) To plan and carry out long-term monitoring of both degraded and "pristine" areas, so that effectiveness of management efforts can be evaluated, and future natural and man-induced fluctuations charted.

4) To combine information from the above three activities with data from other Tasks and related research, to finally attain a basic understanding of the characteristics and dynamics of the Middle Atlantic's marine environment.

A. 1) b. Rationale for NMFS involvement:

NMFS is uniquely qualified to carry out the proposed ecosystems studies in the Middle Atlantic Bight. The siting of MACFC's laboratories insures good coverage of these waters. MACFC has the facilities and capabilities to carry out investigations of a broad, ecosystems scope. Proposed studies in LIS, RB, and along the NJC are a logical and necessary extension of subtasks which have been active for the past 2½ years in all three areas. Extensive surveying has already been completed in the Baltimore Canyon Trough (BCT) area (May 1974); samples analyses are well underway and a preliminary report on benthic communities has been prepared. This area should be of special concern to NMFS due to the magnitude and nature of proposed activities, and the concern over their impacts on fisheries (Jensen, 1974).

The waters border on four states, so ecosystem investigations by agencies or institutions at the State (or lower) level cannot be expected to give the broad understanding and overview necessary for regional management. A report on the decline of New York State's commercial fisheries (Francis and Busch, 1973) states that only large-scale Federal measures can halt or reverse this decline.

NMFS involvement in baseline-impact studies of the sort proposed here is also encouraged in a memorandum of Dr. White (FY 76 Program Guidance, Mar. 4, 1974), and in the Office of Resource Research's Program Emphasis Document for FY 1977 (p. 10).

A. 2) Primary recipient of the information:

Given the highly urbanized nature of the region and the demand for recreational and aesthetic resources, the chief recipient or beneficiary of improved environmental understanding, management and quality would be the general public, and those States whose waters are affected. Commercial and sportfishing industries will benefit in those specific instances in which populations increase due to preservation or restoration of spawning areas, food sources, and other factors important to population dynamics.

A. 3) The studies described in the Activity Plan will go far toward attaining the objective of determining impacts of environmental change for our region. The investigations are designed to provide comprehensive environmental baselines, and to document ecological reactions to natural and man-caused changes over time. All Subtasks focus on characteristics and dynamics of benthic macrofauna, which are widely regarded as the most sensitive indicator group of

environmental conditions and stress-induced change (Boesch, 1972; Gage, 1972; Reish, 1972; Wilhm, 1967). Several benthic species occurring in the study area (scallops; hard, soft and surf clams; oysters; and blue, rock and red crabs) are of considerable importance as resource species. Other benthic organisms are of ultimate importance in the food webs culminating in species of commercial and recreational importance. Less directly, but perhaps of even greater significance, data generated from benthic studies can give us the quickest possible feedback as to success of managerial efforts, and can supply the earliest possible biological warning of further environmental degradation or impacts in new offshore areas proposed for development.

- B. NMFS Goal II, Subgoal D, "Provide descriptions and analyses of marine organic production systems and of biological, physical and chemical environmental conditions and define their influence on the abundance and distribution of living marine resources" is probably even more applicable than IV-A-9 to the projects of this Task. No objective has yet been designated for MACFC within Subgoal II D, however.

30. ACTIVITY PLAN

All projects are based on sampling grids, transects, or stations located within stratified sampling areas and censused with the Smith-McIntyre quantitative grab sampler. Whenever possible, five samples are sieved and returned for laboratory analysis of benthic macrofauna. Subsamples of sediment are analysed for grain size characteristics and heavy metals content. Water samples are routinely taken for determination of temperature, salinity and dissolved oxygen, and often for nutrients. Data are reduced to a standardized logsheet format for direct keypunching and ADP storage. Computer-plotted SYMAPs are used to examine distributions of selected parameters. Population densities, diversities and community structures of benthic macrofauna are investigated. Multivariate analysis is used to establish correlations among macrofauna species, and between fauna and sediment types and contaminant indices (heavy metals, nutrients and dissolved oxygen). More detailed information on methodologies, sampling patterns and schedules is contained in such documents as MACFC Informal Report No. 42 (environmental baselines in LIS) and McGrath (preliminary results of RB benthic census). Supplementary laboratory studies of macrofauna will be carried out to gain a better understanding of the distributions, fluctuations and interactions observed in field data. This work will initially concentrate on species whose presence or absence appears to be a good indicator of environmental contamination. Studies will include tolerances to temperature, salinity and dissolved oxygen levels, the latter measured with a Gilson respirometer. Organisms will also be tested for sediment type preferences and for reactions to sediment with and without high concentrations of heavy metals and other contaminants. The chief objective of these experiments is to ascertain which of the many naturally-occurring variables are most important in determining observed field distributions of benthic macrofauna. The experiments will later be repeated on models of natural communities, such as that established by Blake and Jeffries (1971). This experimental physiological-ecology effort will be closely coordinated with the Bio-chemical Modeling task.

Relation between Activities and Events: Events #3 and 4 are reports based on samples already collected and processed, with results now being analysed. Activity #1 includes all data collected in the first benthic census. The report on this data will establish a baseline for the benthic characteristics of RB, and thus is considered a Milestone (#2). Activity #7 will yield data on changes from this baseline over time. Activity #6 will do the same for the Ambrose Channel dredging area. Laboratory studies (Activity #5) will relate to findings of field surveys not only in RB, but also in the other project areas and in related Tasks, such as Biochemical Modeling and the New London dredging-spoiling survey.

Number 8, the baseline report on LIS, is a Milestone based on cruises completed in 1972 and 1973 (but benthic macrofauna from only the first of these cruises). The baseline information will be used to prepare publications (Activity #9), while remaining benthic samples are processed to extend the baselines and examine their seasonality (Activity #10). As in RB, follow-up sampling (Activity #11) and report (Event #12) are projected to document long-term behavior of this environment.

Event #13 will be the issuance of a report based on data gathered in 1972-1973. Remaining benthic samples taken during this period will be processed (Activity #14) to contribute to the milestone report (#19) on baseline ecology seaward of the New Jersey shore. Activity #16 concerns samples gathered during Activity #15; Activity #18 bears the same relationship to Activity #17. All the BCT information, as well as NJC data, will be pooled in the baseline report on these areas (Milestone #19).

31. TASK OUTPUTS AND BENEFITS

- A. 1) Significant outputs: the reports on the EPA field testing and Ambrose Channel areas in RB; baseline and follow-up reports on all study areas; and publications on aspects of Task investigations.
- A. 2) Relation to needs and recipients: all of these outputs are directed toward providing one or more of the information needs identified above (assessing degraded areas, compiling baselines for all areas, monitoring for long-term changes and effectiveness of management programs, and increasing understanding of the Middle Atlantic's marine environment). By addressing these needs, all outputs can benefit the general public and the pertinent commercial and sportfishing interests.
- B. Benefits: These are difficult to quantify. All inshore surveys have a sampling density of at least one station per six square miles of surface area. Assuming this coverage is satisfactory for baseline purposes, then the needs to characterize, monitor and understand the benthic portions of the inshore areas will be fully satisfied. The BCT investigation cannot, of course, give similar coverage for the Middle Atlantic Bight; it can, however, answer at least 75% of the same needs for the areas expected to receive heaviest impacts from oil-related activities. BCT data will also be combined with information generated from MESA's inshore and deep water studies to provide more extensive coverage of the continental shelf. These integrated data will be presented via SYMAP and other data display systems. When this

data is added to that of MACFC's Resource Assessment Investigations, an understanding of the New York Bight's total environment will be possible.

32. IMPACT OF TASK AUGMENTATION

- A. Current Year - no increases requested.
- B. Budget Year - the requested increase is necessary to process existing backlog of benthic samples for the RB and LIS projects, and thus to complete the existing baseline characterization. The increase is also required if long-term follow-up studies are to begin. Without these studies, application of present baseline data is of much less value. Reimbursible support is expected and will be necessary if present BCT samples are to be analyzed and future studies completed.
- C. Budget Year + 1 - same increase required as for BY, since workup of existing samples will continue for LIS and long-term surveys will be in effect for LIS, RB and BCT.

33. CRITERIA FOR TASK COMPLETION

N/A as per instructions.

34. BACK-UP DOCUMENTATION:

A. Documentation.

1) Cited in this TDP:

Blake, N. J. and H. P. Jeffries. 1971. The structure of an experimental infaunal community. *J. exp. mar. Biol. Ecol.* 6: 1-14.

Boesch, D. F. 1972. Species diversity of marine macrobenthos in the Virginia area. *Ches. Sci.* 13: 206-211.

Francis, J. D., and L. Busch. 1973. New York State's Commercial Fisheries: Industry and manpower projections. *New York's Food and Life Sciences Bulletin*. No. 28, June 1973.

Gage, J. 1972. Community structure of the benthos in Scottish sea-lochs. I. Introduction and species diversity. *Marine Biol.* 14: 281-297.

Jensen, A. 1974. Sport fisheries and offshore oil. *New York Fish and Game Journal* 21: 105-116.

Middle Atlantic Coastal Fisheries Center. Environmental baselines in Long Island Sound. Informal Report No. 42. (In preparation).

- McGrath, R. A. 1974. Benthic macrofaunal census of Raritan Bay - preliminary results. Pa. No. 24, Proc. 3rd Symp. Hudson R. Ecol. Mar. 22-23, 1973. Bear Mt., N. Y. Hudson R. Environ. Soc.
- Reish, D. J. 1972. The use of marine invertebrates as indicators of varying degrees of marine pollution. In: M. Ruivo, Ed., Marine Pollution and Sea Life. Rishing News, Ltd., Surrey, England.
- Wilhm, J. L. 1967. Comparison of some diversity indices applied to populations of benthic macroinvertebrates in a stream receiving organic wastes. J. Water Poll. Con. Fed. 39(10): 1673-1683.
- 2) Background materials concerned with pollution and deterioration in coastal and estuarine water including Long Island Sound, Raritan Bay and the New York Bight:
- Austin, H. M., J. Dickinson and C. Hickey. 1973. An ecological study of the ichthyofauna at the Long Island Lighting Company (LILCO) Fossil Fuel Power Generating Facility at Northport, Long Island, New York, 1972. Prepared for LILCO by the Fisheries Oceanography Department of the New York Ocean Science Laboratory (NYOSL). Final Report. Contract No. SR 72-23F. 248 pp.
- Bloom, S., A. Levin, and G. Raines. 1969. Mathematical Simulation of Ecosystems. A preliminary model applied to a lotic freshwater environment. Battelle Memorial Institute, Columbus, Ohio. 23 pp.
- D'Agostino, A. D. and W. A. Colgate. 1973. Infaunal Invertebrates in the Near Shore Waters of Long Island Sound. Final Report. Contract SR 72-22 (LILCO). 28 pp.
- Dehlinger, P., W. F. Fitzgerald, S. Y. Feng, D. F. Paskausky, R. W. Garvine, and W. F. Bohlen. 1973. A determination of Budgets of Heavy Metal Wastes in Long Island Sound. First Annual Report. Univ. of Connecticut; submitted to Office of Sea Grant Programs, NOAA.
- Federal Water Pollution Control Administration. 1967. Proceedings: Conference on Pollution of Raritan Bay and adjacent interstate waters, Vols. 1-3. FWPCA.
- Haskin, H. H. and A. S. Merrill. 1973. Preliminary Report under Cooperative Agreement dated June 15, 1972 between National Marine Fisheries Service and Rutgers the State University to Conduct an Inshore Inventory of Surf Clams along the New Jersey Coast. Sandy Hook Laboratory. Unpublished Report. 11 pp.
- Holme, N. and A. McIntyre. 1971. Methods for the study of marine benthos. IBP Handbook No. 16. Blackwell Scientific Publ. Oxford. 334 pp.

- Jansson, B. and H. Odum. 1972. Ecosystem approach to the Baltic problem. Bulletins from the Ecological Research Council, Stockholm. 82 pp.
- Marine Sciences Research Center, State University of New York. Technical Report Series, Nos. 2-17 concern various investigations of Long Island Sound and the nature of dredged wastes.
- National Academy of Sciences. 1970. Wastes Management Concepts for the Coastal Zone: Requirements for Research and Investigation. NAS, Washington. 126 pp. In particular note chapters 5 (Biological Effects), 6 (Recommended research and investigation for effective coastal wastes management), and 7 (Suggested priorities and estimated minimum effort required).
- National Academy of Sciences. 1971. Marine Environmental Quality: Suggested Research Programs for Understanding Man's Effect on the Oceans. NAS, Washington. 107 pp. In particular note chapter 5 (The effects on marine organisms; selecting organisms and systems for study, p. 66; importance of a conceptual framework, p. 67).
- National Marine Fisheries Service. 1972. NMFS, Ocean Fisheries and Living Marine Resources, Program Memorandum, FY 1974-1978.
- New England River Basins Commission. 1971. Plan of Study: Long Island Sound Regional Study. 92 pp. plus Appendix of 201 pp.
- New Jersey Department of Environmental Protection. 1971. Studies of the Mullica River - Great Bay Estuary. Misc. Report No. 6M (Completion Report for Project 3-78-R-1 and 2 under the Commercial Fisheries Research and Development Act). 62 pp. plus numerous figures and tables. One of very few reports on Jersey coastal waters.
- Sandy Hook Sport Fisheries Marine Laboratory, NMFS. 1971. Review of aquatic resources and hydrographic characteristics of Raritan, Lower New York and Sandy Hook Bays. A Report Prepared for Battelle NW. Highlands, 71 pp.
- Sandy Hook Laboratory, NMFS. 1972. The effects of waste disposal in the New York Bight. Final Report.
- Sandy Hook Laboratory, NMFS. 1972. Davids Island Phase I: A Short-term ecological survey of western Long Island. A Report Prepared for Battelle NW. Highlands. 33 pp. plus 25 figs. and 65 tables.
- U. S. Environmental Protection Agency. 1971. Proceedings Conference in the Matter of Pollution of the Interstate Waters of Long Island Sound and its Tributaries - Connecticut, New York. April 13-14, 1971. New Haven, Ct.

Westinghouse Electric Corporation. 1972. Final Program Report:
Program Development Plan for the MESA-New York Bight Regional
Project.

B. Related Activities.

- 1) Related Tasks: Biochemical Modeling, (Sandy Hook); Environmental Chemistry and Microbiology (Milford); IEC M&E contaminants analysis, Biological Oceanography (Sandy Hook); Pathology (Oxford) and Biological effects of dredging and spoil disposal, New London, Ct.
- 2) Related Research: This entire task is directly related to the NOAA-MESA Program. Raritan Bay subtask is directly related to EPA research in RB and Long Island subtask is responsive to New England River Basins Commission and its formal investigations.

In LIS, the University of Connecticut is conducting work on heavy metal budgets, circulation and transport of suspended materials under Sea Grant. Yale University is studying effects of dumping dredge spoils from New Haven Harbor. State Univ. of N. Y., Stony Brook, and SUNY-Maritime College, Fort Schuyler, N. Y., are investigating circulation phenomena. The New York Ocean Science Laboratory, Montauk, N. Y., is involved in research on water movements, heavy metals in waters and organisms, and effects of power plants, all in eastern LIS.

COE, SUNY, NYOSL investigations on effects of spoil disposal, Eaton's Neck, LIS.

USGS cooperative cruises with this Task for BCT survey.

C. The proposed Task can be carried out within existing legislation.

- 1) The proposed Task has no direct impact on the environment, and no Environmental Impact Statement is required.

VESSEL REQUIREMENTS:

Operations are normally conducted from vessels under 65 feet operated by MACFC and scheduled as needed by the Officer-in-Charge.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 1974

(Submit five copies by Jan. 2)

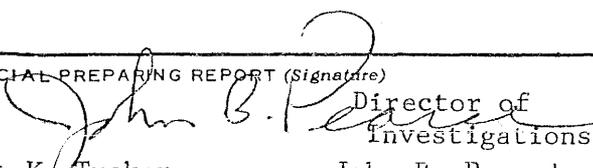
TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER		3. OBJECTIVE CODES				4. RANK	
MAC-008-77-EI-A-1		A	B	C	D	BY TARGET	BY + 1 INC.
5. TASK NUMBER		6. TASK TITLE					
8818P3		Biochemical Modeling, Middle Atlantic					
7. ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
FB6100		Ecosystems Investigations				City	State
						Sandy Hook	NJ

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	EN J L O U	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	88.5		63.2		63.2	
11. Travel	19	.5		.5		.5	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52	2.0		2.0		2.0	
14. Grants (Funds obligated)	58						
15. Supplies	53	10.2		7.5		7.5	
16. Capital Equipment	54	2.5		2.0		2.0	
17. Other (All other obligations)		7.4		5.5		5.5	
18. Total Direct Funds (Add lines 10 through 17 above.)		111.1		80.7		80.7	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		4		4		4	
20. Positions, Other (Number applicable to this Task.)		1		1		1	
21. Man-years, Permanent		7.2		4.2		4.2	
22. Man-years, Other		.8		.8		.8	
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

4. OFFICIAL PREPARING REPORT (Signature)  Robert K. Tucker John B. Pearce Director of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  Carl J. Sindermann, Center Director
--	---

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-008-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X"s" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	75 CY		76 BY		77 BUDGET YEAR									
							+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	A	Characterize crab gill ion transport systems and test <u>in vitro</u> effects of metals on them.	X													
2	A	Test <u>in viro</u> effects of metals on lobster gill ion transport.	X	X												
3	E	Report on effects of metals on gill ATPase enzymes.			X											
4	M	Report on effects of temperature on larval settling.		X												
5	A	Assay metal effects and synergisms with natural environmental stresses on various physiological parameters of experimental animals (including respiration, metabolism, permeability, nervous and hormonal integration, energy and redox pathways, etc.)						X								
6	A	Develop semi-automatic larval culture procedures and rear larvae for assay.				X										
7	A	Develop modeling format, establish sampling procedures for organically bound metals, and carry out sampling in Raritan Bay.				X										
8	A	Develop analytical techniques for metal analysis (polarography) and for environmental organics (chromatography, etc.).				X										
9	A	Carry out laboratory investigations of metal-organic interactions.	X		X											
10	A	Assay physiological effects of organically bound metals on previously characterized biological systems.	X			X										
11	M	Present model of effects of metal-organic interactions on biological systems.					X									
12	A	Carry out environmental studies of settling and distribution of natural and man induced metal-organic complexes.		X				X								
13	A	Extend laboratory studies of effects of complexes on animals to field, with emphasis on trophic interactions.			X			X								
14	M	Present environmental model of metal-organic interactions (incorporating information on previous model).							X							

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-008-77-EI-A-L

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no Incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Res.)	12/2	Tucker, Robert	100
Fishery Biologist	11/2	Young, James	100
Oceanographer	7/2	Matte, Albert	100
Chemist	5/4	Draxler, Andrew	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- | | |
|--------------------------------|--|
| C. STATEMENT OF NEED | 33. CRITERIA FOR TASK COMPLETION |
| D. ACTIVITY PLAN | |
| E. TASK OUTPUTS AND BENEFITS | 34. BACK-UP DOCUMENTATION |
| F. IMPACT OF TASK AUGMENTATION | a. Detail Documentation <i>(Provide one sentence description.)</i> |
| a. Current Year | b. Related tasks and research presently being conducted. |
| b. Budget Year | c. Indicate the Congressional legislative requirements. |
| c. Budget Year + 1 | d. Indicate the Environmental Impact Statement (EIS) requirements. |

29. STATEMENT OF NEED

This task is most directly related to Goal IV, Subgoal A within the proposed MBO plan - the determination of environmental changes. However, the task contributes also to other goals, particularly Subgoal D of Goal II, and indirectly to Goals I and III. In order to protect and manage the fisheries for which NMFS is responsible, it is imperative that we gain an understanding of the effects of pollutants, as they actually exist in the natural environment, on living marine resources. For metals, little data is available about valence states or solubilities under complex environmental conditions, and particularly about the extent of binding or chelation to natural or pollution related organic compounds. Additionally, it is known that a combination of stresses can produce synergistic effects on organisms greater than the additive effects of individual challenges to the well-being of the animal. In coastal and estuarine waters, metal and organic pollutants are often likely to exist together, as with sewage sludge and dredge spoil in the New York Bight. These areas are among the most naturally productive of the marine environments and may serve as nursery grounds for a multitude of species, yet they are subject to multiple contamination sources and, with the advent of offshore drilling, possible additional organic pollution. It is in these areas as well, that animals are exposed to additional stresses, such as salinity or temperature gradients that increase the likelihood of adverse synergistic interactions. This task seeks to determine actual forms of metal-organic pollutants, their cycling through the marine ecosystem, their effects on marine organisms alone and in combination with other, possibly, synergistic stresses. The information gained from this task can be used in managing marine coastal and estuarine ecosystems important to sport, commercial, and forage species. Data generated will contribute to other tasks within MACFC and to MESA, and will be of particular use to such groups as the Tri-State Planning Commission, the New England River Basins Commission, to utilities and the petrochemical industry, as well as to those concerned with recreational and commercial fisheries.

30. ACTIVITIES PLAN

This task requires the development of several initially discrete subunits including the biochemical and physiological characterization of the assay systems, larval culture, environmental sampling, and analytical techniques for metals and organics. These subunits will then be combined to generate data to construct a quantitative model of effects of organically bound metals on marine animals in the ecosystem. Sampling will be three-dimensional with particular emphasis on surface layers and on interactions with bottom sediments. Analytical techniques for metals will include UV irradiation to distinguish between organically bound and free ions and pulsed anodic stripping polarography, a method sensitive in the parts per billion range and having the capability of distinguishing binding and valence states.

Chromatographic, electrophoretic, and spectrophotometric methods will be used for analyzing organics. Equilibrium dialysis, linked substrate chromatography, centrifugation and other relevant techniques will be used in conjunction with polarography to determine binding interactions of metals and organics.

Larval rearing will be adapted from methods developed by Costlow and Bookhaut at Duke Marine Laboratory with the culture methods partially automated. Laboratory investigations of shrimp will be undertaken in a system in which several environmental parameters, including temperature, light, salinity, oxygen levels and contaminant concentrations can be simultaneously controlled.

Physiological and biochemical parameters to be assayed will be chosen on the basis of expected sensitivity to environmental influences. Ion transport, being a membrane phenomenon, is particularly exposed to metal contaminant perturbations; enzymes, such as the Na+K+ATPase, and amino acid metabolism, important in osmoregulation in marine invertebrates, will be investigated as assay systems. Respiration, measured in a Gilson Respirometer, growth and molting of larvae are among other parameters on which metal-organic contaminant effects will be studied.

Data from field environmental sampling and analysis, binding studies, and assays of effects on organisms, will be used to generate an ecosystem model for the interactions of metals with organics and their effects on living marine resources.

31. TASK OUTPUTS AND BENEFITS

Significant outputs of this task will be physiological-ecological models generated from data of investigations of metal-organic interactions, effects of these combinations on physiological parameters of marine organisms, environmental distribution and behavior of metal-organic complexes, and effects on animals in the natural environment. These models will serve the purpose of generalizing the data developed from the study, making possible extrapolation to other similar conditions. Such models will contribute to an understanding of contaminant cycling in marine ecosystems, of effects of contaminants on marine life, and of effects of man induced changes on marine organisms. Thus these quantitative, mathematical models will directly contribute to management of living marine resources and will be of particular benefit to user groups identified in Block 29. Outputs will also consist of written reports and papers for scientific journals.

32. IMPACT OF TASK AUGMENTATION

N/A

33. CRITERIA FOR TASK COMPLETION

34, BACK-UP DOCUMENTATION

- a) Informal Report No. 4 - MACFC, NMFS: summaries of investigations within the Center, some of which relate to this task.

Informal Report No. 5 - MACFC, NMFS: summary report, 1971-72, of cooperative contaminant program within the Center.

Effects of Waste Disposal in the New York Bight: report of Sandy Hook Laboratory, MACFC, NMFS, to U. S. Army Corps of Engineers; indicates extent of heavy metal accumulations in waste disposal areas of New York Bight.

- b) Portions of the tasks within MACFC: Impact of Environmental Change of New York Bight (MESA); Ecosystems Analysis Coastal Ecosystems; and Environmental Effects on Behavior are related to the present task. Considerable research on effects of metals is being carried out under state, university and private auspices, but relatively little involves organically complexed metals.
- c) No additional congressional legislation is required to carry out this task; the task can be done within existing legislation.
- d) No Environmental Impact Statement will be required for this task since the task, per se, will not affect the environment.
- e) The task will not contribute to the Extended Jurisdiction initiative.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 11, 1974

(Submit five copies by Jan. 2)

0: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

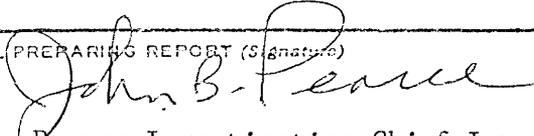
TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.
AC-009-77-EI-A						

TASK NUMBER	6. TASK TITLE
8818P4	Microbiology and Chemistry, Middle Atlantic

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION	
FB6300	Ecosystems Investigations	City Milford	State Conn.

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	UNIT CODE	CURRENT YEAR FY 19 75		BUDGET YEAR FY 19 76		BUDGET YEAR + 1 FY 19 77	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	123.1		124.3		124.3	
1. Travel	19	2.2		2.2		2.2	
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52	1.0		1.0		1.0	
4. Grants (Funds obligated)	58						
5. Supplies	53	16.1		15.5		15.5	
6. Capital Equipment	54	1.5		2.5		2.5	
7. Other (All other obligations)		12.8		12.9		12.9	
8. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		156.7		158.4		158.4	
9. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		7		7		7	
10. Positions, Other <small>(Number applicable to this Task.)</small>		4		4		4	
11. Man-years, Permanent		10.2		7.2		7.2	
12. Man-years, Other		2.2		4.0		4.0	
13. Reimbursable Support <small>(Reimbursable agreements only)</small>							

REMARKS

OFFICIAL PREPARING REPORT (Signature)  John B. Pearce-Investigation Chief Invest.	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  Carl J. Sindermann, Center Director
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NMFS TASK DEVELOPMENT PLAN

TDP NUMBER
MAC-009-77-EI-A

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	77 BUDGET YEAR													
			CY 75		BY 76		+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
			A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	A	Long Island Sound Research - monitor.	X								X					
2	A	New York Bight - collections; lab analyses		X	X	X										
3	A	New York Bight - outside apex.		X	X	X	X									
4	A	New Jersey Coast Survey.			X					X						
5	A	Hydrocarbon - PCB analysis; Long Island Sd., New York Bight.	X													X
6	A	Cooperative support - Center Tasks including experimental biology, MESA, etc.	X													X
7	E	Report Long Island Sound.	X		X		X									
8	E	Report New York Bight (chem-micro).		X		X			X							
9	E	Report finrot NYB		X												
0	M	Manuscript preparation.	X													X

7. OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-009-77-EI-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Supv. Microbiologist	13/6	John Graikoski	100
Chemist	12/6	Richard Greig	100
Microbiologist	11/5	John Babinchak	100
Biologist	11/2	Shearon Dudley	100
Microbiologist	7/5	Maureen Nitkowski	100
Chemist	7/3	Douglas Wenzloff	100
Physical Science Aid	5/1	Betty Ann Nelson	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

a. Detail Documentation (Provide one sentence description.)

a. Current Year

b. Related tasks and research presently being conducted

b. Budget Year

c. Indicate the Congressional legislative requirements.

c. Budget Year + 1

d. Indicate the Environmental Impact Statement (EIS) requirements.

MAC-009-77-EI-A

29. STATEMENT OF NEED

The present Task meets NMFS Objective IV-A-9 and is concerned with the effects of man-induced pollution, both chemical and microbial, on living marine resources and their environment. As examples, microbial species belonging to the genus Clostridium, Aeromonas, Vibrio, Yesernia, Gaffkya, Prorocentrum, Gonyaulax, Gymnodinium, and the chemicals, mercury, DDT, as well as a wide range of petrochemicals have been identified in regards to diseases of the fishery resource, food poisoning outbreaks in man, restricted use of the resources and limitations on the use of the marine environment. We must determine the presence and persistence of pollutant chemicals and disease-producing microbes in the environment, their cycling through food-chain organisms and any possible inter-related microbial and chemical effects which act to the detriment of the marine animals, their habitat and the use of the resource and environment.

The National Marine Fisheries Service involvement in this Task relates to its responsibility to predict the state and potential of the living fishery resources and to improve and wisely manage marine ecosystems. Any limitations, which pollutants can effect, of these resources must be reported to the primary beneficiaries, i.e., the industry and user groups, including consumers, sportsmen, the general public, state and federal agencies, including our Environmental Assessment Division.

30. ACTIVITY PLAN

The activities of the Task are to establish baseline data, both qualitatively and quantitatively, on chemical and microbial (aerobic and anaerobic) levels in the various elements of the ecosystem (animals, waters, sediments) in the specific coastal areas under consideration, and to examine the cycling of man-induced pollutants (microbial and chemical) through the biomass with emphasis on (1) concentrations of microorganisms and toxicants, (2) the influence of pollutants (nutritive and chemical) on microbial growth and types, (3) microbial conversion and degradation mechanisms of pollutants, and (4) the synergistic effects of microorganisms and pollutants on marine animals. Basic to the attainment of the objective is the development of sensitive and specific methodology for the rapid and positive identification of marine microbes and chemical pollutants. The development of baseline data in the environment requires an 18-month cycle of sampling and analysis for specific areas in order to determine variations in regards to time and season. Once identified, specific areas will be selected for more in-depth investigations using monitoring and in situ experiments.

Samples for both microbiological and chemical evaluation will be obtained concurrently from those areas listed in Item 26, Activities, Events and Milestones. The field work will concentrate on those areas that show a potential degradation or contamination of the environment, as evidenced by the presence of disease and abnormalities in animals, mortalities, unusual sediments, etc. Areas of sampling will be included for control purposes. Animals selected as target species from the mid-Atlantic area for bacterial and chemical analysis include those of commercial and sport value, i.e., channeled whelk, flounder, striped bass, lobster, bluefish, hake, etc.

30. ACTIVITY PLAN (Contd)

Materials will be examined for trace metals by atomic absorption spectroscopy and neutron activation analysis (contractual effort). In-house capability includes analysis for As, Ag, Cd, Dr, Cu, Hg, Mn, Ni, Pb and Zn. Potential capability would include nine additional elements. Present neutron activation capabilities include Ag, Cr, Zn, Sb, Se, Co, Rb, Mn and Hg, with additional capabilities for eight other elements plus 10 rare earth metals. Ideally, current metal analysis techniques would require the employment of the two complementary techniques of analysis for comparative purposes.

In-house capabilities for analysis of PCB's (polychlorinated biphenyls) and select groups of hydrocarbons will be by gas chromatographic analysis. If funding permits, they will be initiated in late FY 75-early FY 76.

Initial emphasis in our studies will be placed on the members of the Vibrio group of bacteria, which are implicated in diseases of fish (fin rot) and shellfish (shell erosion), as well as the toxin producing Clostridia. Where necessary distribution of fecal organisms will be used to outline areas of sewage contamination in sediments. The morphologically unique prosthecate bacteria will be used as indicators of certain environmental conditions because they are easily identified in mixed microbial populations.

Evidence of previous exposure of marine animals to specific environmental bacteria will be examined using serological methods and phage typing.

In addition to field environmental studies and where needed, support studies to establish possible mechanisms will be performed in the laboratory and in situ.

The cycling and persistence of selected heavy metals will be examined in marine animals after prior exposures to known metal concentrations.

As select bacterial isolates are obtained from the environment, their physiological characteristics will be determined in order to obtain a proper understanding of their responses under environmental conditions and their effects on marine animals.

The later mentioned activities are cooperative efforts with other Task activities within the Center.

31. TASK OUTPUTS AND BENEFITS

(a) Specific Task outputs expected as related to the needs presented will be data (qualitative and quantitative) on the types of disease-producing microorganisms, heavy metals and other chemical pollutants (PCB's, hydrocarbons, etc.) present in the fisheries and the environment in those areas under study. Further information

MAC-009-77-EI-A

31. TASK OUTPUTS AND BENEFITS (Contd)

will be developed to determine the ability of the marine animals to survive microbial and chemical environmental pollutants and the often subtle effects of these on fishery resources.

(b) The data generated under this Task will be in the form of Center reports, publications, and data reports to the user groups. Data from various reports will be incorporated into management documents, special atlases and synthesis reports which bring the data to bear on specific problems.

32. IMPACT OF TASK AUGMENTATION

NA

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

(a) (1) Center Contaminants Report No. 5, 1972, November 26, 1974.

(2) Distribution of Seven Heavy Metals in Sediments from New York Bight - Center Report to MESA.

(3) Coliforms and Metal Concentrations in Sediments from the Atlantic and Long Beach Area - New York Bight, January 15-17, 1974. Informal Center Report No. 22, March 15, 1974 to MESA.

34. BACK-UP DOCUMENTATION (Contd)

- (4) Physiological Response of Cunner to Cadmium. (In press)
 - (5) Survey of Mercury Concentrations in North Atlantic Finfish.
(Submitted to Journal)
 - (6) Nondestructive Neutron Activation Analysis of Marine Organisms
Collected from Ocean Dump Sites of the Middle Eastern United States.
(Submitted to Journal)
 - (7) Mercury Concentrations in Three Species of Fish from North Atlantic
Offshore Waters. (Review by Center)
 - (8) Comparison of Atomic Absorption and Neutron Activation Analyses for
the Determination of Silver, Chromium, and Zinc in Various Marine
Organisms. (Review by Center)
- (b) The present Task relates to those in NMFS and other agencies. It does not conflict but is complementary with other activities since the Task is concerned with areas of the mid-Atlantic region.

Cooperation is undertaken with other Tasks of the Ecosystems Investigations and Effect of Pollutant Stress Task and Pathobiology Task by providing chemical analysis. Coordination is maintained by meetings, site visits, literature reviews and cooperative studies.

- (c) Current Task can be performed under current legislation.
- (d) An Environmental Impact Statement will not be required for the current Task.
- (e) The Task will not contribute to the Extend Jurisdiction initiative.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 9, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER		3. OBJECTIVE CODES				4. RANK		
MAC-014-77-EI-A-1		A IV-A	B	C	D	BY TARGET	BY + 1 INC.	
5. TASK NUMBER		6. TASK TITLE						
8818P7		Mutagenic Effects of Pollutants						
7. ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION		
FB6300		Experimental Biology Investigations				City Milford	State Conn.	
OBJECT CLASS		UN D R L O O D	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.			TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor		15	36.1		17.1		13.8	
11. Travel		19	.4					
12. Rents, Communications, Utilities		21						
13. Contracts (To be let)		51 52						
14. Grants (Funds obligated)		58						
15. Supplies		53	.8		1.0		1.0	
16. Capital Equipment		54	.3					
17. Other (All other obligations)			3.0		1.2		1.2	
18. Total Direct Funds (Add lines 10 through 17 above.)			40.6		19.3		16.0	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)								
20. Positions, Other (Number applicable to this Task.)			2		0		0	
21. Man-years, Permanent			2.2		.7		.7	
22. Man-years, Other			1.2		0		0	
23. Reimbursable Support (Reimbursable agreements only)								

REMARKS

Partial reprogramming Ref. MAC-056

24. OFFICIAL PREPARING REPORT (Signature)

James E. Hanks
Director of Investigation

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

Carl J. Sindermann
Carl J. Sindermann
Center Director, MACFC

NMFS TASK DEVELOPMENT PLAN

TOP NUMBER
MAC-014-77-EI-A-1
December 9, 1974

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

A, E, OR M	NUMBER EACH ACTIVITY, EVENT, OR MILESTONE	IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.	PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.	77 BUDGET YEAR													
				CY 75		BY 76		+1		+2		+3		+4		+5	
				1	2	1	2	1	2	1	2	1	2	1	2	1	2
				A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	1	Cytogenetic study of neuston samples of fish eggs for genetic damage likely to be induced by mutagenic marine contaminants present in nature.		X	X												
A		Determination of degree of mutagenicity of two major pollutants for gametes and zygotes of commercial fish.				X	X										
M		An estimation of genetic damage already sustained in some wild marine resources by mutagenic pollutants.				X											
A	14	Complete studies on genetic radiosensitivity of commercial oysters.		X													
E	15	Publish technical manuscript on the genetic radiosensitivity of the commercial oyster.				X											
M	16	Report on genetic radiosensitivity of wild commercial shellfish stocks.				X											
A	17	Experimental evaluation of the role of synergism of different major pollutants in enhancing their potential for genetic damage to wild resources.				X	X										
M	18	Report on the synergism of different mutagenic marine contaminants in enhancing or reducing the lethal genetic effects of one another.								X							
A	19	Evaluation of the seriousness of two major type marine pesticide contaminants as mutagens on chronic low-dose exposure - fish and/or commercial molluscs or crustaceans; report on				X	X										
A		Management, breeding, and testing of contaminant-exposed experimental fish populations.										X					

OUT YEAR COMMENTS (Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

a. Continued at same level

b. Increase of ___% *

c. Reduction of ___%

d. Termination

"X" APPROPRIATE COLUMN

REMARKS

All items except 12 and 17-25 have already been begun, or represent work almost completed or manuscripts to be prepared on data already collected. There is considerable inter-play between this and the Task Aquacultural Genetics. In order to accomplish most aspects of this TDP close cooperation will be required from personnel assigned to Physiological Effects of Pollutant Stress Investigation.

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER
MAC-014-77-EI-A-1
December 9, 1974

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M

NARRATIVE
(Brief descriptive phrase of activity, event, or milestone)

75		76		77 BUDGET YEAR									
				+1		+2		+3		+4		+5	
1	2	1	2	1	2	1	2	1	2	1	2	1	2
A	B	C	D	E	F	G	H	I	J	K	L	M	N

A	Genetic analyses of F ₁ -F ₃ offspring of shellfish exposed to mutagenic contaminants.										X	X		
E	Elucidation of the role of natural selection for genetic resistance to contaminants in sustaining important commercial fish stocks.													X
M	Report the estimation of the likelihood of a build-up in important fishery resources of genetic resistance to major contaminants.													X
A	Evaluation of the role of major food-chain species especially genetically sensitive to mutagenic pollutants in reducing recruitment of genetically more resistant commercial species.									X				X
M	Report on the importance of food-chain species very genetically susceptible to mutagenic marine contaminants in reducing the recruitment of more genetically resistant commercial ones.													X
A	Collaborative cytogenetic work on contaminant-exposed material provided by the Environmental Protection Agency's Gulf Breeze laboratory.					X	X							

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-014-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Positions Assigned to MAC-056			

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

29. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

30. ACTIVITY PLAN

31. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

32. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

29. STATEMENT OF NEED

Included in the long-term, difficult-to-measure, and surely most important effects of marine pollutants must be changes in the hereditary material. Like radiation, many chemicals can induce harmful mutations. Some marine contaminants, as heavy metals, belong to classes of substances known to be mutagenic, a mutagenic action of others can be suspected, and others invite testing of their mutagenicity by the seriousness of their widespread occurrence in the marine environment. The immediate effects of hereditary, mutagenic changes are lethal mutations, broken and rearranged chromosomes, abnormal mitotic cell divisions in somatic and pre-meiotic tissues and in zygotes and embryos, and finally abnormal meiotic divisions in the gonads. These effects lead directly to reduced to near complete sterility, reduced fecundity, abnormal zygotes and dead larvae. These effects, in turn, can be the bases for carcinogenesis, teratogenesis, and degenerative cellular changes. Degenerative cellular changes, in turn, lead to a variety of diseases of otherwise unclear etiology. In the broad sense mutagenic effects clearly are of central importance.

Initial analyses of the effects of five different heavy metals on shellfish have shown already a radiomimetic type of mutagenicity (see FY 74 and 75 Subtask Reports on Mutagenic Effects of Pollutants; also manuscripts in preparation). Results are supported by already known mutagenic effects of heavy metals on higher terrestrial plants, as well as some reports on mammals, microorganisms and man.

In a natural resource as the fisheries, breeding occurs uncontrolled in the wild, and is followed by an uncontrollable life history. (Contrast this to the farmer carefully selecting the strain of cereal crop he will sow a particular year, making a decision as to whether he will spray with this or that insecticide or herbicide.). There is now relatively no knowledge on mutagenic effects of major chemical marine contaminants for species of commercial fish. There is little, often conflicting information on chronic low-dose radiation effects on marine species. It is in just such a situation - uncontrolled breeding and no knowledge of genetic effects of ubiquitous contaminants - that insidious genetic damage could significantly reduce important populations or an entire resource, thereby destroying a fishery before the real nature of the damage came to light. Recruitment into the fishery would simply be less and less with no obvious explanation until the resource recovered genetically, or was for all practical purposes destroyed for commercial exploitation. How much genetic damage has contributed already to the demise of commercial stocks can only be surmised.

There is so a need to determine which of the important marine pollutants are mutagenic to commercial fish; to know at what level of various mutagenic pollutants mutations are increased significantly above background spontaneous occurrences; to know how this ultimately affects the resource, industry and finally consumer.

29. STATEMENT OF NEED (Contd)

The commercial fisheries and ultimately the consumer public have a right to and NMFS a need for sound scientific assessment of the effects of mutagenic marine contaminants on the recruitment of a variety of shellfish and groundfish into our commercial fisheries. Deleterious genetic effects of contaminants can be damaging to both the traditional industry and newly developing aquaculture industry alike.

The assessment must be broad enough in scope of pollutants studied and of sufficient depth to serve as a barometer of probable damage from new classes of contaminants or higher concentrations of old ones, and new mixtures of pollutants with new synergistic effects. There must be some appraisal of the potential of important fishery species to develop genetic resistance to prevailing levels of mutagenic contaminants at the same time there is the stress of commercial exploitation or over-exploitation. Also, whether at low levels of chronic exposure there is some compensation for lethal gene effects by way of stepped-up gametogenesis, or whether genetic damage is enhanced in terms of recruitment by a reduction in gametogenesis in the presence of the chronic low-levels of chemical mutagens existing in the marine environment. There is an additional need to study a variety of type species in the food chain since a particularly genetic-sensitive group could offset the genetic resistance of a commercial species.

30. ACTIVITY PLAN

Genetic tests employed for assaying the mutagenicity of selected contaminants will be: (1) a breeding-type test necessitating laboratory spawning and specific crosses, the standard dominant lethal test; (2) cytogenetic tests for chromosome aberrations; and (3) cytological tests for abnormalities of meiosis, mitoses, fertilization and cleavage that lead to genetic damage. Tissues and cells employed will be: eggs, sperm, zygotes, larvae, gonad primordia, spermatocytes, oocytes and gill tissue. There will be breeding and genetic testing of F₃, F₄, F₅ and F₆ animals as populations held and bred in specially designed holding tanks (and given chronic low doses of contaminants).

Exposures to contaminants will be chronic, low-dose, whole-body type; and short-term exposures to the short-lived gametes, zygotes and early embryos. Genetic damage will be appraised in the small laboratory-held populations, as well as in individuals. All genetic damage so obtained will be related to recruitment into the fisheries when wild parent stocks, their spawned gametes, zygotes or embryos are exposed in nature to effective levels of a potentially mutagenic marine contaminant.

Level of damage already sustained by some populations of groundfish will be appraised by spot-checking samples of eggs taken from the neuston. This will be related to body and gonad levels of the contaminant, and past exposure history insofar as possible.

31. TASK OUTPUTS AND BENEFITS

Outputs

1. Determination by dominant lethal gene test of the mutagenicity of low-dose chronic exposure of adult commercial American oysters and fish to heavy metal and pesticide contaminants. Such test data should corroborate cytogenetic test data. Relate the lethality of larvae from dominant lethals to recruitment of the oyster into the fishery. Significant genetic effects of low-levels of chronic exposure should be proved or disclaimed. Levels should be akin to those prevailing in nature so that they have predictive value for effects in nature.

2. Appraisal by cytogenetic methods of the probable genetic damage sustained to embryos of commercial molluscs and fish by exposure of their spawned gametes to heavy metal and pesticide contaminants, or by chronic exposure of the adult gonad. There should be an accumulation of sufficient information to relate loss of experimental zygotes to recruitment in the wild resource or fishery.

3. Determination of whether genetic damage is done to the reproductive tissue of commercial molluscs, fish and crustaceans by exposure to low levels of contaminants during gametogenesis. Sufficient information should be collected to relate germ-line mutations affecting sterility, fecundity and zygote and larval viability to recruitment in the natural resource or fishery.

4. For the first time there will be a genetic study of fish eggs sampled directly from the neuston and exposed to the exact combination and levels of pollutants occurring in nature - samples from the heavily polluted New York Bight. Mutation levels observed in such eggs will relate more directly to recruitment than in the case of strictly experimental material.

5. Completion of data analyses and two manuscripts on the genetic effects of ionizing radiation on the American oyster. Study employed radiation of eggs, sperm, and whole-body radiation of juveniles, as well as adults. Appraisal of the general radiosensitivity of this commercial species in terms of these experimental findings.

6. For direct genetic effects of mutagenic marine contaminants on exposed gametes - determination of the ameliorative, additive or multiplicative effects of heavy metals with one another, with pesticides and with irradiation - on shellfish. Sufficient information on synergistic genetic effects of mutagenic marine contaminants should be obtained to make possible reasonable predictions on effects of contaminant combinations in nature on natural marine fish resources. There should, of course, be in-depth information of single contaminants first.

31. TASK OUTPUTS AND BENEFITS (Contd)

Outputs (Contd)

7. More thorough definition of the genetic effects for shellfish of long-term, whole-body chronic exposure to chemical contaminants, as opposed to initial emphasis on the genetic effects of direct exposure of the genetically-sensitive, short-lived gametes, zygotes and embryos. Genetic effects tested will be dominant lethal mutations, random cytogenetic damage, and genetic-related partial sterility. These are the important limiting factors in the extent to which wild populations may overcome the genetic damage resulting from chronic exposure. There will finally be the genetic analysis of F₁, F₂ and F₃ animals developed from founding stock under continuous low-dose exposure to a heavy metal and pesticide from the time of gamete primordial mitoses to spawning and fertilization.

8. First determination of whether important commercial shellfish can and will or will not through the process of natural selection make themselves genetically resistant to prevailing levels of marine pollutants. Do this by means of experimentally treated groups of animals held and bred as populations, instead of as individuals, and in the presence of specific contaminants. Testing for level of resistance to specific mutagenic marine contaminants would begin in the F₃ generation. Control populations would also be held similarly in especially designed "population" trays. Finally, there should be genetic testing of F₄, F₅ and F₆ generations for genetic resistance to the specific contaminants.

9. Analyses of mutagen sensitivity of appropriate test species all along selected food chains. (Although acute toxicity studies have been conducted for several decades, little is known of the sensitivity levels of the least resistant species so results do not indicate "safe" levels for the biota even for acute, short-term exposures.). Some information should be obtained on the levels of genetic sensitivity to mutagenic marine contaminants along the food chain up to those commercial fish highest in the chain. Information must be sufficient to allow some estimate of the risk to fishery resources of different contaminant levels as based on the most mutation-susceptible links in the food chain.

Benefits

The knowledge gained from these studies will, by including genetic parameters that affect eventual recruitment, help in assessing the total long-term damage that can be caused in a marine ecosystem by the dumping of pollutants into that system. This is ultimately of undisputed benefit to the commercial fisheries (traditional and aquaculture alike) and consumers. Genetic tests provide an especially sensitive means of measuring presence or absence of low-dose effects where these would otherwise remain questionable. Studies proposed here would determine what levels of pollutants do significant genetic damage to be reflected in recruitment into the fisheries, and also adversely affect costly hatchery production. Multi-species are affected - commercial molluscs, fish and crustaceans.

31. TASK OUTPUTS AND BENEFITS (Contd)

Benefits (Contd)

Information developed can be applied by NMFS/NOAA and other agencies in managing and protecting our living marine resources for which they are responsible. They provide support for the review of Environmental Impact Statements and development of state/federal management agreements.

Evidence of mutagenicity of marine contaminants for commercial fish can further be passed on to the FDA for checks on mammalian mutagenicity if high body levels persist raising questions regarding human consumption providing, of course, suitable mammalian tests have not already been made.

32. IMPACT OF TASK AUGMENTATION

NA

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

- a) 1. Informal, in-house report by A. Crosby Longwell - Evaluation of the mutagenicity of marine contaminants for marine species as affecting in-shore and off-shore fisheries. October 1973.
2. Several research papers from the Milford Genetics Program dealing with genetic work that forms a background for studying mutagenic effects of certain contaminants on marine species and commercial fish. See bibliography of Report listed under 1. above.
3. Longwell, A. Crosby, D. A. Nelson, J. R. MacInnes and A. Calabrese - Mutagenic effects of heavy metals on zygotes of the commercial American oyster, Crassostrea virginica. In preparation for publication in a scientific journal.
4. Two manuscripts to be prepared on genetic-damaging effects of lead, silver and cadmium on the eggs of shellfish.
5. Longwell, A. Crosby, S. S. Stiles and J. B. Hughes - Breeding response of the commercial American oyster to ionizing radiation. In preparation for publication in a scientific journal.

34. BACK-UP DOCUMENTATION (Contd)

6. Longwell, A. Crosby, and S. S. Stiles - Oyster genetics and the probable future role of genetics in aquaculture. Malacological Review, 6: 151-177, 1973.
7. Longwell, A. Crosby - Some impressions regarding genetics and the fisheries of Japan. NMFS Circular 388, pp. 123-133, 1974. Part of Proc. of the 1st Meeting of the Aquaculture Panel of the UJNR, Tokyo, Japan, November 1971 - Japan has a mammoth pollution problem.
8. Informal Report No. 3 - Middle Atlantic Coastal Fisheries Center, NMFS - A proposed five-year study of biological and chemical baselines and effects of environmental changes on marine organisms in the New York Bight.

Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, NMFS - Investigation Summaries - A summary of research of on-going programs within the Middle Atlantic Coastal Fisheries Center.

NOAA Document - Marine Pollution Monitoring: Strategies for a National Program.

NSF National Project - IDOE (International Decade of Ocean Exploration).

b) Mutagenicity of marine contaminants for marine species as affecting in-shore and off-shore fisheries is not currently being pursued by any other group in or outside government laboratories except perhaps as isolated projects here and there. No other than above cited coherent report has been prepared on the subject. Environmental mutagenesis is, however, a large field in regard to human safety with most tests conducted on mammalian systems. The artificial breeding systems of land agriculture can protect against untoward effects of environmental mutagens at the level of entire industries. A natural resource as a fishery is by contrast vulnerable. No doubt, the failure of the marine and fishery fields to research the risk of contaminant mutagenicity along with other effects of toxic pollutants results in part from the very limited impact any aspect of genetic research has had to date on the fisheries. This is, however, bound to change and is, in fact, already changing with the advent of aquaculture and the somewhat new field of ecological genetics.

c)

d) This Task will have no adverse impact on the environment. Contaminated water used in this Task will be waste treated in a waste treatment system which has been constructed at this facility.

34. BACK-UP DOCUMENTATION (Contd)

e) This Task will contribute to the Extended Jurisdiction initiative regarding the impact of marine contaminants on the genetic viability of fish eggs with subsequent effects on recruitment.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED
December 9, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-015-77-EI-A-1	3. OBJECTIVE CODES				4. RANK	
	A IV-A	B IV-C	C	D	BY TARGET	BY + 1 INC.

5. TASK NUMBER 8818P8	6. TASK TITLE Physiological Effects of Pollutant Stress
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7. ORGANIZATION CODE FB6300	8. ORGANIZATION TITLE (Responsible for execution of this task) Experimental Biology Investigations	9. PRINCIPAL LOCATION City: Milford State: Conn.
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OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	M N L P O O	CURRENT YEAR FY 19 ⁷⁵		BUDGET YEAR FY 19 ⁷⁶		BUDGET YEAR + 1 FY 19 ⁷⁷	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	138.3		149.2		149.2	
11. Travel	19	1.4		.7		.7	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52	1.5					
14. Grants (Funds obligated)	58						
15. Supplies	53	11.2		4.0		4.0	
16. Capital Equipment	54	1.4					
17. Other (All other obligations)		12.1		12.5		12.5	
18. Total Direct Funds (Add lines 10 through 17 above.)		165.9		166.4		166.4	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		8		8		8	
20. Positions, Other (Number applicable to this Task.)		2		4		4	
21. Man-years, Permanent		6.4		8.0		8.0	
22. Man-years, Other		1.4		3.7		3.7	
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature)

James E. Hanks
Director of Investigation

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

Carl J. Sindermann
Carl J. Sindermann
Center Director, MACFC

NMFS TASK DEVELOPMENT PLAN

TOP NUMBER

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

MAC-015-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	BUDGET YEAR															
		CY 75		BY 76		77		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N		
A	Collection and maintenance of test organisms.	←-----→															
A	Acute exposure of marine invertebrates and vertebrates to heavy metals in tolerance studies.	←-----→															
A	Chronic exposure of marine invertebrates and vertebrates to heavy metals in tolerance studies.	←-----→															
A	Chronic exposure of adult lobsters (<u>Homarus americanus</u>) to cadmium and mercury for biochemical and physiological studies.	→				X											
M	Publish manuscript on effects of cadmium and mercury on adult lobsters.															X	
A	Acute exposure of cunners (<u>Tautogolabrus adspersus</u>) to silver for physiological and biochemical studies.	→	X														
M	Publish manuscript on effects of acute exposure of cunners to silver.															X	
A	Chronic exposure of cunners (<u>T. adspersus</u>) to cadmium for physiological and biochemical studies.	→				X											
M	Publish manuscript on effects of chronic exposure of cunners to cadmium.															X	
A	Chronic exposure of juvenile striped bass (<u>Morone saxatilis</u>) to cadmium and mercury for physiological and biochemical studies.	→				X											
M	Publish manuscript on effects of cadmium and mercury on juvenile striped bass.															X	

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-015-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	77 BUDGET YEAR													
		CY 75		BY 76		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Chronic exposure of bivalve molluscs to silver for physiological studies.					X									
M	Publish manuscript on effect of silver on bivalves.							X							
A	Chronic exposure of blue crabs (<u>Callinectes sapidus</u>) to cadmium for pathological studies at the Oxford laboratory.			X											
A	Effects of acute exposure of hard clam, oyster and surf clam embryos and larvae to heavy metals.					X									
M	Publish manuscript on effects of heavy metals on survival and growth of hard clam, oyster and surf clam larvae.							X							
A	Effect of acute exposure of lobster larvae to heavy metals.			X			X								
M	Publish manuscript on effects of heavy metals on survival and growth of lobster larvae.							X							
A	Physiological and biochemical testing of rock crabs (<u>Cancer irroratus</u>) exposed to cadmium.		X												
M	Publish manuscript on effects of cadmium on rock crabs.		X												
A	Baseline studies on transaminase in marine animals.											X			
A	Chronic exposure of winter flounder (<u>Pseudopleuronectes americanus</u>) to cadmium for physiological and biochemical studies.		X				X								

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-015-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)														BUDGET YEAR																				
	CY 75		BY 76		+1		+2		+3		+4		+5																						
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2																			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N																					
M	Publish manuscript on effects of cadmium on winter flounder.																																		
A	Baseline studies of magnesium-linked changes in metal-stressed marine crustaceans.																X																		
A	Respiratory studies of metal-exposed striped bass using cruising-speed respirometers and opercular-electrode technique.																X																		
M	Publish manuscript on effects of cadmium on adult striped bass respiration (cruising-speed).																																		

OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-015-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Res.)	13/3	002 Anthony Calabrese	100
Research Chemist	12/7	006 Edith Gould	100
Research Physiologist	12/1	007 Frederick P. Thurberg	100
Fishery Biologist (Res.)	9/2	012 Ries S. Collier	100
Physiologist	9/1	015 Margaret A. Dawson	100
Fishery Biologist (Res.)	9/2	016 John R. MacInnes	100
Fishery Biologist (Res.)	9/2	017 James E. Miller	100
Fishery Biologist (Gen.)	7/2	020 David A. Nelson	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

- Detail Documentation (Provide one sentence description.)
- Related tasks and research presently being conducted.
- Indicate the Congressional legislative requirements.
- Indicate the Environmental Impact Statement (EIS) requirements.

a. Current Year

b. Budget Year

c. Budget Year + 1

29. STATEMENT OF NEED

At all levels of both the public and the private sectors, strong concern exists that the living marine resources of our estuarine, coastal, and oceanic ecosystems are being adversely affected by extensive dumping of untreated wastes and by run-off of highly polluted waters. The mechanisms and intensities of such adverse effects are largely unknown. Baseline estimates of marine environmental quality cannot be formulated without such knowledge. This concern is not only for marine animals important to commercial fisheries and sportfisheries, but also for those animals whose presence indicates a healthy environment. Rational resource-oriented water quality standards cannot be established and enforced by cooperating federal and state regulatory agencies when such knowledge is fragmentary or lacking.

To ensure that adequate consideration and protection are given to living marine resources, it is necessary to determine the damaging effects of man-induced environmental perturbations on marine organisms, including finfish, crustaceans and shellfish, by establishing the precise levels of pollutants that can cause mortality and sublethal physiological damage at all stages in their life history. Perhaps of greater importance than mortality is the effect of long-term chronic exposure to sublethal (stress) levels. Such exposure may limit or alter development, growth, reproduction, metabolism, or other physiological and chemical processes.

This Task has the capability and the expertise to continue an on-going NMFS program in the northeast and to meet the goals and objectives set forth in the Program Emphasis Document for FY 1977. The primary objective of this Task is to determine the impact of environmental changes in the Middle Atlantic region and specifically responds to NMFS Goal IV - Subgoal A, which is to determine the damage effected by man-induced environmental changes on the abundance, distribution, and functioning of living marine resources, and on the utilization of these resources and their environment. A secondary objective of this Task responds to NMFS Goal IV - Subgoal C, which is to assure full participation in decision-making related to proposed alterations of the marine environments as they pertain to living marine (including estuarine), inland commercial, and certain anadromous resources and their habitat requirements. Although the objectives of this Task are not to prepare and/or review Environmental Impact Statements, Section 10 and NPDES permits, coastal zone management projects, federal water development projects and Outer Continental Shelf projects, the information collected is essential to both their preparation and review by concerned state and federal agencies.

Using physiological and biochemical techniques, this Task will examine in the laboratory a selected group of important animals that are common to the Northeast Atlantic, and will determine the effects of contaminants on their normal life functions. Results of these experiments will indicate which marine animals may be extremely sensitive to minute amounts of pollutants, and which animals or communities may flourish

29. STATEMENT OF NEED (Contd)

or remain unaffected where specific contaminants are present at trace levels. Achievement of our Task objectives will enable the National Marine Fisheries Service to ensure that adequate consideration and protection are given to living marine resources with which it is charged.

User groups of the information collected in this Task will include those that review Environmental Impact Statements, Section 10 and NPDES permits and similar related projects and those who write such statements. These groups would include the NMFS Environmental Assessment Division, the Environmental Protection Agency, Department of Interior, Corps of Engineers, state water resources agencies, and private industry.

30. ACTIVITY PLAN

Depending on the availability of selected marine animals and their life stages, tests will be set up during those seasons when an adequate supply of test animals can be reasonably anticipated. Animals will be exposed to different levels of contaminants in test containers (jars, aquaria, fiberglass tanks) in short-term tests (96 hours or less) for studies of mortality and physiological effects. For examining long-term effects of pollutants on marine life, the Milford laboratory has developed and constructed a facility wherein marine animals can be exposed to contaminants for long-term effects in nine different systems at any one time (see MACFC Informal Report #17). Selected animals will be placed in fiberglass tanks or glass aquaria in this new facility, and will receive continuous exposure to the pollutants for one to several months in a flow-through system by delivery from proportional diluters. At appropriate time intervals, the exposed animals will be removed and scientists in this Task will examine the animal tissues to investigate any physiological and biochemical damage caused by the pollutant. In addition, various tissues will be provided to scientists in other Tasks in this and other laboratories within the MACFC, for study of induced histopathological anomalies, mutagenic effects, immunological response, and chemical uptake.

For studies of the effects of metals on embryos and larvae of molluscs and crustaceans, adult animals will be induced to spawn in the laboratory either naturally or through various means of stimulation. The embryos or larvae will be collected and exposed in a system designed for the particular animal involved. In the case of molluscan embryos we will determine the number that develop into normal larvae 48 hours from hatching. The larvae will be set up for 10-20 days and survival and growth will be determined. With larval crustaceans we will determine the effects of metals on survival and molting and whether any abnormal development occurs. Although these tests are rather straightforward, they are most tedious and time-consuming and will continue for two to three years.

30. ACTIVITY PLAN (Contd)

For this Task, physiological studies will center on oxygen consumption of whole animals and isolated tissues as an indicator of sublethal stress. This will involve such instrumentation as Gilson and cruising-speed respirometers, including the use of implanted electrodes, as well as ultra-microrespirometers for egg and larval work. Studies will also include osmoregulatory functions, which reflect the effects of heavy metals on the ability of estuarine animals to adjust to changing salinities. A variety of neuromuscular studies (including cardiac) will both support these investigations and broaden the scope of the Physiological Effects Subtask.

For biochemical examination of tissues, a recording spectrophotometer will be used in the study of enzyme kinetics, to discover how and whether these are altered in animals exposed to sublethal concentrations of heavy metals. Particular attention will be given to (1) changes in the biochemical capacity to mobilize energy and physiological defenses, as observed in certain enzymes of nitrogen metabolism, and (2) sensitive magnesium-linked enzyme activities that reflect cation-induced perturbations. Polyacrylamide electrophoresis will be used to determine any change in serum protein patterns, especially in the area of haptoglobins, which complex and transport heavy metals. All biochemical observations will be interpreted in the light of physiological findings, and coordinated to present a whole picture of metal-stressed marine animals.

31. TASK OUTPUTS AND BENEFITS

The significant output of this Task is the determination of physiological and biochemical effects of heavy metals on marine organisms. Special emphasis will be placed on the effects of silver, cadmium, and mercury on the commercially and recreationally more important finfish, crustaceans, and shellfish species of the Northeast Atlantic. Animals of particular interest and importance are the American lobster (Homarus americanus), striped bass (Morone saxatilis), winter flounder (Pseudopleuronectes americanus), cunner (Tautoglabrus adspersus), blue crab (Callinectes sapidus), American oyster (Crassostrea virginica), hard clam (Mercenaria mercenaria), and surf clam (Spisula solidissima). This Task will determine the lethal effects of metals, individually and in combination, on the embryonic and larval stages of some molluscs and crustaceans in short-term exposures. We will also determine the long-term sublethal effects of exposure of several metals on the juvenile and adult stages of molluscs, crustaceans, and finfish in chronic exposure systems. We will define the physiological and biochemical pathways affected and relate them to the metabolic disorders that result in death or permanent damage to the living animals. These studies will be conducted in cooperation with scientists from the Sandy Hook and Oxford laboratories of the Middle Atlantic Coastal Fisheries Center, and with scientists from local universities.

31. TASK OUTPUTS AND BENEFITS (Contd)

The data collected will be reported in various ways. The Middle Atlantic Coastal Fisheries Center's Informal Report Series will be used to disseminate information quickly to in-house sources prior to final publication in the scientific literature (see attached list of publications). The collected information will also be disseminated through regularly scheduled, as well as frequent informal meetings of MACFC personnel with other NMFS staff. Such meetings will also serve to generate critical discussion of on-going research. All of the studies completed in this Task were designed to collect information on the effects of environmental changes on living marine resources (see attached list of publications), and will be made available to the Environmental Assessment Division of NMFS.

Armed with the necessary scientific background information collected by this Task, Regional Environmental Assessment Division personnel can suitably review and evaluate Environmental Impact Statements and Section 10 and NPDES permits. Equally important, baseline data are essential in the preparation of these same documents designed to lead to maximal protection and conservation of the marine resources for which NMFS and NOAA are ultimately responsible. This information should also be made available to other federal and state natural resource agencies concerned with the management and protection of our living marine resources.

SCIENTIFIC PAPERS PUBLISHED OR ACCEPTED FOR PUBLICATION
CY 1973 TO PRESENT

- Blogoslawski, W. J., F. P. Thurberg, and M. A. Dawson (1973)
Ozone inactivation of a Gymnodinium breve toxin. *Water Research*, 7(11): 1701-1703.
- Calabrese, A., R. S. Collier, D. A. Nelson, and J. R. MacInnes (1973)
The toxicity of heavy metals to embryos of the American oyster, Crassostrea virginica. *Mar. Biol.*, 18(3): 162-166.
- Calabrese, A., and D. A. Nelson (1974)
Inhibition of embryonic development of the hard clam, Mercenaria mercenaria, by heavy metals. *Bull. Environ. Contam. Toxicol.*, 11(1): 92-97.
- Collier, R. S., J. E. Miller, M. A. Dawson, and F. P. Thurberg (1973)
Physiological response of the mud crab, Eurypanopeus depressus to cadmium. *Bull. Environ. Contam. Toxicol.*, 10(6): 378-382.
- Gould, E. (1973)
Report on a collaborative study: Malic enzymography of the American oyster, Crassostrea virginica. *J. Assoc. Off. Analyt. Chemists*, 56(3): 541-543.
- MacInnes, J. R., and F. P. Thurberg (1973)
Effects of metals on the behaviour and oxygen consumption of the mud snail. *Mar. Poll. Bull.*, 4: 185-186.
- Thurberg, F. P., M. A. Dawson, and R. S. Collier (1973)
Effects of copper and cadmium on osmoregulation and oxygen consumption in two species of estuarine crabs. *Mar. Biol.*, 23: 171-175.
- Blogoslawski, W. J., F. P. Thurberg, M. A. Dawson, and M. Beckage
Field studies on ozone inactivation of a Gymnodinium breve toxin. *Environmental Letters*. (In Press)
- Butler, P. A., E. Berry, W. P. Breese, A. Calabrese, J. I. Lowe, G. E. Morrison, and H. van der Schalie.
Contribution to the Development of Acute and Long-term Standard Bioassay Methods for the Fourteenth Edition of Standard Methods for the Analysis of Water and Wastewater. (In Press)
- Calabrese, A., R. S. Collier, and J. E. Miller
Physiological response of the cunner, Tautogolabrus adspersus, to cadmium. I. Introduction and experimental design. Submitted as a Special Scientific Report-Fisheries. (In Press)

- Calabrese, A., R. Domenowska, D. Hansen, D. E. Hoss, and D. J. Wildish
Tentative methods for studies of the effects of dredge spoil on macro-organisms.
In: Handbook of methods for monitoring the effects of dredging and disposal in
the marine environment. Handbook to be published by the Marine Technology
Society. (In Press)
- Calabrese, A., and E. W. Rhodes
Culture of M. lateralis and C. fornicata embryos and larvae for studies of
pollution effects. To be published in a special symposium on Marine Invertebrate
Larvae by Thalassia Jugoslavica. (In Press)
- Gould, E., and J. Karolus
Physiological response of the cunner, Tautogolabrus adspersus, to cadmium.
V. Observations on the biochemistry. Submitted as a Special Scientific Report-
Fisheries. (In Press)
- Pauley, G. B., M. W. Newman, and E. Gould
Serum changes in the blue crab, Callinectes sapidus, associated with Paramoeba
perniciosa, the causative agent of gray crab disease. To be published by SSR-F
as part of Symposium. (In Press)
- Thurberg, F. P., A. Calabrese, and M. A. Dawson
The effects of silver on oxygen consumption of bivalves at various salinities.
To be published in a special symposium on pollution and the physiology of marine
animals. (In Press)
- Thurberg, F. P., and M. A. Dawson
Physiological response of the cunner, Tautogolabrus adspersus, to cadmium.
III. Changes in osmoregulation and oxygen consumption. Submitted as a Special
Scientific Report-Fisheries. (In Press)

32. IMPACT OF TASK AUGMENTATION

NA

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

- a) 1. Informal Report No. 3 - Middle Atlantic Coastal Fisheries Center, NMFS - A proposed five-year study of biological and chemical baselines and effects of environmental changes on marine organisms in the New York Bight. This report describes the need for studies on the effect of man-made perturbations on the environment.
2. Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, NMFS - Investigation Summaries - A summary of research in on-going programs within the Middle Atlantic Coastal Fisheries Center. This document describes the program emphasis of the MACFC and the coordination between Tasks.
3. Informal Report No. 5 - Middle Atlantic Coastal Fisheries Center, NMFS - Cooperative study of contaminants in the coastal environment and their effects on living marine resources: Summary Report, 1971-1972. This report describes some of the findings of the MACFC contaminant program.
4. Informal Report No. 17 - Middle Atlantic Coastal Fisheries Center, NMFS - The acute and chronic exposure facility: Milford Laboratory, Experimental Biology Investigations. This document describes exposure facilities developed at the Milford laboratory.
5. Informal Report No. 26 - Middle Atlantic Coastal Fisheries Center, NMFS - A multilaboratory cooperative study of contaminants in the coastal environment and their effects on living marine resources: Summary report of operations from May 1, 1972 to December 31, 1973. This report summarizes contaminant studies of the MACFC.
6. Research Needs - National Technical Advisory Committee on Water Quality Criteria - Federal Water Pollution Control Administration. This document describes the research projects necessary to determine the effect of man-induced changes in the environment.
7. Research Needs in Water Quality Criteria 1972. National Academy of Sciences. This report describes the research necessary to determine the effect of man-induced changes in the environment.

34. BACK-UP DOCUMENTATION (Contd)

8. NOAA Document - "Marine Pollution Monitoring: Strategies for a National Program". This report describes the need for studying the effects of alterations to ecosystems.
 9. National Science Foundation Project - IDOE (International Decade of Ocean Exploration). This report describes some of the on-going research sponsored by NSF regarding the effects of pollutants on ecosystems.
- b) Related NMFS Tasks are being conducted at Tiburon, Beaufort, Seattle and Alaska:
1. Effects of petroleum on finfish (Tiburon)
 2. Effects of petroleum on finfish and crustaceans (Alaska)
 3. Effects of metals, petroleum, PCB's on finfish (Seattle)
 4. Effects of trace metals and thermal pollution on aquatic organisms (Beaufort)

Other federal research related to this Task is being conducted by the Environmental Protection Agency both in-house and by contract. The National Science Foundation is sponsoring related projects through its IDOE Project. Sea Grant is also supporting related research. The research sponsored by the above agencies is too diverse to make mention of here.

- c) No additional Congressional legislation is required.
- d) This TDP will not have an effect on the environment. Proper waste treatment methods are adhered to prior to disposal of any contaminating material.
- e) This TDP will not contribute to Extended Jurisdiction initiative.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 16, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.
MAC-016-77-EI-A-1						

TASK NUMBER	6. TASK TITLE
8817P1	Comparative Pathobiology

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION	
FB6400	Pathobiology Investigations, MACFC	City Oxford	State MD.

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	LINE ITEM	CURRENT YEAR FY 19 ⁷⁵		BUDGET YEAR FY 19 ⁷⁶		BUDGET YEAR + 1 FY 19 ⁷⁷	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	101.3		86.1		86.1	
11. Travel	19	5.2		5.2		5.2	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						
14. Grants (Funds obligated)	58						
15. Supplies	53	6.4		4.2		4.2	
16. Capital Equipment	54	1.0					
17. Other (All other obligations)		9.8		7.2		7.2	
18. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		123.7		102.7		102.7	
19. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		8		8		8	
20. Positions, Other <small>(Number applicable to this Task.)</small>		1		0		0	
21. Man-years, Permanent		8.0		7.0		7.0	
22. Man-years, Other		.5		0		0	
23. Reimbursable Support <small>(Reimbursable agreements only)</small>							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature)

Aaron Rosenfield
Director of Investigation

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

Carl J. Sindermann
Center Director, MACFC

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-016-77-LS-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M

NARRATIVE

(Brief descriptive phrase of activity, event, or milestone)

CY	BY	BUDGET YEAR												
		+1		+2		+3		+4		+5				
		1	2	1	2	1	2	1	2	1	2			
A	B	C	D	E	F	G	H	I	J	K	L	M	N	
X														X
	X		X											
				X										
					X									
X			X											
	X		X											
					X									
	X											X		
						X		X					X	

A Diagnostic services for states, industry, universities
 A Experimental challenges and histology
 E Summarize results
 M Publish results in journal of 2, 3
 A Experimental histology Crustacea
 A Prepare materials, etc., for atlas
 M Publish atlas on crustacean histology
 A Histology selected fish tissues/organs
 M Publish results

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-016-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no Incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Res. Admin.)	14/5	Rosenfield, Aaron	80
Clerk Stenographer	4/3	Wheatly, Nadine	25
Fishery Biologist (Res.)	12/4	Farley, C. Austin	100
Biologist	12/3	Johnson, Phyllis T.	100
Fishery Biologist (Res.)	11/4	Newman, Martin W.	100
Fishery Biologist (Gen.)	7/2	Kern, Frederick G. III	100
Biological Laboratory Technician (Fish.)	6/4	Smith Cecelia S.	100
Biological Laboratory Technician (Microbiology)	5/3	Wright, Dorothy H.	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- | | |
|---|---|
| 30. ACTIVITY PLAN | 33. CRITERIA FOR TASK COMPLETION |
| 32. IMPACT OF TASK AUGMENTATION | 34. BACK-UP DOCUMENTATION |
| a. Current Year
b. Budget Year
c. Budget Year + 1 | a. Detail Documentation <i>(Provide one sentence description.)</i>
b. Related tasks and research presently being conducted.
c. Indicate the Congressional legislative requirements.
d. Indicate the Environmental Impact Statement (EIS) requirements. |

FB6400 - Pathobiology Investigations - Comparative Pathobiology - FY 1977

29. Statement of Need

Until recently, the role of disease in the ecology of marine poikilotherms has been virtually ignored. Information is still woefully inadequate of how disease operates in aquatic environments. Yet, disease and parasite induced mortalities are paramount factors limiting the abundance of marine fish, crustaceans, and mollusks. Furthermore, mass mortalities of aquatic animals grown under intensive culture conditions are often a consequence of disease. The indiscriminate transfer of marine organisms from one location to another without regard to the disease entities they harbor is a particularly dangerous practice, the importance of which has not been adequately recognized. Consequently, adequate knowledge of disease whether infectious, nutritional, genetic, or environmentally induced is essential and application of this knowledge is fundamental for successful management of fishery resources. The primary recipients of the services produced by the task are industry, the states, and the general public.

30. Activity Plan

The approach to be used in achieving the task objective is primarily histological. Appropriate sections of animal tissues (paraffin and epon embedded) are prepared for examination with light and electron microscopy. Employing an essentially observational approach, the presence of microscopic parasites is determined and the apparent histopathology described. When deemed necessary, histochemical techniques and electron microscopy are utilized.

31. Task Outputs and Benefits

1. Outputs

A. Establish a national diagnostic laboratory to identify, classify, and describe infectious and noninfectious diseases of marine feral and cultured fish and shellfish. This objective is a continuing process and, as such, has no finite termination.

B. Develop histological and histochemical techniques appropriate for the diagnosis of disease in estuarine and marine fish, crustaceans, and mollusks. The approximate duration of the task would be 5 years.

C. Develop electron microscope techniques permitting the study of cellular ultrastructure in estuarine and marine fish and shellfish. The approximate duration of the task would be 5 years.

2. Benefits

Accomplishment of task objectives both 1) establishes causes of disease and mortality of fish, crustaceans, and mollusks and 2) provides available diagnostic services for various State, Federal, and industry user groups. This information is needed for the rational, long-term exploitation of natural resources. Disease diagnosis will play an increasingly important role in abating the promiscuous domestic transfer and foreign importation of exotic species. In aquaculture, the output could provide the means for controlling disease, an almost universal limiting factor.

32. Impact of Task Augmentation

No potential increase anticipated. Level funding decreases output and ability to respond to industry and state needs.

33. Criteria for Task Completion

34. Back-up Documentation

- A. 1. Public Law 92-583 Title III - Management of the Coastal Zone (fish and shellfish harvesting, habitat destruction, demands of coastal zone).
2. Public Law 92-500 Title I - Research and Related Programs (amendment of Federal Water Pollution Control Act).
3. Public Laws of the State of Maine relating to sea and shore fisheries (importation of marine species).

4. Lacey Act Title 18, Amendments (transportation, importation, animals, birds, fish, plants in violation of State, National, foreign laws).
 5. H.R. 695, 92nd Congress (protection fish resources).
 6. S. 2764, 92nd Congress (fish disease control).
 7. H.R. 6861, 92nd Congress (advance scientific knowledge fish diseases and relation to pollution).
 8. Public Law 92-532 - Ocean Dumping Act.
 9. Informal Reports #1, 3, 4, Middle Atlantic Coastal Fisheries Center, NMFS, NOAA, U. S. Department of Commerce.
- B. Cooperative Investigations with Milford and Sandy Hook Laboratories, State, Federal and University investigations and foreign governments.
- C. None
- D. None

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 16, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5
National Oceanic and Atmospheric Administration
Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-017-77-EI-A-1	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

5. TASK NUMBER 8818P9	6. TASK TITLE Disease and Environmental Stress
--------------------------	---

7. ORGANIZATION CODE FB6400	8. ORGANIZATION TITLE (Responsible for execution of this task) Pathobiology Investigations, MACFC	9. PRINCIPAL LOCATION City: Oxford, State: MD
--------------------------------	--	--

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE
		A	B	C	D	E	F
10. Total Direct Labor	15	103.7		103.7		103.7	
11. Travel	19	2.5		2.5		2.5	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						
14. Grants (Funds obligated)	58						
15. Supplies	53	3.1		3.1		3.1	
16. Capital Equipment	54	.5		.5		.5	
17. Other (All other obligations)		9.9		9.9		9.9	
18. Total Direct Funds (Add lines 10 through 17 above.)		119.7		119.7		119.7	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		7		7		7	
20. Positions, Other (Number applicable to this Task.)		4		4		4	
21. Man-years, Permanent		7.0		7.0		7.0	
22. Man-years, Other		2.4		2.4		2.4	
23. Reimbursable Support (Reimbursable agreements only)		--		--		--	

REMARKS

24. OFFICIAL PREPARING REPORT (Signature)
Aaron Rosenfield
Director of Investigation

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)
Carl J. Sindermann
Carl J. Sindermann
Center Director, MACFC

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-017-77-EI-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Supv. Fishery Biologist (Res.)	13/4	Murchelano, Robert A.	100
Fishery Biologist (Res.)	13/4	Sawyer, Thomas K.	100
Research Microbiologist	12/9	Tubiash, Haskell S.	100
Microbiologist	12/5	Robohm, Richard A.	100
Physiologist	11/2	Bodammer, Joel E.	100
Biological Laboratory Technician	7/3	Wade, Jane T.	100
Fishery Biologist	7/1	Ziskowski, John	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

EFFECT OF TASK AUGMENTATION

a. Detail Documentation (Provide one sentence description.)

Current Year

b. Related tasks and research presently being conducted.

Budget Year

c. Indicate the Congressional legislative requirements.

Budget Year + 1

d. Indicate the Environmental Impact Statement (EIS) requirements.

NMFS TASK DEVELOPMENT PLAN

TOP NUMBER
MAC-017-77-1E-A-1

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD -- Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Implement menhaden mortality study -- Chesapeake Bay sampling/histology			X										X	
E	Report progress, scientific meetings/workshops					X	X			X		X			
M	Publish findings to date (papers)						X			X			X		
A	Continue N.Y. Bight fin rot histopathology	X					X								
E	Report progress results, meeting/workshop			X		X		X							
M	Publish findings				X	X		X							
A	Experimental histology fish/ compile data	X			X										
M	Publish results						X								
A	Diseases Crustacea, N.Y. Bight/compile data	X					X								
M	Publish results		X							X					

OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

FB6400 - Pathobiology Investigations - Disease and Environmental Stress - FY 77

29. Statement of Need

Susceptibility of aquatic poikilotherms to disease is directly influenced by environmental factors and biotic and abiotic stresses. There are no ways of knowing what stresses are significant in limiting population size, viability, and behavior, without studying the direct and interrelated effects on the animals themselves. The fishing industry, both commercial and recreational, requires research support both short and long term to provide real information for understanding and controlling mass mortalities and the causes of diseases in marine animals. This support should include studies of disease as it: 1) limits the abundance of feral mollusks, crustaceans, and fish; 2) limits the intensive artificial culture and transfer of marine animals in aquaculture; and 3) is a consequence of the man-induced degradation of aquatic environments. Experimental research to test and/or substantiate hypotheses is a necessary requisite to the primarily observational initially diagnostic study of disease. The primary recipients of the services produced by the task are industry, the states, and the general public.

30. Activity Plan

The approach to be used in achieving the task objective is primarily experimental and involves the disciplines of bacteriology, parasitology, and virology. On the basis of initial histological findings, attempts are made to culture and identify microbial agents suspected of being the pathogens responsible for the observed pathology. Subsequent to successful culture of a potential pathogen, experimental studies are conducted under appropriate laboratory conditions to confirm the virulence of the pathogen for the susceptible host to determine the nature of the host's response.

31. Task Outputs and Benefits

1. Outputs

A. Establish a national diagnostic laboratory to identify, classify, and describe infectious and noninfectious diseases of marine feral and cultured fish and shellfish. This objective is a continuing process and, as such, has not finite termination.

B. Apply microbiological (bacteriological, virological) procedures to the study of disease and mortality in marine fish, crustaceans, and mollusks. The approximate duration of this task would be from 5-10 years.

C. Develop immunological and serological procedures for diagnosis of disease and for the assessment of environmental stress in marine fish and shellfish. The approximate duration of this task would be from 5-10 years.

D. Utilize available techniques in quantitative and qualitative biochemistry to assess the physiological condition of marine fish, crustaceans, and mollusks. Develop appropriate biochemical techniques where available ones are not suitable. The appropriate duration of this task would be from 5-10 years.

Criteria for task termination for the above would be the proven utility of a particular procedure for the objective in question.

2. Benefits

Accomplishment of task objectives both 1) establishes causes of disease and mortality and 2) defines the impact of environmental stress on marine fish, crustaceans, and mollusks. The information obtained is necessary for the rational, long-term exploitation of natural resources.

32. Impact of Task Augmentation

No potential increase anticipated. Level funding barely adequate to successfully complete obligations.

33. Criteria for Task Completion

34. Back-up Documentation

- A. 1. Public Law 92-583 Title III - Management of the Coastal Zone (fish and shellfish harvesting, habitat destruction, demands of coastal zone).
- 2. Public Law 92-500 Title I - Research and Related Programs (amendment to Federal Water Pollution Control Act).
- 3. Public Laws of the State of Maine relating to sea and shore fisheries (importation of marine species).
- 4. Lacey Act Title 18, Amendments (transportation, importation, animals, birds, fish, plants in violation of State, National, foreign laws).
- 5. H.R. 695, 92nd Congress (protection fish resources).
- 6. S. 2764, 92nd Congress (fish disease control).
- 7. H.R. 6861, 92nd Congress (advance scientific knowledge fish diseases and relation to pollution).
- 8. Public Law 92-532 - Ocean Dumping Act.
- 9. Informal Reports #1, 3, 4, Middle Atlantic Coastal Fisheries Center, NMFS, NOAA, U. S. Department of Congress.
- B. Cooperative Research Programs with other NOAA, NMFS and Center Units, State, Federal, University Investigators.
- C. None
- D. None

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 21, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5
National Oceanic and Atmospheric Administration
Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER MAC-024-77-SP-A-1	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER 900040	6. TASK TITLE Support MACFC
-----------------------	--------------------------------

ORGANIZATION CODE FB6000	8. ORGANIZATION TITLE (Responsible for execution of this task) Middle Atlantic Coastal Fisheries Center	9. PRINCIPAL LOCATION	
		City Highlands	State N.J.

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	LINE ITEM NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE
		A	B	C	D	E	F
10. Total Direct Labor	15	550.9		550.9		550.9	
11. Travel	19	19.4		19.4		19.4	
12. Rents, Communications, Utilities	21	96.9		96.9		96.9	
13. Contracts (To be let)	51						
	52	15.0		15.0		15.0	
14. Grants (Funds obligated)	58						
15. Supplies	53	63.1		63.1		63.1	
16. Capital Equipment	54	2.5		2.5		2.5	
17. Other (All other obligations)		76.5		76.5		76.5	
18. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		824.3		824.3		824.3	
19. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		32		32		32	
20. Positions, Other <small>(Number applicable to this Task.)</small>		10		10		10	
21. Man-years, Permanent		27.4		27.4		27.4	
22. Man-years, Other		5.0		5.0		5.0	
23. Reimbursable Support <small>(Reimbursable agreements only)</small>		50.0		41.5	27.5	48.0	

REMARKS

4. OFFICIAL PREPARING REPORT (Signature)
John Holston
Deputy Center Director

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)
Carl J. Sindermann
Center Director

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-024-77-SP-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no Incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
TDP# MAC-024-77-SP-A-1 Task #90040 Title: Support, MACFC			
Subtask # MAC-024-1 MACFC - Center FB6000			
Center Director	15/6	Sindermann, Carl J.	100
Deputy Center Director	15/7	Holston, John A.	100
Administrative Officer	12/1	Mayberry, Daryl L.	100
Secretary (Typing)	7/4	Melkers, Kathe	100
Gen. Acctg. Tech.	4/2	Laird, Mary	100
Computer Aid	3/1	Steimle, Suellen	100
Milford Laboratory -FB6300			
Administrative Assistant	9/1	Lanyon, Douglas	100
Adm. Clerk	5/3	Frauenberger, Estelle	100
Clerk-typist	4/3	Bridges, JoAnn	100
Maintenanceman	WG9-04	Provost, Kenneth S.	100
Sanitor	WG2-03	Onofrey, Andrew	100
Subtask # MAC-024-3 Milford Laboratory -FB6400			
Administrative Officer	11/4	O'Connell, William A.	100
Adm. Clerk	5/3	Smith, MaryAnn	100
Editorial Assistant	5/7	Swan, Jane B.	100
Building Repairman	WG10/03	Heister, Paul J.	100
Maintenanceman	WG 8-03	James, Solomon	100
Laborer	WG 3-03	Brocks, Barney L.	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

FACT OF TASK AUGMENTATION

- Detail Documentation (Provide one sentence description.)
- Related tasks and research presently being conducted.
- Indicate the Congressional legislative requirements.
- Indicate the Environmental Impact Statement (EIS) requirements.

Current Year

Budget Year

Budget Year + 1

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-024-77-SP-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Subtask # MAC-024-4 Sandy Hook Laboratory - FB6100			
Administrative Assistant	7/4	Pawlikowski, Helen	100
Adm. Clerk	5/4	Schadt, June D.	100
Adm. Clerk	4/1	Jeffress, Dorothy	100
Accts. Maint. Clerk	4/3	Leimburg, Elizabeth	100
Clerk-typist	3/1	Sanchez, Donna M.	100
Foreman I, Cabinet Maker	WG11/04	Allan, William M.	100
Cabinet Maker	WG11/04	Lauer, Edward F.	100
Maintenanceman	WG08/04	Mellish, Arthur G.	100
Laborer-Maintenanceman	WG04/04	Adams, Solomon	100
Carpenter	WG09/04	Rosenberg, Peter	100
Subtask # MAC-024-5 Oxford Laboratory			
Library Technician	6/3	Lang, Helen S.	100
Subtask # MAC-024-6 Sandy Hook Laboratory			
Librarian	7/11	Trafford, Mabel	100
Subtask # MAC-024-7 Sandy Hook Laboratory			
Motor Vessel Captain	11/3	Wicklund, Irvng	100
Motorboat Operator	10/3	Fishler, Henry	100
Cook-Seaman	5/2	King, Edward	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

IMPACT OF TASK AUGMENTATION

- Current Year
- Budget Year
- Budget Year + 1

34. BACK-UP DOCUMENTATION

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

30 - STATEMENT OF NEEDS

The performance of successful research requires a host of support services, each of which facilitates the performance of one or more aspects of the research. The Middle Atlantic Coastal Fisheries Center, composed of three geographically separated facilities, each with Center-integrated missions but with differing research skills and support needs, poses special problems in administration, ADP and library support, in custodial and maintenance services and in general research supervision.

The concept of a Task, i. e. , the initiation and completion of a research problem, implies that the ancillary services necessary to complete the work will be made available.

31 - TASK OUTPUTS

1. Long-Range

- a. To facilitate the attainment of research objectives through relieving researchers of responsibilities for (1) administrative functions (personnel, procurement, finances, ADP, accounting, etc.), (2) library services, (3) facility maintenance and equipment repair, (4) custodial help, and (5) overall research supervision, guidance and integration.
- b. Criteria for Task termination are not quantifiable; size of support group determined by Task definitions. Support needs will continue as long as facility is active in research. Mix of support needs and personnel will be evaluated annually to assure maximum responsiveness to needs of researchers.

2. Short-term

- a. Provides executive management and direction for the principal investigations teams of the Middle Atlantic Coastal Fisheries Center. Serve as focal point for planning, reprogramming, budget development and utilization of Center personnel, funds, data management, physical facilities, supplies, and equipment.

- b. Administrative personnel are assigned to the Center and to each of three geographically separated research facilities to provide a variety of administrative services in personnel, property, travel, and facility management.
- c. They also assist the Director of Investigations and Officer-In-Charge of the facilities to insure that required records are maintained and that policies, regulations, and procedures of the Center and higher authority are being complied with.
- d. Provide equipment repair and maintenance service as well as technical illustrational and reproductive services to the staffs at the three Center facilities. Provide for electrical and electronic trouble-shooting needs and periodic tune-up services to all scientific equipment and built-in facility services. In concert with authors, prepare realistic drawings of all stages in the life history of living marine organisms and graphs of scientific findings.

32 - BENEFITS

The manifold administrative, custodial, maintenance and other technical support activities, if not handled by the support staff, would, if they were capable of doing them, have to be done by the research staff - to the detriment of their progress in research. Research supervision and guidance is necessary to integrate and coordinate disparate research activities at the three geographically separate research facilities.

Benefits (outputs) are indirect but, inasmuch as the completion of separate Tasks is facilitated, the benefits derived from such Tasks also apply to the Support Task.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 18, 1974

(Submit five copies by Jan. 2)
To: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER C-053-77-SI-A	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER 8817P2	6. TASK TITLE MARMAP S1: Biological Assessment
-----------------------	---

ORGANIZATION CODE FB6200	8. ORGANIZATION TITLE (Responsible for execution of this task) Resource Assessment Investigations	9. PRINCIPAL LOCATION City: Highlands, State: NJ
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OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
Total Direct Labor	15	121.8		94.7		94.7	
Travel	19	1.3		1.3		1.3	
Rents, Communications, Utilities	21						
Contracts (To be let)	51						
Grants (Funds obligated)	52						
Supplies	53	4.2		4.2		4.2	
Capital Equipment	54						
Other (All other obligations)		11.4		11.4		11.4	
Total Direct Funds (Add lines 10 through 17 above.)		138.7		111.6		111.6	
Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		8		8		8	
Positions, Other (Number applicable to this Task.)		5		2		2	
Man-years, Permanent		5.8		5.8		5.8	
Man-years, Other		2.4		1.2		1.2	
Reimbursable Support (Reimbursable agreements only)							

REMARKS

OFFICIAL PREPARING REPORT (Signature)
for
Richard S. Merrill, Dir. of Investigations

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (SIG.)
Carl J. Sindermann
Carl J. Sindermann, Center Director

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-053-77-SI-A

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
1 A	Conduct diurnal migration studies on larval fishes in Middle Atlantic Bight	X				X									
2 AE	Prepare cruise reports on above cruises	X				X									
3 AE	Sort, count, and identify larval fishes from diurnal migration studies	X				X									
4 AE	Prepare manuscripts on data from vertical migration studies		X												X
5 A	Conduct semi-annual survey cruises along Middle Atlantic Bight	X													
5 AE	Prepare cruise reports for semi-annual cruises	X													
7 AE	Prepare reports and/or manuscripts from data on larval fishes collected during semi-annual cruises			X											
8 AE	Prepare manuscripts on in-house data pertaining to distribution of larval fishes in Middle Atlantic Bight	X				X									

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-053-77-SI-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Research)	12/3	Smith, Wallace G.	100
Fishery Biologist (Research)	11/4	Berrien, Peter	100
Fishery Biologist (General)	11/4	Fahay, Michael P.	100
Fishery Biologist (Research)	12/3	Kendall, Arthur W.	100
Fishery Biologist (General)	7/3	Sibunka, John D.	100
Biological Aid	5/2	deGorgue, Cinda L.	100
Fishery Biologist	7/4	Silverman, Myron J.	100
Fishery Biologist (General)	5/3	Roberts, Susan	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

29. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

30. ACTIVITY PLAN

31. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

32. IMPACT OF TASK AUGMENTATION

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

29 - STATEMENT OF NEED

The increased fishing pressures, both foreign and domestic, and the apparent diminution of suitable spawning and nursery grounds have combined to jeopardize our coastal fishery resources to the extent that some are on the brink of being depleted. Unfortunately, our knowledge of coastal fishes is inadequate for recommending immediate and sound management policies. We are not in a position to predict recruitment, optimum levels of exploitation, or the impact of long-term natural fluctuations and man-made changes in the environment upon our commercial and sport fishery resources. It is essential that the assessment of fishery stocks along the Atlantic coast and adjacent estuaries be augmented in order that proper management policies can be established to save these important marine resources. To acquire the scientific and technical base to construct sound management policies, we must obtain information about living marine resources that will permit meaningful predictions of distribution, abundance, conditions, and availability of these resources. Primary recipients of this information include:

- ICNAF
- ASMFC
- Commercial fisheries
- Sport fisheries
- Scientific community user groups.
 - a) State conservation agencies
 - b) pollution investigations
 - c) private research organizations
 - d) university researchers

30 - ACTIVITIES PLAN

Six cruises (beginning in FY 72) were planned to study diurnal activities of young fishes. Collections from these cruises will contain young of the most important commercial and recreational fishes that spawn in the bight. Of the 10 most important coastal species in terms of total combined sport and commercial catch between New York and Cape Hatteras, only Atlantic mackerel and possibly bluefish are not dependent on the shallow coastal areas. The other species depend on the subtidal zone for spawning and/or nursery areas, and even young bluefish and mackerel utilize this area for foraging to some extent.

We will conduct spring and fall coastal surveys to monitor fluctuations in abundance and distribution of young fishes in conjunction with ongoing finfish assessment surveys. Plankton collections will be taken at pre-selected stations in the Middle Atlantic Bight, chosen on the basis of previous cruises designed to study the seasonal distribution of fish eggs and larvae. We will record concomitant measurements of the marine environment on the above cruises and subsequently incorporate pertinent physical data from other sources to establish norms and ranges of variability. These data will be integrated with all available biological data to evaluate the role of the environment in terms of its effect on larval transport, geographic distribution, year-class success and, ultimately, to establish the actual role of the coastal zone in the early life history of economically important fishes.

We will continue to utilize ADP to investigate the relation of inter-specific distributions of fishes and to relate their distributions to several environmental parameters, and to maintain a current data management system, providing outputs to various user groups.

From FY 75 - 77 we plan to:

- 1) In conjunction with coastal finfish assessment task, collect plankton samples, sort and identify ichthyoplankton components, compile and provide distribution and relative abundance summaries to user groups.
- 2) Conduct summer cruise to study diurnal activity and larval transport of selected species of ichthyoplankton of major importance to commercial and recreational fisheries.
- 3) Provide information summarizing results and interpretations of historical ichthyoplankton collections of selected species.

31 - TASK OUTPUTS

- a) Emphasizing those species that are found nearshore, fieldwork during the next 3 to 5 years will center around: a) continued investigations of the diurnal activities of young planktonic fishes to acquire an understanding of their associations with such environmental parameters as photoperiod, depth, temperature, salinity, and seasonal thermocline, and to estimate their dispersion rates on the basis of known coastal circulation; b) surveys of selected coastal areas, designed to monitor fluctuations in abundance of larval fishes, to determine their distribution in coastal waters, to attempt to correlate fluctuations in abundance and distribution with hydrographic features, and to learn more about environmental needs of specific fishes.

We will continue to produce and maintain a data management system adequate to acquire, process, and store information needed to support resource assessment research; provide outputs from the data bank to various users, including industry, sportsmen, population and environmental analysts, other NMFS research groups, and management and regulatory bodies; and adopt additional, new, and more efficient sampling gear, provided correction factors can be determined for our entire data series.

- b) We will operate with standard gear (as adapted for Survey I operations) over enough years so that normal fluctuations and cycles in abundance and distribution of the species and also fluctuations in the natural environment of these species can be ascertained. This information is essential to determine the causes of population fluctuations or declines.

- b) Provide a data base for annual and long-term assessments of the distribution and abundance of utilized and latent resource populations subject to management under international agreements, and actual or planned State-Federal management of stocks of interest to the United States in coastal waters.

Provide better understanding of resources and factors affecting them by comparing known aquatic circulation patterns with diurnal activities of larval fishes and interpreting the results to effects on larval transport and the distribution of juvenile stages.

Improve assessment capabilities by understanding diel movements of larval fishes and how environment may affect their dispersal, survival, and recruitment potential.

Strengthen potential for forecasting and predicting abundance and distribution, and the effects of further environmental variation upon resources by increasing knowledge of relation between fishery resources and several environmental parameters.

Develop specialized information to support policy decisions concerning the impact of man-induced environmental changes on marine resource populations.

Provide data on which to base management decisions involving user groups and national interests by showing seasonal and spatial importance of marine environment to well being of commercial and recreational fishes.

32 - IMPACT OF TASK AUGMENTATION

No anticipated increases.

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

- a. Hempel, G. 1965. On the importance of larval survival for the population dynamics of marine food fish. CALCOPI Reports, Vol. X pp. 13-23.

Ahlstrom, E. H. 1965. Kinds and abundance of fishes in the California Current Region based on egg and larval surveys. CALCOPI Reports, Vol. X. pp. 31-52.

Walford, L. A. 1955. New directions in fishery research. Deep Sea Research. Suppl. to Vol. 3. pp. 471-473.

Smith, W. G. 1973. The distribution of summer flounder, Paralichthys dentatus, eggs and larvae on the continental shelf between Cape Cod and Cape Lookout, 1965-66. Fish. Bull. 71(2): 527-548.

Kendall, A. W., Jr. 1972. Description of black sea bass, Centropristis striata (Linnaeus) larvae and their occurrences north of Cape Lookout, North Carolina, in 1966. Fish. Bull. 70(4): 1243-60.

Richards, S. W., and A. W. Kendall, Jr. 1973. Distribution of sand lance, Ammodytes sp., larvae on the continental shelf from Cape Cod to Cape Hatteras from R. V. Dolphin surveys in 1966. Fish. Bull. 71(2): 371-386.

Fahay, M. P. 1974. Occurrence of silver hake, Merluccius bilinearis, eggs and larvae along the Middle Atlantic Continental shelf during 1966. Fish. Bull. 72(3): 813-834.

Fahay, M. P. An annotated list of postlarvae and juvenile fishes captured with surface-towed meter net in the South Atlantic Bight between May 1967 and February 1968. (in press - SSR-F)

Smith, W. G., J. D. Sibunka, and A. Wells. Seasonal distributions of larval flatfishes (Pleuronectiformes) on the continental shelf between Cape Cod, Massachusetts, and Cape Lookout, North Carolina, 1965-66. (NOAA Technical Report SSR-F - in press)

b. Related research

Coastal finfish assessment, MACFC

MESA

MARMAP

NMFS, Beaufort, N. C. -- advective mechanisms responsible for the seasonal influx of larval menhaden in Onslow Bay

Long Island Sound benthic studies, MACFC

Ichthyological Associates -- ichthyoplankton studies of southern New Jersey estuaries

Boyce Thompson Institute for Plant Research, Inc. -- ichthyoplankton studies of the lower Hudson River

c. N/A

d. Data on larval fish distribution and density is important evidence to be used in determining fishery impact regarding extended jurisdiction responsibilities.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED
December, 1974

(Submit five copies by Jan. 2)

Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

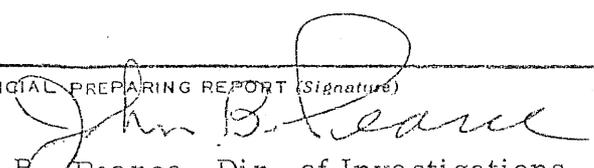
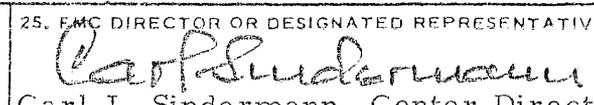
TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
MAC-055-77-IE-K	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER	6. TASK TITLE
71217	MESA-NYB Biological Oceanography

ORGANIZATION CODE	B. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION
FB6000	Ecosystems Investigations	City Highlands State NJ

OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	ENL B O O	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
Total Direct Labor	15	270.0		270.0	211.4	481.4	
Travel	19	10.6		10.6	9.4	20.0	
Rents, Communications, Utilities	21						
Contracts (To be let)	51	52.7		50.0		50.0	
Grants (Funds obligated)	52						
Supplies	58	25.3		28.0	8.2	36.2	
Capital Equipment	53						
Other (All other obligations)	54	23.8		23.8	18.6	42.4	
Total Direct Funds (Add lines 10 through 17 above.)		382.4		382.4	247.6	630.0	
Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		1		1		1	
Positions, Other (Number applicable to this Task.)		10		10	15	25	
Man-years, Permanent		7.5		9.5		9.5	
Man-years, Other		9.5		9.5	13.7	23.2	
Reimbursable Support (Reimbursable agreements only)							

MARKS

OFFICIAL PREPARING REPORT (Signature)  John B. Pearce, Dir. of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  Carl J. Sindermann, Center Director
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NMFS VESSEL REQUIREMENTS FY 1977

1. Date: December 1974 2. TDP No.: MAC-055-76-IE-R 3. Prepared by: James P. Thomas

4. Task Title: Biological Oceanography (MESA-NYB)

SEA TIME - DAYS	CY (a)	BY		BY+1	
		(b) T.A.	(c) Incr.	(d) T.A.	(e) Incr.
NMFS 5. R/V Delaware II	34	40		40	
R/V Albatross IV	16	16		16	
Vessel 6. R/V Kelez	14	14		14	
(Name) 7.					
Charter 8. Trawler (catamaran)	16	16		16	
Vessel (type) 9.					
10. TOTAL SEA DAYS	80	86		86	
Scientists 11. Maximum	14	14	-	14	
per cruise 12. Minimum	6	6	--	6	
(Average) 13. Anticipated	9	9	-	9	
14. 1st.		Aug. 75		Aug. 76	
15. 2nd.					
Cruise Months 16. 3rd.	Feb. 75	Feb. 76		Feb. 77	
17. 4th.	Apr. 75				

18. Vessel Priority:

a. NOAA FRV (NMFS) <u>(1)</u>	d. Univ. RV Charter <u>N/A</u>
b. NOAA RV (NOS) <u>(2)</u>	e. Existing NMFS Small Boat <u>N/A</u>
c. Commercial Charter <u>(3)</u>	f. New, Specialized NMFS Small Boat <u>N/A</u>

19. Remarks:
Piggy-backing: (1) Sediment composition; sediment chemistry (heavy metals).

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-055-77-EI-R-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE
IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

NUMBER A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	75 CY		76 BY		77 BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Macrofauna - apex - work up.	X	X	X	X										
E	Annual Report to MESA Office.	X													
E	Historical - reconnaissance report.		X												
E	SYMAPs - apex - macrofauna.			X	X										
A	Monitor apex - macrofauna.	X	X			X									
A	Sampling macrofauna - Bight; exclusive of apex.		X	X	X										
A	Work up macrofauna - Bight.		X	X	X	X	X								
E	SYMAPs - Bight - macrofauna.					X	X								
M	Report macrofauna (final, on apex; Preliminary on Bight).						X								
0	A Final Report - macrofauna - Bight.									X					
1	A Sampling Raritan Bay - phytoplankton.	X	X												
2	A Work up Raritan Bay - phytoplankton.	X	X	X											
3	E SYMAPs - Raritan Bay - phytoplankton.			X											
4	M Report - Raritan Bay - phytoplankton.			X											
5	A Sampling - Raritan Bay - respiration (water column).				X	X									
6	A Work up - Raritan Bay - respiration (water column).					X	X								
7	E SYMAPs - Raritan Bay - respiration (water column).									X					
8	M Report - Raritan Bay - respiration (water column).									X					
9	A Oxygen consumption - apex - sampling.	X	X												
0	A Work up oxygen consumption - apex.	X	X	X											
1	E SYMAPx - oxygen consumption - apex.		X	X											
2	M Report - oxygen consumption - apex.			X											
3	A Monitor oxygen consumption - apex.		X	X	X										
4	A Oxygen consumption - Bight - sampling.		X	X	X										
5	A Work up - oxygen consumption - Bight.			X	X	X									
6	E SYMAPs oxygen consumption - Bight.			X	X	X									
7	M Report - oxygen consumption - Bight.						X								
8	A Sample seabed oxygen consumption - Raritan Bay.					X	X								
9	A Work up oxygen consumption - Raritan Bay.						X	X							
0	E SYMAP oxygen consumption - Raritan Bay.							X							
1	E Report oxygen consumption - Raritan Bay.							X							

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER
MAC-055-77-EI-R-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE
IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	BUDGET YEAR															
		75		76		77		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N		
A	Ecology of detritus - Raritan - Hudson.											X	X	X			
A	Water column respiration - apex.											X	X	X			
A	Monthly "corridor" cruises to the New York Bight to determine fin rot prevalence and incidence.	X			X												
E	Collation of all data from monthly cruises						X										
M	Manuscript on fin rot prevalence and incidence							X									
A	Prevalence and incidence of fin rot in summer flounder from the N.Y. Bight and Great Bay, New Jersey	X			X												
E	Collate data on fin rot prevalence in summer flounder						X										
M	Manuscript on fin rot prevalence and incidence							X									
A	Entrapment studies with winter flounder in the New York Bight.		X		X												
E	Summarize data on entrapment studies						X										
A	Prevalence and histopathology of an exoskeleton disease in Crangon from the New York Bight.	X			X												
E	Summarize prevalence data						X										
E	Summarize histopathology data						X										
M	Manuscript on histopathology of exoskeleton disease in Crangon							X									
A	Etiologic and histopathologic studies of "black gill" disease of crustacea from the New York Bight.	X			X												
E	Collate data on prevalence of protozoa in/on gill lesions						X										
M	Manuscript on "black gill" disease in benthic crustacean							X									
A	Disease prevalence in bivalve mollusks from the New York Bight		X		X												
E	Summarize disease prevalence in mollusks						X										
M	Manuscript on disease prevalence in mollusks							X									
A	Utilization of entrapped bivalve mollusks as indicators of environmental degradation.		X		X												
E	Initiate feasibility studies in New York Bight		X		X												
M	Collate data first year studies						X										

7. OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

a. Continued at same level
b. Increase of ___% *
c. Reduction of ___%
d. Termination

"X" APPROPRIATE COLUMN

REMARKS

**NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS**

TDP NUMBER

MAC-055-77-EI-R-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Res.) (Quant. Ecol.)	14/2	McNulty, John	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

32. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

35. ACTIVITY PLAN

36. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

37. IMPACT OF TASK AUGMENTATION

a. Detail Documentation *(Provide one sentence description.)*

a. Current Year

b. Related tasks and research presently being conducted.

b. Budget Year

c. Indicate the Congressional legislative requirements.

c. Budget Year + 1.

d. Indicate the Environmental Impact Statement (EIS) requirements.

3. STATEMENT OF NEED

A. Principal objective to which this Task contributes:

NMFS Goal IV, Subgoal A, Objective 9 - "Determine the impact of environmental change in the Middle Atlantic region".

A. 1) a. Need or Problem:

The waters of the New York Bight are subject to the demands of many competing users. The general public, sport and commercial fishermen and others utilize these waters for their recreational activities as well as for their livelihood. They require a relatively clean environment with waters in which they can swim safely and which will also support a sufficient quantity and quality of life to make sport and commercial fishing worthwhile. In addition, industries and municipalities utilize these waters to dispose of their waste products. They require only that these waters assimilate or carry away the wastes dumped into them. Between these two ends of a spectrum are individuals regulating the activities of each. These individuals are the policy makers, grantors of licenses and permits, etc., and they must be concerned about the rights and needs of both ends of the spectrum. These policy makers and managers require precise quantitative information about the environment on which to base their decisions in regulating the various user groups of the New York Bight.

It appears that an imbalance has already occurred in certain portions of the New York Bight as evidenced by values of low diversity and the presence of toxic red tides. Policy makers need to know how much waste material should be allowed to enter the New York Bight on an area by area basis per unit time at different seasons of the year to ensure that adequate consideration and protection are given to the requirements of living marine resources as well as aesthetics and human needs in environmental alterations proposed for the future. This requires that a broad knowledge be acquired on the distributions and biomasses of the communities presently living in the New York Bight and of the fluxes of materials passing through them, so that the effects of man-induced changes on the living marine resources can be determined.

A. 1) b. Rationale for NMFS involvement:

- 1) Under a mandate to NOAA, NMFS has ongoing concern with the effects of ocean disposal on living marine resources to provide data suitable for coastal zone management.
- 2) The area has known and still does have fishery resource importance for adult and juvenile individuals who must make use of these waters for at least a part of their life cycle.
- 3) MACFC of NMFS has been involved in extensive baseline studies of this area since 1967 and is now in the process of building on the information derived from these studies to develop understanding of the structural and functional aspects of this ecosystem.

- A. 2) Primary recipient of the information will be policy makers and managers, grantors of licenses and permits, etc. who require precise quantitative information about the environment on which to base their decisions in regulating the various user groups of the New York Bight. These include the EPA, U. S. Army Corps of Engineers and the Environmental Assessment Division, NMFS.
- A. 3) This information can obviously contribute directly to Objective IV-A-9, "Determine the impact of environmental change..." as regards the effects of ocean disposal on living marine resources. The investigators are cooperating closely with other studies both within and outside the MESA Program. The coverage is such that knowledge gained in the New York area will be applicable to similar environments and impacts throughout and perhaps beyond the Middle Atlantic region.
- B. The Task also contributes to NMFS Goal II, Subgoal D - "Provide descriptions and analyses of marine organic production systems and of biological, physical, and chemical environmental conditions and define their influence on the abundance and distribution of living marine resources". The various physical, chemical and biological investigations which have been and will be conducted over an extended time frame will add greatly to our knowledge of the waters of the New York area, their living marine resources and the extent to which natural and man-induced changes affect these resources. Our contribution here will not be detailed at this time, because no objective has yet been designated (although one has been proposed) for MACFC within Subgoal II D.
- C. The Task appears to pertain to NMFS Goal IV, Subgoal C - "Assure full participation in the decision-making related to proposed alteration of the marine environment...", perhaps that portion concerning Objective 4, Coastal Zone Management. MBO IV-c-4 was considered by the Coordinator, Water Resources Division, to give NMFS lead-agency responsibility for the monitoring survey (by memorandum of 22 April 1974 to Chief, WRD). Again, this objective has not been fully developed at the time of TDP preparation.

30. ACTIVITY PLAN

Subtask: Phytoplankton, primary productivity and water column respiration in Raritan, Lower, Upper and Sandy Hook Bays.

Pollutants enter the waters of the New York Bight areas as both particulate and dissolved material. Thus particulates that remain suspended in the water column and the dissolved substances that remain in solution have the potential to affect planktonic marine resources (including larval stages of sport and commercial species as well as their food sources) as well as taxa at higher trophic levels. Ultimately, man or his domestic animals could be affected through the transfer and concentration of pollutants throughout the food web.

Many of the pollutants that enter the New York Bight are highly organic (petrochemicals, pesticides, sewage wastes, etc.). As such they may provide an additional food source for certain organisms. However, they may instead inhibit the growth and development of these organisms. One of several parameters that should indicate the effect of these compounds on the living system is the measurement of the consumption of oxygen by planktonic organisms living in the water column. In areas where there is a high organic input and respiration is high, oxidizing nearly all the incoming organic matter, we know that such systems are capable of handling high organic loads. Where, however, an imbalance occurs between inputs of organic matter and the oxidation of that matter we know that the system may be receiving too much organic matter. Depressed oxygen values in the water column would indicate that the system is operating at or near capacity; such low DO values are frequently observed in metropolitan waters. In any case ecosystems that are not overloaded should respond actively to increases in the supply of organic matter and ecosystems that are overloaded should not longer respond to additional inputs. In addition, Japanese researchers (Mori et al., personal communication) report that eutrophication has direct effects on many marine organisms, i.e., interfere^s with normal reproduction in forms such as oysters.

To this end this subtask proposes to investigate the 1) seasonal variations in the distribution and magnitude of oxygen consumption in the water column, 2) standing stocks of organic matter, and 3) inputs of organic matter to the system, to determine whether the plankton ecosystems are capable of assimilating the present levels of dissolved and particulate organic matter entering the system. The following parameters will be measured: water column respiration rates, net zooplankton carbon, particulate organic carbon (Leco Carbon Analyzer), particulate inorganic material, primary productivity - particulate and dissolved, phytoplankton-species volume and number, ratio of detritus to phytoplankton, heavy metal in suspended particulate material, dissolved organic carbon (Menzel and Vaccaro, 1964), and, if present data demonstrates the importance of dissolved organic matter, we will measure assimilation and oxidation rates of dissolved organic matter as well as salinity, temperature, pH, and dissolved oxygen. (See Hobbie et al., 1972. A study of the distribution and activity of microorganisms in ocean water. *Limnol. Oceanogr.* 17(4): 544-555).

Subtask: Seabed oxygen consumption - New York Bight.

This subtask is proposed to measure seabed oxygen consumption and map the present rates of decomposition of organic wastes occurring as a result of biological and non-biological processes in the New York Bight. Continuing measurements in and around the waste disposal areas in the apex will be made. Comparisons will be made between seabed oxygen consumption values in the Hudson Shelf Valley and neighboring continental shelf to see if there is any indication that organic wastes are being transported down the Hudson Shelf Valley.

From the results of this study and additional information concerning the extent of organic wastes in the Bight and the rates of input and export by physical means, the following will be determined: 1) the rate

at which organic wastes are accumulating or disappearing in certain areas, 2) the quantity of organic input various areas of the New York Bight can accommodate without deleterious effects to the living marine resources, and 3) the time required for the sediments to return to a homeostatic condition capable of accommodating predictable, but as yet unknown, quantities of organic matter. Baseline decomposition rates will be mapped to monitor the spread of pollutants in the future and to provide policy makers with usable information on quantities of organic matter that delineated areas of the Bight could accommodate temporarily without deleterious effects.

The following parameters will be measured: seabed oxygen consumption (Pamatmat, 1971a, b), dissolved oxygen, pH, salinity and temperature.

Subtask: Benthic meio- and macrofauna.

Waste materials, including solid wastes barged to sea for dumping and effluents from point sources, have been shown to affect benthic dwelling organisms. Benthic macrofauna taxa have been severely affected by ocean disposal of sewage sludge and dredging spoils in the Bight; many components of the macrofauna are commercially important or have great significance in marine food chains. There are also indications that the meiofauna has been affected.

The Smithsonian Advisory Committee (1972) recommended that future research efforts "should be directed to evaluate statistically the effects of ocean dumping on benthic macrofauna, particularly those species important commercially either directly to man or by serving as food for finfish." It also stated the importance and need for studies of the meiofauna.

Our proposed field research on the macrofauna is related to earlier research at SHL and will consider: 1) change in species diversity within macrofaunal communities relative to sources of pollution, 2) change in total biomass and standing stocks of benthic species relative to sources of pollution and ecotones, or zones of transition in physical ecological parameters, and 3) change in the distribution and biology of individual species.

Particular emphasis will be placed on investigating areas over and around the waste disposal areas in the apex. Comparisons will also be made between the distribution, biomass, species diversity and heavy metals in the Hudson Shelf Valley and neighboring continental shelf, and between the Hudson Canyon delta and the neighboring Continental Rise and Abyssal Plain to: 1) provide baseline data and 2) determine if there is any indication the pollutants (heavy metals, coliforms, organic wastes, etc.) are affecting deep sea marine life by being transported down the Hudson Shelf Valley and Canyon. This data would have a direct bearing on any decision to move the locations of the present waste disposal areas. The change in location of the present disposal areas could have a real effect on local sport and commercial fisheries as well as migratory species which normally habituate distant waters.

The objectives of this subtask are to: 1) establish baselines for benthic communities which can be analyzed statistically, 2) provide data on biomass community or species diversity and individual species, particularly those with commercial values, which are affected by pollutants, 3) determine the possibility of specific macrofaunal species serving as "indicator organisms" in the Bight, 4) determine if changes in single major taxa or biomass, rather than changes in total community structure, can be used to assess change due to man-induced environmental perturbations, and 5) provide the above information in the form of a subunit of a predictive model.

The products of this subtask will be: 1) a series of charts indicating the distribution of individual species, biomass and species diversity in the apex of the Bight, 2) correlations between the distribution of macrofauna and sediment type, and distributions of toxins and artifacts associated with bed deposits of sewage sludge and dredging spoils, 3) statistical correlations between species diversity, standing stocks of individual taxa (as biological indicators) and biomass and decisions as to the suitability of these data for management purposes and 4) a subunit of a predictive model suitable for inclusion in the overall NOAA-MESA modeling program. We anticipate contracting with Dr. Saul Saila at the University of Rhode Island to develop methods for multivariate analyses of faunal distributions in relation to environmental variables.

The first effort in this subtask has been to develop a sampling program which has a great degree of statistical validity.

Several facets of research of direct interest to the NOAA-MESA program have not been funded or have inadequate financial resources available to develop them to their full potential. For instance, a greater effort should be made in environmental microbiology and chemistry, particularly as these disciplines relate to the benthic meio-macrofauna studies and resource assessment research on demersal finfish.

Greater support should also be given to the problem of fish disease and its distribution and prevalence within the greater New York Bight.

Subtask: Effects of a polluted environment on the prevalence of disease in economically important fish, crustaceans, and mollusks

The introduction and accumulation of large amounts of inorganic and organic materials into coastal marine environments poses a threat to the well-being and reproductive potential of resident and migrant marine fauna. The prevalence of disease in economically important fish, crustaceans and mollusks from severely degraded marine environments should be monitored to assess the impact on the resource. Disease surveys of demersal fish from the New York Bight apex have shown significantly more winter flounder with fin rot disease (14.1%) than are present in adjacent coastal areas (1.9%). Disease studies of benthic crustaceans from the Bight apex have revealed two abnormal conditions which warrant further study. Grass shrimp (an important organism in the food chain of demersal fish) have been

found with necrotic lesions of the exoskeleton and rock crabs have been found with blackened gills. Bivalve mollusks have not been examined for disease prevalence, although there is reason to believe that these sedimentary animals may also be affected adversely by a degraded environment. ¶

The prevalence of fin rot in winter flounder from the New York Bight apex is high; the specific locus within the Bight which initiates the disease in this migrant fish is not known. Summer flounder with fin rot are also found in the apex area. It is hypothesized that summer flounder contract fin rot during their summer migration to the area. Intensive trawl surveys will be conducted to establish the temporal and spatial prevalence of fin rot in both winter and summer flounder. In addition to prevalence studies conducted within the apex area, disease prevalence in winter and summer flounder from a non-impacted area will be determined. The effect of inimical sedimentary materials on the induction of fin rot disease in winter flounder will be determined by placing entrapped fish in disposal areas receiving sewage sludge, dredge spoils and acid wastes.

Exoskeleton diseases of crustaceans will be characterized histologically, although procedures for satisfactorily embedding and sectioning chitinous exoskeletons must be devised first. With adequate tissue preparation, the histopathology of the exoskeleton disease of Crangon and other crustaceans within the Bight apex (blue crab, rock crab, lady crab, lobster) with "black gill" disease will be examined for the presence of protozoan epibionts and the histopathology of necrotic lesions in gill tissues. Since they are sedentary, bivalve mollusks may be utilized as sentinels of environmental deterioration. The prevalence of disease in bivalve mollusks from the New York Bight apex will be determined via histologic examination of resident species. Bivalve mollusks will also be entrapped within Bight areas that receive sewage sludge, dredge spoils, and acid wastes. Animals will be removed periodically and examined grossly and microscopically.

Frequently scheduled cruises to polluted dump site areas of the New York Bight and contiguous offshore coastal areas and bays will be conducted using appropriate sampling gear. These cruises and examination of samples collected thereby will provide comparative data on the prevalences, incidences, distribution, and seasonality of the fin rot condition and of other disease conditions that appear in several fin-fish and commercial and food chain invertebrates that inhabit highly impacted areas of the New York Bight.

The feasibility of entrapment and recovery systems will be studied using captive animals contained in specially fabricated cages placed in polluted and "control" areas. If such systems can be devised and made functional, comparative field experiments will be carried out using selected "sentinel" or monitor species of fin-fish (winter flounder) and bivalve molluscs (oysters, clams) and possibly crustaceans.

Comparative histopathological and cytological methods such as light and electron transmission microscopy will be employed to describe normal and abnormal tissues, cells and ultra-cellular components from animals collected or used in the above studies, and attempts will be made to determine the etiologic agents that may cause disturbances or alterations to the normal morphology or integrity of the tissues or cell system of these animals.

Subtask: Analysis of Groundfish Samples

This subtask augments the ongoing series of spring and fall coastal fin-fish resource assessment cruises to include intensive sampling in the New York Bight, particularly in the apex area, and in areas selected as possible sites for future ocean dumping. In the apex area, additional sampling sites provide more complete coverage than would otherwise be possible as part of the regular series of spring and fall coastal fin fish resource assessment cruises along the entire Middle Atlantic Bight from Block Island to Cape Hatteras. A supplemental series of monthly cruises will continue through the current fiscal year for the purpose of seasonal sampling from the Raritan Bay area through the apex to the head of the Hudson Canyon. Beginning in FY '76, this supplemental series will cover a greater geographical area than is now covered and will be conducted bimonthly. These surveys provide information on fish migratory patterns, the relative abundance of finfish in stressed and unstressed areas, and they provide the platform for observing, collecting, and preparing pathological groundfish and invertebrate specimens for laboratory analysis.

3131. Task Outputs

- A. Measurements and SYMAPs of the distributions (seasonally) and magnitudes of:
- 1) Oxygen consumption by the planktonic organisms in the water column of Raritan, Lower, Upper, and Sandy Hook Bays compared with standing stocks and inputs of organic matter into the system and heavy metals associated with particulate matter and zooplankton.
 - 2) Oxygen consumption by the seabed in the New York Bight compared with the distributions and quantities of macrofauna, heavy metals, and organic carbon.
 - 3) Macrofauna inhabiting sediments in the New York Bight compared with the distributions and concentrations of heavy metals, and the distribution of sediment parameters.

- 4) Diseased finfish and crustaceans in the New York Bight.
- 5) Relative abundance of groundfish in impacted and non-impacted portions of the New York Bight.

These activities will provide information which will be used to:

- 1) Determine whether or not the planktonic system (Raritan, Lower, Upper and Sandy Hook Bays) is capable of assimilating present levels of dissolved and suspended organic input for each season of the year.
- 2) Determine assimilation capacity of the benthos of the New York Bight for waste materials on an area by area basis per unit time for each season of the year.
- 3) Provide baseline data describing the present situation in the New York Bight area so that the effect of future man-made events on the marine organism can be determined.
- 4) Provide information on the prevalence, incidence, and if possible, the etiology of disease in important commercial, recreational or food chain animals that inhabit or migrate into highly impacted areas of the New York Bight.
- 5) Assess the effects of man-induced environmental changes on the distribution and abundance of groundfish resources of the New York Bight.

Measurements as data and SYMAPs will be incorporated into periodic and topical data reports, and formal publications concerned with rigorously analyzed data and observations and special atlases and publications which graphically indicate baselines and temporal changes observed in the Bight and adjunct waters.

- B. The termination date of the task will be predicted on the ability to obtain enough successful measurements of benthic respiration, redox potential, distribution and biomass of macrofauna and disease prevalence to adequately describe present conditions in the New York Bight. Dr. Cok of Adelphi University has recently produced maps showing the sediment types in the New York Bight. His maps in addition to previous geological and biological data from the New York Bight have been used to determine the position of biological sampling stations. The number of samples taken will ultimately vary according to the variance associated with each sediment type. If the objective of describing the entire Bight proves to be impossible within the time limits set by the MESA Program, then the biologically and economically more important areas of the Bight will be concentrated upon and described. These more important areas would include the apex of the Bight and more specifically the dump sites for dredge spoil, sewage sludge, and chemical-acid wastes as well as coastal areas to which wastes might be transported by currents.

Studies in Raritan, Lower, Upper and Sandy Hook Bays in which we are measuring oxygen consumption by planktonic organisms in the water column will be terminated when enough successful measurements are obtained to adequately describe conditions over an annual cycle and determine whether or not the system is capable of assimilating present or increased levels of organic loading.

The Task outputs will provide the quantitative information required by policy makers to: 1) make decisions, 2) educate the public to support their decisions, and 3) allow them to originate legislation to regulate the many competing activities in the New York Bight area, so that not only would the environment for marine life be prevented from being degraded further, but also that it would be improved and protected.

User groups for this information would include: New York City Commission of Water Resources; various metropolitan municipalities including Passaic Valley Sewer Authority; state agencies including the New York, New Jersey, Connecticut and Rhode Island conservation and fishery organizations; U. S. Environmental Protection Agency; and other user-management groups including organizations with interests in recreational and commercial fisheries.

32. IMPACT OF TASK AUGMENTATION

No potential increases, outside of the 5% per year suggested for planning purposes, are anticipated.

33. CRITERIA FOR TASK COMPLETION

N/A

34. BACK-UP DOCUMENTATION

A.

Hobbie, J. E., O. Holm-Hansen, T. T. Packard, L. R. Pomeroy, R. W. Sheldon, J. P. Thomas, and W. J. Wiebe. 1972. A study of the distribution and activity of microorganisms in ocean water. *Limnol. Oceanogr.* 17(4):544-555.

Holme, N. and A. McIntyre. 1971. Methods for the study of marine benthos. IBP Handbook No. 16. Blackwell Scientific Publ., Oxford. 334 pp.

Jansson, B. and H. Odum. 1972. Ecosystem approach to the Baltic problem. *Bulletins from the Ecological Research Committee*, No. 16. Swedish Natural Science Research Council, Stockholm. 82 pp.

Lenhard, G., L. D. Nourse, and H. M. Schwartz. 1965. The measurement of dehydrogenase activity of activated sludge, p. 105-127. *In*: J. K. Boars (Ed.), *Advan. Water Pollut. Res. (Proc. Int. Water Pollut. Res. Conf., Tokyo, 1964)*, v. 2.

Menzel, D. W. and R. T. Vaccaro. 1964. The measurement of dissolved organic and particulate carbon in seawater. *Limnol. Oceanogr.* 9: 138-142.

Middle Atlantic Coastal Fisheries Center, National Marine Fisheries Service, 1972. Cooperative Study of Contaminants in the Coastal Environment and their Effect on Living Marine Resources: Summary Report, 1971-1972.

National Academy of Sciences. 1970. Wastes management concepts for the coastal zone: Requirements for research and investigation. NAS, Washington. 126 pp.

In particular note chapters 5 (Biological effects), 6 (Recommended research and investigation for effective coastal wastes management) and 7 (Suggested priorities and estimated minimum effort required).

National Academy of Sciences. 1971. Marine environmental quality: Suggested research programs for understanding man's effect on the oceans. NAS, Washington. 107 pp.

In particular note chapter 5 (The effects on marine organisms; selecting organisms and systems for study, p. 66; importance of a conceptual framework, p. 67).

National Marine Fisheries Service. 1972. Ocean fisheries and living marine resources, Program memorandum FY 1974 - 1978.

In particular see pp. II: 3 - 9.

Packard, T. T. and F. A. Richards. 1971. Vertical distribution of the respiratory electron transport system in marine plankton. Limnol. Oceanogr. 16: 60-70.

Pamatmat, M. M. 1971a. Oxygen consumption by the seabed, IV. Limnol. Oceanogr. 16: 536-550.

Pamatmat, M. M. 1971b. Oxygen consumption by the seabed, VI. Int. Rev. Gesamten Hydrobiol. 56: 675-699.

Sandy Hook Laboratory, National Marine Fisheries Service. 1972. The effects of waste disposal in the New York Bight, Final Report.

B. Significant related tasks.

- 1) Microbiology (fish disease) New York Bight - NMFS/MACFC, Milford, Oxford.
- 2) Baseline finfish distribution - New York Bight - MACFC/Sandy Hook.
- 3) Baseline contaminants (heavy metals) New York Bight - NMFS/MACFC, Milford.
- 4) Baseline sediment analyses New York Bight - Adelphi U.
- 5) Marine bacteria and heavy metal findings - New York Bight - Columbia U.
- 6) Vibrio bacteria - New York Bight - Rutgers U.
- 7) Water mass transport and vertical circulation - New York Bight - Lamont-Doherty Geol. Observatory.
- 8) Substrate monitoring program - New York Bight - AOML, Miami.

- 9) Substrate variability program - New York Bight - AOML, Miami.
- 10) Suspended sediments program - New York Bight - AOML, Miami.
- 11) Sediments chemistry program - New York Bight - AOML, Miami.
- 12) Substrate investory program - New York Bight - AOML, Miami.
- 13) Cyclesonde study - New York Bight - AOML, Miami.
- 14) Boundary layer study - New York Bight - AOML, Miami.
- 15) Radioisotope tracer study - New York Bight - AOML, Miami.
- 16) Physical oceanography program - New York Bight - AOML, Miami.
- 17) EPA
- 18) U. S. Army Corps of Engineers.
- 19) Exxon Research and Engineering Company.

C. Current task can be accomplished under existing legislation (see below) providing that the MESA Program in the New York Bight is adequately funded.

- 1) Coastal Zone Management Act of 1972.
- 2) Marine Protection Research and Sanctuaries Act of 1972.

D. This TDP will not affect the environment and no Environmental Impact Statement is needed.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 9, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK		
	A	B	C	D	BY TARGET	BY + 1 INC.	
MAC-056-77-AQ A-1	III-A						
TASK NUMBER	6. TASK TITLE						
3826P1	Aquacultural Genetics						
ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION		
FB6300	Aquaculture Investigations				City Milford State Ct		
OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	19.9		41.3		41.3	31.6
1. Travel	19	.2		.6		.6	
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						
4. Grants (Funds obligated)	58						
5. Supplies	53	1.0		.7		.7	1.1
6. Capital Equipment	54						6.5
7. Other (All other obligations)		2.0		3.6		3.6	2.8
8. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		23.1		46.2		46.2	42.0
9. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		3		3		3	3
10. Positions, Other <small>(Number applicable to this Task.)</small>		1		1		1	
11. Man-years, Permanent		1.0		2.3		2.3	3
12. Man-years, Other		.5		.5		.5	
13. Reimbursable Support <small>(Reimbursable agreements only)</small>							

REMARKS

Reprogrammed FY'75 -- Ref MAC-014

OFFICIAL PREPARING REPORT (Signature)

James E. Hanks
Director of Investigations

-131-

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

Carl J. Sindermann
Carl J. Sindermann, Center Director

NMFS TASK DEVELOPMENT PLAN

TOP NUMBER

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

MAC-056-77-AQ-A-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	77 BUDGET YEAR													
		CY 75		BY 76		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Selective breeding, 2-way selection experiments.					X									
E	Selective breeding demonstrations, and dissemination of information to industry.						X								
M	Periodic (about yearly) development of experimental information on the following of use to industry regarding their hatchery selection: heritability estimates; duration of response to selection; inbreeding in selection; hybridization of selected lines for market.						X								
M	Demonstrations of 2-way model selection experiments.							X							
A	Inbreeding of lines by traditional means and by parthenogenesis.	X													
A	Experimental hybridization of inbreds.						X								
A	Reciprocal recurrent selection program for selecting inbreds on basis of test hybrids.						X								
E	Dissemination of information on inbreeding to industry; also demonstrations on.					X									
M	Regular (upon request) dissemination of information regarding effects of inbreeding in private selection programs in commercial hatcheries.	X													
M	Dissemination to industry of experimental information regarding radical inbreeding followed by hybridization; evaluation of usefulness of such as a commercial technique for shellfish.								X						

OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from response within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

TDP NUMBER

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

MAC-056-77-AQ-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	77 BUDGET YEAR													
		CY 75		BY 76		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Research on experimental cryopreservation of male and female shellfish gametes.								X	-----					
A	Development of gamete cryopreservation techniques suitable for commercial use.										X	-----			
M	Successful freezing and live recovery of male and female shellfish gametes.											X			
M	Development of commercially suitable methods for cryopreservation of shellfish male and female gametes.												X		
E	Conservation of important wild gene pools for future use.									X	-----				
M	Several separate instances of successful conservation of important wild gene pools for future commercial use.											X	-----		

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

a. Continued at same level

b. Increase of ___% *

c. Reduction of ___%

d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

5 | 12

TDP NUMBER

MAC-056-77-AQ-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Research Geneticist	13/4	004 Arlene (Longwell) Mazzone	75
Fishery Biologist (Res.)	11/1	011 Sheila (Stiles) Jewell	75
Fishery Biologist	7/1	019 James B. Hughes	75
<u>Personnel Increase Required</u>			
Geneticist	11/1	Vacant	100
Fishery Biologist	5/1	Vacant	100
Biological Laboratory Technician	4/1	Vacant	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

29. STATEMENT OF NEED

Private Aquaculture - A general conclusion of the 1972 NOAA Aquaculture Survey (by Mardela Corporation), the Section on Economics, was that "economic factors in the U.S., combined with legal and technical inhibitions indicate that technologically intensive closed-cycle systems would eventually provide the best chance for U.S. aquaculture operation". To various degrees this conclusion might be argued. However, that the shellfish industry will be moving in this direction in regard to hatchery production is certain. Rearing successfully the oyster, other shellfish, any animal, under intensive, artificial conditions necessitates considerable alteration of the wild genotype. Part of the reason commercial shellfish hatcheries make no profit, even though basic hatchery techniques are well worked out, is the lack of organisms truly suited to artificial production. Applied genetic research could well aid industrial initiatives in their development of hatchery profitable strains. This work, however, must be supported and conducted along with applied work on nutrition and disease. Its success will be limited by advances in these other two areas. Along with the applied genetic work must be the advance of basic genetic knowledge about shellfish. The idea of continued successful application of the fruits of mission-oriented research to the fish industry without an increase in the base of the present limited genetic knowledge about fish is simply wishful thinking. Contrast all we know about plants and mammals, cereal, and poultry to what is known about fish to realize why fish breeders have a need to enlarge the base of information on which they operate - why indeed they have a right to have this work supported.

Public Aquaculture - Far too little is known about the genetics of shellfish for management of public beds to be conducted in such a way as to make maximum use of the full genetic potential of various commercial species. (Fishing these beds is still the main profitable enterprise of the industry.) This lack of knowledge makes for over-conservatism in attempts at improving wild stock beds, or results in simple neglect of presumed spawning beds. At the same time many of the wild gene pools that breeders will need to call upon for continued domestication of hatchery strains will probably risk loss in the future.

Specific Needs - Specific genetic needs of the shellfish industry to which this Task is addressed then can be broken down as follows: (1) Development of those areas of applied genetic research on shellfish (and other fish as the program evolves) that commercial hatchery producers will require in selecting their own hatchery strains - strains which will enable them to realize a profit from their hatchery enterprises. Just what will be required here has been determined on the basis of (a) what was required for the development of profitable agricultural plants and animals allowing for historic differences in agriculture and fisheries; (b) what sort of information is necessary to answer industry's specific request for information regarding their breeding endeavors. Commercial producers are presently mostly concerned about problems regarding selection and inbreeding. A shellfish

29. STATEMENT OF NEED (contd)

industry relatively unsophisticated in genetics, remains un-enthusiastic about any use of hybrids at all. Most attention accordingly would focus on selection and inbreeding. Some attention though must be given to wide hybridization. NMFS would be in error to follow industry's mood on hybrids. Almost all of our highly profitable food species in the U.S. derived from some original wide hybrid crosses which brought together the gene combinations necessary for their successful commercial exploitation, genes highly important as the species passed from wild to domesticated or cultivated state. (Moreover, hybrids are invariably what attracts most scientific, popular and sometimes new market attention.) Also an applied program of interspecies hybridization would certainly lead to the uncovering of much basic information on shellfish species of yet unpredictable but certain practical application in other breeding studies, as well as in industry.

(2) Concomitant with this required development of practical information is the need to enlarge the background base of genetic knowledge about shellfish essential to the long-range success of commercial breeding.

(3) There is a further need to understand the genetics of wild shellfish populations to open the possibility of maximizing profit from resource management that takes into full consideration the genetic potential of different wild populations.

(4) Lastly there is the need to promote the conservation of wild gene pools of shellfish that will become increasingly valuable in the future as sources of needed genes for hatchery strains. For example, genes to yet unknown hatchery diseases that will surely find expression as domestication advances and hatchery production takes precedence over the wild fisheries.

30. ACTIVITY PLAN

Methods employed will be those standard for mass selection programs, selection in two directions with randomly breeding control. Attention to population size, inbreeding intensity and selection intensity; computations of selection progress by standard genetic methods. Inbreeding by full-sib crosses, and in small closed populations. Also by induced parthenogenesis by radiation followed by experimental doubling of chromosome numbers. Hybridization, by necessity, by large numbers of single crosses. Some research on fertilization inhibition as a means of obtaining large-scale mass hybridizations. Experimental work aimed at forcing otherwise incompatible inter-species crosses. Backcrosses of wide hybrids to local commercial adapted types. Some use of special reciprocal recurrent selection program in inbreeding and hybridization work. Mutagenesis by gamma- and X-irradiation and with mutagenic alkylating agents. Some work on cryopreservation of live gametes as a means of facilitating genetic progress. Cytogenetics to be employed in appraising cross results, as in inter-species hybrids and intense inbreeding and sterility effects. Species, mostly oysters; also some other shellfish, possibly other fish as program evolves.

31. TASK OUTPUTS AND BENEFITS

1. Information on and demonstrations of progress by selective breeding - mostly oysters; other shellfish

For a large variety of commercially important traits (including possibly disease resistance) sound information would be developed for hatchery breeders regarding the likelihood of improvement by private selection programs within commercial hatcheries. This information would relate to different founding individuals, various degrees of inbreeding, and different selection potentials. Once set up, experiments would be continued from generation to generation to obtain continuous information on the presumed limits of improvement by selective breeding. There would also be test hybridizations of selected lines for superior market oysters. Such mass selection experiments with random breeding controls would serve as a continuous source of information to industry, provide scientific data on the oyster, and at the same time be a very visible demonstration of science at work for the fishery industry.

There would be accumulation of sufficient information on all the parameters involved in scientifically based selective breeding so that industry can be advised on their breeding problems without having to resort to new research except in limited instances; also enough information on selective breeding of shellfish for industry to plan more knowledgeably their own new breeding programs. This should take about 10 years with important milestones reached every other year on the average along the way. Advisory work based on the information developed and demonstrations could continue for years past termination of most of the experimental work on this Specific Task Output.

2. Information on and inbreeding demonstrations for industry application; also fundamental genetic information on results of inbreeding - mostly oysters; other shellfish

Inbreeding, both severe and rapid and mild and slow, of several lines would be conducted for various purposes. One of these would be to estimate how well shellfish that are natural outbreeders can tolerate inbreeding; how severe and what form inbreeding depression takes in pelecypod molluscs. Another purpose would be to appraise for industry the feasibility of producing superior hatchery lines by intensive inbreeding followed by cross-breeding of select inbred strains. Finally, inbreeding should result in the "surfacing" of genes useful in basic work and as genetic tags for other applied research. Also, it would make possible an in-depth study of cross-incompatibility genes which can determine the level of crossability in hatchery bred animals, and between different populations and species.

31. TASK OUTPUTS AND BENEFITS (Contd)

Sufficient information should be generated to evaluate for industry the usefulness and cost of inbreeding programs for eventual production of hybrids between inbred lines for market. This should take about seven years to complete, but benefits will accrue along the way. Advisory work based on the information developed, and demonstrations could continue for years past termination of the experimental part of this Specific Task Output.

3. Information on and demonstrations of the results of within species hybridization of natural oyster populations - mostly oysters; other shellfish

Different geographic populations of oysters within any one species would be collected and test hybridized with one another, then the hybrids experimentally or field-tested for specific uses. The purpose of this would be the combination of particular traits in the hybrid that could result in superior hybrid types for re-stocking on wild beds or growing for aquaculture. This could include hybrids with increased environmental range or adaptability, hybrids that will thrive better under stress of heavy pollution, particularly the larval phase, because of heterosis. Also, these hybrids would serve as seed stock for mass selection programs in which it was deemed best or was necessary to include an assortment of genes from a wide area, as for example, genes for disease resistance. As the applied aspects of this program develop, it can be expected that considerable basic genetic information on different wild populations would be uncovered of practical use in other aspects of the genetic program.

Sufficient information should be obtained to advise industry on value of hybrid crosses of wild stocks in hatchery breeding programs, also to advise managers of the wild resource about use of such hybrids on natural beds. Demonstrations and limited information would be presented before the six years ended. Advisory work based on the information developed, and demonstrations could continue for years past termination of the experimental part of this Specific Task Output.

4. Information on, demonstration of, and production of inter-species hybrids of oysters - mostly oysters - include genera other than Crassostrea; other shellfish

Inter-species hybrids would be experimentally produced, studied and tested for commercial value. This work would involve a wide variety of species of different genera, some distantly related, others suspect of not having a true species rank being merely genetically distinct populations of the same species. Commercial and non-commercial types alike would be explored. Information resulting should be of use to commercial hatcheries, and also for management and stocking of wild beds, and for the opening up of new beds. Probably greatest use of the hybrids would be in backcrossing programs with the favored prevalent commercial type. Backcrossing

31. TASK OUTPUTS AND BENEFITS (Contd)

would lead to the incorporation of desirable genes (as for example resistance to larval diseases) from a generally less desirable non-commercial or unadapted species into the popular commercial type. The possibility even cannot be excluded that some F₁ hybrid would itself be a superior market type under many circumstances. Some small amounts of especially difficult-to-come-by hybrid seed might be distributed to industry for experimental purposes.

Commercially practical methods should be developed to achieve wide species hybridization which cannot occur under normal conditions of laboratory or hatchery fertilization; also a large enough number of hybrid combinations should be tested to get a good enough evaluation of such hybrid usefulness. These should be a demonstration of the role of wide hybrids as one step in a hatchery program involving backcrosses of F₁ hybrids to local types with selection. Finally there would be the production of some initial hard-to-come-by seed for industry. Advisory work and demonstrations could continue for years after experimental portion of this Specific Task Output is completed.

5. Studies on experimental mutation breeding as applicable to unique problems of shellfish breeding - mostly oysters; other shellfish

Evaluation of the usefulness for applied breeding programs of inducing mutations in shellfish by ionizing radiation and recognized chemical mutagens. At the same time develop a basic understanding of mutations in these groups. Preserve any basically useful genetic markers that are induced. (Also use radiation as a means of inducing parthenogenesis by induction of lethal mutations in sperm.) While this is a more radical approach than the ones just listed above, it is justified by the primitive nature of shellfish, their enormous fecundity, and paucity of easily handled marker genes. Also, a very rapid domestication of the oyster in the genetic sense could probably well utilize genes readily available now in these species only through mutation. For example, a mutation expressing itself in some aspect of larval morphology or physiology might broaden the spectrum of micro-algae on which fastidious larvae must be fed in commercial hatcheries. (Such an approach - induced mutagenesis - has broad public and scientific visibility.)

Sufficient knowledge should be generated to evaluate mutation breeding as an approach to rapid domestication of wild shellfish for intensive, artificial culture. There should be isolation of some induced mutations for commercial use and for basic research. Advisory work and demonstrations could continue for years after this Specific Task Output is terminated.

6. Cryopreservation of male and female gametes of shellfish

Research would be conducted on experimental cryopreservation and live recovery of both male and female gametes of the shellfish. There would be work on the development of gamete preservation techniques suitable for commercial use.

31. TASK OUTPUTS AND BENEFITS (Contd)

7. Conservation of important wild gene pools of shellfish for future commercial use

First the more important gene pools needing conservation would be identified in part from results of selection experiments, studies of hybrids between different geographic populations within a species, and of inter-species hybrids. Conservation would be by information disseminated to those responsible for the wild resources; by active collection and breeding of specimen groups; lastly possibly by cryopreservation methods.

Summary statement on Task outputs and benefits

This Task will develop the kind of genetic information NMFS needs to answer the specific questions industry poses concerning the development of their own hatchery strains - strains which will enable them to realize a profit from their hatchery enterprises. Such information will also enable NMFS to take the initiative in advising industry on certain aspects of breeding in advance of industry's request for such. Special gene pools conserved in NMFS laboratories or under the Service's auspices would directly benefit industry. Industry and consumer alike would benefit from the improved management of wild shellfish beds that would be possible with increased knowledge of the genetic potential of different wild shellfish populations. As well as aid in future hatchery production, the information gained from the Task can so be applied by commercial shellfish growers, NMFS, and other federal agencies and state agencies in managing and protecting economically valuable shellfish resources.

32. IMPACT OF TASK AUGMENTATION

Requested increase is essential to accomplish most aspects of milestones outlined in TDP.

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

- (a) 1. NOAA Aquaculture Survey, 1972. Report to Participants. Mardela Corporation, Burlingame, California.
2. Oyster genetics and future role of genetics in aquaculture - A review manuscript by A. Longwell and S. S. Stiles. Malacological Review, 1973, 6: 151-177.
3. The genetic system and breeding potential of the commercial American oyster - A review by A. Longwell and S. Stiles which appeared in Endeavour, 29(107): May 1970.
4. Some impressions regarding genetics and the fisheries of Japan - A manuscript by A. Longwell - published as NMFS Circular 388, p. 123-133, as part of the Proceedings of the First Meeting of the US/Japan Aquaculture Panel of the Natural Resources Council, Tokyo, Japan, November 1971.
5. Oyster Genetics: Research and commercial application. Review by A. Crosby Longwell. Proc. Conf. Shellfish Culture. Selden, Long Island, April 1968, p. 91-104.
6. Evaluation of the mutagenicity of marine contaminants for marine species as affecting in-shore and off-shore fisheries. Informal, in-house report by A. Crosby Longwell, 1974.

NMFS TASK DEVELOPMENT PLAN
(See Detailed Instructions)

1. DATE PREPARED
December 9, 1974

(Submit five copies by Jan. 2)
O: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER	6. TASK TITLE
-------------	---------------

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION
-------------------	--	-----------------------

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	UNZ L R O	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	23.6		51.0		51.0	34.5
1. Travel	19	.1		1.0		1.1	
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						
4. Grants (Funds obligated)	58						
5. Supplies	53	3.0		2.2		2.2	1.5
6. Capital Equipment	54						
7. Other (All other obligations)		2.7		4.5		4.5	4.0
8. Total Direct Funds (Add lines 10 through 17 above.)		29.4		58.8		58.8	40.0
9. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		2		2		2	3
10. Positions, Other (Number applicable to this Task.)		1		1		1	
11. Man-years, Permanent		1.1		2.3		2.3	3
12. Man-years, Other		.5		.5		.5	
13. Reimbursable Support (Reimbursable agreements only)							

MARKS
Reprogrammed FY'75 Ref MAC013

OFFICIAL PREPARING REPORT (Signature)
James E. Hanks, Dir. of Investigations

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)
Carl J. Sindermann
Carl J. Sindermann, Center Director

NMFS TASK DEVELOPMENT PLAN

TOP NUMBER

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

MAC-057-77-AQ-A-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	BUDGET YEAR													
		CY 75		BY 76		77									
		1	2	1	2	+1		+2		+3		+4		+5	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Advise and consult with industry personnel on improving food production methods in aquaculture.		X												X
A	Conduct studies on techniques for obtaining axenic molluscan larvae for utilization in nutrition studies.	X													
A	Conduct studies on evaluation of feeding efficiency in different stages of the molluscan life cycle.	X													X
A	Experiment with the utilization of living food sources by molluscs under controlled conditions.		X								X				
A	Experiment on the utilization of non-living foods by molluscs under controlled conditions.		X												X
A	Conduct nutritional studies on molluscs under natural conditions.	X													
A	Maintenance of a stock culture collection of unicellular marine algae.	X													X
A	Expansion of collection of unicellular algae collection by purification, isolation and identification of species.	X													X
A	Investigation of methods for the long-term storage and preservation of cultured species.	X									X				
A	Maintenance of algal mass culture systems.	X													X
A	Studies on the physiological parameters of phytoplankton growth.	X													X
A	Studies on the nutritional parameters of phytoplankton growth.	X													X

OUT YEAR COMMENTS
(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-057-77-AQ-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY 75		BY 76		77 BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Investigate effects of pollutants on phytoplankton to ensure a good response of food species in culture and a healthy marine environment.	X													X
A	Develop the potential of microscopic algae for a new source of protein.	X													X
E	Evaluate potential for phytoplankton preservation and storage as a new source of protein particularly for aquaculture.											X			
E	Evaluate the best cost efficiency for algal food production.											X			

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FHC.)

a. Continued at same level

b. Increase of 50% *

c. Reduction of %

d. Termination

APPROPRIATE COLUMN

REMARKS

Funding of this Investigation must be increased in order to provide the information fundamental to the success of molluscan aquaculture. 'You are what you eat' is a dictum that is most apt for species in aquaculture.

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-057-77-AQ-A-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Research Microbiologist	13/5	005 Ravenna Ukeles	100
Microbiologist	7/2	022 William E. Rose	100
<u>Personnel Increase Required</u>			
Microbiologist	11/1	Vacant	100
Microbiologist	7/1	Vacant	100
Biologist	5/1	Vacant	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

30. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

31. ACTIVITY PLAN

32. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

35. IMPACT OF TASK AUGMENTATION

a. Detail Documentation (Provide one sentence description.)

b. Related tasks and research presently being conducted.

c. Indicate the Congressional legislative requirements.

d. Indicate the Environmental Impact Statement (EIS) requirements.

29. STATEMENT OF NEED

Pressures on land food resources demand that there be also an increased productivity from aquatic environments. The potential for increasing aquatic productivity through controlled aquaculture has been largely untapped because of fundamental problems in the methodology. The consensus of opinion is that an increase in aquatic productivity through aquaculture should be provided by the private sector but assistance in problem solving and the introduction of innovative procedures can best be provided by government scientific laboratories as a public service.

Commercial shellfish operators consistently urge that high priority emphasis be placed upon the problem of providing nutrition to the animals in aquaculture. Obviously, the ability to feed animals nutrients that will support growth, that are non-toxic and are economical is fundamental to the success of any aquaculture efforts.

At present unicellular marine algae are cultured for use as molluscan foods along the lines developed in the past at the Milford laboratory. The method has numerous inherent benefits to achieving the end goal but also presents many problems to the commercial aquaculture producer. The possibility of developing other food sources should be pursued. This information should be based upon information on the nutritional requirements of these animals as far as it is possible to determine them. Allied to the need for providing commercial aquaculture with information on nutritional requirements and how to provide this nutrition are other factors, such as cost, engineering of feeding system, acceptability of food material at different life cycle stages, and monitoring for the invasion of pathogens.

The intent of this Task is to provide information on the cultivation of marine phytoplankton for molluscan foods that will improve the method currently available and will provide an immediate benefit to the industry while a more ideal food is being sought. To accomplish this Task research will be conducted on the chemical and physical factors that affect phytoplankton growth. Nutritional requirements of molluscs will be investigated as they relate to living and non-living food sources.

30. ACTIVITY PLAN

This Task will utilize basic methods for studying the nutrition and physiology of marine phytoplankton food-chain organisms. This information will be applied to the development and improvement of existing large-scale culture methods. Methods for efficient harvesting and for long-term storage of this product will be sought to increase efficiency of mass culture operation. Activities will then proceed to experiments on replacing the living food with a partially or wholly synthetic food product. Simultaneously a critical system for evaluation of nutritional supplements will need to be developed.

31. TASK OUTPUTS AND BENEFITS

1. Information on the maintenance of a collection of marine unicellular algae under controlled conditions will become available.
2. Methods of obtaining and maintaining axenic phytoplankton cultures will be available.
3. Production of large quantities of algal foods for utilization by molluscs.
4. Information on the effects of various pollutants on algal growth will become available for determining potential productivity of natural bodies of water.
5. Information on certain aspects of nutrition and physiology of pure cultures of marine algae will be published.
6. Methods for obtaining axenic molluscan larvae for use in critical nutrition studies will be developed to support critical evaluation of molluscan nutrition.
7. Information on utilization of microscopic algae as food sources to extend the current options available in aquaculture.
8. Information on utilization of synthetic nutritional formulations as food sources to extend the current options available in aquaculture.
9. Consultation on best methods of providing nutrients for molluscan aquaculture will be available to industry.

32. IMPACT OF TASK AUGMENTATION

At the present level of funding work can continue on maintenance of the stock culture collection and maintenance of the algal mass culture food production unit with a minimum amount of experimentation in algal nutritional and physiological requirements. With the estimated potential increase in funding, in addition to the above work, investigations into methodology for evaluating nutritional food requirements in molluscan larvae can be conducted, e.g., the culture of axenic larvae, testing of algal species for which no information on food value is available, testing of synthetic nutritional formulation for evaluating nutritional requirements in larvae, and work can also be initiated into determining nutritional requirements for other life cycle stages.

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

- a) 1. NOAA Regional Aquaculture Workshop Project #A/a-01, Mardela Corp. Report.
2. Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, NMFS - Investigation Summaries - A summary of research in on-going programs within the Middle Atlantic Coastal Fisheries Center.
3. NOAA Week. NMFS Milford scientists develop algae culture for shellfish food.
4. NOAA Technical Report, NMFS Circular 388. Proc. First US/Japan meeting on Aquaculture at Tokyo, Japan.
5. Monograph - "Continuous culture - a method for the production of unicellular algal foods" - R. Ukeles. In: Handbook of Phycoecological Methods, J. R. Stein (ed.), Cambridge Univ. Press, pp. 233-254, 1973.
6. Monograph - "Nutritional requirements in shellfish culture" - R. Ukeles. In: Proc. Conference on Artificial Propagation of Commercially Valuable Shellfish, pp. 43-64, 1971.
7. Monograph - "Cultivation of unicellular algae" - R. Ukeles. To appear in a five-volume series in Marine Ecology.
8. Mass culture of phytoplankton as foods for metazoans - H. C. Davis and R. Ukeles. Science, 134: 562-564, 1961.
9. Dried unicellular algae as food for larvae of the hard shell clam, Mercenaria mercenaria - H. Hidu and R. Ukeles. Proc. Natl. Shellfish. Assoc., 53: 85-101, 1964.
10. A simple method for the mass culture of marine algae - R. Ukeles. Limnol. Oceanogr., 10(3): 492-495, 1965.
11. Influence of dinoflagellate trichocysts and other factors on the feeding of Crassostrea virginica larvae on Monochrysis lutheri - R. Ukeles and B. Sweeney. Limnol. Oceanogr., 14(3): 403-410, 1969.
- b)
- c)
- d) This Task will have no adverse impact on the environment.
- e)

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 9, 1974

(Submit five copies by Jan. 2)

0: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER IAC-058-77-AQ-A	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER 8826P3	6. TASK TITLE Aquaculture: Control of Molluscan Disease
------------------------------	---

ORGANIZATION CODE B6410	8. ORGANIZATION TITLE (Responsible for execution of this task) Pathobiology Investigations	9. PRINCIPAL LOCATION City: Milford State: Ct
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OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	COPI LINE	CURRENT YEAR FY 19 ⁷⁵		BUDGET YEAR FY 19 ⁷⁶		BUDGET YEAR + 1 FY 19 ⁷⁷	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	18.2		37.5		37.5	27.0
1. Travel	19	--		--		--	9.6
2. Rents, Communications, Utilities	21	--		--		--	
3. Contracts (To be let)	51 52	--		--		--	5.0
4. Grants (Funds obligated)	58	--		--		--	
5. Supplies	53	0.6		--		--	20.0
6. Capital Equipment	54	--		--		--	15.0
7. Other (All other obligations)		1.6		3.3		3.3	6.4
8. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		20.4		40.8		40.8	83.0
9. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		2		2		2	
10. Positions, Other <small>(Number applicable to this Task.)</small>		1		1		3	1
11. Man-years, Permanent		1.0		2.0		2.0	
12. Man-years, Other		.5		1.0		2.0	1.0
13. Reimbursable Support <small>(Reimbursable agreements only)</small>		--		--		--	

REMARKS

Reprogrammed FY'75 - Ref. MAC012

OFFICIAL PREPARING REPORT (Signature) Iron Rosenfield Director of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)  -150- Carl J. Sindermann, Center Director
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NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-058-77 -A0-A

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE <i>(Brief descriptive phrase of activity, event, or milestone)</i>	CY		BY		BUDGET YEAR									
							+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	A	Isolations of microbial pathogens from larval bivalve hatchery systems →	X													X
2	E	Present reports			X			X			X			X		
3	M	Publish results					X			X				X		X
4	A	Develop methods to reduce pathogen entry or activity in bivalve hatcheries prevention/treatment →	X													X
5	A	Assess effectiveness prophylactic curative methods		X						X						
6	E	Present reports to scientific meetings and workshops				X			X			X				
7	M	Publish results						X			X			X		
8	A	Continue to provide consultative and research services to Sea Grant, universities, industrial institutions engaged in aquaculture research	X													X
9	M	Publish joint reports and papers with 8A above		X		X		X		X		X		X		
10	A	Begin isolations of protozoan pathogens from larval bivalve hatchery systems	X													X
11	E	Present reports to scientific meetings/workshops				X			X			X			X	
12	M	Publish findings					X			X			X			X
13	A	Begin studies of diseases in grow out systems; bivalve juveniles/adults fish, crustaceans					X									X

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER
MAC-058- 77A-Q-A

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

NUMBER

A, E, OR M

NARRATIVE

(Brief descriptive phrase of activity, event, or milestone)

CY	BY	BUDGET YEAR												
		+1		+2		+3		+4		+5				
		1	2	1	2	1	2	1	2	1	2			
A	B	C	D	E	F	G	H	I	J	K	L	M	N	
			X										X	
				X		X			X				X	
					X			X				X		
		X												X
			X						X					
					X			X			X			
						X				X				X
		X												X
			X	X	X	X	X	X	X	X	X	X	X	X
			X											X
					X			X			X			
						X			X				X	

F 7-76

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your EMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-058 -77-AQ-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Research Microbiologist	12/1	Blogoslawski, Walter J.	100% (*)
Biologist	9/2	Brown, Carolyn	100% (*)
Biological Laboratory Technician (BY & 1)	7/1	Vacant	100%

(*) 50% in F/Y 75; 100% thereafter

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

29. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

30. ACTIVITY PLAN

31. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

32. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

FB6410 - Aquaculture - Control of Molluscan Disease - FY 1977

29. Statement of Need

Increased exploitation of the nation's estuaries and coastal zones for industrial and residential development and recreational activities has markedly reduced the areas available for the production and harvest of fish and shellfish. More efficient and effective means to enhance U.S. seafood production must be found. Aquaculture methods require: 1) an adequate supply of genetically desirable brood stocks; 2) methods to increase larval survival and normal development; 3) methods to promote rapid growth. Disease is often a limiting factor to successful aquaculture operations. With increasing interest in aquaculture, where populations reach maximum density and the transfer of susceptible stocks (as eggs, larvae, fry, fingerlings) becomes a routine procedure, it is necessary to conduct scientific studies on the role of disease so that its effects can be prevented, minimized, or eliminated.

The successful application of disease research to the intensive propagation of fish and shellfish in controlled environments would increase industrial initiatives for commercial aquaculture. A program of disease research would involve: 1) the development and implementation of a research program for disease prevention and control, particularly in hatchery and nursery systems; 2) the development and implementation of an inspection system for routine diagnosis and identification of infectious agents; 3) contracts and interdisciplinary research projects in collaboration with industry, universities, State, and Federal agencies and other research institutions; 4) legislation providing a favorable climate for aquaculture research; e.g., specific NOAA appropriations, "coastal zone legislation," "ocean dumping act," and fish disease legislation, thus leading to coordinated programs with other NOAA elements such as Sea Grant and Federal Aid (88-309) projects. Information generated would be disseminated to all user groups and others interested in aquaculture operations, particularly industry, state, and some university laboratories who cannot do the work themselves.

30. Activity Plan

As far as possible, research will be integrated with ongoing Pathobiology Investigations now dealing primarily with diseases of wild fish and shellfish. Research emphasis will focus on prophylaxis and treatment of infectious and non-infectious diseases of larvae and juveniles of selected shellfish species produced under hatchery systems. Subsequently, diseases occurring in nursery systems and in adult and reproducing populations, both foreign and domestic, will be studied. Field and laboratory experiments will be implemented to test hypotheses on disease control and to test fishery management practices as they apply to various phases of aquaculture operations; particularly in hatchery systems. Techniques will be developed to: 1) monitor, isolate, identify, culture, and diagnose micropathogen presence; 2) determine the mechanisms of micropathogen transmission, penetration, infectivity, host specificity; 3) qualitatively and quantitatively measure micropathogen activity and host responses via biochemical, cytological, physiological, immunological, and biophysical studies.

30. continued

Long-range plans call for implementing research activities as described above to include species of crustaceans and finfish.

31. Task Outputs and Benefits

1. Outputs

A. Successful implementation of this task and consequent productivity therefrom will permit the NMFS to serve as a national and international clearing house and disseminator of technical information on disease control in aquaculture systems, including establishment of disease registries and publication of manuals, bulletins, brochures on diseases encountered in aquaculture and methods for disease control and prevention. It will permit NMFS to integrate inhouse research projects with Federal, State, university, and other research laboratories in order to provide training facilities and to implement and augment programs to prevent diseases in hatchery and nursery systems.

B. Research productivity and termination of task elements will be measured through successful operation of aquaculture programs of cooperating units and through communication of results in the scientific literature and in industry publications.

2. Benefits

Task outputs would substantially benefit those user groups whose success in various aquaculture operations are precluded because of problems related to disease. Examples are: inability to bring molluscan species through larval and juvenile stages on a mass scale to a point where they can be transplanted successfully; spreading of diseases through indiscriminate transfer of animals for farming or for use as brood stocks which may harbor infectious agents; inability to recognize signs of abnormal water quality conditions or the presence of infectious disease entities in the environment in which the animals are grown and inability to distinguish these organisms from innocuous ones; lack of reliable, objective, readily usable information for solving problems in disease related molluscan aquaculture.

32. Impact of Task Augmentation

FY 1975: This TDP represents a modified submission in which funds for the last half of FY 75 are to be reprogrammed. Specific actions for FY 75 include reprogramming part of the current Comparative Pathobiology task to the control of aquaculture diseases. The total FY 75 funding for this task is 20K. Of this 20K and 1 man year will be reprogrammed beginning January 1, 1975. This will obviously reduce the amount of available funds, activity, and output for Comparative Pathobiology Investigations at Oxford.

FY 1976: Specific reprogramming action for FY 76 include the same proportion of funds and personnel reprogrammed the previous year; i.e., 40K and 2 man years. The Comparative Pathobiology Investigation will decrease correspondingly in terms of funds, personnel, and output.

FY 1977: An additional 83K increase for this task is anticipated along with 3 new ceilings.

33. Criteria for Task Completion

34. Back-up Documentation

- A. 1. Shellfish Institute of North America - resolution to reactivate molluscan aquaculture studies - genetics, disease, nutrition.
- 2. Mardela Corporation report to NOAA - includes NMFS needs to study molluscan aquaculture - disease, nutrition, genetics.

B. Related tasks - none on diseases

Inhouse (NMFS) aquaculture (hatcheries, nurseries)
Center, Milford, Conn. - Oxford to do cooperative disease studies
Sea Grant-University of Delaware - Oxford to do cooperative disease studies; 88-309/Federal Aid-State of Maryland - Oxford to do cooperative disease studies.

C. Legislation not required

D. No environmental impact statement needed.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 9, 1974

(Submit five copies by Jan. 2)

O: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK		
	A	B	C	D	BY TARGET	BY + 1 INC.	
MAC-059-77-AQ-A-1	III-A						
TASK NUMBER	6. TASK TITLE						
326P4	Spawning and Rearing of Molluscs						
ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION		
B6300	Aquaculture Investigations				City Milford	State Ct	
OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	LINE COPIES	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	37.7		84.4		84.4	15.8
1. Travel	19	1.2		2.2		2.2	2.5
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						
4. Grants (Funds obligated)	58						
5. Supplies	53	4.0		7.2		7.2	.3
6. Capital Equipment	54			2.5		2.5	
7. Other (All other obligations)		9.2		7.9		7.9	1.4
8. Total Direct Funds (Add lines 10 through 17 above.)		52.1		104.2		104.2	20.0
9. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		5		5		5	2
10. Positions, Other (Number applicable to this Task.)		2		3		3	
11. Man-years, Permanent		1.5		3.2		4.0	2.0
12. Man-years, Other		1.2		3.0		3.0	
13. Reimbursable Support (Reimbursable agreements only)							

REMARKS

Reprogrammed FY'75 Ref. MAC012

OFFICIAL PREPARING REPORT (Signature)
Warren S. Landers, Investigation Chief
James E. Hanks, Director of Investigations

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)
Carl J. Sindermann
Carl J. Sindermann, Center Director

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-059-77-A0-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	BUDGET YEAR													
		CY 75		BY 76		77		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
	All activities, events and milestones contribute to Objective 3, Subgoal A, Goal III of the P.E.D.														
A	Developing method for rearing surf clams to minimum market size in controlled laboratory environment. <u>Base funding</u>		X			X									
A	Developing commercially practical, large-scale rearing of the surf clam to market size. <u>Funding increase</u>					X						X			
A	Developing method for rearing the bay scallop through the juvenile stage in controlled laboratory environment. <u>Base funding</u>		X									X			
A	Developing method for pilot hatchery level rearing of bay scallop to the field "grow-out" stage. <u>Funding increase</u>					X							X		
A	Developing field methods for growing juvenile bay scallops to market size. <u>Funding increase</u>								X						X
A	Determining amenability of the calico scallop to controlled culture through the juvenile stage in the laboratory. <u>Funding increase</u>											X			
A	Rearing bivalve larvae and seed as a service function for other Aquaculture Investigations Tasks. <u>Base funding</u>		X												
E	Complete laboratory method for rearing surf clam to minimum market size by December 1976. <u>Base funding</u>					X									
E	Complete laboratory method for rearing bay scallop through the juvenile stage by December 1978. <u>Base funding</u>										X				

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-059-77-AQ-A-1

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	77 BUDGET YEAR													
		CY 75		BY 76		+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
M	Complete a method for large-scale rearing of the surf clam to minimum market size in controlled environments by December 1978. <u>Funding increase</u>														X
M	Complete a method for large-scale rearing of the bay scallop to the field "grow-out" stage by December 1979. <u>Funding increase</u>														X
M	Complete field methods for growing juvenile bay scallops to market size on a commercial scale by June 1981. <u>Funding increase</u>														X

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TOP NUMBER

MAC-059-77-AQ-A-

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL		NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Director of Investigations	15/6	001	James E. Hanks	25
Tech. Publ. Editor (Fish. Biol.)	9/8	014	Rita Riccio	25
Fishery Biologist (Res.)	13/6	003	Warren S. Landers	100
Fishery Biologist	11/1	009	Edwin W. Rhodes, Jr.	100
Fishery Biologist	9/1	018	Wayne D. Cable	100
<u>Personnel Increase Required</u>				
Fishery Biologist	7/1		Vacant	100
Fishery Technician	4/1		Vacant	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

1. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

2. ACTIVITY PLAN

3. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

4. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

a. Current Year

b. Budget Year

c. Budget Year + 1

29. STATEMENT OF NEED

This Task will contribute to Objective 3, Subgoal A, Goal III of the P.E.D.

As the world demand for food, including that from the sea, increases, it becomes apparent that the contribution from the wild stocks of marine fish and shellfish is limited by natural restrictions on the populations over which man has little control. A new approach to fish and shellfish production which will supplement the wild harvest must be developed. The most promising appears to be aquaculture - the rearing of aquatic animals for human consumption under the complete control of the culturist. To be successful, the life history of the species being considered for commercial culture must be completely understood and the physiological, nutritional and ecological requirements of each stage of development determined and satisfied.

The most dependable, year-round culture systems for molluscs that now exist are for several species of oysters and the hard clam, Mercenaria mercenaria; but even with these species, there are aspects of their early life history, such as nutritional requirements and susceptibility to disease, that are not fully understood. With other species, such as the bay scallop, much more life history work is needed.

The intent of this Task is to develop laboratory techniques for maintaining and spawning commercially valuable and potentially valuable marine molluscs and rearing their embryos, larvae and juveniles in the laboratory. These investigations will be directed toward the development of aquaculture systems which can be used by the industry for commercial-level production.

30. ACTIVITY PLAN

Standard methods available at this laboratory and in the literature which have proven successful for culturing the oyster and the hard clam will be used initially in attempts to develop hatchery culture methods for other bivalve species of known or potential commercial value. Because each species has certain unique requirements, these methods may have to be modified or new technical approaches developed. Attempts will be made in logical sequence (inducing gametogenesis, spawning the adults, rearing the larval stages, growing the post-set stage immediately after metamorphosis and finally rearing the juveniles to the "grow-out" stage in the field) to adapt proven techniques, many of which originated at Milford Laboratory, to the culture of new aquaculture candidates, modifying these techniques when necessary.

31. TASK OUTPUTS AND BENEFITS

The reproductive habits and early development of commercially valuable marine molluscs will be determined in the laboratory. Subsequently, environments in which various marine molluscs can be spawned and their embryos, larvae and juveniles can be reared to the adult stage will be developed in the hatchery and in the field at commercial levels of production.

The information obtained from this Task will be of direct benefit to the development of aquaculture in general in the United States and to molluscan aquaculture in particular. Life history data will be useful in the management of wild stocks of the species involved and will be an aid to the nationwide NMFS effort to protect our living marine resources.

32. IMPACT OF TASK AUGMENTATION

C. An increase in funds for BY + 1 will allow this Task to expand its activity, which will be committed exclusively to the development of laboratory culture methods during the Current Year and the Budget Year, to the problems of scaling up culture methods to the pilot hatchery level and to field "grow-out" methods.

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

- (a) Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, NMFS - Investigation Summaries.

Report of the Mardela Corporation, January 1973.

Sea Grant studies on rearing of marine organisms at numerous universities.

A Draft Outline for the National Fisheries Plan, Dept. Commerce, NOAA, NMFS, August 1974.

Aquaculture in the National Oceanic and Atmospheric Administration, Special Emphasis Document - Harold L. Goodwin, Program Manager, September 1973.

A Coming of Age - David H. Wallace. In "Aquaculture Section", NOAA, Vol. 1, No. 4, 1971.

34. BACK-UP DOCUMENTATION (Contd)

Ocean Harvests: Promise and Practicality - C. P. Idyll. In "Aquaculture Section", NOAA, Vol. 1, No. 4, 1971.

Aquaculture in New England - Gates, Matthiessen and Griscom, Univ. of Rhode Island Sea Grant Marine Technical Report Series No. 18, 1974.

Aquaculture: A New England Perspective - T. A. Gaucher (Ed.). New England Marine Resources Information Program, 1971.

The Status and Potential of Aquaculture, Vol. 1 - John H. Ryther, 1968. Clearinghouse, Springfield, Va.

Marine Aquiculture, William McNeil (Ed.). Selected Papers from Conference on Marine Aquiculture, 1970, Oregon State University Press.

Shellfish Hatcheries: Present and Future - H. C. Davis. Trans. Amer. Fish. Society, Vol. 98, No. 4, 1969.

- (b) No related NMFS Tasks. Sea Grant sponsoring related research.
- (c) No additional Congressional Legislation needed to complete Task.
- (d) This Task will have no adverse impact on the environment.
- (e) This Task will not contribute to the Extended Jurisdiction initiative.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 18, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
MAC-060-77-RF-A	A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER	6. TASK TITLE
	Biological Assessment: Sportfish

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION	
B6200	Resource Assessment Investigations	City Highlands	State NJ

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	LINE NO.	CURRENT YEAR FY 19 ⁷⁵		BUDGET YEAR FY 19 ⁷⁶		BUDGET YEAR + 1 FY 19 ⁷⁷	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15			74.0		74.0	
1. Travel	19					1.3	
2. Rents, Communications, Utilities	21						
3. Contracts (To be let)	51 52						
4. Grants (Funds obligated)	58						
5. Supplies	53			2.8		1.5	
6. Capital Equipment	54						
7. Other (All other obligations)				7.2		7.2	
8. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>				84.0		84.0	
9. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>				3		3	
10. Positions, Other <small>(Number applicable to this Task.)</small>				7		7	
11. Man-years, Permanent				3.0		3.0	
12. Man-years, Other				4.8		4.8	
13. Reimbursable Support <small>(Reimbursable agreements only)</small>							

REMARKS
This task is a part of MAC-002-77-SII-A during FY'75. The task will split from MAC-002 in FY'76 with no anticipated funding increase.

OFFICER PREPARING REPORT (Signature) <i>[Signature]</i> Edward S. Merrill, Dir. of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>[Signature]</i> Carl J. Sindermann, Center Director
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NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-060-77-RF-A

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BUDGET YEAR											
			75		76		+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	AE	Prepare and complete groundfish historic cruise data analyses report.		X												
2	AE	Analyze and complete flatfish racial studies	X			X										
3	A	Analyze data for bluefish studies	X	X												
4	E	Complete bluefish compendium		X												
5	AE	Conduct and complete biological assessments on age, food habits, fecundity of selected fish species	X													
6	AE	Conduct fish collections for species diversity, length-weight, sex ratio and fecundity observations	X													
7	AE	Prepare semi-annual survey report of findings		X												
8	AE	Prepare and complete annual reports		X												

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-060-77-RF-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
MAC-060 will be established by splitting MAC-002 in FY 76 at which time these permanent positions will be assigned.			
Fishery Biologist (Research)	12/3	Wilk, Stuart J.	100
Fishery Biologist (Research)	9/2	Morse, Wallace	100
Secretary (Stenography)	5/3	Noonan, Catherine L.	25

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- | | |
|---|---|
| 9. STATEMENT OF NEED | 33. CRITERIA FOR TASK COMPLETION |
| 10. ACTIVITY PLAN | |
| 11. TASK OUTPUTS AND BENEFITS | 34. BACK-UP DOCUMENTATION |
| 12. IMPACT OF TASK AUGMENTATION | a. Detail Documentation <i>(Provide one sentence description.)</i>
b. Related tasks and research presently being conducted.
c. Indicate the Congressional legislative requirements.
d. Indicate the Environmental Impact Statement (EIS) requirements. |
| a. Current Year
b. Budget Year
c. Budget Year + 1 | |

29 - STATEMENT OF NEED

Fish populations of the Middle Atlantic Bight have been subjected to encroachment of massive foreign fleets offshore, increased U. S. commercial and sport fisheries inshore, and reduction in quality and area of suitable spawning and nursery grounds. These forces have combined with natural fluctuations, in varying proportions, to jeopardize our coastal fishery resources to the extent that some are on the verge of depletion. Unfortunately, our basic biological knowledge of the life histories of coastal fishes is inadequate for recommending immediate and sound national (i.e. State, industry, sportsmen) and international (i.e. ICNAF, bilaterals) management policies. We are not in a position to determine recruitment, optimum levels of exploitation, or the impact of long-term natural fluctuations and man-made changes in the environment upon our fishery resources. The scientific and technical base needed to properly manage our coastal fisheries and to encourage industrial initiatives will incorporate the understanding of basic biological components that make up the life history patterns of the several species. It is essential that the assessment of fishery stocks along the Atlantic coast be augmented in order that proper management policies can be established to insure the maximum sustainable yield of important marine resources.

30 - ACTIVITIES PLAN

- 1) Collect biological materials pertinent to selected Atlantic coast sport and commercial species such as drums, flounders, porgies, sea basses during spring and fall groundfish cruises, localized monthly cruises, and routine port sampling.
- 2) Analyze biological materials to determine one or more of the following: age composition and growth rates (analysis of scales and otoliths); sexual development, spawning season, and fecundity (macro- and microscopic gonadal examination; food and feeding habits (stomach content studies).
- 3) Conduct stock and racial identification studies of selected species by means of discriminant function analysis of morphometric and meristic variates and analysis of scale structure peculiarities.
- 4) Record all data collected on the appropriate automatic data processing forms, transfer to punch cards, and incorporate into sorting, listing, and statistical systems.
- 5) Retrieve and analyze data for use in technical reports, scientific publications, and special problem areas, such as EIS.
- 6) Retrieve data requested by various user groups such as population and environmental analysts, NMFS research, industry, sportsmen, management and regulatory agencies.

FY 75: (Now part of MAC-002-77-SII-A

- 1) Develop historical finfish data into ADP formats for inhouse reports, archiving, and published summary.

- 2) Complete ADP processing of data for racial analysis of flatfish species.
- 3) Complete preparation of bluefish compendium contributions. Included are completion of age, growth, morphometric, and bibliographic material.
- 4) Continue age and growth studies of selected sciaenid species and initiate special studies on fecundity, food habits, and racial separation.
- 5) Complete data report pertaining to 1968-72 Dolphin and Delaware II cruises.
- 6) Complete stock and racial studies of three species of flatfish (Paralichthys dentatus, P. albigutta, P. lethostigma).
- 7) Continue preparation of bluefish compendium contributions.
- 8) Continue studies of selected sciaenid species.
- 9) Prepare semi-annual and annual reports from monthly cruise results.

FY 76:

- 1) Complete synopses for selected species of the Sciaenidae to include age composition, growth rates, spawning seasons, fecundity, food and feeding habits, and identification of stock and/or racial units.
- 2) Continue series of biological analysis reports from monthly cruises.

FY 77:

- 1) Continue to amplify research on age, food habits, fecundity, length-weight for selected sportfish species.
- 2) Prepare reports for scientific, environmental and other user groups on significance of results.

31 - TASK OUTPUTS

- a) The biological studies program will provide material relevant to growth rates, age composition, spawning seasons, fecundity, migrations, food and feeding habits, and other factors affecting the abundance and distribution of important commercial and sport fish. Such studies of the life history of fish are essential for the development of population models which will lead to better predictions of future abundance and as a basis for sound management decisions. It will attempt to establish means to identify geographic races or unit stocks of those species that contribute to the commercial and sport fisheries. These stocks may differ in distribution, growth, fecundity, and survival. Accurate assessment and management of those species where separate coastal units exist must be based on a knowledge of their stock structure. The task initially will:

- 1) Contribute biological data (i.e. length-age, length-weight) in cooperation with NEFC and contracting State agencies to a common input program which will incorporate material from Block Island to Cape Canaveral.
 - 2) Provide analyses of materials collected during cruises or by means of port sampling to population dynamics group. These inputs will initially provide a data base and subsequently improve the accuracy of biometric models of population structure.
 - 3) Provide outputs from the life history data bank to various users, including industry, sportsmen, population and environmental analysts, other NMFS research groups, and management and regulatory bodies.
 - 4) Be prepared to furnish or synthesize data pertinent to man-induced impact on the environment.
- b) The long-range benefit of this task will be the ability to provide, on a regular and timely basis, biological information essential for assessment predictions and management policies pertinent to selected middle Atlantic coastal sport and commercial species.

Using standard collecting and analyses procedures, over enough years, will enable valid comparison of normal fluctuations in specific fish populations and variations from the normal attributed to the impact of natural or man-made stresses.

Information collected will, upon request, be made available to State, Federal, or international units in charge of management recommendations.

Upon request, additional biological materials will be collected and forwarded to colleagues in other investigations, State agencies, and universities.

32 - IMPACT OF TASK AUGMENTATION

- 1) CY -- no increases anticipated.
- 2) BY -- no increases anticipated.
- 3) BY + 1 FY 77 -- no increases anticipated.

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

- a. S. J. Wilk and M. J. Silverman. 197_. Fish and hydrographic collections made by the Research Vessels Dolphin and Delaware II during 1968-1972 from New York to Florida. SSR-F (in press).
- S. J. Wilk and M. J. Silverman. 197_. Summer benthic fish fauna of Sandy Hook Bay, New Jersey. SSR-F (in press).

- L. A. Walford, S. J. Wilk, B. Olla, A. Kendall, B. Freeman, D. Deuel, and M. Silverman. 197_. The bluefish (Pomatomus saltatrix) A synoptic review of its biology. ASMFC Leaflet Series (in press).
- S. J. Wilk. 197_. The weakfish (Cynoscion regalis) a review of its biology and present research. ASMFC Leaflet Series (in press).
- M. J. Silverman. 197_. Early scale development of bluefish (Pomatomus saltatrix). Trans. Am. Fish. Soc. (in press).

b.

- 1) MACFC programs and tasks
 - a) Multispecies task
 - b) Ichthyoplankton task
 - c) Ecosystems Investigations
- 2) Other NMFS programs
 - a) NEFC groundfish survey
 - b) MARMAP
 - c) AEG
- 3) South Carolina - MARMAP

c. None

d. None

e. Biological data of fish stock will add to decision making for tactics in managing any offshore foreign fishery impacts upon recreational fish species.

NMFS TASK DEVELOPMENT PLAN
(See Detailed Instructions)

1. DATE PREPARED
December 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-061-77-EI-R-1		3. OBJECTIVE CODES A B C D				4. RANK BY TARGET BY + 1 INC.	
5. TASK NUMBER R81701		6. TASK TITLE Effect of Contaminant Stress on the Behavior of Selected Marine Species					
7. ORGANIZATION CODE FB6100		8. ORGANIZATION TITLE (Responsible for execution of this task) Ecosystems Investigations				9. PRINCIPAL LOCATION City: Sandy Hook NJ State: N.J.	

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	10.2		11.0		11.0	
11. Travel	19	3.0		3.5		3.5	
12. Rents, Communications, Utilities	21	-		0.8		0.8	
13. Contracts (To be let)	51 52	3.0					
14. Grants (Funds obligated)	58						
15. Supplies	53	11.0		9.5		9.5	
16. Capital Equipment	54	-					
17. Other (All other obligations)		0.9		2.0 1.0		2.0 1.0	
18. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>		28.1		27.8		27.8	
19. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>		-		-		-	
20. Positions, Other <small>(Number applicable to this Task.)</small>		-		0		0	
21. Man-years, Permanent		.5		.6		.6	
22. Man-years, Other							
23. Reimbursable Support <small>(Reimbursable agreements only)</small>		7.0		7.6		7.6	

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) <i>Bori L. Olla</i> Bori L. Olla	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>John B. Pearce</i> John B. Pearce	<i>Carl Suderman</i> Carl Suderman
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NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-061-77-EI-R-

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
No Positions Assigned			

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- 1. STATEMENT OF NEED
- 2. ACTIVITY PLAN
- 3. CRITERIA FOR TASK COMPLETION
- 4. TASK OUTPUTS AND BENEFITS
- 5. IMPACT OF TASK AUGMENTATION
 - a. Current Year
 - b. Budget Year
 - c. Budget Year + 1
- 33. BACK-UP DOCUMENTATION
 - a. Detail Documentation (Provide one sentence description.)
 - b. Related tasks and research presently being conducted.
 - c. Indicate the Congressional legislative requirements.
 - d. Indicate the Environmental Impact Statement (EIS) requirements.

29. STATEMENT OF NEED

At a time when the activities of man continue to impinge on and disrupt the natural homeostasis of the marine ecosystem, it is essential that the level of confidence in assessing and predicting the effects of such activities be improved. It is only through such efforts that rational planning of action for preserving the environment may be implemented. One approach to the problem is to study the response capabilities of selected marine organisms to specific contaminant stresses.

In recent years the need for more comprehensive measures of pollutant effects on aquatic organisms has stimulated the development of methodology in a variety of disciplines including animal behavior.

The most important advantage of using behavior as a measure of stress is that the results often lend themselves to direct interpretation regarding environmental quality as related to the possible consequences at both population and ecosystem levels. The complex of biochemical and physiological responses which are integrated by the animal internally are manifested in directly observable acts. These behaviors reflect not only the internal state but also how an animal responds to and consequently may survive, a particular stress situation. By using the normal behaviors of the animals as baseline measures, the effect of given levels of potentially detrimental stress can be determined and the results extrapolated to predict the impact on or degree of change within a given natural community.

There is a critical need for providing information concerning the life habits, behaviors and habitat and feeding requirements of marine species residing in environments which are potentially susceptible to man-induced change. Environmental modeling and EIS ultimately require information of this sort since realistic models or predictions cannot be developed if there is insufficient data from the natural environment. In addition, there is considerable interest in developing behavioral baseline measures of normality for species used as indicator organisms in contaminant testing by a variety of industrial, state and federal agencies (EPA, AEC).

30. LABORATORY ACTIVITIES PLAN

Laboratory studies conducted under controlled conditions will center on the measurement of normal behavioral responses of selected marine fish species, including juvenile mullet and cunner, and how these behaviors are affected by selected contaminant stresses including temperature, petroleum and/or water soluble petroleum components.

The focal point of the laboratory studies in which mullet comprise the test species is a 180-liter tank, constructed from non-reflective glass which is surrounded by 4 adjacent tanks of similar size. This entire experimental system is equipped with controlled light and temperature system as well as a specialized filtration system.

In the experimental procedure, a single fish located in the central tank is allowed visual contact with a group of fish in one of the adjacent tanks although it is physically separated from them and hence is deprived of all other sensory stimuli. The initial phase of the study will establish normal behavior under preferred conditions of light, temperature and salinity. Quantitative measurements are made on a single fish as it responds to its species mates or to a different species group in an adjacent tank. Data of this kind afford specific baseline information on the strength of the motivation of the fish to aggregate during short and long-term exposures and can be readily compared with any deviations in the normal schooling responses occurring during periods of induced stress.

Feeding behavior is also tested in the same experimental apparatus and quantitative measurements are made on the readiness to feed and on long term feeding motivation of test fish, which again are receiving only visual cues from their species mates. Through this system of testing, an analysis and quantification of feeding behavior will provide the capability to detect changes in feeding motivation caused by temperature, petroleum and by the interaction of the two.

Studies in which cunner are the test species will be conducted in another specialized experimental system equipped with controlled light and temperature and filtration system, and in which the animal's substrate and habitat requirements are approximated.

The initial phase of the study will establish, under conditions corresponding to seasonal fluctuations of temperatures, salinity, light, normal patterns of territoriality, activity, feeding and social interactions for cunner. These behaviors will be quantified for comparison with behaviors observed during periods of contaminant stress. The data, analyzed daily by statistical methods developed specifically for the program, will allow day-to-day evaluation of experimental results. Contaminant levels will be monitored regularly.

FY 75-76 - Normal social, schooling and feeding response of juvenile bluefish will be measured as related to olfactory and visual cues. Effects of temperature stress on established social and feeding patterns of mullet will be determined.

31. TASK OUTPUTS AND BENEFITS

The primary output of this Task will be the utilization of established normal life habits and behaviors of representative marine fish species to determine the effects of selected contaminant stresses (e.g. petroleum, temperature and the synergistic action of the two). This information will result in an increase in the ability to assess and predict potential effects of contaminants within particular ecosystems and aid in developing ecosystem guidelines to be used in all types of ecological modeling efforts.

The need for such guidelines and the important role the Behavior Investigation has played in pioneering this type of effort are exemplified by the following: 1) a workshop on "Behavioral Measures of Environmental Stress" sponsored by the Marine Technology Society; and 2) a forthcoming session, "The Use of Behavior to Measure Stress in the Marine Environment", at the Third International Estuarine Research Federation Conference. Both of these projects, organized, chaired and edited by B. L. Olla, Senior Investigator of this Task, illustrate the national importance of this Task's efforts. The results of such projects receive wide distribution and are important to both private concerns and government agencies engaged in assessing water quality and setting permissible limits.

The inadequacies and limitations of standard test techniques which are being applied on a world-wide basis, have necessitated more comprehensive identification of organismic response to contaminants. The development, by this Task, of methodologies which are generic in nature and can be used in the laboratory or field, or applied in and of themselves to predicting the effects of stress, are contributing significantly to the improvement of standard testing procedures. The actual data gathered by this Task can be used by a variety of concerned groups including private industrial firms, state and various government agencies (EPA, CEQ, AEC).

32. IMPACT OF TASK AUGMENTATION

No potential increases are anticipated.

33. CRITERIA FOR TASK COMPLETION

34. BACK-UP DOCUMENTATION

Atema, J., S. Jacobson, J. Todd and D. Boylan. 1973. The importance of chemical signals in stimulating behavior of marine organisms: effects of altered environmental chemistry on animal communication, p. 177-197. In: G. E. Glass (ed.) Bioassay Techniques and Environmental Chemistry. Ann Arbor Science Publishers Inc., Ann Arbor, Michigan.

This paper reviews the effects of kerosene fraction of feeding attraction to food and homing in various marine organisms.

Atema, J. and L. Stein. 1974. Effects of crude oil on the feeding behavior of the lobster Homarus americanus. Environ. Pollut. 6:77-86. This paper describes interference by crude oil with chemosensory behaviors of lobster during feeding.

Coutant, C. C. 1970. Biological aspects of thermal pollution. I. Entrainment and discharge canal effects. Publ. No. 383, Ecol. Sci. Div. Oak Ridge Nat. Lab: 341-381. This article reviews and evaluates the effects of thermal discharges on biological processes.

Jensen, A. C. 1974. Sport fisheries and offshore oil. N. Y. Fish and Game Jour. 13(1):79-112. This paper discusses the marine sportfishery resources in the North and Middle Atlantic regions in relation to the suspected petroleum reserves.

Krenkel, P. A. and F. L. Parker (ed.). 1969. Biological Aspects of Thermal Pollution; Proceedings. Vanderbilt University Press, Nashville, Tenn. 407 p.

This paper reviews the various sources of thermal pollution and the resulting problems in the environment.

Lyman, H. 1974. Successful Bluefishing. International Marine Publishing Co., Camden, Maine. 112 p.

The findings of the studies on bluefish feeding and activity are used in a book of interest to sportsfishermen.

Olla, B. L. 1971. I. The effect of temperature on the activity of adult Atlantic mackerel, Scomber scombrus. AEC Report (49-7) 3045: 1971. This report summarizes the effects of rapid continual increases of temperature to lethal levels as well as several gradual step increases.

Olla, B. L. 1972. II. The effect of temperature on the activity of adult Atlantic mackerel, Scomber scombrus. AEC Report (49-7) 3045: 1972. This report summarizes the effects of high temperature acclimation followed by two gradual step increases to upper incipient lethal levels and the resultant changes in feeding levels.

Olla, B. L. 1973. III. The effect of temperature on the activity and feeding of adult Atlantic mackerel, Scomber scombrus. Some factors to be considered in the conduct of finfish bioassays. AEC Report (49-7) 3045.

This study reports (1) the effects of identical temperature increases within preferred ranges on activity and feeding patterns of mackerel at different seasons and (2) summarizes the experimental study of behavior in light of the need for changes in bioassay methodology.

Olla, B. L. 1974. (1) Comparative studies on the responses of young tautog, Tautoga onitis and juvenile bluefish, Pomatomus saltatrix to increasing temperatures. (2) The effect of temperature on fish-to-fish attraction in an inshore schooling species, striped mullet, Mugil cephalus. (3) The activity, habitat preference, home range and feeding in the cunner, Tautoglabrus adspersus. AEC Report (49-7) 3045. This study reports (1) the differences in response capability of representative pelagic and demersal species types; (2) the reduction in fish-to-fish response at high sublethal temperatures; (3) the normal environmental requirements of an inshore demersal species, cunner.

Olla, B. L. (ed.). 1975. Behavioral measures of environmental stress. In: Proceedings of the Marine Technology Society's Marine Bioassay Evaluation Workshop. In Press.

This chapter details the need for and use of behavioral measures in bioassay tests on marine organisms.

Olla, B. L. 1975. The use of behavior to measure the effects of petroleum on marine organisms. In: The Proceedings of the Conference on Marine Environmental Implications of Offshore Drilling in the Baltimore Canyon Region of the Mid-Atlantic Coast. In manuscript. This paper reviews the need for and use of behavior in measures assessing and predicting the effects of petroleum and/or petroleum products on marine organisms.

Olla, B. L., A. J. Bejda and A. D. Marine. 1974. Daily activity, movements, feeding and seasonal occurrence in the tautog, Tautoga onitis. Fish. Bull., U. S. 72:27-35.

This paper describes the life habits and environmental requirements, derived from in situ observations, of the tautog.

Olla, B. L., A. J. Bejda and A. D. Martin. 1975. Activity, movements and feeding behavior of the cunner, Tautoglabrus adspersus, and comparison of food habits with the coresident tautog, Tautoga onitis. In review.

This paper describes the life habits and environmental requirements of cunner and feeding interrelationship with tautog.

Olla, B. L., H. M. Katz and A. L. Studholme. 1970. Prey capture and feeding motivation in the bluefish, Pomatomus saltatrix. Copeia 1970: 360-362.

This study describes the different phases of the feeding response and the effect of prey size on feeding motivation.

Olla, B. L. and C. Samet. 1974. Fish-to-fish attraction and the facilitation of feeding behavior as mediated by visual stimuli in striped mullet, Mugil cephalus. J. Fish. Res. Board Can. 31:1621-1630.

This paper describes the role of vision in social attraction and feeding behavior of striped mullet.

Olla, B. L., C. E. Samet, and A. L. Studholme. 1972. Activity and feeding behavior of the summer flounder (Paralichthys dentatus) under controlled laboratory conditions. Fish. Bull., U. S. 70:1127-1136. This paper describes activity cycles, feeding and swimming patterns of adult flounder under controlled laboratory conditions.

Olla, B. L. and A. L. Studholme. 1971. The effect of temperature on the activity of bluefish, Pomatomus saltatrix L. Biol. Bull. 141: 337-349.

This paper describes the effects of thermal stress on activity, feeding and schooling in bluefish.

Olla, B. L. and A. L. Studholme. 1972. Daily and seasonal rhythms of activity in the bluefish (Pomatomus saltatrix). In: H. E. Winn and B. L. Olla (eds.). Behavior of Marine Animals: Current Perspectives in Research. Vol. 2, p. 305-325. Plenum Press, New York.

This paper describes the normal daily and seasonal activity, feeding and schooling behavior of bluefish under controlled laboratory conditions.

Olla, B. L. and A. L. Studholme. 1975. The effect of temperature on the behavior of young tautog, Tautoga onitis (L.). Proceedings of the Ninth European Symposium on Marine Biology. In Review. This paper describes changes in activity, territoriality, feeding and shelter - dependence of young tautog at elevated, sublethal temperature.

- Olla, B. L., R. Wicklund and S. Wilk. 1969. Behavior of winter flounder in a natural habitat. *Trans. Amer. Fish. Soc.* 98:717-720.
This study describes field observations of winter flounder activity and feeding at different times of the day and at different ambient temperatures.
- Parker, F. L. and P. A. Krenkel. 1970. Physical and engineering aspects of thermal pollution. CRC Press, Cleveland, Ohio.
This paper reports specific demands on aquatic environments due to the increased cooling water requirements for both thermonuclear and fossil-fueled steam electric power plants.
- Ricciuti, E. R. 1973. Killers of the Seas. Walker Inc. N. Y. 308 p.
The information on bluefish feeding behavior and prey-size discrimination is used in this book written for the general public.
- Sosin, M. 1973. How long can the bluefish last? pp. 66-70. In: Sportfishing 9(1), Yachting Publishing Corp., New York.
This article uses the research results of this Task in a popularized report on bluefish life habits.
- Sprague, J. B. 1971. Measurement of pollutant toxicity to fish. III. Sublethal effect and "safe" concentrations. *Water Research* 1971. 5:245-266.
This paper points up need for change in bioassay methodology particularly with respect to incorporating behavioral measures.
- Swedmark, M., A. Grønmo and S. Kolberg. 1973. Effects of oil dispersants and oil emulsions on marine animals. *Water Research* 7:1649-1672.
This paper summarizes the results of a comparative study of the toxicity of a number of oil dispersants to a variety of marine animals.
- Takahashi, F. T. and J. S. Kittredge. 1973. Sublethal Effects of the Water Soluble Component of Oil: Chemical Communication in the Marine Environment in the Microbial Degradation of Oil Pollutants, D. G. Ahearn and S. P. Meyers (eds.). Center for Wetland Resources, Louisiana State University, Publication No. LSU-SG-73-01, pp. 259-264.
This paper discusses the effects of oil on sexual and feeding in behavior, as mediated by chemoreception in the lined shore crab, Pachygrapsus crassipes.
- Thermal pollution of water. Panel discussion, Fourteenth Annual Conservation Conference, National Wildlife Federation, Washington, D. C., December 1967. This paper is an analysis of problems imposed upon different environmental communities from effects of thermal additions.
- U. S. Atomic Energy Commission. Nuclear reactors built, being built or planned in the United States as of June 30, 1968.
This study reports the status of thermonuclear power plants, both established and anticipated.

Zobell, C. E. 1969. Microbial modification of crude oil in the sea. pp. 317-326. In: Proceedings: Joint Conference on Prevention and Control of Oil Spills, 1969. American Petroleum Institute, New York, N. Y.

This paper discusses the microbial breakdown of a variety of crude oils under various environmental conditions.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

Dec. 18. 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-063-77-SII-A	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

5. TASK NUMBER	6. TASK TITLE MARMAP II: Multispecies; Coastal Assessment
----------------	--

7. ORGANIZATION CODE FB6200	8. ORGANIZATION TITLE (Responsible for execution of this task) Resource Assessment Investigations	9. PRINCIPAL LOCATION City: Highlands State: N.J.
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OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	LINE NUMBER	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15						39.0
11. Travel	19						7.5
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						160.0
14. Grants (Funds obligated)	58						
15. Supplies	53						14.9
16. Capital Equipment	54						
17. Other (All other obligations)							3.6
18. Total Direct Funds (Add lines 10 through 17 above.)							225.0
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)							2
20. Positions, Other (Number applicable to this Task.)							2
21. Man-years, Permanent							1.6
22. Man-years, Other							1.6
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) <i>Ash & Merrill</i>	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>Carl Gustafson</i>
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NMFS TASK DEVELOPMENT PLAN

TDP NUMBER

MAC-063-77-SII-A

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
							+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	A	Complete specifications for contract studies of estuarine to offshore survey of demersal fishes								X						
2	A	Arrange state-federal or other contracts for monthly resource survey in selected areas							X	X						
3	AE	Review results of contract cruise studies							X	X						
4	AE	Prepare cooperative annual report of monthly cruise set								X						

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)
*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-063-77-SII-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist	11	Vacant	100
Fishery Biologist	09	Vacant	100

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

29. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

30. ACTIVITY PLAN

31. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

32. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

29 - STATEMENT OF NEED

A primary interest of commercial, recreational and coastal conservational interests is to define the role and contribution of estuarine areas to nearshore and offshore marine stocks. The survival, migrations and recruitment of many important species depend to large extent on natural and man-made effects occurring within land-bounded waters along the coast. Estimates of juvenile fish abundance, and distribution of fishes, require a short-term sampling frame for detecting seasonal changes and interpreting annual variations. The results of such sampling at selected areas will provide a means of defining baselines, relating sources of variation, essential to understanding the changes reflected in annual or semi-annual broader area surveys. The conduct of resource surveys in a standard fashion by various coastal states will satisfy their need to monitor the status of their available resources and define the productivity of waters in relation to establishing links to harvestable fractions of resources inhabiting shelf waters. These waters are fished by our own nationals for commerce and recreation and impinge on ICNAF statistical area 6 where international fisheries also operate.

30 - ACTIVITIES PLAN

The task will be accomplished through contract surveys following a standard protocol. Inshore-offshore sectors will be defined as study areas in which sampling will be scheduled in a random stratified strategy to reduce bias. Hydrographic parameters, ichthyoplankton and demersal finfish will be determined at monthly intervals.

Data derived from the various individual contractees, obtained in standard fashion will be compared in a cooperative joint report, using the individual reports as sources. Seasonal changes, species variations and hydrographic differences will be highlighted.

31 - TASK OUTPUTS

- a) Monthly cruise reports will be provided to describe the scientific results of each survey. The characteristics of the hydrographic climate, location of fish concentrations, weight and length characteristics of dominant fin and shellfish and unusual occurrences will be documented and distributed on a timely basis. Members of commercial and recreational fisheries have direct use of the information as do scientific and conservation groups.
- b) Target surveys over particular areas at relatively frequent intervals provide real time information on status of an important segment of the fishable community. Information on size, availability, prerecruit population, distribution, age composition from nearshore areas are not only useful for nearshore stock assessment, but are required for interpreting more precisely the significance of changes in fish stocks appearing in offshore waters and assessed much more infrequently because of the logistical problems and expenses required for shelf surveys coastalwide in scope. They also provide a platform for obtaining samples of ichthyoplankton and neuston for correlative studies.

32 - IMPACT OF TASK AUGMENTATION

N/A

33 - CRITERIA FOR TASK COMPLETION

--

34 - BACKUP DOCUMENTATION

- a. Results of monthly pilot surveys: Raritan Bay - Hudson Canyon.
- b. MARMAP II - Multispecies surveys provide the broad background against which these more frequent "corridor" cruises would bring interpretive perspective. Southern sector of these MARMAP II cruises are being conducted by State of North Carolina by State-Federal contract.
- c. No legislation necessary.
- d. No EIS required.
- e. Yes. As stated above will add precision to some aspects of estimating recruitment sources.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

Dec. 18, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-064-77-RF-A	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

5. TASK NUMBER	6. TASK TITLE MARMAP FA: Population Dynamics
----------------	---

7. ORGANIZATION CODE FB6200	8. ORGANIZATION TITLE (Responsible for execution of this task) Resource Assessment Investigations	9. PRINCIPAL LOCATION City: Highlands State: N.J.	
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OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	IN J B O O	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15						61.4
11. Travel	19						3.2
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						45.0
14. Grants (Funds obligated)	58						
15. Supplies	53						9.3
16. Capital Equipment	54						
17. Other (All other obligations)							6.1
18. Total Direct Funds (Add lines 10 through 17 above.)							125.0
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)							2
20. Positions, Other (Number applicable to this Task.)							4
21. Man-years, Permanent							1.6
22. Man-years, Other							3.2
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS
See attached remarks.

24. OFFICIAL PREPARING REPORT (Signature) <i>Arthur S. Merrill</i>	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>Carl Buchman</i>
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JUSTIFICATION

The proposed MAC-064-77-RF-A will allow developing of statistical analysis relating sportfish/commercial impact of significant middle Atlantic fisheries. Deriving optimum yields and isopleth functions on allocations. It relates directly to the information demands that we will be expected to respond to relating to extended jurisdiction. Proposed energy-oriented exploitation of shelf waters will also impose demands of us in responding to impact of such operations on living marine resources.

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-064-77-EF-A

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD -- Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Initiate primary efforts -- total mortality estimates of sciaenids and selected species					X			X						
AE	Prepare reports from data bank source -- bioanalyses from cruise data							X			X				
A	Prepare selected species isopleth analyses							X							
AE	Prepare and complete status reports and preliminary forecasts of selected species									X					
A	Prepare mixed fisheries analysis model									X					
E	Produce management recommendations to commissions							X							

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

a. Continued at same level

b. Increase of ___% *

c. Reduction of ___%

d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NAFIS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-064-77-RF-A

Reference NOAA Form 32-14A, item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist (Biometrics)	12	Vacant	100
Fishery Biologist (Immunology)	11	Vacant	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

29 - STATEMENT OF NEED

Population dynamics analyses are required for providing management advice to industry, State, and international groups charged with conservation and allocation of renewable marine resources.

The middle Atlantic shelf is populated by a set of exploited and unexploited fish stocks. Catch trends of many of the exploited species show drastic declines in yield and relative abundance over the last 15 years. These reductions have been attributed to overfishing, environmental degradation, or natural fluctuations. Presently, man's activities are the only manipulative factor for controlling abundance. NMFS must be involved in analyses of marine resources because stocks are migrating along several seaboard states or exhibit movements from inshore to offshore where they enter waters available to foreign fleets.

With increasing demands for commercial and recreational harvest, a population dynamics program is essential for developing management strategy.

30 - ACTIVITIES PLAN

Results of cruise surveys, harvest rates of fishery components and biological studies estimating growth and recruitment from data banks and scientific literature (maintained or available to NMFS) provide the necessary input for developing models of species isopleth curves. Locating data, analyzing, and generating parameter estimates are the first study need. In the middle Atlantic area, attempts must be made into yield estimates of mixed species fisheries, an area of research which is essentially undeveloped. Excursions into this necessary line of study will not only point to deficiencies in our information base but will lead to a functional fishery exploitation policy, particularly for harvesting seasonally available demersal fish populations.

During the first year we anticipate:

- 1) Evaluation of data sources.
- 2) Definition of unit stocks. Establishing limits of range for which estimates will prevail. Target species will be scup, weakfish, spot, croaker, sea bass, and fluke, species exploited by both commercial and recreational fisheries.
- 3) Definition of mixed stocks. Preliminary formats for establishing the treatment of situations where fishing mortality of several species has common elements but where none can be treated as a unit.

31 - OUTPUTS

- a) Biometrical analyses integrate information on distribution, recruitment, and mortality to provide developing fisheries with information on magnitude of the resource, potential yield, and decreases in catch per effort caused by projected increases in effort. More precise estimates will be generated for existing fisheries to determine at which point more expansion in effort will produce negligible increase in catch. Such knowledge may discourage wasteful expansion or perhaps encourage some form of regulation.

The task is continuous and will reach objectives when input parameters are adequate to generate a reliable prediction of stock changes with changes in harvest rate. Predictive models will grow in sophistication in several stages, first based on cruise estimates of standing crop versus catch/effort relationships in the fisheries, to involvement of species growth and mortality rates, and finally to integration of our understanding of ecological factors and population processes. For most middle Atlantic stocks we have only some first and, for a few, second level parameters available for analyses.

The requirements for accuracy will be fed back to control intensity of sampling. Yield-effort models will be made available to university, State, and Federal agencies concerned with developing fishery policy and negotiations.

- b) Our task effort will be addressed to information on the biological status of stocks and projected impacts principally incurred by fishing. Biological facts will be integrated with economic and sociologic effects in development of management strategies and international negotiations. Reliability statements will be available, based on quality and quantity of input data. Policymakers and researchers will receive both a timely and historical reference of fish population levels and relationships for fish policy recommendations, negotiations, environmental impact evaluation, and ecosystem modeling.

32 - IMPACT OF TASK AUGMENTATION

Budget year -- initial funding.

Primary staffing would require one biometrician, one programmer.

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

- a. Gulland, J. A. 1969. Manual of Methods for Fish Stock Assessment. Part 1. Fish Population Analysis. FAO Manual in Fisheries Science No. 4, 154 p. Rome.

Nikolski, G. V. 1969. Theory of fish population dynamics as the biological background for rational exploitation and management of fishery resources. Oliver and Boyd. Edinburgh. 323 p.

Davis, J., et al. Investigation of potential for expansion of the industrial fishery of the Mid-Atlantic Bight. Completion Report, Virginia 3-5-D. Comm. Fish. Res. Dev. Act., July 1, 1965 - June 30, 1970.

- b. Ongoing biostatistical analyses and population studies are being conducted at NEFC. The species under intensive study are principally boreal and offshore. Some of their stocks under study have southern contingents in middle Atlantic coast waters.
- c. No congressional legislation is required to carry out proposed tasks.
- d. The proposed studies will not require an EIS; they will, in fact, be valuable adjuncts to preparation of future environmental statements because status of population levels will have better estimators.

NIAMS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

Dec. 18, 1974

(Submit five copies by Jan. 2)

2. Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
AC-065-77-SI-R	A	B	C	D	BY TARGET	BY + 1 INC.
TASK NUMBER	6. TASK TITLE					
31703	MARMAP SI: Larval Fish Studies--AEC Reimbursable					
ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
36200	Resource Assessment Investigations				City Highlands	State N.J.

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	LINE NO.	CURRENT YEAR FY 19 <u>75</u>		BUDGET YEAR FY 19 <u>76</u>		BUDGET YEAR + 1 FY 19 <u>77</u>	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
0. Total Direct Labor	15	34.0		34.0	24.8	58.8	
1. Travel	19	7.2		7.2	3.0	10.2	
2. Rents, Communications, Utilities	21	2.4		2.4	1.7	4.1	
3. Contracts (To be let)	51 52	32.5		32.5	50.0	82.5	
4. Grants (Funds obligated)	58						
5. Supplies	53	118.1		118.1	19.0	137.1	
6. Capital Equipment	54						
7. Other (All other obligations)		20.0		20.0	3.2	23.2	
8. Total Direct Funds (Add lines 10 through 17 above.)		214.2		214.2	101.7	315.9	
9. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		-		-	-	-	
10. Positions, Other (Number applicable to this Task.)		4		4	2	6	
11. Man-years, Permanent		1.2		1.2	-	1.2	
12. Man-years, Other		3.2		3.2	1.6	4.8	
13. Reimbursable Support (Reimbursable agreements only)		23.4		23.4	17.0	40.4	

REMARKS

14. OFFICIAL PREPARING REPORT (Signature)

Arthur J. Merrill

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.)

Carl Suderman

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TOP NUMBER

MAC-065-77-SI-R

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR										
						+1		+2		+3		+4		+5		
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
A	Sort plankton samples collected on cruises designed to study diurnal activities of larval fishes					X										
AE	Identify, count, and measure larval fishes collected during diurnal migration studies					X										
AE	Publish data on diurnal activities of larval fishes					X										
AE	Prepare atlas from in-house data on distribution and abundance of ichthyoplankton collected in Middle Atlantic Bight					X	X									
A	Conduct serial cruises near proposed nuclear power plant sites to study inshore-offshore distribution of larval fishes. Prepare cruise reports.					X										
AE	Sort, identify, count, and measure larval fishes from serial cruises					X										
AE	Prepare manuscripts on results of data collected from serial cruises					X										

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

a. Continued at same level

b. Increase of ___% *

c. Reduction of ___%

d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-065-77-SI-R

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Temporary positions only.			

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- STATEMENT OF NEED
- ACTIVITY PLAN
- TASK OUTPUTS AND BENEFITS
- IMPACT OF TASK AUGMENTATION
 - a. Current Year
 - b. Budget Year
 - c. Budget Year + 1
- 33. CRITERIA FOR TASK COMPLETION
- 34. BACK-UP DOCUMENTATION
 - a. Detail Documentation *(Provide one sentence description.)*
 - b. Related tasks and research presently being conducted.
 - c. Indicate the Congressional legislative requirements.
 - d. Indicate the Environmental Impact Statement (EIS) requirements.

29 - STATEMENT OF NEED

The aquatic environment is a resource with an ever-increasing number of competing users, many of whom alter the environment to the detriment of our living marine resources. The effects of man's changes on the marine environment and its constituent animal populations must be understood to determine the full costs involved. We must obtain information on compositions, extent, and conditions of living marine resources, predict the distribution, abundance, condition and availability of these resources, and prepare analyses adequate to support policy decisions concerning the impact of man-induced environmental changes on marine populations.

Primary recipients of this information include:

- AEC
- ICNAF
- ASMFC
- Commercial Fisheries
- Scientific Community
 - a) State conservation agencies
 - b) Population Investigations
 - c) Private Research Organizations
 - d) University Researchers

30 - ACTIVITIES PLAN

Analyze and prepare for publication data, collected on our series of cruises designed to study diurnal activities of young fishes. Collections from these cruises will contain young of the most important commercial and recreational fishes that spawn in the Middle Atlantic Bight. Of the 10 most important coastal species in terms of total combined sport and commercial catch in the Middle Atlantic Bight, only Atlantic mackerel and possibly bluefish are not dependent on the shallow coastal areas. The other species depend on the subtidal zone for spawning and/or nursery grounds, and even young bluefish and mackerel utilize this area to some extent.

In conjunction with ongoing diffusion, productivity, and finfish assessment studies, we will conduct an experiment to measure monthly changes in the inshore-offshore distribution and abundance of larval fishes, concentrating on those areas near proposed nuclear power plant sites. Concomitant measurements of the marine environment and pertinent physical data from other sources will be incorporated to establish norms and ranges of variability. These data will be integrated with all available biological data to evaluate the role of the environment and additional man-induced changes on the environment in terms of their effect on spawning, larval transport, geographical distribution, and year-class success.

We will continue to utilize ADP to: (1) Develop a program that will also allow us to produce an atlas from in-house data on the seasonal distribution of larval fishes in the Middle Atlantic Bight; (2) Investigate the reaction of interspecific distribution of larval fishes, and to relate their distribution to several environmental parameters; (3) Maintain a current Data Management System and; (4) Provide outputs to various user groups.

We plan the following:

FY 75:

- 1) Conduct monthly cruises in Middle Atlantic Bight to measure changes in the inshore-offshore distribution and abundance of larval fishes, concentrating on those areas near proposed nuclear power plant sites. Begin sort and identification of larval fishes from monthly samples.
- 2) Work actively toward completion of manuscripts on diurnal activities of larval yellowtail flounder and Atlantic mackerel.
- 3) Complete atlas on the seasonal distribution of larval fishes in the Middle Atlantic Bight.
- 4) Establish a data bank of hydrographic data of the Middle Atlantic Bight from our files and those of NODC and other agencies.

FY 76:

- 1) Conduct monthly cruises in Middle Atlantic Bight to measure changes in the inshore-offshore distribution and abundance of larval fishes, concentrating on those areas near proposed nuclear power plant sites.
- 2) Publish manuscripts on diurnal activities of larval yellowtail flounder and Atlantic mackerel. Complete counts and measurements of larvae collected during FY 75 diurnal activities study. Begin work-up data for publication.
- 3) Provide preliminary results from monthly cruises conducted in FY 75.

FY 77:

- 1) Extend geographic coverage of serial cruises south to the Maryland-Virginia border, with some decrease in frequency.
- 2) Publish manuscripts on diurnal activities of larval bluefish and associated species. Begin work-up of FY 76 diurnal activities study.
- 3) Prepare for publication results of FY 75 monthly cruises.
- 4) Provide preliminary results of monthly cruises conducted in FY 76.

31 - TASK OUTPUTS

- a) Emphasizing those species that are found near shore, field work during the next three to five years will center around; (1) Work-up and analysis of data collected to investigate the diurnal activities of young planktonic fishes and to relate these activities to environmental parameters such as photoperiod, depth, temperature, salinity, and seasonal thermocline, and to estimate their dispersion rates on the basis of known coastal circulation; (2) Conduct an experiment to measure monthly changes in inshore-offshore distribution of larval fishes; (3) Collate and synthesize in-house information on seasonal distribution and abundance of larval fishes, emphasizing work on nearshore species found near proposed sites of offshore nuclear power plants.

We will continue to: (1) produce and maintain a Data Management System adequate to acquire, process and store information needed to support Resource Assessment Research; (2) Provide outputs from the data bank to various user groups, including AEC, commercial fishing industry, sportsmen, population and environmental analysts, other NMFS research groups and management and regulatory bodies and; (3) Adopt additional, new and more efficient sampling gear, provided correction factors can be determined for our entire data series.

We will operate with standard sampling equipment over enough years so that normal fluctuations in life cycles of the species, and also fluctuations in the natural environment of these species, and also fluctuations in the natural environment of these species, can be ascertained.

- b) Develop specialized information to support policy decisions concerning the impact of man-induced environmental changes on our marine fishery resources by determining seasonal and spatial importance of the near-shore marine environment to the well being of larval stages of commercial and recreational fishes.

Describe the variations of the marine environment and the bioenvironmental interactions of ichthyoplankton in the Middle Atlantic Bight by comparing known and newly acquired circulation data with diurnal activities of larval fishes and equating the results to their transport, dispersion and survival.

Strengthen potential for forecasting and predicting abundance and distribution, and the effects of further environmental variations upon resources by increasing knowledge of the relation between fishery resources and several environmental parameters.

32 - IMPACT OF TASK AUGMENTATION

33 - CRITERIA FOR TASK COMPLETION

34 - BACKUP DOCUMENTATION

a.

- 1) Hempel, G. 1965. On the importance of larval survival for the population dynamics of marine food fish. CALCOFI Reports Vol. X. pp. 13-23.
- 2) Ahlstrom, E. H. 1965. Kinds and abundance of fishes in the California Current Region based on egg and larval surveys. CALCOFI Reports, Vol. X. pp. 31-52.
- 3) Walford, L. A. 1955. New directions in fishery research. Deep Sea Research. Suppl. to Vol. 3. pp. 471-473.
- 4) Smith, W. G. 1973. The distribution of summer flounder, Paralichthys dentatus, eggs and larvae on the continental shelf between Cape Cod and Cape Lookout, 1965-66. Fish. Bull. 71(2): 527-548.
- 5) NMFS Memo. 11 Dec. 73. To: FNEI - Center Director, Highlands, N. J. From: Wm. F. Royce. Subject: Request for TDP to Support the Atlantic Estuarine Fisheries Center. Environmental Studies for Offshore Nuclear Power Plant Site.
- 6) Kendall, A. W., Jr. 1972. Description of black sea bass, Centropristis striata (Linnaeus) larvae and their occurrences north of Cape Lookout, North Carolina in 1966. Fish. Bull. 70(4): 1243-60.
- 7) Richards, Sarah W. and A. W. Kendall, Jr. 1973. Distribution of sand lance, Ammodytes sp., larvae on the continental shelf from Cape Cod to Cape Hatteras from R. V. Dolphin surveys in 1966. Fish. Bull. 71(2): 371-386.
- 8) Fahay, M. P. 1974. Occurrence of silver hake, Merluccius bilinearis, eggs and larvae along the middle Atlantic continental shelf during 1966. Fish. Bull. 72(3): 813-834.

b. Related Research

Coastal Finfish Assessment, MACFC

MESA

MARMAP

NMFS, Beaufort, N. C. Advective Mechanisms Responsible for the seasonal Influx of larval Menhaden in Onslow Bay

Long Island Sound Benthic Studies, MACFC

Ichthyoplankton Associates - Ichthyoplankton studies of southern New Jersey Estuaries

Boyce Thompson Institute for Plant Research, Inc. - Ichthyoplankton Studies of the Lower Hudson River.

c. N/A

d. N/A

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

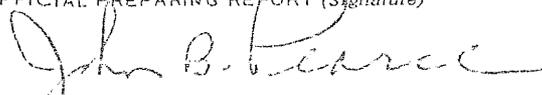
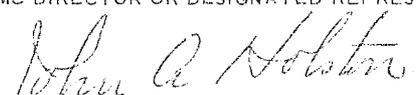
FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER		3. OBJECTIVE CODES				4. RANK	
MAC-066-7-SP-A-1		A	B	C	D	BY TARGET	BY + 1 INC.
5. TASK NUMBER		6. TASK TITLE					
N/A		Construction of New Laboratory Building at Sandy Hook, New Jersey					
7. ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
FB6000		Middle Atlantic Coastal Fisheries Center				City: Highlands, State: NJ	

OBJECT CLASS <small>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	COP LINE	CURRENT YEAR FY 19__		BUDGET YEAR FY 19__		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15						
11. Travel	19						
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						500.0 ¹
14. Grants (Funds obligated)	58						
15. Supplies	53						
16. Capital Equipment	54						
17. Other (All other obligations)							
18. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>							500.0
19. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>							
20. Positions, Other <small>(Number applicable to this Task.)</small>							
21. Man-years, Permanent							
22. Man-years, Other							
23. Reimbursable Support <small>(Reimbursable agreements only)</small>							

¹/ Construction cost-item will be formally submitted at time of fiscal '77 budget call.

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) 	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) 
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CONSTRUCTION OF NEW RESEARCH FACILITY AT SANDY HOOK

JUSTIFICATION

The bill authorizing establishment of the Gateway National Recreation Area has become law, and the National Park service has acquired the land of Sandy Hook and has begun the final planning of the Park. Sandy Hook forms a major component of the Recreation Area, and an integral part of the overall plan is a marine science complex to be located at Sandy Hook. With projections of up to two million visitors a year to the new recreation area, the development of a federal marine science center which includes public display and teaching areas, could be an important ingredient. The new building complex would include federal research facilities, public display and meeting facilities, public aquarium, research facilities for state and university groups, living accommodations for short-term occupancy by visiting scientists, and dock facilities. The complex would include a main building with some 100,000 square feet of floor space, with two adjacent buildings -- one for shop, garage, sea water facilities, and one as a dormitory facility.

The Coast Guard has underway an extensive (reported at 2.5 million) shore-front and wharf development at Sandy Hook. It would be expedient to berth our NOAA vessels in adjacent expanded wharf facilities. Early relation of NOAA construction plans with Coast Guard plans would be desirable.

The building complex, including wharf, would probably cost in the vicinity of five million dollars with a proportionate smaller amount for architects costs.

The long-term nature of environmental and resource problems in the Middle Atlantic Bight, and the growing human population pressure on inshore waters and resources (particularly acute in this area) dictate that a major research facility continue to be located at Sandy Hook. Furthermore the possibilities for interactions with the public, as well as with state and university groups at this location are enormous, since some 11 million people live in the greater New York area. The present facility at Sandy Hook is inadequate for the broader potential presented by the Gateway National Recreation Area and for NOAA research needs in this part of the Middle Atlantic Bight.

The following schedule and estimated costs are proposed:

FY 1976 -- Architects and engineering (building and wharf)	\$500,000
FY 1977 -- Construction (building and wharf)	\$5,000,000

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER		3. OBJECTIVE CODES				4. RANK	
MAC-067-77-EI-A-1		A	B	C	D	BY TARGET	BY + 1 INC.
5. TASK NUMBER		6. TASK TITLE					
8818Q1		Primary Productivity and its Relationship to Pollution and Coastal Fisheries					
7. ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
FB6100		Ecosystems Investigations				City: Sandy Hook State: N.J.	

OBJECT CLASS Lines 10--18. Enter all dollar values as thousands and tenths of thousands. Lines 21--22. Enter as man-years and tenths of man-years.	LINE PROPOC	CURRENT YEAR FY 19 <u>75</u>		BUDGET YEAR FY 19 <u>76</u>		BUDGET YEAR + 1 FY 19 <u>77</u>	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	66.6		77.9		77.9	
11. Travel	19	.6		.6		.6	
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52						
14. Grants (Funds obligated)	58						
15. Supplies	53	4.1		4.5		4.5	
16. Capital Equipment	54	.5		.5		.5	
17. Other (All other obligations)		6.8		7.7		7.7	
18. Total Direct Funds (Add lines 10 through 17 above.)		78.6		91.2		91.2	
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		7		7		7	
20. Positions, Other (Number applicable to this Task.)		-		5		5	
21. Man-years, Permanent		4.7		5.5		5.5	
22. Man-years, Other		.8		.8		.8	
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature)
James P. Thomas | John B. Pearce
James P. Thomas | John B. Pearce

25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (SIA.)
Carl Suderman

NMFS TASK DEVELOPMENT PLAN

TDP NUMBER

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

MAC-067-77-EI-A-1

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

PLANNING PERIOD -- Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	Sampling Raritan Bay - phytoplankton.	X	X												
A	Work up Raritan Bay - phytoplankton.	X	X	X											
E	SYMAPS - Raritan Bay - phytoplankton.			X											
E	Report - Raritan Bay - phytoplankton.			X											
A	Sampling - Raritan Bay - respiration (water column).				X	X									
A	Work up - Raritan Bay - respiration (water column).				X	X									
E	SYMAPS - Raritan Bay - respiration (water column).						X								
M	Report - Raritan Bay - respiration (water column).						X								
A	Sample seabed oxygen consumption - Raritan Bay.				X	X									
A	Work up oxygen consumption - Raritan Bay.				X	X									
E	SYMAP oxygen consumption - Raritan Bay.						X								
E	Report oxygen consumption - Raritan Bay.						X								
A	Ecology of detritus - Raritan - Hudson.							X	X	X					
A	Water column respiration - apex.							X	X	X					

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

Reference NOAA Form 32-14A, item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
Fishery Biologist	12/4	Thomas, James	50
Fishery Biologist (Research)	11/5	Mahoney, John	100
Fishery Biologist (General)	9/5	Phoel, William	50
Botanist	7/4	Evans, Christine	100
Fishery Biologist (General)	9/2	O'Reilly, John	50
Fishery Biologist (General)	7/2	Steimle, Frank	100
Biological Technician (Fisheries)	6/3	Rogers, Leslie	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- | | |
|--|---|
| <p>29. STATEMENT OF NEED</p> <p>30. ACTIVITY PLAN</p> <p>31. TASK OUTPUTS AND BENEFITS</p> <p>32. IMPACT OF TASK AUGMENTATION</p> <p>a. Current Year</p> <p>b. Budget Year</p> <p>c. Budget Year + 1</p> | <p>33. CRITERIA FOR TASK COMPLETION</p> <p>34. BACK-UP DOCUMENTATION</p> <p>a. Detail Documentation <i>(Provide one sentence description.)</i></p> <p>b. Related tasks and research presently being conducted.</p> <p>c. Indicate the Congressional legislative requirements.</p> <p>d. Indicate the Environmental Impact Statement (EIS) requirements.</p> |
|--|---|

29. STATEMENT OF NEED

A. Principal objective to which this Task contributes:
NMFS Goal IV, Subgoal A, Objective 9 - "Determine the impact of environmental change in the Middle Atlantic region."

A. 1) a. Need or Problem:

The waters of the New York Bight and adjunct embayments and estuaries are subject to the demands of many competing users. The general public, sport and commercial fishermen and others utilize these waters for their recreational activities as well as for their livelihood. They require a relatively clean environment with waters in which they can swim safely and which will also support a sufficient quantity and quality of life to make sport and commercial fishing worthwhile. In addition, industries and municipalities utilize these waters to dispose of their waste products. They require only that these waters assimilate or carry away the wastes dumped into them. Between these two ends of a spectrum are individuals regulating the activities of each. These individuals are the policy makers, grantors of licenses and permits, etc., and they must be concerned about the rights and needs of both ends of the spectrum. These policy makers and managers require precise quantitative information about the environment on which to base their decisions in regulating the various user groups of the New York Bight.

It appears that an imbalance has already occurred in certain portions of the New York Bight as evidenced by values of low diversity and the presence of toxic red tides.

Raritan, Lower and Sandy Hook Bays and the Navesink-Shrewsbury estuary are among these waters and contribute to the ecological condition of the near shore coastal waters of the New York Bight due to net transport. Because these waters are grossly polluted and heavily utilized by the surrounding megalopolis, because the area once supported major shellfisheries and probably still has the potential to support them again, and because the area still does support major finfisheries (menhaden), it is important to understand the ecology of the area to provide basic support to studies of these fisheries and to understand what controls or regulates their food sources and/or contributes to their contamination. This requires that a broad knowledge be acquired on the distributions and biomasses of the communities and supporting food chains presently living in these waters and of the fluxes of materials passing through them, so that the effects of man-induced changes on the living marine resources can be determined.

The history of the decline of the once great shellfishery in Raritan Bay is well documented (Campbell, 1964). The decline continues; only last year the remaining areas for harvesting shellfish in Sandy Hook Bay were closed (Red Bank Register, 27 Mar. 73). Such closing has affected the local economy. Shellfish from the Bay have been described as tasting as if they were contaminated with oil (Hoff et al., 1967).

Most recently the issue of diseased finfish in the Bay has been (Mahoney et al., 1973), for the area is still important for both juvenile and adult fisheries (McHugh, 1966; Walford, 1970; Steinle and Gear, 1974; Wilk, unpubl. ms.). Benthic macrofaunal densities in the bay are greatly depressed (McGrath, 1973). However, there is some hint that these populations might be able to recover following pollution abatement as did the benthic fauna of the Raritan River (Dean and Haskins, 1964). In addition toxic red tides occur throughout the area nearly every summer causing additional stress to the system, including living resources and the human population.

The relationship of primary productivity and phytoplankton to fisheries is becoming better established. Several key papers have been published in recent years: Parsons et al. (1969) have demonstrated the importance to a growing zooplankton populations in the Fraser River Estuary of adequate concentrations of the right size and shape of phytoplankton. In a succeeding paper LeBrosseur et al. (1969) present presumptive evidence on the importance of these zooplankton populations as food for larval and juvenile salmon in the same estuary. Ryther (1969) suggests that the yield of fish is greater from a marine ecosystem predominated by phytoplankton with large cells. A shift from large to small phytoplankton cells was blamed as the principal cause of the failure of the oyster industry in Great South Bay (Ryther, 1954). The causes for such shifts are believed to be controlled both by the environment and by the physiological responses of the phytoplankton (Parsons and Takahashi, 1973). Such size shifts do occur in the Raritan system between the large phytoplankton dictom, Skeletonema, and the small chlorophyte, Nannochloris (Patten, 1962). Environmental and physiological-nutritional variables which control these communities are being investigated.

A. 1) b. Rationale for NMFS involvement

1) Under a mandate to NOAA, NMFS has ongoing contain with the effects of waste disposal on living marine resources to provide data suitable for coastal zone management.

2) The area has known and still does have fishery resource importance for adult and juvenile individuals which must make use of these waters for at least a part of their life cycle.

3) MACFC of NMFS has been involved in extensive baseline studies of this area and is now in the process of building on the information derived from these studies to develop understanding of the structural and functional aspects of this ecosystem. Congress has appropriated special funds for the study of plankton ecology and the causes of phytoplankton blooms such as the "red tide".

- A. 2) Primary recipient of the information will be policy makers and managers, grantors of licenses and permits, etc. who require precise quantitative information about the environment on which to base their decisions in regulating the various user groups of the New York Bight. These include the EPA, U. S. Army Corps of Engineers and the Environmental Assessment Division, NMFS.
- A. 3) This information can obviously contribute directly to Objective IV-A-9, "Determine the impact of environmental change..." as regards the effects of waste disposal on living marine resources. The investigators are cooperating closely with other studies both within and outside the MESA Program. The coverage is such that knowledge gained in the New York area will be applicable to similar environments and impacts throughout and perhaps beyond the Middle Atlantic region.
- B. The Task contributes to NMFS Goal II, Subgoal D - "Provide descriptions and analyses of marine organic production systems and of biological, physical, and chemical environmental conditions and define their influence on the abundance and distribution of living marine resources." The various physical, chemical and biological investigations which have been and will be conducted over an extended time frame will add greatly to our knowledge of the waters of the New York area, their living marine resources and the extent to which natural and man-induced changes affect these resources. Our contribution here will not be detailed as this time, because no objective has yet been designated (although one has been proposed) for MACFC within Subgoal II D.
- C. The Task appears to pertain to NMFS Goal IV, Subgoal C - "Assure full participation in the decision-making related to proposed alteration of the marine environment...", perhaps that portion concerning Objective 4, Coastal Zone Management. MBO IV-c-4 was considered by the Coordinator, Water Resources Division, to give NMFS lead-agency responsibility for the monitoring survey (by memorandum of 22 April 1974 to Chief, WRD). Again, this objective had not been fully developed at the time of TDP preparation.

30. ACTIVITIES PLAN

Subtask: Phytoplankton, primary productivity and water column respiration in Raritan, Lower, Upper and Sandy Hook Bays and Navesink estuary.

Pollutants enter the waters of the New York Bight areas as both particulate and dissolved material. Thus particulates that remain suspended in the water column and the dissolved substances that remain in solution have the potential to attract planktonic marine resources (including larval stages of sport and commercial species, and their food sources) as well as taxa at higher trophic levels. Ultimately, man or his domestic animals could be affected through their transfer through and concentration of pollutants within the food web.

Many of the pollutants that enter the New York Bight are highly organic (petrochemicals, pesticides, sewage wastes, etc.). As such they may provide an additional food source for certain organisms. However, they may instead inhibit the growth and development of these organisms. One of several parameters that should indicate the effect of these compounds on the living system is the measurement of the consumption of oxygen by planktonic organisms living in the water column. In areas where there is a high organic input and respiration is high, oxidizing nearly all the incoming organic matter, we know that such systems are capable of handling high organic loads. Where, however, an imbalance occurs between inputs of organic matter and the oxidation of that matter we know that the system may be receiving too much organic matter. Depressed oxygen values in the water column would indicate that the system is operating at or near capacity; such low DO values are frequently observed in metropolitan waters. In any case ecosystems that are not overloaded should respond actively to increases in the supply of organic matter and ecosystems that are overloaded should no longer respond to additional inputs. In addition, Japanese researchers (Mori et al., personal communication) report that eutrophication has direct effects on many marine organisms, i.e., interfere with normal reproduction in forms such as oysters.

To this end the subtask proposes to investigate the 1) seasonal variations in the distribution and magnitude of oxygen consumption in the water column, 2) standing stocks of organic matter, and 3) inputs of organic matter to the system, to determine whether the plankton ecosystems are capable of assimilating the present levels of dissolved and particulate organic matter entering the system. The following parameters will be measured: water column respiration rates, net zooplankton carbon, particulate inorganic material, primary productivity - particulate and dissolved, phytoplankton-species volume and number, ratio of detritus to phytoplankton, heavy metal in suspended particulate material, dissolved organic carbon (Menzel and Vaccaro, 1964), and, if present data demonstrates the importance of dissolved organic matter, we will measure assimilation and oxidation rates of dissolved organic matter as well as salinity, temperature, pH, and dissolved oxygen. (See Hobbie et al., 1972. A study of the distribution and activity of microorganisms in ocean water. *Limnol. Oceanogr.* 17(4): 544-555).

Our second phase of the study of phytoflagellate blooms is underway. Current nutrient studies provide information on the relative importance of inorganic nitrogen and phosphorous compounds in blooms, these will be completed in FY 1975-6. The effects of physiological factors on growth of the organisms are also being studied; tests of effects of salinity on growth were completed and investigations on the effects of temperature, photoperiod and light intensity are underway. This work will be completed in FY 1976.

Phytoplankters listed in the literature and suspected of being toxic to man include Heterocapsa triquetra, Peridinium troichoideum and Prorocentrum micans; these are found in this area and have been dominant or at least prominent in various local blooms. Because of this potentially hazardous situation and because toxicity of particular species may vary depending on the geographical location, we continue to isolate suspect species from local waters; we project studies of their toxicity.

Subtask: Seabed oxygen consumption - Raritan, Lower and Sandy Hook Bays (FY 77). This subtask is proposed to measure seabed oxygen consumption and map the present rates of decomposition of organic wastes occurring as a result of biological and non-biological processes.

31. TASK OUTPUTS AND BENEFITS

A. Measurements and SYMAPS of the distributions (seasonally) and magnitudes of:

- 1) Oxygen consumption by the planktonic organisms in the water column of Raritan, Lower, Upper, and Sandy Hook Bays compared with standing stocks and inputs of organic matter into the system and heavy metals associated with particulate matter and zooplankton.

These activities will provide information which will be used to determine whether or not the planktonic system (Raritan, Lower, Upper and Sandy Hook Bays) is capable of assimilating present levels of dissolved and suspended organic input for each season of the year.

Measurements as data and SYMAPS will be incorporated into periodic and topical data reports, and formal publications concerned with rigorously analyzed data and observations and special atlases and publications which graphically indicate baselines and temporal changes observed in the Bight and adjunct waters.

- B. Studies in Raritan, Lower, Upper and Sandy Hook Bays in which we are measuring oxygen consumption by planktonic organisms in the water column will be terminated when sufficient successful measurements are obtained to adequately describe conditions over an annual cycle and determine whether or not the system is capable of assimilating present or increased levels of organic loading.

The Task outputs will provide the quantitative information required by policy makers to: 1) make decisions, 2) educate the public to support their decisions, and 3) allow them to originate legislation to regulate the many competing activities in the New York Bight area, so that not only would the environment for marine life be prevented from being degraded further, but also that it would be improved and protected. We are actively cooperating with the State of New Jersey in providing data and surveillance in connection with phytoflagellate blooms along the Jersey-New York coastal waters. In addition we provide training to state personnel in regard to bloom surveillance.

User groups for this information would include: New York City Commission of Water Resources; various metropolitan municipalities including Passaic Valley Sewer Authority; state agencies including the New York, New Jersey, Connecticut and Rhode Island conservation and fishery organizations; U. S. Environmental Protection Agency; and other user-management groups including organizations with interests in recreational and commercial fisheries.

The State of New Jersey is particularly concerned with regard to the continuation of our phytoflagellate ecology and surveillance program.

32. IMPACT OF TASK AUGMENTATION

No potential increases, outside of the 5% per year suggested for planning purposes are anticipated.

33. CRITERIA FOR TASK COMPLETION

N/A

34. BACK-UP DOCUMENTATION

- A. Cohn, M. S. and D. Van de Sande. 1974. Red tides in the New York-New Jersey Coastal area. *Underwater Nat.*, 8(3):12-21.

Hobbie, J. E., O. Holm-Hansen, T. T. Packard, L. R. Pomeroy, R. W. Sheldon, J. P. Thomas and W. J. Wiebe. 1972. A study of the distribution and activity of microorganisms in ocean water. *Limnol. Oceanogr.* 17(4): 544-555.

Holme, N. and A. McIntyre. 1971. Methods for the study of marine benthos. IBP Handbook No. 16. Blackwell Scientific Publ., Oxford. 334 p.

Jansson, B. and H. Odum. 1972. Ecosystem approach to the Baltic problem. *Bulletins from the Ecological Research Committee*, No. 16. Swedish Natural Science Research Council, Stockholm. 82 pp.

Lenhard, G., L. D. Nourse, and H. M. Schwarts. 1965. The measurement of dehydrogenase activity of activated sludge, p. 105-127. *In*: J. K. Boars (Ed.), *Advan. Water Pollut. Res. (Proc. Int. Water Pollut. Res. Conf., Tokyo, 1964)*, v. 2.

Menzel, D. W. and R. T. Vaccaro. 1964. The measurement of dissolved organic and particulate carbon in seawater. *Limnol. Oceanogr.* 9: 138-142.

Middle Atlantic Coastal Fisheries Center, National Marine Fisheries Service. 1972. Cooperative Study of Contaminants in the Coastal Environment and their Effect on Living Marine Resources: Summary Report, 1971-1972.

National Academy of Sciences. 1970. Wastes management concepts for the coastal zone: Requirements for research and investigation.

NAS, Washington. 126 pp.

In particular note chapters 5 (Biological effects), 6 (Recommended research and investigation for effective coastal wastes management) and 7 (Suggested priorities and estimated minimum effort required).

National Academy of Sciences. 1971. Marine environmental quality: Suggested research programs for understanding man's effects on the oceans. NAS, Washington. 107 pp.

In particular note chapter 5 (The effects on marine organisms; selecting organisms and systems for study, p. 66; importance of a conceptual framework, p. 67).

National Marine Fisheries Service. 1972. Ocean fisheries and living marine resources, Program memorandum FY 1974 - 1978.

In particular see pp. II: 3 - 9.

Packard, T. T. and F. A. Richards. 1971. Vertical distribution of the respiratory electron transport system in marine plankton. *Limnol. Oceanogr.* 16: 60-70.

Pamatmat, M. M. 1971a. Oxygen consumption by the seabed, IV. *Limnol. Oceanogr.* 16: 536-550.

Pamatmat, M. M. 1971b. Oxygen consumption by the seabed, VI. *Int. Rev. Gesamten Hydrobiol.* 56: 675-699.

Sandy Hook Laboratory, National Marine Fisheries Service. 1972. The effects of waste disposal in the New York Bight, Final Report.

B. Significant related tasks:

- 1) Microbiology (fish disease) New York Bight - NMFS/MACFC, Milford, Oxford.
- 2) Baseline finfish distribution - New York Bight - MACFC/Sandy Hook.
- 3) Baseline contaminants (heavy metals) New York Bight - NMFS/MACFC, Milford.
- 4) Baseline sediment analyses New York Bight - Adelphi U.
- 5) Marine bacteria and heavy metal findings - New York Bight - Columbia U.

- 6) Vibrio bacteria - New York Bight - Rutgers U.
- 7) Water mass transport and vertical circulation - New York Bight - Lamont-Doherty Geol. Observatory.
- 8) Substrate monitoring program - New York Bight - AOML, Miami.
- 9) Substrate variability program - New York Bight - AOML, Miami.
- 10) Suspended sediments program - New York Bight - AOML, Miami.
- 11) Sediments chemistry program - New York Bight - AOML, Miami.
- 12) Substrate inventory program - New York Bight - AOML, Miami
- 13) Cyclesende study - New York Bight - AOML, Miami.
- 14) Boundary layer study - New York Bight - AOML, Miami.
- 15) Radioisotope tracer study - New York Bight - AOML, Miami.
- 16) Physical oceanography program - New York Bight - AOML, Miami.
- 17) Algology Investigations, MACFC, Milford Laboratory.
- 18) U. S. Army Corps of Engineers
- 19) Exxon Research and Engineering Company.

C. Current task can be accomplished under existing legislation (see below).

- 1) Coastal Zone Management Act of 1972.
- 2) Marine Protection Research and Sanctuaries Act of 1972.

D. This TDP will not affect the environment and no Environmental Impact Statement is needed.

VESSEL REQUIREMENTS:

Operations are normally conducted from vessels under 65 feet operated by MACFC and scheduled as needed by the Officer-in-Charge

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-069-77-EI-R-1		3. OBJECTIVE CODES A B C D				4. RANK BY TARGET BY + 1 INC.	
5. TASK NUMBER R81801		6. TASK TITLE Biological Effects of Dredging and Spoil Disposal, New London, Ct					
7. ORGANIZATION CODE FB6100		8. ORGANIZATION TITLE (Responsible for execution of this task) Ecosystems Investigations				9. PRINCIPAL LOCATION City: Sandy Hook State: N.J.	

OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	UNIT BL OO	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15	28.8		15.2	15.2		
11. Travel	19	3.5		3.5	3.5		
12. Rents, Communications, Utilities	21	2.3		1.1	1.1		
13. Contracts (To be let)	51 52	386.0					
14. Grants (Funds obligated)	58						
15. Supplies	53	9.5		32.5	28.9		
16. Capital Equipment	54						
17. Other (All other obligations)		3.7		1.3	1.3		
18. Total Direct Funds (Add lines 10 through 17 above.)		433.8		53.6	50.0		
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)		0		0	0		
20. Positions, Other (Number applicable to this Task.)		4		2	1		
21. Man-years, Permanent		-		-	-		
22. Man-years, Other		3.2		1.8	.8		
23. Reimbursable Support (Reimbursable agreements only)		19.8		10.5	10.5		

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) Robert N. Reid	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) John B. Pearce
---	--

NMFS TASK DEVELOPMENT PLAN

TDP NUMBER

MAC-069-77-EI-R-1

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M NUMBER	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	CY		BY		BUDGET YEAR									
						+1		+2		+3		+4		+5	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	A Baseline field survey.	X	X												
2	A Quarterly monitoring during Phase I dredging-dumping (tentatively Sept.-Oct. 1974; January, April, July, 1975).	X	X	X											
3	A Post-Phase I field survey (October 1975).				X										
4	E Quarterly reports to Navy, Corps of Engineers and Interagency Scientific Subcommittee on Ocean Dumping and Spoiling (1 November 1974; 1 February, 1 May, 1 August, 1 November 1975; 1 February, 1 May, 1 August 1976).	X	X	X	X										
5	E Final reports received from subcontractors (end of contract period, 30 June 1976).				X										
5	M Final report to Navy, Corps, Subcommittee on dredging-dumping effects (January 1977).					X									
7	A Follow-up field surveys (October 1976, 1977, 1978).					X	X	X							
8	A Comprehensive analysis of spoiling effects on benthic macrofauna, and recolonization studies.					X	X	X	X						
9	A Surveys and analysis of alternate disposal areas (tentative).	X	X		X										

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-069-77-EI-R-1

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
N/A			

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- 31. STATEMENT OF NEED
- 32. ACTIVITY PLAN
- 33. CRITERIA FOR TASK COMPLETION
- 34. BACK-UP DOCUMENTATION
 - a. Detail Documentation *(Provide one sentence description.)*
 - b. Related tasks and research presently being conducted.
 - c. Indicate the Congressional legislative requirements.
 - d. Indicate the Environmental Impact Statement (EIS) requirements.
- 35. TASK OUTPUTS AND BENEFITS
- 36. IMPACT OF TASK AUGMENTATION
 - a. Current Year
 - b. Budget Year
 - c. Budget Year + 1

29. STATEMENT OF NEED

A. Principal objective to which this Task contributes:

NMFS Goal IV, Subgoal A, Objective 9 - "Determine the impact of environmental change in the Middle Atlantic region".

1. a. Need or Problem: The U. S. Navy, to provide navigable water depths for a new class of nuclear submarines, must dredge 2.8 million cubic yards of spoils from the Thames River, Ct. Plans are to dispose of these spoils on the New London designated dumping ground, 2-3 miles south of Thames' mouth. The Thames River contains populations of oysters and hard clams. The dumping area itself supports a moderate lobster fishery and abundant winter flounder, as well as high standing crops of valuable food web species. Within six miles to the north and west are the Niantic Bay scallop fishery and an important winter flounder nursery area. The Race, two miles south of the disposal point, is extremely popular for recreational fishing. The waters in the general area are also heavily used for recreational boating and swimming.

Not enough information is yet available to accurately predict the effect of ocean spoil disposal in general. In particular, the impacts of dumping these large amounts of Thames River spoil (polluted, by EPA criteria) in the rather shallow, high energy environment of the New London dumping ground can only be guessed at. For this reason, EPA has issued the dredging permit with the stipulation (among others) that the Navy fund a monitoring survey to thoroughly assess effects of the spoil disposal on the area's resources.

For the first time, a set of criteria has been developed to determine whether the dredging-disposal operation is causing significant environmental harm. The monitoring program addresses itself to these criteria. Any violations, as well as any findings of significant damage outside of the criteria, shall be immediately reported to the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling (ISASODS) and the Policy Coordinating Committee, and thus to the Navy. The Navy has agreed to halt dumping until an alternate site or method of disposal is agreed on, if any such environmental harm is found.

We anticipate continuation of reimbursable funding beyond the present contract period, in order to examine long-term effects of dredging and spoil disposal on the area's benthic ecology, as well as rates and patterns of recolonization. This is in reality the most critical information

requirement, both for the present project and for ocean disposal generally. The Environmental Assessment Division of NMFS has requested repopulation rate studies by MACFC as an investigation of national interest.

- A. 1. b. Rationale for NMFS involvement is threefold: 1) Under a mandate to NOAA, NMFS has an ongoing concern with the effects of ocean dredging and spoiling; 2) the area has known fishery resource importance, and 3) MACFC of NMFS has been involved in an extensive baseline study throughout Long Island Sound since 1972. More intensive surveys in areas of possible impacts are considered an important outgrowth of this baseline study, especially in response to the needs of the NMFS, Environmental Assessment Division.
- A. 2. Primary recipient of the information will be the general public, in the form of those people who place recreational demands upon the area's resources and whose interests the monitoring survey is intended to protect. Other, direct recipients of the information include: the U. S. Navy, COE, ISASODS, EPA and the Environmental Assessment Division, NMFS.
- A. 3. This information can obviously contribute directly to Objective IV-A-9, "Determine the impact of environmental change..." as regards the effects of dredging and spoil disposal in eastern Long Island Sound. The investigators themselves are closely and thoroughly monitoring for impacts; their findings will in turn be assessed by ISASODS and others to determine whether any significant harm is occurring. The studies are thought comprehensive enough that knowledge gained can be applied to similar environments and impacts throughout and perhaps beyond the Middle Atlantic region. Further, the Task is unique in having the potential to prevent adverse impacts in that disposal will be modified or halted if ISASODS determines that the criteria are being violated or other substantive damage is taking place.
- B. The Task also contributes to NMFS Goal II, Subgoal D - "Provide descriptions and analyses of marine organic production systems and of biological, physical, and chemical environmental conditions and define their influence on the abundance and distribution of living marine resources." The various physical, chemical and biological investigations, conducted over an extended time frame, will add greatly to our knowledge of the waters of eastern Long Island Sound, the marine resources there, and influences of natural and man-induced changes on these resources. Our contribution here will not be detailed at this time, as no objective has yet been designated for MACFC within Subgoal II D.

C. The Task appears to pertain to NMFS Goal IV, Subgoal C - "Assure full participation in the decision-making related to proposed alteration of the marine environment...", perhaps that portion concerning Objective 4, Coastal Zone Management. MBO IV-c-4 was considered by the Coordinator, Water Resources Division, to give NMFS lead-agency responsibility for the monitoring survey (by memorandum of 22 April 1974 to Chief, WRD). Again, this objective had not been fully developed at the time of TDP preparation.

30. ACTIVITY PLAN

The total study has been partitioned in the following manner: MACFC has contracted with the New York Ocean Science Laboratory to study finfish, physical and chemical oceanography of the dump site; and with the University of Connecticut to investigate physical and chemical characteristics of the Thames River, dredging effects on phytoplankton and shellfish, and dump site lobster populations. MACFC is examining sediment characteristics, microbiology and benthic macrofauna both in the river and on the dump site.

All parties have completed baseline surveys to determine pre-dredging characteristics of river and dump site. During - dredging surveys have been initiated and will be repeated on a quarterly basis at MACFC, and more frequently for several of the contract investigations. A post - dredging survey will be carried out near the end of the contract period. Complete details of parameters examined, methodologies and scheduling for all groups are given in the monitoring proposal (MACFC, 1974).

Relationship of Activities and Events is as follows: The comprehensive field studies are separated into three Activities (#1, 2 and 3) corresponding to the pre-, during and post-dredging surveys. Quarterly reports will be prepared describing field activities on these surveys and available results from laboratory analyses. Issuance of the quarterly reports to the Navy, COE and ISASODS is considered an Event (#4). Another Event (#5) will be the submission to MACFC (at the end of the contract period) of contractors' final reports on their overall investigations. MACFC's final report to the interested agencies will be the definitive treatment of the monitoring survey, and thus should be considered a Milestone (#6). Activity #7 consists of yearly field surveys from 1976-78 to assess longer-term effects of dredging and spoil disposal. Activity #8 is an in-depth analysis of effects on benthic macrofauna and related sediment parameters, based on samples collected during Activities 1-3 and 7; and also a study of benthic recolonization, from the samples of Activities #7.

It is not yet known whether Activity #9, the study of alternative disposal sites, will be required. If so, reimbursable funding will be supplied for the necessary surveys, sample processing and data analysis. Needs, methodology, outputs and benefits would be the same as those for the present study.

31. TASK OUTPUTS AND BENEFITS

- A. 1. Significant outputs: quarterly and final reports to ISADOS, the Navy and the Corps of Engineers concerning the activities and findings of the monitoring program. The immediate reporting of any substantial environmental impacts should also be considered a significant output. Other anticipated outputs are research papers in the more specialized areas of interest of each investigator.
- A. 2. Relation to needs and recipient: The reports will fulfill the above stated needs to 1) gather information on the effects of the dredging-disposal operation, and 2) protect the area's resources by leading to change or curtailment of the operation if significant impacts are discovered. Reports and publications will also contribute to longer-term knowledge of dumping effects in general, and perhaps to future policy decisions on coastal spoil disposal. Reports will be submitted to the direct recipients (ISASODS, COE and Navy) for evaluation and determination of environmental impact. The general public will be the beneficiary of increased knowledge concerning disposal effects, and, will also benefit from the protective clauses of the project's environmental criteria.
- B. Benefits: The Task should satisfy 80% or more of the need to determine impacts of the dredging operation under consideration. There is a possibility that some impacts (for example, increase in PCBs) will not be measured. If the Task is assumed effective in detecting impacts, it will totally satisfy the need to protect the area's resources, by leading to a modification or halt in dumping if any such impacts are found.

32. IMPACT OF TASK AUGMENTATION

Not applicable, in that Task is contract-funded and no augmentation is anticipated unless a study of alternate disposal sites is required. Renewal of contract funds at a level comparable to that for FY 76 is anticipated, and will be necessary to complete long-term studies of dredging-disposal effects and repopulation rates.

33. CRITERIA FOR TASK COMPLETION

N/A, as per instructions.

34. BACK-UP DOCUMENTATION

- A. Documentation:
- 1) Middle Atlantic Coastal Fisheries Center. 1974. A Proposal for an Environmental Survey of Effects of Dredging and Spoil Disposal in the Thames River and New London Dumping Ground. Submitted to U. S. Army Corps of Engineers. 98 p. - describes overall research plan, individual projects of each investigator, schedules and budgets.

- 2) Corps of Engineers. 1974. Criteria for monitoring Thames River dredging and dumping - ISASODS document file. - lists nine parameters to be examined by monitoring study. If criteria for any of these are exceeded, dumping method or site will be changed.
- 3) Middle Atlantic Coastal Fisheries Center. 1974. An Environmental Survey of Effects of Dredging and Spoil Disposal, New London, Connecticut: 1st Quarterly Report. Informal Report No. 40. 17 p. - details field activities and results available as of 1 November 1974. Includes as appendices contractors' reports on activities and findings as of 1 October 1974.

B. 1) Related Tasks

- a. Impact of Environmental Change, New York Bight (Sandy Hook), is conducting similar investigations, on effects of spoil and waste disposal in the New York Bight.
- b. Impact of Environmental Change, Middle Atlantic (Sandy Hook), is examining water quality and benthic communities throughout Long Island Sound, as well as in Raritan Bay and along the New Jersey coast.
- c. Environmental Chemistry and Microbiology (Milford), is investigating microbiology and metals in sediments and organisms at New London dredging site.
- d. Biochemical Modeling (Sandy Hook), is studying forms and effects of heavy metals in the environment. This includes use of sediment traps at the New London dump site to determine sedimentation rates and sediment composition.

B. 2) Related Research

- a. Several universities and other groups are undertaking a cooperative study of spoil disposal off New Haven in central Long Island Sound.
- b. The Corps of Engineers is also leading a study of disposal effects in mid-western Long Island Sound (Eaton's Neck).
- c. The University of Connecticut and New York Ocean Science Laboratory are both conducting other physical, chemical and biological studies in eastern Long Island Sound.

- C. The proposed Task can be carried out within existing legislation.
- D. The proposed Task has no direct impact on the environment, and no Environmental Impact Statement is required.

VESSEL REQUIREMENTS

Operations are normally conducted from vessels under 65 feet operated by MACFC and scheduled as needed by the Officer-in-Charge.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

2. TDP NUMBER MAC-070-77-EL-R-1	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.

5. TASK NUMBER R81164	6. TASK TITLE FDA-Interagency Agreement-Proliferative Cell Diseases in Molluscs
--------------------------	--

7. ORGANIZATION CODE FB6400	8. ORGANIZATION TITLE (Responsible for execution of this task) Pathobiology Investigations, MACFC	9. PRINCIPAL LOCATION City: Oxford State: MD
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OBJECT CLASS <i>Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</i>	BU D G E T C O D E	CURRENT YEAR FY 19 75		BUDGET YEAR FY 19 76		BUDGET YEAR + 1 FY 19 77	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
10. Total Direct Labor	15						
11. Travel	19	2.0		2.5			
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51 52	13.0		10.0			
14. Grants (Funds obligated)	58						
15. Supplies	53	4.9		7.4			
16. Capital Equipment	54						
17. Other (All other obligations)				5.0			
18. Total Direct Funds (Add lines 10 through 17 above.)		19.9		24.9			
19. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)							
20. Positions, Other (Number applicable to this Task.)							
21. Man-years, Permanent							
22. Man-years, Other							
23. Reimbursable Support (Reimbursable agreements only)							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) 	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) 
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MMFS TASK DEVELOPMENT PLAN

TOP NUMBER

NAC-070-77-EL-R-1

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

NUMBER EACH ACTIVITY, EVENT, OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR ACTIVITY, 'E' FOR EVENT, OR 'M' FOR MILESTONE.

A, E, OR M

NARRATIVE

(Brief descriptive phrase of activity, event, or milestone)

CY	BY	BUDGET YEAR													
		+1		+2		+3		+4		+5					
		1	2	1	2	1	2	1	2	1	2				
A	B	C	D	E	F	G	H	I	J	K	L	M	N		
A		X		X											
A		X						X							
E								X							
M									X						
A			X		X										
E					X										
M						X									
A		X			X										
E									X						
M									X						
M										X					
A					X			X							

OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X" APPROPRIATE COLUMN

REMARKS

29. Statement of Need

Until recently, proliferative cell conditions that satisfied histological criteria for neoplasia in marine or estuarine mollusks were rare. Subsequently, many other accounts of several types of neoplasia and hyperplasia in mollusks from several areas of the world have appeared. The etiologic agents responsible for these conditions remain obscure although some reports tend to implicate biotic agents, physical agents, and various chemical components; particularly those present in fossil fuel or coal tar derivatives.

Recently, viruses have also been observed in mollusks and other shellfish (crustaceans). However, no evidence exists to indicate that these play a role in oncogenesis in the host animals in which they have been found. Furthermore, the origin of these viruses, their ability to infect across taxonomic lines, their manifestation "synergistically" with chemical, physical and environmental stresses, or their role, if any, in neoplasia remain unknown.

The observation of proliferative cell conditions in clams (Macoma balthica) from at least two discreet locations in Chesapeake Bay near Oxford, Maryland, and the presence of unusual DNA positive inclusions in tissues of clams (Mercenaria mercenaria) and oysters (Crassostrea virginica) afford unique opportunity for the NMFS, MACFC Oxford Laboratory, the State of Maryland, Department of Natural Resources, and the Tumor Registry of the Smithsonian Institution who long have been involved in pioneering studies on neoplasia and viruses in shellfish to extend their research activities.

The use of Macoma balthica in these studies at this time is particularly appropriate because:

1. The species is not of profound commercial importance and thus can serve as a useful model in studies of neoplasia and virus infections. Reports and publications on the subject can be made openly and discussed without undue drama and alarm to the public.

2. Consistent epizootic areas and areas of high clam population densities where the proliferative cell condition has never been observed are very convenient to the Oxford Laboratory and its Franklin City field station. Thus, these animals are readily available for the proposed field and laboratory studies. They can be easily transplanted and could possibly serve as useful indicators of environmental degradation or stress conditions. Furthermore, ready access to the study areas will facilitate collections and measurements of water columns, sediments, and associated flora and fauna. Future contemplated studies on farm run-off and industrial effluents can be easily made since the areas are nearby.

3. The diminutive size and high abundance of the species (adults are approximately 3-5 cm) lends them to easy manipulation for both field and laboratory experiments and histological examination. Contemplated genetic studies should thus be simplified for they can be easily maintained and spawning accomplished in ordinary aquaria.

4. The life history, anatomy, and food habits of these animals are relatively well known. Thus, comparative pathobiological studies of many types can be made with other species or closely related species of Macoma and other bivalve mollusks in which neoplasms or viruses have been observed.

5. Their role in the marine food web--they presumably are preyed upon by aquatic birds, carnivorous fish, skates and rays, crustaceans and gastropod mollusks--makes them ideal for feeding studies and transmission tests as related to inducing neoplasms across taxonomic lines.

30. Activity Plan

Several approaches will be used in attempts to gain greater understanding of the unusual disease condition described. Efforts will be made to learn if neoplasia can be transmitted in natural open systems by transplantation of wild healthy animals into disease enzootic areas and vice versa. Laboratory transmission will also be attempted using injections of extracts of neoplastic tissues and cells into healthy animals. Induction experiments will be attempted using agricultural compounds known to be carcinogenic or highly suspected of same to challenge appropriate numbers of animals in carefully controlled recirculated systems. Limited chemical surveys will be made and various hydrographic parameters will be measured in disease enzootic and nonenzootic areas. Observations for neoplastic conditions and collections of other associated benthic fauna will be made in several areas of Chesapeake Bay and environmental conditions compared. Electron microscopy will be used in comparative studies of the disease condition in its ultrastructural aspects and to search for viruses which may be involved. Close collaboration will be maintained with the State of Maryland, Department of Natural Resources (Fishery Administration), Smithsonian Institution, and other elements within NMFS (F2 and F3).

31. Task Outputs and Benefits

1. Outputs - Temperature controlled recirculated aquaria systems will be established and made functional for transmission experiments on neoplastic diseases of selected molluscan species. Transplantation experiments in situ and in the laboratory will be carried out. The histopathology of the neoplastic-like abnormalities in shellfish will be compared and the incidence prevalence, location, distribution, and seasonal effects on the development of neoplasms will be described. Reports will be made available to the scientific community regarding the findings on the above. Attempts will be made to find the etiologic agent(s) of the disease (particularly to learn if viruses are implicated).

2. Benefits - Understanding of this somewhat awesome and poorly understood disease condition in aquatic animals and, if possible, resolution of its causes would greatly assist conservation and industry officials in the management of like or similar resources. Knowledge of how, under what condition, to what extent and to what taxa the disease may be transmitted would benefit not only the above mentioned groups but the scientific community as well. Methods of diagnosis of neoplasia and its possible causes could be devised and applied to other field notably human or veterinary medicine.

32. Impact of Task Augmentation

FY 1975: Funds for this task are derived pursuant to an interagency agreement with the Food and Drug Administration, although funds were obligated just prior to the beginning of July 1974 (FY 75). Some items purchased through the obligated funds will not be delivered until late in FY 75 (laboratory mobile van). Aquarium system will also become functional in FY 75 and a small boat (24 ft.), motor, and trailer have been delivered.

FY 1976: The interagency agreement is expected to be renewed without increase in funding except only modestly to cover inflation costs. Most of the funds, if appropriated and allotted, will be used for chemical analyses under subcontract.

FY 1977: The interagency agreement is again expected to be renewed probably with increase or only modest increase in funding. Funding will be used to prepare publications, meeting travel, etc., of course, in addition to the regular task activities and outputs described. FY 77 is expected to be the last year in which this interagency agreement will be in effect.

33. Criteria for Task Completion

34. Back-up Documentation

- A. 1. C. Dawe and J. Harshbarger Eds. 1968
"Neoplasms and related disorders of invertebrates and lower invertebrates" National Cancer Institute Monograph 31, 1968.
- 2. Farley, C. A. and Sparks, A. K. 1970
"Proliferative diseases of hemocytes, endothelial cells and connective tissue cells in mollusks" *Bibl. Haematol.* 36: 610-617.
- 3. Christensen, D. J., Farley, C. A., and Korn, F. G.
"Enzootic neoplasms in the clam Macoma balthica from Chesapeake Bay" *J. Natl. Cancer Inst.* 52: 1739-1749.
- B. Inter-Governmental, Smithsonian Institution, State and University Investigators and Administrators.
- C. None
- D. None
- E. N/A
- F. Other - see memorandum of interagency agreement
see NMFS proposal to FDA

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED
Dec. 18, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: F&S National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDF; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
	A	B	C	D	BY TARGET	BY + 1 INC.
MAC-071-77-RF-A						

5. TASK NUMBER	6. TASK TITLE
	Recreational Fisheries: Forage Fish-Predator Relations

7. ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION
FB6200	Resource Assessment Investigations	City: Highlands State: N.J.

OBJECT CLASS <small>Lines 10-18. Enter all dollar values in thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.</small>	W Z J R O	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE	TARGET ALLOWANCE	INCREASE
		A	B	C	D	E	F
10. Total Direct Labor	15						100.0
11. Travel	19						6.0
12. Rents, Communications, Utilities	21						
13. Contracts (To be let)	51						100.0
14. Grants (Funds obligated)	58						
15. Supplies	53						19.0
16. Capital Equipment	54						15.0
17. Other (All other obligations)							10.0
18. Total Direct Funds <small>(Add lines 10 through 17 above.)</small>							250.0
19. Positions, Full-time permanent <small>(Number applicable to this Task. Also, complete NOAA Form 32-14C.)</small>							2
20. Positions, Other <small>(Number applicable to this Task.)</small>							8
21. Man-years, Permanent							1.6
22. Man-years, Other							6.4
23. Reimbursable Support <small>(Reimbursable agreements only)</small>							

REMARKS

24. OFFICIAL PREPARING REPORT (Signature) 	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) 
---	--

NMFS TASK DEVELOPMENT PLAN

26. ACTIVITY, EVENT, AND MILESTONE SCHEDULE

TDP NUMBER

MAC-071-77-RF-A

NUMBER EACH ACTIVITY, EVENT,
OR MILESTONE

PLANNING PERIOD - Indicate by entering an "X" at the beginning and completion of subtask or selected operational activities that collectively define the task for the 7 year planning period. Connect "X's" with a solid bar. "Events" and "Milestones" occur at specific points in time. Indicate these significant achievements by placing an "X" in a single column.

IDENTIFY BY ENTERING 'A' FOR
ACTIVITY, 'E' FOR EVENT, OR
'M' FOR MILESTONE.

NUMBER	A, E, OR M	NARRATIVE (Brief descriptive phrase of activity, event, or milestone)	BUDGET YEAR													
			CY 75		BY 76		+1		+2		+3		+4		+5	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
			A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	A	Obtain catch samples and analyze stomach contents						X	X							
2		Collate data via ADP						X	X							
3	E	Prepare report of results								X						

7. OUT YEAR COMMENTS

(Check appropriate boxes and enter applicable percentage.)

*Increases usually come from reprogramming within your FMC.)

- a. Continued at same level
- b. Increase of ___% *
- c. Reduction of ___%
- d. Termination

"X"
APPROPRIATE
COLUMN

REMARKS

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-071-77-RF-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT (If no Incumbent, enter "Vacant")	% OF TIME SPENT ON THIS TASK
Fishery Biologist	12/1	Vacant	100
Fishery Biologist	9/1	Vacant	100

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

ACTIVITY PLAN

TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

IMPACT OF TASK AUGMENTATION

- a. Detail Documentation (Provide one sentence description.)
- b. Related tasks and research presently being conducted.
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

Current Year

Budget Year

Budget Year + 1

29 - STATEMENT OF NEED

The National Marine Fisheries Service assumed responsibility for Federal activities relating to marine game fish in 1970. Traditionally, the Sandy Hook Laboratory has been a leader in Federal research on Atlantic coast marine game fish and is located in an area of intensive sportfishing activity. Periodically conflicts develop on the effects of commercial fishing of one species upon the availability of a second to sportsmen. The Commercial Fishery for menhaden for example is a chronic target of striped bass and bluefish fishermen in the Middle Atlantic Bight area. In view of the progressively increasing numbers of recreational anglers we need to know what impact commercial fishing on forage species has on stocks of predator species in an area and what level of dependence predator species have on particular forage species.

30 - ACTIVITIES PLAN

Develop contacts from known fishing areas, fishery groups, state and federal biologists and begin work in selected areas. Some consideration should be given to emphasizing sampling effort in areas where there has been a history of conflict between user groups. Intensive fishing in the New York Bight makes MACFC an ideal location to center such a study, especially with cooperation from the Federal Recreational Park, and menhaden fleet operating in the area. Contracts will be let to various states in which real or possible problems exist or can be anticipated.

We must determine the seasonal diet items of predators, the variability in their diet, and relative abundance of forage species. From this information we can determine correlations to examine the question of opportunistic or selective feeding by certain predators. The association of predators to schooling species, and estimates of digestion rates are related problems which can be answered from field observations and special sampling (i.e. 24-hour collections). Changes in diet with age of predator, day vs. night feeding, inshore-offshore feeding grounds, latitudinal variation need to be determined also.

Samples of predators should be obtained from various sources to reduce bias. These would include predator food items inventory from catches of commercial fisheries, anglers and research cruises.

Diet analyses would include identification of species to the lowest taxa possible, size preferences and relative volume.

31 - TASK OUTPUTS AND BENEFITS

- a) 1. Determinations from modeling studies of the prey biomass required to maintain various levels of predator stocks. Inputs would include forage species preference, seasonal and spatial associations and metabolic requirements.
2. Estimations of prey to incidence in selected predator species. Emphasis shall be first directed to species which have engendered user-group conflicts, such as bluefish and striped bass.
3. Reports of observations on forage fishery catch to determine their direct impact on "sportfish", i.e. incidental catch of predator stocks in selected areas.
- b) Achievement of task objectives will give MACFC biological data on relationships between predator and forage fish stocks. This in turn will contribute to attainment of management systems for important predator sport fish and forage species in the Middle Atlantic Bight.

Help develop data on which to base decisions regarding allocation of resources to competing user groups.

32 - IMPACT OF TASK AUGMENTATION

No increases anticipated.

33 - CRITERIA FOR TASK COMPLETION

34 - BACK-UP DOCUMENTATION

N. J. Fish and Game Division, 88-309 report by Ron Smith on catch composition of purse seine operations in Delaware Bay.

Connecticut Testimony - Federal Hearings 1973 on Purse Seining and Effect of Sportfishing in Long Island Sound.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED

December, 1974

(Submit five copies by Jan. 2)

TO: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

FMC's - Submit a separate Task Development Plan for each task beginning, continuing, or ending in the current year, budget year, or budget year + 1. Reimbursable funds are not to be mingled with appropriated funds on any programmatic TDP; separate TDP's must be prepared. Submit one TDP itemizing the administrative support cost (Management Fund) for the FMC.

TDP NUMBER	3. OBJECTIVE CODES				4. RANK	
LAC-012-77-IE-A	A IV-A	B	C	D	BY TARGET	BY + 1 INC.

TASK NUMBER	6. TASK TITLE
8818P5	Contaminant Analysis - Rearing of Indicator Organisms

ORGANIZATION CODE	8. ORGANIZATION TITLE (Responsible for execution of this task)	9. PRINCIPAL LOCATION	
FB6300	Experimental Biology Investigations	City Milford	State Ct

OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
D. Total Direct Labor	15	39.4					
E. Travel	19	1.2					
F. Rents, Communications, Utilities	21						
G. Contracts (To be let)	51 52						
H. Grants (Funds obligated)	58						
I. Supplies	53	4.2					
J. Capital Equipment	54						
K. Other (All other obligations)		9.2					
L. Total Direct Funds (Add lines 10 through 17 above.)		54.0					
M. Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)							
N. Positions, Other (Number applicable to this Task.)							
O. Man-years, Permanent		2.1					
P. Man-years, Other		1.2					
Q. Reimbursable Support (Reimbursable agreements only)							

REMARKS
Terminate -- Reprogrammed - 059

OFFICIAL PREPARING REPORT (Signature) Dr. James E. Hanks, Dir. of Investigations	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>Carl Sindermann</i> Carl J. Sindermann, Center Director
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77. IOP NO. MAC-012-76-IE-A TASK DEVELOPMENT PLAN

NO.	ACTIVITY SCHEDULE & EVENTS	FY		FY-1		FY-2		FY-3		FY-4		FY-5		
		1	2	1	2	1	2	1	2	1	2	1	2	
		A	B	C	D	E	F	G	H	I	J	K	L	M
1	A	Developing culture method for the surf clam	X											
2	A	Developing culture method for a marine crab										X		
3	A	Developing culture method for a marine finfish		X										
4	A	Ozone gas depuration of paralytic shellfish poisons in bivalves				X								
5	A	Prophylactic treatments of seawater to improve water quality												
6	A	Seawater sterilization to kill pathogens and sex products from exotic species held in the laboratory				X								
7	A	Testing the biological effects of crude and refined oil products decomposed by marine microorganisms on marine animals					X							
8	E	Surf clam culture method		X										
9	E	Marine crab culture method										X		
10	E	On-line treatment facility for sterilizing seawater							X					
11	E	Effects of ozone disinfected seawater on marine organisms			X									
12	E	Shellfish depuration process using ozone gas to eliminate paralytic shellfish poison					X							

9. OUT YEAR COMMENTS:

CONTINUE AT SAME LEVEL

INCREASE OF _____ %

REDUCTION OF _____ %

TERMINATION

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER
MAC-012-77-EE-A

Reference NOAA Form 32-14A, Item 19. Identify all full-time permanent positions related to this Task for the budget year and all positions requested for budget year + 1 increases. Do not include support personnel; they should appear in the appropriate support Task Development Plan.

POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
No Positions Assigned			

CONTINUE on plain 8x10 1/2 paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

- 29. STATEMENT OF NEED
- 30. ACTIVITY PLAN
- 31. TASK OUTPUTS AND BENEFITS
- 32. IMPACT OF TASK AUGMENTATION
 - a. Current Year
 - b. Budget Year
 - c. Budget Year + 1
- 33. CRITERIA FOR TASK COMPLETION
- 34. BACK-UP DOCUMENTATION
 - a. Detail Documentation *(Provide one sentence description.)*
 - b. Related tasks and research presently being conducted.
 - c. Indicate the Congressional legislative requirements.
 - d. Indicate the Environmental Impact Statement (EIS) requirements.

30. Statement of Need:

The continual introduction of pollutants into the marine environment has become a problem of major concern to marine biologists and others who recognize the vulnerability of marine communities to the effects of these contaminants. Within a species, the stages of development most sensitive to their environment are usually the embryonic and larval; consequently, it is here that the most serious and far-reaching damage occurs, not only to the young organisms directly but also to the continuity of the adult populations which they represent. The aquatic environment is a resource with a number of competing users, many of whom alter the environment to the detriment of the living marine resource. The effects of these changes on the resource animals must be understood and it is necessary to rear these animals in the laboratory year-round in order to provide the researcher the necessary material with which he can fully reach this understanding.

The intent of this Task is to develop laboratory techniques for maintaining adult marine organisms and rearing the embryos, larvae and juveniles of these animals, from one generation to the next if possible, in the laboratory. These life studies investigations will be directed toward the specific problem of providing bioassay researchers with material for studying the effect of environmental pollution on living resources. This knowledge will not only provide support for the review of Environmental Impact Statements and improve our understanding of marine ecosystems, but will provide information usable in developing State/Federal management agreements for specific organisms.

It is absolutely essential that this work be conducted if any further bioassay work is to be continued on the embryonic and larval stages of marine organisms at the MACFC/Milford laboratory. The only continuous, year-round culture systems that now exist are for the oyster, Crassostrea virginica, and the hard clam, Mercenaria mercenaria. All other bioassay work being conducted in the U. S. by State, academic and Federal groups is dependent on obtaining embryonic and larval stages during the normal reproductive period of the organism and is thus haphazard and seasonal both in workload and results. In addition, with rare exceptions, methodology for rearing organisms from one generation to the next is absent even though the early development stages may be readily available.

31. Task Outputs (Specific):

a) Determine the reproductive habits and early development of ecologically and/or commercially important species in the New York Bight about which little is known. These studies will continue for 8-10 years. Criteria for Task termination is the development of techniques for maintaining, conditioning, spawning and rearing a variety of ecologically and/or commercially important marine organisms in the laboratory.

b) Create in the laboratory environments in which various marine organisms can be spawned and their life stages reared in good physiological condition. These studies will continue for 8-10 years. Criteria for Task termination will be such time as techniques are developed for a variety of ecologically and/or commercially important species.

c) Study water quality and the effects of deleterious materials in the water on the well-being of all classes of organisms being reared. This must accompany the life history studies if dependable culture methods are to be developed. These studies will continue for 8-10 years concurrently with 31 a. and b. above.

d) Study the susceptibility of all species selected to disease in the unnatural environment in the laboratory and develop controls for these diseases. The studies will continue for 8-10 years concurrently with 31 a. and b. above.

2. Benefits:

The knowledge gained from these experiments will allow us to assess the damage caused by pollutants on marine organisms by providing the methodology for controlled studies. We will learn more about the life histories of marine organisms in the New York Bight which is essential in developing State/Federal management agreements for specific organisms. The knowledge gained will also aid in the development of aquaculture. Water quality studies will improve the culture environment and increase the survival and growth of laboratory-reared organisms.

3. Activities Plan:

Standard methods available at this laboratory and in the literature will be used in an attempt to culture estuarine and offshore marine species. It is apparent, however, that in some cases these methods will have to be modified and/or new technical approaches developed. Since so little is known about rearing marine organisms on a continual basis throughout the year in the laboratory, the function of this Task is to develop the technical approach for a variety of animals representing a number of ecological niches.

To improve water quality, different methods of seawater disinfection will be used such as ozone gas, antibiotics, and selective ultrafiltration. Trace metal analysis, vitamin assays, and organic matter tests will be performed on treated waters. In conjunction, genetic, biochemical, and physiological tests will determine any adverse effects such as treated water may have over long-term use.

34. Milestones:

Development of a method for rearing all stages in the life-history of the surf clam,

Spisula solidissima, a commercially valuable species representative of bivalve communities in the open coastal waters of the Middle Atlantic Bight.

Development of a method for rearing all stages in the life-history of a marine crab.

Determination of the effects of ozone-sterilized seawater on selected marine organisms.

Development of a method for sterilizing large volumes of seawater containing mollusk pathogens before it is discharged to the wild.

Development of ozone gas depuration of paralytic shellfish poisons in contaminated mollusks.

35. Impact of Task Augmentation:

N/A

36. Back-up Documentation, Legislative Program and Environmental Impact:

a) Informal Report No. 3 - Middle Atlantic Coastal Fisheries Center, NMFS - A proposed five-year study of biological and chemical baselines and effects of environmental changes on marine organisms in the New York Bight.

Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, NMFS - Investigation Summaries - A summary of research in on-going programs within the Middle Atlantic Coastal Fisheries Center.

Informal Report No. 5 - Middle Atlantic Coastal Fisheries Center, NMFS - Cooperative study of contaminants in the coastal environment and their effects on living marine resources: Summary Report, 1971-1972.

Supportable by Dr. Allan Hirsch, Program Manager of the NOAA/MESA Program.

b) Sea Grant supporting studies on rearing of organisms at various universities.

NMFS TASK DEVELOPMENT PLAN

(See Detailed Instructions)

1. DATE PREPARED
December, 1974

(Submit five copies by Jan. 2)

To: Director, National Marine Fisheries Service, ATTN: Fx5 National Oceanic and Atmospheric Administration Washington, D.C. 20235

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TDP NUMBER		3. OBJECTIVE CODES				4. RANK	
MAC-013-77-IE-A		A	B	C	D	BY TARGET	BY + 1 INC.
TASK NUMBER		6. TASK TITLE					
818P6		Pollutants and Phytoplankton Food-Chain Species					
ORGANIZATION CODE		8. ORGANIZATION TITLE (Responsible for execution of this task)				9. PRINCIPAL LOCATION	
B6300		Environmental Biology Investigations				City: Milford State: Ct	

OBJECT CLASS Lines 10-18. Enter all dollar values as thousands and tenths of thousands. Lines 21-22. Enter as man-years and tenths of man-years.	LINE NO.	CURRENT YEAR FY 1975		BUDGET YEAR FY 1976		BUDGET YEAR + 1 FY 1977	
		TARGET ALLOWANCE A	INCREASE B	TARGET ALLOWANCE C	INCREASE D	TARGET ALLOWANCE E	INCREASE F
Total Direct Labor	15	24.6					
Travel	19	.1					
Rents, Communications, Utilities	21						
Contracts (To be let)	51 52						
Grants (Funds obligated)	58						
Supplies	53	3.0					
Capital Equipment	54						
Other (All other obligations)		2.6					
Total Direct Funds (Add lines 10 through 17 above.)		30.3					
Positions, Full-time permanent (Number applicable to this Task. Also, complete NOAA Form 32-14C.)							
Positions, Other (Number applicable to this Task.)							
Man-years, Permanent		.7					
Man-years, Other		.4					
Reimbursable Support (Reimbursable agreements only)							

REMARKS
Terminate -- Reprogrammed -057

OFFICIAL PREPARING REPORT (Signature) James E. Hanks, Director of Inv.	25. FMC DIRECTOR OR DESIGNATED REPRESENTATIVE (Sig.) <i>Carl J. Sindermann</i> Carl J. Sindermann, Center Director
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HMPS

TASK DEVELOPMENT PLAN

AF 10 MAC-013-76-IE-A

ACTIVITY SCHEDULE & EVENTS NARRATIVE	CY		FY		FY-1		FY-2		FY-3		FY-4		FY-5	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A Maintenance of Culture Collection.	<													>
A Maintenance of Mass Culture	<													>
A Nutritional Biochemistry	<													>
A Nutritional Physiology	<													>
A Cytology			X											>
E Effects of Metabolites on Phytoplankton Growth				X										
E Effects of Organic Pollutants on Nutrition.								X						

OUT YEAR COMMENTS:

CONTINUE AT SAME LEVEL
 INCREASE OF _____ %
 REDUCTION OF _____ %
 TERMINATION

REMARKS:

NMFS TASK DEVELOPMENT PLAN
28. FULL-TIME PERMANENT POSITIONS

TDP NUMBER

MAC-013-77-IE-a

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POSITION TITLE	GS LEVEL	NAME OF INCUMBENT <i>(If no Incumbent, enter "Vacant")</i>	% OF TIME SPENT ON THIS TASK
No Positions Assigned			

CONTINUE on plain 8x10½ paper. Identify "Page of Pages" and "TDP Number" in upper right corner. Comment on each of the following items, identifying by number. If item is not applicable, so indicate by entering "NA":

9. STATEMENT OF NEED

33. CRITERIA FOR TASK COMPLETION

10. ACTIVITY PLAN

11. TASK OUTPUTS AND BENEFITS

34. BACK-UP DOCUMENTATION

12. IMPACT OF TASK AUGMENTATION

- a. Detail Documentation *(Provide one sentence description.)*
- b. Related tasks and research presently being conducted
- c. Indicate the Congressional legislative requirements.
- d. Indicate the Environmental Impact Statement (EIS) requirements.

- a. Current Year
- b. Budget Year
- c. Budget Year + 1

0. Statement of Need:

Phytoplankters, the lowest element in the energy transformation chain, and the major source of the world's oxygen supply, play a role in the maintenance of an adequate fishery that cannot be overemphasized. The factors that limit marine phytoplankton productivity and species distribution must be understood. A rapidly expanding population will require increasing industrialization with the consequent continuing accumulation of contaminants in the marine environment. Contaminants arise from direct ocean dumping of waste, as well as from pollutants in rivers, lakes, and soils that find their way into coastal and open ocean waters. These pollutants may be directly toxic to phytoplankters, may directly affect total productivity, or may be harmful to only certain species and affect species composition. The loss of phytoplankton species that are at the base of a food chain will ultimately affect the productivity of commercially valuable species. Some pollutants stimulate growth of phytoplankton, the overabundance of which can also adversely affect commercially valuable species. Many phytoplankters have the capacity to concentrate and store large amounts of a pollutant which can then be passed along the food chain with potentially harmful effects to the fishery and ultimately to human beings. The information developed by this Task will provide guidelines for the long-range management of fisheries relative to the introduction of industrial waste material and other pollutants in the aquatic environment.

Task Outputs (Specific):

a) 1. Maintain stock culture collection, purify strains, make preliminary identifications of unclassified species and provide a source of pure cultures to

2. Maintain mass cultures of marine phytoplankton for production of foods as a support service for all Experimental Biology Investigations.
 3. Conduct studies on the comparative effects of the significant nutritional components for phytoplankton growth and the role of various pollutants in normal nutrition. The study will encompass effects on cell reproduction, growth kinetics and cell composition, and metabolic pathways.
 4. Conduct studies on the uptake and storage of metal ions by phytoplankton.
 5. Conduct studies on cytological effects of marine pollutants to determine if there is a possibility of obtaining an indicator species with cytological evidence of contamination.
 6. Conduct studies on the production of extracellular metabolic substances by phytoplankton and their effect on other species. These biological metabolites can also be a causative factor in environmental pollution. These studies will require 7-8 years.
- b) 1. Refers to 31: a) 1. above. This Sub-task will continue for the duration of the Task.
2. Refers to 31: a) 2. above. This Sub-task will continue for the duration of the Task.
3. Refers to 31: a) 3. above. These studies will continue for 8-10 years. Criterion for Sub-task termination will be determined on the basis of scientific information.
4. Refers to 31: a) 4. above. These studies will continue for 5-6 years. #3 for criterion of Task termination.

5. Refers to 31: a) 5. above. These studies will require 5-6 years.

#3 for criterion of Task termination.

6. Refers to 31: a) 6. above. These studies will require 8-10 years.

#3 for criterion of Task termination.

Benefits:

1. The TDP outputs will be distributed to the beneficiaries through publication in scientific journals. Information will also be distributed through numerous "in-house" reports and both oral and written communications to the interested parties who call upon the Center for information.
2. The information gained from this Task can be applied by NMFS and other state and federal agencies in managing our living marine resources.
3. The particular beneficiary of the Task would be the coastal and offshore fisheries who would have available to them experimental information with which to evaluate the potential or existing damage to a fishery from an industrial effluent through the indirect effect on the food supply.
4. The Task will also provide information to coastal and brackish water fisheries and the possibility of industrial effluents resulting in eutrophication and some approaches to avoiding or controlling this occurrence.

Activities Plan:

This Task will utilize several methods in the study of marine food-chain plankton species. The technical approaches for studying the effects of marine contaminants on these species must be developed as the progress of the task dictates. The basic plan is to employ pure cultures (axenic) of marine unicellular algae in laboratory experimental investigations. The factors that

e involved in affecting the nutrition, physiology and cytology of the species will be investigated through several approaches. These will be largely microscopic studies, growth and population measurements, and analytical evaluation through chemical determination.

Milestones:

The determination of the effect of selective pollutants on the nutrition of food-chain phytoplankters.

The determination of the productive extracellular metabolites by selected phytoplankters.

Impact of Task Augmentation:

N/A

Back-up Documentation, Legislative Program and Environmental Impact:

a) Informal Report No. 3 - Middle Atlantic Coastal Fisheries Center, MFS - A proposed five-year study of biological and chemical baselines and effects of environmental changes on marine organisms in the New York Bight.

Informal Report No. 4 - Middle Atlantic Coastal Fisheries Center, MFS - Investigation Summaries - A summary of research in ongoing programs within the Middle Atlantic Coastal Fisheries Center.

Informal Report No. 5 - Middle Atlantic Coastal Fisheries Center, MFS - Cooperative study of contaminants in the coastal environments and their effects on living marine resources.

NOAA Document - Marine Pollution Monitoring: Strategies for a National Program.

Supportable by Dr. A. Hirsch, Program Manager, NOAA/MESA Program.

Related NMFS publications:

A monograph on Nutritional Requirements in Shellfish Culture, by

Ukeles in Proceedings of the Conference on Artificial Propagation of Commercially Valuable Shellfish.

A monograph on Continuous Culture: A method for the production of cellular algal foods, by Dr. Ukeles in Handbook of Phycological Methods, Stein (ed), published by Cambridge University Press.

A monograph on Cultivation of Unicellular Algae, by Dr. Ukeles, will appear in a five-volume series in Marine Ecology, O. Kinne (ed).

Ukeles, R. Inhibition of unicellular algae by synthetic surface-active agents.

Ukeles, R. Growth of pure cultures of marine phytoplankton in the presence of toxicants.

Ukeles, R. Effect of hexose analogs on growth of Chilomonas paramecium.

Ukeles, R. Sulfonamide inhibition in Monochrysis lutheri.

b) Related NMFS Tasks:

MA-15

NSF sponsoring related but not identical Tasks in its IDOE Project.

c) N/A

d) This Task has no adverse impact on the environment. Chemical contaminated water will be treated in waste treatment system. Toxic microorganisms are killed in sterilizer.

Supportable by Dr. A. Hirsch, Program Manager, NOAA/NMFS Program