PD-AAJ-725
ISN 0991

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PAF

2. DOCUMENT CODE: 5

3. COUNTRY/ENTITY: S&T/AGR/RNR
Type g. Research Support Program Grant

4. DOCUMENT REVISION NUMBER: – (Original)

5. PROJECT NUMBER (7 digits): 936-4026

6. BUREAU/OFFICE: A. SYMBOL: S&T; B. CODE: 10

7. PROJECT TITLE (Maximum 40 characters): CRSP Planning – Fisheries Stock Assessment

8. PROJECT APPROVAL DECISION — ACTION TAKEN: A (A = APPROVED, D = DISAPPROVED, DE = DEAUTHORIZED)

9. EST. PERIOD OF IMPLEMENTATION: YRS. – 1; QTRS 2

10. APPROVED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 82 F. GRANT	E. 1ST FY 82 G. LOAN	H. 2ND FY 83 I. GRANT	H. 2ND FY 83 J. LOAN	K. 3RD FY 84 L. GRANT	K. 3RD FY 84 M. LOAN
(1) ARDN	141I	963	–	350	–	0	–	0	–
(2)									
(3)									
(4)									
TOTALS				350	–	0	–	0	–

A. APPROPRIATION	N. 4TH FY 85 O. GRANT	N. 4TH FY 85 P. LOAN	Q. 5TH FY 86 R. GRANT	Q. 5TH FY 86 S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) ARDN	0	–	0	–	350	–
(2)						
(3)						
(4)						
TOTALS	0	–	0	–	350	–

11. PROJECT FUNDING AUTHORIZED (ENTER APPROPRIATE CODE(S)) 1 = LIFE OF PROJECT, 2 = INCREMENTAL LIFE OF PROJECT: A. GRANT 1; B. LOAN –

C. PROJECT FUNDING AUTHORIZED THRU FY 82

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)

A. APPROPRIATION: NA	B. ALLOTMENT REQUEST NO. C. GRANT	D. LOAN
(1)		
(2)		
(3)		
(4)		
TOTALS		

13. FUNDS RESERVED FOR ALLOTMENT: NA

TYPED NAME (Chief, SER/FM/FSD)

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☐ 941 ☐ LOCAL ☐ OTHER _____

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

NA

FOR PROG/PIAS USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE MM DD YY	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE MM DD YY

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS
PART II

ENTITY: Bureau for Science and Technology

PROJECT TITLE: CRSP Planning - Fisheries Stock Assessment

PROJECT NUMBER: 936-4026

I hereby authorize FY82 grant funds totaling $350,000 for an eighteen (18) month grant to be awarded to the University of Maryland for planning a Collaborative Research Support Program - CRSP in Fisheries Stock Assessment.

J. S. Robins
Agency Director for Food and Agriculture
Bureau for Science and Technology

Date: 4/6/82

Attachments:

1. Action Memo - Fiester to Robins
2. Environmental Threshold Determination
3. BIFAD Letter - Wharton to McPherson dated 12/9/82
   McPherson's Response dated 1/21/82
4. Minutes of Review by the Sector Council for Agriculture (2/23/82) and by the Fisheries Subcommittee ((2/8/82)
5. Planning Grant Proposal submited by the University of Maryland

Clearances:

S&T/AGR/RNR:N. Pease _____ Date _____
S&T/AGR/RNR:T. Gill _____ Date 3/24/82
S&T/AGR:M. Mozynski _____ Date 3/26/82
S&T/AGR:J. Walker _____ Date 29 III 82
S&T/AGR:D. Fiester _____ Date 3/29/82
S&T/PO:B. Chapnick _____ Date 3/5/82

Clearances of the various other Bureaus are recorded on the "Record of S&T Project Review Committee Meeting - the Agriculture Sector Council" (attached).

ENVIRONMENTAL THRESHOLD DETERMINATION

TO: S&T/FA, J. S. Robins

FROM: S&T/AGR, Donald Fiester

SUBJECT: Environmental Threshold Determination for:

Project Title: CRSP Planning - Stock Assessment
Project #: 936-4026
Specific Activity: CRSP Planning Grant
Reference: Initial Environmental Examination (IEE) contained in Planning Proposal for subject project dated March 12, 1981 (page 4a)

On the basis of the Initial Environmental/Examination (IEE) referenced above and attached to this memorandum, I recommend that you make the following determination:

__X__ 1. The proposed agency action is not a major Federal action which will have a significant effect on the human environment.

_____ 2. The proposed agency action is a major Federal action which will have a significant effect on the human environment, and:

_____ a. An Environmental Assessment is required; or

_____ b. An Environmental Impact Statement is required.

The cost of an schedule for this requirement is fully described in the referenced document.

_____ 3. Our environmental examination is not complete. We will submit the analysis no later than _____ with our recommendation for an environmental threshold decision.

Approved: J. S. Robins

Disapproved: _____

Date: 4/6/82

Clearances:
S&T/AGR/RNR: T. Gill Date 3/29/82
S&T/AGR: M. Mozynski Date 3/26/82
S&T/PO: R. Chapnick Date 4/5/82

RECORD OF SECTOR COUNCIL FOR AGRICULTURE MEETING

MEETING DATE: February 23, 1982

1. Project Office: S&T/AGR

Project Title: Stock Assessment Planning - University of Maryland
Project Number 936-4026

Proposed Project Period: FY82 - FY83 -- University of Maryland

Proposed Budget Period: FY82 - FY83 Budget: $350,000 - Univ. of Md.

2. The members of this committee and their findings are specified below:

Office Symbol	Type Name/Signature	Date	Endorsed	Not Endorsed
LAC/DR/RD	Albert L. Brown	2/23/82		
PPC/PDPR	Douglas D. Caton	2/23/82		
NE/TECH/AD	Robert Morrow	2/23/82		
ASIA/TR/ARD	Allen C. Hankins	2/23/82		
AFR/DR/ARD	Lane Holdcroft	2/23/82		
S&T/AGR	Donald R. Fiester	2/23/82		

3. It is the decision of the Council that this project be:

✓ ENDORSED _____ NOT ENDORSED

SIGNATURE _____ Date 2/23/82
J. S. Robins
S&T/FA
Chairperson

Date: [illegible] 1982

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR FOOD AND AGRICULTURE, BUREAU FOR SCIENCE AND TECHNOLOGY

FROM: S&T/AGR, Donald Plester for RPP

Problem: Your approval is required for a $350,000 Grant to the University of Maryland for an 18-month Planning Activity for an eventual CRSP in Fisheries Stock Assessment.

Discussion: In 1977 A.I.D. awarded a contract which provided a world-wide assessment of fishery needs as seen by the LDC countries. In 1979 a workshop was held at the University of Rhode Island to examine the fishery assessment report and make program recommendations. As a result three programs were outlined for A.I.D.'s consideration. These were the Pond Dynamic CRSP, the Stock Assessment CRSP and Reduction of Post Harvest Losses CRSP. The Pond Dynamic CRSP is now approaching the implementation stage. the Stock Assessment CRSP is approaching the planning stage and the Post Harvest CRSP is under consideration for future action.

Your approval is being requested for an 18-month Stock Assessment planning grant not to exceed $350,000. The Planning Proposal is attached. Under this proposed CRSP Planning grant, a Planning Council will be selected and a manual will be prepared for distribution to potential collaborators. The manual will delineate the technical basis of the Stock Assessment CRSP and the procedures that will be used to select and implement programs. Following the completion of this document representatives of several U.S. institutions will meet with LDC representatives at workshops during which potential research areas will be discussed and outlined. Upon completion of the final research plans they will be reviewed by the Planning Council and A.I.D. and selections will be made for implementation. A final report will be submitted to JRC/BIFAD for their review and recommendations to A.I.D. concerning the selection of collaborators and the Management Entity for the 5-year CRSP program. The JRC and BIFAD have recommended that the University of Maryland be selected as the Planning Entity for the Stock Assessment CRSP. In the attached copy of a letter, dated December 9, 1981 to Mr. McPherson from BIFAD Chairman, C. R. Wharton, it is recommended that the Stock Assessment CRSP be implemented. In Mr. McPherson's response to Mr. Wharton, dated January 21, 1982 the recommendation was accepted and Dr. Brady was asked to proceed with the Stock Assessment Planning Proposal (letter attached).

On February 8, 1982 the Fisheries Sub-committee of the Sector Council reviewed and endorsed the Stock Assessment Planning Proposal. The minutes and Bureaus' clearances are attached. A meeting of the Sector Council for Agriculture was held on February 23, 1982 during which time the Stock Assessment Planning Proposal was endorsed. Minutes and the clearance sheet are also attached.

Recommendation: That you approve $350,000 for the 18 month CRSP Planning Grant in Stock Assessment by signing the attached PAF and Environmental Threshold Determination.

Attachments: a/s

Clearances:

S&T/AGR/RNR:N. Pease _____ Date _____
S&T/AGR/RNR:T. Gill _____ Date 3/24/82
S&T/AGR, M. Mozynski _____ Date 3/25/82
S&T/AGR, J. Walker _____ Date 29 III 82
S&T/PO, B. Chapnick _____ Date 4/5/82

BOARD FOR INTERNATIONAL FOOD AND AGRICULTURAL DEVELOPMENT
INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
Agency for International Development
Washington, D.C. 20523

December 9, 1981

Mr. M. Peter McPherson, Administrator
Agency for International Development
Washington, D.C. 20523

Dear Peter:

This is to advise you that the Board for Food and Agricultural Development at its meeting on December 3, 1981 considered three recommendations from the Joint Research Committee (JRC) on research proposals for CRSPs. In three separate motions the Board concurred with the JRC to recommend the proposals to AID for implementation.

The three proposals which the Board hereby recommends to AID for implementation are:

(1) A proposal for a CRSP on Peanuts for which the University of Georgia is recommended to serve as the Management Entity;

(2) A proposal for a CRSP for Aquaculture (Efficiency of Pond Culture), for which Oregon State University is recommended to serve as the Management Entity; and

(3) A proposal for a planning activity for a CRSP in Stock Assessment in capture fisheries, for which the University of Maryland is recommended to serve as the Planning Entity.

The Board recommends that the level of funding for implementing these activities be determined by AID.

Sincerely,

C. R. Wharton

Clifton R. Wharton, Jr.
Chairman

RECEIVED
BIFAD SUPPORT
STAFF
JAN 22 12 29 PM '82

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

THE ADMINISTRATOR

21 JAN 1982

Dear Clifton:

Thank you for your letter of December 9, 1981 in which the Board for Food and Agricultural Development (BIFAD) notified A.I.D. of its recommendation for implementation of the following three CRSP activities:

1. CRSP for Peanuts for which the University of Georgia is recommended to serve as the Management Entity;

2. CRSP for Aquaculture (Efficiency of Pond Culture), for which Oregon State University is recommended to serve as the Management Entity; and

3. CRSP planning activity for Stock Assessment in capture fisheries for which the University of Maryland is recommended as the Planning Entity.

I have asked Dr. Nyle Brady, Senior Assistant Administrator, Bureau for Science and Technology to proceed with developing implementation plans for these three recommendations. The Bureau for Science and Technology will keep the BIFAD Office informed as these new activities develop.

Best personal wishes for the New Year.

Sincerely,

M. Peter McPherson

Dr. Clifton R. Wharton, Jr.
Chairman
Board for International Food and
Agricultural Development
Agency for International Development
International Development Cooperation Agency
Washington, D.C. 20523

AGENCY FOR INTERNATIONAL DEVELOPMENT

SECTOR COUNCIL FOR AGRICULTURE

VOLUME I | Minutes of the Regular Meetings | Number 10

February 23, 1982

The following members and alternates were present: S&T, J. S. Robins, Chairman; S&T, Morris D. Whitaker; S&T/AGR, Donald R. Fiester and Mary E. Mozynski (Executive Secretariat); NE/TECH/AD, Lee Voth (Alternate); ASIA/TR/ARD, Allen C. Hankins; LAC/DR/RD, Albert L. Brown; BIFAD/S, James Nielson; AFR/DR/ARD, David Schaer (alternate); SC/N, Nick Luykx; and SC/HR, Norman Nicholson. The following were present for the project reviews: S&T/AGR, Norman L. Pease and Kenneth Osborn and AFR/DR/ARD, Ken Randolph.

I. The following agenda items were discussed: For Review of CASP Planning Stock Assessment See pp 2-4

A. Dr. Brady's memo to A/AID and DA/AID transmitting the last issue of Agricultural Staff Notes

DA/AID responded to the memorandum by welcoming Dr. Brady to the 'old-boy network' and suggested that qualified technical people who should be considered for executive positions should be nominated. (see attached memorandum from S&T, N. C. Brady to S&T Directorates dated February 10, 1982).

Please submit to me as quickly as possible your recommendations for agriculturalists who should be considered for management positions in the Agency.

B. Career Counciling Position in M/PM

Jack Robins distributed a copy of the memorandum to AA/M, Mr. R. T. Rollis, Jr. requesting that the career counseling position for the Senior Agricultural Officer (SAO) be established in the Office of Personnel Management.

No response has been received to date.

C. S&T/AGR review of the FY 1984 CDSSs

Jack Robins indicated that Nyle Brady has requested that the S&T Bureau review the FY 1984 CDSSs to look for common themes in the same region to determine if a successful program in one country can be transferred successfully to another, or if there are opportunities for S&T/Regional Bureau collaboration such as the Water Management Synthesis II project.

Jack Robins distributed copies of the instructions to the S&T/AGR staff for the CDSS reviews.

S&T/N, Nick Luykx asked who would from the S&T Bureau would attend the CDSS reviews and what format would be followed for the discussions.

The Regional Bureau Sector Council members stated that the reviews would probably be open. If attendance is limited, S&T/AGR will be informed before the meeting.

Dave Schaer stated that the Africa Bureau thoroughly reviews each CDSS before the review takes place and could make major changes in what is submitted from the Missions. He suggested that a review by S&T be completed after the revisions have been made.

Allen Hankins stated that the Asia bureau does not make major changes in the CDSSs, but makes recommendations to the Mission(s), as appropriate, and requires a revised CDSS the following year.

Lee Voth stated that the Near East follows the procedure used by the Asia Bureau.

D. Project Review - Stock Assessment, Planning Grant

1. Project Background and Summary

Norman Pease, the project manager, presented a brief history of the development of the Planning Grant and the selection of the University of Maryland (UM) as the Planning Entity. He stated that the Planning Grant was reviewed and endorsed by the JRC and BIFAD last Fall and the Administrator instructed S&T to proceed with the development of the implementation plans. S&T/AGR is now ready to proceed with the CRSP approval and the preparation of the grant agreement.

2. Subcommittee review

The Planning Grant proposal submitted by the UM was reviewed and endorsed by the members attending the Sector Council Sub-committee review on February 8, 1982; e.g., ASIA/TR, E. Williams and LAC/DR, W. P Warren. Later endorsement was received from AFR/DR, D. Schaer and NE/TECH, J. Lee.

However, AFR/DR/ARD, David Schaer did submit written comments covering the following issues:

a. Timing of the work plan; i.e., is it possible for UM to develop detailed project plans within a ten-day workshop period;

b. LDC involvement;

c. Evaluation criteria for the selection of project proposals and institutions; and

d. The distribution by outputs of the budget items.

3. Discussion by Sector Council

a. David Schaer stated that he had not receive the Project Paper (PP) for the Fishery Development Support Services project or the UM proposal for the Stock Assessment CRSP before the Subcommittee review. However, after the Subcommittee review, when the two project managers realized that Dave had not received the documents, copies were hand carried to his office. These documents have now been reviewed by Boyd Whittle and K. Randolph who drafted the written comments. If the items discussed in the memorandum are addressed in the final scope of work, he will endorse the project.

Norm Pease stated that the items would be addressed in the final scope of work for the Planning Grant.

b. Scaff Brown stated that it appears that Planning stage is too expensive. He questioned the relationship between the budget and the tasks to be undertaken by the UM. He asked who will be doing the work to develop the linkages in the LDCs? What are the fisheries biologist and research assistant going to be doing during the Planning stage?

He stated that he would approve the proposal if the above items are clarified in the final scope of work.

4. Sector Council Endorsement

The proposal was endorsed with the understanding that the above issues would be clarified in the final scope of work. The endorsement sheet is attached for your informtion.

End-of-Review Minutes

E. Project Review - Fishery Development Support Services

1. Project Background and Summary

Kenneth Osborn gave a brief project summary of the history with A.I.D.'s involvement with the University of Rhode Island (URI) beginning in 1969 with the Section 211(d) grant. He stated that the Fishery Development Support Services project is a new project designed to provide S&T/AGR with technical assistance support capability in small scale fisheries under a Cooperative Agreement with the URI. It will provide: 1) information services, 2) advisory and consultant services, and 3) participant training in all areas of small scale fisheries development at the request of Regional Bureaus, missions and host country governments.

2. Subcommittee Review

The project was reviewed by the Sector Council Subcommittee on February 8 and was endorsed by the members attending; e.g., ASIA/TR, E. Williams, and LAC/DR, W. P. Warren. The project manager has since received the endorsement of the Subcommittee members for Africa and the Near East. The Africa Bureau had submitted a memorandum stating reservations regarding the cost increase over the original 211(d) grant, the level of participant training, and the logical framework. Other comments were noted on the project paper which was returned to the project manager.

Ken Osborn stated that they were all good points and had been or would be incorporated in the PP during revision. For example, a new logical framework has been prepared and incorporated in the PP. He stated that the project authorization as covered in the PP will be for more funds than is currently in the FY 1982 OYB and the FY 1983 C.P. However, the PIO/T and the budget in the Cooperative Agreement will be consistant with funds available.

RECORD OF SECTOR COUNCIL FOR AGRICULTURE MEETING

MEETING DATE: February 23, 1982

1. Project Office: S&T/AGR

Project Title: Stock Assessment Planning - University of Maryland
Project Number 936-4026

Proposed Project Period: FY82 - FY83 — University of Maryland

Proposed Budget Period: FY82 - FY83 Budget: $350,000 - Univ. of Md.

2. The members of this committee and their findings are specified below:

Office Symbol	Type Name/Signature	Date	Endorsed	Not Endorsed
LAC/DR/RD	Albert L. Brown	2/23/82		
PPC/PDPR	Douglas D. Caton	2/23/82		
NE/TECH/AD	Robert Morrow	2/23/82		
ASIA/TR/ARD	Allen C. Hankins	2/23/82	ACH	
AFR/DR/ARD	Lane Holdcroft	2/23/82	DHS for	
S&T/AGR	Donald R. Fiester	2/23/82		

3. It is the decision of the Council that this project be:

✓ ENDORSED _____ NOT ENDORSED

SIGNATURE _____ Date 2/23/82
J. S. Robins
S&T/FA
Chairperson

Meeting on February 8, 1982

FISHERIES SUBCOMMITTEE OF THE SECTOR COUNCIL FOR AGRICULTURE

Review of the Stock Assessment CRSP

and the

Fishery Development Support Services

The Acting Office Director, John Yohe chaired the meeting which was attended by the following members from the Regional Bureaus: ASIA/TR/ARD, E. W. Williams and LAC/DR, William P. Warren. Members from S&T/AGR attending were: Project Manager for the Stock Assessment CRSP, N. L. Pease; Project Manager for the Fishery Development Support Services, Kenneth Osborn; Acting Division Chief, Tejpal Gill, S&T/AGR/EPP, Richard Robbins, S&T/AGR/RNR, John Malcolm and S&T/AGR Program Officer, Mary E. Mozynski. In addition, Dr. B. J. Rothschild from the University of Maryland was present to answer questions on the Stock Assessment CRSP Planning Proposal.

The following projects were discussed by the Fisheries Subcommittee:

A. Stock Assessment CRSP Planning Proposal

Norman Pease opened the meeting by providing the members with the history of the development of the CRSP program in fisheries. He then asked Dr. Rothschild to present an overview of the University of Maryland's proposal for a Stock Assessment Collaborative Research Support Program. Dr. Rothschild stated that the Stock Assessment CRSP planning requirements are analyzed in terms of the CRSP philosophy, guidelines for Stock Assessment CRSP as outlined in the workshop for stock assessment for Tropical small-scale fisheries, and the extensive experience of the University of Maryland faculty in stock assessment and international fisheries development.

Seven stock assessment planning activities will be undertaken:

1. The organization of a Planning Council;

2. The development of a Stock Assessment CRSP Planning Manual;

3. The wide dissemination of information on the Stock Assessment CRSP;

4. The active program development assistance to potential LDC participants in a workshop setting;

5. The secretariat serves as a peer review to select proposals;

6. The provision of technical assistance and administrative support to JRC/BIFAD in selecting or disqualifying proposed programs or Institutions; and

7. The designing of procedures for managing the Stock Assessment CRSP and assisting JRC/BIFAD and A.I.D. in the selection of a Management Entity for the Stock Assessment CRSP.

The above work plan is to be completed in an 18-month time frame.

Dr. Yohe asked when Dr. Rothschild expected to have the Memorandum of Understanding signed by the interested LDC institutions.

Dr. Rothschild stated that he expected to organize workshops around other planned meetings and seminars to save scarce resources. For example, ICLARM is planning a workshop in late 1982 which will be attended by fishery scientists and experts from the U.S. as well as from the LDCs. Dr. Rothschild expects to hold a meeting after that workshop on stock assessment. Similar workshops are being held in Africa and Central America which Dr. Rothschild expects to piggy-back his workshops on and thus will save a considerable amount of funds. This is a cost effective approach which has not been used by the other Planning Entities.

After the workshops have taken place, the proposals received from the LDC institutions and evaluated, and the participating institutions selected, then Memorandum of Understanding documents will be signed with the selected institutions.

This planning activity differs somewhat from the other planning grants in that the LDC institutions will be given an opportunity to submit proposals and the University of Maryland will act as a marriage broker bringing together the U.S. institutions and those in the LDCs. The Stock Assessment Planning Manual will provide the guidelines for the submission of the proposals by the LDC institutions.

Pete Williams asked how the University expected to weed out or prevent weak linkages between and among the U.S. Universities and those in the LDCs. Dr. Rothschild stated that this will be done through the evaluation process of the proposals submitted by the LDC institutions and the matching up those proposals with the appropriate U.S. institution.

Tejpal Gill asked how the Missions were to be informed that a Planning Grant is being developed by the University of Maryland. Norm Pease stated that he is drafting a cable now to be submitted to the Missions.

Richard Robbins asked about the selection of the Program Entity. Dr. Rothschild stated that the Planning Council will select the Program Entity at the end of the Planning Grant.

At the end of the discussion, the CRSP Planning Grant to the University of Maryland was endorsed by the attending members of the Fisheries Subcommittee: ASIA/TR/ARD, E. W. Williams and LAC/DR, William Philip Warren. The Subcommittee members from PPC/PDPR, AFR/DR and NE/TECH were not present. The project manager, Norman Pease will obtain their endorsement before the project is submitted to the Sector Committee for endorsement.

B. Fisheries Development Support Services

Dr. Yohe asked the project manager if he wanted to provide the members with a brief overview of the project being proposed for implementation with the University of Rhode Island.

Ken Osborn stated that the University of Rhode Island is a Land Grant institution since 1888 and became one of the four charter Seas Grant institutions in 1967. It is also a Title XII institution. The proposed project will assure the continued availability to AID/W, Missions and selected LDC of the small scale fisheries talent, capabilities and facilities developed at URI and coordinated by the University International Center for Marine Resource Development (ICMRD) which has been developed over the past twelve years under the various A.I.D. contracts and grants, primarily the ten-year Section 211(d) grant.

Ken Osborn further stated that small scale fisheries are near shore, labor intensive fisheries as opposed to capital intensive, large scale, deep-sea fisheries. The fisheries capabilities developed by URI include the ability to conduct applied research and state-of-the-art surveys, offer degree and specialized non-degree training, maintain a unique fisheries library and related information resource, and provide consulting and technical assistance upon request.

The project will consist of three integrated components; 1) Information Services; 2) Advisory and consultant Services; and 3) Participant Training.

Tej Gill asked about the percentage of total budget will be used for each activity. Ken Osborn stated that the number of person-months for each activity is shown in the project paper as follows:

1. Information Services - 14 person-months

2. Advisory and Consultant Services - 17 person-months

3. Participant Training - 25 person-months

If it is important to distribute the budget by the above categories, it can be done. The Cooperative Agreement will provide for a core staff of three (3) people who will coordinate the activities under the agreement in addition, to providing technical assistance.

Phil Warren asked if Auburn University could provide the services proposed under this project. Ken Osborn stated that Auburn covers fresh water fish; whereas, Rhode Island covers marine fisheries. The systems approach being proposed by URI will assist coastal LDCs in the development of the small scale fisheries sector of their agricultural economy. The broad objective will be to:

1. Increase production of relatively low-cost, high quality food protein for consumption and/or export; and

2. Provide additional employment for those who are or could be employed in "cultivating and harvesting food resources" from both the land and the sea.

Dr. Gill then asked what are other donors doing in this area. Ken Osborn stated that the FAO has over 200 fisheries biologist who provide short-term assistance in this area. In addition, the NOAA RSSA provides for short-term assistance. Ken Osborn is also funded under the RSSA.

Phil Warren stated that the need for these services exists in the LDCs in Latin America and many of the missions do not have the funds to access the services. He endorsed the project to be submitted to the Sector Council for Agriculture for endorsement. Pete Williams also endorsed the project.

Ken Osborn is to obtain endorsement from the other Bureaus and PPC/PDPR before going to the Sector Council for final endorsement and before being approved by Dr. Robins

Ken Osborn is to work out the budget with Mary Mozynski before finalizing the paper. A ten year authorization can be submitted for endorsement and approval.

Date: _____

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR FOOD AND AGRICULTURE, BUREAU FOR SICENCE AND TECHNOLOGY

FROM: S&T/AGR, Donald Fiester

Problem: Your approval is required for a $350,000 Grant to the University of Maryland for an 18-month Planning Activity for an eventual CRSP in Fisheries Stock Assessment.

Discussion: In 1977 A.I.D. awarded a contract which provided a world-wide assessment of fishery needs as seen by the LDC countries. In 1979 a workshop was held at the University of Rhode Island to examine the fishery assessment report and make program recommendations. As a result three programs were outlined for A.I.D.'s consideration. These were the Pond Dynamic CRSP, the Stock Assessment CRSP and Reduction of Post Harvest Losses CRSP. The Pond Dynamic CRSP is now approaching the implementation stage, the Stock Assessment CRSP is approaching the planning stage and the Post Harvest CRSP is under consideration for future action.

Your approval is being requested for an 18-month Stock Assessment planning grant not to exceed $350,000. The Planning Proposal is attached. Under this proposed CRSP Planning grant, a Planning Council will be selected and a manual will be prepared for distribution to potential collaborators. The manual will delineate the technical basis of the Stock Assessment CRSP and the procedures that will be used to select and implement programs. Following the completion of this document representatives of several U.S. institutions will meet with LDC representatives at workshops during which potential research areas will be discussed and outlined. Upon completion of the final research plans they will be reviewed by the Planning Council and A.I.D. and selections will be made for implementation. A final report will be submitted to JRC/BIFAD for their review and recommendations to A.I.D. concerning the selection of collaborators and the Management Entity for the 5-year CRSP program. The JRC and BIFAD have recommended that the University of Maryland be selected as the Planning Entity for the Stock Assessment CRSP. In the attached copy of a letter, dated December 9, 1981 to Mr. McPherson from BIFAD Chairman, C. R. Wharton, it is recommended that the Stock Assessment CRSP be implemented. In Mr. McPherson's response to Mr. Wharton, dated January 21, 1982 the recommendation was accepted and Dr. Brady was asked to proceed with the Stock Assessment Planning Proposal (letter attached).

On February 8, 1982 the Fisheries Sub-committee of the Sector Council reviewed and endorsed the Stock Assessment Planning Proposal. The minutes and Bureaus' clearances are attached. A meeting of the Sector Council for Agriculture was held on February 23, 1982 during which time the Stock Assessment Planning Proposal was endorsed. Minutes and the clearance sheet are also attached.

Recommendation: That you approve $350,000 for the 18 month CRSP Planning Grant in Stock Assessment by signing the attached PAF and Environmental Threshold Determination.

Attachments: a/s

Clearances:

S&T/AGR/RNR:N. Pease_____Date_____
S&T/AGR/RNR:T. Gill_____Date_____
S&T/AGR, M. Mozynski_____Date_____
S&T/AGR, J. Walker_____Date_____
S&T/PO, B. Chapnick_____Date_____

University of Maryland
Center for Environmental and Estuarine Studies
Chesapeake Biological Laboratory
Solomons, Maryland 20688

UMCEES Ref. No. 81-19CBL

Proposal by University of Maryland to prepare a Stock-Assessment-Collaborative-Research-Support-Program Implementation Plan and to become the Planning Entity for the Stock Assessment Collaborative Research Support Program

Submitted to

The Joint Research Committee/Board for

International Food and Agricultural Development;

Agency for International Development

by

Brian J. Rothschild, Professor

APPROVED BY:

Joseph J. Cooney, Head
Chesapeake Biological Laboratory

Rita R. Colwell, Acting Director
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Estuarine Studies

March 12, 1981

ABSTRACT

This is a proposal for the University of Maryland to become the Planning Entity for the Stock Assessment CRSP. As Planning Entity, the University of Maryland would prepare an Implementation Plan for the Stock Assessment CRSP.

The introduction to the proposal discusses the motivation for the Stock Assessment CRSP. In particular it points out that considerable improvement in LDC fishery management could be attained through improved stock assessment and that JRC/BIFAD, AID recognizing this fact are seeking to identify a Planning Entity to prepare an Implementation Plan to conduct collaborative stock-assessment research with LDCs.

The proposal develops a planning context (the matching of planning requirements and program activities) for the Stock Assessment CRSP. Stock Assessment CRSP planning requirements are analyzed in terms of the CRSP philosophy, guidelines for Stock Assessment CRSP activities as outlined in the Workshop for Stock Assessment for Tropical Small-Scale Fisheries, and the extensive experience of the University of Maryland faculty in stock assessment and international fisheries development. Seven Stock Assessment CRSP planning activities are developed to meet Stock Assessment CRSP requirements. These activities include 1) organization of a Planning Council, 2) development of a Stock Assessment CRSP Planning Manual, 3) wide dissemination of information on the Stock Assessment CRSP, 4) active program development assistance to potential LDC participants in a workshop setting, 5) serving as a secretariat for a peer review to select proposals, 6) providing technical assistance and administrative suppport to JRC/BIFAD in selecting or disqualifying proposed programs or Institutions, and 7) designing procedures for managing the Stock Assessment CRSP and assisting JRC/BIFAD, AID in selecting a Management Entity for the Stock Assessment CRSP. A work plan is developed to complete the seven activities in an 18-month time frame.

There are two Appendices. The first Appendix is the University of Maryland's Vice President for Graduate Studies and Research letter of 31 October 1980 to Dr. Charles Breitenbach, indicating University of Maryland's desire to become the Stock Assessment CRSP Planning Entity and a discussion of the University's administrative commitment to the CRSP planning process; understanding of the need to involve LDC scientists and/or institutions in the CRSP; stock assessment and fisheries facilities, and prior international experience. The second Appendix contains supplemental information on faculty involvement.

INTRODUCTION

Fisheries provide an important basis for economic and social development for many developing countries (LDCs). It is generally acknowledged that the fishery-benefits derived by LDCs from fisheries can be greatly enhanced through improved fisheries management.[1]

Improved fisheries management will do more than simply increase the catch. It should, in addition, result in increased social and economic benefits that relate to:

- Enhancing the well-being of small-scale, non-industrialized fishermen.
- Attaining an appropriate balance between small-scale fishing and more industrialized fishing operations.
- Determining the optimal amount of fishing effort in relation to domestic fishing-processing operations.
- Determining an equitable level of fees or other compensation that should be extracted from foreign-fishing nations.
- Facilitating LDC self-sufficiency in both food resources and technical expertise.
- Ensuring that stocks are harvested at economically and socially beneficial levels.

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[1]ACMRR Working Party on the Scientific Basis of Determining Management Measures (chaired by Brian J. Rothschild). Report of the ACMRR Working Party on the scientific basis of determining management measures. Hong Kong, 10-15 December, 1979, FAO Fish.Rep., (236): 149 p

- Establishing fishery data collection systems that will function in a timely fashion and distribute information to those who need information for fish-stock management.
- Developing mechanisms for regional cooperation.

The actual improvement of fisheries management depends upon a number of factors. One of the most important factors that contributes to the success or failure of fishery management is the quality and availability of reasonably accurate stock assessments.

Unfortunately, most stock-assessment techniques which have been developed for high-latitude, temperate-zone, heavily industrialized fisheries are not applicable to tropical small-scale fisheries, which are typical in LDCs. The difficulty of using conventional high-latitude stock-assessment techniques in LDCs is additionally compounded by the shortage of trained technicians and experts with a stock assessment background.

Thus, if the LDCs are to increase their fisheries benefits, then the techniques of fishery management and stock assessment will need to be tailored to the special management problems in the LDCs. In addition there is a need to expose and involve technicians and scientists in the LDCs to development of new stock-assessment techniques for direct and expedient application to local LDC management problems.

The JRC/BIFAD, AID concept of a Collaborative Research Support Program (CRSP) is ideally suited for the problem situation described above. Through such a program, individuals and institutions in the U.S. and in developing countries can join together in collaborative research to develop and apply new stock assessment techniques, thus improving stock assessment, fishery management, and the economic and social benefits, which the developing countries would accrue from their fishery resources.

In recognition of the importance of stock assessment, JRC/BIFAD, AID commissioned both an exploratory study and a Workshop on Stock Assessment for Tropical Small-Scale Fisheries[2]. On the basis of these deliberations and analyses, JRC/BIFAD, AID have decided to consider the selection of a Planning Entity (PE) to develop a five-year plan for the Collaborative Research Support Program in stock assessment.

This document is a proposal for the University of Maryland to become the Planning Entity for the Stock Assessment CRSP. As Planning Entity, the University would prepare a five-year Stock Assessment CRSP Implementation Plan. The planning activity will be undertaken for an 18-month period.

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[2]Stock Assessment for Tropical Small-Scale Fisheries. Proceedings of an International Workshop Held September 19-21, 1979, at the University of Rhode Island, Kingston, R.I. 198 p.

Initial Environmental Examination

Initial Environmental Examination--The activities of this project fall into the area described in Environmental procedure regulations, Para 216.2 (c) "Analyses, Studies, Academic or Investigative Research. Workshops and Meetings." These classes of activities will not normally require the filing of an Environmental Impact Statement of the preparation of an Environmental Assessment. It is possible that an output of this project will be set of procedures, guidelines or research results which when used would require such assessment. However, the project itself only proposes research and directly supportive activities. Under these guidelines this activity clearly qualifies for a negative determination at the time when a threshold decision is determined.

CONTEXT FOR PLANNING THE STOCK ASSESSMENT CRSP

Economic and social growth in LDCs is often dependent upon the development and application of appropriate technologies to national problems. These technologies are dependent upon both the technical substance and the degree to which the ultimate recipients of the technology participate in its development and application.

The CRSP concept relies heavily upon the notion of joint effort and cooperation between experts and technicians in the U.S. and LDCs. Through such joint activities, scientists and technicians from the U.S. and LDCs can attain a critical mass of effort which can be expediently applied to an otherwise intractable LDC food and nutrition problem.

The unique CRSP notion of collaborative research between U.S. and LDCs Institutions generates explicit and implicit planning requirements. These include:

- Planning activities should focus on enabling JRC to assist BIFAD in recommending a CRSP implementation plan to AID.
- Opportunities for U.S. and LDC institutions and individuals to participate in the planning process should be maximized. This requirement will ensure that those who will eventually execute the Stock Assessment CRSP will share in determining the direction of the CRSP. Experience has shown that integration of planners and "doers" results in more productive and cost-effective programs.
- An active search needs to be made for potential participants in CRSP implementation. This will ensure that the highest quality programs will be developed (in the context of the criteria selected by the Steering Committee of the Workshop on Stock Assessment for Tropical Small-Scale Fisheries, viz.

"payoff, transferability of research results, probability of success, implementation cost, and adequacy of scientific infrastructure"). The active search will also identify and encourage participants—individuals or institutions--with potential, but little experience in the CRSP subject area.

- Difficulties in communication because of great distances and differing backgrounds need to be overcome. All potential participants need a thorough understanding of the technical basis for the CRSP and the procedures that will be followed to identify programs, select programs for implementation, and manage the implementation process. A common understanding of the Stock Assessment CRSP and the procedures that will be followed in its development and implementation will equalize the advantages of all individuals and Institutions and contribute more effectively to the spirit and intent of the CRSP objectives.

- Evaluation of potential programs, Institutions and individuals must be objective so as to avoid organizational or other conflicts of interest.

- Activities under the CRSP should comply with affirmative action guidelines.

In developing the joint effort, it is important to recognize that the scope of stock-assessment activity as contemplated by the Workshop on Stock Assessment for Tropical Small-Scale Fisheries was much broader than the conventional view of stock assessment. For example, the Workshop designated studies on productivity, assessment techniques, assessment models, policy- and decision-making structures, and biosocioeconomic problems as "first-priority stock-assessment research" (see Table 1). Thus, the Stock Assessment CRSP involves not only stock assessment in its usual narrow sense, but the broad range of activities that generally comprise much of fishery management.

This holistic view will do much to achieve the goals of the Stock Assessment CRSP, to sensitize and activate interests in both the U.S.

Table 1. Research subjects to be studied under the Stock-Assessment-Collaborative-Research-Support-Program. Note that Items 2a through 2e have been given highest priority by the Workshop on Stock Assessment for Tropical Small-Scale Fisheries.

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1. Direct research in the general area of capture fisheries stock and resource assessment in tropical marine coastal environment with the ultimate objective to develop methods for assessing the condition of fishery resources and the effects of fishing effort on it.

2. Stock assessment methods for evaluating fishing potential as recommended by the AID sponsored University of Rhode Island Stock Assessment Workshop, September 19-21, 1979.

   a. Comparative Studies - Productivity. Development of methods for predicting productivity from comparative studies of environmental indices.

   b. Comparative Studies - Catch. Development of assessment techniques from comparisons of data from experimental fishing varying artisanal gears, areas, and intensities.

   c. Comparative Assessment Models. Evaluations of methematical properties and limitations of alternative assessment models and testing these in LDCs.

   d. Policy and Decision-making Structures. Development and testing research methodologies to examine existing policy formulation and decision-making structure.

   e. Biosocioeconomic Models. Construction, implementation and validation of biosocioeconomic models applicable to policy formulation and decision-making.

3. Methods of obtaining Catch and Effort Statistics for application to artisanal fisheries.

   a. Develop and test methods for estimating the landing and fishing effort which can be applied to LDC conditions.

   b. Develop and test new methods for measurement of catch and catch per unit of effort.

4. Determination of the effects of fishing on the resource.

   a. Develop and test techniques for evaluating the impact of fishing effort on the condition of the stocks.

Table 1 (Continued).

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5. Determination of sustainable yields suitable to LDC application.

   a. Develop and test new methods for determination of maximum biologically sustainable yields.

   b. Develop and test new methods for translation of maximum sustainable yields to optimum yields.

Source - Norman L. Pease letter of 6 January 1981.

and the LDCs toward developing the broad stock-assessment techniques and applying them to improve the management of the stocks, and yield —consonant with national and international development goals— materially improved social and economic benefits from the stocks. The achievement of these goals will benefit the participants in the fisheries of concern and the economies of the States that host Stock Assessment CRSP activity. In addition, improved management in LDCs may in some instances be beneficial to fish consumers in the U.S. since in a number of instances LDCs export fish to the U.S. to improve their foreign exchange position.

The program described above suggests that certain specific activities are needed to meet basic CRSP requirements. These activities, oriented toward the development of a set of excellent and relevant Stock Assessment CRSP programs or projects and participation in the planning activity are as follows:

- Organize a Planning Council to guide the development of the plan.
- Develop a Stock Assessment CRSP Planning Manual to communicate and specify the technical basis of the Stock Assessment CRSP and the procedures that will be used to select and implement programs.
- Achieve a wide distribution of information on the Stock Assessment CRSP.
- Actively work with U.S. institutions and LDCs to develop an array of stock-assessment CRSP programs, which can then be considered by JRC/BIFAD, AID. This activity will be facilitated through workshops and site visits.
- Establish and serve as secretariat for a peer review process to make recommendations to JRC/BIFAD, AID on the relative

merit of various projects which will be considered for implementation.

- To provide technical assistance to JRC/BIFAD in the selection of projects and institutions and establish mechanisms for notifying selected or disqualified institutions.

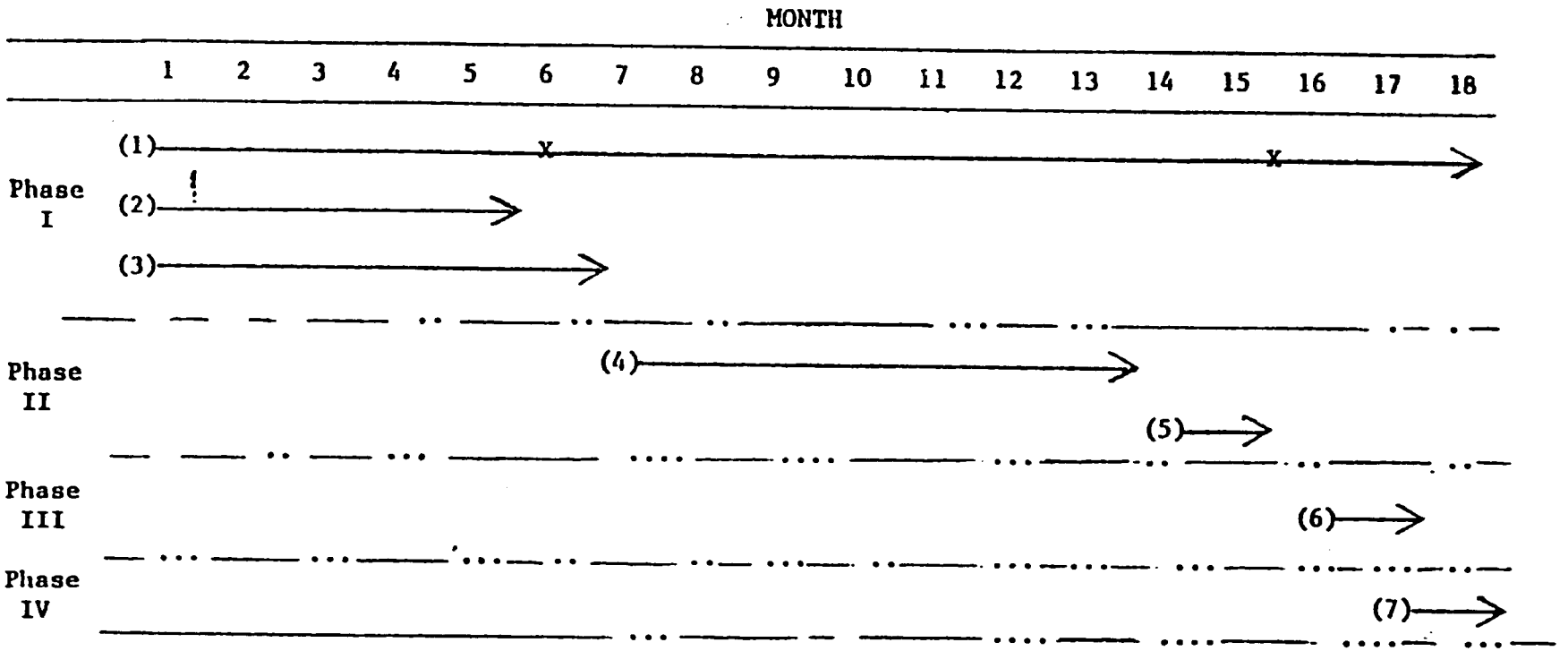
- Design procedures for the administration of the Stock Assessment CRSP and make recommendations regarding a Management Entity for the Stock Assessment CRSP.

WORK PLAN

This section narrates activities to be undertaken by the Planning Entity in planning the implementation of the Stock Assessment CRSP. The planning is based on the philosophy and requirements elaborated in the previous section.

Two major activities will be undertaken. The first involves the planning of procedures to identify, select and implement the Stock Assessment CRSP. The second involves assisting JRC/BIFAD, AID in selecting projects, and the design and selection of a management entity.

The preparation of the Stock-Assessment-Collaborative-Research-Support-Program Implementation Plan will be undertaken in four phases. These are identified in Figure 1. The first phase will take seven months and will consist of three tasks: Organization of a Planning Council, Development of a Stock Assessment CRSP Planning Manual, and developing communications with potential collaborators. The second phase will take seven months, and consists of two tasks: Working with



X signifies a meeting of the Steering Council.

Figure 1. Time phasing for Stock-Assessment-Collaborative-Research-Support-Program Implementation Plan.

the U.S. and LDC Institutions to develop stock-assessment proposals and preparing the JRC/BIFAD decision document. The third phase will take one month and consist of assisting JRC/BIFAD in the selection of CRSP projects. The fourth phase will take two months and involves the development of administrative machinery for the Stock Assessment CRSP and assistance with the selection of the management entity. Time is also allocated during this phase for final report preparation and other project termination work.

PHASE I Formulating the Stock Assessment CRSP

Task 1. Organization of a Planning Council. The Planning Council will be organized to guide the development of the Stock Assessment CRSP Implementation Plan. The Planning Council will consist of individuals with expertise in the CRSP concept, economic or social development, or stock assessment. The Planning Council will review each phase of the Planning Entity's work and make recommendations and suggestions within the bounds of the Planning Entity's general program direction as approved by JRC/BIFAD and AID.

Task 2. Develop a Stock Assessment CRSP Planning Manual. The Stock Assessment CRSP Planning Manual will be a mechanism for communicating the scope and intentions of the Stock Assessment CRSP to the geographically-scattered individuals or institutions who would be eligible to participate in the Stock Assessment CRSP implementation.

More specifically, the Manual will contain an analysis of the diverse and complex technical questions related to the Stock Assessment CRSP (see Table 1); a discussion of the CRSP philosophy; an explanation of the procedures that will be used to administer and manage the CRSP implementation; and other pertinent reference material to assist potential collaborators. The manual will consist of several sections:

- Section 1 will define the role of the Stock Assessment CRSP relative to global fisheries which affect tropical small-scale fisheries. The section will discuss changing conditions in global fisheries, the role of small-scale fisheries in LDCs, the policy options for the development or maintenance of small-scale fisheries, and the role of the Stock Assessment CRSP in implementing LDC fishery policy.

- Section 2 will provide an overview of JRC/BIFAD, AID goals and missions, and the relation of the Stock Assessment CRSP to the overall objective of JRC/BIFAD, AID.

- Section 3 will elaborate on the technical content and basis for the priorities established by the Workshop on Stock Assessment For Tropical Small-Scale Fisheries (see Table 1). Careful elaboration of additional detail is particularly important because of the diverse backgrounds of potential collaborators and the diverse nature of the subjects which were proposed as high-priority stock assessment activities. For example, comparative studies on productivity may require fundamental research, comparative studies on catch may require focus on the application of known principles to ongoing fishing operations, development of comparative assessment models may require development or application of advanced fishery bioeconomic models and computer technology, policy- and decision-making studies may require a holistic overview of economic or political structures of the countries under study, and biosocioeconomic modeling will require a

knowledge of advanced mathematical techniques and computer technology. Section 3 will therefore provide an exposition on each of these various topics that will give prospective collaborators a common point of departure on each of the complex subject areas.

Section 4 will discuss various general principles of planning and program development. Special emphasis will be placed upon well-known criteria for selecting "good" projects and identifying the pitfalls that are frequently encountered in research-program design and development. The discussion in this section will acquaint newcomers with the planning- and program-development process with information needed to design a successful collaborative research project.

Section 5 will discuss the methodology by which JRC/BIFAD, AID will actually select collaborative projects for funding. The discussion will inform potential collaborators on the selection process, pertinent dates and specific criteria.

Section 6 will discuss administrative procedures to be used by the Management Entity. This will cover budgeting, the management of programs, and periodic evaluation of the CRSP during its implementation.

Appendices will contain a bibliography and, where necessary, reprints of references that are critical or difficult to obtain.

Task 3. Developing Communications with Potential Collaborators and Achieving a Wide Distribution of Information on the Stock Assessment CRSP. Two specific activities are planned with regard to disseminating information on the Stock Assessment CRSP. The first is an early inquiry seeking input to the planning process and advice on contacting additional potential collaborators. The second is the distribution of the Stock Assessment CRSP Planning Manual.

Mailing lists will be compiled through consultation with JRC/BIFAD, AID, through the extensive international contacts of the University of Maryland Planning Entity, and by communicating with various international organizations (e.g., IPFC/SCORAD, FAO, WECAF, CECAF, etc.).

The transmittal letter for the Stock Assessment CRSP Planning Manual will request expressions of interest from potential participants in the planning process and will describe procedures for further participation.

The letter of transmittal will also request comments on either the substance or the procedures outlined in the Planning Manual. If appropriate, a supplementary emendation to the manual will be issued.

PHASE II Develop Stock Assessment CRSP Proposals

Task 4. Working with U.S. and LDC Institutions to Develop Stock Assessment Proposals. Distribution of the Stock Assessment CRSP Planning Manual will announce the existence of the Stock Assessment CRSP, and also serve as a medium for identifying potential collaborators.

A series of Stock Assessment CRSP workshops will be held to develop Stock Assessment CRSP programs which will be considered for implementation. At present we anticipate holding three workshops which would involve 10 working days

each. The workshops would most likely be held in Manila to address Southeast Asia and Indian Ocean problems; Dakar to address African problems; and San Jose to address Latin American and Caribbean stock assessment problems. To reduce costs, the Workshop will be planned to coincide with another scheduled meeting. We anticipate that each workshop will be attended by about ten principals from the LDC and several representatives of U.S. institutions.

If necessary, selection of participants will be made on the basis of the likelihood of participation in the implementation of the Stock Assessment CRSP.

About 15 percent of each workshop will involve discussing the planning process as outlined in the Stock Assessment CRSP Manual. The remainder of the time will be devoted to working sessions in which detailed Stock Assessment CRSP proposals are prepared. The proposals will be detailed, and complete with objectives discussed, time-phased work plans developed, budgets prepared, and personnel complement, equipment and facilities identified. The joint preparation of these proposals in a workshop setting facilitated by the Unversity of Maryland Planning Entity, would establish at the outset with the LDCs a basis for collaboration, a feeling of identification with the project and the selection process, an opportunity to discuss and plan regional comparative studies, and a mechanism for

assisting LDCs to plan and write a project proposal. At the completion of the workshop, site visits will be made to evaluate entire program areas.

Task 5. Preparing the JRC/BIFAD Decision Document. At this point all proposals will have been completed and evaluations of Institutions will be complete. A decision document will be prepared for JRC/BIFAD. This document will describe the process used to identify and develop the Stock Assessment CRSP projects, and contain the project descriptions developed at the workshops. A final section of the document will be prepared by a peer-review committee. The committee will be representative of U.S. institutions having an interest in the Stock Assessment CRSP. The peer-review committee will rank proposals according to the criteria established by the Workshop on Stock Assessment for Tropical-Small-Scale Fisheries. These are:

1. Payoff. The anticipated benefits to accrue to developing nations given the success of the research and its implementation in the LDCs. This is a subjective estimate of the numbers of people, of countries, and of fisheries to which the research is relevant.

2. Transferability of Research Results. How easy or difficult it will be for the LDC to apply the methodologies developed by the research. It also considers the degree to which these methodologies can be generalized over environments.

3. Probability of Success. Whether the research is likely to produce usable results within a

reasonable time frame and whether the resultant methodology being applied will be successful.

4. Implementation Cost. The cost of utilizing the research results in terms of both labor and capital.

5. Technical Support and Scientific Personnel Necessary. The scientific infrastructure necessary for the prosecution of the research both within the U.S. and in the LDCs and for the implementation of the research product.

The completed Decision Document would then be submitted to JRC/BIFAD.

PHASE III Assisting JRC/BIFAD in the Selection of CRSP Projects

Task 6. Assistance to JRC/BIFAD in Selection of CRSP Projects. The Planning Entity will provide technical assistance to JRC/BIFAD in the selection process. At this point, the decision document would be discussed with JRC/BIFAD.

PHASE IV Implementation Planning

Task 7. Assist in Developing Administrative Machinery and Selection of the Management Entity. The Planning Entity, upon contemplation of the projects selected for support, will design the administrative machinery for managing the Stock Assessment CRSP. This will include mechanisms for contingency planning, program management, budgeting, and periodic evaluation during the five-year program cycle. The

Planning Entity on these considerations will develop criteria for the selection of a management entity and assist JRC/BIFAD and AID with selection.

UMCEES Ref. No. 81-19a CBL
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20 only)

PROPOSED BUDGET

Salaries and Wages	
Coordinators (2) - 7 months	$ 30,500
Professional support (3) - 54 months	89,000
Secretary - 18 months	18,000
Total Salaries and Wages	$ 137,500
Fringe Benefits (25% of S&W)	34,375
Travel	62,362
Publication and printing	10,000
Supplies, Materials, Equipment	5,000
Postage and Telephone	3,000
TOTAL DIRECT COSTS	$ 252,237
Indirect Costs (71.1% of S&W)	97,763
TOTAL SPONSOR COSTS	$ 350,000

APPENDIX 1

Correspondence on University facilities, commitment to and understanding of the CRSP planning process

UNIVERSITY OF MARYLAND
CENTRAL ADMINISTRATION
ADELPHI, MARYLAND 20783

OFFICE OF THE VICE PRESIDENT
GRADUATE STUDIES AND RESEARCH
(301) 882-3002

31 October 1980

Dr. Charles Breitenbach
Senior Agriculture Advisor/Fisheries
Bureau for Development Support
Agency for International Development
Washington, D. C. 20523

Dear Dr. Breitenbach:

In response to your memorandum of August 16, 1980, the University of Maryland is interested in becoming the planning entity for the stock assessment CRSP. Please find attached our response to the questions posed in your memorandum.

As you may know, our University has extensive experience and expertise in research related to stock assessment, bioeconomic modeling, and policy and decision making.

At least three organizational groups at the University conduct activities on the subjects referred to in the stock assessment CRSP. The Center for Environmental and Estuarine Studies conducts research and engages in educational activities on Chesapeake Bay and the adjacent Atlantic Ocean resources. CEES has a budget of $4.8 million and a staff of 193. The University of Maryland Sea Grant Program has a budget of $1.5 million and encompasses extensive research, education and extension activities. Dr. Virgil Norton, Chairman of the Department of Agricultural and Resource Economics on the College Park Campus of the University has extensive experience in stock assessment and also has assembled in the Department a faculty that includes five professors with considerable experience in stock assessment and fisheries management.

Along with the presence of Dr. Norton and his faculty, the recent addition of Dr. Brian Rothschild to our faculty at the University of Maryland Chesapeake Biological Laboratory stengthens our expertise and planning capability for stock assessment. In addition to being experts in their respective fields of resource economics and stock assessment, Drs. Norton and Rothschild have considerable expertise and experience in planning the kinds of activities contemplated by the stock assessment CRSP. Dr. Norton, for example, was Chief of Plans and Policy Development for the National Marine Fisheries Service. Dr. Norton was also in charge of planning and implementing a significant portion of a program to transfer agricultural and fisheries technology to Brazil. The program required Dr. Norton to live in Brazil and involved a two-way exchange of faculty and students between the U. S. and Brazil. The success of Dr. Norton's efforts are evident in that the program is still working well six years after his participation.

Dr. Rothschild's previous positions include the Director of the Office of Policy Development and Long Range Planning, National Marine Fisheries Service, the Director of the Extended Jurisdiction Planning Staff, and Senior Policy Advisor to the

Page Two
31 October 1980
Dr. Charles Breitenbach

Administrator of the National Oceanic and Atmospheric Administration. He participated in developing the plan for the FAO Indian Ocean Fisheries Programme, in the group of economic and stock assessment experts advising the government of Peru on actions to be taken in response to the collapse of the anchovie fishery, in planning fishery development in Korea, in drafting a fishery policy for Namibia, in developing multinational training workshops for the LDC's in the International Commission for the Conservation of Atlantic Tuna, in chartering the FAO Advisory Committee on Marine Resource Research and was in charge of planning and executing the early stages of extended jurisdiction fishery mangement in the U. S.

We believe that with Dr. Norton and Dr. Rothschild we have the key personnel to actively participate in activities dealing with international fisheries planning.

You should know that we give our wholehearted commitment to the stock assessment CRSP concept. My office has assembled a steering group with Dr. Rothschild as chairman, specifically to coordinate our participation in this CRSP activity. I am confident that our personnel and facilities are appropriate and exceptionally well suited for the effort specified in your memorandum. We are prepared to provide a significant University of Maryland contribution to the effort and fully support the approach of working within the collaborative mode as specified in the CRSP announc

I am hopeful that we will be able to work with you as the plannir stock assessment CRSP.

Sincerely yours,

David S. Sparks

Dr. David Sparks
Vice President for Graduate S
Research

cc: Chancellor Robert Gluckstern
Dr. Rita R. Colwell

QUESTIONNAIRE FOR THE EXPRESSION OF INTEREST
BY INSTITUTIONS INDICATING WILLINGNESS IN
BECOMING THE PLANNING ENTITY ---

Administrative Commitment to the Planning Process. Indicate with a :ief statement on the extent of administrative support by your ıstitution for this activity and awareness of key administrators for the :cessity of collaborative planning of the CRSP.

Prepare a brief statement indicating your institutions understanding f the need to involve LDC scientists and/or LDC institutions, ıternational Research Centers (ICLARM, SEAFDEC, etc.), and .I.D.Regional Bureau Representatives in the planning process. Give an ıdication of the extent to which implementation of the CRSP should be ıdertaken in collaboration with LDC institutions and the necessity for ɔtaining and sharing support of the program (see JRC Guidelines).

Describe briefly the nature and scope of research underway and lanned on stock assessment and fisheries management at your institution.

Discuss briefly the adequacy of facilities at your institution for arrying out a planning activity, including qualifications of staff to be sed for the CRSP. Indicate your plans for release of staff and/or acilities to carry out effective planning activities.

Discuss your institutions prior international experience. This hould include information on past and current activities on research ollaboration; training, and institution building in international isheries related programs.

ıiversity of Maryland
Name of Institution

r. David S. Sparks, V.P. for Graduate tudies and Research
Representative and Title

ctober 31, 1980
Date

For further contact, please refer to:

Dr. Brian Rothschild
Chesapeake Biological Laboratories
Center for Environmental and Estuarine Research
Box 38
Solomons, Maryland 20688
301-326-4281

:f you wish to be considered as planning entity, return by October 25, .980 to:

Dr. Charles Breitenbach
Senior Agriculture Advisor/Fisheries
Bureau for Development Support
Agency for International Development
Washington, D.C. 20523

Telephone No. (703) 235-8993

ATTENDANCE FORM

We would be interested in attending the meeting to participate in the recommendation of a list of (3) potential institutions for selection as the planning entity for the Stock Assessment CRSP by the Joint Research Committee of the BIFAD Board.

XX We would be interested in attending the meeting and are also interested in being considered as a candidate for becoming the planning entity for the Stock Assessment CRSP. Attached is our response to the expression of interest questionnaire.

S	TITLE	ADDRESS	TELEPHONE NUMBER
n Rothschild	Professor	CBL, Box 28 Solomons, MD 20688	301-326-4281
il Norton	Chairman	Dept. Agr. Res. Ec. Univ. of Maryland College Park, MD 20742	301-454-4101
ard Jarman	Asst. to Director	Sea Grant Program Univ. of Maryland College Park, MD 20742	301-454-6056

ise return to:

Dr. Charles Breitenbach
Senior Agriculture Advisor/Fisheries
Bureau for Development Support
Agency for International Development
Washington, D.C. 20523

Telephone No. (703) 235-8993

UNIVERSITY OF MARYLAND RESPONSE TO:

QUESTIONNAIRE FOR THE EXPRESSION OF INTEREST BY INSTITUTIONS INDICATING WILLINGNESS IN BECOMING THE PLANNING ENTITY

1. The administrative commitment at the University of Maryland to the philosophy contained within the CRSP is indicated in the cover letter from Vice President Sparks. Dr. Sparks is responsible for all research activities in the University of Maryland multi-campus programs. Through Dr. Sparks a Steering Committee has been set up at the University of Maryland to work specifically on the CRSP activity. Included among the Steering Committee members are a representative of Dr. Sparks' office, the Director of the University of Maryland Sea Grant Program, the Assistant Provost of the Division of Agricultural and Life Sciences for International Programs, the Chairman of the Department of Agricultural and Resource Economics, the Director of the University of Maryland Center for Environmental and Estuarine Studies (which includes several separate research laboratories with a large number of faculty and excellent facilities) and a senior research biologist with extensive world wide experience in stock assessment who is a professor with one of the University of Maryland Research Laboratories.

2. The individuals in the University administration, on the steering committee and other faculty likely to be involved, clearly understand, and are committed, to the need to involve LDC scientists and institutions, International Reseach Centers and USAID Regional Bureau Representatives in the planning process. The inclusion on the steering committee of a former AID Regional Bureau Representative who is now in the office of the Provost of the Division of Agricultural and Life Sciences in an indication that the latter has been clearly considered. Most important, however, the two key personnel, Dr. Rothschild and Dr. Norton have had extensive experience in working with scientists and international organizations throughout the world. They and the other faculty to be involved recognize and have a strong commitment to the concept that it is impossible and undesirable to attempt to develop any program related to an LDC without the cooperation of the institutions and scientists within the LDC. The cooperation, along with inputs from AID Regional Bureau Representatives and International Research Centers, is essential to assure that a program and the approach to that program are developed in a manner compatible with the cultural desires, economic needs and resource constraints of the countries involved. It is also clear that in addition to an expression of cooperation on the technical aspects of any project it is desirable to have some form of financial, or other contribution, on the part of all involved. The University of Maryland is prepared to make a significant contribution to planning and research activities in which it is involved and would, where appropriate, encourage a commitment of support, no matter how small, from participating institutions in the LDC's.

3. The University of Maryland has a wide range of research underway and planned on stock assessment and fisheries management through the University of Maryland Sea Grant Program and under numerous other contracts or state supported research projects. The University has had a long history of such activity. Some of the top bioeconomic modeling expertise in the nation resides in the University of Maryland Department of Agricultural and Resource Economics and Center for Estuarine and Environmental Studies. In addition, individuals from the Department of Government and Politics, Department of Economics and other departments on campus have made significant national and international contributions in the area of fisheries policies and

management and stock assessment. As an indication of the recognition of the quality and extent of these activities various members of the University faculty have served on national and international research advisory and policy groups. Among these groups are: The Ocean Policy Committee of the National Academy of Sciences; The Fishery Task Group of the Ocean Policy Committee, National Academy of Sciences; The Scientific and Statistical Committees of the New England and Mid-Atlantic Regional Fisheries Management Councils; The New England Regional Fisheries Management Council; The Marine Fisheries Advisory Committee to the Secretary of Commerce; and numerous international advisory committees related to FAO, USAID, and Regional International Fisheries Management Agencies. Especially unique among the faculty members who will be directly involved in this project is a combination of fishery related experiences involving: U. S. Government Service, Academic experience; practical knowledge of the fishing industries of the U. S. and many other countries; and periods of living and working in LDC's.

Examples of research at the University of Maryland related to stock assessment and fisheries management include the assessment of the effects of toxic substances and heavy metals on the viability and productivity of commercial fin and shellfish, predator-prey relationships among fish species, determination of the distribution characteristics of commercial fisheries populations and the assessment of the factors affecting these distributions, and the development of culture techniques for the American oyster and the striped bass. In addition to the research oriented to the physiological, environmental and physical processes which affect stock abundance and availability, there is an ongoing emphasis within the Department of Agricultural and Resource Economics which focuses on the development of socioeconomic and bioeconomic models applicable to state, regional and federal management efforts.

The following are studies either underway or planned with particular relevance to the Stock Assessment CRSP:

Ongoing

An Economic Evaluation of the Chesapeake Bay Sport and Commercial Striped Bass Fisheries - V. Norton and I. Strand, Department of Agricultural and Resource Economics

Economic Impact of the 200 Mile Limit on Rural Northeastern Coastal Communities - V. Norton and I. Strand, Department of Agricultural and Resource Economics

Effects of Management Decisions on Fish Prices and Fishermen's Income Stability - I. Strand, Department of Agricultural and Resource Economics

An Economic Evaluation of the Atlantic Coast Striped Bass Fishery - V. Norton and I. Strand, Department of Agricultural and Resource Economics

The Source of Blue Crab Recruitment in Mid-Atlantic Estuaries - S. P. Sulkin and W. Van Heukelem, Horn Point Environmental Laboratories, UMCEES

Assessment of Larval Striped Bass, Morone saxatillis (Walbaum) Stocks in Maryland and Virginia Waters, F. D. Martin and E. Setzler-Hamilton.

Assessment of Larval Striped Bass Stock in the Potomac Estuary - F. D. Martin and E. Setzler-Hamilton, Chesapeake Biological Laboratories, UMCEES

A Comparison of Food Habits Between Larval Strip Bass, Morone saxatillis and White Perch, M. americana - E. Setzler-Hamilton and F. D. Martin, Chesapeake Biological Laboratories, UMCEEES

Predicting Chemical and Biological Events in Chesapeake Estuarine Waters as a Function of Lunar Cycle Mixing - C. D. Elia and K. Mountford, Chesapeake Biological Laboratory, UMCEES

Planned

Feasibility of Forecasting Oyster Spatfall in Central Chesapeake Bay - V. Kennedy, Horn Point Environmental Laboratories, UMCEES

Investigations of the Genetic Relationship Among Populations of Two Commercial Species of the Chesapeake Bay (Blue Crab: C. sapidus; soft shell clam; M. arenoria) - T. Cole, Horn Point Environmental Laboratories, UMCEES

Forecasting Commercial Finfish Landings and Crabcatch from Estuarine Waters - R. E. Ulanowicz, Chesapeake Biological Laboratory, UMCEES

Restricted Common Property in the Chesapeake Bay Fisheries: An Assessment of Management Options - O. Young, Department of Government and Politics

4. The University of Maryland is a multi-campus institution including the Center for Environmental and Estuarine Studies. The latter consists of three complete regional laboratories—The Horn Point Environmental Laboratories (HPEL), Cambridge, Maryland; The Chesapeake Biological Laboratory (CBL), Solomons, Maryland; and The Appalachian Environmental Laboratory (APL), Frostburg, Maryland. HPEL and CBL are located on tributaries to the Chesapeake Bay and focus primarily on marine resources research. The five research vessels and small outboards of the University of Maryland are maintained through UMCEES and range from the 65-foot Aquarius to 17-foot open run-abouts. The College Park campus provides centralized computer facilities for the entire University system through the Computer Science Center. A full range of software is available for statistical analysis and data file development and management. The College Park campus also is the site of the University of Maryland Sea Grant Program administrative offices which contains complete document preparation services and word processing capability.

By virtue of the University of Maryland College Park campus proximity to Washington, D. C., meetings with federal agency representatives or diplomatic representatives from LDC's can be efficiently arranged. Full meeting, food and room services are also available through the Adult Education Center on campus. Also in the event field experiences for students or other personnel are appropriate, dormitory facilities are available at both the HPEL and CBL.

It is anticipated that the primary leaders for the CRSP planning will be Dr. Brian Rothschild, UMCEES and Dr. Virgil Norton, Department of Agricultural and Resource

Economics. Their qualifications with respect to the planning of the CRSP are addressed in Dr. Sparks' transmittal letter. Both individuals have extensive background in assessing fisheries management research needs and methods and experience with international fisheries programs. At present, it is likely that Drs. Rothschild and Norton will commit a total of 4 man months to the planning effort.

In addition to Drs. Rothschild and Norton, the University of Maryland is in a position to commit significant faculty time and facilities to carry out the planning activity:

5. The University of Maryland has had considerable international experience. Its largest international operation has been the University College which has taught courses at most military installations around the world. This has been the most successful program of its type and has provided extensive University of Maryland faculty experience in many countries throughout the world. The University of Maryland is also experienced in handling USAID contracts. It has had a sizeable USAID technical assistance involvement since the 1950's. The University has been contracting with USAID through the southeast Consortium for International Development (SECID) of which the University is a charter member. Through SECID, the University has provided staff for projects in Malawi, Zambia, Kenya, Serria Leonne, Guyanna and the Caribbean. Individual overseas experiences of faculty in the University system are too numerous to repeat. However, for example, a large number of University Agricultural faculty representing nearly every agricultural and fishery discipline have worked on personal service contracts for AID and other foreign assistance agencies during the past two decades.

The University is administrotively well organized to manage international contracts, has an Office of International Affairs for the College Park campus and an Office for International Programs in the Division of Agricultural and Life Sciences headed by an Assistant Provost. The University Office of Sponsored Programs administers over $50 million in contracts annually. The Assistant Provost for International Programs is highly experienced in managing international projects and contracts. He has personally worked in 23 countries on contracts with USAID, the World Bank, Ford Foundation and U. S. Department of Agriculture. As an outgrowth of international activities, the University of Maryland has established cooperative agreements with the University of Sri Lanka, the University of Cairo, and Central University of Venezuela. The University co-sponsored an important conference on Egyptian Agricultural Development in July 1980 in Alexandria, Egypt. The President of the University of Cairo and the Deans and Vice Deans of the College of Agriculture will visit the University of Maryland in the Fall of 1980 to work out collaborative research programs.

APPENDIX 2

Faculty involvement in Stock Assessment CRSP

Appendix 2

Update on Faculty Involvement

This Appendix updates the information on potential faculty involvement described in the University of Maryland's response to Dr. Breitenbach's "Questionnaire for the Expression of Interest by Institutions Indicating Willingness in Becoming the Planning Entity" (see Appendix 1).

In our response to that questionnaire, we indicated that the University of Maryland's development of the Stock Assessment CRSP proposal was developed through a Steering Committee organized by David Sparks, Vice President, Graduate Studies and Research, University of Maryland multi-campus programs.

> "Through Dr. Sparks a Steering Committee has been set up at the University of Maryland to work specifically on the CRSP activity. Included among the Steering Committee members are a representative of Dr. Sparks' office, the Director of the University of Maryland Sea Grant Program, the Assistant Provost of the Division of Agricultural and Life Sciences for International Programs, the Chairman of the Department of Agricultural and Resource Economics, the Director of the University of Maryland Center for Environmental and Estuarine Studies (which includes several separate research laboratories with a large number of faculty and excellent facilities) and a senior research biologist with extensive world wide experience in stock assessment who is a professor with one of the University of Maryland Research Laboratories."

We also indicated that Dr. Virgil Norton and Dr. Brian Rothschild (we described Dr. Norton's and Dr. Rothschild's extensive experience in national, international, and LDC stock assessment and in planning and system design) would be key personnel in planning and directing the University of Maryland Stock Assessment CRSP program.

Another member of the senior faculty at the University of Maryland has joined our CRSP-planning team. Professor Davis B. Bobrow, Professor of Government and Politics at the University of Maryland will work together on the CRSP with Drs. Norton and Rothschild. Professor Bobrow has had extensive experience in international affairs and public policy. In addition to his overall experience, he would particularly complement our work on high-priority stock assessment task 2d, "policy and decision-making structures, development and testing research methodologies to examine existing policy formulation and decision-making structures." Professor Bobrow is an international specialist with deep interest in fisheries stock assessment and is the author of numerous publications. He was Fulbright Lecturer; Ford Foundation Pre-Induction Scholar; Ford Foundation Behavioral Sciences Fellow; Rhodes Scholar; Fellow, Political Science Section, C.I.S., M.I.T.; Second Year Woodrow Wilson Fellow, M.I.T.; and Social Science Research Council Fellow. He has received special honors in the Social Sciences, University of Chicago; the Political Institutions Prize, University of Chicago; and second class honors, School of Philosophy-Politics-Economics, Oxford University.

Professor Edward Houde has 12-years' experience working directly on the stock assessment of tropical fisheries. Dr. Houde was formerly a professor at the University of Miami, Rosenstiel School of Marine and Atmospheric Science. He is a specialist on the utilization of egg-and-larval techniques for stock assessment. In addition to his numerous publications on eggs and larvae and stock assessment of

fisheries in the tropical Atlantic, Dr. Houde is also presently completing a large international stock-assessment program in the Persian Gulf.

Professor Chu-Fa Tsai has 20-years' experience working in freshwater and marine stock assessment. Dr. Tsai has considerable international experience and has recently spent one year working for the World Bank on tropical small-scale fisheries in Bangladesh. Dr. Tsai is fluent in Chinese and Japanese.

Professor Martin Wiley has worked on various aspects of Chesapeake Bay fisheries for 12 years. Dr. Wiley has considerable experience as an editor. He has served as Editor of Estuaries (formerly Chesapeake Science) for 12 years. Dr. Wiley will serve as the principal editor and coordinator of the Stock Assessment CRSP Manual.

Professor Jay Stauffer has worked for a number of years on freshwater stock assessment. His specialty is in ecosystem management. He has also published a number of papers in ichthyology, a skill particularly important in the design of stock-assessment programs in tropical small-scale fisheries.

Dr. Eileen Setzler-Hamilton is a specialist in fish eggs and larvae and the ecology of larval fish. Her expertise will contribute to developing egg and larval stock-assessment techniques.

Professor Christopher D'Elia is a specialist in tropical reefs and productivity. His work will be particularly relevant to the development of priority item 2a, "comparative studies of productivity and development of methods for predicting productivity from environmental indices."

Professor Ivar Strand is a resource economist with a background in fishery economics. Dr. Strand has published papers on aspects of the economics of fisheries and has worked with the oyster fishermen of Chesapeake Bay.

Professor Nancy Bockstael is an economist with expertise in biosocioeconomic models (stock assessment priority 2e). Her experience in model development will make her a valuable member of the planning entity team.

CURRICULUM VITA

Brian J. Rothschild

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Degrees and Advanced Study:

B. S. Rutgers University, 1957
M. S. University of Maine, 1959,
Ph.D. Cornell University, 1962

Positions Held:

Professor, University of Maryland, Center for Environmental and Estuarine Studies, Chesapeake Biological Laboratory, Solomons, Maryland, July 1980-Present.

Senior Scientist, Office of Policy and Planning, Office of the Administrator, National Oceanic and Atmospheric Administration, Washington, D. C., January 1978-June 1980.

Director, Office of Policy Development and Long Range Planning, National Marine Fisheries Service, Washington, D. C., October 1976-January 1978.

Acting Director, Extended Jurisdiction Planning Staff, National Marine Fisheries Service, Washington, D. C., January 1976-October 1976.

Director, Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, California, June 1972-January 1976.

Deputy Center Director, Northwest Fisheries Center, National Marine Fisheries Service, Seattle, Washington, September 1971-June 1972.

Professor, University of Washington, College of Fisheries, Seattle, Washington, July 1971-September 1971.

Associate Professor, University of Washington, College of Fisheries, Seattle, Washington, September 1968-July 1971.

Positions Held (Continued):

Senior Scientist, Bureau of Commercial Fisheries, Honolulu, Hawaii, February 1968-September 1968.

Acting Deputy Area Director, Bureau of Commercial Fisheries, Honolulu, Hawaii, May 1967-February 1968.

Chief, Skipjack Yellowfin Tuna Ecology Program, Bureau of Commercial Fisheries, Biological Laboratory, Honolulu, Hawaii, July 1962-May 1967.

Research Assistant, Department of Conservation, Cornell University, September 1959-July 1962.

Research Assistant, University of North Carolina, Institute of Fisheries Research, June 1959-September 1959.

Research Assistant, Department of Conservation, Cornell University, February 1959-June 1959.

Membership in Professional Societies:

American Association for the Advancement of Science (Fellow)
American Institute of Fishery Research Biologists
American Fisheries Society

Publications:

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