

Sarah Taylor
July 24, 1989
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This sub-section, I believe, contemplated as a prerequisite to exemption an existing condition of substantial development, and then if present, significant mitigation for the uses that would occur in the exemption area. Some jurisdictions such as Baltimore City, won Commission exemption of large shoreline areas, with their imposition of an offset program that would provide the so-called "other measures" somewhere in the Critical Area using monies collected based on square footage of the development. The question is whether facilities built for the very purpose of water quality improvement or environmental education need to provide for such enhancements.

Thus, for an addition to a wastewater treatment plant, which might involve clearing some trees and increasing impervious surfaces in the Buffer and, without special mitigation, could increase non-point source runoff, is the very fact that the facility is intended to improve water quality enough to obviate the need to offset any further its Buffer encroachment? The answer I think, is no, since the specific policy objectives that are to be "otherwise achieved" are not achieved in this instance by the mere fact of such a facility being developed. Those policies, at COMAR 14.15.09.01B, include providing for (essentially) non-point source runoff pollution control; minimizing human activity impact on special tideland resources, such as wetlands; and maintaining transitional habitat and natural stream and riparian environments. Virtually none of these policy objectives are achieved by the mere fact of improving traditional wastewater treatment at a given plant's facilities, ergo I believe that "other measures" for achieving these objectives would still need to be proposed.

On the other hand, there may indeed be (at least) an indirect, long-term beneficial effect that would address most if not all of those policies, by virtue of the development of an educational facility built specifically (or in some large part) to address such policies through its offerings, exhibits, and/or research programs. While such a facility could also increase impervious surfaces, and thus runoff, for example, a judgment might (or at least foreseeably could) be made that its coastal and critical area-related educational benefits outweigh the detriment of the additional runoff. Given such a judgment, it would seem illogical to require an offset fee to be paid where the monies might simply recycle to those very educational programs sponsored by the facility. The key, I believe, is the judgment that the facility will somehow be sufficiently or substantially addressing the policy objectives of COMAR 14.15.09.01B. At that point, proffered physical amelioration for even some of the additional runoff would add an additional dimension that would make rejection of such use in the exemption or proposed exemption area unlikely, and would likely preclude the need for offset fee assessment.

Please note that this memorandum constitutes advice of counsel and is not an Opinion of the Attorney General.

Commission Meetings & Corresp.

Nov 1989

MSA-S1832-64



JOHN C. NORTH, II
CHAIRMAN

STATE OF MARYLAND
CHESAPEAKE BAY CRITICAL AREAS COMMISSION

WEST GARRETT PLACE, SUITE 320
275 WEST STREET
ANNAPOLIS, MARYLAND 21401
974-2418 or 974-2426

SARAH J. TAYLOR, PhD
EXECUTIVE DIRECTOR

COMMISSIONERS

October 20, 1989

Thomas Osborne
Anne Arundel Co.

James E. Gutman
Anne Arundel Co.

Ronald Karasic
Baltimore City

Ronald Hickernell
Baltimore Co.

Albert W. Zahniser
Calvert Co.

Thomas Jarvis
Caroline Co.

Kathryn D. Langner
Cecll Co.

Samuel Y. Bowling
Charles Co.

G. Steele Phillips
Dorchester Co.

Victor K. Butanis
Harford Co.

Wallace D. Miller
Kent Co.

Parris Glendening
Prince George's Co.

Robert R. Price, Jr.
Queen Anne's Co.

J. Frank Raley, Jr.
St. Mary's Co.

Ronald D. Adkins
Somerset Co.

Shepard Krech, Jr.
Talbot Co.

William Corkran, Jr.
Talbot Co.

William J. Bostian
Wicomico Co.

Russell Blake
Worcester Co.

Dear Commission Member:

The November 1st meeting of the Chesapeake Bay Critical Area Commission will be held at 1:00 p.m. at the University of Maryland, College of Estuarine and Environmental Sciences, Horn Point, Cambridge, Maryland. A separate Subcommittee notice will be mailed to you for that Wednesday morning.

Enclosed are the following items pertaining to the meeting:

- 1) Agenda for the Meeting;
- 2) Minutes of the Meeting of October 4th;
- 3) Directions to the Meeting place.
- 4) Memo regarding the Department of Agriculture's Mosquito Control Program.

Please bring your copy of the Proposed MOU with Waterway Improvement Division and General Approval for Piers and Ramps. Please also bring your copy of the Draft Policy Statement for Expanding the 1,000-Foot Critical Area. Both were distributed in the September 18, 1989 letter for the October Meeting.

I look forward to seeing you on November 1st.

Sincerely,

John C. North
John C. North, II
Chairman

CABINET MEMBERS

Wayne A. Cawley, Jr.
Agriculture

Robert Schoepflein
Employment and Economic Development

Robert Perciasepe
Environment

Ardath Cade
Housing and Community Development

Torrey C. Brown, M.D.
Natural Resources

Ronald Kreitner
Planning

JCN/jjd

Enclosures

Ms. Carroll Barth
Alliance Program for
Chesapeake Bay
Suite 300
6110 Executive Blvd
Rockville, MD 20852

Ms. Ellen Chambers
Patuxent River Civic Assoc.
17401 Queen Anne's Road
Upper Marlboro, MD 20772

Dr. Vincent Cushing
Cushing Associates, Inc
153 Williams Drive
Annapolis, MD 21401

Ms. Ann Pesiri Swanson
Chesapeake Bay Commission
60 West Street
Suite 200
Annapolis, MD 21401

Ms. Ann Wilmer Hoon
P O Box 718
Chestertown, MD 21620

AGENDA

CHESAPEAKE BAY CRITICAL AREA COMMISSION

University of Maryland
College of Estuarine and Environmental Sciences
Horn Point
Cambridge, Maryland

November 1, 1989

9:30 - 4:00 p.m.

9:30 - 11:30	Special Issues Subcommittee	Lecture Hall
9:30 - 11:30	Project Evaluation Subcommittee	Center Operations Conference Room
10:30 - 11:30	Program Amendments Subcommittee	Classroom 2
11:30 - 12:30	Lunch	Center Operations Porch
12:15 - 12:30	Dorchester Co. Amendments Panel	Center Operations Conference Room
12:30 - 1:30	Tour of Horn Point Facilities	
1:30 - 1:40	Approval of the Minutes of October 4, 1989	John C. North, II Chairman

POLICIES, MOU'S & GENERAL APPROVALS

1:40 - 1:50	Vote on Policy to Extend the 1,000' Critical Area Boundary	James E. Gutman/ Anne Hairston
	Vote on MOU with Waterway Improvements Division and General Approval for Piers and Ramps	Samuel Bowling, Ch./ Abi Rome

UPDATES & DISCUSSION

1:50 - 3:00	MOU with the Public Service Commission	Pat Pudelkewicz
	General Approval of Mosquito Control Activities, Department of Agriculture	Abi Rome

(See other side)

Changes to the Criteria

James E. Gutman/
Sarah Taylor/Staff

PROJECT EVALUATION

3:00 - 3:30

Vote on Martin State Airport,
(Baltimore County)

Samuel Bowling, Ch./
Kathryn Langner, Ch./
Abi Rome

Pocomoke Sound Dredge
Disposal (Somerset County)

Vote on Washington Suburban
Sanitary Commission Sewage
Treatment Plant

Samuel Bowling, Ch./
Kathryn Langner, Ch./
Dawnn McCleary

PROGRAM REVIEW & AMENDMENT

3:30 - 3:45

Vote on Beverly Estates -
Growth Allocation
(Dorchester County)

Tom Ventre

Vote on Kenneth R. Cox -
Growth Allocation
(Dorchester County)

Tom Ventre

3:45 - 4:00

Old Business
New Business

John C. North, II
Chairman

Next Commission Meeting: December 6, 1989,

CHESAPEAKE BAY CRITICAL AREA COMMISSION

Minutes of Meeting Held
October 4, 1989

The Chesapeake Bay Critical Area Commission met at the Chesapeake Bay Critical Area Commission Office, 275 West Street, Annapolis, Maryland. The meeting was called to order by Chairman North with the following Members in attendance:

J. Frank Raley, Jr.	Albert Zahniser
Shepard Krech, Jr.	Thomas Jarvis
Ronald Hickernell	Ronald Adkins
William Corkran	Robert Price, Jr.
James E. Gutman	Ronald Karasic
Natalie McPherson for	Parris Glendening
Robert Schoeplein	Kathryn Langner
Louise Lawrence for	Rick Nailer for
Wayne Cawley	Robert Perciasepe
Deputy Secretary Griffin of DNR	Director Kreitner of MDOP

Chairman North asked Dr. O'wole Alade to present the Commission's Geographic Information System. Dr. Alade explained that the Commission began to develop a GIS because of the mandate under the Law requiring project analysis, tracking, and approval of the 60 local Programs. He said that the System was designed to acquire land parcel records and to create the associated land parcel maps using computer technology. The method of map creation was to use legal records such as the deeds and plats acquired from the County courthouses.

He said that in Fiscal Year 87, the Commission staff devoted time to develop a Program with the City of Annapolis as a demonstration, to begin to place data of various types into a micro-computer and merge these data with parcel-by-parcel tax maps.

In Fiscal Year 88, the demonstration project continued. The "CALMAD" Program was debugged, and the entire 1,000' shoreline for the City was placed in the computer so that resources could be assessed and changes to land use could be tracked.

In Fiscal Year 89, with assistance from MCZMP (NOAA/OCRM Grant), the Commission expanded its service to Cecil, Kent, Queen Anne's and St. Mary's Counties. He said that within the next three to four years, 80 - 90% of the local governments will be using the tracking system.

Dr. Alade said that it was the intention of the Commission to accomplish the required program implementation process in the most consistent and efficient manner. Hence, in designing the existing system for the Commission, not only was the hardware and software configuration thoroughly evaluated for functionality, but the user needs, application, data input and output methods, data

processing procedures, data types and scales, and data structures were critically examined for useability.

Dr. Alade further reported that the Commission staff was now in the process of analysis to determine the most appropriate approach for encoding base maps. He said that the time and the cost involved in converting a set of selected tax maps and Critical Area maps was compared using the digitizing and scanning techniques. Also, the ease of converting the maps into computer-readable form using either technique was compared. Dr. Alade reported that, based on the preliminary data, it appeared that scanning Critical Area maps was more cost-efficient; however, the question of usability of data needed to be considered. He suggested that Critical Area maps could be digitized as base maps and tax maps could be scanned as ancillary data.

Mr. Gutman asked how the Commission staff could address the many inaccuracies of tax maps. Dr. Alade said those could be addressed by overlaying more current aerial photographs collected in 1986, and comparing the differences to make the necessary corrections.

Mr. Gutman asked how the updating of tax maps that are reissued over a period of time are kept up-to-date. Dr. Alade answered that so far, no tax maps have been updated but that the Commission will have that capability in a few months.

Chairman North then asked Ms. Verna Harrison, Assistant Secretary, Department of Natural Resources and Chairman of the Living Resources Subcommittee, to report on the Chesapeake Bay Agreement and Initiatives. Ms. Harrison explained the structure and membership of the committees in the Chesapeake Bay Program. She said that the Executive Council comprised the Governors of Maryland, Virginia and Pennsylvania, the Mayor of the District of Columbia, the Administrator of EPA and the Chairman of the Chesapeake Bay Commission. The Principals' Staff Committee was the Cabinet-level Secretaries. The Implementation Committee was a managing body of Assistant Secretaries. She said that there were eight working subcommittees and that the Growth and Development Subcommittee would be the one of concern to most of the Commission members.

Ms. Harrison then explained the intentions and goals of her Subcommittee, Living Resources, the workgroups her committee were divided into, and the plans and time-frames for those plans. She said that the various policies the different workgroups are developing focussed on tidal and non-tidal wetlands, habitat requirements, removing impediments to migratory fish, oyster

management, blue crab management, alosid management, SAVs, stock assessment of ecologically valuable species, and a monitoring plan for living resources.

Mr. Gutman asked what would be described as the trend and what the picture would be for 1995, concerning living resources. Ms. Harrison answered that cooperation between the states had been incredibly enhanced through the Bay Program. She said that as far as living resources are concerned, for example, there had been evidence in Baltimore Harbor of increased diversity in the different types of species in existence, and a resurgence of SAVs in the Potomac River.

Chairman North asked Mr. Ventre to give an update on the status of the meetings with Somerset County. Mr. Ventre reported that the Panel and local County officials have tentatively scheduled a meeting for the week of October 23rd, to attempt to finally resolve the Growth Allocation issue.

Chairman North then asked Mr. Serey to report on the Magruder's Landing project, Prince George's County. Mr. Serey reported that the M-NCPPC proposed to improve an existing boating area on the Patuxent River. He introduced Mr. Lotspeich of M-NCPPC to explain the proposal.

Mr. Lotspeich explained that the proposal was to upgrade the facility. He said that at present, parking for approximately 20 vehicles is provided on a grass area within the Buffer. The proposal was to provide parking for 40 vehicles outside of the Buffer; eliminate parking in the Buffer; widen the existing paved access road to provide for safe vehicle movement; provide two parking spaces for handicapped and emergency use near the boat ramp; and place two picnic shelters outside of the Buffer. Mr. Lotspeich said that two endangered species were found on the site, a flatworm and a rare sedge, and that his Commission was seeking advice from the Natural Heritage Program concerning avoidance.

A motion was made and seconded that the Commission approve the request by the Maryland-National Capital Park and Planning Commission to develop a boat loading and picnic area, as proposed, at Magruder's Landing, Prince George's County, with conditions that the applicant will coordinate with staff and the Maryland Heritage Program to address impacts on endangered species. The applicant will follow the recommendations of the Maryland Natural Heritage Program. The vote was unanimously in favor.

Mr. Serey then asked Mr. Lotspeich to report on the project for a parking area at Harmony Hall Regional Center off Indian Head Highway in Prince George's County. The proposal was to expand the existing parking for the facility. Because of the construction of a theatre in the facility, the County was requesting additional parking, but due to the existence of a 100-year floodplain, parking cannot be developed outside of the Critical Area. The proposal would remove an existing basketball court and install shallow grass swale ponds to absorb runoff. M-NCPPC would require Stormwater Management, Sediment and Erosion Control, and Grading permits before construction.

Mr. Gutman asked what type of paving would be used for the parking lot and what was the soil type. Mr. Lotspeich answered that it would be a gravel surface parking lot, and in that vicinity, the soil was a sandy loam type. He then described the proposed Stormwater Management Concept Plan.

Mr. Serey said that the staff and Subcommittee were recommending that this area be determined to be an area of intense development and that under the State regulations in that type of development, the applicant is required to reduce pollutant loadings by 10% below the existing level. He said that if necessary, the County's Planning Department would work with the Department of the Environment to ensure this, and the Subcommittee was satisfied that this could be addressed.

Mr. Gutman asked how assurance could be made that the reduction would occur. Mr. Lotspeich answered that the M-NCPPC was working closely with the Washington Council of Governments and that a great deal of monitoring was being performed to discover what type of percent reduction could be accomplished for certain nutrients which could then be calculated and techniques for reduction could be applied to the site.

Mr. Glendening made an observation that the Theatre, which was part of the complex, was noted for having excellent acoustics, and that the Hall is a site where George Washington and other noteworthy persons had visited. Mr. Glendening also noted that the County had recently purchased the Malloy property, a 430-acre tract along the Patuxent, expressly for the purpose of keeping it in open space.

A motion was made and seconded that the Commission approve the request by the Maryland-National Capital Park and Planning Commission to construct a parking lot as proposed, at the Harmony Hall Regional Center with the following conditions: the applicant must reduce pollutant loadings on site by 10% below the existing level; the applicant would coordinate with the staff of

the Maryland Department of the Environment. The vote was unanimously in favor.

Chairman North asked Ms. Abi Rome to report on King's Landing/Cammack/Walke Natural Resources Management Area in Calvert County. Ms. Rome reported that Land Planning Services of the Department of Natural Resources, Capital Programs Administration, was proposing to upgrade and develop the Kings Landing Area on the Patuxent River. The area already exists as an environmental and recreation area. Land Planning Services proposes to enhance this area and the new development would include an education/information wing attached to the existing meeting/dining hall, six new cabins, moving existing cabins and/or building a dormitory, a 250-car parking lot, tenting area, extension of an existing pier, group picnic areas, and a comfort station.

She said that the Cammack and Walke areas would be used predominantly for forestry, forest research, wildlife management, some agricultural uses, and a family picnic area.

Ms. Rome said that a Panel had made a site visit. Land Planning Services was in the conceptual planning stage and sought Commission comment and approval. She said that the Subcommittee agreed that conditional approval could be given for the concept plan.

A motion was made and seconded that the Commission approve the conceptual plan with the conditions that: the parking lot should have trench drains which collect the first inch of rainfall and divert it for infiltration; the parking lot shall be landscaped with shade trees; all non-water-dependent facilities should be kept out of the Buffer; the pier, canoe launch, trails boardwalk and pervious overlooks shall be allowed in the Buffer; maintenance of forest cover on all steep slopes to avoid erosion into the numerous steep ravines; final design plans shall be submitted to the Critical Area Commission for approval. The vote was unanimously in favor.

Chairman North asked Mr. Serey to report on St. Mary's County's Program. Mr. Serey reported that the County had forwarded the revised Program to the Commission after the County's public hearing. The Program incorporated some of the changes that had been suggested in an unofficial manner by the Panel and staff during the year. Mr. Serey said that the Panel had met that morning to discuss and review the remaining issues addressed in the staff report of which he then apprised the Commission.

Mr. Serey explained that the Program lacked: proper enforcement language; a clear statement that Planned Unit Developments would be developed in conformance with the criteria, except in regard to density; a complete mineral resources section; current acreage totals for IDAs, LDAs and RCAs; and a procedure to deduct Growth Allocation consistent with the Commission's approvals for other jurisdictions.

Mr. Serey said that the draft report of recommended changes also included technical notes which appear directly in the County's Program. He said that the Panel recommended the entire package be returned to the County, to be changed as noted in the staff report and as pertains to the technical details noted on the document itself.

A motion was made and seconded to return the St. Mary's County Critical Area Program to the County. Within 40 days from the date of return by the Chairman, the County must make changes to its Program as specified in writing by the Chairman and return the Program to the Commission.

If the County has not returned the Program to the Commission with all required changes within the time specified, the Commission shall promulgate a Program for St. Mary's County according to the provisions of Section 8-1810 of the Natural Resources Article, Annotated Code of Maryland. In this regard, Commission's required public hearings will be held at the St. Mary's County Governmental Center, in Leonardtown, on November 29 and December 13, 1989, at 7:30 p.m. Submission of the Commission's promulgated Program to the Maryland Register will follow the public hearings. The vote was unanimously approved.

Mr. Epstein noted that the Commission's intent was to submit it back to the County for changes in accordance with the staff report and the Panel recommendations

Chairman North then asked Ms. Pat Pudelkewicz to report on Kent County's Zoning Ordinance amendments. Ms. Pudelkewicz reported that the County had submitted its amendment to the Commission on May 23, 1989. On June 22, the Commission Panel and the County Commissioners held a joint public hearing. The amendment was presented to the Commission for vote on August 2nd, and was returned to the County to address Commission comments. The County resubmitted the Zoning Ordinance and there were several remaining issues which required further discussion. The County, the Panel and Commission staff met on September 8th and resolved the remaining issues to the Panel's and County's satisfaction.

Ms. Pudelkewicz explained that in correspondence of September 11th to Chairman North, the County had submitted the final changes to the Zoning Ordinance. She said that it contained the proposals to: amend the Development Handbook to address the creation of new habitat protection areas; amend Article X, Section 2.32, definition of "camps, day" to read "Camp, day"; amend Article V, Section 2.24 to read "Convalescent, group, or homes for the aged if located in dwellings existing as of December 1, 1985"; amend Article VII, Section 3.2 to read "Adaptive reuse of historic structures in AZD, RCD, RR, LM, IM, and V Districts with provisions a) - g).

Ms. Pudelkewicz said that the Panel recommended approval with the condition that the changes in the County Commissioner's letter to Chairman North be incorporated into the Ordinance.

A motion was made and seconded that the Commission, pursuant to the Critical Area Law, Section 8-1809(d), approve Kent County's proposed Critical Area Zoning Ordinance Amendments, with the condition that the changes represented in the letter from the Kent County Commissioners to Chairman North, dated September 11, 1989, be incorporated into the Zoning Ordinance, and direct that pursuant to Section 8-1809(e), within 90 days, the County shall adopt the Zoning Ordinance together with all relevant Ordinance changes. The vote was unanimously in favor.

Chairman North then asked Ms. Anne Hairston to report on Prince George's County Program amendments. Ms. Hairston reported that four County Bills and a new Conservation Manual, have been submitted to the Commission for review and approval. The first three bills were submitted on July 25th, 1989, and the remainder on August 3rd. She said that a public hearing had been held, and action needed to be taken by October 25th.

Ms. Hairston said that the amendments were submitted to correct editorial changes, clarify language, streamline County procedures, and make a couple of provisions more strict. She said that most of the changes improve clarity and legibility, but the strengthening of the provisions was more substantive and in some cases, more strict than the criteria.

Ms. Hairston said that one of the amendments prohibits sludge disposal in all areas, although agricultural fertilization with sludge is not limited. The County also prohibits the use of sludge in the Buffer.

Mr. Gutman asked why sludge was prohibited in the Critical Area. Mr. Glendening answered that only sludge disposal is

prohibited in the Critical Area, and sludge for agricultural use is prohibited only in the Buffer or extended Buffer.

A motion was made and seconded that the Commission, pursuant to the Critical Area Law, Section 8-1809(d) and (g), approve the proposed amendments to the Prince George's County local Critical Area Program, and direct that pursuant to Section 8-1809(e), within 90 days, the County shall adopt the Program amendments, together with all relevant ordinance changes. The vote was unanimously in favor.

Chairman North then asked Mr. Karasic and Mr. Duket to report on the Program amendments and refinements procedure. Mr. Karasic reported that the legislation draft had been finalized and contained minor changes from what the Commission had previously reviewed.

Mr. Duket made note of each of the changes (Exhibit A).

Mr. Glendening commented on Amendment (3) with regard to the withholding of funds. He noted that in many counties funding is not received so there would not be a financial penalty. Also, he suggested that the legislature might not be in favor of supporting increased funding if it were to be used as a penalty mechanism.

Mr. Glendening then asked for a clarification of the rest of Amendment (3) as it appeared to be penalizing those jurisdictions who acted in good faith but were found to have had Programs that, although they were approved by the Commission, were later deemed to be in seeming conflict with the criteria.

Mr. Epstein noted that, as in the case of Dorchester County, the Program was approved by the Commission under somewhat obscure circumstances, with the result being a Program that was not whole, or wholly meeting the criteria. The staff are faced with a problem of how to get the local jurisdictions to amend their Programs in accordance with the criteria. He said that at this point, the only remedy was to speak to the jurisdiction personally, to explain the situation and the problem. Mr. Epstein agreed that in its approval of the Dorchester Program, a mistake was made by the Commission, and noted that in large part, similar problems in other counties will have shown to have been "approval" mistakes made by the Commission. It may seem unfair, to now come back to local jurisdictions for changes, but there must be found a way to handle this problem. Otherwise, inadequate Programs, not meeting the criteria, will be operating inconsistently around the Bay.

Mr. Price noted that the problem was when a Program was in conflict with the criteria through an oversight.

Mr. Glendening concurred, but the words he took exception to were "does not achieve the goals", which he remarked, were too obscure. He suggested that there were three circumstances that would demand action by the Commission such as, a clear mistake, an omission, or conflict with the existing law and regulations.

Mr. Gutman suggested that the concept be agreed upon by the Commission, but that the wording be amended as the language must be received by the Legislature in the next two weeks.

Deputy Secretary Griffin advised that the Bill should be complete before submittal to the Legislature.

Mr. Epstein suggested using the words "contains a clear mistake, omission, or conflict with the existing criteria or law".

Concerning the last sentence of Amendment (3), Mr. Glendening added that the removal of eligibility for state technical or funding assistance to a jurisdiction that does not want to develop a Program anyway, would not be a penalty.

It was suggested that the sentence concerning funding assistance be deleted.

Mr. Price suggested that, concerning Amendment (4), Section (3), the local jurisdiction be allowed to regard a change as either a Program refinement or amendment but would not want the Commission to have to involve itself by having to be the notifier, as it was stated in Amendment (4), Section (5)(a).

Mr. Karasic suggested omitting that the Commission be the notifier, and only state that the jurisdiction shall be notified.

Mr. Epstein explained that the concept of Section (5) was to split the Program changes into two categories: this allowed the Chairman to make the first determination as to whether something was "minor" enough to call it a "refinement" or should be treated as an "amendment". Commission intercession on that judgement serves as its "check" and time frames for correction are also provided.

Mr. Epstein noted that another important Amendment was Amendment (6), new Section (o). Mr. Epstein explained that there was no method in the statute now for the Commission to substantively amend its own regulations. He said that what that

section attempted to do was to develop a procedure that would enable the Commission to do so.

Mr. Glendening asked if Amendment (6), Section (2) ensured that every local government in the Critical Area would receive a specific notification of the proposed changes. Mr. Epstein answered negatively. He explained that the subsection referred to three things: 1) that before the Commission took an action, there must be two public hearings; 2) that the regulations must be reviewed by the AELR Committee; and 3) that there be general notification in the newspapers or Maryland Register.

Mr. Glendening suggested that the local jurisdictions should receive specific, written notice of any changes that the Commission was proposing for the criteria. Mr. Price added that subsection (1) should read that the "Commission" shall hold the public hearings, not a Panel of the Commission.

A motion was made and seconded that the Commission approve the changes to the proposed Program Amendments and Refinements legislation. The vote was unanimously in favor.

UNDER NEW BUSINESS

Dr. Taylor introduced a new addition to the Commission staff, Ms. Susan Lawrence, Planner, who will be working with the jurisdictions of the Lower Western Shore on Program Implementation and Amendment.

Dr. Taylor announced a field trip sponsored by the Chesapeake Bay Alliance, October 24th - 26th, and Indiantown Field Day, sponsored by the Agricultural Experiment Station and the Cooperative Extension Service of the University of Maryland.

Ms. Langner made the suggestion that at the next Commission meeting, mosquito control activities conducted by the Department of Agriculture be discussed as the Department had submitted an MOU, asking the Commission for a review and evaluation.

Chairman North announced that this day's meeting would be the last for the attendance of Mr. Ronald Karasic, and expressed the Commission's appreciation for his considerable contribution to the works of the Commission.

Mr. Karasic thanked the Commission, and gave his assurances that it had been an enriching experience, and that he has benefited from everyone.

There being no further business, the Meeting was adjourned.

EXHIBIT A

Program Amendments and Refinements (October 10, 1989)

(1) AMEND NRA 8-1802. Definitions.

Add new (a)(4). "DEVELOPMENT AREA DESIGNATION" MEANS THE DESIGNATION OF LAND IN THE CRITICAL AREA AS INTENSELY DEVELOPED, LIMITED DEVELOPMENT, OR RESOURCE CONSERVATION AREAS, OR THEIR LOCAL EQUIVALENTS, UNDER COMAR 14.15.02.

Add new. (a)(5) "GROWTH ALLOCATION" MEANS THE AMOUNT OF ACRES THAT A LOCAL JURISDICTION MAY USE TO CREATE NEW INTENSELY DEVELOPED AND LIMITED DEVELOPMENT AREAS.

Re-number existing (a)(4) to NEW (a)(6).

Re-number existing (a)(5) to NEW (a)(7).

Add new (a)(9). "PROGRAM AMENDMENT" MEANS ANY CHANGE TO AN ADOPTED PROGRAM WHICH THE COMMISSION DETERMINES WILL RESULT IN A USE OF LAND OR WATER IN THE CRITICAL AREA IN A MANNER NOT PROVIDED FOR IN THE ADOPTED PROGRAM, INCLUDING, BUT NOT LIMITED TO, A CHANGE TO A ZONING MAP THAT IS NOT CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATION OF THE ADOPTED PROGRAM, AND A USE OF GROWTH ALLOCATION THAT IS NOT CONSISTENT WITH THE METHOD FOR DEDUCTING GROWTH ALLOCATION CONTAINED IN THE ADOPTED PROGRAM.

Add new (a)(10). "PROGRAM REFINEMENT" MEANS ANY CHANGE TO AN ADOPTED PROGRAM WHICH THE COMMISSION DETERMINES WILL RESULT IN A USE OF LAND OR WATER IN THE CRITICAL AREA IN A MANNER ALREADY PROVIDED FOR IN THE ADOPTED PROGRAM, INCLUDING, BUT NOT LIMITED TO, A CHANGE TO A ZONING MAP THAT IS CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATION OF THE ADOPTED PROGRAM, AND THE USE OF GROWTH ALLOCATION IN ACCORDANCE WITH THE METHOD FOR DEDUCTING GROWTH ALLOCATION CONTAINED IN THE ADOPTED PROGRAM. HOWEVER, IF THE COMMISSION ADOPTS REGULATIONS CONCERNING GROWTH ALLOCATION, THE PROPOSED PROGRAM CHANGE MUST BE IN ACCORDANCE WITH THE REGULATIONS IN ORDER FOR THE CHANGE TO BE DETERMINED TO BE A REFINEMENT.

Amend existing (a)(7) and re-number to NEW (a)(11). "Project Approval" means the approval of development...authority. The term includes approval of REZONINGS, subdivision plats, and site plans;...and conditional use permits; and issuance of zoning permits. (Note: Definition of "Project Approval" in Criteria also amended)

(2) AMEND NRA 8-1809. Approval and Adoption of Program.

Amend existing (g) Proposed amendments. Each local jurisdiction shall review and propose any necessary amendments to its ENTIRE program, including local zoning maps, at least ONCE every four years, ~~Amendments shall be submitted to and acted on by the Commission in the same manner as the original program~~ BEGINNING WITH THE FOUR YEAR ANNIVERSARY OF THE DATE THAT THE ADOPTED PROGRAM BECAME EFFECTIVE, AND EVERY FOUR YEARS THEREAFTER. EACH LOCAL JURISDICTION SHALL SEND IN WRITING TO THE COMMISSION, WITHIN 60 DAYS OF EACH FOUR YEAR ANNIVERSARY, THE FOLLOWING:

- (1) A STATEMENT CERTIFYING THAT THE REQUIRED REVIEW HAS BEEN ACCOMPLISHED;
- (2) ANY NECESSARY REQUESTS FOR PROGRAM AMENDMENTS, REFINEMENTS, OR OTHER MATTERS WHICH THE LOCAL JURISDICTION WISHES THE COMMISSION TO CONSIDER;
- (3) AN UPDATED RESOURCE INVENTORY; AND
- (4) A STATEMENT QUANTIFYING ACREAGES WITHIN EACH LAND CLASSIFICATION, GROWTH ALLOCATION USED, AND GROWTH ALLOCATION REMAINING.

Add new (h). AS NECESSARY, BUT NOT MORE THAN FOUR TIMES PER CALENDAR YEAR, EACH LOCAL JURISDICTION MAY PROPOSE AMENDMENTS AND REFINEMENTS TO ITS ADOPTED PROGRAM. EXCEPT FOR AMENDMENTS OR REFINEMENTS DEVELOPED DURING PROGRAM REVIEW UNDER SUBSECTION (g) OF THIS SECTION, A ZONING MAP AMENDMENT MAY BE GRANTED BY A LOCAL APPROVING AUTHORITY ONLY ON PROOF OF A MISTAKE IN THE EXISTING ZONING. THE REQUIREMENT IN THIS SUBSECTION THAT A ZONING MAP AMENDMENT MAY BE GRANTED ONLY ON PROOF OF A MISTAKE SHALL NOT APPLY TO PROPOSED CHANGES TO A ZONING MAP THAT ARE WHOLLY CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATIONS IN THE ADOPTED PROGRAM, OR THAT PROPOSE THE USE OF GROWTH ALLOCATION.

Amend existing (h) and renumber to (i). Program not to be amended OR REFINED without approval of Commission. -- A program may not be amended OR REFINED except with the approval of the Commission.
~~Except for...existing zoning. --~~

Amend existing (i) and renumber to new (j). Standards for approval by Commission. -- The Commission shall approve programs, and amendments AND REFINEMENTS that meet:...this subtitle.

Renumber existing (j) to new (k).

(3) Add new (1). IF THE COMMISSION DETERMINES THAT AN ADOPTED PROGRAM CONTAINS A CLEAR ERROR OR OMISSION OF FACT, OR CONFLICTS WITH EXISTING LAW OR REGULATION, IT MAY NOTIFY THE LOCAL JURISDICTION OF THE SPECIFIC DEFICIENCY AND REQUEST THAT THE JURISDICTION SUBMIT A PROPOSED AMENDMENT OR REFINEMENT TO CORRECT THE DEFICIENCY. WITHIN 90 DAYS, THE LOCAL JURISDICTION SHALL SUBMIT TO THE COMMISSION, AS PROGRAM AMENDMENTS OR REFINEMENTS, SUCH PROPOSED CHANGES AS ARE NECESSARY TO CORRECT ANY DEFICIENCY OF WHICH IT IS NOTIFIED BY THE COMMISSION.

(4) Add new (m).

(1) THE COMMISSION MAY PROMULGATE REGULATIONS THAT PRESCRIBE THE PROCEDURES AND INFORMATION REQUIREMENTS FOR PROGRAM AMENDMENTS AND REFINEMENTS.

(2) IN THE ABSENCE OF SUCH REGULATIONS, LOCAL JURISDICTIONS MAY PROPOSE CHANGES TO ADOPTED PROGRAMS, AND WITHIN 14 WORKING DAYS OF RECEIVING A PROPOSAL, THE COMMISSION SHALL ACCEPT THE PROPOSAL FOR PROCESSING, OR RETURN THE PROPOSAL AS INCOMPLETE.

(3) A LOCAL JURISDICTION MAY SPECIFY WHETHER IT INTENDS A PROPOSED CHANGE TO BE A PROGRAM AMENDMENT OR REFINEMENT. HOWEVER, THE COMMISSION SHALL TREAT A PROPOSED CHANGE AS A PROGRAM AMENDMENT UNLESS THE CHAIRMAN DETERMINES THAT IT IS A PROGRAM REFINEMENT.

(4) FOR PROPOSED PROGRAM AMENDMENTS, A COMMISSION PANEL SHALL HOLD A PUBLIC HEARING IN THE LOCAL JURISDICTION AND A QUORUM OF THE COMMISSION SHALL ACT UPON THE PROPOSED AMENDMENT WITHIN 90 DAYS OF THE COMMISSION'S ACCEPTANCE OF THE PROPOSAL. IF ACTION BY THE COMMISSION IS NOT TAKEN WITHIN 90 DAYS, THE PROPOSED AMENDMENT IS DEEMED APPROVED. THE LOCAL JURISDICTION SHALL INCORPORATE THE APPROVED AMENDMENT INTO THE ADOPTED PROGRAM WITHIN 120 DAYS OF RECEIVING NOTICE FROM THE COMMISSION THAT THE AMENDMENT HAS BEEN APPROVED.

(5) PROPOSED PROGRAM REFINEMENTS SHALL BE DECIDED AS FOLLOWS:

(a) THE CHAIRMAN MAY, ON BEHALF OF THE COMMISSION AND WITHIN 30 DAYS OF THE COMMISSION'S RECEIPT OF A PROPOSED CHANGE TO AN ADOPTED PROGRAM, DETERMINE THAT THE PROPOSED CHANGE IS A PROGRAM REFINEMENT. THE LOCAL JURISDICTION SHALL BE NOTIFIED WHEN A PROPOSED CHANGE THAT WAS SPECIFICALLY SUBMITTED AS A REFINEMENT WAS NOT ACTED ON BY THE CHAIRMAN WITHIN THE 30 DAY PERIOD AND SHALL INFORM THE JURISDICTION THAT THE PROPOSAL HAS BEEN DEEMED A PROGRAM AMENDMENT.

- (b) THE COMMISSION MAY OVERRIDE THE CHAIRMAN'S DETERMINATION ONLY BY A MAJORITY VOTE OF A QUORUM TAKEN AT THE FIRST COMMISSION MEETING THAT FOLLOWS THE CHAIRMAN'S DETERMINATION. IF THE CHAIRMAN'S DETERMINATION IS OVERRIDDEN, THE PROPOSED CHANGE IS DEEMED A PROGRAM AMENDMENT AND SHALL BE DECIDED BY THE COMMISSION IN ACCORDANCE WITH THE PROCEDURES FOR PROGRAM AMENDMENTS SET FORTH IN THIS SECTION, EXCEPT THAT THE COMMISSION SHALL ACT ON THE AMENDMENT WITHIN 60 DAYS OF ITS VOTE TO OVERRIDE THE CHAIRMAN.
- (c) IF THE CHAIRMAN'S DETERMINATION IS NOT OVERRIDDEN, THE CHAIRMAN, ON BEHALF OF THE COMMISSION, SHALL, WITHIN TEN WORKING DAYS OF THE FIRST COMMISSION MEETING FOLLOWING THE CHAIRMAN'S DETERMINATION, APPROVE THE PROPOSED REFINEMENT OR SEND IT BACK TO THE LOCAL JURISDICTION FOR THE MAKING OF SPECIFIC CHANGES. WITHIN 14 WORKING DAYS OF RECEIVING A CHANGED REFINEMENT, THE CHAIRMAN SHALL APPROVE OR DENY THE REFINEMENT. THE LOCAL JURISDICTION SHALL INCORPORATE AN APPROVED REFINEMENT INTO THE ADOPTED PROGRAM WITHIN 120 DAYS OF RECEIVING NOTICE FROM THE COMMISSION THAT THE REFINEMENT HAS BEEN APPROVED.
- (5) Add new (n). AS NECESSARY, A LOCAL JURISDICTION MAY COMBINE ANY OR ALL PROPOSED PROGRAM AMENDMENTS OR REFINEMENTS REQUIRED FOR A SPECIFIC PROJECT APPROVAL INTO A SINGLE REQUEST TO THE COMMISSION FOR PROGRAM AMENDMENT OR REFINEMENT. APPROVAL BY THE COMMISSION OF AN AMENDMENT OR REFINEMENT DOES NOT AFFECT THE COMMISSION'S AUTHORITY TO RECEIVE NOTICE OF, OR INTERVENE IN, A PROJECT APPROVAL THAT WAS NOT SPECIFICALLY APPROVED BY THE COMMISSION AS PART OF ITS APPROVAL OF AN AMENDMENT OR REFINEMENT.
- (6) Add new (o). AFTER THE INITIAL PROMULGATION OF THE CRITERIA FOR PROGRAM DEVELOPMENT ON OR BEFORE DECEMBER 1, 1985, AND THEIR AFFIRMATION BY THE GENERAL ASSEMBLY, THE COMMISSION MAY, FROM TIME TO TIME, MAKE SUCH AMENDMENTS TO THE CRITERIA AS IT DEEMS NECESSARY AND APPROPRIATE.
- (1) PRIOR TO PROMULGATING ANY SUCH CHANGES, THE COMMISSION SHALL HOLD AT LEAST TWO PUBLIC HEARINGS, ONE ON THE EASTERN SHORE AND ONE ON THE WESTERN SHORE OF THE CHESAPEAKE BAY. IN ADDITION, THE LOCAL CRITICAL AREA JURISDICTIONS SHALL RECEIVE DIRECT NOTICE OF ALL PROPOSED CHANGES TO THE CRITERIA.
- (2) THE COMMISSION SHALL FOLLOW ALL OF THE PROCEDURES FOR ADOPTING RULES OR REGULATIONS SET OUT IN TITLE 2, SUBTITLE 5 (JOINT COMMITTEE ON ADMINISTRATIVE, EXECUTIVE, AND LEGISLATIVE REVIEW) AND TITLE 10, SUBTITLE 1 (ADMINISTRATIVE PROCEDURES ACT) OF THE STATE GOVERNMENT ARTICLE, IN AMENDING THE CRITERIA.

- (3) WITHIN SIX MONTHS AFTER THE PROMULGATION OF AMENDED CRITERIA, THE LOCAL JURISDICTION SHALL SEND TO THE COMMISSION, AS PROPOSED PROGRAM AMENDMENTS OR REFINEMENTS, CHANGES TO ADOPTED PROGRAMS THAT ADDRESS THE AMENDED CRITERIA, OR SHALL SEND TO THE COMMISSION A STATEMENT DESCRIBING HOW AND CERTIFYING THAT THE ADOPTED PROGRAM IS CONSISTENT WITH THE AMENDED CRITERIA.

Jan FYI



STATE OF MARYLAND
CHESAPEAKE BAY CRITICAL AREAS COMMISSION
WEST GARRETT PLACE, SUITE 320
275 WEST STREET
ANNAPOLIS, MARYLAND 21401
974-2418 or 974-2426

SARAH J. TAYLOR, PHD
EXECUTIVE DIRECTOR

JOHN C. NORTH, II
CHAIRMAN

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MEMORANDUM

TO: COMMISSION MEMBERS

FROM: TERA LISA HARNISH *Teri Lisa Harnish*

SUBJ: SUBCOMMITTEE MEETINGS

DATE: October 18, 1989

PLACE: Horn Point, Cambridge, Maryland

The following Subcommittee and Panel Meetings will be held at Horn Point in Cambridge Maryland, starting at 9:30a.m., on November 1, 1989.

9:30a.m. - 11:30a.m.

SPECIAL ISSUES SUBCOMMITTEE

James E. Gutman, Ch., William Bostain, Parris Glendening (Carolyn Watson), Robert Perciasepe (Rick Naylor), Robert Price, Skip Zahniser, Torrey Brown and Wayne Cawley (Louise Lawrence).

9:30a.m. - 11:30a.m.

PROJECT EVALUATION SUBCOMMITTEE

Kay Langner, Ch., Sam Bowling, William Corkran, Tom Jarvis, G. Steele Phillips, Russell Blake, Ardath Cade and Robert Schoeplein.

10:30a.m. - 11:30a.m.

PROGRAM AMENDMENTS SUBCOMMITTEE

Shep Krech, Ronald Adkins, Ronald Kreitner (Larry Duket), Ronald Hickernell, J. Frank Raley and Victor Butanis.

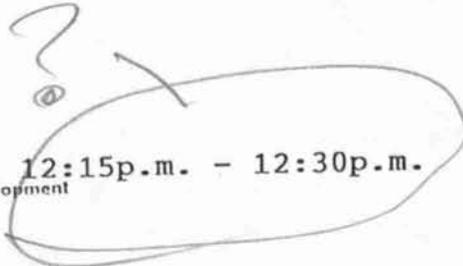
12:15p.m. - 12:30p.m.

DORCHESTER CO. AMENDMENTS PANEL

Robert Schoeplein, Ch., Sam Bowling, William Bostain, Shep Krech, Ronald Kreitner and Robert Price.

CABINET MEMBERS

- Wayne A. Cawley, Jr.
Agriculture
- Robert Schoeplein
Employment and Economic Development
- Robert Perciasepe
Environment
- Ardath Cade
Housing and Community Development
- Torrey C. Brown, M.D.
Natural Resources
- Ronald Kreitner
Planning



Program Amendments and Refinements (September 20, 1989)

(1) AMEND NRA 8-1802. Definitions.

Add new (a)(4). "DEVELOPMENT AREA DESIGNATION" MEANS THE DESIGNATION OF LAND IN THE CRITICAL AREA AS INTENSELY DEVELOPED, LIMITED DEVELOPMENT, OR RESOURCE CONSERVATION AREAS UNDER COMAR 14.15.02.

Add new. (a)(5) "GROWTH ALLOCATION" MEANS THE AMOUNT OF ACRES THAT A LOCAL JURISDICTION MAY USE TO CREATE NEW INTENSELY DEVELOPED AND LIMITED DEVELOPMENT AREAS. ^{or their local equivalents.}

Renumber existing (a)(4) to NEW (a)(6).

Renumber existing (a)(5) to NEW (a)(7).

Amend existing (a)(6) and renumber to (a)(8). "Program" means the ~~critical area protection program AND ALL IMPLEMENTING LAWS, ORDINANCES, AND REGULATIONS of a local jurisdiction, including any amendments OR REFINEMENTS to it.~~ THESE.

Add new (a)(9). "PROGRAM AMENDMENT" MEANS ANY CHANGE TO AN ADOPTED PROGRAM WHICH THE COMMISSION DETERMINES WILL RESULT IN A USE OF LAND OR WATER IN THE CRITICAL AREA IN A MANNER NOT PROVIDED FOR IN THE ADOPTED PROGRAM, INCLUDING, BUT NOT LIMITED TO, A CHANGE TO A ZONING MAP THAT IS NOT CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATION OF THE ADOPTED PROGRAM, AND A USE OF GROWTH ALLOCATION THAT IS NOT CONSISTENT WITH THE METHOD FOR DEDUCTING GROWTH ALLOCATION CONTAINED IN THE ADOPTED PROGRAM.

Add new (a)(10). "PROGRAM REFINEMENT" MEANS ANY CHANGE TO AN ADOPTED PROGRAM WHICH THE COMMISSION DETERMINES WILL RESULT IN A USE OF LAND OR WATER IN THE CRITICAL AREA IN A MANNER ALREADY PROVIDED FOR IN THE ADOPTED PROGRAM, INCLUDING, BUT NOT LIMITED TO, A CHANGE TO A ZONING MAP THAT IS CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATION OF THE ADOPTED PROGRAM, AND THE USE OF GROWTH ALLOCATION IN ACCORDANCE WITH THE METHOD FOR DEDUCTING GROWTH ALLOCATION CONTAINED IN THE ADOPTED PROGRAM.

Amend existing (a)(7) and renumber to NEW (a)(11). "Project Approval" means the approval of development...authority. The term includes approval of REZONINGS, subdivision plats, and site plans;...and conditional use permits; and issuance of zoning permits. (Note: Definition of "Project Approval" in Criteria also amended)

→ If the Commission promulgates a regulation concerning the deduction of GA, the use of GA must be in accordance w such regulation or the change to be considered a "problem refinement"

(2) AMEND NRA 8-1809. Approval and Adoption of Program.

Amend existing (g) Proposed amendments. Each local jurisdiction shall review and proposed any necessary amendments to its ENTIRE program, including local zoning maps, at least ONCE every four years, ~~Amendments shall be submitted to and acted on by the Commission in the same manner as the original program~~ BEGINNING WITH THE FOUR YEAR ANNIVERSARY OF THE DATE THAT THE ADOPTED PROGRAM BECAME EFFECTIVE, AND EVERY FOUR YEARS THEREAFTER. EACH LOCAL JURISDICTION SHALL SEND IN WRITING TO THE COMMISSION, WITHIN 60 DAYS OF EACH FOUR YEAR ANNIVERSARY, THE FOLLOWING:

- (1) A STATEMENT CERTIFYING THAT THE REQUIRED REVIEW HAS BEEN ACCOMPLISHED;
- (2) ANY NECESSARY REQUESTS FOR PROGRAM AMENDMENTS, REFINEMENTS, OR OTHER MATTERS WHICH THE LOCAL JURISDICTION WISHES THE COMMISSION TO CONSIDER;
- (3) AN UPDATED RESOURCE INVENTORY; AND
- (4) A STATEMENT QUANTIFYING ACREAGES WITHIN EACH LAND CLASSIFICATION, GROWTH ALLOCATION USED, AND GROWTH ALLOCATION REMAINING.

[THE COMMISSION MAY WITHHOLD OR DENY STATE TECHNICAL OR FUNDING ASSISTANCE FOR LOCAL PROGRAM ACTIVITIES IF A LOCAL JURISDICTION FAILS TO COMPLY WITH THIS SUBSECTION]

Add new (h). AS NECESSARY, BUT NOT MORE THAN FOUR TIMES PER CALENDAR YEAR, EACH LOCAL JURISDICTION MAY PROPOSE AMENDMENTS AND REFINEMENTS TO ITS ADOPTED PROGRAM. EXCEPT FOR AMENDMENTS OR REFINEMENTS DEVELOPED DURING PROGRAM REVIEW UNDER SUBSECTION (g) OF THIS SECTION, A ZONING MAP AMENDMENT MAY BE GRANTED BY A LOCAL APPROVING AUTHORITY ONLY ON PROOF OF A MISTAKE IN THE EXISTING ZONING. THE REQUIREMENT IN THIS SUBSECTION THAT A ZONING MAP AMENDMENT MAY BE GRANTED ONLY ON PROOF OF A MISTAKE SHALL NOT APPLY TO PROPOSED CHANGES TO A ZONING MAP THAT ARE WHOLLY CONSISTENT WITH THE DEVELOPMENT AREA DESIGNATIONS IN THE ADOPTED PROGRAM, OR THAT PROPOSE THE USE OF GROWTH ALLOCATION.

Amend existing (h) and renumber to (i). Program not to be amended OR REFINED without approval of Commission. -- A program may not be amended OR REFINED except with the approval of the Commission. ~~Except for existing zoning.~~

Amend existing (i) and renumber to new (j). Standards for approval by Commission. -- The Commission shall approve programs, and amendments AND REFINEMENTS that meet:...this subtitle.

Renumber existing (j) to new (k).

(3) Add new (1). IF THE COMMISSION ^{determines} ~~DISCOVERS~~ THAT AN ADOPTED PROGRAM ~~[WILL NOT ACHIEVE THE GOALS OF THE LAW AND CRITERIA]~~ IT MAY NOTIFY THE LOCAL JURISDICTION OF THE SPECIFIC DEFICIENCY AND REQUEST THAT THE JURISDICTION SUBMIT A PROPOSED AMENDMENT OR REFINEMENT TO CORRECT THE DEFICIENCY. WITHIN 90 DAYS, THE LOCAL JURISDICTION SHALL SUBMIT TO THE COMMISSION, AS PROGRAM AMENDMENTS OR REFINEMENTS, SUCH PROPOSED CHANGES AS ARE NECESSARY TO CORRECT ANY DEFICIENCY OF WHICH IT IS NOTIFIED BY THE COMMISSION. ~~[IN ORDER TO REMAIN ELIGIBLE FOR STATE TECHNICAL OR FUNDING ASSISTANCE FOR LOCAL PROGRAM ACTIVITIES.]~~ *Contains a clear mistake, on commission, or conflict with the existing criteria or law*

(4) Add new (m).

(1) THE COMMISSION MAY PROMULGATE REGULATIONS THAT ^{prescribe} ~~DESCRIBE~~ THE PROCEDURES AND INFORMATION REQUIREMENTS FOR PROGRAM AMENDMENTS AND REFINEMENTS.

(2) IN THE ABSENCE OF SUCH REGULATIONS, LOCAL JURISDICTIONS MAY PROPOSE CHANGES TO ADOPTED PROGRAMS, AND WITHIN 14 WORKING DAYS OF RECEIVING A PROPOSAL, THE COMMISSION SHALL ACCEPT THE PROPOSAL FOR PROCESSING, OR RETURN THE PROPOSAL AS INCOMPLETE.

(3) A LOCAL JURISDICTION MAY SPECIFY WHETHER IT INTENDS A PROPOSED CHANGE TO BE A PROGRAM AMENDMENT OR REFINEMENT. HOWEVER, THE COMMISSION SHALL TREAT A PROPOSED CHANGE AS A PROGRAM AMENDMENT UNLESS THE CHAIRMAN DETERMINES THAT IT IS A PROGRAM REFINEMENT.

(4) FOR PROPOSED PROGRAM AMENDMENTS, A COMMISSION PANEL ^{shall} ~~MAY~~ HOLD PUBLIC HEARING IN THE LOCAL JURISDICTION AND A QUORUM OF THE COMMISSION SHALL ACT UPON THE PROPOSED AMENDMENT WITHIN 90 DAYS OF THE COMMISSION'S ACCEPTANCE OF THE PROPOSAL. IF ^{by the Commission} ~~ACTION~~ IS NOT TAKEN WITHIN 90 DAYS, THE PROPOSED AMENDMENT IS DEEMED APPROVED. THE LOCAL JURISDICTION SHALL INCORPORATE THE APPROVED AMENDMENT INTO THE ADOPTED PROGRAM WITHIN 120 DAYS OF RECEIVING NOTICE FROM THE COMMISSION THAT THE AMENDMENT HAS BEEN APPROVED.

(5) PROPOSED PROGRAM REFINEMENTS SHALL BE DECIDED AS FOLLOWS:

(a) THE CHAIRMAN MAY, ON BEHALF OF THE COMMISSION AND WITHIN 30 DAYS OF THE COMMISSION'S RECEIPT OF A PROPOSED CHANGE TO AN ADOPTED PROGRAM, DETERMINE THAT THE PROPOSED CHANGE IS A PROGRAM REFINEMENT. ~~THE COMMISSION SHALL NOTIFY~~ THE LOCAL JURISDICTION ^{shall be notified} WHEN A PROPOSED CHANGE THAT WAS SPECIFICALLY INTENDED TO BE A REFINEMENT WAS NOT ACTED ON BY THE CHAIRMAN ^{submitted} WITHIN THE 30 DAY PERIOD AND SHALL INFORM THE JURISDICTION THAT THE PROPOSAL HAS BEEN DEEMED A PROGRAM AMENDMENT.

(b) THE COMMISSION MAY OVERRIDE THE CHAIRMAN'S DETERMINATION ONLY BY A MAJORITY VOTE OF A QUORUM TAKEN AT THE FIRST COMMISSION MEETING THAT FOLLOWS THE CHAIRMAN'S DETERMINATION. IF THE CHAIRMAN'S DETERMINATION IS OVERRIDDEN, THE PROPOSED CHANGE IS DEEMED A PROGRAM AMENDMENT AND SHALL BE DECIDED BY THE COMMISSION IN ACCORDANCE WITH THE PROCEDURES FOR PROGRAM AMENDMENTS SET FORTH IN THIS SECTION, EXCEPT THAT THE COMMISSION SHALL ACT ON THE AMENDMENT WITHIN 60 DAYS OF ITS VOTE TO OVERRIDE THE CHAIRMAN.

(c) IF THE CHAIRMAN'S DETERMINATION IS NOT OVERRIDDEN, THE CHAIRMAN, ON BEHALF OF THE COMMISSION, SHALL, WITHIN TEN WORKING DAYS OF THE FIRST COMMISSION MEETING FOLLOWING THE CHAIRMAN'S DETERMINATION, APPROVE THE PROPOSED REFINEMENT OR SEND IT BACK TO THE LOCAL JURISDICTION FOR THE MAKING OF SPECIFIC CHANGES. WITHIN 14 WORKING DAYS OF RECEIVING A CHANGED REFINEMENT, THE CHAIRMAN SHALL APPROVE OR DENY THE REFINEMENT. THE LOCAL JURISDICTION SHALL INCORPORATE AN APPROVED REFINEMENT INTO THE ADOPTED PROGRAM WITHIN 120 DAYS OF RECEIVING NOTICE FROM THE COMMISSION THAT THE REFINEMENT HAS BEEN APPROVED.

(5) Add new (n). AS NECESSARY, A LOCAL JURISDICTION MAY COMBINE ANY OR ALL PROPOSED PROGRAM AMENDMENTS OR REFINEMENTS REQUIRED FOR A SPECIFIC PROJECT APPROVAL INTO A SINGLE REQUEST TO THE COMMISSION FOR PROGRAM AMENDMENT OR REFINEMENT. APPROVAL BY THE COMMISSION OF AN AMENDMENT OR REFINEMENT DOES NOT AFFECT THE COMMISSION'S AUTHORITY TO RECEIVE NOTICE OF, OR INTERVENE IN, A PROJECT APPROVAL THAT WAS NOT SPECIFICALLY APPROVED BY THE COMMISSION AS PART OF ITS APPROVAL OF AN AMENDMENT OR REFINEMENT.

(6) Add new (o). AFTER THE INITIAL PROMULGATION OF THE CRITERIA FOR PROGRAM DEVELOPMENT ON OR BEFORE DECEMBER 1, 1985, AND THEIR AFFIRMATION BY THE GENERAL ASSEMBLY, THE COMMISSION MAY, FROM TIME TO TIME, MAKE SUCH AMENDMENTS TO THE CRITERIA AS IT DEEMS NECESSARY AND APPROPRIATE.

(1) PRIOR TO PROMULGATING ANY SUCH CHANGES, ~~A PANEL~~ OF THE COMMISSION SHALL HOLD AT LEAST TWO PUBLIC HEARINGS, ONE ON THE EASTERN SHORE AND ONE ON THE WESTERN SHORE OF THE CHESAPEAKE BAY.

(2) THE COMMISSION SHALL FOLLOW ALL OF THE PROCEDURES FOR ADOPTING RULES OR REGULATIONS SET OUT IN TITLE 2, SUBTITLE 5 (JOINT COMMITTEE ON ADMINISTRATIVE, EXECUTIVE, AND LEGISLATIVE REVIEW) AND TITLE 10, SUBTITLE 1 (ADMINISTRATIVE PROCEDURES ACT) OF THE STATE GOVERNMENT ARTICLE, IN AMENDING THE CRITERIA.

The 10 jurisdictions shall be notified.

In addition, the CA lcl jurisdictions shall receive direct notice of all proposed changes in the criteria

- (3) WITHIN SIX MONTHS AFTER THE PROMULGATION OF AMENDED CRITERIA, THE LOCAL JURISDICTION SHALL SEND TO THE COMMISSION, AS PROPOSED PROGRAM AMENDMENTS OR REFINEMENTS, CHANGES TO ADOPTED PROGRAMS THAT ADDRESS THE AMENDED CRITERIA, OR SHALL SEND TO THE COMMISSION A STATEMENT DESCRIBING HOW AND CERTIFYING THAT THE ADOPTED PROGRAM IS CONSISTENT WITH THE AMENDED CRITERIA.

MOSQUITO CONTROL PROGRAM

Motion

*Gen -
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last Commis
Mtg minutes
S.*

The Project Evaluation Subcommittee would like to make a motion to engage the full Commission, at its next meeting, in a discussion of the mosquito control activities conducted by the Department of Agriculture. Because the Department has submitted a draft Memorandum of Understanding and request for general approval for its Open Marsh Water Management and insecticiding programs, the Commission is being asked to evaluate these activities in the Critical Area. The issue is a complex one, with many potential environmental impacts, and deserves comprehensive and objective review. We would therefore like to receive the input of more Commission members than only those in the subcommittee. In addition, we would like to expand participation in our discussion to other DNR representatives, who may have more experience with mosquito control than many of us here.

STAFF REPORT

October 4, 1989

JURISDICTION: St. Mary's County

ISSUE: Critical Area Program

RECOMMENDATION: Return program to County with required changes to be made within 40 days.

The staff-recommended changes appear below and as noted on program document. The changes on the document are of a technical nature.

Pages 1-2

Enforcement: The program contains requirements for land development, but is not designated as part of the St. Mary's County Zoning Ordinance. As a separate ordinance, it contains no specific means of enforcement or provisions regarding penalties, remedies or appeals.

Page 8

The County must determine the acreage for each classification based on the current Critical Area maps.

Page 10

#5 Grandfathering: The County intends to grandfather Planned Unit Developments which received final zoning approval by the County Commissioners prior to December 1, 1985, provided that the Critical Area Criteria are met insofar as possible.

The panel recommends approval of these projects as grandfathered only if 1) all requirements of the County's resolution of rezoning are fulfilled, and 2) if all requirements of the County's Critical Area Program are met, except the requirement regarding residential density. Therefore, some means is needed whereby 1) the Commission can be assured that development takes place according to these provisions and 2) an adjustment to the County's Growth Allocation can be made if the provisions are not adhered to.

Page 43

The program must specify that no commercial cutting is permitted in the Buffer without a Buffer Management Plan, which is a forest plan containing the minimum elements of COMAR 14.15.09.01C(5)(a)(i)-(iii). The criteria which permit selection cutting to within 50 feet, and clearcutting of loblolly pine and tulip poplar within that area should be included here.

Page 45

The full requirements of a mineral resources element must be part of this program.

Staff Report - St. Mary's County
October 4, 1989
Page Two

The Enforcement Section should include at the beginning of each subsection a clear provision that the applicant is responsible for providing sufficient information to the Environmental Review Team.

Page 61

The program states that the County has "about 1500 acres" of Growth Allocation. This figure must be precise.

Page 79

The development envelop concept for the Design Competition must comply with the Commission's Guidelines. Specifically, there must be an area of 20 acres which remains undeveloped, to be restricted by easements, covenants or other protective measures.

Page 80

For Minor Subdivisions and Single-Lot Subdivisions, each lot created through the use of Growth Allocation must be deducted from the County's total Growth Allocation acreage.

Mr. Brey explained that the Program lacked: proper enforcement language; a clear ~~plan~~ statement that Planned Unit Developments would be developed in conformance with the Criteria, except in regard to density; a complete mineral resources section; current acreage totals for IDAs, CDAs and RCAs; and a procedure to select Month Allocation consistent with the Commission's approvals for other jurisdictions.

~~The~~ The Staff Report of recommended changes also included technical notes which appear ~~in~~ directly in the County's Program. Mr. Brey said ~~that~~ the panel recommended that the entire package be returned to the County.

James E. Nutman, Chairman of the panel for St. Mary's County, ~~read a motion~~ made the balancing motion.

STAFF REPORT

August 2, 1989

JURISDICTION: St. Mary's County

ISSUE: Growth Allocation; proposed methods of deduction.

RECOMMENDATION: APPROVAL of cluster option;
DENIAL of minor subdivision and single-lot subdivision options.

St. Mary's County has approximately 1,500 acres of Growth Allocation. The County proposes that deductions from Growth Allocation occur in one of three ways:

1. Major subdivisions (over five lots), Planned Unit Developments, and other large projects (60% of Growth Allocation, approximately 900 acres):
 - * deductions will be consistent with the Commission's established policy for development envelopes;
 - * lots will be clustered;
 - * all individually-owned lots will be deducted;
 - * a minimum 20 acre undeveloped area, community-owned, will be controlled by covenants or other protective measures.
2. Minor subdivisions (20% of Growth Allocation, approximately 300 acres):
 - * individually-owned lots will not be fully deducted;
 - * a 20,000 square foot development pad will be deducted; five acre minimum lot size;
 - * represents 10 times the number of dwelling units anticipated by full-parcel deduction.
3. Single-lot subdivisions (20% of Growth Allocation; approximately 300 acres):
 - * individually-owned lots not fully deducted;

- * a 20,000 square foot development pad will be deducted; six acre minimum lot size;
- * represents 13 times the number of dwelling units anticipated by full-parcel deduction.

In February, 1988, the Commission approved Guidelines For The Counting of Growth Allocation. The Guidelines establish that the Commission "will entertain alternative proposals" for the deduction of Growth Allocation other than for the full acreage of a parcel. The approval of less-than-full-parcel deduction is discretionary, intended for "circumstances where the overall goals of the Critical Area Program would be enhanced." Enhancement is possible, theoretically, because the deducted area, the development envelope, would include:

"individually-owned lots, any required Buffers, impervious surfaces, utilities, stormwater management measures, on-site sewage disposal measures, any areas subject to human use such as active recreation areas, and any additional requirements of the criteria."

In order to be exempted from deduction, the remaining area, outside the development envelope, must be 20 acres in size and protected by covenants or other restrictive measures.

The Guidelines specifically reject deductions based on a development area or pad within an individually-owned lot. The Commission recognized several reasons for this rejection, including:

- * adverse environmental impacts result from the number, movement and activities of people in the Critical Area;
- * an RCA parcel developed, by use of Growth Allocation, at a density greater than one dwelling unit per 20 acres no longer exhibits RCA characteristics; therefore, the entire parcel should count against Growth Allocation;
- * flexibility in development location and site design is provided through the use of Growth Allocation and the concept of the development envelope for large-scale projects;
- * concentration of development is encouraged; 20,000 square foot LDAs and IDAs are discouraged.

STAFF REPORT

October 4, 1989

SUBJECT

Kent County Zoning Ordinance Amendment

BACKGROUND

Kent County submitted its revised Zoning Ordinance as an amendment to its Critical Area Program on May 23, 1989. On June 22, the Critical Area Commission Panel and the Kent County Commissioners hosted a joint public hearing.

The Amendment was presented to the Critical Area Commission for a vote on August 2, 1989. The Commission voted to return the Zoning Ordinance to Kent County with the Commission's comments which needed to be addressed.

The County resubmitted the Zoning Ordinance on September 12, 1989, within the 40-day time frame required by law.

ISSUES

Kent County addressed most of the comments made by the Critical Area Commission. Several remaining issues which required further discussion between Kent County, the Panel, and Commission staff included commercial uses in the RCA, and a process for designation of new habitat protection areas (HPA's).

At a meeting on September 8, 1989 between the Kent County Commissioners, Kent County staff, the Critical Area Commission Panel, and Critical Area staff, these remaining issues were resolved to the County's and the Panel's satisfaction.

The attached letter to Judge North from the County Commissioners lists the changes to the Zoning Ordinance which will address the issues of commercial uses in the RCA and designation of new HPA's.

PANEL RECOMMENDATION

Panel recommends approval of the Kent County Zoning Ordinance with the condition that the changes presented in the Kent County Commissioners' letter to Judge North dated September 11, 1989, be incorporated into the Zoning Ordinance.

The County Commissioners of Kent County

ALEXANDER P. RASIN, III
PRESIDENT
CHESTERTOWN, MD

ARTHUR L. HARRIS, III
MEMBER
CHESTERTOWN, MD.

WALLACE D. MILLER
MEMBER
CHESTERTOWN, MD.

Court House
Chestertown, Maryland 21620
TELEPHONE (301) 778-4600
EXT. 34

September 11, 1989

WILLIAM H. LANDON
COUNTY ADMINISTRATOR

JANICE F. FLETCHER
ADMINISTRATIVE ASSISTANT/CLERK

ERNEST S. COOKERLY
ATTORNEY TO COMMISSIONERS

*Rec'd
9/12/89
(hand-delivered)*

The Honorable John C. North, II
Chesapeake Bay Critical Area Commission
275 West Street, Suite 320
Annapolis, Maryland 21401

RE: Kent County Zoning Ordinance Amendments

Dear Judge North:

Attached you will find the official submittal of the Kent County Zoning Ordinance. As discussed at our September 8, 1989 meeting, we propose the following:

- 1) Amend the Development Handbook to address the creation of new habitat protection areas. Specifically, "new habitat protection areas will be considered as an amendment to the zoning ordinance. These amendments to the ordinance and habitat protection area maps shall follow the procedure set forth in Article XI, Section VI of the zoning ordinance.
- 2) Amend Article X, Section 2.32 of the Zoning Ordinance (definition of "camps, day") to read: "Camp, day - A lot, tract or parcel of land operated as a resource utilization enterprise in which seasonal facilities are provided for all or any of the following: camping, picnicking, boating, fishing, swimming, outdoor games, and sports and activities incidental and relating to the foregoing but not including miniature golf, golf grounds, golf driving ranges, mechanical amusement device or permanent structures for housing of guests."
- 3) Amend Article V, Section 2.2.4 of the Zoning Ordinance to read: "Convalescent, group, or homes for the aged if located in dwellings existing as of December 1, 1985."
- 4) Amend Article VII, Section 3.2 of the Zoning Ordinance to read: "Adaptive reuse of historic structures, in AZD, RCD, RR, LM, IM, and V Districts, provided:
 - a) Structure must be listed in the historic sites survey or approved as a historically significant structure by the Kent County Historical Trust;
 - b) It is shown that exterior changes to site structures will be minimized. Extension or enlargement of the principle and accessory structures may not exceed 25% of the gross floor area of each individual building above that which exists at the time of the adoption of these regulations;
 - c) Landscaping in keeping with character of the building;
 - d) Site must have access to public road;
 - e) The use is complimentary to the character of the building;
 - f) The number of dwellings shall not exceed the density permitted in the district in which the structure is located;
 - g) In RCD, adaptive reuse projects shall be limited to non-commercial and non-industrial uses.



- 5) ³ Amend Article VII, Section 2.11 of the Zoning Ordinance to read:
Country Inn, boarding or lodging facilities, in AZD, RR, RCD, CAR, LM and IM Districts, provided:
- a) Such structures have existed prior to the effective date of this Ordinance.
 - b) The number of rooming units provided on the site is limited to ten, excluding resident management quarters.
 - c) Boarding or dining facilities, in AZD, RR, CAR, LM, and IM, may be permitted only when attendant to rooming units, and further provided that such facilities be limited to a maximum seating capacity of forty persons. Such dining facility may provide service to patrons other than boarders. No dining facility shall be permitted in RCD.
 - d) The site has access to a public road. This access must be capable of supporting the passage of emergency vehicles. The Board may require improvements to existing access roads. Should improvements be required, a bond must be posted running to the County following the same procedure as that outlined in the Kent County Subdivision Ordinance.
 - e) The minimum lot size for any parcel providing such facilities shall be five acres.
 - f) There is compliance with applicable requirements for such facilities as provided by the Kent County Health Department.
 - g) It is shown that exterior changes to site structures will be minimized. Extension or enlargement of the principle and accessory structures may not exceed 50 percent of the gross floor area of each individual building above that which existed at the time of the adoption of these regulations.
 - h) Adequate landscaping shall be provided to screen all parking areas from adjoining residential properties. Landscaping or screening proposed shall be shown on a site plan as required by this Article.
- 6) Amend Article V, Section 2.3.4 and Article VII, Section 2.13 of the Zoning Ordinance to read: "Day nurseries or child care centers in AZD, RCD, RR and CAR if located in dwellings existing on December 1, 1985."

These amendments have been submitted to the Kent County Planning Commission as required in Article XI, Section VI of the Kent County Zoning Ordinance.

If you have any questions, please do not hesitate to call the Planning Office.

Very truly yours,

COUNTY COMMISSIONERS OF KENT COUNTY

Alexander P. Rasin, III
Alexander P. Rasin, III, President

Arthur L. Harris, III
Arthur L. Harris, III, Member

Wallace D. Miller
Wallace D. Miller, Member

October 4, 1989

Motion for Commission Vote on St. Mary's County Critical Area Program

...to return the St. Mary's County Critical Area Program to the County. Within 40 days from the date of return by the Chairman, the County must make changes to its Program as specified in writing by the Chairman and return the Program to the Commission.

If the County has not returned the Program to the Commission with all required changes within the time specified, the Commission shall promulgate a Program for St. Mary's County according to the provisions of Section 8-1810 of the Natural Resources Article, Annotated Code of Maryland. The Commission's required public hearings will be held at the St. Mary's County Governmental Center, in Leonardtown, on November 15, 1989 at 7:30 p.m. and December 11, 1989 at 7:30 p.m. Submission of the Commission's promulgated program to the Maryland Register will follow the public hearings.

STAFF REPORT

October 4, 1989

SUBJECT

Kent County Zoning Ordinance Amendment

BACKGROUND

Kent County submitted its revised Zoning Ordinance as an amendment to its Critical Area Program on May 23, 1989. On June 22, the Critical Area Commission Panel and the Kent County Commissioners hosted a joint public hearing.

The Amendment was presented to the Critical Area Commission for a vote on August 2, 1989. The Commission voted to return the Zoning Ordinance to Kent County with the Commission's comments which needed to be addressed.

The County resubmitted the Zoning Ordinance on September 12, 1989, within the 40-day time frame required by law.

ISSUES

Kent County addressed most of the comments made by the Critical Area Commission. Several remaining issues which required further discussion between Kent County, the Panel, and Commission staff included commercial uses in the RCA, and a process for designation of new habitat protection areas (HPA's).

At a meeting on September 8, 1989 between the Kent County Commissioners, Kent County staff, the Critical Area Commission Panel, and Critical Area staff, these remaining issues were resolved to the County's and the Panel's satisfaction.

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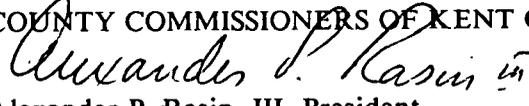
- 3
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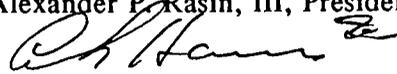
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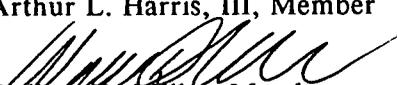
If you have any questions, please do not hesitate to call the Planning Office.

Very truly yours,

COUNTY COMMISSIONERS OF KENT COUNTY


Alexander P. Rasin, III, President


Arthur L. Harris, III, Member


Wallace D. Miller, Member

PROJECT REPORT

October 4, 1989

Project

Kings Landing/Cammack/Walke Natural Resources Management Area,
Calvert County

Applicant

Department of Natural Resources Capital Programs Administration
Land Planning Services

Site

1200 acres (approximately 900 acres in the Critical Area) on the Patuxent River, bordered by Chew Creek to the north and extending to south of Cocktown Creek; west of Huntington

Proposal

The plan is to improve the Kings Landing Area as an environmental education center. New development includes an education/information wing attached to the existing meeting/dining hall, six new cabins, moving existing cabins and/or building a dormitory, a 250-car parking lot, tenting area, extension of an existing pier, group picnic areas, comfort station. The facility will accommodate school groups. Educational programs will feature the ecology of Cocktown Creek, a proposed Estuarine Research Reserve, and surrounding wetlands including the Patuxent River. A boardwalk crossing the creek and linking the three areas is also proposed.

The Cammack and Walke areas will be used predominantly for forestry, forest research, wildlife management, and agriculture (using best management practices). Several group and family picnic areas are also being proposed. A canoe launch will be located on the Patuxent River south of Chew Creek.

Subcommittee Report and Recommendation

The proposal appears to be consistent with the Critical Area Program. The subcommittee recommends approval of the conceptual plan with the following specifications:

- the parking lot should have trench drains which collect the first inch of rainfall and divert it for infiltration
- the parking lot shall be landscaped with shade trees
- all nonwater-dependent facilities should be kept out of the buffer. The pier, canoe launch, trails, boardwalk and

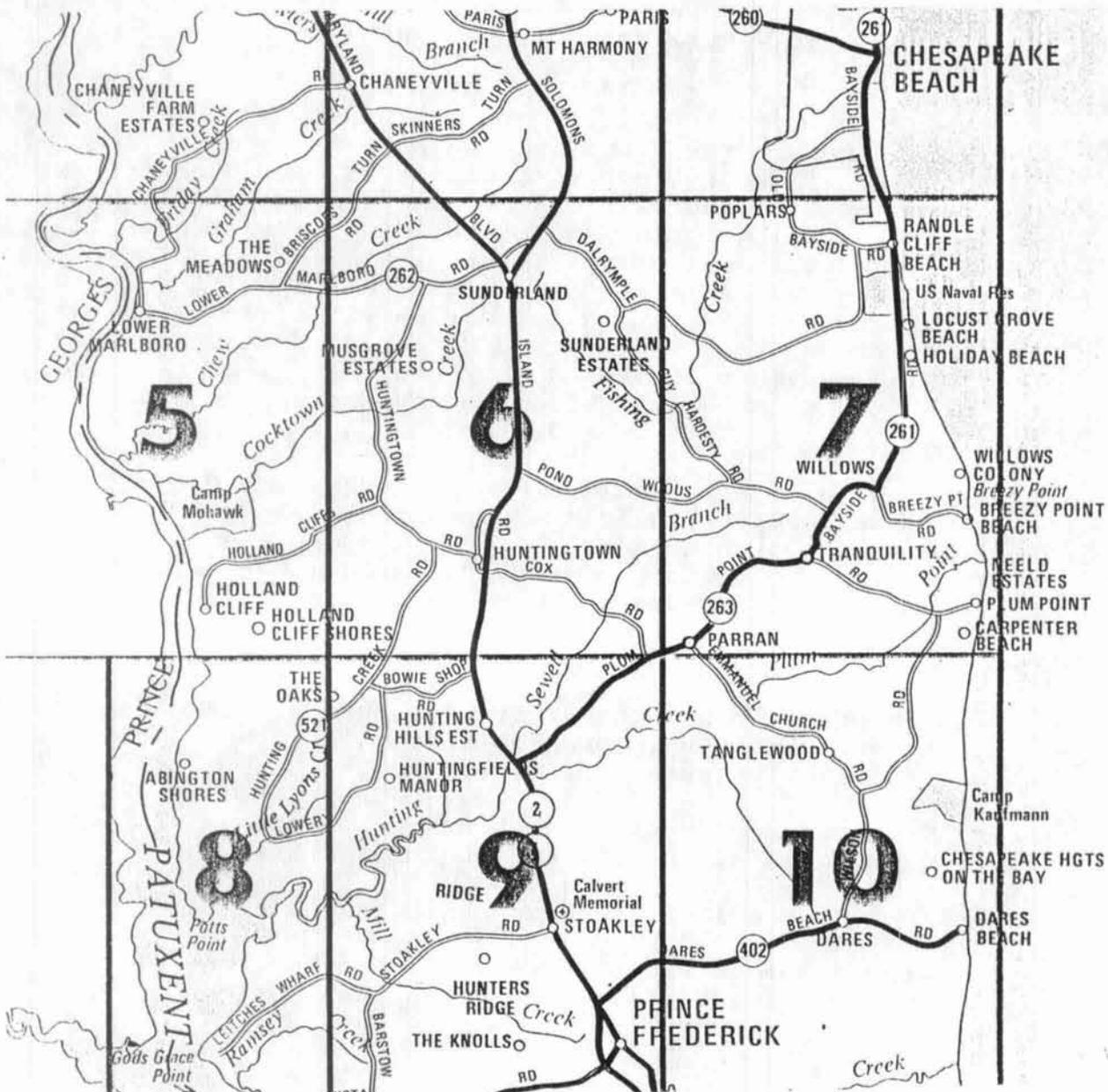
pervious overlooks shall be allowed in the buffer.

- maintenance of forest cover on all steep slopes to avoid erosion into the numerous steep ravines
- final design plans shall be submitted to the Critical Area Commission for approval

Commission Action

Discussion and vote to approve the conceptual plan as it now stands

AR:msl



PROJECT EVALUATION SUBCOMMITTEE REPORT

October 4, 1989

PROJECT: Parking lot at Harmony Hall Regional Center,
Prince George's County

APPLICANT: Maryland-National Capital Park and Planning
Commission

RECOMMENDATION: APPROVAL, with conditions

DISCUSSION:

M-NCPPC proposes to construct a parking area at the Harmony Hall Regional Center, located off Indian Head Highway in Prince George's County. The Center offers County-wide arts and recreation programs. The site consists of 9.7 acres; 4.6 acres are within the Critical Area, including a portion of the main building and parking lots. The Center is in an Area of Intense Development.

Approximately one-half of the proposed parking lot will be within the Critical Area. This area is clear of trees and is relatively flat. An existing basketball court will be removed. The net increase in impervious area is 10,019 square feet.

The site is not managed for stormwater. M-NCPPC will install shallow grass swale ponds and will require Stormwater Management, Sediment and Erosion Control, and Grading permits before construction. The majority of the parking lot will be within the 100 year floodplain. A State (DNR) permit has been issued. No tidal or nontidal wetlands will be affected.

CONDITIONS:

The applicant will satisfy the requirement to reduce on-site pollutant loadings by 10% below existing levels. The applicant will coordinate the required analysis with staff and the Maryland Department of the Environment.

STAFF CONTACT:

Ren Serey

PROJECT EVALUATION SUBCOMMITTEE REPORT

October 4, 1989

PROJECT: Magruder's Landing Boating Facility,
Patuxent River, Prince George's County

APPLICANT: Maryland-National Capital Park and Planning
Commission

RECOMMENDATION: APPROVAL, with conditions

DISCUSSION:

M-NCPPC proposes to improve an existing boating area at Magruder's Landing, in the Patuxent River Park in Prince George's County. The area will be dedicated to Clyde Watson, noted Prince George's County conservationist.

At present, parking for approximately 20 vehicles is provided on a grass area within the Buffer. The proposal includes:

- parking for 40 vehicles outside the Buffer;
- elimination of parking in the Buffer;
- widening the existing paved access road to provide for safe vehicle movement;
- two parking spaces for handicapped and emergency use near the boat ramp;
- two picnic shelters outside the Buffer.

M-NCPPC will obtain permits for Stormwater Management, Sediment and Erosion Control, and Grading. Stormwater will be managed for water quality where feasible. Approximately one acre will be disturbed. Reforestation will exceed the minimum replacement requirements. No tidal wetlands will be affected.

One species on the Maryland List of Endangered Species and one nominated for the list exist near the site. M-NCPPC will coordinate a review of potential impacts with the Maryland Natural Heritage Program and follow any recommended actions.

CONDITIONS:

The applicant will coordinate with staff and the Maryland Natural Heritage Program to address impacts on endangered species. The applicant will follow the recommendations of the Maryland Natural Heritage Program.

STAFF CONTACT:

Ren Serey



Judge

General Assembly of Maryland

JOINT LEGISLATIVE OVERSIGHT COMMITTEE ON CHESAPEAKE BAY CRITICAL AREAS

Room 110
LEGISLATIVE SERVICES BUILDING
90 STATE CIRCLE
ANNAPOLIS, MARYLAND 21401-1991

RECEIVED

SEP 27 1989

September 26, 1989

DNR
CRITICAL AREA COMMISSION

MEMORANDUM

TO: Senator James C. Simpson
Delegate Michael H. Weir
Dr. Sarah J. Taylor
Judge John C. North, II

FROM: Myron Miller *MM*

RE: Meeting to discuss options

This is confirm the informal meeting between Oversight Committee Co-Chairs and Judge North/Dr. Taylor, to discuss possible legislative options. It will be held on Tuesday, October 3, at 10:00 a.m. in Room 302 of the Lowe House Office Building (Baltimore County Delegation Room).

I will bring a tally of the recommendations made before the Committee during its set of four regional hearings to gather local input. If you have any questions with regard to this meeting, please feel free to contact me.

SUMMARY BRIEFING FOR OVERSIGHT COMMITTEE

October 3, 1989

PROPOSALS FOR CHANGING THE LAW

- * Add Maryland Department of Transportation to the membership
- * Simplify the amendments process:
 - a) hearings
 - b) expedite minor revisions
 - c) provide for Commission to request that a local government address a criterion that may have been missed in approval of original program
- * Examine whether the Commission has the ability to promulgate regulations or change its regulations through the Maryland Register and the AELR Committee rather than have to change the Law

PROPOSALS FOR CHANGING THE CRITERIA

- * create flexibility for the 15% impervious surface limitation
 - a) look at 25% limit and apply across the board
 - b) do not require 15% for small lots in existing communities but rather require tie in with stormwater retrofitting program of Department of the Environment
 - c) tie in commercial, industrial uses on existing lots to some form of water quality improvement for every % change of increase over the 15%
- * clarify what is meant by development (i.e., just buildings, driveways, etc. or are sheds included and stormwater control measures as well). Also define what is meant by institutional uses in the RCA. What commercial and institutional uses can be placed in the RCA?
- * re-examine the slips and moorings ratio for community piers
- * re-examine the criteria for marinas and examine the issues of boatels, houseboats, and creating waterfront property by dredging out fastland
- * Look at options to the variance to help local governments simplify project approval process
- * re-examine the intrafamily transfer provision for flexibility
- * re-examine the growth allocation process as far as requirements for counting the growth when land use is changed

- * examine ways to handle highly eroding shoreline areas through development
- * examine the cutting of trees in the Buffer criterion
- * re-examine the replacement ratio for trees on small lots of record
- * re-examine the extended buffer regulation for slopes and on soils with development constraints
- * add definitions where needed and cross check criteria to see that they are consistent across the board from one section to the other

ANSWERS TO REQUEST FOR INFORMATION

- Delegate Guns- Annapolis formula for impervious area limits vs. Baltimore County difficulty with provisions
2. Senator Amoss- funding levels FY 89 and FY 90.

STAFF REPORT

August 2, 1989

JURISDICTION: St. Mary's County

ISSUE: Growth Allocation; proposed methods of deduction.

RECOMMENDATION: APPROVAL of cluster option;
DENIAL of minor subdivision and single-lot subdivision options.

St. Mary's County has approximately 1,500 acres of Growth Allocation. The County proposes that deductions from Growth Allocation occur in one of three ways:

1. Major subdivisions (over five lots), Planned Unit Developments, and other large projects (60% of Growth Allocation, approximately 900 acres):
 - * deductions will be consistent with the Commission's established policy for development envelopes;
 - * lots will be clustered;
 - * all individually-owned lots will be deducted;
 - * a minimum 20 acre undeveloped area, community-owned, will be controlled by covenants or other protective measures.
2. Minor subdivisions (20% of Growth Allocation, approximately 300 acres):
 - * individually-owned lots will not be fully deducted;
 - * a 20,000 square foot development pad will be deducted; five acre minimum lot size;
 - * represents 10 times the number of dwelling units anticipated by full-parcel deduction.
3. Single-lot subdivisions (20% of Growth Allocation; approximately 300 acres):
 - * individually-owned lots not fully deducted;

- * a 20,000 square foot development pad will be deducted; six acre minimum lot size;
- * represents 13 times the number of dwelling units anticipated by full-parcel deduction.

In February, 1988, the Commission approved Guidelines For The Counting of Growth Allocation. The Guidelines establish that the Commission "will entertain alternative proposals" for the deduction of Growth Allocation other than for the full acreage of a parcel. The approval of less-than-full-parcel deduction is discretionary, intended for "circumstances where the overall goals of the Critical Area Program would be enhanced." Enhancement is possible, theoretically, because the deducted area, the development envelope, would include:

"individually-owned lots, any required Buffers, impervious surfaces, utilities, stormwater management measures, on-site sewage disposal measures, any areas subject to human use such as active recreation areas, and any additional requirements of the criteria."

In order to be exempted from deduction, the remaining area, outside the development envelope, must be 20 acres in size and protected by covenants or other restrictive measures.

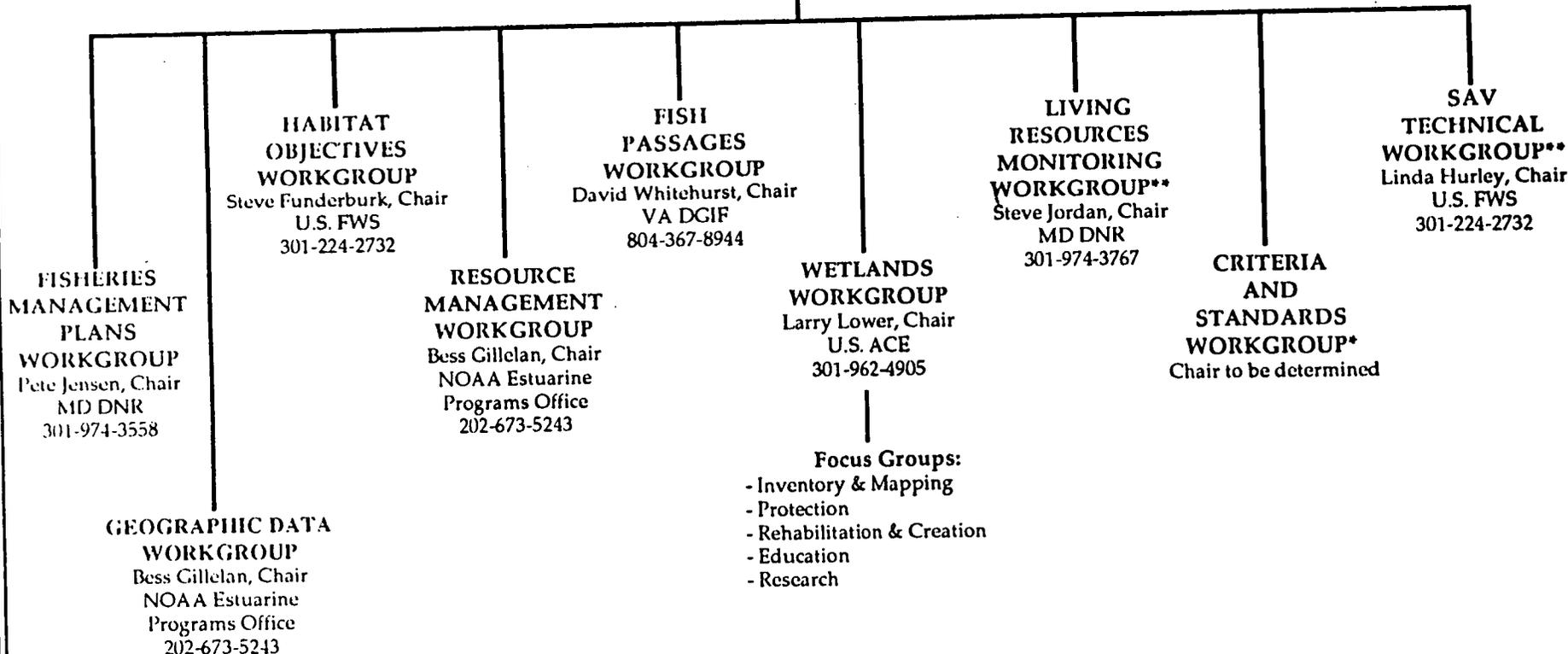
The Guidelines specifically reject deductions based on a development area or pad within an individually-owned lot. The Commission recognized several reasons for this rejection, including:

- * adverse environmental impacts result from the number, movement and activities of people in the Critical Area;
- * an RCA parcel developed, by use of Growth Allocation, at a density greater than one dwelling unit per 20 acres no longer exhibits RCA characteristics; therefore, the entire parcel should count against Growth Allocation;
- * flexibility in development location and site design is provided through the use of Growth Allocation and the concept of the development envelope for large-scale projects;
- * concentration of development is encouraged; 20,000 square foot LDAs and IDAs are discouraged.

LIVING RESOURCES SUBCOMMITTEE

Verna Harrison, Chair
Maryland Department of Natural Resources
301-974-2255

**CHESAPEAKE BAY
STOCK ASSESSMENT COMMITTEE**
Robert Lippson, Chair
NOAA/NMFS
301-226-5771



* A joint workgroup of the Living Resources and Toxics Subcommittees
** A joint work group of the Living Resources and Monitoring Subcommittees

LIVING RESOURCES SUBCOMMITTEE
WETLANDS
WORKGROUP

Larry Lower, Chair
U.S. ACE
301-962-4905

**INVENTORY
&
MAPPING**
Steve Funderburk,
Coordinator
U.S. FWS
301-224-2732

**PROTECTION OF
EXISTING
WETLANDS**
Roger Ficus
PDER
717-541-7803;
Tom Filip
U.S. ACE
301-962-3670,
Coordinators

**REHABILITATION,
RESTORATION,
CREATION**
Ian Frost
VA COE
804-786-4500;
JoAnn Watson
MDE
301-631-3603,
Coordinators

EDUCATION
Judy Plott,
Coordinator
ACE/CBLO
301-266-6873

RESEARCH
Carl Hershner,
Coordinator
VIMS
804-642-7387

LIVING RESOURCES COMMITMENT SCHEDULE

2A

DATE:

7/89

8/89

9/89

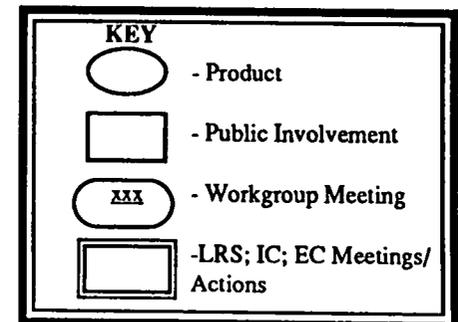
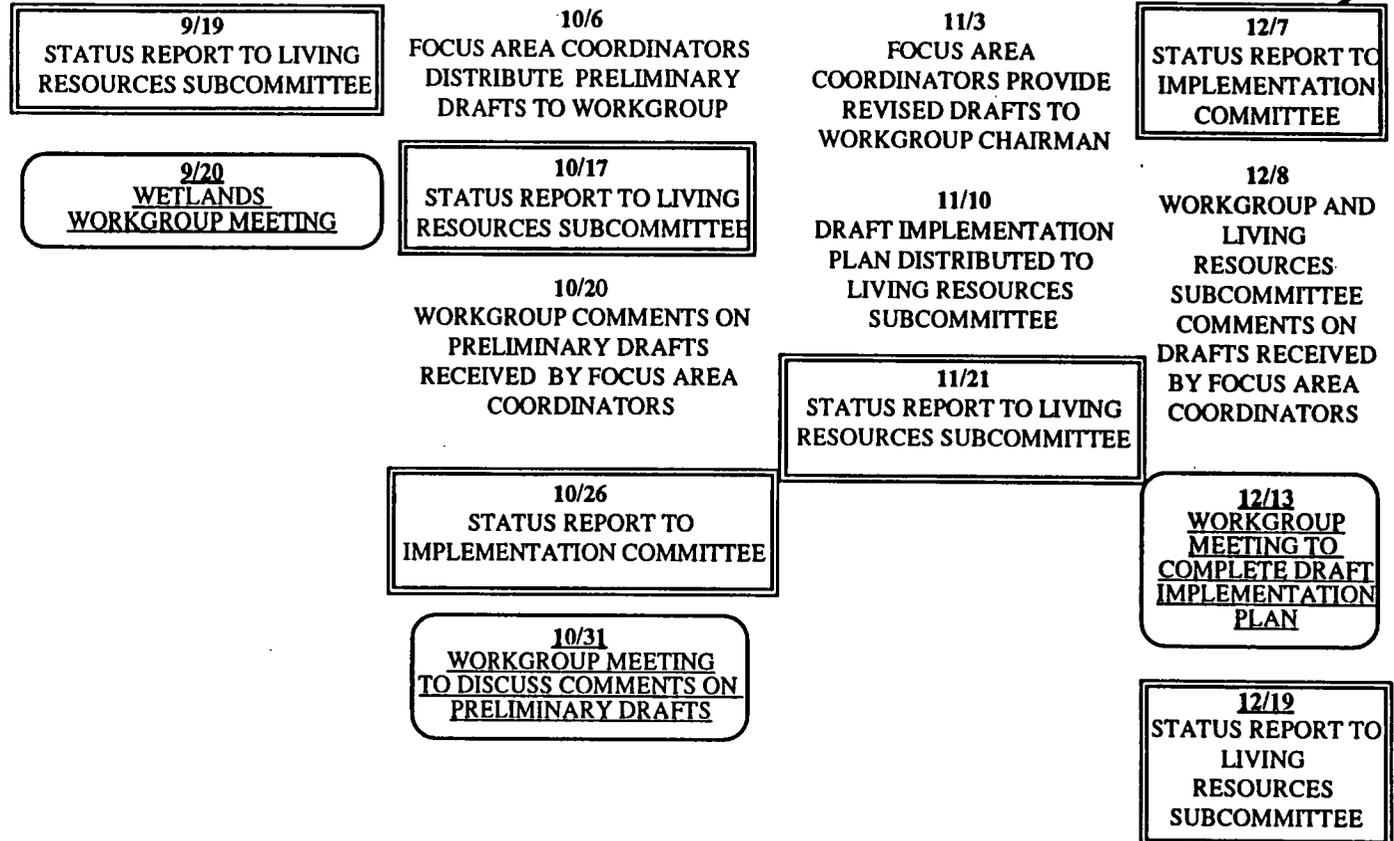
10/89

11/89

12/89

DEVELOP IMPLEMENTATION PLAN

WETLANDS POLICY

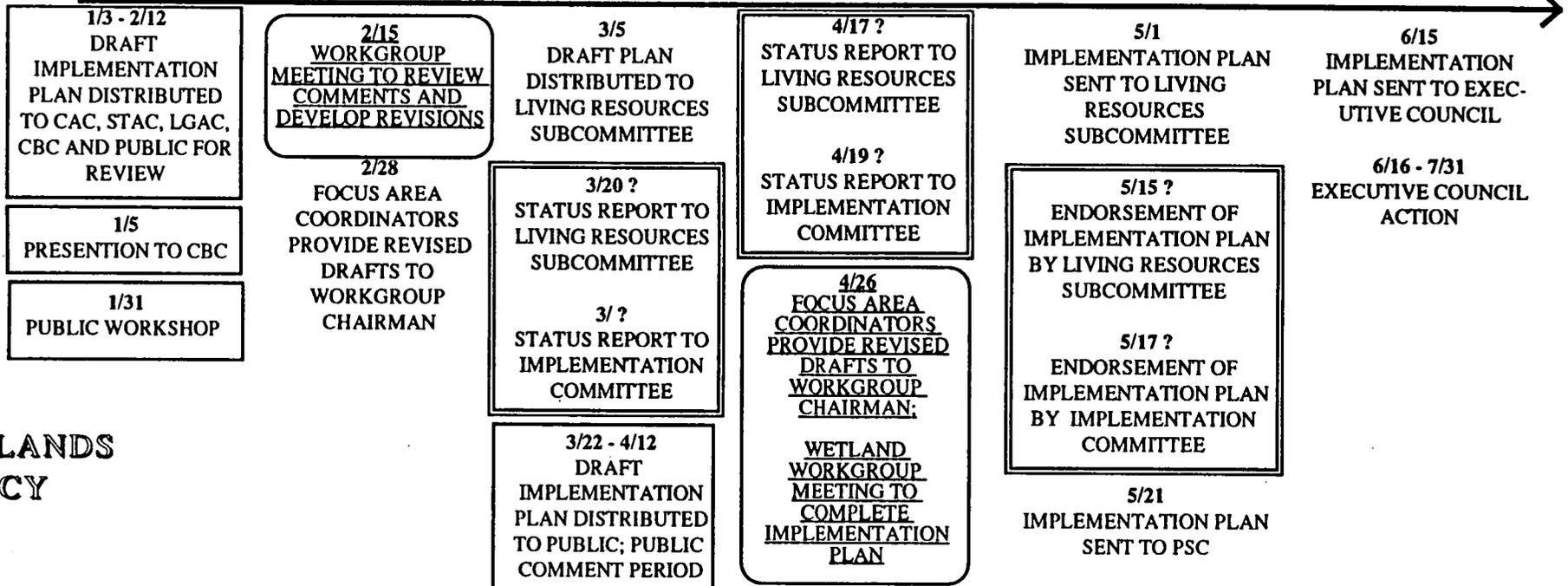


LIVING RESOURCES COMMITMENT SCHEDULE

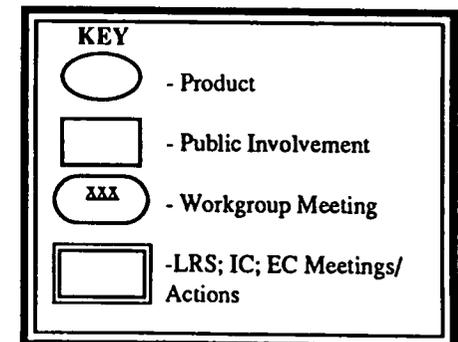
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DATE: 1/90 2/90 3/90 4/90 5/90 6/90

DEVELOP IMPLEMENTATION PLAN



WETLANDS
POLICY



LIVING RESOURCES COMMITMENT SCHEDULE

2C

DATE:

7/90

8/90

9/90

10/90

11/90

12/90

IMPLEMENTATION
PLANS ADOPTED

IMPLEMENTATION

WETLANDS
POLICY

KEY

-  - Product
-  - Public Involvement
-  - Workgroup Meeting
-  - LRS; IC; EC Meetings/
Actions

LIVING RESOURCES COMMITMENT SCHEDULE

2D

DATE:

1/91

2/91

3/91

4/91

5/91

6/91

IMPLEMENTATION



WETLANDS
POLICY

KEY

-  - Product
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LIVING RESOURCES COMMITMENT SCHEDULE

2E

DATE:

7/91

8/91

9/91

10/91

11/91

12/91

ANNUAL REPORT

IMPLEMENTATION

WETLANDS
POLICY

KEY

-  - Product
-  - Public Involvement
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-  -LRS; IC; EC Meetings/
Actions

9/22/89

LIVING RESOURCES SUBCOMMITTEE MILESTONES

	1989		1990				1991			1992
	JULY 1989	DEC 1989	JAN 1990	FEB/ MAR 1990	JULY 1990	DEC 1990	JAN 1991	JULY 1991	DEC 1991	JAN 1992
SHAD, CRAB, OYSTER FMPs	Plans Adopted		Implemen. Plan		Annual Report			Annual Report	Revised Plan	
STRIPED BASS - BAYWIDE PLAN		Plans Adopted			Implemen. Plan (State Fishing Regs. in Plan)		Annual Report			Annual Report
BLUEFISH, WEAKFISH/ SPOTTED SEATROUT, WHITE PERCH FMPs				1st Draft of Plans Prepared {Feb 1990}		Plans Adopted			Annual Report	
CROAKER/SPOT, SUMMER FLOUNDER, AMERICAN EEL FMPs <i>[Red and Black Drwn due 1992]</i>									Plans Adopted	
STOCK ASSESSMENT <i>[Plan Adopted July 88]</i>					Annual; Fisheries Statistics; Status of Stocks Reports			Annual; Fisheries Statistics; Status of Stocks Reports		
WATERFOWL MANAGEMENT PLAN					Plan Adopted			Annual Report		
ECOLOGICALLY VALUABLE SPECIES MANAGEMENT PLAN						Plan Adopted			Annual Report	

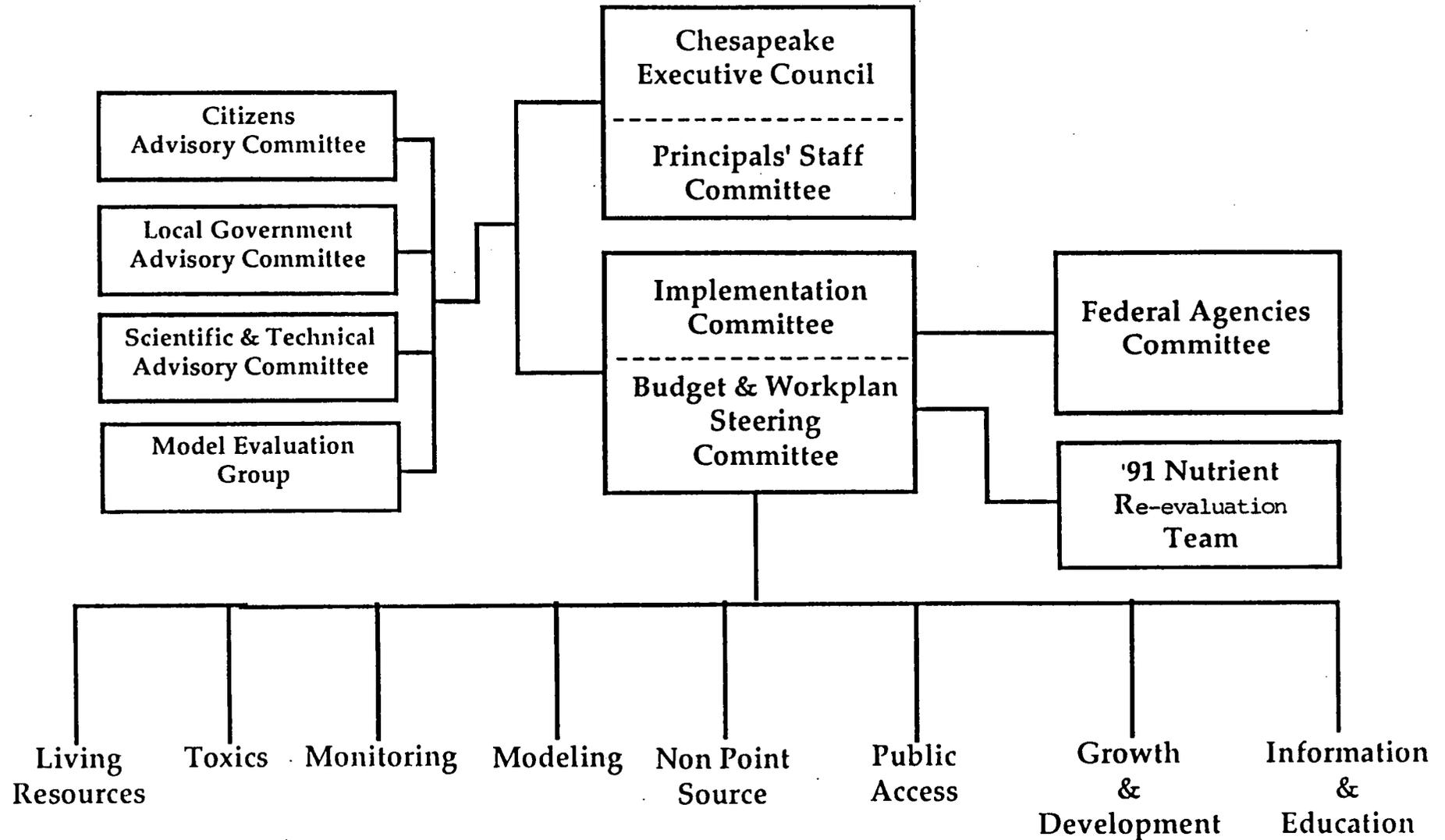
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	1989		1990				1991			1992
	JULY 1989	DEC 1989	JAN 1990	FEB/MAR 1990	JULY 1990	DEC 1990	JAN 1991	JULY 1991	DEC 1991	JAN 1992
SAV POLICY	Plan Adopted		Implemen. Plan		Annual Report; Technical Synthesis Report			Annual Report		
RESOURCE MANAGEMENT SCHEDULES <i>[Plan Adopted July 88]</i>	Annual Report				Annual Report			Annual Report		
WETLANDS POLICY <i>[Plan Adopted Dec 88]</i>					Implemen. Plans Adopted			Annual Report		
FISH PASSAGE <i>[Plan Adopted Dec 88]</i>		Annual Report	Implemen. Plan				Annual Report			Annual Report
LIVING RESOURCES MONITORING <i>[Plan Adopted July 88]</i>			Annual Report			Annual Report			Annual Report	
SEE PLAN FOR DETAILED IMPLEMENTATION STRATEGIES										
HABITAT OBJECTIVES DOCUMENT <i>[Plan Adopted Dec 88]</i>		Draft Plan		Final Plan <i>[Mar 90]</i>		Annual Report			Annual Report	

FOR FURTHER INFORMATION, CONTACT:

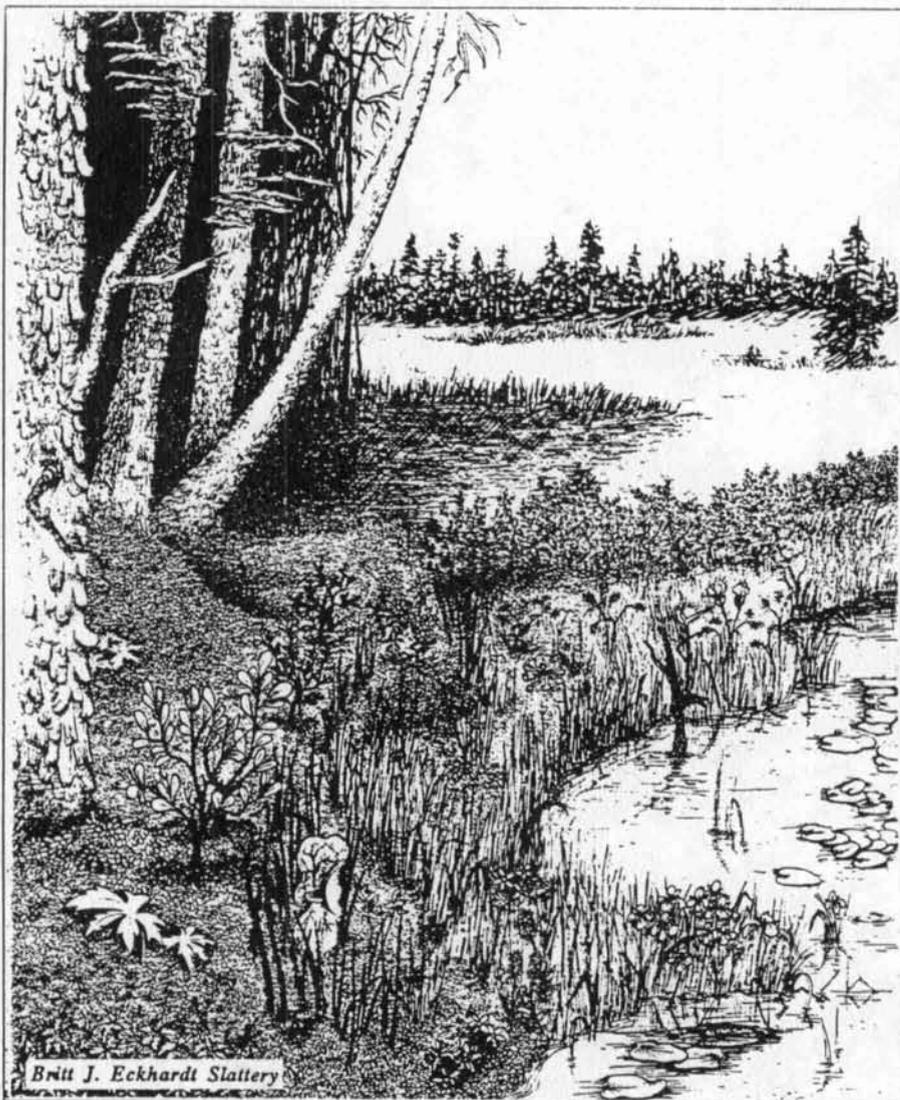
Verna E. Harrison, Chair (301) 974-2255
 Dr. Ed Christoffers, Science Advisor (301) 974-2255
 Dave Packer, Subcommittee Intern (301) 266-6873

MAJOR COMMITTEES IN THE CHESAPEAKE BAY PROGRAM



CHESAPEAKE BAY:

TIDAL AND NON-TIDAL WETLANDS POLICY



WETLANDS IN THE CHESAPEAKE BAY AGREEMENT

In recognition of the crucial function of wetlands within the Bay ecosystem, the Chesapeake Bay Agreement of 1987, signed by the Bay states and the federal government, makes the commitment:

By December 1988, to develop and begin to implement a Baywide policy for the protection of tidal and non-tidal wetlands.

The Chesapeake Bay Program's Living Resources Subcommittee established a Tidal and Non-tidal Wetlands Workgroup in December, 1987 to develop a comprehensive Chesapeake Bay Wetlands Policy for the Bay watershed. The Workgroup, chaired by Maryland Department of Natural Resources, includes representatives from the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, National Marine Fisheries Service, Pennsylvania Department of Environmental Resources, Virginia Council on the Environment, and the District of Columbia Environmental Control Division.

BACKGROUND

Wetlands are usually semi-aquatic lands, either flooded or saturated by water for varying periods of time during the growing season. They form a transition zone between dry upland areas and deeper, permanent bodies of water. The term "wetlands" encompasses a variety of environments such as tidal marshes, shrub swamps,

coastal mudflats, freshwater marshes, bottomland hardwood forests, wet meadows, and inland bogs.

At present, tidal and non-tidal wetlands constitute only three percent of the Chesapeake Bay drainage basin. Between the mid 1950s and the late 1970s, wetland destruction averaged over 2,800 acres annually. Continued wetland losses due to man-made impacts and natural causes increasingly threaten this valuable resource.

ECOLOGICAL VALUES

The health of the Chesapeake Bay ecosystem is inextricably linked to the abundance and condition of the wetlands in the Bay watershed. Some of the vital benefits wetlands provide include:

- Fish and wildlife habitat;
- Erosion control;
- Water quality improvement;
- Stormwater/flood control;
- Contribution of organic (plant) material to the Bay food web;
- Groundwater recharge;
- Habitat for rare, threatened and endangered species;
- Timber production; and,
- Recreational opportunities and scenic beauty.

Many of the Bay's living resources depend on wetlands for their survival. Large flocks of migratory ducks, geese and swans spend winters using the marshes for feeding and cover, while resident bird species rely year-round on wetland habitat.

Wetlands constitute the primary spawning and/or nursery sites for many finfish and shellfish species such as striped bass, menhaden, river herring, shad, spot and croaker, as well as blue crabs, oysters, and clams. When critical reproductive areas are filled for development or choked by pollution and excessive nutrients, the populations of these Bay

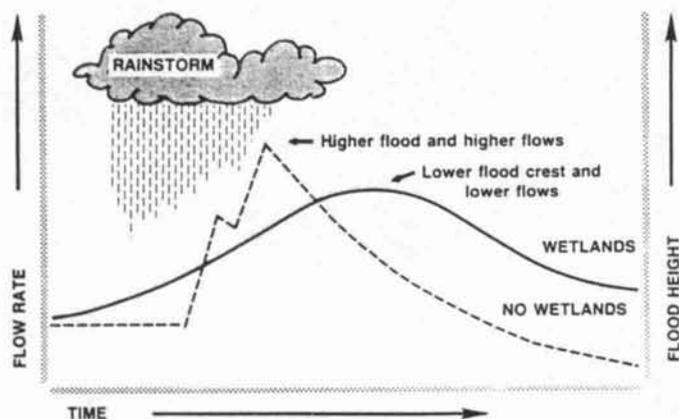
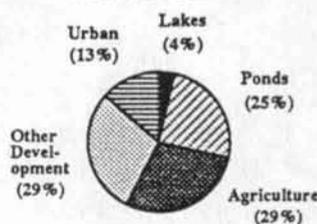
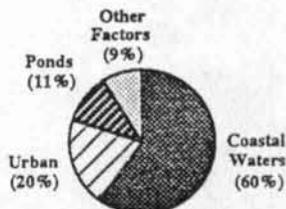


Figure 1. Wetland value in reducing flood crests and flow rates after rainstorms (adapted from Kusler, 1983.)

CAUSES OF INLAND VEGETATED WETLAND LOSS



CAUSES OF COASTAL WETLAND LOSS



Adapted from "Mid-Atlantic Wetlands: A Disappearing Natural Treasure," U.S. Fish and Wildlife Service and U.S. Environmental Protection Agency, 1987.

species will decline. Wetland plants dampen wave action, helping to curb erosion. They are also highly effective in lessening shoreline erosion. Their roots hold soil in place, reducing sedimentation. Sedimentation is not intrinsically harmful; when it is accelerated by disturbances to the environment, however, oyster beds may be smothered and penetration of sunlight critical to the growth of submerged vegetation may be blocked.

Upland runoff and drainage water which pass through wetlands are essentially

"filtered." This improvement in water quality comes from the wetland's ability to process excess nutrients such as nitrogen and phosphorus compounds, to intercept other pollutants, and to trap sediment and reduce suspended solids in the overlying water.

Controlling flood and storm waters is another important function of wetlands. Potentially damaging volumes of fast-moving storm or flood water are temporarily stored in wetland areas. The gradual release of these waters by the wetland minimizes erosion and urban/suburban property damage.

The aquatic food web is dependent upon tidal and non-tidal wetlands to provide nourishment for the many fish, shellfish, and smaller organisms that spend some period of their lives in the wetland habitat. Organic material, or food, is produced in the water by the breakdown of wetland plant leaves and stems.

The wetlands of the Bay states have an intrinsic natural beauty which provides recreational opportunities such as boating, fishing, crabbing and waterfowl hunting, as well as hiking, birdwatching, canoeing and other activities. The financial benefit of these wetland-dependent activities to the economy is significant, yet is threatened by continued wetland loss.

PROTECTION AND MANAGEMENT POLICIES

The goal of the Bay-wide strategy for the protection and management of wetlands within the Chesapeake Bay watershed is to achieve a net resource gain in wetland acreage and function over present conditions by:

- protecting existing wetlands; and,
- rehabilitating degraded wetlands, restoring former wetlands, and creating artificial wetlands.

By July 1990, implementation plans will be developed for the four following focus areas:

Defining the Resource: Inventory and Mapping Activities

To assess progress made toward the goal of net resource gain, comprehensive inventorying and monitoring of all wetland resources is needed. The National Wetlands Inventory and classification methods will be used to determine wetland distribution, acreage, and type.

Major actions include:

- Mapping of wetlands at 10-year intervals, in conjunction with status and trends analyses and cumulative impact assessments; and,

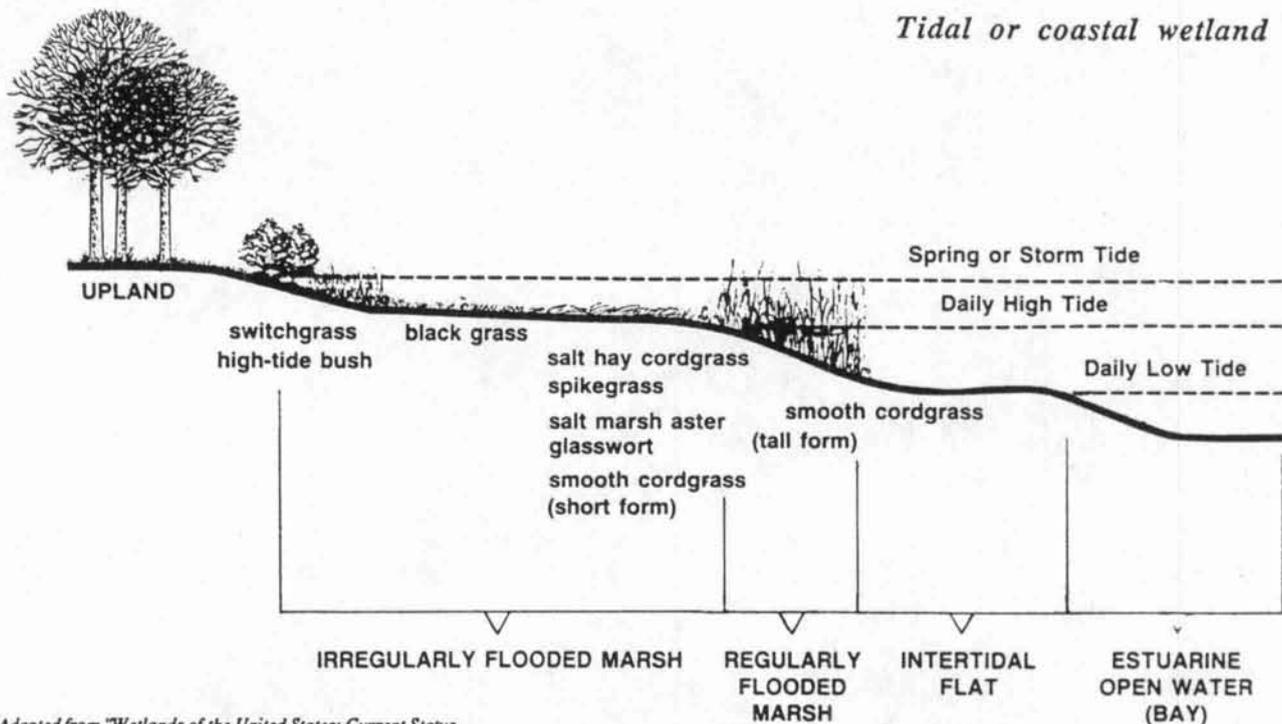
- Monitoring to quantify functions and values of various wetlands and to document changes occurring over time.

Holding the Line: Protecting Existing Wetlands

Existing regulatory standards and other programs at the federal and state level do not adequately protect wetlands. Management efforts must now be directed to control all wetland impacts--direct, indirect and cumulative.

Major actions include:

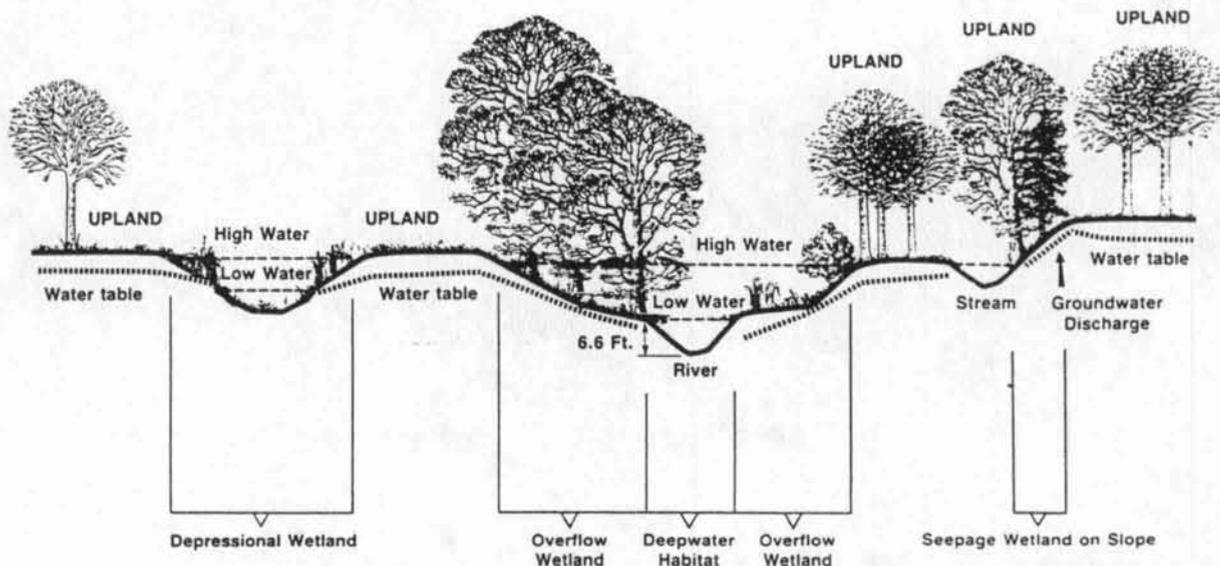
- Reviewing and evaluating existing regulatory and protection programs and initiating corrective measures;
- Identifying, in advance, wetland areas of special concern to enhance protection through the permitting process;
- Eliminating government sanctioned programs which are counterproductive to wetland protection, and establishing private sector incentive programs; and,
- Identifying priority areas for wetland preservation through land acquisition.



Adapted from "Wetlands of the United States: Current Status and Recent Trends," U.S. Fish and Wildlife Service, 1984.

Non-tidal or inland wetland

Adapted from "Wetlands of the United States: Current Status and Recent Trends," U.S. Fish and Wildlife Service, 1984.



Building the Base: Rehabilitating, Restoring, and Creating Wetlands

Commensurate with the goal of obtaining a net resource gain is the need to maintain the existing wetlands base, thereby reducing extensive creation and restoration projects. In those instances when unavoidable losses occur, compensatory creation, rehabilitation or restoration measures will be required. The Policy emphasizes cooperative design and evaluation of compensatory mitigation projects, along with long-term monitoring and management of these sites. Equally important tools for building the base of functioning wetlands are incentives and land acquisition.

Major actions include:

- Using private sector incentives to encourage rehabilitation, restoration, and creation of wetlands; and,
- Acquiring strategic sites to provide appropriate locations for wetland restoration, creation, and use activities.

Extending the Vision: Education and Research

Wetland protection depends upon public awareness of wetland values, management needs, and landowner support for protection policies. Appropriate technical training must be made available to resource managers and private sector interests. In addition, research is essential to

refine our knowledge of wetland functions and improve our ability to sustain these resources.

Major actions include:

- Developing and disseminating information for the public and educational institutions on the values of and need to protect wetlands;
- Initiating technical assistance programs to support local government protection efforts;
- Evaluating the individual and cumulative effects on wetlands of current best management practices, shallow water dredging, structural shore erosion practices, and alteration of the land/water interface; and,
- Assessing the design and effectiveness of artificial wetlands developed for wildlife and waterfowl improvement, shore erosion control, wastewater treatment, or acid mine drainage.

The 1987 Chesapeake Bay Agreement's goal of protecting and restoring wetlands provides an important opportunity for interested citizens, resource managers and legislators to focus their commitment to the health of the Bay watershed.

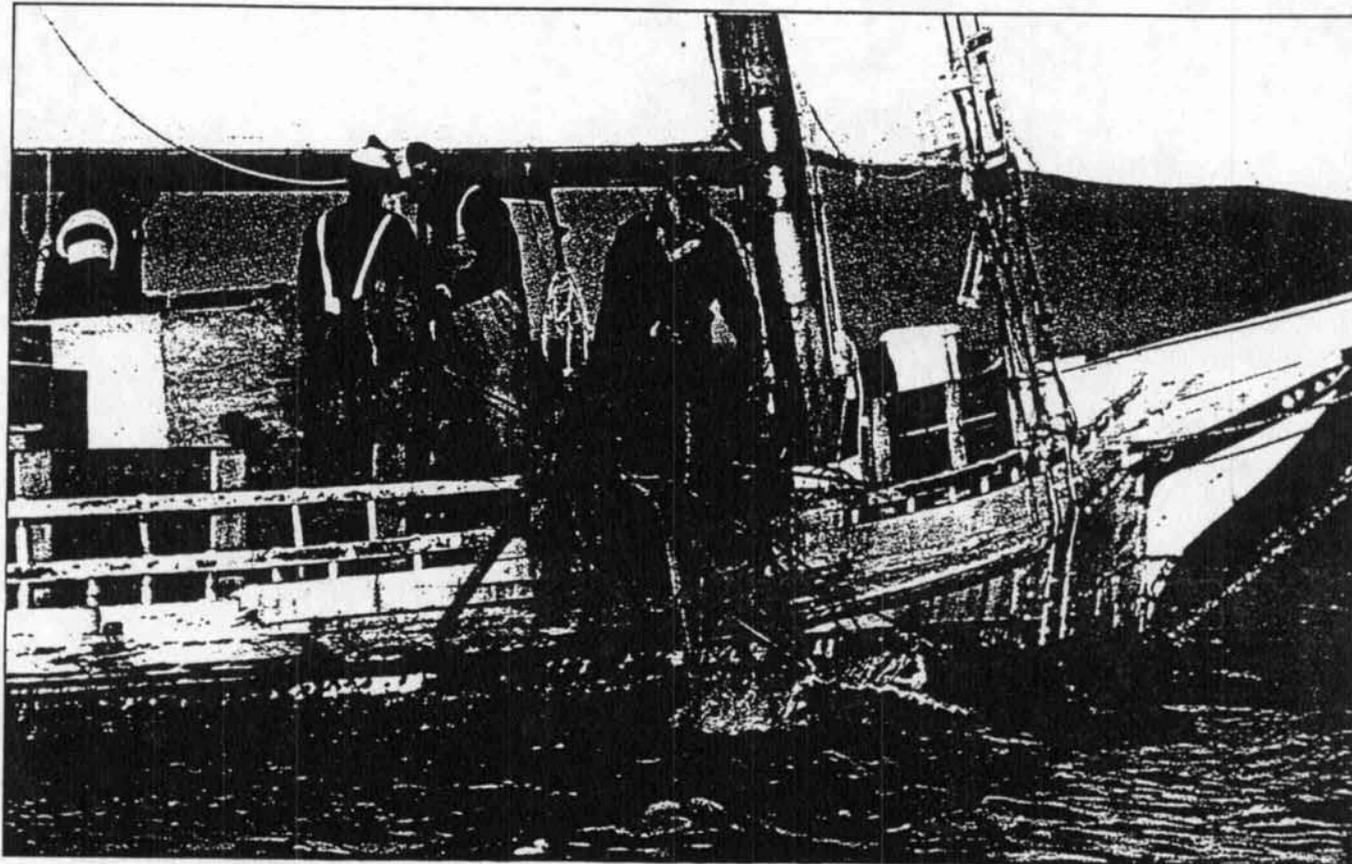
The Chesapeake Bay Wetlands Policy is available from the Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403 (301) 266-6873.

This flyer was prepared by the Living Resources Subcommittee and printed by the Chesapeake Bay Program.

January 1988

CHESAPEAKE BAY:

HABITAT REQUIREMENTS FOR LIVING RESOURCES



LIVING RESOURCES IN THE CHESAPEAKE BAY AGREEMENT

The restoration and protection of the Chesapeake Bay's living resources, their habitats and their ecological relationships is a major focus of the 1987 Chesapeake Bay Agreement. The comprehensive report, "Habitat Requirements for Chesapeake Bay Living Resources", compiled over the past two years by the Chesapeake Bay Program's Living Resources Task Force, is an important first step toward meeting the goals of the Bay Agreement. The following brief summary from the Living Resources Task

Force report contains an example of habitat requirements for one of the selected target species.

BACKGROUND

Declines in the abundance of living resources have been the most tangible warning signs of widespread environmental problems in the Bay. Attempts to protect and restore the Bay ecosystem's health and integrity must go beyond water quality issues to address biological and physical factors as well.

Many variables influence the abundance and distribution of species within the Bay: climate, natural population cycles, reproductive potential,

disease, predation, and the abundance and quality of food and habitat. Human activities, including land and water use, contaminant discharges, and physical habitat alterations, also directly affect important species. Indirectly, results of these activities can disrupt food chains and upset the ecological balance of the estuary.

HABITAT REQUIREMENTS DEVELOPMENT

The Living Resources Task Force identified representative species from all levels of the Chesapeake Bay food web, including plankton, benthos (bottom dwellers), submerged aquatic vegetation, shellfish, finfish, waterfowl, and wildlife. A smaller group of 26 species was targeted for immediate attention in the development of habitat requirements. This selection was based upon their commercial, recreational or ecological significance and the potential threat to sustained production if populations of those species decline further or experience serious habitat problems.

Once the target species were chosen, the Task Force had two areas to investigate. The first objective was to gather data on the physical, biological, and chemical factors affecting the selected living resources. Secondly, they needed to determine where the species live and reproduce, and when, in the life cycle, survival is threatened or critical. The "Habitat Requirements" report merges this knowledge of influential environmental factors with specific habitat locations and critical stages in the species' lives so that protection and restoration efforts and spending can be effectively focused.

APPLICATIONS

The "Habitat Requirements" report is intended to give planners, managers, researchers, and modelers of the Bay information on the habitat quality required for the target species. These habitat conditions will be part of the information used to protect and enhance the Bay's living resources. The Implementation Committee of the Chesapeake Bay Program has set up a Living Resources Subcommittee concerned with the health and abundance of water and wildlife species that depend on Chesapeake Bay habitats. The Subcommittee will help guide agencies in

using the report in their own programs.

The "Habitat Requirements" report does not establish regulatory standards; rather, it identifies necessary habitat conditions to guide management decisions for modifying existing regulatory programs. The report will be useful for guiding programs that regulate or influence :

- agricultural runoff
- urban runoff
- shoreline erosion
- contaminant discharges
- municipal and industrial wastewater treatment
- shoreline deforestation
- wetland dredge and fill
- stormwater management
- urban development
- highway development



Spawning areas require careful protection measures.

TARGET SPECIES : OYSTER

An example of one of the 26 selected target species presented in the "Habitat Requirements" report is the American oyster. The oyster's economic importance and its ecological significance in the benthic (bottom dwelling) community make it a highly valued living resource. Drastic reductions in oyster distribution and abundance in recent years, primarily due to deteriorating habitat quality, overfishing, and disease, are cause for great concern.

Oyster distribution in the Bay is presently determined largely by salinity, salinity related diseases, substrate, and depth. Although oysters are tolerant of a wide range of salinities (3-35 ppt sa-

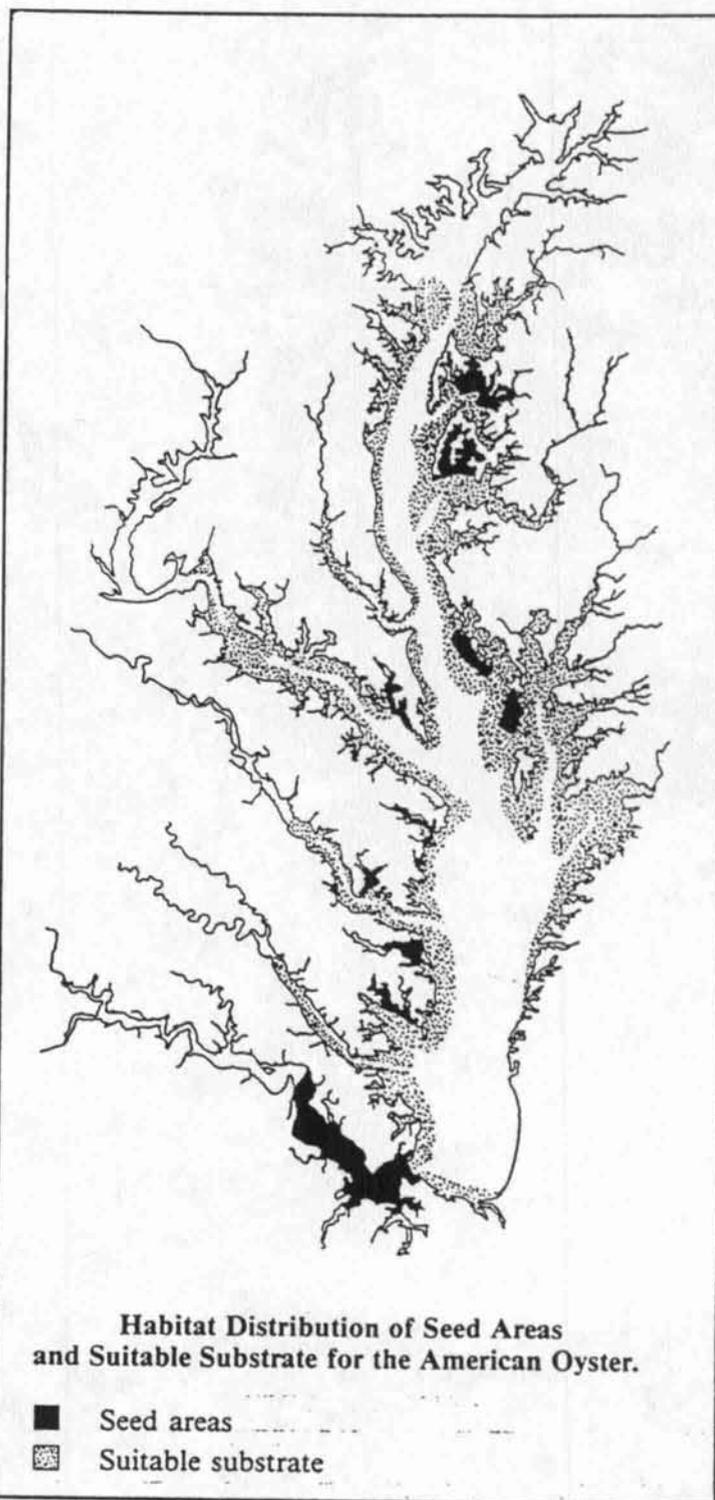
linity), they cannot survive in tidal freshwater or low salinity regions of the Bay. A strong correlation has been found between high salinity and good oyster reproduction. Dry years may increase the salinity of the water up the Bay to promote favorable growing conditions. Under the same saline conditions, however, potentially fatal oyster diseases caused by MSX and Dermo pathogens can flourish.

Oysters spawn (reproduce) in the summer when water temperatures are over 15°C, with the highest rates occurring between 22°- 23°C. Free-swimming oyster larvae permanently attach their newly formed shell to a firm substrate and become young oysters or "spat". This attachment process is known as spat setting. Critical for their survival is the availability of firm foundations, such as pilings, hard rock bottoms, and particularly old shells, called cultch, left naturally on oyster bars or "planted" by resource management agencies and watermen.

Oysters are also sensitive to sedimentation and total suspended solids in the water. Excessive sedimentation smothers adults and prevents setting of spat on clean cultch. When surrounding waters are highly turbid, or cloudy, adult oysters will slow their intake of suspended materials and may cease feeding entirely.

The depths at which oysters can survive are limited by dissolved oxygen concentrations, the amount of available oxygen in the water. Natural episodes of hypoxia, low oxygen concentrations [$< 2\text{mg O}_2/\text{L}$], in bottom waters are believed to have limited oyster distribution in the past to the shallower, more oxygenated areas of the Bay. In recent years, an increased duration and distribution of hypoxia has been responsible for local areas of oyster mortality at depths less than the historical 10 meter limit.

As a filter feeder, the oyster ingests a variety of phytoplankton, bacteria, and small particles of decaying plants and animals mostly from 3 to 35 microns in size. The availability of food within this critical size range may be a key factor in the long-term survival of oysters and other shellfish. Scientific evidence suggests that excess phosphorus and nitrogen in the Bay can cause detrimental changes in the food chain. Nu-



trients may be shifting the underlying support of the entire chain, the plankton communities, to smaller species which are less desirable food.

Overall restoration of oyster habitat is a prerequisite for increasing the abundance and distribution of oysters. Several steps toward habitat restoration are now being undertaken. Re-establishing

Summary of Habitat Requirements for the American Oyster

Critical Life Stages : larval, spat, adult
 Critical Life Period : entire life cycle

Target Species	Habitat Zone	Salinity (ppt)	pH	Dissolved Oxygen (mg/l)	Suspended Solids (mg/l)	Prey Species
American oyster	Firm substrate, cultch	5 - 35	6.8-8.5	> 2.4	< 35	Phytoplankton (size range of 3-35 microns)

shoreline submerged aquatic vegetation in key regions would benefit these bottom dwellers by controlling the resuspension of sediments; moreover, the vegetation minimizes sediment from other sources such as eroding farmland, construction sites, and shorelines. Many of these sediment sources also add nutrients to the Bay ecosystem.

Water quality models of the Bay suggest that substantial reductions in nutrients are necessary to achieve acceptable dissolved oxygen levels. Higher oxygen levels will increase the acreage of suitable habitat, and lower nutrient levels could increase the abundance of the preferred food species of plankton. In addition, Baywide oyster repletion and fisheries management programs are essential for maintaining a viable oyster industry.

The American oyster is just one of the target species whose habitat requirements are detailed in the Living Resources Task Force report. Through a focused and concentrated effort to restore and protect the habitats of our living resources, the Chesapeake Bay will continue to be an economic and ecological treasure for future generations.



Glenn D. Chambers



Copies of the "Habitat Requirements for Chesapeake Bay Living Resources" report are available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular printed by the Maryland Department of Natural Resources, Tidewater Division.

CHESAPEAKE BAY: REMOVING IMPEDIMENTS TO MIGRATORY FISHES

FISH PASSAGE IN THE CHESAPEAKE BAY AGREEMENT

Thousands of miles of fish spawning habitat on Chesapeake Bay tributaries are currently blocked by dams, culverts and other obstructions. Restoring and protecting the Bay's vital fishery resources are integral components of the 1987 Chesapeake Bay Agreement. Working toward this restoration goal, the signatories of the Agreement have supported a commitment by the States and Federal government to:

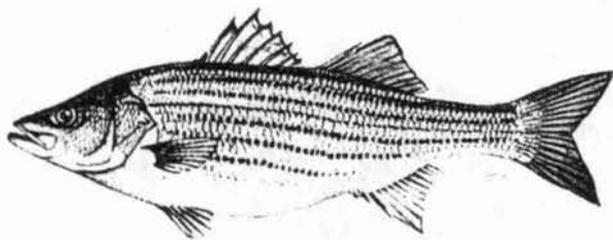
Provide for fish passage at dams, and to remove stream blockages wherever necessary to restore passage for migratory fishes.

A workgroup of the Chesapeake Bay Program's Living Resources Subcommittee was formed in December 1987 to develop the strategy for fish passage. The membership of the Fish Passage Workgroup includes representatives of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Maryland Department of Natural Resources, Chesapeake Bay Foundation, Pennsylvania Fish Commission, Virginia Department

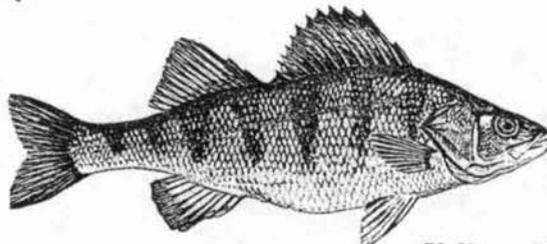
of Game and Inland Fisheries, Virginia Council on the Environment, and the District of Columbia Fisheries Management Program.

BACKGROUND

Of the approximately 260 fish species found in Chesapeake Bay, perhaps those most revered and sought after by both sport and commercial fishermen are the migratory species. This group includes "anadromous" fishes such as striped bass, river herring and shad that spend most of their adult lives in saltier coastal waters but return each year to spawn (reproduce) in fresh water. Another class of migratory fishes are the "catadromous" species, represented in the Bay watershed by the American eel. Catadromous fish spend most of their adult lives in fresh water, returning to the ocean to spawn. Together, anadromous and catadromous species are described as diadromous, or migratory between salt and fresh water. Other species, including white and yellow perch, migrate to fresh water to spawn but spend the rest of the year in the brackish waters of Chesapeake Bay.



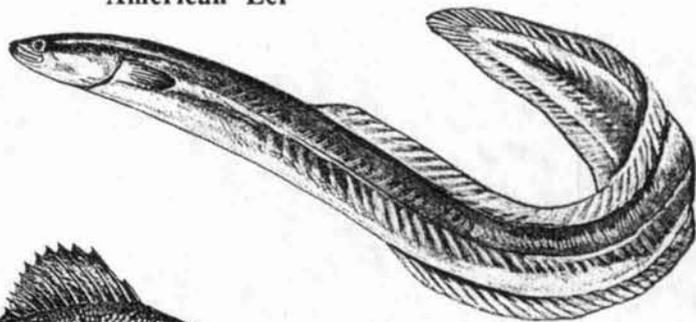
Striped Bass



Yellow Perch

*Migratory Fish Native to
Chesapeake Bay*

American Eel



Illustrations by
Duane Raver, Jr.

Table 1

RECENT COMMERCIAL HARVESTS OF MIGRATORY FISHES IN CHESAPEAKE BAY				
(Average annual tons for each 10-year period)				
		1966-1975	1976-1985	% Decline
American Eel	VA	427.1	257.0	40%
	MD	117.8	106.7	9%
American Shad	VA	1,114.0	454.0	59%
	MD	409.7	37.4*	91%
Hickory Shad	VA	18.8	0.5	97%
	MD	8.7	0.6*	93%
River Herring (Blueback herring and alewife)	VA	9,486.0	725.0	92%
	MD	1,094.7	71.0	94%
Striped Bass	VA	1,059.0	226.0	79%
	MD	1,803.3	642.4*	64%
White Perch	VA	173.8	65.0	63%
	MD	650.8	341.9	47%
Yellow Perch	VA	1.9	0.2	90%
	MD	51.8	14.9	71%
Total	VA	12,280.6	1,727.7	86%
	MD	4,136.8	1,214.6	71%
TOTAL	Bay	16,417.4	2,942.6	82%

* Pre-moratorium

At one time, Chesapeake Bay abounded with these migratory fishes. Striped bass, shad and river herring (the collective term for blueback herring and alewives) supported extensive recreational and commercial fisheries during their annual spawning runs. Today, however, landings of migratory fishes are at the lowest ebb in history. In Maryland, the catch of American shad has declined from over 7 million pounds a century ago to about 20,000 pounds in 1980. In Virginia waters, shad harvests now average around 900,000 pounds, compared to over 11 million pounds a hundred years ago. A once thriving shad run in the District of Columbia has similarly declined, and fishes no longer migrate up the Susquehanna River to Pennsylvania due to several dams in its lower reaches.

During the last twenty years the decline in commercial landings has been particularly steep. The majority of landings have decreased by 90% or more (see table 1). This decline is the result of an intricate complex of factors -- some natural, most man-made -- including pollution and siltation of spawning areas, overharvesting by commercial and recreational fishermen, and construction of dams and other obstructions across the Bay's streams and rivers which prevent access to formerly utilized (historic) habitat.

FISHERY VALUE

The decline of migratory fishes has had significant economic and ecological impacts on the Bay

area. In 1920, American shad and river herring were number one and two in value of those finfish species landed commercially in Chesapeake Bay. Current values for these species are slight by comparison. The American shad commercial catch for Chesapeake Bay peaked at about 17 million pounds at the turn of the century. Today these landings would be worth over \$6 million at the dock. The 1985 harvest of shad from the Bay had a dockside value of \$170,000.

The benefits of restoring migratory fishes to their former abundance are increased greatly when the total value to the economy is considered. When taken to the retail level, commercial fisheries are worth significantly more than their dockside value. Sportfishing also has a great impact on the economy due to retail purchases by recreational fishermen. A 1981 study (1) estimated the fishery benefits of providing passage for migratory fishes past four hydropower dams on the lower Susquehanna River, opening nearly 350 mainstem river miles of historic habitat. The study considered the expected benefits from the commercial and recreational harvests of American shad. The value to the economy ranged from a low estimate of \$42 million to a high of \$185 million annually. This analysis did not include other social and aesthetic values immeasurable in dollars. It also did not include the potential benefits of restoring other migratory species. The 1981 estimated one-time cost for providing fish passage at the four dams was \$60 million.

A similar analysis (2) was conducted in 1987 for the James River to estimate the value of providing fish passage around the five dams at Richmond, extending the range of migratory fishes to Lynchburg, Virginia. Approximately 140 river miles would be opened. The estimated economic benefits of restoring several anadromous species to this stretch of river ranged from \$8.1 to \$13.1 million annually. The cost of fish passage facilities was estimated to be a one-time expenditure of \$4.5 - \$6.5 million.

While the economic benefits of a fishery can be mathematically estimated, it is more difficult to calculate the ecological value of fish restoration. Shad, herring and other migratory fishes have

1. "Economic Benefits Associated with Shad Restoration on the Susquehanna River," McConnell and Strand, University of Maryland, 1981.
2. "Anadromous Fish Passage in Virginia," Virginia Council on the Environment, 1987.

historically played an important role in the Chesapeake Bay ecosystem. Along with the other Bay initiatives to reduce nutrient input, increase aquatic grass abundance and control fishing, restoration of these species will help return the Bay system to its natural productivity.

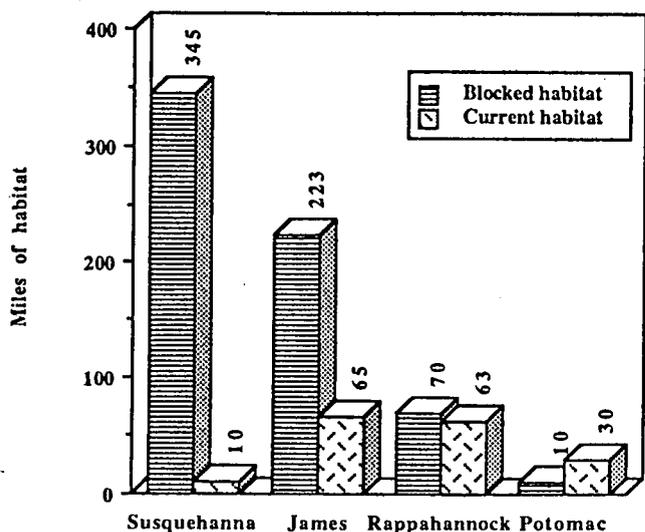
Reintroduction of anadromous fishes to their previous spawning grounds will have an ecological impact on those freshwater systems as well. Studies have shown that in freshwater areas where herring have been restored, resident fish populations were enhanced as compared to similar areas without herring. The juvenile herring produced in the spawning run serve as a forage base (food supply) for bass and other resident species.

IMPEDIMENTS TO MIGRATION: A BAY-WIDE PROBLEM

Impediments to fish migration exist on nearly every tributary of the Chesapeake Bay. Over the years, the Bay states have conducted inventories to document the type and location of these blockages. Several thousand have been found to exist in the Bay watershed. The most well known are the large hydropower facilities such as Conowingo Dam on the Susquehanna River. Fish migration can be blocked, however, by a structure with a vertical height of only one foot. Where a road passes over a small tributary, the stream runs through a culvert which may act as a blockage. On many tributaries, state and federal agencies maintain gauging station weirs to monitor streamflow. These, too, may act as blockages. Finally, a wide variety of small to

POTENTIAL SPAWNING AND NURSERY HABITAT FOR AMERICAN SHAD

(excluding smaller tributaries of the four rivers)



mid-sized dams are found in the Bay watershed. These dams include historic mill and municipal water supply dams, as well as wildlife or recreational impoundments.

Virginia

Several regional surveys of stream blockages have been done in Virginia, but the data are incomplete and not currently centralized. On the James River, five dams located in Richmond block access to nearly 140 miles of historic habitat. Providing fish passage at these blockages has become a top priority for the Commonwealth. Further upstream, a series of seven dams around Lynchburg block an additional 84 miles of habitat. The first of these dams was recently granted a license for hydropower generation which requires provision for fish passage. The Embrey Dam at Fredricksburg, which blocks 70 miles of the Rappahannock River, was recently issued a hydropower license with similar conditions. However, neither of these dams have yet been modified to allow fish passage. Virginia law requires fish passage at stream obstructions, but several key regions and all dams over twenty feet high are exempt.

Maryland

In Maryland, anadromous fish spawning streams were surveyed from 1968 to 1980. Nearly 900 man-made stream blockages were documented; this inventory, however, must be updated. The Department of Natural Resources has identified priority sites where mitigation work should begin. One of the priority sites is on the Patapsco River where four dams block access to nearly 30 miles of migratory fish habitat.

The top priority for Maryland is the Susquehanna River, historically important for American shad, hickory shad, and river herring. Construction of four hydropower dams on the lower river in the early 1900s blocked nearly 350 miles of habitat. Maryland is working with the power companies involved to have fish passage provided at these dams. Maryland has the statutory authority to require fish passage at obstructions other than hydropower dams, but this authority has not been widely applied.

Pennsylvania

Pennsylvania has also conducted an inventory of dams throughout the state. All dams are documented, but smaller blockages may not be. Emphasis has been placed on fish passage at the four dams on the lower Susquehanna River. In addition, Pennsylvania and the hydropower companies have devoted substantial resources to restocking adult and juvenile

American shad to the river as part of a cooperative restoration project. Pennsylvania law gives the Fish Commission authority to require passage at obstructions to fish migration on all waters of the state. This authority is superseded by federal regulations governing hydropower dams.

District of Columbia

Resource managers from the District of Columbia have assessed the impact of dams and blockages on local fishery resources. The municipal water supply dam at Little Falls excludes migratory fishes from 10 miles of valuable habitat. While just outside of D.C. borders, fish passage at the dam would help restore historic migratory fish runs to District waters. Other blockages on Rock Creek and tributaries of the Anacostia River also must be remedied.

SOLUTIONS

The structures which act as impediments to fish migration are diverse, ranging from large hydro-power dams to small road culverts. No one solution can address all situations. The objective of fish passage is to decrease the vertical gradient and water velocity so that upstream navigation is within the fish's physical capability.

The simplest solution is to remove part or all of an obstruction. This is only possible when the structure has no useful purpose and when breaching would not adversely affect the river.

Some structures such as culverts and gauging stations can be redesigned to provide the gradient and flow necessary for fish passage. Culverts can be set below grade (partially buried in the riverbed) and gauging stations can be modified to minimize vertical rise.

A common solution is to install a fish passage facility, or fishway, to allow fish to pass over or around an obstruction. On smaller blockages, a "fish ladder" is used. This is a passive flume-like (inclined water channel) structure with a series of baffles or weirs which interrupt the flow of water (see Figure 1). The fish negotiate a ladder just as they would natural rapids.

For large dams with a vertical rise of fifty feet or more, a mechanized device known as a "fish lift" is often used. Fish are attracted by flow into a confined space and elevated in a volume of water over the dam. In some cases, fish will be transported in special tank trucks around several dams until all are fitted with passage facilities.

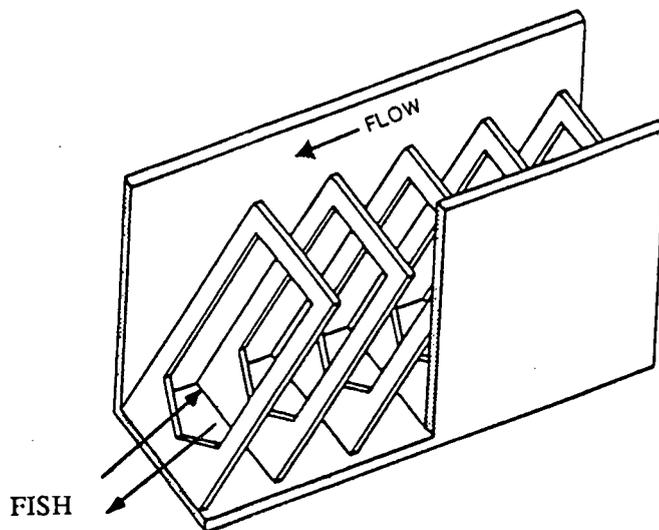


Figure 1. A common variation of the Denil Fishway concept, cut-away view.

Fish passage technology is well-developed and proven effective. Several New England states have active and successful programs providing passage for migratory fishes. In Massachusetts, nearly two hundred fishways maintain fish migrations on approximately one hundred tributaries. On the Connecticut River, migratory fishes have been restored to 174 miles of historic habitat as a result of fishway operations at 3 dams. These successes can serve as examples for Chesapeake Bay states.

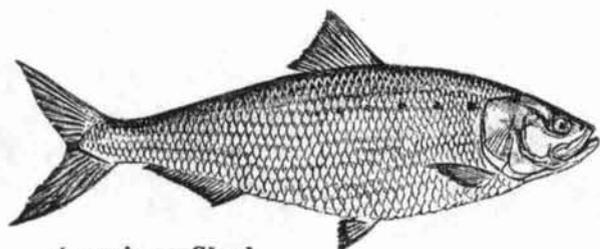
A LOOK TO THE FUTURE

The Chesapeake Bay Program's Fish Passage Workgroup has analyzed existing information to determine what is known about blockages to fish migration. The findings of the Workgroup are summarized in a report entitled Removing Impediments to Migratory Fishes in the Chesapeake Watershed. Some of the recommendations contained in the report, which will be finalized in December 1988, are as follows:

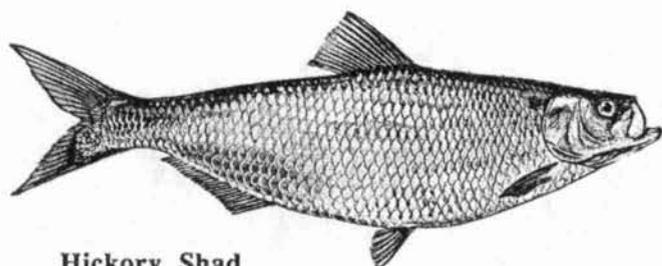
1. Blockages - A multi-faceted approach is necessary to help restore migratory fishes. The states should develop programs in the following areas:

a) Culverts - All future road and highway culverts should be designed and constructed to assure the passage of migratory fish species present or potentially present in the affected stream. The highway department of each Bay state, with the assistance of other responsible agencies, should prepare an inventory of existing culverts which act as impediments to migratory fishes, and plan a strategy to remedy this problem.

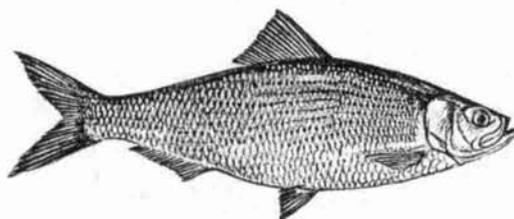
POTENTIAL AMERICAN SHAD SPAWNING AND NURSERY HABITAT OF MAINSTEM RIVERS *



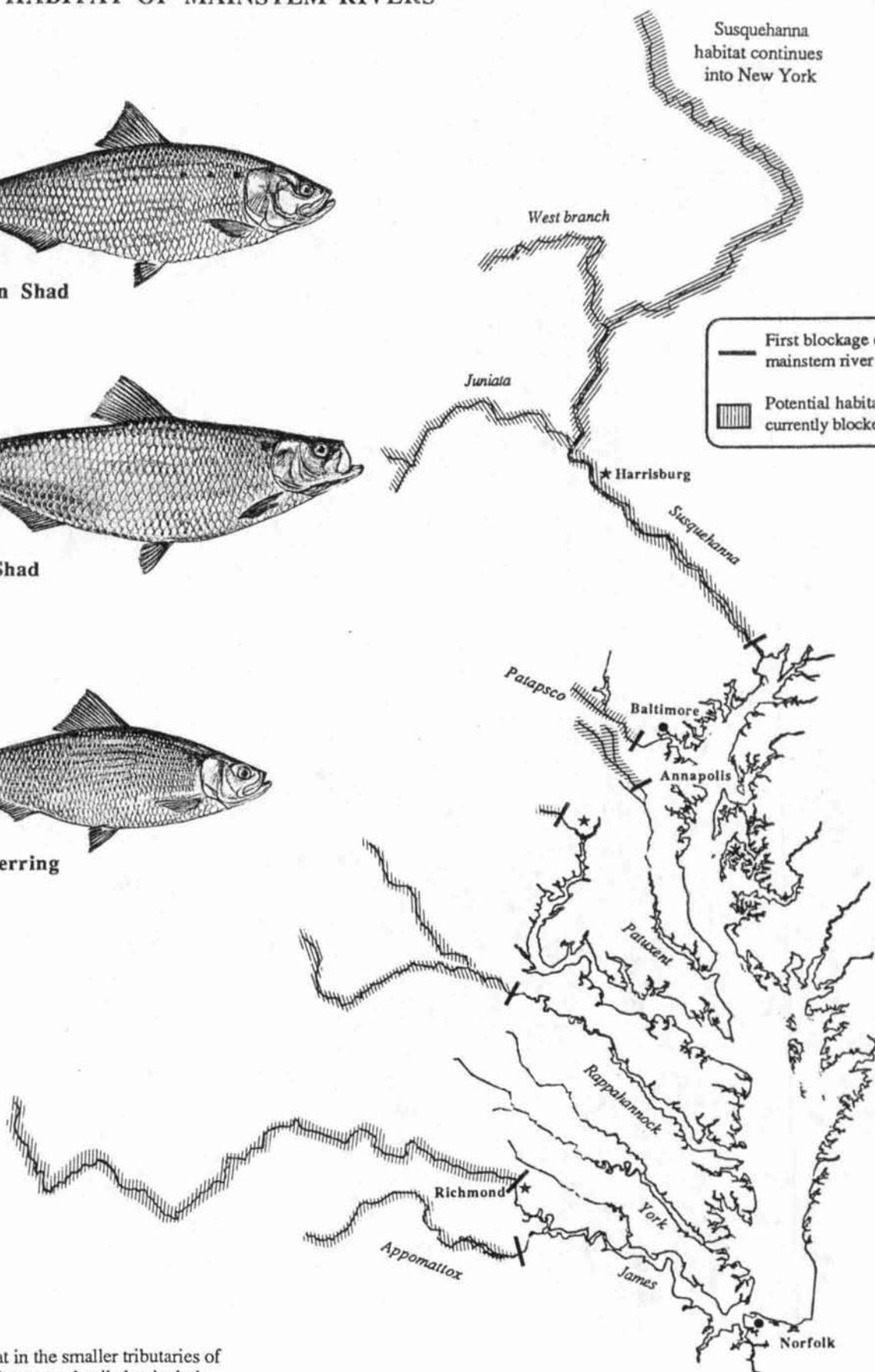
American Shad



Hickory Shad



Alewife Herring



* Potential habitat in the smaller tributaries of the mainstem rivers too detailed to include

b) Small dams / obstructions - Each Bay state should establish a priority list for future fish passage projects at all small dams and other obstructions. Projects at publicly-owned obstructions should be undertaken as a cooperative effort between the appropriate state agencies and local governments. Federal agencies should cooperate with state governments to mitigate federally-owned blockages. Private sector owners of blockages should, under state law, be responsible for providing fish passage under the direction of the appropriate state agencies.

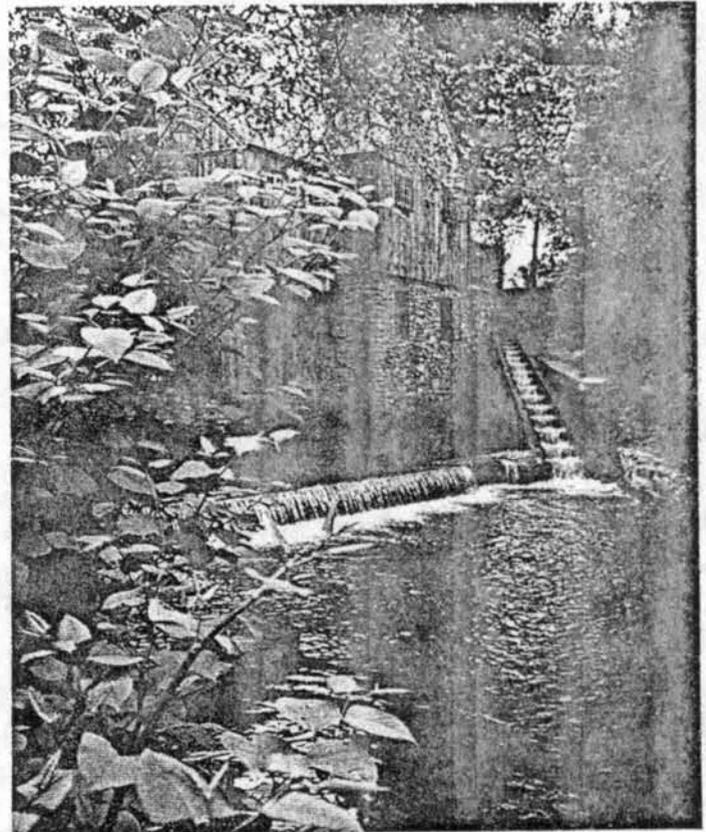
c) Hydropower dams - Fish passage should be provided at all hydropower dams that block historic or potential migratory fish habitat. The States should evaluate the adequacy of current provisions for fish passage at such facilities within the Bay watershed. When necessary, the States should request reopening the licenses of hydropower facilities to assure that adequate provisions are made for fish passage within a reasonable time frame. In no case should any new licenses be issued without proper provisions for fish passage.

d) Reintroduction - Wherever necessary and appropriate, the States should initiate programs to reintroduce migratory fishes to habitat above present blockages. Young fish can become "imprinted" on the upstream habitat and will return to spawn there when the blockage is removed. Adult fish can be trapped below blockages and transported upstream to spawn, or young hatchery-produced fish can be stocked above the blockages.

2. Evaluation and Monitoring - Federal and state agencies should determine how effective the fish passage devices are at passing different species of fish. They also should evaluate the effects of restoration efforts on target species and other organisms in the biological community.

3. Public education and involvement - Public support and involvement must be an integral part of the fish passage program to insure its long-term success.

4. Technical expertise - In the Bay region, qualified assistance is needed to design and oversee the construction of fish passage facilities. The establishment of a technical advisory office would provide this necessary resource to Bay state and local agencies.



Historic mill dam with fish ladder. Small barrier dam directs fish toward base of ladder.

5. Blockage inventory - The responsible state and federal agencies should work together to compile an up-to-date, comprehensive inventory of dams and other obstructions to fish migration in the Bay states.

Using the Workgroup's findings, the Bay states will develop plans for removing these impediments which will require cooperation between state, federal, and local government as well as support from private citizens. With some time, money, and dedication, we can restore hundreds of miles of spawning habitat for the benefit of the Bay's fishery resources and the enjoyment of its citizens.

The Removing Impediments to Migratory Fishes in the Chesapeake Watershed report is available from the Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Chesapeake Bay Foundation, with support from the Jessie B. Cox Charitable Trust and assistance from the Chesapeake Bay Program's Living Resources Subcommittee.

September 1988

CHESAPEAKE BAY

OYSTER MANAGEMENT PLAN

OYSTER MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The 1987 Chesapeake Bay Agreement recognized the American oyster (*Crassostrea virginica*) as a priority species in need of management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Bay-wide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee, to guide the development of the initial drafts of the fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial and recreational fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Oyster Management Plan. For greater detail, please consult the complete management plan.

WHAT IS A FISHERY MANAGEMENT PLAN?

In order to preserve a viable economic and ecological role for Chesapeake Bay oysters, certain measures must be taken to wisely use and protect the resource. Developing a management plan involves analyzing the biological, economic, and social components of the fishery, defining problems, identifying solutions, and making recommendations for actions on habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.

The oyster management plan provides background information on the species consisting of biological profiles, habitat requirements,

historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems, and propose corresponding management strategies and actions.



© Rick Brady, 1989.

Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

OYSTER BACKGROUND

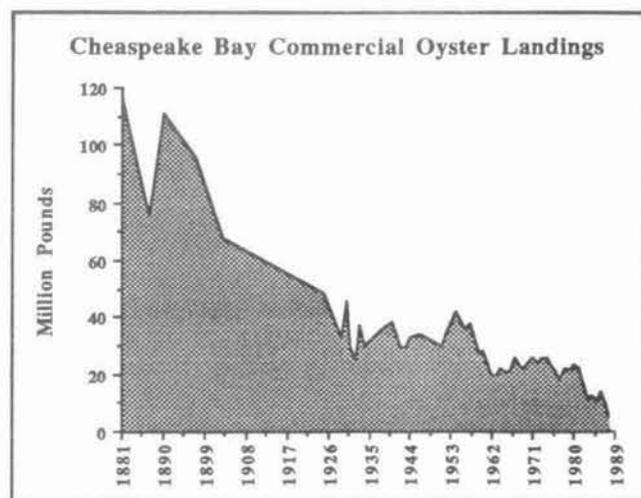
Oysters have been one of the most important commercial resources in the Chesapeake Bay since the mid-1800s, but in recent years there has been a dramatic decline in Baywide oyster harvests. Oysters start as swimming larvae, attach to a solid substrate, usually near other oysters in beds or "bars," and then become immobile or sessile. This makes oysters relatively easy to catch, and also makes them particularly susceptible to predators, diseases, silting, and pollution.

Goal and Objectives

The overall goal of this plan is to increase the baywide stocks of oysters through the initiation of short and long-term management actions which will enhance the ecological value of the resource, ensure the growth of the resource and maintain a viable fishery.

To achieve this goal, the following objectives must be met:

- Stabilize harvest to maintain a spawning stock at a size which eliminates low reproductive potential as a cause of poor spawning success.
- Enable Baywide fisheries management agencies to provide more timely and effective



responses to short-term and unpredictable changes in the status or operation of the fishery to prevent overharvest.

- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.
- Evaluate statewide repletion efforts.
- Develop seed (young oysters for transplanting) sources in low risk areas to benefit the public and private industry.
- Further our understanding of oyster diseases and the development of a disease-resistant strain of Chesapeake Bay oyster.
- Promote continued cooperation of various state agencies in water quality and habitat improvement measures to maximize conditions for natural production and to minimize harvest restrictions due to sanitary reasons.
- Encourage the utilization of aquaculture techniques on private oyster grounds.
- Increase and stabilize the market share of Bay oysters by providing a reliable product both in quality and quantity.

Problem Areas, Management Strategies, and Proposed Actions

Harvest Decline And Overharvesting

For the past 27 years, oyster harvests have been on the decline. Maryland harvesters have seen 1973's 3.2 million bushel bounty drop to 565,000 bushels in 1987. Virginia, likewise, has experienced declines from 1.9 million bushels in 1964 to 442,000 bushels in 1987. The outlook for the near future is not optimistic. The average daily catch per man is lower than the permitted limit, indicating that the limit is no longer an effective means of conserving the resource.

Strategies and Actions:

- Maryland and Virginia will establish catch limits that reflect the status of the resource, and will open and close harvest areas on a rotating basis to control fishing effort and protect brood stock (adult oysters available to spawn.)
- Maryland will continue a delayed entry program for commercial harvesting to stabilize harvest.

Under this program, prospective fishermen must register for a fishing license and wait a minimum of two years before receiving the license.

Recruitment

The past two decades have seen erratic and generally low levels of natural spat set (attachment of swimming oyster larvae to substrate), and a reduced geographic range of good setting areas compared to historical records.

Strategies and Actions:

- Maryland and Virginia will plant shell for cultch (substrate for attachment) and move seed oysters to augment natural reproduction.
- Maryland and Virginia will continue hatchery operations to produce larvae and seed oysters for research and rehabilitation projects.
- Maryland and Virginia will support aquaculture efforts as a means of increasing oyster production.
- Maryland will experimentally reconstruct buried oyster beds to make them productive again.
- Maryland and Virginia will conduct research on the relationship between adult oyster density and recruitment, and will use this information to determine optimum harvesting and seed planting strategies.

Disease Mortality

Recent expansion of the geographic range and intensity of the oyster diseases MSX and Dermo (Perkinsus) have contributed to harvest declines.

Strategies and Actions:

- Maryland and Virginia will continue the annual disease survey to determine the best plan for planting shell and seed oysters.
- Maryland and Virginia will continue research on the transmission and reduction of oyster diseases, and on development of both a disease-resistant strain of the American oyster and a disease-resistant hybrid oyster.
- Maryland will implement a program to monitor seed oysters for disease before transporting them to growing areas.



hand tonging for oysters

photo from Maryland Watermen's Assoc.

Leased Ground Production

Presently, privately leased portions of the Bay bottom are underutilized. For both Maryland and Virginia, it has been estimated that less than 10% of the total leased grounds are in production.

Strategies and Actions:

- Maryland has established seed beds from which seed oysters can be grown and sold to private leaseholders.
- Maryland and Virginia will continue an active extension program to provide technical assistance to oyster leaseholders.
- Maryland and Virginia will implement "proof of use" measures in the form of minimum production or repletion criteria, to promote private production and cultivation.
- Virginia will promote the development of new culture methods by removing impediments in the existing permitting process required for the private sector.
- Virginia will conduct research on the feasibility of and methods for new oyster culture techniques.

Habitat Issues

The distribution and abundance of Bay oysters are greatly affected by water quality. Low dissolved oxygen conditions which limit oyster distribution, have increased due to nitrogen and

phosphorus overenrichment from sewage treatment plants and agricultural runoff. Excessive sedimentation from activities such as channel dredging, upland construction, and agriculture also limit the distribution and abundance of oysters by smothering oyster beds and preventing spat from setting.

Strategies and Actions:

- Maryland and Virginia will work toward improved water quality and enhanced biological productivity by implementing recommendations of the Nutrient Reduction Strategy, the Toxics Reduction Strategy, and the Conventional Pollutants Strategy commitments of the 1987 Chesapeake Bay Agreement.

Shellfish Sanitation

The stationary nature of adult oysters makes them particularly vulnerable to adverse water quality conditions and bacterial contamination.

Strategies and Actions:

- Maryland and Virginia will promote the objectives of the 1987 Bay Agreement to improve water quality conditions, including more effective sewage treatment and water conservation programs to help reduce the volume of sewage.
- Virginia will continue participation in the Interagency Shellfish Enhancement Task Force to encourage cleanup and opening of condemned shellfish grounds.
- Depuration (cleansing of bacteria) techniques will be investigated and Virginia will implement regulations to allow containerized relaying of oysters from condemned waters (moving contaminated oysters to clean water, where they cleanse themselves).

Market Production

Consumer preference for Chesapeake Bay oysters has decreased because of inconsistent harvest levels, the often smaller size, poor quality, and higher price of Bay oysters, and negative publicity about oyster diseases.

Strategies and Actions:

- Maryland and Virginia will implement the strategies of this management plan to restore oyster stocks. Productive stocks should help correct the market problems.
- Maryland will promote public awareness that oysters infected with MSX and Dermo are safe to consume. Virginia will use industry and state

promotion of oyster quality to prevent further loss of market production due to public misconception.

Repletion Program

The repletion program consists of planting old dredged oyster shell, "fresh" or "house" shell and transplanting seed oysters. Sources of viable dredged shell are disappearing, "fresh" or "house" shell is lost due to out-of-state exportation or distribution to numerous buyers, and many traditional growing areas are infected with oyster diseases. Costs for the repletion efforts are increasing. Maryland will undergo a major reevaluation of its repletion program which may dictate changes in the proposed management strategy.

Strategies and Actions:

- Maryland will review the existing statutory authority which dictates the distribution of seed and shell, and will consider increasing the tax on exported oysters to compensate for the loss of shell and to increase revenues.
- Maryland and Virginia will evaluate their repletion programs by monitoring production in the planted and seeded areas.
- Maryland and Virginia will investigate alternative sources of cultch.
- Maryland will continue to protect and expand specific areas of oyster seed production by establishing oyster sanctuaries for seed and research purposes.
- Virginia will enhance its seed oyster program in the Great Wicomico, Piankatank, and James rivers to contribute to the rebuilding of the oyster fishery in Virginia. Seed will be used to plant prime disease-free growing areas. Virginia will also establish a special repletion program for the Seaside of the Eastern Shore.

Clearly, the Bay's oyster resource needs a concerted effort on the part of watermen, resource managers, legislators and private citizens to ensure its future as an ecologically important species and economically viable fishery. Timely oyster management efforts can help lead to these important goals.

The Chesapeake Bay Oyster Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources.

September 1989

CHESAPEAKE BAY

BLUE CRAB MANAGEMENT PLAN

BLUE CRAB MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The blue crab has been a symbol and a mainstay of Chesapeake Bay fisheries in recent decades. The 1987 Chesapeake Bay Agreement recognized the blue crab (*Callinectes sapidus*) as a priority species in need of comprehensive and coordinated management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Baywide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee to guide the development of the draft fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of

fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial, recreational, and charterboat fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Blue Crab Management Plan. For greater detail, please consult the complete management plan.

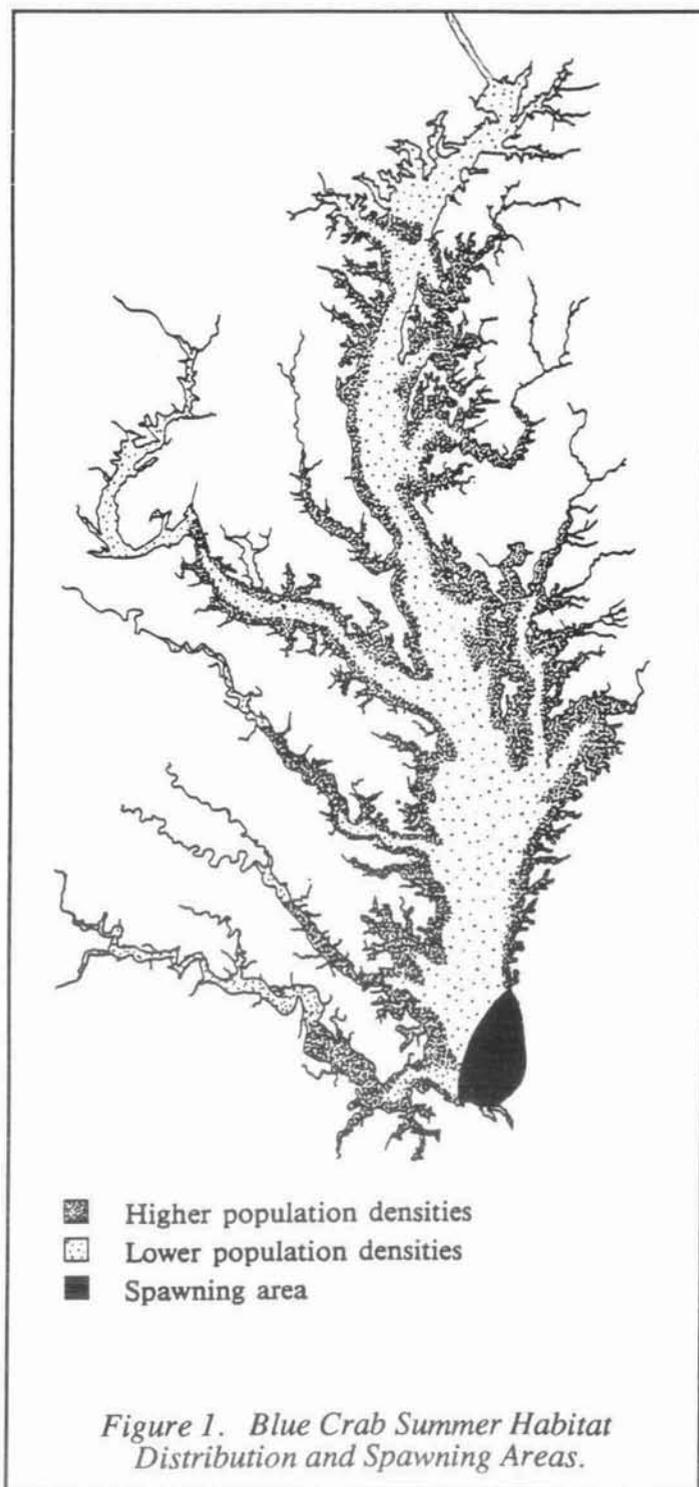
WHAT IS A FISHERY MANAGEMENT PLAN?

In order to protect the bountiful harvests of crabs from Chesapeake Bay, certain measures must be taken to wisely use and preserve the resource. Developing a management plan involves analyzing the biological, economic, and social components of the fishery, defining problems, identifying solutions, and making recommendations for action on habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.



M. E. Warren/Chesapeake Bay Foundation

The blue crab management plan provides background information on the species consisting of a biological profile, habitat requirements, historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems and propose corresponding management strategies and actions.



Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

BLUE CRAB BACKGROUND

Blue crabs are currently the most valuable commercial species in the Chesapeake Bay. There also appears to be a large and important recreational blue crab fishery. Although blue crabs are distributed throughout the Bay and the tidal portions of its tributaries, males are most abundant in salinities below 15 ppt, while females prefer salinities above 10 ppt. Mating occurs primarily in mid-Bay (where preferred salinities of the two sexes overlap) after which female crabs migrate toward the mouth of the Bay to spawn. Blue crab larvae are transported by currents off the coast and then back into the Bay, during which period numerous environmental factors affect recruitment of young crabs into the Chesapeake Bay fishery.

Goal and Objectives

The goal of this plan is to manage blue crabs in Chesapeake Bay in a way which conserves and protects the ecological value of the stock, and at the same time, generates the greatest long-term economic and social benefits from the resource.

To achieve this goal, the following objectives must be met:

- Maintain the spawning stock at a size which eliminates low reproductive potential as a cause of poor spawning success.
- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.
- Minimize conflicts between user groups by coordinating management efforts throughout Chesapeake Bay.
- Promote a program of education and public awareness to clarify the causes and nature of the problems in the blue crab industry and the rationales for management efforts.
- Promote a regulatory process which provides for adequate resource protection, optimizes the commercial fishery, provides sufficient opportu-

- nity for recreational crabbers, and considers the needs of other user groups.
- Investigate and promote harvesting practices which minimize waste and maximize economic return from the resource.
- Determine and adopt standards of environmental quality and habitat protection necessary for the maximum reproduction and survival of blue crabs.
- Promote research that improves understanding of the biology and population dynamics of blue crabs.
- Promote studies to collect the kinds of economic, social, and fisheries data required to effectively monitor the status of the blue crab fishery.

Problem Areas , Management Strategies, and Proposed Actions

Increasing Fishing Effort

There is growing concern that continued increases in fishing effort will lead to overexploitation of the stock. As the total amount of gear used in the crab fishery increases over time, it is possible that blue crab spawning stock could be reduced below an optimum level for sustainable harvest.

Since all Bay fishermen are harvesting the same stock of crabs and fishing effort is increasing, competition among Virginia and Maryland commercial, non-commercial, and recreational crabbers causes some conflict.

Strategies and Actions:

- Maryland and Virginia will contain the commercial harvest of blue crabs at present levels, with management actions which may include: harvest season, gear restrictions, catch limits, time restrictions, and size limits.
- Maryland will continue, and Virginia will establish a delayed entry program for the commercial blue crab fishery. Under this program, prospective crabbers must register for a license and wait a designated time period, for example two years, before being issued the license.
- Maryland and Virginia will work to clarify interjurisdictional allocation issues by improving blue crab fishery information.

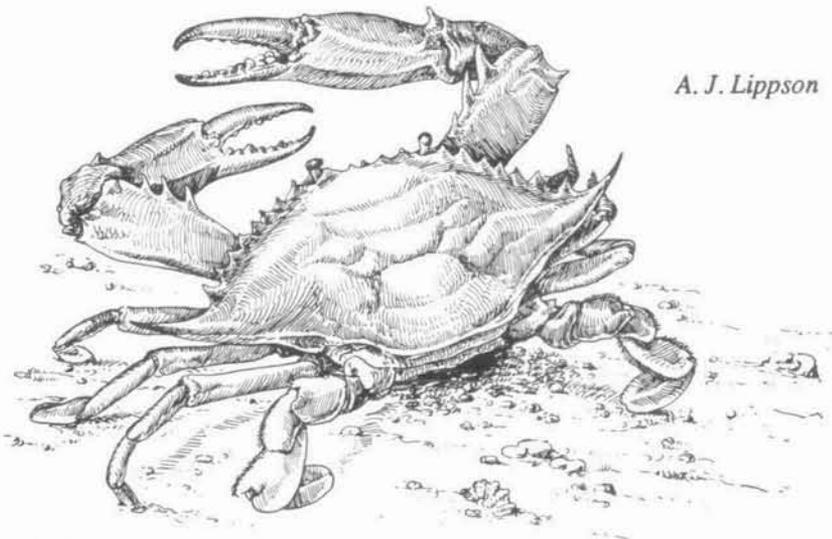
The economic and social aspects of the fishery will be evaluated to help resolve conflicts among user groups. Maryland will establish gear and license requirements that clearly distinguish commercial from recreational crabbers.

Wasteful Harvesting Practices

Numerous harvesting practices decrease the yield or reproductive potential of the blue crab resource. Examples include sublegal size crabs yielding small amounts of meat, loss of reproductive potential by harvesting sponge crabs (females bearing eggs), lost or abandoned crab pots trapping and killing crabs and higher mortality rates of green peelers (crabs 4-5 days from molting) held in shedding floats.

Strategies and Actions:

- Maryland and Virginia will promote the use of cull rings to allow small crabs to escape from crab pots. The effectiveness of using cull rings will be evaluated from crab pot studies.
- Maryland will prohibit the harvest of sponge crabs and both Maryland and Virginia will investigate other measures needed to protect the reproductive potential of crabs.
- The harvest of poor quality crabs will be reduced. Maryland will promote the release of buckram (papershell) crabs and Virginia will reduce wastage in the crab winter dredge fishery.
- Enforcement of existing regulations addressing abandoned crab pots will be improved, and



A. J. Lippson

Blue Crab

other actions, such as developing stronger regulations and requiring the use of biodegradable sections in crab pots, will be considered.

- Maryland and Virginia will provide up-to-date technical information to peeler float and shedding operation owners to reduce mortalities associated with holding practices.

Stock Assessment Deficiencies

Data collected in recent years have advanced blue crab biology and fishery knowledge, however, additional information—such as accurate catch and effort data, natural and fishing mortality rates, and effects of environmental variables and human activities—is needed to improve the understanding and management of blue crab populations.

Strategies and Actions:

- Maryland and Virginia will continue current crab trawl surveys and winter dredge surveys to gather additional crab population data. The two states will also implement compatible reporting systems to obtain accurate information on harvest and effort for the commercial fishery.
- There will be a Baywide effort, using both federal and state surveys, to collect more accurate recreational catch and effort data, and to evaluate the economic impact of the recreational harvest on the blue crab fishery.
- Maryland and Virginia will support cooperative research to address stock/recruitment relationships, natural and fishing mortality rates, and environmental parameters that effect fluctuations in crab populations.

Regulatory Issues

The blue crab regulatory process in Chesapeake Bay is based on biological and conservation concerns as well as long standing social, economic and political considerations. Some of the problems to be addressed by regulation are conflicts between crab potters and recreational boaters; the interstate shipment of undersize peelers and soft crabs; and Baywide penalties which are inconsistent and sometimes inadequate to deter violations.

Strategies and Actions:

- Maryland and Virginia will continue to monitor conflicts between crabbers and recreational boaters and enforce existing regulations on open and closed crabbing areas and pot free

channels. Maryland will also pursue methods of reducing the number of crab pot floats.

- Maryland and Virginia will investigate the biological and economic effects of regulated size limits on the soft crab fishery and the need to coordinate soft and peeler crab size limits.
- Maryland will standardize regulations regarding allowable gear types for recreational licensing, and Virginia will use surveys to determine recreational harvest and effort.
- Enforcement policies and practices will be made as consistent as possible among jurisdictions.

Habitat Degradation

Although crabs appear to be one of the more resilient species in the Bay, they too are affected by habitat loss stemming from declines in submerged aquatic vegetation and from periods of low dissolved oxygen.

Strategies and Actions:

- Maryland and Virginia will implement water quality and habitat improvement measures outlined in the Chesapeake Bay Agreement's Nutrient Reduction Strategy, Toxics Reduction Strategy, and Conventional Pollutants Strategy commitments.
- Maryland and Virginia will identify prime habitat areas for blue crabs and actively protect these areas from the effects of harvesting, development, and pollution.
- Maryland and Virginia will continue to support research into larval and juvenile blue crab environmental requirements, and will support protection of critical habitats such as submerged aquatic vegetation and wetlands.

The time to plan for wise management of the blue crab resource is now. With foresight and guidance, the savory crustacean will continue to support a healthy fishery and maintain its ecological link in the Chesapeake Bay ecosystem.

The Chesapeake Bay Blue Crab Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources. September 1989

CHESAPEAKE BAY

ALOSID (SHAD AND HERRING) MANAGEMENT PLAN



Abundant shad and herring catch on the Susquehanna Flats, early 1900s. Photo from Chesapeake Bay Foundation

SHAD AND HERRING MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The once teeming spawning runs of shad and herring in the Bay's tributaries in the early and mid 1900s filled pound and dip nets to overflowing. Nowadays, sparse runs in far fewer freshwater reaches are commonplace for these species. The 1987 Chesapeake Bay Agreement recognized the American shad (*Alosa sapidissima*) as a priority species in need of comprehensive and coordinated management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Baywide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A management plan has been developed to encompass the *Alosa* genus of migratory fishes, which includes American shad, hickory shad (*Alosa mediocris*), and the two species collectively known as river herring: alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). Migratory species such as shad and herring that live in the ocean, yet return to spawn in fresh-water tributaries, are also known as "anadromous" fishes.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee, to guide the development of the initial drafts of the fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial, recreational, and charterboat fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Alosid Management Plan. For greater detail, please consult the complete management plan.

WHAT IS A FISHERY MANAGEMENT PLAN?

In order to restore and enhance shad and river herring populations in Chesapeake Bay, certain measures must be taken. Developing a management plan involves analyzing the biological, economic and social components of the fishery, defining problems, identifying solutions, and making recommendations for actions to correct habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.

The shad and herring management plan provides background information on the species consisting of biological profiles, habitat requirements, historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems, and propose corresponding management strategies and actions.

Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

Goal and Objectives

The goal of this management plan is to protect, restore and enhance baywide shad and river herring stocks to generate the greatest long-term ecological, economic and social benefits from the resource.

To achieve this goal, the following objectives will be met:

- Maintain a spawning stock at a size which will eliminate low reproductive potential as a cause of poor spawning success.
- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.

- Reduce fishing effort on shad and herring stocks until they exhibit increased abundance.
- Improve knowledge of shad and herring population dynamics to more accurately assess and minimize interjurisdictional conflicts.
- Redefine tributary survey programs to improve water quality and habitat accessibility specifically for alosids.
- Continue programs to introduce shad and herring into areas which will support natural spawning migrations.

Problem Areas, Management Strategies, and Proposed Actions

Declining Abundance

Historically, shad and river herring supported some of the most valuable commercial fisheries in the Chesapeake Bay. From the late 1800s to the mid-1900s, shad was the most economically valuable food fish harvested in Maryland and Virginia. Presently, shad and river herring are at low levels of abundance relative to catches in the historical and recent past, as evidenced in figures 1 and 2.

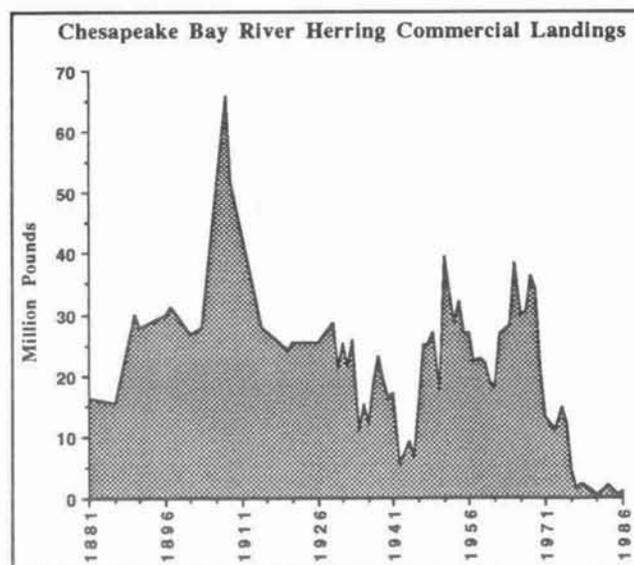


Figure 1.

Strategies and Actions:

- Maryland will continue the moratorium on American shad and hickory shad in its portion of Chesapeake Bay. Virginia will assess current shad exploitation rates and take appropriate steps to limit fishing effort if necessary. Pennsylvania will continue its moratorium on shad

in the Susquehanna River basin while restoration efforts are in progress.

- Maryland will control the harvest of river herring on a river-by-river basis by one or a combination of: harvest limits; harvest season; areal closures; and gear restrictions. Virginia will use similar measures to control harvests of river herring, American shad and hickory shad. Systems slated for restoration will also be regulated or closed. Pennsylvania will implement size restrictions on herring in the Elk Creek basin.

Overfishing

Both shad and river herring are vulnerable to overfishing at present low population levels. Harvest is affecting yearly production of young, and probably prevents stock recovery in some areas. Adding to this potential for overfishing are the interjurisdictional offshore fisheries which target mixed stocks of shad and river herring from different river systems along the coast. Offshore harvests of shad and herring affect inshore stocks, complicating management strategies.

Strategies and Actions:

- The harvest of shad and river herring will be regulated in accordance with the Atlantic States Marine Fisheries Commission recommendations. The coastal shad intercept fishery will be controlled through a combination of gear restrictions, seasonal and areal closures, and harvest limits. The herring harvest will be controlled during spawning migrations through gear restrictions and spawning area closures.
- Maryland and Virginia will ensure that the by-catch of river herring is minimized in the foreign and domestic mackerel fisheries.

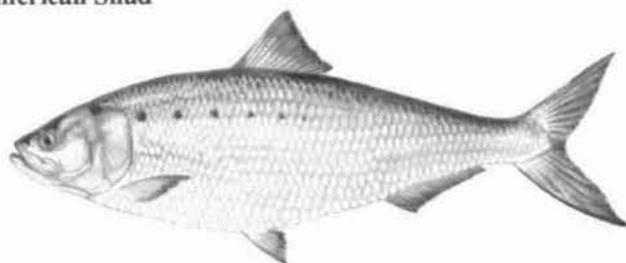
Stock Assessment Deficiencies

Data on shad and herring are needed concerning harvest, fishing effort, biological characteristics of the harvest, and fishery independent measures of stocks. At low stock size, shad and herring juvenile abundance, catch and effort data, and landings data may not accurately represent actual population abundance. For all shad and herring species, information is needed on early life mortality from the egg to the juvenile stage.

Strategies and Actions:

- Shad and herring adult and juvenile surveys will be continued with the objective of developing a

American Shad



Alewife



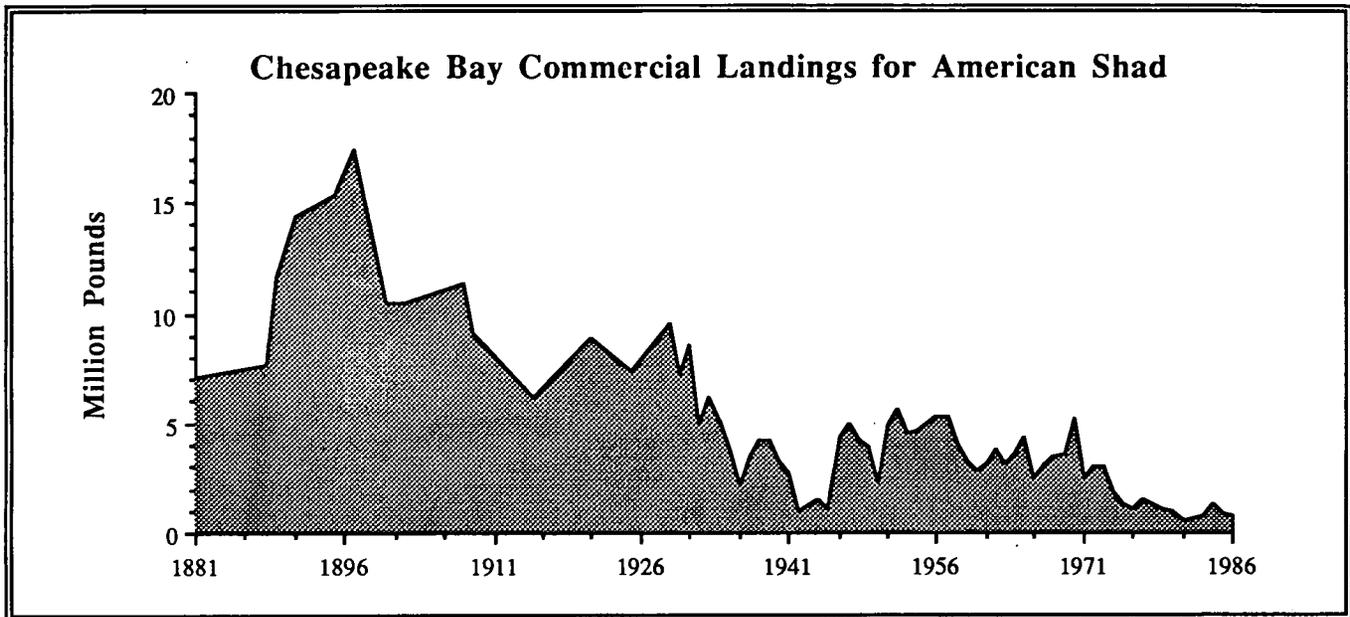
baywide index of abundance and determining other stock characteristics.

- Virginia will initiate an ocean intercept tagging program to determine stock composition in the coastal shad fishery.
- Virginia will improve assessment of current fishing rates on shad stocks in territorial waters and seek to improve catch and effort data through mandatory reporting.
- Pennsylvania and Maryland, in cooperation with the other Susquehanna River Anadromous Fish Restoration Committee members, will continue their juvenile shad assessment and marking program.
- The abundance of American shad in the Potomac River will be investigated through a joint effort by Maryland, Virginia, and the District of Columbia.

Habitat Loss And Degradation

Changes in shad and herring spawning habitat have been a primary cause of stock declines over the past century. The loss of previously productive habitat due to migration barriers has significantly contributed to the problem. Dams, road culverts and other stream blockages have steadily eliminated many hundreds of miles of spawning and nursery grounds. In recent decades, water

Figure 2.



quality degradation has also had harmful impacts upon the remaining available habitat.

Strategies and Actions:

- Maryland, Virginia, Pennsylvania, and the District of Columbia will work to implement the recommendations of the Fish Passage Strategy, adopted as a 1987 Chesapeake Bay Agreement commitment. Actions include removing stream blockages, designing and constructing permanent fish passage facilities, and restocking areas. Fish passage projects will be monitored to gauge their success, and reintroduced stocks will be protected.
- Maryland and Pennsylvania have set water quality standards for dissolved oxygen and minimum flows in the Susquehanna River below Conowingo Dam, which are in effect. The construction of a permanent fish passage facility is scheduled for completion in 1991.
- Maryland will establish a new water use classification system based on the physical habitat and water quality characteristics to guide resource management. The revised system would define anadromous fish spawning areas.
- Maryland, Virginia, Pennsylvania and the District of Columbia will work toward improved water quality and enhanced biological productivity by implementing recommendations of the Nutrient Reduction Strategy, the Toxics Reduction Strategy, and the Conventional Pollutants Strategy commitments

of the Chesapeake Bay Agreement. A plan for continued research and monitoring of acid rain causes and impacts is also recommended.

Concentrated efforts to restore American shad to sustainable levels of abundance, especially in areas of historic importance, are currently being undertaken. Two methods used in restoration to assist natural population growth are the trapping and transporting of adult spawners above obstructed passages and the hatchery production of eggs, fry and juvenile shad for stocking.

The long-range outlook for shad and river herring in Chesapeake Bay is hopeful. Decades of stock declines cannot be immediately mended, but progress is being made on restoring the quantity and quality of habitat necessary for successful reproduction. These efforts, in conjunction with restoration programs and fishing controls, should benefit shad and herring populations and, in turn, the residents of the Chesapeake Bay watershed.

The Chesapeake Bay Alosid Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources.

September 1989

CHESAPEAKE BAY:

SUBMERGED AQUATIC VEGETATION POLICY



**SUBMERGED AQUATIC VEGETATION IN
THE CHESAPEAKE BAY AGREEMENT**

Providing for the protection and restoration of Chesapeake Bay's living resources is a hallmark of the 1987 Chesapeake Bay Agreement. A "Schedule for Developing Bay-wide Resource Management Strategies" was developed in response to the Living Resources commitment:

By July 1988, to adopt a schedule for the development of Bay-wide resource management strategies for commercially, recreationally, and selected ecologically valuable species.

Submerged aquatic vegetation, an important indicator of Bay health, is one of the five major categories of Bay living resources for which management strategies are being developed.

The Submerged Aquatic Vegetation Workgroup of the Chesapeake Bay Program's Living Resources Subcommittee developed the strategy for the protection and restoration of submerged aquatic vegetation. The workgroup includes representatives from the U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, National Marine Fisheries Service, Maryland Department of Natural Resources, Virginia Marine Resources

Commission, Interstate Commission on the Potomac River Basin, Chesapeake Bay Foundation, University of Maryland, Virginia Institute of Marine Science, and Harford Community College.

This Policy's intent is to guide the protection and restoration of all submerged aquatic vegetation within the Chesapeake Bay and its tidal tributaries.

BACKGROUND

Submerged aquatic vegetation (SAV) are vascular plants that live and grow below the water surface. Because of their need for sufficient sunlight, they are found in the shallow water areas of the Chesapeake Bay and its tributaries. There are 13 principal species distributed according to their individual salinity requirements.

ECOLOGICAL VALUES

SAV provides a number of important ecological benefits:

- a) Fish and wildlife habitat
- b) Food for waterfowl
- c) Nutrient uptake
- d) Removing suspended sediments and holding substrates
- e) Producing oxygen for the water column and upper sediment layer
- f) Contributing organic matter to the Bay food web

SAV beds provide shelter and nursery areas for many species of fish and wildlife. Small fish such as killifish, silversides, and minnows and juveniles of larger species such as white perch, striped bass and yellow perch find protection and cover from predators in SAV beds. The plants are a substrate in the water column for algae, snails and worms which are food for fish and larger invertebrates. Molting blue crabs also find shelter in SAV until their shells harden.

SAV is an important source of food for many species of ducks, geese and swans. Migrating and over-wintering populations of waterfowl rely on the nutritious seeds, rootstocks and starchy tubers of SAV for their diet.

Excessive nutrients in the Bay can cause algae blooms; SAV helps to prevent this by removing nutrients from the water and sediment. SAV also helps to remove suspended sediments from the water column by trapping sediment particles on the plant leaves and stems. The roots act to bind the substrate and prevent resuspension of particles, while dense beds of SAV slow water currents and dampen wave energy to protect shorelines from erosion.

Another valuable function of SAV is its ability to provide oxygen to the surrounding waters. In the absence of SAV, low dissolved oxygen levels can be harmful or lethal to many aquatic organisms.

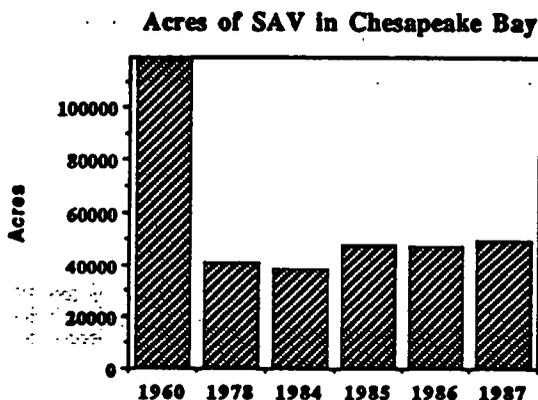
As SAV beds die back at the end of the growing season, they provide a valuable source of organic material (detritus) for the Bay ecosystem's food web.

MONITORING VALUES

Because the growth and survival of SAV is directly connected to the water quality of Chesapeake Bay, SAV can serve as a valuable indicator of whether an area's water quality is sufficient to support living resources. Attempts to improve Bay water quality can be evaluated by SAV response. Thus, changes in SAV distribution and abundance can serve as a measure of the success of the Bay-wide restoration program. In addition, the annual SAV monitoring reports are used in the regulatory review process.

Decline of SAV

Former levels of SAV distribution were well over 100,000 acres. Today, less than 50,000 acres remain. Most of this decline has occurred within the last two decades and has affected all species in most areas of the Bay.



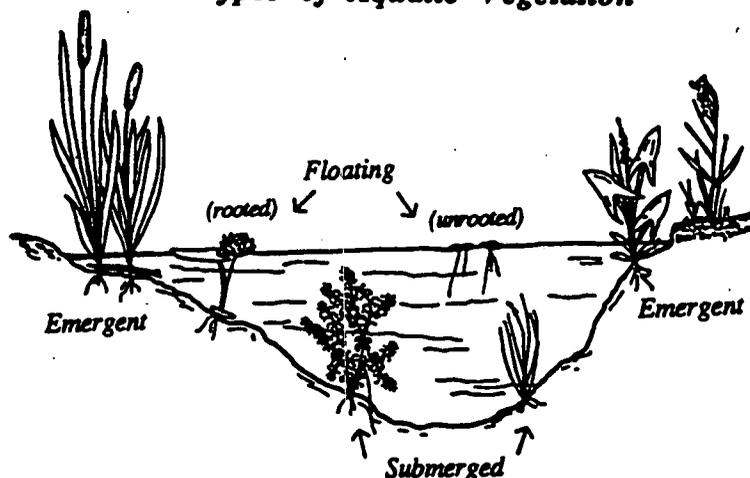
Causes for the loss of SAV are attributed to a decline in the water quality of Chesapeake Bay mainly from excessive loadings of nutrients and sediments. Resultant algae blooms and high sediment levels increase turbidity blocking vital sunlight to SAV.

POLICY ISSUES

- * The goal of the Bay Program's Policy for the protection and restoration of submerged aquatic vegetation is to achieve a net gain in SAV distribution and abundance in the Chesapeake Bay and its tidal tributaries by:
 - * protecting existing SAV beds from further losses;
 - * setting and achieving regional water and habitat quality objectives that will result in Bay-wide restoration of SAV; and,
 - * setting regional SAV restoration goals considering historical distribution records and estimates of potential habitat.

Four key components are included in the Policy: assessing the resource, protection of existing SAV, restoration of SAV, and education and scientific research. Within each component,

Types of Aquatic Vegetation



specific policy statements and action items to implement the policy have been developed.

I. Assessing the Resource

Only through an established, consistent and regular survey of populations over time can progress toward the net gain of SAV goal be measured. An effective assessment and monitoring strategy is essential to evaluate SAV distribution and abundance, and the quality of their supporting habitats.

II. Protection of Existing SAV

Current regulatory and resource management programs need to be evaluated for their effectiveness in protecting existing SAV and their habitats from further losses.

III. Restoration of SAV

Efforts must be made to restore SAV by improving the habitat conditions necessary for natural revegetation. The water quality and habitat quality requirements of SAV should be established as regional goals for strategies to reduce influx of nutrients, toxics and conventional pollutants to the Chesapeake Bay.

IV. Education and Scientific Research

Education is important to increase public awareness of this valuable resource and to provide sufficient information to resource managers responsible for implementing SAV protection and restoration practices. Scientific research will improve our knowledge of SAV to refine and enhance protection activities.

Greater detail on specific SAV policy statements and action items may be found in the Chesapeake Bay Submerged Aquatic Vegetation Policy. Meeting the 1987 Chesapeake Bay Agreement's goals for protecting and restoring SAV provides an important opportunity for interested citizens, resource managers and legislators to focus their commitment to the health of the Bay ecosystem.

The Chesapeake Bay Submerged Aquatic Vegetation Policy is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was prepared by the Living Resources Subcommittee and printed by the Chesapeake Bay Program.
July, 1989

CHESAPEAKE BAY:

STOCK ASSESSMENT PLAN



M.E. Warren

STOCK ASSESSMENT IN THE CHESAPEAKE BAY AGREEMENT

In recognition of the important values - economic, recreational, ecological, aesthetic, symbolic - that we attribute to Chesapeake Bay living resources, the 1987 Chesapeake Bay Agreement contains an entire category of commitments related to restoring and protecting the Bay's living resources. The Chesapeake Bay Stock Assessment Plan responds to one of these commitments:

By July 1988, to develop, adopt, and begin to implement a Bay-wide plan for the assessment of commercially, recreationally, and selected ecologically valuable species.

The Stock Assessment Plan was developed by the Chesapeake Bay Stock Assessment Committee, a federal/state committee sponsored by the National Oceanic and Atmospheric Administration (NOAA). Membership includes scientists and resource managers from Maryland, Virginia, Pennsylvania, the District of Columbia, NOAA National Marine

Fisheries Service and Estuarine Programs Office, and the U.S. Fish and Wildlife Service.

This flyer highlights the conclusions and recommendations of the Chesapeake Bay Stock Assessment Plan.

BACKGROUND

Stock assessment is the interpretation of fish population data for describing the status of fish stocks and for predicting the results of fishery management options. Stock assessment analyses take population characteristics such as growth, mortality, and reproduction and relate them to controlling factors which include fishing pressure and environmental distress such as climatic fluctuations, pollution, and habitat degradation.

Maryland, Virginia, and the District of Columbia have all been conducting stock assessments on selected species, but many of the ongoing programs are limited in terms of geographic coverage and range of species. The Plan concludes that existing

programs do not constitute a comprehensive stock assessment program for the Bay and its tributaries, and it recommends routine, systematic assessments that provide long-term data for all the critical life stages of finfish and shellfish species in the Bay.

WHAT DO WE KNOW?

Figure 1 illustrates present knowledge of a few representative Chesapeake Bay finfish and shellfish species. The figure indicates that for some species, such as menhaden, there is adequate information upon which to make informed management decisions. Other species, such as the oyster, have not received the level of attention their importance would seem to warrant. Fur-



ther, the chart shows that, in general, there is sufficient basic biological information, but little reliable catch, effort, and recruitment data is available. This deficiency is significant because these data are the major types of information required for stock assessment analyses.

DATA NEEDS

Shortcomings of the present data collection efforts in the Chesapeake are accentuated in Figure 1. Stock assessment data needs include improved catch data, fishing effort data, and biological data (length, age, weight, sex) from commercial and recreational fisheries. These three categories are called "fishery-dependent" data.

"Fishery-independent" data are also necessary so that unbiased information essential for stock

assessments is collected on juveniles and adults. Fishery-independent sampling does not rely on commercial or recreational fishermen for collecting fish and is conducted through standardized surveys, such as the Maryland beach seine survey which is used to estimate a juvenile index for striped bass. Short-term intensive research is also needed to understand the processes that affect growth, mortality, and reproduction.

The Plan calls for baseline fisheries data that are 1) collected with standard methods Bay-wide, 2) precise and accurate, 3) representative of the distribution and abundance of Bay species, 4) inclusive of all major species and their critical life stages, and 5) long-term in scope.

PROPOSED PROCESS FOR IMPLEMENTATION

Approximately 100 people are currently working on some aspect of stock assessment in the Bay region at over twenty organizations. Research, monitoring, and management programs that contribute to stock assessment spend about three million dollars per year; most of these funds (\$2.5 million) are provided by federal agencies, in particular, NOAA and the Fish and Wildlife Service. Coordination of personnel and financial resources will be a key goal for implementing the proposed Bay-wide data collection program and for conducting stock assessment analyses.

Figure 2 displays organizational responsibilities and activities involving fishery stock assessment in the Bay. This figure illustrates the division of responsibility between research (including data collection and monitoring) and management organizations in all jurisdictions. The Chesapeake Bay Stock Assessment Committee (CBSAC) was formed in 1985 to improve the coordination of technical stock assessment problems.

The major features of a Bay-wide stock assessment program and recommended dates of implementation are summarized as follows:

Fishery-Dependent Programs: July 1989

- * Initiate a Bay-wide fishery statistics program to provide improved estimates of catch and fishing effort for each type of fishing gear and area of the Bay.

Figure 1. Example species selected from the status of stock knowledge matrix (CBSAC Status of Stock Knowledge Working Group, 1/88)

	B	A	K	M
	L	M	I	E
	U	E	L	N
	E	R.	N	O
			C	Y
	C	S	H	F
	R	H	O	I
	A	A	V	S
	B	D	Y	H
				R
				N
Review literature				
Stock identification				
Reproduction-spawning time, location, habitats				
Reproduction-fecundity (age specific, maturity)				
Growth				
Mortality				
Population size/Abundance indices				
Fishery Independent Length Frequency				
Fishery Independent Age Frequency				
Commercial Landings			NA	NA
By-catches and discards	NA		NA	NA
Recreational Landings			NA	NA
Catch per unit effort - Commercial			NA	NA
Catch per unit effort - Recreational			NA	NA
Length Freq. Commercial Landings (size at first capture)			NA	NA
Length Freq. Recreational Landings (size at first capture)			NA	NA
Age Freq. Commercial Landings (size at first capture)			NA	NA
Age Freq. Recreational Landings (size at first capture)			NA	NA
Trophic Dynamics and Fish Kills				
Movement, Distribution and Density by Habitat				
Movement, Distribution and Density by Environment				
Environmental Tolerances				
Gear Selectivity				
Surplus Production Models				
Yield/Recruit Models				
Stock-Recruit Models				
Virtual Population Analysis				
Prediction/Simulation Models				
Economic Characteristics			NA	

LEGEND

-  Acceptable State of Knowledge
-  Significant Progress Made
-  Analysis Underway
-  No Analysis
-  No Data
-  Not Applicable

- * Outline procedures for collecting such data, to include the implementation of a trip-ticket system for commercial fishermen and more extensive recreational fisheries surveys.
- * Institute a program for obtaining species and age composition, as well as other biological characteristics of commercial and recreational catch.

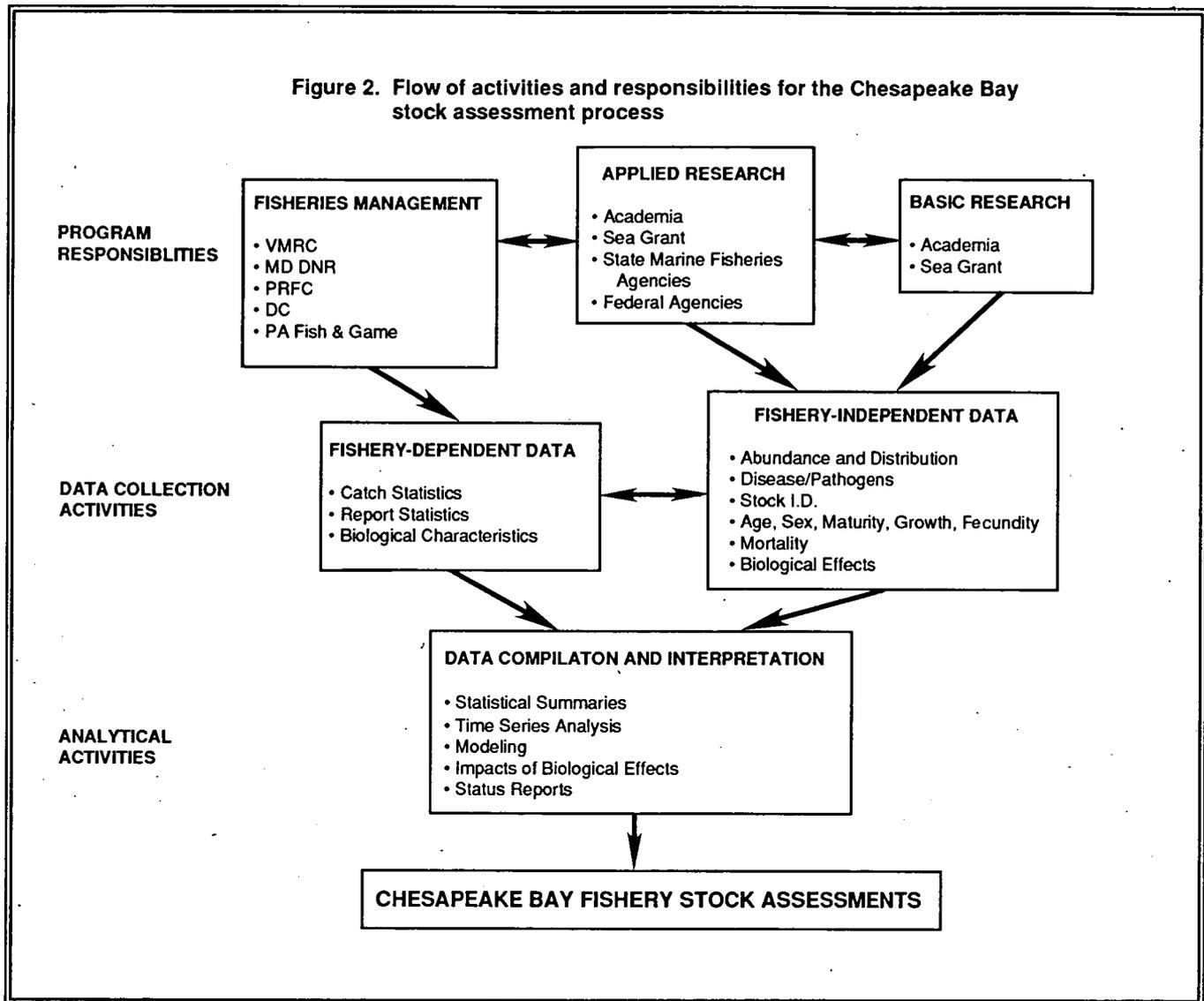
**Fishery-Independent Programs:
Spring 1989**

- * Complete final design for a Bay-wide trawl survey to obtain fishery-independent

estimates of abundance and distribution.

- * Augment trawl survey with other sampling methodologies to obtain abundance indices for species and life stages not captured by the trawl survey, such as the ongoing beach seine surveys in Maryland and Virginia.
- * Develop research program to investigate the effects of the environment on juvenile fish and shellfish populations.
- * Coordinate these surveys and studies with the Chesapeake Bay Program Bay-wide Monitoring Program.

Figure 2. Flow of activities and responsibilities for the Chesapeake Bay stock assessment process



**Stock Assessment Implementation:
July 1988**

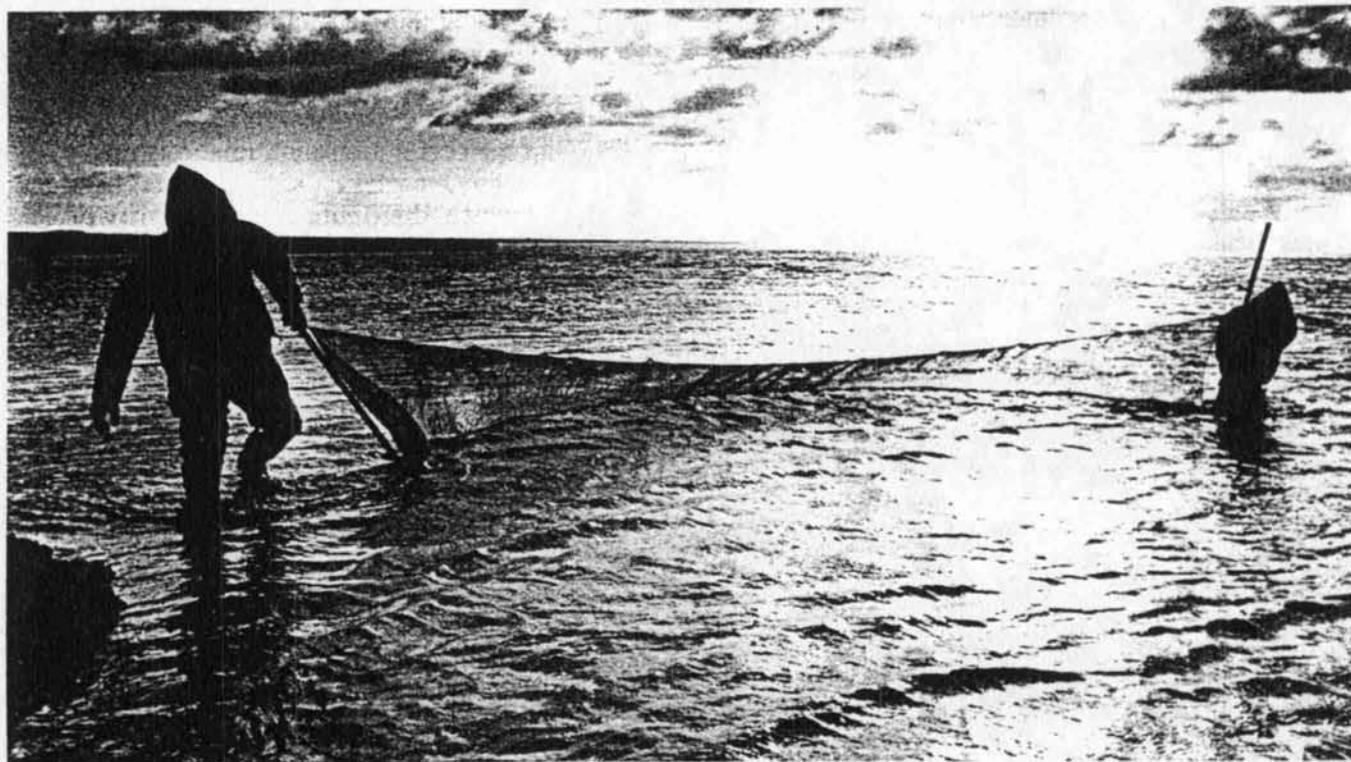
- * Continue Chesapeake Bay Stock Assessment Committee (CBSAC) oversight responsibilities for Bay-wide Stock Assessment.
- * Maintain CBSAC working group roles for reporting on status of Bay stocks, investigating analytical techniques, and data management.
- * Establish new stock assessment working groups on finfish, oysters, and blue crab to begin immediately with the evaluation of available data and proposed sampling programs.
- * Produce annual reports on the status of stocks, fishery statistics, and periodic Bay-wide stock assessment reports.

The Stock Assessment Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873

This circular was printed by the Chesapeake Bay Program.

CHESAPEAKE BAY:

MONITORING PLAN FOR LIVING RESOURCES



Dave Harp, Chesapeake Bay Foundation

LIVING RESOURCES MONITORING AND THE CHESAPEAKE BAY AGREEMENT

The Governance section of the Chesapeake Bay Agreement of 1987 contains a commitment by the states and the federal government:

By July 1988, to develop a Baywide monitoring plan for selected commercially, recreationally, and ecologically important species of living resources.

A joint workgroup of the Chesapeake Bay Program's Monitoring Subcommittee and Living Resources Subcommittee was formed in November 1987 to develop the living resources monitoring plan. The membership of the Living Resources Work Group includes representatives

of the Chesapeake Bay Stock Assessment Committee in addition to the two Subcommittees.

Several thousand species of plants, animals and microorganisms live in the Chesapeake Bay. These thousands of species, collectively, are the Bay's living resources. Each species has its own set of habitat requirements or preferences. Some species are valuable economic resources, while others are pests to people or desirable species. Some have enormous ecological significance and some are appreciated mainly for their rarity or beauty.

WHY MONITOR?

In working toward the goal of restoring the abundance and diversity of resources in the Bay, monitoring is essential. Many of the actions necessary to improve the quality of Bay habitats

have been identified and begun to be implemented. Regional fisheries management plans, presently under development, have the potential for preventing overharvest of commercial and recreational species. But plans for improving water quality will always be based on imperfect knowledge. In order to measure progress, it will be necessary to maintain the best possible records of resource abundance, distribution, diversity and reproduction. This record-keeping can be accomplished through a well designed living resources monitoring program.

In addition to tracking resource trends, monitoring will gradually improve our knowledge of Chesapeake Bay species, their natural cycles, their habitat needs, and how they respond to human activities. To meet these goals, a resource monitoring program must be integrated with biological research, water quality monitoring, ecological modeling, and fisheries management. Cooperation and coordination between agencies, programs, jurisdictions, and disciplines are essential.



photo: Kent Mountford

Fish egg and larvae survey aboard the University of Maryland research vessel "Orion."

OBJECTIVES

The Workgroup began its task by defining three major objectives of living resources monitoring:

- 1) Document the current status of living resources and habitats in Chesapeake Bay.
- 2) Track the abundance and distribution of living resources and the quality of habitats over time.
- 3) Examine correlations and relationships among water quality, habitat quality, and the abundance, distribution, and integrity of living resource populations.

The Living Resources Monitoring Plan has been designed to:

- * Provide a framework for Bay-wide monitoring of living resources;
- * Achieve coordination and data compatibility among living resources, habitat, and water quality monitoring programs;
- * Establish biological data collection methods which will ensure data comparability between jurisdictions and programs;
- * Establish an efficient, coordinated system of data management responsive to the objectives of living resources monitoring; and
- * Review existing programs, identify components that should be added or modified, and develop recommendations for implementation of the plan.

A goal beyond the immediate commitment to develop a living resources monitoring plan is the full integration of living resources and water quality monitoring within Chesapeake Bay. That is, ultimately, there will be a Chesapeake Bay Monitoring Program that will include both water quality and living resources components. The Living Resources Monitoring Plan is a significant step towards that goal.

APPROACH

The Living Resources Monitoring Workgroup has given the language of the Bay Agreement ("selected ... species" and "living resources") a broad interpretation in the development of the

Monitoring Plan. For example, tidal and non-tidal wetlands, although not truly "species," have been included because of their great importance as habitats and regulators of water quality.

The Plan provides a framework for consistent, sustained monitoring of Chesapeake Bay living resources: monitoring that is responsive to the information needs of those who must manage the Bay's habitats and living resources, and to the public, who ultimately will judge the success of the Bay restoration.

COMPONENTS OF THE ECOSYSTEM

In Section II of the Plan, entitled Data Needs, Existing Programs, and Monitoring Recommendations, several broadly defined groups of organisms are considered as "ecosystem components":

FINFISH

- Freshwater Spawners
- Estuarine Spawners
- Marine Spawners
- Ichthyoplankton

SHELLFISH

- Oysters
- Blue Crab
- Hard Clam
- Soft Shelled Clam

WILDLIFE

- Waterfowl
- Colonial Birds
- Shore and Seabirds
- Raptors
- Reptiles and Amphibians
- Mammals

PLANT COMMUNITIES

- Submerged Aquatic Vegetation
- Benthic Algae and Macroalgae
- Tidal Wetlands
- Non-tidal Wetlands

BENTHIC FAUNAL COMMUNITIES

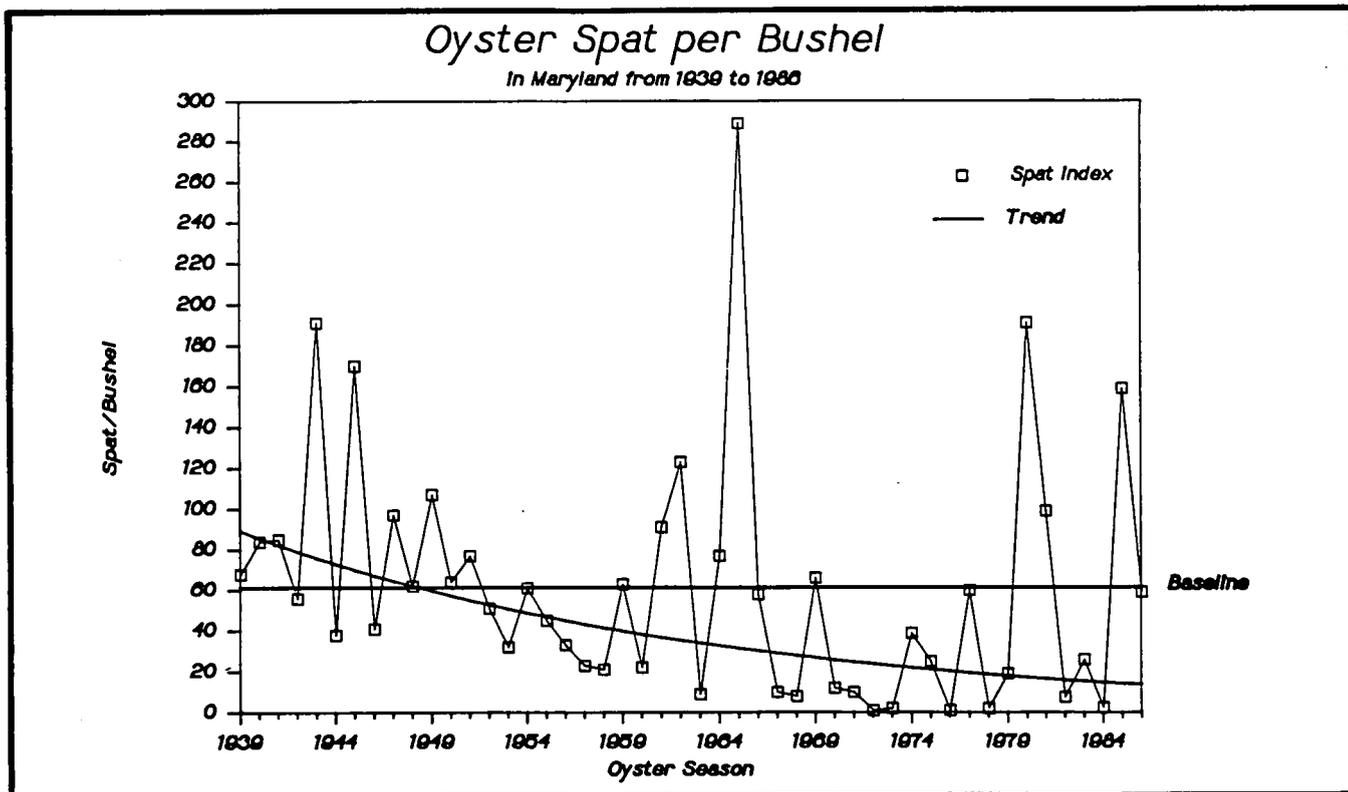
- Benthic Infauna
- Benthic Epifauna

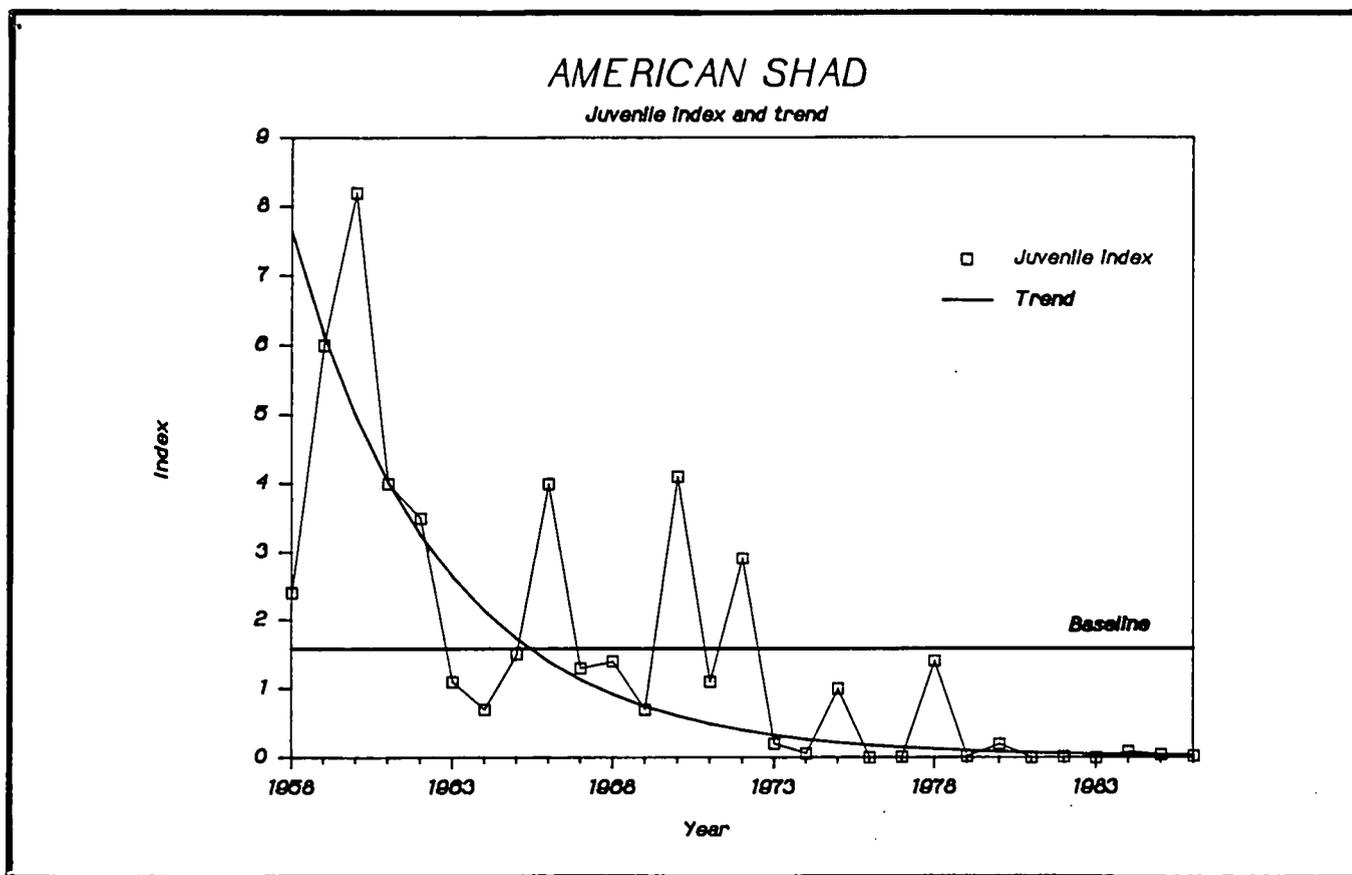
PLANKTONIC COMMUNITIES

- Picoplankton
- Nanoplankton and phytoplankton
- Microzooplankton
- Mesozooplankton
- Gelatinous Zooplankton

For each subgroup, data needs are identified, existing monitoring programs are reviewed, deficiencies noted, and recommendations made for future monitoring, including key areas of integration with other living resources and water quality monitoring programs.

Section III of the Plan is a discussion of how the data resulting from living resources monitoring





These graphs (above and preceding page) depict examples of long-term living resources monitoring information from Maryland's portion of the Chesapeake Bay. An annual index developed from field counts of each year's reproductive crop is shown, along with the long term average of the index (baseline), and long-term trends that can be discerned through simple statistical analysis.

should be stored, analyzed, and reported. Permanent accessibility and regular reporting of basic data on living resources status and trends were the principle concerns addressed in this section. The information gained from monitoring must be readily available to managers, scientists, and the public.

RECOMMENDATIONS

Section IV summarizes the major recommendations of the Plan, and discusses how and when these should be implemented. First, it is recommended that the Plan be used Bay-wide as a guide to uniform collection methods for biological data. Second, a core living resources monitoring program is proposed to fulfill the monitoring objectives. Additional recommendations address the need for managing monitoring data to ensure quality, security, and accessibility, and the need to develop better methods for assessing the impacts of contaminants on living resources populations.

The Living Resources Monitoring Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873

This circular was printed by the Chesapeake Bay Program.

Five amendments, four County Bills and a new Conservation Manual, have been submitted to the Critical Area Commission for review and approval. The first three bills were submitted on July 25, 1989, and the remainder was submitted on August 3. The public hearing was held on September 13, 1989. A vote is needed at the Commission meeting on October 4 because action must be taken by October 25.

The amendments were submitted to correct editorial changes, clarify language, streamline County procedures, and make a couple of provisions more strict. Most of the changes merely improve the clarity and readability of the documents, but the strengthening of provisions was more substantive. The amendments were advertised as technical, which is generally accurate for the changes.

Sludge disposal is prohibited: The Criteria limit sludge disposal to IDAs except where a net improvement in water quality can be shown. The County prohibits sludge disposal in all areas, although agricultural fertilization with sludge is not limited. There is no conflict with the Criteria, because the County can always be stricter than the Criteria.

Fertilization with sludge in the extended buffer: The Criteria allow permitted agricultural fertilization with sludge except in the 100-foot buffer. The County has prohibited any use of sludge in the entire buffer, including areas extended. The County is stricter, but the provision does not conflict with the Criteria. However, agricultural use requires only 25-foot buffers, and fertilization will occur in the extended buffer areas. Sludge applied occasionally as part of a fertilizer management program can provide organic sources of fertilizer, which generally are more stable and slow-releasing than commercial inorganic fertilizer.

Waiver to the Conservation Agreement: This provision is evidently needed to administer the County's program, and is a good idea. The conditions for the waiver keep any activity out of the most sensitive areas like the buffer. The County will not lose the ability to enforce the Critical Area Program, but less scrutiny will be given the small projects issued a waiver.

Minor Revision Procedure for Approved Conservation Agreements: This provision also seems to be needed for effective administration of the program on the County level. The conditions for the minor revisions exclude any changes in sensitive areas and limit the possible impact. The comments for the waiver apply to this provision as well.

Allowing Marinas as a Permitted Use in M-X-T Zones: The bill does not conflict with the Criteria because all the applicable criteria are required as conditions for the permitted use. The bill is specifically aimed at allowing Port America to install its marina as a permitted use to meet the project's time frame, and all other marinas will continue to be treated as special exceptions. An amendment tailored to a specific project does not set a good precedent, but all the provisions of the Criteria are being met and only the County's procedure is being changed.

The recommended action is approval, because the changes do not conflict with the Criteria, and the County is entitled to be stricter.

STAFF REPORT

October 4, 1989

JURISDICTION: St. Mary's County

ISSUE: Critical Area Program

RECOMMENDATION: Return program to County with required changes to be made within 40 days.

The staff-recommended changes appear below and as noted on program document. The changes on the document are of a technical nature.

Pages 1-2

Enforcement: The program contains requirements for land development, but is not designated as part of the St. Mary's County Zoning Ordinance. As a separate ordinance, it contains no specific means of enforcement or provisions regarding penalties, remedies or appeals.

Page 8

The County must determine the acreage for each classification based on the current Critical Area maps.

Page 10

#5 Grandfathering: The County intends to grandfather Planned Unit Developments which received final zoning approval by the County Commissioners prior to December 1, 1985, provided that the Critical Area Criteria are met insofar as possible.

The panel recommends approval of these projects as grandfathered only if 1) all requirements of the County's resolution of rezoning are fulfilled, and 2) if all requirements of the County's Critical Area Program are met, except the requirement regarding residential density. Therefore, some means is needed whereby 1) the Commission can be assured that development takes place according to these provisions and 2) an adjustment to the County's Growth Allocation can be made if the provisions are not adhered to.

Page 43

The program must specify that no commercial cutting is permitted in the Buffer without a Buffer Management Plan, which is a forest plan containing the minimum elements of COMAR 14.15.09.01C(5)(a)(i)-(iii). The criteria which permit selection cutting to within 50 feet, and clearcutting of loblolly pine and tulip poplar within that area should be included here.

Page 45

The full requirements of a mineral resources element must be part of this program.

Staff Report - St. Mary's County
October 4, 1989
Page Two

The Enforcement Section should include at the beginning of each subsection a clear provision that the applicant is responsible for providing sufficient information to the Environmental Review Team.

Page 61

The program states that the County has "about 1500 acres" of Growth Allocation. This figure must be precise.

Page 79

The development envelop concept for the Design Competition must comply with the Commission's Guidelines. Specifically, there must be an area of 20 acres which remains undeveloped, to be restricted by easements, covenants or other protective measures.

Page 80

For Minor Subdivisions and Single-Lot Subdivisions, each lot created through the use of Growth Allocation must be deducted from the County's total Growth Allocation acreage.

STAFF REPORT

August 2, 1989

JURISDICTION: St. Mary's County

ISSUE: Growth Allocation; proposed methods of deduction.

RECOMMENDATION: APPROVAL of cluster option;
DENIAL of minor subdivision and single-lot subdivision options.

St. Mary's County has approximately 1,500 acres of Growth Allocation. The County proposes that deductions from Growth Allocation occur in one of three ways:

1. Major subdivisions (over five lots), Planned Unit Developments, and other large projects (60% of Growth Allocation, approximately 900 acres):
 - * deductions will be consistent with the Commission's established policy for development envelopes;
 - * lots will be clustered;
 - * all individually-owned lots will be deducted;
 - * a minimum 20 acre undeveloped area, community-owned, will be controlled by covenants or other protective measures.
2. Minor subdivisions (20% of Growth Allocation, approximately 300 acres):
 - * individually-owned lots will not be fully deducted;
 - * a 20,000 square foot development pad will be deducted; five acre minimum lot size;
 - * represents 10 times the number of dwelling units anticipated by full-parcel deduction.
3. Single-lot subdivisions (20% of Growth Allocation; approximately 300 acres):
 - * individually-owned lots not fully deducted;

- * a 20,000 square foot development pad will be deducted; six acre minimum lot size;
- * represents 13 times the number of dwelling units anticipated by full-parcel deduction.

In February, 1988, the Commission approved Guidelines For The Counting of Growth Allocation. The Guidelines establish that the Commission "will entertain alternative proposals" for the deduction of Growth Allocation other than for the full acreage of a parcel. The approval of less-than-full-parcel deduction is discretionary, intended for "circumstances where the overall goals of the Critical Area Program would be enhanced." Enhancement is possible, theoretically, because the deducted area, the development envelope, would include:

"individually-owned lots, any required Buffers, impervious surfaces, utilities, stormwater management measures, on-site sewage disposal measures, any areas subject to human use such as active recreation areas, and any additional requirements of the criteria."

In order to be exempted from deduction, the remaining area, outside the development envelope, must be 20 acres in size and protected by covenants or other restrictive measures.

The Guidelines specifically reject deductions based on a development area or pad within an individually-owned lot. The Commission recognized several reasons for this rejection, including:

- * adverse environmental impacts result from the number, movement and activities of people in the Critical Area;
- * an RCA parcel developed, by use of Growth Allocation, at a density greater than one dwelling unit per 20 acres no longer exhibits RCA characteristics; therefore, the entire parcel should count against Growth Allocation;
- * flexibility in development location and site design is provided through the use of Growth Allocation and the concept of the development envelope for large-scale projects;
- * concentration of development is encouraged; 20,000 square foot LDAs and IDAs are discouraged.

October 4, 1989

Motion for Commission Vote on St. Mary's County Critical Area Program

...to return the St. Mary's County Critical Area Program to the County. Within 40 days from the date of return by the Chairman, the County must make changes to its Program as specified in writing by the Chairman and return the Program to the Commission.

If the County has not returned the Program to the Commission with all required changes within the time specified, the Commission shall promulgate a Program for St. Mary's County according to the provisions of Section 8-1810 of the Natural Resources Article, Annotated Code of Maryland. The Commission's required public hearings will be held at the St. Mary's County Governmental Center, in Leonardtown, on November 15, 1989 at 7:30 p.m. and December 11, 1989 at 7:30 p.m. Submission of the Commission's promulgated program to the Maryland Register will follow the public hearings.

PROJECT REPORT

October 4, 1989

Project

Kings Landing/Cammack/Walke Natural Resources Management Area,
Calvert County

Applicant

Department of Natural Resources Capital Programs Administration
Land Planning Services

Site

1200 acres (approximately 900 acres in the Critical Area) on the Patuxent River, bordered by Chew Creek to the north and extending to south of Cocktown Creek; west of Huntington

Proposal

The plan is to improve the Kings Landing Area as an environmental education center. New development includes an education/information wing attached to the existing meeting/dining hall, six new cabins, moving existing cabins and/or building a dormitory, a 250-car parking lot, tenting area, extension of an existing pier, group picnic areas, comfort station. The facility will accommodate school groups. Educational programs will feature the ecology of Cocktown Creek, a proposed Estuarine Research Reserve, and surrounding wetlands including the Patuxent River. A boardwalk crossing the creek and linking the three areas is also proposed.

The Cammack and Walke areas will be used predominantly for forestry, forest research, wildlife management, and agriculture (using best management practices). Several group and family picnic areas are also being proposed. A canoe launch will be located on the Patuxent River south of Chew Creek.

Subcommittee Report and Recommendation

The proposal appears to be consistent with the Critical Area Program. The subcommittee recommends approval of the conceptual plan with the following specifications:

- the parking lot should have trench drains which collect the first inch of rainfall and divert it for infiltration
- the parking lot shall be landscaped with shade trees
- all nonwater-dependent facilities should be kept out of the buffer. The pier, canoe launch, trails, boardwalk and

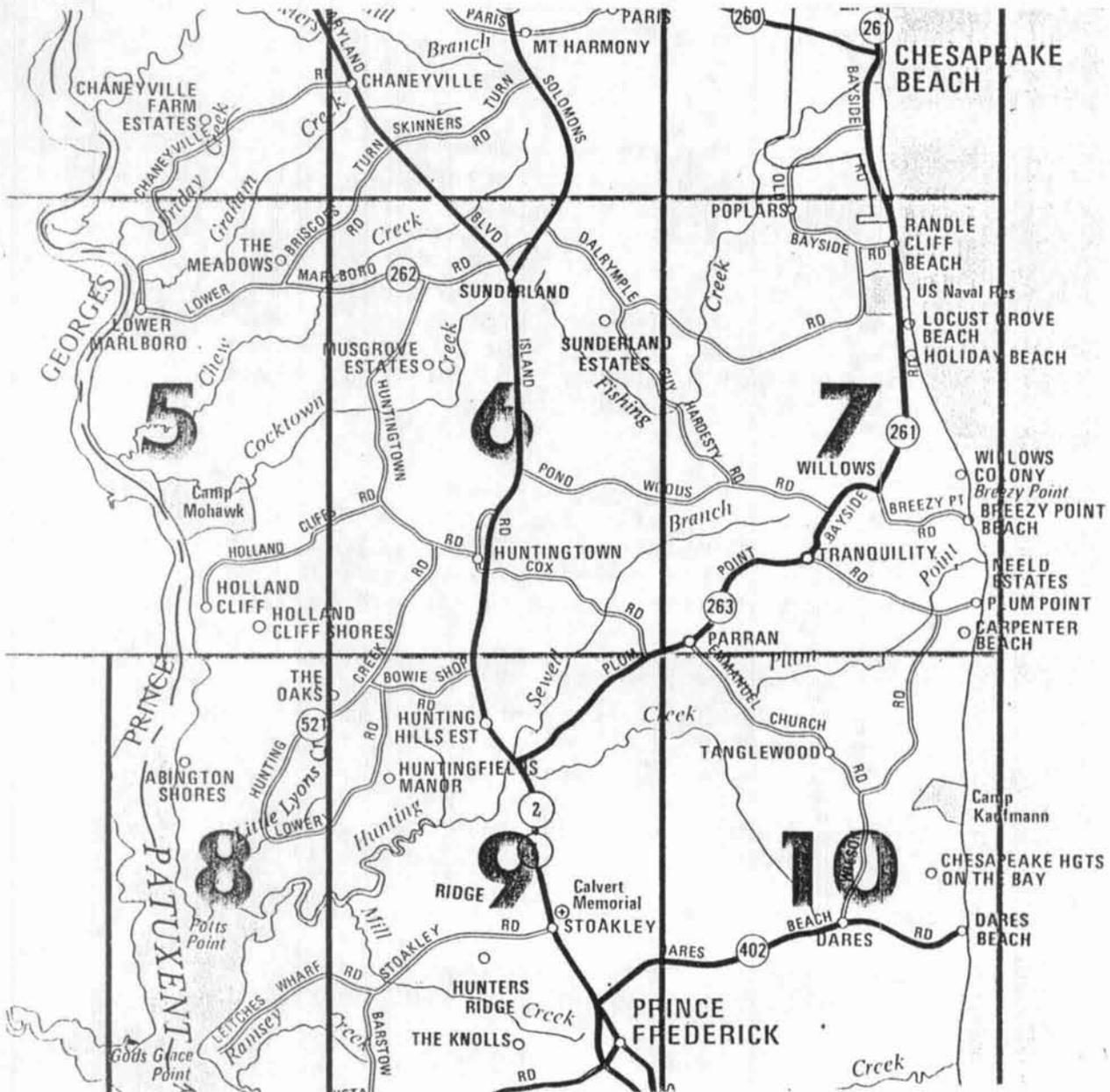
pervious overlooks shall be allowed in the buffer.

- maintenance of forest cover on all steep slopes to avoid erosion into the numerous steep ravines
- final design plans shall be submitted to the Critical Area Commission for approval

Commission Action

Discussion and vote to approve the conceptual plan as it now stands

AR:msl



PROJECT EVALUATION SUBCOMMITTEE REPORT

October 4, 1989

PROJECT: Parking lot at Harmony Hall Regional Center,
Prince George's County

APPLICANT: Maryland-National Capital Park and Planning
Commission

RECOMMENDATION: APPROVAL, with conditions

DISCUSSION:

M-NCPPC proposes to construct a parking area at the Harmony Hall Regional Center, located off Indian Head Highway in Prince George's County. The Center offers County-wide arts and recreation programs. The site consists of 9.7 acres; 4.6 acres are within the Critical Area, including a portion of the main building and parking lots. The Center is in an Area of Intense Development.

Approximately one-half of the proposed parking lot will be within the Critical Area. This area is clear of trees and is relatively flat. An existing basketball court will be removed. The net increase in impervious area is 10,019 square feet.

The site is not managed for stormwater. M-NCPPC will install shallow grass swale ponds and will require Stormwater Management, Sediment and Erosion Control, and Grading permits before construction. The majority of the parking lot will be within the 100 year floodplain. A State (DNR) permit has been issued. No tidal or nontidal wetlands will be affected.

CONDITIONS:

The applicant will satisfy the requirement to reduce on-site pollutant loadings by 10% below existing levels. The applicant will coordinate the required analysis with staff and the Maryland Department of the Environment.

STAFF CONTACT:

Ren Serey

PROJECT EVALUATION SUBCOMMITTEE REPORT

October 4, 1989

PROJECT: Magruder's Landing Boating Facility,
Patuxent River, Prince George's County

APPLICANT: Maryland-National Capital Park and Planning
Commission

RECOMMENDATION: APPROVAL, with conditions

DISCUSSION:

M-NCPPC proposes to improve an existing boating area at Magruder's Landing, in the Patuxent River Park in Prince George's County. The area will be dedicated to Clyde Watson, noted Prince George's County conservationist.

At present, parking for approximately 20 vehicles is provided on a grass area within the Buffer. The proposal includes:

- parking for 40 vehicles outside the Buffer;
- elimination of parking in the Buffer;
- widening the existing paved access road to provide for safe vehicle movement;
- two parking spaces for handicapped and emergency use near the boat ramp;
- two picnic shelters outside the Buffer.

M-NCPPC will obtain permits for Stormwater Management, Sediment and Erosion Control, and Grading. Stormwater will be managed for water quality where feasible. Approximately one acre will be disturbed. Reforestation will exceed the minimum replacement requirements. No tidal wetlands will be affected.

One species on the Maryland List of Endangered Species and one nominated for the list exist near the site. M-NCPPC will coordinate a review of potential impacts with the Maryland Natural Heritage Program and follow any recommended actions.

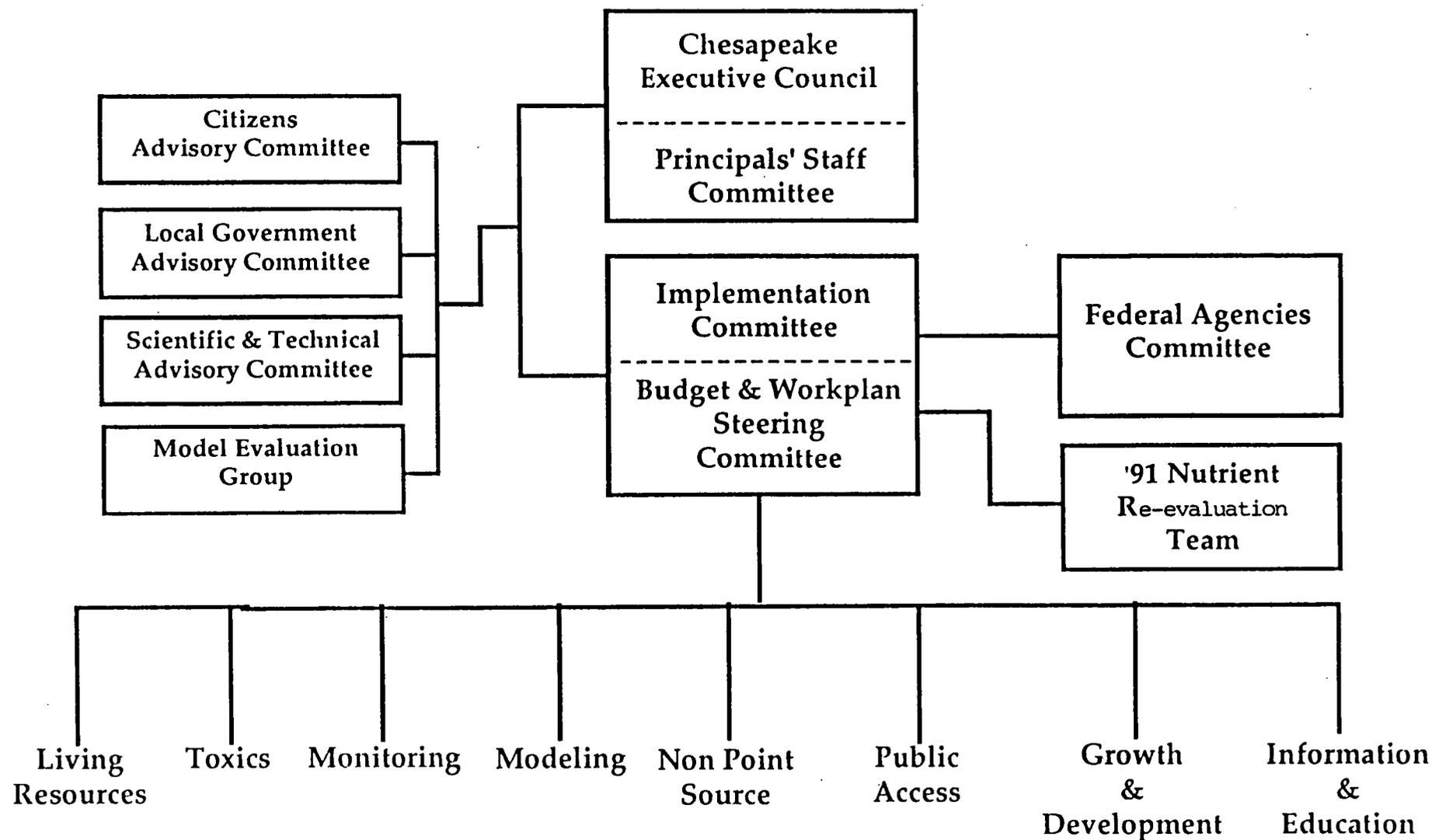
CONDITIONS:

The applicant will coordinate with staff and the Maryland Natural Heritage Program to address impacts on endangered species. The applicant will follow the recommendations of the Maryland Natural Heritage Program.

STAFF CONTACT:

Ren Serey

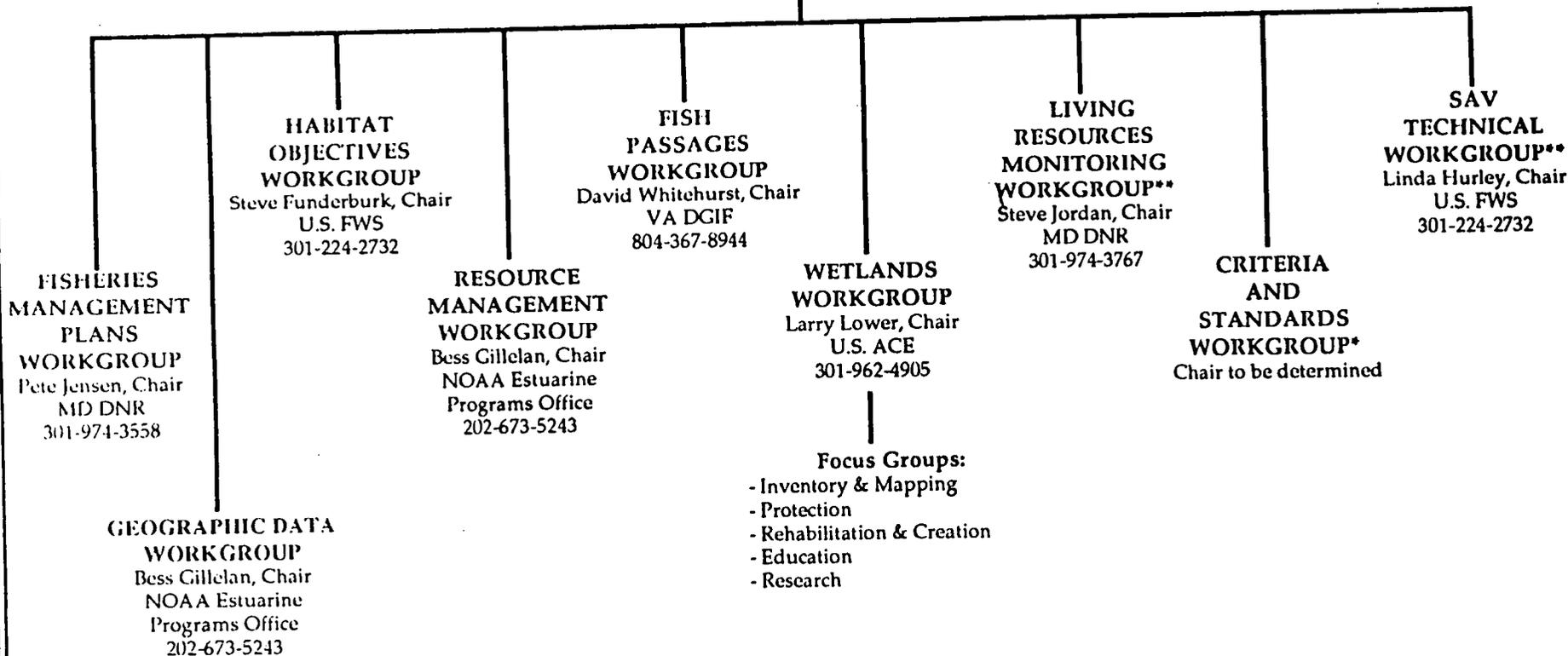
MAJOR COMMITTEES IN THE CHESAPEAKE BAY PROGRAM



LIVING RESOURCES SUBCOMMITTEE

Verna Harrison, Chair
Maryland Department of Natural Resources
301-974-2255

**CHESAPEAKE BAY
STOCK ASSESSMENT COMMITTEE**
Robert Lippson, Chair
NOAA/NMFS
301-226-5771



* A joint workgroup of the Living Resources and Toxics Subcommittees

** A joint work group of the Living Resources and Monitoring Subcommittees

9/22/89

LIVING RESOURCES SUBCOMMITTEE MILESTONES

	1989		1990			1991			1992	
	JULY 1989	DEC 1989	JAN 1990	FEB/MAR 1990	JULY 1990	DEC 1990	JAN 1991	JULY 1991	DEC 1991	JAN 1992
SHAD, CRAB, OYSTER FMPs	Plans Adopted		Implemen. Plan		Annual Report			Annual Report	Revised Plan	
STRIPED BASS - BAYWIDE PLAN		Plans Adopted			Implemen. Plan (State Fishing Regs. in Plan)		Annual Report			Annual Report
BLUEFISH, WEAKFISH/ SPOTTED SEATROUT, WHITE PERCH FMPs				1st Draft of Plans Prepared [Feb 1990]		Plans Adopted			Annual Report	
CROAKER/SPOT, SUMMER FLOUNDER, AMERICAN EEL FMPs [Red and Black Drum due 1992]									Plans Adopted	
STOCK ASSESSMENT [Plan Adopted July 88]					Annual; Fisheries Statistics; Status of Stocks Reports			Annual; Fisheries Statistics; Status of Stocks Reports		
WATERFOWL MANAGEMENT PLAN					Plan Adopted			Annual Report		
ECOLOGICALLY VALUABLE SPECIES MANAGEMENT PLAN						Plan Adopted			Annual Report	

9/22/89

	1989		1990				1991			1992
	JULY 1989	DEC 1989	JAN 1990	FEB/ MAR 1990	JULY 1990	DEC 1990	JAN 1991	JULY 1991	DEC 1991	JAN 1992
SAV POLICY	Plan Adopted		Implemen. Plan		Annual Report; Technical Synthesis Report.			Annual Report		
RESOURCE MANAGEMENT SCHEDULES <i>[Plan Adopted July 88]</i>	Annual Report				Annual Report			Annual Report		
WETLANDS POLICY <i>[Plan Adopted Dec 88]</i>					Implemen. Plans Adopted			Annual Report		
FISH PASSAGE <i>[Plan Adopted Dec 88]</i>		Annual Report	Implemen. Plan				Annual Report			Annual Report
LIVING RESOURCES MONITORING <i>[Plan Adopted July 88]</i>			Annual Report			Annual Report			Annual Report	
HABITAT OBJECTIVES DOCUMENT <i>[Plan Adopted Dec 88]</i>		Draft Plan		Final Plan <i>[Mar 90]</i>		Annual Report			Annual Report	

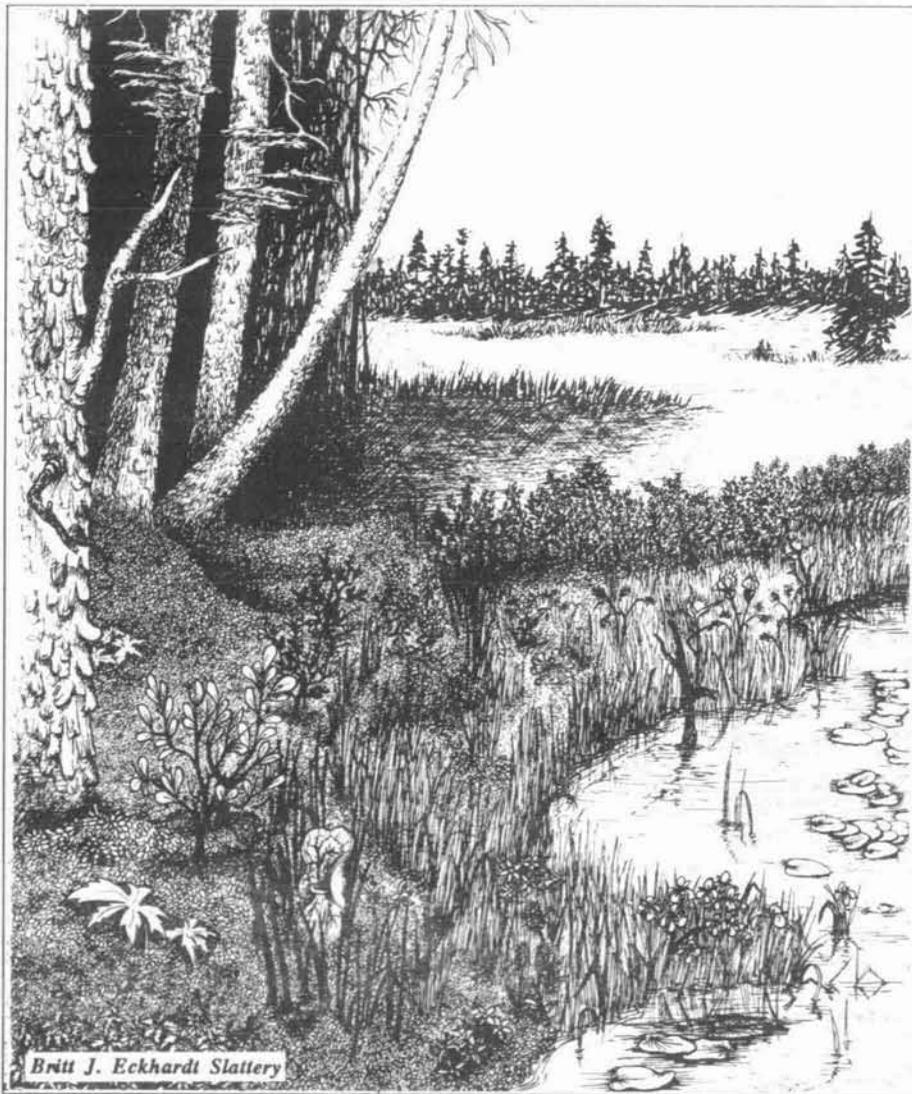
SEE PLAN FOR DETAILED IMPLEMENTATION STRATEGIES

FOR FURTHER INFORMATION, CONTACT:

Verna E. Harrison, Chair (301) 974-2255
 Dr. Ed Christoffers, Science Advisor (301) 974-2255
 Dave Packer, Subcommittee Intern (301) 266-6873

CHESAPEAKE BAY:

TIDAL AND NON-TIDAL WETLANDS POLICY



WETLANDS IN THE CHESAPEAKE BAY AGREEMENT

In recognition of the crucial function of wetlands within the Bay ecosystem, the Chesapeake Bay Agreement of 1987, signed by the Bay states and the federal government, makes the commitment:

By December 1988, to develop and begin to implement a Baywide policy for the protection of tidal and non-tidal wetlands.

The Chesapeake Bay Program's Living Resources Subcommittee established a Tidal and Non-tidal Wetlands Workgroup in December, 1987 to develop a comprehensive Chesapeake Bay Wetlands Policy for the Bay watershed. The Workgroup, chaired by Maryland Department of Natural Resources, includes representatives from the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, National Marine Fisheries Service, Pennsylvania Department of Environmental Resources, Virginia Council on the Environment, and the District of Columbia Environmental Control Division.

BACKGROUND

Wetlands are usually semi-aquatic lands, either flooded or saturated by water for varying periods of time during the growing season. They form a transition zone between dry upland areas and deeper, permanent bodies of water. The term "wetlands" encompasses a variety of environments such as tidal marshes, shrub swamps,

coastal mudflats, freshwater marshes, bottomland hardwood forests, wet meadows, and inland bogs.

At present, tidal and non-tidal wetlands constitute only three percent of the Chesapeake Bay drainage basin. Between the mid 1950s and the late 1970s, wetland destruction averaged over 2,800 acres annually. Continued wetland losses due to man-made impacts and natural causes increasingly threaten this valuable resource.

ECOLOGICAL VALUES

The health of the Chesapeake Bay ecosystem is inextricably linked to the abundance and condition of the wetlands in the Bay watershed. Some of the vital benefits wetlands provide include:

- Fish and wildlife habitat;
- Erosion control;
- Water quality improvement;
- Stormwater/flood control;
- Contribution of organic (plant) material to the Bay food web;
- Groundwater recharge;
- Habitat for rare, threatened and endangered species;
- Timber production; and,
- Recreational opportunities and scenic beauty.

Many of the Bay's living resources depend on wetlands for their survival. Large flocks of migratory ducks, geese and swans spend winters using the marshes for feeding and cover, while resident bird species rely year-round on wetland habitat.

Wetlands constitute the primary spawning and/or nursery sites for many finfish and shellfish species such as striped bass, menhaden, river herring, shad, spot and croaker, as well as blue crabs, oysters, and clams. When critical reproductive areas are filled for development or choked by pollution and excessive nutrients, the populations of these Bay

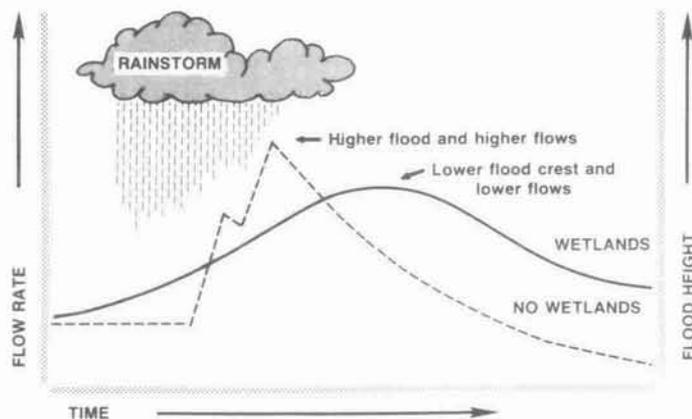
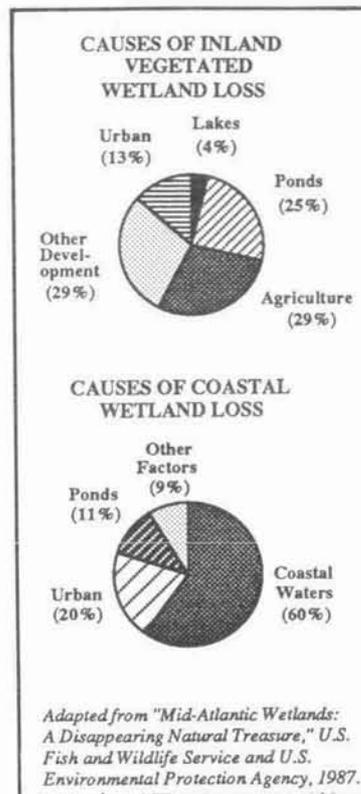


Figure 1. Wetland value in reducing flood crests and flow rates after rainstorms (adapted from Kusler, 1983.)



species will decline. Wetland plants dampen wave action, helping to curb erosion. They are also highly effective in lessening shoreline erosion. Their roots hold soil in place, reducing sedimentation. Sedimentation is not intrinsically harmful; when it is accelerated by disturbances to the environment, however, oyster beds may be smothered and penetration of sunlight critical to the growth of submerged vegetation may be blocked.

Upland runoff and drainage water which pass through wetlands are essentially

"filtered." This improvement in water quality comes from the wetland's ability to process excess nutrients such as nitrogen and phosphorus compounds, to intercept other pollutants, and to trap sediment and reduce suspended solids in the overlying water.

Controlling flood and storm waters is another important function of wetlands. Potentially damaging volumes of fast-moving storm or flood water are temporarily stored in wetland areas. The gradual release of these waters by the wetland minimizes erosion and urban/suburban property damage.

The aquatic food web is dependent upon tidal and non-tidal wetlands to provide nourishment for the many fish, shellfish, and smaller organisms that spend some period of their lives in the wetland habitat. Organic material, or food, is produced in the water by the breakdown of wetland plant leaves and stems.

The wetlands of the Bay states have an intrinsic natural beauty which provides recreational opportunities such as boating, fishing, crabbing and waterfowl hunting, as well as hiking, birdwatching, canoeing and other activities. The financial benefit of these wetland-dependent activities to the economy is significant, yet is threatened by continued wetland loss.

PROTECTION AND MANAGEMENT POLICIES

The goal of the Bay-wide strategy for the protection and management of wetlands within the Chesapeake Bay watershed is to achieve a net resource gain in wetland acreage and function over present conditions by:

- protecting existing wetlands; and,
- rehabilitating degraded wetlands, restoring former wetlands, and creating artificial wetlands.

By July 1990, implementation plans will be developed for the four following focus areas:

Defining the Resource: Inventory and Mapping Activities

To assess progress made toward the goal of net resource gain, comprehensive inventorying and monitoring of all wetland resources is needed. The National Wetlands Inventory and classification methods will be used to determine wetland distribution, acreage, and type.

Major actions include:

- Mapping of wetlands at 10-year intervals, in conjunction with status and trends analyses and cumulative impact assessments; and,

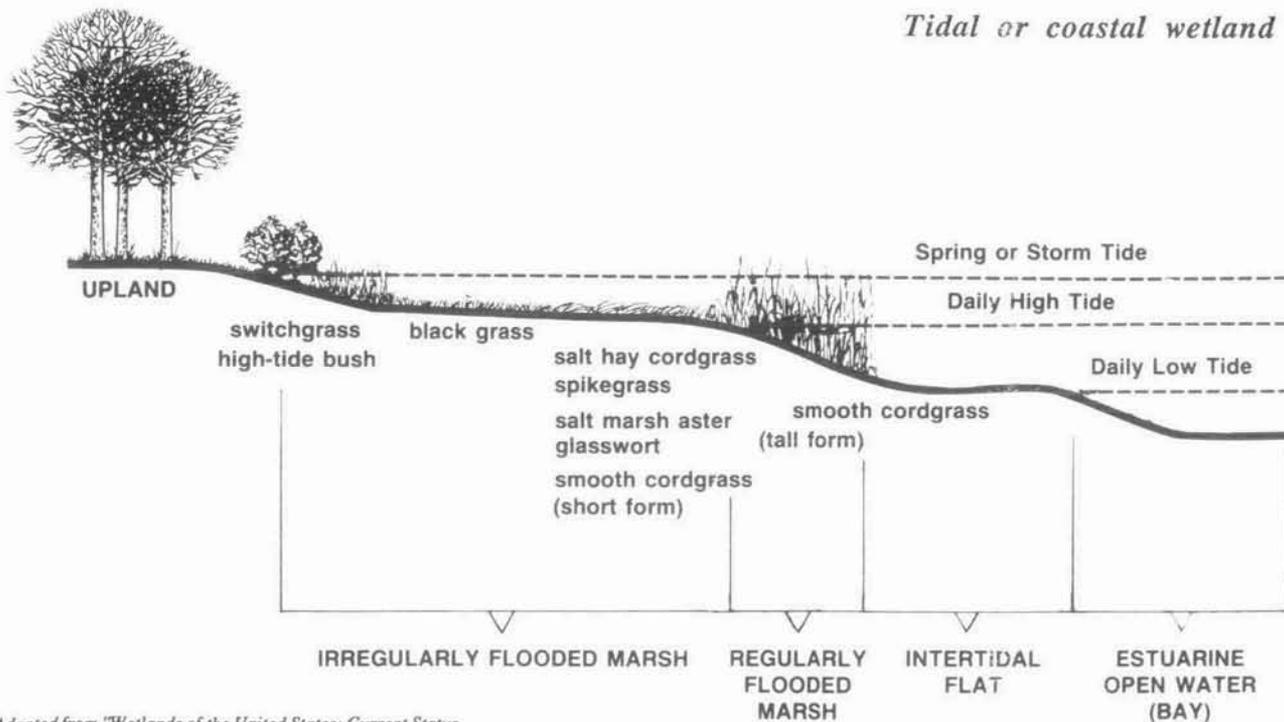
- Monitoring to quantify functions and values of various wetlands and to document changes occurring over time.

Holding the Line: Protecting Existing Wetlands

Existing regulatory standards and other programs at the federal and state level do not adequately protect wetlands. Management efforts must now be directed to control all wetland impacts--direct, indirect and cumulative.

Major actions include:

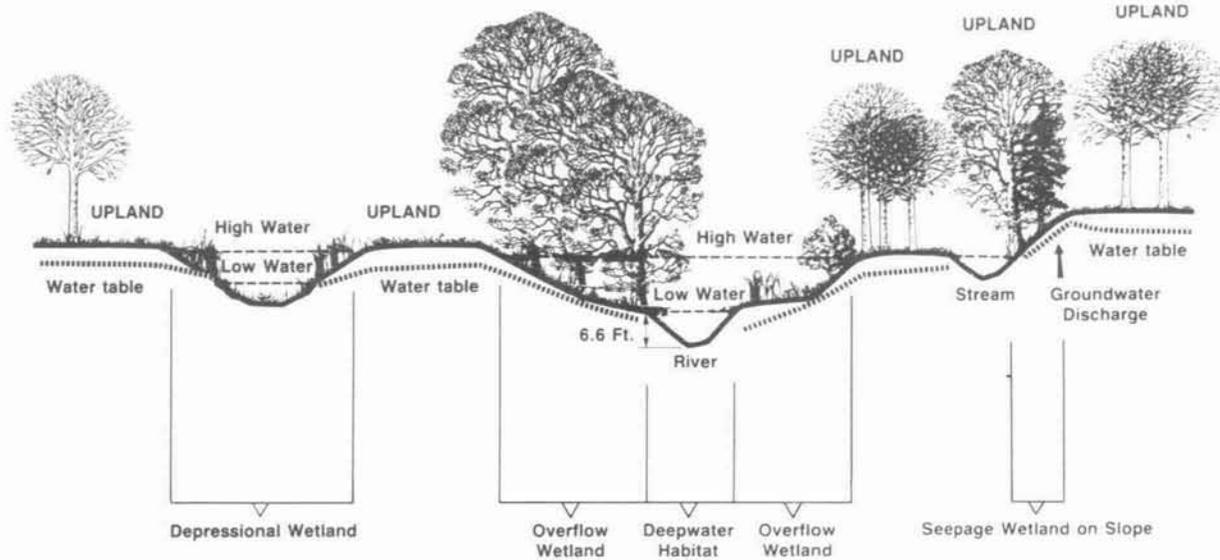
- Reviewing and evaluating existing regulatory and protection programs and initiating corrective measures;
- Identifying, in advance, wetland areas of special concern to enhance protection through the permitting process;
- Eliminating government sanctioned programs which are counterproductive to wetland protection, and establishing private sector incentive programs; and,
- Identifying priority areas for wetland preservation through land acquisition.



Adapted from "Wetlands of the United States: Current Status and Recent Trends," U.S. Fish and Wildlife Service, 1984.

Non-tidal or inland wetland

Adapted from "Wetlands of the United States: Current Status and Recent Trends," U.S. Fish and Wildlife Service, 1984.



Building the Base: Rehabilitating, Restoring, and Creating Wetlands

Commensurate with the goal of obtaining a net resource gain is the need to maintain the existing wetlands base, thereby reducing extensive creation and restoration projects. In those instances when unavoidable losses occur, compensatory creation, rehabilitation or restoration measures will be required. The Policy emphasizes cooperative design and evaluation of compensatory mitigation projects, along with long-term monitoring and management of these sites. Equally important tools for building the base of functioning wetlands are incentives and land acquisition.

Major actions include:

- Using private sector incentives to encourage rehabilitation, restoration, and creation of wetlands; and,
- Acquiring strategic sites to provide appropriate locations for wetland restoration, creation, and use activities.

Extending the Vision: Education and Research

Wetland protection depends upon public awareness of wetland values, management needs, and landowner support for protection policies. Appropriate technical training must be made available to resource managers and private sector interests. In addition, research is essential to

refine our knowledge of wetland functions and improve our ability to sustain these resources.

Major actions include:

- Developing and disseminating information for the public and educational institutions on the values of and need to protect wetlands;
- Initiating technical assistance programs to support local government protection efforts;
- Evaluating the individual and cumulative effects on wetlands of current best management practices, shallow water dredging, structural shore erosion practices, and alteration of the land/water interface; and,
- Assessing the design and effectiveness of artificial wetlands developed for wildlife and waterfowl improvement, shore erosion control, wastewater treatment, or acid mine drainage.

The 1987 Chesapeake Bay Agreement's goal of protecting and restoring wetlands provides an important opportunity for interested citizens, resource managers and legislators to focus their commitment to the health of the Bay watershed.

The Chesapeake Bay Wetlands Policy is available from the Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403 (301) 266-6873.

This flyer was prepared by the Living Resources Subcommittee and printed by the Chesapeake Bay Program.

January 1988

LIVING RESOURCES SUBCOMMITTEE

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RESEARCH
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LIVING RESOURCES COMMITMENT SCHEDULE

2A

DATE: 7/89 8/89 9/89 10/89 11/89 12/89

DEVELOP IMPLEMENTATION PLAN

WETLANDS POLICY

9/19
STATUS REPORT TO LIVING
RESOURCES SUBCOMMITTEE

9/20
WETLANDS
WORKGROUP MEETING

10/6
FOCUS AREA COORDINATORS
DISTRIBUTE PRELIMINARY
DRAFTS TO WORKGROUP

10/17
STATUS REPORT TO LIVING
RESOURCES SUBCOMMITTEE

10/20
WORKGROUP COMMENTS ON
PRELIMINARY DRAFTS
RECEIVED BY FOCUS AREA
COORDINATORS

10/26
STATUS REPORT TO
IMPLEMENTATION COMMITTEE

10/31
WORKGROUP MEETING
TO DISCUSS COMMENTS ON
PRELIMINARY DRAFTS

11/3
FOCUS AREA
COORDINATORS PROVIDE
REVISED DRAFTS TO
WORKGROUP CHAIRMAN

11/10
DRAFT IMPLEMENTATION
PLAN DISTRIBUTED TO
LIVING RESOURCES
SUBCOMMITTEE

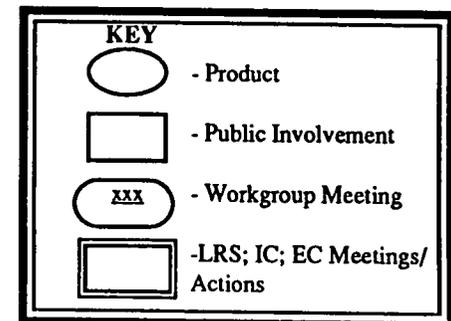
11/21
STATUS REPORT TO LIVING
RESOURCES SUBCOMMITTEE

12/7
STATUS REPORT TO
IMPLEMENTATION
COMMITTEE

12/8
WORKGROUP AND
LIVING
RESOURCES
SUBCOMMITTEE
COMMENTS ON
DRAFTS RECEIVED
BY FOCUS AREA
COORDINATORS

12/13
WORKGROUP
MEETING TO
COMPLETE DRAFT
IMPLEMENTATION
PLAN

12/19
STATUS REPORT TO
LIVING
RESOURCES
SUBCOMMITTEE

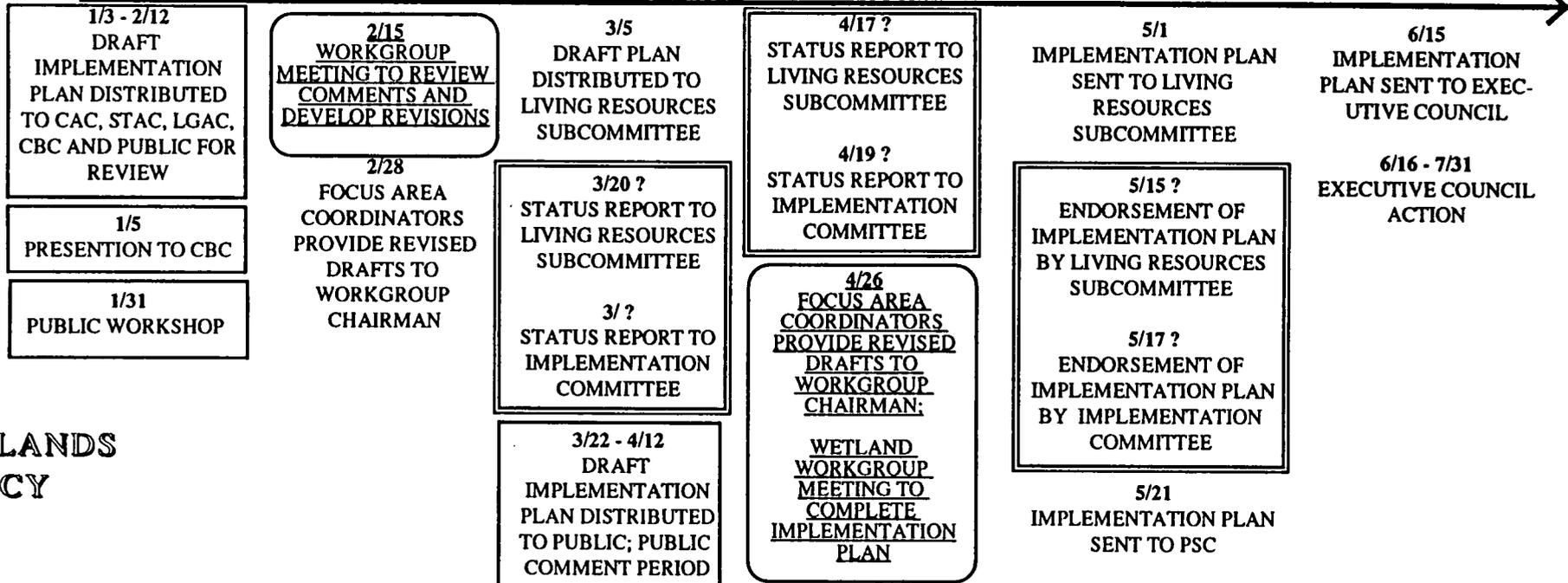


LIVING RESOURCES COMMITMENT SCHEDULE

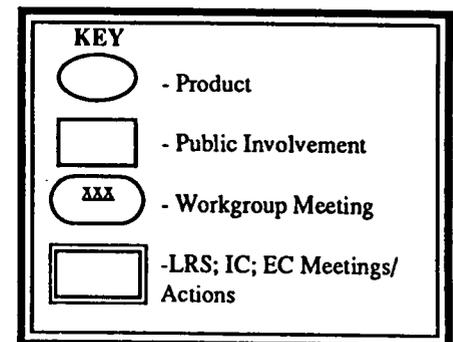
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DATE: 1/90 2/90 3/90 4/90 5/90 6/90

DEVELOP IMPLEMENTATION PLAN



WETLANDS
POLICY



LIVING RESOURCES COMMITMENT SCHEDULE

2C

DATE:

7/90

8/90

9/90

10/90

11/90

12/90

IMPLEMENTATION
PLANS ADOPTED

IMPLEMENTATION



WETLANDS
POLICY

KEY



- Product



- Public Involvement



- Workgroup Meeting



-LRS; IC; EC Meetings/
Actions

LIVING RESOURCES COMMITMENT SCHEDULE

2D

DATE:

1/91

2/91

3/91

4/91

5/91

6/91

IMPLEMENTATION



WETLANDS
POLICY

KEY

 - Product

 - Public Involvement

 - Workgroup Meeting

 - LRS; IC; EC Meetings/
Actions

LIVING RESOURCES COMMITMENT SCHEDULE

2E

DATE:

7/91

8/91

9/91

10/91

11/91

12/91

ANNUAL REPORT

IMPLEMENTATION

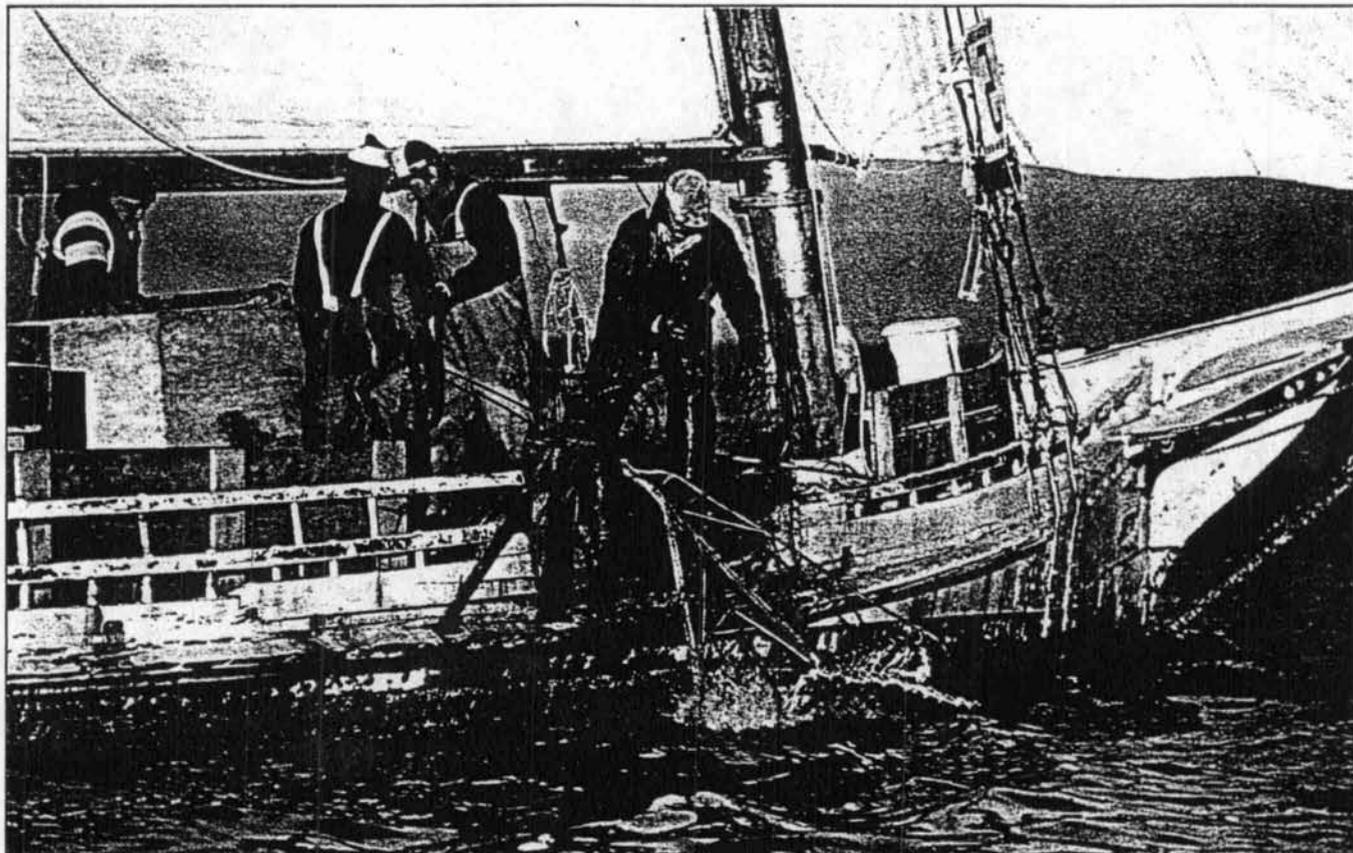
WETLANDS
POLICY

KEY

-  - Product
-  - Public Involvement
-  - Workgroup Meeting
-  -LRS; IC; EC Meetings/
Actions

CHESAPEAKE BAY:

HABITAT REQUIREMENTS FOR LIVING RESOURCES



LIVING RESOURCES IN THE CHESAPEAKE BAY AGREEMENT

The restoration and protection of the Chesapeake Bay's living resources, their habitats and their ecological relationships is a major focus of the 1987 Chesapeake Bay Agreement. The comprehensive report, "Habitat Requirements for Chesapeake Bay Living Resources", compiled over the past two years by the Chesapeake Bay Program's Living Resources Task Force, is an important first step toward meeting the goals of the Bay Agreement. The following brief summary from the Living Resources Task

Force report contains an example of habitat requirements for one of the selected target species.

BACKGROUND

Declines in the abundance of living resources have been the most tangible warning signs of widespread environmental problems in the Bay. Attempts to protect and restore the Bay ecosystem's health and integrity must go beyond water quality issues to address biological and physical factors as well.

Many variables influence the abundance and distribution of species within the Bay: climate, natural population cycles, reproductive potential,

disease, predation, and the abundance and quality of food and habitat. Human activities, including land and water use, contaminant discharges, and physical habitat alterations, also directly affect important species. Indirectly, results of these activities can disrupt food chains and upset the ecological balance of the estuary.

HABITAT REQUIREMENTS DEVELOPMENT

The Living Resources Task Force identified representative species from all levels of the Chesapeake Bay food web, including plankton, benthos (bottom dwellers), submerged aquatic vegetation, shellfish, finfish, waterfowl, and wildlife. A smaller group of 26 species was targeted for immediate attention in the development of habitat requirements. This selection was based upon their commercial, recreational or ecological significance and the potential threat to sustained production if populations of those species decline further or experience serious habitat problems.

Once the target species were chosen, the Task Force had two areas to investigate. The first objective was to gather data on the physical, biological, and chemical factors affecting the selected living resources. Secondly, they needed to determine where the species live and reproduce, and when, in the life cycle, survival is threatened or critical. The "Habitat Requirements" report merges this knowledge of influential environmental factors with specific habitat locations and critical stages in the species' lives so that protection and restoration efforts and spending can be effectively focused.

APPLICATIONS

The "Habitat Requirements" report is intended to give planners, managers, researchers, and modelers of the Bay information on the habitat quality required for the target species. These habitat conditions will be part of the information used to protect and enhance the Bay's living resources. The Implementation Committee of the Chesapeake Bay Program has set up a Living Resources Subcommittee concerned with the health and abundance of water and wildlife species that depend on Chesapeake Bay habitats. The Subcommittee will help guide agencies in

using the report in their own programs.

The "Habitat Requirements" report does not establish regulatory standards; rather, it identifies necessary habitat conditions to guide management decisions for modifying existing regulatory programs. The report will be useful for guiding programs that regulate or influence :

- agricultural runoff
- urban runoff
- shoreline erosion
- contaminant discharges
- municipal and industrial wastewater treatment
- shoreline deforestation
- wetland dredge and fill
- stormwater management
- urban development
- highway development



Spawning areas require careful protection measures.

TARGET SPECIES : OYSTER

An example of one of the 26 selected target species presented in the "Habitat Requirements" report is the American oyster. The oyster's economic importance and its ecological significance in the benthic (bottom dwelling) community make it a highly valued living resource. Drastic reductions in oyster distribution and abundance in recent years, primarily due to deteriorating habitat quality, overfishing, and disease, are cause for great concern.

Oyster distribution in the Bay is presently determined largely by salinity, salinity related diseases, substrate, and depth. Although oysters are tolerant of a wide range of salinities (3-35 ppt sa-

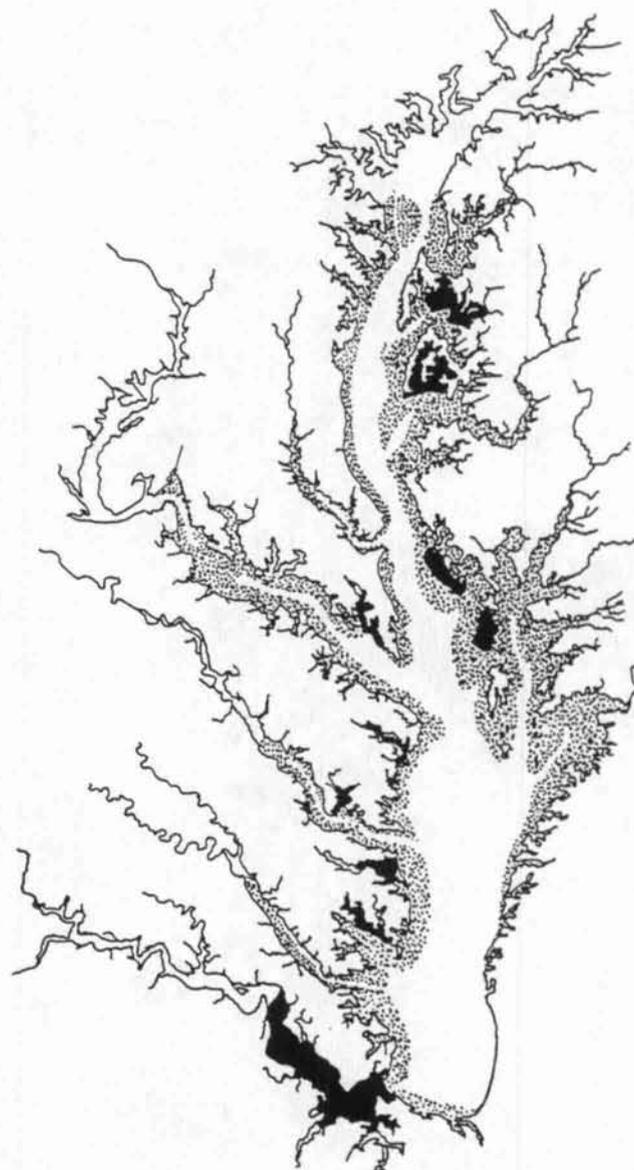
linity), they cannot survive in tidal freshwater or low salinity regions of the Bay. A strong correlation has been found between high salinity and good oyster reproduction. Dry years may increase the salinity of the water up the Bay to promote favorable growing conditions. Under the same saline conditions, however, potentially fatal oyster diseases caused by MSX and Dermo pathogens can flourish.

Oysters spawn (reproduce) in the summer when water temperatures are over 15°C , with the highest rates occurring between 22° - 23°C . Free-swimming oyster larvae permanently attach their newly formed shell to a firm substrate and become young oysters or "spat". This attachment process is known as spat setting. Critical for their survival is the availability of firm foundations, such as pilings, hard rock bottoms, and particularly old shells, called cultch, left naturally on oyster bars or "planted" by resource management agencies and watermen.

Oysters are also sensitive to sedimentation and total suspended solids in the water. Excessive sedimentation smothers adults and prevents setting of spat on clean cultch. When surrounding waters are highly turbid, or cloudy, adult oysters will slow their intake of suspended materials and may cease feeding entirely.

The depths at which oysters can survive are limited by dissolved oxygen concentrations, the amount of available oxygen in the water. Natural episodes of hypoxia, low oxygen concentrations [$< 2\text{mg O}_2/\text{L}$], in bottom waters are believed to have limited oyster distribution in the past to the shallower, more oxygenated areas of the Bay. In recent years, an increased duration and distribution of hypoxia has been responsible for local areas of oyster mortality at depths less than the historical 10 meter limit.

As a filter feeder, the oyster ingests a variety of phytoplankton, bacteria, and small particles of decaying plants and animals mostly from 3 to 35 microns in size. The availability of food within this critical size range may be a key factor in the long-term survival of oysters and other shellfish. Scientific evidence suggests that excess phosphorus and nitrogen in the Bay can cause detrimental changes in the food chain. Nu-



Habitat Distribution of Seed Areas and Suitable Substrate for the American Oyster.

■ Seed areas
▨ Suitable substrate

trients may be shifting the underlying support of the entire chain, the plankton communities, to smaller species which are less desirable food.

Overall restoration of oyster habitat is a prerequisite for increasing the abundance and distribution of oysters. Several steps toward habitat restoration are now being undertaken. Re-establishing

Summary of Habitat Requirements for the American Oyster

Critical Life Stages : larval, spat, adult
 Critical Life Period : entire life cycle

Target Species	Habitat Zone	Salinity (ppt)	pH	Dissolved Oxygen (mg/l)	Suspended Solids (mg/l)	Prey Species
American oyster	Firm substrate, cultch	5 - 35	6.8-8.5	> 2.4	< 35	Phytoplankton (size range of 3-35 microns)

shoreline submerged aquatic vegetation in key regions would benefit these bottom dwellers by controlling the resuspension of sediments; moreover, the vegetation minimizes sediment from other sources such as eroding farmland, construction sites, and shorelines. Many of these sediment sources also add nutrients to the Bay ecosystem.

Water quality models of the Bay suggest that substantial reductions in nutrients are necessary to achieve acceptable dissolved oxygen levels. Higher oxygen levels will increase the acreage of suitable habitat, and lower nutrient levels could increase the abundance of the preferred food species of plankton. In addition, Baywide oyster repletion and fisheries management programs are essential for maintaining a viable oyster industry.

The American oyster is just one of the target species whose habitat requirements are detailed in the Living Resources Task Force report. Through a focused and concentrated effort to restore and protect the habitats of our living resources, the Chesapeake Bay will continue to be an economic and ecological treasure for future generations.



Glenn D. Chambers



Copies of the "Habitat Requirements for Chesapeake Bay Living Resources" report are available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular printed by the Maryland Department of Natural Resources, Tidewater Division.

CHESAPEAKE BAY: REMOVING IMPEDIMENTS TO MIGRATORY FISHES

FISH PASSAGE IN THE CHESAPEAKE BAY AGREEMENT

Thousands of miles of fish spawning habitat on Chesapeake Bay tributaries are currently blocked by dams, culverts and other obstructions. Restoring and protecting the Bay's vital fishery resources are integral components of the 1987 Chesapeake Bay Agreement. Working toward this restoration goal, the signatories of the Agreement have supported a commitment by the States and Federal government to:

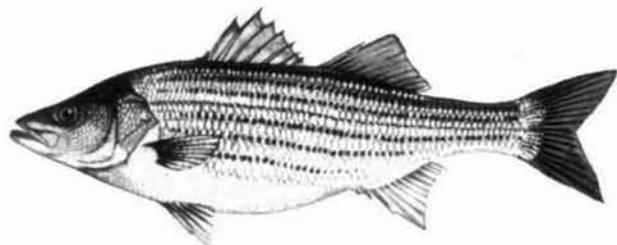
Provide for fish passage at dams, and to remove stream blockages wherever necessary to restore passage for migratory fishes.

A workgroup of the Chesapeake Bay Program's Living Resources Subcommittee was formed in December 1987 to develop the strategy for fish passage. The membership of the Fish Passage Workgroup includes representatives of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Maryland Department of Natural Resources, Chesapeake Bay Foundation, Pennsylvania Fish Commission, Virginia Department

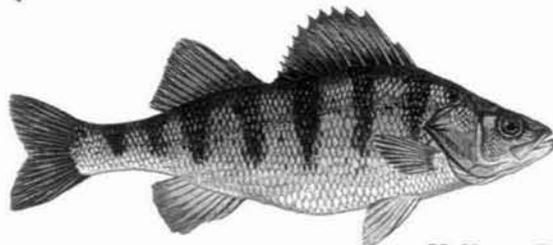
of Game and Inland Fisheries, Virginia Council on the Environment, and the District of Columbia Fisheries Management Program.

BACKGROUND

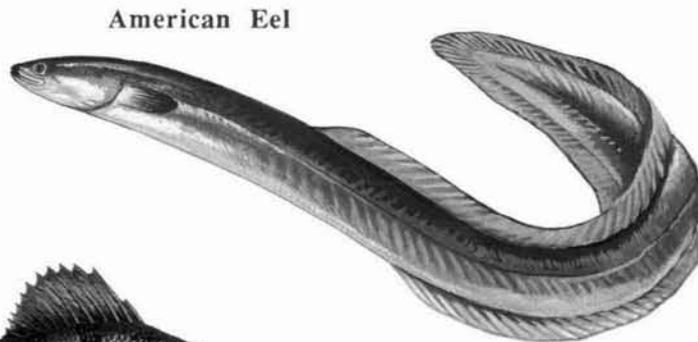
Of the approximately 260 fish species found in Chesapeake Bay, perhaps those most revered and sought after by both sport and commercial fishermen are the migratory species. This group includes "anadromous" fishes such as striped bass, river herring and shad that spend most of their adult lives in saltier coastal waters but return each year to spawn (reproduce) in fresh water. Another class of migratory fishes are the "catadromous" species, represented in the Bay watershed by the American eel. Catadromous fish spend most of their adult lives in fresh water, returning to the ocean to spawn. Together, anadromous and catadromous species are described as diadromous, or migratory between salt and fresh water. Other species, including white and yellow perch, migrate to fresh water to spawn but spend the rest of the year in the brackish waters of Chesapeake Bay.



Striped Bass



Yellow Perch



American Eel

*Migratory Fish Native to
Chesapeake Bay*

Illustrations by
Duane Raver, Jr.

Table 1

RECENT COMMERCIAL HARVESTS OF MIGRATORY FISHES IN CHESAPEAKE BAY				
(Average annual tons for each 10-year period)				
		1966-1975	1976-1985	% Decline
American Eel	VA	427.1	257.0	40%
	MD	117.8	106.7	9%
American Shad	VA	1,114.0	454.0	59%
	MD	409.7	37.4*	91%
Hickory Shad	VA	18.8	0.5	97%
	MD	8.7	0.6*	93%
River Herring (Blueback herring and alewife)	VA	9,486.0	725.0	92%
	MD	1,094.7	71.0	94%
Striped Bass	VA	1,059.0	226.0	79%
	MD	1,803.3	642.4*	64%
White Perch	VA	173.8	65.0	63%
	MD	650.8	341.9	47%
Yellow Perch	VA	1.9	0.2	90%
	MD	51.8	14.9	71%
Total	VA	12,280.6	1,727.7	86%
	MD	4,136.8	1,214.6	71%
TOTAL	Bay	16,417.4	2,942.6	82%

* Pre-moratorium

At one time, Chesapeake Bay abounded with these migratory fishes. Striped bass, shad and river herring (the collective term for blueback herring and alewives) supported extensive recreational and commercial fisheries during their annual spawning runs. Today, however, landings of migratory fishes are at the lowest ebb in history. In Maryland, the catch of American shad has declined from over 7 million pounds a century ago to about 20,000 pounds in 1980. In Virginia waters, shad harvests now average around 900,000 pounds, compared to over 11 million pounds a hundred years ago. A once thriving shad run in the District of Columbia has similarly declined, and fishes no longer migrate up the Susquehanna River to Pennsylvania due to several dams in its lower reaches.

During the last twenty years the decline in commercial landings has been particularly steep. The majority of landings have decreased by 90% or more (see table 1). This decline is the result of an intricate complex of factors -- some natural, most man-made -- including pollution and siltation of spawning areas, overharvesting by commercial and recreational fishermen, and construction of dams and other obstructions across the Bay's streams and rivers which prevent access to formerly utilized (historic) habitat.

FISHERY VALUE

The decline of migratory fishes has had significant economic and ecological impacts on the Bay

area. In 1920, American shad and river herring were number one and two in value of those finfish species landed commercially in Chesapeake Bay. Current values for these species are slight by comparison. The American shad commercial catch for Chesapeake Bay peaked at about 17 million pounds at the turn of the century. Today these landings would be worth over \$6 million at the dock. The 1985 harvest of shad from the Bay had a dockside value of \$170,000.

The benefits of restoring migratory fishes to their former abundance are increased greatly when the total value to the economy is considered. When taken to the retail level, commercial fisheries are worth significantly more than their dockside value. Sportfishing also has a great impact on the economy due to retail purchases by recreational fishermen. A 1981 study (1) estimated the fishery benefits of providing passage for migratory fishes past four hydropower dams on the lower Susquehanna River, opening nearly 350 main-stem river miles of historic habitat. The study considered the expected benefits from the commercial and recreational harvests of American shad. The value to the economy ranged from a low estimate of \$42 million to a high of \$185 million annually. This analysis did not include other social and aesthetic values immeasurable in dollars. It also did not include the potential benefits of restoring other migratory species. The 1981 estimated one-time cost for providing fish passage at the four dams was \$60 million.

A similar analysis (2) was conducted in 1987 for the James River to estimate the value of providing fish passage around the five dams at Richmond, extending the range of migratory fishes to Lynchburg, Virginia. Approximately 140 river miles would be opened. The estimated economic benefits of restoring several anadromous species to this stretch of river ranged from \$8.1 to \$13.1 million annually. The cost of fish passage facilities was estimated to be a one-time expenditure of \$4.5 - \$6.5 million.

While the economic benefits of a fishery can be mathematically estimated, it is more difficult to calculate the ecological value of fish restoration. Shad, herring and other migratory fishes have

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1. "Economic Benefits Associated with Shad Restoration on the Susquehanna River," McConnell and Strand, University of Maryland, 1981.
 2. "Anadromous Fish Passage in Virginia," Virginia Council on the Environment, 1987.

historically played an important role in the Chesapeake Bay ecosystem. Along with the other Bay initiatives to reduce nutrient input, increase aquatic grass abundance and control fishing, restoration of these species will help return the Bay system to its natural productivity.

Reintroduction of anadromous fishes to their previous spawning grounds will have an ecological impact on those freshwater systems as well. Studies have shown that in freshwater areas where herring have been restored, resident fish populations were enhanced as compared to similar areas without herring. The juvenile herring produced in the spawning run serve as a forage base (food supply) for bass and other resident species.

IMPEDIMENTS TO MIGRATION: A BAY-WIDE PROBLEM

Impediments to fish migration exist on nearly every tributary of the Chesapeake Bay. Over the years, the Bay states have conducted inventories to document the type and location of these blockages. Several thousand have been found to exist in the Bay watershed. The most well known are the large hydropower facilities such as Conowingo Dam on the Susquehanna River. Fish migration can be blocked, however, by a structure with a vertical height of only one foot. Where a road passes over a small tributary, the stream runs through a culvert which may act as a blockage. On many tributaries, state and federal agencies maintain gauging station weirs to monitor streamflow. These, too, may act as blockages. Finally, a wide variety of small to

mid-sized dams are found in the Bay watershed. These dams include historic mill and municipal water supply dams, as well as wildlife or recreational impoundments.

Virginia

Several regional surveys of stream blockages have been done in Virginia, but the data are incomplete and not currently centralized. On the James River, five dams located in Richmond block access to nearly 140 miles of historic habitat. Providing fish passage at these blockages has become a top priority for the Commonwealth. Further upstream, a series of seven dams around Lynchburg block an additional 84 miles of habitat. The first of these dams was recently granted a license for hydropower generation which requires provision for fish passage. The Embrey Dam at Fredricksburg, which blocks 70 miles of the Rappahannock River, was recently issued a hydropower license with similar conditions. However, neither of these dams have yet been modified to allow fish passage. Virginia law requires fish passage at stream obstructions, but several key regions and all dams over twenty feet high are exempt.

Maryland

In Maryland, anadromous fish spawning streams were surveyed from 1968 to 1980. Nearly 900 man-made stream blockages were documented; this inventory, however, must be updated. The Department of Natural Resources has identified priority sites where mitigation work should begin. One of the priority sites is on the Patapsco River where four dams block access to nearly 30 miles of migratory fish habitat.

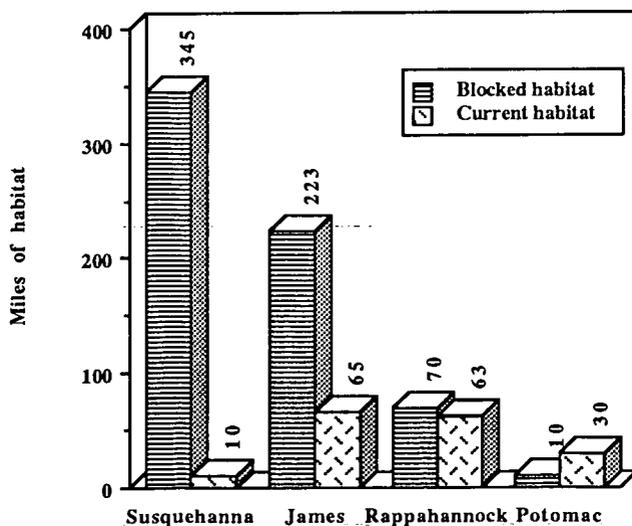
The top priority for Maryland is the Susquehanna River, historically important for American shad, hickory shad, and river herring. Construction of four hydropower dams on the lower river in the early 1900s blocked nearly 350 miles of habitat. Maryland is working with the power companies involved to have fish passage provided at these dams. Maryland has the statutory authority to require fish passage at obstructions other than hydropower dams, but this authority has not been widely applied.

Pennsylvania

Pennsylvania has also conducted an inventory of dams throughout the state. All dams are documented, but smaller blockages may not be. Emphasis has been placed on fish passage at the four dams on the lower Susquehanna River. In addition, Pennsylvania and the hydropower companies have devoted substantial resources to restocking adult and juvenile

POTENTIAL SPAWNING AND NURSERY HABITAT FOR AMERICAN SHAD

(excluding smaller tributaries of the four rivers)



American shad to the river as part of a cooperative restoration project. Pennsylvania law gives the Fish Commission authority to require passage at obstructions to fish migration on all waters of the state. This authority is superseded by federal regulations governing hydropower dams.

District of Columbia

Resource managers from the District of Columbia have assessed the impact of dams and blockages on local fishery resources. The municipal water supply dam at Little Falls excludes migratory fishes from 10 miles of valuable habitat. While just outside of D.C. borders, fish passage at the dam would help restore historic migratory fish runs to District waters. Other blockages on Rock Creek and tributaries of the Anacostia River also must be remedied.

SOLUTIONS

The structures which act as impediments to fish migration are diverse, ranging from large hydro-power dams to small road culverts. No one solution can address all situations. The objective of fish passage is to decrease the vertical gradient and water velocity so that upstream navigation is within the fish's physical capability.

The simplest solution is to remove part or all of an obstruction. This is only possible when the structure has no useful purpose and when breaching would not adversely affect the river.

Some structures such as culverts and gauging stations can be redesigned to provide the gradient and flow necessary for fish passage. Culverts can be set below grade (partially buried in the riverbed) and gauging stations can be modified to minimize vertical rise.

A common solution is to install a fish passage facility, or fishway, to allow fish to pass over or around an obstruction. On smaller blockages, a "fish ladder" is used. This is a passive flume-like (inclined water channel) structure with a series of baffles or weirs which interrupt the flow of water (see Figure 1). The fish negotiate a ladder just as they would natural rapids.

For large dams with a vertical rise of fifty feet or more, a mechanized device known as a "fish lift" is often used. Fish are attracted by flow into a confined space and elevated in a volume of water over the dam. In some cases, fish will be transported in special tank trucks around several dams until all are fitted with passage facilities.

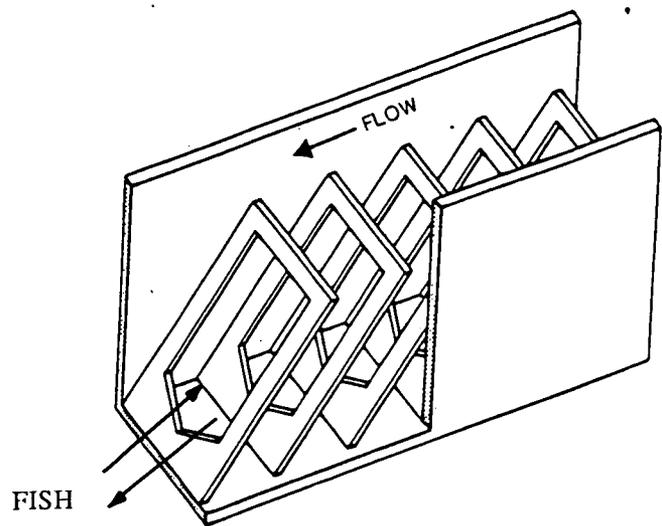


Figure 1. A common variation of the Denil Fishway concept, cut-away view.

Fish passage technology is well-developed and proven effective. Several New England states have active and successful programs providing passage for migratory fishes. In Massachusetts, nearly two hundred fishways maintain fish migrations on approximately one hundred tributaries. On the Connecticut River, migratory fishes have been restored to 174 miles of historic habitat as a result of fishway operations at 3 dams. These successes can serve as examples for Chesapeake Bay states.

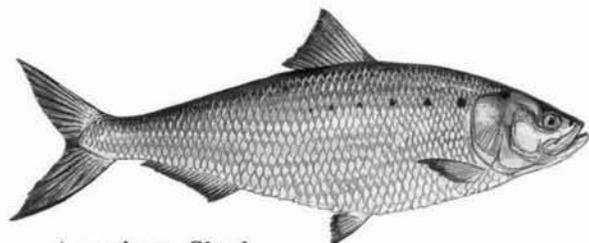
A LOOK TO THE FUTURE

The Chesapeake Bay Program's Fish Passage Workgroup has analyzed existing information to determine what is known about blockages to fish migration. The findings of the Workgroup are summarized in a report entitled Removing Impediments to Migratory Fishes in the Chesapeake Watershed. Some of the recommendations contained in the report, which will be finalized in December 1988, are as follows:

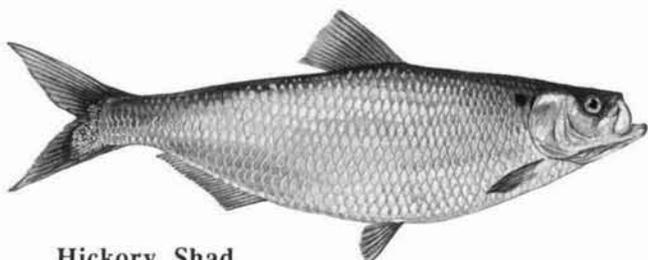
1. Blockages - A multi-faceted approach is necessary to help restore migratory fishes. The states should develop programs in the following areas:

a). Culverts - All future road and highway culverts should be designed and constructed to assure the passage of migratory fish species present or potentially present in the affected stream. The highway department of each Bay state, with the assistance of other responsible agencies, should prepare an inventory of existing culverts which act as impediments to migratory fishes, and plan a strategy to remedy this problem.

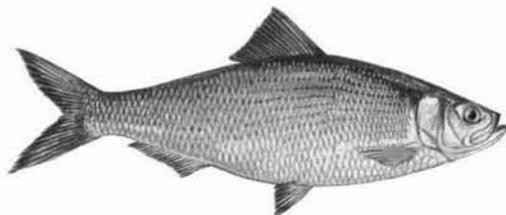
POTENTIAL AMERICAN SHAD SPAWNING AND NURSERY HABITAT OF MAINSTEM RIVERS *



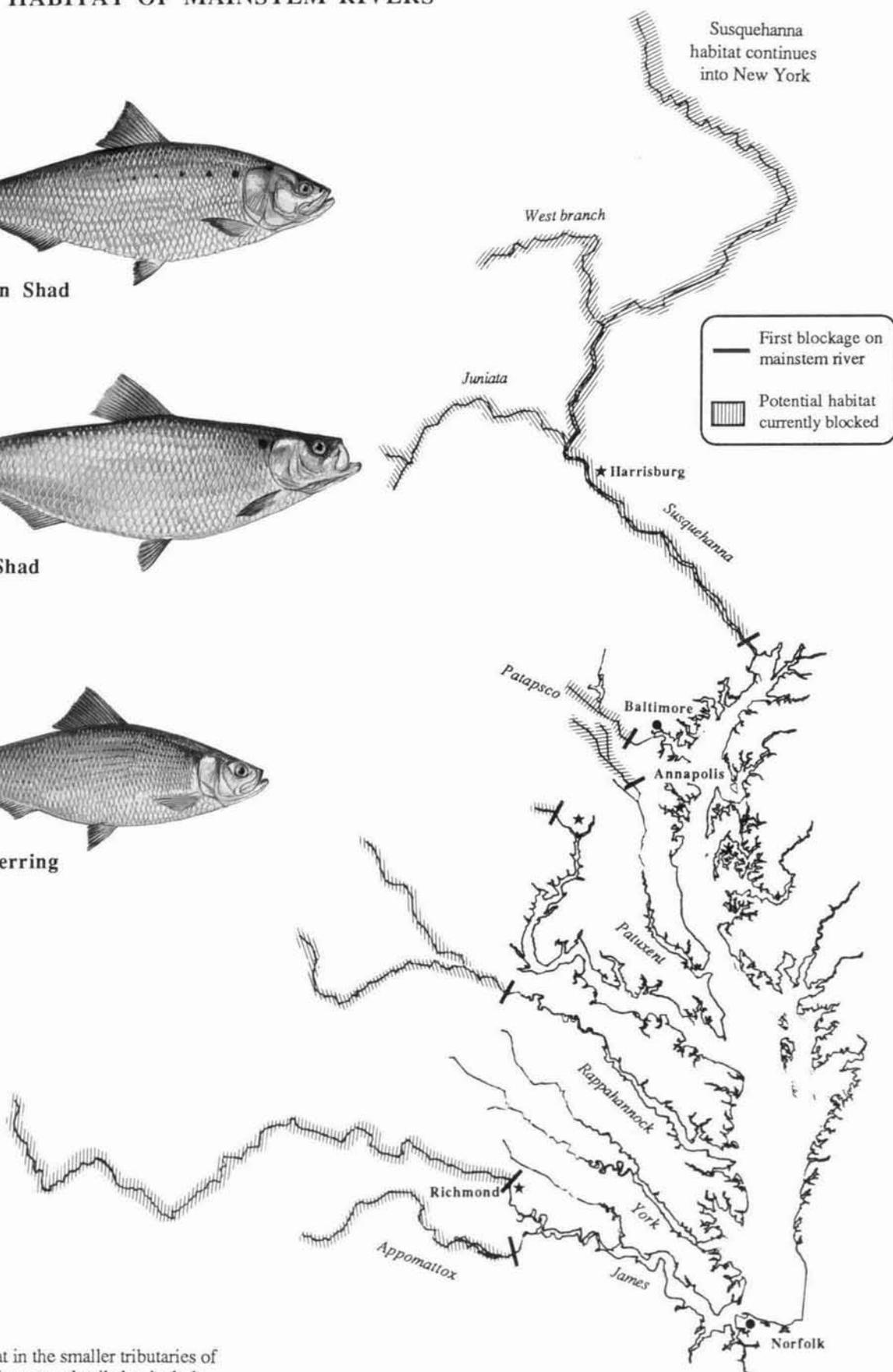
American Shad



Hickory Shad



Alewife Herring



* Potential habitat in the smaller tributaries of the mainstem rivers too detailed to include

b) Small dams / obstructions - Each Bay state should establish a priority list for future fish passage projects at all small dams and other obstructions. Projects at publicly-owned obstructions should be undertaken as a cooperative effort between the appropriate state agencies and local governments. Federal agencies should cooperate with state governments to mitigate federally-owned blockages. Private sector owners of blockages should, under state law, be responsible for providing fish passage under the direction of the appropriate state agencies.

c) Hydropower dams - Fish passage should be provided at all hydropower dams that block historic or potential migratory fish habitat. The States should evaluate the adequacy of current provisions for fish passage at such facilities within the Bay watershed. When necessary, the States should request reopening the licenses of hydropower facilities to assure that adequate provisions are made for fish passage within a reasonable time frame. In no case should any new licenses be issued without proper provisions for fish passage.

d) Reintroduction - Wherever necessary and appropriate, the States should initiate programs to reintroduce migratory fishes to habitat above present blockages. Young fish can become "imprinted" on the upstream habitat and will return to spawn there when the blockage is removed. Adult fish can be trapped below blockages and transported upstream to spawn, or young hatchery-produced fish can be stocked above the blockages.

2. Evaluation and Monitoring - Federal and state agencies should determine how effective the fish passage devices are at passing different species of fish. They also should evaluate the effects of restoration efforts on target species and other organisms in the biological community.

3. Public education and involvement - Public support and involvement must be an integral part of the fish passage program to insure its long-term success.

4. Technical expertise - In the Bay region, qualified assistance is needed to design and oversee the construction of fish passage facilities. The establishment of a technical advisory office would provide this necessary resource to Bay state and local agencies.



Historic mill dam with fish ladder. Small barrier dam directs fish toward base of ladder.

5. Blockage inventory - The responsible state and federal agencies should work together to compile an up-to-date, comprehensive inventory of dams and other obstructions to fish migration in the Bay states.

Using the Workgroup's findings, the Bay states will develop plans for removing these impediments which will require cooperation between state, federal, and local government as well as support from private citizens. With some time, money, and dedication, we can restore hundreds of miles of spawning habitat for the benefit of the Bay's fishery resources and the enjoyment of its citizens.

The Removing Impediments to Migratory Fishes in the Chesapeake Watershed report is available from the Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Chesapeake Bay Foundation, with support from the Jessie B. Cox Charitable Trust and assistance from the Chesapeake Bay Program's Living Resources Subcommittee.

September 1988

CHESAPEAKE BAY

OYSTER MANAGEMENT PLAN

OYSTER MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The 1987 Chesapeake Bay Agreement recognized the American oyster (*Crassostrea virginica*) as a priority species in need of management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Bay-wide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee, to guide the development of the initial drafts of the fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial and recreational fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Oyster Management Plan. For greater detail, please consult the complete management plan.

WHAT IS A FISHERY MANAGEMENT PLAN?

In order to preserve a viable economic and ecological role for Chesapeake Bay oysters, certain measures must be taken to wisely use and protect

the resource. Developing a management plan involves analyzing the biological, economic, and social components of the fishery, defining problems, identifying solutions, and making recommendations for actions on habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.

The oyster management plan provides background information on the species consisting of biological profiles, habitat require-

ments, historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems, and propose corresponding management strategies and actions.



© Rick Brady, 1989.

Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

OYSTER BACKGROUND

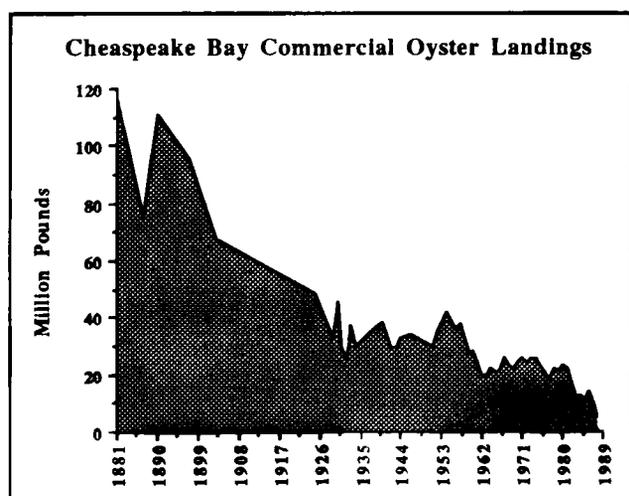
Oysters have been one of the most important commercial resources in the Chesapeake Bay since the mid-1800s, but in recent years there has been a dramatic decline in Baywide oyster harvests. Oysters start as swimming larvae, attach to a solid substrate, usually near other oysters in beds or "bars," and then become immobile or sessile. This makes oysters relatively easy to catch, and also makes them particularly susceptible to predators, diseases, silting, and pollution.

Goal and Objectives

The overall goal of this plan is to increase the baywide stocks of oysters through the initiation of short and long-term management actions which will enhance the ecological value of the resource, ensure the growth of the resource and maintain a viable fishery.

To achieve this goal, the following objectives must be met:

- Stabilize harvest to maintain a spawning stock at a size which eliminates low reproductive potential as a cause of poor spawning success.
- Enable Baywide fisheries management agencies to provide more timely and effective



responses to short-term and unpredictable changes in the status or operation of the fishery to prevent overharvest.

- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.
- Evaluate statewide repletion efforts.
- Develop seed (young oysters for transplanting) sources in low risk areas to benefit the public and private industry.
- Further our understanding of oyster diseases and the development of a disease-resistant strain of Chesapeake Bay oyster.
- Promote continued cooperation of various state agencies in water quality and habitat improvement measures to maximize conditions for natural production and to minimize harvest restrictions due to sanitary reasons.
- Encourage the utilization of aquaculture techniques on private oyster grounds.
- Increase and stabilize the market share of Bay oysters by providing a reliable product both in quality and quantity.

Problem Areas , Management Strategies, and Proposed Actions

Harvest Decline And Overharvesting

For the past 27 years, oyster harvests have been on the decline. Maryland harvesters have seen 1973's 3.2 million bushel bounty drop to 565,000 bushels in 1987. Virginia, likewise, has experienced declines from 1.9 million bushels in 1964 to 442,000 bushels in 1987. The outlook for the near future is not optimistic. The average daily catch per man is lower than the permitted limit, indicating that the limit is no longer an effective means of conserving the resource.

Strategies and Actions:

- Maryland and Virginia will establish catch limits that reflect the status of the resource, and will open and close harvest areas on a rotating basis to control fishing effort and protect brood stock (adult oysters available to spawn.)
- Maryland will continue a delayed entry program for commercial harvesting to stabilize harvest.

- Under this program, prospective fishermen must register for a fishing license and wait a minimum of two years before receiving the license.

Recruitment

The past two decades have seen erratic and generally low levels of natural spat set (attachment of swimming oyster larvae to substrate), and a reduced geographic range of good setting areas compared to historical records.

Strategies and Actions:

- Maryland and Virginia will plant shell for cultch (substrate for attachment) and move seed oysters to augment natural reproduction.
- Maryland and Virginia will continue hatchery operations to produce larvae and seed oysters for research and rehabilitation projects.
- Maryland and Virginia will support aquaculture efforts as a means of increasing oyster production.
- Maryland will experimentally reconstruct buried oyster beds to make them productive again.
- Maryland and Virginia will conduct research on the relationship between adult oyster density and recruitment, and will use this information to determine optimum harvesting and seed planting strategies.

Disease Mortality

Recent expansion of the geographic range and intensity of the oyster diseases MSX and Dermo (Perkinsus) have contributed to harvest declines.

Strategies and Actions:

- Maryland and Virginia will continue the annual disease survey to determine the best plan for planting shell and seed oysters.
- Maryland and Virginia will continue research on the transmission and reduction of oyster diseases, and on development of both a disease-resistant strain of the American oyster and a disease-resistant hybrid oyster.
- Maryland will implement a program to monitor seed oysters for disease before transporting them to growing areas.



hand tonging for oysters

photo from Maryland Watermen's Assoc.

Leased Ground Production

Presently, privately leased portions of the Bay bottom are underutilized. For both Maryland and Virginia, it has been estimated that less than 10% of the total leased grounds are in production.

Strategies and Actions:

- Maryland has established seed beds from which seed oysters can be grown and sold to private leaseholders.
- Maryland and Virginia will continue an active extension program to provide technical assistance to oyster leaseholders.
- Maryland and Virginia will implement "proof of use" measures in the form of minimum production or repletion criteria, to promote private production and cultivation.
- Virginia will promote the development of new culture methods by removing impediments in the existing permitting process required for the private sector.
- Virginia will conduct research on the feasibility of and methods for new oyster culture techniques.

Habitat Issues

The distribution and abundance of Bay oysters are greatly affected by water quality. Low dissolved oxygen conditions which limit oyster distribution, have increased due to nitrogen and

phosphorus overenrichment from sewage treatment plants and agricultural runoff. Excessive sedimentation from activities such as channel dredging, upland construction, and agriculture also limit the distribution and abundance of oysters by smothering oyster beds and preventing spat from setting.

Strategies and Actions:

- Maryland and Virginia will work toward improved water quality and enhanced biological productivity by implementing recommendations of the Nutrient Reduction Strategy, the Toxics Reduction Strategy, and the Conventional Pollutants Strategy commitments of the 1987 Chesapeake Bay Agreement.

Shellfish Sanitation

The stationary nature of adult oysters makes them particularly vulnerable to adverse water quality conditions and bacterial contamination.

Strategies and Actions:

- Maryland and Virginia will promote the objectives of the 1987 Bay Agreement to improve water quality conditions, including more effective sewage treatment and water conservation programs to help reduce the volume of sewage.
- Virginia will continue participation in the Interagency Shellfish Enhancement Task Force to encourage cleanup and opening of condemned shellfish grounds.
- Depuration (cleansing of bacteria) techniques will be investigated and Virginia will implement regulations to allow containerized relaying of oysters from condemned waters (moving contaminated oysters to clean water, where they cleanse themselves).

Market Production

Consumer preference for Chesapeake Bay oysters has decreased because of inconsistent harvest levels, the often smaller size, poor quality, and higher price of Bay oysters, and negative publicity about oyster diseases.

Strategies and Actions:

- Maryland and Virginia will implement the strategies of this management plan to restore oyster stocks. Productive stocks should help correct the market problems.
- Maryland will promote public awareness that oysters infected with MSX and Dermo are safe to consume. Virginia will use industry and state

promotion of oyster quality to prevent further loss of market production due to public misconception.

Repletion Program

The repletion program consists of planting old dredged oyster shell, "fresh" or "house" shell and transplanting seed oysters. Sources of viable dredged shell are disappearing, "fresh" or "house" shell is lost due to out-of-state exportation or distribution to numerous buyers, and many traditional growing areas are infected with oyster diseases. Costs for the repletion efforts are increasing. Maryland will undergo a major reevaluation of its repletion program which may dictate changes in the proposed management strategy.

Strategies and Actions:

- Maryland will review the existing statutory authority which dictates the distribution of seed and shell, and will consider increasing the tax on exported oysters to compensate for the loss of shell and to increase revenues.
- Maryland and Virginia will evaluate their repletion programs by monitoring production in the planted and seeded areas.
- Maryland and Virginia will investigate alternative sources of cultch.
- Maryland will continue to protect and expand specific areas of oyster seed production by establishing oyster sanctuaries for seed and research purposes.
- Virginia will enhance its seed oyster program in the Great Wicomico, Piankatank, and James rivers to contribute to the rebuilding of the oyster fishery in Virginia. Seed will be used to plant prime disease-free growing areas. Virginia will also establish a special repletion program for the Seaside of the Eastern Shore.

Clearly, the Bay's oyster resource needs a concerted effort on the part of watermen, resource managers, legislators and private citizens to ensure its future as an ecologically important species and economically viable fishery. Timely oyster management efforts can help lead to these important goals.

The Chesapeake Bay Oyster Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources.

September 1989

CHESAPEAKE BAY

BLUE CRAB MANAGEMENT PLAN

BLUE CRAB MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The blue crab has been a symbol and a mainstay of Chesapeake Bay fisheries in recent decades. The 1987 Chesapeake Bay Agreement recognized the blue crab (*Callinectes sapidus*) as a priority species in need of comprehensive and coordinated management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Baywide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee to guide the development of the draft fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of

fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial, recreational, and charterboat fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Blue Crab Management Plan. For greater detail, please consult the complete management plan.

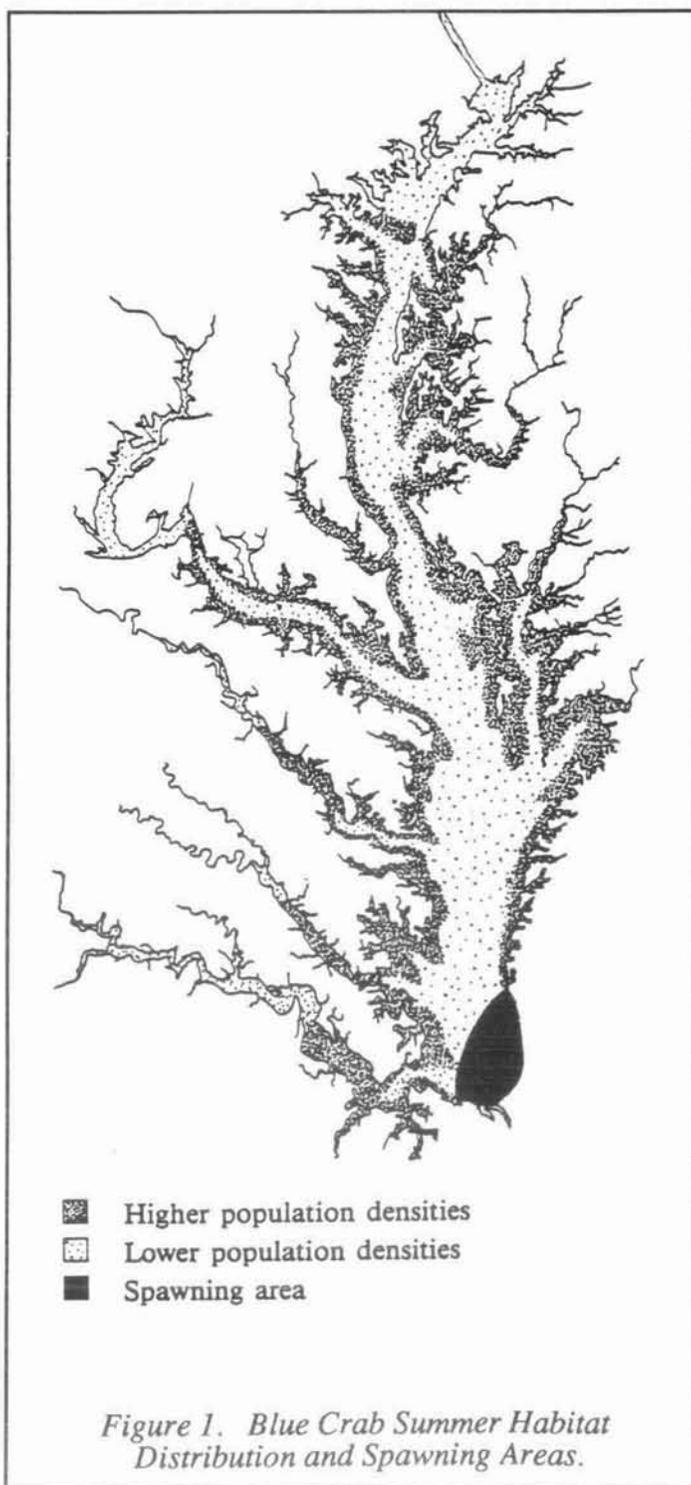
WHAT IS A FISHERY MANAGEMENT PLAN?

In order to protect the bountiful harvests of crabs from Chesapeake Bay, certain measures must be taken to wisely use and preserve the resource. Developing a management plan involves analyzing the biological, economic, and social components of the fishery, defining problems, identifying solutions, and making recommendations for action on habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.



M. E. Warren/Chesapeake Bay Foundation

The blue crab management plan provides background information on the species consisting of a biological profile, habitat requirements, historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems and propose corresponding management strategies and actions.



Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

BLUE CRAB BACKGROUND

Blue crabs are currently the most valuable commercial species in the Chesapeake Bay. There also appears to be a large and important recreational blue crab fishery. Although blue crabs are distributed throughout the Bay and the tidal portions of its tributaries, males are most abundant in salinities below 15 ppt, while females prefer salinities above 10 ppt. Mating occurs primarily in mid-Bay (where preferred salinities of the two sexes overlap) after which female crabs migrate toward the mouth of the Bay to spawn. Blue crab larvae are transported by currents off the coast and then back into the Bay, during which period numerous environmental factors affect recruitment of young crabs into the Chesapeake Bay fishery.

Goal and Objectives

The goal of this plan is to manage blue crabs in Chesapeake Bay in a way which conserves and protects the ecological value of the stock, and at the same time, generates the greatest long-term economic and social benefits from the resource.

To achieve this goal, the following objectives must be met:

- Maintain the spawning stock at a size which eliminates low reproductive potential as a cause of poor spawning success.
- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.
- Minimize conflicts between user groups by coordinating management efforts throughout Chesapeake Bay.
- Promote a program of education and public awareness to clarify the causes and nature of the problems in the blue crab industry and the rationales for management efforts.
- Promote a regulatory process which provides for adequate resource protection, optimizes the commercial fishery, provides sufficient opportu-

- nity for recreational crabbers, and considers the needs of other user groups.
- Investigate and promote harvesting practices which minimize waste and maximize economic return from the resource.
- Determine and adopt standards of environmental quality and habitat protection necessary for the maximum reproduction and survival of blue crabs.
- Promote research that improves understanding of the biology and population dynamics of blue crabs.
- Promote studies to collect the kinds of economic, social, and fisheries data required to effectively monitor the status of the blue crab fishery.

***Problem Areas , Management Strategies,
and Proposed Actions***

Increasing Fishing Effort

There is growing concern that continued increases in fishing effort will lead to overexploitation of the stock. As the total amount of gear used in the crab fishery increases over time, it is possible that blue crab spawning stock could be reduced below an optimum level for sustainable harvest.

Since all Bay fishermen are harvesting the same stock of crabs and fishing effort is increasing, competition among Virginia and Maryland commercial, non-commercial, and recreational crabbers causes some conflict.

Strategies and Actions:

- Maryland and Virginia will contain the commercial harvest of blue crabs at present levels, with management actions which may include: harvest season, gear restrictions, catch limits, time restrictions, and size limits.
- Maryland will continue, and Virginia will establish a delayed entry program for the commercial blue crab fishery. Under this program, prospective crabbers must register for a license and wait a designated time period, for example two years, before being issued the license.
- Maryland and Virginia will work to clarify interjurisdictional allocation issues by improving blue crab fishery information.

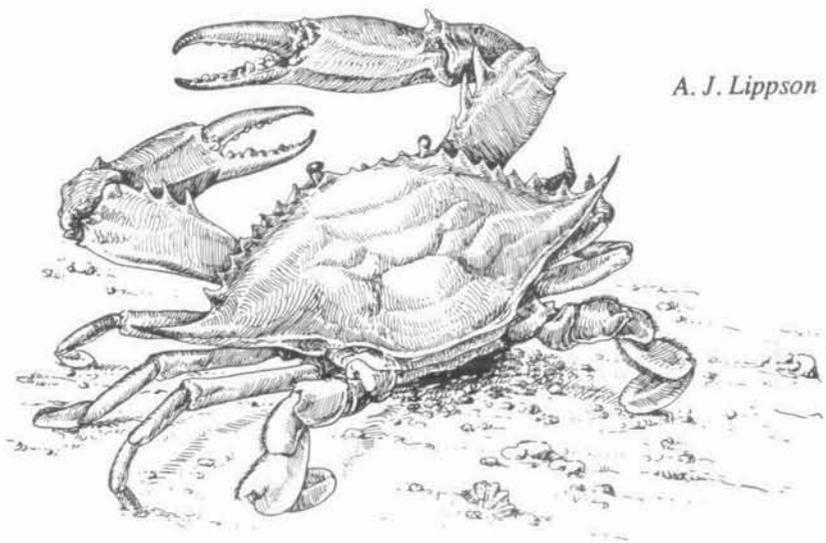
The economic and social aspects of the fishery will be evaluated to help resolve conflicts among user groups. Maryland will establish gear and license requirements that clearly distinguish commercial from recreational crabbers.

Wasteful Harvesting Practices

Numerous harvesting practices decrease the yield or reproductive potential of the blue crab resource. Examples include sublegal size crabs yielding small amounts of meat, loss of reproductive potential by harvesting sponge crabs (females bearing eggs), lost or abandoned crab pots trapping and killing crabs and higher mortality rates of green peelers (crabs 4-5 days from molting) held in shedding floats.

Strategies and Actions:

- Maryland and Virginia will promote the use of cull rings to allow small crabs to escape from crab pots. The effectiveness of using cull rings will be evaluated from crab pot studies.
- Maryland will prohibit the harvest of sponge crabs and both Maryland and Virginia will investigate other measures needed to protect the reproductive potential of crabs.
- The harvest of poor quality crabs will be reduced. Maryland will promote the release of buckram (papershell) crabs and Virginia will reduce wastage in the crab winter dredge fishery.
- Enforcement of existing regulations addressing abandoned crab pots will be improved, and



Blue Crab

other actions, such as developing stronger regulations and requiring the use of biodegradable sections in crab pots, will be considered.

- Maryland and Virginia will provide up-to-date technical information to peeler float and shedding operation owners to reduce mortalities associated with holding practices.

Stock Assessment Deficiencies

Data collected in recent years have advanced blue crab biology and fishery knowledge, however, additional information—such as accurate catch and effort data, natural and fishing mortality rates, and effects of environmental variables and human activities—is needed to improve the understanding and management of blue crab populations.

Strategies and Actions:

- Maryland and Virginia will continue current crab trawl surveys and winter dredge surveys to gather additional crab population data. The two states will also implement compatible reporting systems to obtain accurate information on harvest and effort for the commercial fishery.
- There will be a Baywide effort, using both federal and state surveys, to collect more accurate recreational catch and effort data, and to evaluate the economic impact of the recreational harvest on the blue crab fishery.
- Maryland and Virginia will support cooperative research to address stock/recruitment relationships, natural and fishing mortality rates, and environmental parameters that effect fluctuations in crab populations.

Regulatory Issues

The blue crab regulatory process in Chesapeake Bay is based on biological and conservation concerns as well as long standing social, economic and political considerations. Some of the problems to be addressed by regulation are conflicts between crab potters and recreational boaters; the interstate shipment of undersize peelers and soft crabs; and Baywide penalties which are inconsistent and sometimes inadequate to deter violations.

Strategies and Actions:

- Maryland and Virginia will continue to monitor conflicts between crabbers and recreational boaters and enforce existing regulations on open and closed crabbing areas and pot free

channels. Maryland will also pursue methods of reducing the number of crab pot floats.

- Maryland and Virginia will investigate the biological and economic effects of regulated size limits on the soft crab fishery and the need to coordinate soft and peeler crab size limits.
- Maryland will standardize regulations regarding allowable gear types for recreational licensing, and Virginia will use surveys to determine recreational harvest and effort.
- Enforcement policies and practices will be made as consistent as possible among jurisdictions.

Habitat Degradation

Although crabs appear to be one of the more resilient species in the Bay, they too are affected by habitat loss stemming from declines in submerged aquatic vegetation and from periods of low dissolved oxygen.

Strategies and Actions:

- Maryland and Virginia will implement water quality and habitat improvement measures outlined in the Chesapeake Bay Agreement's Nutrient Reduction Strategy, Toxics Reduction Strategy, and Conventional Pollutants Strategy commitments.
- Maryland and Virginia will identify prime habitat areas for blue crabs and actively protect these areas from the effects of harvesting, development, and pollution.
- Maryland and Virginia will continue to support research into larval and juvenile blue crab environmental requirements, and will support protection of critical habitats such as submerged aquatic vegetation and wetlands.

The time to plan for wise management of the blue crab resource is now. With foresight and guidance, the savory crustacean will continue to support a healthy fishery and maintain its ecological link in the Chesapeake Bay ecosystem.

The Chesapeake Bay Blue Crab Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources. September 1989

CHESAPEAKE BAY

ALOSID (SHAD AND HERRING) MANAGEMENT PLAN



Abundant shad and herring catch on the Susquehanna Flats, early 1900s. Photo from Chesapeake Bay Foundation

SHAD AND HERRING MANAGEMENT IN THE CHESAPEAKE BAY AGREEMENT

The once teeming spawning runs of shad and herring in the Bay's tributaries in the early and mid 1900s filled pound and dip nets to overflowing. Nowadays, sparse runs in far fewer freshwater reaches are commonplace for these species. The 1987 Chesapeake Bay Agreement recognized the American shad (*Alosa sapidissima*) as a priority species in need of comprehensive and coordinated management. The Bay Agreement signatories from Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission pledged:

By July 1989, to develop, adopt, and begin to implement Baywide management plans for oysters, blue crabs, and American shad. Plans for other major commercially, recreationally, and ecologically valuable species should be initiated by 1990.

A management plan has been developed to encompass the *Alosa* genus of migratory fishes, which includes American shad, hickory shad (*Alosa mediocris*), and the two species collectively known as river herring: alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). Migratory species such as shad and herring that live in the ocean, yet return to spawn in fresh-water tributaries, are also known as "anadromous" fishes.

A cooperative Fishery Management Workgroup was established under the Chesapeake Bay Program's Living Resources Subcommittee, to guide the development of the initial drafts of the fishery management plans prepared by Maryland Department of Natural Resources and Virginia Marine Resources Commission. The workgroup is comprised of fishery experts and resource managers from state and federal agencies, academic institutions, citizen and environmental organizations, and commercial, recreational, and charterboat fishery interests.

This fact sheet provides a summary of selected issues from the Chesapeake Bay Alosid Management Plan. For greater detail, please consult the complete management plan.

WHAT IS A FISHERY MANAGEMENT PLAN?

In order to restore and enhance shad and river herring populations in Chesapeake Bay, certain measures must be taken. Developing a management plan involves analyzing the biological, economic and social components of the fishery, defining problems, identifying solutions, and making recommendations for actions to correct habitat problems and human usage of the resource. A management plan must also be reviewed and updated regularly to incorporate new information.

The shad and herring management plan provides background information on the species consisting of biological profiles, habitat requirements, historical fishery trends, an economic perspective, current stock status, and current regulations; the management section of the plan builds upon this information to discuss an overall goal and objectives for the resource, examine specific problems, and propose corresponding management strategies and actions.

Each of the appropriate jurisdictions in the Chesapeake Bay region will develop an implementation plan in 1990 for the management actions to which it is committed. In addition, the Potomac River Fisheries Commission, which has regulatory authority for the Potomac River, will develop management actions and an implementation plan where appropriate by July 1990.

Goal and Objectives

The goal of this management plan is to protect, restore and enhance baywide shad and river herring stocks to generate the greatest long-term ecological, economic and social benefits from the resource.

To achieve this goal, the following objectives will be met:

- Maintain a spawning stock at a size which will eliminate low reproductive potential as a cause of poor spawning success.
- Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.

- Reduce fishing effort on shad and herring stocks until they exhibit increased abundance.
- Improve knowledge of shad and herring population dynamics to more accurately assess and minimize interjurisdictional conflicts.
- Redefine tributary survey programs to improve water quality and habitat accessibility specifically for alosids.
- Continue programs to introduce shad and herring into areas which will support natural spawning migrations.

Problem Areas, Management Strategies, and Proposed Actions

Declining Abundance

Historically, shad and river herring supported some of the most valuable commercial fisheries in the Chesapeake Bay. From the late 1800s to the mid-1900s, shad was the most economically valuable food fish harvested in Maryland and Virginia. Presently, shad and river herring are at low levels of abundance relative to catches in the historical and recent past, as evidenced in figures 1 and 2.

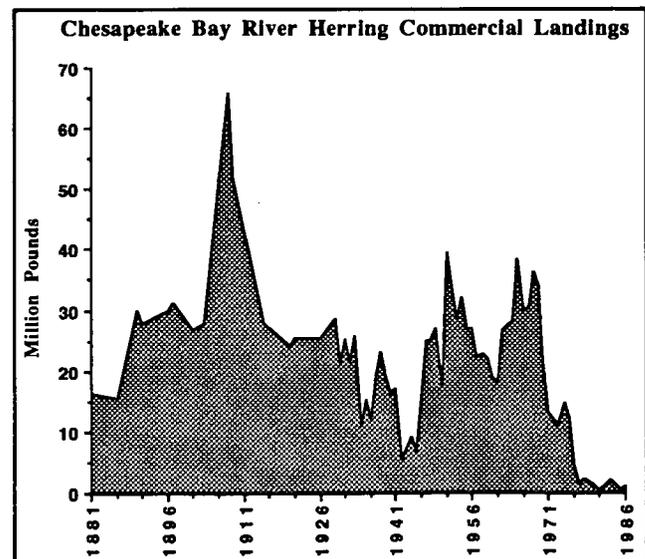


Figure 1.

Strategies and Actions:

- Maryland will continue the moratorium on American shad and hickory shad in its portion of Chesapeake Bay. Virginia will assess current shad exploitation rates and take appropriate steps to limit fishing effort if necessary. Pennsylvania will continue its moratorium on shad

in the Susquehanna River basin while restoration efforts are in progress.

- Maryland will control the harvest of river herring on a river-by-river basis by one or a combination of: harvest limits; harvest season; areal closures; and gear restrictions. Virginia will use similar measures to control harvests of river herring, American shad and hickory shad. Systems slated for restoration will also be regulated or closed. Pennsylvania will implement size restrictions on herring in the Elk Creek basin.

Overfishing

Both shad and river herring are vulnerable to overfishing at present low population levels. Harvest is affecting yearly production of young, and probably prevents stock recovery in some areas. Adding to this potential for overfishing are the interjurisdictional offshore fisheries which target mixed stocks of shad and river herring from different river systems along the coast. Offshore harvests of shad and herring affect inshore stocks, complicating management strategies.

Strategies and Actions:

- The harvest of shad and river herring will be regulated in accordance with the Atlantic States Marine Fisheries Commission recommendations. The coastal shad intercept fishery will be controlled through a combination of gear restrictions, seasonal and areal closures, and harvest limits. The herring harvest will be controlled during spawning migrations through gear restrictions and spawning area closures.
- Maryland and Virginia will ensure that the by-catch of river herring is minimized in the foreign and domestic mackerel fisheries.

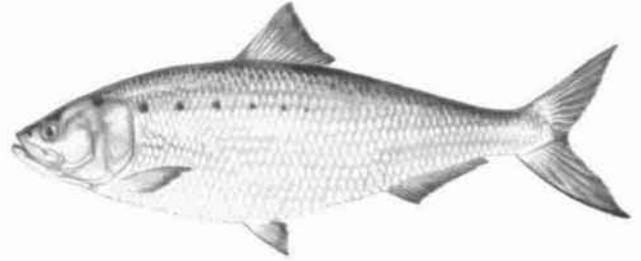
Stock Assessment Deficiencies

Data on shad and herring are needed concerning harvest, fishing effort, biological characteristics of the harvest, and fishery independent measures of stocks. At low stock size, shad and herring juvenile abundance, catch and effort data, and landings data may not accurately represent actual population abundance. For all shad and herring species, information is needed on early life mortality from the egg to the juvenile stage.

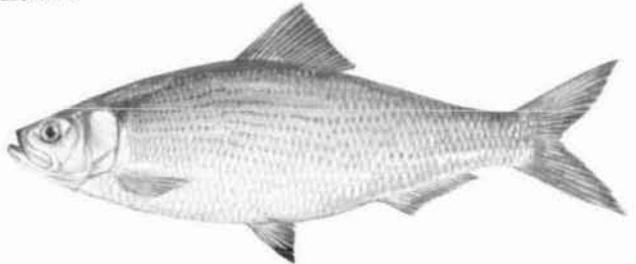
Strategies and Actions:

- Shad and herring adult and juvenile surveys will be continued with the objective of developing a

American Shad



Alewife



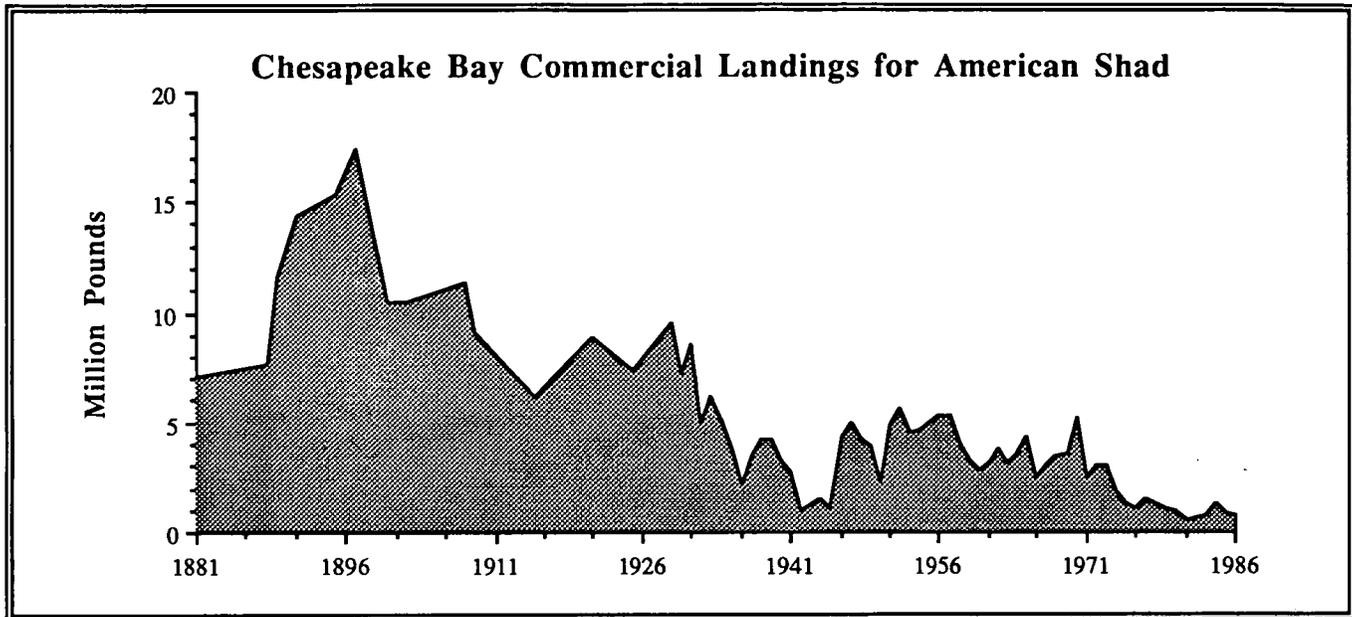
baywide index of abundance and determining other stock characteristics.

- Virginia will initiate an ocean intercept tagging program to determine stock composition in the coastal shad fishery.
- Virginia will improve assessment of current fishing rates on shad stocks in territorial waters and seek to improve catch and effort data through mandatory reporting.
- Pennsylvania and Maryland, in cooperation with the other Susquehanna River Anadromous Fish Restoration Committee members, will continue their juvenile shad assessment and marking program.
- The abundance of American shad in the Potomac River will be investigated through a joint effort by Maryland, Virginia, and the District of Columbia.

Habitat Loss And Degradation

Changes in shad and herring spawning habitat have been a primary cause of stock declines over the past century. The loss of previously productive habitat due to migration barriers has significantly contributed to the problem. Dams, road culverts and other stream blockages have steadily eliminated many hundreds of miles of spawning and nursery grounds. In recent decades, water

Figure 2.



quality degradation has also had harmful impacts upon the remaining available habitat.

Strategies and Actions:

- Maryland, Virginia, Pennsylvania, and the District of Columbia will work to implement the recommendations of the Fish Passage Strategy, adopted as a 1987 Chesapeake Bay Agreement commitment. Actions include removing stream blockages, designing and constructing permanent fish passage facilities, and restocking areas. Fish passage projects will be monitored to gauge their success, and reintroduced stocks will be protected.
- Maryland and Pennsylvania have set water quality standards for dissolved oxygen and minimum flows in the Susquehanna River below Conowingo Dam, which are in effect. The construction of a permanent fish passage facility is scheduled for completion in 1991.
- Maryland will establish a new water use classification system based on the physical habitat and water quality characteristics to guide resource management. The revised system would define anadromous fish spawning areas.
- Maryland, Virginia, Pennsylvania and the District of Columbia will work toward improved water quality and enhanced biological productivity by implementing recommendations of the Nutrient Reduction Strategy, the Toxics Reduction Strategy, and the Conventional Pollutants Strategy commitments

of the Chesapeake Bay Agreement. A plan for continued research and monitoring of acid rain causes and impacts is also recommended.

Concentrated efforts to restore American shad to sustainable levels of abundance, especially in areas of historic importance, are currently being undertaken. Two methods used in restoration to assist natural population growth are the trapping and transporting of adult spawners above obstructed passages and the hatchery production of eggs, fry and juvenile shad for stocking.

The long-range outlook for shad and river herring in Chesapeake Bay is hopeful. Decades of stock declines cannot be immediately mended, but progress is being made on restoring the quantity and quality of habitat necessary for successful reproduction. These efforts, in conjunction with restoration programs and fishing controls, should benefit shad and herring populations and, in turn, the residents of the Chesapeake Bay watershed.

The Chesapeake Bay Alosid Management Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was printed by the Maryland Department of Natural Resources.

September 1989

CHESAPEAKE BAY:

SUBMERGED AQUATIC VEGETATION POLICY



**SUBMERGED AQUATIC VEGETATION IN
THE CHESAPEAKE BAY AGREEMENT**

Providing for the protection and restoration of Chesapeake Bay's living resources is a hallmark of the 1987 Chesapeake Bay Agreement. A "Schedule for Developing Bay-wide Resource Management Strategies" was developed in response to the Living Resources commitment:

By July 1988, to adopt a schedule for the development of Bay-wide resource management strategies for commercially, recreationally, and selected ecologically valuable species.

Submerged aquatic vegetation, an important indicator of Bay health, is one of the five major categories of Bay living resources for which management strategies are being developed.

The Submerged Aquatic Vegetation Workgroup of the Chesapeake Bay Program's Living Resources Subcommittee developed the strategy for the protection and restoration of submerged aquatic vegetation. The workgroup includes representatives from the U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, National Marine Fisheries Service, Maryland Department of Natural Resources, Virginia Marine Resources

Commission, Interstate Commission on the Potomac River Basin, Chesapeake Bay Foundation, University of Maryland, Virginia Institute of Marine Science, and Harford Community College.

This Policy's intent is to guide the protection and restoration of all submerged aquatic vegetation within the Chesapeake Bay and its tidal tributaries.

BACKGROUND

Submerged aquatic vegetation (SAV) are vascular plants that live and grow below the water surface. Because of their need for sufficient sunlight, they are found in the shallow water areas of the Chesapeake Bay and its tributaries. There are 13 principal species distributed according to their individual salinity requirements.

ECOLOGICAL VALUES

SAV provides a number of important ecological benefits:

- a) Fish and wildlife habitat
- b) Food for waterfowl
- c) Nutrient uptake
- d) Removing suspended sediments and holding substrates
- e) Producing oxygen for the water column and upper sediment layer
- f) Contributing organic matter to the Bay food web

SAV beds provide shelter and nursery areas for many species of fish and wildlife. Small fish such as killifish, silversides, and minnows and juveniles of larger species such as white perch, striped bass and yellow perch find protection and cover from predators in SAV beds. The plants are a substrate in the water column for algae, snails and worms which are food for fish and larger invertebrates. Molting blue crabs also find shelter in SAV until their shells harden.

SAV is an important source of food for many species of ducks, geese and swans. Migrating and over-wintering populations of waterfowl rely on the nutritious seeds, rootstocks and starchy tubers of SAV for their diet.

Excessive nutrients in the Bay can cause algae blooms; SAV helps to prevent this by removing nutrients from the water and sediment. SAV also helps to remove suspended sediments from the water column by trapping sediment particles on the plant leaves and stems. The roots act to bind the substrate and prevent resuspension of particles, while dense beds of SAV slow water currents and dampen wave energy to protect shorelines from erosion.

Another valuable function of SAV is its ability to provide oxygen to the surrounding waters. In the absence of SAV, low dissolved oxygen levels can be harmful or lethal to many aquatic organisms.

As SAV beds die back at the end of the growing season, they provide a valuable source of organic material (detritus) for the Bay ecosystem's food web.

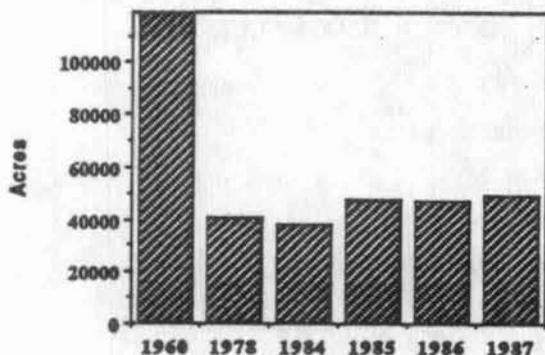
MONITORING VALUES

Because the growth and survival of SAV is directly connected to the water quality of Chesapeake Bay, SAV can serve as a valuable indicator of whether an area's water quality is sufficient to support living resources. Attempts to improve Bay water quality can be evaluated by SAV response. Thus, changes in SAV distribution and abundance can serve as a measure of the success of the Bay-wide restoration program. In addition, the annual SAV monitoring reports are used in the regulatory review process.

Decline of SAV

Former levels of SAV distribution were well over 100,000 acres. Today, less than 50,000 acres remain. Most of this decline has occurred within the last two decades and has affected all species in most areas of the Bay.

Acres of SAV in Chesapeake Bay



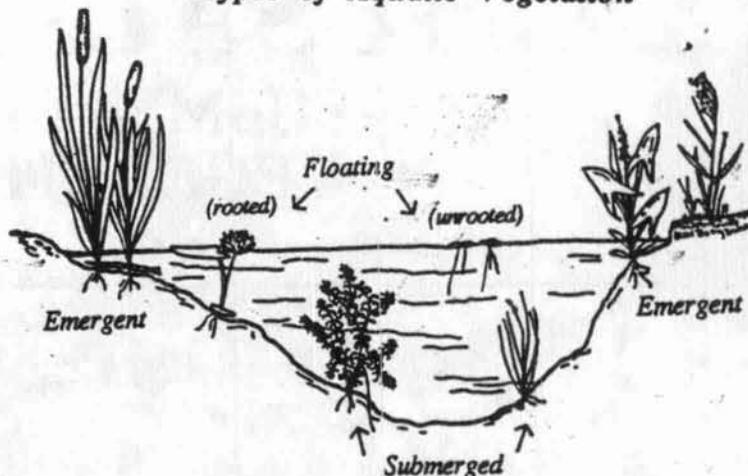
Causes for the loss of SAV are attributed to a decline in the water quality of Chesapeake Bay mainly from excessive loadings of nutrients and sediments. Resultant algae blooms and high sediment levels increase turbidity blocking vital sunlight to SAV.

POLICY ISSUES

- * The goal of the Bay Program's Policy for the protection and restoration of submerged aquatic vegetation is to achieve a net gain in SAV distribution and abundance in the Chesapeake Bay and its tidal tributaries by:
 - * protecting existing SAV beds from further losses;
 - * setting and achieving regional water and habitat quality objectives that will result in Bay-wide restoration of SAV; and,
 - * setting regional SAV restoration goals considering historical distribution records and estimates of potential habitat.

Four key components are included in the Policy: assessing the resource, protection of existing SAV, restoration of SAV, and education and scientific research. Within each component,

Types of Aquatic Vegetation



specific policy statements and action items to implement the policy have been developed.

I. Assessing the Resource

Only through an established, consistent and regular survey of populations over time can progress toward the net gain of SAV goal be measured. An effective assessment and monitoring strategy is essential to evaluate SAV distribution and abundance, and the quality of their supporting habitats.

II. Protection of Existing SAV

Current regulatory and resource management programs need to be evaluated for their effectiveness in protecting existing SAV and their habitats from further losses.

III. Restoration of SAV

Efforts must be made to restore SAV by improving the habitat conditions necessary for natural revegetation. The water quality and habitat quality requirements of SAV should be established as regional goals for strategies to reduce influx of nutrients, toxics and conventional pollutants to the Chesapeake Bay.

IV. Education and Scientific Research

Education is important to increase public awareness of this valuable resource and to provide sufficient information to resource managers responsible for implementing SAV protection and restoration practices. Scientific research will improve our knowledge of SAV to refine and enhance protection activities.

Greater detail on specific SAV policy statements and action items may be found in the Chesapeake Bay Submerged Aquatic Vegetation Policy. Meeting the 1987 Chesapeake Bay Agreement's goals for protecting and restoring SAV provides an important opportunity for interested citizens, resource managers and legislators to focus their commitment to the health of the Bay ecosystem.

The Chesapeake Bay Submerged Aquatic Vegetation Policy is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873.

This circular was prepared by the Living Resources Subcommittee and printed by the Chesapeake Bay Program. July, 1989

CHESAPEAKE BAY: STOCK ASSESSMENT PLAN



M.E. Warren

STOCK ASSESSMENT IN THE CHESAPEAKE BAY AGREEMENT

In recognition of the important values - economic, recreational, ecological, aesthetic, symbolic - that we attribute to Chesapeake Bay living resources, the 1987 Chesapeake Bay Agreement contains an entire category of commitments related to restoring and protecting the Bay's living resources. The Chesapeake Bay Stock Assessment Plan responds to one of these commitments:

By July 1988, to develop, adopt, and begin to implement a Bay-wide plan for the assessment of commercially, recreationally, and selected ecologically valuable species.

The Stock Assessment Plan was developed by the Chesapeake Bay Stock Assessment Committee, a federal/state committee sponsored by the National Oceanic and Atmospheric Administration (NOAA). Membership includes scientists and resource managers from Maryland, Virginia, Pennsylvania, the District of Columbia, NOAA National Marine

Fisheries Service and Estuarine Programs Office, and the U.S. Fish and Wildlife Service.

This flyer highlights the conclusions and recommendations of the Chesapeake Bay Stock Assessment Plan.

BACKGROUND

Stock assessment is the interpretation of fish population data for describing the status of fish stocks and for predicting the results of fishery management options. Stock assessment analyses take population characteristics such as growth, mortality, and reproduction and relate them to controlling factors which include fishing pressure and environmental distress such as climatic fluctuations, pollution, and habitat degradation.

Maryland, Virginia, and the District of Columbia have all been conducting stock assessments on selected species, but many of the ongoing programs are limited in terms of geographic coverage and range of species. The Plan concludes that existing

programs do not constitute a comprehensive stock assessment program for the Bay and its tributaries, and it recommends routine, systematic assessments that provide long-term data for all the critical life stages of finfish and shellfish species in the Bay.

WHAT DO WE KNOW?

Figure 1 illustrates present knowledge of a few representative Chesapeake Bay finfish and shellfish species. The figure indicates that for some species, such as menhaden, there is adequate information upon which to make informed management decisions. Other species, such as the oyster, have not received the level of attention their importance would seem to warrant. Fur-



ther, the chart shows that, in general, there is sufficient basic biological information, but little reliable catch, effort, and recruitment data is available. This deficiency is significant because these data are the major types of information required for stock assessment analyses.

DATA NEEDS

Shortcomings of the present data collection efforts in the Chesapeake are accentuated in Figure 1. Stock assessment data needs include improved catch data, fishing effort data, and biological data (length, age, weight, sex) from commercial and recreational fisheries. These three categories are called "fishery-dependent" data.

"Fishery-independent" data are also necessary so that unbiased information essential for stock

assessments is collected on juveniles and adults. Fishery-independent sampling does not rely on commercial or recreational fishermen for collecting fish and is conducted through standardized surveys, such as the Maryland beach seine survey which is used to estimate a juvenile index for striped bass. Short-term intensive research is also needed to understand the processes that affect growth, mortality, and reproduction.

The Plan calls for baseline fisheries data that are 1) collected with standard methods Bay-wide, 2) precise and accurate, 3) representative of the distribution and abundance of Bay species, 4) inclusive of all major species and their critical life stages, and 5) long-term in scope.

PROPOSED PROCESS FOR IMPLEMENTATION

Approximately 100 people are currently working on some aspect of stock assessment in the Bay region at over twenty organizations. Research, monitoring, and management programs that contribute to stock assessment spend about three million dollars per year; most of these funds (\$2.5 million) are provided by federal agencies, in particular, NOAA and the Fish and Wildlife Service. Coordination of personnel and financial resources will be a key goal for implementing the proposed Bay-wide data collection program and for conducting stock assessment analyses.

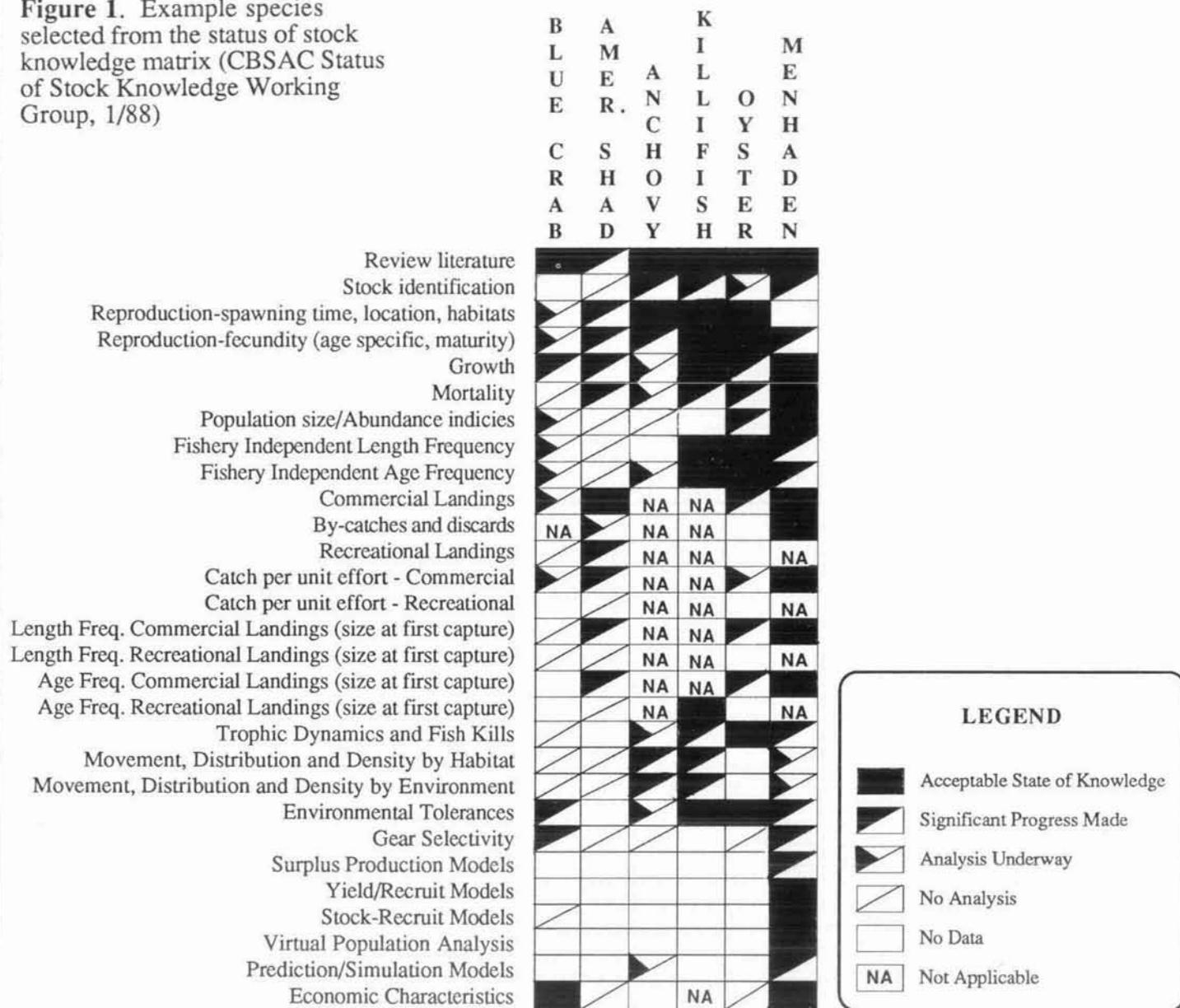
Figure 2 displays organizational responsibilities and activities involving fishery stock assessment in the Bay. This figure illustrates the division of responsibility between research (including data collection and monitoring) and management organizations in all jurisdictions. The Chesapeake Bay Stock Assessment Committee (CBSAC) was formed in 1985 to improve the coordination of technical stock assessment problems.

The major features of a Bay-wide stock assessment program and recommended dates of implementation are summarized as follows:

Fishery-Dependent Programs: July 1989

- * Initiate a Bay-wide fishery statistics program to provide improved estimates of catch and fishing effort for each type of fishing gear and area of the Bay.

Figure 1. Example species selected from the status of stock knowledge matrix (CBSAC Status of Stock Knowledge Working Group, 1/88)



- * Outline procedures for collecting such data, to include the implementation of a trip-ticket system for commercial fishermen and more extensive recreational fisheries surveys.
- * Institute a program for obtaining species and age composition, as well as other biological characteristics of commercial and recreational catch.

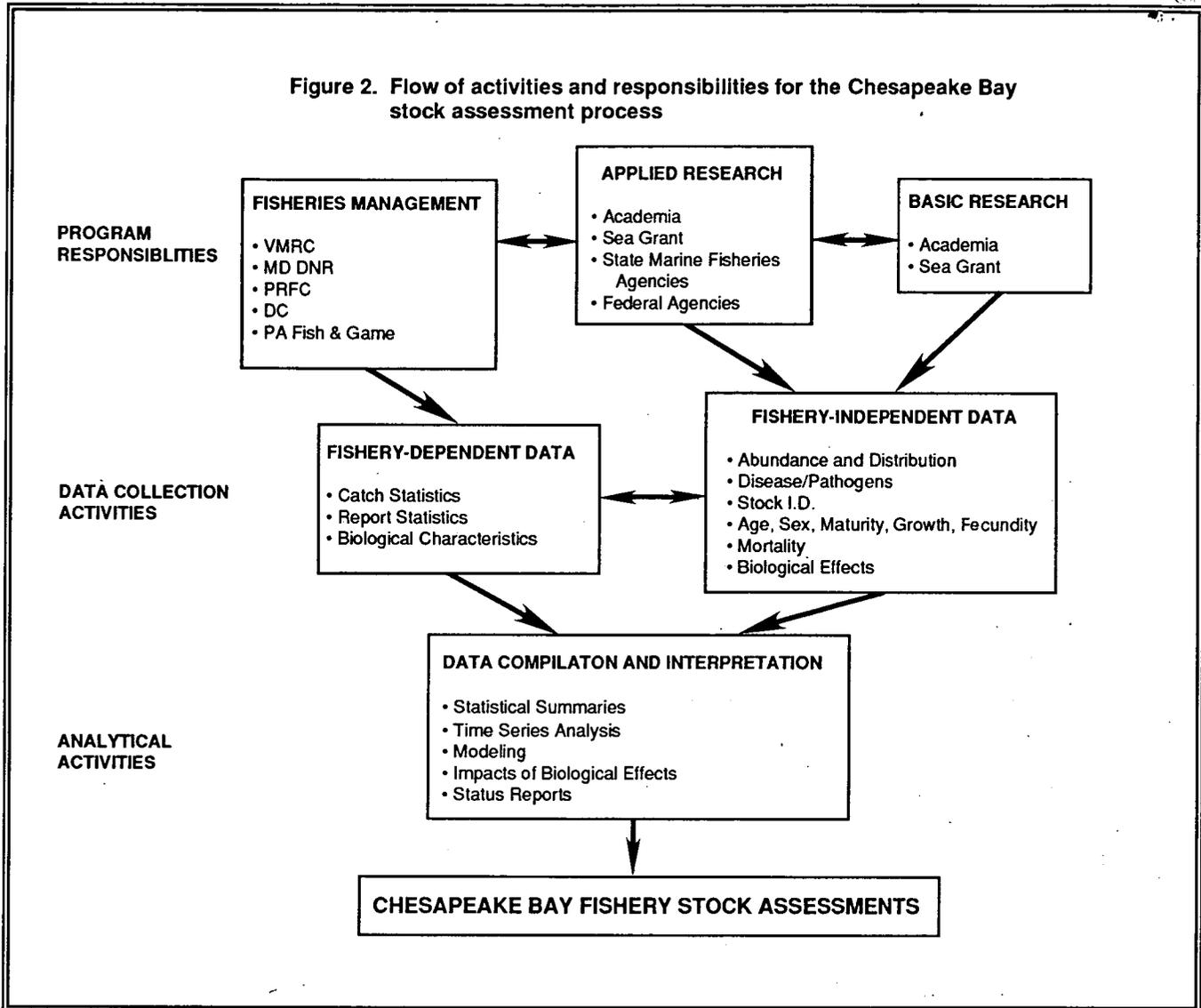
**Fishery-Independent Programs:
Spring 1989**

- * Complete final design for a Bay-wide trawl survey to obtain fishery-independent

estimates of abundance and distribution.

- * Augment trawl survey with other sampling methodologies to obtain abundance indices for species and life stages not captured by the trawl survey, such as the ongoing beach seine surveys in Maryland and Virginia.
- * Develop research program to investigate the effects of the environment on juvenile fish and shellfish populations.
- * Coordinate these surveys and studies with the Chesapeake Bay Program Bay-wide Monitoring Program.

Figure 2. Flow of activities and responsibilities for the Chesapeake Bay stock assessment process



**Stock Assessment Implementation:
July 1988**

- * Continue Chesapeake Bay Stock Assessment Committee (CBSAC) oversight responsibilities for Bay-wide Stock Assessment.
- * Maintain CBSAC working group roles for reporting on status of Bay stocks, investigating analytical techniques, and data management.
- * Establish new stock assessment working groups on finfish, oysters, and blue crab to begin immediately with the evaluation of available data and proposed sampling programs.
- * Produce annual reports on the status of stocks, fishery statistics, and periodic Bay-wide stock assessment reports.

The Stock Assessment Plan is available from the Chesapeake Bay Liaison Office, 410 Severn Ave., Annapolis, MD 21403 (301) 266-6873

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CHESAPEAKE BAY:

MONITORING PLAN FOR LIVING RESOURCES



Dave Harp, Chesapeake Bay Foundation

LIVING RESOURCES MONITORING AND THE CHESAPEAKE BAY AGREEMENT

The Governance section of the Chesapeake Bay Agreement of 1987 contains a commitment by the states and the federal government:

By July 1988, to develop a Baywide monitoring plan for selected commercially, recreationally, and ecologically important species of living resources.

A joint workgroup of the Chesapeake Bay Program's Monitoring Subcommittee and Living Resources Subcommittee was formed in November 1987 to develop the living resources monitoring plan. The membership of the Living Resources Work Group includes representatives

of the Chesapeake Bay Stock Assessment Committee in addition to the two Subcommittees.

Several thousand species of plants, animals and microorganisms live in the Chesapeake Bay. These thousands of species, collectively, are the Bay's living resources. Each species has its own set of habitat requirements or preferences. Some species are valuable economic resources, while others are pests to people or desirable species. Some have enormous ecological significance and some are appreciated mainly for their rarity or beauty.

WHY MONITOR?

In working toward the goal of restoring the abundance and diversity of resources in the Bay, monitoring is essential. Many of the actions necessary to improve the quality of Bay habitats

have been identified and begun to be implemented. Regional fisheries management plans, presently under development, have the potential for preventing overharvest of commercial and recreational species. But plans for improving water quality will always be based on imperfect knowledge. In order to measure progress, it will be necessary to maintain the best possible records of resource abundance, distribution, diversity and reproduction. This record-keeping can be accomplished through a well designed living resources monitoring program.

In addition to tracking resource trends, monitoring will gradually improve our knowledge of Chesapeake Bay species, their natural cycles, their habitat needs, and how they respond to human activities. To meet these goals, a resource monitoring program must be integrated with biological research, water quality monitoring, ecological modeling, and fisheries management. Cooperation and coordination between agencies, programs, jurisdictions, and disciplines are essential.



photo: Kent Mountford

Fish egg and larvae survey aboard the University of Maryland research vessel "Orion."

OBJECTIVES

The Workgroup began its task by defining three major objectives of living resources monitoring:

- 1) Document the current status of living resources and habitats in Chesapeake Bay.
- 2) Track the abundance and distribution of living resources and the quality of habitats over time.
- 3) Examine correlations and relationships among water quality, habitat quality, and the abundance, distribution, and integrity of living resource populations.

The Living Resources Monitoring Plan has been designed to:

- * Provide a framework for Bay-wide monitoring of living resources;
- * Achieve coordination and data compatibility among living resources, habitat, and water quality monitoring programs;
- * Establish biological data collection methods which will ensure data comparability between jurisdictions and programs;
- * Establish an efficient, coordinated system of data management responsive to the objectives of living resources monitoring; and
- * Review existing programs, identify components that should be added or modified, and develop recommendations for implementation of the plan.

A goal beyond the immediate commitment to develop a living resources monitoring plan is the full integration of living resources and water quality monitoring within Chesapeake Bay. That is, ultimately, there will be a Chesapeake Bay Monitoring Program that will include both water quality and living resources components. The Living Resources Monitoring Plan is a significant step towards that goal.

APPROACH

The Living Resources Monitoring Workgroup has given the language of the Bay Agreement ("selected ... species" and "living resources") a broad interpretation in the development of the

Monitoring Plan. For example, tidal and non-tidal wetlands, although not truly "species," have been included because of their great importance as habitats and regulators of water quality.

The Plan provides a framework for consistent, sustained monitoring of Chesapeake Bay living resources: monitoring that is responsive to the information needs of those who must manage the Bay's habitats and living resources, and to the public, who ultimately will judge the success of the Bay restoration.

COMPONENTS OF THE ECOSYSTEM

In Section II of the Plan, entitled Data Needs, Existing Programs, and Monitoring Recommendations, several broadly defined groups of organisms are considered as "ecosystem components":

FINFISH

- Freshwater Spawners
- Estuarine Spawners
- Marine Spawners
- Ichthyoplankton

SHELLFISH

- Oysters
- Blue Crab
- Hard Clam
- Soft Shelled Clam

WILDLIFE

- Waterfowl
- Colonial Birds
- Shore and Seabirds
- Raptors
- Reptiles and Amphibians
- Mammals

PLANT COMMUNITIES

- Submerged Aquatic Vegetation
- Benthic Algae and Macroalgae
- Tidal Wetlands
- Non-tidal Wetlands

BENTHIC FAUNAL COMMUNITIES

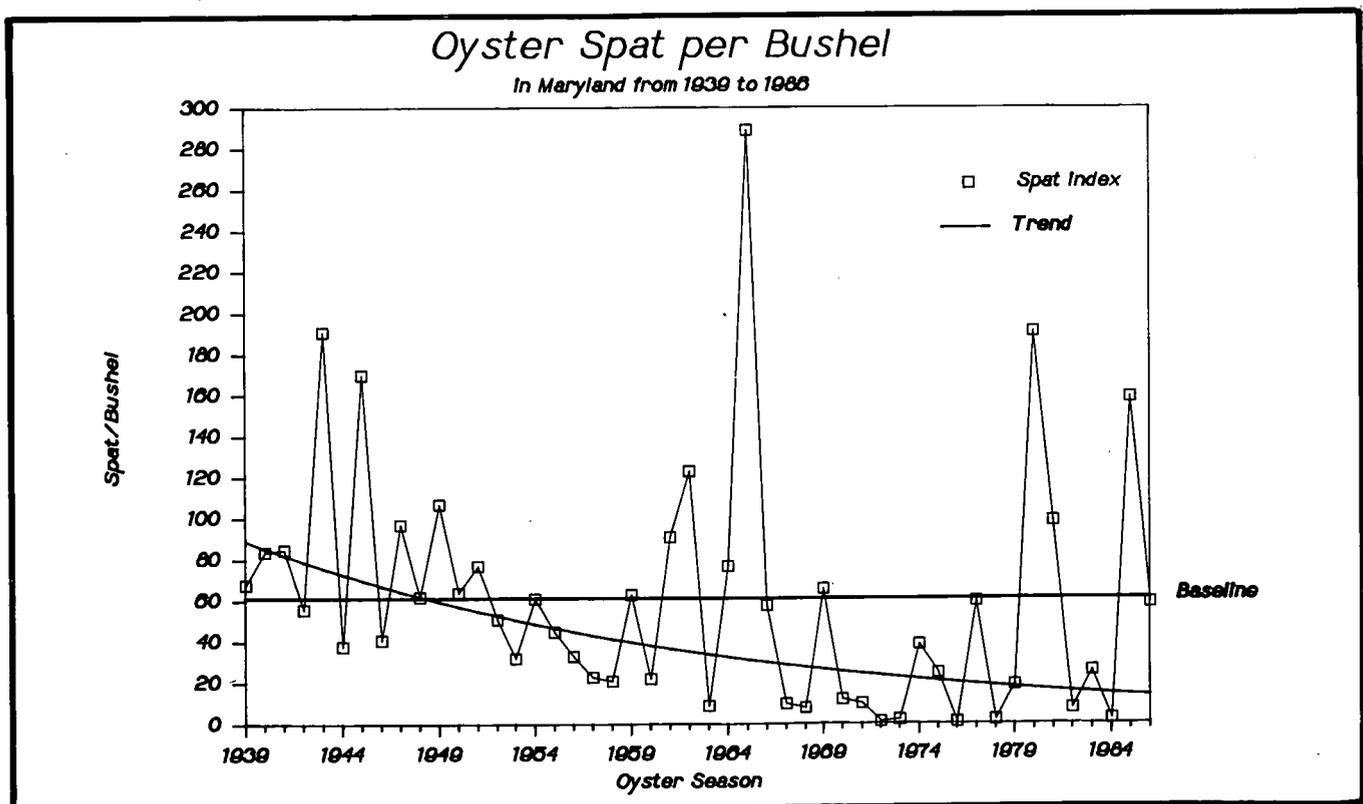
- Benthic Infauna
- Benthic Epifauna

PLANKTONIC COMMUNITIES

- Picoplankton
- Nanoplankton and phytoplankton
- Microzooplankton
- Mesozooplankton
- Gelatinous Zooplankton

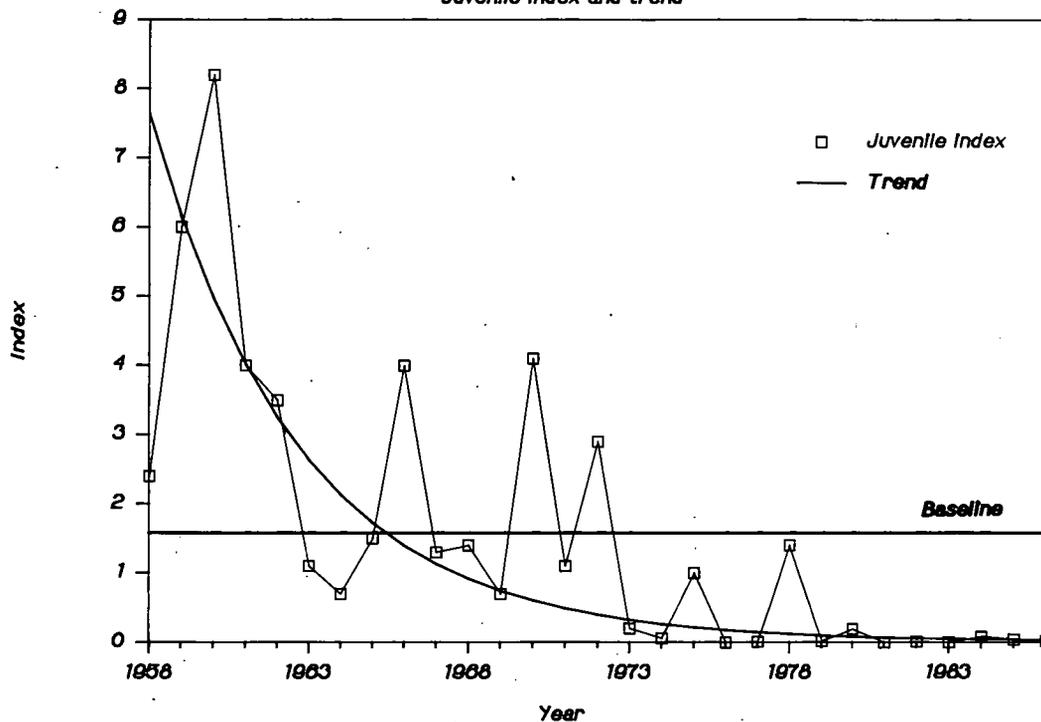
For each subgroup, data needs are identified, existing monitoring programs are reviewed, deficiencies noted, and recommendations made for future monitoring, including key areas of integration with other living resources and water quality monitoring programs.

Section III of the Plan is a discussion of how the data resulting from living resources monitoring



AMERICAN SHAD

Juvenile Index and trend



These graphs (above and preceding page) depict examples of long-term living resources monitoring information from Maryland's portion of the Chesapeake Bay. An annual index developed from field counts of each year's reproductive crop is shown, along with the long term average of the index (baseline), and long-term trends that can be discerned through simple statistical analysis.

should be stored, analyzed, and reported. Permanent accessibility and regular reporting of basic data on living resources status and trends were the principle concerns addressed in this section. The information gained from monitoring must be readily available to managers, scientists, and the public.

RECOMMENDATIONS

Section IV summarizes the major recommendations of the Plan, and discusses how and when these should be implemented. First, it is recommended that the Plan be used Bay-wide as a guide to uniform collection methods for biological data. Second, a core living resources monitoring program is proposed to fulfill the monitoring objectives. Additional recommendations address the need for managing monitoring data to ensure quality, security, and accessibility, and the need to develop better methods for assessing the impacts of contaminants on living resources populations.

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