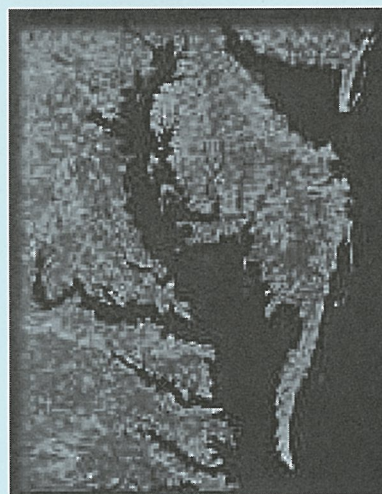


エメックス国際セミナー チェサピーク2000 *Chesapeake 2000 Agreement* 報 告 書

リニューアルされたチェサピーク湾プログラムについて
～流域における協力体制ー統合管理（ガバナンス）の新たな地平を目指して～



財団法人国際エメックスセンター

はじめに

米国東部に位置するチェサピーク湾は、メリーランド州をはじめとする6つの州に囲まれている北米の代表的な閉鎖性海域です。チェサピーク湾の環境管理は、1983年と1987年（1992年に改訂）に連邦政府並びに周辺州政府ワシントン市の間で署名された協定に基づき実施されてきましたが、今回のチェサピーク 2000は、その湾協定の第3版で、2年にわたる見直し作業を経て今年6月28日に調印されたものです。

「流域における協力(A Watershed Partnership)」と呼ばれるチェサピーク2000は、これまでの成果や課題に基づき、また、次世紀での回復努力に焦点を当てた長期的観点から、科学者や地元政府、環境保護団体、市民の協力と参加を得て作成されたもので、チェサピーク湾と支流における生物資源を存続させるため、十分な水質の改善とその将来にわたっての維持を図ることを目標としています。

一方、我が国においても、沿岸管理域の統合管理や市民参加のあり方が国土庁や環境庁をはじめとして様々な観点から検討されているが、いずれの主体の取り組みにおいても、市民参加による統合管理、情報公開、環境教育はこれからのキーワードとなっています。

このような我が国の取り組みにおいても、本稿で紹介したチェサピーク湾における挑戦的な取り組みや政策形成の過程は、今後の日本の沿岸域環境保全の推進に資するものがあると思われた。当センターでは、今後とも、一層の情報収集に努めていきたいと考えている。

本報告書は、チェサピーク 2000の合意に努力された米国の科学者、行政及び立法の関係者を招き、その意義と課題及び市民参加のあり方、新たな統合管理のあり方についてご紹介いただきました「エメックス国際セミナー チェサピーク 2000」での内容をまとめたものです。

本報告書は、以下のセミナーで発表された内容や使用または配布された資料に基づいて編集しています。なお、参考資料については、関連ホームページ(<http://www.chesapeakebay.net/index.htm>)から2000年8月にダウンロードしたものを基いて編集しています。

名 称： エメックス国際セミナー

テーマ： チェサピーク2000

リニューアルされたチェサピーク湾プログラムについて
～流域における協力体制
ー統合管理（ガバナンス）の新たな地平を目指して～

日 時： 平成12年8月22日（火） 14時～16時30分

場 所： ひょうご国際プラザ3階ホール
（神戸市中央区脇浜海岸通1丁目5番1号）

主 催： 財団法人国際エメックスセンター

協 賛： 瀬戸内海環境保全知事・市長会議

後 援： 環境庁、兵庫県、（社）日本水環境学会、日本沿岸域学会、
（社）瀬戸内海環境保全協会、瀬戸内海研究会議、
財団法人ひょうご環境創造協会

コーディネーター及び講師：

熊本 信夫（北海学園大学長）

ウェイン・ベル（ワシントン大学環境科学センター所長）

デビッド・キャロル（環境政策・研究管理事務所長）

ジェーン・ニシダ（メリーランド州環境省長官）

Chesapeake 2000: A Watershed Partnership **チェサピーク2000：流域における協力体制**

「Chesapeake 2000」は、多くの管轄区を含むチェサピーク湾における共同プログラムによって書かれた湾協定（第3版）である。これまでの協定は、1983年と1987年（1992年に改訂）に署名されているが、今回の協定は、チェサピーク湾プログラムに携わるスタッフや関係者が科学者や地元政府、保護団体、市民の協力を得て作成したものである。これらの資料は、現在、インターネット上で、様々な関連情報とともに公開されている。

「Chesapeake 2000」は、先の協定やその方向性で概説されているチェサピーク湾プログラムの成果や責務に基づき、また、次世紀での回復努力に焦点を当てた長期的な責務として作成された。この新しい協定の主な目標は、チェサピーク湾とその支流における生物資源を存続させるに十分な水質の改善とその将来にわたっての維持にあるとしている。

「Chesapeake 2000」は、チェサピーク湾プログラムの歴史の中でも最も包括的で高い目標と見られている。いくつかの流域においては、水準を回復するには栄養塩の削減を現在の40%以上にすると必要があると見積もられている。さらに、初めて包括的なヘドロ削減レベルが設定されることとなった。

以下にこの協定で示されている回復のための責務を示す。

- (1) 2010年までにカキの数を10倍に増加させることを目標とする。
- (2) 十分な水質改善によって、チェサピーク湾及びその支流を米国環境保護庁の「危機に瀕した水域リスト」から2010年までに削除する。
- (3) 現行の税政策を再吟味し、健全な土地利用を奨励し、持続的な発展を阻害する要因を取り除くため、税によるインセンティブ方策を創設する。
- (4) 干潟回復と保護に関する新しい目標を設定する。
- (5) 船からの廃棄物に関する非投棄ゾーンを選定する
- (6) 工業遊休地の再開発に関する数値目標を設定する。(2010年までに1,050カ所)
- (7) 2010年までにふれあいの場所（Public Access Point）を30%拡大することを目標とする。
- (8) 藻場を114,000エーカーに増加させることを再び約束する。
- (9) 小川や河川の保護を推進する。

「流域における協力体制(A Watershed Partnership)」と呼ばれるこの協定は、チェサピーク湾の市民やコミュニティーに届くことにも重点をおいている。この協定によると、「この再締結において、全ての者、つまり個人、企業、コミュニティー、そして政府が、各々の努力によって、チェサピーク湾集水域の全市民に対して共有されたビジョンを委託するということに勝る偉大な目標はない。」と述べている。さらに、不斷の努力と教育は、64,000平方マイルの集水域の市民参加を得る重要なツールであると考えられるとも付け加えられている。

**瀬戸内海及び米国チェサピーク湾における
窒素、リンの発生負荷量推移の比較表**

（単位：トン／日）

		窒 素	リ ン	（参考）流域人口
瀬戸内海	1984年	682	49.1	約3,000万人
	1989年	700	44.1	
	1994年	737	42.6	
チェサピーク湾	1985年	372.92 (300百万ポンド/年)	27.97 (22.5百万ポンド/年)	約1,500万人
	1998年	323.21 (260百万ポンド/年)	19.89 (16百万ポンド/年)	
	2000年推定	298.34 (240百万ポンド/年)	19.27 (15.5百万ポンド/年)	

（当センター調）

プログラム

14:00～14:10 開会・あいさつ

14:10～14:45 基調講演

「チェサピーク2000の意義と課題」

Watershed matters:

an example of using coastal seas information to enrich science teaching]

ウェイン・ベル

Dr.Wayne H. Bell

ワシントン大学環境科学センター所長

Director,

Center for the Environment and Society, Washington College

14:45～15:00 休 憩

15:00～16:30 セミナー

司会（コメンテーター）

熊 本 信 夫

President Nobuo Kumamoto

北海学園大学長

Hokkaigakuen University

報 告 1

チェサピーク2000の目標に向けて

「The 2000 Chesapeake Bay Agreement」]

ジェーン・ニシダ

Dr.Jane T. Nishida

メリーランド州環境省長官

Secretary,

Maryland Department of Environment

報 告 2

チェサピーク2000の策定まで

「The 2000 Chesapeake Bay Agreement and Beyond:
Meeting National and International Restoration Challenges」]

デビッド・キャロル

Mr.David A.C. Carroll

環境政策・研究管理事務所長

Legislative Director

Office of Congressman Benjamin L. Cardin

パネルディスカッション・質疑応答

16:00 閉 会

プロフィール

基調講演者

ウェイン・ベル Wayne H. Bell, Ph.D.
国際エメックスセンター科学・政策委員基調講演者
Director, Center for the Environment and Society
Washington College



1976年ハーバード大学で博士号を取得後、主にメリーランド大学環境科学研究所副所長として1988年から2000年まで環境政策や資源管理、環境科学教育等の分野で活躍し、同分野における著書や委員の経験多数。この7月より、ワシントン大学環境科学センター所長に就任し、一層のエメックス活動の推進に積極的に取り組んでいる。

コメンテーター

熊本 信夫 Nobuo Kumamoto
国際エメックスセンター科学・政策委員
President, Hokkaigakuen University



[学 歴] 1964年3月 北海道大学大学院法学研究科公法専攻修士
課程修了

1973年6月 法学博士（北海道大学）

1974年6月 カリフォルニア大学ロー・スクール大学院修士課程修(LL.M)

[職 歴] 1968年6月 ミシガン大学ロー・スクール・フルブライト研究員

1974年4月 北海学園大学法学部教授

1981年10月 ヘブライ大学客員教授

1982年3月 チューレーン大学客員教授

1983年10月 国連アジア・太平洋経済社会委員会法律顧問

1984年2月 ジョージア大学客員教授

1988年1月 カリフォルニア大学客員教授

1990年4月 北海学園大学法学部長・大学院法学研究科長

1994年12月 チュラロンコン大学客員教授

1996年11月 北海学園大学学長

[主な受賞] 1993年11月 褒章受賞

[著 者] 「アメリカにおける政教分離の原則」、「行政手続きの課題」

「ENVIRONMENTAL LAW AND POLICY IN THE PACIFIC BASIN AREA」

講 師

デビッド・キャロル David A.C. Carroll
国際エメックスセンター科学・政策委員
Legislative Director
Office of Congressman Benjamin L. Cardin



93年に米国ボルチモアで開催したエメックス93時のメリーランド州環境省長官で、卓越した指導によりエメックス93を成功に導いた。その後、99年のトルコ・アンタルヤにおけるエメックス会議でも基調講演をするなど、エメックス活動の推進に積極的に取り組んでいる。現在、米国下院議員の政策スタッフとして活躍中である。

講 師

ジェーン・ニシダ Jane T. Nishida
国際エメックスセンター科学・政策委員
Secretary, Maryland Department of Environment



現在、米国メリーランド州環境省長官として活躍されているニシダ氏は、祖父母が東京都出身の日系三世である。ニシダ氏は、チェサピーク湾財団在職当時、メリーランド州議会の数々のチェサピーク湾の環境保護に関する法律立案に貢献したことから、パリス・N・グレデニング氏がメリーランド州知事に就任した際、環境省長官に抜擢され現在に至っている。

セミナー風景





チェサピーク 2000 の意義と課題

\Watershed matters : an example of using coastal seas information
to enrich science teaching]

ウェイン・ベル Wayne H. Bell, Ph.D.

ワシントン大学環境科学センター所長

Director, Center for the Environment and Society
Washington College

In English, the word "matters" has several meanings. I emphasize two of those meanings here:

First: "matters" means "information" or "subjects of concern. "

Second: "matters means "to be of importance," or, "makes a difference. "

In explaining matters about the Chesapeake Bay watershed, I will show you why this watershed is important to the Bay as an ecological system.

As we explore "watershed matters" together, I invite you to take the perspective of a teacher who wishes to use this information to teach about the environment. <Fig. 1-2>

The Chesapeake Education Initiative was originally signed as Directive 98-01 under the Chesapeake Bay Program. The concept behind

this Directive has been incorporated into Chesapeake 2000. The intent is to go beyond teaching young people about the environment.

That is certainly important. But the expanded goal is to use information about the environment in the teaching of science, mathematics, history, social studies, and other subjects. Educators have evidence that the use of the environment as a context for learning can actually increase student interest in a subject and improve student performance in school. <Fig.3>

This satellite image taken by the Sea-viewing Wide Field-of-view Sensor (Sea WiFS) shows the principal coastal seas on the East Coast of the United States. From North to South they are: Delaware Bay, Chesapeake Bay, Albemarle Sound, and Pamlico Sound. The locator map shows the location and extent of the Chesapeake

本日の私のプレゼンテーションのタイトルは、「ウォータージェット・マターズ Watershed Matters」です。これは、沿岸海域情報現場の科学教育に使う、どう生かすかということでもあります。英語でこの「マターズ (Matters)」という言葉には幾つもの意味がありますが、2つをここでは強調したいと思います。1つは、名詞として、「情報」とか、「関心の対象」というふうに辞書に定義されております。もう一つは、動詞として、「大切なこととか、違いをもたらす、変える」という意味であります。

「ウォータージェット・マターズ」を話では、集水域がなぜ大切なのかということを強調したいと思います。

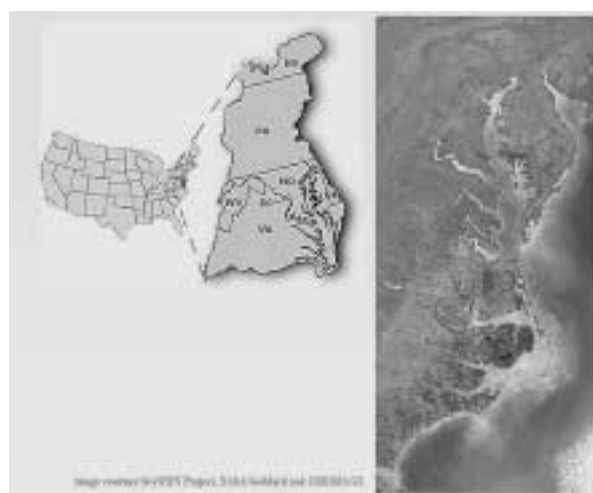
私が「ウォータージェット・マターズ」の話を続けていく間は、皆さんを自分が先生になったと思っていただきたいと思います。そして、環境の情報をどう現場に生かしていくかということを一緒に考えていただきたいと思います。(図1-2)

「チェサピーク・エデュケーション・イニシアチブ」という名の教育構想は、もとのチェサピーク湾プログラムのCD9810の一部として署名されました。この概念が「チェサピーク2000」に組み込まれたわけであり。この構想の目的は、若い人々に環境の大切を教えるだけではなくて、いろいろな学校の教科、科学の学習、数学、歴史、社会科に生かすということでもあります。もちろん環境の大切さを若い人に教えることは大事でありますけれども、科学の理科や、数学や歴史、社会科にも生かせるということがもっと大事になっております。教育の現場にいる人は、環境が最もいい、非常にいい教材になるということを、もうはっきりと経験として理解しています。(図3)

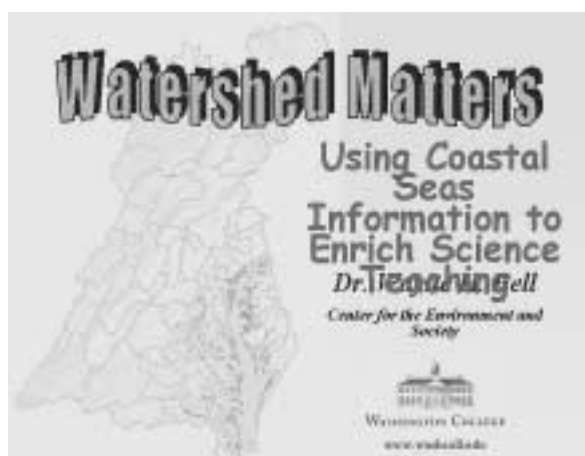
図4は、Sea WiFSという、海を眺望できるワイド・フィールドセンサーで撮った衛星写真で北米東海岸を示しております。北から南にデラウェア湾、チェサピーク湾、アラベラル河口、それからパム



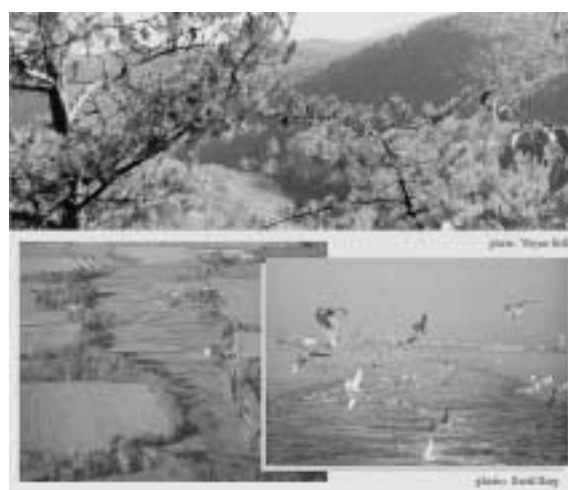
☒ 1



☒ 4



☒ 2



☒ 5



☒ 3



☒ 6

Bay watershed itself. It includes land in 6 states plus all of the District of Columbia (Washington, DC). It reaches from the Baseball Hall of Fame in New York State to the largest naval base in the world at Norfolk, Virginia. The total area of the Chesapeake Bay watershed is 64,000 square miles, or approximately 190,000 square km. <Fig.4>

Such a large watershed includes a very diverse landscape. It reaches from forested uplands to rich agricultural lowlands and wetlands that border the Chesapeake tidewater. It also includes several major cities, notably Baltimore (shown here from outside its fine harbor) and Washington, DC. In addition to the United States Capitol, the state capitols of Maryland, Virginia, and Pennsylvania are located on the watershed. It is home to more than 16 million people. By

broad category, land use on the Chesapeake Bay watershed can be classified as follows: forest 62%, agriculture 27%, urban 11% <Fig.5>

The Chesapeake Bay is famous for its living resources. Our "beautiful swimmer," the blue crab, remains the Bay's most economically important commercial harvest. Oyster populations have been decimated by two diseases and over-fishing. But their past importance to the region lives on in a struggling industry and legacy of a few beautiful sailing vessels, the Chesapeake Bay skipjacks, that remind us of better times when oysters help create an unique regional culture. <Fig.6>

The harvest of the bounty of fish is coming under increasingly strict and sophisticated management. Restoration of the striped bass is one of the true success stories on informed natural

リコ河口です。また、この写真では、6つの州とワシントンDCを含んでおりますし、さらに、ニューヨークにあります野球の殿堂や、バージニア州のノルフォークにあります世界最大の海軍基地も写っています。集水域の全面積は6万4,000平方マイル、メートル法で19万平方キロメートルであります。(図4)

このような大きな集水域には多様な景観が集まっております。そして、高いところに森があり、低いところには農業が盛んで湿地も含んでおりますし、干潮水域も含んでおります。代表的な大都市ボルチモアやワシントンDCが含まれております。アメリカ合衆国の首都であるワシントンDC以外にも、メリーランド、バージニア、ペンシルバニアの州とも含んでおりますし、人口は1,600万人の人が住んでおります。大まかな分析で州域の土地利用を区別いたしますと、62%が森林、27%が農業地、11%が都市域であります。この都市部が森林や農

業地を犠牲にして拡大を続けております。(図5)

チェサピーク湾は、生物資源が豊かなことで有名です。「ブルークラブ」という名のワタリガニは、経済的に大切な商業産物です。また、カキは、今は随分数が少なくなっております。その原因は、2つの病気と乱獲であります。カニが大切だった時代の遺産がまだ残っておりまして、幾つかの美しいチェサピーク湾スキップジャックス(The Chesapeake Bay Skipjacks)と呼ばれる漁船とかが、古きよき時代を思い起こさせております。(図6)

魚の恵みが豊かであるということもありますが、厳しい管理下に置かれております。昔は非常に商業的に漁獲がされたシマスズキは、図7に示すように回復し、今ではスポーツフィッシングとしても重要になりまして、毎年トロフィーの大きさもあるような魚が釣り上げられています。(図7)

このウォーターシェッド・マターズが集水域の事

resource management. Once a major commercial enterprise, the striped bass fishery has become equally important as a sport fishery with an increasing number of trophy-size fish taken each year. <Fig.7>

If "watershed matters" are to be taught in our schools, it is important to help teachers gain an appreciation of how the watershed can affect the Chesapeake Bay. We begin with a table such as this in which several familiar coastal seas are listed according to size, volume, and watershed area. Note how shallow the Chesapeake Bay actually is. Although there are places where it is as deep as 30 m, on the average it is a very shallow body of water. Other than depth, it is difficult to appreciate these statistics fully. But a very meaningful measure can be derived by dividing the volume into the watershed area for

each coastal sea listed. The next slide shows a plot of the results of this exercise. <Fig.8>

I have left the ratio for Chesapeake Bay off of the resulting plot for a moment to show you how the other coastal seas relate to one another. On the scale I have selected, some of the watershed/ volume ratios are almost negligible. When I add the ratio for Chesapeake Bay, one immediately gains an appreciation for the size of its watershed relative to the Bay itself. The ratio is more than 5 times greater than for the other coastal seas, even though most of them are much larger. <Fig.9>

Here is another way to gain some insight into the potential importance of the watershed to Chesapeake Bay. The first map, downloaded from the Internet, shows the 195 state counties that the watershed covers. Now I superimpose

柄を学校で教えるようになるには、先生に集水域がチェサピーク湾に与えている影響の大きさについて教える必要があります。

その一つのいい方法は、よく知っているなじみのある世界の海域が水深・水域面積の一覧表を見せることだと思います。チェサピーク湾が非常に水深が浅いということを気がつかれると思います。そして、水深以外には、こういった統計を読みにくいのですが、もっと意味ある方法は、それぞれの沿岸域の面積をそれぞれの海域面積でわり算して、集水域と水域の比率を求める方法があります。(図8)

チェサピーク湾の率はわざと除いてあります。といいますのは、私の選んだそのスケールを使いますと、幾つかの集水域対水域率は、全く無視できるレベルに近い値です。そして、チェサピーク湾の例を見ますと、チェサピーク湾の集水域がいかに大きな広大であるかということがおわかりいただけたと思います。ほかの沿岸海域に比べて5倍以上であります。

(図9)

図10には、チェサピーク湾にとって集水域の重要性の知見を得る別の方法を示しています。インターネットからダウンロードされた地図には、集水域をカバーする195の州郡が示されています。そして同じスケールに調整した別の地図も示します。これが主な支流のマップを示しております。これによりまして集水域が巨大な盆地のような作用で、溪間、陸地から、大気から物質を取り込んで湾に流し込んでいることがわかると思います。この集水域では、4つの河川が流れ込んでおり、この川の水が湾の淡水の90%を占めております。人によっては、集水域に降った一滴の雨でもチェサピーク湾に達する可能性を持っているという人もいますけれども、それは、この集水域の持つ重要性を正しくつかんでいないということが、次で、私の説明を聞いていただければわかると思います。(図10)

another map adjusted to the same scale. This is a map of the principal tributaries. The overlay shows that the watershed behaves as a vast basin, capturing material from the landscape as well as from the atmosphere and directing it toward the Bay proper. The four rivers identified contribute approximately 90% of the total freshwater flow into the Chesapeake Bay. Some people say that any drop of water that falls on the watershed has the potential of reaching Chesapeake Bay. This fails to represent the real significance of the apologize in advance that many of the Internet resources I will be showing you have elected to present their information using English rather than metric units of measure. Unfortunately, this does not encourage use of their data by the international community. The U.S. Geological Survey maintains many very useful Internet pages on Chesapeake Bay. This particular

page is a good resource for educators who are teaching fundamental graphing skills to their students. These data show the average freshwater flow integrated for all tributary streams above the various indicated lines. I have selected line E. This gives an estimate of the total freshwater flow into the Chesapeake Bay system. On the Internet page, the data are presented monthly with an annual total. I have selected the latter for data going back to 1951. <Fig. 11>

Here I have graphed the data. Teachers are interested to know that the annual streamflow into Chesapeake Bay is highly variable. Some of the extremes are highlighted. 1972 was the year of the great flood from Tropical Storm Agnes. This was due to runoff from two major snow storms on the watershed and heavy spring rains. 1999 saw a major drought in the U.S.

さて、ここでちょっと一つ断らなければいけませんのは、私が示しているインターネット情報の単位というのが、メートル法ではなくて、英米のマイルなどを使った単位になっていることであります、これは、お断りしなければなりません。国際性がないと言わなければならないわけでありまして、アメリカ地理調査は、湾に関するインターネットページをたくさん流しております。このページは先生がグラフィックの技術を教えるときに重要な教材になり得ます。こういったデータが示しているのは、平均流量で、このEの地点での年間の流量、つまりチェサピーク湾システムに流れ込む淡水の量を推定した数を示しております。(図11)

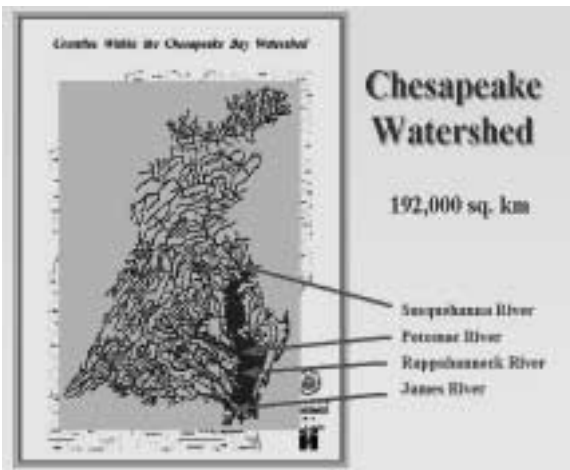
図12では、年間流量データをグラフにプロットいたしましたけれども、先生は、この年間の流量はアップダウンする、変化しているということを知ることができるといいます。特に外れているポイントをマークいたしましたけれども、72年というのは、ハリ

ケーンのアグネスの影響で洪水があった年でありました。これはチェサピーク湾の状態に、科学者も国民も最も注目した一大事件でありましたけれども、この洪水の遺産はいまだに堆積物の大きな負荷となっておりまして。96年は、72年よりも高くなっておりますけれどもこれは歴史に残る雨の多い年として72年を上回っているわけでありまして。96年には2回の大雪、吹雪と春の豪雨がありました。そして、99年、昨年には日照りによって、大西洋側の中部の州を被害をうけました。従って、歴史的な、最も乾燥のした年になるはずだったんですけども、ハリケーンのプロイダが9月に来たために多少雨はふえております。(図12)

ことしの7月には、先生のグループに、メリーランド大学・環境科学センターの研究用の船舶実験船の「アクエリアス」に乗ってもらい水質サンプリングを行うというメリーランド大学の主催するクルーズに招待しました。州の機関が協力して、水質測定結



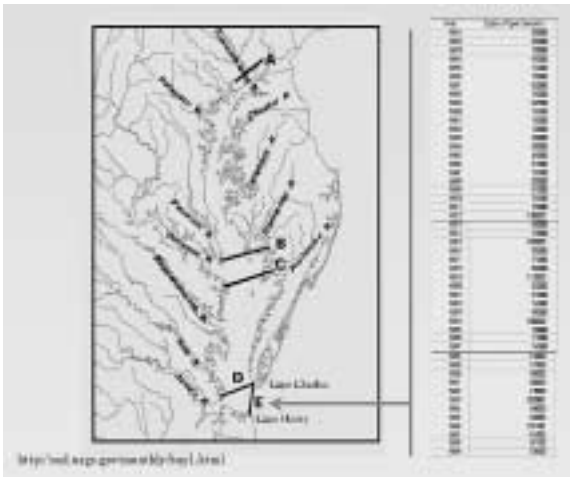
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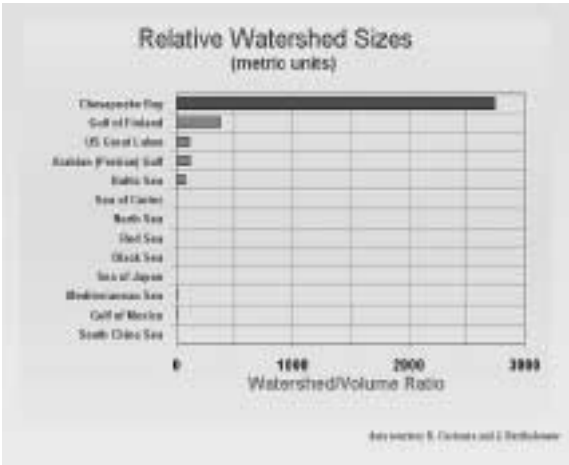
10

Coastal Sea	Mean Depth m	Volume cu. km	Watershed Area sq. km
South China Sea	1,080	2,507,476	9,232,777
Gulf of Mexico	1,512	2,125,470	9,235,494
Mediterranean Sea	1,580	1,347,476	4,152,767
Sea of Japan	1,752	713,476	3,919,779
Black Sea	1,150	869,476	3,926,764
Red Sea	559	301,476	1,677,774
North Sea	41	925,476	1,654,774
Sea of Cortez	819	105,476	1,219,774
Baltic Sea	88	27,771	1,221,767
Arabian Persian Gulf	40	1,640	1,249,768
US Great Lakes	35	1,335	1,249,768
Gulf of Finland	37	1,476	1,177,774
Chesapeake Bay	6	70	1,622,774

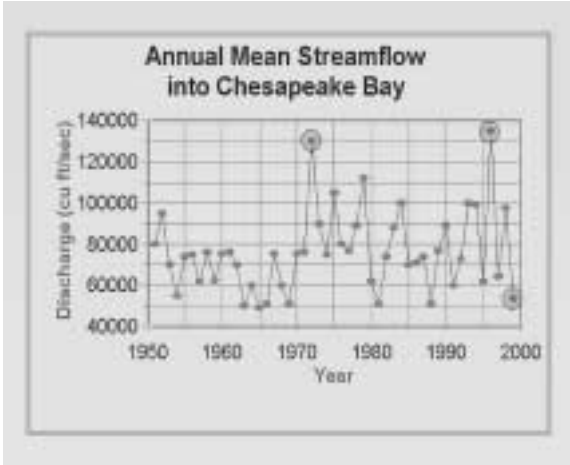
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11



9



12

mid-Atlantic states. It would easily have been the driest year on record except for heavy rainfall from Hurricane Floyd in September of that year. <Fig.12>

In July 2000 a group of teachers and I went on a water sampling cruise aboard the Research Vessel Aquarius, one of the ships used for Chesapeake Bay research by the University of Maryland Center for Environmental Science. The teachers were enrolled in a course offered by the Chesapeake Bay Program. State and federal the Maryland Space Grant Consortium. The points on the map show the locations of the more agencies cooperate under this program to analyze water chemistry every two weeks over most of the year. The Space Grant teachers took their measurements in the vicinity of Station

Number CB4.2C. The station is located near the main channel ("main stem") in the Maryland portion of the Chesapeake Bay. <Fig.13>

Depth (m) Temp (deg.C) Salinity (0/00) Oxygen (mg/L)

0	25.7	8.7	8.24
-3	25.8	8.1	8.20
-6	25.2	9.8	4.25
-9	23.4	13.0	0.25
-12	22.5	15.0	0.20
-15	22.4	14.9	0.20
-18	22.4	14.9	0.19
-21	22.0	16.0	0.19
-24	21.9	16.4	0.17

Here are their data. Temperature shows a decrease of about 4 deg C from surface to bottom, with much of the drop occurring at 5-10 m in depth. Salinity does the opposite, increasing from 8 to 16 parts per thousand. Again, most of the change occurs at a depth of 5-10 m.

果を2週間ごとにとってくれておりますけれども、湾の中間部、CB4.2Cのステーション近くで測定を行いました。(図13)

ここに、そのときのデータが示されております。温度をみますと、表面から海底に向かって4度下がっていて、表面から5メートル、10メートルの深さで、この温度が落ちているのがわかります。塩分に関しては、これは反対で、下へ行くほど上がっており、8 PPTから16 PPTまで上がっております。そして、溶在酸素は絶壁のように落ち込む地点があります。つまり水深10メートル以下のところでは、酸素が非常に少ないという状態になっております。こういった3つのパラメーターを調べたわけであります。(図14)

これは、先生方に対して、例えばチェサピーク湾管理とか、その他の研究から得られるような、いろいろなデータというものをいかに解釈するかと

いうことを理解していただくための実際に練習するプログラムでありました。まず、シーボス(CBOS)と呼んでおります直下の水の様子、いろいろ測量して、ホーン・ポイント研究所の中央データ処理の施設に送るわけであります。このデータは、15分ごとに更新されています。言いかえますと、このシステムは、いわゆるチェサピーク湾に関しまして、リアルタイムで皆さんに情報を提供しているということになります。それから、湾の中ほどのシーボスVは、先生方と私が行きましたCB4.2Cのモニタリングステーションの非常に近いところであります。(図15)

残念ながら、シーボスのデータ・トランスミッターは、私と先生方がデータをとった2000年の7月11日には動いていませんでした。図16にシーボスのホームページがございしますが、これはインターネットに1カ月後、トランスミッターがもう一回ラインに戻りましたときに、現在の状況がこの

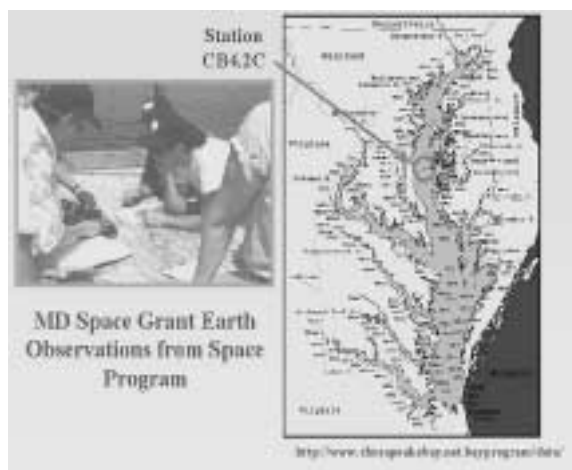


图 13

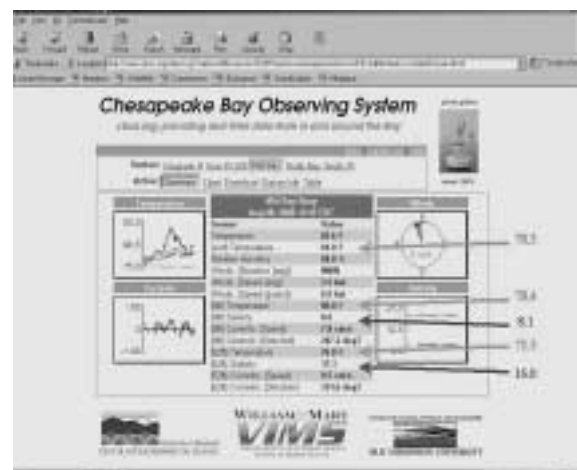


图 16

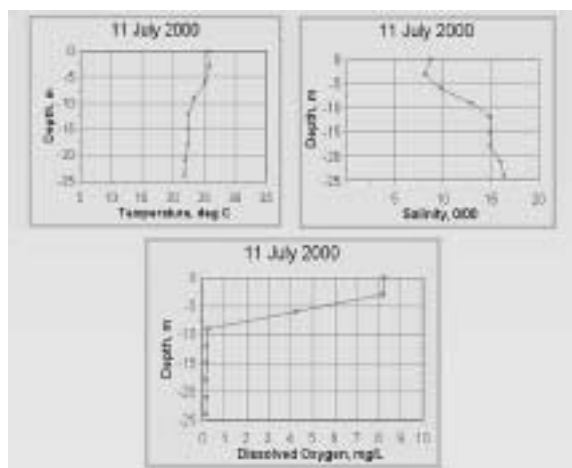


图 14



图 17

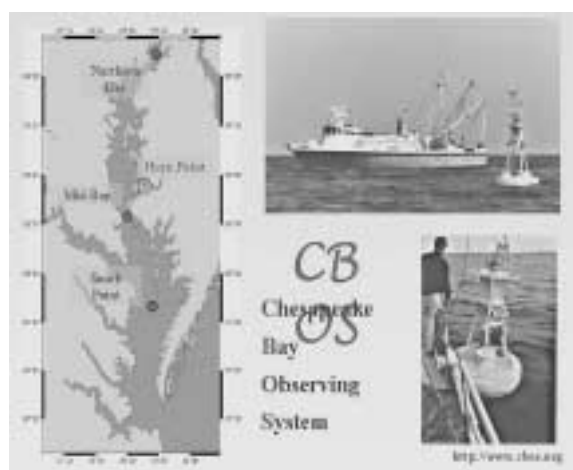


图 15

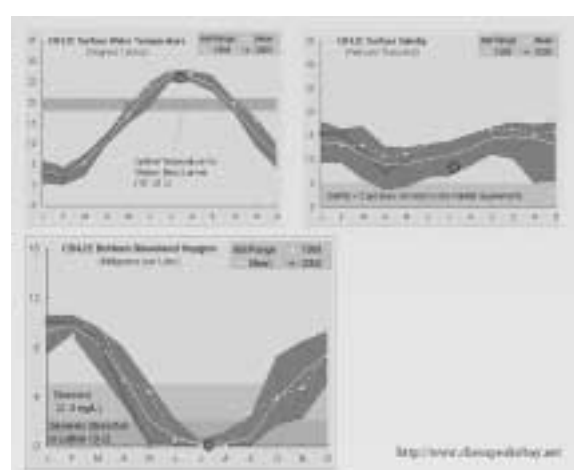


图 18

Dissolved oxygen drops precipitously across this same depth range. Below 10 m, the data indicate there is almost no oxygen in the water. <Fig. 14>

The purpose of the exercise is the help teachers interpret data such as these by using other information available from the Chesapeake Bay management and research communities. The information I show them appears on Internet pages and are readily available to everyone.

We begin with CBOS ("see-boss"), the Chesapeake Bay Observing System. CBOS is a series of remote sensing buoys that are permanently moored at locations near the main channel. They take surface weather and subsurface water measurements and radio the data to a central collecting and processing computer at the Horn Point Laboratory. After automatic calculation

and conversion, the data are posted to the CBOS Internet site. The information at the site is updated every 15 min. In short, CBOS provides information certain locations in Chesapeake Bay in real time. The mid-Bay not CBOS buoy is close to water quality monitoring station CB4. 2C. <Fig.15>

Unfortunately, the CBOS data transmitter was not working on 11 July 2000 when the Space Grant teachers were taking their water quality measurements near the mid-Bay buoy. Here is the CBOS home page approximately 1 month later, when the system was back on line. Visitors to this Internet site view a table that gives an immediate summary of the current conditions. By clicking on the miniature graphs, one can also get a larger graphics summary of conditions for selected parameters over the past day, two days,

ように表示されたわけでありませう。これは我々は本当に船に乗ったり、あるいはまた、現在の状況というのは、なかなかこういうのは見ることはできませんけども、航行、船にかかわる人たちは理解できると思います。このグラフをクリックしていただきますと、いろいろグラフィカルな、あるいはもっと大きないろんな状況を見ていることができます。例えば2日前のものでありますとか、1週間前でありませうとか、1年、1カ月とか、1年前のデータがござらんいただけます。温度は、華氏に変換した数字で7月11日の分ですが、先生方のデータがちょっと低いぐらいですけれども、ほとんど同じぐらいの温度になっております。シーボスのデータよりもちょっと低い数字が出ていますが、先生方が取得したこの情報をすぐに実際の状況と比べながら、そして生徒さんたちに、こういう数字なんだよということを教えてさしあげることが可能であるということです。塩分濃度についても非常に近い数字が出ておりました。(図16)

今度は、チェサピーク湾のプログラムホームページです。このインターネットアドレスは、<http://www.chesapeakebay.net>です。これは米国環境庁の持っておりますチェサピーク湾プログラムに関する、もちろんチェサピーク2000年協定に関するウェブハブになっておりまして、例えばさまざまな州とか関連の連邦当局、その他の州、地域、それから米国沿岸海域プログラムなどとリンクしています。例えば、モニタリングデータが1985年から始められましたが、このホームページから、その年から全部のサマリーをござらんいただくことができます。凡そ2、3カ月ごとの、大体その数値が測定されましたときに、インターネットが更新されます。従って、リアルタイムではありませんが、ほとんど現在の状況というのがわかりいただけるものです。(図17)

図18は、CB4、ポイント2Cのところの非常に代表的な水面温度で、このホームページにアクセスするとこの図が出てきます。これは、1年間の変化で1月から12月までの変化を見ることができ、

week, month, or year. I have added the values obtained by the teachers (converted to deg. F) on 11 July for comparison. Although water conditions one month later into the summer have changed slightly, their results are comparable.

Imagine if a teacher were able to compare data with CBOX measurements taken on the same day at the same time! <Fig.16>

We move now to the Chesapeake Bay Program home page. This is the Internet site maintained by the U.S. Environmental Protection Agency for the Chesapeake Bay Program under the Chesapeake 2000 and previous agreements. Actually, it is a "web hub" that can connect a visitor to many Chesapeake Bay Program activities as well as to those in the collaborating state and federal agencies. It can also connect a user to other regional and national coastal seas programs.

Through this home page a visitor can access summary data for the Chesapeake Bay water quality monitoring program going back to its first year under the first Agreement, 1985. The time between data updates varies depending on the source. For summary water quality monitoring data, the lag time is approximately 2-3 months. <Fig.17>

Here is a representative graph for surface water temperature at Station CB4.2C. The graph shows the cycle over the course of a year, beginning with January on the left and ending with December on the right. The dark shading shows the range for all measurements for this specific location dating back to 1985. The solid blue line is the average over that time period. Data for the previous year (1999) are shown by the yellow dash line. Data for the current year (2000) to

シェードがついているところは、1985年まで測定された数字が全部この中に入っております。それぞれの水面温度は、そのステーションで測定された温度です。1999年のデータでは黄色の三角のついた矢印の線が出ております。また、2000年のデータは5月までです。温度差については、年じゅう非常にその差が狭いということです。少しはあったかきときもあったでしょうし、あるいはまた寒いときもあったかもしれませんけれども、大体、夏の統計を見てみますと、ほとんど1年前と比べまして差がない。非常に狭い範囲だということです。先生方がとらえた数字と大体同じ数字が出ておりますから、みなさんもなかなか米国の環境庁もいい仕事をしているんじゃないかと、これでごらんいただけるんじゃないでしょうか。それから、塩分については、少し違っており年度ごと見ても少し差があります。先生方も、やはりその水面の塩分を見ておられましたけれども、大体平均以上です。2000年というのは、私が申しあげました非常に雨の多い年で、特

にワシントンDCを含めた集水域で非常に雨が多かったということ、そして気温も低かったということがありました。しかし、米国の気象統計のデータを見てみますと、年々の数字というものが結構差があるということです。むしろ先生方は、淡水、CD2、ポイント4でとらえたときには淡水の方が多かったということでありましょうか。本当に淡水がたくさん集水域から集められて、そしてこの湾全体のシステムに影響を与えた初めての年ではなかったかと思います。それから、底の水の溶存酸素については、ほとんど酸素がゼロだという状況です。大体5月から9月の間には、ほとんど酸素がなく、秋からだんだんと酸素がためられていきます。そして春にはまた下がってくるという状況になっています。先生方も実際に、実験なさって、そしてそのデータをとらえたときに、ほとんど酸素がなかったということがわかったと思います。(図18)

それでは、一番先進的なリサーチプロジェクトのお話をしましょう。そのチェサピーク湾というもの

the last update are in red. I have added a red dot to show the value obtained by the Space Grant teachers. Note the narrow range of temperatures that are experienced year after year. Surface salinity is represented in the same manner. But note the wider range of data for any given time. Note also that the teachers obtained a salinity value well below the data average. The year 2000 was a very wet one for the Chesapeake Bay watershed. This is the first clear suggestion of the influence that freshwater input from the watershed has on the structure of the water column. The dissolved oxygen data are for bottom water. Here is clear that the development of zero oxygen conditions is an annual feature from May to September. <Fig.18>

We move now to a cutting-edge research project that has been developed to examine the

very structure of the Chesapeake Bay : "Trophic Interactions in Estuarine Systems" (TIES). At the heart of this project is an instrument scientists call "ScanFish." It is a remote sensor that is towed behind a research vessel at 4 knots.

ScanFish is programmed to go up and down in the water column, taking measurements every few seconds as it goes and relaying the data to the mother ship. Sophisticated electronics and computer programming enable researchers to control how ScanFish swims, process its data, and determine the precise location of each data point. A typical ScanFish cruise takes approximately 1 week. It consists of a longitudinal (North to South) run followed by a series of 36 transects across the Bay. Data resolution is approximately 4-10 m. In just one cruise scientists obtain much more data than ever taken by all Chesapeake Bay researchers combined. <Fig.19>

は、どういうものかということですが、これは河口域での栄養に関する総合作用、タイズ(TIES)と呼んでおります。この中で一番有名なものがスキャンフィッシュという機器で、研究船に引っ張られるような形で、例えば4ノットぐらいのスピードで引っ張られるセンサーです。このセンサーを水の柱(ウォーターコラム)の中を上へ上がったり、下へ下がったりするというふうにプログラムして、そこで得られたデータを母船に送るわけです。例えば、非常に先進的なエレクトロニクスでのデータ処理によって、データ取得位置が非常に正確に決定されるというような機能を持っています。典型的なスキャンフィッシュの使用期間はクルーズで大体この横軸は、ボルチモアの南からメリーランド、それからノーフォーク、バージニアまで行くわけでありまして。図中のブルーのところ1週間です。そして上から下、それから36カ所でデータを取得します。データ解像度は4ないし10メートルです。たった一回のクルーズで、今の科学者は、今まで全部合わせよりも大量な

チェサピーク湾に関するデータというものが得られるわけでありまして。(図19)

このスキャンフィッシュから出た塩分のプロフィールデータの概略は、オールドドミニオン大学の先生方が、このインターネットで公開しているものです。これは97年7月の2日間で取得した南から北へのこれは特徴であります。これはいわば、科学者が今まで見たことのないような、瞬時のチェサピーク湾のポートレートで、2日間でこんなに素晴らしい皆さんの水質というものが、今まで得られたことはなかったというものでありました。が、ほとんど淡水に近いところです。それから、赤いところが海の水ということです。この矢印で示す16PPTのところは、先生方が海底の水でCD4ポイント2Cのステーションで取得したところです。もしみなさんが先生方でありましたら、このデータをどんなふうにご理解いただけますか？この塩分の特徴といいますのは、いわば、この淡水から塩分の高い水へと、層

Summary graphics from the ScanFish cruises have been posted to the Internet by scientists at Old Dominion University, Virginia. Here is the Chesapeake Bay salinity profile along the longitudinal transect taken over just 2 days in July 1997. This is nearly an "instant" portrait of the Chesapeake that no scientists had ever seen before. The transect covers the distance from South of Baltimore, Maryland, to the mouth of the Bay near Norfolk, Virginia. "Pressure" is roughly equivalent to depth in meters. The salinities are color-coded in parts per thousand. Higher salinity (seawater) is increasingly red; lower salinity (fresh water) is increasingly blue. The arrow shows approximately 16 parts per thousand, the value found by the teachers near the bottom at Station CB4.2C. I have added a vertical line to show the location of their station relative to the ScanFish transect. Now the teachers can

see that the salinity profile they measured reflects a of fresher water at the surface over saltier water at depth. The major transition between these layers is just above 10 m. <Fig.20>

Here are two more examples of Chesapeake Bay salinity distributions taken on different ScanFish longitudinal transects. The upper portrait was taken after the "wettest spring ever" on the watershed in April 1998. The lower one is the closest TIKES came to sampling during the drought year of 1999. Even at this time relatively early in the season, the difference in fresh and salt water distribution under these two extreme conditions is spectacular. <Fig.21>

What the teachers have learned is consistent with the model of Chesapeake Bay as a was developed and laboriously confirmed by the late D.W. Pritchard of The Johns Hopkins Universi-

をなしているというふうにおわかりいただけると思います。高い塩度の水がもちろん海から来て、そして淡水というのが集水域から流れてくるということです。ここらあたりが、ちょうど水と淡水と塩水が混ざっているところだということです、大体10メートルぐらいのところということです。(図20)

さて、ここにもう二つの湾の塩分の分布をお示します。1つ目は、1998年の史上最多の雨があった春のデータです。もう一つは、1999年の干ばつの年です。この7月は、淡水が非常に少ないものとなっており、塩分の高い水が、このようにたくさん入ってきていることがこの赤い部分で示されています。こんなにすばらしく豊富な資料というものを今まで得られたことがあったでしょうか？(図21)

全部のデータを一緒にしてみますと、得られたデータからチェサピーク湾は、いわゆる汽水域ということがはっきりわかります。ジョンホプキンス大学のD.W.ピチャード先生がかつて作成したモデルで、

まず集水域から流れてきた水が海から流れてきた海水とここで混ざるというモデルです。そして最初、もちろん混ざっているということですから、塩分の濃い海の分をしばらく取り除くんですけれども、それを取り除くことによって、もっと海水が入ってくるということです。ですから、流れが2つあるということです。淡水が集水域から外へ出ていく、そして海水は海から入ってくるということです。夏の間ですけれども、水中のプロフィールは、このような形になっています。例えば、温度でありますとか、塩分に関しても、非常に大きく変化いたします。4から8メートルぐらい、あるいは10メートル以下ぐらいです。それからこの汽水の密度は、ピックのクラインというふうに研究者は呼んでおりますけれども、このように濃度は変わってきております。また、ここで淡水と海水が出会いますが、この交換といいましょうか、これがよく混ざるといことなんですから、この交換によりまして、濃度が上がるといことでありまして、この中で一番たくさんいろ

ty. In this model, fresh water entering from the tributaries meets salt water from the ocean and partially mixes with it. The mixing essentially removes some of the denser ocean water from the bottom which then has to be replaced by more water coming in from the sea. During the summer, a profile of the water column will show rapid changes in temperature and salinity at 5-10 meters (the pycnocline). According to his model, fresh and saltwater meet somewhere in the Bay. At this convergence, mixing processes cause an increase in the concentration of particles in the water column. Scientists call this the "zone of maximum turbidity." Pritchard's model describes the fundamental way estuaries are structured. But the driving force that establishes this structure is fresh water from the watershed. This is really a good example of

why "watershed matters." <Fig.22>

Is this just an interesting observation, or does this structure influence the distribution of life in Chesapeake Bay? On many ScanFish cruises, the longitudinal run re-run while the research vessel tows a midwater trawl to capture small fish that are important in the Chesapeake Bay food chain. This chart summarizes the aggregated results of these trawls from 1995 to 1998. The data show the largest concentration of fish biomass in the upper Chesapeake Bay. It turns out that this is the region where fresh and salt water normally first meet, the "zone of maximum turbidity."

Here, small plankton - eating fish exploit the increased abundance of particles as food. Once again, this system would not exist if it were

んなものが入ってきた ゾーンだというふうに言っております。プリチア先生のこのモデルは、いわゆるチェサピーク湾だけではなくて、よく似た汽水域の基本的なモデルだということです。すなわち、淡水は集水域から、非常にこのシステムそのものは、非常にユニークなものでありますけれども、やはり集水域そのものがものを言うという地域であります。(図22)

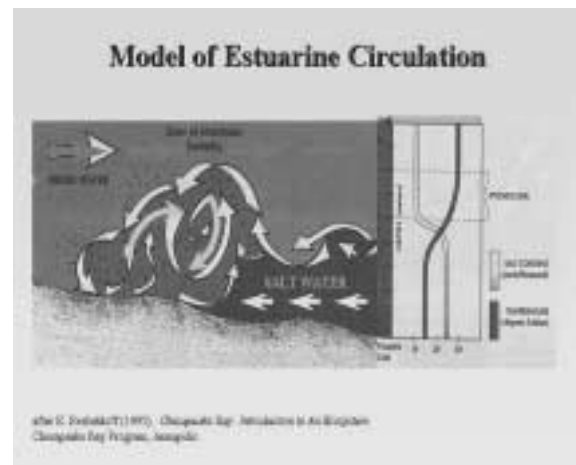
では、本当にこのチェサピーク湾に住んでいる生物に対して、本当に集水域というのは影響を与えているのでしょうか？例えば、いろいろクルーズでトロールを行うことで、湾の魚を調査研究をしました。これはスキャンフィッシュのクルーズ、これは95年から98年の分で全部、重量です。この図は、漁獲量の積算したものでカラーコードにしたものであります。このデータから、バイオマスというのは、淡水と海水が初めて出会うというところで最大となっていることがわかります。そしてこの最大の攪拌が

行われているところで、多くの生物がいるということです。例えばいろんな分子、粒子とかと、いろんな小さなプランクトン、また、それを魚が食べるということです。実際に、この食物連鎖というものの重要な点が、ここにあり、集水域のごく終わりごろから始まるということです。従って、もし、この中に、集水域からの淡水がなければ、このようなすばらしい食物連鎖が起こるということもないわけです。(図23)

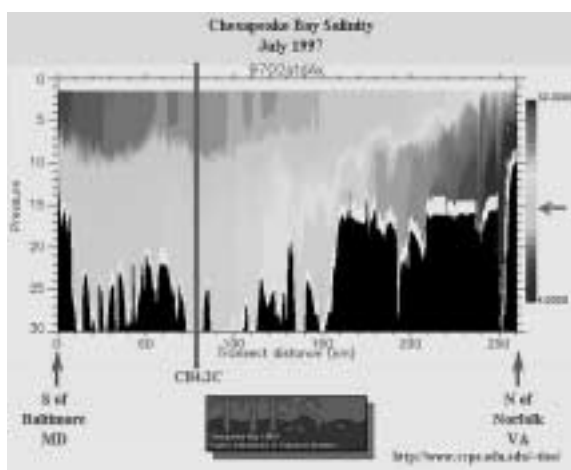
また、この集水域の働きというものの、あるいは役割というものは、例えば全世界的にもきな働きがあるわけです。例えば、1999年はチェサピーク湾にとりましても、非常に干ばつの年でありました。これはラ・ニーニャ現象の結果だということであり、これは太平洋の中央で起こる現象であります。これはラ・ニーニャの3つの画像をごらんいただきます。これは衛星から見た画像で、この紫色の濃いところは海面高が15ないし20センチ低



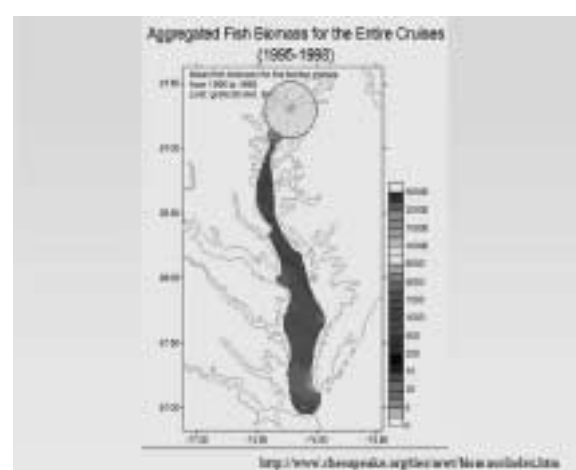
19



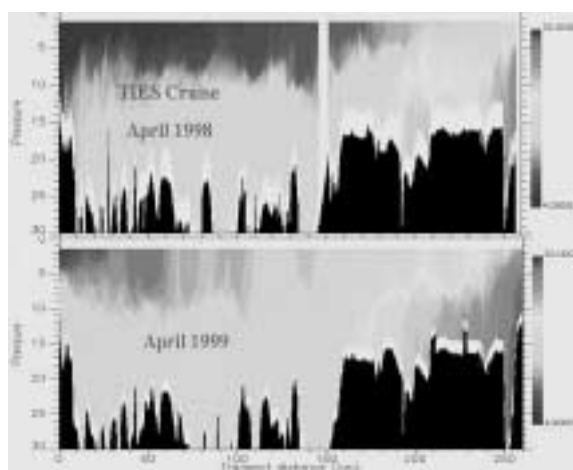
22



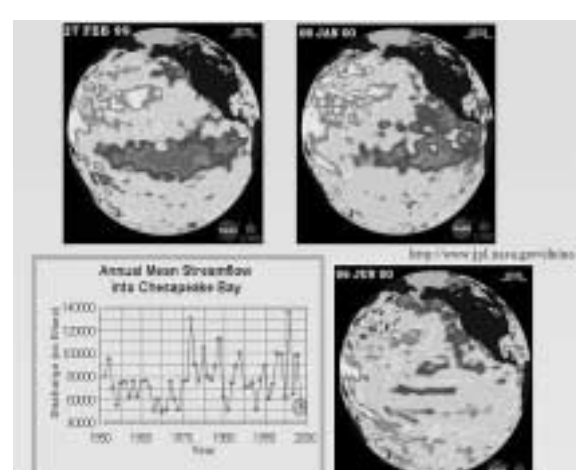
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23



21



24

not for the influence of fresh water from the watershed. Watershed definitely does matter. <Fig.23>

The role of watershed as integrator can be seen by looking at global influences. As I mentioned before, the year 1999 was a drought year for the Chesapeake Bay watershed. This drought was caused by the most recent La Nina in the mid-Pacific Ocean. Here are three scenes in the life of the latest La Nina. These color-interpreted data from the TOPEX/Poseidon satellite project reveal a 15-20 cm depression in sea level height in the purple region. This corresponds to a 2-3 deg. C decrease in surface water temperature. The "abnormal" cooling of such a large area and of water influences the path of the jet stream with consequent changes in marine and continental weather patterns.

<Fig.24>

What would be only a small influence of the surface of the Chesapeake Bay proper becomes a major influence on the structure of the system because of the integrative nature of its watershed.

We now see that the watershed make the Bay sensitive to climate and weather half a world away. Beginning with a routine set of water chemistry measurements taken at only a single station, teachers can now learn about the fundamental way the Chesapeake Bay environment functions and why "watershed matters" to both that function and to the living resource that depend on it. This is a wonderful way to convey what we mean when we talk about viewing the Chesapeake Bay and its watershed as a single ecological system. <Fig.25>

下しているというところです。また、その水面下2ないし3度ぐらい下がっていると、温度も低いというところでもあります。これだけの大きな大量の水が、非常に温度が低いということでもありますから、そうなると、それをジェット気流に対して影響を与えることになりますし、ひいては海洋や大陸での気象パターンも変化してくるということでもあります。(図24)

図25は、99年の2月27日、1月8日及び2000年の1月に撮ったものであります。ラ・ニーニャがちょっと弱ってきたということでもあります。この6月までにはラ・ニーニャはもう消え去ってしまいました。やっぱり、チェサピーク湾の方でも非常に雨が少ないんじゃないかというふうに言われておりましたけれども、結構たくさんの雨が降りました。実際には、チェサピーク湾だけへの小さな影響というものとお考えかもしれませんが、実際は集水域全体、それを統合した目で見れば、大きな

影響を与えるということになります。集水域こそが本当に影響を受けるわけであります。つまり、チェサピーク湾そのものも、その世界の反対側で起っている現象の影響を大きく受けているわけであります。(図25)

なぜ、私が教育に関して、このような情報を使いたいという理由は次のとおりです。もう20年ぐらい前でありますけれども、セネガルの方がおっしゃっています。結局、我々は愛するもののみを大事にし、そして理解するもののみをまた愛し、そして本当に教えられたもののみを本当に理解するんだということなんです。ということは、科学だけではなくて、もちろんほかの、その分野でも、こういうことを教えられていかねばなりません。そうでなければ、本当の真実のデータというものを子供たちに教えなければ、ただ単なる意見にだけ基づいたようなことしか理解しません。非常に表面的なことしか理解しないことになるでしょう。このような表面的な意見に

This is why I am interested in using coastal seas data to enrich education in our schools no matter what the subject and no matter where they may be. In my opinion, if we do not use authentic environmental data to educate your young people in the sciences and in disciplines, other their commitment to a healthy, productive environment will be based more on opinion than on fact. It will be superficial, lacking in understanding of how the coastal system they would save or restore actually functions and how human activity is truly a part of that system. Ultimately, I question whether such a superficial commitment can every be sustained long enough to "save the Bay." <Fig.26>

I have heard many researchers and educators alike talk about eliminating the communication gap that currently exists between science and

society. It is time for those of us who are concerned about the future of the world's coastal seas become leaders in reducing, no, eliminating this gap. It is time for us to act now. <Fig. 27>

We all want our coastal seas to be healthy, productive, and inspiring. We do not want scenes like these to be remembered only in photographs.

We do now want words like thee preserved only in the journals of the early explorers. <Fig.28>

基づいて、表面的な確約しかできないというものは、本当に持続するのでしょうか。たくさんの研究者、あるいはまた教育者の方々も、実際には我々の社会と、そして科学の世界との間のギャップを取り除かなければならないということをよく聞いております。ですから、私ども本当に沿岸海域の感じで、いろいろな研究をしている者、我々こそが本当にリーダーにならなければならないんじゃないのでしょうか。(図26)

私どもは川の一部であると理解して、そして川全体としての責任を持たなければならないと、チェコのパスラブ・ハベルが言っております。(図27)

私どものこの価値というものは、この河川の、集水域の、そしてこの沿岸海域の価値というものは、言葉を超えるものであります。価値を超えるものであります。確かに私どもが、初めてこのチェサピーク湾を見つけた、このキャプテン・ジョンスミスの言

葉をかりますと、大きく、しかも楽しめる船の生き返る川があるという特権を持ち、人間の住む地として、ここよりほかに天と地がつくらしめたよりよき土地はないだろうというふうに戒めています。もちろん、沿岸海域というのは健全で、生産的で、そして何かを触発されるものでなければならないと思います。ただ単に写真の中だけで記憶されるだけではなく、あるいはまた、素晴らしい探検家の手記にだけ、言葉として残されるものではないと思っています。将来は我々とともにあります。集水域こそ、ものを言うわけであります。私ども、この陸に住む者、そして、この美しい沿岸海域と、そして集水域を結びつける我々にこそ、その責務があると考えます。(図28)

チェサピーク 2000 の目標に向けて

〔The 2000 Chesapeake Bay Agreement〕

ジェーン・ニシダ

Jane T. Nishida

メリーランド州環境省長官

Secretary, Maryland Department of Environment

Chesapeake Bay 2000 Agreement was just signed on June 28th and to go into the specific goals and strategies for the Chesapeake Bay 2000 Agreement. I will try to quickly move to the first part, because Dr. Bell has done such a good job of outlining the Chesapeake Bay watershed. And I want to thank Dr. Bell for assisting me in this presentation today. As Dr. Bell has indicated, the Chesapeake Bay 2000 represents, I guess, 6 states, whole which are the signatories to the Chesapeake Bay 2000 Agreement. It is the largest estuary in North America. In 1983 which was the first Chesapeake Bay Agreement, it was signed in 1983 by the state of Maryland, Pennsylvania, Virginia the District of Colombia and for the federal government, US Environmental Protection Agency. In 1987, the second Chesapeake Bay Agreement actually set specific goals and commitments in time frames for achieving those

goals. The most notable good we have talked to you before is 40% nutrients reduction goal. As I mentioned, restored agreement was just signed on last month on June 28th 2000, which sets new very ambitious goals for the next decade. It continues the cooperative approach from the 1983 agreement as well as continues those goals and dates from the 1987 agreement. <Fig.1-6>

The theme that you will see throughout the new Chesapeake 2000 Agreement is obviously to improve the water quality of the Chesapeake Bay. But as you will know from the next presentation that we are making, its emphasis is on whole watershed or whole ecosystem approach, that you have to address and protect the ecosystem through various measures through living resources, through habitat, through smart land use and etc.. And the second theme is that individuals have

このチェサピーク2000は、ちょうど6月28日にサインされたばかりであります。今回、私の方から具体的にどういったゴールを目指してこの協定が締結されたかということについてお話を申し上げたいと思います。

ベル先生のお話でありましたけれども、このチェサピーク2000の協定というのは、6つの州をまたがった協定であり、その対象であるチェサピーク湾は、北米最大の河口域ということになります。最初の湾協定がサインされたのは83年で、メリーランド州、ペンシルバニア、バージニア、そしてコロンビア特別行政区、そしてアメリカ連邦政府、これは具体的に言うと環境保護省が署名しました。そして、87年に次の新しいバージョンとして具体的なゴールを設定したわけです。例えば40%栄養塩を削減するといったことが具体的にこの段階から盛り

込まれていました。先ほど申しましたけれども、最新の協定は、先月の20日過ぎに非常に大きな意味を持つ、次の10年を目指しての非常に大きな同意書として締結されました。これは83年、87年の協定を引き継ぎ更新した協定ということになります。

(図1-6)

図7は、新しい2000年のチェサピーク協定の主なテーマであります。どのようにして水質を改善していくかということが主なテーマですが、特に強調されているのが、全体的な生態系を見ていこうということです。つまり、生態系をさまざまな方策を使って、例えば生息域やその地域それぞれを見ながら、全体的に見ていこうということなのです。そして、もう一つ強調されているのが、個人個人がやはり責任を持って川やこの湾を守っていこうという点



☒ 1



☒ 4



☒ 2



☒ 5



☒ 3



☒ 6

a responsibility for protecting the watershed.
〈Fig.7〉

The first goal, as I mentioned in the Chesapeake 2000 Agreement, and this is the actual language from the goal that the governor signed was to restore hands to protect the finfish and shellfish and other living resources in the Chesapeake Bay to show that you are able to sustain, all the fisheries in this bound of ecosystem. 〈Fig.8〉

And again, this is the actual language in the bay agreement. Specifically, what this has meant is that the governors from the state of Virginia, Pennsylvania, Maryland as well as the District of Colombia, as well as the federal government have pledged that in 10 years from 2010, we

are going to see a 10 fold increase and the number of oysters in the Chesapeake Bay. So what I would like to talk is that what is the practical implications of that goal for agencies like mine, the Maryland Department of Environment to achieve that goal. 〈Fig.9〉

It means that in order for agencies like the department of environment to achieve the goal, we are going to have to implement several options or several strategies to achieve that 10 fold increase. We are going to have to look at the use of oyster sanctuaries, we are going to have to promote obviously aquaculture in terms of developing oysters, we are going to have to continue the disease research, because one of the things that we have found is obviously dwindling population of oysters is a result of the disease. 〈Fig.10〉

であります。(図7) 図8は、実際にサインされた協定に掲げた目標であります。これについては貝、魚、そしてそのほかの生物資源や、また生態系の回復促進、そして保護していこうということです。そして、同時に漁獲量を確保しながら、バランスのとれた生態系をつくり上げていこうということでもあります。(図8)

図9に示すように、具体的には、バージニア、ペンシルバニア州、メリーランド、そしてコロンビアDC、そして米国連邦政府がはっきりとこの協定に「この10年の間に、2010年までに、カキの数を10倍にふやす」という明言をしたことです。これは具体的に、私の今、所属しています環境政策省では、どういった意味を持つのかということについてのお話をしていきたいと思います。(図9)

この目標達成のためには、幾つかの具体的な政策を導入していかなければいけません。そしてその結果としてカキの数を10倍にしなければいけないわけです。例えば、カキの保護区域をつくる、もしくは水産養殖の促進をする。そしてカキの病気の研究を継続していくということがあげられます。特に、カキの問題、特に数が減少したというのは、病気が蔓延したからということがわかっているからです。

(図10)

そして、目標のもう一点としては、国家的なバラスト水管理計画を作成し、外来種を管理していくということでもあります。2002年までに、暫定的、または自発的なバラスト水管理計画をつくっていかなければいけないということです。(図11)

ただ、この自発的ということですが、メリー



Chesapeake 2000 Major Themes

- Primary goal is to improve the water quality of Chesapeake Bay.
- Central theme is "watershed partnership" - complex ecosystem requires a multi-faceted approach.
- Other theme is:
"personal responsibility" - individuals can make a difference

☒ 7

Living Resource Restoration Oysters

- Management Implications
 - Must develop and implement an oyster management strategy by 2002 that includes:
 - The use of oyster sanctuaries
 - Promotion of aquaculture
 - Continued disease research
 - Disease-resistant management strategies

☒ 10

Living Resource Protection and Restoration

- Goal: Restore, enhance and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.



☒ 8

Living Resource Restoration Exotic Species

- In 2000, establish a Chesapeake Bay Program Task Force to help develop a national ballast water control program.
- By 2002, develop and implement an interim, voluntary ballast water management program for the Bay.

☒ 11

Living Resource Restoration Oysters

- By 2010, achieve at least a tenfold increase in native oysters in the Chesapeake Bay.



☒ 9

Living Resource Restoration Exotic Species

- Management Implications
 - Maryland passed a law in 2000 to implement a voluntary ballast water management program, which includes:
 - New regulations requiring vessels to submit "ballast water control report forms"
 - Criminal penalties for failing to report ballast water management information

☒ 12

The next specific goal that was in the Chesapeake Bay 2000 Agreement was that we are going to have to develop a national balanced water control program to look at exotic species. <Fig.11>

Under the agreement, in 2 years you would have to develop and enter the voluntary balanced water system for the Chesapeake Bay. In Maryland, we have taken one step further. This year, in our Maryland legislature, we adopted a law that would require a balanced water management program. We have new regulations that we are in the process at now developing, which would require ships that would come into Baltimore Harbor to submit forms with regards to balanced water discharges, and there are actual criminal penalties attached for failing to provide these reports. <Fig.12>

Another specific goal when it comes to living resources under the Chesapeake Bay 2000 Agreement is that we will have to develop by the year 2005, an ecosystem that would look at multi-species management. <Fig.13>

We would look at it not only ,obviously, from one particular species, oysters, but from the multiple finfish and shellfish. And again, the practical implication of that is, or that we will have to develop fisheries management systems that would look at, perhaps sometimes conflicting goals for species. For example, a plan, that will have to address both striped-bass and blueclaps where in the classical situation, they are in creditor relationship. But in order again to develop multi-species management plan, we are going to have to look at those competing perhaps in other words will be called interlock-



図 13

ランド州ではもう一歩先へ進み、バラスト水管理プログラムを州法にしたわけです。その結果として、このボルチモア湾に入港してくる船舶に対しては、必ずバラスト水管理報告書ということを提出させるということになっております。もしもこれに対してその義務を怠った場合には、その結果として処罰の対象になります。(図12)



図 14

次の目標は、この新協定では、2005年までに多様な州に基づいた生態系をつくり出し守っていくということ、つまりカキだけではなく、そのほかさまざまな種を見て、全体的な多様な種を確保していくということをうたっています。(図13)

これを具体的に見ていくと、例えば漁獲についての管理システムをつくっていきます。そして、その

ing goals. 〈Fig.14〉

The next goal, away just to move to show you again the complexity of any ecosystem is we are looking to protecting what we call the vital habitat and restoration, in other words, we want to protect habitats and natural areas that provide the diversity of the living resources of the Chesapeake Bay. 〈Fig.15〉

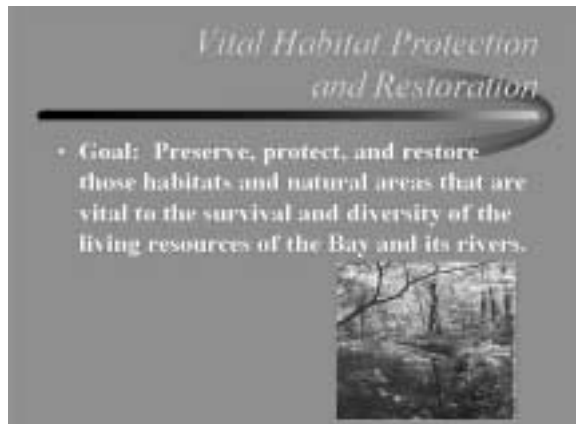


図 15

際には幾つかの種を同時に見ていきます。例えば、ここに挙げております例としてはシマスズキとワタリガニ、これはチェサピーク湾で見た場合は、非常に典型的な補食の関係にあります。これを片方だけで見るのではなく、幾つかの種の間を、つまり、その全体を見た目標をつくっていかうということなのです。(図14)

次の目標は、やはり生態系は非常に複雑ですので、そのために必要な活力のある生息域をつくり守っていかうということです。その結果として、このチェサピーク湾、そしてその河川の生物資源の生存と多様化を確保していくということをうたっております。(図15)

2010年までにすべてのチェサピーク湾域では、

And by the year 2010, all these states in the Chesapeake Bay Agreement have agreed to develop watershed management plans for about 2/3 of the bay watershed. Again Maryland has already taken a leadership role with regards to these management plans. 〈Fig.16〉

And we have developed, what we call, watershed restoration action strategy to address this commitment. And it means that the strategy that we are looking at cover a variety of sources of pollution. We are looking at controls on point sources and industrial discharges, we are looking at controls in terms of non-point source runoff like an agricultural farming runoff, we are looking at wetlands lost, drinking water as well as the quality of habitat that I just referred. Again, there are specific goals within the vital habitat goal. 〈Fig.17〉

その3分の2にわたる地域について、こういった管理プログラムをつくらなければいけません。(図16)

これについてもメリーランド州では非常に進んでおりまして、集水域の回復行動戦略ということをつくって責務として発表しております。もちろん、その中で重要視している幾つかの点があります。それは、具体的な幾つな汚染源をチェックしてそれを管理していかうとしています。例えば、ポイントソースと呼んでいる固定発生源というのは、工場やそのほかの工場、企業などで、ノンポイントは、農場などや流水などからくる汚染源です。私たちは、こういったものを管理し、資源の損失をゼロにすることで、水域の生物危機を守っていくことがうたわれております。(図17)

また、具体的に2010年までに、それぞれの管

And they are, the most specific is that by the year 2010, each state jurisdiction will have to achieve a net gain of 25000 wetland acres to our voluntary restoration and creation program. Again this is a net gain. We are not looking at just protecting losses from wetlands, we want to actually get ahead of the curb by restoring more wetlands. <Fig.18>

That's why we have this 25000 net gain goal. What this is meant again for Maryland because obviously 25000 acres is a very ambitious goal. In Maryland, we have appointed a citizen advisory committee that constitute not only the government from the state government as well as local government. But we have also enlisted the help of private sector which includes development community, the farmers as well as environmental groups and citizens to help us develop the strategy in order so that we can achieve this goal.

<Fig.19>

The next specific strategy under habitat protection is that by the year 2010, we are going to restore 2010 miles of riparian forest buffer, it was no accident that number was chosen by the way. And the management implication of that is that what we have in the United States and what you are, I guess increasingly seen here in Japan is that with suburban development, we are losing more and more forest. And we have come up with the management strategy that reduces obviously the conversion of forest into suburban development. And we have to assure that we can do that through a variety of mechanisms such as conservation easements, land purchases so that we can restore the forest in order to achieve our goal. <Fig.20-21>

轄地域では2万5,000エーカーの湿原を増加させるということをうたっています。これは単に現存する湿原の純損失をゼロにするだけではなく、実際に2万5,000エーカーの新しい湿原をつくっていかうということを言っているわけです。(図18)

メリーランド州では、この2万5,000エーカーというのは、非常に大きな土地になりますので、州政府から、市民の顧問委員会というものを任命しまして、州政府に対して提言をするようなシステムをつくっております。そしてまた、プライベートセクター、例えば企業などの開発団体、そして農業従事者、そして環境団体といった人たちも巻き込んで環境政策をつくっていかうというふうに働きを進めています。(図19)

次の戦略ですが、2010年までに、2,010

マイルの沿岸森林の緩衝地帯をつくろうと考えています。これがどういった意味を持つかと申しますと、米国の場合は、日本でも最近同じだと思いますけれども、この森林がどんどんと都市の開発のために伐採されてしまっているということがあります。従って、これを何とか食い止めなければいけないということを考えているわけです。都市開発のために森林が伐採されるのを何とか抑えなければいけない。そのためには、例えばその土地の使用目的を制限するとかによって、個人の所有になっているところであっても、森林をそのまま守っていくということが出来るからです。(図20-21)

次の目標としては、水質を改善し、そしてその湾の、そしてまた、その河川の水生生物資源を支援していくということ、そして人々の健康を守っていく

Vital Habitat Protection Watersheds

- By 2010, develop watershed management plans in two thirds of the Bay watershed covered by the new Agreement.



☒ 16

Vital Habitat Protection Wetlands

- Management Implications
 - Maryland has appointed a Citizens Advisory Committee on Wetlands to help achieve goal.
 - Maryland is developing a wetland conservation plan to guide efforts both to prevent the loss of existing wetlands and to restore and create wetlands acres.

☒ 19

Vital Habitat Protection Watersheds

- Management Implications
 - Maryland is developing "Watershed Restoration Action Strategies" to meet this commitment. These strategies address:
 - + Controls over point source discharges
 - + Nonpoint source pollution
 - + Wetland loss
 - + Aquatic habitat
 - + Drinking water protection
 - + Health of riparian areas

☒ 17

Vital Habitat Protection Forests

- By 2010, restore 2010 miles of riparian forest buffer.
- Establish a new, expanded goal by 2003.



☒ 20

Vital Habitat Protection Wetlands

- Achieve a no-net-loss of existing wetlands through regulatory programs.
- By 2010, achieve a net gain of 25,000 wetland acres through voluntary restoration and creation.



☒ 18

Vital Habitat Protection Forests

- Management Implications
 - Need to promote expansion and connection of contiguous forests through conservation easements, greenways, and land purchases.
 - Conserve existing forests along all streams and shorelines.

☒ 21

Turning to another area within the Chesapeake 2000 Agreement, and that is the goal to achieve and maintain water quality necessary to protect quality of resources of the bay and its tributaries. We have already established in 1987 so we want to continue our efforts to meet the 40% nutrient management reduction goal. And specifically, we want to, by the year 2010, correct all those nutrient management problems so that we can remove the Chesapeake Bay from the list of impaired waters. In the United States, we are required to identify those waters which we say, do not meet the federal water quality standards. Unfortunately, one of those waters is the Chesapeake Bay. So the state has committed by the year 2010, we will remove the Chesapeake Bay from the federal list of impaired waters. <Fig.22-23>

This is no easy task, I might add, and in order to do that, we have to look at a number of things. First, obviously waste water treatment plants are the large source of nutrients entering into the Chesapeake Bay. One of the things we have done is invested money into a new treatment system which is called "biological nutrient removal system" to reduce the nutrients from the waste water treatment plants, that does require funding to our local government so that they can upgrade the waste water treatment plants. It also means with regards to the agricultural runoff, we have to look at mandatory controls on our farmers. Again, not a very popular topic, but one, in order for us to achieve the goal. And then finally, of course, just a technical and scientific challenge of meeting the water quality standards. <Fig.24>

ということ、これが目標となっています。そのためには、1987年ベースの40%の栄養素削減を引き続きうたっています。2010年までに、この地域にあります堆積物や栄養素を削減し、その結果として、米国の破壊の進んだ水域のリストからチェサピークを外していこうということを考えています。
(図22-23)

もちろん、これはそれほど簡単なことではありません。そのためには幾つかの事を見ていかなければいけません。まず最初にやらなければいけないのは、排水処理であります。特に大きな工場などから出る排水の処理については、基金を導入して、BNRと呼ばれる生物学的な栄養素の削減プログラムを促進していきます。そして、全体的に排水規制レベルを上げていこうということや、産業だけではな

く、農業に対しても強制的に栄養塩管理計画というのをつくってもらおうということを進めています。もちろんこれは余り歓迎されているプログラムではありませんが、必要であると考えています。そしてまた、栄養塩と堆積物について、水質基準をつくっていくとその際に出てくる技術的な問題について調べていくということ、研究していくということ等が含まれています。(図24)

また、1994年の段階で既に、チェサピーク湾を有害物質のない、きれいな湾にしようということがうたわれておりますが、これを引き続き守っていきます。そして、特に今度言われているのが、2010年までにミキシングゾーン、混合域というものを削減していこうということを明示しています。このミキシングゾーンというのは、例えば有害物質も



図 22



図 23

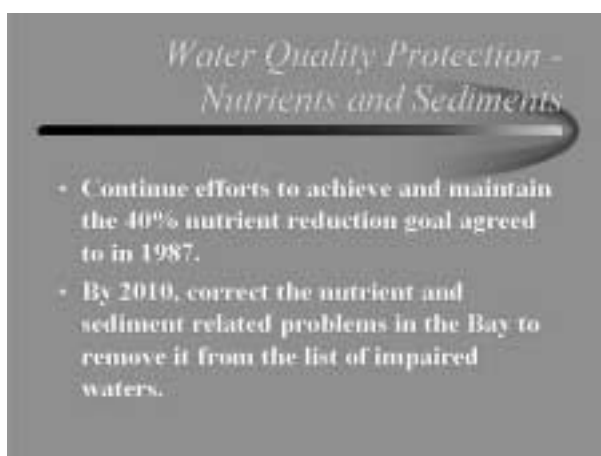


図 24

The next is, we would like to meet the commitment that was made in 1994 by having the Chesapeake Bay toxic-free goal, and we are trying to do that through voluntary pollution prevention measures. The specific goal in the bay agreement is that by the year 2010, we want to achieve the elimination of mixing zones for persistent bioaccumulative of the toxics. A mixing zone is a zone where essentially toxics are discharged into the bay and they serve, the bay serves as a dilution factor. Under the bay agreement, we are not allowing the mixing zones or dilution factor. The practical implications mean that we will have to work with businesses much closely to encourage them to institute pollution prevention measures. <Fig.25>

It would also require us to provide technical systems to those businesses with regards to toxic-

しくは排水などがこの汚染源から排出されて、湾に排出されたとき、その有害物質が実際その水で薄められるわけですが、これを許してはいけないということです。たとえ、その有害物質がある程度の水の量で薄められることがあったとしても、一切このような排水を許せないということをはっきりと明言しています。(図25)

しかし、このようなことをするためには、もちろん様々な技術的な協力も必要ですので、技術開発については私たちの方でも進めていかなければいけません。例えば、このミキシングゾーンの廃止ということをお話したわけですが、ボルチモア湾で考えたときには、もしもこのようなことが実際に徹底されれば、かなりこれは経済的な影響を及ぼします。ですから、これに対して、なるべく経済的影響を緩

ty reduction evaluations. And most importantly, for the port of Baltimore or if you are in Kobe, for the port of Kobe, is that elimination of mixing zones has brought implications for our port.

We have already eliminated one mixing zone for the port of Baltimore. And we are now struggling about how to come up with the disposal option as a result. The next area is in the water, excuse me, in the relationship between air pollution and water pollution. <Fig.26>

By the year 2003, we want to assess the impacts of the air pollution to the Chesapeake Bay. We already know that about 25% of the pollution into the bay comes from the air deposition. The difficulty we have in addressing the air pollution into the Chesapeake Bay is that although Maryland and each individual state has done much to reduce the air pollution in our

individual state, much of the air pollution in the Chesapeake Bay comes from the other parts of the United States, from the west. Just as much of your pollution isn't generated in Japan, it may come from China, we have a similar problem. So that is going to be a challenge for us in meeting our air pollution goals. <Fig.27-28>

This is a very unique goal that we have established, and that is, we have established a goal with regards to what we call "sound land use". That is, we want to develop and promote land use policy that will protect and restore our watershed resources. We are finding more and more that what happens on the land, can dramatically impact the water quality. So the goals that you see here are really worth noting, because they are, I think, really historic not only for the Chesapeake Bay but frankly for the

和していくような施策もとらなければいけません。

(図26)

次の点として、2003年までに大気中の汚染物質の、このチェサピーク湾に対する影響をアセスメントしていこうということを明示しています。既にわかっていることとしては25%の窒素酸化物については、大気中から、この水中に入ってきているということはわかっております。そしてメリーランド州や、そのほかの州、いろいろな形でやっているわけですが、わかったこととしては、この関係のある、ここに名前が上がっている州だけではなく、そのほかの州から来ているということです。もちろん日本や中国から来ているというわけではありませんけれども、やはり米国のそのほかの州から来ているとい

うことですので、すぐに私たちがすぐに何かをできる、そして何かをすることによって解決できるというものではありません。従って、これは難しい問題だと考えられます。(図27, 28)

そして私がお話したい次の点は、健全な土地利用です。この健全な土地利用を進めることによって、水質を守っていくことができるということがわかります。逆に言いますと、この陸で行っているさまざまな行動が水質に大きな影響を及ぼしているわけです。これはチェサピーク湾だけではありません。国全体について言えることかと思います。そしてまた、国際的にも言えることかだと思います。非常に難しい問題です。まず、一番最初に私たちが具体的な方策としてとり上げたのは、2010年までに恒久的に20%のこの土地を非開発地域にするということ

entire nation or internationally for that matter as well. And that the first score is that we have committed to permanently preserve from development 20% of the land area in the Chesapeake Bay by the year 2010. We have also committed that by the year 2012, we are going to reduce the harmful rate of sprawl by 30%. This means could be translated obviously into your area here and Hyogo prefecture. Hyogo prefecture and your neighboring prefectures would be committing to preserving 10 of 20% of this area for essentially natural resources preservation. And you would be by the year 2012, saving 30% of that area that would have been developed would be now reduced. <Fig.29-30>

It's very significant. In Maryland, we have done and instituted our own program, which we call "small growth". And under this program,

there are several components and that highlights two on this five. One is that we have dedicated state funds to essentially preserve what we call our rural legacy, where we buy farm land and open space and prevent that from going into further development. The second program, as you can see it from the pictures on the slide, is a program that we take industrial sites in our city, as shown here, and we turn those industrial sites, we clean them up and we turned them into productive use. So it has the benefit of protecting the environment and also promoting economic development. <Fig.31>

In addition, we have a number of innovative programs in Maryland, we have a program that says that if you live near your work, you actually give you a financial incentive to live near your work. And we have found that in the first couple

す。また、2012年までに、この悪影響である無秩序な開発を削減するということです。兵庫県でも同様かと思いますが、近隣の県が10%から20%の土地を自然のために確保すると、非開発地域にするということを言ったとすればどうでしょうか。そして、ずっとそういったことをすれば2010年になると、10年の間で非常に大きな変化が実際にあらわれるわけです。(図29、30)

次の点ですが、これはメリーランド州で行っているスマートな成長というプログラムです。これは州のプログラムで成長をうまくコントロールしていくというプログラムなのです。そしてもう一つのプログラムは農地、地域の遺産プログラム、これは具体的に言うと州の基金を使って、存在する農地とオープンスペースを守っていくとするものです。その

ほかに、ここに写真が出ておりますけれども、これはグランフィードプログラムというものです。このグランフィードというのは、具体的には産業地域をあらわしておりまして、このような上の写真に見られないような、古い、使われていないような産業地域をさらに再開発していこうというプログラムです。(図31)

メリーランド州では、1つ大きなメリットがあります。これは大都市に近いということです。今やっているプログラムとしては、なるべく近くに住んでもらおうということ、つまり自分の仕事の近くに住んでもらおうということです。20%から30%ぐらいの人々が、もしも金銭的に何かメリットがあるんなら、そうしたいということを言っています。

Water Quality Protection - Chemical Contaminants

- Commitment to fulfill the 1994 goal of a Chesapeake Bay free of toxic effects.
- Through voluntary pollution prevention programs:
 - Strive for zero release of chemical contaminants from point sources.
 - By 2010, achieve the elimination of mixing zones for persistent or bioaccumulative toxics.

☒ 25

Water Quality Protection - Air Pollution

- Management Implications
 - Approximately 25% of the NO_x pollution in the Bay comes from air deposition.
 - Not all states support regional efforts to reduce air pollutants.
 - Transport of airborne pollutants into the Bay watershed makes it difficult to achieve federal clean air requirements and Bay goals.

☒ 28

Water Quality Protection - Chemical Contaminants

- Management Implications
 - Goes beyond traditional removal of pollutants to source reduction and pollution prevention.
 - Requires more technical assistance such as Toxicity Reduction Evaluations.
 - Elimination of mixing zones has broad implications for port and dredging.



☒ 26

Sound Land Use

- Goal: Develop, promote, and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loads for the Bay and its tributaries, and restore and preserve aquatic living resources.



☒ 29

Water Quality Protection - Air Pollution

- By 2003, assess the effects of airborne pollutants on the Bay ecosystem and help establish pollutant reduction targets.



☒ 27

Sound Land Use

- Permanently preserve from development 20% of the land area in the watershed by 2010.
- By 2012, reduce the rate of harmful sprawl development in the Bay watershed by 30%.
- By 2002, promote coordination of transportation and land use to encourage compact development.



☒ 30

of years, the program about 25 to 30% of the people said that they would not had entered or not live near their work but for this financial incentive.

In addition, we give a pack, credit, to businesses that will create jobs and what we call designated growth area. And we have the ambitious goal for the United States, that we want to double the number of public transit trip in the United States and provide alternative modes of travel other than just a free way traffic. <Fig.32>

The final goal have to do again with individual responsibility for the Chesapeake Bay and that is we want to promote that individuals, the community organizations, businesses and local governments take their own programs to achieve the goals and commitments that I have just outlined. <Fig.33>

What this means is that in terms of education, we are asking by the class by the 2005, that there will be a Chesapeake Bay outdoor experience for every school student in the watershed before they graduate from school. It also means that by the year 2002, we are going to ensure that we, as government, also provide a role model. So that we are going to ensure that any government's property or development projects are consistent with the bay agreement. <Fig.34>

So I want to close by turning back to how this Chesapeake Bay 2000 affects into the EMECS principles that this organization has been promoting for number of years. As you can see, I think that it supports principle No.1, and pursuing the holistic approach to the land-sea complex that emphasizes the importance in terms of the land development to the water quality. Secondly,

ですから、私たちの州でやっていることというのは、例えば雇用創出をした場合には、例えば税額の控除をするということや、また、米国全体でなるべく公共の交通をふやして例えば2倍にしていこうということを具体的に考えられています。その結果として車を使ってハイウェイで人々が仕事に行ったりしなくてもいいようにしたいと考えているわけです。

(図32)

図33は、それぞれのコミュニティがどのようにして参加しているかということです。それぞれのコミュニティがはっきりと公約をして、私が今までお話ししてきたような活動に参加しています。(図33)

最も重要な点となるのが教育ですが、これについては2005年に卒業する学年を最初にして、一番

最後の年、実際に卒業する前に1日かけて湾の水域で野外活動の体験をしてもらおうということを考えています。また、我々政府としても手本を示さなければいけないというふうに考えています。さまざまな開発、プロジェクトをつくった際に、それがしっかりとこのチェサピーク湾の協定に基づいたものでなければいけないというふうに考えているわけです。

(図34)

最後に、このチェサピーク2000がどのようにエメックスの考えに合っているかということをお話したいと思います。図35に具体的に示してありますけれども、まず1番目として、全体的なアプローチをとって、この陸と海のあわせた全体的なアプローチをしているということ、つまり、陸、そして海を別々に見るのではないということです。2つ目としては、人間の活動がいかに汚染を引き起こすか、そして沿岸域の生態系がいかに悪化しているかということについて、科学的な知識を得ていくということ

it does improve the scientific understanding of polluting human activities and degeneration of the coastal system, because as you see, not only in terms of the development area but also in terms of business activities, we have been trying to show that link between science and human activities.

Third, it does actively engaged the major state groups, by establishing these goals, it means not only the government will have to change their policies but businesses and citizens will also change the way they interact with the Chesapeake Bay. And then finally, we are acting locally and thinking regionally both in terms of scientific solutions as well as legal solutions. <Fig.35>

です。これはさまざまなビジネスの活動、いろいろな活動が実際に問題を引き起こしているということで、これを科学的に見ていこうということです。3つ目としては、主な関係団体の相手との会話を進めていくということ、つまり、対話を進めていくということです。これは、政府が政策をかえればそれで済むというのではなく、やはり市民が変わらなければいけないということ、考え方を変えて、実際チェサピーク湾に対して自分たちがまず変わっていかなければいけないということです。そして4つ目は、地域的に行動して、そしてまたもう少し広い意味で、この技術的、また法的な解決策を指導していくということです。(図35)

Sound Land Use

- **Management Implications**
 - Maryland has adopted a comprehensive land use program called "Smart Growth"
 - Rural Legacy Program invests state funds to protect remaining farmland and open spaces.
 - Brownfields Program cleans up abandoned and contaminated industrial sites.

American Co. ... Before



American Co. ... After



☒ 31

Stewardship and Community Engagement

- Beginning with Class of 2005, provide Bay outdoor experience for every school student in the watershed before graduation.
- By 2001, develop a clearinghouse for information on local watershed efforts, including financial and technical assistance.
- By 2002, insure that all government properties and development projects are consistent with these Bay Agreement.



☒ 34

Sound Land Use

- **Management Implications**
 - Live Near Your Work provides financial incentives to employees who purchase homes close to their work.
 - Job Creation Tax Credit creates tax credit for new jobs in designated Smart Growth areas.
 - Establish goal of doubling the number of daily transit trips and promoting alternative modes of travel.

☒ 32

Conclusions

- Chesapeake 2000 Agreement Supports the EMEUN Principles:
 - Principle 1: Pursue a holistic approach to the land-sea complex.
 - Principle 2: Improve scientific understanding of the polluting human activities and degradation of coastal ecosystems.
 - Principle 3: Develop active dialogue between major stakeholder groups.
 - Principle 4: Act locally – think regionally in implementing technical and legal solutions.



☒ 35

Stewardship and Community Engagement

- **Goal:** Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments, and schools to undertake initiatives to achieve the goals and commitments of this agreement.



☒ 33

チェサピーク 2000 の策定まで

\The 2000 Chesapeake Bay Agreement and Beyond: Meeting National
and International Restoration Challenges]

デビッド・キャロル David A.C. Carroll

環境政策・研究管理事務所長

Legislative Director

Office of Congressman Benjamin L. Cardin

It is a great pleasure to be in Kobe again. I have been fortunate to visit this City and region many times as part of the unique relationship between Maryland and the Hyogo Prefectural Government. Since our first meeting in Maryland in the late 1980's, the first EMECS conference in 1990, the conference in Baltimore in 1993, and the subsequent conferences in Stockholm and Antalya, many of us have formed new bonds, as friends, colleagues, and managers of programs to restore and protect coastal seas and bays. This has given us a new perspective of the challenges we face and the variety of restoration efforts underway that can offer our own programs and others a unique insight. I will talk about that insight and responsibility in a few moments.

I would first like to thank Governor Kaihara, the International EMECS Board and the Center staff for their continuing dedication and work to

bring us together in preparation for the 5th International EMECS Conference here in Kobe in 2001. I believe all of us today want to express our special admiration and respect for Governor Kaihara. It is not an easy task to initiate and sustain this kind of effort. And to continue to focus on coastal seas issues as Hyogo and Kobe have made remarkable advances in recovering, and building for the future, after the great earthquake. We want to express our deep appreciation for your efforts and that you have allowed us to be partners in the International EMECS Center and agenda.

Setting the Context for a New Chesapeake Bay Agreement : Let me spend just a few moments reviewing for you the past two years of the evaluation process of the Chesapeake Bay Program. I will not go into much detail as extensive presentations were made at the EMECS

本日、神戸に戻って来れましたことをとてもうれしく思います。神戸市とこの地域にたびたび来る機会がありましたのも、メリーランド州と兵庫県のユニークな関係のおかげであります。1980年代の後半に最初の出会いがありましてから、1990年の神戸における第1回のエメックス会議、93年のボルチモアでの第2回会議、その後のストックホルム、アンタリアのエメックス会議を経まして、我々多くは、それぞれ友人として、また同僚として、海域や湾の修復プログラムマネージャーとしてきずなをはぐくんできました。このような機会を通じまして、我々が直面する挑戦に対しまして新しい展望を与えてもらいました。また、この展望が知見につながりました。この知見と責任について、きょうの講演でお話したいと思います。まず最初に、兵庫県の貝原知事に対しましては、またセンターの理事会・

評議会、センター副理事長、センターのスタッフの献身的な働きに対しましては、来年の神戸での第5回エメックス会議に向けての、今回のセミナーの開催に至ったご努力に対しまして感謝を申し上げたいと思います。特に貝原知事に対しては、特別の尊敬の念を持っています。このような取り組みを率先して、さらに継続していくというのが容易なことではありません。また、震災の復興を兵庫県、神戸市が進める中で、海域の問題に力を入れていくことは、やはり容易なことではありません。我々深い感謝の気持ちを皆様の努力に対して、またエメックスのパートナーとして参加させていただいてることに感謝いたします。

さて、新しいチェサピーク湾協定の内容設定やこの評価プロフィールについてお話したいと思います。これについては、昨年、トルコ、アンタリアで

/ MEDCOAST Conference in Antalya just last fall. But I think there are some interesting perspectives that can be gained from the evaluations process. In 1998 the Board of the Alliance for the Chesapeake Bay proposed an independent evaluation of the restoration program to assist in the development of the new 2000 Bay Agreement. Special funding was secured from the U.S. Congress. The Alliance (a major NGO involved in the Chesapeake restoration for 20 yrs.) developed a evaluation process, working with the Bay Program and a number of interest groups that would help shape the content of the new agreement. The project took 18 months and began with a three pronged approach to find out what people thought were the successes and failure of the program.

(1) a questionnaire was distributed through the Bay Journal, the monthly newspaper produced

by the Alliance for the Bay Program. 750 detailed questionnaires were returned.

(2) 95 in-depth, face to face interviews with key leaders, managers and stakeholders.

(3) 22 focus group discussions with a variety of interest groups. In total, over 1,000 people participated in the evaluation process that lead up to a new Bay Agreement. After the release of the draft agreement, another 1,000 people reviewed and commented on the proposed content of the agreement. This process, perhaps the most extensive and inclusive public participation effort ever to develop a watershed management program, gave not only strong focus to the new Bay Agreement, but also has given us new insight into environmental restoration programs. That new insight, just now evolving, is what I would like to cover today. I hope these observations will provide some guidance for discussions

行われました基調講演の中で非常に詳しく報告いたしましたので詳しくは述べません。しかしながら、興味深い展望が、評価プロセスから得られております。1998年にチェサピーク湾連合が独自の評価法を修復プログラムに対して行いまして、チェサピーク2000協定の作成に役立てるという取り組みを行いました。そして、これには、特別な資金が連邦政府から供出されました。このチェサピーク湾連合というのはNGOで20年間、湾プログラムに中心的な役割を果たしておりますけれども、評価プロセスをつくる役割を果たして、湾プログラムと利益団体と協力して、新しい協定の内容の作成をつくりました。このプロジェクトには18カ月を費やし、3つのアプローチを使って、人々がどんなことに成功したのか、まだできていない点について評価を行ってもらいました。

まず第1には、チェサピーク湾連合が月刊で出しておりますニュースレターであります「湾ジャーナル」に載せました。アンケートに答えてもらいました。750の詳しい回答が寄せられました。

また、95のインタビューをリーダーや、マネージャーや、スティックホルダーに対して行いました。また20人の絞ったグループディスカッション、いろいろな利益団体と行いました。全部で1,000人がこの評価プロセスに参加したことになります。協定素案を発表した後には、さらにもう1,000人がそのドラフトを読み返しまして、コメント、提案を寄せてくれました。この評価を最終的な結果をまとめるに当たりまして、連邦政府に対して我々は報告を行いました。このプロセスは、恐らく今の中で最も広範で、包括的な市民参加の一例だと思います。これによって焦点を絞り込んだのに役立った

leading up to and including the EMECS 5 conference in Kobe.

A Unique Perspective : I have been in a fortunate position to observe both the Chesapeake Bay Program and the evolution of the International EMECS Center. As a partner in the development of the Bay Program and the evaluation process to renew the Bay Agreement, I participated in helping to shape one of the most acknowledged estuary restoration programs in the world. As an observer, from the early days of the EMECS, I have been fortunate to witness the evolution of an organization with tremendous potential to bring together science, citizens, managers, NGOs and governments to share knowledge, to learn new ways, and to advance our thinking and action to restore and protect coastal and bay resources. Now is a good time to step back for a moment and take a look at how these two

extraordinary programs can give us insight into where we should be going with environmental restoration programs in the future.

Chesapeake Bay Program and the EMECS Experience : As I have mentioned, the Chesapeake Bay Program was initiated almost 25 years ago as the United States Congress funded the first comprehensive research of the bay's problems.

Since that time three renewed Bay Agreements have been signed, the most recently just 8 weeks ago. The details of the evaluation process that generated the 2000 Bay Agreement were presented at the EMECS/MEDCOAST conference and reprinted in the proceedings. The content of the new Agreement has been also been covered by Secretary Nishida. I think it is clear that the goals set in the 2000 Bay Agreement are very advanced and will challenge us all to meet them.

ということではなくて、新しい知見を得ることができたわけであります。この新しい知見、洞察力は常に進化しているわけですが、この点がきょうまさに私がお話ししたい点であります。私の論点がさらなる討論を促し、来るべき第5回エメックス会議に生かされることを望むわけであります。

このように、私はチェサピーク湾・プログラムと財団法人国際エメックスセンターの両方の活動に参加する機会を得てまいりました。湾プログラムの方にはパートナーとしまして、新しい湾協定の評価プロセスに参加し、世界で最も認められた河口域回復計画に参加してきました。一方、財団法人国際エメックスセンターの方には、オブザーバーといたしまして、世界の科学者、市民、マネージャー、GNO、政府関係者を一堂に集めるという、このすばらしい可能性を持ったノーマライゼーションの発展を見守っ

てきました。そしてこの人たちが知識を共有し、新しい方法を学び、思想や行動を進歩させる方法を常に学んできたわけであります。今、一步振り返りまして、この2つのプログラムから、いかに有効な知見を得られるのか、ここから将来に向かって環境回復プログラムから、どう進めるかを考えるときだと思います。

先に述べましたように、チェサピーク湾プログラムは25年前にスタートいたしまして、米国連邦予算がついた最初の包括的な研究としてスタートいたしました。当初のものから、2回の改訂を経まして、第3回の協定が8週間前に調印されたわけであります。2000年湾協定の評価プロセスは、第4回エメックス会議の報告書に詳しく述べられております。また、協定の内容は、ニシダ長官が今詳しく話したとおりであります。これは挑戦的である上に、それ

I would like to share with you a few thoughts on what I believe are lessons learned from our public evaluation of the Bay Program relative to global efforts to restore and protect coastal bays and waters. Actually, many of these lessons are shared with other coastal seas efforts that we have been privileged to learn about through the EMECS conferences.

1. The Role of Large Scale Restoration Programs: Large scale water quality restoration programs are essential to advancing our knowledge of water conditions, living resources, and the impacts of populations and development. At first glance perhaps this is obvious, however I don't think we fully acknowledge the fact, nor convey to the funding sources and the public that large scale programs are essential if we are to generate the body of science necessary to address the major problems we are confronting. Without

programs like the Baltic Sea, Chesapeake Bay, Seto Inland Sea, or Mediterranean Sea, our knowledge would not be as advanced as it is today. Without these comprehensive efforts, the problems facing smaller estuaries would not be addressed.

2. Partnerships Are Fundamental :

Partnerships at all levels are critical if we are to put together successful and sustainable effort. The Chesapeake Bay Program learned very early, and is still working on, our efforts to be inclusive in all levels of the research and decision making. I would submit that we needed to take the concept of partnerships to the next level. International efforts, as we have learned, enrich restoration programs at a number of levels. The more opportunities we have to formally acknowledge these partnerships, the stronger our efforts will be.

に見合う能力がこれから非常に大変であるということもまた事実であります。幾つかの、このプロセスからいろんな教訓が得られました。地球規模の取り組みにどう関係づけられるかという教訓を得てきたわけであります。多くの教訓というのは、実はほかの地域と取り組みと協力している、共通しているものですが、それはエメックス会議を通じて学んだというところが多いわけであります。

4つの教訓のうちの1つは、大規模な保全修復計画の役割でありますけれども、大規模な環境回復プログラムが水質の改善、あるいは生物の固体数をふやしたり、人口の影響をなくすということに、非常に不可欠なものはわかっております。しかし、明らかに見えていながら、実は十分にこの知識を認識、事実を認識していることが今までありませんでした。これは、科学者に我々が直面してる問題をわかって

もらうためには、非常に重要なことであります。バルト海のプログラム、チェサピーク湾のプログラム、瀬戸内海のプログラム、地中海のプログラム、こういったところから知識は今ほど大規模なプログラムがなければ進んだものにはなっていないでしょう。包括的な努力、取り組みをして、事によって、より小さな湾に直面する問題にも解決ができるわけであります。

第2番には、パートナーシップの重要性であります。これは本当の基本であります。パートナーシップがすべてのレベルで行われることに成功して、プログラム成功の持続を可能にするものであります。チェサピーク湾・プログラムにおきましては、当初から、もうこのことに気がついて認識しておりました、すべてのレベルの包括的な総合的な努力を研究、意思決定について行ってきました。パートナーシッ

3. Information Sharing :

Sharing information should be an integral component of every major restoration program. Unfortunately, much of the work, even within individual restoration efforts are pursued in what we call a "smokestack" mentality. That is, major areas of interest and/or research, never cross, remaining isolated within that particular area of expertise. The problems that this kind of thinking and acting creates are substantial. Perhaps most disappointing are the missed opportunities that cross fertilization can generate.

This is true not only within our respective programs, but between major efforts nationally and internationally. There are a number of efforts underway to address this problem, but the need still exists to systematically exchange knowledge and solutions faced very specifically by coastal seas and bays. EMECS holds great

promise in meeting that need.

4. Opportunities for EMECS :

What opportunities are there for the future of EMECS? As I have outlined in the previous remarks, it seems that there are numerous opportunities for this organization to assume a new role. Many of the tasks to begin to address the challenges are defined in the work program that has been recently outlined for the coming year. But I think we should look even beyond ; to define a role that carries EMECS well into the future.

We began to define the tasks facing the International EMECS Center with the list of actions in the Antalya Coastal Seas Declaration. Many of these actions are also reflected in the findings from the evaluation that lead to the 2000 Chesapeake Bay Agreement. I believe that is encouraging.

プの概念をさらに、今次のレベルに高めなければいけないと思います。つまり国際的な取り組みを豊かにすることが大事だと思います。パートナーシップの機会が多ければ多いほど取り組みが強化され、また回復計画が迅速に進むと思います。

第3番目には、情報交換であります。情報交換するというのが、これはすべての大きな環境回復プログラムの大切な部分であります。しかしながら、残念ながら我々の多くはまだ時代おくれな、いわゆる煙突時代の精神にしがみついております、交流が余りなく、情報交換もなく、それぞれのエリアに孤立しているわけで、煙突という名前がつけられているわけでありすけれども、このようなアプローチでは問題がいろいろ起こってきます。

一番失望する点は、まさに生物の荒廃、品種改良から生まれるようないい結果というものを生み出す

チャンスを失っているわけでありす。それぞれのプログラムの中だけでなく、幾つかの国内・国際取り組みの間にも、これが言えることであります。そういったことで、この場に対処する方法、系統立てて知識を交換するシステムが、今、非常に求められております。この意味でエメックスが持っている将来性というのは非常に大きなものであります。

次に、財団法人国際エメックスセンターの将来性についてです。さきにも述べましたとおり、新しい役割を果たす家族のチャンスに恵まれていると思います。最近、エメックスセンターの組織改正と多くの事業計画が決定されました。

我々もっと大切なのは、財団法人国際エメックスセンターの将来の役割にあると思います。エメックスに直面している課題は、まさに昨年出されましたアンタリア宣言の行動計画に示されております。こ

We should be heartened that the over 1,000 participants in the Bay evaluation identified many of the same issues and actions adopted by the Antalya Declaration. What we need to do now is to tie the work of the International EMECS Center even more closely to specific international estuary and coastal seas restoration efforts. In closing, the International EMECS Center has brought together a diverse and talented group of people, dedicated to working together to protect our coastal and environmental resources.

Governor Kaihara, again I wish to thank you for your vision and willingness to offer continued support to the International EMECS Center and to those of us who have had the pleasure of making the journey with you, the dedicated staff, and so many people from around the globe.

We look forward to supporting you and the International EMECS Center as it meets the

challenges of this new century.

の宣言に盛り込まれている行動計画はチェサピーク 2000 の評価の結果とも多く共通しております。このことは非常に心強いことであります。1,000 人の参加者がアンタリア宣言の行動計画と同じことを、チェサピーク湾について言っているわけであり、今やるべきことは、まさに財団法人国際エメックスセンターの事業を、より具体的な、国際的な取り組みにタイアップ、連携を進めていくことだと思います。

最後に、財団法人国際エメックスセンターは、実に多彩な優秀な人材を世界から集めてきました。その人たちは皆、水域環境保全に献身的な働きを行う集団であります。

貝原知事に対しまして、ここにもう一度、知事のビジョンと、この取り組みを続けていくという強い意欲に対して感謝の意を表したいと思っております。

私どもといたしましても、新しい 21 世紀の課題に取り組むに当たりまして、遅々と財団法人国際エメックスセンターをますます支援していきたいということをお約束いたします。

どうもご清聴ありがとうございました。

パネルディスカッション

司会 熊 本 信 夫

Prof. Kumamoto

Well, we still have more than an hour to go, so before we open the floor for the discussion, I would like to pick up some questions from myself. I would like to ask some questions, incorporating some questions you have already received from the audience. First of all, Dr. Bell, how the scientific data has been accumulated and showing a lot of actual examples? Without having those scientific data and authentic information, we cannot resolve the problems. Dr. Nishida has mentioned earlier, thank you for your explaining about much in detail about the Chesapeake 2000 Agreement. And Mr. Carroll has explained that there are lots of corporations in this. And on the premise of the large scale plan that we have to incorporate a various kinds of scientific information, while I think this intended content of Mr. Carroll. So I would like to raise the question to Dr. Bell. Accumulated data or scientific

information, how to, politicians or the policy makers, or those people who should follow these principles such as the people involved in fisheries and agriculture, how we can convey all those scientific information to those people? This is the point I would like to raise to Dr. Nishida. The Chesapeake 2000 agreement, in order to actually implement and realize it, how you receive and accept those scientific information or data? How do you fully utilize this scientific information? And another question to Dr. Nishida. By 2010, and you would like to expand this idea for more 2/3 of the area. Do you think that you would like to expand this idea to other states as well? If you could answer to those questions, we would like to be very appreciated. To Mr. Carroll, toward the planning, how we would like to incorporate information into the process? And how the International EMECS Center can work and can play a role in the future? Would

○ 司会 (コメンテーター)**熊 本 信 夫 (北海学園大学長)**

私たちに残されている時間は、1時間程度でありますけれども、フロアの方からの直接のご質問をいただく前に、全体を通して私の方で一、二の質問をさせていただいて、その中には既にいただいているご質問も折り込んで述べたいと思っております。その後で、フロアからのご質問をいただきたいと思っております。

まず、ウェイン・ベルさんは、さまざまな科学的なデータというものが、いかに形成されてきたかということについて、具体的な資料を通じて述べられたのであります。こういう知識なしに、私たちは問題の解決を図ることはできないだろうと思っております。それから、ニシダさんは、2000年の協定の内容を非常に詳細な形で述べられました。それから、デビッド・キャロルさんは、さまざまな協力は、大きなスケールの計画というものを前提として、そ

の中に科学的指標を導入というようなものも含めていくことによって生かされるという趣旨を述べられました。

そこで、ウェイン・ベルさんの方に対する質問ですが、問題は集められた資料、データというものをいかに政策の経営者、政策の作成者、あるいはそういった政策というものを具体的に遵守していく関連の方々、これらには、漁業を営む方もいらっしゃるでしょうし、生産に携わる方もいらっしゃると思いますが、こういったところにどういう形で、そのデータを伝えていくかということが問われているのではないかと、この点についてどうお考えになるかということでもあります。

それから、ニシダさんの方に対する質問であります。2000年の協定というものを実現するためにも、今、上げられましたデータというものをどのように受けとめて、活用していこうとされているのかという点をいかにお考えになるのかということ

you like to touch upon these?

Dr. Bell

Ok, I will begin. As I understand the question in its most general sense, we are dealing with how to share evaluated data, and make sure it becomes available to various user groups which could range from regulatory agencies to other groups such as agricultural farmers and of course my pleasure, to teachers. Let me begin by saying that there are 2 major sources of data for program like the Chesapeake Bay. Some years ago, I did analysis that the institution where I used to work with University of Maryland about the research that they do. And how it responded? I think in that analysis, there are a couple of interesting lessons, which come out. First of all, one of the primary supporters for the Chesapeake Bay research by the scientific community, that would be the university based, laboratory based

community. One of the primary resources for that is the federal government. Through competitive grants and contracts and the largest single founder for many years has been US national science foundation. My older institution accounted for 25% of the total federal grants in its expenditures in any year for scientific research. That's an interesting finding because the national science foundation has never signed any Chesapeake Bay agreement. It's an independent federal agencies dealing with the advance for the science nationwide and is not signatory at any such types of agreements because that's not its mission. Yet it is funding cutting-edge science, the project for example, which national science foundation supports. So you have this independent but relevant, you would say, scientific community out there, one of the largest challenges for research done by a community like that is to get information that is funded under programs that are not

あります。ニシダさんにはもう一つ、西暦2010年までに、全体3分の2の地域に、この回復を及ぼしていきたいということを述べておられましたが、他の州との関係についてはいかにお考えになっておられるのか、これあたりもつけ加えて述べていただけたらと思います。

また、デビッド・キャロルさんは、データをいかに取り入れていくかということを、全体的な計画の中で考えるべきだとお話しされましたが、今後、財団法人国際エメックスセンターがいかに活動していったらよいのか、先ほどの報告との関係でどうお考えかについて、それぞれ説明していただきたいと思います。

では、ウェイン・ベルさん、どうぞ。

○ **ウェイン・ベル氏**

(ワシントン大学環境科学センター所長)

質問は、評価されたデータを実際に政策決定者、

あるいは農家、それから、私の観点からいきますと、先生方といったユーザーにどのようにして利用してもらえるかということですね。このチェサピーク湾に関するデータ源としては、主に2つありまして、そのひとつに私が何年か前にメリーランド大学で研究したのがあります。そこで幾つか、私たちも学んだことがありました。まず、科学者によるチェサピーク湾の研究のための主な支援は大学や研究所です。主な資金提供源は、連邦政府で例えば私たちが1年間の収入うちの25%は連邦の方から来たということでした。最大の支援団体は、おもしろいことにチェサピーク湾の協定に署名していない米国科学財団で、国家レベルでの科学の振興に関する独立した官庁です。

やはり、こういう科学的な世界で何が一番大事かということといえば、どのようにしてその情報を得るかということだと思います。しかし、現実には必ずしもこの湾の計画を通じて直接資金が得られるとい

funded directly through the bay programs to the bay program into the agencies that have made commitments to do things under the bay program. That's the challenge that many universities and others have not entirely met. But it is the one that's extremely important. And quicker that information can get to the interested parties, the better, and that seems not reading necessary for peer review journal articles and other types of that communications which is a continuing frustration for agency officials. The other resource, however, that is increasingly and has always been important, and maybe in some ways increasingly so, has been research and monitoring conducted by those agencies that are part of the Chesapeake Bay signatory agreement. This includes the state agencies for the signatory state like Maryland, Virginia and Pennsylvania but also federal agencies which are signing by the administrator of the US Environmental Protec-

tion Agency represents actually the entire federal government and all sorts of federal agencies, such as US geological service and many others. That are conducting programs on the Chesapeake Bay, programs that ranges from satellite remote sensing to actual periodic monitoring, very rich data source. And there is an effort under way to compile that information and make it more available. Driven in part by the readiness to which you can now post information to the internet. The Chesapeake Bay Program home page contains a large amount of that data, synthesized into various graphics some of which I showed you, and it is a very rich resource. When the Chesapeake Bay program was reevaluating its successes or accomplishments under the 40% nutrient management goal, their results of the assessment for various tributaries and sub-tributaries as well as the bay proper were available on the internet. Even so, there is a wealth

うことではありません。米国においても、大学だけではなく、このような活動に対してなかなか資金が得られないという現状があります。従って、興味を持っている方々に対して、どのようにして、この情報をできるだけ早く提供できるかが重要です。このコミュニケーションは非常に大変ですが、私たちにとりましても、この社会と科学の世界との間のコミュニケーションギャップというのは非常に大きいわけです。

それから、もう一つ申し上げられることですが、研究とモニタリングを進めるということは、もちろんチェサピーク湾の協定の一部で、メリーランド、バージニア、ペンシルバニア、もちろん米国の環境保護庁もこの中の協定に入っております。それから、例えば米国の地質学関係と、あるいはまた太陽関係等の当局もかなり協定に入っているわけでありまして。もちろん衛星のリモートセンサーでこの湾も見られているわけでありまして。いろいろな資料というもの

をこの中で得られております。

このような資料が、だんだん蓄積されており、インターネットを通じてこの資料が得られます。チェサピークもホームページをつくっており、様々な情報を提供しています。例えばグラフィックもありますけど、いろんな情報がその中に載っております。

チェサピーク湾の協定といいますのは、今まで、もちろんその栄養塩を40%削減というようなことも目標としてきました。それからさまざまな支流からいろいろ流れて来ますが、インターネット上でごらんいただきますと、どのような支流がこのチェサピーク湾に流れているかということも見ていただけます。

それからまた、米国の環境保護庁など関連する当局、それ以外の関連する当局とか、あるいは州とかのものの資料も出てきております。そしてコンピューターを使いながら、できるだけたくさん情報を皆様方にお伝えするようにしております。

of information that is generated, that is not necessarily written in the format can be used and be analyzed by the UACPA or other agencies. And there is an initiative now to make the data and more standard format so that can be incorporated and computers can if you will tune on it, and bring it out in an interpreter fashion and manage the vast amount of our information that's available. How to make it available to the user groups is, of course part of our challenge, one requires a very strident call that we are probably here, maybe forever, but one that we really need to hear more clearly is the scientific community needs to be much more communicative. And professional scientists need to be able to recognize that. It's a professional responsibility just as much to communicate with the public and interested agencies and parties who need the information, as it is to publish for your peers. We will change that culture in science. I

think we are going to have a wealth of information available. And finally for the educators, let me just say that resources such as what I showed you today were scientific data, published almost in real time to the internet or certainly in time that is only a few month short. But what we are really doing there is generating a local text book that shows circuits, the old traditional way in which scientific information gets to be classified. And we are , in many ways, what I presented to you today is, in some sense, a science textbook for Maryland in the Chesapeake region. And we really could take advantage of that even more, and I'm sure we will, as our coastal sea program goes along. But remember, if we are interested in the future generations and future citizens' partnership, it's important to reach those future citizens and one of the best ways to do that is that here's a network authority there, the education that you have in your country, that is real-

ユーザーです。例えばどのように効率をされていくかということでありますけれども、恐らく今でも、これから先ずっともっとよくわかってくると思いますが、例えばプロの科学者というのは、本当にもっと上手にコミュニケーションを持っていかなければならないということです。プロとしての責任であるということでもあります。一般の人たち、あるいはまた興味を持つ、そういう当局に対して、いかにして情報を提供するかということ、これが我々の責務になると思っています。もちろん、科学的な文化というものも今もありまして、このような情報をいかにして、これからもっとも民間の人たちに伝えていくかということが非常に重要になってくると思います。

教育者といいますのは、非常に科学的な豊富な情報があるわけです。インターネットを通じてリアルタイムまたは1カ月か2カ月ぐらいの差で皆さん方に見ていただくことができるわけであります。です

から、この中で、例えばそういう意味ではローカルなテキストとかできるのです。今までだったら、本当に教室で、今までは昔にやってきたやり方ではなくて、もっと新しい情報をどんどんクラスでできるわけであります。ですから、あるいはメリーランドとか、あるいはまたチェサピーク湾だけのそういうテキストブックができるということが出来ます。

そして、これから先、我々が、このプログラムを進めていくことによって、もっと詳しい情報が出てくると思います。そして、将来的な市民に対して、自分たちは意思をもってかわっていくというような、そういう奉仕の精神もつくっていくと思っております。教育というものの、そして教育のネットワークというものが非常に重要だということが思えますし、そして、我が国だけでなく、それは日本の皆さん方にとっても非常に重要なリソースになると思います。

ly looking beyond local balance, and it is in the international resource.

Prof. Kumamoto

Thank you very much. Dr. Nishida, please.

Dr. Nishida

Yes, the first question, I will repeat, all I have in our memory, and that was how do we accept the scientific data in terms of implementation of the Chesapeake Bay Agreement. And I would like to answer that by saying one of the strength of the Chesapeake Bay program is that it has been based on some science. It has a science advisory committee that assists the government in determining these goals. So when we entered into the Chesapeake Bay 2000 Agreement, it was based on that advice that we were getting from the scientific community with regards to these specific goals and the time frame. That

adds strength that therefore to governments, as we begin the hard task of developing laws and regulations to implement the goals, because we can go back and say that these were not goals that government picked from the air, but it was based on the scientific data at the time. Having said that, unfortunately there are some, within industry and some within the government who still believe that it has to be done base on exhaustive science. You could always do additional research. And one of the dilemmas is that a government, I think, faces these when you have enough science to act. And in the Chesapeake Bay Agreement, we are essentially saying that based on the best available science of now, we cannot afford to wait any longer. We have to act on what we have here, but that's not to say that science cannot add and science. The second question that I was asked to speak of, and that is what is the reaction of other states to the

○ **司会 (コメンテーター)**

熊 本 信 夫 (北海学園大学長)

ニシダさんはいかがでしょうか。

○ **ジェーン・ニシダ氏**

(メリーランド州環境省長官)

最初の質問ですけれども、私たちは、この科学的な情報をいかにして得て、そして実際にそれをどのようにしてチェサピーク湾の協定の中で実現していくかということでもあります。それに対しては、チェサピーク湾の協定のメリットといいますのは、非常に科学的な根拠に基づいているということです。もちろん私たちの政府が、アドバイザーリコミュニティの助言を得て科学的な根拠に基づいて、この目標を目指そうということでありましたので、という意味では、この助言に基づいて、私たちは科学的な世界の皆様方からさまざまな情報をいただいてそれをもとにしております。

また、実際にこの目標を本当に実施するために、さまざまな厳しい規制でありますとか、ルールというものもつくっているわけでもあります。もちろん私たちはもともと目標を持った時点から、それを実際に実施するためにさまざまな規制というものをつくってきました。政府としては、いつでも、さまざまな科学的な情報をもとにして、それを使いつつ、しかし、本当に科学的な根拠を幾らたくさん持っても十分であるということはないと思います。けれども、今手に入る最高の情報というものを持つだけではなく、その最高の情報をもとにして、そしてその後、もちろんさまざまな情報が出てくれば、それをまた持つことによって、例えば規制を変えていくという方に考えております。

2 番目のご質問でありますけれども、ほかの例えば州です。州の反応はどうかということは、非常に時宜を得たご質問をいただいたと思います。神戸にまいります直前ですが、実は、50 州の環境関係者

Chesapeake Bay 2000 Agreement. It's very timely that you ask me that, because before I came to Kobe, I attended an environmental commissioner meeting, this is the environmental commission for the 50 states of the US met, and I did the similar presentation on the Chesapeake Bay 2000 Agreement. And they were in all, frankly for two reasons. One, because of the ambitious nature of the goals, and secondly because the state like Maryland, which is viewed as a liberal progressive state when it comes to the environment, and the state like Virginia which is not viewed as a liberal and progressive state but rather as a conservative state, but we could agree on these goals. So I think that people have been impressed with the goals, but frankly a little bit frightened by the goals, too. I know the commissioner applauded came up to me afterwards and said, "I wouldn't want to adapt that in my state, because it would mean obvious-

ly a nightmare in terms of management." So I think while they applaud us, they want to be behind us in terms of seeing whether we can achieve these goals, because they are so ambitious.

Prof. Kumamoto

Before we receive the answer from the David Carroll, I would like to ask another question relating to what was mentioned by Dr. Nishida. Some of the Environmental Agency people said in the other state that they would like to adapt that. They said that in Japan, Japanese central government is on the process of delegating the power to the local authorities. These days, in Japan, neighboring prefectures and cities, if one prefecture decides something that neighboring prefecture is always wondering whether they should follow that step or not, but the policy of the local authority and local government are different from each other. How you coordinate with

が集まった環境に関するコミッショナルな会議がございまして、このチェサピーク湾に関係しまして、この2000年の協定につきまして、私たちの目指すものは、非常に野心的であるということをお話いたしました。同時に、バージニア州については、メリーランド州は非常に自由な州とは異なり、どちらかということ、保守的な州というような州の性格の違いが在りながら、私たちの持っている目的は共通しているということです。目標というのは、ひょっとしたら、本当に驚くべきことかもしれません。ほかの州の知事さんが「いや、私はそういうのは使いたくないですね、」とか言われ、また、「実際に管理する側にとっては、それは悪夢のようなものだから」というふうに言われた環境関係者がいらっしゃいました。実際に目標が本当に私たちが遂行できるかどうかというのは、かなり非常に野心的でありますから、このような発言がでたのでしょう。

○ 司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

関連で質問を加えさせていただきます。今、ジェーン・ニシダさんのお話の中では、自分の州では、この目標についてちょっと見合わせたいというお話です。日本でも、これは米国と違って中央政府が、その権限を地方に分けていくというのが基本的な考え方ではありますが、最近は少し状況が変わってきております。日本でもそれぞれの地域ごとに政策決定が行われて、したがって、日本の場合ですと隣の県とか市になりますけども、それに同調するかどうかというのは、非常に大きな問題なわけです。この協定、チェサピーク2000協定に至るプロセスの問題を考えた中で、そういう自治体の違い、自治体の方針の違いというものをどういう形で調整していくか、そういったことなども、ちょっとつけ加えて、今後のあり方について述べていただければありがたいのですが。

the difference, the different idea that each different states are having? How do you coordinate if each different state is having a different idea or a different policy? How do you coordinate that? Dr. David, please.

Mr. Carroll

You give me such an easy question, professor. First of all, I think we have to change our concept of how we manage our resources. And I think this is happening with the public, especially in the last 5 to 10 years. Remember, political boundaries are artificial boundaries. They are from long histories and for reasons, we fought wars over or whatever.

But artificial boundaries and citizens are beginning to understand that natural resources do not acknowledge political boundaries. The air is, as Dr. Nishida mentioned, 25% of the nitrogen in

the Chesapeake Bay comes from the air deposition. Much of that comes from, in fact, from the Ohio River Valley, power plants in the Ohio River Valley. And for many years, the focus in the Ohio River Valley, the environmental secretaries, their governors and people who run the power plant, just simply, you know, so ignored. And we finally coming very close, I believe, that EPA to beginning to manage that because enough people in the Congress and political leaders, enough of the NGOs have said, you know, why should the citizens of the Chesapeake Bay watershed have to pay for the pollution that is coming from outside of our airshed. So what has begun to say, where we don't want that is to go is a sort of watershed or airshed wars. But what it does begin to say is that everything we do has some sort of impact on someone else's for natural resources. We simply have to acknowledge that, and then we can get

○ デビッド・キャロル氏

(環境政策・研究管理事務所長)

まず、資源をどのようにしてマネジメントしていくかという考え方を変えなければいけないと思います。これはもう既に人々の間では起こっています。この5年から10年の間に、こういった変化が起きました。例えば、政治の境界というのは人間が作り上げたものです。歴史、そして戦争があったり、何らかの形で人為的につくられたものです。しかし、それぞれの人々が今このことに気がつき始めました。

つまり自然の資源というのは、こういった人間がつくったような、政治的な境界にこだわるものではないということ。例えば窒素酸化物については、チェサピーク湾の窒素などは、よく空気中からも来ているというお話をしました。特にこれは、この川の上流の方に発電所等のいろいろな汚染源となっているということもありました。オハイオ州では、こういっ

た工場や発電所で仕事しているような人たち、その持ち主の人たちが、その下流でどういったことが起こっているかということに対して、最初は完全に知らん顔していたわけです。そして、それに対してNGOの方が働きかけました。つまり、チェサピーク湾、つまりこの下流の方が何でその上流から、つまり自分たちを外の方から来る汚染に悩まなければいけないんだということに声を上げ始めたわけです。その結果として、この水域、そして空域の戦いというのが起こりました。つまり、私たちが何をしても、ほかの人たち、だれか回りの人たちに何らかの影響を与えてしまうわけです。これを覚えておかなければいけません。そして、それを認めなければいけません。そして認めることによって、一緒に努力をすることができる戦略ができるわけです。それが先ほどニシダさんのおっしゃった、このチェサピーク2000協定の中心になる考え方だと思います。メリーランド州の考え方、この州の法律、これ

over that critical point of acknowledging it, we can then begin to develop strategies that address that, like we are beginning have in airshed, like we have in the Chesapeake Bay Agreement. As Dr. Nishida pointed out, the governmental structures in Pennsylvania, Maryland and Virginia are completely different. Completely different the way they run their governments. The political situation in the state is completely different, yet they were able to come to the agreement somehow on this new bay agreement. Why? Because the citizens, NGOs and many of the local governments said that this Chesapeake Bay and watersheds that lead into the rivers are more important than just political boundaries. It's a part of their life. It's people who are willing to go that extra step to achieve these goals. And we have a personal responsibility to, I mean, you know, I have no children, and I will be dead in 10, 20, 30 years, 40 years if I'm lucky, so why should I worry

about that? I think most of us here who are leaving future generations have responsibilities. People are beginning to acknowledge that. People understand that. That also becomes a powerful force. Young people educating some of our biggest environmental programs in the state of Maryland, the recycling program, really were initiated out of the public school system and became legislation. I'm sorry professor, it's much too long.

Prof. Kumamoto

That's all right, thank you very much. It is a quite impressive answer to my very simple question.

Mr. Carroll

Is that when I swear "you talk too long? "

は完全に今までとは異なったもので新しいやり方です。政府、政治的にも変わってまいりました。そして、メリーランド州は、そのほかの州とは非常に考え方が違う、政治的な考え方が違うのに、それでもやはり手を結ぶことができたわけです。国民、そしてNGO、そういった人たちがそれを見てきました。この川の水が流れ込んでくるチェサピーク湾というのは、この政治的な境界よりもずっと大切なのだということに気がつき始めたからです。ですから、こういったことを理解することによって、人々が前に一歩踏み出したのだと思います。そして、個人個人が責任をとるということ、つまり、責任感を感じるということだと思います。その結果として、20年、30年、私たちの子供たちの世代になってきたときに、随分と違っている将来になるのではないのでしょうか。ここにいるほとんどの私たちが、やはりこの将来を担っていく人たちです。ですから人々は理解し始めています。そして、その結果として、若い人

たちが理解するということが大きな力になっているわけです。これが教育のメリットであります。

メリーランド州では、これを進めています。例えば、公共の学校のシステムにこういったことを導入して法律にもしているわけです。

○ 司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

私としては、どう調整するかという質問をしたんですが、同じ問題は自治体、あるいは委員会等の政策に対して、企業はどのようにこれに対してリアクションがあったのか、企業の協力がどうあったのか。それから、市民参加の問題ですが、市民がこれについてどのように参加したのかということも問題だろうと思います。

それから、ウェイン・ベルさんのお話の中で、コミュニティからボランティア、ワーキングボランティアが参加して、この科学的なデータの形成にホンテ

Prof. Kumamoto

I don't think so.

Prof. Kumamoto

Earlier I asked Dr. Nishida, how they could coordinate among different states with different political approaches, the same will be true to the local governments and commissions. Excuse me, how would the private sectors, private companies, enterprises will react to the policies given by the state agencies or the local governments. How they react to that? Do they cooperate or not? And also how did the citizens participate in such an effort or a promotion? These are very important. Also incidentally, earlier in the presentation by Dr. Bell, there were some discussions of the working volunteer from the local community in promoting the scientific data collection. Excuse me, I wonder if there was such an incident. There are some floor participants' ques-

tions in relation to development of the participants of the citizens. So I would like to ask the corporate's participation, and Dr. Bell for the volunteers of the citizens.

Dr. Nishida

In the Chesapeake Bay program, there is a citizens advisory committee that does include business sector. So there are businesses that participate in the development of the Chesapeake Bay Agreement. I can tell you that with regards to the reaction of the bay agreement. For the most part of the bay agreement has been a voluntary agreement, and therefore, businesses have been willing to participate very actively and been very supportive. We have tried to emphasize pollution prevention as oppose to heavy regulatory programs that would impose fines and penalties. And again, we have a program with the business sector called "businesses for the bay",

リベーションをしたのかどうか、その辺、どういう例があるのかというふうな質問がフロアから既に私の手元に来ておりますので、合意形成に至る過程で企業の参加はどうなのかということはジェーンさんの方に、市民参加についてはデビッドさんの方に、それからコミュニティからのワーキングボランティアの参加について、これは科学的にデータということに限られますけれどもウェイン・ベルさんにそれぞれお答えいただけますか。

○ ジェーン・ニシダ氏**(メリーランド州環境省長官)**

このプライベートセクターがどのように関与しているかということですが、チェサピーク湾のプログラムでは、委員会がありますが、この中には企業は入っておりません。それではこういった反応があるかということですが、この協定のほとんどが自主的な合意内容となっています。ですからそれに

対しては、非常に好意的な反応が今まで出ています。例えば、汚染防止については、かなり規制することもできます。例えば罰金を取ったり、さまざまな罰則を取ったりすることもできますが、こういった形ではやっておりません。企業の方では企業の方で、自分たちで自主的に何か事が起こるまで待つのではなく、自主的に行動をとっています。そしてこのような自主的な行動の方が非常にうまくいくと思います。このようなことも含めて、私たちのやり方が変わってきていると思います。今までのような規制に基づいたやり方、強制的なやり方ではなく、つまり罰金をしたりするようなやり方ではなくなってきたわけです。もしこういったやり方だと、ビジネスは参加してきません。しかしそうではなく、やはり自主的なプログラムでビジネスをパートナーとして迎え入れたいと考えています。こういった企業の多様の変化、非常に好意的な変化が大きな要因となってきたと思います。

where businesses will develop these voluntary programs that try to pro-actively reduce pollution. And we give them awards every year and that has had a much success. When we go into this new agreement, as you saw from my presentation, it is frankly going to change how we operate, it means that there are going to be more regulatory programs, more programs that will become mandatory, and therefore there will be fines and penalties are set against businesses that do not participate in the program. We are hoping that because of our strong partnership under the voluntary program, that we can continue to keep businesses involved. And so far, I haven't seen many businesses run away from the program. But it's going to be a challenge to make sure that in order to meet these ambitious goals, that we can continue in the cooperative ways that we have in the past.

Dr. Bell

Can I just add?

Prof. Kumamoto

Yes, please.

Dr. Bell

I think what is important to understand about the bay program, and I want to emphasize what Dr. Nishida has is that this largely has been a voluntary program. There are very few, if any, federal regulations. There have been no federal regulations, which said you had to enter into a bay agreement, completely voluntary. There are very few federal laws even, which mandated us to clean up nitrogen and phosphorus. In fact, until our very recent program, nitrogen was not even recognized as the controllable pollutant. So the states, our Maryland, Pennsylvania and Virginia are committing tens of millions of dollars,

○ **ウェイン・ベル氏**

(ワシントン大学環境科学センター所長)

私の方からも言いたいんですが、この湾の協定、このプログラムで大切なこと、ニシダさんの方もおっしゃいましたけれども、非常に自主的な項目だということです。強制的なものはそれほどありません。これは連邦法とは違うわけです。ここには連邦法はありません。つまり、これをしなければいけないという法律ではなく、自主的な取り決めです。

その法律、例えば連邦府の中を見たとしても、例えば窒素、リンの浄化についての規制を見ていくと、完全な強制というのはそれほどありません。例えば窒素については、この管理規制項目には入っていないぐらいです。メリーランド州、ペンシルバニア、こういったところでは、非常に多額のお金を使って、特にリン、窒素もそうですけれども、リンを浄化しています。これは法律に、つまり連邦の法律に決まっていなくてもかかわらずに窒素を除去するための

排水処理施設をつくっています。これは連邦法で決まったからということではないわけです。非常に特異な興味深いことだと思います。このチェサピーク湾の水質、そして文化的な背景を考えて、このような違いが、変化が起こっているわけです。そして、その結果として、多額の何億ドルもかけて、自主的にこのプログラムを始めているわけです。どうもありがとうございます。

○ **デビッド・キャロル氏**

(環境政策・研究管理事務所長)

市民、ボランティアの参加ですけれども、ニシダさんがおっしゃったとおり、チェサピーク湾プログラムでは、このマネージメントの団体で、チェサピーク湾連合というのがあります。これは自分たちでさまざまな活動をしていくわけです。例えば非常にまじめな分析を中心としたジャーナルでグラフやデータを発表しています。

including the local governments, to clean up the pollutant, nitrogen and phosphorus, especially nitrogen, which there was no law requiring it to be cleaned up. And in fact, the state of Maryland and a number of local governments have now committed probably a couple hundred Million US dollars in building waste water treatment plants to remove nitrogen without there being a federal requirement. So we have a very unique situation there, where, because of the importance of the Chesapeake Bay as a water body and our cultural background. Local governments, businesses and the federal government are participating and committing hundreds of millions of US dollars in a voluntary program.

Mr. Carroll

Thank you. With regards to citizens and volunteers to pick up initially on what Dr. Nishida said, the Chesapeake Bay program has

into a management structure. The citizen group called the alliance for the Chesapeake Bay, which we see is partial funding from the bay program to help with itself own activities, notably the publication of one of the finest pieces of the literature around there, the Bay Journal, which is a non nonsense analysis of the Chesapeake Bay information, it's not afraid to put a few graphs and some data table as well to get citizens informed. There are other citizen groups within the region, it's interesting that you don't find Sierra Club in auto-ban society and some of the national NGOs has the Chesapeake Bay and as you do some other programs that are whole grown. They include the alliance, but they also include a very large group called the Chesapeake Bay foundation, which is a private organization not funded by the bay program, but raises money for the bay restoration efforts and environmental education programs and alike.

そして、そのほかの市民グループの活動としては、シエラクラブなど、NGOの中には、国際的なものもたくさんありますけれども、そういったものではありません。チェサピーク湾での活動は、非常に地域に根ざした活動からできたボランティアです。例えばチェサピーク基金で湾の自然を回復するための資金を集めたりしています。市民がどのような活動しているかということですが、例えばモニタリングの事業に参加している人たちもいれば、もっと独立した活動をしている人たちもあります。また、メリーランド、デラウェア、さらにはペンシルバニアで活動しているわけですが、それぞれが自分たちのモニタリングステーションをつくっているわけです。そしてちゃんとチェサピーク湾の事業がうまくいっているかということ、非常に効率よくサンプルを集めて分析しています。これは非常によいことだと思います。事業の中には何年かたっているものもあります。例えば80年代に始めた事業ではかな

りの情報が集まっています。

モニタリング事業は非常に長い視点に立ってプログラムの情報を集めているものもありますが、そういったものを見ると、長期的にどういった変化があったかということがわかると思います。例えば大きなショッピングセンターが建ったことによって、河口の水質がどのように変化してきたかということを見せてくれるわけです。ただ、ここで問題というのは、まずモニタリングで参加している人の多くは、何か問題があるのではないかという懐疑的な見方をする人がいるということです。確かにそういった傾向もありますけれども、懐疑的な見方をするだけで正しいことではありませんので、余り度が過ぎると問題です。また、やはりデータを使ってもらわなければいけないと考えている人たちの中には、こう過激な言動も少し目につきます。しかし、全体的に見れば、これらのデータ非常にすばらしいデータの財産ですので、この活動はとても重要なことです。そ

With regards to the citizens involved in the voluntary monitoring, there are numbers of citizen monitoring programs, some of them are maintained under the auspices of the Chesapeake Bay program and coordinated though it, and some of them are more independent. These were now live in the peninsula, where Maryland and Virginia are found. There are couple of river monitoring groups that have set up independent monitoring that has expanded on what the Chesapeake Bay program is doing in the river monitoring by taking more intensive samples. The quality of these ranges from fair to good, some interesting kinds of trends since these programs are, in some case, several years old, some cases dating back into the 1980s. They produced a fair amount of information. Citizen monitoring programs that are maintained over the long whole, don't necessarily show you large scale trends, unless there has been a severe

change, someone built a huge shopping center just upstream of your monitoring station, you might find increasing pollutants into the water, maybe some other nutrients. But for the most part of the scale and sensitivities that citizens are using are, there's a frustration, I guess, its two faults. One is, I think a lot of citizens got involved in monitoring thinking that they are going to find something out and they are able to take collective action, not always the case. And the second is that there is a continuing use of data that are getting useful as anybody using them, and this has become a data sharing, formatting and so on. This is been looked into, but we hope to convene, perhaps this year, a workshop to bring these monitoring programs together to look at those issues and see how we can continue to maintain this terrific resource of volunteers who are interested and committed to increase the water quality and basically asking

して、こういった活動こそがこの品質を高めているんだと思います。また、こういった人たちの方でも、私たちに対して何らかのアドバイスを求めてきたりもします。

最後にまた、もう一つ、教育についてのプログラムがやはり市民によってつくられているということがあります。この教育プログラムは、多くのほかの活動と並行して非常に活発に行われています。こういった人たちのほとんどはプロフェッショナルな科学者ではありませんし先生でないという場合もあります。例えば、本当に先生として、しっかりとこの環境について教えようと思うと、資格をとらなければいけないわけですが、こういった資格を持っていない人たちもたくさんいます。

しかし、全体的に見るとこの地域として、いろいろな人たちに情報を届けなければいけないという必要性は絶対にあるわけです。そして、そのことは、結果として長期的に見ると参加意識を高め、また、

長期的に活動していくためには非常に重要だと思います。

○ 司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

フロアからの質問がでているようです。それとの関連で、先ほどニシダさんは、この2000年の協定の最後にまとめとして4つの点を指摘されました。

1つはホーリスティック・アプローチ、つまり「全体的に問題」を見ていくということで、これは非常に大事なことであります。それから、科学に基づく理解、これをいかに改善していくか、あるいは取り入れていくかということだと思います。それから、3番目にはアクティブ・ダイアログ、つまり積極的な対話です。この種の問題解決をまとめていく上で対話というのが中心にならなければならないと考えているとのことで、これはまさにそのとおりであると思われます。

for a kind of guidance they need. Finally and again, this goes back to my continuing plea. Both for environmental education programs and a number of environmental education centers around the Chesapeake Bay region for citizen programs in general, and for a number of other activities that involves volunteer work, many of people who are involved in there things are not professional scientist. Even in the case of teachers, that are working under environmental education in Maryland requires that environmental matters to be taught three times during the student's career in the public schools. Teachers are not often trained in the ecology, and trained under the kind of sophisticated kind of thing that I presented. There really is a need for the community on this information to reach out to the concerned citizens and others and help bring them up to understand the advances that are available to them. It will make a lot of differ-

ences in terms of what the citizens understand, and in the long term, I think that the depth of the commitment will be able to sustain that commitment.

Prof. Kumamoto

Thank you very much. Scientific knowledge, the administrative policy, the other issue. They are also given by some floor participants as questions. Earlier, Dr. Nishida gave the summary of 4 points at the end of her presentation. Holistic approach was the first point, to take a holistic view, which is very important. And the scientific understanding, how to improve the scientific understanding or how to implement this aspect into our total activity. And the third is the active dialogue, which is also very important in promoting such an activity, which is understood, accepted by all of us. And No. 4

また、計画は広域で立てて、具体的にはそれぞれの地域に適合したものを進めていくと、これが2000年の協定中の基本であるというふうに最後までまとめられました。私も全くそのとおりだと思いますし、きょうご出席の皆様方も大体同じようなお考えをお持ちだろうと思います。

そこで、先にウェイン・ベルさんの方にお尋ねして、その後、ジェーンさんにお尋ねしたいんですが、チェサピーク湾の水質、あるいは生物に対する、あるいは水質の汚染、こういったものは、もう相当改善されたというふうにお考えなのか、先ほど非常にいろんなデータを提示されましたけども、特に化学物質、環境ホルモンについてはどうでしょうかというのがあります。もう一つの質問は、チェサピーク湾内での赤潮の発生について、原因である窒素などの栄養塩の問題は解決されているのでしょうか。この質問が2つありますので、まずウェイン・ベルさんに、その点のお答えをいただけますでしょうか。

○ ウェイン・ベル氏

(ワシントン大学環境科学センター所長)

それでは一般的な汚染物質について、それから栄養素についてお話しします。この後者は赤潮で関係しておりますので、ニシダさんの方からお話がありましたけれども、93年からコミットメントをとって、チェサピーク湾では栄養塩については、25%減らそうということを考えております。これはまだ続けております。非常に近いところまで来ています。恐らく、この窒素はかなりうまくいってます。まだリン等には問題がありますけれども、これもかなりうまくいっております。

こういった栄養素の負荷というのは、陸地からどれぐらい入ってくるかということで、なかなか計算が難しいわけです。ですから、いろいろなことを考えなければいけません。

例えば、ある河川における、つまり流域におけるこの濃度、また、そこでどれぐらいの量の農薬が使

is to think regionally, act locally. So we have to have the large picture, but we have to be very specific, focusing on the different needs of the each locality. I do agree with these four summary points, and I think most of the participants also share our view. So, first I would like to have a question to Dr. Bell and then to Dr. Nishida. The first question to Dr. Bell is about the Chesapeake Bay water quality and the biological conditions. Have you deducing there is much improvement, especially endocrine destructive chemicals and other chemical pollutants? What do you think the current status is in the Chesapeake Bay? Another is about your comment on the red tide in the Chesapeake Bay.

Do you think already the problem of the nitrogen has been solved as a source or the cause of the red tide, Dr. Bell?

Dr. Bell

First with the pollutant in general and talk about nutrients, because that will relate to the red tide. You can do that one at least fairly completely. As Dr. Nishida pointed out, we had a commitment since 1983 to reduce the nutrients loadings to the Chesapeake Bay by 40% over all, and those goals will to be achieved by this year. We are very close to those goals. For nitrogen, the evidence indicates that we actually, probably made it for firstly at close, not quite as close, but we are doing quite well. You need to understand that those are nutrients loads, which are calculated and determined by what comes in from the land. It's a difficult number to measure, so we refer these loads for variety of things, such as concentrations of nutrients in certain streams, use of fertilizer by agriculture and we estimate where they go and a variety of other types of things including some moderates to

われているか、そしてそのほかのことを考慮して、広範囲にデータを見て計算しなければいけないわけです。この栄養素の濃度ということですが、湾流域の人口については、皆さん驚かれるかと思いますが、25%増加して、既に600万になっています。しかし、この栄養塩濃度はずっと大体横ばいです。長期的に見ると、また年間のこういう違いを見てみると、大体横ばいでありまして、窒素にしても、リンにしても同じことが言えます。これは非常にいいニュースです。しかし同時に、このプロセスを十分理解することも必要です。というのも、このチェサピーク湾は、生物や状況、政治的なシステムでなっているということです、やはりこのバランスをどうやって維持して、改善していくかということを考えていかなければいけないわけです。実際に、その藻が大発生するということがあります。これが起こると、それは栄養塩がふえているということになるわけです。

これはなかなか実際起こってしまうと難しいわけです。特に、ことしは流水が非常に多かったわけで、その結果として6週間ぐらい、非常に悪い状態が続きました。メリーランド州からバージニア州にかけて、こういった状態が続いたわけです。

そして、マホガニータイドといったものがありまして、これが実際続くかどうかということは注意深く見ていかなければいけません。皆さんの中には、フェステリアという病気についてお話を聞いた方もいらっしゃるかと思います。97年にエメックス主催の発表会があったときにお話をしましたけれども、かなりの毒素が、このピスカシラというこの病名にかかり、たくさんの魚が死んでしまいました。この対策として、かなり多くのモニタリングプログラムが始まることになりました。良い知らせとしては、その結果として、この同じ病気で死んだ魚は非常に減ったということがあります。

また一方で、赤潮ですけれども、これは大分減って

estimate what those loads are. When you look at the nutrient concentration in the Chesapeake Bay, I think you will be impressed with the fact that despite the fact we have had the growth in the Chesapeake Bay population by about 25% since the bay agreement was signed, and now to around 16 million I think, nonetheless, the nutrient concentration in the Chesapeake Bay, on the whole, remains fairly constant. If you look at long term trend, there were some annual and inter-annual variations which make it harder to get trends, but nitrogen looks like its essential level and phosphorus that matter does, too. That's both encouraging, but it's also we need to understand the underline processes that are going on here. If you believe that the Chesapeake Bay as a steady system in which nutrient supply is matched by its uptake by organisms to grow, then you will expect concentrations not to change dramatically, probab-

ly really alarmed if they do go up a lot, because that will indicate the balances has been upset. As a result of that, then the question about whether we had increased nutrient becomes a very good question, because if we have, that would imply that in fact nutrient supplies may also been increasing. And there is a data, a little bit difficult to tease out. This particular year where we had a lot of runoff from the watershed, we also had a massive mahogany tide in the Chesapeake Bay, which lasted about 6 weeks, in the middle section of the bay, at least in the Maryland waters, unless I am less familiar with the Virginia situation. And undoubtedly, that the mahogany tide was sustained, in part, by fairly large growth of nutrients coming in this year from the watershed. Whether that trend will continue, especially in years when we have lower runoff, we have to have a look at. I think a number of you are also familiar with, maybe

います。赤潮自体は減っています。80年ぐらいから私がやっているのですけれども、97年からこのプログラムが、特に最近出ておりますけれども、それほどひどい状況にはなっておりません。全体的な目標としては、このチェサピーク湾がちゃんと生物が生きていけるようにしなければいけないということですから、25%の栄養塩を減らすということによっても、やはり栄養塩だけではなく、酸素の量ということも見ていかなければいけません。酸素のところはできてしまっている、そういった問題もあるからです。この比率がどうなっているかということを見ていかなければいけません。それは全体的に、生息域に影響していくからです。環境ホルモンについて言えば、これは米国とその他の国との間の非常に大きな違い、興味深い違いだと思います。全体的に見ると、米国ではこの有害物質ということですが、有害物質という意味では他の国ほど大きな騒ぎはありません。例えばレイチェル・カールソン

の「沈黙の春」については多くの人が読まれていると思いますけれども、どちらのケースも非常に重要なことだとは考えています。チェサピーク湾については、有害物質が非常に高いところもあります。特に堆積物の中にあるわけですが、これについてはホットスポット、ボルチモア、ノースバージニア、そしてその他、ワシントンDCの近くの川などにこういった非常に問題のあるところが見られます。チェサピーク湾よりもこういったところに多い訳です。そして、最終的な目標としては、やはり全く有害物質のない湾を作り上げるということです。ただ、こういった有害物質は今から入ってこなくても、非常に残留性が高いということがあります。例えば、食物連鎖の中から入ってくる、そういったことによって最終的に環境ホルモンという、分泌を狂わせてしまうような有害物質が入ってくるということがあるわけです。そしてそういった物質が入ってくると牡蠣やその他の魚に悪影響を与え、そしてその結果と

heard of fisteria outbreak we had back around the time of EMECS 1997. And which led Governor Glenndening closing some rivers due to the presence of, small numbers, because this is not an abundant organism, of small numbers of toxic organic called fisteria and its relatives. There has been a major research and monitoring programs initiated as a result of that. And the good news is that we have seen very little fish kills that can be attributed to this organism since then, or we have better tools for detecting it. It's an organism that is present naturally in small numbers all the time. And so at least, at the moment, outbreaks of that particular, what will call a red tide, the particular organism seems to be rare, if not existent, and we are still left in the position we can bring the mcoming back. We don't have in the Chesapeake region, large fish killing red tides for the most part, and the evidence, since I have come back to the bay region from

working elsewhere since the 1980s is that the large number of blooms and associated fish kills, the one when we experienced in the late 1970s, that led to the bay program, have largely decreased to the point where its locally significant. There are some other ramifications I guess I have to point out about nutrient lording, the overall goals of the bay program is really related to restoring the Chesapeake Bay as a living habitat, and even the 40% nutrient lords will impose the regionally to eliminate the zero oxygen water, in the deep water of the Chesapeake Bay system. As we learned more, in fact you saw some of the data today, some of that is at least natural. And what we are really beginning to ask now is that can we reduce the extent of that kind of low oxygen water and its duration, and therefore restore effective habitat.

して免疫性が弱ってしまいます。するとこういった生物が、周りにある環境にある有害物質に対して免疫が弱ってしまうという問題があるわけです。その他の外国では非常に感心が強まっているかと思えます。特に川などから入ってくる水、こういった有害物質について長期的、短期的なことを考えてゆかなければなりません。これは特にどれぐらい魚を食べている国民性かということについても関係あると思います。これは食物連鎖に関係あるからです。ですから皆さんが非常に感心があるというのはよく分かりますし、皆さんの方からも多くのことを学んだと思います。

○ 司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

非常に内容のある話をありがとうございました。

ニシダさんの方にお尋ねしますが、先ほど4つの

ポイントの中で考えていかなければならないのですが、ある政策を進める結果として、ほかの方にマイナスの要素になるというふうなことがしばしばあります。日本では河川、あるいは海の汚染を防止する一つの有力な方法は、下水道のシステムを発達させるということです。これによって多くの河川の水が非常によくなって、魚が戻ってきたと、こういうふうに言われます。特に、日本の河川ではサケが戻ってきました。これは下水の改善ということによって戻ったと理解されるのであります。しかし、この場合、この下水処理に殺菌のためにさまざまな薬品が使われるというふうに思います。同じような問題がチェサピークでもあるのではないだろうか。したがって、その結果として、下水道の整備によって、逆にチェサピーク湾内の漁業資源にマイナスの影響というのが出ていないのかどうかという質問であります。ジェーン・ニシダさんがよろしいのか、デビッド・キャロルさんがよろしいのか、ウェイン・ベル

Prof. Kumamoto

Thank you very much for your informative speech. Thank you. I'd like to ask you, Dr. Nishida. You've raised 4 points, of course we have to consider all these points. If you implement 1 policy, you might see some kind of minus or negative effect to other policies in Japan. In Japan, we have to develop more sewerage system, with this development, of course we are having clearer water into river. It is said so. Particularly in Japanese rivers that lot of salmons are coming back to the river because we have implemented very big policy to change and clear

the water of the river using that very good sewerage system. In this case, of course we use various kinds of drugs and medicines to treat the water. I think you might have the similar problem in the Chesapeake Bay. Because we have a very good sewerage system, but from the other point of view, if you set up a very

good sewerage system, don't you have any negative effect to the fishery? May I ask you to Dr. Nishida or to Dr. Bell or Dr. Carroll, anyone?

Dr. Nishida

Treatment plant, that is something that we have sort of priority emphasis in the Chesapeake Bay.

And as Dr. Bell was referring to, that in terms of because of the our meeting the 40% nutrient reduction goal, a large part of that is because of the requirements that we have put on our wastewater treatment plants. I mentioned one program in my presentation and that is the biological nitrogen removal system, which is a system we impose on our larger wastewater treatment plants. And of the 66 wastewater treatment plants in Maryland, about 64 of those treatment plants have either installed this new

氏がよろしいのか、どなたでも結構です。

○ ジェーン・ニシダ氏**(メリーランド州環境省長官)**

この下水の処理に関しましては、非常に私たちは力点を置いておりまして、特にそのチェサピーク湾では力点を置いているものであります。ベル先生の方から40%栄養塩を減らすという紹介がありましたけれども、この下水処理ということに関しても、私たちは政策を持っております。

私のプレゼンテーションで、この生物学的な窒素の除去に関して、66の下水施設がメリーランドにありますけれども、このうち64が新技術を使うなり、あるいは、新しい設備をつくらうということを確約しております。私たちはこの目標を達成するために、もちろんその州からの資金を調達しなければなりません。そのために資金調達の大きなプログラムがあります。このような技術を使って、新しい下水処理

設備というものがきちんと設備されるようにするという事です。従って、それぞれの州政府や連邦政府から、こういう資金を取りまして、できるだけそのような新しい下水設備を取り入れるということです。環境の数値をあわせるためにということを考えております。漁業につきましては、例えば日本でサケが戻ってきたとおっしゃいましたけれども、そのような大きな成果は私たちの国では得られていません。

フィステリアという病気が何年か前に発生しましたけれども、やはりこれも下水処理の方から起こった病気でありました。また、それだけではなくて、農業のランリョクです。流水からもそういう病気が起こったということでありました。もちろん、川に対しまして、窒素が非常に多くなったことで魚が死んだということもございました。メリーランドでは、もちろん汚水処理に関しましても、それから私たち人間だけではなくて、動物から汚物処理ということに関しても、新しい設備を使っていこうと考えてお

technology or have committed to installing it. What that has meant is that in order to meet that goal, they have required funding from the state. So we have very large funding program where we assist the local governments in being able to install this technology, because we know many local governments are not able, even though they have a desire to meet the environmental standards, physically can not meet it. So with the help of state government funds as well as assistance we get from the federal government, from appropriations we get from the congress, we had these programs into place. I'd like to just talk a little bit in terms of the impact in terms of fisheries. We haven't necessarily seen a large impact as you have in Japan with regards to salmon fishery, again because we have invested so much of it. What we found in disease fisteria several years ago, that it wasn't from the wastewater treatment plants but rather it

was from the nutrient from agricultural runoff. It was the waste that we get from the animal productions, that is contributing to the nitrogen loading into our rivers which are killing our fish. So what we tried in Maryland is to say, yes, we have to continue to look at wastewater treatment facilities and human sewerage, but we also have to look at animal sewerage and other sources of nutrient.

Prof. Kumamoto

Well, in the audience, is there anybody who can explain about this sewerage implementation or sewerage improvement in Japan? Mr. Kumazawa raised this question. What is actually happening in Japan? Your question was, in Japan we are treating the wastewater at the downstream. So sometimes because we try to treat those water, sometimes we have an adversarial effect to the fishery or the water. And in Maryland, Dr.

ります。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

ご説明いただきました下水道の整備と漁業支援への影響というふうな点について、ご質問されました方はいらっしゃいますか。

もしできれば、この点について、日本ではどうか、ご存じの範囲でちょっとご説明いただけますか。

○質問者

私は、東京湾の汽水域の件で、この間、少し聞いたのでございますが、やはり非常に大量に雨が降りますと一度に流れ込んできますので、下流で下水処理をやっておりますから、だから大量な殺菌をしなけりゃいけないということで、東京湾の汽水域のあたりには非常にその影響があると言っておりました。

しかし、時期が過ぎると、やはり戻ってくるという、生物がいなくなるけれども、やはりあと回復するというようなお話を聞きましたけれども。影響はやはりあるようですが、殺菌作用によって海水の魚たちの影響はあるようなことをおっしゃってましたけれども。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

大雨のときに、処理が十分できなくて、処理されないのが海へ流れていっていると、そういう意味じゃないのでしょうか。

○質問者

いえいえ、その処理をうんとしなけりゃいけないから、殺菌の量をふやすと言っておりました。そのための影響が非常に出ていているということで、でも後で回復するというようなお話でございます。

Nishida just mentioned that they are implementing and introducing various kinds of new type of technologies. I have just heard about the mixing water area at Tokyo Bay. In this blackish water or the region, because when we have a lot of rain, we have a lot of water into the bay. Because we are treating the wastewater at the downstream, in order to clear the water, we have to have a very big amount of chemical. So I heard that around the blackish water area in Tokyo Bay, they have an adversarial effect. As time goes by, we can see no more organisms but as time goes on, again those kinds of organisms would come back to the bay. There are some adversarial effects to fishery or maybe the fish.

Person in the floor

You mean when we have a lot of rain, we have to have a very big amount of chemicals,

so that's why we are having the negative effect on to the bay. But the situation would recover as time goes on. Dr. Okaichi, would you tell us something about this issue? About the treatment of sewerage, and because of those sewerage treatments, sometimes we might face adversarial effect on to the biological world. Do you have any thing to say?

Prof-E. Okaichi

In Japan, the biggest problem relating to the sewerage system is not in the metropolitan area but in the local area or rural area's sewerage system. That's the problem. That means agricultural area, the point source pollution, which is located here and there in agricultural area. Looking at this sewerage system in Osaka prefecture or Hyogo prefecture, they have already implemented almost 100% sewerage system. However in Okayama prefecture, Hiroshima and

○司会 (コメンテーター)

熊 本 信 夫 (北海学園大学長)

この点、岡市先生何かお教えいただけますでしょうか、今のこの問題について、下水場の処理、その結果、逆に海の自然等にマイナスの影響が出てこないだろうかと、こういうあたりが今のご質問の内容でしたけども、先生のお立場ではいかがでございますか。

○岡市 友利 (香川大学名誉教授)

今、日本の下水処理で一番問題になっているのは、むしろ大都市の下水よりも、むしろ何というか、ローカルな方、ニューラルな地域の、つまり農村部、その他に点在している点源汚染がむしろ問題なわけです。

例えば、何か沿岸での下水処理場の整備状況を見ますと、大阪とか、兵庫というようなところは大方100%近い下水処理場が完備されているんです。

ところが、そのほかの府県、これは岡山、広島、香川等を含めまして、下水処理の程度というのは、恐らく30%ぐらい、あるいは場合によれば20%ぐらいと、非常に下水の処理能力が落ちているわけです。今の方が、要するに大量に雨が降ったときに、下水処理場の処理能力が間に合わなくて流したという事実は実は全くないとは言えないのです。ただ、そのときにどういう薬品を混ぜているのか、そういうことは、実は、申しわけないのですが、それは余りよく承知してないわけです。しかしいずれにしても、日本とか瀬戸内海の現在の大きな問題というのは、そういうふうな非常に点在している集落における排水をどのように処理していくか、それが河川を、小さな河川を汚染しているということだというふうに思っております。それから、今のような薬品をどのようにするのか、いろんな薬品が海の中に流れておりますけれども、全体としては生物への大きな影響は私は現在認めていないという、立場というより

Kagawa prefectures, the sewerage treatment system has not yet been achieved 100% of course, there are about 30 or less than 30, 20% sometimes. The sewerage system is very bad in those areas. So when we have a very big amount of rain, the capacity of the treatment of the sewerage cannot really meet that. Well, I cannot say that there is not at all this problem but what kind of treatment we do? I don't know much about that. In any case, around the Seto Inland Sea in Japan, those agricultural areas here and there locating that, how we can treat those sewerages in those rural areas? How to treat the water in tributaries? What kind of medicines or drugs we should use for the treatment? Some part of those drugs and medicines we use for treatment has been flown into the sea. But as a whole, we cannot or we do not find a very big adversarial effect to the biological world in the sea so far.

Prof. Kumamoto

In relation to the sewerage system, is there anybody in the floor, in the audience, who can give us information about that? Could you give us your identification please?

Person in the floor

I'm from Imabari City, which locates on the part the Seto Inland Sea. My name is Shiraishi. The fact I know is, it's a bit against mentioned by Dr. Okaichi. In rural cities, in smaller cities, the sewerage system treatments are not really the administrator. But from the citizen point of view, I think it's a very bad situation I can say. You might think that administrators know that some part of cases, the drug or the medicine would go into the sea, and it might not have a very bad effect to the sea. However I would like to against your opinion. In some places, we can find fish we cannot eat fish because of those

も、そういう考えでいきたいということ。ただ、今はまた十分気をつけてもらわないと困ります。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

ありがとうございました。

フロアの方から、この点について下水道の処理との関連で情報提供していただける方いらっしゃいますでしょうか。

○質問者

私、瀬戸内海の今治というところから来ました。

今の両先生のお話に大変事実として申し上げますと、先生のお考えに反するかもわからないのですが、この小都市の下水処理の状況は、私は行政サイドではございませんが、市民から見ても極めて悪く考えられます。しかもそれを行政サイドが承知しているのかなと思われる場合もあるとも考えられます。それが海に流れ込んでおりまして、漁業に、魚類に

影響がないんじゃないかというお考え、ここんところは私の考えといたしますか、受けとめ方と反しておりまして、幾つものところで、もう既にその場所の魚が食べられないと思われます。ただ、それが小さいところで起きますから、大きな声になっていないと。ただ、もうあそこの魚は食べてはいけないというところは、例えば広島湾のカキとか、そういう大学の研究機関とか、あるいは県レベル、国レベルの目が届いていないところで、そういうケースが私らの周囲には事実ありまして、それに私ら残念に思い、大変危惧しておりますのでございます。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

ちょっと質問させていただきますが、それは下水道が完備していて、そういう現象になっているのですか。

sewerage system treatment. The oyster in the Hiroshima Bay or those places where actually administrators do not know, all those kinds of adversarial effects are going on. We are really worrying about that. May I ask you?

Prof. Kumamoto

Well, let me say, because you have a very good sewerage system that's why you..... What was mentioned by Dr. Okaichi was that there is really the problem where you don't have the perfect sewerage system. The cities where they have very a good sewerage system, they don't have any problem. Dr. Okaichi just mentioned that in those small cities where there is not a perfect sewerage system....

Person in the floor

Well, Dr. Okaichi mentioned that he might not see any problem at all, but actually from

the citizen point of view, that in the local region, I can say there is an adversarial effect in the sea because of the imperfect sewerage system.

Prof. Kumamoto

I think I have already mentioned all the questions given by the floor participants preciously except maybe one, but is there any other questions from other people? If not, then I would like to give this last question to Dr. David Carroll, because he earlier said he got only easy question. So now I would like to give him a little bit heavier question to him to conclude the session. That is about the budget for the environmental restoration. The basic idea of the question is, I suppose maybe to focus on the state or the Chesapeake Bay area. But whatever the data you might have, or maybe this question should given to Dr. Nishida, But any how, if you have

○質問者

いやいや下水もないですね。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

それで、いやそこで、岡市先生のお答えは、むしろそういうところにこそ問題があるとおっしゃっておられたのです。

○質問者

そういう意味では賛成でございます。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

そうです。岡市先生のご意見は、きちっと整備されているところは今後問題ないけれどもということですが。・・・

○質問者

そういう意味ではもうおっしゃるとおりでございますね。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

ほかの方は逆に問題があるというふうにおっしゃったのです。岡市先生のご意見はそういう趣旨でございます。

○質問者

そういう意味では全く賛成でございます、そういうものが流れ出しておるので、魚類に影響がないとは言えないと思います。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

逆にむしろ影響があるというふうに岡市先生はおっしゃってます。

any figure, what will be the annual budget spent on the restoration of the environment? And also what will be the monetary effect coming as a result? If you have calculated, maybe you could share the information with us. It's simple, but maybe hard question.

Mr. Carroll

Actually, because one of the things we discovered fairly early on and we are talking about wastewater treatment plants here. However it's, as Dr. Nishida pointed out, many of our sources are what we call "non-point source", that is runoff from rain. And that has several affects.

One is in your wastewater is a tremendous amount of overflow and a leakage into that system which forces that out into our streams and rivers. This is a problem we are facing, but trying to improve the infrastructure, the pipe systems. The second big issue is, in fact, the runoff

comes during the storms from city streets or suburban streets and in places like Baltimore Harbor, a new port news are developed areas, a large percentage of the pollution loading is caused not by waste water treatment plants necessarily but by the runoff from rain. And the issue there is because they will need to face is that because there are so many stormed rains and outlets reaching our rivers and bays, how do we treat every one of those? And no one has an answer yet. Do we build a waste water treatment plant at every single storm out fall? I think you know what the answer for that is. So we are going to develop new techniques to stop or reduce pollution loadings come from our developed areas, our rural areas but especially the suburban area. In Maryland, for example, there are about 6 million acres in the state of Maryland. And a million of those acres are in developed lands. And while most of that or large

○質問者

大変小さいところでいろいろ起きているというように感じております。

○司会（コメンテーター）

熊本 信夫（北海学園大学長）

岡市先生のご意見はそういうご意見です。地方のそういうところで問題があると、こうおっしゃっておられる。

○質問者

それは全く私の受けとめ方がちょっと間違っておりますのかもわかりませんが、そういう実態でございます。

○司会（コメンテーター）

熊本 信夫（北海学園大学長）

最後に、デビッド・キャロルさんに、先ほど私の質問は非常に軽いと言ってくださったんで、最後に

1つ、重い質問をさせていただいてというふうに思っております。これは環境修復にどれぐらい予算をかけるかということで、恐らくこの質問の趣旨は、州とか、あるいはチェサピーク全体とかによるかと思いますが、その点、ご存じの範囲で結構ですが、1年間にどれぐらいの予算を盛り込んでいるのか、あるいは、これはジェーン・ニシダさんの方がよろしいのかもしれませんが、それから、その費用をかけた結果、どういう効果が生じているのか、その辺どういうふうな評価がなされているのかなど含めて、費用と効果の部分についてお答えいただければありがたい。質問は簡単ですけども、答えは大変難しいかもしれません、どうぞひとつよろしく。

○デビッド・キャロル氏

（環境政策・研究管理事務所長）

そうしましたら、前の質問にちょっと返りたいのですけれども、というのも私たちが理解したこととして、先ほど排水処理について話をしていたかと思

percentage of that is served by waste water treatment plants, certainly the runoff, the non point source runoff is not treated. Yet it just likes a water treatment plant right into our streams. So we have a big challenge ahead of us and that is now how do we start to control runoff from developed areas. We'll talk about budget. And budget is a so much tricky thing to pen down, but I'll give you some numbers. As mentioned, the federal government through Environmental Protection Agency funds or pours the Chesapeake Bay program through a federal appropriation each year, and that is approximately 18 million US dollars. Now the states respond to that by making their own funding commitments, which we refer to as "the federal money leverage", or inspire the states to spend more money. And it has been estimated, it's very rough, that from the 80 million dollars, federal money, it leverages each year somewhere between

45 and 70 million dollars of state money. And if you add on top of that, and this is a figure where it becomes more difficult is, how much do local governments, smaller governments spent. And that is a number that we really don't have a handle on it. So within the bay region, there is somewhere between 60 and 100 million dollars a year that is spent on program management, fishery management, infrastructure that is waste water treatment plants, operations, programs for agencies and etc..

That's the total budget figure. But those come from many different sources. You will not find anywhere and anyone's budget which says 60 to 80 million dollars, 100 million dollars. But there is 80 million dollars approximately each year from the federal government to run the bay program. There are, I think, both Wayne Bell and Jane Nishida mentioned earlier, also many federal agencies who are now formal particip-

います。ニシダさんからお話がありましたとおり、多くの汚染源としては、非点源なわけです。つまり、例えば流水や広範囲なところから来ている汚染源であります。ですので、このパイプのような形で、この排出処理がされていた場合、かなりの大雨が降ったときにはオーバーフローということが起こってしまいます。その結果として、全体的な流域で、やはりこの汚水が川に流れ込んでしまうということがあるわけです。

ですので、インフラをしっかりとっていくということが急務であると考えています。

また、もう一つ大きな問題としては、この流水が町、そして都会の都市の方からやってくるということ、例えばボルチモア湾や、またニューポート、こういったところから入ってきます。すると、ほとんど多くの汚染、汚濁物が雨からの、雨水の流水であります。これは非常に重要な問題になっています。これがどんどん川に流れ込んでしまうと。すると、これをどうやって対処していったらいいのかという

こと、これについては、残念ながらまだ答えがありません。つまり、すべてのこういった雨水に対する処理場をつくるのかということ、やはりこれはかなり難しいと言わざるを得ません。こういった都市から流れ込んでくる雨水や、そのほかの排水の処理を考えていかなければいけないわけです。メリーランド州などでは600万エーカー、こういった非常に広い都市を有しております。ほとんど排水処理がカバーしているところです。しかし、それでも非点源から来るような、こういった汚染源については、なかなか処理できておりません。これが非常に大きな挑戦であると考えています。これについては、今ちょうど着手しかかっているところにあります。

予算は難しいことだと思うのですが、少し数字をお出しできるかと思います。

例えば、この環境保護庁といったような米国の政府、こういったところが毎年政府の予算を組んでいます。これについては1,800万ドルでありました。それに対して州の方ですが、州の方でも資金を供出

ants, who actually signed a federal agreement with EPA, and so there is probably at the federal side, another 6 to 50 million dollars that come from other agencies.

Our Fisheries Agency, core engineer, which is largely construction agency, and that comes from a variety of sources. There are about 26 to 28 other federal agencies that participate in the bay program. Now the really difficult question to respond to is what benefits have been gained. Everyone tries, I think everyone's natural response is to say, well, if I have to go to my state legislature or my congress or my business community, I want to say, we are going to spend 40 million dollars a year and we are going to get 60 million dollars of benefits. Well, unfortunately it's very difficult to do that in the environmental programs and many people who are working on that. My theory is that we need more information on that. If you try to do a

strict cost benefit analysis, the environment almost always lose. And because there are many benefits that simply are not tangible benefits. In Maryland, our recreational boating industry represents between 7 hundred and 50 million and a billion dollars of business every single year. Well, someone would have to say if we just let the bay get polluted and turned into solid mahogany tide from May until September, what will happen to the recreational boating? Who would want to take go sailing in a bay, which is full of red tide and dead fish? Probably not very many people, but it's very hard to put a value on that or to know when that will happen. So it's very difficult, but I think you can look at most regions, most coastal bays and seas that you can at least identify the categories of areas where there will be significant economic loss if you do not pursue and make the investment in your environmental restoration program. So

しなければいけません。これは連邦の予算を使ってプログラムしていくわけですが、これが1,800万ドルを受けて、それをうまく使って、最終的にはこの州としては4,500万から7,000万の予算をつくるということです。ただ、これは小さな政府になるとなかなか大変だと思います。これはメリーランド州のような大きな州政府ではこれぐらいの予算を使うということですが、小さい州になると少しわかりません。この州全体で恐らく、この漁獲などについては6,000万から1億ドルぐらいを使うのではないかと思います。これはさまざまな機関が集まっているいろいろな漁獲高や魚の資源、そういったことを確保していくということですが、これはいろいろなところから入ってくるお金です。恐らく全体的に6,000から1億ぐらいではないかと思うんですが、大体毎年政府、連邦政府から来るのは1,800万ドル、湾プログラムに対してはこの金額です。ベル先生、ニシダ先生の方から話がありましたが、連邦機関の方でもさまざまな形で、この環境

保護庁に対して、調印をして、さまざまなプログラムに参加しています。そして、そのほかの機関としては600万から1,500万ぐらいが、そのほかの、例えば建設省のようなところから来ます。

全体では26から28ぐらいの、こういったさまざまな機関が参加していると思います。さまざまな金額を供出しています。

しかし難しい点としては、こういったメリットが、金額的な効果があったかということです。これは自然に答えとして出てくるのは、例えば議会に行ったとき、もしくはビジネスのコミュニティに行ったときに、普通、私たちが4,000万ドルぐらい使って、6,000万ドルぐらいの金額効果があったということが出来るかもしれません。しかし、環境プログラムの場合は非常に難しくなります。なかなかそうはいきません。私個人の考え方としては、このような計算をするには情報が少な過ぎるということです。例えばコスト、そしてコスト効率の考え方をすると、なかなか難しい。そして、余り狭義に考え過ぎると、

maybe I thought of answer that question.

Prof. Kumamoto

You might have some more questions, but now I would like to review what we have discussed so far. We talked about many issues about the Chesapeake Bay, and this Chesapeake Bay share many common features with the Seto Inland Sea. I think this does require my explanation. Both are enclosed coastal areas and it has inflows of the rivers and the water doesn't go out to the outer ocean. As for the marine resources, both the Chesapeake Bay and the Seto Inland Sea are very similar. As said by Dr. Bell, the fishery is a great natural resources, also found in the Seto Inland Sea. And also there are a lot of utilizations as the agricultural purposes although there is not much discussion today. And also it has the functions of the habitats for the people and also industrial land

or industrial zone. And also as for the political jurisdiction, as for the Chesapeake Bay, there are altogether 6 judiciaries and the similar things is true for Seto Inland Sea. But the system is different between Japan and the United States. Japan has a quite clear relationship between the central government and the local governments,

while the state governments are pretty strong in the US. So there are similarities and differences between the Chesapeake Bay and the Seto Inland Sea. But all in all or maybe because of this, how to utilize scientific data and how to involve the citizens groups and the private sectors in the promotion activities promoted by the administrative bodies or the national government, there are some common issues that we all have to think about together.

Today's seminar was the wonderful seminar, and to commemorate the new beginnings of the EMECS after incorporation, and I would like to

環境にお金をかけてもむだだという考えに行き着いてしまうかもしれません。これは非常に気をつけなければいけません。有形効果がないからやめてしまうというのではだめです。

例えば、メリーランド州では、ボート、船舶です。こういったところではマホガニータイド、こういったことを見て、9月までにプログラムを考えています。

例えば赤潮が出て、そしてまた魚が死んでしまうと、このボートを楽しみに来る人たちはいなくなってしまう。もしもこんなことになれば、どういった金額的なロスがあるかということは、なかなか算出はできません。こういったこともしかしコスト、そして効果を考えるときには考えていかなければいけないわけです。ですから、それぞれの知識でカテゴリーをまずつくらなければいけないと思います。どういったところで、何かこういった問題があれば大きな経済的なロスが出る。環境的な行動をとらなければ、こういったことがロスになるということ、まずカテゴリーしなければいけないと思います。

○司会（コメンテーター）

熊 本 信 夫（北海学園大学長）

ちょっと振り返って考えてみますと、きょうはいろいろとお話がありましたチェサピーク湾のあたりと、瀬戸内海と非常に共通する面があるわけであり、これは皆様方、私の方から説明するまでもないと思いますけれども、いずれも閉鎖地域でありまして、河川の水が流入して、それが外洋に出て行くというのには、なかなか困難なところがあるという点で共通点がありました。

それから、資源の海といいますか、資源という点ではチェサピーク湾、それから瀬戸内海非常に共通しております。第1に、もちろんきょうのテーマでもあります、ウェイン・ベルさんの説明の中心でありました漁業資源の問題、瀬戸内海についてはもちろん言うまでもありませんが、そのほか、きょうは格別出ませんでしたけれども、農地として活用されている、このあたりも同様であります、それから、生産の危機、人々が住む場所というふうなこと

take this opportunity to appreciate 3 speakers, who are great friends of mine to spent long hours with us. And I appreciate you participants as well. And to conclude, I would like to give them a big hand. Thank you very much.

もありますし、そのほか多くの工場等々に、いずれにいたしましても物理的に非常に共通点があります。

これに加えて、行政の区画が先ほど4つの状態、6つの区域、チェサピーク湾ありました。その上流の州などを含めると6つほどの州にありますし、瀬戸内海の場合もありますか、県、そのほか市が関与すると。それに加えて、米国の場合、連邦と州の関係がありますし、日本の場合は中央政府と自治体との関係があると。いろんな点で共通点がありまして、そこで起きている現象に対する取り組み方という点も、そういう意味では、相当共通する部分があるというふうに理解されるわけであります。

それだけに、きょういろいろとご報告がありました、科学的なデータをいかに活用するか、それから行政の意思決定の上に、市民、企業、あるいはそのほかの諸団体がいかに参加していくか、こういうことによってデータを集約して、これをいかに具体的な政策論に反映させていくかという点は、私たちも

同様に考えていくことができる部分であろうかと思っています。

きょうのセミナーは、国際エメックスセンターが財団法人としてスタートするにふさわしい内容のものであったかと思っています。

Chesapeake 2000



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September 21, 2000

The Honorable Toshitami Kaihara
Governor, Hyogo Prefecture
IHD Bldg. 5-1
Wakinohama-kaigandori 1-chrome
Chuo-ku, Kobe 651-0073 Japan

Dear Governor Kaihara:

Thank you so very much for your kind words about the new Chesapeake Bay Agreement. I know that you are keenly aware of the magnitude and importance of the document that provides the vision and guides so many people working to restore the Chesapeake. A copy of the signed Agreement is enclosed for your information and use.

The signing ceremony was truly an historic event. It is one that should be repeated throughout the world as citizens and governments come together to meet the challenges of the future and make the commitments necessary to revitalize our coastal waters. There will be a delegation of Maryland officials attending the "EMECS International Seminar on Chesapeake 2000" which you are so graciously hosting. We have many experiences and "lessons learned" that we are eager to share.

Your reminder about the Fifth International Conference on the Environmental Management of Enclosed Coastal Seas in November, 2001 is very much appreciated. The meeting would certainly be an excellent opportunity to discuss some of the implementation aspects of the Chesapeake Bay Agreement. I will follow closely as details of the meeting are developed.

With great admiration, I thank you again for the congratulations you offer. Please accept my best wishes for your continued success.

Sincerely,

Parris N. Glendening
Governor

Enclosure



CHESAPEAKE 2000

PREAMBLE

The Chesapeake Bay is North America's largest and most biologically diverse estuary, home to more than 3,600 species of plants, fish and animals. For more than 300 years, the Bay and its tributaries have sustained the region's economy and defined its traditions and culture. It is a resource of extraordinary productivity, worthy of the highest levels of protection and restoration.

Accordingly, in 1983 and 1987, the states of Virginia, Maryland, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission and the U.S. Environmental Protection Agency, representing the federal government, signed historic agreements that established the Chesapeake Bay Program partnership to protect and restore the Chesapeake Bay's ecosystem.

For almost two decades, we, the signatories to these agreements, have worked together as stewards to ensure the public's right to clean water and a healthy and productive resource. We have sought to protect the health of the public that uses the Bay and consumes its bounty. The initiatives we have pursued have been deliberate and have produced significant results in the health and productivity of the Bay's main stem, the tributaries, and the natural land and water ecosystems that compose the Chesapeake Bay watershed.

While the individual and collective accomplishments of our efforts have been significant, even greater effort will be required to address the enormous challenges that lie ahead. Increased population and development within the watershed have created ever-greater challenges for us in the Bay's restoration. These challenges are further complicated by the dynamic nature of the Bay and the ever-changing global ecosystem with which it interacts.

In order to achieve our existing goals and meet the challenges that lie ahead, we must reaffirm our partnership and recommit to fulfilling the public responsibility we undertook almost two decades ago. We must manage for the future. We must have a vision for our desired destiny and put programs into place that will secure it.

To do this, there can be no greater goal in this recommitment than to engage everyone — individuals, businesses, schools and universities, communities and governments — in our effort. We must encourage all citizens of the Chesapeake Bay watershed to work toward a shared vision — a system with abundant, diverse populations of living resources, fed by healthy streams and rivers, sustaining strong local and regional economies, and our unique quality of life.

In affirming our recommitment through this new *Chesapeake 2000*, we recognize the importance of viewing this document in its entirety with no single part taken in isolation of the others. This Agreement reflects the Bay's complexity in that each action we take, like the elements of the Bay itself, is connected to all the others. This Agreement responds to the problems facing this magnificent ecosystem in a comprehensive, multifaceted way.

BY THIS AGREEMENT, we commit ourselves to nurture and sustain a Chesapeake Bay Watershed Partnership and to achieve the goals set forth in the subsequent sections. Without such a partnership, future challenges will not be met. With it, the restoration and protection of the Chesapeake Bay will be ensured for generations to come.



LIVING RESOURCE PROTECTION AND RESTORATION

The health and vitality of the Chesapeake Bay's living resources provide the ultimate indicator of our success in the restoration and protection effort. The Bay's fisheries and the other living resources that sustain them and provide habitat for them are central to the initiatives we undertake in this Agreement.

We recognize the interconnectedness of the Bay's living resources and the importance of protecting the entire natural system. Therefore, we commit to identify the essential elements of habitat and environmental quality necessary to support the living resources of the Bay. In protecting commercially valuable species, we will manage harvest levels with precaution to maintain their health and stability and protect the ecosystem as a whole. We will restore passage for migratory fish and work to ensure that suitable water quality conditions exist in the upstream spawning habitats upon which they depend.

Our actions must be conducted in an integrated and coordinated manner. They must be continually monitored, evaluated and revised to adjust to the dynamic nature and complexities of the Chesapeake Bay and changes in global ecosystems. To advance this ecosystem approach, we will broaden our management perspective from single-system to ecosystem functions and will expand our protection efforts by shifting from single-species to multi-species management. We will also undertake efforts to determine how future conditions and changes in the chemical, physical and biological attributes of the Bay will affect living resources over time.

GOAL

Restore, enhance and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.

Oysters

- ◆ By 2010, achieve, at a minimum, a tenfold increase in native oysters in the Chesapeake Bay, based upon a 1994 baseline. By 2002, develop and implement a strategy to achieve this increase by using sanctuaries sufficient in size and distribution, aquaculture, continued disease research and disease-resistant management strategies, and other management approaches.

Exotic Species

- ◆ In 2000, establish a Chesapeake Bay Program Task Force to:
 1. Work cooperatively with the U.S. Coast Guard, the ports, the shipping industry, environmental interests and others at the national level to help establish and implement a national program designed to substantially reduce and, where possible, eliminate the introduction of non-native species carried in ballast water; and
 2. By 2002, develop and implement an interim voluntary ballast water management program for the waters of the Bay and its tributaries.

- ◆ By 2001, identify and rank non-native, invasive aquatic and terrestrial species which are causing or have the potential to cause significant negative impacts to the Bay's aquatic ecosystem. By 2003, develop and implement management plans for those species deemed problematic to the restoration and integrity of the Bay's ecosystem.

Fish Passage and Migratory and Resident Fish

- ◆ By June 2002, identify the final initiatives necessary to achieve our existing goal of restoring fish passage for migratory fish to more than 1,357 miles of currently blocked river habitat by 2003 and establish a monitoring program to assess outcomes.
- ◆ By 2002, set a new goal with implementation schedules for additional migratory and resident fish passages that addresses the removal of physical blockages. In addition, the goal will address the removal of chemical blockages caused by acid mine drainage. Projects should be selected for maximum habitat and stock benefit.
- ◆ By 2002, assess trends in populations for priority migratory fish species. Determine tributary-specific target population sizes based upon projected fish passage, and current and projected habitat available, and provide recommendations to achieve those targets.
- ◆ By 2003, revise fish management plans to include strategies to achieve target population sizes of tributary-specific migratory fish.

Multi-species Management

- ◆ By 2004, assess the effects of different population levels of filter feeders such as menhaden, oysters and clams on Bay water quality and habitat.
- ◆ By 2005, develop ecosystem-based multi-species management plans for targeted species.
- ◆ By 2007, revise and implement existing fisheries management plans to incorporate ecological, social and economic considerations, multi-species fisheries management and ecosystem approaches.

Crabs

- ◆ By 2001, establish harvest targets for the blue crab fishery and begin implementing complementary state fisheries management strategies Baywide. Manage the blue crab fishery to restore a healthy spawning biomass, size and age structure.

VITAL HABITAT PROTECTION AND RESTORATION

The Chesapeake Bay's natural infrastructure is an intricate system of terrestrial and aquatic habitats, linked to the landscapes and the environmental quality of the watershed. It is composed of the thousands of miles of river and stream habitat that interconnect the land, water, living resources and human communities of the Bay watershed. These vital habitats—including open water, underwater grasses, marshes, wetlands, streams and forests—support living resource abundance by providing key food and habitat for a variety of species. Submerged aquatic vegetation reduces shoreline erosion while forests and wetlands protect water quality by naturally processing the pollutants before they enter the water. Long-term protection of this natural infrastructure is essential.

In managing the Bay ecosystem as a whole, we recognize the need to focus on the individuality of each river, stream and creek, and to secure their protection in concert with the communities and individuals that reside within these small watersheds. We also recognize that we must continue to refine and share information regarding the importance of these vital habitats to the Bay's fish, shellfish and waterfowl. Our efforts to preserve the integrity of this natural infrastructure will protect the Bay's waters and living resources and will ensure the viability of human economies and communities that are dependent upon those resources for sustenance, reverence and posterity

GOAL

Preserve, protect and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the Bay and its rivers.

Submerged Aquatic Vegetation

- ◆ Recommit to the existing goal of protecting and restoring 114,000 acres of submerged aquatic vegetation (SAV).
- ◆ By 2002, revise SAV restoration goals and strategies to reflect historic abundance, measured as acreage and density from the 1930s to the present. The revised goals will include specific levels of water clarity which are to be met in 2010. Strategies to achieve these goals will address water clarity, water quality and bottom disturbance.
- ◆ By 2002, implement a strategy to accelerate protection and restoration of SAV beds in areas of critical importance to the Bay's living resources.

Watersheds

- ◆ By 2010, work with local governments, community groups and watershed organizations to develop and implement locally supported watershed management plans in two-thirds of the Bay watershed covered by this Agreement. These plans would address the protection, conservation and restoration of stream corridors, riparian forest buffers and wetlands for the purposes of improving habitat and water quality, with collateral benefits for optimizing stream flow and water supply.
- ◆ By 2001, each jurisdiction will develop guidelines to ensure the aquatic health of stream corridors. Guidelines should consider optimal surface and groundwater flows.
- ◆ By 2002, each jurisdiction will work with local governments and communities that have watershed management plans to select pilot projects that promote stream corridor protection and restoration.
- ◆ By 2003, include in the "State of the Bay Report," and make available to the public, local governments and others, information concerning the aquatic health of stream corridors based on adopted regional guidelines.
- ◆ By 2004, each jurisdiction, working with local governments, community groups and watershed organizations, will develop stream corridor restoration goals based on local watershed management planning.

Wetlands

- ◆ Achieve a no-net loss of existing wetlands acreage and function in the signatories' regulatory programs.
- ◆ By 2010, achieve a net resource gain by restoring 25,000 acres of tidal and non-tidal wetlands. To do this, we commit to achieve and maintain an average restoration rate of 2,500 acres per year basin wide by 2005 and beyond. We will evaluate our success in 2005.
- ◆ Provide information and assistance to local governments and community groups for the development and implementation of wetlands preservation plans as a component of a locally based integrated watershed management plan. Establish a goal of implementing the wetlands plan component in 25 percent of the land area of each state's Bay watershed by 2010. The plans would preserve key wetlands while addressing surrounding land use so as to preserve wetland functions.
- ◆ Evaluate the potential impact of climate change on the Chesapeake Bay watershed, particularly with respect to its wetlands, and consider potential management options.

Forests

- ◆ By 2002, ensure that measures are in place to meet our riparian forest buffer restoration goal of 2,010 miles by 2010. By 2003, establish a new goal to expand buffer mileage.
- ◆ Conserve existing forests along all streams and shorelines.
- ◆ Promote the expansion and connection of contiguous forests through conservation easements, greenways, purchase and other land conservation mechanisms.

WATER QUALITY PROTECTION AND RESTORATION

Improving water quality is the most critical element in the overall protection and restoration of the Chesapeake Bay and its tributaries. In 1987, we committed to achieving a 40 percent reduction in controllable nutrient loads to the Bay. In 1992, we committed to tributary-specific reduction strategies to achieve this reduction and agreed to stay at or below these nutrient loads once attained. We have made measurable reductions in pollution loading despite continuing growth and development. Still, we must do more.

Recent actions taken under the Clean Water Act resulted in listing portions of the Chesapeake Bay and its tidal rivers as "impaired waters." These actions have emphasized the regulatory framework of the Act along with the ongoing cooperative efforts of the Chesapeake Bay Program as the means to address the nutrient enrichment problems within the Bay and its rivers. In response, we have developed, and are implementing, a process for integrating the cooperative and statutory programs of the Chesapeake Bay and its tributaries. We have agreed to the goal of improving water quality in the Bay and its tributaries so that these waters may be removed from the impaired waters list prior to the time when regulatory mechanisms under Section 303(d) of the Clean Water Act would be applied.

We commit to achieve and maintain water quality conditions necessary to support living resources throughout the Chesapeake Bay ecosystem. Where we have failed to achieve established water quality goals, we will take actions necessary to reach and maintain those goals. We will make pollution prevention a central theme in the protection of water quality. And we will take actions that protect freshwater flow regimes for riverine and estuarine habitats. In pursuing the restoration of vital habitats throughout

the watershed, we will continue efforts to improve water clarity in order to meet light requirements necessary to support SAV. We will expand our efforts to reduce sediments and airborne pollution, and ensure that the Bay is free from toxic effects on living resources and human health. We will continue our cooperative intergovernmental approach to achieve and maintain water quality goals through cost-effective and equitable means within the framework of federal and state law. We will evaluate the potential impacts of emerging issues, including, among others, airborne ammonia and nonpoint sources of chemical contaminants. Finally, we will continue to monitor water quality conditions and adjust our strategies accordingly.

GOAL

Achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health.

Nutrients and Sediments

- ◆ Continue efforts to achieve and maintain the 40 percent nutrient reduction goal agreed to in 1987, as well as the goals being adopted for the tributaries south of the Potomac River.
- ◆ By 2010, correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act. In order to achieve this:
 1. By 2001, define the water quality conditions necessary to protect aquatic living resources and then assign load reductions for nitrogen and phosphorus to each major tributary;
 2. Using a process parallel to that established for nutrients, determine the sediment load reductions necessary to achieve the water quality conditions that protect aquatic living resources, and assign load reductions for sediment to each major tributary by 2001;
 3. By 2002, complete a public process to develop and begin implementation of revised Tributary Strategies to achieve and maintain the assigned loading goals;
 4. By 2003, the jurisdictions with tidal waters will use their best efforts to adopt new or revised water quality standards consistent with the defined water quality conditions. Once adopted by the jurisdictions, the Environmental Protection Agency will work expeditiously to review the new or revised standards, which will then be used as the basis for removing the Bay and its tidal rivers from the list of impaired waters; and
 5. By 2003, work with the Susquehanna River Basin Commission and others to adopt and begin implementing strategies that prevent the loss of the sediment retention capabilities of the lower Susquehanna River dams.

Chemical Contaminants

- ◆ We commit to fulfilling the 1994 goal of a Chesapeake Bay free of toxics by reducing or eliminating the input of chemical contaminants from all controllable sources to levels that result in no toxic or bioaccumulative impact on the living resources that inhabit the Bay or on human health.
- ◆ By Fall of 2000, reevaluate and revise, as necessary, the “Chesapeake Bay Basinwide Toxics Reduction and Prevention Strategy” focusing on:
 1. Complementing state and federal regulatory programs to go beyond traditional point source controls, including nonpoint sources such as groundwater discharge and atmospheric deposition, by using a watershed-based approach; and
 2. Understanding the effects and impacts of chemical contaminants to increase the effectiveness of management actions.
- ◆ Through continual improvement of pollution prevention measures and other voluntary means, strive for zero release of chemical contaminants from point sources, including air sources. Particular emphasis shall be placed on achieving, by 2010, elimination of mixing zones for persistent or bioaccumulative toxics.
- ◆ Reduce the potential risk of pesticides to the Bay by targeting education, outreach and implementation of Integrated Pest Management and specific Best Management Practices on those lands that have higher potential for contributing pesticide loads to the Bay.

Priority Urban Waters

- ◆ Support the restoration of the Anacostia River, Baltimore Harbor, and Elizabeth River and their watersheds as models for urban river restoration in the Bay basin.
- ◆ By 2010, the District of Columbia, working with its watershed partners, will reduce pollution loads to the Anacostia River in order to eliminate public health concerns and achieve the living resource, water quality and habitat goals of this and past Agreements.

Air Pollution

- ◆ By 2003, assess the effects of airborne nitrogen compounds and chemical contaminants on the Bay ecosystem and help establish reduction goals for these contaminants.

Boat Discharge

- ◆ By 2003, establish appropriate areas within the Chesapeake Bay and its tributaries as “no discharge zones” for human waste from boats. By 2010, expand by 50 percent the number and availability of waste pump-out facilities.
- ◆ By 2006, reassess our progress in reducing the impact of boat waste on the Bay and its tributaries. This assessment will include evaluating the benefits of further expanding no discharge zones, as well as increasing the number of pump-out facilities.

SOUND LAND USE

In 1987, the signatories agreed that “there is a clear correlation between population growth and associated development and environmental degradation in the Chesapeake Bay system.” This Agreement reaffirms that concept and recognizes that more must be done.

An additional three million people are expected to settle in the watershed by 2020. This growth could potentially eclipse the nutrient reduction and habitat protection gains of the past. Therefore it is critical that we consider our approaches to land use in order to ensure progress in protecting the Bay and its local watersheds.

Enhancing, or even maintaining, the quality of the Bay while accommodating growth will frequently involve difficult choices. It will require a renewed commitment to appropriate development standards. The signatories will assert the full measure of their authority to limit and mitigate the potential adverse effects of continued growth; each however, will pursue this objective within the framework of its own historic, existing or future land use practices or processes. Local jurisdictions have been delegated authority over many decisions regarding growth and development which have both direct and indirect effects on the Chesapeake Bay system and its living resources. The role of local governments in the Bay’s restoration and protection effort will be given proper recognition and support through state and federal resources. States will also engage in active partnerships with local governments in managing growth and development in ways that support the following goal.

We acknowledge that future development will be sustainable only if we protect our natural and rural resource land, limit impervious surfaces and concentrate new growth in existing population centers or suitable areas served by appropriate infrastructure. We will work to integrate environmental, community and economic goals by promoting more environmentally sensitive forms of development. We will also strive to coordinate land-use, transportation, water and sewer and other infrastructure planning so that funding and policies at all levels of government do not contribute to poorly planned growth and development or degrade local water quality and habitat. We will advance these policies by creating partnerships with local governments to protect our communities and to discharge our duties as trustees in the stewardship of the Chesapeake Bay. Finally, we will report every two years on our progress in achieving our commitments to promote sound land use.

GOAL

Develop, promote and achieve sound land use practices
which protect and restore watershed resources and water quality,
maintain reduced pollutant loadings for the Bay and its tributaries,
and restore and preserve aquatic living resources.

Land Conservation

- ◆ By 2001, complete an assessment of the Bay’s resource lands including forests and farms, emphasizing their role in the protection of water quality and critical habitats, as well as cultural and economic viability.
- ◆ Provide financial assistance or new revenue sources to expand the use of voluntary and market-based mechanisms such as easements, purchase or transfer of development rights and other approaches to protect and preserve natural resource lands.
- ◆ Strengthen programs for land acquisition and preservation within each state that are supported by funding and target the most valued lands for protection. Permanently preserve from development 20 percent of the land area in the watershed by 2010.

- ◆ Provide technical and financial assistance to local governments to plan for or revise plans, ordinances and subdivision regulations to provide for the conservation and sustainable use of the forest and agricultural lands.
- ◆ In cooperation with local governments, develop and maintain in each jurisdiction a strong GIS system to track the preservation of resource lands and support the implementation of sound land use practices.

Development, Redevelopment and Revitalization

- ◆ By 2012, reduce the rate of harmful sprawl development of forest and agricultural land in the Chesapeake Bay watershed by 30 percent measured as an average over five years from the baseline of 1992-1997, with measures and progress reported regularly to the Chesapeake Executive Council.
- ◆ By 2005, in cooperation with local government, identify and remove state and local impediments to low impact development designs to encourage the use of such approaches and minimize water quality impacts.
- ◆ Work with communities and local governments to encourage sound land use planning and practices that address the impacts of growth, development and transportation on the watershed.
- ◆ By 2002, review tax policies to identify elements which discourage sustainable development practices or encourage undesirable growth patterns. Promote the modification of such policies and the creation of tax incentives which promote the conservation of resource lands and encourage investments consistent with sound growth management principles.
- ◆ The jurisdictions will promote redevelopment and remove barriers to investment in underutilized urban, suburban and rural communities by working with localities and development interests.
- ◆ By 2002, develop analytical tools that will allow local governments and communities to conduct watershed-based assessment of the impacts of growth, development and transportation decisions.
- ◆ By 2002, compile information and guidelines to assist local governments and communities to promote ecologically-based designs in order to limit impervious cover in undeveloped and moderately developed watersheds and reduce the impact of impervious cover in highly developed watersheds.
- ◆ Provide information to the development community and others so they may champion the application of sound land use practices.
- ◆ By 2003, work with local governments and communities to develop land-use management and water resource protection approaches that encourage the concentration of new residential development in areas supported by adequate water resources and infrastructure to minimize impacts on water quality.
- ◆ By 2004, the jurisdictions will evaluate local implementation of stormwater, erosion control and other locally-implemented water quality protection programs that affect the Bay system and ensure that these programs are being coordinated and applied effectively in order to minimize the impacts of development.
- ◆ Working with local governments and others, develop and promote wastewater treatment options, such as nutrient reducing septic systems, which protect public health and minimize impacts to the Bay's resources.
- ◆ Strengthen brownfield redevelopment. By 2010, rehabilitate and restore 1,050 brownfield sites to productive use.
- ◆ Working with local governments, encourage the development and implementation of emerging urban storm water retrofit practices to improve their water quantity and quality function.

Transportation

- ◆ By 2002, the signatory jurisdictions will promote coordination of transportation and land use planning to encourage compact, mixed use development patterns, revitalization in existing communities and transportation strategies that minimize adverse effects on the Bay and its tributaries.
- ◆ By 2002, each state will coordinate its transportation policies and programs to reduce the dependence on automobiles by incorporating travel alternatives such as telework, pedestrian, bicycle and transit options, as appropriate, in the design of projects so as to increase the availability of alternative modes of travel as measured by increased use of those alternatives.
- ◆ Consider the provisions of the federal transportation statutes for opportunities to purchase easements to preserve resource lands adjacent to rights of way and special efforts for stormwater management on both new and rehabilitation projects.
- ◆ Establish policies and incentives which encourage the use of clean vehicle and other transportation technologies that reduce emissions.

Public Access

- ◆ By 2010, expand by 30 percent the system of public access points to the Bay, its tributaries and related resource sites in an environmentally sensitive manner by working with state and federal agencies, local governments and stakeholder organizations.
- ◆ By 2005, increase the number of designated water trails in the Chesapeake Bay region by 500 miles.
- ◆ Enhance interpretation materials that promote stewardship at natural, recreational, historical and cultural public access points within the Chesapeake Bay watershed.
- ◆ By 2003, develop partnerships with at least 30 sites to enhance place-based interpretation of Bay-related resources and themes and stimulate volunteer involvement in resource restoration and conservation.

STEWARDSHIP AND COMMUNITY ENGAGEMENT

The Chesapeake Bay is dependent upon the actions of every citizen in the watershed, both today and in the future. We recognize that the cumulative benefit derived from community-based watershed programs is essential for continued progress toward a healthier Chesapeake Bay. Therefore, we commit ourselves to engage our citizens by promoting a broad conservation ethic throughout the fabric of community life, and foster within all citizens a deeper understanding of their roles as trustees of their own local environments. Through their actions, each individual can contribute to the health and well-being of their neighborhood streams, rivers and the land that surrounds them, not only as ecological stewards of the Bay but also as members of watershed-wide communities. By focusing individuals on local resources, we will advance Baywide restoration as well.

We recognize that the future of the Bay also depends on the actions of generations to follow. Therefore, we commit to provide opportunities for cooperative learning and action so that communities can promote local environmental quality for the benefit and enjoyment of residents and visitors. We will assist communities throughout the watershed in improving quality of life, thereby strengthening local

economies and connecting individuals to the Bay through their shared sense of responsibility. We will seek to increase the financial and human resources available to localities to meet the challenges of restoring the Chesapeake Bay.

GOAL

Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments and schools to undertake initiatives to achieve the goals and commitments of this agreement.

Education and Outreach

- ◆ Make education and outreach a priority in order to achieve public awareness and personal involvement on behalf of the Bay and local watersheds.
- ◆ Provide information to enhance the ability of citizen and community groups to participate in Bay restoration activities on their property and in their local watershed.
- ◆ Expand the use of new communications technologies to provide a comprehensive and interactive source of information on the Chesapeake Bay and its watershed for use by public and technical audiences. By 2001, develop and maintain a web-based clearing house of this information specifically for use by educators.
- ◆ Beginning with the class of 2005, provide a meaningful Bay or stream outdoor experience for every school student in the watershed before graduation from high school.
- ◆ Continue to forge partnerships with the Departments of Education and institutions of higher learning in each jurisdiction to integrate information about the Chesapeake Bay and its watershed into school curricula and university programs.
- ◆ Provide students and teachers alike with opportunities to directly participate in local restoration and protection projects, and to support stewardship efforts in schools and on school property.
- ◆ By 2002, expand citizen outreach efforts to more specifically include minority populations by, for example, highlighting cultural and historical ties to the Bay, and providing multi-cultural and multi-lingual educational materials on stewardship activities and Bay information.

Community Engagement

- ◆ Jurisdictions will work with local governments to identify small watersheds where community-based actions are essential to meeting Bay restoration goals—in particular wetlands, forested buffers, stream corridors and public access and work with local governments and community organizations to bring an appropriate range of Bay program resources to these communities.
- ◆ Enhance funding for locally-based programs that pursue restoration and protection projects that will assist in the achievement of the goals of this and past agreements.
- ◆ By 2001, develop and maintain a clearing house for information on local watershed restoration efforts, including financial and technical assistance.
- ◆ By 2002, each signatory jurisdiction will offer easily-accessible information suitable for analyzing environmental conditions at a small watershed scale.

- ◆ Strengthen the Chesapeake Bay Program's ability to incorporate local governments into the policy decision making process. By 2001, complete a reevaluation of the Local Government Participation Action Plan and make necessary changes in Bay program and jurisdictional functions based upon the reevaluation.
- ◆ Improve methods of communication with and among local governments on Bay issues and provide adequate opportunities for discussion of key issues.
- ◆ By 2001, identify community watershed organizations and partnerships. Assist in establishing new organizations and partnerships where interest exists. These partners will be important to successful watershed management efforts in distributing information to the public, and engaging the public in the Bay restoration and preservation effort.
- ◆ By 2005, identify specific actions to address the challenges of communities where historically poor water quality and environmental conditions have contributed to disproportional health, economic or social impacts.

Government by Example

- ◆ By 2002, each signatory will put in place processes to:
 1. Ensure that all properties owned, managed or leased by the signatories are developed, redeveloped and used in a manner consistent with all relevant goals, commitments and guidance of this Agreement.
 2. Ensure that the design and construction of signatory-funded development and redevelopment projects are consistent with all relevant goals, commitments and guidance of this Agreement.
- ◆ Expand the use of clean vehicle technologies and fuels on the basis of emission reductions, so that a significantly greater percentage of each signatory government's fleet of vehicles use some form of clean technology.
- ◆ By 2001, develop an Executive Council Directive to address stormwater management to control nutrient, sediment and chemical contaminant runoff from state, federal and District owned land.

Partnerships

- ◆ Strengthen partnerships with Delaware, New York and West Virginia by promoting communication and by seeking agreements on issues of mutual concern.
- ◆ Work with non-signatory Bay states to establish links with community-based organizations throughout the Bay watershed.

*B*Y THIS AGREEMENT, we rededicate ourselves to the restoration and protection of the ecological integrity, productivity and beneficial uses of the Chesapeake Bay system. We reaffirm our commitment to previously-adopted Chesapeake Bay Agreements and their supporting policies. We agree to report annually to the citizens on the state of the Bay and consider any additional actions necessary.

DATE June 28, 2000

FOR THE COMMONWEALTH OF VIRGINIA



James S. Gilmore III

FOR THE STATE OF MARYLAND



Pam N. Glendon

FOR THE COMMONWEALTH OF PENNSYLVANIA



Tom Bily

FOR THE DISTRICT OF COLUMBIA



Gregory A. Williams

FOR THE UNITED STATES OF AMERICA



Carol M. Brown

FOR THE CHESAPEAKE BAY COMMISSION



Hull - Bellamy

What's new in the Chesapeake Bay Region in 2000

Water Quality

Living Resources

Toxics Reduction

Air Quality

Forests

Land, Growth and Stewardship

Community Watershed Initiative

Businesses For the Bay



What's new with . . .

WATER QUALITY IN THE CHESAPEAKE BAY REGION IN 2000

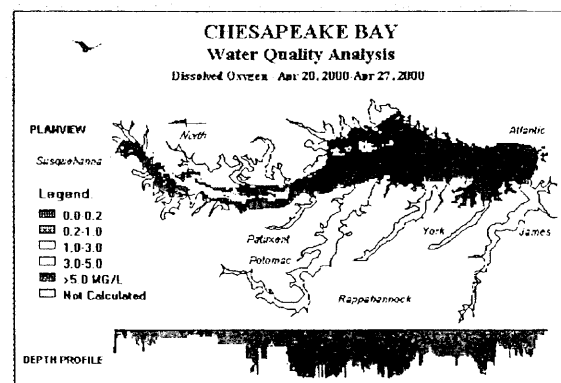
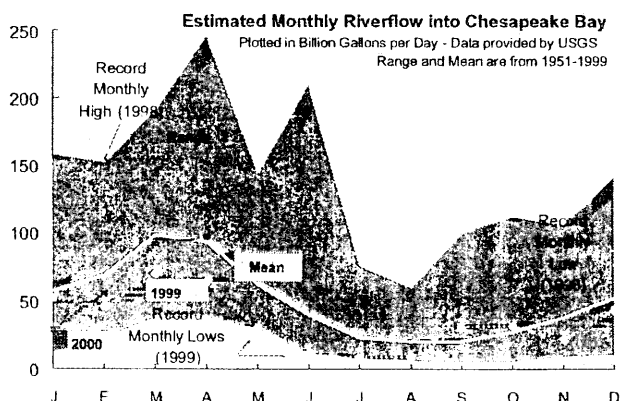
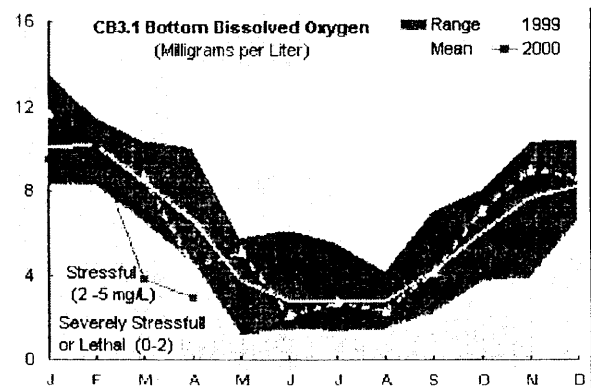
Flow in Bay Still an Issue

1999 was the fourth lowest annual rainfall for the period 1951–1999, according to hydrologists at the U.S. Geological Survey (USGS). Thus, freshwater flow into the Chesapeake Bay was below normal. Annual flow into the Bay for the past 49 years has averaged about 50.2 billion gallons per day (bgd). Flow for 1999 was estimated to be 34.6 bgd, or 31% below average. Only 1963, 1965, and 1966 had lower flows at 33.8, 31.6, and 34.4 bgd, respectively. All months, except September and October, were below average in 1999, with record lows set in May and June.

Flows to the Bay in January and February of 2000 remained below the long-term average. Flows in March were just below average and flows in April were just above average. Normal precipitation in March and April helped to replenish ground-water levels and reservoir supplies in the Maryland-Delaware-D.C. region. Ground-water levels at the end of March had increased throughout most of the area and are in the normal range throughout the entire bi-state area. Contents of the Baltimore reservoir system increased from 65.8 billion gallons in February to 74.9 billion gallons near the end of March, which was 95 percent of average and 106 percent of last year at this time. However, improved water-supply conditions will be sustained only if precipitation remains near normal in the coming months.

Low DO In Mainstem Gets Early Start

Unfortunately, low dissolved oxygen in the mainstem appears to be getting an early start. In an area north of the bay bridge in Maryland, bottom water DO during the March cruise was less than 4.0 mg/l which is unprecedented for this area and time of year. This low DO continued into April and expanded to cover a larger area. Causes for this early onset of low DO are under investigation.



Bay Grass Acres Up in 1999

The acreage of Bay grasses increased in 1999 (over that seen in 1998) to an estimated 68,125 total acres baywide. This gain of 4,635 acres over 1998 reverses a decrease observed in 1998 and reflects a strong recovery of grasses in the Tangier Sound and Honga River areas. Weather may play a key role in determining the abundance of grass beds. The cumulative effect of several high precipitation years is considered a factor in slowing recent Bay grass recovery. High flows affect water clarity by increasing runoff from the land, which adds higher levels of nutrients and sediment to the water. Higher levels of nutrients fuel algal blooms that reduce water clarity and block the sunlight underwater grasses need in order to grow.

Researchers believe recent droughts may have played a role in the increase of grasses, particularly in the middle Bay. However, lower flows also increase salinity levels that may have negatively impacted the freshwater grasses that grow in the upper Bay and portions of the Bay's tributaries. In some areas, salinity levels were at a 15-year high during the growing season for these grasses.

Bay Experiences Massive Bloom

Chesapeake Bay scientists are observing one of the most concentrated and extensive algal blooms in the Bay in the past 20 years. These blooms are referred to as mahogany tides and

result from high concentrations of *Prorocentrum minimum*, a species that contains reddish pigments and causes the water to have a brownish to mahogany hue. This algal species is common in the Bay and routinely occurs in abundance every spring. This species is typically found in areas of moderate salinity and does not occur in fresh water. Nutrients, light, temperature and water flow are factors that enhance the blooms, which generally occur in the Bay from the end of April through May. Concentrations comparable to those currently being seen have occasionally occurred in past years. The die-off of blooms in Breton and St. Clement bays off the Potomac River this year are thought to have caused the low dissolved oxygen levels that led to several recent fish kills.

Water Clarity Still an Issue

Trend analysis of the 1999 mainstem data showed few improvements in long-term trends. There were no significant trends in annual Phosphorus, Chlorophyll or bottom water Dissolved Oxygen. Trends in water clarity were decreasing and water column sediment concentrations were increasing. Trends in total nitrogen concentration were decreasing throughout most of the mainstem bay. Although concentrations of many of the parameters analyzed were better than those measured in 1998, the improvements were not large enough to offset the long-term trends.

For more information on water quality, go to
www.chesapeakebay.net/wquality.htm
on the Bay Program website.





What's new with . . .

LIVING RESOURCES IN THE CHESAPEAKE BAY REGION IN 2000

Since it was formed in 1983, the Chesapeake Bay Program has been committed to restoring the Bay's living resources—its finfish, shellfish, Bay grasses and other aquatic life and wildlife. The new *Chesapeake 2000* agreement furthers the original commitments and adds ambitious new ones, expands the Program's priorities to include an active campaign to involve citizens and communities in watershed restoration activities, and includes an important shift in orientation toward multispecies management. The agreement also continues the Bay Program's critical work in setting the standard for protection and restoration activities in the Chesapeake Bay watershed.

In 1999 and 2000 important ground was gained in terms of establishing goals for oyster restoration and in reopening fish passages—good news for the many organisms that inhabit the Bay's aquatic reefs, and for migratory fish.

More than 3,000 species of plants and animals inhabit the Bay's ecosystem. This year's research indicates that many species of plants and animals are improving or doing well, however, many others continue to struggle and require more attention and targeted restoration efforts.

Consensus Reached on Oyster Sanctuaries

The *Chesapeake 2000* agreement commits the Bay Program partners to achieving, at a minimum, a tenfold increase in oysters in the Bay by 2010, based upon a 1994 baseline.

In January 2000 the Chesapeake Bay Program cosponsored a two-day Oyster Restoration Workshop in Waldorf, MD, to exchange information and work toward revising the Oyster Management and Aquatic Reef Habitat plans. On the second day, scientists, managers, policy makers, watermen, and other interested parties agreed that 10 percent of the historic productive oyster reef acreage should be placed in protected sanctuary areas and managed for maximum ecological benefits. They also agreed on the components of reef design; the necessity of and strategies for minimizing the spread of oyster disease; the need to conserve shell supply—a critical resource for rebuilding oyster reefs—and research and monitoring priorities. *Chesapeake Bay Program Oyster Restoration*, a collection of the workshop proceedings and agreement statements, was published in March 2000 and is available through the the Bay Program at 1-800-YOUR BAY or on the web at: www.chesapeakebay.net/search/pubs.htm.

The new Virginia Oyster Heritage Program will undertake large-scale restoration throughout Virginia's coastal zone. Phase One of the program includes construction of nine new reefs in the Rappahannock River that will be protected as sanctuaries. Loose oyster shells will be spread over 25 acres surrounding each sanctuary, thus enabling the sanctuaries to serve as breeding areas to enhance the oyster fishery.

Wetlands

The *Chesapeake 2000* agreement commits the Bay Program partners to achieving a no-net loss of existing wetlands acreage and function through regulatory programs, and to achieving a

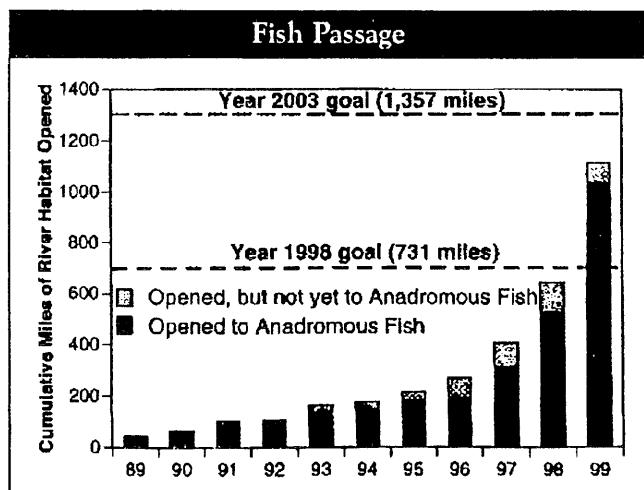
net resources gain by restoring 25,000 acres of tidal and non-tidal wetlands by 2010.

In April 2000, the Commonwealth of Virginia took an important step to protect non-tidal wetlands with new legislation, which was signed into law April 19, 2000 and goes into effect July 1, 2000. The law requires that anyone proposing to undertake ditching, draining or excavating in nontidal wetlands first obtain a Virginia Water Protection Permit from the State Water Control Board. Permit applicants also must perform compensatory mitigation for adverse impacts to wetlands. General and individual permits will be established, and general permits will be required for activities that would affect less than half an acre of wetlands. This law closes the loophole that was created when a federal court overturned the *Tulloch Rule*, a federal rule that regulated the process of draining wetlands. By October 1999, 2,500 acres of Virginia wetlands had been drained and 6,500 more were at risk. The new law directs the Water Control Board to establish and implement policies and programs to protect and enhance Virginia's wetlands, actions that will help the Commonwealth fulfill the wetlands protection and restoration commitments in the *Chesapeake 2000* agreement.

Fish Passage

In 1999, thanks chiefly to the construction of a vertical slot fish ladder at York Haven Dam on the Susquehanna River near Harrisburg, Pennsylvania, 508 more miles of mainstem waterways in the Chesapeake Bay watershed were reopened to migratory fish. This increase brings the total of miles reopened between 1988-1999 to 1,032 and keeps the Bay Program on track to surpass its current commitment to reopen 1,357 miles of Bay mainstem tributaries by 2003. The York Haven ladder permits shad to swim unobstructed as far north as the Binghamton, New York area.

A Denil fish ladder was completed this spring at Wilson Mill Dam in Harford County, Maryland, which opens 24 miles of



Deer Creek and allows schools of alewife, blueback herring, and hickory shad to circumvent the 200-year-old dam and swim upstream to spawn. Other fish passage projects in the works this year include several small projects in Pennsylvania and a pool-and-weir fish passage at Petersburg, Virginia, which will open 121 miles of the Appomattox River to migratory fish. The fish passage at Embrey Dam on the Rappahannock River in Fredericksburg, Virginia, which will open an additional 71 miles, is expected to be completed by 2003.

1999 Bay Grass Survey

The Chesapeake Bay region's underwater grasses increased to an estimated 68,125 total acres baywide in 1999. This gain of 4,635 acres over 1998 reverses a decrease observed in 1998 and reflects a strong recovery of grasses in the Tangier Sound and Honga River areas.

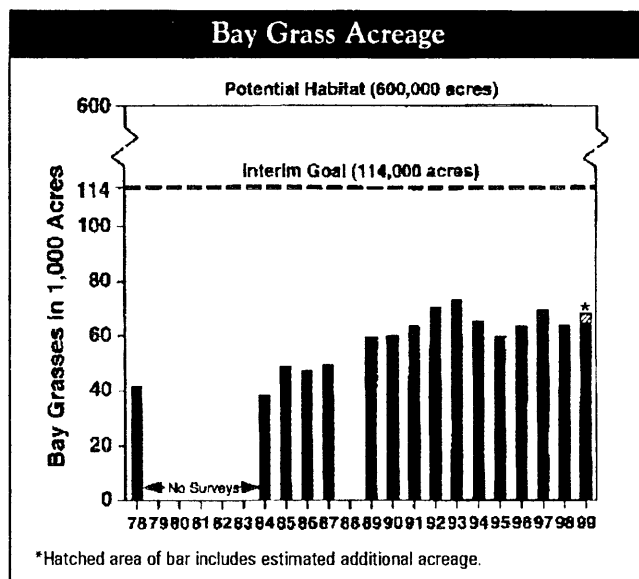
The most dramatic increases last year were found in Tangier Sound where grasses had previously decreased for six years. Grasses increased from 6,610 acres in 1998 to 10,618 acres in 1999, a 61 percent gain. The amount of grasses in Tangier Sound has been an ongoing concern to the Bay Program because it is an important nursery for young blue crabs and many species of fish.

The increase in underwater grasses was not uniform for all areas of the Bay. The 1999 survey shows:

- Acreage in the **upper Bay** decreased 2% to 8,768 acres
- Acreage in the **mid-Bay** area increased 22% to 36,676 acres
- Acreage in the **lower Bay** decreased by 9% to 19,246 acres

Weather may play a key role in determining the abundance of grass beds. The cumulative effect of several high precipitation years is considered a factor in slowing recent Bay grass recovery. High flows affect water clarity by increasing runoff from the land, which adds higher levels of nutrients and sediment to the water. Higher levels of nutrients fuel algal blooms that reduce water clarity and block the sunlight underwater grasses need in order to grow.

Researchers believe recent droughts may have played a role in the increase of grasses, particularly in the middle Bay.



However, lower flows also increase salinity levels that may have negatively impacted the freshwater grasses that grow in the upper Bay and upper portions of the Bay's tributaries. In some areas, salinity levels were at a 15-year high during the growing season for these grasses.

In the *Chesapeake 2000* agreement the partners recommit to restoring grasses to 114,000 acres, a goal initially set in 1993. The 1999 estimated total represents nearly 58 percent of the Bay Program's goal. *Chesapeake 2000* also calls for developing revised restoration goals that reflect historic abundance as measured from the 1930s to the present and calls for implementing a strategy to accelerate protection and restoration of underwater grass beds in areas of critical importance to the Bay's living resources. Both commitments have a 2002 due date. The agreement also contains nutrient and sediment reduction goals that will lead to better water quality and improved conditions for underwater grasses.

h o t t o p i c s

► **Multispecies Management:** The *Chesapeake 2000 Agreement* formally recognizes the importance of conducting research and forming management policies that concentrate not only on single species in isolation but adjust "to the dynamic nature and complexities of the Chesapeake Bay and changes in global ecosystems." The Bay Program's fundamental management perspective is therefore shifting from single-system to ecosystem functions, and single-species to multispecies management. Here are a few examples of activities and issues that stem from this new orientation:

- The *Menhaden Fisheries Management Plan* is currently being revised by the Atlantic States Marine Fisheries Commission (ASMFC) to reflect the new management approach. Instead of focusing primarily on managing the fish for commercial harvest, it will focus also on managing with two other important issues in mind: the importance of menhaden as a forage species for striped bass and other important fish, and the natural function of the species as a filter feeder in helping filter abundant plankton from the water column.

- The National Oceanic and Atmospheric Administration has the lead in developing an ecosystem plan for fisheries that focuses on the interactions of species. Ultimately it will include fishery independent surveys, establish a fisheries monitoring network to study all gears and all life stages of fish, and develop multispecies models and retrospective analyses.
- An old species makes news: Horseshoe crabs have been harvested in great numbers by fishermen since the early 1990s for their use as bait for conch. A new ASMFC coastwide cap on the take of crabs aims to prevent their overharvest, since horseshoe crab eggs also (here's the multispecies angle) form an important part of the diets of migratory shorebirds. The ASMFC cap presents a challenge to Virginia's commercial fishing regulators, who consider the scientific evidence insufficient to support such an action. A debate in the Commonwealth's General Assembly over whether to change Virginia regulations is likely.

For more information on living resources, go to
www.chesapeakebay.net/baybio.htm
 on the Bay Program website.



Chesapeake Bay Program
 A Partnership for the Future



What's new with . . .

TOXICS REDUCTION IN THE CHESAPEAKE BAY REGION IN 2000

The Chesapeake Bay Program's toxics goal is "... a Chesapeake Bay free of toxics by reducing or eliminating the input of chemical contaminants from all controllable sources to levels that result in no toxic or bioaccumulative impact on the living resources that inhabit the Bay or on human health." The Bay Program continues to take steps toward controlling and reducing inputs of chemical contaminants to the system and toward better defining toxic conditions in the Bay.

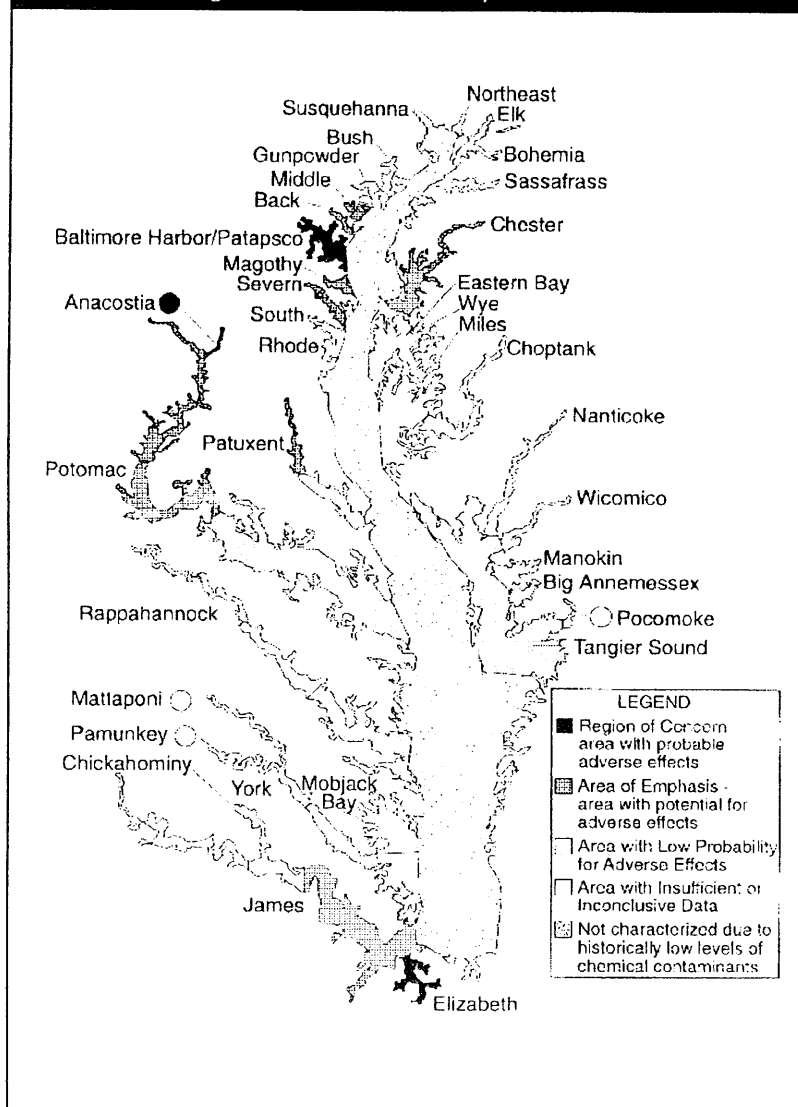
What's The Problem?

The nature, extent and severity of toxic impacts vary widely throughout the Chesapeake system. A few areas, called "hotspots" or Regions of Concern, have serious localized problems, and some other regions, previously thought to be free of toxics, have shown some toxic effects. Overall, however, there is no evidence of severe, system wide toxics problems.

Chesapeake Bay Agreement Speaks Out on Toxics

The Bay Program goal of a "Bay free of toxics . . ." is also the overarching goal of the chemical contaminant portion of the new *Chesapeake 2000* agreement. As a step to reach this goal there is a commitment to strive for "zero release of chemical contaminants from point sources" through continual improvement of pollution prevention measures and other voluntary means. Particular emphasis will be placed on achieving the voluntary elimination of mixing zones for persistent or bioaccumulative toxics as one step toward "zero release." For nonpoint sources, there is a commitment to use Integrated Pest Management on lands that have a higher potential for contributing pesticide loads to the Bay.

Status of Chemical Contaminant Effects on Living Resources in the Bay's Tidal Rivers



In addition, the *Chesapeake 2000* agreement commits to reevaluate and revise the 1994 Toxics Strategy by late 2000. To develop a new Toxics 2000 Strategy, the Toxics Subcommittee of the Bay Program has conducted a year-long reevaluation and revision of the 1994 Toxics Strategy which has included:

- **13 forums and working sessions** with federal/state/local governments, environmental and public interest groups, research institutions, and managers of stormwater programs and point source facilities;
- **120 ideas and goals developed by over 300 stakeholders** to be considered for the new Strategy; and
- **Stakeholder consensus on what the new Strategy should look like and which key commitments it should include.**

The Toxics 2000 Strategy will commit to actions to achieve the goals set in *Chesapeake 2000*. The Toxics 2000 Strategy will be reviewed by the public this summer and submitted for signature by the Executive Council in the Fall.

In 1999, the Bay Program released *Targeting Toxics: A Characterization Report- A Tool for Directing Management and Monitoring Actions in the Chesapeake Bay's Tidal Rivers*. This toxics characterization is the most comprehensive assessment to date of the status of chemical contaminant effects on living resources—its fish, shellfish, and other creatures—in the tidal rivers of the Bay. The information in the report will help Bay Program decision makers target specific tidal rivers for management and monitoring. The Toxics 2000 Strategy commits to completing and refining the characterization of toxics by 2005. For a copy of the report, go to <http://www.chesapeakebay.net/pubs/792.pdf> or <http://www.chesapeakebay.net/toxics2.htm> or call 1-800-YOUR BAY.

This report was designed to identify areas where chemical contaminant effects to the Bay's living resources occur or have the potential to occur. Human health impacts from contaminated air, soil, and drinking water were not addressed. Because potential human health impacts are an important issue, state agencies have already looked at human health issues in the tidal rivers of the Bay. Where human health concerns already have been identified, appropriate fish consumption advisories or other warnings have been issued. The information in this report should not alter the current recreational or commercial uses of any of the rivers.

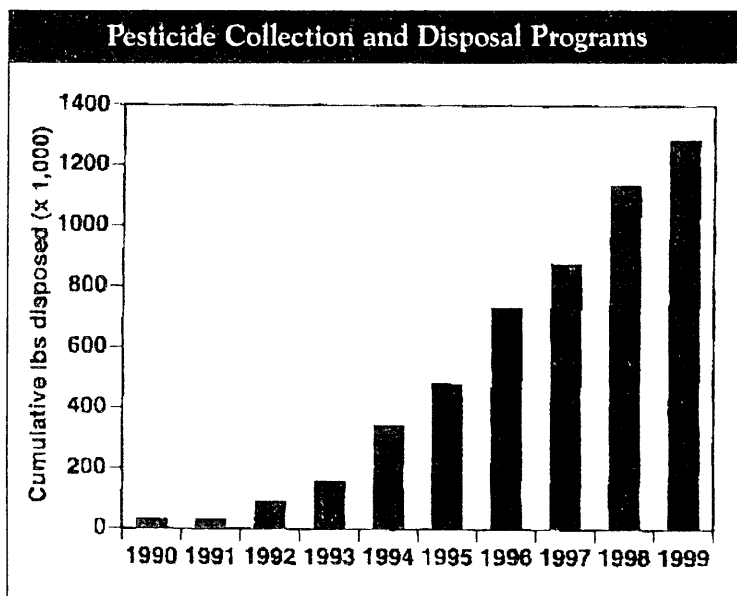
Several local organizations in the Severn and Chester River watersheds asked to have a detailed presentation on the report specific to their watershed. Interested community leaders from the Upper Eastern Shore Tributary Team, the Chester River Association, the Severn River Commission and the Severn River Association participated in the characterization presentations with the Bay Program. After the presentations, community leaders discussed

possible sources of contamination and were interested in ways to address those sources. Additionally, they were interested to learn about new or proposed studies dealing with chemical contaminants in their watershed.

This summer, the Chesapeake Bay Program and the National Park Service will publish a community handbook to help communities address toxics in their watershed management plans to prevent and eliminate toxic impacts in the Bay watershed. This handbook is based on a workshop held in December 1999 where members of community organizations and government representatives who work with them, met to: 1) inform interested communities and organizations about chemical contamination; 2) identify actions that can be taken to restore and protect rivers; and 3) identify technical and financial assistance appropriate to restore and protect those rivers. The lessons learned from the workshop, from community presentations, and from community activities to reduce toxic impacts will be incorporated into the handbook.

Bay Program Achieves Pesticide Collection and Disposal Goal

According to the 1999 pesticide collection disposal data, pesticide collection and disposal programs have been offered in 100% of the counties in PA, MD, and VA in the Chesapeake Bay watershed. Unwanted or unused pesticides are collected by contractors going from site-to-site, or at a central location, and then disposed at EPA approved sites. These programs are carried out through the state Departments of Agriculture working with the Cooperative Extension Services in MD, PA, and VA. Since 1990, nearly 1.3 million pounds of pesticides were collected and disposed.



For more information on toxics reduction, go to
www.chesapeakebay.net/toxics1.htm
 on the Bay Program website.





What's new with . . .

AIR QUALITY

IN THE CHESAPEAKE BAY REGION IN 2000

*The air pollution we create also pollutes our land and water. Therefore...
in order to clean up the Chesapeake Bay, we must also clean up the air.*

When the federal *Clean Air Act* and *Clean Water Act* became laws in the early 1970s, air pollution and water pollution were considered two separate problems. In recent years, research has provided us with a better understanding of the link between these environmental threats. The Bay Program now knows that approximately a quarter of the nitrogen load to the Bay comes from air deposition. The sources of nitrogen pollution include: stationary and area sources (utilities, industries); mobile sources (cars, trains, boats); agriculture sources; as well as natural sources. The following is an overview of the latest findings related to nitrogen emissions and deposition in the Chesapeake Bay region.

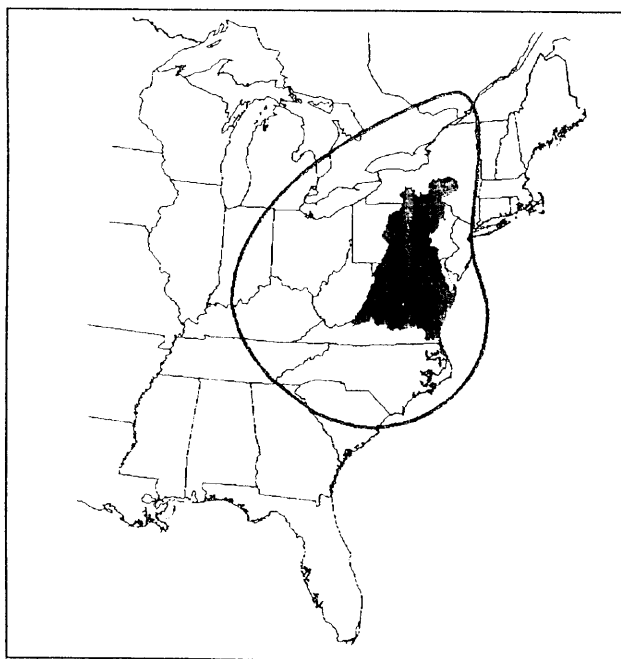
New Airshed

The Chesapeake Bay's "airshed" is the geographical area from which air pollutants and contaminants directly or indirectly impact the Chesapeake Bay. Recently, the Bay Program experts reevaluated the nitrogen oxide, or NOx, airshed for

the Chesapeake Bay region. This research concluded that the airshed is 418,000 square miles, or roughly 6½ times the size of the watershed. It is also 15% larger than previously determined. It includes areas as far away as Canada, Indiana, Tennessee and Georgia. The airshed shows 76% of the emissions contribute to the nitrogen deposition in the Bay watershed. Half, or 38%, of NOx emissions come from the Chesapeake Bay signatory jurisdictions (DC, MD, VA, and PA). Therefore, the greatest improvement to the Bay will be seen if we reduce the NOx emissions right here. Since almost everything that burns emits NOx we must look at industries, electric utilities, and automobiles. These sources, and others, contribute to the nitrogen-rich air pollution that affects the Bay and its rivers.

Interest in Ammonia Emissions on the Rise

To date, attention has been devoted to estimating NOx emissions and the benefits of reducing those emissions; much less attention has been given to ammonia emissions (a form of nitrogen). Recent studies indicate that ammonia emissions may be a significant source of nutrient loadings to land and water, thus influencing the Bay. The Chesapeake Bay Program, the Great Waters Program, and the Mid-Atlantic Regional Air Management Association are sponsoring a two-day workshop in November on the significance of ammonia emissions and loadings to sensitive coastal areas. The intention of the workshop is to have a diverse audience develop a common understanding of the issues and explore opportunities for addressing economic and environmental consequences. In addition, the Bay Program computer modeling experts are working to estimate the ammonia airshed for the Bay region and to incorporate the results from several ammonia research studies. Gauging the size of this airshed is important for Bay managers because ammonia emissions—like NOx emissions—also have local and long-range impacts.



Principal NOx airshed for the Chesapeake Bay (watershed shown in blue).

Air's Place in The New Agreement

In the new *Chesapeake 2000* agreement air deposition issues are addressed in the water quality section under the chemical contaminants section:

Complementing state and federal regulatory programs to go beyond traditional point source controls, including nonpoint sources such as groundwater discharge and atmospheric deposition, by using a watershed-based approach;



and

Through continual improvement of pollution prevention measures and other voluntary means, strive for zero release of chemical contaminants from point sources, including air sources;

and in the air pollution subsection:

By 2003, assess the effects of airborne nitrogen compounds and chemical contaminants on the Bay ecosystem and help establish reduction goals for these contaminants.

These items reflect the importance of integrating air deposition into all components of the Bay clean up, rather than treating it as a separate issue. The Bay Program is making strides in incorporating air deposition into toxic, nutrient, and pollution prevention management efforts. In addition the Bay Program Office continues tracking the effects of federal and regional controls as they benefit the Bay.

For more information on air quality, go to
www.chesapeakebay.net/air_pollution.htm
on the Bay Program website.





What's new with . . .

FORESTS

IN THE CHESAPEAKE BAY REGION IN 2000

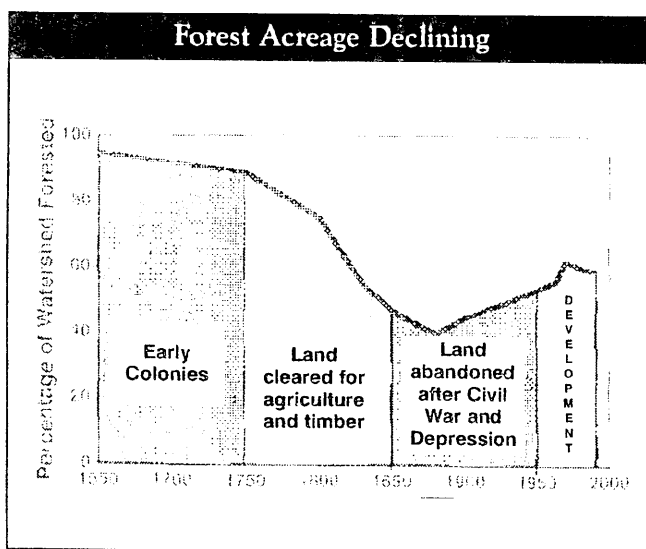
Forests: A Key to the Bay's Health

The health of streams and rivers and the resilience of the Chesapeake Bay watershed is linked to trees. Forests perform important environmental functions that we sometimes take for granted. Forests protect our streams and soil; clean our air and water; provide opportunities for outdoor recreation; supply habitat and food important to the survival of many Bay species; and supply raw materials for the fuel, lumber and paper that we use every day. Scientific findings clearly show that, as living filters, forests are the most beneficial land use for clean water.

Losses Offset Gains

Forests make up nearly 60% of the land in the Bay watershed or approximately 24 million acres. The U.S. Forest Service estimates that more than 100 acres of forest are lost every day, with the most rapid declines in areas closest to the Bay. Reforestation has generated some gains in the headwater regions of the watershed, though other areas have seen more than 85% of forest cover converted to agriculture or urban development.

A major cause of forest loss today is the way we develop land. Forests are cleared to make room for new homes, shopping malls, roads and other types of development. We now develop land at a rate much faster than our population is growing, sprawling across the landscape and requiring more forests and farms to be cleared. By 2020, new homes could consume more than 600,000 acres of forests and farmland. Planning to retain forests as we grow will be one of the big challenges of the next millennium.



Chesapeake 2000 Agreement

The *Chesapeake 2000* agreement reflects a commitment to the conservation, restoration, and stewardship of the Bay's forests. It contains elements that seek to protect and expand critical forests and to retain our working forest land base such as:

- Assessing resource lands (forests and farms) and their ecological and economic values;
- Promoting mechanisms to conserve contiguous forests and open space;
- Developing and implementing strategies to retain existing riparian forests; and
- Monitoring riparian forest restoration progress and expanding the goal of restoring 2,010 miles of riparian forest buffers by 2010.

Addressing Forest Fragmentation

When large tracts of forest are carved up into smaller, more isolated patches, forest fragmentation is the result. Fragmentation occurs when forests are converted to urban development or agriculture and impacts water quality and quantity, fish and wildlife populations, and the health and diversity of the forest itself.

Fragmentation can disrupt animal travel corridors, increase flooding and runoff, increase the invasion of non-native vegetation, degrade forest interior habitats and can increase conflicts between wildlife and people. Experts have found that the cumulative effect of small habitat losses over time may prove as dramatic as one large loss. The Chesapeake Bay Program has identified fragmentation as an important issue for the region. The following are highlights of programs and projects to address this:

- The Bay Program Geographic Information System team completed a spatial assessment of forest fragmentation in the Chesapeake watershed. The analysis quantifies fragmentation in the Bay states on a watershed basis and helps to define and characterize the extent and location of fragmentation in the entire basin.
- In November 1999, the Bay Program and the U.S. Forest Service sponsored a regional conference designed to share the latest science and information on the ecological, economic, and policy and law impacts related to fragmentation. The conference, *Balancing the Landscape: Retaining Forests in the Chesapeake Bay Watershed*, helped initiate the development of a strategy to address the issues.
- The Chesapeake Bay Program, USDA Forest Service, Chesapeake Bay Commission and Abell Foundation have collaborated to sponsor a study of the "Laws, Policies and Institutions Affecting Forest Fragmentation in the Bay

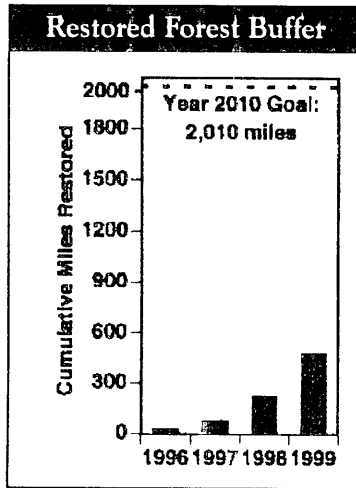


Region.” The Environmental Law Institute conducted the assessment that includes recommendations for approaches and policy actions to reduce forest loss and fragmentation and incentives to retain forests. The report will be available this summer for distribution.

For more information on forest fragmentation, call 1-800-YOUR BAY (ext.706).

Buffer Miles Adding Up

As more people in the Bay region are discovering the importance of trees and forests, citizens have made significant strides in focusing on forest issues in their efforts to protect and restore the Bay system. Much of this effort was sparked by the 1996 Bay Program goal that called for the restoration of 2,010 miles of streamside, or riparian, forest buffers by the year 2010. This initiative, known as the *Chesapeake Bay Riparian Forest Buffer Initiative*, is in full swing. From January through September 1999, nearly 203 miles of forest buffers had been planted. That brought the cumulative total to 476 miles since 1996. To highlight the effort, each jurisdiction increased awareness and outreach, expanded incentives to landowners and worked to permanently protect riparian forests.



Partner Highlights from the Forest Buffer Initiative:

MARYLAND

- Over 108 miles are slated for restoration in 2000 bringing the total to 317 miles restored since 1996.
- Conducted a monitoring study of forest buffer restoration projects. The findings will help increase survival and improve future restoration project success.
- Gained citizen assistance and support through the Maryland Tributary teams. The Maryland Forest Service conducted

information exchange workshops to foster communication, develop interest and listen to needs and recommendations. *Stream ReLeaf* awards were given to citizens, civic organizations, landowners, businesses, who participated in the program.

- The Maryland Forest Service developed a portfolio to use with landowners during site visits to answer questions about the Conservation Reserve Enhancement Program, market the program and its economic incentives, and encourage participation to restore wetlands and riparian forests.

PENNSYLVANIA

- Governor Ridge signed the Growing Greener Initiative in December 1999. This initiative has allowed the Conservation Districts to hire 45 watershed coordinator positions statewide. Many local efforts involve buffer restoration projects.
- The Pennsylvania Bureau of Forestry has assigned staff to *Stream ReLeaf* and watershed programs. The Bureau's Stewardship Program has expanded its efforts and will focus on restoration of riparian forest buffers.
- Pennsylvania and the Alliance for the Chesapeake Bay have teamed up to provide mini-grant opportunities to local groups and will conduct 12 projects on streams in the Bay watershed.

VIRGINIA

- The Commonwealth has established 135.2 miles of riparian forest buffer in the Bay watershed and 157.4 miles statewide.
- Governor Gilmore signed Executive Order 48, "Preserving Water Quality in the Chesapeake Bay Through the Establishment of Riparian Buffers Along Streams in the Commonwealth". This Order creates a Riparian Working Group headed by State Forester, Jim Garner, and directs all state agencies who hold land to evaluate the need for riparian buffers.
- Expanded partnership to facilitate outreach and implementation, with American Forests to develop a *StreamReleaf* marketing effort, and with the Environmental Alliance for Senior Involvement for assistance with the riparian initiative.

Potomac Partnership Efforts Roll Out

The U.S. Forest Service, Ducks Unlimited, Inc., and the forestry agencies of Maryland and Virginia have united in a public-private partnership to address water quality, habitat and community livability issues in several tributaries of the Potomac River basin. The consortium will increase wetland and riparian restoration efforts, expand outreach to private land owners, conduct watershed assessments, baseline inventories, research and monitoring, develop urban greenways, implement natural storm water management techniques, reduce the risk of catastrophic fire to communities, and conduct training and education efforts. The work of the Potomac Partnership will lead to the restoration of 150 acres of wetland and 50 miles of riparian forest in the first two years. The project will initially target activities on private lands in the Monocacy and Antietam watersheds in Maryland, and the North and South Forks of the Shenandoah River in Virginia. The initiative was kicked off this spring with the completion of a project Business Plan guiding the implementation of the \$1.1 million annual USDA Forest Service commitment for the five year effort.

OF NOTE:

► **New Report:** The Bay Program released a new forest buffer report in 1999: *Riparian Forest Buffers Linking Land and Water*. This publication explains the crafting of the initiative, including policy goals recommendations. It's available on the Bay Program website at www.chesapeakebay.net or by calling 1-800-YOUR BAY.

► The Bay Program partners have distributed more than 10,000 copies of the *Chesapeake Bay Forests Matter* poster since 1999. For a free copy, call 1-800-YOUR BAY.

To learn more about Chesapeake Bay forests, go to
www.chesapeakebay.net/forest.htm
 on the Bay Program website.



Chesapeake Bay Program
 www.chesapeakebay.net



What's new with . . .

LAND, GROWTH AND STEWARDSHIP IN THE CHESAPEAKE BAY REGION IN 2000

The Chesapeake Bay Program's Land, Growth and Stewardship effort works to identify Baywide land use and growth issues and to forge alliances with other organizations working to preserve the health of the Bay system, including its natural landscapes. The Bay Program effort keys on three areas: sound land management decisions, the impacts of existing growth, and public and private actions to reduce the impact of growth on the Bay system. In 1996, the Bay Program adopted the *Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region* as a way to address population growth and land development. The goal is to encourage sustainable development patterns that integrate economic health, resource protection and community participation. With the signing of the *Chesapeake 2000* agreement, the Bay Program's commitment to promoting sound land use is reaffirmed. There is a resounding call to work more closely with local governments and communities to achieve sound land use practices throughout the watershed.

Workshops Help Local Communities Grow Responsibly

As part of the effort to encourage sound land use, the Bay Program continues to sponsor workshops for local officials that highlight effective ways to reduce the impacts of growth. One series of workshops—Better Site Design and Watershed Planning Workshops—focuses on sharing information with municipal officials about how to prepare small watershed plans and how to implement innovative land development principles, such as green parking lots, stream buffers, cluster development, narrow streets and pollution prevention programs. The workshops also help local officials identify ways to change existing codes and ordinances to reduce impervious cover, conserve natural areas and reduce storm water runoff. Participants get hands-on experience using real-world site plans. For example, officials from Frederick County, Maryland, participated in one of the first workshops. They are working to implement innovative practices by reviewing their local codes and ordinances to allow for better development patterns. The Bay Program is also sponsoring demonstration projects throughout the watershed where, in cooperation with local officials, local codes and ordinances are reviewed and sound land use alternatives are suggested. Thus far, we have ordinance review projects underway in the Rappahannock area of Virginia and Cecil County, MD.

The Bay Program is expanding this program to include a "train the trainers" program designed to instruct local planners to train

others to review local codes and ordinances with the goal of reducing impervious cover. The first ever "train the trainer" workshop was held on May 8 in Annapolis, MD and received positive reviews. A similar workshop will be held July 18 in Harrisburg, Pennsylvania, and one will be held in Virginia later this year.

A complementary training program is under way in Pennsylvania through the Conservation Design/Growing Greener initiative. Conservation Design focuses on how rural communities can conserve open space and natural resources while accommodating some growth. The Bay Program is sponsoring three workshops and case studies to promote conservation design principles and practices. For more information on the Bay Program workshops or on Growing Greener, call 1-800-YOUR-BAY, ext 704.

Bay Access Guide Available

The updated *Chesapeake Bay Public Access Guide* is now available. This popular map highlights specific locations in the Bay region where the public can access waters of the Bay and its tributaries from boat ramps, parks, fishing piers, hiking trails and recreational areas. This is one tool to help achieve the *Chesapeake 2000* agreement goal of increasing responsible public access by 30% by 2010.

Bay Program Report on Growth and Development

As part of its effort to inform and educate the public on the role they can play in improving the health of the Bay, the Bay Program continued to develop a broad range of Environmental Indicators throughout 1999. In June 1999, the Bay Program issued a new publication featuring Environmental Indicators and interpretive text related to population and growth issues in the Bay region. For a free copy of *Chesapeake Bay Watershed: Its Land and People*, go to the Bay Program website at www.chesapeakebay.net and click on publications or call 1-800-YOUR-BAY.

Stay Tuned

- A handbook for local communities illustrating techniques for designing environmentally friendly sites will be available through the Bay Program later this year. The techniques focus on reducing the impact of development on existing natural features and comparing conventional site design to environmentally



friendly site design. In addition to individual illustrations, model development plans applying the environmentally friendly design practices will be available. Included with each of the three site plans is a detailed break down of the amount of impervious cover, construction costs, and existing and proposed open space. A related power point presentation will also be available later this year.

- The Chesapeake Bay Program will be surveying recreational area users throughout the watershed this summer to determine their public access needs.
- A literature synthesis on the environmental and economic effects and costs of septic systems is being conducted by the

Bay Program. The purpose of the study is to identify the various costs of septic systems and the relationship between growth patterns and septic systems.

- In addition to its other web-based activities, the Bay Program sponsored the development of a web-based database that offers references on alternative development practices. It includes nutrient removal information, economic and cost considerations, model ordinances or case studies, and other social and environmental considerations. The site provides summaries of each reference, plus information on how to obtain copies. The database is available at <http://www.chesapeakebay.net/data/dev/mtp1.cfm>.

For more information on Land, Growth and Stewardship, go to
www.chesapeakebay.net/landscape.htm
on the Bay Program website.



Chesapeake Bay Program
Land, Growth and Stewardship



What's new with the . . .

COMMUNITY WATERSHED INITIATIVE IN THE CHESAPEAKE BAY REGION IN 2000

The Community Watershed Initiative

The Chesapeake Bay Program officially recognized the importance of community watershed organizations to the restoration of the Bay and its living resources in 1997 when the Chesapeake Executive Council signed the Community Watershed Initiative. The Bay Program fleshed out the initiative in 1998 with adoption the Community Watershed Initiative Strategy.

Community Watershed Task Force

In 1999, the Bay Program further committed itself to partnering with and supporting community-based efforts to protect and restore the Bay system by forming the Community Watershed Task Force. The role of the task force is to implement the strategy. Currently, the task force includes representatives from eight regional and local watershed groups, as well as federal, state and local government representatives from throughout the Bay watershed.

The task force identified several initial priorities, including:

- Assessing the needs of community groups and the needs and interests of Bay Program partners in working with community groups;
- Packaging existing Bay Program tools and resources for communities;
- Conducting outreach to communities about Bay Program goals and how they translate to local rivers and streams, as well as about the resources available to protect rivers and streams; and
- Promoting opportunities for collaboration and coordination among the Bay Program's subcommittees and partners as they work in communities.

Community Watershed Focus in *Chesapeake 2000* Agreement

The new agreement places a renewed emphasis on community engagement in the Bay restoration effort, and especially on assisting local governments and communities in restoring and preserving their own local watersheds. The agreement commits to providing new technical and financial assistance to communities to support local watershed management efforts, with particular attention to stream corridor, forest buffer and wetlands planning. This focus on locally supported watershed management will require the Bay Program to work ever more effectively with its community partners—local governments and community groups—to ensure the Program is aware of community needs, and works to help meet those needs.

Some examples of resources the Program is committing to provide include: a clearing house for information on local watershed restoration efforts (2001), enhanced funding for locally-based programs, and, easily accessible information suitable for analyzing environmental conditions at the small watershed scale (2002).

Survey IDs Top Concerns & Needs

In the fall of 1999, the Bay Program's Community Watershed Task Force issued a survey to more than 290 organizations in the watershed. The purpose of the survey was to assess the needs and interests of the growing number of community watershed groups and to identify their top concerns. The survey attracted 84 responses or a 29% response rate. Overall, the -survey showed that these groups are active in restoration, pollution prevention and planning activities.

The top two issues identified as concerns were protecting drinking water quality (81%) and conserving/restoring rivers and streams (74%). Respondents also said that while they are very concerned about the quality of their local rivers and streams, they are less concerned with the overall health of the Bay (46%).

Funding is the type of assistance most sought after by these organizations, according to the survey. However, the groups also identified needs for:

- Technical assistance and guidance, especially with pollution prevention and restoration projects;
- Assistance with the production of outreach materials;

Top 5 Issues Identified by Organizations

Issue	% of Orgs
1. Protecting drinking water quality	81%
2. Conserving/restoring rivers and streams	74%
3. Preventing natural disasters (e.g., flood control)	65%
4. Protecting/restoring wildlife and habitat	63%
5. Maintaining/restoring commercial and/or recreational fisheries	60%



- Training in the areas of planning and organizational development; and
- Equipment and materials, especially plants, trees and seeds for riparian buffers and stream bank restoration projects.

A copy of the report outlining the complete survey findings can be found on the Bay Program web site at www.chesapeakebay.net/cwi.htm, or call 1-800-YOUR BAY.

Bay Program Responds

The Community Watershed Task Force has identified 10 specific actions in response to the survey findings. They include:

1. Focus attention on regional and community-based watershed organizations and design communication and resources to reach this audience.
2. Identify and develop relationships with key regional organizations that service community-based groups.
3. Target outreach efforts in watersheds with no representation in the survey, including in the states that are not official partners in the Bay Program—Delaware, New York and West Virginia.
4. Make resources more readily available to communities engaged in addressing issues of common interest.
5. Raise awareness of on-going Bay Program projects that address the issues of most concern to community watershed organizations.
6. Develop referral information for issues in which watershed groups have expressed concern, but where the Bay Program has little or no purview. Relate these issues to others in which the Program is more active.
7. Improve the Bay Program's messages about local river, stream and watershed conservation, and shift away from a Bay-focused message.
8. Take advantage of watershed groups as a resource for communicating information, and work to develop content and informational materials that can be put to use by these groups.
9. Promote existing Bay Program resources that help fulfill unmet needs identified in the survey.
10. Encourage the Bay Program to support the development of new tools and resources that help build capacity in communities for planning and organizational development activities.

In addition, the survey report was sent to all respondents, as well as to organizations that received the original survey, but did not respond. Respondents and non-respondents were invited to provide feedback on the survey results and Task Force actions, and non-respondents were reminded that it is not too late to complete the survey.

Small Watershed Grants Program Under Way

In April, the National Fish & Wildlife Foundation, in cooperation with the Chesapeake Bay Program, announced over \$1.3 million in grants to 56 community groups and local governments through the Chesapeake Bay Small Watershed Grants Program. The Program provides small grants, ranging from \$5,000 to \$35,000, to organizations working at the local level to protect and improve watersheds. The purpose of the grant program, which is funded through the U.S. Environmental Protection Agency, is to demonstrate effective techniques and partnership building to achieve Chesapeake Bay Program objectives at the small watershed scale.

The Fiscal Year 1999–2000 grants represent a broad range of projects in rural, suburban and urban communities that span the entire Chesapeake Bay basin. For example, funded projects include: working with community members in the Seeley and Catatunk Creek watersheds, both tributaries to the Tioga River and spanning the New York-Pennsylvania border, to develop flood control and streambank erosion strategies; building the capacity of three urban watershed organizations in the Baltimore area through the use of innovative monitoring technologies and the hands-on demonstration of habitat restoration techniques; involving at-risk youth who are engaged in the juvenile justice system in wetlands restoration projects along the Potomac River in Northern Virginia; and, training a corps of citizens to provide physical assistance to farmers in planting riparian buffers and installing livestock exclusion fencing at critical riparian sites in the Rapidan watershed in central Virginia.

For more information on Small Watershed Grants, call Karen Hester Abrams or Malia Somerville of the National Fish & Wildlife Foundation at (202) 857-0166 or visit their web site at www.nfwf.org.

Web-Based Tools Target Communities

The Chesapeake Bay Program website, www.chesapeakebay.net, features information on the entire Bay watershed, as well as the local watersheds that help to support the region. It also has several resources that will assist community-based organizations. Those resources include:

- *Bay Atlas*: Allows users to customize maps of their watershed using various data available through the Bay Program, including land cover, submerged aquatic vegetation, and some water quality data.
- *My Watershed*: Uses Bay Program data to generate profiles of watersheds at a range of scales, from large to small watershed. The profiles include a map of the watershed and graphs depicting population trends, land cover and nutrient and sediment pollution information. The profiles also help users find Bay Program-funded restoration projects in their watershed; the local public access sites to the Bay, rivers and streams; local businesses that are pollution prevention partners in *Businesses for the Bay* program; and local watershed groups that are active in the area.

For more information on the Community Watershed Initiative,
go to www.chesapeakebay.net/csi.htm
on the Bay Program website.



Chesapeake Bay Program
A U.S. Environmental Protection Agency Program



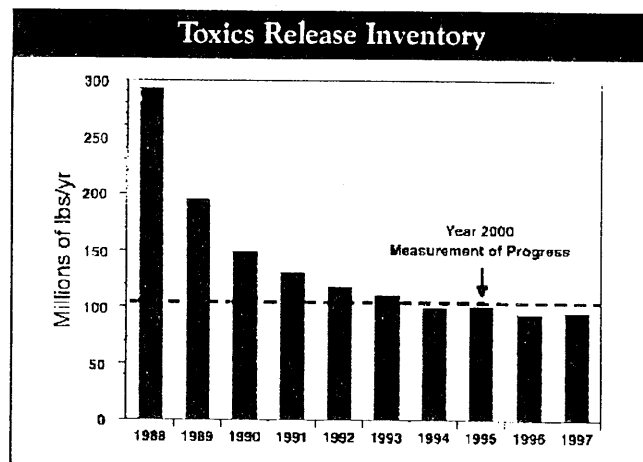
What's new with . . .

BUSINESSES FOR THE BAY IN THE CHESAPEAKE BAY REGION IN 2000

Businesses for the Bay is the Chesapeake Bay Program's voluntary pollution prevention program for businesses, government facilities and other organizations within the Bay watershed. Since the program began in 1996, more than 250 facilities have committed to preventing pollution by joining *Businesses for the Bay*. In addition, 90 individuals from those participating facilities have volunteered to serve as Business-to-Business Mentors, providing their pollution prevention expertise to others in need of technical assistance. *Businesses for the Bay* also has a group of Partners, which are organizations that help to promote *Businesses for the Bay* and pollution prevention to their members.

Making Great Progress

Each year, *Businesses for the Bay* participants report on the progress they make in preventing pollution. Participants reporting this year said that they reduced or recycled almost 877 million pounds of wastes in 1998. These wastes ranged from specific chemicals to air emissions to solid waste. Several facilities also volunteered to report their cost savings. As a result of their efforts, more than \$3.9 million was saved. These results are up significantly from 1997, when 222 million pounds were reduced or recycled and \$1.4 million was saved. In addition, many facilities reported that they trained employees on pollution prevention techniques. In 1998, more than 4,600 employees in the Bay watershed were trained.



Businesses Report Chemical Releases

Another indicator of the progress businesses are making in reducing their releases of chemicals to the Bay watershed is contained in the U.S. Environmental Protection Agency's national Toxic Release Inventory or TRI. According to the most recent inventory, facilities that report to the TRI cut their chemical releases by 67% between 1988 and 1997. This remains steady compared to the 1996 information. However, these reductions still exceed the Bay Program's goal for industry, which is a 65% reduction by 2000.

First-Ever Annual Meeting

Businesses for the Bay members gathered on December 3, 1999, in Annapolis, Maryland, for the first-ever *Businesses for the Bay* Annual Meeting.

- Participants networked and shared pollution prevention ideas.
- Participants received tips on implementing Environmental Management Systems, getting employees and their CEOs to understand the importance pollution prevention, and identifying the hidden cost savings of preventing pollution.
- *Businesses for the Bay* 1999 Excellence Awards winners and the 1999 Mentor of the Year were honored:
 - Small Business, Outstanding Achievement:
Parker's Exxon, District of Columbia
 - Medium Business, Outstanding Achievement:
Uniroyal Goodrich, Scottsville, Virginia

OF NOTE:

Articles about *Businesses for the Bay* and its participants were featured in national publications such as *Water Environment & Technology* and *Coastlines* and regionally in *The Washington Post*, *Baltimore Business Journal*, *Richmond Times-Dispatch*, and the *Bay Journal* in 1999. The program also was featured at national and regional conferences.



Businesses for the Bay 1999 Excellence Awards winners
and the 1999 Mentor of the Year (*continued*)

- Medium Business, Significant Achievement:
DAP, Inc., Baltimore, Maryland
- Large Business, Outstanding Achievement:
Siemens Automotive Corporation, Newport News,
Virginia
- Large Business, Significant Achievement:
Procter & Gamble Cosmetics, Hunt Valley, Maryland
- Mentor of the Year: **Denise Jeffries**, City of Newport
News, Newport News, Virginia

Providing Technical Assistance

One way *Businesses for the Bay* helps facilities learn how to prevent pollution is through technical assistance workshops. In 1999, *Businesses for the Bay* partnered with several organizations, including the Maryland Rural Development Corporation and the Virginia Department of Environmental Quality, to teach printers, fleet maintenance personnel, educators, and others how to implement various pollution prevention activities. *Businesses for the Bay* also relies on its Mentors to provide free, technical assistance by sharing their experiences in preventing pollution.

For more information on *Businesses for the Bay*, go to
www.chesapeakebay.net/b4bay.htm
on the Bay Program website.



Chesapeake Bay Program
A Partnership for the Future

Chesapeake 2000 and the Bay

Where are we and Where are we going?



Chesapeake 2000 and the Bay

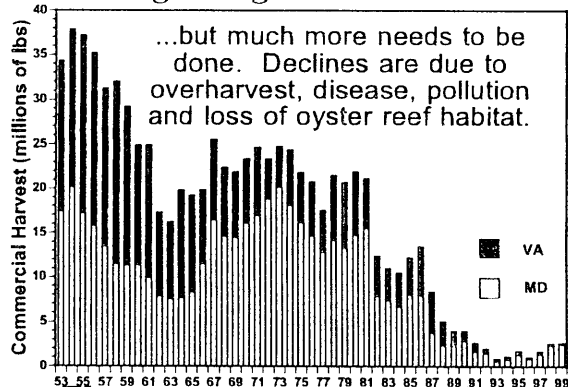
Where Are We and Where Are We Going?

The Bay and its rivers are doing better than they were when the first Chesapeake Bay Agreement was signed in 1983, but we still have a way to go before we reach our goals for a restored Chesapeake. Bay Program partners have taken stock of new challenges and technology in an effort to renew the agreement. The latest agreement, called *Chesapeake 2000*, reaffirms the Chesapeake Bay Program partnership and recommits the partners to restore and protect the Bay system for years to come.

Living Resource Protection and Restoration

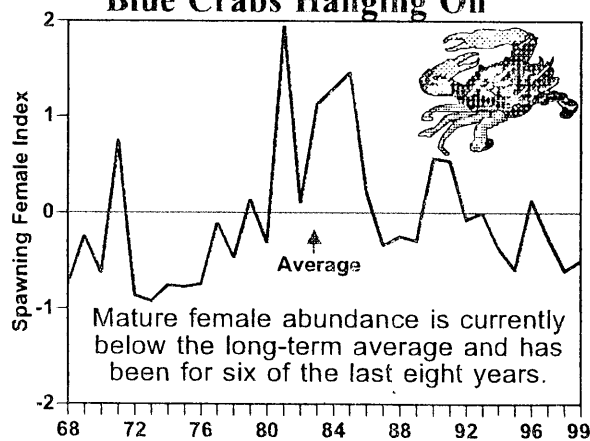
Goal: *Restore, enhance and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.*

Declines in Oyster Harvest are Beginning to Reverse...



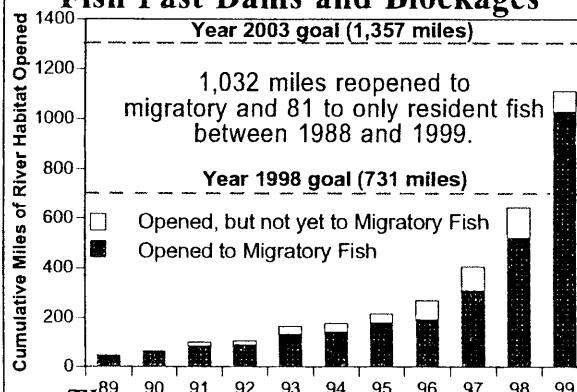
The new agreement commits to increase native oysters tenfold by 2010.

Blue Crabs Hanging On



The new agreement commits to establish harvest targets for the fishery by 2001.

Progress Made Getting Migratory Fish Past Dams and Blockages



The new agreement commits to set a new goal for additional fish passages and to revise fishery management plans to include habitat and target population sizes for migratory fish.

The new agreement contains additional commitments related to living resources:

- Identify invasive (exotic) species that have potential to harm the Bay and develop ways to manage them.
- Develop multi-species management plans for targeted species and revise existing fishery management plans to incorporate multi-species and ecosystem approaches.

The Chesapeake Bay Program is the voluntary partnership among the U.S. EPA (representing the federal government), the jurisdictions of MD, VA, PA & DC, the Chesapeake Bay Commission, and participating citizen advisory groups. For more information, call 1-800-662-CRIS or visit the Chesapeake Bay Program website at www.chesapeakebay.net.

6/22/00



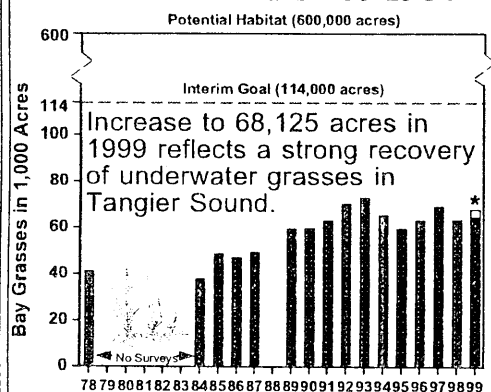
Chesapeake 2000 and the Bay

Where Are We and Where Are We Going?

Vital Habitat Protection and Restoration

Goal: *Preserve, protect and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the Bay and its rivers.*

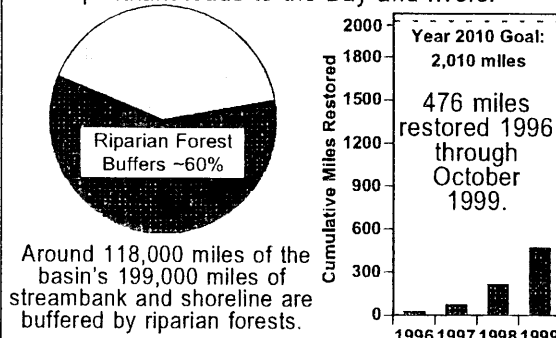
Underwater Bay Grasses have Increased since 1984



The new agreement recommits to the existing goal and commits to revise goals to address water clarity, water quality and bottom disturbance.

Streamside Forests Being Restored

Streamside (riparian) forest buffers help reduce pollutant loads to the Bay and rivers.



The new agreement commits to establish a new goal to expand buffer mileage and to conserve all existing mileage.

The new agreement also commits to:

- Achieve a no-net loss of existing wetlands acreage and function.
- Restore 25,000 acres of wetlands by 2010.
- By 2010, implement locally supported watershed management plans in 2/3 of the watershed.

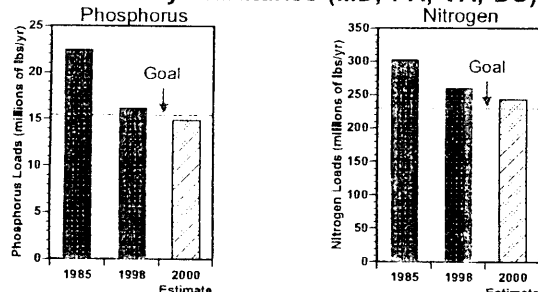
Water Quality Protection and Restoration

Goal: *Achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health.*

The new agreement commits to correct all nutrient and sediment-related problems in the Bay and its tidal tributaries by 2010.

Nutrient Pollution Declining but We Still Need to Do More

Total Nutrient Loads Delivered to the Bay from All Bay Tributaries (MD, PA, VA, DC)



Phosphorus loads delivered to the Bay from all of its tributaries declined 6 million lbs/yr between 1985 and 1998. We expect to reach the goal by 2000.

Nitrogen loads declined 42 million lbs/yr. More must be done in order to meet the goal by 2000.

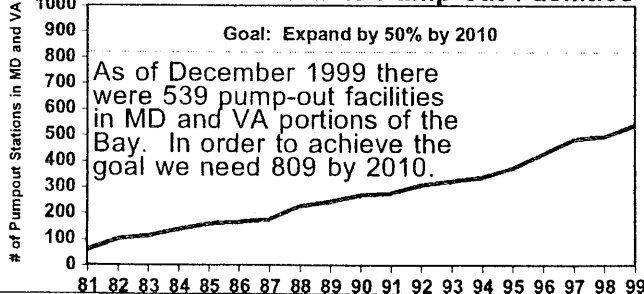
Maintaining reduced nutrient levels after 2000 will be a challenge due to expected population growth in the region.

Source: CBP Watershed Model. Data include total nutrient loads from point and nonpoint sources delivered to the Bay from Bay Agreement jurisdictions.

The new agreement also commits to:

- Achieve and maintain the 40% nutrient reduction goal agreed to in 1987.
- By 2003, establish appropriate areas within the Bay and its tributaries as "no discharge zones" for human waste from boats and by 2010, expand by 50% the number and availability of waste pump-out facilities.

Boat Waste Pump-out Facilities



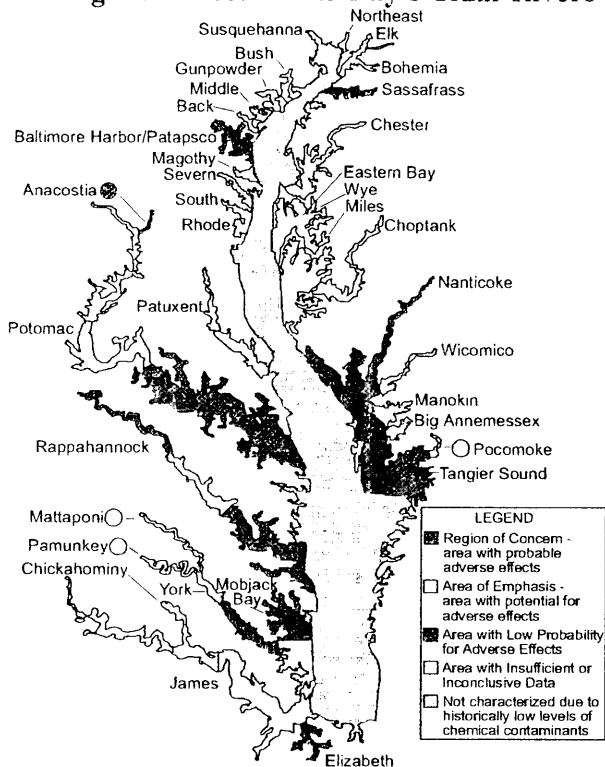
For more information, visit the Chesapeake Bay Program website at www.chesapeakebay.net or call 1-800-662-CRIS.

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A Snapshot of Chesapeake Bay: How's it Doing?

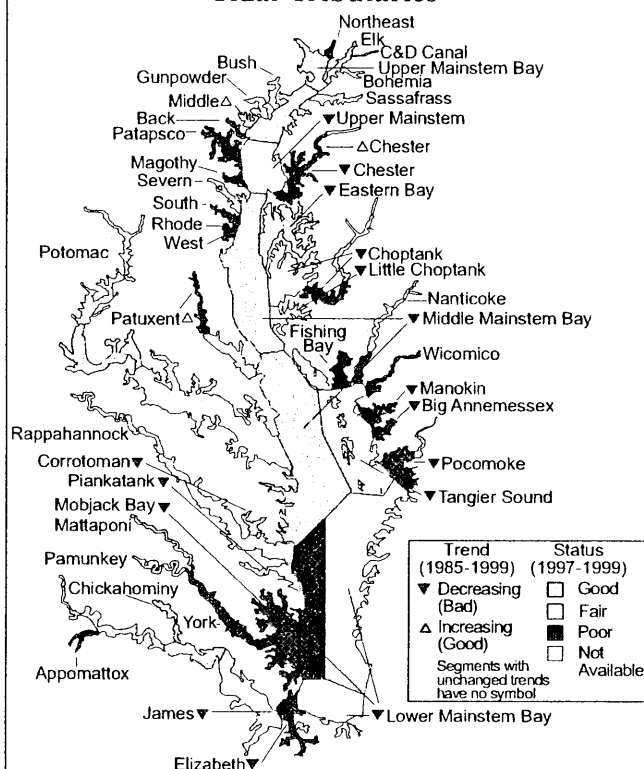
Status of Chemical Contaminant Effects on Living Resources in the Bay's Tidal Rivers



The new agreement commits to:

- Reduce chemical contaminants to levels that result in no toxic or bioaccumulative impact on living resources that inhabit the Bay or on human health.
- Through voluntary means, strive for zero release of chemical contaminants from point sources (including air sources).

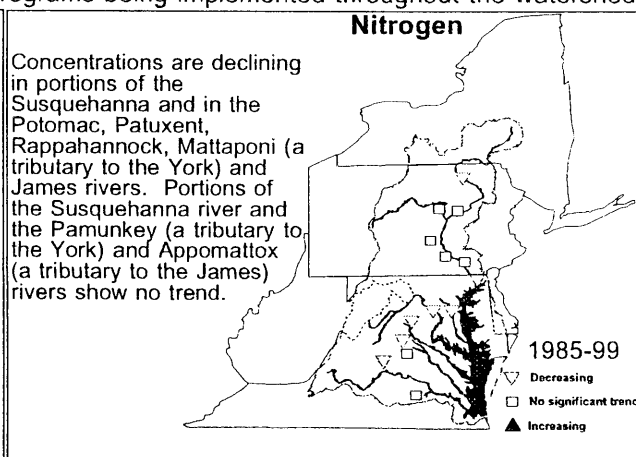
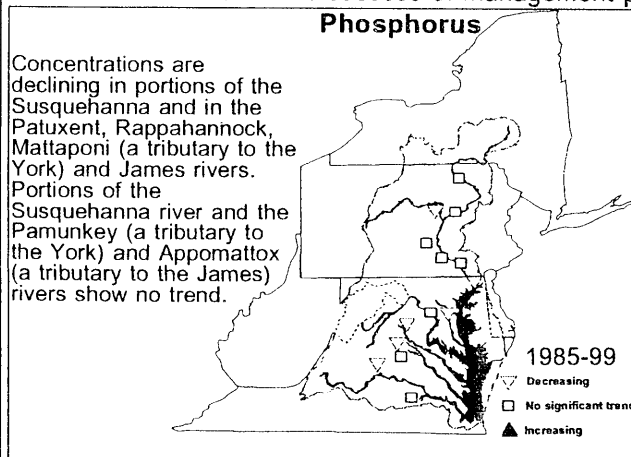
Water Clarity in the Bay and Its Tidal Tributaries



The new agreement states that in pursuing the restoration of vital habitats throughout the watershed, we will continue efforts to improve water clarity in order to meet light requirements necessary to support underwater Bay grasses.

Nutrient Pollution Levels are Declining in Non-tidal Portions of the Rivers

These results measure the success of management programs being implemented throughout the watershed.



Results are shown for flow adjusted trend analyses of monitoring data using the earliest complete data set collected since 1985 through 1999.

For more information, visit the Chesapeake Bay Program website at www.chesapeakebay.net or call 1-800-662-CRIS.

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Chesapeake 2000 and the Bay

Where Are We and Where Are We Going?

Sound Land Use

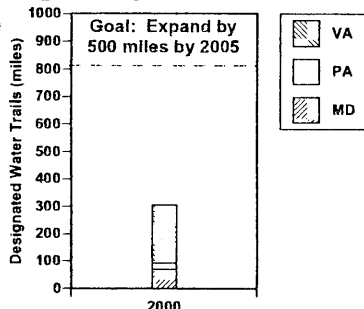
Goal: Develop, promote and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources.

The new agreement commits to:

- Permanently preserve from development 20% of the land area in the watershed by 2010.
- By 2012, reduce the rate of harmful sprawl development of forest and agricultural land in the watershed by 30%.
- By 2005, increase the number of designated water trails in the Chesapeake Bay region by 500 miles.

Water Trails in the Bay Region

There are currently an estimated 305 miles of water trails in the Bay region. In order to achieve the goal we need 805 by 2005.

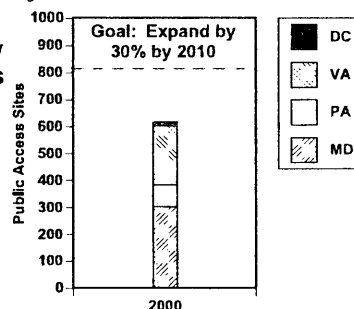


The new agreement commits to:

- By 2010, rehabilitate and restore 1,050 abandoned industrial sites (brownfields) to productive use.
- Coordinate transportation and land use planning.
- By 2010, expand by 30% the system of public access points to the Bay, its tributaries and related resource sites in an environmentally sound manner.

Public Access Points to the Bay and its Tributaries

Based on preliminary information there are at least 619 public access sites. In order to achieve the goal we need a minimum of 186 more by 2010.



Stewardship and Community Engagement

Goal: Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments and schools to undertake initiatives to achieve the goals and commitments of the new agreement.

What can you do to help restore the Bay?

Prevent pollution from entering the Bay and rivers by planting trees, especially along streams and shorelines.

Conserve electricity and water and reduce the amount of miles you drive.

Plant native vegetation that requires the use of less fertilizer, pesticides and water.

Limit fertilizer use and apply at appropriate times.

Use safer, nontoxic alternatives for cleaning and for controlling pests and weeds.

Properly dispose of household hazardous waste, antifreeze, oil and boat waste.

Prevent pollution by reducing, reusing and recycling.

Get involved in community groups and watershed organizations to develop watershed management plans.

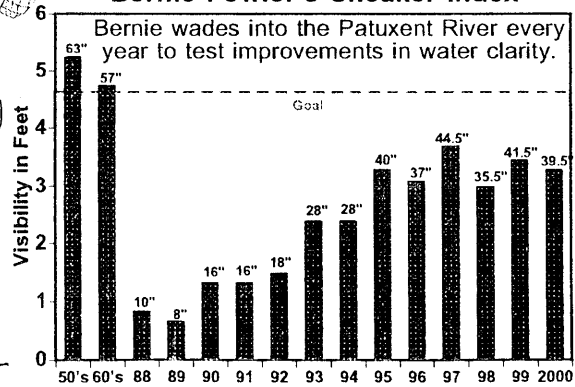
For more ideas, call 1-800-662-CRIS.

Get involved with citizen monitoring efforts that track progress in the Bay cleanup.



Bernie Fowler's Sneaker Index

Bernie wades into the Patuxent River every year to test improvements in water clarity.



The Chesapeake Bay Program is the voluntary partnership among the U.S. EPA (representing the federal government), the jurisdictions of MD, VA, PA & DC, the Chesapeake Bay Commission, and participating citizen advisory groups. For more information, call 1-800-662-CRIS or visit the Chesapeake Bay Program website at www.chesapeakebay.net.

6/22/00

A Citizen's Guide to the Chesapeake 2000 Agreement



Chesapeake 2000: A Watershed Partnership **A Citizen's Guide to the *Chesapeake 2000 Agreement***

Living Resource Protection and Restoration

It is recognized that the health of the Bay watershed's living resources is the ultimate indicator of the success in all restoration and protection efforts. The focus is on the interconnectedness of the Bay's living resources and the importance of protecting the entire natural system. Likewise, restoration actions must be integrated and coordinated.

Goal: Restore, enhance and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.

What the Agreement Says

Increase oysters tenfold by 2010.

Identify invasive (exotic) species that have potential to harm the Bay. Develop ways to manage them. Work on national policy regarding ballast water in ships.

Provide fish passage for migratory fish by opening areas blocked by dams, etc. Revise fish management plans to include habitat and target population sizes for migratory fish.

Develop multi-species management plans for targeted species. Revise existing fish management plans to incorporate multi-species approach.

What it Means

Oysters' ability to filter pollutants from water plays a role in water quality. This commitment means that more oyster seeding is needed and that establishing and expanding protected areas for oysters also are needed. Creating more and increasing the size of oyster reefs also are needed.

Invasive species such as nutria, mute swans and Rapa Whelks take over habitat from native species and change the ecosystem. Some exotic species are carried in ships' ballast water from other parts of the world. Until a national policy is established, we will ask ports and shipping lines to voluntarily help manage this threat to the Bay.

Many ocean fish species spawn in freshwater rivers. Providing more habitat for spawning upstream helps sustain the species. This commitment means that we need to bypass barriers, dams, pipes, and other man-made structures that are barriers to passage. Fish management plans are expected to lead to stronger populations of migratory fish and expanded opportunities for recreational anglers.

Multi-species management means developing specific plans/actions to keep all species in balance with one another and with their habitat. This commitment may lead to stronger populations and expanded opportunities for recreational anglers.

Manage the blue crab fishery to include specific harvest targets in order to restore healthy populations, including spawning biomass, size and age structure.

This commitment would set specific harvest targets and would strive for balance, taking proper number of males vs. females, large vs. small, and young vs. old. It's intended to produce stronger populations in the future.

Vital Habitat Protection and Restoration

The Chesapeake Bay's natural infrastructure is an intricate system of terrestrial and aquatic habitats linked to the landscapes and the environmental quality of the watershed. The focus is on preserving the natural infrastructure to protect the Bay's waters and living resources.

Goal: Preserve, protect and restore those habitats and natural areas vital to the survival and diversity of the living resources of the Bay and its rivers.

What the Agreement Says

Recommit to the goal of restoring 114,000 acres of Bay grasses (also known as Submerged Aquatic Vegetation or SAV). Revise goals to address water clarity, water quality and bottom disturbance.

What it Means

Bay grasses provide habitat for living resources and reduce shore erosion. They also are indicators of water quality. Enlarging areas covered by grasses is important to species like crabs, striped bass, etc. This commitment will target restoration efforts to levels shown by aerial photography in the 1930s, focusing on areas important to living resources.

Achieve no-net loss of wetlands. Achieve a net gain by restoring 25,000 acres of tidal and non-tidal wetlands. Preserve key wetlands identified by local governments and community groups with specific wetland protection plans that cover 25% of all state lands.

Wetlands provide habitat for many fish, shellfish, waterfowl and animals, and they filter pollutants from the land before they enter streams, rivers and the Bay. Many store water during storms to reduce flooding of nearby lands. This is a commitment to no further loss of wetlands, increasing the total acreage by 25,000 and insuring that these wetlands function as they should.

Plant forest (riparian) buffer strips along 2010 miles of waterways in the Bay watershed by 2010. Link contiguous forests. Work with local governments to adopt local stream corridor protection plans with forest conservation and restoration components.

Buffers filter runoff from the land 70% better than lawns or farmland. Contiguous forest provides habitat for a variety of animals and reduces their conflicts with humans. With this commitment, the Bay Program partners and local governments will undertake a variety of actions to achieve the forest goals.

Work to enlist 50% of the local governments in the Bay region to write watershed management plans. Work with local governments and communities to select pilot projects to promote stream corridor protection, restoration and maintenance of minimum flows. Improve stream monitoring.

Local citizen and government involvement is critical to improving/maintaining the health of streams within local communities. Developing an ethic of stewardship of the local stream is essential to preserve and enhance water quality. With this commitment, the Bay Program partners and local governments would undertake a variety of actions to achieve the goals.

Water Quality Restoration and Protection

Improving water quality is the most critical element in the overall restoration and protection of the Chesapeake Bay and its tributaries. The goal to remove the Chesapeake Bay and its tidal tributaries from the *Clean Water Act's* "impaired waters" list is the most comprehensive in the restoration's history.

Goal: Achieve and maintain the water quality necessary to support the aquatic living resources of the Bay and its tributaries and to protect human health.

What the Agreement Says

Continue efforts to reduce and cap nutrient loadings to meet the 40% reduction goal of the 1987 Bay Agreement.

Correct all nutrient-related problems in the Bay to remove the Chesapeake for the "impaired waters" list (for nutrients).

Reduce the amount of sediment entering the Bay and its tidal rivers sufficiently to remove the Bay from the impaired waters list by 2010.

Develop strategies for loss of sediment storage area behind dams on Susquehanna River.

What it Means

Reducing the amount of nitrogen and phosphorus in the Bay's waters is critical to maintaining healthy plants, fish, shellfish, and waterfowl in the Chesapeake. This reconfirms the commitment to achieve the 1987 Agreement's 40% reduction and, equally as important, maintain the reduction or "cap" loads at the reduced level.

The *Clean Water Act* sets specific criteria for declaring water bodies impaired. This commitment establishes the goal of cleaning up the Bay sufficiently to get the Chesapeake off of the EPA list of impaired waters.

While some sedimentation of the Bay is expected, excess sediment reduces water clarity, covers Bay grass beds and oyster reefs with silt, and requires the dredging of channels for boating and shipping. This commitment means that for the first time, actions will be developed to comprehensively address sediment inputs to the Bay.

Dams along the Susquehanna River trap and hold sediments. However, they are becoming filled and losing their capacity as sediment traps. This commitment means that a plan to alleviate this problem would be developed and implemented.

Reduce chemical contaminants from all controllable sources striving for zero release from point sources through voluntary measures. Include nonpoint sources in this strategy.

The current chemical contaminant strategy is being reevaluated. These commitments reaffirm that process and add a goal of zero release and targeting nonpoint sources for reduction. This would broaden the focus to many of the decisions made daily by people that result in water quality degradation.

Focus on the Anacostia River in the District of Columbia, the Patapsco River and Baltimore Harbor in Maryland, and Virginia's Elizabeth River as models for urban river restoration.

These identified Regions of Concern (or "hot spots") for chemical contaminant effects of living resources have experienced improvements due to management efforts by the Bay Program partners. This commitment means that continued support and new approaches are needed to address existing pollution, as well as runoff from developed land.

Assess the effects of airborne nitrogen and chemical contaminants and develop a plan for strengthening air emissions pollution prevention throughout the airshed.

Airborne nitrogen and polluting chemicals enter the waters of the Bay watershed. This would commit the Bay Program jurisdictions and urge state in the airshed (larger than the watershed including states in the Midwest) to enhance their pollution prevention programs.

Establish specific no discharge zones for boat waste; expand number of boat pumpout stations.

Human waste from boats is a human health hazard and its discharge is illegal. This commitment would now prohibit discharge of treated waste from Coast Guard-approved Marine Sanitation Devices in certain identified areas of the Bay deemed of critical ecological importance, fish and shellfish harvest areas, swimming areas or where boats congregate.

Sound Land Use

We've learned that what happens on the land affects water quality, habitat and living resources. Future development will be sustainable only if we protect our natural and rural resource land, limit impervious surfaces and concentrate new growth in existing population centers or suitable areas served by appropriate infrastructure. The focus is on Bay Program partners working with local governments and others to develop the tools necessary to lessen the impact of growth and land development.

Goal: Develop, promote and achieve sound land use practices that protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources.

What the Agreement Says

Protect and preserve natural resource lands through use of easements, purchase of development rights, etc. Inventory Bay watershed's resource lands. Provide assistance to local governments to revise ordinances to protect forest and agricultural lands. Develop GIS system for local government use.

Expand public access points to the Bay, its tributaries and related sites by 30%. Increase number of water trails. Enhance outreach materials.

By 2010, reduce the rate of conversion of forest and agricultural lands to development by 30%.

***Not all of the Bay Program signatories agree to this commitment being a part of this agreement.**

Remove governmental impediments to low impact design. Review tax policies that encourage undesirable growth patterns. Remove barriers to redevelopment. Provide analytical tools to local governments.

Develop guidelines to limit impervious cover. Concentrate new residential development in areas with infrastructure. Evaluate local implementation of stormwater and erosion control.

Develop wastewater treatment options.

What it Means

Forest and agricultural lands are resources that provide economic benefits, sustain agriculture, provide habitat, provide critical ecological functions and enhance our quality of life. These commitments seek to preserve the integrity of our natural resource lands and, in turn, water quality through the preservation of that land.

This commitment recognizes that providing public access is critical to increasing public support for the Bay, as is providing increased opportunities for recreation and learning.

This is one indicator of the rate of development sprawl. This commitment recognizes that by reducing land conversion, the rate of sprawl slows. Land use practices will have to change to meet this goal.

This commitment would give localities incentive to encourage new development and redevelopment designed for environmental protection and for maximum utilization of existing infrastructure. This should minimize sprawl and direct growth to redevelopment opportunities in existing communities.

Too much impervious cover (hard surfaces) in an area can degrade water quality. This commitment will help control the amount of impervious surfaces. Also, concentrating development in places where sewer, water, and other services already are found reduces sprawl, conserves resources and reduces the cost of building new schools, roads, sewer and water lines. Improved stormwater and erosion control ordinances will reduce the impact of building and farming on streams.

Effluent discharged from wastewater treatment plants is a prime source of nutrients in the Bay region. Home septic systems also can pollute surface and groundwater. This commitment recognizes that further reductions in impacts from both will be necessary to offset growth in loads as a result of population increases. Developing and promoting alternative treatment options also will be necessary.

Strengthen brownfield redevelopment.

Redevelopment of brownfield sites (previously used areas with some environmental contamination) into commercial/industrial uses provides the opportunity for community revitalization. This commitment maximizes these opportunities, supports urban revitalization and reduces sprawl.

Coordinate transportation and land use planning. Modify transportation policies to reduce dependence on cars. Encourage use of clean vehicle technologies and travel alternatives such as telecommuting.

This commitment recognizes that planning for transportation and land use concurrently results in a more coherent travel pattern, reduced travel times, and reduced sprawl. Encouraging use of clean vehicles and travel alternatives would reduce air pollution.

Individual Responsibility and Community Engagement

The focus is on the Bay being dependent upon the actions of every citizen in the watershed -- today and in the future. Focusing individuals on local resources advances Baywide restoration as well.

Goal: Promote individual stewardship and assist individuals, community-based organizations, local governments and schools to undertake initiatives to achieve the goals and commitments of this agreement.

What the Agreement Says

Make public awareness and personal involvement through public outreach and citizen interaction a Bay Program priority. Use the latest communication techniques. Forge partnerships with departments of education and the education community; provide teachers and students with opportunities to participate in projects and activities. Expand outreach efforts to minority populations.

The jurisdictions will identify small watersheds where community-based actions are essential to meet Bay restoration goals and work with local governments to bring additional resources to these efforts. The Bay Program will establish a clearinghouse for local watershed restoration efforts. Each jurisdiction will provide information to local governments to help analyze environmental conditions at a small watershed scale.

What it Means

Alerting individuals to the impacts of their actions on the Bay's natural system and its watershed is essential to efforts to restore and protect the Bay watershed. By involving citizens, it is hoped they will change their behavior to adopt more environmentally aware daily practices. The purpose of this commitment is to increase awareness and actions by individuals to promote an ethic of stewardship of the environment.

Community-based activities are the most effective method of engaging the public in watershed restoration activities. Programs that create ownership/stewardship of local waters create an environmental awareness that individual actions matter to local waters and to the Bay. These commitments focus on bringing new resources to the local level and enhancing action in these areas.

Government by example—ensure that all properties managed by governments are utilized in a manner consistent with Bay Program goals. Expand the use of clean vehicle technologies. Build partnerships with Delaware, New York and West Virginia: the other Bay watershed states.

The commitment recognizes that Bay Program partner governments and agencies should be the best examples of good environmental stewardship in all activities they undertake. Governments should set the example for effective and efficient environmental action.

News Release



NEWS RELEASE

Embargoed Until June 28, 2000 Contact: Nancy A. New 410/267-5758 or
Donna Heron 215/814-5113
ON June 28: 443/562-4183

New Chesapeake Bay Agreement Signed D.C. Mayor Williams Selected Executive Council Chair

(June 28, 2000) FRIENDSHIP/ROSE HAVEN, MD -- A new agreement that will guide the next decade of restoration in the Chesapeake Bay watershed was signed today by the Chesapeake Executive Council. The agreement contains commitments that will improve water quality and protect living resources in the Bay and its tributaries. It will also remove the Bay from the federal list of impaired waters by 2010.

This action by the Executive Council -- Maryland Governor Parris N. Glendening; Pennsylvania Governor Thomas J. Ridge; Virginia Governor James S. Gilmore, III; District of Columbia Mayor Anthony A. Williams; U.S. Environmental Protection Agency Administrator Carol M. Browner; and Chesapeake Bay Commission Chair Bill Bolling -- culminates two years of work to develop the new agreement. The jurisdictions and governmental bodies represented in the Executive Council lead the cooperative Chesapeake Bay Program.

Council members also selected Mayor Williams to serve as chair of the Executive Council for the next year. Gov. Glendening has served as chair since 1997.

Chesapeake 2000: A Watershed Partnership is the most comprehensive and far-reaching agreement in the Bay Program's history. The primary goal of the new agreement is to improve water quality sufficiently to sustain the living resources of the Chesapeake Bay and its tidal tributaries and to maintain that water quality into the future. This will mean setting increased nutrient reduction goals and for the first time setting sediment reduction goals Baywide.

Meeting these water quality standards by 2010 will preclude the need for regulatory measures slated to begin in 2011. EPA has placed the Bay and its tidal waters on the impaired waters list for an over abundance of the nutrients nitrogen and phosphorus.

The agreement has five sections containing commitments to protect and restore living resources, vital habitats, and water quality through sound land use by promoting stewardship and engaging communities throughout the 64,000 square mile watershed. The agreement is designed to build on past restoration actions and will continue all Bay Program commitments outlined in previous agreements or Executive Council directives. Specific restoration commitments include:

- Increase the number of native oysters tenfold by 2010
- Restore blue crabs by establishing harvest targets and implementing complementary state management plans Baywide
- New wetlands restoration and protection goals
- Reduce the loss rate of farm and forest land to harmful sprawl development in the watershed by 30 percent by 2012
- Permanently preserve from development 20 percent of the lands in the watershed by 2010
- Strive for zero release of chemical contaminants from point sources by 2010
- Provide a meaningful outdoor Bay or stream experience for every school student in the watershed before graduation from high school, beginning with the Class of 2005
- Expand public access by 30 percent by 2010, and add 500 miles of water trails by 2005

Chesapeake 2000 becomes the third Bay Agreement written to guide the actions of the multi-jurisdictional Chesapeake Bay Program. The first agreement, creating the Bay Program, was signed in 1983. A second was signed in 1987 and amended in 1992. Scientists, local government officials and conservation leaders all played a role in developing the new agreement. The process also included considerable public input and review.

Most commitments in the new agreement are scheduled for completion within ten years. It is already being used to guide the use of Bay Program partner resources.

STATEMENTS FROM
CHESAPEAKE EXECUTIVE COUNCIL MEMBERS

Mayor Anthony A. Williams, District of Columbia, Incoming Chair

“It’s important that we provide our children with clean, usable natural resources, so they can enjoy our city and the region. By establishing a Green Government initiative, we’ve achieved a 40 percent reduction in pollutants that spoil our waterways. But to rejuvenate the Chesapeake – and revitalize the Anacostia River – we need a commitment from the whole community. It’s cooperation between our local and federal partners that will improve the condition of our environment.”

Governor Parris N. Glendening, Maryland, Outgoing Chair

“The new Bay Agreement offers a new perspective on cleaning up the Chesapeake and its tributaries. The core theme of individual stewardship, the ideas that ‘I am responsible,’ and ‘What I do does make a difference,’ resounds throughout the document. In crafting this Agreement, we listened carefully to what people had to say. We understood the importance of developing a document that was inclusive of all the Bay’s citizens. Our goals and commitments were based on good science and we leavened the document with common sense while targeting real-world results. Today, we have an Agreement that will work throughout the watershed. This Agreement takes us a long way towards our goals of a healthy, productive, living Chesapeake Bay, a restored Chesapeake Bay that will be our proudest legacy and our proudest achievement.”

Governor James S. Gilmore, III, Virginia

“The Chesapeake Bay and its great tributary rivers represent a way of life, a place of recreation and of refuge, and an essential resource for the prosperity of our entire region. I am proud, on behalf of all Virginians, to join our Chesapeake Bay Agreement partners in this renewal of our common goals to preserve, protect and enhance the Chesapeake Bay and its watershed.”

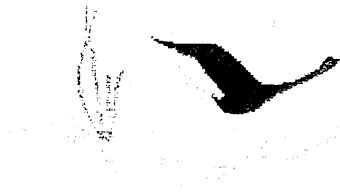
Administrator Carol M. Browner, U.S. Environmental Protection Agency

“Today’s action reflects the Clinton-Gore Administration’s ongoing commitment to work with local communities to protect America’s environment for this generation and future generations. By taking these vital steps to improve water quality and restore wetlands in the Chesapeake Bay area, we will protect one of our nation’s greatest national treasures, while significantly increasing public health protections.”

Senator Bill Bolling, Chair, Chesapeake Bay Commission

“Today we execute the Chesapeake 2000 agreement and celebrate the cooperative partnership that is the hallmark of our Chesapeake Bay restoration effort. Achieving the lofty goals in Chesapeake 2000 will require money, hard work and the continued cooperative efforts of government, the private sector and individual citizens as we each seek to be responsible stewards of the Bay. The Chesapeake Bay Commission will redouble its efforts in the Virginia, Maryland and Pennsylvania General Assemblies to help make the promise of Chesapeake 2000 a reality. I am very proud to sign this agreement today on behalf of the Chesapeake Bay Commission.”

Past Agreements



Chesapeake Bay Program

1983 Chesapeake Bay Agreement

We recognize that the findings of the Chesapeake Bay Program have shown an historical decline in the living resources of the Chesapeake Bay and that a cooperative approach is needed among the Environmental Protection Agency (EPA), the State of Maryland, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia (the States) to fully address the extent, complexity, and sources of pollutants entering the Bay. We further recognize that EPA and the States share the responsibility for management decisions and resources regarding the high priority issues of the Chesapeake Bay.

Accordingly, the States and EPA agree to the following actions:

1. A Chesapeake Executive Council will be established which will meet at least twice yearly to assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake Bay estuarine systems. The Council will consist of the appropriate Cabinet designees of the Governors and the Mayor of the District of Columbia and the Regional Administrator of EPA. The Council will be initially chaired by EPA and will report annually to signatories of this Agreement
2. The Chesapeake Executive Council will establish an implementation committee of agency representatives who will meet as needed to coordinate technical matters and to coordinate the development and evaluation of management plans. The Council may appoint such ex officio nonvoting members as deemed appropriate.
3. A liaison office for Chesapeake Bay activities will be established at EPA's Central Regional Laboratory in Annapolis, Maryland, to advise and support the Council and committee.

DATE: December 9, 1983

SIGNERS:

For the Commonwealth of *Virginia*--*Charles S. Robb, Governor*

For the State of *Maryland*--*Harry Hughes, Governor*

For the Commonwealth of *Pennsylvania*--*Mark Single, Lieutenant Governor*

1983 Chesapeake Bay Agreement

For the District of Columbia, *Marion Barry, Mayor*

For the United States of America--*William Ruckleshaus, Administrator, U.S. Environmental Protection Agency*

For the Chesapeake Bay Commission--*Joseph V. Gartlan, Jr., Chairman*

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For more information, contact the Chesapeake Bay Program Office, 410 Severn Avenue, Suite 110, Annapolis, MD 21403, Tel: (800) YOUR-BAY, Fax: (410) 267-5777.

 *Last modified 4 March 1996*



Chesapeake Bay Program

1987 Chesapeake Bay Agreement

THE CHESAPEAKE BAY IS A NATIONAL TREASURE and a resource of worldwide significance. Its ecological, economic, and cultural importance are felt far beyond its waters and the communities that line its shores. Man's use and abuse of its bounty, however, together with the continued growth and development of population in its watershed, have taken a toll on the Bay system. In recent decades, the Bay has suffered serious declines in quality and productivity.

REPRESENTING the Federal government and the States which surround the Chesapeake Bay, we acknowledge our stake in the resources of the Bay and accept our share of responsibility for its current condition. We are determined that this decline will be reversed. In response, all of our jurisdictions have embarked on ambitious programs to protect our shared resource and restore it to a more productive state.

IN 1980, the legislatures of Virginia and Maryland established the Chesapeake Bay Commission to coordinate interstate planning and programs from a legislative perspective. In 1985, Pennsylvania joined the Commission. And, in 1983, Virginia, Maryland, Pennsylvania, the District of Columbia, the U.S. Environmental Protection Agency and the Chesapeake Bay Commission formally agreed to a cooperative approach to this undertaking and established specific mechanisms for its coordination. Since 1983, our joint commitment has carried us to new levels of governmental cooperation and scientific understanding. It has formed a firm base for the future success of this long-term program. The extent and complexity of our task now call for an expanded and refined agreement to guide our efforts toward the twenty-first century.

RECOGNIZING that the Chesapeake Bay's importance transcends regional boundaries, we commit to managing the Chesapeake Bay as an integrated ecosystem and pledge our best efforts to achieve the goals in this Agreement. We propose a series of objectives that will establish a policy and institutional framework for continued cooperative efforts to restore and protect the Chesapeake Bay. We further commit to specific actions to achieve those objectives. The implementation of these commitments will be reviewed annually and additional commitments developed as needed.

Goals and Priority Commitments

THIS NEW AGREEMENT CONTAINS Goals and Priority Commitments for Living Resources; Water Quality; Population Growth and Development; Public Information, Education and Participation; Public Access; and Governance.

The parties to this 1987 Agreement are the U.S. Environmental Protection Agency representing the Federal government, the District of Columbia, the State of Maryland and the Commonwealths of Pennsylvania and Virginia (hereinafter the "States") and the Chesapeake Bay Commission. This Agreement may be amended and attachments added in the future by unanimous action of the Chesapeake Executive Council.

Living Resources

GOAL: PROVIDE FOR THE RESTORATION AND PROTECTION OF THE LIVING RESOURCES. THEIR HABITATS AND ECOLOGICAL RELATIONSHIPS. The productivity, diversity and abundance of living resources are the best ultimate measures of the Chesapeake Bay's condition. These living resources are the main focus of the restoration and protection effort. Some species of shellfish and finfish are of immense commercial and recreational value. Others are valuable because they are part of the vast array of plant and animal life that make up the Chesapeake Bay ecosystem on which all species depend. We recognize that the entire natural system must be healthy and productive. We will determine the essential elements of habitat and environmental quality necessary to support living resources and will see that these conditions are attained and maintained. We will also manage the harvest of and monitor populations of commercially, recreationally and ecologically valuable species to ensure sustained, viable stocks. We recognize that to be successful, these actions must be carried out in an integrated and coordinated manner across the whole Bay system.

OBJECTIVES:

- Restore, enhance, protect and manage submerged aquatic vegetation.
- Protect, enhance and restore wetlands, coastal sand dunes, forest buffers and other shoreline and riverline systems important to water quality and habitat.
- Conserve soil resources and reduce erosion and sedimentation to protect Bay habitat.
- Maintain freshwater flow regimes necessary to sustain estuarine habitats, including where appropriate establishing minimum in-stream flows.
- Develop compatible Bay-wide stock assessment programs.
- Develop Bay-wide fisheries management strategies and develop complementary state programs and plans to protect and restore the finfish and shellfish stocks of the Bay, especially the freshwater and estuarine spawners.
- Provide for the restoration of shellfish stocks in the Bay especially the abundance of commercially important species.
- Restore, enhance and protect waterfowl and wildlife.

COMMITMENT:

TO ACHIEVE THIS GOAL WE AGREE:

- *by January 1988* to develop and adopt guidelines for the protection of water quality and habitat conditions necessary to support the living resources found in the Chesapeake Bay system and to use these guidelines in the implementation of water quality and habitat protection programs.
- *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.
- *by July 1988*, to adopt a schedule for the development of Bay-wide resource management strategies for commercially, recreationally and selected ecologically valuable species.
- *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.
- *by December 1988*, to develop a Bay-wide policy for the protection of tidal and non-tidal wetlands.
- Provide for fish passage at dams, and remove stream blockages wherever necessary, to restore natural passage for migratory fish.

Water Quality

GOAL: REDUCE AND CONTROL POINT AND NONPOINT SOURCES OF POLLUTION TO ATTAIN THE WATER QUALITY CONDITION NECESSARY TO SUPPORT THE LIVING RESOURCES OF THE BAY. The improvement and maintenance of water quality are the single most critical elements in the overall restoration and protection of the Chesapeake Bay. Water is the medium in which all living resources of the Bay live, and their ability to survive and flourish is directly dependent on it.

To ensure the productivity of the living resources of the Bay, we must clearly establish the water quality conditions they require and must then attain and maintain those conditions. Foremost, we must improve or maintain dissolved oxygen concentrations in the Bay and its tributaries through a continued and expanded commitment to the reduction of nutrients from both point and nonpoint sources. We must do the same for toxics and conventional pollutants. To be effective, we will develop basin-wide implementation plans for the control and reduction of pollutants which are based on our best understanding (including that derived from modeling) of the Bay and its tributaries as an integrated system.

OBJECTIVES:

- Provide timely construction and maintenance of public and private sewerage facilities to assure control of pollutant discharges.
- Reduce the discharge of untreated or inadequately treated sewage into Bay waters from such sources as combined sewer overflows, leaking sewage systems, and failing septic systems.
- Evaluate and institute, where appropriate, alternative technologies for point source pollution control, such as biological nutrient removal and land application of effluent to reduce pollution loads in a cost-effective manner.
- Establish and enforce pollutant limitations to ensure compliance with water quality laws.

- Reduce the levels of nonpoint sources of pollution.
- Reduce sedimentation by strengthening enforcement of existing control regulations.
- Eliminate pollutant discharges from recreational boats.
- Identify and control toxic discharges to the Bay system, including metals and toxic organics to protect water quality, aquatic resources and human health through implementation and enforcement of the states' National Pollutant Discharge Elimination System permit programs and other programs.
- Reduce chlorine discharges in critical finfish and shellfish areas. Minimize water pollution incidents and provide adequate response to pollutant spills.
- Manage sewage sludge, dredged spoil and hazardous wastes to protect the Bay system.
- Manage groundwater to protect the water quality of the Bay.
- Quantify the impacts and identify the sources of atmospheric inputs on the Bay system.

COMMITMENT:

TO ACHIEVE THIS GOAL WE AGREE:

- *by July 1988*, to develop, adopt and begin implementation of a basin-wide strategy to equitably achieve by the year 2000 at least a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Chesapeake Bay. The strategy should be based on agreed upon 1985 point source loads and on nonpoint loads in an average.
- *by December 1991*, to re-evaluate the 40 percent reduction target based on the results of modeling, research, monitoring and other information available at that time.
- *by December 1988*, to develop, adopt and begin implementation of a basin-wide strategy to achieve a reduction of toxics consistent with the Water Quality Act of 1987 which will ensure protection of human health and living resources. The strategy will cover both point and nonpoint sources, monitoring protocols, enforcement of pretreatment regulations and methods for dealing with in-place toxic sediments where necessary.
- *by July 1988*, to develop and adopt, as required by the Water Quality Act of 1987, a basin-wide implementation strategy for the management and control of conventional pollutants entering the Chesapeake Bay system from point and nonpoint sources.
- *by July 1988*, the Environmental Protection Agency, acting for the federal government, will develop, adopt and begin implementation of a strategy for the control and reduction of point and nonpoint sources of nutrient, toxic and conventional pollution from all federal facilities.

Population Growth and Development

GOAL: PLAN FOR AND MANAGE THE ADVERSE ENVIRONMENTAL EFFECTS OF HUMAN POPULATION GROWTH AND LAND DEVELOPMENT IN THE CHESAPEAKE BAY WATERSHED.

There is a clear correlation between population growth and associated development and environmental degradation in the Chesapeake Bay system. Enhancing, or even main-mining, the quality of the Bay while accommodating growth will frequently involve difficult decisions and restrictions and will require continued and enhanced commitment to proper development standards. The states and the federal

government will assert the full measure of their authority to mitigate the potential adverse effects of continued growth.

Local jurisdictions have been delegated authority over many decisions regarding growth and development which have both direct and indirect effects on the Chesapeake Bay system and its living resources. The role of local governments in the restoration and protection effort will be given proper recognition and support through state and federal resources.

States will engage in an active partnership with local governments to establish policy guidelines to manage growth and development.

OBJECTIVES:

- Designate a state-level office responsible for ensuring consistency with this Agreement among the agencies responsible for comprehensive oversight of development activity, including infrastructure planning, capital budgets, land preservation and waste management activities.
- Provide local governments with financial and technical assistance to continue and expand their management efforts.
- Consult with local government representatives in the development of Chesapeake Bay restoration and protection plans and programs.
- Identify and give public recognition to innovative and otherwise noteworthy examples of local government restoration and protection-related programs.
- Assure that government development projects meet all environmental requirements.
- Promote, among local, state and federal governments, and the private sector, the use of innovative techniques to avoid and, where necessary, mitigate the adverse impacts of growth.

COMMITMENT:

TO ACHIEVE THIS GOAL WE AGREE:

- to commission a panel of experts to report, *by December 1988*, on anticipated population growth and land development patterns in the Bay region through the year 2020, the infrastructure requirements necessary to serve growth and development, environmental programs needed to improve Bay resources while accommodating growth, alternative means of managing and directing growth and alternative mechanisms for financing governmental services and environmental controls. The panel of experts will consist of twelve members: three each from Virginia, Maryland and Pennsylvania, and one each from the District of Columbia, the Environmental Protection Agency and the Chesapeake Bay Commission.
- *by January 1989*, to adopt development policies and guidelines designed to reduce adverse impacts on the water quality and living resources of the Bay, including minimum best management practices for development and to cooperatively assist local governments in evaluating land-use and development decisions within their purview, consistent with the policies and guidelines.
- to evaluate state and federal development projects in light of their potential impacts on the water quality and living resources of the Chesapeake Bay, and design and carry out each state and federal development project so as to serve as a model for the private sector in terms of land-use practices.

Public Access

GOAL: PROMOTE INCREASED OPPORTUNITIES FOR PUBLIC APPRECIATION AND ENJOYMENT OF THE BAY AND ITS TRIBUTARIES. Interest in and commitment to the Chesapeake Bay and its tributaries are greatly affected by personal contact with that natural system. Consequently, improved opportunities for access to the shores and waters of the system are essential if public awareness and support are to be maintained and increased.

OBJECTIVES:

- Improve and maintain access to the Bay including public beaches, parks and forested lands.
- Improve opportunities for recreational and commercial fishing.
- Secure shoreline acreage to maintain open space and provide opportunities for passive recreation.
- Secure necessary acreage to protect unique habitat and environmentally sensitive areas.

COMMITMENT:

TO ACHIEVE THIS GOAL WE AGREE:

- to intensify our efforts to improve and expand public access opportunities being made available by the federal government, the states, and local governments, by developing a strategy, which includes an inventory of current access opportunities *by July 1988*, which targets state and federal actions to secure additional tidal storefront acres by December 1990 along the Bay and its tributaries.
- *by December 1988*, to prepare a comprehensive guide to access facilities and the natural resource system for the tidal Chesapeake Bay.

Governance

GOAL: SUPPORT AND ENHANCE THE PRESENT COMPREHENSIVE, COOPERATIVE AND COORDINATED APPROACH TOWARD MANAGEMENT OF THE CHESAPEAKE BAY SYSTEM.

GOAL: PROVIDE FOR CONTINUITY OF MANAGEMENT EFFORTS AND PERPETUATION OF COMMITMENTS NECESSARY TO ENSURE LONG-TERM RESULTS.

The cooperation necessary to sustain an effective Chesapeake Bay restoration and protection effort requires a formal working arrangement involving the states and the federal government. That institutional arrangement must allow for and promote voluntary individual actions coordinated within a well-defined context of the individual responsibilities and authorities of each state and the federal government. It must also ensure that actions which require a concerted, Bay-wide approach be addressed in common and without duplication. One of the principal functions of the coordinating institution is to develop strategic plans and oversee their implementation, based on advice from the public, from the scientific community and from user groups.

In addition, the coordinating body must exert leadership to marshal public support, and it must be accountable for progress made under the terms of this agreement. The coordinating body will continue to

be called the Chesapeake Executive Council. The Chesapeake Executive Council shall be comprised of the Governors, the Mayor of the District of Columbia, the Administrator of the Environmental Protection Agency and the Chairman of the Chesapeake Bay Commission. The chairmanship of the Council shall rotate annually as determined by the Council. The term of the Chairman shall be one year. The Administrator of the Environmental Protection Agency shall represent the federal government, and the Chairman of the Chesapeake Bay Commission shall represent its members.

OBJECTIVES:

- Continue to demonstrate strong, regional leadership by convening an annual public meeting of the Chesapeake Executive Council.
- Continue to support the Chesapeake Executive Council and provide for technical and public policy advice by maintaining strong advisory committees.
- Coordinate Bay management activities and develop and maintain effective mechanisms for accountability
- The Chesapeake Bay Liaison Office shall provide staff support to the Chesapeake Executive Council by providing analyses and data management, and by generating reports related to the overall program. The Implementation Committee shall provide guidance to the CBLO Director in all matters relating to support for the Council and their supporting committees, subcommittees and work groups including the development of all plans and other documents associated with the Council.
- Examine the feasibility of joint funding support of the Chesapeake Bay Liaison Office.
- Track and evaluate activities which may affect estuarine water quality and resources and report at least annually.
- Develop and maintain a coordinated Chesapeake Bay data management system.
- Continue to implement a coordinated Bay-wide monitoring system and develop a Bay-wide living resources monitoring system.
- Develop and implement a coordinated Bay-wide research program.

COMMITMENT:

TO ACHIEVE THESE GOALS WE AGREE:

- to develop an annual Chesapeake Bay work plan endorsed by the Chesapeake Executive Council.
- to continue to support Bay-wide environmental monitoring and research to provide the technical and scientific information necessary to support management decisions.
- to strengthen the Chesapeake Bay Liaison Office by assigning, as appropriate, staff persons from each jurisdiction and from participating federal agencies to assist with the technical support functions of that office.
- *by July 1988*, to develop and adopt a comprehensive research plan to be evaluated and updated annually to address the technical needs of the Chesapeake Bay Program.
- *by July 1988*, develop a Bay-wide monitoring plan for selected commercially, recreationally and ecologically valuable species.
- *by March 1988*, to establish a local government advisory committee to the Chesapeake Executive

Council and charge that committee to develop a strategy for local government participation in the Bay Program.

- to consider and review the feasibility of establishing an independent Chesapeake Bay Executive Board.
- *by July 1988*, the Environmental Protection Agency, acting for the federal government, will develop a coordinated, federal agency workplan which identifies specific federal programs to be integrated into a coordinated federal effort to support the restoration of the Chesapeake Bay.

BY THIS AGREEMENT, we reaffirm our commitment to restore and protect the ecological integrity, productivity and beneficial uses of the Chesapeake Bay system. We agree to report in *January 1989* on progress made in fulfilling the commitments in this agreement, and to consider at that time additional commitments. The implementation strategies which will be developed pursuant to this agreement will be appended as annexes, and annual reports will include an accounting of progress made on each strategy.

DATE: December 15, 1987

For the Commonwealth of Virginia -- *Gerald L. Balilis, Governor*

For the State of Maryland -- *William Donald Schaefer, Governor*

For the Commonwealth of Pennsylvania -- *Robert P. Casey, Governor*

For the District of Columbia -- *Marion Barry, Mayor*

For the United States of America -- *Lee Thomas, Administrator, U.S. Environmental Protection Agency*

For the Chesapeake Bay Commission -- *Kenneth J. Cole, Chairman*

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 *Last modified 4 March 1996*