JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION
OF THE VIRGINIA GENERAL ASSEMBLY

Costs of Expanding Costal Zone Management in Virginia

Senate Document No. 50 (1995 Session)

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Preface

The federal Coastal Zone Management Act requires that certain pollution prevention management measures are to be implemented by 1999 in states with approved coastal zone programs. These management measures specifically address nonpoint pollution, or pollution such as fertilizers, pesticides, sediments, or toxics that may move over or through the ground.

Nationally, EPA estimates that compliance with the measures may cost between $390 and $591 million annually. Concerns about the potential cost impacts led to General Assembly passage of Senate Joint Resolution 43 in 1994, requiring a JLARC review of the potential impacts of the measures in Virginia.

This review found that excluding the potential cost impact of one particular measure — retrofitting existing onsite disposal systems (OSDS, or septic tanks) — Virginia's estimated cost for its existing coastal zone is within the range of average costs per participating coastal state, based on EPA's national estimates. This estimated Virginia cost is $18.1 million.

However, the geographic zone within which the measures are applied, and the interpretation that is given to the OSDS measure, could have major impacts on Virginia's costs. If the management measures are also applied within the boundaries of the federal agency basic recommendation or extended to the full area which Virginia has been asked to consider, then the best estimate of costs increases to $25.5 and $42.1 million respectively. Further, if the OSDS measure is interpreted or implemented in a stringent manner, then potential costs for this measure could increase Virginia's costs to $155.9 million in the existing zone, $189.0 million in the basic recommendation zone, and $232.4 million for the full area which Virginia has been asked to consider.

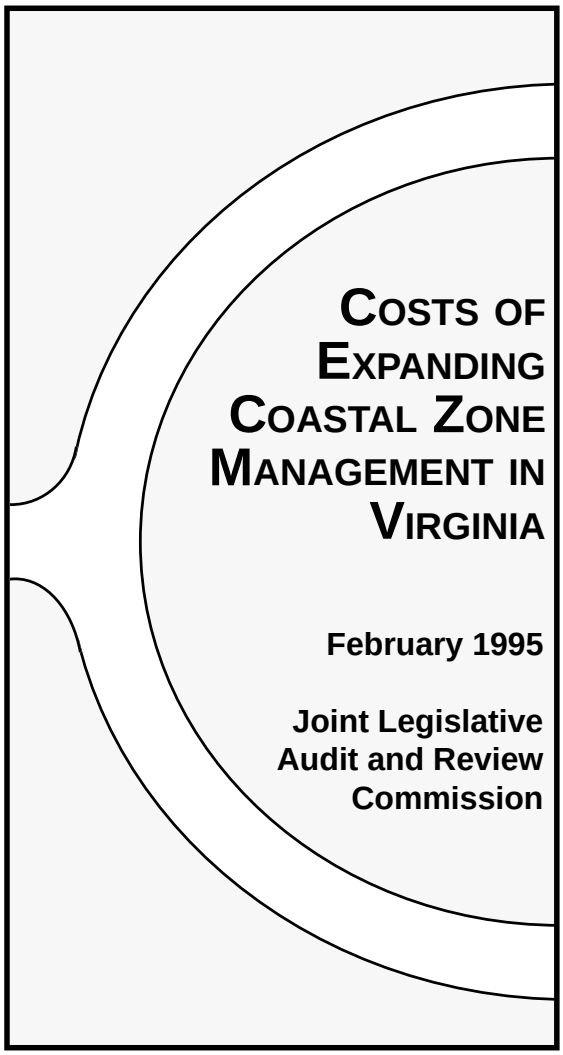
Whether Virginia or other coastal states will actually incur substantial costs is dependent on a number of future events. Both the Coastal Zone Management Act and the Clean Water Act are scheduled for reauthorization during 1995. Virginia has not yet received feedback from federal agencies as to how those agencies interpret the requirements relative to Virginia's situation. Further, Virginia has a number of options, including not fully addressing the Act and accepting the limited federal funding penalties that may result.

On behalf of JLARC staff, I would like to express our appreciation for the cooperation and assistance provided by the Department of Conservation and Recreation, the Department of Environmental Quality, the Chesapeake Bay Local Assistance Department, the Department of Agriculture, the Department of Health, the Department of Forestry, and the Shenandoah Valley Soil and Water Conservation District.

Philip A. Leone
Director

February 22, 1995

JLARC Report Summary



The Coastal Zone Management Act, a federal act originally adopted in 1972, is intended to promote a national interest in the effective management of coastal zones and waters. A 1990 reauthorization of the Act required that certain nonpoint pollution management measures must be implemented in states with approved coastal zone programs. Nonpoint pollution has been described by the United States Environmental Protection Agency (EPA) as the pollution of waters "caused by rainfall or snowmelt moving over and through the ground." Examples of nonpoint pollution include fertilizers, pesticides, sediments, or toxics that are set in motion by precipitation.

Senate Joint Resolution 43 of the 1994 Session requires a JLARC study of the potential cost impacts of the nonpoint pollution management measures. Key findings of this report follow.

- Aside from one particular management measure — the retrofitting of existing onsite disposal systems (OSDS, or septic tanks) — Virginia's estimated cost in its existing coastal zone is about $18.1 million, or within a range suggested by EPA national cost estimates.

- Two factors, the geographic zone within which the measures are applied, and the interpretation given to the OSDS measure, could have a major impact on the magnitude of Virginia's cost.

- Several factors form a context for Virginia's response to the management measures, including the fact that funding at risk from nonimplementation is limited and Virginia has an existing nonpoint pollution effort to pursue similar ends using means more in its control.

Virginia's Potential Cost in the Current Coastal Zone, Excluding Existing OSDS

JLARC staff's estimate of the basic cost of the management measures in the existing coastal zone is $18.1 million annually. This is within the range of the mean approximate cost per participating coastal state of be-

tween $16.2 and $24.6 million, calculated based on EPA's national cost estimates.

The largest portion of these costs are urban costs, estimated to be $10.1 million annually. These costs are incurred for management measures such as urban runoff, erosion and sediment control, new OSDS costs, and roads, highways, and bridges. In addition, about $4.7 million in annual agriculture costs are estimated. "Other" costs, for forestry, hydromodification (dams, channelization, streambank and shoreline stabilization projects), and marinas are estimated at $3.3 million annually.

Costs of an Expanded Coastal Zone and the OSDS Measure

If the coastal zone is expanded to include either of the boundaries Virginia has been asked by the National Oceanic and Atmospheric Administration (NOAA) to consider, then the costs for the management measures would be significantly greater. Specifically, it is estimated that excluding existing OSDS, NOAA's basic recommendation would increase costs by about 40 percent, while implementation within the full zone Virginia has been asked to consider would increase costs by about 130 percent compared to the costs of the current zone.

Potentially, the single greatest factor affecting the magnitude of Virginia's costs, however, is the application of the existing OSDS measure. OSDS is the treatment of wastewater through the use of conventional septic tanks and soil absorption or drainage fields. The measure for existing OSDS requires an enforceable approach to obtain proper operation and maintenance of these systems. The measure could have a unique impact in Virginia. EPA's economic achievability analysis for the existing OSDS measure categorizes distances of less than two feet from the septic tank to the groundwater table as an "insufficient" separation distance. Virginia's state regulations permit separation distances of as little as two inches from the septic tank trench bottom to the groundwater table.

Based on a cost approach similar to EPA's economic achievability analysis, it appears that Virginia's existing OSDS cost in both the current and proposed zones could be about $190 million. The reason that the cost could be so substantial is the large number of households potentially affected.

State Response to the Management Measures

To this point, the State has not ruled out the implementation of the management measures, but nor has a definitive commitment been made to implement them. The executive branch's position is that if the measures are implemented, they will be implemented in the existing coastal zone, and not in the NOAA/EPA proposed zones.

The State has been addressing nonpoint pollution through its tributary strategy approach to reducing pollution to the Chesapeake Bay. This approach has enabled a mix of voluntary and enforceable meaures, and enables the State to pursue its most effective options to achieve water quality improvements. The State's current approach to the set of federal management measures appears appropriate: to consider the management measures for the existing zone, while exploring the details for what is expected in that zone before making a final decision. The State needs to clearly understand what the federal expectations are with regard to the implementation of potentially high-cost management measures. The State may also need to consider whether its agencies have the regulatory authority to make boundary distinctions in applying and ensuring the implementation of the measures.

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I. Introduction

Nonpoint pollution has been described by the United States Environmental Protection Agency (EPA) as the pollution of waters "caused by rainfall or snowmelt moving over and through the ground." Examples of nonpoint pollution include fertilizers, pesticides, sediments, or toxics that are set in motion by precipitation. Nonpoint pollution can be contrasted with point source pollution, or pollution that is discharged from specific "conveyances", such as pipes. Whereas the discharge of point source pollution is subject to federal and state permit requirements, nonpoint source pollution is not.

States have developed nonpoint source management programs under Section 319 of the Federal Water Pollution Control Act. This section requires states to develop assessment reports that indicate the extent of their nonpoint pollution problem, as well as management plans to identify their nonpoint pollution controls. However, this section has not specified the nonpoint pollution measures that must be used, nor has it required that the measures be enforeceable as opposed to voluntary.

As part of a 1990 reauthorization of the federal Coastal Zone Management Act, new requirements for the management of nonpoint pollution were placed upon states participating in the coastal zone program. Section 6217 of Public Law (P.L.) 101-508 required participating states to develop a "Coastal Nonpoint Pollution Control Program" that "shall serve as an update and expansion of the State nonpoint source management program developed under section 319 of the Federal Water Pollution Control Act." Section 306 of the Coastal Zone Management Act was amended to require that state coastal zone management programs must contain:

> enforceable policies and mechanisms to implement the applicable requirements of the Coastal Nonpoint Pollution Control Program of the State required by section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990.

Pursuant to the Act, and through a workgroup process which included representation by a number of State and federal agencies, EPA developed nonpoint pollution management measures that are to be implemented by the states. Fifty-six management measures were developed, including seven agricultural measures, ten forestry measures, fifteen urban area measures, fifteen marinas measures, six hydromodification measures, and three wetlands measures.

The Act also directed the federal agency which administers the coastal zone management program, the National Oceanic and Atmospheric Administration (NOAA), to recommend to states the boundaries within which the nonpoint management measures must be implemented. For Virginia, NOAA's "basic" boundary recommendation includes all of Virginia's existing coastal zone area, three additional localities in full, and portions of an additional twelve localities. Also, NOAA has asked Virginia to examine a

"look-beyond" area, which is generally the Shenandoah Valley, for potential inclusion as a section 6217 management area due to data suggesting nonpoint pollution problems.

Concerns have been expressed at the national level and in Virginia about the costs and impacts of the nonpoint management measures and the proposed boundaries in which they apply. Using the work of several research consultant firms, EPA has estimated the national costs for compliance with the management measures as approximately $390 to $591 million annually. The national costs are based on general conditions across states and the use of some simplifying assumptions. Because of variations between states, the size of the range in the estimates may not reflect the actual degree of uncertainty associated with the management measures.

In Virginia, Senate Joint Resolution 43 of the 1994 Session required a JLARC staff assessment of the costs (see Appendix A). JLARC staff estimated costs using a similar cost approach as used at the national level, but with adjustments for Virginia's situation. Based on this approach, JLARC staff estimated the costs for the management measures in the existing coastal zone plus the land area covered by NOAA's basic recommendation and the look-beyond area. Excluding costs for existing onsite disposal system (the retrofitting of conventional septic tank) costs but including selected administrative costs, these costs may range from $18.0 to $68.1 million annually, with a best single estimate of $42.1 million.

Further, a major finding of the study is that if the Section 6217 management measure for existing onsite disposal systems is interpreted and implemented aggressively, then Virginia could potentially face very large costs for this measure. Study results indicate that the costs in Virginia for this measure alone could range from $160 to $633 million, with a best estimate of $190 million. A major reason for the magnitude of this potential cost is the large number of households that could potentially be affected.

COASTAL ZONE MANAGEMENT AND VIRGINIA'S PARTICIPATION

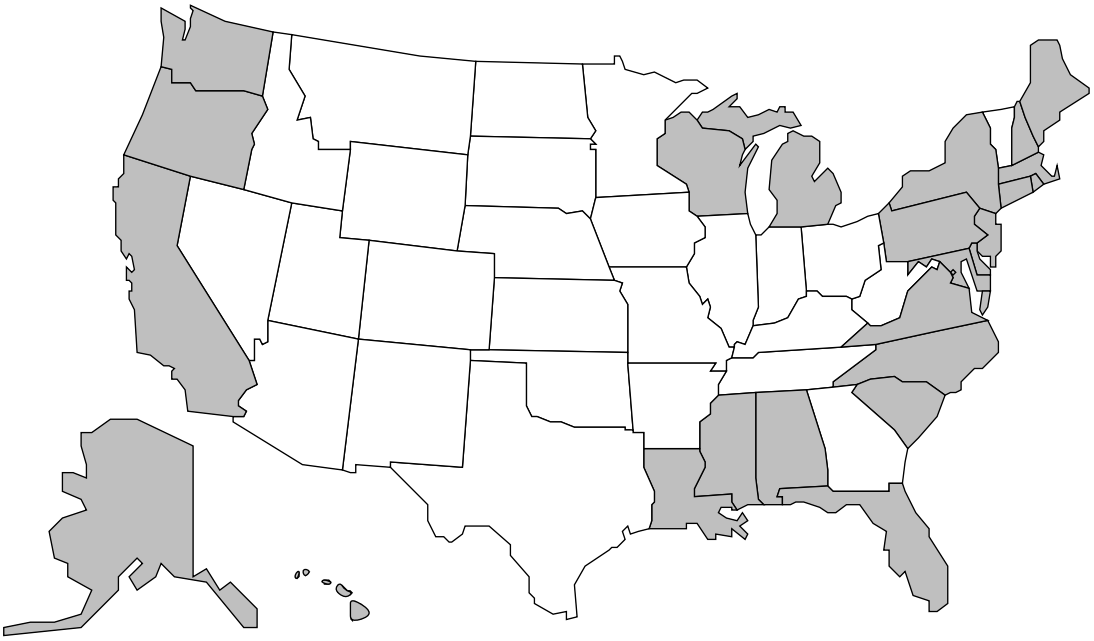
The Coastal Zone Management Act, a federal act originally adopted in 1972, was intended to promote a national interest in the effective management of coastal zones and waters. The 1972 act indicated that at that time, "state and local institutional arrangements for planning and regulating land and water uses in such areas are inadequate." Management purposes of the Act have included: natural resource protection, hazards, major facility sitings, public access for recreation, the redevelopment of urban waterfronts and ports, decisionmaking simplification and coordination, public participation, and marine resource conservation.

In order to receive federal coastal zone management funding, a state or territory must have an approved coastal zone management program. NOAA is responsible for the decision as to whether a state receives approval. Sixteen criteria for program approval are now identified in Section 306 of the Act, including the inclusion of the requirement for enforceable policies and mechanisms to meet Section 6217. Currently, 24 of the 50

states have approved coastal zone management programs (see Figure 1). In addition, five territories, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the Virgin Islands have approved programs. There are also five "coastal" states which are currently developing programs: Georgia, Illinois, Indiana, Minnesota, Ohio, and Texas. Illinois is the only nonparticipating coastal state.

Figure 1

State Participation in Coastal Zone Management



States with Approved Programs

Alabama	Hawaii	Mississippi	Pennsylvania
Alaska	Louisiana	New Hampshire	Rhode Island
California	Maine	New Jersey	South Carolina
Connecticut	Maryland	New York	Virginia
Delaware	Massachusetts	North Carolina	Washington
Florida	Michigan	Oregon	Wisconsin

Note: Five U.S. territories not shown on the map also have approved coastal zone management programs.
Source: JLARC staff graphic based on NOAA/EPA listing of states with approved programs.

Virginia has had a federally-approved program since 1986. The program was established and has functioned through a network of existing agencies and regulatory functions mostly within the Natural Resources Secretariat. Seven existing regulatory progams compose the core of the program:

1. fisheries management,
2. subaqueous lands management,

3. wetlands management,
4. dunes management,
5. nonpoint source pollution control,
6. point source control, and
7. shoreline sanitation.

Thus, nonpoint source pollution control is only one of the seven functions that are part of the coastal zone management umbrella. The lead agency for the State's nonpoint source pollution control effort and for developing the Section 6217 program is the Department of Conservation and Recreation (DCR). Other State agencies that are part of the coastal zone program's network approach include the Department of Environmental Quality (DEQ), which is the lead agency for Virginia's coastal program and has a role in point source pollution control, including air and water; the Virginia Marine Resources Commission (VMRC), which has a role in fisheries management, subaqueous lands management, wetlands management, and dunes management; Game and Inland Fisheries (G&IF), which has a role in fisheries management; and the one agency outside of the Natural Resources Secretariat, the Department of Health (DOH), which has a role in shoreline sanitation. The State's Chesapeake Bay Preservation Act has not been included in the program, so the Chesapeake Bay Local Assistance Department (CBLAD) has not been part of the network. However, DEQ and CBLAD have been working with NOAA to include the Chesapeake Bay Preservation Act as part of the program as well.

Federal funding for coastal zone management is provided by NOAA. Funding in federal FY 1993 and FY 1994 totalled $2,323,000 and $2,292,000, respectively. Of the FY 1994 amount, approximately 67 percent will fund State projects, 25 percent will fund local competitive projects, and 8 percent will fund regional planning district commission (PDC) support projects. A few examples of the types of projects funded through recent grants from the program include:

- an interagency study of shellfish waters for long-term water quality,
- an educational program to encourage proper boater sewage disposal,
- mapping of submerged aquatic vegetation, and
- local grants for wetlands management.

DEQ staff indicate that the federal funding is important in leveraging the commitment of local and State funds and funding from private sources to address coastal issues.

SECTION 6217 REQUIREMENTS

While not directly amending the Coastal Zone Management Act, Section 6217 of P.L. 101-508 is part of the 1990 reauthorization of the Act. It contains two major requirements regarding the approval of coastal zone programs: (1) the development of a Coastal Nonpoint Pollution Control Program that provides for the development and implementation of management measures to protect coastal waters, and (2) an evaluation of coastal zone boundaries. States have until July 1995 to develop and submit a

program for approval by NOAA and EPA, and full implementation of the management measures is required by 1999.

Nonpoint Pollution Control Program and Implementation of Management Measures

As part of the 1990 reauthorization of the Act, Congress made a set of findings, which included:

- the condition of coastal waters is significantly declining;
- almost half of the population lives in coastal areas, and commercial and recreational fishery activities support a $12,000,000,000 industry;
- "nonpoint source pollution is increasingly recognized as a significant factor in coastal water degradation"; and
- "State management programs . . . must play a larger role, particularly in improving coastal zone water quality."

Section 6217 contains requirements that could increase the role of the coastal zone states in managing nonpoint pollution.

Under Section 6217, states have a limited time frame within which to submit a nonpoint pollution control program for federal approval. This program must be adequate to ensure the development and implementation of management measures, defined in Section 6217 as:

> economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.

There is a body of literature on the subject of nonpoint pollution best management practices (BMPs). BMPs are fairly specific methods of using land that are supposed to reduce or minimize the extent of nonpoint pollution. For example, under certain conditions, it has been found that conventional methods of farm tilling can be replaced by conservation tillage (leaving a substantial proportion of the soil surface covered by residue after planting, to reduce erosion) to achieve the farm operator's objective while reducing nonpoint pollution. There are probably several hundred specific BMPs that have been defined in the literature.

Pursuant to Section 6217, the EPA has defined 56 management measures, which in essence draw together many BMPs. In many cases, it is possible for a land user

to meet a management measure through the use of one (or more) of many potential BMPs. For example, an EPA document lists 21 types of BMPs that could be applied to meet one agricultural management measure, the erosion management measure. EPA staff have described the management measures as "integrated systems of practices rather than discrete best management practices."

In sum, the EPA management measures can be viewed as broad standards to be implemented by land users whose practices may contribute to nonpoint pollution. The measures indicate what must or must not be done. They are broad in that there are frequently a number of different practices which either constitute or may satisfy the measure. Most are not quantified in terms of the extent or scope of the action required.

Section 6217 and its management measures are intended to build upon state programs. However, EPA staff have also said that the coastal nonpoint programs that are required through Section 6217 "are not intended to be 'business as usual' for addressing nonpoint pollution." Key areas of contrast between Section 6217 and many existing efforts are that a baseline level of pollution prevention or control is required, and there must be state policies and mechanisms to enforce the controls to ensure that they are fully implemented.

The Section 6217 measures only apply to states with approved coastal programs. Under the provisions of the Act, failure to comply with Section 6217 requirements results in certain funding penalties for participating states. These penalties could begin in fiscal year 1996. A NOAA/EPA letter to an organization of the coastal states has indicated that conditional approvals of programs may be granted as appropriate for up to five years, and that during this time the penalty provisions would not apply. The potential penalties for programs without approval include the withholding of an increasing proportion of coastal zone management (Section 306) and federal water pollution control (Section 319) funds between 1996 and 1999.

Evaluation of Coastal Zone Boundaries

Section 6217 also requires the Federal Secretary of Commerce to "review the inland coastal zone boundary of each coastal State program . . . and evaluate whether the State's coastal zone boundary extends inland to the extent necessary to control the land and water uses that have a significant impact on the coastal waters of the State." The primary federal agency from that Secretariat that is involved in this process is NOAA.

During the spring of 1993, NOAA provided its state-by-state recommendations for the modification of coastal zone boundaries. NOAA states that its boundary recommendations are based on coastal watersheds, which are defined as:

> the U.S. Geological Survey (USGS) Cataloging Units adjacent to the coast and extending inland along estuaries to include the Cataloging Unit that encompasses the head of tide.

While NOAA's recommendation is stated in the form of a boundary for the coastal zone, NOAA indicates it can be viewed as a more limited recommendation for the area within which Section 6217 should be implemented. Thus, a state may retain its existing coastal zone boundary for general program purposes, but designate the area between the existing and NOAA-recommended zones for inclusion as a Section 6217 management area. A state also has the option to develop an alternative coastal zone boundary proposal as the Section 6217 management area, which NOAA and EPA would then review to determine if the alternative is sufficient to protect coastal waters.

EPA'S ASSESSMENT OF SECTION 6217 COSTS

Section 6217 stated that the management measures developed by EPA were to be "economically achievable measures," although the section did not provide an operational definition of what is economically achievable. The EPA was assisted by some consultants in performing economic achievability analyses of its proposed management measures. The Research Triangle Institute (RTI) performed economic achievability analyses of the forestry, urban, and marinas components. Staff from the Economic Research Service of the U.S. Department of Agriculture assisted in developing the agriculture economic achievability analysis, with the involvement of a consulting firm, DPRA Incorporated, in estimating confined animal costs. The economic achievability analyses were also utilized in developing an overall regulatory impact analysis for the management measures, prepared for the EPA's Nonpoint Source Control Branch by RCG/Hagler, Bailly, Inc.

Section 6217 Economic Achievability Analyses

At the time of the economic achievability analyses, NOAA had not finalized its boundary recommendations for Section 6217. Therefore, some assumptions needed to be made about the geographic area to be used in performing the analysis. There was some variation between papers in the geographic region analyzed and whether or not the papers used the information to provide national costs.

For example, to obtain a number of observations in each of its farm profiles that it considered statistically reliable for the agriculture analysis, information from each entire coastal state (not from just within its existing coastal zones) were used, as well as information from four states reportedly developing programs (Minnesota, Ohio, Georgia, and Texas) and two states without plans for participation (Indiana and Illinois). The agriculture economic achievability did not itself attempt to provide a total national cost for agriculture in the coastal zone. On the other hand, the forestry economic achievability paper provides a total national cost estimate for the coastal zone, using a decision rule provided by NOAA to include costs incurred within localities with more than a 15 percent area in the coastal drainage basin. The forestry analysis also included some states (Georgia, Illinois, Indiana, Minnesota, Ohio, and Texas), however, that are not currently participating coastal zone management states.

Basically, EPA and its consultants addressed the question of economic achievability by attempting to define a variety of different operations, determining costs those operations would face as a result of the management measures, and then estimating the costs on a per-unit basis and/or as a proportion of income or revenue of those operations. Average results on a per-unit basis appear to be as follows:

- a $1,500 weighted average compliance cost per farmer for selected agriculture management measures, with a wide range in per-farm costs depending on the region and type of operation;
- a $11.70 average compliance cost per harvested acre of forest;
- a $2,394 to $7,427 compliance cost per marina facility;
- a $367 to $977 per household cost for new home development;
- a $313 to $3,264 cost per onsite disposal system retrofit.

The cost results were very sensitive to the mix of management measures that must be implemented. The EPA's agriculture economic achievability paper, for example, contained the following findings:

- "Annual costs of the measures are less than $5,000 per farm for most farm sizes";
- Costs for "combined measures on larger dairy farms in all regions" could range up to $26,800;
- Of the mangement measures, the soil erosion measure is the "most affordable"; "about a quarter of farms have costs equaling less than one percent of net farm income, and another half have costs less than five percent of net farm income"; but
- "Combinations of effluent control and other measures, required on most dairy and hog farms, increase costs and decrease economic achievability", with 55 percent of farms affected by the combined dairy waste, erosion, and grazing management measures expected to experience costs greater than 20 percent of net farm income."

EPA concluded that the management measures are economically achievable. During the public comment period on the achievability analyses, EPA received criticism that it had not defined economic achievability or provided the critieria used in making the determination. EPA's written response to this public comment stated:

> EPA used a variety of different factors to evaluate the economic achievability of proposed management measures. Based on the economic analyses results, EPA was able to estimate such factors as the

likely effects on household income or net income of farmers; on municipalities' abilities to raise sufficient revenue to finance the measures; and on foresters' net profits. EPA made final determinations as to the achievability of the measures based on an assessment of all these relevant factors.

National Cost Estimates Based on Economic Achievability Analyses

A December 1992 EPA regulatory impact document, building upon the economic achievability analyses, estimated Section 6217 costs for coastal states. The cost estimates of the regulatory impact analysis are shown in Table 1. Based on this range, the mean cost per participating coastal state based on the low estimate is about $16.2 million, and the mean cost per participating coastal state based on the high estimate is about $24.6 million.

Table 1

EPA Estimates of Annual National Compliance Costs for Management Measures, by Nonpoint Pollution Source

Nonpoint Pollution Source Category	Low Estimate	High Estimate
Agriculture	$107,340,000	$129,140,000
Forestry *	26,900,000	26,900,000
Marinas	14,700,000	45,600,000
Urban **	241,000,000	389,000,000
Total	$389,940,000	$590,640,000

*For "net economic welfare impact." Estimated compliance cost was $11,091,000.

**Includes hydromodification and wetlands costs.

Source: EPA's *Regulatory Impact Analysis: Management Measures Guidance for Nonpoint Source Controls in Coastal Watershed Areas*, December, 1992.

EPA has stated that its cost estimates are illustrative of "order-of-magnitude" impacts upon the various nonpoint sources, at the national level, but do not have precision. In part, a lack of precision in the estimates is attributed by EPA to the fact that the management measure guidance upon which the estimates are based is "a nonregulatory document, and its final implementation will depend on the structure of state coastal NPS programs."

Due to the magnitude of the task of estimating costs across all the coastal states, several simplifying assumptions were made that may make the national cost totals unrealistic, as indicated when specific state costs are developed. Staff of the Department of Natural Resources in Wisconsin, a coastal zone program state with many dairy farms, have estimated that the annual costs for runoff management and manure storage costs in their state could be about $110 million, or within the range of the national agriculture cost calculated in the regulatory impact analysis. Chapter II of this report discusses how Virginia's costs could be much greater than an anticipated share of the national compliance costs, and in a worst-case scenario, could be half or more of the national estimate. The magnitude of Virginia's cost depends to a great extent on the resolution of issues such as the how the Section 6217 management area boundary is drawn, and what is assumed with regard to the implementation of particular cost components such as existing onsite disposal systems (septic tanks).

VIRGINIA'S SECTION 6217 BOUNDARY

NOAA staff categorize their recommendation for potential expansion of the existing coastal zone in Virginia into two components: a "basic recommendation" and a "look-beyond" area. NOAA staff indicate that their "basic recommendation" includes: (1) Section 6217 management in the existing coastal zone boundary, plus (2) certain coastal watershed localities or portions of localities. NOAA's "look-beyond" area, in the Shenandoah Valley of Virginia, is an area which NOAA indicates the State should analyze whether Section 6217 should apply, based on the area's nonpoint pollution potential.

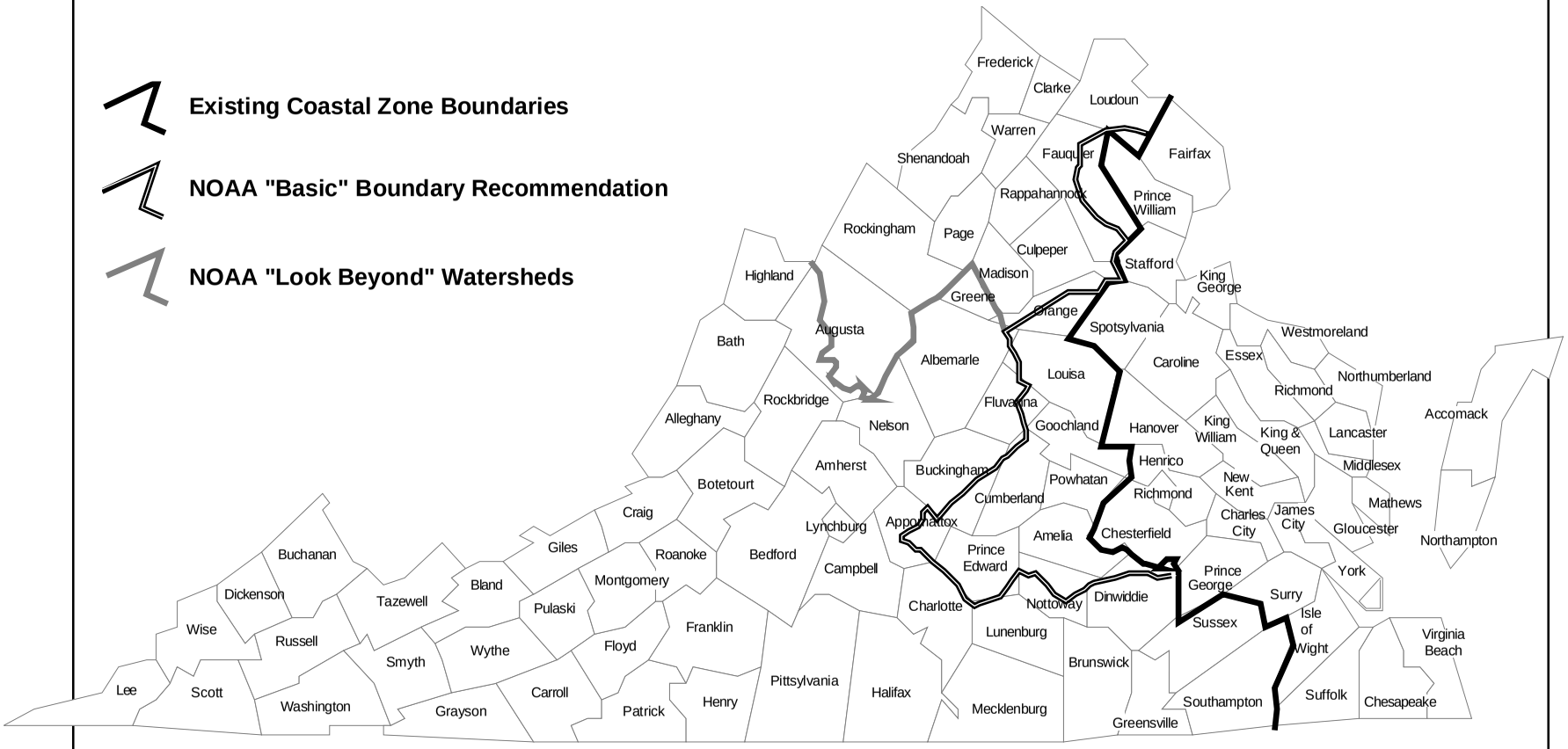
For this report, JLARC staff analyzed the costs for the existing coastal boundary, the "basic recommendation," and the "look-beyond" area. There were several important reasons for including the "look-beyond" area in the cost examination. First, NOAA does require the State to analyze the "look-beyond" area for potential inclusion under Section 6217. Second, the potential cost of Section 6217 for the Shenandoah Valley was one of the major concerns that led to the JLARC study mandate. Finally, there is no guarantee that the "look-beyond" area will be excluded when NOAA takes its final boundary position. In fact, if NOAA's primary consideration as to whether it should be included is its nonpoint pollution potential, and not other factors such as its degree of coastal drainage and the cost impact, then NOAA may decide it needs to be included.

Figure 2 indicates the NOAA boundary recommendation as it was applied for costing purposes in this report. The depiction of the boundaries in Figure 2 is based on materials from NOAA indicating that:

- in no case is the recommended boundary less than the current boundary;
- NOAA's "basic recommendation" is the coastal watershed boundary shown in the figure;

Figure 2

NOAA Coastal Zone Boundary Recommendation



Source: JLARC staff graphic based on Virginia Department of Conservation and Recreation map showing NOAA coastal zone boundaries, and materials from NOAA.

- there is a "look-beyond" area, or generally the Shenandoah Valley, for which the State is to analyze whether Section 6217 management measures should apply, due to the area's nonpoint pollution potential; and

- Highland County should not be included as part of the "look-beyond" area.

It should be noted that the details of the NOAA boundary recommendation have been a source of some confusion or difference in interpretation between State and NOAA staff. A 1994 map of Virginia's DCR, showing NOAA's Section 6217 management area boundary recommendation, indicated a retrenchment of the existing zone to exclude portions of Prince George, Surry, Isle of Wight, and Suffolk counties, and also made no distinction between a "basic recommendation" and a "look-beyond" area. A State agency document submitted to NOAA and EPA for review similarly defined the NOAA-proposed zone to include the Shenandoah Valley. Also, State agency staff indicate that the rationale of NOAA staff for excluding a portion of Highland County from the "look-beyond" area could apply to other localities. At the time this report is being written, however, State officials consider the exact definition of the proposed NOAA-zone to be somewhat irrelevant due to the State's position that it does not intend to implement Section 6217 outside of the existing zone.

ASSESSMENT OF VIRGINIA'S USE OF ENFORCEABLE MEASURES

Federal law requires that NOAA and EPA make a determination as to whether or not a state's proposed Coastal Nonpoint Pollution Control Program meets the requirements of Section 6217. Prior to the point when these agencies make a final determination, each state has an opportunity for a "threshold review" of their coastal nonpoint pollution program. A state can make an assessment of what it is currently doing, and what it might still need to do, that is relevant to meeting Section 6217 requirements. It can submit a product to NOAA and EPA that would enable those agencies to provide an initial or preliminary review of the state's program. The threshold review provides an opportunity for early discussion between the federal agencies and each state on Section 6217 requirements as applied to that state.

In Virginia, a threshold review paper was developed by DCR with the assistance of five work groups composed of individuals from various State agencies, local government representatives, association representatives, and others. It was submitted by the Secretary of Natural Resources in May of 1994. The paper provides an assessment and discussion, management measure by management measure, of regulatory and other programs in the State that address nonpoint pollution and may enable the State to meet the management measures. The paper provides a State self-assessment as to whether existing State efforts fully, partially, or do not meet each management measure. This assessment is done both within the existing coastal zone and the recommended NOAA boundary area. Table 2 summarizes the results of the assessment contained in Virginia's threshold review document. State agency personnel and NOAA staff discussed this document on December 13 and 14, 1994, but NOAA staff used the meeting as a fact-

Table 2

Threshold Review Assessment of Whether Management Measures Are Met and Enforceable in Virginia

(Data are number of management measures in each category shown)

	Within the Coastal Zone, Management Measures Are:			Within the Section 6217 Management Area, Measures Are:		
Nonpoint Pollution Source Category	Fully Met	Partially Met	Not Met	Fully Met	Partially Met	Not Met
Agriculture	6	1	0	2	5	0
Forestry	10	0	0	10	0	0
Urban	9	5	1	5	9	1
Marinas	13	2	0	13	2	0
Hydromodification	6	0	0	6	0	0
Wetlands	3	0	0	3	0	0
Total	**47**	**8**	**1**	**39**	**16**	**1**

Source: JLARC staff summary of findings in DCR's May 1994 submission to EPA, *Virginia Threshold Review Report: Review of Programs Applicable to Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990.*

finding opportunity and provided very limited feedback. NOAA's response to Virginia's document is expected in late February or early March of 1995.

Basically, the threshold review document indicates the judgement of the work groups that Virginia's existing nonpoint pollution efforts are adequate to meet most of the management measures, especially in the existing coastal zone. The document indicates that 84 percent of the management measures are fully met in the existing zone, and 70 percent are fully met in the NOAA-recommended expanded zone. Areas of greatest shortcomings in current implementation, as indicated by the proportion of management measures not fully met, are the urban component (both in the current and expanded zone, but especially in the expanded zone) and the agricultural component in the expanded zone.

JLARC REVIEW OF COSTS AND IMPACTS

The mandate for this study is Senate Joint Resolution 43 from the 1994 General Assembly session. The mandate requests JLARC to study the costs and impacts associated with implementing Section 6217. The mandate indicates that the study should include:

- analysis of the costs and impacts to the regulated community;
- analysis of the costs and impacts to state agencies and local governments;
- actions the federal government could take if the State does not implement Section 6217; and
- programs that might be impacted by not implementing Section 6217.

In addition, a bill was considered during the 1994 session that would prohibit the extension of the coastal zone management area. This bill, Senate Bill 190, provided that:

> No state agency shall propose, solicit proposals for, or cooperate in the establishment or declaration of a coastal zone management area or other mandatory program with enforceable measures similar to the coastal zone management program, west of Interstate 95.

The bill had ten patrons representing at least a portion of the State currently outside of the coastal zone but within the NOAA-recommended boundary. This bill was carried over to the 1995 session, and was assigned to the Chesapeake and Its Tributaries Subcommittee for consideration. During the course of the review, JLARC staff attended a Chesapeake and Its Tributaries subcommittee meeting and public hearing that were held on SB 190, and briefed the subcommittee on the status of the JLARC study.

This report has been developed in response to the HJR 43 mandate. The remainder of this section discusses the scope and research activities of the study, and the report organization.

Study Scope

Three primary issues were defined for the study:

(1) What are the estimated compliance and administrative costs for Section 6217 in Virginia, in the current and expanded coastal boundary areas?

(2) What factors might affect the State's approach to Section 6217?

(3) What federal funding and State programs may be impacted if the State does not implement Section 6217?

Consistent with the requirements of the study mandate, the greatest focus of the research was on the first issue, compliance and administrative costs. For each of the nonpoint source pollution categories, such as agriculture, forestry, marinas, and urban areas, cost approaches were considered for their feasibility within the time frame and for their applicability to the cost problem.

Research Activities

Several research activities were conducted in JLARC's review of the costs and impacts of Section 6217. Primary activities included a review of federal management measures and cost documents, a review of other key documents, consultation with experts as necessary to implement cost calculations, and collection of data and calculations of costs. In addition, JLARC staff conducted interviews, attended key meetings pertaining to Section 6217, and visited several farms in the Shenandoah Valley.

Review of Federal Management Measure and Cost Documents. Several federal agency documents provided important background information for the review. The EPA document *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* provided information pertaining to the content of the management measures. A document prepared for EPA by RCG/Hagler, Bailly, Inc. entitled *Regulatory Impact Analysis: Management Measures Guidance for Nonpoint Source Controls in Coastal Watershed Areas* provided a summary of the cost framework and the overall cost findings for Section 6217 at a national level. This document built upon several other documents that provided specific details about the compliance costs and economic achievability of the management measures in the nonpoint pollution source categories. These documents included:

- *Economic Achievability Analysis: Agriculture Management Measures*;
- *Economic Impact Analysis of Coastal Zone Management Measures Affecting Confined Animal Facilities*;
- *Economic Analysis of Coastal Nonpoint Source Pollution Controls: Forestry*;
- *Economic Analysis of Coastal Nonpoint Source Pollution Controls: Marinas*; and
- *Economic Analysis of Coastal Nonpoint Source Pollution Controls: Urban Areas, Hydromodifications, and Wetlands*.

An EPA summary of and response to public comments on its economic achievability analyses of the management measures was also reviewed.

Review of Other Key Documents. In addition to the federal documents, several other types of documents were reviewed during the study. A DCR document, the *Virginia Threshold Review Report: Review of Programs Applicable to Section 6217 of the Coastal Zone Reauthorization Amendments of 1990*, was reviewed. This document provides a self-assessment by Virginia work groups, organized by DCR, as to whether or not Virginia has programs in place to meet various Section 6217 requirements. Virginia tributary strategy papers from May and August 1993 and October 1994 were also reviewed for nonpoint pollution material, as well as DEQ's *Virginia Water Quality Assessment for 1994: 305(b) Report to EPA and Congress*. Other Virginia documents reviewed included: a draft prepared for the Virginia Department of Agriculture and

Consumer Services (VDACS) entitled *A Preliminary Analysis of Expected Farm Level Impacts of the Coastal Zone Reauthorization Amendments of 1990*; the Virginia Department of Forestry's *Best Management Practice Implementation and Effectiveness, 1993*; and the University of Virginia's Institute for Environmental Negotiation's 1991 *Report of the Task Force on Septic Regulations*. In addition, articles in publications such as the *Journal of Soil and Water Conservation, Land Economics, Environmental Management*, the *Water Resources Bulletin*, and *Coastal Management* were examined.

Consultation with Experts. For the agriculture component, the primary method employed to consult with in-State experts was a questionnaire sent to the agricultural extension agents in the existing and proposed coastal zone boundaries in Virginia. Extension agents are agricultural experts who serve a particular locality (or in a few cases, two localities). They have knowledge of the conditions and trends in farming for their locality. JLARC sent the questionnaire in part to collect data in areas where there are gaps in existing sources of information. The extension agents were provided with the Section 6217 management measures, and asked to provided their low, high, and most likely single estimates of the extent to which the management measures are already met in the locality they serve.

In the forestry component, JLARC staff worked with staff from the Department of Forestry on cost assumptions, as an alternative approach to compare with the application of the EPA methodology. For hydromodification, marinas, urban, and onsite disposal system components, JLARC staff discussed particular issues with staff in DCR's Dams Safety Office, the Department of Health, the DCR Bureau of Nonpoint Source Programs, and the Richmond office of the USDA Soil and Conservation Service. In several of the cost areas, faculty at the Virginia Polytechnic Institute and State University were contacted to discuss certain issues.

Collection of Data and Cost Calculations. Most cost estimates for the study fit within a three-component framework: the number of units potentially affected, the cost per unit, and the proportion of units likely affected. To provide an illustration, an agricultural management measure might require some expenditures per acre of cropland. The number of units potentially affected by the management measure can be viewed as the number of cropland acres. The cost per-unit is the expected dollar cost for addressing the management measure per cropland acre. If the proportion of cropland acres to which the management measure would apply can be determined (for example, excluding cropland acres on which the management measure is already practiced or is not needed), then the cost can be calculated as the number of cropland acres times the per-acre cost times the proportion of cropland that are likely to be affected. The JLARC staff approach to obtaining the data necessary and performing the cost calculations is described in more detail by nonpoint pollution source in a technical appendix to this report.

Report Organization

This report examines the costs, impacts, and options for Virginia in addressing Section 6217 nonpoint pollution requirements. Chapter I has provided an introduction to the Coastal Zone Management Act and Virginia's participation, described the Section 6217 requirements, summarized the results of Virginia's threshold review submission findings on Virginia's use of enforceable management measures meeting Section 6217, and discussed the JLARC study mandate, scope, and research activities.

Chapter II provides an overview of the cost findings of the study. Chapter III places these findings in an overall context regarding Section 6217 and nonpoint pollution control, and concludes the report. A technical appendix addresses the technical analysis of compliance costs by nonpoint pollution source and selected administrative costs.

II. Overview of Cost Findings

Pursuant to Senate Joint Resolution 43 from the 1994 Session, JLARC staff estimated costs for Section 6217. Compliance and selected administrative costs were examined. Compliance costs stem from land-user implementation of the management measures, while administrative costs are incurred by governmental entities in assisting or enforcing compliance with the management measures. The compliance costs have been identified by potential zones or boundaries within which Section 6217 might be implemented. This report addresses the costs for the existing zone and the NOAA-proposed zone, including the "basic recommendation" and the "look-beyond" area described in detail in Chapter I of this report.

There are several key cost findings of this report. Excluding the potential cost impact of one particular management measure — retrofiting existing onsite disposal systems (OSDS, or septic tanks) — Virginia's costs within its existing coastal zone are fairly similar to what might be expected based on EPA's estimates of national costs. EPA's national cost estimates range between about $390 to $591 million, or a mean approximate cost per participating coastal state of between $16.2 and $24.6 million. JLARC staff's best cost estimate for Virginia's existing coastal zone, excluding OSDS retrofit costs, is $18.1 million, which is within this range.

However, there are two factors that have a major impact on Virginia's potential costs. First, the boundary within which Section 6217 is applied will obviously affect total costs. Second, the interpretation and application of the management measures, including the assessment of the degree to which the management measures are already met, are critical. This is especially the case with regard to the existing OSDS management measure. This measure could potentially require the use of alternative technologies to correct septic tank failures or prevent possible problems, and could be very expensive if broadly applied.

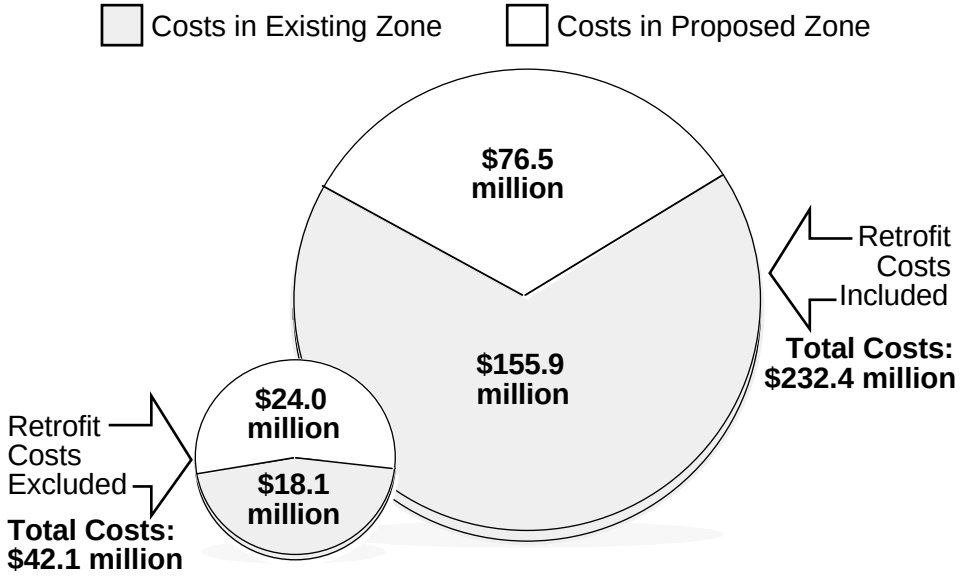
Figure 3 illustrates the importance of both the boundary and OSDS issues. The figure shows that, excluding OSDS retrofit costs, JLARC staff's best estimate of the costs in the proposed zone is greater than the costs in the existing zone, and therefore the total cost of both zones is more than double the existing zone cost ($42.1 compared to $18.1 million). The figure also shows, however, that a question with even larger cost implications than the boundary issue is the potential impact of the OSDS retrofit management measure in Virginia. As suggested by the relative sizes of the cost pies, Virginia's costs with the inclusion of OSDS retrofit are estimated to be more than five times the cost of the management measures excluding OSDS retrofit. This is due to the large number of households in the existing and proposed coastal zones which could potentially be impacted by the OSDS retrofit measure. It is estimated that a greater proportion of these costs would fall in the existing coastal zone.

Figure 3 also indicates the proportion of the JLARC staff best cost estimate that is constituted by nonpoint pollution source components. Excluding existing OSDS,

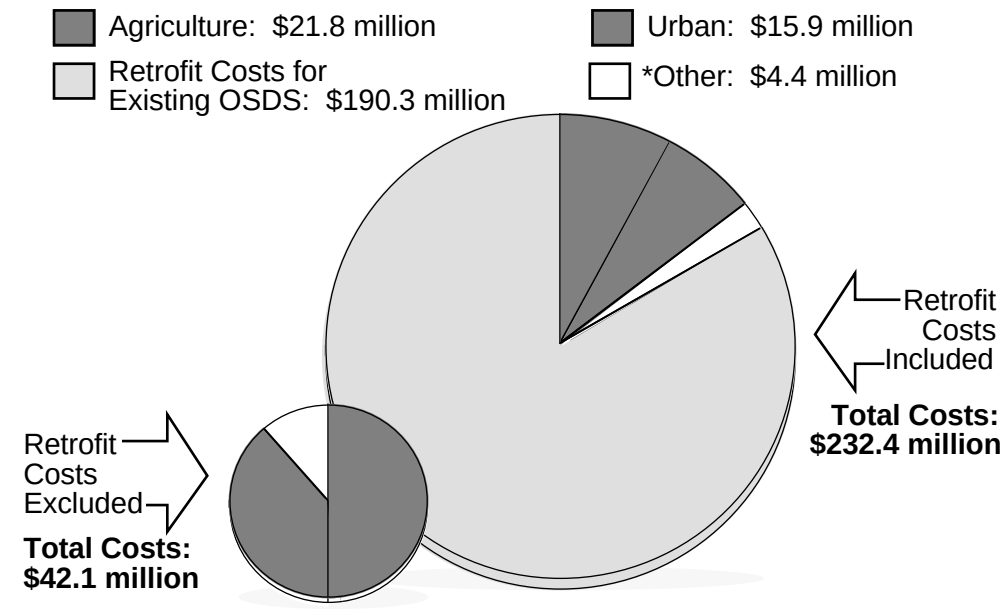
Figure 3

Best Estimate of Section 6217 Costs Excluding and Including OSDS Retrofit Costs
(Compliance and Selected Administrative Costs)

Costs Shown by Zone



Costs Shown by Type



*"Other" includes forestry, hydromodification, and marinas costs.
Source: JLARC staff analysis of Section 6217 costs.

agriculture costs are slightly more than half of all costs, with the urban component also accounting for a substantial proportion of costs. However, once OSDS retrofit costs are included, OSDS retrofit costs comprise the vast majority of total costs.

This chapter has three parts. First, key points about the estimation of Virginia's costs are addressed, including: the factors that make precision in the cost estimates difficult; JLARC staff's best, low, and high cost estimates as of February 1995; and the future events upon which Virginia's actual costs will depend. Second, the cost impact of the boundary issue is described. Finally, the OSDS retrofit cost issue is discussed.

THE ESTIMATION OF VIRGINIA'S SECTION 6217 COSTS

There are several factors that make it difficult to estimate Section 6217 management measure costs with precision. The management measures themselves are broadly written and subject to interpretation. There is no definitive set of BMPs to assume for costing purposes. There is still substantial uncertainty as to which management measures will be considered by federal agencies to be already be met in Virginia, and which management measures will necessitate further action and costs. For those management measures which are not currently met, as broadly determined, there may be some land users who are nonetheless implementing practices consistent with the management measures while others are not. There is no definitive set of data to use to measure implementation levels, however. Also, there is a great diversity of land use situations, such that approaches to estimating the costs must use some simplifying assumptions. Finally, there are limitations generally in the type and quality of data that are available.

The JLARC staff compliance cost estimates for Virginia were developed mostly using the EPA Section 6217 costing framework, but with the application based on Virginia data and discussion with Virginia experts. To address some of the uncertainty and imprecision that is involved, JLARC staff as feasible developed more than one cost estimate, using differing assumptions, methods, or data. Study results were therefore expressed as a best estimate, and as a range (a high and low estimate). With regard to administrative costs, time and resource constraints did not permit a full analysis, but selected types of administrative costs were considered as feasible to provide an estimate of at least the minimum likely costs.

Table 3 shows the JLARC staff best estimate, and the range from the low to high estimate, of annual costs for the current and proposed zones combined. The costs include compliance and selected administrative costs, and are shown by nonpoint pollution source category. The data indicate a substantial range exists from the low to high cost estimates. Specific assumptions leading to the wide range in cost estimates are explained in a technical appendix to this report.

On a per-unit basis, the best estimates of Virginia's compliance costs generally are about what might be expected in relation to the national EPA per-unit costs. As

Table 3

Best, Low, and High Estimates of Virginia's Potential Section 6217 Costs* (in millions)

	Best Estimate	Low Estimate	High Estimate
Agriculture	$21.8	$11.3	$34.1
Urban	15.9	6.3	25.8
Other Costs**	4.4	0.4	8.2
OSDS Retrofit	190.3	159.8	632.7
Total	$232.4	$177.8	$700.7

*Existing and proposed zones, including "look-beyond" area.

**Other costs are forestry, hydromodification, and marinas costs.

Source: JLARC staff analysis of Virginia's Section 6217 costs.

indicated in Table 4, the compliance cost per new development household is slightly above the EPA cost range, due to a recognition of a greater number of households whose costs might include new OSDS costs and the exclusion of certain high-cost communities by EPA's consultants. The estimated compliance cost per onsite disposal system retrofit is within the EPA cost range. The compliance cost per marina facility is just slightly under the low end of the EPA range. This occurs for two primary reasons: (1) unlike the EPA marina cost range, the Virginia per-facility cost is based on dividing total costs by the number of marinas that are potentially affected, thus recognizing that some facilities

Table 4

Comparison of Best Estimated Average Per-Unit Virginia Costs with EPA Economic Achievability Ranges

Virginia	EPA Analyses	EPA Analyses
Per Farm	$862	$1,500
Per Harvested Forestry Acre	$15.92	$11.70
Per Marina Facility	$2,386	$2,394 to $7,427
Per Household, New Development	$990	$367 to $977
Per Household, OSDS Retrofit	$526	$313 to $3,264

Source: JLARC staff analysis of Virginia's Section 6217 compliance costs, and EPA/consultant analyses of national compliance costs.

will not incur any additional costs, and (2) Virginia has few of the large, high-cost facilities.

The best estimate of the compliance cost per farm in Virginia is less than the national weighted average cost. However, the Virginia average cost is influenced by the fact that a substantial number of farms are estimated to already meet a number of the management measures. Further, whereas the EPA cost is stated by EPA to be "weighted toward fewer large farms", Virgina's average farm size is only about half the size of the average farm nationally, and is less than the average farm size of several coastal states. Virginia's average cost per harvested forestry acre is estimated to be somewhat higher than the southeast region average, but is within the wide range of unit costs by forest type discussed in the EPA economic achievability paper.

The per-unit costs help provide another perspective on the magnitude of the costs. While OSDS retrofit costs in raw terms are estimated to compose about two-thirds or more of Virginia's potential costs, this is because of the large number of households that could be affected. As indicated in Table 4, it is estimated that new development households and farm households are likely to incur a higher cost on an annualized per-unit basis than non-farm households with septic tank retrofit needs.

Whether or not Virginia, or any of the other coastal states, will actually incur substantial Section 6217 costs is highly dependent on a number of future events. Coastal states have recently sought revised guidance on Section 6217. While subject to interpretation, EPA and NOAA's letter response to CSO appears to reflect an intent to make some changes from its prior positions on the timeframes, the geographic scope, and the nature of the enforceable policies that may be required. The Coastal Zone Management Act and the Clean Water Act are scheduled for reauthorization during 1995, and either reauthorization could potentially bring changes in nonpoint pollution requirements that would alter or eliminate Section 6217 requirements. NOAA and EPA have not yet given Virginia detailed feedback on how those agencies interpret Section 6217 requirements relative to Virginia's situation. Also, Virginia has a number of options for responding to Section 6217, including the option of not fully addressing it, and accepting the limited federal funding penalties that may result.

COST IMPACTS IN EXPANDED ZONE COULD BE SUBSTANTIAL

An expansion of Virginia's coastal zone to include NOAA's basic recommendation and the "look-beyond" area could be expensive. As indicated in Table 5, excluding OSDS retrofit costs, the combined cost for the other Section 6217 cost components could be greater in the proposed than in the existing zone, largely due to higher agricultural administrative and compliance costs in the proposed zone.

OSDS retrofit costs could be the single greatest cost, and it is estimated that these costs are incurred more heavily in the existing zone. In fact, the magnitude of these costs in the existing zone is estimated to be about 2.6 times the costs in the proposed zone.

Table 5

Best Cost Estimate for Virginia's Existing and Proposed Zones (in millions)

	Existing Zone	Proposed Zone
Agriculture	$ 4.7	$ 17.1
Urban	$ 10.1	$ 5.9
"Other" costs	$ 3.3	$ 1.0
Total without OSDS Retrofit	$ 18.1	$ 24.0
OSDS Retrofit	$137.8	$ 52.5
Total with OSDS Retrofit	$155.9	$ 76.5

* "Other" costs are forestry, hydromodification, and marinas costs.

Source: JLARC staff analysis of Section 6217 administrative and compliance costs.

Still, it is estimated that a decision to expand the zone could add about $76.5 million to Section 6217 costs, or almost a 50 percent increase in costs.

About 57 percent of the proposed zone costs are incurred in the "look-beyond" area, and about 43 percent are incurred within NOAA's basic recommendation. As Table 6 indicates, for agriculture, the look-beyond costs exceed the basic recommendation costs by a substantial margin.

OSDS RETROFIT COULD BE VIRGINIA'S MAJOR SECTION 6217 COST

One of the EPA management measures is existing onsite disposal systems (OSDS). This measure is addressed in the EPA guidance document as an urban component measure, but due to the potential magnitude of its costs, it is treated in the JLARC staff analysis as a separate component.

Onsite sewage disposal systems treat wastewater through the use of conventional septic tanks and soil absorption or drainage fields (an area of soil surrounding the system which provides for the removal of pathogens and other pollutants). EPA has separate management measures addressing existing OSDS and new (future) use of OSDS. The EPA management measure for existing OSDS requires an enforceable approach to obtain proper operation and maintenance of these systems. The management measure could potentially require the use of alternative technologies or approaches to correct septic system failures or prevent possible problems.

Table 6

Best Cost Estimates, NOAA's Basic Recommendation *Versus* the "Look-Beyond" Area (in millions)

	Basic Recommendation	"Look-Beyond" Area
Agriculture	$ 4.8	$ 12.3
Urban	$ 2.2	$ 3.7
"Other" costs	$ 0.4	$ 0.6
Total Without OSDS Retrofit	$ 7.4	$ 16.5
OSDS Retrofit	$ 25.7	$ 26.8
Total with OSDS Retrofit	$ 33.1	$ 43.3

Source: JLARC staff analysis of Virginia's Section 6217 costs.

EPA's urban economic achievability document estimated annual costs for selected retrofit options ranged from $313 to $3,264 per OSDS household. However, while these costs were addressed in the economic achievability paper, the cost is not captured in EPA's national cost estimates as reported in its regulatory impact analysis. The reason for this omission is not clear, although it may have been based on an assumption that the measure would not have substantial cost implications for most coastal states.

However, the OSDS retrofit measure could have a unique impact in Virginia. EPA's economic achievability analysis for the existing OSDS measure categorizes distances of less than two feet from the septic tank to the groundwater table as an "insufficient" separation distance. While many coastal states have regulations which provide for such a separation distance, Virginia's state regulations permit separation distances of as little as two inches, and under no circumstances require a distance of more than twenty inches. Specifically, the minimum separation distance is defined by State regulations for each of four basic soil types. In soil types one and two (soil type two accounts for the majority of land area in Virginia's existing coastal zone), minimum separation distances of two to three inches, and three to twelve inches, are permitted respectively. Distances of twelve to eighteen inches, and eighteen to twenty inches, are permitted in soil types three and four respectively (these soil types account for the majority of land area in the proposed coastal zone).

Virginia's threshold review document as submitted to EPA recognized OSDS management as a potential problem. The document indicates that Virginia only "partially meets" the new OSDS and existing OSDS management measures in both the existing and proposed coastal zones. In connection with the new OSDS measure, the document notes that:

> The regulations administered by the Department of Health establish criteria for the construction and operation of onsite disposal systems. Siting requirements, setbacks, and minimum separation distances are specified. Because the separation distance between the seasonal water table and the soil absorption trench bottom may be as small as two inches (based on soil percolation rates), water quality protection may not be achieved. These regulations provide only partial compliance with the management measure.

It appears that OSDS retrofit could be the most expensive management measure cost for Virginia. Based on the costing approach taken in EPA's economic achievability analysis, the best estimate of Virginia's OSDS cost in both the existing and proposed zones is about $190 million. Unless the management measure is interpreted less stringently than appears to be assumed in the EPA economic analysis, the low estimate of these costs is $160 million. And, using high cost assumptions and a sweeping application of the management measure, the cost could be as high as $633 million. These costs could easily constitute two-thirds or more of Virginia's Section 6217 cost. This assessment is based on the proportion that JLARC's low OSDS cost estimate of $159.8 million composes of a total cost of $234.5. The total cost figure used here is based on adding the low OSDS cost estimate to the high cost estimate for all the other management measures.

The reason that OSDS retrofit costs could be so substantial is the number of households potentially affected. There are an estimated 362,000 households in the existing and proposed coastal zones that could potentially be impacted. Of these households, the JLARC best cost estimate is calculated based on some impact to about 287,000 households.

III. State Response to Section 6217

By July of 1995, coastal states are required to submit an approvable Section 6217 management program to NOAA and EPA. There are three separable decisions which each coastal zone state needs to consider as the deadline approaches. The most basic decision is whether or not the state wishes to pursue implementation of the Section 6217 management measures at all. The second decision is the geographic boundary within which the state will pursue Section 6217. If the boundary recommended by NOAA and EPA is not acceptable to the state, then it may propose an alternative boundary, which could be the existing coastal zone. However, NOAA and EPA believe that they have the authority to determine that the alternative boundary composes an inadequate basis for a sufficient Section 6217 program. The third decision is how the state will pursue implementation of Section 6217. For example, what changes will be necessary in the state to implement Section 6217? What aspects of the implementation of Section 6217 and its management measures are subject to negotiation with NOAA and EPA? And what aspects does the state or NOAA and EPA consider non-negotiable?

With regard to these impending decisions, in Virginia, the State to this point has not ruled out the implementation of Section 6217, but nor has a definitive commitment been made to implement it. The executive branch has taken a position that if Section 6217 is implemented, it should be implemented in the existing coastal zone, and not in the NOAA/EPA expanded boundary area. This position was stated to NOAA and EPA staff at a December 1994 meeting.

The State has developed and submitted a threshold review document for the EPA and NOAA detailing those Virginia nonpoint pollution efforts that may meet the objectives of Section 6217. The document is providing a basis for more specific discussion with EPA and NOAA on the implementation of Section 6217 in Virginia, including what aspects of nonpoint pollution control in Virginia might have to change and what aspects are subject to negotiation. Additional information that may result from this dialogue between the State and the federal agencies may have an impact on the State's decision regarding Section 6217 implementation.

The purpose of this chapter is to overview some contextual information related to the State's policy choice on Section 6217. Potential factors that may affect the State response to Section 6217 are considered, including: the current status of information on the benefits and costs of nonpoint pollution prevention; the extent of the nonpoint pollution problem in Virginia and progress that is being made in its reduction without Section 6217; and differences in perspective that may exist on the means, or how, nonpoint pollution should be reduced. In addition, this chapter contains the results from contacts made by JLARC staff to fifteen other eastern coastal states to inquire about their planned response to Section 6217, and some conclusions about the approach to Section 6217 that Virginia may take.

POTENTIAL FACTORS AFFECTING STATE RESPONSE TO SECTION 6217

To provide a context for the cost findings reported in Chapter II, JLARC staff examined two issues that relate to the question of whether any action should be taken to address Section 6217. First, JLARC staff placed the costs of Section 6217 in the context of the potential benefits of implementing Section 6217, including the federal funding that would not be lost if the State implements the section. Second, JLARC staff reviewed the nonpoint pollution issue in Virginia, and Virginia's commitment to and the status of nonpoint pollution reduction efforts. Several findings resulted from this assessment.

Specifically, the economics of nonpoint pollution prevention are not clear-cut. The research literature on the benefits of nonpoint pollution control is limited, and the conclusions from that limited research are mixed. JLARC staff estimates of the cost for just some selected administrative activities to implement Section 6217 indicates costs of about $9.9 million annually, which exceeds the estimated $1.8 million in federal funds that would be at risk from non-implementation; and once compliance costs are considered, the likely costs for Section 6217 far exceed the likely federal funding loss that the State would experience if it did not implement it. However, it is not known how these costs would compare to the benefits of Section 6217 if those benefits, especially including the water quality benefits, could be fully quantified.

Virginia does have a commitment to reduce nonpoint pollution in the form of nutrients as part of the State's Chesapeake Bay commitment. Baseline results for 1985 from the Chesapeake Model about point and nonpoint pollution appear to be generally well-accepted. The model results indicated that nonpoint sources were accountable for a substantial portion of controllable nutrient loads in Virginia's tributary basins. While there has been a major change in some of the previously reported data on what progress has been made and will be made under existing nonpoint pollution efforts in Virginia, even more recent optimistic numbers indicate that existing nonpoint efforts are likely to fall somewhat short of the 40 percent reduction goal in the nonpoint nutrient loads.

Thus, the following question is raised. What should the focus be for enhancing nonpoint pollution reduction efforts, in terms of how and where the effort should be conducted, and who should pay the costs? The discussion of nonpoint pollution economics and goals is therefore followed by a consideration of some of the pros and cons of an enforceable measures approach to nonpoint pollution.

Economics of Nonpoint Pollution Prevention Are Not Clear-cut

There are several major problems in assessing the economics of nonpoint pollution prevention. The economic achievability of nonpoint pollution prevention is a judgemental assessment. Existing methodologies to calculate water quality benefits are generally considered inadequate. Therefore, few benefit-to-cost comparisons of nonpoint pollution reductions are made. Results from the comparisons that have been performed

have been mixed. Further, the responses of landusers to BMP requirements may be difficult to predict.

Economic Achievability is Judgemental. The 1990 reauthorization of the Coastal Zone Management Act charged EPA with assesssing the "economic achievability" of the management measures developed pursuant to Section 6217. The Act did not attempt to define the concept of economic achievability.

Several economic achievability analyses were performed for EPA. The papers containing an explanation of these analyses provided various data. These data included indicators such as the costs of the measures, or the costs of the measures as a proportion of landuser income. In none of these documents, however, were any threshold criteria stated as to what level of landuser income consumption to meet the measures was considered inappropriate or unachievable.

The following example illustrates the nature of the economic achievability problem. A weighted cost of $1,500 per farm, as estimated by a consultant firm for EPA for just three of the agriculture measures (erosion, nutrient, and pesticide management), constitutes about six percent of average farm net income nationally. For farms in the southeast region needing to meet the dairy waste, erosion, and grazing management measures, the costs were estimated to constitute about 15 to 45 percent of net income. EPA concluded that the agriculture management measures were economically achievable. The basis which leads to a conclusion that this level of cost is "achievable" is not explained in the economic achievability documents — it is a matter of agency judgement.

If the costs of the management measures were calculated to exceed the wealth of the landusers to pay those costs, and the landowners are the ones expected to pay the costs, then the measures can clearly and objectively be stated as "economically unachievable" (unless there is no concern as to the continued viability of the landusers). As long as wealth exists to cover the costs, however, the measures are theoretically "economically achievable." However, this by itself is not an important finding, because it is not feasible to assume that up to 100 percent of wealth can be devoted to nonpoint pollution prevention. The determination of what proportion of wealth is feasible or achievable for this purpose is a matter of judgement.

Returning to the agriculture example, from the standpoint of whether income exists to meet these costs, the data indicate that the answer is yes. However, the extent to which the farms remain economically viable with this level of income loss is a much more complex question, is probably more relevant to an economic achievability determination, and is not addressed with data in EPA's agriculture analysis. The economic achievability dimension also leaves out another important dimension, which is that once the cost figures are known, what is the appropriateness, equity, and political feasibility of requiring farmers to devote this proportion of income to nonpoint pollution prevention?

Cost/Benefit Results are Mixed and Benefit Methodologies Are Considered Inadequate. Evidence suggests that under existing methodologies to quantify benefits (which many claim are unable to fully capture these benefits), sweeping

application of BMPs produces low benefit-to-cost ratios. However, the literature also indicates that the direction of the ratio depends on the pollution strategy employed. BMPs applied in the right scenario can produce favorable benefit-to-cost ratios.

For example, an assessment of the costs and benefits of soil conservation programs in the early 1980s estimated that on average, the ratio of benefits to costs across all farm production regions was only 0.65. ["The economic efficiency of voluntary soil conservation programs", *Journal of Soil and Water Conservation*, 1989.] However, four of the ten regions of the country were estimated to have a ratio of benefits to costs above one, including the "southeast" at 1.08 to one.

Another study of the benefit and costs of a nonpoint pollution prevention program in one watershed, which included agricultural nonpoint controls and a waste-water treatment upgrade, estimated a total benefit-to-cost ratio of 1.40 to one. ["Benefits and costs of agricultural nonpoint source pollution controls: The case of St. Albans Bay", *Journal of Soil and Water Conservation*, 1989. The article does not report separate ratios for the agriculture and the wastewater treatment upgrade activities are not provided in the journal article about the study, however.]

A 1994 study of taking more highly erodible cropland out of use near water segments with water quality problems, to address an "upper bound in the continuum of management strategies that might be adopted" regarding nonpoint pollution, found water quality benefits to cost ratios of no better than 0.56, and in some cases considerably worse, for each of four implementation scenarios. ["Land Retirement as a Tool for Reducing Agricultural Nonpoint Source Pollution", *Land Economics*, February 1994.] However, this study noted but did not attempt to quantify other potential benefits than water quality improvements, such as "improved wildlife habitat for hunting and nonconsumptive uses". The agricultural economists who conducted the study also stated that the results from their analysis "suggest that the benefits from a carefully targeted land retirement program could approach or exceed costs".

A 1993 paper written by several professors in the forestry department at Virginia Tech, entitiled "Benefits and Costs of Forestry Best Management Practices in Virginia", indicates a range in the ratio of forestry sediment control benefits to BMP costs in Virginia from 0.10 to 0.55. The ratio most favorable to the BMPs was calculated for a "passively-administered, nonregulatory BMP program" in the Piedmont region of the State. The least favorable ratio of 0.10 was calculated for a hypothetical "regulatory forestry BMP program that would mandate more stringent BMP regulations similar to those of states that have mandatory programs" in the coastal plain of Virginia.

A study of the costs and benefits of urban erosion and sediment control in North Carolina found that "benefit-cost analysis suggests that the overall ratio is likely to be positive, although a definitive figure is elusive." ["Costs and Benefits of Urban Erosion and Sediment Control: The North Carolina Experience", *Environmental Management*, 1993].

Federal Funding at Risk is Limited, But Direct Comparison to Costs is Misleading. In 1994, Virginia received $2.15 million in federal Section 306 (coastal zone) funds, $1.65 million in Section 319 (Clean Water Act) funds, and $0.2 million in Section 6217 funds. These are the funds that would be directly at risk if the State does not receive at least conditional approval of its proposed Section 6217 program.

The Section 306 and 319 penalties for not implementing Section 6217 involve the withholding of certain portions of the funding. These proportions increase from 1996 to 1999. For example, in 1996, the 306 penalty is 10 percent of 1995 baseline funding withheld; by 1999, it is 30 percent of 1995 funding. In 1996, the 319 penalty is also 10 percent of 1995 baseline funding, but the reductions to 1999 are based on a different principle. Each year's penalty is established based on the prior year funding, so there is a compounding effect to the reduction. Thus, while the proportion of prior year funding that is to be received is 90, 85, 80, and 70 percent in 1996, 1997, 1998, and 1999 respectively, the proportion of the 1995 baseline that is received by year is 90, 76.5, 61.2, and 42.8.

Based on these proportions, and assuming that the Section 6217 funding would be lost if the program is not adequately implemented, JLARC staff estimate that the State would lose $0.6 million in federal funding in 1996. By 1999, assuming no increase in program funds nationally, the State would lose $1.8 million.

This amount is less than the $9.3 million JLARC staff estimate would need to be expended annually during this time period for selected administrative activities to implement Section 6217. Further, the amount is minimal in comparison to the compliance costs that have been calculated. However, the ability to maintain the federal funding may only be a small part of the positive effects, or benefits, of Section 6217. The greater benefit, the water quality benefits, have not been quantified.

Individual Responses to BMPs May Not Be Adequately Predicted. A final point regarding the economics of nonpoint pollution is that it is not easy to fully anticipate landuser responses to the best management practices. For example, some farmers in the Shenandoah Valley have indicated that their response to a loss of income might be to try to restore that income through an increase in their production — for example, increasing the farm's number of animals. Such a change could offset some of the gain per-animal in nutrient reductions.

State Commited to Nonpoint Reductions But May Fall Short of Goal

Virginia has some efforts underway to address the nonpoint pollution reduction issue. One of the major overarching umbrellas under which this issue is being addressed is the 40 percent nutrient reduction goal for the Chesapeake Bay. This reduction goal, shared by Maryland, Pennsylvania, and Virginia, is leading Virginia to work on nonpoint pollution prevention efforts in the tributary rivers to the Bay. Depending on the perspective taken, Section 6217 could be viewed as enhancing the State's approach to nonpoint pollution and making realization of the goal more likely; or it could be viewed

as imposing a particular approach when the State could find more acceptable alternatives for meeting its nonpoint pollution goals.

Chesapeake Bay Model Provides Quantified Nonpoint Pollution Baseline. Results from computer runs of the Chesapeake Bay model from a 1985 baseline year have been generally accepted by the Chesapeake Bay states (Virginia, Maryland, and Pennsylvania) as the baseline against which the objective of reducing nutrient levels by 40 percent is to be assessed. Model results from 1985 are available by tributary to the Bay (in Virginia, the Potomac River Basin, the Rappahannock River Basin, the York River Basin, the James River Basin, the Western Shore Coastal Basin, and the Eastern Shore Coastal Basin) and by land use (agriculture, forest, urban).

The model estimates the amount of nutrient material in the tributaries that is controllable and noncontrollable (nutrient loadings that result from the natural state and are not the result of human activity are considered noncontrollable). The 1985 baseline estimates of controllable nutrient loading levels in Virginia's tributaries sum to 70.932 million pounds of nitrogen per year and 9.503 million pounds of phosphorus per year. Of this amount, 35.830 million pounds of nitrogen (50.5 percent of the total controllable nitrogen) and 4.532 million pounds of phosphorus (47.7 percent of the total controllable phosphorus) were due to nonpoint as opposed to point sources. Thus, in the baseline year run of the Chesapeake Bay Model, nonpoint pollution accounted for a substantial proportion of nutrient loadings in Virginia's tributary basins. Within the category of nonpoint pollution, 1985 baseline year estimates across the tributaries suggest that about 82 percent of the nonpoint source nutrient loadings were from agricultural land uses, 16 percent were from urban land uses, and only 2 percent were from forestry land uses.

Current Efforts Projected to Place Virginia Close but Short of Nonpoint Goal. In May and August of 1993, DEQ issued discussion papers which contained nutrient reduction information based on the Chesapeake Bay model. The papers contained estimated nutrient reductions from nonpoint sources achieved as of 1991, and as projected to the year 2000 (see Table 7). These estimates and projections were shown by tributary basin. The State is currently behind in its tributary strategy work, so these papers reflect the last published results for all basins, although new information on the Potomac Basin has been made available.

With regard to controllable nonpoint nitrogen and phosphorus reductions achieved in the six years from 1985 to 1991, estimates reported in these papers ranged from a low of about three percent in nitrogen reduction in the Western Coastal Basin to almost seven percent in phosphorus reduction in the Potomac Basin. There was substantial variation across basins in the percentage reductions projected by the year 2000, or the year of 40 percent nutrient reduction goal of the Chesapeake Bay states. Projected percentage reductions ranged from a low of about ten percent for nitrogen reduction in the western coastal basin to a high of about 26 percent for nitrogen reductions in the Potomac Basin.

Table 7

DEQ 1993 Tributary Strategy Papers: Estimated and Projected Percentage Reductions From 1985 Levels, Nonpoint Pollution Nutrient Loads by Tributary Basin

	Nitrogen		Phosphorus	
River Basin	Achieved By 1991	Projected By 2000	Achieved By 1991	Projected By 2000
Rappahannock	5	13	6	15
York	5	15	5	13
James	5	14	6	15
Western Coastal	3	10	4	13
Eastern Coastal	4	22	4	23
Potomac	6	26	7	25

Source: DEQ's May 1993 "Discussion Paper: Reducing Nutrients in Virginia's Tidal Tributaries", and DEQ's August 1993 "Discussion Paper: Reducing Nutrients in Virginia's Tidal Tributaries."

It is important to understand, however, that the estimates of results achieved or projected are based on information entered into the model on measures that have been undertaken or are anticipated to address nonpoint pollution. The 1993 Potomac paper stated, for example:

> We estimate year 2000 nutrient reductions in the Potomac River Basin as a result of progress achieved through current best mangement programs . . . . These projections are based on anticipated BMP implementation through a number of agencies with existing programs, including the Virginia Agricultural Best Management Practices Cost-Share Program, the Virginia Nutrient Management Program, the Chesapeake Bay Preservation Act in the Tidewater region, the Food Security Act of 1985, and the installation of BMPs on all forestry harvesting areas. They can be viewed as conservative estimates, although total numbers are probably not far off.

The estimates by pollution source are not based on actual water quality measurement. The measurement of nonpoint pollution reduction progress through the Bay Model is very sensitive to the assumptions that are applied about nonpoint pollution prevention measures in use and the simulated relationship between these measures and nonpoint pollution reduction. DCR staff indicate that during the development of the Potomac tributary strategy and through discussion with representatives of Maryland, Pennsylvania, and the District of Columbia, it became clear that the list of BMPs being used to calculate nutrient reductions was too limited. DCR staff indicate that a work group of the Nutrient Subcommittee for the Bay Model reviewed an expanded listing for

the calculation of nutrient reductions, for technical consistency between the Bay participants.

Whereas the August 1993 DEQ paper on the Potomac basin indicated a six-year level of nonpoint reduction achievement from 1985 to 1991 of about six and seven percent for nitrogen and phosphorus, the State's October 1994 Potomac paper indicates a reduction achievement from 1985 to 1993 of about 17 and 15 percent for nonpoint nitrogen and phosphorus. The updated paper did not indicate that a substantial change in the nature of the calculation had occurred, thereby leaving an impression that in two years, the State had been able to more than double the percentage reductions that had been reportedly achieved during the previous six years. The new estimated percentage of nonpoint phosphorus reductions in Virginia's Potomac Basin is nearly equal to the percentage reduction reported by DEQ in the Chesapeake Bay's overall phosphorus levels for 1985 to 1992, a reduction level which has been previously attributed to the State's phosphorus point source policy and the State's phosphate ban.

Differences in the 1993 and 1994 Potomac papers in the projected nonpoint reductions to the year 2000 are also striking. Whereas total basin reduction percentages under current efforts had been projected to fall 14.0 and 15.0 percentage points short of the year 2000 goal for nitrogen and phosphorus respectively, revised projections indicated that current efforts would only fall 8.0 and 4.3 percentage points respectively.

There are two areas of consistency between the papers, however. First is the overall perspective that current efforts are anticipated to move the State substantially forward to its nonpoint pollution reduction goal. Second is the finding that there is a gap between current efforts and complete achievement of the goal.

The latter finding is important because it suggests a need to increase the State's nonpoint pollution effort, which is a premise of Section 6217. However, this still leaves the questions of how and where the increased effort should be conducted, and who would pay the costs.

Differences in Perspective Exist on Means to Achieve Nonpoint Reductions

A January 1993 EPA document, Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters, states that:

> During the first 15 years of the national program to abate and control water pollution, EPA and the States have focused most of their water pollution control activities on traditional 'point sources'.

The starting point in arguing for Section 6217 and the need for enforceable measures appears to be that progress in nonpoint pollution reduction to date has been too limited. Thus, there is a need for further action. As stated by EPA staff, Section 6217 is "not intended to be 'business as usual' for addressing nonpoint pollution".

In addition, it is argued, nonpoint pollution best management practices are well-established and they work. Data on the pollution reduction effectiveness of BMPs are provided in the EPA guidance. A requirement for general implementation, as opposed to implementation only when water quality harm has been proven, is necessary because it is infeasible to demonstrate the need for the management measures in each situation. A Section 6217 coordinator in another state makes the following analogy to illustrate the point:

> A doctor may prescribe certain measures for a patient to follow. The doctor's prescription is based on the knowledge that these measures can help and have helped numerous patients with similar symptoms. Patients generally accept the prescription on that basis. However, whether or not the prescription will work for the particular patient is not a certainty — for example, body chemistries and conditions differ. If doctors had a burden to produce empirical data for each patient supporting the utility of each and every prescription under a wide variety of conditions, the practice of medicine would break down. Similarly, there are inadequate resources available to demonstrate to each and every landuser that best management practices on their property will improve water quality.

Further, it is also argued that in some cases, the nonpoint pollution best management practices can actually save the landuser money. The flexibility of the management measures is also emphasized. There are a variety of practices that can be used to satisfy the management measures.

On the other hand, the argument against enforceable measures includes the following points. Progress on a voluntary basis has been good and more can be done. The enforceable management measure approach poses problems. The management measures themselves are ambiguous. For example, the grazing management measure requires that "one or more" of four different practices may be required, including the costly option of fencing animals from streams. Thus, it is vague as to how many of those practices will be expected and the extent to which fencing in particular will be expected. The management measures may be expensive, especially if interpreted unreasonably. Further, whether or not the measures are appropriate and effective depends on site-specific factors. The requirements intrude on landowner or landuser rights. This is especially inappropriate when no finding of water quality harm has been made.

APPROACHES PURSUED BY EASTERN COASTAL STATES

Virginia, as well as other coastal zone states, face a somewhat difficult policy choice regarding Section 6217. At this time, it appears that Virginia is headed in the direction of implementing Section 6217 in the existing coastal zone but not in the expanded zone. For comparison purposes, in November 1994 JLARC staff contacted fifteen other eastern coastal states to inquire about their planned response to Section

6217. These contacts indicate that most states, like Virginia, appear to be heading in a direction of implementing Section 6217 at least in some form and within some geographic boundary. Further, most states, like Virginia, plan to use a different Section 6217 management boundary than proposed by NOAA. The contacts indicate that while some of the states have attempted to estimate Section 6217 costs in particular areas, such as dairy farm costs, no state contacted has yet attempted to fully estimate the costs it may experience under Section 6217.

Specifically, JLARC staff found that thirteen of the fifteen states, all with approved programs, are still seeking to work out an understanding with the federal agencies on Section 6217. In one state with an approved program, it is considered uncertain as to whether it will be possible to reach an understanding. One state that has been developing a coastal program for approval (but is not yet a coastal zone management state) will not go forward if Section 6217 remains unchanged.

With regard to the boundary issue, eleven of the fifteen states surveyed plan to use a different Section 6217 boundary than proposed by NOAA. Eight states, including four in the southeast, plan to use a less inclusive boundary. Three northeastern states think a boundary dividing the state is undesirable, and may cover the entire state. One state in the northeast plans to accept the boundary recommendation. Another state in the southeast is uncertain as to its boundary response. For two states, whose existing coastal zone already encompasses the entire state, the question is not applicable.

In general, the survey indicated substantial state concerns about the implementation of Section 6217. The states indicated that there is an organization which is working on a coastal state reaction to Section 6217. This organization, the Coastal States' Organization (CSO), represents State Governors on coastal matters. CSO is seeking changes to Section 6217. CSO staff indicate that their effort is to "fix" rather than eliminate Section 6217. CSO sought and received revised administrative guidance from the federal agencies prior to the 1995 Congress. CSO staff have stated that if their organization's concerns are not adequately addressed, CSO may seek changes when the Coastal Zone Management Act is scheduled for reauthorization in 1995.

CURRENT VIRGINIA APPROACH APPEARS APPROPRIATE

The information reviewed for this study indicates that additional activities to address nonpoint pollution in the Shenandoah Valley are desirable. The usefulness of further nonpoint pollution activity in NOAA's "look-beyond" area does not appear to be particularly in dispute. DCR's data indicates some nonpoint pollution problems in that area. The Chesapeake Bay Model indicates that in an average hydrologic year, about 20 to 40 percent of pollution loads to the Potomac, which has a Shenandoah Valley Subbasin, are transported to the Bay. The JLARC staff survey of extension agents found that the 13 agents serving farmers in localities with 50 percent or more land area in the "look-beyond" area all agreed with the statement that nonpoint pollution could be better managed on some farms in their locality. JLARC staff discussions with soil conservation

district staff in the Shenandoah Valley and with the farmers at the farms visited did not indicate a disbelief that best management practices on their farms might reduce their impact on tributary rivers and the Bay — their strong concern, however, was with the approaches that might be dictated to achieve water quality objectives.

Section 6217 does not appear to be the appropriate vehicle to address the nonpoint pollution problems in the look-beyond area, for several reasons. This area is not part of the coastal watershed. Its localities generally have less than 15 percent of their land area with drainage to the coast. Section 6217 has the potential to be especially costly for landusers in this area — for example, due to the intensity of livestock farming in this region. The State has an alternative available to achieve its nonpoint objectives through its tributary strategy effort in connection with the Bay, and this is an effort over which the State has more control in ensuring that the ends achieved are worth the means that are pursued.

Further, there are problems with the land area addressed by NOAA and EPA's "basic recommendation". Twelve of the 15 localities in this area are dissected by the hydrologic boundary that is drawn. Eight of these localities have less than 50 percent of their land area in the basic recommendation. NOAA and EPA have recognized that a regard for local jurisdictional boundaries is a factor which can be used to justify an alternative boundary.

In summary, additional nonpoint pollution reduction efforts appear to be necessary if the State is to meet its Chesapeake Bay goals and promote water quality. However, Section 6217 as currently designed raises several concerns, including its approach, its expense, and the uncertainty that exists as to NOAA's final boundary position. Consequently, the State's current approach appears to be appropriate: to consider implementation of Section 6217 in the existing coastal zone while exploring the details of the likely impact within that zone before making a final decision. The State needs to clearly understand what the federal expectations are with regard to the implementation of potentially high-cost management measures, such as existing OSDS. The State may also need to consider whether its agencies have the regulatory authority to make boundary distinctions in applying and ensuring the implementation of the management measures.

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