Application of Growth Analysis for the Chesapeake Bay Watershed

A WORKSHOP

Sponsored by
The Scientific and Technical Advisory Committee
and
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Chesapeake Bay Program

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Introduction

In 1983 Maryland, Virginia, Pennsylvania, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission signed the Chesapeake Bay Agreement, which was strengthened in 1987 and amended in 1992. The Agreement commits the signatories, among other things, to implement strategies in each of the tributaries to the Chesapeake Bay that will result in a reduction of nutrients necessary to support living resources in both the Bay and its tributaries.

One of the formal goals of the Chesapeake Bay Agreement is to "plan for and manage the adverse environmental effects of human population growth and land development in the Chesapeake Bay watershed." One of the primary ways this goal is being addressed is through the actions of the Chesapeake Bay Program's Land, Growth and Stewardship Subcommittee (LGSS). As set forth in its mission statement, the Subcommittee is responsible for:

> Identifying growth and land use issues of a Bay-wide nature, addressing development topics, and forging alliances with other organizations and interests to: 1) Promote sound land management decisions; 2) provide growth projections and assess the impacts of existing growth on the Bay and its tributaries: and 3) encourage public and private actions to reduce the impacts of growth.

The Chesapeake Bay Program further refined these broad goals in its report, "Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region," October 10, 1996. Drawing from the report's recommendations, the Chesapeake Executive Council's Adoption Statement on Land, Growth, and Stewardship, directed the Chesapeake Bay Program to:

> Identify models, technologies and practices that can be used to assess and minimize the impacts of different development patterns and land-use designs on nutrient loadings to the Bay. This information will be useful to state and local jurisdictions as they work to achieve the nutrient reduction and habitat restoration goals of the program. The Chesapeake Bay Program will communicate and distribute collected materials on these models, technologies and practices to local governments, land use decision-makers, practitioners, realtors, homebuilders, and other stakeholders.

To this end, a study of build-out analysis and water quality modeling was conducted in 1997. On September 17 & 18, 1998, the Chesapeake Bay Program's Land Growth and Stewardship Subcommittee (LGSS) and the Scientific and Technical Advisory Committee (STAC) hosted the workshop. It brought together scientific experts and managers from within and outside of the Chesapeake Bay watershed to discuss the next steps the Bay Program should take in its efforts to implement the 1996 directive of the Executive Council.

The goal of this Application of Growth Analysis workshop was to identify a course of action that would enhance the ability of the Chesapeake Bay Program and state and local partners to assess and identify alternative development strategies to minimize the impacts of development on local waterways, nutrient loads, and the Bay. To accomplish this goal, participants of the workshop:

- Reviewed reports on how present trends in population growth will impact land development and water resources in the future;

- Discussed information, issues, and approaches to growth impact analysis with invited experts in the field;
- Examined lessons learned from previous case studies;
- Discussed and examined the feasibility of alternative approaches the Bay Program could take to provide themselves and Bay partners with the ability to analyze, assess, and identify development strategies to minimize the impacts of development on local waterways, nutrient loads, and the Bay; and
- Identified next steps to recommend to the Bay Program to accomplish the goal of the workshop.

These steps were accomplished through the presentations made and three breakout Work Group sessions held on Day 1 of the Workshop, followed by a plenary session on Day 2, in which each Work Group presented their findings and recommendations. These were then integrated through discussion by all of the attending workshop participants into recommendations to the Bay Program.

Presentations

1. *"A Historical Perspective on Growth and the Chesapeake Bay" by Dr. Kent Mountford.*

Dr. Mountford is a senior scientist with the U.S. Environmental Protection Agency's Chesapeake Bay Program in Annapolis, MD. He examined the stages of growth and development in the Watershed's history and associated changes in the Bay's ecology and status in living resources.

Abstract:

Buildout is considered a relatively "new concept." It refers to occupying "all" of the lots or parcels in a region at their "zoned" density. You might believe this a saturation density for development, but the concept probably has little to do with how well the underlying ecosystem can function or provide wildlife and humans, land and aquatic systems with an acceptable quality of life.

The lessons of history are sobering, because, at differing levels of ecosystem, or landscape organization, human activities have reached a kind of "buildout" several times in the last four centuries. The slate was not "clean" when the first Europeans arrived here, because Native American populations had occupied and modified the land by hunting, fire and agriculture for thousands of years. They had attained something of a "sustainable economy."

Europeans quite quickly divided the land into titled parcels, a concept foreign to native Americans, and focused on cash crop yields, especially tobacco. The land, once fully occupied by ownership and/or tied up by survey, became a limited resource, turning greedy eyes to the piedmont "frontier."

Despite high mortality in the Chesapeake Colonies, the continuing flow of workers and external energy resources sustained exploitation of the region's indigenous resources for profits which like Wal-Mart and K-Mart, did not fully benefit the indigenous community. Resource flow outward was the objective.

Collapses of the single-product tobacco market reduced inflow of goods into the Colonies, which then stimulated a shift to grain crops, and deep plowing. As these expanded onto the piedmont, plowing together with the loss of vast forest acreage caused very large soil erosion losses, filling in streams and weakening cropland fertility.

Despite these massive changes, useful fisheries production of the Bay seems to have been sustained late into the 19th C. Overharvesting of all resources from forest to fish and shellfish, sediment and nutrient loads, compounded by urbanization and a basin population of 15,000,000 appear to have succeeded the Bay's capacity to sustain yields early in the 20th C.

We couch human consumption of land and resources on the positive terms "Growth and Development," but the scale of disruption has reached very large proportions in the current century, with bridges short-circuiting rivers that were formerly an impediment to rapid travel across the land. In the Chesapeake basin, on the order of 150 billion vehicle-miles are driven annually, and this increases much faster than population. We may have already exceeded, by a factor of two, the ability of the land and Bay to sustain themselves against our impacts.

These trends proceed unimpeded. Do we intend to permit this and underwrite continuing decline of the Bay?

2. *"Growth and Bay Restoration: Moving Ahead" by James T. Noonan.*

Mr. Noonan is coordinator of the Smart Growth Policy Planning Team in the Maryland Office of Planning. He characterized current conditions and provided a status report on selected Bay Program efforts to fulfill commitments and follow directives relating to population growth and development in the Bay watershed.

Abstract:

The Chesapeake Bay Program has been concerned for over a decade about the impacts of growth and development on the watershed. The 1987 Chesapeake Bay agreement recognized "the clear correlation between population growth and associated development and environmental degradation in the Chesapeake Bay system." In 1988 a panel of experts convened to look at the issue of growth and development in the watershed. They determined that the pattern of growth and development, uncoordinated public infrastructure investment strategies and undirected problem solving contribute greatly to the current problems of the watershed. The need for action was recognized once again in 1997 and accepted through the "Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region."

Throughout this time period, however, growth and development has been the one variable that has not been addressed in a comprehensive fashion in the watershed. This is an increasingly important factor in our ability to make long-term improvements to water quality in the watershed or to maintain the gains achieved through controls on point sources or from agricultural sources. By the year 2020 the population of the watershed will reach about 18 million people. How and where those people live may be more important than the number itself.

In the past few years the Bay program has developed a series of environmental indicators which together begin to provide an indication of the impact of growth and development on the watershed. There are numbers relating the substantial growth of VMT relative to the increase in population and numbers concerning the impacts of septic systems on nutrient loads. However, some of the most important data is only now being developed.

In 1996 the Land, Growth and Stewardship Subcommittee developed a proposal for obtaining consistent data concerning land use and land-use change for the entire watershed. By measuring land-use changes over a 20 year time period and relating that to other indicators we can provide a harder statistical look at the relationship of the pattern of development to the health of the Bay. We can also develop the ability to project those relationships outwards in time based on measured relationships.

Why would such an effort be useful to the program and the jurisdictions within it? We can actually measure the impact of growth on the nutrient goals and caps. Based on detailed work done in sub-watersheds, we can estimate as well the water quality benefits of alternative patterns of growth (and the policies that support those patterns). Perhaps we can demonstrate the costs or savings for infrastructure investment of changing the pattern of new growth. Perhaps state and local government can also identify and assign the costs of pollution clean-up in an equitable fashion to those who are impacting water quality, rather than continuing to place the burden on existing communities and agriculture.

3. *"Camp Pendleton Study" by Allan Shearer.*

Mr. Shearer is currently pursuing the Ph.D. in Landscape Architecture at Harvard University. He presented highlights of a project on "Biodiversity and Landscape Planning: Alternative Future for the Region of Camp Pendleton, California." He described build-out analysis and development of alternative future scenarios for the region. Special emphasis was placed on application for the Chesapeake Bay region.

Abstract:

The two-year research program, "Biodiversity and Landscape Planning: Alternative Futures for the Region of Camp Pendleton, California," explores how urban growth and change in the rapidly developing area located between San Diego and Los Angeles might influence the biodiversity of the area. The study was conducted by a team of investigators from the Harvard University Graduate School of Design, Utah State University, the National Biological Service, the USDA Forest Service, The Nature Conservancy, Biodiversity Research Consortium, the two relevant regional agencies, the San Diego Association of Governments (SANDAG), the Southern California Association of Governments (SCAG), and Marine Corps Base (MCB) Camp Pendleton. The research was supported by the Strategic Environmental Research and Development Program (SERDP), a joint program of the U.S. Department of Defense, the U.S. Department of Energy, and the U.S. Environmental Protection Agency (EPA). The research was supported through a grant to the Western Ecology Division of the EPA's National Health and Environmental Effects Research Laboratory, and the USDA Forest Service Pacific Northwest Research Station.

The study region is an 80 kilometer x 134 kilometer rectangle that encompasses the five major river drainage basins directly influencing Camp Pendleton: San Juan, San Mateo, San Onofre, Santa Margarita, and San Luis Rey. The research strategy is based on the hypothesis that the major stressors causing biodiversity change are related to urbanization. As population increases and development spreads, habitat is lost due to grading, paving, ornamental landscaping, and other human activities. There are also indirect, secondary, and cumulative effects on vegetation by development through hydrologic and fire influences. These affect habitat and ultimately, biodiversity.

A computer-based Geographic Information System was developed to describe the region. Analytical models use the digital data to evaluate the complex dynamic processes at work in the very large study area and the possible impacts on biodiversity resulting from changes in land use.

Future change is studied at four scales: several restoration projects, a subdivision, a third order watershed, and the region as a whole. Regional change is simulated via six alternative projections of development to the year 2010 and to subsequent "build-out." The first scenario is based upon the current local and regional plans as summarized by the Southern California Association of Governments, the San Diego Association of Governments, and those of Camp Pendleton. Five alternative scenarios provide a method to explore and compare the impacts of different land use and development policies relating to biodiversity. Alternative #1 illustrates what may be considered the dominant spread pattern of low-density growth. Alternative #2 also follows the spread pattern, but introduces a conservation strategy in the year 2010. Alternative #3 proposes private conservation of biodiversity by encouraging large-lot ownership adjacent to and encompassing important habitat areas. Alternative #4 focuses on multi-centers of development and new communities. Lastly, Alternative #5 concentrates growth in a single new city. All alternatives accommodate the population forecast for the region.

A set of process models is used to assess each alternative. The soil models evaluate the agricultural productivity of the area's soils. The hydrology models predict the 25-year storm hydrographs for each of the rivers and their sub-watersheds, flooding heights and water discharge, and resultant soil moisture. The fire models assess both the need for fire in maintaining vegetation habitat, and the risks of fire and fire suppression. The visual model assesses scenic preferences for the region's landscape. Biodiversity is assessed in three ways: a landscape ecological pattern model; ten selected single-species potential habitat

models; and a species richness model.

The evaluations of the alternatives may be used by stakeholders, including MCB Camp Pendleton, to assess the desirability of the policies that generated them or to devise and compare additional development scenarios and conservation strategies.

While the research team is not making specific recommendations as part of this program, we do hope to increase understanding of the risks and benefits of a range of alternatives for the Camp Pendleton region. We also hope to provide tools and techniques that may be helpful in managing the processes of urbanization and landscape change for its several political units and its many stakeholders.

4. *"Why Model Growth Impacts on Watersheds? Examples and Fundamental Considerations" by Joe Tassone.*

Mr. Tassone is Deputy Chief of Planning, Coordination and Resource Management, Maryland Office of Planning. He illustrated application of Maryland's Watershed Planning System to assess growth impacts and identified some considerations that are fundamental to both small-watershed and Bay-scale analysis.

Abstract:

Modeling growth impacts on watersheds is one means to estimate and assess the impacts that potential future growth and development patterns will have on watershed resources. Obviously, this ability is helpful to a community trying to make decisions about how to accommodate growth while preserving some of its land, water, and environmental resources. It is also important to the Bay Program, trying to provide guidelines for local partners to the same end, that will "add up" to Bay resource conservation. The objective of this workshop is to determine how to provide this ability to Bay Program partners responsible for growth and land use decision-making activities.

Why is it important to make this ability widely available? In a fast growing watershed such as that of the Chesapeake Bay, our land and water resources objectives will be compromised over time if growth continues under current patterns. This is occurring first in small watersheds with significant development pressure. Impacts are adding up increasingly at the state/tributary level and Chesapeake Bay-scale. Well-directed growth at the local and regional (tributary) levels will greatly reduce or minimize many of these impacts, at all of these geographic scales. But successful management in the long term will not be achieved unless better directed growth soon becomes the widespread norm.

A combination of modeling and informational tools, strategically developed and designed, will be necessary to provide decision-support capabilities to the diversity of communities and governing bodies involved - local, state, and federal - and keep them on the same page. To achieve this desired outcome, the tools developed for use at the multiple geographic scales of interest here should be consistent, but cannot be identical.

First and most important, analyses must be relevant to the scale at which they are used. For example, a county or township may want to know the effect of changing maximum lot size and subdivision requirements in one or more specific zoning districts; at the Bay-scale, the interest would be on different development patterns at different densities. Thus, even if they are used to assessing impacts of intrinsically similar development alternatives on the same set of resource/ watershed parameters, but at different scales, there are unavoidable differences. These differences include the kinds of decisions for which support is needed, the specific questions to be answered, scale/detail of data, the way develop-

ment alternatives are represented and their effects on land/water resources are estimated, and how the development alternatives relate to any given local authority's actual situation.

At any of these scales, however, there are fundamental considerations that are important for sound results that will support decision-making and consistency among methods/models.

- Projections of the magnitude of growth.
- Geographic distribution/allocation of growth projections to watersheds.
- A way to estimate impacts of projected growth on land and water under current trends.
- A way to estimate impacts of projected growth under alternative growth patterns/scenarios.
- A way to relate alternative patterns/scenarios to alternative management actions.

5. *"Integrating Build-0ut Analysis and Water Quality Modeling" by Cary H. Gaunt.*

Ms. Gaunt is an environmental planner and policy analyst with SAIC, a high tech and environmental consulting firm. She summarized findings on build-out methodologies as described in the report, "Integrating Build-out Analysis and Water Quality Modeling to Predict the Environmental Impacts of Alternative Development Scenarios," which was prepared by the Chesapeake Bay Program.

Abstract:

This presentation highlights key information and findings identified in the synthesis report, *Integrating Build-Out Analysis and Water Quality Modeling to Predict the Environmental Impacts of Alternative Development Scenarios*. The report, prepared in early 1998 for the Land, Growth, and Stewardship Subcommittee of the Chesapeake Bay Program, addressed the following:

- Provided background information on the use of build-out analysis and water quality modeling as land planning and water quality predictive management tools.
- Documented as case studies relevant build-out analysis/water-quality modeling projects conducted in the Chesapeake Bay Region and elsewhere.
- Evaluated the feasibility of the Chesapeake Bay Program's Watershed Model and other watershed and water quality modeling tools that could be used in conjunction with build-out analysis.
- Presented information helpful in assessing the utility of these tools in meeting Chesapeake Bay Program goals, and made preliminary recommendations on methodologies.

The case studies were central to achieving these objectives. The research team identified and investigated 14 build-out analyses conducted around the country, including the Chesapeake Bay region. Five of these were examined in detail specifically because they integrated build-out analysis with modeling – a particular interest of the Land, Growth, and Stewardship Subcommittee. The detailed case studies provided a wealth of information (see Exhibit 1) that helped assess the potential for integrating build-out analysis and modeling for the Chesapeake Bay Program. The remaining case studies were presented as shorter, two page fact sheets containing similar, but abbreviated information.

tion gained from this assessment was used to present summary information on the degree to which each method or model would meet the needs of a particular situation or organization. It also provided a baseline of decision criteria that should be evaluated to determine optimal approaches. Using these decision criteria, the Chesapeake Bay Program's Watershed Model was evaluated to determine its potential utility in supporting build-out analysis. The Watershed Model is the primary tool used by the Chesapeake Bay Program to help signatories meet tributary-specific nutrient reduction goals. Its potential use as a support tool for build-out analysis could facilitate an improved understanding of land planning consequences on Bay water quality on a watershed-wide scale.

This presentation provides summary information from all aspects of this study. In particular, the following elements were described:

- What is a build-out analysis?
- Example of a build-out analysis.
- Why would the Chesapeake Bay Program be interested in conducting build-out analyses?
- What are the different approaches used to conduct build-out analyses?
- How can water quality modeling help?
- Brief overview of modeling in the context of build-out analysis.
- Examples of where build-out analysis has been integrated with modeling.
- What do we need to consider if we want to do this in the Chesapeake Bay Watershed?
- Is the Watershed Model an option?

Exhibit 1. Elements Evaluated for the Detailed Case Studies

- Introduction and purpose of study
- Relevance to Chesapeake Bay Program
- Size and geographic boundaries
- Description of landscape
- Applicability of method to other geographic areas and scales
- Alternative development scenarios considered
- Questions and variables included in study
- Methodology
- Study results and findings
- Types of data required for model
- Data acquisition and level of effort
- Required computer and other resources
- Format of final product
- Lessons learned and alternative approaches
- Additional information

6. *"Growth and the Watershed Model: Assessment of Impacts" by Lewis C. Linker.*

Mr. Linker is Coordinator of the U.S. Environmental Protection Agency's Chesapeake Bay Modeling Group. He demonstrated how the Bay Watershed Model could be used to assess potential impacts of growth and management alternatives in conjunction with some basis information about those alternatives.

Abstract:

The purpose of the Chesapeake Bay Watershed Model is to provide an inventory of loads delivered to the Bay. The model is used to track progress toward accomplishment of the Chesapeake Bay Program goals. This watershed model provides measurement of input of nutrients and sediment loads to the Chesapeake Bay (3D) model. It provides a basis for examination of management alternatives. Development of the Watershed Model is a collaborative product of the Chesapeake Bay Program Office (CBPO) and the Maryland Office of Planning.

The model includes information on:

- Land use projections to Year 2010 as either base zoning or as directed growth.
- Population projections to Year 2010 in both scenarios.
- Point source CAP at tributary strategy levels in both scenarios.

A draft output of the Patuxent Watershed model provides a Year 2010 comparison of the impact of directed growth instead of the base growth scenario:

- Cropland would increase from 82,400 acres to 117,000 acres.
- Forest would increase from 194,800 acres to 255,200 acres.
- Pasture and large lot agriculture would decrease from 87,000 acres to 43,300 acres.
- Urban pervious would decrease from 126,200 acres to 91,900 acres.
- Urban impervious would decrease from 72,700 acres to 56,100 acres.

The model provides estimated changes in total nitrogen, total phosphorus, and total suspended sediment loads as a result of the changes in land use for the directed growth scenario over the base scenario. Consequently, application of these simulation tools can inform the public and decision-makers on large-scale effects of different growth patterns for landscape changes and nutrient/sediment loads to the Bay. The tools can help examine affects of load changes on water quality and living resources.

Nutrient loads associated with the directed growth pattern are consistent with the Chesapeake Bay 2000 nutrient load cap.

Summary Conclusions and Recommendations from the Workgroups

The following is a summary statement of the workgroups' conclusions and recommendations. The first section provides comments on Bay Program Policy and Coordination. The second section provides comments on Key Needs in Terms of Assessment Data and Tools.

Bay Program Policy and Coordination

Responsibility for Assessment Strategy Development and Implementation. The Land, Growth and Stewardship Subcommittee (LGSS) should convene an ad-hoc Assessments Work Group, consisting of representatives of the LGSS in coordination with members of the STAC and the Modeling and Nutrient Subcommittees, to formulate:

- a specific strategy to develop and disseminate the range of watershed-based assessment tools and services recommended through the Workshop (below) and subsequent deliberations of the Work Group itself, and
- an EC Directive designed to implement that strategy.

Developing Assessment Capabilities: Resource Allocation. Include as part of the Assessment Strategy recommendations to refocus Bay Program modeling and analysis resources to develop and implement the appropriate data and tools necessary to conduct Bay Watershed scale assessments of growth and development patterns. Also provide Bay Program partners with the information and tools needed for modeling and assessment within states (major tributaries and smaller watersheds).

Conducting Assessments: Bay Watershed Level. The Assessments Strategy should include a work plan to coordinate development of appropriate tools and their application for Bay Watershed scale assessments through the ad-hoc Assessments Work Group. One product of Bay Watershed-scale assessments should be identification of major tributaries and/or smaller watersheds as "hot spots," wherein development is most likely to compromise Bay restoration objectives, and where a closer examination by state and/or local partners would be most appropriate.

Conducting Assessments: Major tributary and Local / Community Watershed Levels. The Bay Program should structure its Assessment Strategy such that assessments within states are coordinated among government levels, with local governments and communities participating on a voluntary basis. Within each state, collaboration should occur:

- In Pennsylvania, through counties and municipalities
- In Virginia, through planning district commissions, counties, cities, and towns
- In Maryland, through the Maryland Office of Planning, counties, and municipalities.

Where appropriate, involve other regional governmental bodies in assessments. One product of major tributary-scale assessments should be identification of smaller watersheds as "hot spots," wherein development is most likely to compromise tributary and/or community watershed resource objectives, and where a closer examination by state and/or local partners would be most appropriate.

Outreach to and Interaction with Local Governments and Communities. The ad-hoc Assessments Work Group should include in the assessment strategy:

- An outreach element with a plan to encourage and assist each state to demonstrate available tools and informational resources to local governments and communities, and provide direct outreach by the Bay Program where requested by a state.

- A plan, developed in coordination with the Local Government Advisory Committee (LGAC), to survey or otherwise estimate the needs and interests of local governments and communities with regard to watershed-based assessments of growth and development alternatives.

Key Needs: Assessment Data and Tools

Range of Assessment Tools Needed to Support Assessments and Decision-Making. Assessment tools should be developed to conduct watershed-based assessments of growth and development alternatives and provide management decision support at three levels: Bay Watershed[1], major tributary[2], and local-community watershed scales[3].

Tools should be developed to assess:

- impacts of development alternatives on nutrient loads and the Bay (tributary and Bay scales) and local-community watershed resources (land, water, habitat, and stream);
- fiscal impacts of development alternatives for local government;
- impacts of transportation alternatives on land use, development patterns, and watershed resources.

One principal objective of tool development is to make the assessment/decision support tools accessible to as wide a range of communities and local governments as possible. Accordingly, tools intended for application at the major tributary and local/community scales should be produced, to the degree and time frame feasible. These tools should be produced in two versions: one with simple input data requirements and computing capabilities; and one capable of more sophisticated analysis and assessments, requiring correspondingly more extensive and diverse input data and greater computing capabilities.

Tools for this level of application should be designed so that communities and local planners can efficiently make watershed-specific inference about growth alternatives, their likely impacts on watershed resource objectives, and their socio-economic acceptability to the public.

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1 "Bay Watershed scale assessments" refers to assessments for the entire Bay Watershed or for entire major tributaries that cross state boundaries.

2 "Major tributary scale assessments" refers to assessments for entire tributaries within one state's boundaries or for parts of tributaries within one state's boundaries.

3 "Local/community watershed scale assessments" refers to assessments in watersheds smaller than major tributaries within state boundaries, with considerable focus on local watershed resources. "Bay Watershed scale assessments" refers to assessments for the entire Bay Watershed or for entire major tributaries that cross state boundaries.

Development of Assessment Tools. Development of the desired range of assessment tools should begin with the tools already developed by Bay Program partners, and focus on their customization and integration to achieve the objectives of the Assessments Strategy. Based on the individual and combined capabilities of these tools presented at the Workshop, the work plan to accomplish this should include the following tasks:

- identify modeling tools directly relevant to the objectives of the Assessments Strategy;
- evaluate the Maryland Office of Planning's Watershed Planning System (WPS) and other appropriate models for suitability, and adapt them to provide the tools needed for local/ community watershed-based assessments;
- incorporate transportation and fiscal impacts analysis capabilities into the resulting models;
- adapt the Bay Program's Watershed Model to provide a tool for major tributary and Bay Watershed-scale assessments;
- integrate the Watershed Model with the WPS and/or other models adapted for community scale assessments, to achieve adequate levels of consistency among assessments at different scales, building on the proof-of-concept exercise presented by Bay Program staff at the Workshop.

Range of Informational Products to Support Decision-Making. In some cases and areas, it will be difficult or impossible for communities or local governments to apply assessment tools to support decision making. To provide support in these instances, informational products that relate growth alternatives to watershed resource impacts should be developed and disseminated.

Development of Informational Products. To develop these products, appropriate assessment tools should be applied by the Bay Program and, where feasible by the states, in a variety of tributaries and smaller watersheds. These should range from rural to more extensively developed watersheds and from watersheds with little development pressure to watersheds with great pressure. Results should be used to associate a range of expected impacts with a range of development alternatives. This information should be organized and disseminated in publications that can be used to support assessments and decision making in local/community watersheds lacking the ability or resources to use the analytical models and tools.

Development / Maintenance of Data Resources. The Assessments Strategy should support development within each state of statewide central depositories of data on land use/land cover, planning/land use management, soils, streams, wetlands, and transportation networks. Specifically, provide guidelines to help ensure that data content and specifications:

- will meet needs for tributary and local-community scale assessments;
- will be compatible across state boundaries, with respect to coordinate projections, scale of source data, and interpretability of data for Bay Watershed and major tributary-scale assessments.

Appendices

1. Workshop Reports
2. List of Participants

Workgroup Reports

Participants were divided into 3 workgroups as a means to get recommendations from them on courses of action for the Bay Program. These workgroup sessions were followed by a Day 2 conclusions workgroup discussion.

Workgroup 1 Report - Chesapeake Bay / Bay Program Scale

The following issues were posed as a means to focus the discussion:

1. At the Chesapeake Bay scale,
   a. how could analysis be conducted to provide initial and ongoing (as things change over time) assessments of alternative growth and development patterns in the Bay watershed and their estimated potential impacts on nutrient loads and the Bay?
   b. what types of products should come from the analysis to best provide information and guidelines that are useful for program and decision-support to State and local partners for managing development, and how should results be packaged and distributed to maximize utility and value to Bay partners?
2. Characterize the data/information needed to conduct such an analysis.
3. What additional study and research is needed to strengthen our ability to do the necessary work for Bay scale analysis?
4. How would you recommend that the assessment be coordinated in the Bay Program, i.e.
   a. who should be involved in a Bay scale assessment?
   b. what roles should they play?
   c. what steps should be taken by the Bay Program (identify specific groups, individuals, and responsibilities) to complete your recommendations?

   Be sure to identify needed roles/contributions, if any, from federal, state, and local agencies/ communities in your answer.
5. What are the major issues or obstacles to completing the desired assessment(s) and sharing the results effectively? Address needs for staff resources and costs as part of your answer.

Summary Report of Breakout Session:

How Could Alternative Growth Analysis be Conducted?

- Organize data, resources, and participants at the recognized Bay Tributary scale regardless of detail of data.

- Analysis should link growth management (directed growth, efficient growth, etc.) to nutrient impacts as well as ecosystem and community impacts (e.g., local streams). Local impacts and benefits should be highlighted in addition to Bay and Tributary scales.

- Establish an agreed upon base line and planning horizon (e.g., project growth from 1995 to 2020).

- Analysis should have agreed upon indicators and land-use categories.

- Approach analysis at three scales initially:
    1. Bay watershed;
    2. "Hot Spots" identified via Bay-scale analysis and/or locations with willing local participants, data, and resources; and
    3. Locally (i.e., county, township, municipality) by providing a basic tool that locals can use on their own. Something similar to the "What if" program as an example.

- Develop an analysis of two contrasting development patterns as an example/case study in the Bay watershed.

- Analysis should include information on the performance of different types of zoning tools. It should answer "how do we achieve a desired growth pattern?"

Products and Guidelines:

- The product(s) should be Web based, with paper reports as well.

- Present output in ways that will register with the public (e.g., data visual maps and photos of alternative futures). This output should be targeted to a variety of audiences.

- Develop and widely distribute a booklet that outlines six (more or less) different life styles and their impacts on growth and resources (e.g., a family of four in the city will contribute x nutrients to the Bay, the same family would contribute y in the suburbs).

- Develop a Times Square-type billboard that gives a running count of nutrients to the Bay.

- The output should include the local benefits and costs of contrasting development patterns and highlight who pays.

- The analysis should address how economic development could affect communities and the Bay.

- Provide results in user-friendly summary form and in more detailed form for those that want it.

- Show local benefits of Bay goals.

Data and Information Needs:

- Use satellite data—consider 30m resolution versus 60m resolution.

- Develop unified loading coefficients, land-use data, and land-use and zoning classification systems.

- Develop and include VMT data.

- Use Census block data or TAZ where available for population information.

- Develop growth management indicators.

- Use parcel data where available.

- Develop agronomic information for animal operations and crop types.

- Conduct a scoping process for data availability, related resources, and interest in participation by local and regional entities.

Needed Additional Study and Research:

- Additional study on loading coefficients and BMP effects on various development patterns.
- Develop information on the cost of BMPs.
- Develop information on getting from population projects, to household projections, to lot sizes.
- Outline factors people consider in housing choices and how their characteristics affect this choice (i.e. age, income). Answer "what will make people choose density?"
- Need accurate classification of crop types.
- Outline how development affects water supplies.
- Establish guidelines/benchmarks for efficient growth patterns (x du/acre in development district, % of growth in development district, y du/acre outside of development district).
- Provide information on successful alternative septic systems. Couple this information with guidance on the growth management impacts of accommodating significant amounts of growth on septic tanks versus sewer.

Who Does What?

- CBP does the regional analysis and prompts counties to conduct/coordinate more detailed work. This should lead to providing information to state funding agencies for targeting their resources.
- Develop an EC directive for 1999 that outlines the need for this work and commits them to provide resources to do it.
- Involve the modeling group at CBP—they would provide a synthesis role and link this work to water quality.
- Use the counties initially as the local government contacts.
- Develop various ways to involve the public.

Obstacles:

- Data and related resources.
- Lack of centralized data sources at the state levels.
- Potential lack of political support for the analysis and its output.
- Resources: people, time, and money.

- Lack of an effective communication channel between CBP and local governments.

- Countering the anti-urban mentality of many people in our society.

- The local planning process is not very public and is too complicated. People need to see and understand their local plans and related ordinances.

Workgroup 2 Report - State Government / Bay Tributary Scale

The following issues were posed as a means to focus the discussion.

1. At the State / Chesapeake Bay tributary scale,
   a. how could analysis be conducted to provide initial and ongoing (as things change over time) assessments of alternative growth and development patterns in each state and tributary, and their estimated potential impacts on nutrient loads and the Bay?
   b. what types of products should come from the analysis to best provide information and guidelines that are useful for program and decision-support to State agencies and local partners for managing development, and how should results be packaged and distributed to maximize utility for these purposes?
2. Characterize the data/information needed to conduct such an analysis.
3. What additional study and research is needed to strengthen our ability to do the necessary work for state / Bay tributary scale analysis?
4. How would you recommend that the assessments be coordinated with the Bay Program, i.e.,
   a. who should be involved in state / Bay tributary scale assessments?
   b. what roles should they play?
   c. what steps should be taken by the Bay Program (identify specific groups, individuals, and responsibilities) to complete your recommendations?

   Be sure to identify needed roles/contributions, if any, from federal, state, and local agencies/ communities in your answer.
5. What are the major issues or obstacles to completing the desired assessment(s) and sharing the results effectively? Address needs for staff resources and costs as part of your answer.

Summary Report of Breakout Session:

How Could Analysis be Conducted?

- Assessments should be coordinated by collaboration among government levels on a voluntary basis:
  1. In Pennsylvania - coalitions of counties and municipalities.
  2. In Virginia - coalitions of counties, cities and towns at the Planning District Commission level.
  3. In Maryland - State, counties, and municipalities.

- Assessments of impacts:
  1. nutrient loads (tributary scale).
  2. fiscal (local government scale).
  3. on local watersheds.
  4. transportation impacts on land use and watersheds - should be compared to “smart growth” scenarios.

Data and Information Needs:

- Pennsylvania and Virginia need a statewide central depository of data on land use/land cover, planning, soils, streams, wetlands, etc.

    1. There needs to be a uniform coordinate projection.
    2. Compatible GIS across jurisdictions.
    3. Compatible scale of source data.

Additional Study and Research Needs:

- Development of assessment capability for:

    1. Fiscal impact of alternative development scenarios.
    2. Transportation impacts on land use.

Who Does What?

- Bay Program would develop and provide assessment tools and the State and local governments would apply the tools.

    1. All of the tools and assessments should be publicly available.
    2. In Virginia, CBLAD (Chesapeake Bay Local Assistance Department) demonstrates the tools to the counties and then the (regional) Planning District Commissions would apply the tools for the counties.
    3. Tributary watershed and transportation impact assessments, due to their regional scale, would need to be done by an MPO (Metropolitan Planning Organization), other regional collaboration, or by the State.

The following are miscellaneous issues:

- Certain problems such as transportation and watersheds need a higher level (broader geographic area than local governments) for an analysis or assessment tool to be useful.

- Maryland's experience was that it was difficult to combine data because different GI systems were in use. Maryland is encouraging records of the courts to establish a standard.

- In Pennsylvania, many municipalities have no planning and case law has established that if they do initiate planning, they have to provide/plan for all land uses.

- Regardless of how data is collected, it should be provided at countywide basis. In Maryland, analysis is being conducted at the tributary scale and information is not broken out for each county.

- The States need to look at what land use means for taxes and the economy. South Carolina and Georgia started their land use and analysis for economic development reasons.

- The discussion question "how could analysis be conducted " creates the assumption that the states and/or counties have a commitment to do an analysis. This is not a task of the Bay program and not a commitment. If it becomes a commitment at the State or county level, there are budgeting implications at the State/local level.

- Models should assess the interactions/connections between transportation and land use. Transportation is an infrastructure connected to land use. Current modeling does not capture the connection. We need a model that helps to make the connection. Because transportation is so well planned, an analysis of historical impacts could be done as well as projecting future impacts.

- The model needs to be heirarchial. Transportation data on county and local land use data can also be used on a State and regional basis.

- If the data is collected locally, it may not capture regional, or state interactions for transportation.

- There needs to be a mechanism to bring local level data to higher level problems. When discussing how data can be analyzed and used, a larger scale needs to be used for some issues.

- There is interest in having a growth trends analysis for existing transportation plans in comparison with smart growth scenarios and environmental consequences to show benefits.

The following are specific notes for Pennsylvania:

- Pennsylvania presently has very small database for analysis on growth issues.

- In Pennsylvania, tools would be most useful at the local government level - county or township.

- There is no data center in Pennsylvania that collects land use information.

- In Pennsylvania, land use authority is given to the local level - townships and municipalities.

- If they choose to do so, Pennsylvania counties could perform analysis and provide information to local governments.

- Not all Pennsylvania counties have comparable resources (computers, staff, and information) and abilities to implement an analysis if provided with a tool and data.

- The tool that is developed must be one that the local governments choose to use or choose not to use.

- No one office in Pennsylvania collects the data that would be necessary for this type of analysis.

- Suggest that all federal $ for Pennsylvania go to the level where the tool is being implemented so that there is not an added layer of bureaucracy distributing the money.

- It was suggested that the State could create a platform so that the local governments could contribute.

- At the county level, some such as Lancaster County, have GIS up and running.
- The current (State) administration is forging partnerships and this is a State role in PA.

- Financial incentives need to be created so that local governments do this at the county or regional level.

- The way to achieve tributary scale assessments is through local jurisdictions: counties and groups of counties. The program must have links with local government to be initiated locally. It is often difficult to get the Bay Program to proceed in this manner.

- Pennsylvania recognizes sprawl as a problem. The state also has a strong farmland preservation direction.

- Penn State University has good demographic data for the State and good nutrient management information related to agriculture and extension programs. They also have land cover from satellite data.

The following are specific notes for Maryland:

- In Maryland, analysis should be done by the State in collaboration with the counties. The State has been supportive and has provided GIS for the Counties.

- Tributary Strategies are good and watershed-based for analysis, but implementation is on a county basis. So it would be helpful to get the data on a county by county basis once the analysis is done at the tributary scale.

- Maryland has an advantage over other states because local governments have more land-use authority.

- Maryland has a great GIS program.

- In Maryland, a lot of counties have better data than the State. The counties should be able to bring this higher quality data to the State and say "can you run the analysis/model for us integrating county data." So counties should have the opportunity to make this request.

The following are specific notes for Virginia:

- Virginia GIS network is poor - just formed a group to work on this. Better data is available at the Universities.

- There is a strong need in Virginia for statewide data and a central depository that collects and maintains this data.

- There is a specific need for statewide land-use data.

- In Virginia a need exists to be able to sell the need for this analysis to the local governments.

- Virginia has a legislative requirement for local governments to update their comprehensive plans on a routine cycle (5 years). They could use this analysis and integrate it into their plans with these updates but you need to give them money (about $30,000 per county) as an incentive.

- Virginia has fragmented data. Some areas have great data but it is not constant across the state.
- Virginia needs a central depository for land use and planning data in order to accomplish this task.
- In Maryland, before the OP/DNR packages of data, it was difficult to combine systems. Now they are all on the same platform.
- VA-GIS Board is dealing with the issue of all data being on the same platform. There will never be a State standard because needs are different. Clerks of Courts have started for plat recordation.
- VA Department of Transportation has digitized the State.
- Compatibility is becoming less of an issue. Projection standards are important for compatibility of the data.

The Following are Data Needed for all States:

- In order to project land use and water impacts, it is important to have information that tells which rules apply.
- Need a database on soil types, hydrology, stream locations (better than USGS), and wetlands.
- In Virginia, available data is poor and better data is needed than exists for analysis.
- One Pennsylvania County flew and digitized the area. This was done in Maryland for wetlands.
- This level of detail (MD photo quarter-quads) is useful for identifying sensitive areas but is probably too detailed for regional land use. This provides too much information for the computer to handle.
- For data to be useful for the local governments, it needs to have a high level of accuracy and include information that they don't already have.
- The detail needed for some data is more difficult than for other data. Streams and wetlands need more detail than forests.
- Need to be careful not to set data standards so high that the analysis never gets done because it costs too much or takes too long.
- The scale depends on what questions are being asked. For example, forests at the state scale are not useful for FID habitat analysis.
- In Maryland, before the OP/DNR packages of data, it was difficult to combine systems. Now they are all on the same platform.
- The VA-GIS Board is dealing with the issue of all data being on the same platform. There will never be a state standard because needs are different. Clerks of Court have started data use in plat recordation.
- • The VA Department of Transportation has digitized the state.

- Compatibility is becoming less of an issue. Projection standards are important for compatibility of the data.

The Following are Assessments Needed for all States:

- Need a central group to do this or technology be transferred to the counties. This makes sense in one place so one group is trained and has the resources (computer equipment).

- Virginia wouldn't want the Bay program to bypass state and go to the local level with assessment tools. Because the State wants to ensure that growth assessment models reflect state laws before they are applied.

- Bay Program should pay for all of this (data and assessment models) - has to provide the resources.

- Bay Program should create the tools and make them available for the States to use in cooperation with local governments.

- Pennsylvania would prefer to have the tools available for counties. Local governments would feel comfortable with counties using the tool. Don't insert the State into the program because it adds more bureaucracy.

- Virginia would want the tools provided to the state to insure accuracy. If giving just data to locals, that would be ok. If giving scenarios, need to assure that they are in line with state code.

- If Bay Program hands out an assessment tool then that should enable counties to use them.

- Data needs to be centralized in the States.

- Don't limit to the counties in Pennsylvania. Municipalities could use the assessment tools if the counties choose not to use it.· In Virginia, the assessment tool should be available for use by counties and municipalities.

- 40% of Pennsylvania has no planning or zoning. There are 2600 municipalities in PA and due to court decisions, when zoning is adopted, each jurisdiction has to provide opportunities for all types of land use.

- Data needs to be open and available. Grass roots groups need access to data.

- In Maryland, this is problematic because data collection is funded by sale of data.

- Transportation data is hard to get. Zoning data is hard to get. Regional entities have transportation data.

- Need staff resources, equipment and data to apply assessment tool. Up to $30,000 or more per local government.

- If implementation is desired, need to change the comprehensive plan to reflect information learned through the assessment at no local cost.

- Once the assessment tool is available, need to show it will benefit the local governments to get them to use the tool.

- In Pennsylvania, if the assessment tool is available and the assessment is done for the local governments, they will use the information.

- Often fiscal impacts are important. Model should incorporate fiscal impacts.

- Pennsylvania's form of government is local and land use control is kept local. Local elected officials are not politicians.
    1. First option - demonstrate to the locals - you can get the tool and apply.
    2. Second option - demonstrate to locals - we can apply the tool for you.

- To run the assessment tool, need software, hardware, and number of people to operate the computer.

- In Virginia, some Planning Districts already have some equipment and staff to do the assessment. This is the best scale to distribute the tool and resources for using it. One person at the state and then grants to the planning district commissions.

- Pennsylvania can't project staff resources. Resources could be located at the county level.

Workgroup 3 Report - Local Government / Community Watershed Scale

The following issues were posed as a way to focus the discussion.

1. At the local/community watershed scale,
   a. how could analysis be conducted to provide initial and ongoing (as things change over time) assessments of alternative growth and development patterns in each state and tributary, and their estimated potential impacts on those watersheds, nutrient loads, and the Bay?
   b. what types of products should come from the analysis to best provide information and guidelines that are useful for local programs and decision-support for choosing effective management alternatives for growth and new development?
2. Characterize the data/information needed to conduct such analyses.
3. What additional study and research is needed to strengthen our ability to do the necessary work for local/community watershed analysis?
4. How would you recommend that the assessments be coordinated with the Bay Program, i.e.,
   a. who should be involved in local/community watershed assessments?
   b. what roles should they play?
   c. what steps should be taken by the Bay Program (identify specific groups, individuals, and responsibilities) to implement your recommendations?

   Be sure to identify needed roles/contributions, if any, from federal, state, and local agencies/ communities in your answer.
5. What are the major issues or obstacles to completing the desired assessment(s) and sharing the results effectively? Address needs for staff resources and costs as part of your answer.

Summary Report of Breakout Session:

How Could Growth Analysis be Conducted?

- Local communities (citizens and officials) must be part of the process from the beginning.

  1. Local issues and concerns must be addressed in addition to Statewide and Bay-wide issues and concerns. At the community watershed scale residents and local officials tend to be more concerned with local issues and will be more willing to participate if the growth analysis is tied to these local issues.

  2. A component of the growth analysis should include the identification of growth related issues at the local level.

  3. By including community residents in the process you develop local support for recommendations and solutions. Local community support will also provide local elected officials the support they need to change policies and plans.

- The "outreach" to these communities may vary from state to state but there must be a process to get local communities "engaged" in growth management issues.

  1. Maryland has a strong growth management agenda and an established lead agency.

  2. Virginia would do direct outreach to the communities.

3. In Pennsylvania, the local issue may not be growth and it will be necessary to link local issues to growth. One approach would be to do a needs survey and tie growth issues to the local needs. This approach would give a foot in the door to begin to work with the local communities and officials.

- The Tools must be designed to fit the local needs/concerns and ability. We have megamodels but what we need are tools that can be used at the local and regional level by local citizens and officials.

  1. In many local communities there is the NIMBY complex and there is a need to work with locals to build models that are regional and show the cumulative impacts. This will educate the community on how land-use changes beyond their community could impact them. Planning on vary small, local scale alone can result in fragmented solutions.

  2. We need a tool that can be taken to the communities. It needs to be able to present cumulative impact of growth on resources. If local communities could see the cumulative impacts they would be more willing to participate at both the local and regional scale. They need to understand that inter-relationship between the actions that occur locally and those that occur regionally relative to their community.

  3. It was pointed out that the tools are not just for the production of numbers but for providing insights - so Keep It Simple.

- We need a range of tools designed to address different growth issues/questions relative to local needs, various levels of complexity and available data. In general it was felt that the tool should be simple, flexible, and assess a range of alternatives and impacts

  1. The tools need to be flexible, simple, and provide visual output: flexible enough to use both simple and complex databases; complex enough to address local questions as related to growth; simple enough to be used by local governments.

  2. The tool needs to be able to "plug" in additional parameters (zoning, parcel data) as available but must not be dependent on these parameters to run.

  3. The toolbox should include an economic or fiscal component. This is important in trying to understand the tradeoffs that occur between different alternatives. There are some simple methods to measure economic impacts.

  4. The availability of data and the technical ability of the community must be considered in selection of the tools. Does the community have access to a GIS or computer system?

Products:

- The results from the selected tools (growth analysis) must be visual to improve the ease of transferring information to the public and elected officials. This does not mean that everything has to be GIS based. There are visual products that could be produced manually. It is necessary to identify and select a variety of tools that can be used by local communities with different levels of computer and GIS availability.

1. A component of the growth analysis should be included in the identification of growth and related issues.

2. The tools should provide recommendations or visions of alternative scenarios.

3. The tool should not address just build-out.

4. The tools should assess the fiscal impacts of any recommendation to assist in evaluating alternatives.

- Distribute UMBC Baltimore Development Tapes to stress the impact of growth. The tapes dramatically demonstrate the rate of conversion of land over almost two and half centuries.

Data and Information Needs:

- Need to identify what type of data is available.

    1. Land use data needs to be at a level appropriate for land-use planning at the local level

    2. There is a need to help local officials understand how they can use the data that is available to them.

- The level of technology (GIS and computers) available varies from jurisdiction to jurisdiction.

- Funding is an issue.

Additional Studies or Research:

- Pennsylvania felt it was very important to develop a needs survey that would identify local concerns and issues. The issues and concerns would then be linked to growth management.

- We need to be realistic about how much of this can be done at the Bay Program level. What is the Bay Programs capability?

- It is important that the tools that are selected or developed can be used by the local communities with minimal technical assistant required from the Bay Program.

- Additional research is required on cost-effectiveness of alternatives with this information incorporated into the growth analysis.

Who Does What?

- Land, Growth and Stewardship Subcommittee would take the lead to:

    1. Establish a roundtable to look at local issues.

    2. Establish an Ad-hoc workgroup that would include STAC, Modeling subcommittee, LGAC, etc. to evaluate tools, data needs, and develop a strategy to achieve goals

3. Identify local organization that would provide local support.

- Working with Land, Growth and Stewardship Subcommittee, STAC, LGAC, and CAC should develop tools and pass on to Bay Program, the EC and Implementation Committee.

Day 2 Conclusions Workgroup Report

Using workgroup reports as a point of departure, workshop participants were asked to develop recommendations for steps the Bay Program can take to provide themselves and the Bay partners with the ability to assess and identify development strategies to minimize the impacts of development on local waterways, nutrient loads, and the Bay. The emphasis of recommendations was on informational and modeling tools that should be supported by the Bay Program to meet the needs identified. The group was asked to answer the following questions:

1. Determine how efforts to implement the recommendations of the three workgroups should relate to each other.
2. Identify the desired range of informational products and assessments capabilities needed to provide decision support to the range of Bay Program partners we wish to serve.
3. Determine what kinds of EPA, state and local participation and resources are needed to produce the desired range of products and assessment capabilities.
4. In light of the above considerations, outline a strategy and recommendations to make to the Implementation Committee.

Summary Report of Breakout Session:

How Should These Group Efforts Relate to Each Other?

- Data will be needed (e.g. monitoring data) at a variety of scales including bay level, tributary level and the local level.

- Growth management information should be tied to the Chesapeake Information Management System (CIMS).

- Need to determine how monitoring data can be most helpful for growth analysis.

- Central repositories of data should be developed by each state.

- Any growth analysis must consider transportation needs and transportation activities.

- An assessment is needed to determine the different abilities of communities to use growth data.

- The focus should be action driven with less emphasis on data collection.

- The program must make assessment capability broadly available at all scales of analysis.

- Assessment should be at watershed/tributary level, then pinpoint local assessments as examples.

- Some large tool growth management analysis is needed in order to contrast impacts on Bay of alternative development patterns.

- The Bay Program cannot wait for local governments to tell us their needs – the Bay program must address growth issues – Planning District Commissions could be a focal point.

- The Bay Program must use a personal approach when dealing with local governments.

- A 3-pronged approach is needed for the analysis – bay, tributary, and local.

- In addition to the 3 pronged approach, the program must identify "hotspots" and do more detailed analysis for these areas.

- The program should provide simple tools to local governments so they can do their own analysis.

- The NCRI work used census block data and spurred counties to re-look plans and citizen attention.

- The Bay Program on growth must develop an outreach strategy.

Desired Range of Information Products and Assessment Capabilities Needed:

- The program must incorporate a watershed-based assessment of growth and development alternatives for local areas.

- Paper products often are more important to local areas than web-based products.

- The program could use overlay method to identify hot spots.

- The program should add a fiscal component to analysis to show costs of different development patterns.

- The program should incorporate lifecycle costing (costs over time) of development alternatives.

- An opinion was expressed that Pennsylvania does not have adequate resources to provide growth analysis technical assistance to local governments.

- The program should conduct a survey on ability to do assessments by local governments.

- The program should consider a mentoring program for local communities similar to one used in "Businesses for the Bay."

- The program should integrate WQ and build-out analysis using the WQ model for all watersheds. Photos should accompany the analysis.

What EPA, State and Local Participation and Resources are Needed?

- To accomplish WQ/Build-out analysis for large-scale effects, need background information that may or may not be available.

- For smaller geographic scale assessments, Chesapeake Bay Program should provide tool(s) for both a detailed assessment and a simplified approach.

- States and EPA must be willing to have a major impact on the highway planning process. EPA has stated a willingness to have this major impact.

- The watershed program must piggyback on tools, data, and assessments that a accomplished for transportation projects.

- The program should use tributaries as the organizational nexus for water quality/build-out analysis.

- The Chesapeake Bay Program should use an integrated approach to show impacts of transportation on water quality.

Strategies and Recommendations to Make to Implementation Committee:

- Someone must take responsibility to accomplish the proposed tiered approach – a sophisticated model and a simple model.

- The group agreed to a suggestion that LGSS form an ad hoc workgroup (include LGSS, STAC, and the Modeling Subcommittee) to develop an assessment/modeling process.

- Because the Bay Program's Monitoring Strategy draft is due by December, growth analysis efforts need to get their needs determined and incorporated.

- After 2000, the Modeling Subcommittee will have an opportunity to focus more resources on land issues. We must incorporate this effort into Chesapeake Bay Basin-wide monitoring strategy.

- The growth analysis effort should make an effort to tie into Chesapeake 2000.

- The ad hoc committee should prepare a Directive on growth analysis and management for EC consideration in 1999.

- The ad hoc committee should request a literature synthesis from STAC on growth impact analysis. The literature synthesis should include available work that has not yet been published.

- The ad hoc committee should request a literature synthesis from STAC on studies to determine how people decide where they live.

- The ad hoc committee should prepare an analysis of the Patuxent watershed water quality study.

- The ad hoc committee should determine what would be needed to accomplish a Patuxent watershed water quality study in other areas in MD, PA and VA.

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