Maintaining Progress

in Restoring the Chesapeake Bay

Holding the Line on

Nutrient Pollution

After 2000

Report to the

Implementation Committee of the

Chesapeake Bay Program

from

The Cap Issues and Policy Group

August 1999

Executive Summary
on
The Nutrient Loading Cap: Issues and Options

Note: The concepts discussed in this Executive Summary was presented to and accepted by the Principal Staff Committee of the Chesapeake Bay Program on June 23, 1999. It summarizes the recommendations from the Cap Issue and Policy Group and is providing guidance for program planning regarding the cap.

Background and Current Status

The 1987 Chesapeake Bay Agreement, signed by the Commonwealth of Pennsylvania, the State of Maryland, the Commonwealth of Virginia, the Environmental Protection Agency and the Chesapeake Bay Commission (the Executive Council), established a goal of improving water quality in the Bay to support living resources. A key commitment to achieving that goal was to reduce nutrient pollution by 40% by 2000. In 1992, the Executive Council committed to reducing nutrient levels to a capped nutrient load by 2000 and maintaining that load thereafter. In 1997, we reaffirmed that commitment. A task force of the Implementation Committee was formed to identify policy issues and options under a capped load. The findings and recommendations of the Cap Issues and Policy Group are summarized below.

Options for Program Actions

The Chesapeake Bay Program has made a very strong commitment to reach and maintain the nutrient cap. Further reductions in the capped load may be needed to get mainstem or priority area living resource response. We need to establish strategies by the end of 2000 to maintain a capped load. A cap strategy should be developed by each jurisdiction following guidelines developed by the Bay program to assure consistency. Ultimately, these strategies will be integrated with the Tributary Strategies. It may be advantageous to have multi-jurisdictional cap strategies in certain watersheds (particularly the Potomac). Success in maintaining the capped load should be measured, in the long term, through evaluating changes in water quality in the Bay and its tributaries.

Implications

Maintaining a capped nutrient load represents an immense challenge for environmental management. It requires us to completely offset any increase in nutrient load associated with expansion or development in any sector. Growth in load may be expected from increases in sewage flows and polluted runoff from new development. Growth in load from agriculture will be primarily from expansion and further intensification of animal agriculture.

We will need to expand implementation of BNR or other nutrient reducing technologies.

It may be necessary to further reduce nutrient concentrations in discharges from plants, including those where BNR is already installed, particularly where permitted flows substantially exceed current flow. Only minimal non-point source nutrient reductions have been achieved from developed lands. We will need to better address both existing and new loads from these sources. NPDES Stormwater Permits, with a pollution prevention emphasis, may provide a tool to address these loads. We must also change how we develop to minimize nutrient impacts. New state and federal laws and strategies regarding animal agriculture must be fully implemented. Expansion of animal agriculture should be in the context of regional nutrient balances.

We must continue to reduce loads from existing sources to offset load increases due to growth. Nutrient loads will grow due to expansion even if we use the best available technologies. In addition, load increases in non-signatory states must be offset if we want to maintain a capped load. The Chesapeake Bay Program must decide how to integrate loads and nutrient reduction efforts from non-signatory states and air.

Recommended Action

Each jurisdiction should develop and begin implementing a cap and goal management strategy by January 1, 2001. It should include a strategy for reaching nutrient reduction goals in areas with shortfalls, offsetting projected growth in load and should reflect any new goals that are established. Cost effectiveness and equity should be considered in strategy development.

Plans should be developed for the ten major Chesapeake basin watersheds and should be multi-jurisdictional in shared watersheds. The workgroup recommended and the PSC endorsed the concept that all cap strategies shall consider the following:

- expanded implementation of tributary strategy practices and addition of other practices not in current strategies
- development and implementation of new technologies or enhancements to current practices
- strategies to reduce nutrient impacts from new and existing development
- integration of land preservation and growth initiatives into the cap strategy
- anticipated reductions in atmospheric nitrogen loads from actions in and out of the basin
- plans by non-signatory states for load reductions within each basin
- plans to maintain or replace practices, structures or facilities installed to reach our current goal
- programs that track discrete sources of substantial load increases and assure complete offset of these increases
- the role for trading and offsets programs in maintaining the cap
- plans to use monitoring and modeling data to evaluate the effectiveness of the strategies at maintaining a cap on nutrient loads delivered to the bay

It is critical that cap management strategies have programs that track discrete sources of substantial load increases and assure complete offset of these increases.

Cap and goal strategies should be developed in coordination with local governments and should include major involvement by citizens, local watershed groups and other stakeholders. Specific approaches and strategies will be determined by each jurisdiction or multi-jurisdictional watershed coalition. Cap and goal management strategies will be submitted to the Executive Council. These strategies will maintain loads at levels agreed upon in Executive Council Directive 93-1, Joint Tributary Strategy Statement, for the Potomac and above and at the levels currently being established for the lower Virginia rivers. Jurisdictions will develop interim strategies for maintaining a capped load by January 1, 2001. Final cap strategies will be an integral part of revisions to tributary strategies. The nutrient loading cap and/or the strategies will need to be revised in the future if monitoring does not show adequate improvements in water quality in the Bay and its tributaries.

Maintaining Progress in Restoring the Chesapeake Bay: Holding the Line on Nutrient Pollution After 2000

The Cap Issues and Policy Group of the Chesapeake Bay Program developed the following report to be used by its partners for general guidance in writing their own cap strategies. In the writing of the report, the workgroup has provided potential issues and options to be used by the Chesapeake Bay Program and jurisdictions as a guidance document.

In 1987, the Chesapeake Bay Program adopted a goal of reducing pollutant nutrient loads to the Bay by 40% from 1985 levels by 2000. This goal was principally focused on improvements in dissolved oxygen levels and living resources in the deeper parts of the Bay. The Chesapeake Bay Agreement 1992 Amendments stated that once the nutrient reduction goals were achieved, loads could not increase. This represented the first official recognition of the nutrient goals as "capped loads" that must, at a minimum, be maintained once they are met. Such a requirement seems obvious if Bay restoration is to last, but a capped load goal establishes a point in time, 2000, after which all increases in nutrient load must be completely offset. During tributary strategy development, the jurisdictions accounted for growth in load between 1985 and 2000, but did not develop plans for maintaining capped loads.

Directive 93-1, Joint Tributary Strategy Statement, reaffirmed these goals and established loading caps equal to 186 million pounds per year of nitrogen and 9.9 million pounds per year of phosphorus for the Potomac and above portions of the watershed. The current allocations for the five Chesapeake Bay basin tributaries, Potomac and above, are shown in Appendix A. Load goals were also established for the jurisdictions and major watersheds. These amendments initiated the development of tributary specific strategies by each of the jurisdictions. Additional monitoring and modeling efforts were undertaken for the lower Bay watershed in Virginia. Nutrient loading goals and reduction strategies are currently being developed for the Rappahannock, York, and James river basins and the Virginia Eastern Shore.

. The 1997 reevaluation of the tributary strategies reaffirmed the capped loads established in Directive 93-1. In addition, the reevaluation found the tributary strategies to be adequate to meet nutrient reductions when the full effects of all practices/technologies reached Bay waters, based upon current Best Management Practice (BMP) nutrient reduction efficiencies and watershed model results.

In 1997, the Bay Program was directed to evaluate the need to achieve greater nutrient reductions to restore the most critical living resource areas and to revise our nutrient reduction goals for the mainstem Bay. These activities are underway and may require even greater reductions in pollutant nutrient levels, particularly in critical living resource areas, than our current goals. In addition, it appears that sediment loads must be reduced concurrently with nutrient loads, if we are to see recovery of underwater grasses and other important shallow water living

resources.

Throughout the last twelve years, the nutrient goals for the Bay have remained constant. The only clear consensus, to date, about the 2000 goal reevaluation is that the current nutrient loading caps represent our minimum commitment and recommended revisions will likely be more challenging. There is still debate about when we will implement all the practices needed to reach our 1993 capped loads and when we will actually see the nutrient reductions in Bay monitoring data.

Despite debate over progress and upcoming revisions to our goals, one fact remains clear: maintaining our goals in the face of growth in load over time will be the greatest challenge for the Bay Program, states, local governments, and citizens. It dictates that no net increase in nutrient pollution is acceptable to the Bay. At a minimum, it means that when we allow one pound of growth in nutrient load due to sewage treatment plant expansion, new industries, new subdivisions or agricultural expansion, we must offset that increase somewhere else. We must plan for the long term since the course of action we choose today will control available options for the future.

This will force us to rethink how we grow or expand and will ultimately only be accomplished through corporate political will and individual behavior change. It forces us to question growth as a measure of prosperity and sustainability and it raises the long term issue of limits to growth in all sectors. Yet, if we do not accept this challenge, all of the gains that have been made in restoring the Bay will disappear in the face of growth.

The Bay Program Response

During the 1997 reevaluation, it became apparent that addressing a capped nutrient load by 2000 would create numerous policy issues. In 1998, a task force was formed to begin defining the major issues and identifying technical and policy options to address those issues. The task force included representatives of federal, state and local governments, regional councils/commissions, sewage treatment plant interest, university faculty and citizens. The group held several discussion sessions and then assigned task groups to develop frameworks for specific issues and options. The task force also discussed general approaches that could be used to maintain capped nutrient loads.

The discussion below summarizes the issues and options and offers a general approach for the Bay Program and jurisdictions to consider. This report necessarily discusses a wide array of choices and consequences. Many of these are controversial and counter to current approaches, but must be discussed and considered if we are to maintain capped nutrient loads to Chesapeake Bay. The lessons, controversies, and difficulties learned here should be of value to water quality interests throughout the United States, since most restoration efforts assume a capped load once goals are achieved and a “total maximum daily load” for nutrients would mandate it.

Growth in Nutrient Loads

Nutrient loads to Chesapeake Bay are thought to be about six times higher than before European settlement. Much of that increase has occurred since World War II. Since the 1970's, we have begun requiring reductions in nutrient loads from sewage treatment plants and other point sources. Concurrently, we began working with non-point sources of pollution from agricultural and urban areas to implement practices that reduce nutrient pollution. The Chesapeake Bay Program has been successful in increasing application of technologies and practices to reduce nutrient pollution in the last 15 years. The fact that we are arguably close to achieving the year 2000 nutrient loading caps is remarkable. This has been accomplished in the face of expanding sewage treatment plants, urban sprawl, agricultural intensification and increasingly resource consumptive lifestyles.

Current accomplishments have required accelerated technology development, expanded voluntary implementation and new regulatory programs, and have cost hundreds of millions of dollars. They were done in an efficient manner that makes it likely that most easy reductions have been realized.

Nearly all practices or technologies provide incremental reductions in nutrient pollution, they do not eliminate it. A capped nutrient load requires no net increase in nutrient load. If growth is to continue, we must minimize new nutrient loads caused by growth and implement new technologies to minimize nutrient pollution from existing or planned activities. We must also operate and maintain existing nutrient reduction practices properly to assure their continued efficiency. In the long run, we must redefine how we grow so it is less nutrient polluting, or less polluting and consumptive in general.

Current Growth and Existing Programs

Nutrient loads to Chesapeake Bay will increase due to growth in agriculture, point source discharges and development beyond 2000. This will erode current progress unless strategies are implemented to offset these increases. Existing tributary strategies were designed to reduce nutrient pollution by 40% by 2000 from 1985 levels including projected increases in load due to growth in load in all areas. Thus, our current reduction efforts have kept pace with growth, but only to the year 2000. Further, our planning efforts have, of necessity, already committed (planned) for future growth. The task force evaluated growth potential for the major nutrient source areas: point sources, urban development and agriculture.

Expected Sources of Growth in Nutrient Load

Animal Agriculture

Expansion and further concentration of poultry and livestock production are expected to be the principal cause of growth in loads from the agricultural sector. Data from 1982 through 1997 Agricultural Census were used to assess growth and trends. Substantial growth in the poultry industry is expected to continue in the three signatory states as well as in the Bay watershed portions of Delaware and West Virginia. The most rapid growth in broilers and turkeys are occurring in the Potomac basin in West Virginia while considerable growth in layers is occurring in Pennsylvania.

Principal growth in the swine industry is occurring in Pennsylvania, and to a lesser extent, in New York. There is currently rapid consolidation and movement to contract production within this industry. There is some suggestion that large scale contract swine production may be increasing in Maryland and the Chesapeake Bay watershed portion of Virginia (current swine production in Virginia is dominantly out of the Bay watershed).

Voluntary and mandatory nutrient management may result in reductions in nutrient loads from both existing and new animal operations but a net increase in load is likely unless major reductions occur. Since future expansion will be dominated by large, contract operations, nutrient loads from individual new or expanded facilities are likely to be substantial.

Developed Lands

Nutrient loads from development and management of urban and suburban landscapes have proven very difficult to control. Even at full implementation of tributary strategies, these loads will have remained almost constant or increased slightly since 1985. This is not the largest load source but has proven most difficult to reduce and is likely to continue expanding. It must be recognized that substantial increases in point source (or septic systems) and atmospheric loads are usually associated with growth in urban and suburban non-point source loads. Recommendation should be considered in terms of impact on total loads.

If we are to maintain a capped nutrient load, we ultimately must control increases in loads due to urban and suburban expansion. This has been the topic of extensive discussion and debate within the Bay Program, the jurisdictions and nationally. Bay region states are leaders in looking for ways to manage growth but our programs are new and unproven where they exist.

Reducing nutrient pollution in the face of population growth and development will require changes in individual behavior. Choices by homeowners, car owners and all consumers impact nutrient pollution. Ultimately, we will need to measure quality of life by something other than the level of resource consumption.

Changing how we grow, challenges governmental and individual views on land use and property rights. It also requires a broader understanding of the real long term costs of uncontrolled growth. States can provide guidance but ultimately local governments and citizens will hold the key to successfully managing growth.

The largest nutrient issues in the urban non-point source area are the consumption of resource lands and the ability to reduce nutrient (and sediment) loads in runoff from developed lands. We must better understand how growth patterns affect nutrient loads, directly or indirectly. By analyzing grow-out options, we can assess nutrient loads, resource land conservation, impervious surfaces and other growth issues.

Programs that encourage use of existing sewage or stormwater treatment systems and discourage sprawl will be critical to maintaining capped loads. Enhancing the water quality focus of new and existing stormwater management is critical to reducing nutrient losses from existing development. Reducing our dependence on septic systems for new and existing housing and encouraging use of nitrogen removing systems will slow growth in these loads.

Our ability to maintain a capped load will be determined by the success in controlling direct and indirect load increases from development. "How we grow" also impacts many Bay and watershed living resources. Yet, it challenges our current definition of progress and prosperity. We have focused on point sources and agriculture in our tributary strategies but we must reduce nutrient impacts from population growth and development if we are to maintain a capped load.

Point Sources

Most increases in loads from point sources will result from flow increases associated with new sewerage connections and/or population growth. Load increases due to connection of existing homes currently served by septic systems can actually provide better opportunities for treatment of that waste. This assumes that there is not concurrent growth elsewhere on septic systems that offsets the new connections.

Growth in total sewage load will result from economic growth and population changes. This will generate new loads at sewage treatment plants. Growth in the industrial sector may also generate some increase in nutrient load.

Recommendations

It is recommended that the Bay Program develop strategies to maintain the nutrient loading caps, as a minimum. Tributary specific nutrient loading goals, as allocated in 1993, should be maintained except where priority living resource areas are established with lower (more restrictive) loading goals.

Each jurisdiction should develop a cap maintenance strategy by January 1, 2001. Cap strategies should be integrated into tributary strategies. The overall strategy should include a plan for reaching nutrient reduction goals in areas with shortfalls and for offsetting all projected increase in loads.

Cap maintenance strategies should be developed for the ten major Chesapeake basin watersheds. They may be multi-jurisdictional but must be coordinated between jurisdictions. Each jurisdiction should consider the following elements in development of its plan.

- **Expanded implementation of tributary strategy practices and addition of current practices not included in tributary strategies**

There were very few practices in the tributary strategies that were implemented everywhere. Thus, some additional reductions can be obtained by going beyond tributary strategies. This may be particularly true for many agricultural practices such as animal waste management, nutrient management, etc. Certain developed land practices such as urban nutrient management and alternative septic systems for new construction may provide additional reductions.

The jurisdictions used different approaches, and practices, to reach tributary strategy goals. Jurisdictions may use practices not emphasized in their individual strategies to offset growth in load. Other existing practices not used in the tributary strategies may also be included in cap strategies.

- **Development and implementation of new technologies or enhancements to current practices**

Obviously, knowledge regarding nutrient reduction technologies is increasing rapidly. This will provide new practices or enhancements that will result in greater reductions. Precision agriculture, rain gardens, stormwater sand filters and point source process control technology are just a few examples of new technologies.

There are also enhancements to many of our current practices. Nutrient management in our tributary strategies was based on nitrogen but we are moving rapidly to phosphorus based

nutrient management. This should result in greater reduction in both nitrogen and phosphorus from cropland. Most sewage treatment plants with Biological Nutrient Reduction (BNR) are getting about a 55% nitrogen reduction. However, in some cases, low cost enhancements can be made that result in a 70% nitrogen reduction . Even greater reductions can be achieved with additional enhancements but at a much higher cost. These and other enhancements to existing technologies can provide substantial additional reductions.

- **Strategies to reduce nutrient impacts from new and existing development**

This can be accomplished in at least three ways: changes in how we develop, pollution prevention, and better treatment of stormwater runoff. Low impact development, clustering and minimizing disturbance are all techniques to minimize nutrient and sediment pollution from new development. These should be incorporated consistent with jurisdictional and Bay Program growth initiatives discussed below.

Significant nutrient reductions have not been achieved from new or existing developed land. While some treatment options exist and should be used, they can be very expensive. It is suggested that efforts be focused on pollution prevention to reduce nutrient pollution from new or existing development. The stormwater NPDES permitting system could be strengthened to enhance nutrient reductions. For new development, treatment and minimizing new load creation should be emphasized during development with pollution prevention efforts directed at remaining loads.

- **Integration of land preservation and growth initiatives into the cap strategy**

Individual jurisdictions and the Bay Program have or are developing initiatives to preserve open space and/or to manage the impacts of growth. There are many important reasons for these initiatives, of which reducing nutrient pollution is only one. How these initiatives are developed and focused can greatly influence their effectiveness at reducing nutrient pollution. While accomplishing multiple objectives, we must work to assure maximum feasible nutrient reductions are achieved through these objectives.

Most increases in nutrient load will come from some aspect of population growth. Managing how we grow will be critical to the long term maintenance of a capped nutrient load.

- **Anticipated reductions in atmospheric nitrogen loads from actions in and out of the basin**

Nearly one quarter of all nitrogen reaching Chesapeake Bay is attributed to atmospheric deposition. In the past, this was not considered “controllable” by Bay jurisdictions since much of it originated outside the watershed. All sources are part of the total nutrient load to the Bay and

all increases in loads must be offset. We recommend that reductions in nitrogen from air pollution be part of cap strategies. Current and anticipated programs and regulations should result in substantial reductions. Successful management of growth and subsequent reductions in travel will also reduce atmospheric deposition. Strategies to reduce ammonia-nitrogen emissions from agricultural sources should also be included. The Bay Program must develop a methodology to account for reductions in air deposition and to incorporate these reductions into cap strategies.

- **Plans by non-signatory states for load reductions within each basin**

To maintain living resource responses, all increases in nutrient loads must be offset, regardless of where they originate. Thus, load increases in West Virginia, New York or Delaware must be offset at the source or in a downstream signatory. The Bay Program has discussed greater involvement of non-signatory states for many years. It is critical that these states be part of cap strategies for certain basins. It may be appropriate to initiate discussion of cap strategies to prevent growth in their loads. Since they have not had to reach our current reduction goals, it may not be as difficult to "cap" their loads in the short term. The Bay Program must incorporate loads from non-signatory states into the "controllable" load to avoid erosion of the progress made by the signatory jurisdictions through full implementation of their tributary strategies. Regardless of the approach taken, we must encourage and track nutrient reductions in non-signatory states under a capped load.

- **Plans to maintain or replace practices, structures or facilities installed to reach our current goals**

We have implemented, installed or constructed many things to reach current nutrient reductions. Each of these has operation and maintenance requirements and a design life. We currently assume, wrongly, that each practice is properly maintained and operates as efficiently today as it did the day it was implemented.

We critically need to develop an organized, and funded, plan to assure maintenance and replacement of practices, or our progress will erode. All cap strategies should contain a plan for maintenance and/or replacement of practices and structures. Practices needing attention range from grassed waterways to animal waste storage systems, to stormwater structures to sewage treatment plants. Many of these practices are nearing their design life and will need major upgrades or replacement. A large part of the non-point source practices have not received proper maintenance and may not be reducing nutrient pollution at projected levels. While maintenance may not be as much of a problem for point sources, assistance with the very large capital replacement costs would be beneficial.

We strongly recommend that practice maintenance and replacement plans be developed as part of jurisdictional cap strategies.

- **Programs that track discrete sources of substantial load increases and assure complete offset of these increases**

There are limits to reductions that can be obtained from existing sources of nutrient loads. We recommend that new or expanded activities by individual sources that generate substantial load increases be required to offset that increase. This can be accomplished through technology based reductions, land use conversions, other on-site reductions, off-site reductions, purchases from potential nutrient banks, potential nutrient trading programs or other innovative approaches. Jurisdictions should determine what constitutes a "substantial load increase" for a discrete nutrient source and develop tracking and offset programs for each source.

- **The role for trading programs in maintaining the cap**

Trading and other market-based offset programs could have an important role in creating a cost-effective cap maintenance program. Under a capped load, the longevity of trades and trading programs is also of concern since more reductions must continually be found to offset growth.

The Nutrient Subcommittee's Trading and Offsets Workgroup has created a diverse task force to evaluate the potential for trading in the Bay Program or jurisdictions. If deemed a viable approach, the task force will recommend options for trading programs in the Bay region. We recommend the Bay Program wait on the findings of this task force before deciding if and how trading can be used in cap strategies.

- **Plans to use monitoring and modeling data to evaluate the effectiveness of the strategies at maintaining a capped load**

The purpose of our nutrient reduction goal and cap is to create water quality conditions that will support living resources. We currently judge our success at reaching goals based on model projections. This is necessary to offset lag times in seeing practice impacts on ground and surface waters and to overcome extreme hydrologic variability. We will continue to rely on models to assess progress and project the response to future scenarios but we should increasingly measure our progress through actual water quality and living resource monitoring data. Ultimately, the effectiveness of our reductions and cap maintenance must be seen in Bay water quality that results in desired living resource responses.

Nominal versus Discrete Load Increases: One approach to a Cap Strategy

Maintaining a capped nutrient load requires anticipating load increases due to growth in load from all sources and having a strategy or plan to offset those increases. A capped load

requires a "zero sum gain" in load. Many options are available for maintaining a capped load with varying probabilities for success. They range from the essentially random, voluntary approach used successfully in initial tributary strategy development to strict limits or prohibitions on growth. The former becomes more difficult once initial reductions are achieved and the latter is not currently economically, politically or socially acceptable.

We recommend an intermediate path that requires greater reductions from discrete entities responsible for substantial controllable load increases while continuing reduction efforts in all other areas.

Managing Nominal Load Increases

Growth in nutrient loads can be classified as "nominal" versus discrete, large, load increases related to major new or expanded facilities. We consider nominal load growth to be that which occurs as a result of routine or minor changes in land use, management or technology. Examples include a new house in an existing subdivision, adding five cows to a small dairy or forest harvesting activities. This is the type of growth that occurs routinely. It tends to be random but very widespread. In fact, this type of growth may account for the largest total increase in load, as opposed to increases by "discrete entities".

It is suggested that a random approach, like that of the tributary strategies, be used as the principal tool to address nominal load increases under a capped load. Upcoming revisions to tributary strategies should include cap strategies to address nominal increases in load. Additional reductions in nominal load should also be explored through programmatic and technologic changes.

Reductions in nitrogen from air pollution control should be accounted for and incorporated into our capped load strategies, as should the loads and nutrient reductions from non-signatory states.

Many of the existing practices are being constantly improved and new practices are being developed. With or without a capped load, it is incumbent upon the Bay Program to use the most efficient and effective practices, and to incorporate new technologies into our reduction efforts.

Minimizing new loads and reducing existing loads from urban and suburban development are critical to halting growth in nominal load. This requires us to address both how we grow and how to minimize nutrient pollution where we grow.

There are many other approaches to reducing nominal load increases. However, a basic change, or perhaps just a reassertion, of the importance of pollution prevention as a guiding principal of our efforts is critical if we are to maintain a capped load. It must be recognized that all increases in load must be completely offset. This makes it more critical than ever that anything that can be done to prevent load increases is far more desirable than having to find means of

reducing pollutant loads.

Managing Discrete Load Increases

While nominal load increases may have a large cumulative impact, a number of discrete actions will generate significant increases in load attributable solely to a single new activity. This could include new or expanded point source discharges, major new subdivisions, planned communities or commercial developments and new or expanded large scale confined animal operations. We are not prepared to propose the size of load increase that should be considered as discrete. However, we think each jurisdiction should make that decision in light of current regulatory or programmatic requirements and their ability to obtain additional reductions in nominal loads.

It is recommended that discrete entities generating a significant increase in load be asked or required to offset the full increase resulting from their establishment or expansion. This is a major departure from current approaches that require reduction in concentration but have allowed load increases. It is consistent with past point source requirements for Biological Oxygen Demand (BOD) and suspended solids loads. It is also the likely result of implementing programs such as TMDLs.

Experience in other regions has suggested a general approach likely to be followed when loads from discrete entities need to be maintained at existing levels. In most cases, technology based reductions are used first. Most entities prefer to exhaust all cost-efficient technology based reductions before looking to other methods.

Nutrient trading is a subject of much current interest that involves paying or bartering with someone else to reduce their nutrient loads to "trade" for reductions needed by the discrete entity. Trading can occur between point sources, point to non-point and potentially between non-point sources.

There is also potential for discrete entities to purchase land or easements and convert land use to offset nutrient increases. Obviously, the new land use must be less polluting than the old and there must be mechanisms in place to assure the longevity of the land use change. Interest has also been expressed in the private development of "nutrient banks". In this case, a business would install nutrient reducing practices or measures beyond those required. As a discrete entity needed nutrient credits to offset growth, it could purchase credits from the bank. An alternative version of this would require a discrete entity to pay into a cost-share pool at a negotiated rate to allow load increases by the entity.

Requiring discrete entities to offset load increases due to new or expanded facilities goes further than traditional approaches to pollution reduction but is necessary if we are to maintain a capped load. The need to offset all load increases places even more emphasis on changing how we grow and pollution prevention.

Cap Strategy Development

Cap and goal strategies should be developed in coordination with local governments and should include major involvement by citizens and local watershed groups. Specific approaches and strategies will be determined by each jurisdiction or multi jurisdictional watershed coalition. Cap and goal management strategies will be submitted to the Executive Council. These strategies will maintain loads at levels agreed upon in Directive 93-1, Joint Tributary Strategy Statement, for the Potomac and above and at the levels currently being established for the lower Virginia rivers. Jurisdictions will develop interim strategies by January 1, 2001. Final cap strategies will be an integral part of revisions to tributary strategies. The nutrient loading cap and/or the strategies may need to revised in the future if monitoring does not show adequate improvements in water quality in the Bay and its tributaries.

Appendix A

A table showing jurisdiction specific tributary nutrient load allocations originally established during the 1992 Reevaluation is being developed and will be available by August 20, 1999.