

## ENABLING EFFECTIVE ADAPTIVE MANAGEMENT IN THE CHESAPEAKE BAY PROGRAM (11/28/11)

### Introduction

The Chesapeake Bay Program's Executive Council (EC) and the Federal Leadership Committee for the Chesapeake Bay (FLC) have called for coordinating and, where appropriate, integrating the goals, outcomes, and actions of the Chesapeake Bay Program (CBP) with the goals, outcomes and actions described in the Executive Order (EO) Strategy. On July 11, 2011 the EC agreed to use a four stage process as the path forward. That process is described in "[Coordinating Chesapeake Bay Program and Federal Leadership Committee Goals, Outcomes and Action](#)".

Stage 1 of this process began on that day and relies on CBP Goal Implementation Teams (GITs) to "set direction" for the program. During stage 1, priorities and areas of programmatic and geographic focus for each major goal area (*i.e.*, fisheries, habitats, water quality, healthy watersheds, and stewardship) are refined by the relevant GITs as guided by key strategies or agreements such as *Chesapeake 2000*, EC directives, and the EO Strategy. Also on July 11, 2011, the EC agreed with a proposal to assist GITs during stage 1 of the above-mentioned four stage process. The proposal, [Enabling Effective Adaptive Management in the Chesapeake Bay Program](#), is included in **section 1 of this document**.

On September 22, 2011 the [Scientific and Technical Analysis and Reporting \(STAR\) Team convened a meeting](#) to assist the CBP in planning for assessments, accountability and outreach during 2012. Attendees at this meeting included leadership of GITs, Communication Workgroup (CWG), Management Board (MB) and STAR, members of the Federal Office Directors (FOD), Scientific and Technical Advisory Committee (STAC) members and the EcoCheck Report Card Team. They agreed on [immediate next steps for the CBP](#). During that meeting, GIT leaders also requested guidance and assistance in implementing adaptive management through a Decision Framework (DF), described in the "[Enabling Effective Adaptive Management in the Chesapeake Bay Program](#)". In response to this request, new sections (sections 2 through 4) were added. Please note, sections 2 through 4 are up for review, but section 1 is already final and not for review at this time.

**Section 2 of this document** describes the proposed roles and responsibilities for the GITs, the Decision Framework Implementation Workgroup (DFIW), the ChesapeakeStat Development Team (CSDT), the GIT/STAR/CWG Coordinators and Staffers Group, the STAR, the CWG, CBP Advisory Committees and the MB.

**Section 3 of this document** includes guidance to assist GITs as they implement the DF.

**Section 4 of this document** is currently a placeholder for the MB to establish a schedule and expectations that will ensure continued implementation of the DF and will encourage GITs to utilize the assistance being offered by the DFIW, CSDT, STAR and CWG.

Additional action items from the September 22nd meeting are addressed in a separate document, "How CBP Will Be Accountable and Communicate Assessment Information to the Public in 2012".

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**SECTION 1: JOINT PROPOSAL OF THE CHESAPEAKESTAT ACTION TEAM AND THE LEADERSHIP GIT**  
APPROVED BY THE PRINCIPALS' STAFF COMMITTEE MAY 10, 2011

## **I. Introduction**

The Executive Council created a ChesapeakeStat Action Team in June 2010 and charged it with defining a process for maximizing the use of the ChesapeakeStat website in Bay Program partnership decision-making. The Management Board (MB) further described the goal of improving support for decision-making and the mission and scope for the ChesapeakeStat process to include setting specific, time-bound objectives, identifying responsible parties, regular review and adaptive action, and transparent reporting of progress.

Adaptive management has long been discussed, advocated, and implemented in a limited fashion in the Chesapeake Bay Program (CBP), including being described in the program's internal governance document and featured in the Executive Order 13508 (EO) strategy. A proposal for an adaptive management system was presented to the MB in January 2010 by the Leadership GIT with a proposal to implement March 2010. The MB decided to postpone the implementation of the Adaptive Management system in order to give the GITs more time to fully develop their goals, and to allow the MB more time to review their progress. This document presents recommendations for making incremental progress toward the previously established adaptive management goals.

The Principals' Staff Committee approved this consolidated recommendation of the ChesapeakeStat Action Team and the Leadership GIT as an **incremental step** in moving toward adaptive management – a bottom-up approach to coordination and recommendation to promote movement to an adaptive management framework.

## **II. Current Situation**

The existing organizational and governance structure of the Chesapeake Bay Program partnership, and more specifically the Goal Implementation Teams (GITs), is based on and driven by the goals and desired results articulated in the Chesapeake Action Plan (CAP). The program's organizational structure was agreed to by the PSC, but because the CAP was not formally endorsed or fully supported by the states (and for the Federal Agencies was superseded by the EO); the GITs' individual focus is not defined consistently for all the GITs by either the CAP or the EO, but is often an integration of both.

The CAP, and subsequent re-organization, was initiated largely in response to recommendations from the U.S. Government Accountability Office (GAO) in a 2005 report. That report specifically recommended:

- developing an overall, coordinated implementation strategy that unifies the program's planning documents, and
- establishing a means to better target the program's limited resources to ensure that the most effective and realistic work plans are developed and implemented.

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In reviewing the CAP, the GAO said that “while these actions appear to be positive steps in the right direction, we believe that additional actions, such as identifying resources and assigning accountability to partners for implementing the strategy, are needed for the Bay Program to **move forward in a more strategic and well-coordinated manner.**”

Executive Order 13508 was signed by the President in May 2009 and directed federal agencies to develop a strategy for protection and restoration for the bay (completed in May 2010). The need to more effectively coordinate Program activities and work efforts and leverage limited resources remains critical.

The time has come to make progress towards true adaptive management implemented as a systematic process as the next logical step for the CBP.

### **III. The Decision Framework**

Restoring a large complex ecosystem to desired conditions is a process fraught with uncertainty. Success hinges on the ability of all partners in the process to commit to learning while doing – in other words – taking action without guarantees, supporting effective monitoring, transparently assessing progress, and redirecting efforts when warranted.

As a guide, we have described the following adaptive management decision framework for the Chesapeake Bay Program:

1. Articulate program goals.  
Identify the goals the GIT is working toward.
2. Describe factors influencing goal attainment.  
Identify and prioritize all factors that influence performance toward a goal. This step can help identify areas for cross-GIT collaboration.
3. Assess current management efforts (and gaps).  
Identification of gaps/overlaps in existing management programs addressing the important factors affecting goal attainment.
4. Develop management strategy.  
Coordination and implementation planning by stakeholders.
5. Develop monitoring program.
6. Assess performance.  
Criteria for success/failure of management efforts should be known when the strategy is

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developed and the monitoring program is designed. This is the analysis that informs program adaptation. This helps inform next steps.

7. Manage adaptively.

Based on the monitoring assessment, system models are amended, and monitoring strategies are revised to improve program performance.

When goals and actions are identified and justified, monitoring needs can be clearly defined and monitoring resources prioritized. When monitoring information is available, assessment of progress becomes feasible, and reporting of performance is enabled. When performance is assessed in this manner, decisions are informed, and adaptive management occurs.

**IV. Proposed Implementation Approach and Roles and Responsibilities**

The ChesapeakeStat Action Team was tasked with recommending a process by which ChesapeakeStat could support the work of the MB in reviewing performance and providing coordination across the goal teams. Additionally, ChesapeakeStat was identified in the EO Strategy as a forum to “provide data to show progress toward outcomes and serve as a useful adaptive management process and tool. ChesapeakeStat will improve coordination of the restoration effort and expand public accountability by providing information on progress of partner activities and use of funds. A significant element of ChesapeakeStat is that Chesapeake Bay Program managers, federal agencies, states, local governments, nongovernmental organizations and the public will be using the same tool to track efforts to restore and protect the Bay.”

Implementing adaptive management through the decision framework can (and over time, should) occur at multiple organizational levels. Initially, the proposal suggests starting with the GITs and will require them to explicitly articulate their goals, action plans, and the rationale for those plans. (This is information that can be obtained from all the current organizational units, regardless of their current focus (*Chesapeake 2000*, the Executive Order, etc.). No matter what each of the GITs believes its mission to be – or whether this mission aligns neatly or logically with another GIT – each should be able to articulate the goals, identify the actions planned, and provide a compelling rationale for those actions. This is the information that ultimately provides the basis for coordination, collaboration, and the development of program strategy. This becomes a bottom-up, Goal Implementation Team approach to coordination rather than top-down alignment.

a. Goal Implementation Teams

The GITs are at different stages relative to goal setting and strategy development. Given this variability, moving forward requires a flexible approach but with a simple, firm foundation– and this can be implemented by beginning where it is possible to begin.

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**Decision Framework – A  
Practical Application &  
Example**

1. *Articulate program goals.* Conserve healthy watersheds in a variety of landscapes (e.g., agricultural, residential, etc.).
2. *Describe factors influencing goal attainment.* Local knowledge of effective management practices to conserve “health.”
3. *Assess current management efforts (and gaps).* Need effective transfer of successful practices between localities.
4. *Develop management strategy.* Establish information sharing web forum and peer mentoring network.
5. *Develop monitoring program.* Document local implementation of ideas drawn from other watersheds.
6. *Assess performance.* Greater than desired number of local implementations.
7. *Manage adaptively.* Review value of the information sharing strategy and revise if needed.

Interested GITs will evaluate and describe their work using the categories described in the decision framework. They will work with the ChesapeakeStat team to develop content for inclusion in ChesapeakeStat and use the website to communicate their work to other GITs, the MB, the Federal Leadership Committee, the public, and other interested stakeholders.

Eventually all of the GITs will have to be able to explicitly define their goals and articulate the rationale for any action plans. When this is accomplished, it will be possible for the GITs to identify their individual monitoring and analysis needs – thereby tasking Scientific and Technical Analysis and Reporting (STAR) (data collection and analysis) and enabling ChesapeakeStat (management issue identification and framing).

At present, the leadership of the Habitat and Watersheds GITs have committed to describing the basic information in a consistent format (aka Decision Framework) necessary to enable the adaptive management process. The Water Quality and Fisheries GITs have activities underway and much of the essential information developed could be captured in the framework necessary to initiate the process. The Leadership GIT is best positioned to staff the adaptive management process and the Management Board given their current suite of responsibilities.

**b. ChesapeakeStat Team and STAR**

The ChesapeakeStat Team (part of the Leadership GIT) and STAR will continue to work with early implementers by assisting in data collection, analysis, and performance reporting - as those needs are identified by each GIT. Content will be developed in ChesapeakeStat following the categories described in the decision framework with initial new content in SAV, Agriculture, and Watersheds. This will occur over the next several months. Additional content will be added as other GITs identify and describe content for the needed information categories described in the decision framework.

While there can be many layers to the information described in the decision framework and the information can be described in a very detailed, “ecosystem-based” approach, in the spirit of beginning where it is possible to begin, an example approach is described in the text box on the left. The example provided demonstrates that not every GIT is in the same place but there are still goals that can be articulated and progress can be described transparently and used to enhance future strategies.

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#### Introduction

Implementing adaptive management in the Chesapeake Bay Program (CBP) through a decision framework is directed by the Principals' Staff Committee (PSC) and Management Board (MB) but begins with each Goal Implementation Team (GIT) and their workgroups. Implementation of adaptive management will help us be more accountable, transparent and consistent in how we communicate our goals, strategies, and rationale to each other and external audiences. Each GIT will be able to articulate their goals, identify the actions planned, a rationale for those actions, and the willingness to accept unexpected outcomes. The roles and responsibilities portion of this document outlines the function of various CBP workgroups and teams, including those that will be available to assist each GIT as they implement the decision framework. The initial investment of time needed to apply the decision framework to our work is nontrivial, however, articulating the uncertainties in our work, effectively addressing those areas we have control over, and including the capability to learn from implementing well-reasoned strategies will yield significant benefits in the long term.

#### Roles and Responsibilities

##### *1. Goal Implementation Teams (GITs)*

All GITs will evaluate and describe their work using the categories described in the Decision Framework (DF) (e.g., articulate their goals, strategies, and the rationale for those strategies). The Decision Framework Implementation Workgroup (DWIF) will assist GITs in this process and will review the logic connecting the information to ensure it is clearly articulated, and is consistent with the elements of the DF.

GIT coordinators and staff will work with the ChesapeakeStat Development Team (CSDT) to include DF content in the ChesapeakeStat website. The intended audience for their content is their own GIT/workgroup, other GITs, the MB, the PSC, the Chesapeake Executive Council (EC), and the Federal Leadership Committee (FLC). While not the intended audience, the public and other interested stakeholders will be able to view the information presented on the ChesapeakeStat website.

When this is accomplished, it will be possible for the GITs to work with Scientific and Technical Analysis and Reporting (STAR) to identify their individual modeling, monitoring and analysis needs and the Communications Workgroup (CWG) to identify their communication and outreach needs.

At present, the leadership of the Habitat and Watersheds GITs and the Agriculture Workgroup of the Water Quality GIT have committed to describing the basic information in a consistent format necessary to enable the adaptive management process. The Water Quality and Fisheries GITs have activities underway and much of the essential information developed could be captured in the framework necessary to initiate the process.

All GITs will work with the Partnering, Leadership, and Management GIT and the DFIW to assemble updates for the MB on GIT progress on implementing the DF. In the future, regular periodic reports

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from the GITs to the MB will allow the GITs to efficiently discuss their strategies, progress, roadblocks, and monitoring needs within the context of the framework.

#### **2. Decision Framework Implementation Workgroup (DFIW)**

The DFIW will work with the GITs as they articulate elements of the decision framework to ensure that their effort is consistent with the intent, comprehensive enough to make the effort effective, and that the information is appropriately used to generate true adaptive management of the program's activities. This will not be an insignificant effort and we need to implement a support mechanism for the GITs to ensure a good start.

Creating a small cadre of individuals who can work individually with GITs/workgroups/staff to develop the initial elements of the decision/logic framework in a consistent and appropriate manner is crucial. Specifically, it will be necessary to lead the groups through development of clear and concise articulation of goals, and the logic modeling necessary to develop initial management strategies. In some cases, this will simply involve revisiting existing plans to ensure they are clearly explained and all necessary questions are appropriately answered. Once this has been accomplished, the exercise of developing performance expectations and monitoring plans will need to be led by a mentor(s) so that the output is sufficiently uniform and of adequate quality to profitably engage STAR.

The DFIW is responsible for performing a quality check on the information being presented in the decision framework to ensure the logic connecting all the pieces is clear, articulated, and adequate. That is, have the GITs articulated their goals in clear and observable terms? Have they assessed and reported the elements that must be managed in order to achieve their goals? Have they developed a management strategy with performance expectations? Is there a monitoring strategy with appropriate indicators and reporting/analysis planning? The STAR Team could provide a method for responding to the modeling, monitoring and assessment needs in a documentable way.

The DFIW will provide overall coordination of the process with the GITs, STAR, CSDT and CWG which includes:

- Developing guidance for GITs to operationalize the DF and ensure consistency of level of detail and product among GITs (refer to section 3 of this document for additional details).
- Initiating contact with the GITs to identify which areas of their work they will apply the DF to initially and develop a schedule for overall topic content development;
- Providing workshops or other support mechanisms for GITs;
- Meeting with GITs to clarify expectations and provide support describing their work using the logic built into the DF;
- Ensuring quality check and adherence to DF and minimum consistency in content across goal areas;

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- Tracking and reporting progress by the GITs in developing the information required by the DF to the MB;
- Communicating content needs to the CSDT (working with the GITs) to ensure content is available on the ChesapeakeStat website in a timely manner; and
- Supporting the development of MB and PSC agendas, including working with the MB and GITs to establish a schedule for cross-goal topic discussions and review of individual GIT work described in the ChesapeakeStat website at each MB meeting.

#### **3. ChesapeakeStat Development Team (CSDT)**

The CSDT will work with GIT coordinators and staffers to include DF content on the ChesapeakeStat website. The CSDT will continue to work with early implementers by assisting in data collection, analysis, and performance reporting - as those needs are identified by each GIT. The CSDT is responsible for continuing to build in additional capabilities within the website to report elements of the decision framework and support the adaptive management (decision framework) process.

The CSDT will:

- Participate in scoping meetings with the GITs and the DFIW to evaluate topics to be described using the decision framework (DF);
- Assist the GITs in translating the DF on the ChesapeakeStat website and coordinate with the DFIW and the CWG;
- Develop map layers and data representations to support GIT work and communicate with CBP partners;
- Ensure a consistent look and feel across goal areas on the ChesapeakeStat website;
- Monitor website topic content development progress by the GITs;
- Provide real-time support during MB/PSC/EC meetings so that ChesapeakeStat content is available, displayed and used in meeting discussions and decision making.

#### **4. GIT/STAR/CWG Coordinators and Staffers Group**

Coordinators/staffers meetings will be used to fulfill the role of getting information to and from the GITs regarding the decision framework implementation process. Training, guidance and other tools will be provided to and discussed with the coordinators and staffers. Needs of the GITs will be conveyed via their coordinators/staffers to the coordinators/staffers of the CWG, STAR, DFIW, CSDT and MB who regularly attend coordinators/staffers meetings.

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**5. Scientific and Technical Analysis and Reporting (STAR) Team**

The primary role of STAR is to provide science to the GITs to carry out the decision framework. Examples of the type of science that STAR can provide to support each step of the decision framework are:

*Articulate program goals*—Information can be compiled on the status of environment conditions related to the goals being considered by different GITs. Examples of information of environmental conditions for different GITs are (1) Fisheries: status of blue crab and oyster populations; (2) Habitat: wetland conditions, SAV acres, stream health conditions; (3) Water Quality: dissolved oxygen and clarity in the estuary, nutrients and sediments in the watershed; (4) Healthy Watersheds: health of streams, land-cover conditions, and (5) Stewardship: number of acres of conserved lands.

*Describe the factors influencing goal attainment*—Information can be provided on the biological, chemical, and physical factors that may affect attainment of goals. Ecosystem models can be used to assess the interrelation of the factors, test different scenarios for goal attainment, and assess the amount of uncertainty about environmental factors affecting goal attainment. Modeling can also be a critical part of articulating the goals.

*Assess current management efforts (and gaps)*- This could also include assessment of current science efforts needed to support the management efforts.

*Develop management strategy*—Information about the types of practices that are most effective to achieve strategies and lessons learned from other ecosystems could be contributing science for this step. Using appropriate models to test the outcomes of different management strategies would be valuable to help select the most effective practices and policies.

*Develop monitoring program*—Provide guidance on selecting key performance indicators for a goal and design the appropriate monitoring programs. Provide information on available monitoring programs and work with partners to enhance monitoring to meet the needs of the GITs.

*Assess performance*-Provide analysis of factors affecting changes in performance indicators. Use monitoring results to assess progress toward goals, improve models, and reduce uncertainty about the factors affecting performance.

*Manage adaptively*- Provide summaries of lessons learned about factors affecting goal attainment to improve implementation of management strategies, models and monitoring programs, or consider changes to goals.

STAR will coordinate science support for the GITs using the modeling, monitoring and GIS teams at the CBP office, and working with federal, state, and academic partners. The capacity of STAR to support all the GITs will depend on the type of expertise needed by a particular GIT. For example, STAR currently has strong capabilities at the CBP office and CBP partners in water-quality modeling and monitoring, land-change modeling and mapping, indicator development, and information management. The

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fisheries GIT have a strong science support group (through NOAA and academic partners). STAR will have to reach out to CBP partners to increase capacity to provide more science support for the habitats, healthy watersheds, and stewardship GITs. The STAR can also organize topical meetings working with a particular GIT to address a need for modeling, monitoring, and assessment.

**6. Communications Workgroup (CWG)**

Assist GITs with their needs related to external communication of accountability and assessment information in order to support public understanding and encourage necessary behavior changes.

**7. Advisory Committees**

The three Advisory Committees (Citizens, Local Government, and Scientific and Technical) provide independent perspectives from critical stakeholder groups and strengthen the natural and social science basis for Bay restoration activities. The Advisory Committees are the independent thinkers and advisors to the EC, PSC and MB and provide support to GIT requests for policy, scientific and technical input as allowed by the limited time that Advisory Committee members are able to apply. As such, they are critical to supporting implementation of the adaptive management framework.

The Scientific and Technical Advisory Committee STAC could assist STAR in efforts to coordinate oversight/review of indicators and monitoring plans as they are developed. Also, where the GITs identify areas of uncertainty in elements of their strategies, STAC will provide advice on means of reducing uncertainty including, if appropriate, through responsive workshops.

**8. Management Board**

The MB will establish a schedule and expectations that will ensure continued implementation of the DF and will encourage GITs to utilize the assistance being offered by the DFIW, CSDT, STAR and CWG (refer to section 4 of this document for additional details).

The MB will review performance, identify opportunities for coordinating resources, identify opportunities for strategic coordination and leveraging of complementary efforts, help address project roadblocks, and recognize when program redirection is necessary. This process will also inform other partners and the public about CBP priorities and progress toward achieving those priorities.

Time will be allocated in each MB meeting to discuss cross-goal topics of concern that highlight the work of more than one goal team. Data and information would be accessed via established content on the ChesapeakeStat website and, after follow-up actions are assigned, tracking of that follow-up would occur on the ChesapeakeStat website, and be reported during the next MB meeting.

These monthly portions of the meeting agenda would be balanced so that the MB would have the opportunity to hear from each of the GITs individually and as part of cross-goal topic discussions. These monthly topic discussions would build over time into a regular quarterly annualized schedule. Such a schedule would allow the MB to use the outputs of the DF, and other information, in a predictable

**Comment [ns1]:** TBD. An initial draft of section 4 will be developed by DFIW in advance of the next MB mtg. Should include "check in" points in order to keep the effort moving forward in a timely manner. Should recognize that although this is an iterative process, MB has certain expectations for 2012.

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management process that engages the GITs in shared strategic decision making. At quarterly meetings, GITs would have an opportunity to review their strategies and discuss how the results of adaptive management learning will be used to adjust and improve their future strategies.

**Comment [ns2]:** MB needs to consider if there is a role for the PSC and the EC in this process (and potentially, an Independent Evaluator).

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**Purpose**

The decision framework is designed to address two issues: the need for transparency and accountability in the Chesapeake Bay Program; and a need to effectively implement adaptive management. In both cases developing and documenting a rationale for all activities that links them clearly and logically to program's goals is essential. The decision framework is intended to facilitate the development and articulation of that logic by providing a structure for: identification of goals; reasoned development of strategies; purposeful design of monitoring; and planning for effective assessment of efficacy.

The decision framework is a tool for development of the essential logic that must underpin any successful environmental management program. Simply providing input for each step outlined in the framework will not guarantee a sound or well-reasoned logic. That can only arise from the conscientious efforts of those identifying and pursuing program goals. The framework is simply a structure for consistent presentation and effective coordination of all its activities.

What follows is a brief summary of the purpose of each of the seven steps in the framework and some guidance on the key characteristics of appropriate **input**.

**1. Articulate program goals**

**Purpose:** Without an explicit, unambiguous goal it is impossible to know precisely what is being sought and therefore whether any of the planned activities are justified.

**Key characteristics:** The goal statement should identify a measurable outcome. Preferably it should be realistic and attainable within a practical time period. But there is no reason it cannot be aspirational. The key is that it must be explicit. Terms like "healthy" or "sustainable" or "natural" are open to endless debate, and therefore not particularly useful in goal statements. If they are used, it is essential that there be an accompanying statement that defines them in terms of measurable parameters. For example, "clean" waters might be defined as those meeting all water quality standards, "natural" conditions might be defined as specific parameters matching those in a particular reference site.

The goal statement should be sufficiently explicit, or well enough defined, that anyone reading it would have no doubt about what the aspiration is.

**2. Describe factors influencing goal attainment**

**Purpose:** In order to know what must be done to attain the specified goal, it is necessary to know how the ecosystem operates, and therefore, what has to be managed. Ideally, a well developed ecosystem model would always be available to answer these questions. This is almost never the case, and ultimately a sophisticated model or even a really well-informed understanding of the system is not essential before management efforts can begin. It is entirely possible to learn while doing, and that is exactly what most environmental management programs must do. The key to constant improvement, however, is to be explicit about the beginning understanding. When the starting point is identified,

**Comment [ns3]:** Examples and additional explanatory information for each of the seven steps will be added to section 3. When done, a revised version of this document will be distributed, hopefully in advance of the next MB mtg.

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monitoring can identify consistent or inconsistent behavior and thus inform subsequent adjustments of the understanding.

The initial understanding is also what justifies the initial management actions. Accountability demands openness about the certainty of management action efficacy. It is acceptable to take actions in the face of significant uncertainty, as long as there is reasonable assurance that the action was considered in light of all that is known about the system.

**Key Characteristics:** The decision framework suggests a starting point for this assessment that is relatively unsophisticated, and not terribly time consuming. The idea is that qualitative and conceptual understandings are sufficient to start a process that should be iterated frequently and hopefully with increasing sophistication as understandings increase. In the first iteration, it is most important to identify factors in both the natural and human systems. The objective is to be as complete as reasonably possible. The framework suggests facilitating this identification by considering factors that might fall under the broad categories of biological, chemical, physical, geological, and human factors. Sub-categories are also suggested in an effort to promote comprehensive consideration.

Identification of factors is a process that can easily wander into levels of sophistication that rapidly exceed the utility of an initial assessment. In the first iteration “lumping” is preferable to “splitting” in factor identification.

Once identified, all factors should be rated for both their importance in affecting goal attainment, and the ability to be managed. This is a simple articulation of the rationale for any management strategy. Program accountability would expect that all important factors would be managed if the goal was to be attained. This can also be a test of goal practicality. If there are factors critical to goal attainment that are also difficult or impossible to manage, the practicality of the goal may be suspect.

**3. Assess current management efforts – identify gaps**

**Purpose:** Once critical factors influencing goal attainment are identified, the next step is to identify and assess ongoing management efforts. For factors currently under some management, the efficacy of the management with respect to the goal should be assessed. The objective is to determine if the ongoing management effort is sufficient to achieve the goal, or whether enhancement is necessary. Factors that are not being managed will require development of a new strategy.

**Key Characteristics:** In the initial iteration of this assessment, there is no need and perhaps no basis for a detailed evaluation of existing management efforts. The first objective is to identify needs for new management efforts and opportunities for coordination of existing efforts. In time, monitoring will develop the basis for more rigorous evaluation, and a more robust rationale for any revisions necessary.

**4. Develop management strategy**

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**Purpose:** Management strategies are the actions that the program will undertake to address the factors affecting goal attainment. In many programs, strategy development is accomplished through some form of logic modeling or results chain development. There are many versions of this practice, and there are a variety of tools to facilitate the undertaking. None of them are explicitly called for in the decision framework, in the expectation that it is possible to develop well reasoned strategies without those methods.

**Key Characteristics:** Strategies should all be directly tied to the critical factors. Anything not linked to a critical factor has little reason to be part of the program, in so far as it is thus not addressing a program goal.

Strategies should be described in terms that make them measurable. There are two things that should be considered in this context. The first is description of the management action called for by the strategy. What exactly is going to be undertaken? Evaluators refer to this as the “intervention.” The second thing is the desired outcome. What should happen as a result of the intervention? Both the intervention and the outcome should be observable and measurable.

It is useful to consider the time over which interventions should produce observable outcomes. This information is critical to the design of the monitoring program.

#### **5. Develop monitoring program**

**Purpose:** Monitoring is necessary to answer two basic accountability questions: Are we doing what we said we would do? Is the outcome what is expected and desired?

**Key Characteristics:** There should be a direct link between the monitoring program and the strategy, which should be clearly tied to the goal. In this way the rationale for the monitoring should be very clear. As noted above the monitoring should have two specific purposes: to document that the strategy is being implemented as planned; and to determine if the system is responding as expected. The parameters or indicators monitored should be clearly identified and the frequency of monitoring should be based on what will be necessary to document status and trends in the context of any system variability.

In some strategies it may be necessary to propose a third type of monitoring metric. The logic of the decision framework is based on clear identification of the underlying understanding about the ecosystem. In some cases this will be little more than a hypothesis. In these cases the assumptions about system processes should be explicit, but identified as assumptions. It can be important for adaptive management to include monitoring to assess the accuracy of these assumptions. It is possible that monitoring of an intervention and an outcome will not be sufficient to assess underlying assumptions and this will impede efforts to enhance management efficacy.

#### **6. Assess performance**

**ENABLING EFFECTIVE ADAPTIVE MANAGEMENT IN THE CHESAPEAKE BAY PROGRAM**  
**SECTION 3: CHESAPEAKE BAY DECISION FRAMEWORK (11/15/11)**

**Purpose:** For both accountability and adaptive management it is essential to evaluate the performance of the management effort. Two assessments are needed. For accountability the question is whether the management intervention was effectively delivered. This is typically a very simple and straightforward assessment. Did we do what we said we needed to do when we said we needed to do it? For adaptive management it is important to know if the system responded as expected. Did the outcomes appear at the level and at the pace expected?

**Key characteristics:** The assessment of performance should occur in two phases: before the management even begins, and then intermittently after commencement. The initial assessment is really an expression of the understanding of how the system operates and the certainty surrounding that understanding. The way this is identified is by specifying what the monitoring program is expected to show over time. When the strategy is developed and the monitoring parameters are identified, program managers should clearly identify the trajectory of monitored values they anticipate. This reflects their current understanding of how the system behaves and when they expect to attain the goal.

Program managers should also provide a clear identification of the variation around the expected system trajectory they believe would be consistent with the system behavior matching their expectations. This envelop of reasonable uncertainty reflects their confidence in the initial understanding of system behavior. It must be explicit over the time period to anticipated goal attainment, because it also establishes the criteria for performance assessment at interim points.

If the consensus expected system response to an intervention is +15% in two years, and the confidence in that expectation is that it will actually be somewhere between +5% and +30%, then the thresholds for deciding the intervention is working as expected are effectively established. For adaptive management, this is setting the decision criteria for “staying the course” or revising the strategy.

#### **7. Manage adaptively**

**Purpose:** In order to constantly improve the effectiveness of the management program, there must be a process for continually reducing the uncertainty in management strategies. The decision framework attempts to enable this by promoting explicit identification of the understanding that drives management efforts, and detailed prediction of expected system behavior based on that understanding. Well designed monitoring then enables constant assessment of the accuracy of that understanding and informs revision of the understanding to reduce the uncertainty in the next iteration.

**ENABLING EFFECTIVE ADAPTIVE MANAGEMENT IN THE CHESAPEAKE BAY PROGRAM**

**SECTION 4: SCHEDULE AND MANAGEMENT BOARD EXPECTATIONS (11/15/11)**

The MB will establish a schedule and expectations that will ensure continued implementation of the DF and will encourage GITs to utilize the assistance being offered by the DFIW, CSDT, STAR and CWG. An initial draft of section 4 will be developed by DFIW in advance of the Dec 13<sup>th</sup> MB mtg. It should include “check in” points in order to keep the effort moving forward in a timely manner. It should also recognize that although this is an iterative process, the MB has certain expectations for 2012.