Supporting management through an annual cycle of ecological forecasting and assessment

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Abstract

A novel approach to supporting management through an annual cycle of ecological forecasting and integrated assessment is presented. The cycle consists of: (i) forecasting Chesapeake Bay summer ecological conditions in spring; (ii) tracking summer ecological conditions and assessing the accuracy of the forecast until fall; and, (iii) completing the cycle in early spring by assessing overall Bay health and producing a geographically detailed ecosystem health report card. The ecological forecasts are largely based on the relationship between river flow/nutrient loads and the forecast metric. The ecosystem health report card is based on a spatially derived index of compliance to established thresholds. Index scores are converted to report card grades (A to F) for 15 regions of the Bay. Overall, the annual cycle engages managers and broader community, forcing constant assessment and communication of information, and ensuring awareness of recent and developing conditions. Finally, the annual cycle raises the profile and legitimacy of the restoration planning and program and in some instances, such as the report card, leads to locally effective management action.

Aims

- Land off-the annual cycle with a proactive product that engages the broader community.
- Provide guidance for understanding summer conditions (e.g. ecosystem health).
- Provide guidance for Chesapeake Bay restoration efforts by targeting remediation efforts in locations and times that environmental conditions will favor restoration success.

Approach

In late spring each year, the summer ecological conditions for three key indicators (dissolved oxygen, harmful algae/bacteria, and aquatic vegetation) are produced. These forecasts are based on established relationships between the indicator and stresses (nutrient load, flow-rates, and water quality). Forecasts are summarised in a newsletter and web site. A press release and media briefing is used to help disseminate the forecast results.

Outcomes

- Extensively reporting and communicating from being reactive to proactive.
- Improves communication between scientists and managers in solving problems and key priorities.
- Provides context for understanding and explaining observed conditions.
- Forecasts are not always accurate — disparities between forecast and observed conditions are explained at the end of the season.

Aims

- Provide frequent updates on key ecosystem health indicators over the summer and fall.
- Provides timely assessment and synthesis of unusual events or conditions that may have significant implications to the Bay’s health.
- Use the unusual events and conditions in “learning moment”.

Approach

Data processing and analysis is expedited so that indicators are available within days to weeks of occurrence. Indicators are then placed in context by comparing them to historical conditions such as long-term averages, and maximum and minimum values. If community events or results occur, the scientific and monitoring community provide rapid assessment, summarizing the results and interpretations into a timely newsletter.

Outcomes

- Community provided with an up-to-date assessment of Bay health through the Chesapeake Bay Program website.
- Newsletter describing the impact of an early summer rain event on the Bay’s health produced.