

Gulf Of Maine Indicators

**Final Report of Listening Sessions
and
Evaluation of Tides of Change Report**



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Gulf of Maine Ecosystem Indicators Partnership

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Report

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I. Introduction to the Project and Recommendations

The Gulf of Maine Ecosystem Indicator Partnership (ESIP) is a group of public and nonprofit environmental managers, policy analysts, and scientists which is working in partnership with the Gulf of Maine Council (GOMC) to prepare a set of regional indicators. The indicators are intended to assist decision makers and scientists in their efforts to ensure the integrity and viability of the environment and communities that together make up a sustainable Gulf of Maine (GOM). Two major events held in 2004 – the Northeast Coastal Indicators Workshop (www.gulfofmaine.org/nciw) and the Gulf of Maine Summit (www.gulfofmainesummit.org), have aided ESIP in its efforts. During these events, nearly 400 Gulf of Maine stakeholders identified 6 sets of indicators of land use/coastal development; contaminants; fisheries; aquatic habitat; climate change; and eutrophication/nutrient loading. *Tides of Change Across the Gulf: An Environmental Report of the Gulf of Maine and Bay of Fundy*, a “state of the environment” report, was released prior to the Summit to help participants prepare for it. *Tides of Change* examined the status of and trends in three of the six topical areas – coastal development, contaminants, and fisheries – in the Gulf. At the Summit, proposed indicators for each of these themes were critiqued and improved on.

In 2005, ESIP contracted with Elizabeth A. Della Valle, AICP to help reaffirm the target audience’s needs and uses of regional indicators; consider ways to improve the development, portrayal, and use of indicators; and assess whether the current approach to state of the environment reporting should be continued. This report summarizes the results of:

- four, three hour listening sessions held in New Hampshire and New Brunswick in the fall of 2005;
- phone interviews with twenty-five representatives of the target audience within each state and province in early 2006; and
- a review of seven state of the environment reports prepared for other marine, coastal, estuarine, and lake ecosystems.

Participants in the listening sessions and phone interviews were representatives of the target audience – decision makers, scientists, land use planners, marine and coastal resource users, and a variety of interest groups. ESIP identified these individuals based on the representatives’:

- use, management, or research of resources in the GOM;
- use of local environmental information to make decisions or set policy for the GOM;
- degree of leadership in her/his social and professional system;
- frequency of interaction with peers – both personal and professional; and
- availability and willingness to participate in the sessions and/or interviews.

The listening sessions were informal gatherings in which the target audiences were asked their opinions and reaction to the approach, tone, style, graphics, text, and other facets of ESIP's emerging indicator work. The sessions were designed and conducted to:

- thoughtfully select participants to be representative of the target audience;
- ensure active participation and interaction of the participants;
- be well organized by task, theme, and goals;
- gather a range of ideas, opinions, and concerns; and
- improve the development, portrayal, and use of indicators to make them more useful to target audiences.

Questions asked at the session were designed to:

- confirm that the results of 2004 Gulf of Maine issues survey are still germane;
- identify how regional indicators are currently used and how they might serve the needs of the target audience in making policy, funding, and investment decisions;
- investigate useful formats for information about the health of the GOM ecosystem, including various indicator products, approach, style, tone, graphics, and text as well as the degree and type of analysis, scale of reporting, and range, style, and frequency of information products desired; and
- identify credible sources of information for regional indicators and assess what makes them credible.

The phone interviews were designed to assess the value of the *Tides of Change* report to the intended user community in each state and province in the Gulf and how future reports might be modified to make them more useful. The contractor prepared the survey in coordination with ESIP to document uses of the report, including:

- informing participants about topic areas covered in the report;
- setting policy;
- developing strategy;
- educating legislators, policy makers, the public; and
- other uses.

Based on input from the listening sessions, phone interviews, and review of similar reports, the contractor identifies lessons learned in the report and makes recommendations below for ways to make the next chapters of the GOM's state of the environment report on nutrients, aquatic habitats, and climate change more useful for its target audiences.

1 As ESIP moves forward in establishing a regional set of indicators and state of the environment reporting system, it should also define its intent in undertaking the initiative, consider adopting an active role to develop policy, and coordinate partners to improve and maintain the health of the Gulf of Maine.

2. ESIP should identify its most important partners and engage them in steps 3 – 6 below. It should prepare and implement an ongoing outreach and education effort to engage

partners in the design, finance, and maintenance of a regional system of indicators and state of the Gulf reporting and in coordinating efforts to improve and maintain the health of the Gulf. It should seek funds to support development of a collaborative effort.

3. ESIP, with its partners, should define a healthy Gulf of Maine that includes environmental, economic, and cultural conditions.
4. ESIP, with its partners, should identify management questions that need to be answered and develop indicators that provide the strategic information that is responsive to those questions.
5. ESIP, with its partners, should refine its strategy to prepare products for various audiences, including type of product, format, and frequency of publication.
6. ESIP, with its partners, should follow the same general format for the next state of the environment report, though it should consider the alternative process of white papers and workshops in each of the states and provinces leading up to finalization of the report and summit.

II. Executive Summary of the Listening Sessions and Evaluation of Tides of Change

A. Executive Summary of the Listening Sessions

1. **Participants**: Four, three-hour listening sessions were held in Portsmouth, New Hampshire and Moncton, New Brunswick in the fall of 2005. Three sessions, one each on coastal development, contaminants, and fisheries indicators were held in New Hampshire on October 18th and 19th. On November 21st, a single session that covered all three themes was held in New Brunswick. Overall, 36 people participated in one or more listening sessions or responded to a pre-session survey¹.

About a third (34%) of the participants were decision makers, 9% were planners, and 25% were scientists. The remaining third were users of the resource (9%) or had “other” interests in the Gulf of Maine (22%). Participants represented national agencies or organizations, state/provincial organizations, subregional organizations, local organizations, and other interest groups from the public, private, and non-profit sectors.

New Hampshire had the highest representation (39%), followed by Massachusetts (19%), New Brunswick (17%), Maine (14%), Nova Scotia and elsewhere (both at 6%).

2. **Use of Regional Indicators**: In general, participants suggested that a regional set of indicators would and/or should be used to:

- **Assess and monitor the health of the Gulf** – establish a baseline and monitor the health for the ecosystem to understand how human activities are affecting it. Identify changes in the behavior of the region’s residents needed to improve its health and identify partners and complementary efforts. Evaluate the success of remedial activities.
- **Inform the public and build coalitions to protect and/or improve the health of the Gulf** – educate the public and create support for policies, programs, investments, and behaviors that improve the health of the Gulf. Bring people together to ensure ecologically sound development and protection.
- **Advise government, and others, on policies, investments, and programs** – inform political decision making about integrated policies, programs, investments, and behaviors to preserve and/or improve the health of the Gulf. Target resources accordingly. Coordinate public private, academic, and nonprofit sector efforts to manage the resources of the Gulf and measure effectiveness of those efforts.

3. **First Things First**: Participants in the sessions generally agreed that before designing a strategy to develop a regional system of indicators of the health of the Gulf of Maine, it is

¹ When a participant was confirmed, she/he was provided with background materials and a pre-session survey to stimulate consideration of the issues and to provide insight into how the listening sessions should be designed. The pre-session survey was also offered to those individuals who were interested, but unable to participate, in a listening session. 29 people participated in the 4 listening sessions, 18 of whom responded to the pre-session survey, 3 participants attended more than one session; 7 people responded to the pre-session survey but did not attend a listening session.

important for ESIP to define its intent and role in undertaking the project. Should its intent and role be passive – to simply make information available to decision makers, interested parties, and the general public? Or, should it take its cue from how the public health community approaches its mission of improving and protecting the health of its patients – by embracing an intent and role that is more active – that of identifying health problems in the Gulf and attempting to change behavior to improve its health?

A number of participants said ESIP should first define what management questions it is trying to answer, then establish indicators that provide strategic information that is responsive to those questions. Others said it is important that ESIP establish a definition of a healthy Gulf of Maine that includes environmental, economic, and cultural conditions.

All other elements of preparing a strategy to develop a regional indicator system² flow from the defined purpose of the effort, the management questions it is trying to answer, and subsequent objectives.

4. *Integrated Ecosystem Management*: Developing an integrated management and policy approach toward protecting and sustaining the health of the Gulf was a theme that was raised in several sessions. Indicators were seen as a way to help point out particular areas on which to work with others in a cooperative manner. Participants noted that the issues facing the Gulf are larger than any one group can handle – both from a jurisdictional perspective and from the financial and human resource aspect. Several participants felt that ESIP needs to focus on social and economic indicators, as well as environmental indicators, to come up with a balance that is necessary to sustain a healthy Gulf of Maine – essentially a triple bottom line integrating the environment, social/cultural, and economic features.

5. *Collaborative Design, Financing, and Management of A Regional System*: Given the enormity and expense of developing, implementing, and sustaining a regional indicator system, participants felt that no one group can undertake this project on its own. Many participants said that those who are likely to be the most important contributors to an indicator effort are engaged in similar or complementary efforts. They suggested that this effort should be grafted onto other existing efforts to make the task more manageable and fundable.

Participants also felt that political and economic decision makers and the general public respond viscerally to problems and that it is important for everyone, from political decision makers, major industries, and individual users of the Gulf's resources, to have and understand credible information about the impact of their decisions. Participants agreed that people tend to trust their peer groups and suggested that data collection protocols require oversight by a collaborative peer review group. They suggested that to assure buy-in, ESIP should kick-off the effort with a series of meetings and workshops to engage

² Including identifying specific indicators, partners to help collect data, key audiences for the information, most appropriate products, best way to communicate indicators, most appropriate scale at which to report indicators, how often products should be released, and estimated costs to design and manage the system.

a collaborative peer review group in establishing the goals and design of the regional indicator system, in selecting indicators, and in establishing data collection protocols.

This raised the question of who should pay for the development and maintenance of a regional indicator system. Participants noted that funding the system, itself, can slant perception of the system. In one listening session, it was generally agreed that funding the development and maintenance of the system needs to be collaborative – funding from multiple stakeholders will help maintain impartiality. It was felt that contributions need not be equal, but that various groups should have an equal say in design of the system.

6 *Don't Reinvent the Wheel!*: In general, participants felt that indicators are currently in use in the Gulf and other regions, so it is not necessary for ESIP to re-invent the wheel. They suggested that several groups are in the process of exploring related work (GOMC, RARGOM, GoMOOS, NOAA, EPA, USGS, DOE, DFO, and others) and ESIP should engage with those partners early on to assure that everyone is moving in the same direction.

7. *Most Important Audiences:* Without access to information about the intent and goals of a regional indicator system, participants identified most important audiences for indicators and discussed specific products, types of information, scales and frequency of reporting for policy makers, decision makers, public health officials, regulators, land use authorities, the tourism industry, resource users, and opinion shapers in the Gulf.

a. *State/Provincial/National Policy Makers* (e.g., governors and premieres, legislators)

Participants said indicators would enable better management of contaminants entering the environment and help policy makers make more proactive, science-based decisions about actions to sustain the Gulf. Indicators would help assess cumulative trends in the Gulf, provide a tool for monitoring the effectiveness of programs, including rehabilitation of habitat along the coast, and encourage decision-making based on science rather than politics^{3, 4}.

The policy making audience has two needs – detailed information for internal use and application of that data through stories and products that are packaged for external education. Illustrative charts that compare data to goals – for example, bar charts that show progress, identify what's left to do, show return on investment, and project consequences – are useful types of information.

Legislators need summarized explanatory text and directed information with bulleted points that interpret data related to their decision making. They also need information that tells their constituents' stories. They need information that compares the Gulf to other ecosystems, describes and evaluates the success of their regulatory/management strategies, and points out the consequences of not addressing issues in the Gulf. Those

³ One participant felt that the ministry should be required to consider the indicators in making decisions as a way to reduce decisions based politics rather than indications of the implications of the decision.

⁴ One participant felt that social and economic indicators, as well as ecological indicators, are needed to balance the triple bottom line (environment, social, economic).

developing information and interpreting data for decision makers need raw data and detailed technical information linked to meta data. Depending on the jurisdiction policy makers represent, they need information at a gulf, ecoregion, state/province, county, regional, watershed, estuary, town/city, fisheries management area, congressional district, or local service district-wide scale.

The most useful products for policy makers are 1-page fact sheets. The most useful products for their advisors are web-based information and peer-reviewed articles. Other useful products include color publications (hard copy as well as on the web), brochures, static and interactive GIS, and CD-ROMS. To be most useful to policy makers, information should be updated every 3-4 years with alerts or bulletins, as new information becomes available or if conditions change, particularly if linked to election cycles.

b. *Public and Private Sector Decision Makers* (e.g., federal, state/provincial, and local government upper and mid-level elected and appointed officials; owners and upper-level management of private industry)

The public and private decision making audience needs summary graphs, illustrative charts, maps, explanatory text that synthesizes consensual information from a number of viewpoints, raw data, case studies, and peer reviewed articles. In general, the best information presents the good, as well as the bad, news, in a fairly quick and visual way as in executive summaries, visual “sound bites”, and computer animations that show change over time.

Depending on the jurisdiction decision makers represent, they need information at a gulf, ecoregion, state or province, county, regional, watershed, estuary, management district, or congressional district scale. The most useful products for decision makers are color publications (hard copy as well as web-based), static and interactive GIS, other web based information, CD-ROMS, white papers, computer animations, and indices.

c. *Public Health Officials*

Participants said indicators would help public health officials fulfill their mission by reducing human exposure to contamination, improving livability and quality of life, influencing policy making, directing focus and publication of identified problems, and finding connections between environmental factors and disease.

The public health audience needs raw data, articles in Science News, researchers knowledgeable about the issues, cartoons and simple charts, detailed background information plus information that is condensed and synthesized. In general, public health officials need information at a gulf or state/province-wide scale. They would use indicators on a regional basis to identify trends, then seek out the cause of specific problems, e.g., pathogens moving north with climate change/ocean change.

The most useful products for public health officials are interactive GIS, peer-reviewed articles, and databases of raw data. In general to be most useful to public health officials,

information should be updated every 2-3 years with alerts or bulletins, as new information becomes available, though frequency depends on the particular issue (e.g., clam flat closures, beach closures, etc.) and whether indicators are tracking the status or are being used for prediction.

d. *State/Provincial Regulators*

Indicators would help state/provincial regulators align their mission, goals, priorities, and spending, evaluate the effectiveness of their efforts, and demonstrate return on the taxpayer's dollar. Indicators would help set a regional context for state/provincial action, increase collaboration and coordination, influence local policies, improve regulatory decisions, and create a unified voice, clear direction, and support for over-arching issues because they are gulf-wide.

The regulatory audience needs information displayed in illustrative charts, maps, explanatory text, and raw data. Stories and products that are packaged for external education, compare the Gulf to other ecosystems, identify the consequences of not addressing the issues, and offer detailed technical information would be most useful. They may need information at an ecoregion, state or province, watershed, estuary, or town/city-wide scale.

The most useful products for state/provincial regulators are intelligent GIS and other information available through a timely, accurate web portal and 1-page fact sheets. To be most useful, information should be updated every 2, 5, and 10 years, with periodic alerts or bulletins, as new information becomes available or if conditions change, particularly if linked to legislative, budget, election, and strategic planning cycles.

e. *Regional Land Use Authorities*

Indicators would help regional land use authorities identify types of development that are occurring, indicate which geographic areas are highly sensitive, and identify development for which to plan. Indicators would help justify decisions, support more science rather than politically-based decisions and give planning more credibility, which may help generate financial support of the authorities. Indicators would provide a broader context for authorities so they understand what happens across boundaries, help identify cumulative trends, and enable more effective integration of ecological, cultural/social, and economic issues.

The land use authority audience needs illustrative charts, maps, explanatory text, raw data, and case studies that are available at an ecoregion, county, regional, watershed, estuary, town/city, and ecological boundary scale. The most useful products for land use authorities are color publications accessible from the web and GIS. Other web-based information is also useful. To be most useful, information should be updated every 3-4 years with alerts or bulletins, as new information becomes available or if conditions change.

f. *Tourism Industry*⁵

The tourism industry has a financial self-interest in a healthy Gulf of Maine and a stake in keeping coastal “New England” and the “Bay of Fundy” environmentally and culturally healthy. Indicators would be useful to the industry as a tool to better plan for its future. Supporting a regional indicator system would enable it to market itself as a green or smart business investing in its community and the future of the region. Some indicators would provide information that saves them money in day-to-day operations. (e.g., not having to wash towels every day) or reduce fines or costs of correcting violations, including health inspections, and facilitates permitting. Use of indicators provides the industry a way to share information with its clients/customers who are interested in the Gulf and the environment around them.

The tourism industry audience needs summary graphics, used the way USA Today does for more impact. To do so, ESIP should consider seeking assistance from those with expertise in marketing, graphic illustration, and the print media to create icons that meld with the Gulf’s culture. The industry also needs case studies and success stories that feature “people” and describe how changed behaviors and adopted practices have improved health and made the industry a profit. Case studies should provide comparisons with other places that have serious problems, linked to action opportunities – e.g., we don’t want to be the Chesapeake Bay, but if we don’t act, we might end up there. Topically, case studies should focus on things that relate to clients and customers and are an integral part of the tourism experience. They should provide short term vs. long term cost-benefit analysis.

The tourism industry needs information at an ecoregion, state/province, and county-wide scale. Useful products are brochures, posters, and print ads that are catchy, easy to understand and remember, as well as bumper sticker, coasters, or the like that provide a “reward” for clients/customers and acknowledge that they can have a positive impact and make a difference – all part of a marketing campaign. The most useful products would be press kits with an active (the web) and a passive (brochures) element, and web-based media advertising with information for the business owner and a give-away/collectable for the client/customer (magnet, pen, pad, coasters) – funneled through associations (e.g., MLA, chambers of commerce, homebuilder associations, marina owner/operator associations, agencies engaged in tourism)⁶.

To be most useful, information should be updated every 2-3 and 10 years with seasonal and other bulletins as new information becomes available or if conditions change, particularly if linked to visitation cycles.

g. *Resource Users* (e.g., fishermen/aquaculturalists)

Indicators would enable better management of resources because better science would be applied to decision-making, which in turn may create more confidence in indicators by

⁵ There is a lot of variety within the Tourism Industry – the kayak operator vs. the theme parks, the B&B vs. a large resort

⁶ Use associations to figure out best medium.

using data supplied by fisherman. Because ESIP is independent, credible, and trustworthy, fisherman may be encouraged to more accurately declare their landings, improving information on which indicators are based. Better targeted research may improve access to resources, identify good locations for a certain size or type of harvest and help build awareness of depleting resources. In general, indicators would inform seafood consumers about contaminants and build confidence in the quality of the product. And indicators may help identify areas where aquaculture should or should not be located, identify sensitive or degraded areas, and identify at-risk fish stocks which are not tied to fixed geographic locations.

The resource user audience needs all types of credible information, including summary graphs, illustrative charts, maps, explanatory text, raw data, case studies, peer reviewed articles, particularly offered in ways that can be accessed quickly and visually. Executive summaries, visual “sound bites”, computer animations, and syntheses that show change over time would be particularly useful. Articles in Commercial Fisheries News (CFN), National Fishermen, and relevant newsletters, with links for more information, would be helpful to the fishing community. The key is to keep it as simple as possible, providing detailed technical data to their trusted technical advisors.

Major economic interests generally need information at a gulf, watershed, or estuary-wide scale, depending on the fishery. Other resource users may need information at a gulf, ecoregion, and state or province-wide scale.

The most useful products for major economic interests are static and interactive GIS, web-based information, peer reviewed publications, white papers, computer animation, and articles in trade journals. For other resource users, the most useful products are articles in trade newsletters and posters. Color publications and fact sheets are also useful. Information should be updated annually with alerts or bulletins, as new information becomes available or if conditions change, and with quarterly articles in newsletters.

h. Opinion Shapers

Indicators would validate the mission of opinion shapers, including the media and interest groups that influence political and economic decision makers and the general public. They would provide data to address their “issue”, information to inform the public, and sometimes, an opportunity for an exposé. In addition they offer an opportunity to improve their community.

The opinion shapers audience needs credible, sometimes sensational, information, including maps, Ross Perot type posters, cartoons/pictograms, flow charts, and visualizations and animations showing change over time. They also need access to spokespeople, good quotes, and briefing sheets. Depending on the audience, problem, indicator, and issue, opinion shapers may need information at a gulf, county, or region-wide scale.

The most useful products for opinion shapers are color publications, web-based information, posters, fact sheets, and give-aways like reporter pads (something that hangs around for a while) with information about the GOMC and the indicator effort. Press conferences casting the indicators as a news event, with a supporting press kit, would also be helpful. To be most useful, information should be updated every 2 to 2-3 years with periodic alerts if conditions change, particularly if linked to seasonal or calendar events like Earth Day, Wetlands Month, National Boating Week, summer beach season, spring fertilizing.

B. Executive Summary of Interviews and Evaluation of *Tides of Change*

Twenty-five phone interviews of a target audience⁷ were conducted in January 2006 about *Tides of Change*.

1. Evaluation of Content and Format of Report

Just under a third of respondents have used the report since the Summit, primarily for educational purposes, as a reference for public and coastal decision makers, and to influence policy and strategy development. Respondents said they found the report to be a useful compilation of information, trends, issues, and stresses on the Gulf and a good starting point for tracking trends in future editions. Some noted its potential value in directing research dollars, increasing coordination among institutions and agencies, starting to quantify parameters for land use density, and as a discussion document for the 2004 Summit. Many noted that it provided a useful view of the region as a whole.

Nearly all respondents liked the format of the report, finding it to be effective, easy to read, laid out in a logical order, and doing a good job with a lot of data. Respondents generally liked the photographs, graphics, color charts, figures, sidebars, case studies, and citations. Most respondents found the report to be a very readable way of describing the issues for a large audience of lay people.

More than three-quarters of respondents believed the report provided an appropriate level of detail for an overview of the Gulf. Some pointed out inconsistencies in the level of detail of data for certain geographic areas. One or two thought the report was too long. A few managers said the report needed more specific indicators, reference points, detailed initiatives, and technical detail to make it useful to them. Several respondents noted the report would be more useful if it included additional analysis of the implications of the information for the region and strategies for how to manage them.

Several respondents noted the report is silent about the increasingly important issue of conflicting right to use of land under water and of water itself in light of recent proposals for energy production, other mega projects, and renewed interest in oil and gas development.

⁷ Interviews focused on 21 public sector respondents involved in developing policy, implementing strategies, or permitting and 2 scientists, 1 planner, and 1 user of the resource from Maine, Massachusetts, New Brunswick, New Hampshire, and Nova Scotia.

A few said they would have liked more information on achievements to date and a more extensive description of a vision and objectives for the Gulf.

One respondent noted the report needs a 5-10 page Executive Summary to highlight important findings. Another suggested that case studies should indicate if they are included for illustrative purposes, as best examples, or to point out interesting consequences. Several noted that the quality of some graphics, both in hard copy and on-line, could be improved. Other issues for on-line readers were difficulty reading columns of text and reviewing color graphs because they didn't have access to a color printer. One respondent noted the report is text heavy, but that this is a beginning.

2. Content of Future Reports

Nearly all respondents believed that future reports should describe pressures on the ecosystem and societal responses to those pressures. The report would provide a framework for a gulf-wide discussion about concrete actions to maintain or improve conditions and develop administrative indicators, or measures, of societal response. One respondent suggested the report talk about institutional failures because it is important for people to understand causes of concern identified in the report.

Nearly all respondents believed the report should describe new or emerging issues to help make people aware that there may be increasing pressures. Some suggested each report include an emerging issues section or case studies that note potential issues on the horizon, followed up with establishment of indicators to report changes in future reports.

Just over half the respondents believed that future reports should discuss efforts to develop regional indicators and efforts to address ecosystem health concerns identified in the report, because people want to know what will be done about the issues raised. About a quarter believed it very important that the organization publishing the report have a plan, a future direction – something to measure progress or lack of progress against. One respondent said that's the "so what" of the report. Another said it would be good for Gulf of Maine groups to identify areas on which to focus their efforts.

Nearly half the respondents thought the best approach to evaluating the health or state of the Gulf is for the report to tie progress to specific, measurable goals that provide a sense of evaluation and baseline for comparison when another report is prepared. Respondents didn't believe it necessary to present the data behind the goals in the report, but said data needs to be accessible to those who want it. Nearly a third of respondents liked a blend of qualitative and quantitative approaches. Some said the approach depends on the intended audience – a technical audience needing more specific information than a broader audience. Two or three pointed out measurable goals and report card approaches could be combined. One said that reporting trends is what's most important, not the format in which they are reported. Two respondents preferred reporting on progress against a specific management plan. One suggested that ESIP measure progress against existing federal/provincial/state plans like a "watch dog" to see if they are being implemented and are effective.

Approach for Next Report: More than three-quarters of respondents thought ESIP should use the same general approach for the content and format of the next report to create a companion volume. In general they liked the approach, though two or three respondents suggested adjusting the format to allow chapters to stand on their own. Another two or three suggested that a different approach to comparing problem areas around the Gulf is needed.

Four or five respondents supported a different approach. One suggested that ESIP publish an initial set of white papers, followed by workshops in each jurisdiction to expand analysis and set the stage to discuss a regional strategy and role of the GOMC at a follow-up Summit. One or two said the report should be shorter and health should be defined. Another two or three noted the current approach is a general characterization and the report should be moving toward a more quantifiable approach. One noted, however, that to change the approach, some things needed to be in place and if they aren't, the future report should follow the same approach.

The interviews suggest that respondents generally they recognized it will take time to establish a vision and measurable goals for the Gulf and to select appropriate indicators. Respondents were comfortable with the next report generally charactering the ecosystem while shifting toward a more quantifiable approach where possible. As the purpose, definition of health, and measurable goals are established, ESIP can adjust the format of future reports to the crisper, more punchy and quantitative approaches used for the Great Lakes, Casco Bay, Chesapeake Bay, and New Hampshire Estuaries.

Most respondents suggested themes for the topics planned for the next report. Some suggestions were very specific; others focused on an overall approach. Some offered insightful questions or connections that link the topic to an area with which they are familiar. Others offer thoughts about how to use the report to influence decision makers or as an educational tool. Some suggested other issue areas for the next report. Suggestions are described in Appendix B. Detailed Summary of the Evaluation and Interviews. Nearly all respondents indicated interest in contributing to the next report. A variety of ways are detailed in the Appendix as well.

3. Comments on Initiative, Collaboration, and Communication

A number of respondents commented about progress of the indicator/state of the environment initiative. Some were anxious to move to the next stage of identifying specific indicators and putting reports together. Others were concerned about a lack of clarity about the purpose of the report, which they believe has a significant impact on the types of indicators that should be tracked and the type of report that should be produced. Some expressed concern that the effort hasn't been as productive as it could be because it doesn't have a tie to the management questions that need to be answered. One respondent indicated concern that the feedback provided at the Summit is getting lost while the indicator effort is moving to the next stage and encouraged ESIP to review the feedback to make sure it is not forgotten. Recognizing the various concerns, ESIP might consider continuing its work on selected indicators, while at the same time reaching out to

various partners to establish the purpose, vision, and goals of the initiative. ESIP might consider identifying and securing funds to support this collaborative effort

A number of respondents commented on collaboration and initiatives of community groups in monitoring indicators and preparing the report, noting that the report can support and feed various coastal and ocean management programs in the region. Some noted that, as resources become more limited, there is greater need to partner and that historically the “well trained amateur” has made important contributions to efforts like these. Other respondents noted the importance of balancing health of both the environment and communities and encouraged ESIP to consider novel ways to seek broad input, embracing ways to collect input from groups that cannot make it to a summit.

Several respondents encouraged ESIP to increase efforts to communicate about progress of the indicator/state of the Gulf initiative so that the project itself becomes better known. Some suggested more public forums to vet issues raised in this report; sharing the results of the listening sessions and phone interviews, and publishing regular reports about progress of the effort. Some noted they had lost touch with the initiative since the Summit, felt pretty disconnected at this point, wondered if the effort mostly exists at the state/provincial level. Some said that without an ongoing outreach and education effort that uses the report, it will just be another report and the opportunity to use it to influence policy and decisions will be squandered. ESIP might consider preparing an outreach strategy with state and provincial coastal and estuary programs as conduits for information and coordination of disparate groups in the region.

4. Lessons from Other State of the Environment Reports: More than three-quarters of all respondents had some familiarity with other state of the environment reports. Of those who were familiar with other reports, they thought the best state of the environment reports are simple, concise, and easily understood, focus on a limited number of key issues, sometimes posing a question and then answering it in one or two pages of colorful graphics and limited, understandable text. They are easy and pleasant to read. They are written in simple language and are not laden with jargon or technical language, so they can be understood by a wide gamut of people. They include carefully selected and good visual presentation of indicators. They have a specific vision, a focus on specific issues, and strategies to solve them. They separate fact from fiction and identify limitations of the data. And they meet the needs of the organizations producing the report.

5. Comparison of Other State of the Environment Reports:

Seven state of the environment reports for were reviewed, including the Great Lakes (GL), European Seas (ES), Atlantic Region (AR), Casco Bay (CB), Chesapeake Bay (ChB), Boston Harbor (BH), and New Hampshire Estuaries (NH), all more fully described in Appendix B. Detailed Summary of the Interviews and Evaluation of *Tides of Change*. Each report is different, varying in length from a crisp 36 pages to a 451 compendium. Most reports were 76 pages or less. All were available on the web – two as part of an interactive site. Nearly all were available as a published full color printed report.

All the reports included a variety of graphics. Most used a number of photographs. All used a variety of maps, illustrative tables, charts, and raw data. Most used diagrams. Nearly half used posters, clip art, and other eye catching artwork. One used a stop-light color pressure index.

More than half used case studies. Nearly half included descriptions of partners related efforts and areas of special focus. Three described specific topic areas and effects on the environment (ICES, CBP, and MWRA). Four (EC/USEPA, ICES, EC, and CBEP) provided a detailed key or summary of findings. Three included sections on emerging issues (ICES, CBEP, and CBP). Two included definitions (ICES and EC). One included quotes and a section on "What you can do". One included a section on project milestones and a web link to additional data.

Three were tied to specific goals and/or measurable indicators and made conclusions about the status of conditions. Four made reference to future indicator efforts. Two reports provided statistics for specific geographic segments of the environment.

All reports provided references and acknowledgements at the beginning or end of the report; nearly half included references and acknowledgements at the end of each section of the report. More than half included chapters on partners.

Four were crisp, highly visual snapshots of specific indicators and trends. Two were detailed explorations of marine ecosystems. One tracked the progress of improved environmental conditions following capital investments in remediation.

Appendices

Summary of Listening Sessions, Interviews, and State of the Environment Reports

Appendix A

A. Detailed Summary of the Listening Sessions

Three listening sessions were conducted October 18/19, 2005 in Portsmouth, New Hampshire and one listening session was conducted November 21, 2005 in Moncton, New Brunswick.

1. Participants⁸

Table 1. Types of Participants – 2005 Gulf of Maine Indicator Listening Sessions

		Decision Makers	Planners	Scientists	User of Resource	Others
Coastal Development		4	2			3
Contaminants		5		4		1
Fisheries		1		4	1	2
Combined Issues		1	1		2	1
Total	32	11	3	8	3	7
	100%	34%	9%	25%	9%	22%

National – Canadian Department of Fisheries and Oceans (DFO), United States Environmental Protection Agency (EPA), United States National Oceanic & Atmospheric Administration (NOAA), United State Geological Survey (USGS), New England Fisheries Management Council (NEFMC), Conservation Law Foundation (CLF)

State/Provincial – New Brunswick Department of Environment and Local Governments (NB DELG), Maine Dept of Environmental Protection (MDEP), Maine State Planning Office (MSPO), New Hampshire Department of Environmental Services (NHDES), New Hampshire Fish & Game Department (NHF&GD), Massachusetts Department of Marine Fisheries (MDMF)

Regional – Petticodiac Watershed Monitoring Association (New Brunswick), Casco Bay Estuaries Project (Maine), New Hampshire Estuaries, Strafford Regional Planning Commission (New Hampshire), Massachusetts Bays, Regional Association for Research in the Gulf of Maine (RARGOM)

Local – Readfield Planning Board (Maine), Greenwood Land Use Advisory Committee (New Hampshire), Hampton Conservation Commission (New Hampshire), Portsmouth City Engineer (New Hampshire)

Other – GOMC, GOMC Environmental Monitoring, GOMC Working Group, JD Irving The Keeley Group, Maritime Fisherman's Union, Normandeau Associates, Portland Yacht Services, University of New Hampshire

⁸ Based on the 2004 survey, the four most important issues related to land use/coastal development were changes in land cover, acreage of large undeveloped blocks of land, effect of land use change on fragmentation of habitat of priority species, and trends in impervious cover, changes in water quality, and hydrology. The attendees/invitees to this session focused mostly on changes in land cover and changes in water quality and hydrology.

2. General Comments

- There are indicators out there. The people who have been using them need to be engaged so you don't reinvent the wheel.
- A report card is entirely different from a set of indicators used for policy decisions or investment decisions. Which are we doing? There is a clear sequential set of things to do to develop indicators.
- At Casco Bay Estuary Project, we needed to establish a baseline, then look for trends. From there, we looked for impact, whether or not there was a problem. This is a government focused planning process, which is the proper environment for something of this scale. The responsibility of the government is to make sure that the population is economically sound, so it can provide services for its population. We have to look forward several generations to make sure that the fisheries are sustainable. It's great to focus in on indicators, but you also have to look at the regulatory approach.

Table 2. Participants in 2005 Gulf of Maine Pre-Session Survey⁹ and Indicator Listening Sessions

		decision maker	planner	scientist	user of resource	other	subtotal participants	total participants
Nova Scotia							2 (6%)	
	session	1						1
	survey	1						1
New Brunswick							6 (17%)	
	session		1		2	1		4
	survey		1	2	1	1		5
Maine							5 (14%)	
	session		1	1	1	1		4
	survey	1			1			2
New Hampshire							14 (39%)	
	session	2	1	6	1	4		14
	survey	1	2	4		3		10
Massachusetts							7 (19%)	
	session	5		1				6
	survey	4						4
Other							2 (6%)	
	session	3						3
	survey	1						1
Subtotal								
	session	11	3	8	4	6		32
	survey	8	3	6	2	4		23
Subtotal Both		19	6	14	6	10		55
# Participants at More Than One Session		1		1		1		3
Survey Respondents Didn't Attend Session								
		3	1	3				7
Total Participants		18	6	13	6	9	36	36

⁹ When a participant was confirmed, she/he was provided with background materials and a pre-session survey to stimulate consideration of issues to be discussed at the listening session. Results of the survey were also used to provide insight into the design of the listening sessions. The survey was also offered to those interested, but unable to participate, in a session. The background materials and a summary of the results of the pre-session survey are included in Appendix B. Detailed Summary of the Interviews and Evaluation of *Tides of Change*.

3. Use of Indicators and Identification of Audiences

a. *If indicators of (coastal development, contaminants, fisheries) in the watershed of the Gulf of Maine were available today, how would **you** use them?*

Assess and monitor the health of the Gulf

- Compare what we're seeing in specific estuaries/watershed to the whole Gulf
- Look at issues at a larger scale
- Compare trends and statistics within region, to other regions, and aggregate data for national assessments
- Follow up on questions and issues raised by indicators to feed back and create better indicators
- Identify areas for long-term environmental monitoring
- Identify "hot spots" to define research areas and guide regulatory efforts
- Guide general research to understand how human impacts are changing the Gulf and evaluate remedial activities if we're not meeting our goals

Inform the public and build coalitions to protect and/or improve the health of the Gulf

- Educate about the Gulf and its resources to create support for policies that address problems and ensure environmentally sound development and protection
- Help public understand the science so they can get involved in regulatory aspect and influence decision making
- Identify other programs to coordinate with for a larger effect

Advise government and others about policies, investments, and programs

- Understand how development and change impacts conservation plans
- Measure how we're doing compared to project goals and objectives and direct and/or shift priorities and/or funds, if appropriate
- Identify areas of concern to target spending and measure effectiveness of those investments, including tracking changes over time
- Ensure that permitting, programmatic, and other decisions take the environmental situation into account and help strengthen state and federal regulations
- Convey sense of urgency to raise funds to conserve land
- Inform political decision making
- Influence decision makers to direct more money to research
- Develop integrated management and policy approach – see if there are correlations between contaminants and fisheries data, between land use and fisheries data, to try to identify what is happening
- Direct land use to appropriate areas

General Comments

- Involve fisherman more to develop knowledge about fisheries, e.g., where lobsters move may indicate something about the habitat

- Important for all these audiences to make decisions based on science and to insure that the science is credible

b. You've heard how others participating today, a mix of decision-makers, planners, scientists, and others, would use indicators of (coastal development, contaminants, fisheries) in the watershed of the Gulf of Maine if they were available today. Are there other ways that the indicators should be used that are more important to protecting and improving the health of the Gulf?

Assess and monitor the health of the Gulf

- Identify behavior that we want to change, provide the basis for a campaign to do so, identify partners and complementary efforts to do so
- Identify what contaminants could become pollutants with just a little push (baseline vulnerability for bioterrorism)

Inform the public and build coalitions to protect and/or improve the health of the Gulf

- Help land use regulators understand things like impervious surface standards better, why non-point source pollution control is so important, and compel them to action
- Link education and outreach programs to encourage changes in behavior and measure how that effort is going
- Understand why the federal government is spending money the way it is spending it
- Bring people and interests together to protect and/or improve the health of the Gulf

Advise government, and others about policies, investments, and programs

- Help emergency management response and insurance industry assess and understand change in development over time
- Advocate for regulation
- Connect indicators to issues and provide linkages across issues
- Have better sense of where to put money and/or resources
- Help GOMC resolve what their role should be in coastal development issues
- Drive policy and make better informed major management decisions
- Link public management decisions with other sectors
- Provide information for an ecosystem, place-based management approach
- Justify regulation, measure whether regulation is working, generate support for greater enforcement of current regulations, and focus resources where they are most needed and can be most effective
- Leverage funds to research and/or address issues
- Target funds to areas with the most serious problems

General Comments

- The general public responds viscerally to perceived problems. It's very important that the information is accurate and that people can understand and consume the information without it causing confusion/misinterpretation. Need to make sure it's peer-reviewed. Get concerned when not-necessarily accurate data is used, or

misused, and a lot of money/resources have to be spent to address problems that might not really be there.

- How do you know who you want to influence if you don't know what question you're trying to answer?

c. So, from what you are saying, there are a bunch of different types of groups or audiences for indicators of (coastal development, contaminants, fisheries) in the Gulf of Maine?

The following table is a compilation of the different audiences identified at the four listening sessions.

Table 3. Types of Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Total	Coastal Development	Contaminants	Fisheries	Combined
Congressional/legislative leaders	4	1	1	1	1
State/Provincial agencies (protection, management, infrastructure)	4	1	1	1	1
Other coastal/commercial industries (seafood, energy, manufacturing, pharmaceuticals)	4	1	1	1	1
Advocacy/Interest Groups (national; state; local citizens)	4	1	1	1	1
Researchers, scientists, universities	4	1	1	1	1
General public (Opinion Leaders)	4	1	1	1	1
State/Provincial regulators	3	1		1	1
Local officials and staff	3	1	1	1	
Federal agencies	2	1		1	
Public health organizations/officials	2	1	1		
Regional planners/commissions/land use authorities	2	1			1
Builders/development profession	2	1			1
Tourism industry	2	1		1	
Coastal property owners	2	1			1
Educators, museums, science centers	2	1		1	
Media	2	1	1		
Seafood consumers	2			1	1
GOMC	1	1			
Marine/Estuary/Coastal Groups (NEP, NEERS)	1	1			
Port authorities	1				1
Sewerage commissions	1				1
Architects/landscape designers/consultants/development professionals	1	1			
Fishermen/aquaculturalists	1				1
Private resource managers	1	1			
Contributors (Private industry + Sewage)	1				1
Lobbyists	1		1		

d. It would be hard to focus on all those groups at once. If you could only pick one group to tailor these indicator projects toward, what would it be? Why?

Three of the four sessions narrowed their list of audiences down to the two most important groups. The fourth session winnowed its list down to the three most important audiences. Combined, they include:

Decision Makers
 State/Provincial/National Policy Makers
 Public Health Officials
 State/Provincial Regulators
 Regional Land Use Authorities
 Tourism Industry
 Economic Interests (primarily fisheries)
 Fishermen/aquaculturalists
 Opinion Shapers

General Comments

- You need to decide what you're trying to change before you know who to target!
- What's the problem? What are you trying to change?
- If you're looking at improving the health of the Gulf of Maine, whose behavior do you want to change? Also, what gives you the biggest bang for your buck, since the GOMC is probably not going to have a ton of resources to invest. How do we graft this material onto complementary efforts – e.g., make it easy for Conservation Law Foundation to use it in their work.
- Public Health Officials – add credibility to the problem. To get to the lawmakers, we need public health officials that know what they're talking about so the lawmakers take the problem seriously.
- "Opinion Shapers" (Advocacy/Media) – stir the pot. Get the public engaged to put the pressure on elected officials. Elected officials are reactive, not proactive.

e. How would indicators of coastal development serve the needs of each of the groups?

State/Provincial/National Policy Makers

- See cumulative trends
- Encourage science-based decision-making – but don't throw out precautionary principle – should not be industry slanted
- Enable more proactive decision and action
- Better management of contaminants entering the environment
- Provide tool for monitoring effectiveness of programs (environmental effects)
- Justify – good indicator = good reason = good decision; help base decision making on science rather than politics^{10, 11}
- Monitor rehabilitation of habitat along the coast

¹⁰ One participant felt that the ministry should be required to consider indicators in making decisions - way to eliminate political decisions and base decisions on indications of their implications.

¹¹ One participant felt that social and economic, as well as ecological, indicators are needed to balance the triple bottom line (environment, social, economic).

Public Health Officials

- Act for the public good – fulfill their mission
- Prolong life – reduce exposure to contamination
- Improve livability (quality of life) – reduce contamination/guard against exposure to contaminants, change behavior at the individual and community level
- Influence policy making
- Increase publications
- Direct/focus resources on identified problems
- Find connections between environmental factors and disease

State/Provincial Regulators (including the GOMC)

- Know how to direct funds, prioritize resources, or focus programs
- Support existing communication/education efforts (outreach, publications, brochures)
- Support their mission
- Align mission, goals, priorities, spending – and have the indicators reflect/evaluate the effectiveness of their efforts (as the New Hampshire National Estuary Program)
- Demonstrate return for taxpayer dollars
- Improve ability to do more of the same by influencing legislators/legislatures who set the budget by demonstrating success/outcomes
- Common level of support for over-arching issues because the indicators are Gulf-wide, increase collaboration, create a unified voice and a clear direction
- Set a regional context for state/provincial action
- Improve regulatory decisions, policies, and coordination across states/provinces
- Influence local policies

Regional Land Use Authorities

- Identify type of development that is occurring and determine type of development that should be planned for
- Justify decisions they make
- Give planning credibility by linking it to indicators
- Generate support from councils who control the money
- More science-based, rather than politically-based, decisions
- Indicate which geographic areas are highly sensitive
- Enable authorities to look at cumulative trends
- Put jurisdiction into broader regional context
- Integration of ecological, cultural/social, and economic indicators may help integrate the issues they address more effectively

Tourism Industry¹²

- Financial self-interest in a healthy GOM
- Save money in day-to-day operations (e.g., not having to wash towels every day)
- Stake in keeping coastal “New England” and “Bay of Fundy” environmentally and culturally healthy

¹² There is a lot of variety within the Tourism Industry – the kayak operator vs. the theme parks, the B&B vs. a large resort

- Enable marketing as someone who is investing in the community, the future, etc., as a “green business”, smart business
- Reduce fines/costs of correcting violations, including health inspections
- Way to share information with clients/customers who are interested in the resource, the Gulf, the environment around them
- Usefulness for business planning – better planning for the “future”
- May facilitate permitting

Fishermen/Aquaculturalists

- Better resource management because better science applied to decision-making
- Better targeted research in the Gulf may improve access to resources
- Enable managers to use the existing science¹³
- See long-term indications of depleting the resource
- Show areas where aquaculture should/should not be placed, determine sensitive and degraded areas, identify at-risk fish stocks (which are not tied to fixed geographic locations)
- Identify good locations for certain size or type of harvest (can fish the resource up to “X” point)
- General confidence in the quality of the product by informing seafood consuming market about contaminants, e.g., European market permits lower levels of contaminants

Opinion Shapers

- Validates their agenda, have data to address their “issue”
- Opportunity to improve their community
- Opportunity for an exposé
- Opportunity to share new information/inform the public

¹³ One participant observed that using data from fishermen can create more confidence in indicators. Because ESIP is independent, it is perceived as more credible than others. He noted that there is still a lot of work to do with fisherman, e.g., they are supposed to declare their landings, but sometimes do not do so due to mistrust.

4. Types of Information

a. *What types of information would be most useful for each of the two groups? Why?*

The following table summarizes the combined feedback of participants at the four listening sessions.

Table 4. Most Useful Information for Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Summary Graphs	Illustrative Charts	Maps	Explanatory Text	Raw Data	Case Studies	Peer Reviewed Articles	Other
Decision Maker	X	X ¹⁴	X	X ¹⁵	X	X	X	-way they can get it fairly quickly and visually -executive summaries -visual “sound bite” -credible information ¹⁶ -change over time -computer animations
Provincial national policy makers¹⁷		X ¹⁸		X ¹⁹	X ²⁰			-summarized and directed information; bulleted points
Public Health Officials					X			-articles in Science News -researchers knowledgeable about the issues -cartoons, simple charts -detailed background information plus condensed and synthesized
State/Provincial Regulators		X	X	X	X			-stories/products that are packaged to meet needs for external education -compare to other ecosystems -consequences of not addressing the issues -detailed technical information
Regional land use authorities		X	X	X	X	X		
Tourism	X ²¹					X ²²		-things that relate to

¹⁴ Not summary graphs or illustrative charts because they portray bias, unless they are peer reviewed.

¹⁵ Useful information has been synthesized from a number of viewpoints and has some consensus behind it.

¹⁶ It must present the good, as well as the bad, news.

¹⁷ Have two needs – detail for internal consumption/for themselves; then application of that data through stories/products that are packaged to meet the need for external education.

¹⁸ Compare data to goals – e.g., use graphics like bar charts to show progress, what is left to do, return on investment, project consequences.

¹⁹ Legislators need interpretation of the data that relates to their decision making, that tells their constituents' stories. Compare to other ecosystems, including their regulatory/management components, evaluate their success, point out the consequences of not addressing the issues.

²⁰ Those developing the information and interpreting the data for the decision makers need detailed technical information linked to the meta data.

	Summary Graphs	Illustrative Charts	Maps	Explanatory Text	Raw Data	Case Studies	Peer Reviewed Articles	Other
Industry								<ul style="list-style-type: none"> their clients/customers -things that are an integral part of the tourism experience -comparisons with other places where there are serious problems -short v. long term cost-benefit analysis -brochures, posters, print ads²³ -bumper sticker, coasters²⁴
Economic (fisheries) Interests ²⁵	X	X	X	X	X	X	X	<ul style="list-style-type: none"> -way they can get it fairly quickly and visually -executive summaries -visual "sound bite" -credible information -change over time -computer animations -synthesis -articles in Commercial Fisheries News (CFN), National Fishermen, with links for more information
Fishermen/ Aquaculturalists	X	X		X		X		<ul style="list-style-type: none"> -as simple as possible -data to technical advisors, then something simple from a trusted source -newsletter -web-based text and simple data
Opinion Shapers			X					<ul style="list-style-type: none"> -Ross Perot type posters -cartoons/pictograms -flow charts -visualization/ animation showing change over time -something sensational -spokesperson -good quotes -briefing sheet -credible information

²¹ Summary graphics the way USA Today does to have more impact – bring in people with expertise in marketing and graphic illustration (print media, create icons that meld with culture).

²² Case studies/success stories of where adopted practices changed behaviors and made industry a profit, improved business, etc.

Feature the **people**. Provide comparisons with other places where there are serious problems and link to action opportunities – e.g., we don't want to be the Chesapeake Bay, but if we don't act, we might end up there.

²³ Has to be catchy and easy!

²⁴ Provide some "reward" for clients/customers – acknowledgement that they can have a positive impact/and make a difference.

²⁵ They're not going to look at it unless they really trust it. The process has to be totally transparent. And, the fishermen need to be part of it – they need ownership in the raw data.

b. Thinking about each of the two groups, at what scale should the information be reported?

The following table summarizes the combined feedback of participants at the four listening sessions.

Table 5. Most Useful Scale of Information for Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Decision Maker	Provincial/National Policy Makers	Public Health Officials ²⁶	State/Provincial Regulators	Regional Land Use Authorities ²⁷	Tourism Industry	Economic (Fisheries) Interests	Fishermen / Aquaculturalists	Opinion Shapers
gulf-wide	X	X X ²⁸	X				X	X	X
ecoregion	X	X X		X	X	X		X	
state or province-wide	X	X X	X	X		X		X	
county-wide or regional	X	X X			X	X			X
watershed-wide, estuary	X	X X		X	X		X	X	
city/town		X		X	X				
specific development (neighborhood/ developer's proposal)									
other	Management districts, congressional district	Fisheries mgt area, congressional district Depends on issue, local service district			Ecological boundaries		Depends on fishery		Varies by audience/ problem / indicator/ issue

²⁶ Trend – indicators on regional basis then find what causes specific problems, e.g., pathogens moving north with climate change/ocean change.

²⁷ Providing the broader context for land use authorities is very important. Need to understand what happens across boundaries.

²⁸ Two "XX's" indicate input from two separate listening sessions.

5. Types of Products and Frequency of Updates

a. *What kind of product would be most useful in meeting the needs of that group?*

The following table summarizes the combined feedback of participants at the four listening sessions.

Table 6. Types of Products for Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Decision Maker	Provincial/ National Policy Makers	Public Health Officials	State/ Provincial Regulators	Regional Land Use Authorities	Tourism Industry	Economic (Fisheries) Interests	Fishermen / Aquaculturalists	Opinion Shapers
black & white publication									
color publication	X	X						X	X
color publication accessible from web	X				X				
brochures						X			
GIS	X	X		X	X		X		
Interactive GIS	X	X	X	X			X		
web-based information	X	X		X ²⁹	X	X	X		X
CD-Rom	X								
posters						X		X	X
fact sheets		X		X				X	X
peer reviewed publications		X	X				X		
white papers	X						X		
give-aways						X			X ³⁰
computer animation	X						X		
other	Indices		Database raw data			Marketing campaign ³¹ press kit ³² , web ³³ , media advertising	Articles in trade magazines	Newsletters	Conference as news event w/press kit

²⁹ Timely, accurate, one-stop web portal.

³⁰ E.g., reporter pad with information about the GOMC and the indicator effort – something that hangs around for a while.

³¹ With an active element (the web) and a passive element (brochures).

³² With information for the business owner and a give-away/collectable for the client/customer (magnet, pen, pad, coasters) – funneled through associations (e.g., MLA, chambers of commerce, homebuilder associations, marina owner/operator associations, agencies engaged in tourism). Use associations to figure out best medium.

b. Thinking about each of the groups, what would be the single most useful product?

Provincial/national policy makers

Decision makers –

- 1 pager
- fact sheets

Advisors –

- web-based
- peer reviewed articles

Regional land use authorities

- color publications
- GIS

State/Provincial Regulators (including the GOMC)

- intelligent GIS, web-based information
- 1-page fact sheets

Tourism Industry

- the “kit”
- web-based information

Fishermen/Aquaculturalists

- articles in trade newsletters
- posters

c. To be most useful to each of the two groups, how often should new indicator information of coastal development be available? The following table summarizes the combined feedback of participants at the four listening sessions.

Table 7. Frequency of New Products for Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Provincial/ National Policy Makers	Public Health Officials ³⁴	State/ Provincial Regulators	Regional Land Use Authorities	Tourism Industry	Fishermen / Aquaculturalists	Opinion Shapers
annually						X	
every 2 yrs		X	X				X
every 2-3 yrs		X			X		X
3-4 yrs w/alerts/ bulletins if change	X			X			
every 5 yrs			X				
seasonal bulletins					X		
as available	X	X			X	X	
periodic alerts about changes			X				X
decadal census			X		X		
other	Election cycles		Political cycles ³⁵		Visitation cycles	Quarterly articles for newsletters	Seasonal / calendar ³⁶ events

³³ One-stop web portal – timely, accurate, easily updated/accessed, include powerpoint, images, products, rainy day kid activities; links to/from chambers, google-able – useful/targeted for tourists and industry – active (sought out and more likely to be sought out by tourists than industry).

³⁴ Depends on indicator and audience e.g., clam flat closures, beach closures; depends on the issue, whether tracking status or whether the indicator is being used for prediction.

³⁵ Legislative, budget, election, strategic planning.

³⁶ Earth Day, Wetlands Month, National Boating Week, summer beach season, spring fertilizing.

General Discussion

- Annually
- Timely information, every 2 to 5 years for publication
- Periodically for some indicators
- Has to match regulations/laws, to evaluate implementation and identify holes – report card on legislation in place
- Depends on what reporting on – landings annually, some cycles much longer; annually to 10 years, depends on data
- Measure regularly, but report periodically
- State of the Gulf Report – aggregate reporting of indicators. Frequent enough to maintain interest, but not so often to be a burden to those who produce it or ho-hum to those that read it, but long enough to actually show some change, e.g., 2-3 years.

6. Sources of Data

a. Preliminary responses to the survey question about trustworthy sources of information suggest that, in general, government agencies, academic and agency scientists, and the GOMC are most trusted, followed by NGO's, then private scientists, trade organizations, and private industry. Again, thinking about the point of view of each of the groups, what is the most trustworthy source of information on (coastal development, contaminants, fisheries)?

Table 8. Sources of Data for Audiences – 2005 Gulf of Maine Indicator Listening Sessions

	Decision Maker	Provincial National Policy Makers	Public Health Officials	State/ Provincial Regulators	Regional Land Use Authorities	Tourism Industry	Economic (Fisheries) Interests	Fishermen / Aquaculturalists	Opinion Shapers
federal government	X								
private industry/ trade organizations						X			
NGOs				X					
academic, public sector scientists				X			X		X
private sector scientists						X			
GOMC				X	X				

General Discussion

- Some don't trust private sector – perception of being bought and paid for; some feel businesses will be comfortable only with data from private sector – have greater trust because they recognize that the private sector has a common goal (to make money), it is who they would go to for their information
- Going to coalitions for information – looking for consistency across groups (federal, state, NGO and private agreeing on the data) which will serve as a translator regarding who is credible
- Portsmouth session suggested fisheries don't trust federal government/academic scientists while Moncton session suggested that only academic scientists are trusted.
- The more independent, the more credible
- Trustworthiness is a matter of a number of things. Is it interpreted data or is it raw data?
- Depends on whether they can see the methodology

b. One respondent to the survey suggested that it is not the source, but the methods used that engenders trustworthiness. Should ESIP develop minimum standards for inclusion of data collected for its indicators?

Support for Standards

- Yes, absolutely. How the data is collected and how it's presented matters a great deal – goes to the motivation/spin issue. Standards are one way to address that concern.
- ESIP will always rely on others for data, so transparency of meta data and data collection methodology matters as to whether you can "trust" the data.
- If you have an accepted methodology, it doesn't matter as much whether the data comes from an NGO, the feds, or a state/province.
- When you have a coalition, it is how they behave when you have a problem with the data.
- Yes. Not necessarily methodology, but some QA/QC.
- Yes. Before data is entered into the database, there should be consensus that the data was collected appropriately.
- Cooperative research
- Peer review of the research
- QA/QC; review before data is accepted
- There should be protocols for the data that gets collected and included.
- People tend to trust their peer groups – justification for a collaborative peer review group.
- If you want buy-in, need to include people you want buy-in from to get their stamp of approval.

Exception for Qualitative Data

- Minimum standards work great for statistical analysis, but don't work very well for qualitative/anecdotal data, e.g., fishermen report a large number of juvenile fish in a particular area, but isn't part of the standard stock assessment procedure. Provide

for rejection or use of data as background/sensitivity – publish comment, leave judgment to peer review.

Relationship to Coalition for Funding

- Raises question of who is going to pay for indicator system – this can slant the perception of the process. Generally agreed that funding needs to be collaborative as well. Need funding from multiple stakeholders – the appearance is important. Does not need to be equal percents, but there does need to be equal say.

c. Are there any areas that I haven't asked questions about that you would like to discuss?

- Groups once again raised the issue of the need for clarity about the intent in preparing indicators of the health of the Gulf – why is ESIP doing it, for whom, and the overall context.
- There are some forces out there developing baselines (RARGOM developing track for NOAA/Gulf of Maine Ocean Observing System (GoMOOS) – Evan Richert and Josie Quintrell are working on developing a governance structure], but we don't really know what they mean (in terms of ecosystem-based management). National Science Foundation also has a coastal ocean observatory system planned in addition to NOAA's Integrated Ocean Observing Systems (IOOS)
- The GOMC is undertaking this State of the Gulf Report, but there are a lot of other organizations or activities that are also developing indicators – NOAA, GoMOOS, Gulf of Maine Partnership. It's not clear that there's much communication between these groups to bring them together. It's not clear that the GOMC really has the resources to do this.
- This is a good example of how we're not doing ecosystem management; we're not weaving the pieces together. This could be the beginning of forming real regional councils on an ecosystem level. Starting with the observing system, then the modeling center, and then moving up to management framework... And, when **there are goals set**, the GOMC could play a role in reporting on indicators of those goals.
- Slippery slope is setting goals; that's where the detailed/hard work is
- The estuaries programs are a good model – there are things they don't have (regulatory or policy-influencing power), but there is something to be learned from the structure.
- Everybody knows there are significant oil and gas resources off the Bank, and this is coming off the table in terms of protection. The Council should be establishing, in advance, criteria for the preservation of the resource (e.g., wind farms, oil/gas exploration). Add economic component.
- In addition to focusing on fish as an important component of the Gulf, I want to look more broadly at marine life, other critters and plants, trophic levels, habitat, biodiversity.
- In the shrimp industry, shrimp were protected to the extent where the shoreside/support industry fell apart, so when the shrimp came back, there was no

market left. There was no thought about the regulatory impact on the commercial side. The indicators need to reflect fishermen and fishing communities

- Why I like ecosystem management. People are in the ecosystem. Also when you think about fish, you need to think about economic components (trends and future markets).

B. Detailed Summary of the Interviews and Evaluation of *Tides of Change*

1. Interviews

a. Who Was Interviewed

Twenty-five individuals were interviewed as follows:

- 4 in Maine,
- 5 in Massachusetts,
- 5 in New Brunswick,
- 5 in New Hampshire, and
- 6 in Nova Scotia.

Respondents, identified by ESIP, who were successfully interviewed, include individuals at a variety of state, provincial and federal agencies, and other interests as follows:

Table 9. Who Was Interviewed – 2005 Tides of Change Interviews

<i>State or Provincial Departments</i>	
	Marine Resources
	Environmental Protection or Services
	Coastal Programs
	Fish and Game
	Agriculture and Fisheries or Agriculture, Fisheries, and Aquaculture
	Environment and Local Government
<i>Federal Agencies</i>	
	Canadian Department of Fisheries and Oceans
	Environment Canada
	US Environmental Protection Agency
<i>Other Interests</i>	
	Atlantic Salmon Federation
	Acadia Center for Estuarine Research

A concerted effort was made to focus on public sector respondents involved in policy development, implementing strategies, or permitting because they are the target audience for state of the environment reporting. Other respondents were identified to fill in gaps in representation by participants at previously conducted listening sessions.

Though the survey was designed to take approximately 20 minutes, many respondents were very interested in the subject matter, and most interviews lasted about 30 minutes. Some stretched to 45 or 50 minutes.

Of the 25 respondents, nearly two-thirds were familiar with and had previously reviewed the report. About a third reviewed the report for the first time in anticipation of the survey.

b. Use of the Report

Two respondents used the report 10 or more times; one primarily for educational purposes and the other as a reference tool for public and coastal decision makers. Other respondents who had used the document since the Summit indicated they used it only a few times, and then, as a general planning reference, compilation of information, background for planning a state of the environment report, broad focus on ecosystem management, and in one case to use some of the indicators for assessment of smaller watersheds.

Four respondents indicated they had used the report to influence policy and strategy development. One used it to help prepare the GOMC Action Plan; another to affirm the focus of provincial marine policies; a third to work with salmon and aquaculture issues in the inner Bay of Fundy; and a fourth to focus and frame strategies for data management and sharing about indicator development with the GOMC and GOM Ocean Data Partnership.

A number of respondents noted the value of the document as a compilation of information on the Gulf to “set the context to look at overall issues”. It was thought to be useful for educating legislators, agency decision makers, stakeholders, and interested members of the general public about the complexity of issues and challenges in ecosystem management. Others thought it could be summarized into Fact Sheets, as support for development of an oceans management/zoning policy. One respondent noted its value in providing a “snapshot in time; its true value will come out in 5-10 years” in reporting trends about the health of the Gulf.

At least two respondents noted its potential value in directing research dollars and increasing coordination among institutions and agencies. Two respondents identified its usefulness in bringing various interest groups together and increasing communication and knowledge about the Gulf.

Another said he found it useful in starting to quantify parameters for land use density. Another noted the report was basically a discussion document for the Summit and he had lost sight of the indicator/state of the environment effort since he hadn’t been contacted to take part in further work.

At least one respondent said he couldn’t “say it has not been useful, but I hadn’t needed to use it for anything pressing” on his agenda. Another indicated he didn’t expect he would use the report because it was too broad a scale (“It’s hard enough to get people to understand that what they do affects Great Bay, much less the Gulf of Maine.”) and, though potentially useful at a “higher policy development level”, was not relevant to his day-to-day work.

c. Content of the Report

(1) Usefulness

Sixty-eight percent of respondents found the contents of the report useful. Most respondents believed the report is well written, easy and interesting to read, and provides an appropriate level of detail for an overview of the Gulf and “assessing challenges for the Gulf in terms most understand”. One respondent said the “purpose of this report was to do a state of the environment report...for an event that was attended by a large, diverse group of people. It is most useful in its current format for the public or someone looking for information about the GOM to cite in something they are working on – so given that audience, it’s perfect”.

For some (2-3 respondents), the content was useful largely to prepare “fairly focused individuals” for discussion of indicators at the Summit, “generally bringing together...many perspectives of interests in the GOM” and identifying the types of indicators currently being tracked.

For one respondent the report “was consistent with actions/approach to achieve the vision of the GOMC...and reaffirmation that we’re going down the right road in terms of ecosystem-based management.”

For some it was valuable in providing a succinct overview of trends, issues, and stresses in the Gulf, “backed by reasonable and pretty understandable scientific documentation”. It was seen as “not too science heavy or light” and was “written so that people will understand it even though some areas were technical”. It was viewed as useful to build “understanding by politicians” to encourage more funding for restoration efforts, “to help community groups see the interdisciplinary nature of their work”, and beneficial “to advance the focus of multi-system/stakeholder approaches”. Some noted it was a good starting point, but requires the next step of tracking trends and said to be really useful, the document “will need to be updated, be a living document every 2-3 years to see if things are getting better/worse...refining some of the indicators as we find they are necessary”.

For some respondents (4-5) the report summarized familiar information associated with the Gulf ecosystem in one place, providing a different perspective from “the way I normally think” and a useful look at the region as a whole. In some cases (2-3), it offered a view of management techniques different than those with which they are most familiar. Several respondents (7-8) noted it provides a lot of good data, graphs, charts, and trend analysis of ecosystem indicators. Others (3-4) noted that amid the familiar information, they found an “eye opener” (“I was astounded by how much area is dammed”).

One respondent noted the report provided an “interesting look at the GOM as an organism, though it was not meant to be described this way, but as a discrete environmental entity with forces acting on it and beginning to shape cause and effect observations of land use patterns, contamination, and corresponding effects on water quality, its impact on species, and introduction of nonnative species. All these things are hugely complex problems that

interact in ways we're not really sure of. The report helped to define those independent elements and how they interact with each other in this environment.”

Several respondents (8-9) commented on the section of matrices and its “stop light” approach of colors indicating level of stress. Some (2-3) said it helped identify “red flags” or “hot spots” and areas “where funding should be allocated”, while others (5-6) questioned the methodology used to identify the areas and questioned whether the designations reflected “people’s opinion at forums or was based on scientific information”. Some (2-3) found it useful while others (3-4) said it “didn’t do much for me, except for identifying variability in different areas.”

At least one respondent noted his concern that the discussion of health and state of the Gulf was not balanced with the health and state of the economy of the Gulf. He suggested the report try to strive for a more balanced approach. He also noted that it is often difficult for fisherman/aquaculturalists and other small business interests to participate in a forum and that it is important to get their input in other ways (e.g., go to them to solicit input if they cannot participate in meetings and forums). Another respondent said the report provided him with “more focus on economics than he usually has”.

Some respondents (4-5) indicated the report would be useful as a source of facts “to hinge ideas on”. Others (2-3) noted they would use it as one source of information, not the “final word or authority” for their research. One said she used the glossary to prepare a glossary for another report she prepared.

Several respondents (5-6) noted the land use chapter and the 10% impervious surface threshold in watersheds was interesting, especially since actual growth patterns are the opposite of those recommended to minimize water degradation.

A number of respondents (4-5) commented on the history of development of the Gulf section, some (2-3) saying they found the section useful in providing an “overview of what/how land use contributes to contamination...establishing a rational basis of planning in science” and is “great from an educational standpoint. It surely sets the foundation for where we are today”. Another said it identified an “accumulation of issues...no one group is to blame, but are all part of growth, development, industry, pollution from outside the areas which has had cumulative effects that have created impact on the ecosystem”. One notes “these changes occurred over a long time. We can’t get the system back in shape over night. It will take time, but in collaboration we can make it happen”. Others (1-2) said the history section was interesting, but not particularly useful for them.

(2) Level of Detail

More than three-quarters of respondents believed the report provided an appropriate level of detail to provide an overview of the Gulf.

Some respondents (2-3) pointed out inconsistencies in the level of detail of data for certain geographic areas; sometimes more detailed in the states; sometimes more detailed in the

provinces. One respondent suggested the report would be improved by fleshing out “areas that are lacking”. Another noted the lack of Canadian socioeconomic data, said he had encountered the same problem himself, and wondered whether the data is “readily available”. He also noted it is “more difficult to achieve a more holistic approach if the data is lacking”. At least one respondent suggested that it would be helpful to know why data is missing, whether it is because it isn’t available or if there is another reason.

Some respondents (2-3) noted the report provided a lot of detail, “but anyone who studies the Bay will understand that many variables make the ecosystem work”. One pointed out the report did a decent job of “carrying out the discussion in literate terms, not just scientific terms”, which is needed. Another indicated that the level of detail is appropriate for an “informed public”.

Some respondents (1-2) believed the report was too long, one saying it “should be under 30 pages”. One said “in general, these reports have to be skimmable so if someone just flips through it, they can come away with the message. If you can’t skim it and get the gist, you will miss a lot of the audience”. He said the “way we do the New Hampshire State of the Estuaries report is to ask a simple question and give a simple answer; follow it up with all the backup you want. Keep graphics just to the point you are trying to make, so the reader is not distracted by other graphics”.

Others (2-3) noted that for their purposes as a manager who deals with things that are much more specific, the report provided too little detail to be useful. He also said that he “would expect to go to other places to get it”. Many respondents (5-6) pointed out that the references section of the report was good and provided the opportunity to find more detail, if it is wanted. Some (2-3) noted as the region gets into “true oceans management”, it will need more specific indicators, reference points, detailed initiatives, and technical detail. Some (3-4), in saying the content was not detailed enough to be useful to them, added that, given the nature of the report, they didn’t think the report “could have provided enough” information and didn’t “want to make the report into a technical document that would be useful for me. It would lose its effectiveness”.

One manager said the detail of the report is great for regional understanding, but “if I try to use it locally, it’s not adequate”. To be useful it would need to provide greater detail for his jurisdiction, which he didn’t see as realistic.

Another manager said “what would have been really useful for me was a bit more analysis of what the information means ... what the implications are for the region and development of strategies for what to do about it”. She said the “land use section had some suggested strategies in it, but...we really didn’t get a chance to talk about the implication of this stuff...the Summit was focused on ... indicators instead of what to do about them. In addition to the report, we need to reinforce the material presented in face-to-face meetings.” One respondent said “to make it more useful it would connect the issues in the GOM to the issues on the land”.

(3) Suggested Changes to Content

Several respondents (9-10) noted the report is silent in one area of increasingly urgent need – conflicting rights of use to land under the water and to water itself. In light of renewed interest and recent proposals to site energy production (liquid natural gas terminals, wind farms, natural gas pipelines, nuclear power, tidal power) and other infrastructure (telecommunication lines, docks and piers) and the approaching termination of the moratorium on offshore oil and gas exploration, they believed the additional information would improve understanding of the state of the Gulf and what the future may hold in store for it. One respondent noted energy issues, in particular, are “important because impacts on the Gulf have often been in relation to energy”. Another suggested uses like desalination plants and aquaculture, uses of water itself are increasing, and the report needs to “look at living organisms that use the water, and not necessarily any other habitat”.

Another respondent would have liked to have seen more information on the historically strong link between fisheries of the Gulf and the major rivers of the Gulf. He noted there was little information provided on the importance of those rivers to diadromous fish and declines in groundfish populations and a lot of new information has become available on this over the last couple of years.

Other missing areas identified by respondents included more information on the human component of ocean use, achievements in the Gulf, and a more extensive description of the vision for the Gulf.

One respondent, when asked what he would change to make the content of the report more useful said he was “not sure he would want to change this particular report. What he would first do is sit back and figure out what overall objectives we are trying to achieve in the GOM, then from that, to characterize the ecosystem, stresses on the system, more technical documentation to get to what we are trying to address – conceptual and operational objectives, then have a more technical dialog on how to achieve them. This report does everything up until the technical objectives.”

d. Format of the Report

Nearly all respondents liked the format of the report. They found it to be effective, easy to read, laid out in a logical order, and “did good job dealing with a lot of data”. One respondent said it is “reasonably clear and presented in a way I could get my hands around”. Respondents generally liked the photographs (“when I got tired of reading, there were pictures for relief”), graphics, color charts, figures, sidebars, case studies (“particularly for someone who might not read the entire report”), and citations. Most respondents (15-16) found the report to be a “very readable way of describing the issues” for a large audience of lay people.

(1) Suggested Changes

One change in format a few respondents (2-3) noted was the addition of a 5-10 page Executive Summary in the beginning to highlight important findings, “then, if necessary, I’ll read the remainder of the report”.

One respondent observed it was “not often enough pointed out whether the case studies are just examples to illustrate kinds of problems or if they are the top of the heap”. He recommended adding statements to case studies that “begin to pull out more interesting consequences in the Gulf of Maine to provide a sense of balance and point out its particular relevance to the reader”.

Several respondents (5-6) noted the quality of some of the graphics, both in the bound, hard copy and on-line, could be improved, especially when the reader tries to zoom in for detail. Text in the graphics, again both in hard copy and on-line, was sometimes blurry. Another issue for on-line readers was difficulty reading down a column of text on the page, then having to go back up to the top of the page to read the next column. Others expressed difficulty reviewing some color graphics because they didn’t have access to a color printer. One respondent suggested that colored matrices could have been done “with patterns instead of colors to survive a black and white version”.

At least one respondent said “some of charts are a little hard to work with (in the contaminants and fisheries sections”. She also noted the report “is text heavy, but that this is a beginning”. She said her agency “ran into the same thing when it started its State of the Coast reports in 1998” and with subsequent editions they had achieved a crisper, shorter, and more to the point product and expected the State of the Gulf report would do the same.

One respondent noted that he hoped the report is recyclable. He said we “should always make sure we can recycle our documents”. He said he liked the fact that it is available on-line at the GOMC web site.³⁷

One respondent said he didn’t find the format of breaking down information by states in the fisheries section useful.

(2) References

Respondents were fairly evenly split in their preference for the placement of references at the end of the section on each indicator (6) or at the end of the report as a whole (7).

Some felt that references should be placed at the end of the section on each indicator “because reports like this don’t often get read completely”. They said readers often focus on sections “of pertinence or interest”, so it is important each section be self-contained. Others said it’s easier and quicker to find footnotes and references if they are close to the

³⁷ Please note that at least half of the respondents were directed to the Summit website to review or download the report, greatly facilitating the conduct of these phone interviews.

section rather than “going back and forth” or wading through a lengthy list. One respondent encouraged “reflecting back to who the report is for, who we want to read it, who we want to take up challenges presented in it. If it’s professionals involved in management decisions or scientists involved in coastal management, if we don’t have to pursue people to get involved, it’s fine to put them at the end of the report; but if we hope to use the report to engage more people outside of that community, then we have to provide them with easiest way to deal with the report...members of the public will be more likely to go to the end of the chapter to know where the information came from or where to go to get more information.”

Alternatively, some respondents preferred to see the references collected and provided at the end of the report, so they are in one ready, convenient reference. One respondent noted he had “been trained to put references at the end”, he reads “through the document to see what it’s about, then looks at references to see what it’s been based on.” Others indicated the report is an “interesting read” and preferred the references be collected at the end so they don’t interrupt the text. Some respondents liked the way *Tides of Change* numbered each reference, so it could be more readily located. Some indicated if references are all at the end of the report, to “make sure they’re in subcategories, because there are so many scattered throughout the report, they are not easy to find.”

A few respondents qualified their preference based on the length of the report. One said if the report is short with every indicator section taking about two pages, then his preference is to put the references at the end of each section “in case people want to photocopy each section as a fact sheet; but if the report is longer, put the references at end” because otherwise, it will break up the flow of the document.

(3) Acknowledgments

Just under half of the respondents (11) thought groups who collaborated in the collection of information and preparation of the report should be acknowledged at the end of the section on each indicator, rather than at the end of the report; because it provided the groups a “higher profile”. Some (4) noted placement at the end of each section helps keeps those groups in people’s minds and if they are put at the end, people may lose sight of what each group contributed. One respondent said acknowledgements “may deserve a final section in the report itself”, noting “collaboration is a necessary ingredient to the whole program...helping someone doing research makes the connection to the right group.”

Others (4) noted the reader may ask “who was involved in this effort. They won’t be able to sort that out if they need to find them in a long list of acknowledgements at the end of the document.” One respondent went on to say that this could result in duplication because some groups might provide information for a number of sections, but didn’t see this as a problem “given the significance of people and ideas and the ease of access to it.” Others (3) noted knowing what group has contributed what information might be informative to other groups as well, including resource users, environmental lobbyists, government managers. “It would help the reader put it in context to see if it’s balanced or if it’s an agenda. If it’s at the end, the reader may not get around to even looking at it.” Another

respondent thought acknowledgments become “part of the justification of why a particular indicator was used and the value of that indicator.”

Some (1-2) reiterated their preference that each section be as “self contained” as possible and placing acknowledgments at the end of each section helps do that. They noted if the report “is used as a reference of who contributed to the report or was involved, keep acknowledgements with the section. At least with this report, it was large with very different topics and quite a different list of contributors to each section.”

A much smaller group of respondents (2) believed acknowledgments should be put together at the end of the report. One said “given that this is a collaborative approach, I would rather see it all summarized at the end.” Some (1-2) supported putting the acknowledgments in one place so all contributors get equal recognition, especially since “specific contributions to a table or paragraph are lost anyway”.

Another group of respondents (2) indicated alternative preferences. For some, it depends on the level of involvement the group had with the report. “I can see some groups, who are very involved in development of the report, acknowledged at the beginning. If they are particularly involved in a section, put them there. Acknowledge those groups that had general involvement with the development of the report at the end. Put acknowledgments of folks where it’s relevant to their level of engagement.” One respondent suggested the editors’ names be on the front cover. “If we have significant contributors, let’s put them all up front and center. They’re a big part of this.” Another said he thought “that everyone who collaborates should be placed in a prominent place in the report”.

One respondent noted one place in the *Tides of Change* where “there was a little box that noted that most of the references in this chapter come from “X”. It is nice to read the acknowledgement in the beginning, as long as it’s not long...one to two sentences, to know where the information is coming from, so if I perceive some sort of bias, I know it up front.”

One respondent said he’d “like to see one section in the report talk about all partnerships. It’s important to have one area where we hammer home collaboration and scientific consensus.”

(4) Technical Appendices

Just over two-thirds of respondents believed the report should include a separate set of readily accessible technical appendices for those who want them, though most (9-10) said it needn’t be a printed document if it can be accessed electronically. One respondent noted “reports that have a summary and then technical detail are useful because then can reach a wider audience”. A few respondents (1-2) suggested it might be appropriate to have a few printed copies available to those who don’t have access to the web and who request them. One respondent liked the approach of putting appendices on a CD, noting that “web links aren’t permanent”.

Most respondents (7-8) felt it was important the report does its “best to explain the technical information in lay terms” and isn’t a “huge document”, saying “we can’t afford to swamp the report” if it is intended “as an inducement to people to become more concerned/aware about the GOM”. Some (2-3) pointed out “policy folks don’t necessarily have a lot of time to read technical information.” Most (11-12) said it is a good idea to have technical appendices “accessible and easy to look up” “so those that want to delve further, can” to evaluate or use the raw data. Some (4-5) said it is good “buttress” the report with separate technical appendices. It “lends a degree of credence to the report...it’s important they’re very well documented and based in scientific inquiry rather than someone simply forming a summary opinion.” One respondent noted the technical appendices allow the reader to “ground truth...to get a better feel about whether the report is balanced or has an agenda”. As discussed earlier in this report, the New Hampshire Estuary Program does its technical report first, then, decides which parts will be summarized in the printed state of the environment report.

A smaller group of respondents (3) believed a separate set of technical appendices is unnecessary or undesirable. One said “if the report has a good executive summary at the beginning and a summary at the end, that’s what I can give to my congressman.” Another said he “didn’t think it was necessary. All the references were there. If people wanted to dig into it, they could do so. Perhaps if future reports are more results oriented against a performance goal, then there would be more need for technical information/appendices.

One respondent suggested “actual references be made available on the web, rather than just referencing them, because some references are not necessarily available in the library if they are not published in a journal”.

Another respondent said it “depends on how this thing develops. If there are 100 indicators and a lot of technical background, I would probably split it up. If we decide to focus on 15 indicators and it’s more a public outreach/education piece, it should be one document”. He pointed out if we want to reach both the public audience for outreach purposes and the technical audience, we’ll need both a “boiled down, plain English, subset of indicator information and a more technical document”.

e. Lessons from Other State of the Environment Reports

More than three-quarters of all respondents had some familiarity with other state of the environment reports. Nearly a third of those with familiarity had participated in preparation of other state of the environment reports.

Of those who are familiar with other reports, nearly a third described general things they liked about the reports, rather than identifying a specific report. Those that referred to a specific report identified reports by the Casco Bay Estuary Partnership, Maine, New Hampshire Estuary Program, *Tides of Change*, Great Lakes, Mass Bays, Environment Canada, Nova Scotia, New Brunswick, International Council for Exploration of the Sea, and Chesapeake Bay. Nearly every respondent who indicated familiarity with other reports

identified a specific approach or technique as why they thought it is the best state of the environment report.

In general they thought the best state of the environment reports:

- are simple, concise, and easily understood. Some respondents thought the New Hampshire Estuary Program (2), the Casco Bay Estuary Partnership (3), and the Mass Bays Program (2) do a good job with their reports. They focus on a limited number of key issues, sometimes posing a question and then answering it in one or two pages of colorful graphics and limited, understandable text.

New Hampshire Estuary Program's approach is to select a limited number of indicators to report on each year. It's Technical Advisory Committee, which is made up of researchers, regulators, and federal agencies, collects and reviews data on a large set of indicators to prepare a technical report. This peer review helps make sure data is being used/interpreted correctly. Its "Technical Report" is then presented to a Management Committee that decides which indicators to put in the report. The content of the report will change year to year, some indicators will be the same, some will be replaced by others, some will be brought back again another time. The Management Committee looks for those indicators that are the most current (if they are periodic) or those that "tell the best story". The process involves both "technical and policy decisions which can't be made...without reviewing the data. The most important thing is that those decisions be made by as broad and capable decision makers as possible." One respondent, in discussing New Hampshire Estuary Programs process said "we have a process people understand... and know how they can engage in it".

- are easy and pleasant to read. Respondents identified reports prepared by Nova Scotia, Casco Bay Estuary Partnership, Environment Canada, and Tides of Change as good examples of reports "written in simple language" and "not laden with jargon or technical language". They described the best reports as written to be "understood by a wide gamut of people" and well balanced with "comprehensiveness and examples people can relate to". One respondent said she "easily understood what they are trying to tell me".
- include carefully selected and good visual presentation of indicators. Some respondents (3) noted the Great Lakes' color coding index fairly simply shows trends for various indicators, "where they are reported, and how much information they have". Other respondents identified the Casco Bay Estuary Partnership report's use of graphics (3). One liked the use of a map showing the extent of indicator in the beginning of each section of an unspecified Maine report. Several respondents (4-5) noted the color graphics on forums in *Tides of Change* "doesn't tell you very much".
- have a focus, a specific vision of, key problems, and strategies to solve them. Respondents identified the Chesapeake Bay, International Council for Exploration of the Sea, Great Lakes, and the Land Use Chapter of *Tides of Change* reports as

examples that include these approaches. Some respondents (2-3) noted the best reports provide an “overview that people need to get”, state of the environment reports “often get bogged down in detail”, and the report should provide the “bigger picture” appealing to “a wide variety of audiences”.

One respondent noted the Chesapeake Bay report “holds people’s feet to the fire” which can generate bad news, “that is disempowering and a downside to having quantifiable goals”. He suggested “we need to have a discussion about whether to adopt a quantifiable approach...It’s difficult to come up with numbers, but on the positive side, the press picks up on” the report. One respondent identified the report produced by International Council for Exploration of the Sea as “good because it gave a better vision of where they are trying to go with respect to ecosystem management, describes stresses and strain, plus the condition it wants to get to in the future”.

One respondent noted the *Tides of Change* report is one of the best he has seen in terms of its land use discussion. He said, “The New Hampshire report is most useful to me because it provides more specific data/information on the region I’m in, but its land use descriptions are much more superficial. *Tides of Change* goes into much greater depth about problems and a strategy to solve it.”

- separate fact from fiction and identify the limitations of the data. One respondent said “Those that are particularly good are good because they separate fact from fiction; they separate emotion from reality”. Another pointed out “The best include limitations of the data, showing where we are missing information”.
- meets the needs of the organizations producing the report. One respondent, who was familiar with many state of the environment reports said “I don’t know if it’s fair to say that any one report is better than another. Each report was developed to meet the particular need of that region/program/ecosystem. Among the 28 US estuary programs, they’re all different...Why it is best is because it meets needs of that organization”.

f. Approaches to Evaluating Health of the Gulf

(1) Specific, Measurable Goals

Nearly half the respondents thought the best approach to evaluating the health or state of the Gulf is for the report to tie progress to specific, measurable goals to provide some sense of evaluation. One respondent said “If we are going to dwell in this area of indicators and state of the environment reporting, we need to establish expectations and translate them into measurable goals. We might use indicators as proxies of achieving larger goals or a series of indicators to see if we are moving in a general direction, but if we are going to make progress we have to figure out what progress we want to make, measure it, and report it.” Another respondent said he thought the report should provide measurable indicators and establish a baseline for comparison when another report is prepared. Respondents didn’t necessarily believe the data behind the goals had to be

presented in the report, though they think data needs to be accessible to those who want it. One respondent believed measurable goals “allows us to work within our own jurisdiction to see how we contribute to those goals from a science to management and back perspective...if your watershed is a major contributor of “X”, you can help achieve some of those goals by looking at “X”; but if it’s not a major contributor, you can look at other things. Having measurable goals allows an allocation of actions to be more beneficial to the entire region”.

One respondent noted Chesapeake Bay “did a huge retooling of its indicators because it needed to statistically determine whether it is attaining its goals and communicate that to lay audiences. The Chesapeake Bay report includes a graph and bar with an indication of where conditions are. Its readers have never seen the Bay Management Plan; they don’t have to read the text; they are not reliant on you for an interpretation.” He noted that a measurable system is “harder to set-up...but once set up, it’s a powerful tool. It forces people to focus on the real issue. No one disagrees with the goal of improving the environment, but the bottom line is ‘are we having an effect’. That’s what people want to know.”

Some respondents (2-3) noted that providing information against a measurable goal allows the reader to make his or her own assessment. One respondent noted various readers have different points of view and it is “wise to let the reader make his or her own judgment”.

(2) Blend of Approaches

Nearly a third of respondents liked a blend of approaches. One respondent pointed out “some indicators lend themselves to more qualitative techniques; others to a report card format; others can use quantifiable measures. I think the best ones are quantifiable and would be wary of comparison to management plans because we are not sure if the goals of the plan are tied to the goals of the indicators.” Another pointed out you need to look at the intended audience. “If it’s technical, use one approach; if not, another...the traffic light for zones of indicators...is effective for describing a large amount of information – is good for communicating to a large audience. For a technical audience, you need more specific information.”

Some respondents (2-3) pointed out measurable goals and report card approaches could be combined since “a report card is an outgrowth of measurement against some standards. As far as communicating the state of the environment, this combined approach is most effective. A report card reports how well we are achieving specific measurable goals, which is difficult to do sometimes because we won’t see changes over the timeframe of the report.”

Some respondents (1-2) like a combination of measurable goals and management plans, such as the GOMC’s Action Plan and some measurable goals. One respondent pointed out “quantifiable goals are meaningful for looking at historical trends as well as for looking forward”.

One respondent said what is “most important is trends, so how we report trends doesn’t matter as long as a trend is evident and over a fair amount of time (10 years as a minimum goal)”.

(3) Specific Management Plan

Some respondents preferred reporting on progress against a specific management plan.

One respondent noted the “GOMC doesn’t have a direct mandate for resource issues in Gulf, but...a lot of agencies on the federal/provincial side have management plans”. He believes it would be good to measure progress against those plans, rather than the GOMC preparing its own management plan, to see if they are being implemented and effective “instead of setting up a whole regime ourselves, with no mandate to do anything about them...We can certainly address education, collaboration, participation, but not much else. For example, the indicator approach is the same thing. The federal government in Canada, under the Oceans Act, should do it. They have the mandate, resources, management plans that directly impact the Gulf. Then the GOMC can keep an eye on indicators established by those agencies and evaluate whether they...are...being addressed by those that have a direct mandate. I wonder whether we should be doing this ourselves; who should pay; do we have a mandate. Rather let those that have the mandates, do it, and the GOMC serve as watch dog.”

(4) Report Card Approach

Some (3) respondents preferred the report card approach.

One respondent noted a lot of people prefer a measurable approach, but he is “not sure how we can even decide on categories...to the extent that we have quantifiable goals, that’s important; but...it’s time consuming. Maybe we can transition from a general to a more quantifiable approach over time”.

Some respondents (1-2) noted a set of measurable criteria has to be behind a report card to allow one to offer an assessment. One respondent noted he likes the “stop light approach and is not sure whether we need to get a bit more detailed and shift to a report card”.

Most respondents (1-2) who like the report card approach respondents prefer general indications of progress rather than letter grades. One pointed out he likes to “talk about improving or not improving. If something is not improving, it doesn’t necessarily make it bad. For example, if you have a huge increase in population and water quality remains level, that’s actually a good thing. That’s why letter grades are not my favorite. The interaction of resources is pretty complicated.”

One respondent said he never liked the report card approach. He pointed out it is “hard enough to come up with one measurable goal; it’s “too much to score A, B, C, D”. He said people don’t take it as seriously and it’s somewhat arbitrary. If you tell them it’s a C or D;

that means something to the public, even if it's not appropriate. If instead, you look at a graph, we're at 20 and trying to get to 25, that means the same thing to everybody.

(5) General Goals

The smallest number of respondents supported tying the report to a set of general goals. Those that support this approach believe it is “nice to think we could come up with a suite of nice, clear indicators to measure against a set of objectives, but it's hard to do; so we should try to report against a set of general objectives...with a mixture of descriptive reporting and a suite of indicators”.

g. Approaches to Describing Issues

(1) Pressures on the Gulf

Twenty-two of the twenty-five respondents believe the report should describe pressures on the Gulf and societal responses to those pressures.

Some (4-5) believe it provides a “framework for discussion that is relevant to all of the jurisdictions around the Gulf, tends to blur the political boundaries, and allows articulation of issues on a gulf-wide basis”. Some (5-6) see description of pressures and responses as “the greatest value” of the report and “indicators are useless without answers to the ‘so what’ question”, making “people aware of the state of environment, as well as influence behavior of individuals, organizations, institutions to either maintain a state that is good from an environmental standpoint or to improve a degraded state”. Others (1-2) see these descriptions as a good way to educate people and get them thinking about those pressures. If people “have a thorough idea of conditions now and how we got there, then we'll be in a better position to say what needs to be done”. Some (2-3) believe with an informed target audience, “we can go to legislators and senior bureaucrats”. Others (2-3) see it as “more informative to management and getting into concrete actions in relation to meeting your objectives...it starts to get you towards a Pressure State Response system. One said “it's disingenuous to just provide the material. We should say here's what we think. People are smart enough to draw their own conclusions. There is nothing wrong with reaching some conclusions.” Another added it “should be informative to know if we are not addressing or addressing the pressure in a way that adds to the stresses”. One respondent said he thought societal responses should be “put in the executive summary”. Another pointed out we don't necessarily need to talk about responses, but “institutional failures” because “it's necessary for people to understand the causal issues related to degradation of quality of environment and what can be done about it. It's not enough to describe the state of the environment. We also need to provide a context for that and that's what pressures and responses do.” One respondent noted a “societal response part, that's what we call an administrative indicator”. One respondent believed *Tides of Change* does this and “in future reports, it won't be as necessary. It is valuable to get to how to fix the problems and how to track them.”

Some respondents (2-3) did not believe pressures and societal responses should be part of the report. One was concerned “it adds more background text to what should be a simple report” and suggested it may be appropriate for a separate volume. Others weren’t sure “it’s the responsibility of state of the environment report to get into responses”.

(2) Emerging Issues

Nearly all (23 of 25) respondents believe the report should describe new or unanticipated issues and societal responses to them. Some (7-8) see these issues as “very much related to taking a pulse on the anticipated health of the Gulf and helping to build awareness of what may be causing the threat of what the response to the threat should be”. Some (4-5) think “people have to be made aware that this is a changing scene and every now and then we are aware of things that may be increasing pressures” and suggested that perhaps an ‘Emerging Issues Section’ “should always be included in a state of the environment report”. Some (5-6) believe the report doesn’t have to go into great detail, but should note potential issues on the horizon, and put the main focus on defined problems and suggestions for how to address them. Others (2-3) suggested a set of indicators should be established to “track changes in future publications”. Without mention in the document, they point out “there will be no record” and it won’t serve as a “reference point”. Some (4-5) pointed out they shouldn’t “scare people, but they surely deserve some mention for what is known or projected” and we may “find that they are less important than we might have thought, but at the risk of being wrong, it is important to describe emerging trends or issues”. One respondent said “we have to talk about what we see coming down in the future. As we are cleaning up the environment, we see other issues that were masked...and they are having major impacts”. Related responses noted that if we “identify issues earlier, we might nip them in the bud and prevent them from becoming major problems”. One respondent suggested a good way to deal with emerging issue may be with case studies.

One respondent indicated “if they’re related to the data that’s being presented then that makes some sense. If they are unrelated, I’m not sure they belong in the document.” Another believed it is a good idea to address emerging issues, but not necessarily responses, saying “that shows we have our eyes on the future and acknowledges that we don’t capture everything in the report”.

(3) Future Directions

Just over half the respondents believed the report should discuss future directions of the organization publishing the report and future indicator efforts.

Some (8-9) said “people want to know what you are going to do about it now”. Others (6-7) qualified their statement by noting it is only appropriate to include this information if it “pertains to issues raised in the report” to “set a framework for future directions”. Some (4-5) believed it very important the organization have a plan, a future direction...need something to measure progress or lack of progress”. One respondent said the “reason is that it’s sort of the ‘so what’ of the report. If I read one of reports, I would want to know in

the end what the next steps are to address the problem and what role the organization will play in that”. Then other groups “can focus their efforts or tag along and build on them”. One noted the report “could talk about how organizations are responding to the indicator – if it’s good, what is the organization doing to keep it that way; if it’s losing status, what is the organization doing to try to prevent loss”.

One respondent said it depends on the audience for the report, the “issue of the role of the GOMC vs the State of the Gulf is a good discussion. How much the Council is doing should be part of what is happening in the Gulf. It probably should not be front and center – issues facing the Gulf should be, because there are maybe a dozen different organizations dealing with those issues”. A related response was that the report should “try to identify the areas and the agencies and groups that have some control and involvement...it’s good for Gulf of Maine groups to step to somewhat higher ground and identify what areas groups should put their focus on”.

One respondent noted the “objective of organizations and departments often times change for a number of reasons, so it may be difficult to list directions of all departments and organization for the long term...I think it would be hard for government departments to do that because of their changing landscape”.

A relatively small group of respondents (2-3) did not believe future directions are an appropriate element of the report because it would be “too cumbersome for a state of the environment report” which isn’t a “policy report”.

A quarter of the respondents had more varied responses, generally supporting discussion of future indicator efforts because we are in the beginning stage of identifying them.

h. Approach for Next Report

(1) General Approach

More than three-quarters of respondents think the same general approach should be used for the next report, that the two reports then could be looked at “as a pair”. In general they liked the approach, though several respondents (1-2) suggested a format change to allow topical chapters to stand on their own so they can be handed out in response to specific interests. Some (12-13) noted having a consistent approach would be useful; it’s effective, why change it. Others (7-8) simply like the approach used with *Tides of Change*.

Some (1-2) suggested the committee involved in planning the second report “should review what worked and didn’t work, make changes appropriately, but generally speaking, the first format worked well”. Some (1-2) added it is important to make sure input is obtained from all stakeholders and include adequate time for review.

Some (4-5) respondents noted the format may not work as well for the topic of climate change. One respondent specifically suggested he “would start with reference to the uncertainties we face with all the debate about climate change in terms of relevance to our

area...it's very difficult to feel confident that any forecasts about climate change are going to be accurate, especially for Nova Scotia because it is surrounded by water on three sides. So I'm not sure we can look at hard information in the immediate area like with other issues. The report may have to be adjusted in response to specific issues, some are more amenable to providing information and forecasting the future."

At least one respondent noted he is "not sure it's a good idea to move on to new topics unless we plan to come back to the first three topics at some point to track changes and identify new or different aspects that have come up". He said he'd "provide an update on those issues parallel with moving on to the new issues".

Some respondents (2-3) indicated they would use a different format to discuss forums and comparisons of geographies around the Gulf, particularly in defining the methodology for flagging problem areas to assure that the "overview is reflective of the big picture and is balanced".

At least one respondent pointed out the need for an Executive Summary in the beginning of the report.

A few respondents (2-3) supported taking a different approach. At least one noted we "really need to talk about audience and use of the report. You're getting some really good review of that. Maybe ESIP should publish a good set of white papers, followed by a mini conference or workshop in each jurisdiction with a lot of analysis of what the information is telling us, discuss our regional strategy, and the role of the Council. I would suspect we're not at the level of developing a crisp report card format on those three things and in lieu of something that attempts to be a glossy publication like this one I would do three white papers. I don't have a good enough feel of the audience and intent. If its managers, I want something to help me focus on the response from my state; if it's the general public I want something short and crisp when its completed. My answer depends on the stage we are at with the GOMC Action Plan. That matters. If the report is done before the Action Plan is completed, the report can be used to inform the Council on those three topics. If the Action Plan is completed, it won't be useful to the Council."

One respondent noted if the GOMC is funding the report, the Council "should decide what should be included. If others are funding it, they can decide more collaboratively what to include." Some (1-2) noted the report should be shorter and the health of the Gulf should be defined. Still others (1-2) noted the current approach is a "general characterization and the next report should move toward a more quantifiable approach as much as we can". And one respondent noted "if there is going to be another report so we can measure change over time, then it needs to be done differently...I'm not sure it gives the level of detail to really assess change in a quantitative way into the future". And finally, one respondent said "in order to change the approach, we have to get some things in place. If we haven't, we may have to follow the same approach. Real specific indicators with measurable goals take a while. If we are seeking to do the report quickly, we may not have time, in which case we should do a similar approach, but make it shorter and simpler."

(2) Themes

Most respondents (15-17) had a lot of suggestions for themes to cover in the three topics – nutrients, aquatic habitat, and climate change – proposed for the next report. Sometimes suggestions are very specific; sometimes they are more general, focusing on the overall approach that should be taken. Some indicated they don't know much about the topic, then, offer insightful questions or connections that link the topic to an area with which they are more familiar. Sometimes they offer comments about how the report could be used to influence decision makers or as an educational tool.

(a) Nutrients

Overall, respondents suggested the topic of nutrients include an overview of current issues, a discussion of the status and trends in water quality, sources and an understanding of the mass balance of nutrients in the Gulf, threshold values, a focus on estuaries and embayments, management measures, remediation efforts, and case studies. More detailed suggestions are laid out below.

Overview of current issues related to nutrients

- types of nutrients (N, P, other growth enhancing/discouraging nutrients that are not necessarily contaminants, but are relevant to the growth/prosperity of coastal wasters)
- what we know and don't know
- what we are doing about nutrients
- how nutrients move through the Gulf, including loading into ponds, streams, and rivers
- contribution from each region (geographic breakout of estuaries, near shore, etc.), carrying capacity in relation to nutrient loads and discussion of the larger picture, including localized impacts, eutrophication of the coastal environment, and impacts on the Gulf as a whole
- impacts to public health (for example, red tide) and the environment, including those nutrients not connected with potential pathogens vs those that are

Discussion of the status and trends in water quality (changes over time)

- track nitrates and phosphates around the Gulf
- track algal blooms around the Gulf because they're indicative of heavy nutrient loads,
- current condition of oxygen
- nutrient load
- habitat impairment
- gauge where we are in the problem – discuss cycles, is pollution from nutrients getting better or worse and how fast

Sources and understanding of the mass balance of nutrients in the Gulf

- relationship to coastal development and land use and attempt to quantify point/nonpoint sources
- influx from outside the Gulf

- nutrient transfers between terrestrial environment and the Gulf and vice versa
- sewage treatment plant outfalls
- individual septic systems
- agricultural runoff
- aquaculture (information independent from federal/provincial sources on the effect of feeding salmon and pollutants on the water column)
- hatcheries (information independent from federal/provincial sources on problems with algae at certain sites)
- sawmills
- heavy metals which introduce nutrients

Threshold values

- thresholds – points where anticipate damage and how close we are to those points (some places with a lot of nutrients may not be eutrophied)
- nutrient standards (effort to set nutrient classifications for water bodies)
- TMDL's for various water bodies

Focus on estuaries and embayments

- discuss nutrients as an estuary and embayment issue, not a gulfwide issue
- inventory and focus of estuaries, embayments, and watersheds areas that may be exceeding their carrying capacity for nutrients, colored by National Coastal Assessment on the states side, trace what's changed over time and resulting conditions, understand flows, monitor over time and speculate as to whether problem in future, what can do to abate situation
- some metrics of ranking as eutrophic, or not
- comparison of watersheds

Management measures

- initiatives that address nutrients
- success of existing efforts
- funding/planning around sewage management
- aging infrastructure of sewage treatment plants

Remediation efforts

- ways to remediate
- success of remediation efforts

Case studies

- track water quality issues in some communities
- what's being done to reduce nutrients

(b) Aquatic Habitats

Overall, respondents suggested the topic of aquatic habitats include an overview of current issues, a discussion of the status and trends in aquatic habitats, classification of aquatic

habitats and map of types of habitats in the Gulf, impact of changes in temperature patterns, impact of on-shore land use, impact of offshore activities, seafloor mapping, and remediation efforts. More detailed suggestions are laid out below.

Overview of current issues related to aquatic habitats

- what we have
- types of aquatic habitats important for which species
- how mosaic of different habitats support diversity of marine life in Gulf
- identification and mapping of critical habitats across the Gulf
- what we know and what we're doing about it

Discussion of the status and trends in aquatic habitat (changes over time)

- do it on theme of drainage systems, what it is, what it consists of, and where it is going (in a couple drainage systems, trace what's going on and what is happening to fresh water and salt water habitats, because many point sources have been cleaned up focus on cumulative impacts as move past communities to the ocean – fascinating story that people can relate to)
- changes in ecosystem resulting from rise/decline of certain species (for example, relationship between sea urchin population and kelp beds off coast of Maine)
- current condition of water and sediment and trends
- discuss impact of changes in temperature patterns
- discuss some measure of threats/loss over time for different habitat types (wetlands, eelgrass, mudflats of the upper Bay, etc.), how they are impacted to date and what could happen in the future
- discuss indicator species, like mollusks
- discuss historic ecological relationship of fisheries and anadromous fish habitat

Classification of aquatic habitats and map of types of habitats in Gulf

- task of summit should be on what classification system to use, once chosen, come up with definition of sensitive habitats and what they are sensitive to
- characterization and functions of different habitat types, including areas identified as protected areas or key areas in terms of nursery closures
- discuss distribution of different habitats in Gulf (# acres of eelgrass habitat, etc.), map them, and discuss what percent has been mapped
- identify good, bad, and impaired habitat for various species (coastal/salt marsh/fresh water wetland habitat)
- distribution of invasive species and impact on aquatic habitats
- impact of climate change, changes in community structure (animals that are in areas/impact on historical mix), cycles of the past
- ranking of threats
- identify where have good information, where there are gaps in information, recommendations for how to fill in the gaps

Impact of on-shore land use (including sediments and nutrients)

- effects of on-shore land use (build off land use chapter from *Tides of Change*)

- effects of near shore infrastructure (wharves, jetties, etc.)
- effects of aquaculture – effect on overall habitat and ecology of area,

Impact of offshore activities

- effects from weirs to nets to trawling/dragging for fishing – impacts on benthic habitat and habitats for variety of species (from fish to whales), what activity is happening and at what pace and level, what changes to expect, how long to turn back to more natural state
- effects of shipping on water quality and habitat, relationship to invasive species

Seafloor mapping

- amount of sea floor mapping that been done and where
- how that information is being used by NGOs, government, etc.
- use of mapping in evaluating proposed offshore developments (LNG, oil/gas exploration, etc.)

Remediation efforts

- ways to improve different habitats in the future
- restoration efforts
- success of existing responses (opening up causeways/culverts to allow salt marshes to recover)
- acres restored under some definition, by habitat type

(c) Climate Change

Respondents approached the topic of climate change somewhat differently than nutrients and aquatic habitats, raising concerns about speculation, the global nature of the problem, and the focus and approach taken with the report with respect to physical, chemical, and biological parameters as well as economic impacts on traditional industries, infrastructure, and public safety. One respondent noted there is a lot of speculation about climate change and encouraged “focus on what we know and don’t know from a long term perspective”. Another noted there is a lot of information available on the subject and suggested the report not duplicate it, but “bring some value to what’s already out there” by focusing on how it is anticipated to effect the Gulf region and perhaps discussing existing models to show “where we are in our understanding of the issue”. One respondent suggested that we “may need more social information about what we’re doing” to adapt to climate change.

One respondent asked if the report would include a goal or approach to do something about it. He suggested this is “where a real global policy would be worthy of mention”. One respondent said climate change is “really important, but difficult to deal with because it depends on the time frame of the analysis. Over the next 50 to 100 years, there will be some increase in surface temperature, possibly from direct insolation. There will almost certainly be some increase in heat from land to water, so near shore temperatures will rise, with implications for productivity and processes. Then you get to the thorny issue of tides. At the outer edges of the Gulf, we will not see much change in terms of temperature. If

climate change affects tidal surges we'll need to add to the stability of coastal structures. There will be shifts in the location of salt wedges and estuaries and shifts in fish species. One important issue is fisheries modeling for the tidal response of the Gulf as temperature and sea level rise... current fishery models don't consider the implications of some of the environmental variables, which are based on growth parameters of the fish themselves; however there are other things involved. For example, various stages of fish themselves are affected differently by temperature impacts. There is a significant tidal cycle over 18.6 years. Maximum tides have the coldest temperatures. Fish landings have 18 year cycles too. This is not in the models, so when looking at rising sea levels and an increase in temperatures as a result of global warming, need to consider what it will do to the balance of fish stocks. The whole circulation pattern will also be critical, impacting the input from Labrador, pushing the Gulf Stream further offshore. The balance between those currents requires careful thinking about oceanography in terms of climate change. There will be significant effects on fish stocks and they won't be the same effects on all species."

Overall, respondents suggested the topic of climate change focus on sources of climate change, potential for increased variability in the system, things we can measure, illustrate the impacts of climate change on the Gulf, and adaptive management. More detailed suggestions are laid out below.

Sources of climate change

- discuss relationship to coastal development
- atmospheric deposition

Potential for increased variability in the system due to climate change

- temperature
- rainfall
- wide swings in storms

Focus on things we can measure

- long term trends in air and water temperature
- weather records – precipitation by decade, number of clear days, etc.
- extreme weather events (discuss whether they run in cycles)
- changes in sea level and extent of tides
- number of days ports are open year-round

Illustrate impacts of climate change on the Gulf

- temperature records and patterns of algal blooms, changes in diversity, quantity, and distribution of various plant/animal species (including microorganisms), try to correlate to changes in climate and overlay with current patterns in the Gulf
- change in pollutants in terms of bioaccumulation
- change over time in sea level rise, beach erosion, and accretion rates
- changes in currents and fresh water flux (salinity regime)
- assess how ocean temperature fluctuations and overall changes in hydrologic regime affects different aspects of the Gulf, from physical oceanography to fisheries to bird migrations, with differences in water temperatures see differences in migratory

patterns of some fish species, are the changes being caused/affected by climate change, are increases in stock due to management efforts; are decreases because of bad management or some other factor of which climate change could be one; as climate can affect one species, then it affects, in turn, some sort of change of another species – predator or prey groups; in Pen Bay working with 12 anadromous species, some are more affected by warming than others; acid rain potentially could have impacts on Gulf – harming rivers so important to the Gulf

- which low lying areas (V and A zones) of the Gulf have been developed, what amount and percent of low lying areas have been developed
- economic impact on various industries
- economic impact of responses to erosion, coastal hazards and risk to human habitation
- impact on coastal wetlands and habitat associated with those wetlands and interplay that development has on that, main issue is that if it was an undeveloped coast, wetlands would migrate inland, but will be prevented from doing that because people will build walls to prevent it which will result in complete loss of tidal marshes and devastating impact on fisheries

Adaptations, management and adaptation plans

- increased wildness of our climate, “getting ready for 100 year storms happening every second year”
- sea level rise, shoreline erosion, coastal hazard, storms, damage to infrastructure
- responses to impacts on economies
- assessing whether spending money on coastal wetland restoration makes sense if they’re going to be inundated
- what can we do to plan ahead to avoid major problems,
- discussion of very difficult property issues, build on foundation laid in land use section in *Tides of Change*
- discuss issue of trying to reduce the rate of climate change we’re seeing, Kyoto targets, reality is whatever is happening on the ground is happening and have to deal with it, more than reduction of emissions

(d) Other Issue Areas

- impact of coastal development on our *traditional maritime economies*
- effects of *large scale landscape change* – macro change of land use across the Gulf – forest conversion, farmland conversion, the land use section in *Tides of Change* touched on habitat, nonpoint source issues, wetlands, fragmented habitat, but not the macro land use changes
- *growth and land use*, communities will continue to grow, how should we grow now and in the future, how should we plan to use the land bordering the Gulf, how should we go about land use to reduce nutrients, etc. (decisions for economists and politicians and land owners)
- *update population changes* covered in first report to assess changes in runoff, discharges, etc., keep eye on development and population build up around the Gulf as a backdrop to other things, some areas are depopulating – moving to urban

centers and leaving rural centers, a lot of coastal Canada is moving from rural areas to Halifax

- *offshore energy development* – LNG, wind, oil and gas, transmission lines for electricity and gas – what are resources, threats to aquatic habitats, what is global experience about exploration, getting some information on the table for folks to consider
- *sustainable maritime activity and changes in industrial practice* in the Gulf – emerging issues, for example, increased interest in quarries that may affect demand for shipping, piers, wharves, some mega projects being proposed, on or adjacent to shore would need piers built, heavy vessels to transport out of region, effect on right whales, cod, etc., some being looked at in CEA reports right now, place for ecotourism in the mix of maritime activities
- *ocean zoning*, conflict of uses
- *more on fisheries and aquaculture* – rebuilding/restoration plans for fish stocks, consequence of inability to recover at-sea fisheries, more focus on aquaculture with attendant problems, invasive species
- *connection of Gulf and major rivers* that feed into it and how that relationship is severely compromised from what it once was
- more on *physical parameters of the Gulf*, hydrodynamic modeling and how dispersion models are applied so can see how things move in the Gulf, realize there have been various efforts at doing that, description of various basins or structures that occur in Gulf and major influences and driving forces, then build in effect of contaminants, etc.
- *biodiversity* (things that are not commercial fisheries) – food web issues/all species, general water quality
- *ecosystem management* around the world and what might be useful, what can/can't do, need to have dialog on that
- *community-based management initiatives*, quantify trends in participation of communities, individuals, and groups in ecosystem monitoring and management
- *fragmented authority*, governmental structures and how they do/don't coordinate activities to help achieve some of the outcomes that are needed, maybe just discussion of key authorities that have to be aligned to affect policy changes and how to achieve that
- *assessment, management, and funding* – indicators may help direct funds
- *local impacts of stormwater runoff* – pathogens, habitat, degradation
- assure that topics *speak to all stakeholders*, including those who derive their livelihood in the Gulf
- include *discussion of challenges* – if pick nutrients, look at investments jurisdictions are making around the Gulf to deal with nutrients, go beyond science to how much has been invested in sewage treatment over past “X” years, engage other parts of community, economics/sustainability of fisheries

i. Interest in Contributing to Next Report

All, but one of the respondents indicated an interest in contributing to the next report. The respondent who didn't said he thought other organizations in his jurisdiction had more useful information to offer.

Ways that respondents indicated they would be willing to contribute include:

- participating in meetings, workshops, and forums leading up to the report and conference associated with it
- developing background information for indicators and the report
- contributing data and being contact for data gathering in their jurisdiction (land use, stormwater, NPS pollution, nitrogen loads to some specific areas, watershed management planning, habitat uses and classifications, climate change, water temperature, other areas of climate change)
- contributing information for a case study on ocean zoning
- writing, reviewing, and editing draft chapters
- providing technical and financial support in the form of grants and some contract support

j. General Comments

(1) Progress of the Indicator/State of the Environment Reporting Initiative

A number of respondents had general comments about progress of the indicator/state of the environment reporting initiative. At least two respondents were anxious to move to the next stage of “identifying specific indicators and putting some reports together” based on “information/good data from other parts of county”. One said we need to “start doing it, even if we’re not perfect at the beginning. We need to figure out the foundation, taking baby steps forward to evolve in the next report to go beyond characterizing the issue”. Another respondent supported this perspective, noting that “it’s a useful approach to look at change” though he was “not sure the mechanism has been set up to track them or hone in on them at this point” and “needs to be done”.

One respondent expressed concern we “don’t know who the partnership is. We have to figure out who’s putting out the report”.

Related to the question of who is putting out the report some respondents (4-5) wanted to know its purpose and audience because they believe those decisions have a significant impact on the types of indicators that should be tracked and the type of report that should be produced. One respondent said he believes it is important “to get management objectives squared away. There has been a big push on indicators, but it hasn’t been as productive as it could be because we don’t have a tie to the management questions the Council wants answered³⁸. It would be a better use of everyone’s time to have a summit/retreat to get those questions nailed down and then let scientists work on figuring out the indicators that are needed”. Another respondent said that “we are going down two roads here. The Council is very appreciative of the contributions of all agencies, especially the federal agencies. We don’t know if GPAC is alive. We need to give more thought to what to report on; what level of effort is needed; what the target is for this report; what the

³⁸ Note that this respondent’s assumption is that it is the GOMC that is putting the report out for its purposes.

difference is between ecosystem indicators and this report because reporting out of science is different than if doing the report for others. If we want a consolidation of science, then we have to create a different document (like a second document of technical appendices). We might want to do one every four years for public consumption and then every four years as a science report (so a report comes out every two years). If we do one every two years, the challenge is reporting any change. The subtleties aren't always as evident, even if done on a four year cycle." And yet another respondent said "if they're looking at it from the standpoint of education, it's probably important to put together a document to be used as a reference for many years, having a document that...doesn't age. Such a document would be useful, not just to the general public for knowledge, but for others to see the driving issues we're concerned with. The physical and chemical elements may need to be laid out more clearly – I'm not sure that I've seen that."

Another respondent encouraged ESIP to review the "really good feedback that was provided at the Summit". She indicated she is concerned that feedback is "getting lost" since she "hasn't seen it summarized in the Summit report and the indicator effort is marching ahead...moving to the next stage...go back to review it to make sure it's not being forgotten." She added ESIP "can reject the feedback or take it". She also said "it's important to be accurate...so make sure to leave enough time for it to be peer reviewed."

(2) Collaboration and Initiatives of Community Groups

A number of respondents (6-7) offered thoughts about collaboration and the initiatives of community groups in monitoring indicators and preparing the State of the Gulf report.

Some respondents (1-2) noted the "linkages between this and various coastal and ocean management programs. The product will support and feed into those efforts." In addition, some respondents (2-3) noted "resources are becoming limited...so the need to partner is going to be a big issue, and...boundary water groups like the one for the St. Croix provide a good perspective and should be maintained and promoted".

One respondent noted "one of the areas/issues...has to do with people outside the professional cadre of scientists and government employees – touched on in *Tides of Change*, initiatives of community groups are really important. The Gulf is too big, too complex, to be monitored by governments and universities only. There needs to be an emphasis and recognition of the role of the motivated and well trained amateur...takes us back 140 years to when there were few professional oceanographers and biologist, back then, some of the major contributions were made by amateurs."

Another respondent suggested that in seeking balance between health of the environment and health of the communities and livelihood of residents of the Gulf, ESIP should "make sure to get a response from authorities engaged in doing their work and not assume areas we may not have mandate or capability of doing". Related to seeking that balance, another respondent encouraged ESIP "to look at novel ways to get broad input", recognizing there are other ways to collect input from those groups that can't make it to a summit.

(3) Communication About Progress of Indicator and State of the Environment Reporting Initiative

Several respondents (4-5) encouraged ESIP to increase communication about the progress of the indicator/state of the Gulf initiative to make the project more well know.

Some (1-2) suggested ESIP conduct more public forums to vet some of the issues raised in this section of the report. Some (3-4) suggested more “advertising” or effort to communicate about progress of the effort, for example, by sharing the results of this survey and the listening sessions. Others (2-3) suggested greater emphasis on education, to “bring in all the players, in a sense as a coalition...we affect our environment. The more we know about it the more we can do to prevent it...Unless people communicate, we can’t bring together common ground and effect change. We need all the groups to educate the public and every group plays a role. We all live in this environment and collectively we can bring about change. We can’t understand these issues unless we are educated about them.”

Some (3-4) noted they had lost touch with the initiative since the Summit, saying they “feel pretty disconnected at this point” and wondered if “it’s mostly existing at a state/provincial level” and “suggested some effort be spent trying to pull in agencies like mine³⁹ to get them more plugged in. Perhaps one practical way to do that is to get the State Coastal Programs and Estuary Programs to do that on behalf of the GOMC. Bring us along, make sure we are plugged into it; say, yes, we want you to participate in this. Maybe we need a little help with that.”

2. Review of Other State of Environment Reports

a. *Summary of Reports*

Seven state of the environment reports, published between 1994 and 2005, were reviewed as part of this evaluation. They included two international reports, one Canadian report, and four US reports as follows:

International

Environment Canada and United States Environmental Protection Agency (EC/USEPA) – *State of the Great Lakes 2003* and *Implementing Indicators 2003: A Technical Report*
 International Council for the Exploration of the Sea (ICES) – *Environmental Status of the European Seas, 2003*

Canadian

Environment Canada (EC) – *State of the Environment in the Atlantic Region, 1993*

³⁹ A regional planning council.

United States

Chesapeake Bay Program (CBP) - *The State of the Chesapeake Bay: A Report to the Citizens of the Bay Region*, 2002

Casco Bay Estuary Partnership (CBEP) - *State of the Bay 2005*

Massachusetts Water Resources Authority (MWRA) – *The State of Boston Harbor: Mapping the Harbor's Recovery*

New Hampshire Estuaries Program (NHEP) – *2003 State of the Estuaries*

Each report is different, varying in length from a crisp 36 pages (NHEP) to a 451 compendium (EC). Five were 76 pages or less (ICES, CBEP, CBP, and NHEP). All were available on the web – two were part of an interactive site (CBP and MWRA). Nearly all were available as a published full color printed report. The one that was not full-color, included a blue and gray tones printed publication (CBP).

All of the reports included a variety of graphics. Five used a number of photographs; one used a limited number of photos (EC/USEPA), and one did not use photos at all (EC). All used a variety of maps, illustrative tables and charts, and raw data. All but one (NHEP) used diagrams. Three used posters, clip art, and other eye catching artwork (CBEP, CBP, and MWRA). One (EC/USEPA) used a stop-light color pressure index.

Four reports used case studies (ICES, CBEP, CBP, and MWRA). Three included descriptions of partners related efforts and areas of special focus (CBEP, CBP, and MWRA).

Three described specific topic areas and effects on the environment (ICES, CBP, and MWRA). Four (EC/USEPA, ICES, EC, and CBEP) provided a specific section that detailed key or a summary of findings. Three included sections on emerging issues (ICES, CBEP, and CBP). Two include definitions (ICES and EC).

One included specific quotes and a section on “What you can do” (CBP). One included a section on project milestones and a web link to additional data (MWRA).

Four were tied to specific goals and/or measurable indicators (EC/USEPA, CBEP, CBP, and NHEP) and made conclusions about the status of conditions. The EC/USEPA report discussed the status of 43 indicators, CBEP discussed 14 indicators, and NHEP discussed 12. Four made reference to future indicator efforts (EC/USEPA, CBEP, CBP, and NHEP).

Two reports provided statistics for specific geographic segments of the environment (EC/USEPA and ICES).

All reports provided references and acknowledgements at the beginning or end of the report; three included references and acknowledgements at the end of each section of the report (EC/USEPA, CBEP and NHEP). Four included chapters on partners (EC/USEPA, CBEP, CBP, and NHEP).

b. Review of Individual Reports

International

Great Lakes – Provides assessment of 43 of approximately 80 indicators and conclusion about environmental status. Its general approach is to assess environmental status as good, mixed improvement, mixed, mixed degradation, or poor. The report discusses management challenges for land use, habitat degradation, climate change, toxic contamination, and indicator development. It identifies lake and river segments, including insets with statistics on each geographic segment, assesses the segment and discusses pressures, future and emerging management issues, and provides acknowledgements and sources. It assesses the state of the ecosystem based on indicators, pressures, societal response to the state or pressures, includes a snappy visual index to provide “assessments at a glance”, acknowledgements and sources. The report also includes sections on future indicator work and acknowledgements. A separate 168 page technical volume was also prepared to provide fully referenced documentation for the information presented in each indicator report.

European Seas – In this report, “All aspects of the marine environment are studied and evaluated in order to gain knowledge about physical processes, water chemistry and pollutants, fish and fisheries, sea birds and marine mammals. As well as filling gaps in existing knowledge, this information is also developed into unbiased non-political advice.” in preparation for the first joint meeting at Ministerial Level of the OSPAR Commission (OSPAR) for the Protection of the Marine Environment of the North-East Atlantic and the Helsinki Commission (HELCOM) for the Protection of the Marine Environment of the Baltic Sea Area. It provides an overview of key environmental conditions including a brief description of the physical environment, description of marine organisms and communities, and identifies impacts on the water bodies from land-based and atmospheric contaminants, climate change, fishing and mariculture, shipping and transportation, human impacts on the sea and its living resources from bathing to energy generation, urbanization (industrial and municipal discharges and agriculture), tourism, and recreational activities; and draws conclusions about the present state of and main threats to the seas along with brief mention of some management measures in effect or being considered to reduce the impact of human activities. It also defines the various seas geographically, in surface area and volume, in size of catchment areas and population contained within it. Biodiversity is a significant overall theme. It includes a summary of key findings (of both data and management) on climate change, fisheries, nutrient enrichment, contaminants, shipping, coastal zone, marine biodiversity.

Canadian

Atlantic Canada – This report is the third in a series, first prepared in 1979. Its objective is “to increase awareness of the public concerning environmental conditions and trends, to help them understand the relationship between human activities and environmental quality and the sustainability of ecosystems, and to provide a broad basis for improved decision making on environmental matters”. It provides an overview of the environment, identifies

problem areas, describes conditions and trends, outlines direction in which the Region is headed environmentally. A central theme is the relationship between human activities and environmental quality, human health and the economy and explores the concept of sustainability of and use of the environment/resources. It includes general conclusions, a glossary, and an index

United States

Casco Bay – Articulates goals of 1996 management plan, describes watershed, human impacts on the estuary, and monitoring efforts to measure progress in preserving and protecting the health of the Bay. General approach is to, in a section heading, pose a question (and usually answer it in 1-2 sentences), then in the section describe why the indicator is important, key/overall findings, what patterns of change are occurring, how the information can be used to further the goal of preservation and protection, and references. Chapters describe population, impervious surface, combined sewer overflows, shellfish, swimming beaches, protected land, undeveloped land, waterbirds, eelgrass, sediments, mussels, water quality, inland water quality, and stewardship, followed by a summary, discussion of future directions, and acknowledgement of those who helped with data collection, writing, editing, images, and GIS mapping and lists Board of Directors.

Chesapeake Bay – Articulates status toward goals of 2000 Plan describing status as good, mixed improvement, mixed, mixed degradation, and poor and offers highlights of progress toward goals. In general, the report is presented in sections, giving background on the subject, status and trends, information on what the Bay Program is doing, and useful tips on what the reader can do with contact information at end. The report discusses watershed partnerships, watershed profiles, life in the Bay, vital habitat protection and restoration efforts, water quality, sound land use, stewardship and community engagement and future efforts, and provides contact information.

New Hampshire – Provides assessment of status of 12 of 30 indicators associated with management goal. In general, the approach is to, in a section heading, pose a question (answer it in 1-2 sentences), then describe why the indicator is important, the trend, offer possible explanations, NHEP-funded activities related to that goal, and references. It includes a chapter about the Estuaries Project and estuaries, trends of key environmental indicators, and coastal watershed partnerships. Twelve chapters on indicators discuss why the indicator is important, its status/changes, offers explanation/possible reasons for changes, lists NHEP goal and NHEP funded activities, and references. The report also includes two case studies and general acknowledgements.

Boston Harbor – In general the report assesses changes to water, sediment, and living communities over 15 years as improvements to treatment and discharge of sewage effluent were implemented. It includes a description of the Boston Harbor project, maps the Harbor's recovery by describing water quality, the floor of the Harbor, and fish and shellfish. It also examines the Harbor's tributary rivers, describing bacteria, clarity, algae and chlorophyll and changes in the Harbor after addressing outfalls, the future of Harbor, Mass Bay monitoring efforts, and references.

c. Progress Toward Preserving or Improving Ecosystem Health – Selected Results

Thirty years experience of clean-up efforts, monitoring, and reporting in Chesapeake Bay suggests passive reporting effort alone is likely to be insufficient to protect and improve the health of the Gulf. In 2000, Chesapeake Bay's political and environmental leaders came together to establish a detailed plan to reduce pollution in the Bay and its tributaries over the next decade. A recent news article noted that "Chesapeake Bay enjoys the very best science in the world. It enjoys enormous public support, but what's lacking is the political will to implement existing plans that have been proven to reduce pollution."⁴⁰

A recent press release described the unveiling of the Great Lakes Regional Collaboration Strategy and funding of The Great Lakes Legacy Act of 2002 (\$270 million in funding over five years) for cleanups of contaminated hot spots at 31 areas of concern in the United States. "Over the past year, more than 1,500 people from throughout the Great Lakes basin participated on eight strategy teams to develop the recommendations that form the basis of the strategy."⁴¹

Concern that simply reporting information about the Gulf will not be enough to protect and improve its health was a theme at several of the listening sessions and phone interviews. Participants said, sometimes quite passionately that ESIP, the GOMC, whoever is the prime driver of this effort, needed to decide whether it will take a passive or active role, following the model of the public health community, in protecting and improving the health of the Gulf and in setting goals against which to select appropriate indicators and measure progress.

⁴⁰ "Chesapeake Remains Ill, Bay Group Report Says Quality of Water, Habitat and Fish Given Grade of D." Elizabeth Williamson, *Washington Post*, November 14, 2005; Page B01.

⁴¹ News for Release: Monday, December 12, 2005, U.S. Environmental Protection Agency (EPA), "**Great Lakes Regional Collaboration Strategy Now Available; EPA Outlines Next Federal Actions.**" Contact: Anne Rowan, EPA Region 5, 312-353-9391.

Table 10. Summary of Characteristics of Eight State of the Environment Reports

	Great Lakes	Great Lakes App	Atlantic Canada	CBEP	NHEP	Boston Harbor	Chesapeake	European Seas
Publication Date	2003	2003	1994	2005	2003	2002	2002	2003
Web								
Report Available on Web	X	X	X	X	X	X	X	X
Interactive Web						X	X	
Publication								
Color Publication	X	X	X	X	X	X		X
Black & White w/Blue Tones							X	
# Pages	114	168	451	52	36	44	65	76
Type of Graphics								
Photographs	X	LTD		X	X	X	X	X
Maps	X	X	X	X	X	X	X	X
Illustrative Tables and Charts	X	X	X	X	X	X	X	X
Diagrams	X	X	X	X		X	X	
Data	X	X	X	X	X	X		X
Posters/Clip Art				X		X	X	
Pressure Indicators	X							
Types of Inserts								
Case Studies				X		X	X	X
Partners Related Efforts				X	X	X	X	
Descriptions of Topic Areas/Effects						X	X	X
Areas of Special Focus				X		X	X	X
Key Findings or Summary	X		X	X				X
Emerging Issues				X			X	X
Definitions			X					X
What You Can Do							X	
Quotes							X	
Project Milestones						X		
Additional Data		X				X		
Tied to Goals or Indicators	X	X		X	X		X	
Statistics of Geographic Segments	X							X
References and Acknowledgements								
At Beginning or End of Report	X	X	X	X	X	X	X	X
At End of Section	X	X	X	X	X			
Chapter on Partners	X				X	X	X	
Indicators								
Number of Indicators	43 of 80	X		14	12 of 30			
Conclusions About Status	X			X	X	X	X	
Reference to Future Indicators	X			X	X		X	