

Water Chapter

Section 1: Fresh Surface Waters

High and Low Stream Flows

Reviewed by the Ecological Condition Group

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator has been modified as described below.
Critical modifications	<i>None required</i>	
Suggested modifications	Clarify the text under “What the Data Show,” which is currently difficult to interpret.	EPA has rewritten text in this section. Additionally, the language was made more consistent with the graphics.
	Consider breaking Figure 1 into two graphs: <i>timing</i> and <i>magnitude</i> . These are currently lumped together.	EPA determined that the graphic change could add confusion. The text was modified to point out that Figure 2 provides a detailed breakdown of the trends that are grouped together in Figure 1.
	In the write-up, clarify text regarding the baseline period (20 years, within 4 years of target window 1930–1949).	The text was revised in the indicator summary to provide a clear basic overview of baseline period. Please note that full detail is emphasized in the QA form.

Nitrogen and Phosphorus Discharge from Large Rivers

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included and modified as described below.
Critical modifications	Include data for ammonium, total nitrogen, and organic nitrogen in this indicator.	Additional species cannot be added now due to data constraints (e.g., data not yet compiled/analyzed).

Consensus Statements		EPA Response
	Revise the indicator to reflect circumstances in which certain systems are co-limited by nitrogen and phosphorus. To this end, EPA should consider developing a nitrogen-to-phosphorus ratio.	Additional text was added to the indicator summary to point out the potential for co-limitation.
	Define “large” rivers and include data from additional large river systems.	The text was revised to clarify that these rivers are geographically distributed and reflect >50% of discharge in the lower 48 states. Comparable data for other river systems have not yet been compiled.
Suggested modifications	Include total nitrogen and total phosphorus in the public report, and present all nitrogen species and dissolved inorganic phosphorus in the technical document.	Additional species were not added to the technical document due to data constraints (e.g., other species are not as data-rich, or data not yet compiled/analyzed).
Other comments	In certain systems with natural sources of phosphorus, elevated levels may not represent an anthropogenic stressor; therefore, management strategies targeting these systems would be inappropriate.	Discussion of management strategies is outside the scope of ROE.

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included and modified as described below (as well as modifications described above, under the water group’s comments).
Critical modifications	Change to either <i>Total N and Total P</i> or <i>inorganic N and inorganic P</i> , both for consistency and for interpretation of the important forms for primary production or eutrophication.	Additional species were not added to the technical document due to data constraints (e.g., other species are not as data-rich, or data not yet compiled/analyzed).

Consensus Statements		EPA Response
	If possible, capture more than just these four major rivers. If this is not possible, work with USGS to explore the possibility of analyzing additional rivers in the future. It would be nice to include an arid river system.	Comparable data for other river systems have not yet been compiled.
	Report the average annual load for each river over the full period of record.	The long-term averages (over the period of record for each river) have been calculated and added to the text for context. These numbers also appear in the “non-graphic data set.”
Suggested modifications	If the average annual discharge and/or average N and P concentrations were provided, it would allow for better comparison among rivers.	EPA agrees this would be useful, however there is not time available to re-run models, etc. in time for this report.

Pesticides in Streams in Agricultural Watersheds

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Do not include.	The indicator was included with the modifications noted below. Note: For clarity, this indicator is now presented as two separate indicators: one for N and P, and the other for pesticides.
Critical modifications	None.	
Suggested modifications	None.	

Consensus Statements		EPA Response
Other comments	1) Adjust this indicator for future ROEs to represent 1 st and 2 nd order streams... 2) ...include ecological rather than human health endpoints... 3) ...and differentiate between agricultural and urban areas.	EPA determined that: 1. This likely cannot be done for NAWQA streams. Under-sampling of first- and second-order streams is noted as a technical limitation in the QA form (T4Q4). First- and second-order streams are represented proportionally to their occurrence in the new indicator Nitrogen and Phosphorus in Wadeable Streams. 2. Pesticides are already presented in terms of the available aquatic life standards, so EPA assumes this comment refers to nutrients. For clarity the previous indicator is now being presented as two separate indicators. For the response to this comment on nutrients please see the indicator "Nitrate and Phosphorus in Streams in Agricultural Watersheds" 3. Sites were chosen so as to avoid major non-agricultural pollution sources (e.g., sewage treatment).
	Compare contaminant levels with ecologically relevant endpoints rather than MCLs.	This comment was addressed in response to #2 above.
	This indicator could be explored as a regional indicator for regions such as California, where agriculture takes place at lower elevations and along higher order streams.	The emphasis for the current ROE is on National Indicators, and there was no Regional Indicator of this type submitted for consideration.
	Because stream conditions are typically temporal, it may be inappropriate to average data over long time periods.	EPA added text to note this limitation clearly.

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: High)	The indicator was included with modifications as detailed below.
Critical modifications	Change the categories for nitrogen so they reflect levels of concern for algal growth (e.g., 0-0.25 mg/L, 0.25-0.5 mg/L, 0.5-2 mg/L, greater than 2 mg/L).	EPA could find no citable basis for these categories. The data were re-compiled to split 0-2 mg/L for nitrate and total N into two categories: 0-1 mg/L and 1-2 mg/L, and the graphics and text were revised accordingly.
	Express nitrogen and phosphorus as either <i>Total N and Total P</i> or <i>inorganic N and inorganic P</i> .	The indicator was revised to include data on nitrate, total N, ortho-P, and total P.

Consensus Statements		EPA Response
	To prevent misinterpretation, explain that thresholds for pesticide exceedances are designed to be fully protective of aquatic life, and are therefore not comparable to the toxicity thresholds for sediments (e.g., Coastal Sediment Index).	An explanation was added to the text as a limitation of the indicator.
	Explore ways to display data spatially (e.g., a concentration map) in addition to the present histograms. The map and histogram could share the same color scheme, to communicate the data more effectively.	Recommendation for future reports.

Nitrate and Phosphorus in Streams in Agricultural Watersheds

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Do not include.	The indicator was included with the modifications noted below. Note: For clarity, this indicator is now presented as two separate indicators: one for N and P, and the other for pesticides.
Critical modifications	None.	
Suggested modifications	None.	

Consensus Statements		EPA Response
Other comments	<p>4) Adjust this indicator for future ROEs to represent 1st and 2nd order streams...</p> <p>5) ...include ecological rather than human health endpoints...</p> <p>6) ...and differentiate between agricultural and urban areas.</p>	<p>EPA determined that:</p> <p>4. This likely cannot be done for NAWQA streams. Under-sampling of first- and second-order streams is noted as a technical limitation in the QA form (T4Q4). First- and second-order streams are represented proportionally to their occurrence in the new indicator Nitrogen and Phosphorus in Wadeable Streams.</p> <p>5. Pesticides are already presented in terms of the available aquatic life standards, so EPA assumes this comment refers to nutrients. Ecological criteria do not exist on a national basis for N and P, and regional differences may be significant. The drinking water nitrate MCL is included for context only; text was modified to emphasize this.</p> <p>6. Sites were chosen so as to avoid major non-agricultural pollution sources (e.g., sewage treatment).</p>
	Compare contaminant levels with ecologically relevant endpoints rather than MCLs.	This comment was addressed in response to #2 above.
	This indicator could be explored as a regional indicator for regions such as California, where agriculture takes place at lower elevations and along higher order streams.	The emphasis for the current ROE is on National Indicators, and there was no Regional Indicator of this type submitted for consideration.
	Because stream conditions are typically temporal, it may be inappropriate to average data over long time periods.	EPA added text to clearly note this limitation.

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: High)	The indicator was included with modifications as detailed below.
Critical modifications	Change the categories for nitrogen so they reflect levels of concern for algal growth (e.g., 0-0.25 mg/L, 0.25-0.5 mg/L, 0.5-2 mg/L, greater than 2 mg/L).	EPA could find no citable basis for these categories. The data were re-compiled to split 0-2 mg/L for nitrate and total N into two categories: 0-1 mg/L and 1-2 mg/L, and the graphics and text were revised accordingly.
	Express nitrogen and phosphorus as either <i>Total N and Total P</i> or <i>inorganic N and inorganic P</i> .	The indicator was revised to include data on nitrate, total N, ortho-P, and total P.
	To prevent misinterpretation, explain that thresholds for pesticide exceedances are designed to be fully protective of aquatic life, and are therefore not comparable to the toxicity thresholds for sediments (e.g., Coastal Sediment Index).	An explanation was added to the text as a limitation of the indicator.
	Explore ways to display data spatially (e.g., a concentration map) in addition to the present histograms. The map and histogram could share the same color scheme, to communicate the data more effectively.	Recommendation for future reports.

Streambed Stability in Wadeable Streams

Reviewed by the Water and Ecological Condition Group (October peer review)

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Include with modifications.	The indicator has been modified as described below.
Critical modifications	Modify the graphic to convey regional differences and/or stream type (e.g., dammed or free flowing).	At this time, EPA is not ready to display the data by region or by disturbance regime, because the data have only recently been analyzed. Note that the reference conditions for streambed stability are different from one ecoregion to the next.
	Modify the graphic to be more easily understood by identifying proportions of the following: 1) streams with fine sediment sizes and unstable streambeds, 2) streams within the range of bed composition that would be considered stable, and 3) streams with large sediment sizes and overly stable streambeds.	EPA has revised the graphic to make it easier to interpret. The new graphic shows the percentage of stream miles falling into three categories: “least disturbed,” “moderately disturbed,” and “most disturbed.”

Consensus Statements		EPA Response
	Explain that some streams and regions may naturally exhibit relatively low stability (braided, gravel-bed rivers) or high stability (bedrock dominated channels).	EPA has added text to the indicator summary and QA form to explain that regional reference conditions are used in part to account for this natural variability.
	Improve the write-up by more explicitly describing the methodology used to calculate streambed stability, why the method was chosen, how to appropriately interpret the CDFs, and how these measures may reflect anthropogenic or natural stressors on the system.	EPA has changed the graphic so that it no longer shows a CDF; instead, it classifies streams into three categories based on the comparison between observed conditions and regional reference conditions. The revised text and QA form clarify what Relative Bed Stability (RBS) represents, how it is calculated, and how it is used to classify streams into the three categories presented in the graphic. Anthropogenic stressors are described in the text, and natural variability is explained as a reason for using different reference conditions for each ecoregion.
Suggested modifications	Include reference conditions explicitly on the graphic as a horizontal line, or add a descriptive picture to depict what type of streambed a given CDF may represent.	EPA modified the graphic and no longer uses a CDF. Reference conditions vary from one ecoregion to the next and are implicit in the bar graph.
	Modify the right vertical axis on the graphic by measuring in 1,000's of kilometers to shorten the numbers and make the chart more readable.	There is no longer a CDF included.
Other comments	Present this indicator for review by fluvial geomorphologists (e.g., Wolman, Montgomery, Dietrich, Dunn, Graf).	The WSA's approach and data analysis for sediment stability were included in a manuscript submitted to the Journal of the American Water Resources Association. This manuscript was peer reviewed by a panel that included fluvial geomorphologists.
	Alternative presentation to the CDF could be used, such as percent of streams surpassing key thresholds presented by region, much like the IBI graphic presented in the next section.	The CDF has been replaced with a graphic showing the percentage of streams falling into three categories relative to regional reference conditions.
	Regional delineations and conclusions can be made from the data as long as a minimum of 30 to 50 data points are available for that region.	Because the data have only recently been analyzed EPA is not ready at this time to display the data by region or by disturbance regime. Note that the reference conditions for streambed stability are different from one ecoregion to the next.

Nitrogen and Phosphorus in Wadeable Streams

Reviewed by the Water and Ecological Condition Group (October peer review)

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Include with modifications.	The indicator has been included with modifications as detailed below.
Critical modifications	Modify the graphics to enhance interpretability of the CDF by presenting data in a regional context and including reference conditions (or a “rule of thumb”). For example, by region, present the CDF showing a threshold value considered “impacted;” 100 µg/l for total phosphorus was discussed, but both nitrogen and phosphorus thresholds should be thoroughly researched.	The graphics have been revised, and the CDF has been replaced by a bar graph displaying three ranges of concentrations relative to regional reference concentrations for both N and P. The reference thresholds themselves are documented in the “non-graphic dataset” that accompanies the indicator materials (Excel file).
	Present the N/P ratios graphically, in addition to the CDF.	At this time N/P ratios for this indicator based on meaningful ecoregional thresholds will not be displayed because the WSA data have become available only recently.
	In the write-up, address the concern about single-sampling of each stream; explain why the number of samples taken is appropriate, and reference other studies that address the use of single samples for regional characterization of macroinvertebrates or peer-reviewed publications based on this dataset.	EPA has shown probability sampling based on single sampling of streams during an index period to produce very robust distribution estimates of even highly variable chemical parameters (Messer et al. 1988. Stream Chemistry in the Southern Blue Ridge: Feasibility of a Regional Synoptic Sampling Approach. Water Resources Bull. 24: 821-829.). It also is the basis for EPA’s Coastal Assessment and other sampling programs. It would be inappropriate to defend the design in the write-up, but the limitation (times other than the index period) is noted in the write-up.
Suggested modifications	Consider applying Redfield ratios or a stoichiometric index to enhance the indicator’s interpretability.	At this time N/P ratios for this indicator based on meaningful ecoregional thresholds will not be displayed because the WSA data have become available only recently.
Other comments	Regional delineations and conclusions can be made from the data as long as a minimum of 30 to 50 data points are available for that region.	At this time displaying N/P ratios for this indicator based on meaningful ecoregional thresholds will not be displayed because the WSA data have become available only recently.

Benthic Macroinvertebrates in Wadeable Streams

Reviewed by the Water and Ecological Condition Group (October peer review)

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Include with modifications.	The indicator was modified as described below.
Critical modifications	Include both measures of benthic macroinvertebrate health (i.e., MMI and O/E) in the ROE 2007. The write-up should detail the differences between the two measures and how each should be interpreted and applied.	Modifications were made to include both metrics and the differences defined in the write-up.
	Modify the graphic to enhance understanding, and break the data out into regions (see Figure 1, below).	The graphic for the IBI was modified to a bar graph and broken down by ecoregion, and a graphic has been added for the O/E component of the indicator.
	Expand the reference list and applicable sections of the write-up to include more details on the origin of the data and the methodology used to calculate the indices. (<i>This general concern applies to all indicators.</i>)	The QA form was revised to describe the methodology in detail, and appropriate citations have been added to the text.
Suggested modifications	In the write-up, link the IBI CDFs to causal factors and ecosystem effects, even if only in a descriptive, exemplary way. Oregon, North Carolina, Ohio, and several other states have used O/E to determine causal relationships; these applications should be described.	The introduction section discusses causal factors for modifications to benthic invertebrate taxa. Space limitations do not permit a discussion of linkage of IBI scores to specific stressors.
Other comments	Include a map of the sample points, as shown at: http://www.epa.gov/OWOW/monitoring/wsa/WSAProbabilityDesign.pdf .	The revised QA form points readers to this map.
	Regional delineations and conclusions can be made from the data as long as a minimum of 30 to 50 data points are available for that region.	At this time, it is not appropriate to display IBI or O/E by EPA Region because the WSA data have become available only recently. The IBI has been regionalized for three large ecoregions.

Section 2: Ground Water

Nitrate and Pesticides in Groundwater in Agricultural Watersheds

Reviewed by the Water Group

<i>Consensus Statements</i>		EPA Response
Overall recommendation	Include with modifications.	The indicator has been modified as described below.
Critical modifications	None.	
Suggested modifications	<ol style="list-style-type: none"> 1) Include trends for this indicator rather than data grouped over several years. Revise Figure 033-2 to reflect these trends. 2) Compare contaminant levels against natural background levels as well as drinking water standards. 3) Instead of a count of pesticides detected, examine and present the magnitude, frequency, and scope of any exceedances. 4) Specify the target population for Figure 033-1. 	<p>EPA determined that:</p> <ol style="list-style-type: none"> 1) The data are grouped together because they reflect one NAWQA sampling cycle. Trend data will not be available until results from the second NAWQA cycle, which is ongoing. Text was added to the “limitations” section of the summary to explain this. 2) For context, information on nitrate background levels was added to the summary (based on a NAWQA background study). 3) The majority of the pesticides analyzed do not have standards/benchmarks. Thus, it is difficult to compare them all with regard to “exceedances.” No changes were made. 4) Text was added to the summary acknowledging that the study basins over-represent certain regions (e.g., the Midwest), yet are specifically chosen to reflect the range of agricultural uses and hydrogeologic conditions that occur in agricultural watersheds across the conterminous U.S.

<i>Consensus Statements</i>		EPA Response
Other comments	<ol style="list-style-type: none"> 1) EPA should emphasize the importance of this indicator because it could be a stressor contributing to health and ecosystem effects. 2) Groundwater sampling in agricultural watersheds does not necessarily reflect agricultural stressors. 	<p>EPA considered this recommendation and determined that:</p> <ol style="list-style-type: none"> 1) Emphasis regarding human health concerns is included in first three paragraphs. The indicator does not explicitly address contributions to ecosystem effects. 2) These data do reflect agricultural stressors. NAWQA avoided sampling sites near obvious non-agricultural point sources (e.g., directly down-gradient from septic system or sewage treatment). Text was added to the summary to emphasize this. Any historical contamination would also reflect agricultural activities, since it is unlikely that agricultural land previously was urban/ suburban.

Section 3: Wetlands

Wetland Extent, Change, and Sources of Change

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	EPA's response on this indicator will be posted at a later date.
Critical modifications	None.	
Suggested modifications	Update indicator text to reflect that National Wetlands Inventory (NWI) data are compiled on a five-year (not ten-year) cycle.	
	Revise or replace Figure 020-4, and present the causes for wetland extent change as a trend.	
	If the data allow, present the indicator on a regional basis for extent, change, and sources of change rather than only for sources of change.	

Consensus Statements		EPA Response
	Include a map of NWI plots across the entire country to show geographic coverage of the inventory.	
Other comments	Updated procedures used to detect changes in wetland extent do not affect the statistical validity of the indicator.	
	The West Coast is not as well represented as other regions because original survey design was based on preliminary estimates of the extent of wetlands in every state.	
	Wetlands may represent indirect ecosystem effects, and they often respond non-linearly to stressors. EPA should acknowledge that not all wetlands process nutrients and pollutants similarly.	
	NWI revises its count of wetlands every 5 years, not every 10 years.	

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: High)	
Critical modifications	None required	
Suggested modifications	The reviewers encourage EPA to consult with other federal agencies to expand the NWI to Alaska and Hawaii in the future.	
Other comments	Although there are limitations to the NWI methodology (as noted in the writeup), this is a critical indicator.	

Section 4: Coastal Waters

Coastal Water Quality

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements	EPA Response
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Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included and modified as detailed below.
Critical modifications	Incorporate a factor in this index to reflect physical drivers that affect the system (i.e., freshwater discharge/residence time).	EPA appreciates this comment but would be unable to incorporate this recommendation in time for this edition of the ROE.
	Include total nutrients in the indicator, not merely the dissolved species.	The National Coastal Assessment collected data only on dissolved nutrients, so the data on total levels are not available..
	Present the score for the Great Lakes separately and fully explain the methodology used to calculate the score.	The “Condition Score” is no longer a part of this indicator; the Great Lakes data are no longer included.
Suggested modifications	Pesticides and heavy metals are not represented if the <i>Coastal Sediment Quality Index</i> is removed from the report; therefore, EPA should consider including pesticide and heavy metal data in its calculation of this index.	The Coastal Sediment Quality indicator will be included in ROE, and will still include pesticides and heavy metals.
	Develop other associated stressor and biological effects indicators to accompany this indicator.	none
	Caveat the data by cautioning against drawing broad conclusions from spatially-specific, short-term data.	The appropriate caveats have been added to the text and the QA form.
	Identify and describe the deficiencies and gaps of the data included in the index.	Any important gaps and deficiencies have been noted either in the text or in the QA forms.
	Revise Figure 332-2 so that all of the pie charts are the same size.	The pie charts have been replaced in order to present a more specific breakdown by component <i>and</i> by region.
Other comments	None.	

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: High)	The indicator has been modified as detailed below (and in water reviewer comments, above).

Consensus Statements		EPA Response
Critical modifications	This indicator needs to be better presented. The nature of the analyses and summary needs to be more explicitly described. (See individual suggestions below).	EPA has made several modifications in response to the specific comments below.
	Clarify what is meant by regional reference conditions.	Text has been added to the summary to explain why and how regional reference conditions are used (i.e., sediment load, mixing parameters, ecological sensitivity, and other factors vary geographically).
	In Figure 2, make sure the color scheme is consistent across the five pie charts, and explain what it means. Consider replacing <i>less than/greater than</i> with <i>worse than/better than</i> .	The pie charts have been replaced with bar graphs. EPA cannot replace with “worse”/”better” because ROE is intended to present data, not value judgments. However, graphics have been designed so there is a consistent color scheme where green corresponds with conditions generally seen as environmentally favorable, etc.
Suggested modifications	Present more of the regional data (i.e., reference conditions, regional exceedances), perhaps in the form of a table.	Regional data for all five components is now presented.
	Graphics note: make the pie charts in Figure 2 the same size; or if there is a reason why they should remain different sizes, explain this.	The pie charts have been replaced.
	Correct the typo in the footnote to Figure 1 (<i>areally</i> , not <i>aerially</i>).	This item was removed because it applied to the condition score (which has been removed).

Peer Review Comments

Individual reviewers elaborated on a number of problems with the way the indicator is presented (see the critical modifications above). Comments and suggestions included the following:

- Like the Coastal Benthic Index, the indicator brings a lot of different measures together into a single score, which may be too aggregated to provide much meaningful information. In particular, the mix of chemical and biological components means that regions can get the same score for many different reasons. However, another reviewer emphasized that it is fine to have a multivariate index, as long as its derivation is consistent.
- Figure 2 is more informative than Figure 1, for reasons including those outlined in the previous comment.
- “Lumping” of regions is also a problem in Figure 2 because it can lead to misimpressions. It might be better to present tables with regional data, perhaps as an addition to the current Figure 2 (and perhaps in place of Figure 1). This approach would stay closer to the original data.
- In the pie charts, the indicator should be clearer about whether it is good/bad to be more/less than the reference condition. In the current presentation, this is not immediately clear.
- It is unclear whether water clarity is measured in terms of depth. In any case, the meaning of measurements like these must be clarified.

One reviewer also noted a limitation to the proposed indicator: that its “low” and “high” categories do not necessarily reflect the range of historical variation. Nonetheless, several reviewers expressed hope that the indicator can be improved to the point where it can be included in ROE, because as one reviewer noted, it is important for ROE to address coastal quality.

EPA Response

The aggregation of indicators into a single score is a useful way to capture the overall quality of coastal waters, but regional breakouts of each individual metric have now been provided as part of the indicator in order to allow the access to the disaggregated data. Figure 2 has been duplicated for each water quality metric.

EPA has clarified the issues of good/bad and the water clarity metric. It is true that the metric does not reflect the range of historical variation, but this is true of most environmental indicators.

Coastal Benthic Communities

Reviewed by the Water Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included with the modifications detailed below.
Critical modifications	None.	
Suggested modifications	Revise the indicator text to include more detail on the methodology used to calculate the scores for each region.	Derivation of the index is more complicated than can be adequately described within summary text. The QA document points to several references that treat this matter in greater detail.
	Acknowledge that episodic effects, climatic perturbations, and other disturbances such as trawling, could significantly impact benthic populations.	EPA has added text on this limitation.
	To the extent possible, be consistent when calculating the index across regions.	At the present time, it is not practical to change the way the index is calculated.
	Exercise caution when extrapolating across broad regions based on a relatively few number of samples collected at a limited number of locations or over a short time period (e.g., on the West Coast).	EPA has added a temporal representation as a limitation (see above comment on episodic events, etc.). The probability samples have a sufficient number of sample sites to provide unbiased estimates with reasonably small error bounds for the entire geographic regions covered by the indicator.
Other comments	None.	

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: Medium)	The indicator was included with the modifications below (and in water reviewer comments, above).
Critical modifications	The index is a potentially useful indicator. However, it needs to be better presented. The nature of the analyses and summary needs to be more explicitly described. (See individual suggestions below).	The regional “condition score” was removed in response to general peer review comments on all the Coastal Condition indicators. The current presentation has been modified to further clarify terminology, sampling period, and related trends.
	The use of regional information to set thresholds needs to be more explicitly described. The indicator does not describe how “professional judgment” was applied in deriving the condition scores across regions.	Derivation of the index is more complicated than can be adequately described within summary text. The QA document points to several references that treat this matter in greater detail.
	Make sure terminology is consistent between the text and the graphics.	Both the text and graphics were revised.
	Fix typos: <ul style="list-style-type: none"> o footnote to Figure 1: <i>aerially</i> → <i>areally</i> o paragraph 3 of writeup: <i>sediment</i> → <i>benthic</i> 	The first typographical error is no longer applicable because the condition score has been removed. The second typographical error has been corrected.

Coastal Habitat Index

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements	
Decision	Do not include as a separate indicator.
<p>Critical modifications</p> <ul style="list-style-type: none"> • Include the index score as part of the <i>Coastal Condition Index</i> indicator but not as a separate indicator. • Present the dataset for this indicator in conjunction with the NWI data in the indicator for <i>Wetland Extent, Change, and Sources of Change</i>. <p>This indicator was combined into the Wetland Extent, Change, and Sources of Change indicator.</p>	

The water indicators peer reviewers agreed that this indicator, *Coastal Habitat Index*, should **not** be included in the ROE 2006 **unless the critical modifications can be made**. The reviewers had a difficult time distinguishing this

indicator from the *Wetland Extent, Change, and Sources of Change* indicator and felt that EPA did not justify the inclusion of the coastal wetland data as a separate indicator. They concluded that this indicator was duplicative and should not appear on its own.

Ecological Condition Group Review

Consensus Statements		
Decision	Include with modifications. (Rank: HIGH)	
Critical modifications	<ul style="list-style-type: none"> * Change the title to “Coastal Wetland Index” to more accurately reflect indicator content/focus. Note that coastal areas include more than just wetlands. This indicator characterizes <i>wetlands</i>, not <i>habitats</i>. * The baseline period (1780-1990) is inappropriate for the West Coast, which was not developed until after 1850. Adjust the baseline accordingly. 	This indicator was combined with the Wetland Extent, Change, and Sources of Change indicator.

Coastal Condition Index

Reviewed by the Water Group

Consensus Statements		
Decision	Include with modifications.	
Critical modifications	<ul style="list-style-type: none"> • Exclude the <i>Coastal Sediment Quality Index</i> from the calculation of the <i>Coastal Condition Index</i> at this time. • Include the calculation of the <i>Coastal Habitat Index</i> in this section rather than with the <i>Wetland Extent, Change, and Sources of Change</i> indicator or as a separate indicator. 	This indicator was dropped

The water indicators peer reviewers agreed that this indicator, *Coastal Condition Index*, should **not** be included in the ROE 2006 **unless the critical modifications can be made**. The reviewers acknowledged the usefulness of this indicator because it provides an overall assessment of coastal conditions in various regions across the country. However, they recommended several major modifications if the index is to be presented in the ROE 2006. The reviewers proposed that this indicator would benefit from a conceptual diagram and a more effective means for communicating the different regional scores that contribute to this indicator. The reviewers offered the two figures below as examples. Figure 2-1 from the *National Coastal Condition Report* is an example of how EPA could present this indicator as an aggregate of other indicators. Figure 1-4, also from the *National Coastal Condition Report*, could be adapted and included with this indicator to show how stressors, ambient conditions, exposures, and effects are connected. Freshwater inflow, groundwater discharge, and deposition from the air should be added to the figure.

Extent of Hypoxia in Gulf of Mexico and Long Island Sound

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included with modifications as detailed below.
Critical modifications	Include additional regional indicators to bolster hypoxia as an important multi-regional indicator of ecological condition.	Additional regional indicators will not be added to this ROE at this time.
Suggested modifications	<ol style="list-style-type: none"> 1) Link or associate this indicator with the physical and chemical characteristics of the system. 2) Clearly define hypoxia with respect to dissolved oxygen levels, and apply this definition consistently across regional datasets. 3) Revise the figures to reflect the timing, extent, and target populations of the surveys. 4) Present this indicator as an ambient indicator rather than an effects indicator. 	<p>EPA made the following modifications:</p> <ol style="list-style-type: none"> 1) Text was added noting the influence of physical/chemical factors such as salinity and mixing parameters, and the importance of temperature, etc. in determining the actual threshold for hypoxia was clarified 2) For consistency, graphics have been revised so all use 2 mg/L as a threshold. However, text has been added to clarify that while 2 mg/L is a commonly used threshold for hypoxia, the true functional definition depends on temporal, spatial, and regional conditions. 3) Both maps now include the date of sampling and the nature of the measurement (bottom water). Map legends now point out sample locations as well. Additional detail on sampling has been organized into one paragraph in the summary. 4) The ambient/effects is not part of the presentation of indicators in the ROE.
Other comments	Other pressures or ambient indicators could be linked to the hypoxia indicator, such as nutrient loads and freshwater discharge.	Text was added to the indicator summary noting that low Gulf hypoxia coincided with a drought year in the Mississippi Basin.

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: High)	The indicator was included with modifications as listed below.

Consensus Statements		EPA Response
Critical modifications	<ol style="list-style-type: none"> 1) Explain why Long Island Sound and the Gulf of Mexico use different thresholds for hypoxia. 2) Explain other differences between the two approaches, noting that these are two separate regional pilots with different sampling protocols. 3) Modify the graphical presentation: <ul style="list-style-type: none"> • Label the y-axis in Figure 1. • Provide comparable graphics for each region. • Trend lines in Figure 3 may be misleading. Eliminate trend lines or perform a more thorough statistical analysis of possible trends. 	<ol style="list-style-type: none"> 1) Graphics have now been modified to use the same threshold. However, in response to this comment, EPA has added text that clearly explains how and why actual thresholds for hypoxia vary over time and space. 2) Summary text has been revised accordingly. There is now a single paragraph explaining the two approaches and several ways in which they differ. 3) Graphics have been modified accordingly.
Suggested modifications	Extend the indicator to include other regions/systems/seasons.	This indicator is a “Regional Indicator,” therefore expansion is not possible for the ROE07.

Submerged Aquatic Vegetation in Chesapeake Bay

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator will be included with modifications described below.
Critical modifications	None.	N/A
Suggested modifications	Explain the crosshatched area on Figure 317R-1.	EPA added a new graphic to replace the original, which omitted the key to the cross-hatching.
	Expand this indicator to other regions where possible (e.g., Hawaii, Florida, San Francisco Bay, Puget Sound, Mobile Bay, Gulf of Mexico bays and estuaries, Mid-Atlantic, and Northeast).	This indicator is a “Regional Indicator” and expansion is not feasible for the ROE07.
	If other regions cannot be represented in the 2006 ROE, the indicator text should be clearer about its status as a regional indicator and explain that there are other appropriate regional indicators.	The indicator reflects Chesapeake Bay SAV only.

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator will be included with modifications described below.
	The importance of this indicator is understated and should be better emphasized. It can be applied to a variety of locations and ecosystem types and is useful to reflect habitat condition and change.	The indicator write-up emphasizes the importance of this indicator; Expansion of Regional Indicators is not feasible for ROE07.
Other comments	None.	

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: LOW)	The indicator will be included with modifications described below. (and above, in response to Water reviewer comments).
Critical modifications	None required	
Suggested modifications	It would be interesting to know if any data/descriptive sources are available to characterize the spatial extent of SAV prior to 1930-1950.	EPA determined that the only available Bay-wide data are from the surveys conducted by Virginia Institute of Marine Science (1978-2004) and the analysis of historic photographs from the 1930s-1950s. (http://www.vims.edu/bio/sav/Final_SAV_Historical_Report_2004.pdf)
	It would be interesting to explore whether patterns in species composition can be determined.	Recommendation for future report.
	In the future, explore how an indicator of SAV can be expanded to other regions. Look for data from other regions (e.g., Puget Sound, Florida Bay, or areas where SAV may be invasive).	EPA determined that it is not feasible to add additional Regional Indicators at this time.
Other comments	Note that several pre-meeting comments were based on the assumption that the indicator should be national in scale.	

Coastal Sediment Quality Index – July peer review

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements	EPA Response
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Consensus Statements		EPA Response
Overall recommendation	Do not include.	Substantial changes were made to the indicator and a revised indicator was submitted for peer review consideration.
Critical modifications	None.	
Suggested modifications	Include a placeholder in the ROE 2006 for a sediment quality indicator, but do not present this index.	
Other comments	There are fundamental problems inherent in aggregating sediment toxicity, sediment contaminant concentrations, and TOC.	The indicator was re-structured so that it no longer aggregates the three disparate measures.
	The sediment quality guidelines used are more effective as screening tools and do not necessarily relate to biological effects.	This was noted as a limitation in the write-up.
	Toxicity tests are not always reliable, and the indicator does not include any microbial or plant toxicity tests.	This was noted as a limitation in the write-up.

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Do not include. (Rank: NA)	

Consensus Statements		EPA Response
Reasons for exclusion	Indicator is difficult to understand.	<p>EPA has made substantial changes to the indicator to improve clarity and to respond to these comments:</p> <ul style="list-style-type: none"> • The original Figure 1 has been removed. The revised indicator presents a regional breakdown of each of the components of the sediment quality index, <i>not</i> the index as a whole • TOC has been eliminated from the indicator and the impact of TOC noted in the text. • Graphics for toxicity and contaminants have been included and the fact that contaminants and toxicity are not necessarily equivalent is explained in the text. • The pie charts have been replaced by two bar graphs: one for sediment contamination and

Consensus Statements		EPA Response
	<p>Indicator would require many major changes. These include (but are not limited to):</p> <ul style="list-style-type: none"> o This indicator needs to be better presented. Like the Coastal Benthic Index and the Coastal Water Quality Index, the nature of the analyses and summary needs to be more explicitly described. o Eliminate Figure 1. o Eliminate TOC from Figure 2. Include text to explain the impact of TOC on the bioavailability of contaminants. o Present graphics for toxicity and contaminants, and include text to explain possible reasons why the two are not exactly equivalent (e.g., indicate that contaminants are not necessarily toxic). o In Figure 2, correct the color scheme, which is inconsistent among the different pie charts. o If toxicity is included in Figure 2, consider improved definitions for toxicity (e.g., “not statistically different from reference condition,” “low toxicity,” and “high toxicity”). o Present regional information. 	<p>for sediment contamination and one for sediment toxicity.</p> <ul style="list-style-type: none"> • The text clearly defines toxicity thresholds. Both toxicity and sediment contaminants are now presented by Region, and compared (reconciled) across regions.
Suggested alternatives	Explore ways to develop a better indicator of coastal sediment contamination, as there is still a need for such an indicator.	EPA has made substantial changes to the indicator and is resubmitting it for peer review.

Coastal Sediment Quality – October peer review

Reviewed by the Water and Ecological Condition Group

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Include with modifications.	The indicator was included with several of the modifications below.

Consensus Statements	EPA Response
Critical modifications	Rename the indicator from “Sediment Quality” to a more appropriate descriptor, such as “Sediment Toxicity,” “Sediment Contamination,” or a combination of these two terms.
	To be consistent with other agency efforts (e.g., the Coastal Condition Report), the indicator name will remain “Coastal Sediment Quality.” The text has been revised, however, to emphasize that toxicity and contamination are two specific aspects of sediment quality.
	Include additional details about the bioassay methodology, why this particular bioassay and test organism were chosen, and the quality control methods employed when carrying out the bioassay.
	The revised text and QA form explain that <i>Ampelisca</i> is a standard bioassay tool. Methodology and quality control procedures are described in the documents cited in the QA form.
	Provide a clear explanation of the methodology used to calculate the index.
	This indicator no longer uses an index to characterize sediment quality. Instead, the two measures are presented separately. Basic methodology is explained in the text, with more detailed citations provided in the QA form.
	Clearly and prominently describe the limitation of sediment toxicity tests and the application of the “effects range low” (ERL) and “effects range medium” (ERM) endpoints.
	The revised text identifies the <i>Ampelisca</i> bioassay and the ERM approach as screening tests.
	<p>Improve the graphics and write-up to provide an indication of ecological impacts and present trends. Include a more detailed description of the indicator’s limitations, and specify appropriate interpretations of the graphics.</p> <p>Trend data are presently unavailable, and inferences about ecological impacts would be largely speculative given the screening nature of these tests. Thus, for more discussion of ecological effects, the revised text points the reader to the Coastal Benthic indicator, which more directly represents ecological impacts.</p> <p>The revised text includes an explicit statement of limitations, particularly the fact that these measurements are screening tools.</p> <p>To prevent misinterpretation of the graphics, the data categories have been renamed (“potentially toxic” and “not likely toxic”), thus emphasizing that the tests do not prove with certainty that sediments are toxic. Upon further review, it was also decided that the “moderate” contamination category was potentially misleading because in practice, exceedance of ERMs is seldom associated with toxic effects. This category was merged into “not likely toxic.”</p>

Consensus Statements		EPA Response
	<p>Improve the approach for addressing missing data. Explain why the data are missing, and describe any shared characteristics of sites missing data. Exercise care when interpreting the data, as the sampled population to which inferences can be made may differ from the target population.</p>	<p>To avoid making inappropriate inferences, the missing data are now displayed as such (i.e., they are no longer apportioned to the other categories). An explanation for missing data has been added to the QA form (T4Q4).</p>
Suggested modifications	None.	
Other comments	<p>Calculating an index based on bioassays using one species may not be scientifically justifiable or meaningful.</p>	<p>Ampelisca is a standardized test of acute toxicity, and has been extensively tested and peer reviewed. While it is true that the assay is not a full proxy for sediment toxicity, it is nonetheless an important screening tool, which—if interpreted appropriately—can provide meaningful insight into the potential for sediments to be toxic to benthic organisms. In the revised indicator text, the limits of interpretation are defined for the reader.</p>
	<p>A wide range of effects ranging from physiological effects, stress, impacts on reproductive processes, disease, and viability (mortality) can result from toxins. This range of effects needs to be addressed in addition to mortality when evaluating whether or not sediments exhibit toxicity.</p>	<p>This point has been added to the text as a limitation.</p>
	<p>Sediment toxicity tests are most useful and typically applied to a localized area. ERL and ERM endpoints are useful as screening tools but may not be as appropriate as a national or regional indicator.</p>	<p>There are however limitations to the ERM approach, it is a useful screening tool at a national or regional scale.</p>
	<p>Even small proportions of estuaries with contaminated sediments can cause widespread effects on biota through the estuary. The text needs to explain the ecological implications of different levels of sediment contamination. Also, one of the regions with the highest sediment contamination exhibited the lowest level of sediment toxicity. The text should help readers understand how this can occur and how the results should be interpreted.</p>	<p>The text provides a brief introduction to ecological concerns. It directs the reader to the Coastal Benthic indicator for a more in-depth discussion.</p> <p>The text has been revised to provide a stronger, more in-depth explanation of how and why the two measurements frequently differ—and thus, why they are particularly effective as a screening tool when used in tandem.</p>
	<p>Regional results should be presented accompanied with a map, as few people know where EPA regions are located.</p>	<p>Readers will be directed to a map of EPA Regions that will appear in the introduction to the final report.</p>

Algal Bloom Outbreaks – July 05 Peer Review

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	EPA has made substantial changes to the indicator and is submitting a revised indicator for peer review consideration.
Critical modifications	Include data for estuarine and riverine systems where HABs can be attributed to anthropogenic or other stressors rather than physical forcing mechanisms that tend to control red tides.	EPA does not assume that estuarine and riverine systems are the only methods for measuring or delivering anthropogenic stressors. Anthropogenic stressors (e.g., construction, sewer outfalls, storm water runoff, etc.) exist along the coastline that may influence HAB outbreaks. Continued monitoring will allow EPA to better understand them, predict their occurrence, and provide adequate public notice and precautions. Moreover, because HAB outbreaks are in themselves a stressor to the coastal ecosystem, including the public, they are an important trend to monitor for the Gulf Coastal and even Atlantic Seaboard region of the southeast.
	Acknowledge that any trends observed in HABs depend on the number, frequency, and timing of sampling efforts because the blooms are episodic events.	EPA has modified the indicator to represent only a set of locations (Florida Gulf Coast) that has had a much more consistent monitoring program in place. EPA believes that this monitoring design better captures episodic blooms.
Suggested modifications	None.	
Other comments	None.	

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Do not include. (Rank: NA)	EPA has made substantial changes to the indicator and is submitting a revised indicator for peer review consideration.
Reasons for exclusion	Though this is an important phenomenon, the present indicator is deficient in that standardized methods are not employed across the Gulf States Region, and the spatial distribution of the event is not charted. EPA and perhaps CDC should be working with the States to standardize sampling and reporting methods in order to improve the charting of this class of environmental problem.	EPA has modified the indicator to represent only a set of locations (Florida Gulf Coast) that has had a much more consistent monitoring program in place

Consensus Statements		EPA Response
	<p>The interpretation of harmful outbreaks is somewhat vague. These events are undesirable, but their link directly to environmental degradation or undesirable change is questionable. The patterns shown in the graphics may be fully in balance with historical patterns both temporally and geographically. The indicator does not reveal whether outbreaks are indicators of pollution, species change, or any other altered ecological condition other than algal growth.</p>	<p>The ROE's purpose is to report trends in the environment, not just those environmental trends directly attributed to pollutants. Whether or not they are made worse by pollution, the occurrence of <i>K. brevis</i> blooms critically affects water quality and shellfish beds along the coastal area, which affects local commercial and recreational environments.</p>
	<p>The period of record is relatively short, and the local spatial dynamics of HABs occur on a comparatively short time scale. These factors reduce the usefulness of this indicator for the ROE.</p>	<p>EPA has modified the indicator to represent only a set of locations (Florida Gulf Coast) that has had a much more consistent monitoring program in place. Moreover, the existing monitoring program will continue to collect data and will provide a longer time series over which to measure the frequency of local HAB outbreaks. EPA believes that the frequency of these local outbreaks is significant and sufficient to establish a trend in environmental condition for indicator purposes.</p>

Harmful Algal Bloom Outbreaks in the Gulf of Mexico (Region 4) – October 05 Peer Review

Reviewed by the Water and Ecological Condition Group

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Do not include.	A revised version of this indicator will be included in ROE under the name “Harmful Algal Bloom Outbreaks along the Western Florida Coastline.” Reasons for including this indicator are described below.
Critical modifications	Do not include this indicator in ROE 2007, but leave a placeholder for this type of indicator.	EPA agrees that the peer reviewers have raised several important concerns about this indicator. However, upon further review of the survey design, it appears that these comments stem largely from the way the indicator was originally presented, and do not reflect the actual survey design, which EPA believes is quite sound and consistent. EPA believes the peer reviewers’ concerns can be addressed by making the indicator materials more clear. A revised version will be included in ROE.
Suggested modifications	None.	
Other comments	In future ROEs, include a suite of HAB indicators for several algal groups (e.g., estuarine and coastal dinoflagellates, cyanobacteria, prasinophytes, brown algae), ecosystems, and regions.	This is not possible given current data availability, but could be explored for future versions of ROE. For now, this indicator is included as a Regional Indicator, with the limitations acknowledged in the text.
	The study design could be improved if a researcher delineated a particular area in the Gulf, resampled that area at regular intervals, and counted the number of days per year in which harvesting shellfish from that area was prohibited. This sampling method would allow for a trend analysis over time and would resolve the issue of whether observed red tide trends were the result of the level of sampling rather than a reflection of changes in the frequency or severity of HABs.	The text and QA form have been revised to describe the survey methodology in greater detail, emphasizing its consistency and regularity. The State of Florida maintains a network of monitoring sites from which samples are collected at regular intervals. Additional samples are collected in order to characterize the extent and duration of a particular HAB event. Daily satellite imagery from NOAA is used to help identify blooms for targeted sampling and to confirm sampling results.

The peer reviewers agreed that this indicator should *not* be included in ROE 2007. The reviewers agreed that while HABs are important indicators of ecological health, EPA did not choose the most appropriate regional dataset to represent the indicator. The initiation, location, and transport of red tides in the Gulf of Mexico are generally more attributable to physical forcing mechanisms than anthropogenic influences and are, therefore, less manageable. How would EPA use this indicator in a management context, except possibly as a human exposure warning indicator (which Florida already has)? In addition, the reviewers noted that Figure 237R does not explain the significance of number of blooms versus bloom duration and does not tie either measurement to environmental pressures or ecological effects.

The reviewers agreed that in future ROEs, EPA should include regional HAB datasets for several algal groups and ecosystem types. For example, blue-green algae (cyanobacterial) blooms in freshwater and some brackish systems

as well as dinoflagellates in the Chesapeake Bay and other estuaries can be linked to nutrient loading and have been mitigated by reducing nutrient inputs. EPA should emphasize these types of HABs, as they represent more manageable environmental stressors and can be sampled under more controlled conditions.

EPA Response:

Environmental “manageability” is not a criterion for indicators in the ROE, and as the reviewers note, the presence and frequency of red tides are an important indicator of the condition of coastal ecosystems. EPA agrees with reviewers that additional species of HABs would be a useful addition to this indicator.

Chesapeake Bay Blue Crabs: Mature Females-Spawning Stock Abundance

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		
Decision	Do not include.	This indicator has been dropped based on the recommendation from the peer reviewers
Critical modifications	None	
Suggested modifications	None	
Other comments	<ul style="list-style-type: none"> • EPA did not justify choosing this dataset as an aggregate indicator for the Chesapeake Bay; there are better regional examples of this type of indicator. • It is difficult to associate this indicator with specific ambient conditions and stressors. • Figure 320R-1 does not illustrate any trends and is not an effective means of communicating this indicator. 	

The water indicators peer reviewers agreed that this indicator, *Chesapeake Bay Blue Crabs: Mature Females – Spawning Stock Abundance*, should **not** be included in the ROE 2006. The reviewers agreed that this indicator may be an adequate aggregate indicator for the Chesapeake Bay, but EPA did not make a compelling case for the inclusion of this indicator in the ROE 2006. The reviewers found it difficult to associate this indicator with specific ambient conditions and stressors and suggested that if relationships to stressors are available, then EPA should present them to justify the inclusion of this indicator.

Ecological Condition Group Review

Consensus Statements		
Decision	Do not include. (Rank: NA)	This indicator has been dropped based on recommendations from the peer reviewers.
Reasons for exclusion	* The causes for the changes in crab abundance include human harvest as well as environmental change. Interpretation of these trends would face the same challenge as any other commercial species abundance trend.	
Other comments	* Many other species have longer records and have more well-established assessment techniques (e.g., coho salmon, Chinook salmon, Atlantic salmon, sockeye, cod, halibut, and others). Several of these species on the East coast (e.g., cod, lobster) would show different trends.	

Section 5: Drinking Water

Population Served by Community Water Systems with No Reported Violations of Health-Based Standards *Reviewed by the Water Group*

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator has been included with modifications as detailed below.
Critical modifications	None.	
Suggested modifications	Explain the methods EPA will use to update this indicator as MCLs change over time.	The indicator graphic was modified to clearly show trends in data for MCLs in effect at beginning of ROE reporting, and to include data if reported to include new MCLs.
	Include a figure that presents violation trends by type of exceedance instead of grouping types of exceedances together, like Figure 049-3.	Figure 042-3 modified.

Consensus Statements		EPA Response
	Consider deleting Figure 049-4 or including a similar figure for the entire U.S. population as well.	Figure 049-4 has been deleted.
	Re-scale the vertical axis of Figure 049-2 to 50-100; the data also could be presented as a table.	A table presenting the data points is available online.
	Present this indicator as an exposure indicator rather than an ambient indicator.	EPA has revised the presentation of the ROE indicators.
Other comments	None.	

Section 6: Consumption of Fish and Shellfish

Coastal Fish Tissue Contaminants

Reviewed by the Water Group and by the Ecological Condition Group (as a Referenced Indicator)

Water Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications.	The indicator was included with modifications described below.
Critical modifications	None	
Suggested modifications	Present contaminant concentrations, for PCB and mercury especially, rather than aggregating the data into an index. This will eliminate the issue with different assumptions in the index, like fish consumption rates.	Although the original text was unclear on this point, the score is tied directly to actual chemical concentrations. The word “index” has been removed from the indicator, and the text has been revised to explain how the data were used to arrive at the percentage of sites in each range of contaminant levels. Figure 285-2 disaggregates the scores and displays the percentage of sites falling into three contaminant concentration ranges for each chemical.
	Consider including examples from different regions or ecosystems (e.g., San Francisco Bay) in addition to overall, national data.	No additional “Regional Indicators” are being added to this edition of the ROE.

Consensus Statements		EPA Response
	Explicitly state the assumptions made in developing the indicator (if it is to remain as an index), especially since fish consumption varies widely across the country. The calculations of scores should be consistent across various regions of the U.S.	EPA has added text to clarify the EPA guidelines that were used (four 8-ounce meals per month) and explain how a high/moderate/low score was assigned to each site. Scores were calculated the same way in all regions.
	Show trends data for the concentrations of contaminants. There exists a wealth of trend data for some contaminants, like PCB and mercury that could easily be displayed to represent temporal trends.	The NCA dataset does not yet capture temporal trends, as some sampling/ analytical methods changed between NCCR I and NCCR II
	Better represent freshwater data in this indicator.	The available fresh water data reflect different study designs, so they cannot be compared directly with the coastal results. However, a new indicator—Contaminants in Lake Fish Tissue—has now been added to ROE as a complement to the coastal fish indicator.
	If EPA includes Great Lakes data in this indicator, it should present the data separately because they originate from a different data source.	Great Lakes data are not comparable to the other data in this indicator and are no longer included.
	Consider whether the factor used to correct whole-body concentrations (3.0) is appropriate for mercury. In the Great Lakes fish, this is not an appropriate factor. Include textual information on emerging contaminants and provide examples (PDBE's).	Great Lakes data are no longer included in this indicator. Emerging contaminants such as brominated flame retardants are discussed in the chapter text.
Other comments	Indicators for pressures, ambient conditions, and effects related to the accumulation of contaminants in fish tissue (especially for PCB and mercury) should be discussed and related to this indicator.	Recommendation for future reports.

Coastal Fish Tissue Contaminants

Reviewed by Ecological Condition Group (as a Referenced Indicator)

Ecological Condition Group Review

Consensus Statements		EPA Response
Overall recommendation	Include with modifications. (Rank: MEDIUM)	The indicator was included with modifications described below (and in water reviewer comments, above).

Consensus Statements		EPA Response
Critical modifications	Eliminate Fig. 1 and the “condition score.” This is confusing.	The condition score has been eliminated. Figure 1 now presents just the percentages of sampling sites rated high/moderate/low. EPA has modified Figure 1 so it more clearly presents “high contamination,” and revised the corresponding text to make the ratings construction more transparent.
	Add a table of regional values for those chemicals which show >0 exceedances in Figure 2 (e.g., Hg, PCBs, PAHs, DDT).	Recommendation for future reports.
	Data are currently presented in the context of human health factors. Unless the presentation can be changed to include comparable wildlife benchmark values, the indicator is too constrained to help us answer this question of biomeasures of exposure. If this modification is not made, the indicator can still be presented in ROE (assuming the previous two modifications are made), but should not be discussed in the Eco chapter.	EPA Guidance criteria do not exist to assess the ecological risk of whole-body contaminants in coastal fish. However, text was added to the “limitations” section of the indicator summary to emphasize this point. Recommendation for future reports.
Suggested modifications	Continue to explore opportunities to include Great Lakes data.	Recommendation for future reports.

Contaminants in Lake Fish Tissue

Reviewed by the Water and Ecological Condition Group (October peer review)

Water and Ecological Condition Group Review

Consensus Statements		EPA Response
Decision	Include with modifications.	
Critical modifications	Modify the graphics to include additional descriptions of the information presented, especially in the case of the two apparently identical maps depicting sampling sites.	The map that existed in the QA form was removed.
	Include contaminant-specific thresholds and/or criteria in Figures 335-1 and 335-2 to provide context for the results.	The final report presenting this data have not been published. Decisions about thresholds have not yet been made. EPA believes that the raw data justify the inclusion of the indicator, even without thresholds.

Consensus Statements		EPA Response
	In the write-up, emphasize how this indicator should be interpreted with respect to ecological conditions and human health by providing thresholds and/or criteria.	The final report presenting this data have not been published. Decisions about thresholds have not yet been made. EPA believes that the raw data justify the inclusion of the indicator, even without thresholds.
	In the write-up, defend the rationale behind collecting different types of fish at different sampling sites (if this indeed was the case).	The write-up was modified to explain that 12 widely distributed predator and six-bottom dwelling species (in order of decreasing preference) were the focus of the study to minimize interspecies differences across the U.S. and to explain criteria used for selecting target species.
Suggested modifications	In the write-up, explain that arid areas are not well represented in the dataset. Because the distribution of sampling sites was based on the frequency of occurrence of lakes, the study cannot address fish tissue contaminants in more arid regions. A different sampling design would be required.	EPA has added a limitation to this effect.
	Present the data regionally for those areas where sufficient data have been collected (e.g., Figure 1 in the Coastal Fish Tissue Contaminants indicator). Presenting the data by ecoregions would likely be preferable to EPA regions.	EPA has determined that there is not a sufficient sample size to present the data for more than a few EPA Regions.
Other comments	None.	