July 29, 2005

MEMORANDUM

SUBJECT: Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act

FROM: Diane Regas, Director /s/
Office of Wetlands, Oceans and Watersheds

TO: Water Division Directors
Regions 1-10

I am pleased to provide a copy of the *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* (IRG). The 2006 IRG was developed in a cooperative effort between EPA Headquarters, EPA Regional offices, and a number of interested state partners. EPA also posted a draft version of the guidance on its Web site for public comment between February 22, 2005 and April 22, 2005. Subsequently, EPA received approximately 40 sets of comments on the draft from a wide range of stakeholders. Those comments have been addressed in the final guidance.

This guidance is for states, territories, authorized tribes, and interstate commissions that help states prepare and submit section 305(b) reports (hereinafter referred to as "jurisdictions"). It outlines development of their biennial Integrated Reports (IR) in support of EPA's strategy for achieving a broad-scale inventory of water quality conditions. The objective of this document is to provide jurisdictions a recommended reporting format and suggested content to be used in developing a single document that integrates the reporting requirements of the Clean Water Act (CWA) section 303(d), section 305(b), and section 314 (pursuant to the CWA, jurisdictions report to EPA biannually on the condition of waters within their boundaries). Each IR will report on the water quality standards attainment status of all waters, document the availability of data and information for each water, identify certain trends in water quality conditions, and provide information to managers in setting priorities for future actions to protect and restore the health of our nation's aquatic resources.

As stated in its introduction, the 2006 IRG is a comprehensive compilation of relevant guidance EPA has issued to date regarding IR; however, there are few changes from the 2004 guidance. The 2006 IRG provides: (1) increased emphasis on the use of the Assessment Database (ADB) or comparable electronic data format (the ADB is being modified to accommodate the recent format, content, and multi-category listing option that the guidance suggests), (2) greater clarity on the content and the format of those components of the IR that are

recommended and required under CWA sections 303(d), 305(b), and 314, (3) greater clarity on issues associated with data solicitation, collection, consideration, and interpretation of water quality standards, (4) additional information on the option to report water quality status of individual segments in more than one category (e.g., to show that some designated uses of a water are being attained and some designated uses are not), and (5) additional clarity and flexibility on alternatives to total maximum daily loads (TMDLs) for attaining water quality standards (e.g., utilization of reporting "Category 4b").

Thank you for all of your help and input in the development of this 2006 IRG. The document may be found on our Web site at: http://www.epa.gov/owow/tmdl/2006IRG. Should you have questions about the guidance, please contact Sarah Furtak at 202-566-1167.

Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act

July 29, 2005

Watershed Branch
Assessment and Watershed Protection Division
Office of Wetland, Oceans and Watersheds
Office of Water
United States Environmental Protection Agency

This document provides EPA's guidance for preparing the 2006 Integrated Report. The Integrated Report is intended to satisfy the listing requirements of sections 305(b) and 314 of the Clean Water Act (CWA). This guidance document discusses existing requirements of the CWA and EPA's implementing regulations. Those statutory and regulatory provisions contain legally binding requirements. This document describes those requirements; it does not substitute for them. The recommendations in this document are not binding; indeed, there may be other approaches that would be appropriate in particular circumstances. When EPA makes a decision on a state's section 303(d) list, it will make each decision on a case-by-case basis and will be guided by the applicable requirements of the CWA and implementing regulations, taking into account comments and information presented at that time by interested persons regarding the appropriateness of applying these recommendations to the particular situation.

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ABBREVIATIONS AND ACRONYMS

ADB	Assessment Database
AU	Assessment Unit
CALM	Consolidated Assessment and Listing Methodology
CPP	Continuing Planning Process
CFR	Code of Federal Regulations
CWA	Clean Water Act
DQO	Data Quality Objectives
DU	Designated Use
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FGDC	Federal Geographic Data Committee
GPRA	Government Performance Report Act
IR	Integrated Report
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NSSP	National Shellfish Sanitation Program
OW	Office of Water
PPG	Performance Partnership Grant
PWS	Public Water Supply
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RIT	Reach Indexing Tool
SDWA	Safe Drinking Water Act
STORET	STORage and RETrieval
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WQC	Water Quality Criteria
WQS	Water Quality Standard

I. INTRODUCTION

The *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* was developed specifically for the 2006 reporting cycle. The objective of this document is to provide to states, territories, authorized tribes, and interstate commissions[1] a recommended reporting format and a suggested content to be used in developing a single document that integrates the reporting requirements of the Clean Water Act (CWA) section 303(d) and section 305(b). This guidance for developing the Integrated Report (IR) supports the Environmental Protection Agency's (EPA) strategy for achieving a broad-scale, national inventory of water quality conditions. Use of the IR format will serve to report on water quality standards (WQS) attainment status of assessed waters, document availability of data and information for each segment, identify trends in water quality conditions, and provide information to managers in setting priorities for future actions to protect and restore the health of our nation's aquatic resources.

EPA has established a goal that all fifty-six states and territories utilize the integrated reporting format by 2008. EPA continues to promote this comprehensive assessment approach in order to enhance the states' ability to track both programmatic and environmental goals of the CWA, and ideally, to increase the pace of achieving these important environmental goals. This document includes recommendations designed to allow states and other interested stakeholders to track the progress of interim management actions by employing the multi-category reporting framework. By issuing this guidance well in advance of the April 1, 2006 deadline for submission of CWA section 303(d) lists and section 305(b) reports, EPA intends to encourage the broadest possible adoption of the integrated reporting approach.

EPA continues to advocate the use of the five-part categorization format for sorting waters (see box below for brief description and Section V). While this document is more comprehensive than previous Integrated Report Guidance, there are clarifications to the previous (2004) Integrated Report Guidance. Specifically, this guidance provides:

- increased emphasis on the use of the Assessment Database (ADB) or compatible electronic data format (the ADB is being modified to accommodate the recent format, content, and multi-category listing option that the guidance suggests),
- greater clarity on the content and the format of those components of the IR that are recommended and required under CWA sections 303(d), 305(b), and 314,
- greater clarity on issues associated with data solicitation, collection, consideration, and interpretation of water quality standards,
- additional information on the option to report water quality status of individual segments in more than one category (e.g., to show that some designated uses of a water are being attained and some designated uses are not),[2] and
- additional clarity and flexibility on undertaking and reporting alternatives to total maximum daily loads (TMDLs) for attaining water quality standards (e.g., utilization of reporting "Category 4b").

[1] In the remainder of this document, unless specified otherwise, *states* also refers to authorized tribes, territories and interstates commissions.

[2] In this guidance document EPA refers to "designated uses" as the basis and unit for reporting water quality, although note that states determine their section 303(d) list (i.e., Category 5) consistent with 40 CFR 130.7 (b)(3).

It is important to note that certain components of the recommended format and content for the 2006 IR document are based on requirements of the CWA and EPA's implementing regulations (e.g., the submission of an approvable section 303(d) list), whereas other components are based on Agency recommendations. In section II of this guidance, those components *required* by the CWA sections 303(d), 305(b), 314, and the corresponding regulations are identified.

In addition to identifying the required components in the 2006 IR submission, this guidance will indicate the components of the 2006 IR document for which EPA recommends states provide an opportunity for *public review and comment* (e.g., the list of impaired waters requiring TMDLs and the assessment methodology used by the state to develop their IR document).

Five Reporting Categories

Category 1: All designated uses are supported, no use is threatened;
Category 2: Available data and/or information indicate that some, but not all of the designated uses are supported;
Category 3: There is insufficient available data and/or information to make a use support determination;
Category 4: Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed;
Category 5: Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

Integrated Monitoring and Assessment

The Clean Water Act requires states to provide every two years an assessment of the quality of all their waters (section 305(b)) and a list of those that are impaired or threatened (section 303(d)). To efficiently meet this charge, EPA recommends that states, tribes, and other water quality monitoring collaborators use a combination of monitoring and assessment techniques to:

1. increase the percentage and types of waters assessed;
2. reliably estimate the overall condition of all waters within a state; assess changes over time; and measure progress toward the "fishable-swimmable" goal of the Clean Water Act (section 305(b));
3. comprehensively identify all impaired and threatened waters to support section 303(d) listing requirements; and
4. prioritize site-specific assessments needed to confirm the location of both high quality and impaired waters, and support control, restoration, and prevention actions.

EPA has strongly encouraged states to use integrated monitoring and assessment techniques. These include probability-based assessments and other predictive tools, as well as site-specific assessments. The use of probability assessments can eliminate the risk of generating a biased picture of water quality conditions state-wide and provide a cost-effective bench mark of state water quality program effectiveness. The probability-based assessment results can also help a state decide if it should target certain waters for further assessment or if limited resources for water quality assessment could be used more effectively in other ways. States currently using broad-scale probability-based assessment to complement their site-specific assessment include VA, SC, KY, and IN, among others.

II REPORTING REQUIREMENTS UNDER THE CLEAN WATER ACT SECTIONS 303(D), 305(B), 314 AND CORRESPONDING REGULATIONS

EPA strongly encourages states to submit a single report (the Integrated Report) that satisfies the reporting requirements of CWA sections 303(d), 305(b) and 314. A summary of states' reporting requirements for each of these sections and corresponding regulations is provided below:

Section 303(d) – by April 1 of all even numbered years, a list of impaired and threatened[3] waters still requiring TMDLs; identification of the impairing pollutant(s); and priority ranking of these waters, including waters targeted for TMDL development within the next two years.

Section 305(b) – by April 1 of all even numbered years, a description of the water quality of all waters of the state (including, rivers/stream, lakes, estuaries/oceans and wetlands). States may also include in their section 305(b) submittal a description of the nature and extent of ground water pollution and recommendations of state plans or programs needed to maintain or improve ground water quality.

Section 314 – in each section 305(b) submittal, an assessment of status and trends of significant publicly owned lakes including extent of point source and nonpoint source impacts due to toxics, conventional pollutants, and acidification.

A more detailed description of states' reporting requirements under sections 305(b), 303(d) and 314 and corresponding regulations is provided in Table 2-1.

Integrated Reports that satisfy the reporting requirements of sections 303(d), 305(b) and 314 also satisfy the 305(b) reporting requirement for section 106 grant funds. For states to be eligible for section 106 grant funds, section 106(e)(1) requires that states must have the means to monitor water quality (including "navigable waters and to the extent practicable, ground waters") and annually update water quality data and include it in their section 305(b) submittals. Under Agency policy, EPA will not award any section 106 funding under a section 106 grant or a performance partnership grant (PPG) to any state that has not annually updated its monitoring data and submitted the most recent report required under section 305(b) (Note that tribal recipients have different requirements). Annual updates to the STORage and RETrieval (STORET) national warehouse satisfy the conditions of the section 106(e)(1) annual update for the purposes of receiving section 106 funds (*FY 2001 Clean Water Act Section 106 Guidance,* February 16, 2001 http://www.epa.gov/owm/rmes/section106priorities.pdf).

Integrated Reports that satisfy the reporting requirements of sections 303(d), 305(b) and 314 may also be used to satisfy the water quality report requirement for section 205(j) grant funds. CWA section 205(j) requires states to determine the nature, extent, and causes of water quality problems in various areas of the state and interstate region, and report on these annually. CWA regulations provide that in the

[3] *Threatened waters* States may define "threatened waters" in their assessment and listing methodologies. EPA recommends that states consider as threatened those waters that are currently attaining WQSs, but which are expected to not meet WQSs by the next listing cycle (every two years). For example, segments should be listed if the analysis demonstrates a declining trend in a specific water quality criteria (WQC), and the projected trend will result in a failure to meet a criterion by the date of the next list (i.e., 2008 for purposes of the 2006 assessment cycle); or, segments should be listed if there are proposed activities that will result in WQSs exceedances.

years in which it is prepared, the section 305(b) report satisfies the requirement for the annual water quality report under section 205(j). Furthermore, in years when the section 305(b) report is not required, the state may satisfy the annual section 205(j) report requirement by certifying that the most recently submitted section 305(b) report is current or by supplying an update of the sections of the most recently submitted section 305(b) report which require updating (40 CFR 130.8(d)).

Table 2-1. Summary of State Reporting Requirements Under CWA Sections 303(d), 305(b), and 314, and Corresponding Regulations

Authority	State Reporting Requirement
CWA section 303(d); 40 CFR 130.7	By April 1 of all even numbered years, states must submit to EPA the following information: • A list of water quality-limited (impaired and threatened) waters still requiring TMDL(s), pollutants causing the impairment and priority ranking for TMDL development (including waters targeted for TMDL development within the next two years). • A description of the methodology used to develop the list. • A description of the data and information used to identify waters, including a description of the existing and readily available data and information used. • A rationale for any decision to not use any existing and readily available data and information. • Any other reasonable information requested by EPA, such as demonstrating good cause for not including a water or waters on the list.
CWA section 305(b); 40 CFR 130.8	By April 1 of all even numbered years, states must submit to EPA the following information: • A description of the water quality of all waters[a] in the state and the extent to which the quality of waters provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water. • An estimate of the extent to which CWA control programs have improved water quality or will improve water quality, and recommendations for future actions necessary and identifications of waters needing action. • An estimate of the environmental, economic and social costs and benefits needed to achieve the objectives of the CWA and an estimate of the date of such achievement. • A description of the nature and extent of nonpoint source pollution and recommendations of programs needed to control each category of nonpoint sources, including an estimate of implementation costs. • An assessment of the water quality of all publicly owned lakes, including the status and trends of such water quality as specified in section 314(a)(1) of the CWA [see below for additional information].

Authority	**State Reporting Requirement**
CWA section 314	States must submit the following information in their section 305(b) reports: • An identification and classification according to eutrophic condition of all publicly owned lakes in such state. • A description of procedures, processes, and methods (including land use requirements), to control sources of pollution of such lakes. • A description of methods and procedures, in conjunction with appropriate federal agencies, to restore the quality of such lakes. • Methods and procedures to mitigate the harmful effects of high acidity, including innovative methods of neutralizing and restoring buffering capacity of lakes and methods of removing from lakes toxic metals and other toxic substances mobilized by high acidity. • A list and description of those publicly owned lakes in such state for which uses are known to be impaired, including those lakes which are known not to meet applicable water quality standards or which require implementation of control programs to maintain compliance with applicable standards and those lakes in which water quality has deteriorated as a result of high acidity that may reasonably be due to acid deposition. • An assessment of the status and trends of water quality in lakes in such state, including but not limited to, the nature and extent of pollution loading from point and nonpoint sources and the extent to which the use of lakes is impaired as a result of such pollution, particularly with respect to toxic pollution.

Note:
[a] "Waters of the United States" as defined in 40 CFR 122.2.

III. RECOMMENDED ORGANIZATION OF AN INTEGRATED REPORT

As states transition from reporting water quality results under separate documents (e.g., section 305(b) reports and section 303(d) lists) to reporting under a single Integrated Report (IR), it would be helpful to use a common organizational structure and method of reporting water quality results so that members of the public can more easily review reports and lists from different states. EPA's recommended organization for states' Integrated Report submittals is provided in Exhibit 3-1.

An annotated version of Exhibit 3-1 constitutes the remainder of Section III. The recommended structure and content for an IR are based, in large part, on EPA's 1997 guidelines[4] for CWA section 305(b) reports. Hence, states should consult EPA's 1997 guidelines for further details when needed.

The recommended organization provided in Section III also highlights what reporting elements are required by sections 303(d), 305(b), 314, and corresponding regulations (as discussed in Section II), versus those elements that are recommended. A summary of which elements of EPA's recommended organization for an Integrated Report are required verus recommended is provided Table 3-11 at the end of this section.

Exhibit 3-1
Recommended Organization for Year 2006 Integrated Report Submittals

EXECUTIVE SUMMARY
PART A. INTRODUCTION
PART B. BACKGROUND
- B1. Total Waters
- B2. Water Pollution Control Program
- B3. Cost/Benefit Assessment
- B4. Special State Concerns and Recommendations

PART C. SURFACE WATER MONITORING AND ASSESSMENT
- C1. Monitoring Program
- C2. Assessment Methodology
- C3. Assessment Results
- C4. Wetlands Program
- C5. Trends Analysis for Surface Waters
- C6. Public Health Issues

PART D. GROUND WATER MONITORING AND ASSESSMENT
PART E. PUBLIC PARTICIPATION

[4] Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Report Contents; Office of Water, US EPA; EPA-841-B-97-002a, September 1997.

EXECUTIVE SUMMARY

The Executive Summary should highlight the report's major points of information, conclusions and recommendation. States should include in this section a summary of the overall water quality (surface water and ground water) in the state, description of the causes and sources of water quality impairments, summary of the plan showing how the state will achieve comprehensive coverage of its waters, discussion of the programs to correct impairments and discussion of the general changes or trends in water quality.

In the summary of overall water quality status for surface waters, states may include the tables requested in Section C.3 (Assessment Results). States are also encouraged to include in this section summary maps that depict water quality status information.

PART A. INTRODUCTION

The Introduction should include a narrative discussion that defines the purpose and contents of the 2006 Integrated Report. The Introduction may include a rationale for why the state has chosen to streamline its reporting of water quality status (i.e., the results of placing segments into the five categories) and trends. The state may choose to explain why the use of this new reporting format will serve as a better mechanism to integrate CWA sections 303(d), 305(b), and 314 efforts in the state. The state may also choose to discuss how this integrated reporting format will clarify the complementary roles of predictive tools (e.g., probability-based monitoring designs, models, and remote-sensing) and site-specific monitoring to assess water quality conditions.

States may also describe in the Introduction how they are ensuring the development of an integrated database of assessment information that reflects the status of water quality standards attainment. Specifically, the Introduction may discuss how the state may increase the amount of assessment information that is geo-referenced and transmitted electronically through the ADB or a compatible data exchange format.

PART B. BACKGROUND INFORMATION

The Background section should include a description of total waters in the state, a description of the state's water pollution control program, a cost/benefit analysis of actions necessary to achieve the objective of the CWA, and any special state concerns and recommendations.

B.1 Scope of Waters in the Integrated Report

To put the report into perspective for the reader, the state should provide a brief water resource overview (as shown in Table 3-1) of all waters[5] in the state. States are also encouraged to include summary maps of water resource information in this subsection.

[5] "Waters of the United States" as defined in 40 CFR 122.2.

Table 3-1. Atlas

Topic[a]	Value	Scale[b]	Source[c]
State Population		N/A	N/A
Total Miles of River and Streams . Miles of perennial rivers/streams (subset) . Miles of intermittent (nonperennial) streams (subset) . Miles of ditches and canals (subset) . Border miles of shared rivers/streams (subset)			
Number of lakes/reservoirs/ponds[d] . Number of significant publicly owned lakes/reservoirs/ponds (subset)			
Acres of lakes/reservoirs/ponds . Acres of significant publicly owned lakes/reservoir/ponds (subset)			
Square Miles of estuaries/harbors/bays			
Miles of Ocean Coast			
Acres of Freshwater Wetlands			
Acres of Tidal Wetlands			

Notes:

N/A Not applicable

[a] State may add categories to the atlas table to reflect special areas of interest (such as, acres of playas; acres of riparian areas outside of wetlands; and miles of streams and acres of lakes on Tribal lands).

[b] State should specify the scale (e.g., 1:100,000; 1:24,000) in this column.

[c] State should specify the source (e.g., NHD, USGS quad maps, state inventory) in this column.

[d] Impoundments should be classified according to their hydrologic behavior, either as stream channel miles under rivers or as total surface acreage under lakes/reservoirs/ponds, but not under both categories. In general, impoundments should be reported as lakes/reservoirs/ponds unless they are run-of-river impoundments with very short retention times.

Please note, most of the tables in this section ask states to report on the extent, or size of waters. To clarify the source of these measurements, states should include in this subsection a description of the process used to make measurements of waters in the state. To promote national consistency in measurement and reporting, EPA recommends the use of the National Hydrography Dataset (NHD), which currently supports measurements at the 1:100,000 scale. Additional information on the NHD is available at www.epa.gov/owow/monitoring/georef/nhd.htm. EPA notes that many states are now making measurements at the 1:24,000 scale. Therefore, for purposes of reporting measurements in the Integrated Report, EPA asks that states indicate the scale at which the measurements were made.

B.2 Water Pollution Control Program

The state should provide a description of its approach to water quality management, including overviews of any watershed-based programs; the WQSs program; the point source control program; the nonpoint source control program; the TMDL program, and; program coordination with other state, tribal, and local agencies. States may also choose to highlight atmospheric deposition reduction strategies in this subsection. As shown in Table 2-1, CWA section 305(b) and EPA's implementing regulations require states to provide the following information about their water pollution control programs:

- *An estimate of the extent to which CWA control programs have improved water quality or will improve water quality, and recommendations for future actions necessary and identifications of waters needing action.*
- A *description of the nature and extent of nonpoint source pollution and recommendations of programs needed to control each category of nonpoint sources, including an estimate of implementation costs.*

B.3 Cost/Benefit Assessment

As shown in Table 2-1, CWA section 305(b) (and associated regulations) also requires states to provide an *estimate of the environmental, economic and social costs and benefits needed to achieve the objectives of the CWA and an estimate of the date of such achievement.* EPA recognizes that this information may be difficult to obtain due to the complexities of the economic analysis involved. Until such time as comparable procedures for evaluation costs and benefits are in wider use, states should provide a brief narrative that includes as much of the following information as possible.

For costs, EPA asks that states provide information on capital investments in municipal and industrial facilities, investments in nonpoint source measures, annual operation and maintenance costs of municipal and industrial facilities, total annual costs of municipal and industrial facilities, and annual costs to states and local governments to administer water pollution control activities.

For benefits, EPA asks that states provide information on improvements in recreational and commercial fishing; extent of stream miles, lakes acres, etc., improved from impaired to meeting WQSs; reduced costs of drinking water treatment due to cleaner intake water; and increase in use of beaches and recreational boating due to improved water quality.

B.4 Special State Concerns and Recommendations

In this subsection, states should (1) discuss special concerns that are significant issues within the state and that affect its water quality programs and (2) provide recommendations for actions that are necessary to achieve the objectives of the CWA.

PART C. SURFACE WATER MONITORING AND ASSESSMENT

The Surface Water Monitoring and Assessment section should include a description of the state's monitoring program, a description of the assessment methodology for classifying all surface waters, assessment results, a description of the state's wetlands program, an analysis of surface water quality trends, and information on public health issues.

C.1 Monitoring Program

This subsection should include a description (or reference applicable documents) of the following elements of the state's monitoring program:

- Monitoring Program Strategy
- Monitoring Objectives
- Monitoring Design
- Core and Supplemental Indicators
- Quality Assurance
- Data Management
- Data Analysis/Assessment
- Reporting
- Programmatic Evaluation
- General Support and Infrastructure Planning

EPA expects that states will develop, over time, a monitoring program that addresses the 10 elements listed above. The first of these elements (monitoring program strategy) is currently under development by states and will include a timeline to complete implementation of all 10 elements by 2014. Additional guidance on these elements is available in EPA's Elements of a State Water Monitoring and Assessment Program (US EPA, Office of Wetlands, Oceans, and Watersheds; EPA 841-B-03-003; March 2003).

As shown in Table 2-1, CWA section 305(b) and EPA's implementing regulations require states to provide a *description of the water quality of all waters*[6] *in the States and the extent to which the quality of waters provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water.* As a result, EPA and the states have established a long-term goal of comprehensively characterizing surface waters of each state using a variety of techniques. These techniques may include traditional targeted monitoring, probability-based monitoring surveys, targeted site-specific monitoring, landscape and water quality models, and remote sensing. States should include a description of their approach to comprehensive assessment in this subsection.

[6] "Waters of the United States" as defined in 40 CFR 122.2.

States should also include in this subsection a schedule that identifies the waters that will be monitored and assessed during the next two-year reporting cycle. If this information is included in other documents, such as the state's section 106 workplan or a Performance Partnership Grant (PPG), the state may provide a reference to that document. EPA does not expect that all waters will be scheduled for monitoring during the next two-year reporting cycle. This short-term monitoring schedule should be consistent with the state's monitoring priorities. The short-term monitoring schedule may present upcoming monitoring activities planned under the long-term strategy, including the use of probability-based monitoring, landscape and water quality models, and targeted monitoring to predict and verify water quality conditions. EPA intends that the monitoring schedule will inform stakeholders and EPA of a state's upcoming monitoring activities and will help promote collaboration and coordination among monitoring organizations.

C.2 Assessment Methodology

This subsection should include a description (or reference applicable documents) of the state's methodology for assessing the water quality attainment status of all waters[7] in the state. The assessment methodology should be consistent with the state's WQSs and include a description of the following as part of their section 303(d) list submissions:

- What data and information were used to make attainment determinations (e.g., results from site-specific and probabilistic monitoring and other predictive tools);
- How the data and information were used to make attainment determinations and place surface water segments in the five reporting categories;
- Rationales for any decision to not use any existing and readily available data and information;
- Changes in the assessment methodology since the last reporting cycle.

Assessment methodologies that include the information listed above also satisfy the state's requirements under CWA section 303(d) (and associated regulations) to provide the following information as shown in Table 2-1: (1) *a description of the methodology used to develop the section 303(d) list,* (2) *a description of the data and information used to identify [impaired and threatened] waters, including a description of the existing and readily available data and information used, and* (3) *a rationale for any decision to not use any existing and readily available data and information*[8].

EPA also encourages states to make the assessment methodology available to the public for review and comment. Hence, states are encouraged to provide a description of the public participation process for the IR in this section, or reference their CPP as appropriate. Additional information on development/use of an assessment methodology and EPA's five reporting categories is provided in Sections IV and V of this guidance, respectively.

[7] "Waters of the United States" as defined in 40 CFR 122.2.

[8] Although a description of the state's assessment methodology is required, EPA does not approve or disapprove the assessment methodology under CWA section 303(d).

C.3 Assessment Results

This subsection should present the results of the state's surface water assessments, including the five-part categorization of all surface water segments, probability-based survey results, the section 303(d) list, and State-level summaries of designated use support. In addition, states should satisfy CWA section 314 (Lakes Program) reporting requirements in this subsection.

States should attempt to manage their assessment results in the Assessment Database (ADB) or a compatible data management system and submit them electronically with the Integrated Report. That system should provide the supporting information for this section. The summary tables provided in this section can be generated directly out of the ADB and inserted into any word processing document.

Additional information on these reporting elements is provided below. How states organize the presentation of their assessment results in hard-copy format is left to their discretion. For example, states could organize their assessment results by the reporting elements italicized below, or by waterbody type (e.g., rivers/streams, lakes/ponds, estuaries/oceans, and wetlands).

Five-Part Categorization of Surface Waters

States should assign all of their surface water segments to one or more of the five reporting categories presented in Section V of this guidance. States should also include a summary of the extent of surface waters assigned to each reporting category as shown in Table 3-2.

Table 3-2. Size[a] of Surface Waters Assigned to Reporting Categories

Waterbody Type	Category							Total in State	Total Assessed
	1	2	3	4a	4b	4c	5		
River/stream miles									
Lake/pond acres									
Estuarine square miles									
Ocean coast miles									
Freshwater wetland									
Tidal wetland acres									

Note:

[a] For states that place surface water segments in more than one reporting category, the summation of the size of surface water segments assigned to the five reporting categories will be greater than the "Total in State" summation for each waterbody type. In such cases, EPA recommends that states provide a statement in the IR that clarifies the discrepancy.

Results of Probability-based Surveys

States should report the results of probability-based surveys as shown in Table 3-3. EPA is working on a supplemental module to the ADB for transmitting the results of probability-based surveys. Reporting the results is particularly important because probability-based surveys allow states to report on the condition of the entire population of surface waters (e.g., coastal waters, rivers and streams, estuaries, etc.) included in the design. Site-specific assessment results will not result in an assessment of all surface waters, unless the state is able to implement a census.

Table 3-3. Attainment Results Calculated Using Probabilistic Monitoring Designs

Project ID	**STX_1**	
Project Name	Downstate Sample Survey	
Target Population	All streams ordered 4 or greater in basins C and D	
Type of Waterbody	River	
Size of Target Population	100	
Units of Measurement	Miles	
Designated_use	Aquatic life	
Percent_attaining	75%	
Percent_not_attaining	23%	
Percent nonresponse	2%	
Indicator	Biological	
Assmt_date	20000201	
Precision	90%	

Section 303(d) List

As shown in Table 2-1, The Clean Water Act and EPA regulations require states to submit the following information as part of their section 303(d) list submission:

- *A list of water quality-limited (impaired and threatened) waters still requiring TMDL(s)* [waters assigned to Category 5], *pollutants causing the impairment, and priority ranking for TMDL development (including waters targeted for TMDL development within the next two years).*
- *Any other reasonable information requested by EPA, such as demonstrating good cause for not including a water or waters on the list.*

Although states are not required to provide "good cause" for each delisting prior to receiving a formal request from EPA, EPA recommends that states do so in the IR. States should highlight in this subsection those segment/pollutant combinations that have been either added or removed since the last reporting cycle and summary rationales ("good cause") for each delisting. Table 3-4 provides a recommended format for summarizing delisting rationales in this subsection. States should provide detailed rationales for removing segment/pollutant combinations from their previous 303(d) lists in the record of decision for the list.

States may also report on the status of their TMDL development by providing information such as that found in Table 3-5 in this subsection or in the discussion of their Water Pollution Control Program (Section B.2).

Table 3-4. Segment/Pollutant Combinations Removed from State's Year 2004 Section 303(d) List

Segment/ Pollutant Combination on Year 2004 Section 303(d) List	Segment (Waterbody) ID	Summary[a] Rationale for Delisting of Segment/Pollutant Combinations (*identify number of reason*) 1. State determines water quality standard is being met 2. Flaws in original listing 3. Other point source or nonpoint source controls are expected to meet water quality standards 4. Impairment due to non-pollutant 5. EPA approval of TMDL 6. Waterbody not in state's jurisdiction 7. Other

Note:

[a] Detailed justifications for removing waters from previous section 303(d) list should be provided in the record of decision for the listing cycle in which the state proposes the water for removal.

Table 3-5. TMDL Development Status

Segment/Pollutant Combination	Segment ID	Project Status[a]	Projected TMDL Submittal Date

Note:

[a] Under project status, states may provide a brief description of the status of TMDL development. This could be done by providing a 1 or 2 word description of status (e.g., "completed", "in draft") or by providing a more extensive description of status. For example, states may elect to include information on whether the TMDL is being developed under court order deadline, whether supplemental monitoring is being performed, and when public meetings are scheduled to be held.

State Summaries of Designated Use Support

The state should provide designated use support summaries for each waterbody type, as shown in Table 3-6. States should include values for applicable designated use categories such as aquatic life, fish consumption, shellfishing, swimming, secondary contact, drinking water, agricultural, cultural ceremonial, etc.

EPA recognizes that states may have site-specific results, as well as results of probability survey(s) that could be used to generate these results. When information from state-wide probability surveys is available, that information should be used to complete Table 3-6 for the appropriate waterbody type/use combination. Site-specific information should be used to provide designated use summaries for waterbody types where probability-results are not available or to complement the results of probability-results that are not state-wide in scope. It is important that the state indicate whether the state-wide numbers in Table 3-6 were generated via probability or site-specific surveys. In addition, states that report results based on probability surveys should complete Table 3-3 to provide additional information. States should also include state-level summaries of causes and sources (when possible) of impaired waters as shown in Tables 3-7 and 3-8, respectively.

Table 3-6. Individual Designated Use Support Summary *(One Table for Each Waterbody Type)*

Designated Use	Size of Surface Waters				
	Total in State	**Total Assessed**	**Supporting – Attaining WQ Standards**	**Not Supporting – Not Attaining WQ Standards**	**Insufficient Data and Information**
Aquatic Life State Defined 1. 2.					
Fish Consumption Shellfishing Swimming Secondary Contact Drinking Water State Defined 1. 2.					
Agricultural Industrial Cultural or Ceremonial State Defined 1. 2.					

Table 3-7. Size of Waters Impaired by Causes *(One Table for Each Waterbody Type)*

Cause/Impairment Type (Examples[a]) from ADB	Size of Waters Impaired
Ammonia (unionized)	
Cause/Stressor Unknown	
Chlorophyll a	
Copper	
Escherichia coli	
Mercury	
pH	
Phosphorus	
Turbidity	
Etc.	

Notes:

[a] The parameters identified in this table are used as examples only. Please refer to the complete list of causes available for reporting at http://www.epa.gov/waters/adb/

Table 3-8. Size of Waters Impaired by Sources *(One Table for Each Waterbody Type)*

Source Category (Examples[a]) from ADB	Size of Surface Waters Impaired
Industrial Point Sources	
Municipal Point Sources	
Combined Sewer Overflows	
Urban Runoff/Storm Sewers	
Agriculture	
Crop production	
Rangeland grazing	
Hydromodification	
Atmospheric Deposition	
Unknown Source	
Etc.	

Notes:

[a] The parameters identified in this table are used as examples only. Please refer to the complete list of sources available for reporting at http://www.epa.gov/waters/adb/

CWA Section 314 (Clean Lakes Program)

As shown in Table 2-1, states are required to submit the following information about the status of publicly owned lakes:

1. *An identification and classification according to eutrophic condition of all publicly owned lakes in such state.*

2. *A description of procedures, processes, and methods (including land use requirements), to control sources of pollution of such lakes*

3. *A description of methods and procedures, in conjunction with appropriate federal agencies, to restore the quality of such lakes*

4. *Methods and procedures to mitigate the harmful effects of high acidity, including innovative methods of neutralizing and restoring buffering capacity of lakes and methods of removing from lakes toxic metals and other toxic substances mobilized by high acidity*

5. *A list and description of those publicly owned lakes in such state for which uses are known to be impaired, including those lakes which are known not to meet applicable water quality standards or which require implementation of control programs to maintain compliance with applicable standards and those lakes in which water quality has deteriorated as a result of high acidity that may reasonably be due to acid deposition*

6. *An assessment of the status and trends of water quality in lakes in such state, including but not limited to, the nature and extent of pollution loading from point and nonpoint sources and the extent to which the use of lakes is impaired as a result of such pollution, particularly with respect to toxic pollution.*

Table 3-9 provides a recommended format for reporting on the trophic status of significant publicly owned lakes. States satisfy the requirement to provide a list of publicly owned lakes that are known to be impaired by placing such waters in Category 5 and including them on the section 303(d) list. Table 3-10 provides a recommended format for reporting on trends in lake water quality. States may satisfy the requirement to provide a trend analysis of water quality in lakes in this subsection or in Trend Analysis for Surface Waters (Section C.5).

Table 3-9. Trophic Status of Significant Publicly Owned Lakes

Description	Number of Lakes	Acres of Lakes
Total in state		
Assessed		
Oligotrophic		
Mesotrophic		
Eutrophic		
Hypereutrophic		
Dystrophic		
Unknown		

Table 3-10. Trends in Lake Water Quality

Description	Number of Lakes	Acres of Lakes
Assessed For Trends		
Improving		
Stable		
Degrading		
Fluctuating		
Trend unknown		

C.4 Wetlands Program

States may dedicate a section of their Integrated Report to providing a description of their wetlands program if not already covered in another section of the Report. This section could include information on development of wetland water quality standards, extent of wetland resources, integrity of wetlands resources, and wetland protection activities.

C.5 Trend Analysis for Surface Waters

As discussed in Section C.3, states are required under CWA section 314 to report on lake water quality trends. In addition to lake trends, states may also report on water quality trends for other surface waters in this section of the Integrated Report. To enhance states' and EPA's capability to perform water quality trend analyses, states should routinely and comprehensively update STORET and ADB (or compatible electronic data format).

C.6 Public Health Issues

In this subsection, states should provide information on public health issues, including information on their programs related to drinking water supplies, beach use, and fish/shellfish advisories. For drinking water programs, states should highlight the following information:

1. Total miles of rivers/streams and acres of lakes/reservoirs designated for drinking water use.
2. For waters designated for drinking water use, miles of rivers/streams and acres of lakes/reservoirs assigned to each of the five reporting categories.
3. Summary of the methodologies used to perform drinking water use assessments under the Clean Water Act, including the contaminants chosen for assessment and the rationale for their selection. Note, states may reference their assessment methodology for this information.
4. Identification and extent of impaired miles of rivers/streams and impaired acres of lakes/reservoirs that overlap source water areas of community water systems as delineated by states under SDWA section 1453.

States should consult Section 4, Chapter 8 (*Public Water Supply/ Drinking Water Use Reporting*) EPA's 1997 guidelines[9] for further details on reporting in this subsection.

PART D. GROUND WATER MONITORING AND ASSESSMENT

As discussed in Section II of this guidance, for states to be eligible for section 106 grant funds, section 106(e)(1) requires that states must have the means to monitor water quality (including "navigable waters and to the extent practicable, ground waters") and annually update water quality data and include it in their section 305(b) submittals. In this section, states should include a summary of their ground water monitoring and protection programs, ground water quality, ground water contamination sources, and ground water/surface water interactions. States should consult Section 5 (*Ground Water Assessment)* EPA's 1997 guidelines[10] for further details on reporting ground-water monitoring data.

PART E. PUBLIC PARTICIPATION

EPA regulations require states to describe in their Continuing Planning Processes (CPP) the process for involving the public and other stakeholders in the development of the section 303(d) list (40 CFR 130.7(a)). EPA encourages the state to provide opportunities for public participation in the development of the Integrated Report and demonstrate how it considered public comments in its final decisions.

States should respond to commenters by including a responsiveness summary in their Integrated Reports or by making the summary available by other means used by the state (e.g., internet posting, mailing to commenters). States should submit or make available to EPA at the time of the Integrated Report submittal a copy of all comment letters, e-mail, etc., received from the public and a responsiveness summary addressing all comments. The responses should provide enough detail to clearly explain how

[9] Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Report Contents; Office of Water, US EPA; EPA-841-B-97-002a, September 1997.

[10] Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Report Contents; Office of Water, US EPA; EPA-841-B-97-002a, September 1997.

the state considered the comment and whether and how the placement of waters in the five categories changed in response to the comment.

If the state received comments on a particular issue that opposes or questions the state's decisions, the Regions should determine whether those comments are adequately addressed in the state's comment response document. If the Region agrees with the state's substantive decision, but believes that the state's comment response is inadequate, the Region can work with the state to supplement its response even after the formal submission is made (but prior to the Region's approval or disapproval action). If the state is unwilling or unable to supplement the state's responses, the Region should address the issue in its decision document or elsewhere in the administrative record.

Table 3-11. Summary of Water Quality Reporting Elements of an Integrated Report

Reporting Element	Required[a] (●) Versus Recommended (❍)
Executive Summary	❍
Part A. Introduction	❍
Part B. Background Information	
B.1 Total Waters	❍
B.2 Water Pollution Control Program	See below
Description of water quality management program	❍
An estimate of the extent to which CWA control programs have improved water quality or will improve water quality, and recommendations for future actions necessary and identifications of waters needing action.	●
A description of the nature and extent of nonpoint source pollution and recommendations of programs needed to control each category of nonpoint sources, including an estimate of implementation costs.	●
B.3 Cost/Benefit Analysis	●
B.4 Special State Concerns and Recommendations	❍
Part C. Surface Water Monitoring and Assessment	
C.1 Monitoring Program	❍
C.2 Assessment Methodology	See below
Description of data and information was used to make attainment determinations	●
Description of how the data and information was used to make attainment determinations	●
Rationales for any decision to not use any existing and readily available data and information.	●
Description of changes in the assessment methodology since the last reporting cycle	❍
C.3 Assessment Results	●[b] (See below)
Assessment Database (ADB)[c] and georeferencing information	❍
Five-part categorization of waters	❍
Results of Probability-based designs	❍
303(d) list: list of water quality-limited (impaired and threatened) waters still requiring TMDL(s) [waters assigned to Category 5], pollutants causing the impairment and priority ranking for TMDL development (including waters targeted for TMDL development within the next 2 years).	●
Changes from previous 303(d) list (i.e., the water/pollutants that have been added and the water/pollutants that have been delisted and the reason for their delisting)	❍

Reporting Element	Required[a] (●) Versus Recommended (❍)
Status of TMDL development	❍
State summaries of designated use support	❍
Eutrophic condition of all publicly owned lakes in such State	❍
A description of procedures used to control pollution and restore water quality	❍
Methods used to mitigate high acidity in lakes	●
A list and description of those publicly owned lakes in such State for which uses are known to be impaired and those lakes in which water quality has deteriorated as a result of high acidity that may reasonably be due to acid deposition	●
An assessment of the status and trends of water quality in lakes	●
C.4 Wetland Program	❍
C.5 Trends Analysis	❍
C.6 Public Health Issues	❍
Part D. Ground Water Monitoring & Assessment	❍
Part E. Public Participation	See below
Description of public participation process	❍
Copy of all comment letters, e-mail, etc., received from the public and a responsiveness summary	❍

Notes:

[a] Required by Clean Water Act sections 303(d), 305(b) or 314 and their corresponding regulations.

[b] CWA section 305(b) requires states to provide a description of the water quality of all waters in their state. As a result, EPA and the states have established a long-term goal of comprehensively characterizing surface waters of each state using a variety of techniques. These techniques may include traditional targeted monitoring, probability-based monitoring surveys, targeted site-specific monitoring, landscape and water quality modeling, and remote sensing.

[c] EPA strongly encourages all states to use the ADB. If the state is not using the ADB, this assessment unit specific information should be submitted in a compatible electronic system. The state should work with EPA to ensure that the electronic assessment information submitted can be compiled by EPA for regional and national reporting and can be sorted into the five part list as outlined in the IR guidance.

IV. ISSUES CONCERNING THE DEVELOPMENT AND USE OF AN ASSESSMENT METHODOLOGY

A. What constitutes an assessment methodology?

The assessment methodology constitutes the decision process (including principles of science, statistics and logic used in interpreting data and information relevant to segment conditions) that a state employs to determine to which of the five integrated reporting categories a segment belongs. It is important that assessment methodologies must be consistent with applicable WQSs. They should also be consistent with sound science and statistics.

As described in section 130.7 (b)(6) (i- iv), each state shall provide documentation to the Regional Administrator at the time that the integrated report or the separate section 303(d) list is submitted. This documentation must support the state's determination to list or not list its segments as required in 130.7(b)(1) and 130.7(b)(2). A major component of this documentation is a description of the methodology that the state used to develop their Integrated Report or the separate section 303(d) list.

The methodology should: 1) explain how the state identifies, considers (evaluates) all existing and readily available data and information; 2) articulate the basics of the quality assurance and quality control (QA/QC) criteria used to evaluate data submitted by outside entities to determine what weight, if any, should be assigned to said data and information; and 3) explain the analytical approaches, including statistical analyses, used to infer true segment conditions from all valid existing and readily available information. The decision processes the states describe in the methodology should provide all stakeholders with the opportunity to understand exactly how assessment decisions are made.

Prior to submission of its Integrated Report, each state should provide the public with the opportunity to review and comment on the methodology, consistent with their continuing planning process (CPP), public participation policies, and monitoring strategies.

B. What will EPA do with the methodology?

When a state has by rulemaking adopted a methodology as part of its approved water quality standards and the water quality standards are applicable for CWA purposes, 40 CFR § 131.21, EPA will apply the approved methodology as it reviews the state's submission in order to determine whether to approve or disapprove the section 303(d) list (Category 5). If a state has not by rulemaking adopted a methodology into its water quality standards, EPA will consider the state's methodology, to the extent that it reflects a reasonable interpretation of the state's water quality standards and sound science, in determining whether to approve or disapprove the section 303(d) list. In either scenario, EPA encourages the state to make available the most recent methodology used to develop the current Draft 2006 Integrated Report (or separate 303(d) list) prior to submission of their IR. The methodology allows EPA and other reviewers to understand the decision process followed by the states as they review the 2006 Draft. Where EPA has concerns with the assessment methodology, EPA will provide comments to the state to assist in developing an approvable section 303(d) list.

For methodologies that are not part of the state's applicable water quality standards, EPA will consider the methodology as it assesses whether the state conducted an adequate review of all existing and readily available water quality-related information, whether the factors that were used to make listing

and removal decisions were reasonable, whether the process for evaluating different kinds of water-quality related data and information is sufficient, and whether the process for resolving jurisdictional disagreements is sufficient. If EPA finds that the state's methodology is inconsistent with its water quality standards, and its application has resulted in an improper section 303(d) list, EPA may disapprove the list. Regardless of the suitability of the methodology, EPA must review the list for consistency with the relevant provisions of the CWA and the regulations.

EPA sees the methodology as an evolving document which states periodically revise as appropriate at some time during the listing cycle[11]. As such, EPA strongly encourages states to submit their draft and current methodologies to EPA and to the public for review and comment (but not formal approval) well in advance of any deadline the state sets for submission of data and information.

C. Data Assembly

40 CFR section 130.7(b)(5) requires that "Each State shall assemble and evaluate all existing and readily available water quality related data and information to develop the list."

States should solicit data and information including, but not limited to, the types listed below:

- observed effects (see glossary)
- closures, restrictions and/or advisories applicable to swimming, fish consumption, and drinking water
- violations of Safe Drinking Water Act (SDWA) standards
- segment-specific ambient monitoring-chemical, physical, and/or biological
- large-scale probabilistic monitoring designs
- simple dilution calculations
- predictive (simulation) modeling,
- landscape analysis
- remote sensing
- complaints and comments from the public

To the extent practicable, such types of data and information should be drawn from existing compilations of information regarding water quality, including, but not limited to:

- publicly-available databases (e.g., STORET)
- source water assessments per the Safe Drinking Water Act
- monitoring information from pesticides registrations
- watershed plans and other kinds of water quality or natural resource management plans
- Superfund Records of Decision
- reports prepared pursuant to sections 305(b), 303(d), 314, and 319 of the CWA

[11] EPA notes that it does not view state regulatory provisions concerning assessment methods that merely describe the sufficiency or reliability of information necessary for states to make an attainment decision as water quality standards, because they do not have the effect of changing the ambient conditions (i.e., magnitude, duration, frequency of concentrations of pollutants) considered necessary to support a designated use.

Such types of data and information should also be solicited from a wide variety of organizations and individuals, such as:

- other state agencies such as Fish and Wildlife, Parks, and Agriculture Departments
- federal agencies, including EPA, USGS, NOAA, USDA, and USFWS
- local governments
- drinking water utilities and state agencies responsible for SDWA implementation
- universities and other research institutions
- environmental consulting firms
- National Pollutant Discharge Elimination System (NPDES) permittees
- conservation/environmental organizations
- outdoor recreation organizations
- citizen monitoring groups

EPA regulations provide that states should actively solicit organizations and individuals such as those listed above. See 40 CFR 130.7(b)(5)(iii). EPA considers active solicitation as notifying local, state, and federal agencies, members of the public, and academic institutions that the state is seeking water quality related data and information for the purpose of developing the Integrated Report, through notices in the State Register, notices or announcements in appropriate local or trade papers, direct mailings to members of the public that have previously submitted public comments or other interested parties on the State's mailing list, or announcements and requests for data at appropriate public meetings or informational meetings. EPA recommends that states also request such data and information via letters sent to other state agencies, federal agencies and academic institutions that may have data/information.

If the state has specifications for data and information, these specifications should be included in any requests for information. To facilitate the timely completion of a draft list that can be distributed for public review and comment, states may set a reasonable "cut-off" date after which no additional data or information will be considered in the preparation of the draft section 303(d) list and other aspects of a preliminary Integrated Report. If a state institutes a cutoff date for data submission, effective prior to establishing a draft list, there could also be a separate data solicitation step prior to compilation of a final 303(d) list. Under this scenario, the state would compile the preliminary list using all information it has at hand based on identified data sources. Additional data submissions during the public comment period would then be evaluated, appropriate changes to the draft list would be made based on these new data or information.

If the state intends to consider only data and information submitted prior to a certain cutoff date, the state should clearly explain that this is the only opportunity for the public to provide data and information for the current assessment cycle, and that data submitted after that cutoff date would be considered during the next listing cycle. States should provide a mechanism for an exception to the limit for the submission of data if the submitter can demonstrate that the data were readily available prior to the data cutoff date and should have been included in any reasonably diligent state review of data. EPA will generally limit its review of a state listing submission to the data and information assembled by the state prior to the data cutoff date if the state was reasonably diligent in assembling available data and information and soliciting data and information from the public.

EPA is aware that many states have turned to the rotating basin strategy as a technically sound approach for making assessment determinations of the state's waters. In this approach, the available monitoring resources are concentrated or targeted in one portion of the state for a specified period of time, thus allowing for data to be collected and assessed in a spatially and temporally focused manner. Over time, every portion of the state is targeted for this higher resolution monitoring and assessment effort (often over a five-year period), however the state must consider all existing and readily available data and information during the development of its 2006 Integrated Report, regardless of where in the state the data and information were generated.

The state should make reasonable efforts to obtain and consider sources of data and information not provided by commenters. If particular data/information referenced in the public comments are not provided, EPA expects states to make a reasonable effort to secure the data. Solicitation requests should note that at a minimum commenters should provide as much information as possible in order for the state to be able to obtain the data or information, and again emphasize any state criteria for considering and prioritizing data sets.

D. How should the methodology describe data and information expectations?

1. Data Quality Considerations

A state must evaluate all existing and readily available data and information, to establish how it should be used in attempting to make a WQS attainment status determinations, applying reasonable and scientifically sound data evaluation procedures. Such evaluation protocols should strike a balance between: (1) employing only the very highest quality data, and (2) employing as much useful information about the condition of as many segments as possible. That is, these protocols should reflect both legitimate concerns about basing decisions on the best possible information and the fact that there is relatively little or no segment-specific monitoring data or other forms of assessment-relevant information available for the majority of the nation's waters.

Such protocols/evaluation criteria would include typical elements of a quality assurance project plan (QAPP). Examples of such elements include a description of the methods used to collect the data in the field, a description of the methods to assure proper handling and "chain of custody" of the samples during transport to the laboratory, documentation of the laboratory methods used to perform the analysis of samples, and a description of any independent audits to verify the consistency of the data. In their articulation of QA/QC expectations for data and information submitted by others, states should describe the types and amount of metadata that should be provided along with specific sets of data and information. If an outside entity fails to provide necessary metadata along with submitted data and information, the state should attempt to obtain the metadata from the data-submitting organization before concluding that the data and information is of low quality, simply due to lack of metadata.

Data quality criteria should be published along with any solicitations of data and information. Ideally, such QA/QC protocols should be made available to the public well in advance of any such solicitation for any given IR reporting cycle.

In addition to articulating their data review criteria, EPA recommends that states work with data-generating organizations not only during the period of time just before the Integrated Report development, but on a more continual basis, to help ensure their data are collected and stored in such a way that the data will of high quality. States may wish to encourage such organizations to develop QAPPs and submit them to the state for review and comment, and even perhaps formal approval by the state. A state may elect to employ a rebuttable presumption that data and information submitted by organizations with a state-approved QAPP meets the state's QA/QC standards. Lack of a State-approved QAPP should not, however, be used as the basis for summarily rejecting data and information submitted by such organizations, or assuming it is of low quality, regardless of the actual QA/QC protocols employed during the gathering, storage, and analysis of these data.

2. Data Representativeness Considerations

The spatial and temporal representativeness of data and information should be considered by states as they attempt to characterize conditions in a given segment. Clearly, the degree of confidence in a WQS attainment status determination increases as the amount of data and information grows. Ideally, all decisions about the WQS attainment status of individual assessment units would be based on a complete census of water quality conditions, which could involve sampling every portion of a waterbody at frequent intervals. Unfortunately, gathering this vast amount of data is not currently feasible, due to the limitations of current monitoring technology as well as the amount of funding available for gathering and analysis of water quality information.

Even for those segments where unusually large amounts of monitoring data is available, compared to most waterbodies, the percentage of all possible locations in time and space from which data has been collected is very, very small. Given this situation, states and EPA will continue to need to make WQS attainment status determinations by extrapolating, in time and space, to a substantial degree, from individual points of data.

Hence, state methodologies should describe, in general terms, the decision logic used to determine the temporal and spatial extent a grab sample can be construed to represent. In order to make credible assessment determinations, states should employ approaches that strike a balance between the extremes of: (1) considering every grab sample to be representative of merely the instant in which, and the drop of water from which, each was taken; or, (2) assuming each such sample is representative of conditions over several years, and covering hundreds of stream miles or hundreds of lake acres. (Note that available data and information should be used to assess attainment of applicable water quality standards unless a specific technical rationale is provided to support a determination that such data and information should not be used (see 40 CFR 130.7(b)(6)(iii-iv)).

Many state numeric water quality criteria include multiple day averaging periods, while most state monitoring programs do not collect samples at a rate of one or more per day. In such circumstances, states should decide how far out in time to extrapolate from the time at which a particular single grab was collected. EPA recommends that such decisions be based on contextual information regarding conditions when and where the grab was taken. For example, such information might include: 1) precipitation, 2) streamflow, 3) location of point source discharges in relation to the monitoring site, 4) land use patterns in the vicinity, 5) expected patterns of pollutant loading from the different kinds of sources present in the

watershed, 6) occurrence of a chemical spill or other unusual event, and 7) historic patterns of pollutant concentrations in the monitoring segment and/or waterbodies similar to it.

For instance, such contextual information might indicate that levels of a pollutant under study are likely to have remained fairly constant over a certain period. This would generally be a reasonable conclusion if, for example, available information suggested that both pollutant loadings and stream flow remained fairly steady over that period. In such cases, it could be reasonable to assume that the concentration seen in a sole available grab sample was representative of average conditions over the period of interest. On the other hand, if it were known that the watershed draining into a segment had a large number of precipitation-dependant sources of pollutants, a particular sample had been collected during the only significant rainfall that occurred during that period, and the precipitation event was of a duration shorter than the averaging period used in the water quality standard, then it could make sense to conclude that the concentration in that sample was not roughly equal to the average over the period in question (e.g., 1 day, 4 days, 7 days).

Similarly, contextual information can help inform a decision as to how far out in space to extrapolate from a particular sampling point. Where no point source dischargers are present and land use practices are the same over large areas, assuming data collected at a particular monitoring site is representative of conditions over a long stretch of river could be reasonable. On the other hand, if a number of point sources and a variety of nonpoint sources are found along a similar length of stream, it may be prudent to presume that data from a particular sampling site is representative of only a portion of that river reach.

In deciding how broad a span of time and space to assume a particular grab sample might represent, States may wish to consider the implications of a more expansive versus a more cautious approach to interpreting available monitoring data in the context of available metadata. Willingness to extrapolate further in time and space will generally lead to making WQS attainment/non-attainment determinations on a larger number of waters and designated uses, while a more cautious approach can result in a higher proportion of waters and uses being reported as "status unknown".

Though a determination of whether a single grab sample can reasonably be construed to be representative of (i.e., close in value to) average conditions over a specified period is an important step in the assessment process, the mere fact that the only grab sample available for a particular period is not deemed representative of average conditions over said period does not necessarily mean that it could not be used as the basis of a WQS attainment status determination. For instance, despite being non-*representative* of the average concentration, it may be indicative of the average, or at least a fairly reliable indicator of whether or not the average concentration in the waterbody over said period is above or below the level specified in the WQS.

For example, it is widely known that dissolved oxygen levels rise and fall in most waterbodies following a diurnal cycle. Hence, if a grab sample were collected at 5 a.m. (around when DO levels should be at the lowest point during the daily cycle) and the DO level in the sample was above, or even somewhat below, the level specified in an applicable WQC expressed as a 24 hour average concentration, it would be reasonable to assume the daily average concentration of DO on the day the one grab was collected was higher than that specified by the WQC. (Conversely, if a DO sample were collected at 6p.m., i.e., during the *high* end of the diurnal cycle of DO levels, and the concentration was below, or

even slightly above, the specified concentration, it could be reasonable to conclude that the 24-hour average DO level was below that specified by the WQC.)[12]

Awareness of the types of sources upstream of a site and knowledge of the weather at the time of sampling can also be instructive. For instance, if the level in the sole grab of a pollutant associated primarily with nonpoint sources was slightly higher than the criterion-concentration, but the grab had been taken during a one-in-10-year one-hour rainfall event, it could be reasonable to assume the 4-day average was lower than the criterion-concentration.

Similarly, EPA believes that data should not automatically be treated as unrepresentative of relevant segment conditions solely on the basis of its age without supporting information indicating that the data are not a good indicator of current conditions. However, older data should be evaluated with care. For example if the most recent data for a particular assessment unit is 10 years old, and that data indicated that average and/or peak conditions in a segment at that time were worse than those specified by an applicable WQC; and, since that time, all the sources of the pollutant in question had been required to dramatically lower the levels of the pollutant in their effluent, and few changes that would lead to increased loadings of the pollutant had taken place in the watershed, it could be reasonable to assume that the segment was now meeting the WQC for that pollutant. By contrast, if 15 year old data indicated that a segment was then just barely meeting WQS for several pollutants associated with urban runoff, and the watershed of that segment had since that time undergone considerable urbanization, a conclusion that the segment was no longer meeting WQC for some or all of those pollutants could be warranted.

States should be cautious about employing assessment methodologies that assign little or no weight to data consistent with state QA/QC protocols based on the theory that it is "unrepresentative" simply because the data seem to reflect unusual circumstances. Rather, such unusual circumstances should be evaluated in the context of the specific requirements of applicable WQSs. In assessing potential adverse effects on humans or other life forms, it is just as important to be cognizant of potential short term events as it is to reflect longer term "average" conditions. Short term exposure to very high levels of pollutants (or low level of necessary elements like oxygen) can be extremely harmful, even lethal. For this reason, EPA and state WQC for a number of pollutants include concentration/duration combinations for short periods as well as such combinations for longer periods. Such criteria are typically referred to as acute and chronic WQC, respectively.

Extreme values or "outliers" can be very relevant when dealing with WQC aimed at protecting humans or other life forms against adverse effects of acute (short term) exposure to pollutants. The fact that such values may occur fairly infrequently and are not representative of long term average conditions is unimportant when dealing with WQC expressed as short-term that should occur only rarely, if ever. EPA's WQC addressing acute exposure of freshwater aquatic life to toxic chemicals are an example of WQC expressed in this way – they are one-hour average concentrations that should be surpassed no more than once every three years on average. WQC expressed as instantaneous concentrations never to be surpassed address even more rare, but nevertheless harmful, conditions.

[12] Another example of using data sets consisting of just one grab sample to make inferences about conditions over longer periods is illustrated by one aspect of the 1986 EPA water quality criteria document for bacteria (www.epa.gov/waterscience/beaches/1986crit.pdf).

Caution regarding exclusion of "outliers" is expressed in EPA's *Guidance for Data Quality Assessment: Practical Methods for Data Analysis (QA/G-9)* (EPA/600/R-96/084) published in July 2000, available at http://www.epa.gov/quality/qa_docs.html):

> "One should never discard an outlier based solely on a statistical test. Instead, the decision to discard an outlier should be based on some scientific or quality assurance basis. Discarding an outlier from a data set should be done with extreme caution, particularly for environmental data sets, which often contain legitimate extreme values. If an outlier is discarded from the data set, all statistical analysis of the data should be applied to both the full and truncated data set so that the effect of discarding observations may be assessed. If scientific reasoning does not explain the outlier, it should not be discarded from the data set." (EPA/600/R-96/084, pp. 4-26).

Additional guidance about "outliers" can be found in the discussion of trimmed means on page 35 of *Biological Criteria: Technical Guidance for Survey Design and Statistical Evaluation of Biosurvey Data* (EPA/822/B/97/002).

However, disregarding valid data gathered during extreme conditions (e.g., significant droughts or floods) can be appropriate if applicable state's WQS include a provision specifying that some or all WQC do not apply during certain rare events, such a 7Q10 low (or high) stream flow. Also, data collected at certain times of years could legitimately be disregarded when making use support status determinations based on seasonal WQC – ones that apply only to times of year other than that when these particular data were collected.

In addition to such "temporal waivers" of WQS, state regulations often contain "spatial wavers"– portions of segments in which some or all WQS do not apply. Mixing zones in the immediate vicinity of NPDES-regulated discharges are the most common example of such exemptions. Hence, data collected within the confines of designated mixing zones should not be applied against some or all WQC otherwise applicable to the receiving segment.

3. Data Quantity Considerations

EPA encourages the collection of adequate data to make well-grounded attainment determinations. EPA has not established, required, nor encouraged the establishment of rigid minimum sample set size requirements in the WQS attainment status determination process. EPA is particularly concerned with application of such thresholds state-wide, without regard to key factors like the manner in which applicable WQC are expressed, variability in segment-specific conditions, and fluctuations in rates of pollutant loading. Rather if employed, target sample set sizes should not be applied in an assessment methodology as absolute exclusionary rules, and even the smallest data sets should be evaluated and, in appropriate circumstances, used. While it may be appropriate to identify target sample sizes as a methodology is developed, states should not exclude from further consideration data sets that do so solely because they not meet a target sample size. A methodology may provide for an initial sample size screen, but should also provide for a further assessment of sample sets that do not meet the target sample size. (EPA suggests that states avoid setting target sample set sizes higher than the amount of data available at most sites.)

Assessments based on larger sample sets are more likely to yield accurate conclusions than assessments based on smaller sample sets. For example, smaller sample sets are more prone to lead to erroneously concluding that at a WQC has not been exceeded, because they result in a lower probability of detecting WQSs exceedances that have actually occurred. (EPA, *Consolidated Assessment and Listing Methodology – Toward a Compendium of Best Practices* (CALM) July 2002, pp. 4-9).

Any target sample set size thresholds must be consistent with the state's EPA-approved water quality standards. Hence, when making an determination based on comparison of ambient data and other information to a numeric WQC expressed as an "average" concentration over a specified period of time, a statement of a desired number of samples may be appropriate. Still, the methodology should provide decision rules for concluding nonattainment in cases where the target data quantity expectations are not met, but the available data and information indicate a reasonable likelihood of a WQC exceedance (e.g., available samples with major digressions from the criterion concentration, corroborating evidence from independent lines of evidence such as biosurveys or incidence of waterborne disease, indications that conditions in the waterbody and loadings of the pollutant into the waterbody have remained fairly stable over the period in question).

Even a very small set of samples may be sufficient to indicate impairment, particularly when the duration/averaging periods of relevant WQC are quite short (an hour or less). For example, one grab sample meeting QA/QC specifications with a concentration higher than the criterion - concentration for a toxic compound could well be grounds for concluding that a WQC expressed as a concentration not be surpassed at any time had been exceeded. A single sample with a concentration that digressed from (was above) the criterion-concentration would be a particularly strong indicator of exceedance of such a criterion if it was the only sample that had been collected. In such a situation, the rate of digression in the sample set (in this instance a set of one) was 100%. This means that, if the timing of the sample was picked randomly, the chances are good that if additional samples had been taken over the period of concern, the vast majority of those would also have had concentrations above the criterion-concentration. (Of course, if the sole sample were collected during a time, condition and/or location condition excluded from application of said WQC, by the state's WQS regulation, it would not be an appropriate basis for 303(d)-listing a segment. Commonly encountered examples of such exclusions include streamflows below the low-flow 7Q10 or areas inside the designated mixing zone for an NPDES permittee.) *NOTE*: See Sec. IV.D.2 for discussion of a somewhat different issue regarding use of single grab samples.

4. Providing Excluded Data (considered and evaluated, but not used) to EPA

EPA regulations require states to provide as part of their section 303(d) list submission a rationale for not using any existing and readily available water quality-related data and information in developing the list. 40 CFR 130.7(b)(6)(iii). EPA recommends that states provide such a rationale on a segment-specific basis to assist EPA in reviewing the state's listing decisions. EPA may also request that states provide any data or information they decided not to use to develop their list and a case-specific rationale for that decision to not use the data in a particular WQS attainment status determination. EPA may review the data and rationale, disapprove section 303(d) listing decisions if appropriate, and make changes in the section 303(d) list based on data and information that was improperly excluded. Failure by a state to provide a reasonable technical rationale for a specific determination or for a decision not to use particular data or information may result in partial disapproval of the list for failure to include segments in Category 5, and potential additions of segments to the section 303(d) list by EPA.

E. Should a state use information other than site-specific ambient monitoring data?

Yes, as appropriate. Categorization decisions should generally not be based only on site specific ambient monitored data, and what was directly observed in the limited set of samples available to the water quality assessor, when other relevant types of information are available. For example, EPA regulations require that "reports from dilution calculations and predictive modeling" be included in the data and information that a state considers in its assessment process for section 303(d) listing (Category 5) purposes (40 CFR 130.7(b)(5)(ii)). Likewise, it may be appropriate to place a segment in any of the other four IR categories based on assessments resulting from the consideration of assessment tools such as predictive modeling, remote sensing data, land use analysis, knowledge about pollutant sources and loadings, observed effects, etc. (see longer listing of types of data and information in Sec. IV, Part C).

EPA believes that a valid assessment of a segment's condition should involve drawing conclusions beyond those which would be arrived at by taking into account nothing more that what was directly observed in the fraction of all possible segment conditions over a given span of time and volume of space represented by a typical set of ambient data. Simple dilution calculations, for example, can be used to estimate what concentration of a pollutant might be present under conditions (e.g., streamflow, pollutant loads) different from those extant at the times sampling was performed.

F. How should states use results of probability-based monitoring?

States should report the results of probability-based assessments as a component of their Integrated Report. A probability-based monitoring design is a type of sample survey design that ensures monitoring at a representative set of sample sites from which inferences can be made about the larger population or resource under investigation (e.g., rivers and streams throughout a state or watershed). It is similar to an opinion poll in which a sample of people are selected at random to represent a larger population. Probability-based designs are used in a wide range of disciplines when conducting a census (e.g., sampling every stream mile) is not economically feasible or is not necessary.

States are encouraged to use probability-based monitoring designs for developing probabilistic statements about waterbody conditions over broad scales (basins, the entire state). EPA believes that a probability-based monitoring design applied over large areas, such as an entire state or a large watershed, is a cost-effective approach to producing a statistical statement, of known confidence, describing the aggregate condition of water resources. For instance, based on such a study, a state might be able to state, with 75% confidence, that 37% of lakes of 50 acres or less fail to meet WQC for total phosphorus.

In addition, sampling performed under probability-based surveys provides site-specific data about each sample location. These data should be considered along with any other site-specific data that might be available, to determine if they should be used to make WQS attainment status determinations, leading to placing segments in the five categories.

The results of probability-based monitoring provide a useful benchmark for the extent that segments are likely to be healthy or degraded. This may help states refine their understanding of how much additional targeted monitoring is needed to complete identification of segments needing restoration, as well as high quality waters needing extra protection.

Though probability-based monitoring programs usually result only in a statistical statement, of known confidence, about aggregate waterbody conditions across a large area, in some instances, results may be compelling enough to support site-specific decisions about water quality in segments besides those from which ambient data were collected. For example, if a probability-based survey of fish tissue from a random sample of lakes across a state found, with a reasonably high level of confidence, that a very high percentage of lakes contain fish with tissue contaminant concentrations exceeding advisory levels, decision makers might decide to list all of the state's lakes as impaired for fish consumption use However, see Section V.H.6 below for additional guidance on use of fish consumption advisories in attainment determinations. For more information on the design and implementation of probability-based sample surveys, visit EPA's Aquatic Resource Monitoring web page at http://www.epa.gov/nheerl/arm/index.htm.

G. How should statistical approaches be used in attainment determinations?

The state's methodology should provide a rationale for any statistical interpretation of data for the purpose of making an assessment determination.

1. Description of statistical methods to be employed in various circumstances

The methodology should provide a clear explanation of which analytic tools the state uses and under which circumstances. EPA recommends that the methodology explain issues such as the selection of key sample statistics (arithmetic mean concentration, median concentration, or a percentile), null and alternative hypotheses, confidence intervals, and Type I and Type II error thresholds. The choice of a statistic tool should be based on the known or expected distribution of the concentration of the pollutant in the segment (e.g., normal or log normal) in both time and space.

Past EPA guidance (1997 305(b) and 2000 CALM) recommended making non attainment decisions, for "conventional pollutants" — TSS, pH, BOD, fecal coliform bacteria, and oil and grease[13] — when more than "10% of measurements exceed the water quality criterion." (However, EPA guidance has not encouraged use of the "10% rule" with other pollutants, including toxics.) Use of this rule when addressing conventional pollutants, is appropriate if its application is consistent with the manner in which applicable WQC are expressed. An example of a WQC for which an assessment based on the ten percent rule would be appropriate is the EPA acute WQC for fecal coliform bacteria, applicable to protection of water contact recreational use. This 1976-issued WQC was expressed as, "...no more than ten percent of the samples exceeding 400 CFU per 100 ml, during a 30-day period." Here, the assessment methodology is clearly reflective of the WQC.

[13] There are a variety of definitions for the term "conventional pollutants." Wherever this term is referred to in this guidance, it means "a pollutant other than a toxic pollutant."

On the other hand, use of the ten percent rule for interpreting water quality data is usually not consistent with WQC expressed either as: 1) instantaneous maxima not to be surpassed at any time, or 2) average concentrations over specified times. In the case of "instantaneous maxima (or minima) never to occur" criteria use of the ten percent rule typically leads to the belief that segment conditions are equal or better than specified by the WQC, when they in fact are considerably worse. (That is, pollutant concentrations are above the criterion-concentration a far greater proportion of the time than specified by the WQC.) Conversely, use of this decision rule in concert with WQC expressed as average concentrations over specific times can lead to concluding that segment conditions are worse than WQC, when in fact they are not.

If the state applies different decision rules for different types of pollutants (e.g., toxic, conventional, and non-conventional pollutants) and types of standards (e.g., acute vs. chronic criteria for aquatic life or human health), the state should provide a reasonable rationale supporting the choice of a particular statistical approach to each of its different sets of pollutants and types of standards.

2. Elucidation of policy choices embedded in selection of particular statistical approaches and use of certain assumptions

EPA strongly encourages states to highlight policy decisions implicit in the statistical analysis that they have chosen to employ in various circumstances. For example, if hypothesis testing is used, the state should make its decision-making rules transparent by explaining why it chose either "meeting WQS" or "not meeting WQS" as the null hypothesis (rebuttable presumption) as a general rule for all waters, a category of waters, or an individual segment. Starting with the assumption that a water is "healthy" when employing hypothesis testing means that a segment will be identified as impaired, and placed in Category 4 or 5, only if substantial amounts of credible evidence exist to refute that presumption. By contrast, making the null hypothesis "WQS not being met" shifts the burden of proof to those who believe the segment is, in fact, meeting WQS.

Which "null hypothesis" a state selects could likely create contrasting incentives regarding support for additional ambient monitoring among different stakeholders. If the null hypothesis is "meeting standards," there were no previous data on the segment, and no additional existing and readily available data and information are collected, then the "null hypothesis" cannot be rejected, and the segment would not be placed in Category 4 or 5. In this situation, those concerned about possible adverse consequences of having a segment declared "impaired" might have little interest in collection of additional ambient data. Meanwhile, users of the segment would likely want to have the segment monitored, so they can be ensured that it is indeed capable of supporting the uses of concern. On the other hand, if the null hypothesis is changed to "segment not meeting WQS," then those that would prefer that a particular segment not be labeled "impaired" would probably want more data collected, in hopes of proving that the null hypothesis is not true.

Another key policy issue in hypothesis testing is what significance level to use in deciding whether to reject the null hypothesis. Picking a high level of significance for rejecting the null hypothesis means that great emphasis is being placed on avoiding a Type I error (rejecting the null hypothesis, when in fact, the null hypothesis is true). This means that if a 0.10 significance level is chosen, the state wants to keep the chance of making a Type I error at or below ten percent. Hence, if the chosen null hypothesis

is "segment meeting WQS," the state is trying to keep the chance of saying a segment is impaired – when in reality it is not – under ten percent.

An additional policy issue is the Type II errors (not rejecting the null hypothesis, when it should have been). The probability of Type II errors depends on several factors. One key factor is the number of samples available. With a fixed number of samples, as the probability of Type I error decreases, the probability of a Type II error increases. States would ideally collect enough samples so the chances of making Type I and Type II errors are simultaneously small. Unfortunately, resources needed to collect such numbers of samples are quite often not available.

The final example of a policy issue that a state should describe is the rationale for concentrating limited resources to support data collection and statistical analysis in segments where there are documented water quality problems or where the combination of nonpoint source loadings and point source discharges would indicate a strong potential for a water quality problem to exist.

EPA recommends that, when picking the decision rules and statistical methods to be utilized when interpreting data and information, states attempt to minimize the chances of making either of the two following errors:

- Concluding the segment is impaired, when in fact it is not, and
- Deciding not to declare a segment impaired, when it is in fact impaired.

States should specify in their methodology what significance level they have chosen to use, in various circumstances. The methodology would best describe in "plain English" the likelihood of deciding to list a segment that in reality is not impaired (Type I error if the null hypothesis is "segment not impaired"). Also, EPA encourages states to estimate, in their assessment databases, the probability of making a Type II error (not putting on the 303(d) list a segment that in fact fails to meet WQS), when: 1) commonly-available numbers of grab samples are available, and 2) the degree of variance in pollutant concentrations are at commonly encountered levels. For example, if an assessment is being performed with a WQC expressed as a 30-day average concentration of a certain pollutant, it would be useful to estimate the probability of a Type II error when the number of available samples over a 30 day period is equal to the average number of samples for that pollutant in segments state-wide, or in a given group of segments, assuming a degree of variance in levels of the pollutant often observed over typical 30 day periods.

H. How should states use community-level bioassessment data?

Many states use multi-metric, community-level biological assessments to report water resource condition. Biological assessments provide direct measures of the cumulative response of the biological community to all sources of stress. Therefore, a biocriteria/bioassessment represents a very useful indicator of the use support status for aquatic life.

Credible assessments of biological condition can be accomplished with far fewer samples than with parameter-specific monitoring. However, attention to proper quality assurance and control is equally important in biological monitoring as it is in chemical and physical measurements. Threshold values for segment impairment determinations as well as quality assurance should be addressed in the state's methodology.

States should include biological assessments in the data and information they assemble and evaluate in developing their Integrated Reports, and must provide a rationale for any decision not to use the assessments in developing their section 303(d) lists.

States using biological assessments to make reporting determinations should also consider other types of data and information (i.e., chemical and physical). In instances in which the indication of aquatic life use support provided by biosurvey data and that provided by chemical and/or physical data differ, EPA continues to support the principle of independent applicability (see Section IV.K. below), as most recently articulated in its Consolidated Assessment and Listing Methodology guidance.

I. What information should the state provide regarding its interpretation of its WQS?

When deciding whether to put a segment in Category 1, 2, 4 or 5, a state is trying to answer the question, "What does available ambient monitoring data and other information tell us about whether or not this segment is meeting WQS?" In order to answer this question, it is necessary to be very clear about the WQS that apply to the segment– the DUs assigned to the segment, as well as the numeric water quality criteria (WQC) applicable to each DU, along with narrative WQC.

Ideally, states' WQS regulations will clearly articulate each DU and all WQC applicable to that DU. However, in some instances, there may be ambiguity in the way WQS are expressed. For example, a WQC could refer to an "average" concentration. This could mean the median, the arithmetic mean, the geometric mean, or something else describing a central tendency. Also, WQS regulations and guidance sometimes do not clearly state a duration component of a WQC (criterion-duration) – particularly some types of human health (HH) criteria. (For reference purposes: EPA HH criteria for carcinogens are presumed to have a duration of a year or more; whereas a duration of 30 days is employed in criteria addressing human pathogens and water contact recreation. EPA's aquatic life WQC for toxic chemicals present acute and chronic concentrations applicable to exposure durations of (a) 1 hour and (b) 4 days, respectively.)

For toxic ("priority" pollutants) and protection of freshwater aquatic life, EPA guidance recommends use of a once in three year maximum allowable excursion recurrence frequency (*Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act,* Section III (F), EPA, 2003). Hence, for example, if a state freshwater aquatic life WQC were expressed as "1-hour average concentration not to surpass 22 ug/L", EPA would assume an applicable excursion frequency of no more than once in 3 years.

J. How should states handle shared waters?

States with shared waters should make every effort to coordinate with each other in the development of their Integrated Reports. Coordination should occur early in the process. Where possible, states should work together to collect, assemble, solicit, and assess all readily available data and information relevant to the shared waters. Assessments for waters that are shared by neighboring states should be as consistent as possible. This is particularly important for segments listed in Category 5. However, differing state WQS can make consistent attainment decisions difficult. In such cases, EPA

Regional offices and interstate commissions, where applicable, should assist in resolving inconsistencies when they arise. The Integrated Report should document the coordination that has occurred between neighboring states and interstate commissions.

Some interstate commissions are required to prepare a section 305(b) report, but the responsibility of preparing Integrated Reports and section 303(d) lists rests with the states. Data and information in an interstate commission section 305(b) report should be considered by the states as one source of readily available data and information when they prepare their IR and make decisions on segments to be placed in Category 5; however, data in a section 305(b) interstate commission report should not be automatically entered in a state IR or section 303(d) list without consideration by the state about whether such inclusion is appropriate. EPA has made the necessary modification to its ADB system to ensure that interstate commission data stays segregated from state data.

K. How does the state make attainment decisions when different types of data indicate a different attainment status?[14]

To address the possibility of conflicting results among different types of data used to assess attainment with WQS, EPA recommends that states apply the policy on independent applicability as appropriate for making WQS attainment decisions. This policy was initially crafted to address development of NPDES permit discharge limits. Its use is slightly different in the context of WQS attainment decisions.

The intent of this policy is to protect against dismissing valuable information when evaluating aquatic life use support, particularly in detecting impairment. EPA's policy on independent application is based on the premise that any valid, representative dataset indicating an actual or projected water quality impairment should not be ignored when one is determining the appropriate action to be taken. However, EPA recognizes that there are circumstances when conflicting results should be investigated further before the attainment or nonattainment decision is made. For example, states may obtain multiple datasets of varying quality, which may influence the reliability of the assessment results.

Figure 4-1 elaborates on the use of the independent application policy in reconciling conflicting results among different datasets used to assess attainment with aquatic life-based WQS. The decision process begins in the upper left of Figure 4-1. When a state, territory, or authorized tribe has two or more types of data that do not indicate consistent attainment status, it should determine whether differences in assessment results can be attributed to differences in the quality of the datasets. For example, this may involve consideration of analytical methods, review of sampling techniques, and detailed assessment of datasets. When the differences are due to data quality issues, the independent application policy allows for resolving the differences by cleaning the data or weighing the higher quality dataset more favorably in the attainment decision.

[14]Part K of Section IV has been adapted from pages 3-9 to 3-10 of EPA's *Consolidated Assessment and Listing Methodologies (CALM)*, July 2002.

When detailed data analysis fails to identify data quality issues that explain the discrepancies, site-specific environmental conditions should be considered (e.g., effects of water chemistry, or the ability of species to adapt over time). Site specific WQC may be explored via application of the water effects ratio, resident species recalculations, or other appropriate methods.

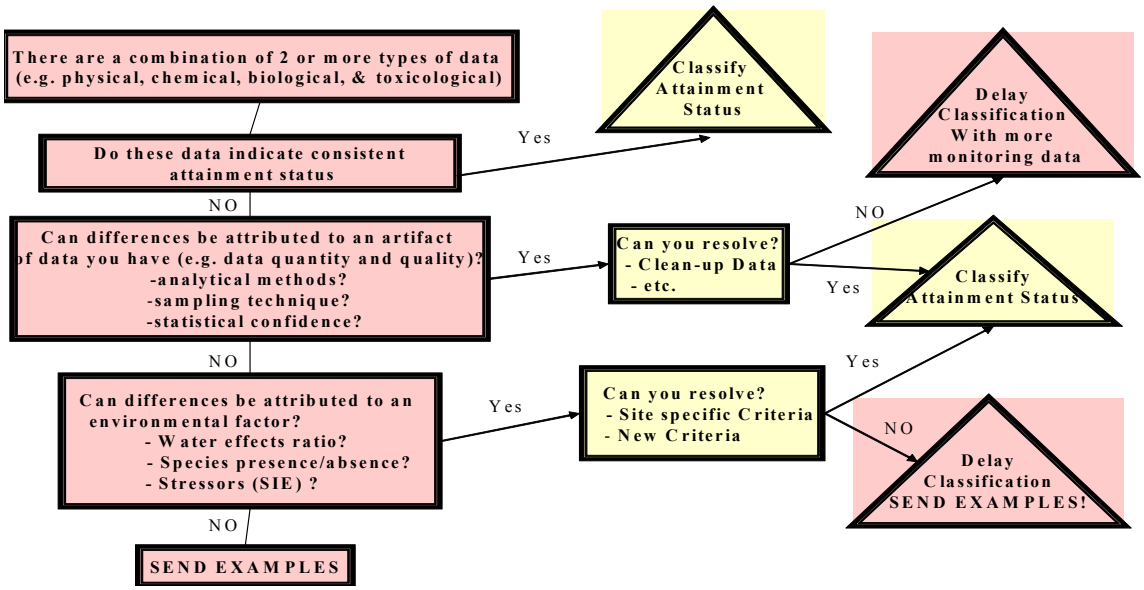

Figure 4-1. Using Multiple Types of Data to Assess Attainment

For Purposes of WQS Attainment/Nonattainment Determinations:

Policy of independent applicability *says*:

- When evaluating multiple types of data (e.g., biological, chemical) and any one type of data indicates an element of a WQS is not attained, the segment should most likely be identified as impaired.

- If there is reason to doubt the nonattainment finding, re-evaluate all of the data sets to resolve discrepancies. In some cases this may lead to modification of applicable WQS to account for site-specific information.

Policy of independent applicability *does not say*:

- Always assume that a single sample result showing impairment outweighs all other data showing attainment.

- Accept all differences in data findings at face value.

V. FIVE-PART CATEGORIZATION OF WATERS

Use of the Integrated Report format and the use of the five-part categorization scheme envisions that each state provides a comprehensive description of the water quality standards attainment status of all segments within a state. In this guidance, the term "segment" is synonymous with the term "assessment unit" (AU) used in previous IR Guidance. Fundamental to this accounting is the use of a consistent and rational segmentation and geo-referencing approach for all segments including rivers, streams, lakes, wetlands, estuaries, and coastal waters. There is no single approach to the development of a segmentation scheme. However, it is important that the selected segmentation approach be consistent with the state's water quality standards and be capable of providing a spatial scale that is adequate to characterize the WQS attainment status of the segment. The IRG provides some recommendations on how states may develop a segmentation scheme for monitoring, assessing and categorizing water quality conditions. Additionally, the IRG provides recommendations for assigning individual segments to the five-category system.

A. Recommendations for Segmenting Waters

EPA recommends that states consider using the National Hydrography Dataset (NHD)[15] coding scheme to georeference their segments, where segments may comprise part of an NHD reach, an individual NHD reach, or a collection of NHD reaches or parts of reaches. Alternatively, if a state has already developed a comparable Geographic Information System (GIS) framework, EPA requests that states provide any relevant information necessary to allow consistent georeferencing. Additionally, this information should be included in the state's ADB submission. States generally partition waters to represent homogeneity in physical, biological or chemical conditions. This segmentation may reflect an *a priori* knowledge of factors such as flow, channel morphology, substrate, riparian condition, adjoining land uses, confluence with other waterbodies, and potential sources of pollutant loadings (both point and nonpoint). While there is no single default dimension for a segment size, states have utilized these or similar principles when they defined the segments used in their water quality standards. Other factors may include the following:

- The expected natural variability of the measured criteria associated with the WQSs.
- The type of water (e.g., a small stream, a wide river, a tidal and stratified estuary, and coastal shoreline).
- Time of travel of a parcel of water in the waterbody or segment or the magnitude of any tidal excursions.
- The amount of and type of data and information necessary to provide a reasonably accurate characterization of the criteria (or core indicators) associated with the designated uses in the segment or waterbody.
- Any expected changes in significant influences in the watershed (land use, point or nonpoint sources of pollutants).
- Any site-specific concerns such as patchy or unique habitat distribution patterns or biological population distributions.

[15] By making this recommendation, EPA is not equating availability of geographical information on a water segment in the NHD with the legal definition of water of the U.S. under CWA.

Using NHD or other comparable GIS framework, a state should assign a discrete "address" or geo-location to each segment, and document the process used for defining water segments in their methodologies. The physical boundaries (beginning and end points) of a segment should be defined in such a manner that a scientifically valid assessment of each and every segment can be made. The individual size of a segment will vary based upon methodologies. Segments should, however, be larger than a sampling station but small enough to represent a relatively homogenous parcel of water (with regard to hydrology, land use influences, point and nonpoint source loadings, etc.).

B. How should segments be assigned to EPA's five reporting categories?

EPA continues to advocate the use of the five category approach for classifying the WQS attainment status for each segment. In this guidance document EPA refers to "designated uses" as the basis and unit for reporting water quality. A segment is considered impaired when WQS[16] are not being supported and/or met, and is considered threatened when WQS are not expected to be fully supported and/or met in the next listing cycle. In classifying the status of water quality in 2006, states have the option to report each segment in one or more categories. EPA recommends that states use the following five reporting categories to classify segments as meeting or not meeting applicable WQS:

Category 1: All designated uses are supported, no use is threatened;
Category 2: Available data and/or information indicate that some, but not all of the designated uses are supported;
Category 3: There is insufficient available data and/or information to make a use support determination;
Category 4: Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed;
Category 5: Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

Exhibit 5-1 provides an example of how to consider designated uses in the categorization process. EPA believes that the placement of segments into the five reporting categories best allows states to document attainment of applicable WQSs, and to develop monitoring strategies that effectively respond to the needs identified in the assessment, while ensuring that the attainment status of each water quality standard applicable to a particular segment is addressed.

[16] Water quality standards include designated use(s), criteria, and the antidegradation policy. Water quality criteria are important elements of water quality standards and attainment of criteria should also be evaluated in making listing decisions (See 40 CFR 130.7 (b)(3)). Failure to meet WQC warrant listing of waters under section 303(d). EPA has not developed guidance at this time on determining attainment status for antidegradation policies. EPA recognizes that such policies, while an important part of WQS, may not lend themselves to "attainment" determinations on a segment specific basis.

Exhibit 5-1. 2006 Integrated Reporting Guidance: Segment Categorization Guide

The following schematic describes a process states might consider using for determining the placement of segments into the Integrated Report (IR) Categories. The process begins with the assessment of the water quality standard attainment status (designated use(s), criteria) of each segment, and concludes with the placement of each segment into one or more of the five IR Categories. The assessment of the water quality standards attainment status should be consistent with the state's assessment and listing methodology and must ensure that segments not meeting or not expected to meet applicable water quality standards are identified. While the schematic focuses on the assessment of designated uses (DU) for each segment, as previously stated all components of the water quality standard are considered in the categorization of a segment.

Step-by-step process to categorize a segment

1. For each segment, assemble and consider all existing and readily available data and/or information to determine the support status for each individual designated use.
2. Based on the data and information available, make support decisions for each DU in the segment and assign the appropriate symbol (✔+, ✔-, ?, T, 4a, 4b, 4c – See *Symbols and Definitions*).
3. Using the results of Step 2, place the segment into the appropriate category or categories.

Symbols and Definitions:

✔+ = The existing data and information shows that a use ***is supported***.

✔- = The existing data and information shows that a use ***is not supported.***

? = There is insufficient existing data and information to make a use support determination, consistent with the state's assessment and listing methodology.

T = A use in this segment is currently being supported, but is **THREATENED** and it is projected not to be supporting by the next scheduled list submission date.

4a = A TMDL to address a specific segment/pollutant combination has been approved or established by EPA.

4b = A use impairment caused by a pollutant is being addressed by the state through other pollution control requirements.

4c = A use is impaired, but the impairment is not caused by a pollutant.

In the following schematic, each box represents one (1) segment. Each segment may contain one or more DUs. After compiling and considering all existing and readily available data and information for each DU in a specific segment, support decisions are made. Placement of the segment into the appropriate category or categories is based on the sufficiency of the data and information, and the analysis of whether the data demonstrates that the DU is supported.

SEGMENT #1 (1 DU) → **ASSESSMENT**

DU1 → **✔+**

SEGMENT #2 (2 DUs) → **ASSESSMENT**

DU1, DU2 → **T, ✔-**

SEGMENT #3 (3 DUs) → **ASSESSMENT**

DU1, DU2, DU3 → **✔+, ✔+, ?**

SEGMENT #4 (4 DUs) → **ASSESSMENT**

DU1, DU2, DU3, DU4 → **✔-, 4a, ?, ✔+**

SEGMENT CATEGORIZATION

	DU1	DU2	DU3	DU4	Single Category	Multi-Category
SEGMENT 1	✔+				C1	C1
SEGMENT 2	T	✔-			C5	C5
SEGMENT 3	✔+	✔+	?		C2	C2 & C3
SEGMENT 4	✔-	4a	?	✔+	C5	C5, C4a, C3 & C2

Additional examples are provided below to further illustrate the process of segment classification into multiple categories.

	DU1	DU2	DU3	DU4	Single-Category	Multi-Category
SEGMENT A	✔+	✔+	✔+	✔+	C1	C1
SEGMENT B	✔-	✔-	✔-	✔-	C5	C5
SEGMENT C	✔-	✔-	✔-	T	C5	C5
SEGMENT D	?	?	?	?	C3	C3
SEGMENT E	4b	✔-	✔-	✔-	C5	C4b, C5
SEGMENT F	✔+	✔+	✔-	✔-	C5	C2 & C5
SEGMENT G	✔+	✔+	?	?	C2	C2 &C3
SEGMENT H	?	?	?	✔-	C5	C3 & C5
SEGMENT I	✔+	✔+	✔+	4c	C4c	C2, C4c
SEGMENT J	?	?	4c	T	C5	C3, C4c, & C5
SEGMENT K	✔+	?	?	✔-	C5	C2, C3, & C5
SEGMENT L	✔+	✔+	?	T	C5	C2, C3 & C5
SEGMENT M	✔+	?	4b	✔-	C5	C2, C3, C4b & C5

States have the option to place segments into more than one of the five categories when appropriate. The placement of segments into more than one category will allow states to:

1. Demonstrate progress in the efforts to develop TMDLs,
2. Track progress as segments incrementally attain some, but not all water quality standards, and
3. Identify those segments where there is a need to obtain additional data and information for purposes of determining attainment status of some water quality standards.

While EPA recommends that states adopt and utilize the IR format for reporting the status of their water quality in 2006, states may choose to submit separate 303(d) and 305(b) reports. Furthermore, even if a state chooses to use the IR format, it may choose to place each segment into only one category and rely on the reporting capability of ADB to provide detail on the support status of all individual uses. More detailed guidance for determining the appropriate categorization of segments is provided below. It is important to note that states must consider all existing and readily available data and information in developing their section 303(d) lists, and may choose to assess a segment and assign the segment to a category using data and information other than monitored data (e.g., land use, pollutant loading coefficients, remote sensing data, modeling, etc.).

C. May a state use subcategories or additional categories in its Integrated Report?

Yes, in order to refine their classifications, states may choose to establish new or additional subcategories in addition to the proposed five major categories. For example, a state may decide to divide Category 3 into two subcategories in order to distinguish between those segments for which no data and/or information exist from those segments for which some data and/or information exist, but the data are insufficient to make a determination whether the segment is attaining applicable standards. A state may also choose to use subcategories for segments placed into Category 3 when establishing monitoring priorities. For example, the state may place its segments into different subcategories depending on whether the segment is high, medium, or low priority for follow-up monitoring based on information from probability-based monitoring, landscape or water quality models, land use data, or limited site-specific monitoring.

D. Which segments should states include in Category 1?

Segments may be placed into Category 1 if all designated uses are supported, and no use is threatened. When a segment meets the Category 1 requirements, the state has concluded, consistent with their water quality standards (and their assessment methodology) that sufficient data and information exist to determine that ***all applicable water quality standards are being attained,*** thereby making the use of Category 2 unnecessary for this segment, (see Category 2 discussion below). By placing a segment into Category 1, the state is also concluding that there are adequate data and there is sufficient information to make a determination for any water quality standard, making the use of Category 3 unnecessary for this segment (see Category 3 discussion below).

1. In order to place a segment in Category 1, must states have specific data and information regarding the status of each water quality standard?[17]

No. States may describe in either their assessment methodology or in their water quality standards a subset or hierarchy of indicators (as described in the CALM guidance and *Elements of a State Water Monitoring and Assessment Program*) that serve to characterize whether conditions in a segment are capable of meeting all applicable water quality standards.

Because limited resources affect the design of water quality monitoring programs, the state should use a tiered approach to monitoring that includes a core set of baseline indicators selected to represent each applicable designated use, plus supplemental indicators selected according to site-specific or project-specific decision criteria. Using this tiered approach, the state should be able to make the best use of its resources to meet water quality decision needs, including assessing water quality standards attainment and designated use support, identifying needed changes to water quality standards, describing causes and sources of impairments, developing water quality-based source controls, and assessing whether water quality standards are attained. Where the assessment of the supplemental indicators applicable to every designated use in a segment documents that all uses are supported and no use is threatened, that segment should be placed into Category 1.

The monitoring strategy should define a core set of indicators (e.g., water quality parameters) for each water resource type that include physical/habitat, chemical/toxicological, and biological/ecological endpoints as appropriate, that reflect designated uses, and that can be used routinely to assess attainment with applicable water quality standards throughout the state. This core set of indicators is monitored to provide Statewide or basin/watershed level information on the fundamental attributes of the aquatic environment and to assess water quality standards attainment/impairment status. Previously, chemical and physical indicators were emphasized; however, biological monitoring and assessment should assume a prominent role in state monitoring as well.

The monitoring strategy should also describe the process the state uses for identifying supplemental indicators to monitor. Supplemental indicators are often key to identifying causes and sources of impairments and targeting appropriate source controls. These supplemental indicators may include each water quality criteria in the state's water quality standards, any pollutants controlled by the National Pollutant Discharge Elimination System (NPDES), and any other constituents or indicators of concern.

Table 5-1 presents examples of recommended core and supplemental water quality indicators. The Consolidated Assessment and Listing Methodology provides additional information on considerations for selection of supplemental indicators (see http://www.epa.gov/owow/monitoring/calm.html, Chapter 10).

[17] Part D(1) of Section V has been adapted from Section II (Part D) of *Elements of a State Water Monitoring and Assessment Program*; Office of Water, US EPA; EPA 841-B-03-003, March 2003**.**

Table 5-1. Recommended Water Quality Indicators for General Designated Use Categories

	Aquatic Life & Wildlife	Recreation	Drinking Water	Fish/Shellfish Consumption
Recommended Core Indicators	*Condition of biological communities (EPA recommends the use of at least two assemblages) *Dissolved oxygen *Temperature *Conductivity *pH *Habitat assessment *Flow *Nutrients *Landscape conditions (e.g., % cover of land uses) Additional indicators for lakes: *Eutrophic condition Additional indicators for wetlands: *Wetland hydrogeomorphic settings and functions	*Pathogen indicators (E. coli, enterococci) *Nuisance plant Growth *Flow *Nutrients *Chlorophyll *Landscape conditions (e.g., % cover of land uses) Additional indicators for lakes: *Secchi depth Additional indicators for wetlands: *Wetland hydrogeomorphic settings and functions	*Trace metals *Pathogens *Nitrates *Salinity *Sediments/TDS *Flow *Landscape conditions (e.g., % cover of land uses)	*Pathogens *Mercury *Chlordane *DDT *PCBs *Landscape conditions (e.g., % cover of land uses)
Supplemental Indicators	*Ambient toxicity *Sediment toxicity *Other chemicals of concern in water column or sediment *Health of organisms	*Other chemicals of concern in water column or sediment *Hazardous chemicals *Aesthetics	*Volatile organic compounds (VOCs) (in reservoirs) *Hydrophyllic pesticides *Nutrients *Other chemicals of concern in water column or sediment *Algae	*Other chemicals of concern in water column or sediment

Source: *Elements of a State Water Monitoring and Assessment Program*; Office of Water, US EPA; EPA 841-B-03-003, March 2003**.**

2. Should states use biosurvey data to list a segment as in attainment for aquatic life use support?

EPA encourages the use of biosurvey data in concert with other specified and supplemental indicators for making an aquatic life use attainment determination. Properly developed biosurvey data can provide direct evidence of aquatic life use support. States may develop, consistent with their assessment methodology and water quality standards, their own bioassessment approach to assessing aquatic life use support. CALM and the 2003 *Elements of a State Water Monitoring and Assessment Program,* recommend the use of at least two assemblages (e.g., fish and macroinvertebrates) in such assessments (See Table 5-1 taken from *Elements of a State Water Monitoring and Assessment Program*).

3. What data should states have to determine that a segment is meeting a "fish consumption" use?

Assessment determinations regarding fish/shellfish consumption uses should be based on parameter-specific data for two groups of pollutants: (1) human pathogens, or indicators thereof, and (2) chemicals with high bioaccumulation potential. Among the bioaccumulative pollutants, EPA recommends mercury, chlordane, Dichloro-diphenyl-trichloroethane (DDT), and polychlorinated biphenyls (PCBs) as core indicators.

E. Which segments should states include in Category 2?

Segments should be placed in Category 2 if the state determines that available data and/or information indicate that some, but not all of the designated uses are supported. If the state has chosen to use the multi-category approach, segments reported in Category 2 may also be reported in Categories 3, 4, or 5 depending upon the results of the analysis of all available data and information on the other uses in the segment. However, if a single-category approach is used, Category 5 takes precedence over all other categories.

F. Which segments should states include in Category 3?

Segments should be placed in Category 3 when there is insufficient available data and/or information to make a use support determination. Category 3 is consistent with and responds to one of the recommendations in the National Research Council's (NRC) report, Assessing the TMDL Approach to Water Quality Management (2001), in which the authors suggested that a category be created for those segments where there existed insufficient data and/or information to assess the use. The state should identify those segments that are higher and lower priority for followup monitoring, and may do so using predicative tools such as probability surveys or landscape models. Category 3 provides states with the flexibility to monitor these segments in a manner consistent with their overall monitoring strategy and schedule.

G. Which segments should states include in Category 4?

Segments may be placed in Category 4 if available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed. States may place segments that meet this definition in one of the following three subcategories:

- a state developed TMDL has been approved by EPA or a TMDL has been established by EPA for any segment-pollutant combination (Category 4a);

- other required control measures are expected to result in the attainment of an applicable water quality standard in a reasonable period of time (Category 4b);
- the non-attainment of any applicable water quality standard for the segment is the result of pollution and is not caused by a pollutant (Category 4c).

1. Which segments should states include in Category 4a?

Segments should be placed in Category 4a when a TMDL to address a specific segment/pollutant combination has been approved or established by EPA. Once the TMDL has been approved or established, the state should implement the TMDL as soon as practicable. Additionally, EPA encourages states to provide monitoring schedules for these segments to ensure that sufficient data and information are obtained to document progress of the implementation actions towards meeting the applicable water quality standards. Segments in this category may also be included in other categories, as appropriate (See Exhibit 5-1).

2. Which segments should states include in Category 4b?

EPA regulations recognize that alternative pollution control requirements may obviate the need for a TMDL. Segments are not required to be included on the section 303(d) list if technology-based effluent limitations required by the Act, more stringent effluent limitations required by state, local, or federal authority, or "[o]ther pollution control requirements (e.g., best management practices) required by local, State or Federal authority" are stringent enough to implement applicable water quality standards (see 40 CFR 130.7(b)(1)) within a reasonable period of time. This guidance acknowledges that the most effective method for achieving water quality standards for some water quality impaired segments may be through controls developed and implemented without TMDLs (referred to as a "4b alternative"). The discussion below focuses on the use of "other pollution control requirements" as a basis for the conclusion that a segment does not need a TMDL.

a. What demonstration does EPA expect a state to make to support a successful Category 4b proposal?

EPA will evaluate on a case-by-case basis a state's decisions to exclude certain segment/pollutant combinations from Category 5 (the section 303(d) list) based on the 4b alternative. States should provide in their submission the rationale which supports their conclusion that there are "other pollution control requirements" sufficiently stringent to achieve applicable water quality standards within a reasonable period of time.

Specifically, this rationale should include: (1) a statement of the problem causing the impairment, (2) a description of the proposed implementation strategy and supporting pollution controls necessary to achieve water quality standards, including the identification of point and nonpoint source loadings that when implemented assure the attainment of all applicable water quality standards, (3) an estimate or projection of the time when water quality standards will be met, (4) a reasonable schedule for implementing the necessary pollution controls, (5) a description of, and schedule for, monitoring milestones for tracking and reporting progress to EPA on the implementation of the pollution controls, and (6) a commitment to revise as necessary the implementation strategy and corresponding pollution controls if progress towards meeting water quality standards is not being shown. EPA acknowledges that the level of rigor necessary to support the state's rationale will vary depending on the complexity of the

water impairments and corresponding implementation strategies. Note that a state could pursue water quality trading under 4b, so long as it follows the principles described in the Agency's relevant guidance.

If the Agency determines that the controls are not, in fact, "requirements," or that they will not result in attainment of applicable water quality standards within a reasonable time, then EPA may disapprove the state's failure to include the segment at issue on the section 303(d) list (i.e., Category 5) and add the segment to the list. In subsequent list submissions, EPA may determine that a segment that has been placed into Category 4b must go back into Category 5, if the circumstances have changed such that the state can no longer support its original 4b demonstration.

b. What constitutes acceptable "pollution control requirements" to support Category 4b alternatives?

Because of the case-specific nature of water quality impairments and controls designed to address such impairments, EPA cannot identify classes of controls that will always be adequate to support a conclusion that a segment is not required to be included in Category 5. In evaluating whether a particular set of pollution controls are in fact "requirements" as specified in EPA's regulation, the Agency will consider a number of factors including: (1) authority (local, state, federal) under which the controls are required and will be implemented with respect to sources contributing to the water quality impairment (examples may include: self-executing state or local regulations, permits, and contracts and grant/funding agreements that require implementation of necessary controls), (2) existing commitments made by the sources to implementation of the controls (including an analysis of the amount of actual implementation that has already occurred), (3) the availability of dedicated funding for the implementation of the controls, and (4) other relevant factors as determined by EPA depending on case-specific circumstances.

Since the overriding objective of the 4b alternative is to promote implementation activities designed to achieve water quality standards in a reasonable period of time, for all of the factors listed above, EPA will evaluate each 4b alternative on a case-by-case basis, including in particular the existence of identifiable consequences for the failure to implement the proposed pollution controls. Depending on the specific situation, "other pollution control requirements" may be requirements other than those based on statutory or regulatory provisions, as long as some combination of the factors listed above are present and will lead to achievement of WQSs within a reasonable period of time. For example, established plans of government agencies that require for attainment of WQS with a reasonable period of time may qualify even when their components include incentive-based actions by private parties. States may also choose to rely on controls that have already been implemented where there is sufficient certainty that implementation will continue until WQS are achieved and will not be reversed. Because the controls are already in place and achieving progress, EPA may consider such controls to be requirements even if their implementation did not occur pursuant to binding legal authority.

c. What constitutes a reasonable period of time for purposes of 4b?

EPA expects that segments impaired by a pollutant but not listed under section 303(d) based on the implementation of existing control requirements will attain WQSs within a reasonable period of time. What constitutes a "reasonable time" will vary depending on factors such as the initial severity of the impairment, the cause of the impairment (e.g., point source discharges, in place sediment fluxes, atmospheric deposition, nonpoint source runoff), riparian condition, channel condition, the nature and behavior of the specific pollutant (e.g., conservative, reactive), the size and complexity of the segment (a

simple first-order stream, a large thermally-stratified lake, a density-stratified estuary, and tidally-influenced coastal segment), the nature of the control action, cost, public interest, etc. States should consider such factors and provide, as stated in Section IV.G.2.A. above, a time estimate by which the controls will result in WQS attainment, including an explanation of the basis for their conclusion. EPA will evaluate on a case-specific basis whether the estimated time for WQS attainment is reasonable.

d. What are some examples to illustrate how the preceding guidance would be applied?

EPA will evaluate on a case-specific basis each set of controls a state uses to support a decision to include a segment in Category 4b. The following circumstances are examples of controls which may be sufficient to support such a decision, depending on the facts of the specific case:

- A waterbody is impaired solely by point sources. Each point source has an NPDES permit containing limits sufficient to implement WQS in that waterbody by the end of the permit terms.
- A waterbody is impaired by nonpoint source sediment input. The state has adopted regulations requiring sources to implement certain best management practices (BMPs), and can enforce the regulatory requirements under state law. The state demonstrates that implementation of BMPs by these sources will result in meeting WQS in the waterbody in a reasonable time.
- A waterbody is impaired by nonpoint sources and the state has entered into contracts for source remediation. Implementation of the contract terms will result in attainment of WQS in the waterbody in a reasonable time. While the state cannot obtain specific performance as a contract remedy, it can file a claim for significant monetary damages if the terms are not met.
- A waterbody is impaired by nonpoint sources which have already implemented some or all of certain measures that will result in attainment of WQS in that waterbody in a reasonable time. The controls are unlikely to be removed or reversed (e.g., watershed restoration measures pursuant to 319 grant).
- A waterbody is impaired by nonpoint sources within federal lands where a forest management plan has been developed and is being implemented. In this case, certain elements are included in the forest management plan emphasizing BMP certification programs, require adaptive adjustments of practices, and specify monitoring options needed to demonstrate compliance with state water quality standards.

3. Which segments should states include in Category 4c?

Segments should be placed in Category 4c when the states demonstrates that the failure to meet an applicable water quality standard is not caused by a pollutant, but instead is caused by other types of pollution. Segments placed in Category 4c do not require the development of a TMDL. Pollution, as defined by the CWA is "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water" (section 502(19)). In some cases, the pollution is caused by the presence of a pollutant and a TMDL is required. In other cases, pollution does not result from a pollutant and a TMDL is not required. States should schedule these segments for monitoring to confirm that there continues to be no pollutant associated with the failure to meet the water quality standard and to support water quality management actions necessary to address the cause(s) of the impairment. Examples of circumstances where an impaired segment may be placed in Category 4c include segments impaired solely due to lack of adequate flow or to stream channelization.

EPA encourages the state to collect or assemble additional data and/or information to verify the initial placement of the segment, and to re-categorize the segment based on the assessment of the additional data and/or information where appropriate.

H. Which segments should states include in Category 5?

This category constitutes the section 303(d) list that EPA will review and approve or disapprove pursuant to 40 CFR 130.7. States must include on their section 303(d) list those waters required to be listed by the Clean Water Act and EPA's implementing regulations. Segments must be placed in Category 5 when, based on existing and readily available data and/or information, technology-based effluent limitations required by the Act, more stringent effluent limitations, and other pollution control requirements are not sufficient to implement an applicable water quality standard and a TMDL is needed. 40 CFR 130.7(b)(1).

A segment that is included in Category 5 may also be included in other categories where appropriate. For example, the segment may be attaining some applicable standards, in which case it may also be included in Category 2. As the state develops and EPA approves TMDLs for the pollutants identified as causing a Category 5 segment to exceed an applicable standard, the segment can be placed in Category 4a, but must also remain in Category 5 if it is exceeding any applicable standard and a TMDL needs to be developed for the pollutant causing that exceedance. However, note that Category 5 takes precedence if the state chooses to list a segment in only one category.

1. Is Category 5 of the Integrated Report for 2006 a new section 303(d) list, and must the state account for all segments previously listed as needing a TMDL in the 2004 list?

The section 303(d) list (segments in Category 5) once approved (or, if necessary, established by EPA following disapproval of a state's list) is a new list that replaces the previous list. The time frame for establishing TMDLs should be 8 to 13 years from the date of the original listing. For example, a segment originally included on the 1998 section 303(d) list, and still identified on the 2006 submission as requiring a TMDL, should be addressed by 2011.

Segments included on previous 303(d) lists or previously placed in Category 5 should be accounted for in subsequent submissions. However, the fact that a segment was previously included in Category 5 (or on the 303(d) list) does not necessarily mean that it must remain in Category 5 until a TMDL is established. In some cases, removing a segment from Category 5 prior to TMDL development may be warranted. For example, the state may determine that the conditions have changed such that the segment is no longer required to be on the section 303(d) list (e.g., if new data and/or information shows that the applicable standard is met). Alternatively, the state may determine that other required control measures are sufficient to implement the applicable standard, and therefore may move the segment to Category 4b. The state may also determine based on the assessment of new data and information that pollutants do not cause or contribute to the impairment of the segment and therefore may move the segment to Category 4c. The state may also demonstrate that the original Category 5 listing was erroneous (i.e., not consistent with its assessment methodology or WQSs).

EPA may request, as discussed below, that the state demonstrate good cause for not including individual segments (including previously listed segments) in Category 5 (40 CFR 130.7(b)(6)(iv)). EPA may request this demonstration if the state does not develop an adequate record supporting the basis for

the decision or does not specifically explain its decision to move segments previously listed in Category 5 to other categories.

2. What constitutes good cause for not including in the current submission segments that were previously included in Category 5 (the section 303(d) List)?

To provide interested stakeholders with a more complete understanding of the changes that may have occurred from one IR cycle (or 303(d) submission) to the next, and to help expedite EPA's review and approval/disapproval action for those segments in Category 5, EPA recommends that states submit with their IR (or their 303(d) list) a table documenting changes in segment placement or categorization from the 2004 IR, and a brief summary of the basis for those changes. Table 5-2 provides an example of how states might do this.

Table 5-2. Documentation of "Good Cause" to Move Segments from Category 5.

Segment previously in Category 5	New placement in 2006	Explanation for change
Segment 214	Category 4a	TMDL completed and approved by EPA for Chromium.
Segment 266	Category 4c	The analysis of new data concluded that the aquatic life use impairment is solely due to low river flow.
Segment 321	Category 4b	The state has proposed an alternative approach to attain WQS by implementing required controls via NPDES permits.
Segment 349	Category 1	The assessment of new data documents that applicable WQS are now being attained.
Segment 350	Category 3	Previous listing in Category 5 was inconsistent with assessment methodology. Available data insufficient to determine attainment status.

In addition, EPA may request that states provide "good cause" for not including on the 2006 section 303(d) list (Category 5) submission segments that were previously included on the list. If EPA makes such a request, the state must explain its basis for not including the segment on the list. Consistent with 40 CFR 130.7(b), "good cause" for not including segments in Category 5 may be based on the following determinations:

- The assessment and interpretation of more recent or more accurate data in the record demonstrate that the applicable WQS(s) is being met.
- The results of more sophisticated water quality modeling demonstrate that the applicable WQS(s) is being met.
- Flaws in the original analysis of data and information led to the segment being incorrectly listed.
- A demonstration pursuant to 40 CFR 130.7(b)(1)(ii) that there are effluent limitations required by state or local authorities that are more stringent than technology-based effluent limitations, required by the CWA, and that these more stringent effluent limitations will result in the attainment of WQSs for the pollutant causing the impairment.

- A demonstration pursuant to 40 CFR 130.7(b)(1)(iii) that there are other pollution control requirements required by state, local, or federal authority that will result in attainment of WQSs for a specific pollutant(s) within a reasonable time (i.e., 4b).
- Documentation that the state included on a previous section 303(d) list an impaired segment that was not required to be listed by EPA regulations, e.g., segments where there is no pollutant associated with the impairment.
- Approval or establishment by EPA of a TMDL since the last section 303(d) list.
- A state inappropriately listed a segment that is within Indian country, as defined in 18 U.S.C. section 1151.
- Other relevant information that supports the decision not to include the segment on the section 303(d) list.

EPA has the authority to disapprove a submission if EPA identifies existing and readily available information that shows a segment is required by the CWA and EPA regulations be included in Category 5 (the section 303(d) list). In that situation, EPA will partially disapprove the state's list and identify additional segments for inclusion in Category 5.

3. Can previously listed segments (without new data or information) be delisted solely because they have not yet been assessed with a new methodology?

No. EPA does not believe it would be appropriate to remove segments previously listed in Category 5 (without new data or information) ***solely*** because they have not yet been assessed with a new methodology. However, there are some situations where a segment may be removed from Category 5 without relying on data and information collected after the date of the previous list. For example, if the state evaluates the pre-existing data and information using a new or revised methodology that accurately reflect the applicable WQS, and the results of that evaluation provide a "good cause" basis for not including the segment on the 2006 section 303(d) list, the segment would no longer need to be included in Category 5. However, the delisting should only occur if it is determined that the basis for the decision is consistent with the state's applicable WQSs and is reasonable.

4. Must Category 5 include threatened segments?

Yes, states must include threatened segments in Category 5 where appropriate (40 CFR 130.7(b)). The definition of "water quality limited segment" in EPA's regulations implementing CWA section 303(d) includes waters not expected to meet applicable water quality standards, which EPA refers to as "threatened" waters. 40 CFR 130.2(j). EPA recommends that states consider as threatened those segments that are currently attaining WQS, but are projected as the result of applying a valid statistical methodology to exceed WQS by the next listing cycle (every two years). For example, segments should be listed if the analysis of existing data and information demonstrates a declining trend in the segment's WQS, and the projected trend will result in a failure to meet that standard by the date of the next list (i.e., 2008 for purposes of the 2006 assessment cycle). The state assessment and listing methodology should describe how the state identifies threatened segments.

5. Must Category 5 include an impaired segment if the specific pollutant causing the impairment has not been identified?

Yes, if a designated use is not supported and the segment is impaired or threatened, the fact that the specific pollutant is not known does not provide a basis for excluding the segment from Category 5. These segments must be listed unless the state can demonstrate that no pollutant(s) causes or contribute to the impairment. Prior to establishing a TMDL for such segments the pollutant causing the impairment must be identified.

If the assessment of the new data and information demonstrates that the use impairment is not associated with a pollutant and is attributable only to other types of pollution (e.g., flow or habitat alteration) the segment may be placed into Category 4c. EPA has developed guidance to assist states in identifying the causes of a biological impairment. This document, "Stressor Identification Guidance," was released in December 2000 (EPA 822-B-00-025). This document is also available on the Internet at: http://www.epa.gov/ost/waterscience/biocriteria/stressors/stressorid.pdf.

6. When should Category 5 include segments covered by fish and shellfish consumption advisories?

EPA generally believes that fish and shellfish consumption advisories and certain shellfish growing area classifications based on segment specific information demonstrate impairment of CWA section 101(a) "fishable" uses. This applies to fish and shellfish consumption advisories and certain shellfish area classifications for all pollutants that constitute potential risks to human health, regardless of the source of the pollutant. Furthermore, advisories based on the results from probability surveys or other predictive tools having a high degree of confidence (i.e., 95%) may also form the basis of listing segments as impaired. States, on their own prerogative, may choose to place segments into Category 5 (or on the section 303(d) list) using probability surveys when fish and shellfish consumption advisories and certain shellfish area classifications constitute potential risks to human health.

For purposes of determining whether a segment is impaired and should be included on section 303(d) lists states are required to consider all existing and readily available data and information (see 40 CFR 130.7). This should include physical, chemical and biological data, including data on pathogens (such as bacteria and phytotoxins) as well as fish and shellfish tissue concentration data, where such data are existing and readily available. States collect several types of monitoring data to help determine if segments are attaining or maintaining applicable water quality standards. If a state does not consider particular existing and readily available data and information in deciding which segments are impaired and must be placed on the section 303(d) list, they must provide an explanation to EPA of why they did not use such data and information.

While numeric human health criteria for ambient water column concentrations of pollutants are a basis for determining impairment, the attainment of such criteria does not always mean that designated uses are being protected. Segment-specific factors sometimes cause pollutants, including pathogens, to accumulate in fish and shellfish tissue at higher levels than predicted by the methodology used to derive the numeric human health criteria. Examples of such factors include water temperature, nutrient levels, food web structure, the concentration of dissolved organic carbon in the ambient water, and accumulations in the sediment. Hence, a segment can be meeting numeric ambient water quality criteria, but not attaining the designated uses because fish or shellfish tissue concentrations exceed levels that are protective of human health. In instances where tissue concentrations indicate an impairment of the

designated use, even though ambient water column concentrations of pollutants do not indicate an exceedance, EPA recommends states translate the applicable narrative criteria on a site- specific basis or adopt site specific numeric criteria to account for higher than expected exposures from contaminated fish or shellfish tissue and protect designated uses.

Applicable shellfish growing area classifications should be used as part of determinations of attainment of water quality standards and listing of impaired segments. Shellfish growing area classifications are developed by the National Shellfish Sanitation Program (NSSP) using water column and tissue data (where available), and information from sanitary surveys of the contributing watershed, to protect public health. The states review these NSSP classifications every three years. There are certain NSSP classifications and data that do not necessarily indicate WQS violation. These include: "Prohibited" classifications set as a precautionary measure due to the proximity of wastewater treatment discharges, or absence of a required sanitary survey; shellfish tissue pathogen data (which can fluctuate based on short-term conditions not representative of general water quality); or short-term actions to place growing areas in the closed status.

When deciding whether to identify a segment as impaired, states need to determine whether there are impairments of designated uses and narrative criteria, as well as the numeric criteria. Although the CWA does not explicitly direct the use of fish and shellfish consumption advisories or NSSP classifications to determine attainment of water quality standards, states are required to consider all existing and readily available data and information to identify impaired segments on their section 303(d) lists. For purposes of determining whether a segment is impaired and should be included on a section 303(d) list, EPA considers a fish or shellfish consumption advisory, a NSSP classification, and the supporting data, to be existing and readily available data and information that demonstrates non-attainment of a section 101(a) "fishable" use when:

- the advisory is based on fish and shellfish tissue data,
- a lower than "Approved" NSSP classification is based on water column and shellfish tissue data (and this is not a precautionary "Prohibited" classification or the state water quality standard does not identify lower than "Approved" as attainment of the standard),
- the data are collected from the specific segment in question, and
- the risk assessment parameters (e.g., toxicity, risk level, exposure duration and consumption rate) of the advisory or classification are cumulatively equal to or less protective than those in the state's water quality standards.

This applies to all pollutants that constitute potential risks to human health, regardless of the source of the pollutant. However, for fish/shellfish advisories for "dioxin and dioxin-like compounds", due to unique risk characterization issues, listing decisions should be made on a case-by-case basis.

EPA acknowledges that in some cases, fish and shellfish consumption advisories may not demonstrate that a section 101(a) "fishable" use is not being attained in an individual segment. For example, a state may have issued a statewide or regional warning regarding fish tissue contaminated with a bioaccumulative pollutant, based on data from a subset of segments. A state may use a higher fish consumption value in determining the need for an advisory compared to the value used in establishing water quality criteria for the protection of human health. As noted above, a state may also classify shellfish growing areas "Prohibited" as a precautionary measure due to the proximity of wastewater treatment discharges or where a required sanitary survey has not been conducted. In such instances, these

segments need not be listed as impaired under section 303(d) unless there are segment specific data (and the data were not considered during the development or review of a non-precautionary NSSP classification), showing non-attainment of section 101(a) uses.

Some fish and shellfish consumption advisories and NSSP classifications are based on Food and Drug Administration (FDA) action levels as opposed to EPA's risk-based methodology for the protection of human health. FDA action levels are established to protect consumers of interstate shipped, commercially marketed fish and shellfish rather than fish and shellfish caught and consumed within the state. FDA action levels also include non-risk based factors (e.g., economic impacts) in their derivation, while water quality criteria must protect the designated uses without regard to economic impacts.

Where tissue contamination that triggers an advisory based on FDA action levels indicates an exceedance of state human health criteria, the advisory is an indication that section 101(a) "fishable" uses are not attained, and therefore, these segments should be placed into Category 5 or included on the 303(d) list.

7. How should Category 5 handle segments for which WQS are being revised or where temporary variances are in place?

The attainment decision must be based on the applicable WQS. In the case of a standard that is being revised, that standard is not applicable until it has been approved by EPA. 40 CFR 131.21. Therefore states must include in Category 5 segments that do not meet an applicable WQS at the time of listing, even if the new standard is in the process of being revised to be less stringent, until such time as EPA approves the revised standard. However, these segments would not have to be considered a high priority for TMDL scheduling. If EPA approves a revised standard in the future, the segment may be removed from the section 303(d) list at that time provided the segment does not meet the listing requirements with respect to the new standard. With respect to variances, which are temporary and usually apply to a particular discharger, but may also apply to a segment, the applicable WQS typically is the underlying standard, and therefore the segment should be placed in Category 5 if it does not support one or more of the designated uses in the underlying standard.

8. Must Category 5 include a segment where the criterion has been exceeded, but the exceedance is the result of background or natural conditions?

In some cases, a segment may exhibit water quality characteristics or chemical concentrations approaching or exceeding those levels established in the state's water quality standards due solely to non-anthropogenic causes. If the state's water quality standards include a specific exclusion for exceedances caused by "natural conditions", these segments would not be considered impaired (i.e., they could be excluded from Categories 4 and 5). These segments should instead be placed into Categories 1 through 3 as appropriate. For such segments, these background or natural conditions can be defined by assessing the results of water quality monitoring efforts, by the use of predictive models, or a characterization based on data from a watershed with similar hydrologic, land use, and pollutant loading characteristics.

9. What additional information is needed for segments in Category 5?

Identification of Pollutants

Section 130.7(b)(4) requires states to identify, for each segment included on the section 303(d) list (Category 5), the "pollutants causing or expected to cause violations of the applicable water quality standards." For the 2006 listing cycle, segments identified as impaired or threatened based on biological criteria should be included in Category 5 unless the state demonstrates that a pollutant is not causing the impairment, or inclusion in Categories 4a or 4b is warranted. States must identify all pollutants that are known to be causing the impairment of a segment.

Prioritization and TMDL Schedule

Section 303(d)(1) requires states to "establish a priority ranking" for the segments it identifies on the list, taking into account the severity of the pollution and the uses to be made of such segments, and to establish TMDLs "in accordance with the priority ranking." Consistent with section 130.7(b)(4) each state shall also submit biennially a priority ranking including waters targeted for TMDL development in the next two years. Each listed pollutant-segment combination (i.e., those in Category 5) must receive a clear priority ranking, which EPA recommends be either in the form of a scheduled TMDL completion date or a ranking such as high, medium, or low. States have considerable flexibility in deciding how best to apply these factors in prioritizing their list of waters needing TMDLs. For example, a waterbody with a severe water quality problem may be given a high priority for TMDL development in light of the severity of the concern. Conversely, a severe water quality problem may require complex analysis before developing a TMDL, and the state may therefore choose to give it a lower priority to allow time to collect necessary information and complete the analysis. Thus, the most severe water quality problems or the most toxic pollutants need not always be given the highest priority for TMDL development, if circumstances warrant a lower priority. EPA will review the priority ranking but will not take action to approve or disapprove it.

Federal regulations provide that "schedules for submissions of TMDLs shall be determined by the Regional Administrator and the State" (40 CFR 130.7(d)(1)). Factors such as the state's use of a rotating basin approach or commitments specified in court orders or consent decrees may be considered when states develop priorities and schedules. EPA recommends that states develop a schedule for establishing TMDLs as expeditiously as practicable and that the schedule (1) identifies which TMDLs will be established in each year of the upcoming integrated reporting cycle and (2) estimates the approximate number of TMDLs to be established for each year thereafter. EPA encourages the states to ensure that the schedule provides that all TMDLs for every pollutant-segment combination listed on previous section 303(d) lists be established in a time frame that is no longer than 8 to 13 years from the time the pollutant-segment combination is first identified in Category 5. EPA will not take any action on the schedule. The schedule is intended to help the public and EPA to understand the state's priorities and assist in work planning.

In developing their schedules, states will need to decide which TMDLs are higher priority than others. States need not specifically identify each TMDL as high, medium or low priority. Instead, the schedule itself can reflect the state's priority ranking. The CWA does not prescribe a particular method of expressing a priority ranking, and EPA believes a TMDL schedule is a reasonable, efficient way to demonstrate priority ranking. In some circumstances, the order in which TMDLs are established might be

subject to some modifications as the schedule is implemented, based on logistical efficiencies or data availability.

VI. REPORTING RESULTS

States are required to submit their water quality report (integrated or separate 303(d) and 305(b)) to EPA by April 1, 2006. At this time, states should also submit their assessment results electronically in the ADB or compatible data management system along with georeferencing information. The EPA regional offices will provide states in their regions with the appropriate contact information for submitting both the water quality report and electronic assessment results.

As part of the review of the submittals, the EPA regional offices will coordinate with the states to makes revisions to (if necessary) and finalize the electronic assessment results. The EPA regional offices will provide the electronic assessment results to EPA headquarters when the results are ready to be incorporated into the National Assessment Database (NAD).

GLOSSARY

Assemble (data and information) Through solicitation and other means, gathering all *existing and readily available water quality-related data and information.*

Assessment Unit (AU). A waterbody whose attainment status is reported in the Integrated Report. An AU must be named and located based on the National Hydrography Dataset (NHD). Where the states's or territory's spatial resolution is on a finer scales than NHD, EPA will translate that resolution into the NHD.

Attainment The condition of meeting applicable *water quality standards*.

Assessment Making a decision, based on all *valid* (accepted) *existing and readily available water quality -related data and information*, about the condition of a segment with regard to *WQS* (i.e., making a *WQS attainment status determination*.)

Averaging period The period of time over which the receiving water concentration is averaged for comparison with criteria concentrations (see also Criterion-Duration).

Categorization determination Deciding in which of EPA's five summary categories (or a state's equivalent system) a particular segment-designated use combination or segment-pollutant combination belongs.

Cause(s) of Impairment The stressor(s), whose presence in a waterbody is/are, singly or in combination, causing or contributing to failure to meet any applicable WQS. Impairment causes include, but are not limited to, pollutants and other forms of pollution.

Characterization determination Making, based on all *valid existing and readily available water quality-related information*, a *WQS attainment status determination*; or, deciding that additional data collection and analysis will be needed before attainment status can be determined. A characterization determination can be made with regard to one or more, or all, of the *WQS* applicable to a *segment*.

Consider (data and information) Determining whether individual data points, data sets, or other forms of information meet previously published *quality assurance/quality control (QA/QC)* specifications (see also *evaluate (data and information)*). Data and other information meeting such specifications is *valid.*

Criterion-Duration The period of time (averaging period) over which ambient data is averaged for comparison with a *criterion-magnitude*. For example, certain EPA *WQC* for protection of aquatic life are expressed, in part, as 4-day average concentrations of a particular pollutant (i.e., the criterion-duration is 4 days). *WQC* expressed as a "concentration not to surpass (supercede, exceed, etc.)" are often called "instantaneous criteria", in that their duration/averaging period is just a second (instant).

Criterion-Frequency That element of a numeric *WQC* describing how often waterbody conditions can surpass the combined magnitude and duration components (i.e., specifying the allowed number of *excursions* that can occur within a certain period time (i.e., the acceptable rate of excursions). For example, certain EPA aquatic life *WQC* are stated as "the 4-day average concentration of the pollutant

shall not supercede ___ ug/L more often than once every 3 years, on average." Here, the *criterion-frequency* is "once every 3 years, on average."

Criterion-Magnitude (or Criterion-Concentration) That element of a numeric *WQC* specifying acceptable ambient levels of a pollutant or other indicator. Most criterion magnitudes are expressed as concentrations (e.g., milligrams/liter), though magnitudes for some parameters are expressed differently (e.g., pH and temperature).

Data Quality Objectives A specification of the quality of the data needed in order to meet the monitoring project's goals.

Designated Uses (DU) Those uses specified in state or tribal water quality standards regulations for a particular segment, whether or not they are being attained. (40 CFR 131.3.(g)) Uses so designated in *WQS* are not meant to specify those activities or processes that the waterbody is currently able to fully support. Rather, they are the uses/processes that the state or tribe wishes the waterbody to be clean enough to support, whether or not the waterbody can, in its current conditions, fully support them.

Digression (Exception) A single grab sample, or set of spatially-composited samples, with a concentration inconsistent with (higher than in most cases, but lower than for some parameters like dissolved oxygen) the *criterion-concentration* in an applicable *WQC*. For example, if the c*riterion-concentration* for a pollutant is 13 ug/L, and one has 4 grab samples containing concentrations of 9 ug/l, 17 ug/L, 5 ug/L and 22 ug/l, one would have observed two digressions" in this set of samples (see *excursion* and *exceedance,* for comparison).

Evaluate (data and information) Determining whether individual data points, data sets, or other forms of information meet previously published quality assurance/quality control (QA/QC) specifications (see also *consider (data and information)*). Data and other information meeting such specifications is *valid.*

Exceedance A situation in which ambient conditions are inconsistent with those desired conditions described by the combined three elements of a numeric *WQC* (magnitude, duration, and frequency). Put another way, when the rate of *excursions* is higher than that specified by the *criterion-frequency*. For example, an *exceedance* would have occurred if a *WQC* for a certain parameter says "the one-hour average concentration shall not surpass 40 ug/L more often than once in 3 years, on average" and during a given 3 year (1095 day) period there are two or more one hour periods in which the average concentration was 41 ug/L or higher. Waters on which one or more *exceedances* are failing to meet WQS, and therefore must be placed on the state's, territory's or tribes' section 303(d) list. By contrast, occurrence of a *digression* or an *excursion* does not, in and of itself, constitute a failure to meet applicable *WQS*.

Excursion Having an average concentration in a set of samples, or in a waterbody itself, that is inconsistent with the average concentration specified by the combination of the magnitude and duration components of an applicable *WQC*. For example, if a *WQC* says the 30-day average concentration of pollutant "x" should be no greater than 77 mg/L, and the results of monitoring, modeling or other studies indicate there is a 30-day period with a concentration of 88 mg/L, then an *excursion* has occurred (compare with *digression* and *exceedance*).

Existing and Readily Available Water Quality-Related Data and Information The definition of this term includes, but is not limited to:

- Information found in watershed plans and other types of water quality management plans;
- Information contained in reports and databases developed pursuant to the CWA, including: Integrated Reports, separate section 305(b) report, a section 303(d) list, a section 314 lakes assessment, a section 319(a) nonpoint assessment, STORET, the ADB, etc.;
- Information appearing in reports and databases developed pursuant to other federal statutes and programs, including but not limited to SDWA section 1453 source water assessments, Superfund and Resource Conservation and Recovery Act reports, the Toxic Release Inventory, USDA programs, and USGS programs;
- Restrictions and/or advisories regarding shellfish harvesting and water-based recreation;
- Any *observed effect* (see definition below);
- Results from site-specific biological, chemical, and physical monitoring and surveys;
- Results of utilization of remote-sensing technology efforts; and
- Results of use of predicative tools/ extrapolative tools (e.g., probabilistic surveys, landscape-models, dilution calculations and models estimating pollutant loadings and ambient water quality).

Impairment Failure to support a *water quality standard* .

Observed effect(s) Direct manifestations of an undesirable effect on waterbody conditions. For example, fish kills, fish lesions, depressed populations of certain aquatic species, and bioassessment scores are observed effects indicating changes in aquatic communities. Major algal blooms, undesirable taste and odor in raw and finished drinking water, and increased incidences of gastroenteritis and other waterborne diseases among swimmers are also observed effects. Depending on a state's *water quality standards* and specific waterbody conditions, *observed effects* may form the basis of an impairment decision. For example, depending on the magnitude and cause of a fish kill, this observed effect may or may not result in an assessment of "impaired." Generally speaking, pollutants and pollution are not considered *observed effects* (e.g., lead, pesticides, phosphorus); rather, they are causes of *observed effects*.

Parameter A specific pollutant, or other chemical/physical condition, such as phosphorus, copper, E. coli bacteria, BOD, temperature, pH, turbidity, etc

Quality assurance project plan (QAPP) A written document that outlines the procedures a monitoring project will use to ensure that the samples participants collect and analyze, the data they store and manage, and the reports they write are of high enough quality to meet project needs.

Quality assurance (QA) The overall management system which includes organization, planning, data collection, quality control, documentation, evaluation, and reporting activities. QA provides the information needed to ascertain the quality of data and whether they meet the requirements of a project. QA ensures data will meet defined standards of quality with a stated level of confidence.

Quality control (QC) Routine technical activities whose purposes are, essentially, error control. Since errors can occur in either the field, the laboratory, or in the office, QC must be part of each of these functions.

Population A group of animals (including humans), or plants belonging to the same species. This is the definition of "population" utilized most often in environmental sciences. Statisticians, however, use this word in a much broader sense–the set of individuals, items, circumstances or conditions that is being

studied. Frequently "target population" is used by statisticians to describe the entire universe of things/situations from which a set of samples is taken. Hence, the "target population" from which a set of water quality samples were taken would be all concentrations of the parameter of interest in every drop of water found in a particular assessment unit in every second of time over a certain period. The term "waterbody conditions" is used in this document in reference to what statisticians call "population".

Sample A single measurement or aliquot. Often called a "grab sample" in environmental monitoring. (Note: This is a different use of "sample" than that commonly employed by statisticians. What a statistician would call a "sample" is referred to as a "sample set" in this document.)

Sample Set A group of individual measurements or aliquots (i.e., a collection of "samples").

Section 304(a) criteria Those *WQC* developed by EPA under authority of section 304(a) of the CWA, based solely on the latest scientific information regarding the relationship that levels of a stressor (pollutant, etc.) has to effects on aquatic organisms or human health. These criteria are issued as guidance to states, territories, and tribes for use in developing their own *WQC*.

Segment A waterbody (river, lake, bay, estuary, wetland, etc.) or portion thereof.

Threatened waters EPA recommends that states consider as threatened those waters that are currently attaining WQSs, but which are expected to exceed WQSs by the next listing cycle (every two years). For example, segments should be listed if the analysis demonstrates a declining trend in a specific water quality criteria (WQC), and the projected trend will result in a failure to meet a criterion by the date of the next list (i.e., 2008 for purposes of the 2006 assessment cycle); or, segments should be listed if there are proposed activities that will result in WQSs exceedances.

Unsupported uses Those *designated uses* that are not fully supported by conditions in the waterbody to which those uses are assigned by *WQS*.

Use (data and information) Employing data and information to make a characterization determination.

Valid (data and information) Data meeting *QA/QC specifications*. Status should *use* all such data and information making *characterization determinations*.

Water Quality Criteria (WQC) Elements of state, territorial, or tribal *WQS*, expressed as parameter (pollutants, etc.) levels or narrative statements, representing a quality of water that supports one or more *designated uses*. Numeric *WQC* addressing chemical or physical conditions contain three attributes: 1) *magnitude* (e.g., concentration), 2) *duration* (averaging period), and 3*) frequency* (recovery interval).

Water Quality Standard (WQS) Provisions of state, tribal, or territorial (or, in some cases, federal) law which define the water quality goals for a waterbody/segment. *WQS* consist of: *designated uses, water quality criteria* (both numeric and narrative), as well as antidegradation policies and implementation procedures.

WQS Attainment Status Determination Deciding, based on use of all *valid* existing and readily available data and information, whether *WQS*, or components thereof, are being met or are not being met.

APPENDIX

DATA ELEMENTS FOR *2006 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT* AND DOCUMENTATION FOR DEFINING AND LINKING SEGMENTS TO THE NATIONAL HYDROGRAPHY DATASET

(Seventeen Sheets)

Data elements for *2006 Integrated Water Quality Monitoring and Assessment Report* and documentation for defining and linking segments to the National Hydrography Dataset.

The Clean Water Act (CWA) requires states to report water quality monitoring and assessment information to satisfy CWA sections 303(d) and 305(b). EPA recognizes that states use a variety of monitoring designs which allow them to characterize waters of the United States at different scales. This reporting format accommodates jurisdiction-wide or watershed-level assessments based on probability designs and attainment decisions on individual segment. The purpose of this appendix is to provide a consistent format for the Integrated Report. This appendix is organized as follows:

A. Reporting Segment Results
   1) Define the segment
   2) Report segment geographic information using the National Hydrography Dataset (NHD)
   3) Report on the trophic status for all lakes
   4) Report attainment decisions for the segment's standard and each of its designated use(s)
   5) Document how and when the attainment decision for each segment-designated use combination was determined
   6) Report any pollutants and non-pollutants causing impairments and their probable sources
   7) Report any observed effects of pollution for each segment-designated use combination
   8) Report on approved TMDLs and provide a schedule for establishing TMDLs
   9) Documenting the monitoring schedule

B. Reporting Attainment Decisions based on Probability Designs
   1) Identify the waters assessed through a probability design ("target population")
   2) Report the geographic locations of the target populations using NHD
   3) Report attainment results for standards
   4) Report the precision and date of the attainment results
   5) Report all pollutants and non-pollutants causing impairment and their probable sources

C. Data Elements to be reported using EPA's Assessment Database or an equivalent relational database

D. Minimal Database Design to support Electronic Submission

A. Reporting Segment Results

The following information should be submitted in order to identify and characterize segments. Jurisdictions should use a relational database to store and maintain their attainment results and, document decisions on standards attainment status, identify any pollutants or other types of pollution and their sources for all segments not attaining standards, and report the assessment metadata for each attainment decision. All segment information should be provided in a database format, preferably using EPA's Assessment Database (ADB) software. Following is a brief description of the data elements EPA expects to receive in electronic format. The permissible value domains for these data elements should be used and can be downloaded from http://www.epa.gov/waters/adb. This includes a standardized list of pollutants and non-pollutants, sources, assessment type and confidence codes.

1) Define the segments

As described in this guidance, all waters in the state that are "waters of the United States" (as defined n 40 CFR 122.2) should be assessed and reported on. These types of water may include, but are not limited to, lakes, rivers, estuaries, coastal shorelines, wetlands, oceans and ground water. The basic unit for assessing attainment status for sections 305(b) and 303(d) attainment is the segment.

The following descriptive information should be included for each segment:

- unique segment identifier (primary key)
- segment's type (river/stream, lake/reservoir, coastal shoreline, wetland, etc.)
- segment's size and units of measurement
- segment's name and location on the NHD
- segment's designated uses

2) Reporting segment geographic information using the National Hydrography Dataset (NHD)

Each state and territory must define their segments, in order to report the status of all of the Nation's waters in an effective and consistent manner. Segments are the basic unit of record for conducting and reporting the results of all water quality assessments. Currently, state and territory segments are defined using a wide range of criteria - from individual monitoring stations to Natural Resource Conservation Service watersheds. Sometimes these segments are defined using geographic information systems (GIS) but more often are only described textually. As a consequence, it is extremely difficult to ensure adequate assessment of all waters. EPA strongly encourages states and territories to uniformly adopt the National Hydrography Dataset (NHD) reach addressing protocol for assigning segments. Through a unique reach number and a position, reach addresses precisely locate water features, such as segments. These reach addresses get stored in a GIS compatible format. NHD reaches are typically defined from confluence to confluence and are the hydrographic equivalent of a street's block number. A reach address is analogous to a street address number. Additional NHD information and data is available from USGS, http://nhd.usgs.gov. EPA will provide hands on training to any interested jurisdiction on the protocols for linking water quality information to the NHD. Once the segment has a reach address, other critical water quality data -- such as the segments position within the stream networks, flow, and any other information linked to the NHD – becomes readily available.

States and territories should document the process used for defining segments in their assessment methodologies. Segments should not span more than one water quality standard. The individual size of segments will vary based upon assessment methodologies. segments should, however, be larger than a sampling station but small enough to represent a homogenous standard attainment within individual segments. An individual segment may comprise part of a NHD reach, an individual NHD reach, or a collection of NHD reaches and or parts of reaches.

The use of the NHD protocol for segment delineation provides powerful mapping and spatial analysis capabilities for all water quality characterization activities. This delineation approach will help target resources and activities such as scheduling monitoring, issuing permits, and targeting restoration measures. In particular, the application of NHD will provide much more spatial resolution in identifying segments requiring the establishment of TMDLs. Furthermore, the incorporation of NHD will aid in developing and implementing management actions in individual and/or multiple segments. Jurisdictions should use the NHD protocols for defining and linking the segments covered by completed TMDLs or bundles of TMDLs. This TMDL specific geographic information should be submitted to EPA simultaneously with a TMDL's submission.

For each segment in Category 5, the use of the NHD convention clearly defines the geographic bounds affected by the TMDL. This should delineate the specific geographic location of the targeted segment, a clear description of the standard, and a more focused representation of the relevant watershed(s) which contribute point and non-point source pollutant loads. For example, in the establishment of a TMDL for a section 303(d) listed segment, pollutant reduction efforts in a non-impaired segment may be the most logical and efficient action to the attainment of the standard in the impaired segment. By linking TMDLs to NHD the management actions throughout a watershed will be visible.

EPA recognizes that some states and territories may work with other spatial hydrographic data, however, states and territories should still provide NHD addresses for their segments. NHD is currently being developed at higher resolutions and jurisdictions may use these data. States and territories interested in developing higher resolution NHD are encouraged to work with United States Geological Survey (USGS).

The NHD-Reach Indexing Tool (RIT) is a useful tool for creating segment's reach addresses and can delineate user-defined polygons in wetlands, large estuaries, oceans, and near coastal segments. All GIS coverages submitted to EPA should have unique segment identifiers that match those in the jurisdiction's assessment database. Table 1 lists the basic requirements for a GIS submission and the appropriate metadata that should be included.

3) Report on the trophic status for all lakes

> The trophic condition of all lakes must be reported using values found on http://www.epa.gov/waters/adb.

Table 1. Reporting on Segment Geographic Information

Water Type	GIS Coverage	Database Metadata
Rivers	River segments should be included as a linear feature in a GIS coverage (e.g., ESRI Shapefile). NHD event table format is preferred.	Include standard metadata requirements for NHD event tables. A list of these requirements can be found at: http://www.epa.gov/waters/georef/nhdrit_datastructure.pdf Otherwise provide Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata about the coverage, as well as the location of an segment identifiers in the coverage that can be joined to those in the database. FGDC metadata requirements can be found at: http://www.fgdc.gov/metadata/contstan.html
Lakes	Lake segments can be included as a linear or polygon feature in a GIS coverage (e.g., ESRI Shapefile). NHD event table format is preferred.	Include standard metadata requirements for NHD event tables. A list of these requirements can be found at: http://www.epa.gov/waters/georef/nhdrit_datastructure.pdf. Otherwise provide Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata about the coverage, as well as the location of a segment identifiers in the coverage that can be joined to those in the database. FGDC metadata requirements can be found at: http://www.fgdc.gov/metadata/contstan.html
Estuaries	Estuarine segments should be included as a polygon feature in a GIS coverage (e.g., ESRI Shapefile).	Include Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata about the coverage, as well as the location of a segment identifiers in the coverage that can be joined to those in the database. FGDC metadata requirements can be found at: http://www.fgdc.gov/metadata/contstan.html
Coastal Waters quality	Coastal shoreline segments should be included as a linear feature in a GIS coverage (e.g., ESRI Shapefile). Other near coastal units (e.g., shellfish beds) should be reported as polygons.	Include standard metadata requirements for NHD event tables. A list of these requirements can be found at: http://www.epa.gov/waters/georef/nhdrit_datastructure.pdf. Otherwise provide Include Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata about the coverage, as well as the location of a segment identifiers in the coverage that can be joined to those in the database. FGDC metadata requirements can be found at: http://www.fgdc.gov/metadata/contstan.html
Wetlands	Wetlands segments should be included as a polygon feature in a GIS coverage (e.g., ESRI Shapefile).	Include Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata about the coverage, as well as the location of a segment identifiers in the coverage that can be joined to those in the database. FGDC metadata requirements can be found at: http://www.fgdc.gov/metadata/contstan.html

4) Report attainment decisions for the segment's standard and each of its designated use(s)

EPA encourages states and territories to provide assessment information for every segment's designated use(s). Each segment's designated use should be assessed and reported to have one of the following conditions:

- Fully Supporting
- Not Supporting
- Insufficient or no data and information - Segments with insufficient data and information to support an attainment determination for a standard
- Not Assessed

For segments which are not attaining one or more designated uses, jurisdictions should determine and report if the segment is expected to attain its standard (i.e., all designated uses) in the near future. For these segments, jurisdictions should report the other pollution control requirements which when implemented will result in the attainment of water quality standards. Jurisdictions should also report the dates these actions were or will be implemented and the anticipated year of attainment. This information is need by EPA to validate the assumptions jurisdictions used when placing segments in Category 4b.

Threatened waters are those segments where a jurisdiction has determined that sufficient data exists to determine that all designated uses are being attained, and that non-attainment is predicted by the time the next *Integrated Report* is due to be submitted. These segments should be included in Category 5.

5) Document how and when the attainment decision for each segment-designated use combination was determined

EPA requests the following information be included to document the attainment decision for each assessed segment designated use:

- Assessment date (e.g., December 20, 2005) - This date documents when the jurisdiction completed the technical analysis of data and made its decision on the segment's designated use attainment status. A common way to store a full Y2K-compliant date is in the character format YYYYMMDD (e.g., 20031220 for December 20, 2005).

- Assessment type - Jurisdictions should list all types of data they used to make each use attainment decision (e.g., physical/chemical monitoring, toxicity testing (e.g., bioassays), benthic macro-invertebrate surveys, etc.).

- Assessment confidence - Assessment confidence levels, which range from 1 (least rigorous) to 4 (most rigorous) should be reported for each assessment type. Jurisdictions should provide definitions of their assessment confidence levels in their assessment methodologies.

6) Report any pollutants and or non-pollutants causing impairment and their probable sources

Jurisdictions should report all of the pollutants or other types of pollution for impaired or threatened segments. The list of acceptable pollutants and other types of pollution is available on http://www.epa.gov/waters/adb. The list contains a complete set of chemical characteristics and non-pollutant causes of impairment. Jurisdictions should link the specific pollutant to the designated use or designated uses that are not being attained.

Jurisdictions should also identify the probable sources contributing to an impairment. The sources should be documented using the list provided on http://www.epa.gov/waters/adb. These sources need to be linked to the appropriate pollutant causing the impairment.

7) Report any observed effects of pollution for each segment-designated use combination

Jurisdictions should document and report any observed effects of pollution for each segment-designated use combination. Observed effects may include; fish lesions, fish kills, stream bottom deposits, low combined biota/habitat bioassessment. How jurisdictions use observed effects to make attainment decisions is dependent upon a jurisdictions' interpretation of their water quality standards and should be documented in their assessment methodology.

8) Report on approved TMDLs and provide a schedule for establishing TMDLs

Jurisdictions must submit an estimated schedule for establishing TMDLs for every pollutant on each segment in Category 5. This schedule should specify the year for all TMDLs which will be established prior to the next Integrated Report, and the number per year for all others. In addition jurisdictions should indicate which of the pollutants on impaired segments have an approved TMDL. Jurisdictions should indicate the date EPA approved these TMDLs and the EPA TMDL identification number. Information on the approval date and EPA TMDL identification number can be found on http://www.epa.gov/waters/tmdl.

B. Reporting assessments based on State-wide or watershed-level probability designs

The following sections address the data requirements recommended by EPA for reporting probability-based assessments. This guidance defines the data elements and format necessary to document a jurisdiction's assessment based upon probability based monitoring designs. Each data element is defined in Table 3.

1) Identify the waters assessed through a probability design ("target population")

Study area findings should be associated with the area's standard(s) and should be clearly documented along with the target population that was monitored to develop the indicator. For instance, wadeable perennial streams throughout a state and territory may be the target population for an indicator of biological integrity related to aquatic life support. Each probability survey project should be assigned an ID (a Probability Survey Project ID).

2) Report the geographic locations of the target populations using NHD

Where the target population is not the same as an entire state, maps should be provided that use polygons to highlight a project's geographic area such as all waters of a specific class (e.g., lakes) throughout watershed units, eco-regions, or other geographic regions. States and territories are expected to have GIS polygon coverages (e.g., ESRI Shapefile) related to each probability survey project. GIS coverages should conform to Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata. State in-house probability survey project polygons should be available with basic FGDC

compliant metadata in either a shapefile format or in a standard ESRI export file format (*.e00). Additional information can be found at: http://www.fgdc.gov/metadata/contstan.html. Additional information to define the geographic frame (sample frame or "population") for a probability survey project should include such items as: the water type relevant to the project (e.g., rivers); or other "stratification" features.

States and territories are also expected to develop size estimates for the entire target population. States and territories should be able to document the GIS Hydrography coverage or other data layer used to develop their target population sizes.

3) Report attainment results for water quality standards

For each probability survey project, attainment results should be summarized. The presentation of the study's findings should apply a breakpoint that clearly defines the estimated percentage of the total target population meeting standards and the percentage not meeting standards. For each probability survey project, a description of the project methodology should be provided. Where there are a small number of standard project designs, a state can make reference to pertinent sections from its monitoring strategy, QAPP and/or assessment methodology materials. The estimated percentage of the target population meeting standards should also be accompanied by the precision of the estimate, in the form of 90 or 95% confidence intervals.

4) Report the precision and date of the probable attainment results

A major attraction of probability designs is that statistics can be developed that show the confidence levels associated with attainment results. States and territories should provide a discussion of the statistical tests they apply to produce the precision value information or refer to other documents that provide this information such as a QAPP or assessment methodology. As with reporting for segment results, the assessment date should be included for each probability survey project indicating when the state and territory finished the technical analysis of data and made its decision on the standards attainment status.

5) Report any pollutants and non-pollutants and their probable sources

Where possible, EPA requests that states and territories develop pollutant and source summary information for each of their probability survey projects. The maximum impact percentage should not exceed the percent for the use non-attainment results reported.

C. Data elements to be reported using EPA's Assessment Database or an equivalent relational database

Data elements to be reported using either EPA's Assessment Database or the relational database structure outlined in Section D, Minimal Database Elements to Support Electronic Submission.

Table 2. Segment Specific Data Elements to be reported in the 2006 Integrated Report

Field Name	Field Type	Domain	Description	Requirement Condition
STATE	Text	http://www.epa.gov/waters/adb/	State or jurisdiction abbreviations	Always Required
TOT_WATER_TYPE	Text	http://www.epa.gov/waters/adb/	Water type for the Atlas of Total waters within a jurisdiction	Always Required
TOT_WATER_SIZE	Numeric	Dependent upon units used to measure	Water size for the Atlas of Total waters within a jurisdiction	Always Required
SCALE	Text	Free Text	Scale (i.e. 1:24,000) of the source used to determine the water size for the Atlas of total waters within a jurisdiction	Always Required
TOT_SOURCE	Text	Free Text	Source used to determine the water size for the Atlas of total waters within a jurisdiction	Always Required
ID305B	Text	Free text, Jurisdiction specific	Unique identifier for Assessment Unit ID (state defined)	Always Required
CYCLE	Date	YYYY	Reporting Cycle	Always Required
WATER_NAME	Text	Free Text	Name of Assessment Unit	Always Required
LOCATION	Text	Free Text, Jurisdiction specific *Note, this does not replace linking Assessment Units to the NHD	Text description of the Assessment Unit's location	Always Required

Field Name	Field Type	Domain	Description	Requirement Condition
WATER_TYPE	Text	http://www.epa.gov/waters/adb/	Water type for the Assessment Unit (e.g., River, Estuary, Wetland)	Always Required
WATER_SIZE	Numeric	Dependent upon units used to measure	Size of the Assessment Unit	Always Required
SIZE_UNIT	Text	http://www.epa.gov/waters/adb/	Size unit (e.g. Miles if WATER_TYPE is River)	Always Required
TROPHIC_STATUS	Text	http://www.epa.gov/waters/adb/	Trophic status of publicly owned lakes	Optional
TREND	Text	http://www.epa.gov/waters/adb/	Trend of publicly owned lakes	Optional
CYCLE_LAST_ASSESSED	Date	YYYY	The most recent cycle that an Assessment Unit was assessed	Optional
MONITORING_SCHEDULED_DATE	Date	YYYY	Date by which additional monitoring for attainment status will be completed	Optional
PREVIOUSID305B	Text	Free Text	Used for tracking Assessment Units from cycle to cycle. This field would be used when there is a change in the ID structure for an Assessment Unit, or if an Assessment Unit gets split	Conditionally Required: If an Assessment unit has changed from the previous reporting cycle, then a record needs to be maintained of how the new ID matches with the previous ID

Field Name	Field Type	Domain	Description	Requirement Condition
PREVIOUSCYCLE	Date	YYYY	Cycle for the previous Assessment Unit ID. Used for cycle tracking	Conditionally Required: If PREVIOUSID305B is populated, then the cycle that the previous ID is associated with should also be populated.
USE_NAME	Text	http://www.epa.gov/waterscience/wqs	Description of the designated use which is being assessed	Always Required
ATTAINMENT	Text	Fully Supporting, Not Supporting, Insufficient Information or Not Assessed	The attainment status for a particular designated use associated with an Assessment Unit	Always Required
THREATENED_FLAG	Text	Y/null	Flag used to indicate threatened waters. Threatened assessment units are those assessment units where uses are being attained, but non-attainment is predicted by the time the next *Integrated Report* is submitted.	Conditionally Required: Must be populated if the use is Threatened
ASSMNT_TYPE	Numeric	http://www.epa.gov/waters/adb/	Caption describing a category of data types used to make attainment/impairment decision	Conditionally Required: Must be populated for all uses that are assessed
ASSMNT_CONF	Numeric	http://www.epa.gov/waters/adb/	A score ranging from a lower range of 1 up to 4 indicating reliability and precision for a category of standard specific assessment type	Optional

Field Name	Field Type	Domain	Description	Requirement Condition
ASSMNT_DATE	Date	YYYYMMDD	Date the use attainment decision was made. Can be entered for each assessed use.	Optional
CAUSE_NAME	Text	http://www.epa.gov/waters/adb/	Description of the pollutants, non-pollutants and observed effects	Optional
SOURCE_NAME	Text	http://www.epa.gov/waters/adb/	Description of the source of the pollutant	Optional
CYCLE_FIRST_LISTED	Date	YYYY	First Year (cycle) water was listed for a given cause of impairment	Conditionally Required: Required for 303(d) listings
POLLUTANT_FLAG	Text	Y/N	Marked Y if the cause of impairment is a pollutant, N if the cause is pollution	Conditionally Required: Must be populated if the Cause of Impairment is a pollutant
EXPECTED_TO_ATTAIN_DATE	Date	YYYY	Date by which the assessment unit is projected to attain its standards	Conditionally Required: Required for parameters that are causes of impairment, but will meet standards by some given date in the future.
IMPLEMENTATION_ACTION	Text	Free Text	Pollution control requirements other than a TMDL taken for an Assessment Unit to meet standards	Conditionally Required: At least one action is required for each EXPECTED_TO_ATTAIN_DATE

Field Name	Field Type	Domain	Description	Requirement Condition
ACTION_DATE	Date	YYYYMMDD	Date other pollution control requirement was/will be completed	Conditionally Required: Required for each IMPLEMENTATION_ACTION
TMDL_SCHEDULE	Date	YYYY	Date when the jurisdiction anticipates submitting the TMDL for EPA approval	Conditionally Required: Either TMDL_SCHEDULE *or* TMDL_PRIORITY must be populated for causes that are part of the 303(d) list.
TMDL_PRIORITY	Text	High, Medium, Low	State's priority for developing a TMDL	Conditionally Required: Either TMDL_SCHEDULE *or* TMDL_PRIORITY must be populated for causes that are part of the 303(d) list.
TMDL_COMPLETION_DATE	Date	YYYYMMDD	Date TMDL was completed or the date by which a TMDL is projected to be completed	Optional
TMDL_ID	Numeric	http://www.epa.gov/waters/tmdl	EPA assigned unique identifier for approved TMDLs	Conditionally Required: Must be populated for causes that have had TMDLs established
TMDL_PROJECT_STATUS	Text	http://www.epa.gov/waters/adb/	Brief description regarding the status of the TMDL development for a given Assessment Unit/Pollutant combination.	Optional

Field Name	Field Type	Domain	Description	Requirement Condition
TMDL_STATUS_COMMENT	Text	Free Text	Summary comment describing the status of the TMDL development for a given Assessment Unit/Pollutant combination.	Optional
DELISTING_REASON	Text	http://www.epa.gov/waters/adb/	Reason an Assessment Unit/Cause has been removed from the 303(d) list	Conditionally Required: Must be populated for Assessment Units/Causes that have been removed from the 303(d) list
DELISTING_COMMENT	Text	Free Text	Summary comment describing the reasons for delisting	Optional
DELISTING_DATE	Date	YYYYMMDD	Date an Assessment Unit/Cause has been removed from the 303(d) list	Conditionally Required: Must be populated for Assessment Units/Causes that have been removed from the 303(d) list
MONITORING_STRATEGY	BLOB	Free Text	The jurisdiction's current monitoring strategy document stored in PDF, MS Word or WordPerfect format.	Optional
ASSESSMENT_METHODOLOGY	BLOB	Free Text	A copy of the assessment methodology used to make attainment decisions stored in PDF, MS Word or WordPerfect format.	Optional

Table 3. Probabilistic Monitoring Data Elements to be reported in the 2006 Integrated Report

Field Name	Field Type	Domain	Description	Requirement Condition
PROJECT_ID	Text	Free text jurisdiction specific	State assigned identifier used to uniquely identify the study/project	Always Required
CYCLE	Date	YYYY	Reporting Cycle	Always Required
PROJECT_NAME	Text	Free Text	Name of the project	Always Required
TARGET_POPULATION	Text	Free Text jurisdiction specific	Description of the project's target population	Always Required
WATER_TYPE	Text	http://www.epa.gov/waters/adb/	Water type for the assessment unit (e.g., River, Estuary, Wetland)	Always Required
WATER_SIZE	Numeric	Dependent upon units used to measure	Size represented by the target population	Conditionally Required: Required if WATER_TYPE is populated
SIZE_UNIT	Text	http://www.epa.gov/waters/adb/	Size unit (e.g. Miles if WATER_TYPE is River)	Conditionally Required: Required if WATER_SIZE is populated
LOCATION_TYPE	Text	Free Text	Description of the type of location (i.e. 8-digit HUC, County, etc.)	Optional
LOCATION_DESC	Text	Free Text	Values for locations associated with an Assessment Unit or Project ID.	Conditionally Required: Required if LOCATION_TYPE is populated
INDICATOR	Text	Free Text	A description of the indicator that was monitored (e.g. Biological indicator, Trophic State Index, etc.)	Always Required

Field Name	Field Type	Domain	Description	Requirement Condition
ASSMNT_DATE	Date	YYYYMMDD	Date the attainment decision was made	Optional
PRECISION	Numeric	1-100.00	Precision of the estimate, in the form of 90 or 95% confidence intervals	Optional
CONFIDENCE	Numeric	1-100.00	The confidence interval (% +/-) for the standard attainment decision	Optional
USE_NAME	Text	Designated Uses as described in state water quality standards	Description of the designated use which is being assessed	Optional
PERCENT_ATTAINING	Numeric	1-100.00 (%Attaining + %Not Attaining + % Nonresponse should not exceed 100)	Percent of target population attaining standard	Always Required
PERCENT_NOT_ATTAINING	Numeric	1-100.00 (%Attaining + %Not Attaining + % Nonresponse should not exceed 100)	Percent of target population not attaining designated standard	Always Required
PERCENT_NON_RESPONSE	Numeric	1-100.00 (%Attaining + %Not Attaining + % Nonresponse should not exceed 100)	Estimated percent of the target population for which a use attainment assessment could not be completed	Optional
CAUSE_NAME	Text	http://www.epa.gov/waters/adb/	Description of the pollutants, non-pollutants and observed effects	Optional

Field Name	Field Type	Domain	Description	Requirement Condition
CAUSE_PERCENT	Numeric	Sum of all impairment percentages not to exceed the percent not attaining	Percent of non-attaining population impaired by a specific cause (30% non-attainment attributed to nitrogen)	Optional
SOURCE_NAME	Text	http://www.epa.gov/waters/adb/	Description of the source of the pollutant	Optional
SOURCE_PERCENT	Numeric	Sum of all source percentages not to exceed 100% for a given impairment	Percent of non-attaining population attributable to a particular source of pollution (e.g. of the 30% of nitrogen impaired waters, 70% was potentially attributable to agricultural runoff)	Optional
MONITORING_STRATEGY	BLOB	Free Text	The jurisdiction's current monitoring strategy document stored in PDF, MS Word or WordPerfect format.	Optional
ASSESSMENT_METHODOLOGY	BLOB	Free Text	A copy of the assessment methodology used to make attainment decisions stored in PDF, MS Word or WordPerfect format.	Optional

D. Minimal Database Design to support electronic submission of the Integrated Report

The data elements and business processes outlined in the previous three sections must be assembled into a relational database design. EPA's Assessment Database is one data base design capable of storing and reporting the attainment status of a jurisdiction's waters. States and territories should use EPA's Assessment Database to track the attainment status of their segments and to submit the supporting information behind their Integrated Report. If a state or territory or authorized tribe chooses not to use the Assessment Database, then at a minimum they should use the database design outlined in Diagram A to transmit their Integrated Report to EPA. EPA will provide any interested state or territory training and support using the Assessment Database.

Diagram A. Entity relationship diagram for the minimum elements needed to support an electronic submission of the Integrated Report.