GUIDELINES FOR PERFORMING SCREENING LEVEL ECOLOGICAL RISK ASSESSMENTS WITHIN THE NORTH CAROLINA DIVISION OF WASTE MANAGEMENT

October 2003

North Carolina Department of Environment and Natural Resources
Division of Waste Management
http://portal.ncdenr.org/web/wm/home

DISCLAIMER

This guidance document presents approaches for conducting screening level ecological risk assessments. They are based on the North Carolina Division of Waste Management's knowledge and experience to date. Parties wishing to use this guidance for any other purpose should first check with the appropriate regulating agency to make sure this guidance meets all requirements.

This guidance supercedes the document entitled "Guidelines For Performing Screening Level Ecological Risk Assessments For Department Of Defense, National Priority List, And National Priority List Caliber Sites Within The North Carolina Superfund Program," which was released in draft form in November 2002. Guidance set forth in this document applies to site-specific ecological risk assessments performed under Department of Defense, National Priority List, and National Priority List Caliber (DOD/NPL/NPLC) sites within the Superfund Program. It may also be used by all other programs within the North Carolina Division of Waste Management. For non-DOD/NPL/NPLC sites, parties should check with the individual program area within NC DWM for applicability prior to using this guidance.

TABLE OF CONTENTS

Section			Page
	Disclaimer		ii
	Table of Contents		iii
	List of Tables		iv
	List of Acronyms		v
	Executive Summary		vi
1.0	Introduction		1
2.0	Step 1: Preliminary Problem Formulation and Ecological Effects Evaluation		3
	2.1	Ecological Setting	3
		2.1.1 Facility Summary	3
		2.1.2 Regional Ecological Summary	4
		2.1.3 Site-Specific Ecological Setting	4
	2.2	Fate and Transport Mechanisms	5
	2.3	Potentially Complete Exposure Pathways	6
		2.3.1 Conceptual Site Model	7
3.0	Step 2: Preliminary Exposure Estimate and Risk Calculation		8
	3.1	Data Collection and Evaluation	8
		3.1.1 Detection Limits	8
		3.1.2 Hardness Dependent Screening Values	8
		3.1.3 pH Dependent Screening Values	9
		3.1.4 Dioxins and Furans	10
	3.2	Abiotic Screen	10
	3.3	Uncertainty & Data Gaps	12
	3.4	Scientific/Management Decision Point	12
	3.5	SLERA Summary	13
	References		14

Appendices

A Checklist For Ecological Assessments/Sampling

LIST OF TABLES

Table

1 Calculation of Dioxin Toxicity Equivalents, Soil
2 Calculation of Dioxin Toxicity Equivalents, Sediment
3 Calculation of Dioxin Toxicity Equivalents, Salt Water
4 Calculation of Dioxin Toxicity Equivalents, Freshwater
5 Selection of COPCs, VOCs in Soil
6 Selection of COPCs, SVOCs in Soil
7 Selection of COPCs, Pesticides in Soil
8 Selection of COPCs, Inorganics in Soil
9 Selection of COPCs, VOCs in Sediment
10 Selection of COPCs, SVOCs in Sediment
11 Selection of COPCs, Pesticides in Sediment
12 Selection of COPCs, Inorganics in Sediment
13 Selection of COPCs, VOCs in Saltwater
14 Selection of COPCs, SVOCs in Saltwater
15 Selection of COPCs, Pesticides in Saltwater
16 Selection of COPCs, Inorganics in Saltwater
17 Selection of COPCs, VOCs in Freshwater
18 Selection of COPCs, SVOCs in Freshwater
19 Selection of COPCs, Pesticides in Freshwater
20 Selection of COPCs, Inorganics in Freshwater

Tables can be found at the end of this document.

LIST OF ACRONYMS

BGS – Below ground surface
COPC – Contaminant of potential concern
CSM – Conceptual site model
DOD – Department of Defense
EPA – Environmental Protection Agency, United States
ERA – Ecological risk assessment
ESV – Ecological screening value
FS – Feasibility Study
HQ – Hazard quotient
LULC – Land use and land cover map
NAPL – Non-aqueous phase liquid
NC DWM – North Carolina Division of Waste Management
NPL – National Priority List
NPLC – National Priority List Caliber
OSWER – US EPA Office of Emergency and Remedial Response
PAH – Polynuclear aromatic hydrocarbon
PA/SI – Preliminary Assessment/Site Investigation
RI – Remedial Investigation
SLERA – Screening level ecological risk assessment
SMDP – Scientific management decision point
SQL – Sample quantitation level
TCDD – 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF – Toxic equivalency factor
TEQ – Toxic equivalent
TIC – Tentatively identified compound

Executive Summary

The North Carolina Division of Waste Management's mission is to prevent the harmful release of waste to the environment and clean up existing contamination. In order to aid in the clean up of existing contamination, this document provides guidelines for conducting a screening level ecological risk assessment (SLERA) for sites under the authority of NC DWM.

In the Superfund Program, a significant component of the remedial investigation/feasibility study (RI/FS) report is the baseline risk assessment, which consists of a human health risk assessment and an ecological risk assessment (ERA).

The purpose of the ERA is to: "1) identify and characterize the current and potential threats to the environment from a hazardous substance release, 2) evaluate the ecological impacts of alternative remediation strategies, and 3) establish cleanup levels in the selected remedy that will protect those natural resources at risk." (US EPA 1994, OSWER Directive # 9285.7-17.)

The ERA process under the Comprehensive Environmental Response, Compensation, and Liability Act consists of eight steps. These steps are:

1. Preliminary Problem Formulation and Ecological Effects Evaluation
2. Preliminary Exposure Estimate and Risk Calculation
3. Baseline Risk Assessment Problem Formulation
4. Study Design and Data Quality Objectives
5. Field Verification of Sampling Design
6. Site Investigation and Analysis of Exposure and Effects
7. Risk Characterization
8. Risk Management

Five Scientific/Management Decision Points (SMDP) are included in this process. They follow steps 2-5 and 8. An SMDP requires a meeting between the risk manager and risk assessment team to evaluate and approve or redirect the work up to that point.

This eight-step process is outlined in the United States Environmental Protection Agency's Interim Final *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments,* June 1997, (referred to as the Process Document). Although the Process Document furnishes EPA's most recent approach on designing and conducting an ERA, users should continue referring to *Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual,* (US EPA 1989) for fundamental ERA information and concepts, such as factors influencing and effects of contaminants on ecosystems.

The SLERA consists of steps 1 and 2 of the eight-step process, along with the first SMDP. The SLERA provides a general indication of the *potential* for ecological risk (or lack thereof). The SLERA may also be used 1) to estimate the likelihood that a particular ecological risk exists, 2) to identify the need for site-specific data collection efforts, and 3) to focus site-specific ecological risk assessments where warranted (US EPA, 2001).

THE SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT PROCESS

1.0 INTRODUCTION

This guidance is intended to clarify the content of SLERAs submitted to the NC DWM. Since SLERAs are designed to be conservative assessments, risk assessors and risk managers can have a high level of confidence that contaminants eliminated by the SLERA process contribute a negligible risk to the environment. SLERAs are not designed or intended to provide definitive estimates of actual risk or generate cleanup goals. In general, they are not based upon site-specific assumptions. Rather, the purpose of the SLERA is to assess the need and, if required, the level of effort necessary to conduct a detailed, or "baseline," ecological risk assessment for a particular site or facility. (US EPA, 2001.)

The SLERA (Steps 1 and 2 of the eight step process) should consist of the following components:

Step 1: Preliminary Problem Formulation and Ecological Effects Evaluation. This step is designed to help answer the question "Is there an ecology here to protect?" Step 1 includes the following information:

- Ecological Setting
- Fate and Transport Mechanisms
- Potentially Complete Exposure Pathways

Step 2: Preliminary Exposure Estimate and Risk Calculation.
This step is designed to help answer the question "Are risks to ecological receptors present at the site?" Step 2 includes the following information:

- Data Collection and Evaluation
- Abiotic Screen
- Uncertainty and Data Gaps
- Scientific/Management Decision Point
- SLERA Summary

Although steps 1 and 2 can be conducted at any point during the remedial process, they are intended to be conducted prior to the RI and should play an important role in scoping the RI field effort. If, as is common, these steps are completed with data collected during the preliminary assessment/site investigation phase, site-specific information will probably be limited. Therefore, it is important that the SLERA not only summarize available data, but also clearly identify unavailable or inadequate data so these data gaps can be examined and the appropriate actions taken. Although the scope of this guidance is limited to screening level ecological risk assessments, it is beneficial to consider data requirements for human health and ecological risk assessments concurrently in order to streamline sampling efforts.

A SMDP follows step 2. The objective of the SMDP is two-fold. It determines whether a full ecological risk assessment is required and focuses any future risk assessment on those ecological issues that are significant to the risk managers and trustees. A list of state and federal resource trustees can be found at US EPA Region IV's Ecological Risk Assessment Bulletin Web site at: http://www.epa.gov/region4/waste/ots/ecolbul.htm.

2.0 STEP 1: PRELIMINARY PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

The intent of this section is to provide the reader with an idea of the types of information, level of detail, and time commitment the NC DWM expects for the completion of Step 1 of the SLERA. Depending on the program area, it is possible that much of the information listed below has already been collected for a site. For example, for Superfund sites, much of the below information is collected in the RI phase. While it is not necessary to duplicate information from another report in the SLERA, where the SLERA is produced as a "stand alone" report, the source of the information must be clearly cited.

2.1 Ecological Setting

The ecological setting section of the SLERA should include as much information as is available on the following three areas:

- Facility Summary
- Regional Ecological Setting
- Site-Specific Ecological Setting

Since the information provided in these sections will be the basis of the assumptions the reader uses throughout problem formulation, it is important that these sections give a clear, straightforward and thorough description of the site.

2.1.1 Facility Summary

The facility summary section should give the reader a general idea of the processes used and how raw materials, products and wastes were handled and disposed. This section should include the following information:

- Facility history, including timelines.
- Facility process/processes summary.
- Potential non-site related sources of contamination.
- Precursers used, also products, bi-products and waste products generated.
  - Include volumes if available.
- Regulatory History.
  - Current and historic permits.
  - Regulatory actions (Consent Orders, Notices of Deficiency, etc.).
- Waste storage practices used at the site (include dates of operation).
  - Description of units used to store wastes (lagoons, landfills, tanks, piping, etc.).

- Waste disposal practices employed at the site (include dates of operation and closure).
  - Include maps of all known waste disposal areas.
  - List of expected (or potential) contaminants.

2.1.2 Regional Ecological Summary

This section should provide the reader with information on the site location and general habitat types in the area. This information can be obtained from resources such as "Biodiversity of the Southeastern United States, Lowland Terrestrial Communities" (Wiley and Sons, 1993), and "Biodiversity of the Southeastern United States, Aquatic Communities" (Wiley and Sons, 1992). The regional ecological summary needs to provide enough information for the risk assessors and risk managers to be able to identify general habitat that may be present at the site, and what types of fate and transport mechanisms may occur. This section should include:

- Description of the eco-region and expected habitats.
- Identify the watershed in which the site is located.
- Average rainfall.
- Average temperatures.
- Length of growing season.
- Identify Threatened and Endangered Species that use habitats found in the eco-region.

2.1.3 Site-Specific Ecological Setting

This section should include a summary of all the observations made during the site visit. Record them on the Checklist for Ecological Assessment/Sampling included as Appendix A of this document. This checklist should be completed and enclosed as an Appendix for all SLERAs. The checklist ***must*** be completed and enclosed with the SLERA when the SLERA is used as evidence to support a no further ecological assessment decision. Organizing this section by habitats present at the site is useful. Include a figure that shows the location and coverage of each habitat at the site. Information in this section should include:

- On-site and off-site land uses (agricultural, residential, undeveloped, etc.).
- List all types of habitats included within the site boundary.
  - Include size and/or relative area (e.g. 30 percent of the site) of each habitat.
  - Include a thorough description of man-made units that may act as habitat (lagoons, drainage ditches, etc.).
- Create a map or figure that shows the location of all habitats present.
- Note the layout and general topography of the site.
- Identify any obvious surface water runoff pathways (gullies, ditches, etc.).

- Identify soil types located at the site.
- A list of all species that would normally be expected to use the site under relatively unaffected conditions.
    - List by scientific name with common name in parenthesis.
    - Any species observed during the site visit or known to use the site should be highlighted.
    - All species of special concern (threatened, endangered, protected or regionally important) that may be present in the area should be identified.
    - All nearby critical and/or sensitive habitats should be identified.

After finishing the checklist, it may be possible to determine that present or future ecological impacts are negligible because complete exposure pathways do not currently exist and could not exist in the future. Many Superfund sites are located in highly industrialized areas where there could be few if any ecological receptors or where site-related impacts might be indistinguishable from non-site-related impacts. For such sites, remediation to reduce ecological risks might not be needed. However, all sites should be evaluated by qualified personnel to determine whether this conclusion is appropriate (US EPA, 1997).

Since many factors can influence observations made during the site visit, it is important to provide a reference frame to observations included in this section. Items to be noted include:

- Level of effort spent on site visit.
    - Time (hours) spent on-site; split into applicable habitat types.
- Time of the year site visit was made.
- Time of day site visit was made.
- Weather conditions during site visit.
- Tidal stage during site visit (if applicable).

Any other conditions that could have effected the observations made (drought information, etc.) should also be noted.

2.2 Fate and Transport Mechanisms

During the problem formulation step, risk assessors and risk managers will need to make assumptions about the potential for contaminants to migrate. To support these assumptions, the risk assessment should identify all potential contaminant migration pathways (for example, windblown dust, surface water runoff, erosion, etc.) identified at the site. This information will be used when completing the preliminary screening-level conceptual site model for the site. This model should illustrate which migration pathways need additional investigation.

2.3 Potentially Complete Exposure Pathways

Evaluating potentially complete exposure pathways at a site is one of the primary tasks of the SLERA. An exposure pathway is the pathway by which a contaminant travels from a source (e.g., drums, contaminated soils) to receptors. A pathway can involve multiple media, such as soil runoff to surface waters, or volatilization to the atmosphere (US EPA, 1997). Section IV of Appendix A of this document, (page 32) "Exposure Pathway Evaluation," should be completed in order to aid with this evaluation. This portion of the SLERA should not be confused with an evaluation of the usefulness or suitability of the habitat present at the site to support ecological receptors. The input from a qualified ecologist should be sought prior to eliminating specific receptors from consideration based on habitat quality.

It is common for this section of a SLERA to focus on the ability of the habitat to support ecological receptors. Since input from a qualified ecologist should be sought before eliminating specific receptors from consideration based on habitat quality, this normally does not take place in the SLERA. A few examples of scenarios that may seem to (but do not) present incomplete exposure pathways are provided below:

- Many sites have man-made drainage ditches that are not recognized as natural habitat viable to support ecological receptors. However, most drainage ditches do provide feeding and/or foraging opportunities for many ecological receptors. Therefore, by definition, these ditches provide a potentially complete exposure pathway for those receptors and should be included in the conceptual site model as a complete exposure pathway.
- Many sites have industrial areas that include large areas of maintained grass, parking lots, bare soil, etc. While these areas do not provide what is traditionally thought of as habitat, they do provide cover and foraging opportunities for many species. These species could be soil invertebrates (as well as the receptors which feed on them), or other species more accustomed to human interaction (passerine birds, rodents, other species).

All potential exposure pathways present at a site should be presented in the SLERA. The most likely exposure pathways are often related to the physical and chemical properties discussed in the preceding section for the media and the contaminants (e.g., whether or not the contaminant is bound to a matrix, such as organic carbon). In the rare case that any of the exposure pathways are incomplete, those pathways should be identified and the rationale for assuming incompleteness must be presented. Once all exposure pathways have been identified, they should be presented in a conceptual site model (see Figure 1 in Appendix A for an example CSM).

2.3.1 Conceptual Site Model

A site CSM is developed as part of the SLERA to facilitate an overall understanding of the site. The CSM includes the hypotheses that form the basis of the SLERA. It is used to communicate the understanding of the site to its stakeholders. The CSM identifies the complete and potentially complete exposure pathways. It provides a template to conduct the exposure pathway evaluation and to inventory the pathways determined to be incomplete. It also provides a means to identify relevant ecological receptors and habitats. Should it be decided that the site requires further ecological evaluation beyond the SLERA level, the CSM is updated and refined as additional data are gathered.

3.0 STEP 2: PRILIMINARY EXPOSURE ESTIMATE AND RISK CALCULATION

3.1 Data Collection and Evaluation

As stated in the introduction, it is common to perform a SLERA with data collected at the PA/SI or NC DWM program-equivalent stage of site evaluation. Since this data is usually relatively limited, it is very important to not only summarize all available and relevant data, but to also determine if data are of sufficient quantity and quality to support the SLERA.

3.1.1 Detection Limits

If the SLERA indicates adverse ecological effects are possible at environmental concentrations below standard quantitation limits, a "non-detect" based on those limits cannot be used to support a "no risk " decision (US EPA, 1997). Therefore, it is essential that all contaminants (detected and non-detected) for which analysis was completed be evaluated in the SLERA. In cases where the contaminant was not detected above detection limits, the maximum sample quantitation limit (SQL) is used as a proxy concentration for that contaminant, and that value used in the abiotic screen (section 3.2). Reasons for doing so are:

1. For some contaminants, adverse effects may be possible at concentrations below detection limits.
2. Bioaccumulative contaminants may bioaccumulate to dangerous levels in upper tropic level organisms at abiotic concentrations below detection limits.
3. If, after the first SMDP, it is determined that the site requires further evaluation, contaminants in need of special analytical methods to achieve appropriate detection levels can be highlighted for discussion.

3.1.2 Hardness Dependent Screening Values

Hardness is used as a surrogate for a number of water quality characteristics that affect the toxicity of metals. Increasing hardness has the effect of decreasing the toxicity of metals (US EPA, 2002). The Ecological screening values (ESVs) listed in Table 20 for the following analytes were derived using the assumption that hardness (mg/L as $CaCO_3$) = 50.0. If site conditions vary, the following equations must be used to calculate screening values:

Compound	Acute Screening Value	Chronic Screening Value
Cadmium	$e^{(1.128(\ln H)-3.828)}$	$e^{(0.7825(\ln H)-3.49)}$
Chromium III	$e^{(0.819(\ln H)+3.688)}$	$e^{(0.819(\ln H)+1.561)}$
Copper	$e^{(0.9422(\ln H)-1.464)}$	$e^{(0.8545(\ln H)-1.465)}$
Lead	$e^{(1.273(\ln H)-1.46)}$	$e^{(1.273(\ln H)-4.705)}$
Nickel	$e^{(0.846(\ln H)+3.3612)}$	$e^{(0.846(\ln H)+1.1645)}$
Silver	$e^{(1.72(\ln H)-6.52)}$	NA
Zinc	$e^{(0.8473(\ln H)+0.8604)}$	$e^{(0.8473(\ln H)+0.7614)}$

e = base of natural logs
H = hardness (mg/L as $CaCO_3$)
ln = natural log

The above equations can be found at US EPA Region IV's Ecological Risk Assessment Bulletin Web site at: http://www.epa.gov/region4/waste/ots/ecolbul.htm.

If hardness data is unavailable, the following equation can be used to calculate hardness (APHA et. al., 1995):

Hardness = 2.497 x Ca (mg/L) + 4.118 x Mg (mg/L)

Screening values must be calculated for each sampling location, site averages should not be used.

3.1.3 pH Dependent Screening Value

The ESVs for pentachlorophenol listed in Tables 14 and 18 were derived using the assumption that the pH = 7.8. If site conditions vary from this, the following equations must be used to adjust the ESVs:

Compound	Acute Screening Value	Chronic Screening Value
Pentachlorophenol	$e^{(1.005pH-4.83)}$	$e^{(1.005pH-5.29)}$

e = base of natural logs

The above equations can be found at US EPA Region IV's Ecological Risk Assessment Bulletin Web site at: http://www.epa.gov/region4/waste/ots/ecolbul.htm. Screening values must be calculated for each sampling location; site averages should not be used.

3.1.4 Dioxins and Furans

Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans have a wide range of relative potencies and are usually found in complex mixtures in the environment. This makes analysis and therefore, the subsequent determination of risk, expensive and difficult. To simplify this process, the use of internationally recognized toxic equivalency factors (TEFs) are used to evaluate their toxicity. The TEF is an order of magnitude estimate of the toxicity of an individual congener relative to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The TEF concept is based on the evidence that dioxin-like compounds share a common mechanism of action. TEFs specific to mammals, birds and fish are incorporated into Tables 1 through 4.

It is assumed that effects from different congeners are additive. The congener concentration multiplied by the TEF equals the toxic equivalent (TEQ) concentration.

The proxy concentration for non-detects should be one-half the SQL. The sum of the TEQ concentrations is then incorporated into the calculation of a hazard index. (TNRCC, 2001.)

3.2 Abiotic Screen

The abiotic screening section should begin with a summary of the number and types of site related sampling investigations to date. This section should include a description of analytical data to be used in the abiotic screen for the site. Because the methodologies used to collect and/or analyze the data may be a source of uncertainty, they need to be discussed in detail. Only unfiltered water samples shall be used for screening purposes in SLERAs submitted to NC DWM. It is essential that the rationale for excluding data be clear and concise.

For the SLERA, risk is estimated by calculating screening hazard quotients (HQ). A screening HQ is calculated using the maximum concentration of each contaminant detected in each media and comparing that value to the EPA Region IV ESV for each contaminant using the following formula:

Hazard Quotient = maximum concentration / Region IV ecological screening value

For contaminant groups where individual contaminants are summed (e.g. total PAHs, DDT and breakdown products, etc.) and there are both detected and nondetected contaminants, one half the SQL should be used as the proxy concentration for the nondetected contaminants. For contaminants that are neither summed nor detected, the maximum SQL is used to compare against the Region IV ESV (see Section 3.1.1). All ESVs in the attached tables, plus additional ESVs, can be found at US EPA Region IV's Ecological Risk Assessment Bulletin Web site at: http://www.epa.gov/region4/waste/ots/ecolbul.htm. Contaminants for which no Region IV ecological screening value is available must be retained as COPCs at the end of the SLERA process.

The following data should be summarized from the analytical data gathered from the site:

- Frequency of detection.
- Maximum detected concentration.
- Minimum detected concentration.
- Location of maximum concentration.
- Sample quantitation limit ranges.
- Sample identification numbers for all the samples used in the SLERA.

The first five bullet items should be entered into the contaminant of potential concern tables (Tables 5 through 20). The last bullet item may be presented in a separate table. The use of tables 5 through 20 is optional, but if alternate tables are used, they should include the same information. Electronic versions of these tables can be downloaded from http://wastenot.nc.us.

Each contaminant should be placed into the applicable category based on the review of the analytical data available:

- Category 1 – Contaminants whose maximum detection exceeds the media specific ecological screening value included in the COPC tables.
- Category 2 – Contaminants that generated a laboratory SQL that exceeds the EPA Region IV media-specific ecological screening value for that contaminant.
- Category 3 – Contaminants that have no EPA Region IV ecological screening value, but were detected above the laboratory SQLs.
- Category 4 – Contaminants that were not detected above the laboratory SQLs and have no EPA Region IV ecological screening value.
- Category 5 – Contaminants whose SQL or maximum detection exceeds the NC Surface Water Quality Standards.

Tentatively identified compounds (TICs), where required or available, must be considered in the SLERA. Although the TICs do not necessarily need to go through the data validation process, their presence should be reviewed to determine if they could be related to site operations. For example, Aroclor 1268 has been detected on several sites. It first showed up as a TIC, but it was not until the presence of this TIC was evaluated

with respect to site history that it was identified. Also, the presence of TICs should be used to determine if interferences are affecting the detection limits of other chemicals.

This section should also include a discussion of the physical parameters of the media sampled at a site, including:

Soils/Sediment
- Grain size analysis
- Total Organic Carbon

Surface Water
- pH
- Hardness

3.3 Uncertainty & Data Gaps

This section of the SLERA should include ALL uncertainties, assumptions and data gaps included in the completion of the SLERA to this point. This section is vital to the risk managers who must understand the level of confidence that can be placed in the results discussed in the risk characterization section of the SLERA.

3.4 Scientific/Management Decision Point

This section should include an analysis of the screening HQs calculated in the abiotic screen. While there are limited analyses that can be conducted at this stage, it will assist the Baseline Risk Assessment Problem Formulation (Step 3 of the ERA process outlined in the Executive Summary) if any and all possible trends in the data are summarized at the end of the SLERA. It is important to note that the outcome of the screening steps can only be one of the following:

- There is adequate information to conclude that the ecological risks are negligible;
- Site has inadequate data to complete the risk characterization. Large data gaps need to be filled prior to completion of the screening process; or
- The information indicates a potential for adverse ecological effects and a more thorough assessment is warranted.

3.5 SLERA Summary

The SLERA (Steps 1 and 2) is intended to be a simple, low level of effort, low-cost screening method. It is designed to assist risk managers identify sites that need no additional ecological investigations due to lack of unacceptable exposure to contaminants at a site. Very few sites will "screen-out" of the process at this point. However, a secondary, although equally important intent of the screening is to provide some direction and focus to the remaining investigation that needs to be completed. The end result of all SLERAs should be to provide the information needed to address major uncertainties, assumptions and data gaps identified in the screen.

References

American Public Health Association, American Water Works Association, Water Environment Federation. "Standard Methods for the Examination of Water and Wastewater," edited by Andrew D. Eaton, Lenore S. Clesceri, Arnold E. Greenberg, p. 2-36. Washington, DC: 1995, 19th Edition.

Texas Natural Resource Conservation Commission (TNRCC). "Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas." December 2001. Available on the Internet at http://www.tnrcc.state.tx.us/admin/topdoc/rg/263.pdf

US EPA, "Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual." Interim Final, March 1989. EPA/540-1-89/001. Available on the Internet at http://www.epa.gov/cgi-bin/claritgw?op-Display&document=clserv:OSWER:1174;&rank=4&template=epa

US EPA, "Role of the Ecological Risk Assessment in the Baseline Risk Assessment." Final, August 1994. Available on the Internet at www.epa.gov/superfund/programs/risk/memo.pdf

US EPA, "Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments." Interim Final, June 1997. EPA 540-R-97-006. Available on the Internet at www.epa.gov/superfund/programs/risk/ecorisk/ecorisk.htm

US EPA, "The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments." Intermittent Bulletin, June 2001. EPA 54/F-01/014. Available on the Internet at http://www.epa.gov/superfund/programs/risk/ecoup/slera0601.pdf

US EPA, "National Recommended Water Quality Criteria." November 2002. EPA 822-R-02-047. Available on the Internet at www.epa.gov/waterscience/pc/revcom.pdf

APPENDIX A

CHECKLIST FOR ECOLOGICAL ASSESSMENTS/SAMPLING

INTRODUCTION

This checklist has been developed as a tool to gather information about the facility property and surrounding areas. Specifically, the checklist helps compile information on the physical and biological aspects of the site. The data include the site environmental setting, use of the site, releases at the site, contaminant fate and transport mechanisms, and the area's habitats, receptors and exposure pathways. The completed checklist can then be used to construct the conceptual site model (CSM) for the site. The checklist and CSM serve as the basis for the SLERA.

In general, the checklist is designed for applicability to all sites, however, there may be unusual circumstances which require professional judgment in order to determine the need for further ecological evaluation (e.g., cave-dwelling receptors). In addition, some of the questions in the checklist may not be relevant to all sites. Some facilities may have large amounts of data available regarding contaminant concentrations and hydrogeologic conditions at the site, while other may have only limited data. In either case, the questions on the checklist should be addressed as completely as possible with the information available.

Habitats and receptors, which may be present at the site, can be identified by direct or indirect[1] observations and by contacting local and regional natural resource agencies. Habitat types may be determined by reviewing land use and land cover maps (LULC), which are available via the Internet at http://www.nationalatlas.gov/mapit.html. Since receptors are often present at a site even when they are not observed, it should be assumed they are present where viable habitat is present.

Some sources of general information available for the identification of ecological receptors and habitats include:

- U.S. Fish and Wildlife Service (http://www.fws.gov)
- U.S. Forest Service (USFS) (http://www.fs.fed.us/)
- U.S. Bureau of Land Management (USBLM) (http://www.blm.gov/nhp/index.htm)
- United States Geological Service (USGS) (http://www.usgs.gov)
- National Wetland Inventory Maps (http://wetlands.fws.gov)
- National Audubon Society (http://www.audobon.com)
- National Biological Information Infrastructure (http://biology.usgs.gov)
- North Carolina Division of Water Quality (http://h2o.enr.state.nc.us/)
- Sierra Club (http://www.sierraclub.org)
- National Geographic Society (http://www.nationalgeographic.com)
- State and National Parks System
- Local universities
- Tribal organizations

[1] Examples of indirect observations that indicate the presence of receptors include: tracks, feathers, burrows or scat.

INSTRUCTIONS FOR COMPLETING THE CHECKLIST

The checklist consists of four sections: Site Location, Site Characterization, Habitat Evaluation and Exposure Pathway Evaluation. Answers to the checklist should reflect existing conditions and should not consider future remedial actions at the site. Completion of the checklist should provide sufficient information for the preparation of a CSM and SLERA and allow for the identification of any data gaps.

Section I - Site Location provides general site information, identifies the facility being evaluated and gives specific location information. Site maps and diagrams, which should be attached to the completed report, are an important part of this section. The following elements should be clearly illustrated: 1) the location and boundaries of the site relative to the surrounding area, 2) any buildings, structures or important features of the facility or site, and 3) all ecological areas or habitats identified during completion of the checklist. It is possible that several maps will be needed to clearly and adequately illustrate the required elements. Although topographical information should be illustrated on at least one map, it is not required for every map. Simplified diagrams (preferably to scale) of the site and surrounding areas will usually suffice.

Section II - Site Characterization is intended to provide additional temporal and contextual information about the site. It may have an impact on determining whether a certain area should be characterized as ecologically viable habitat or contains receptors. Answers to the questions in Section II will help the reviewer develop a broader and more complete evaluation of the ecological aspects of a site.

Section III - Habitat Evaluation provides information regarding the physical and biological characteristics of the different habitat types present at or in the locality of the site. The applicable portions of Section III of the checklist should be completed for each individual habitat identified. For example, the questions in Section III.C of the checklist should be answered for each wetland area identified at or in the locality of the site. The individual areas must be identified on a map or maps.

Section IV- Exposure Pathway Evaluation is used to determine if contaminants at the site have the potential to impact habitat identified in Section III. An exposure pathway is the course a chemical or physical agent takes from a source to an exposed organism. Each exposure pathway includes a source (or release from a source), an environmental transport mechanism, an exposure point and an exposure route. A complete exposure pathway is one in which each of these components, as well as a receptor to be exposed, are present. Essentially, this section addresses the fate and transport of contaminants that are known or suspected to have been released at the site. In the rare cases where a potentially complete exposure pathway does not exist, additional ecological evaluation is usually not warranted.

Potential transport pathways addressed in this checklist include migration of contaminants via air dispersion, leaching into groundwater, soil erosion/runoff and groundwater discharge to surface water.

USING THE CHECKLIST TO DEVELOP THE CONCEPTUAL SITE MODEL

The completed Site Assessment Checklist can be used to construct the CSM. An example of a CSM diagram is presented in Figure 1. The CSM illustrates actual and potential contaminant migration and exposure pathways to associated receptors. The components of a complete exposure pathway are simplified and grouped into three main categories: sources, release mechanisms and potential receptors. As a contaminant migrates and/or is transformed in the environment, sources and release mechanisms may expand into primary, secondary and tertiary levels. For example, Figure 1 illustrates releases from inactive lagoons (primary sources) through spills (primary release mechanism), which migrate to surface and subsurface soils (secondary sources), which are then leached (secondary release mechanism) to groundwater (tertiary source). Similarly, exposures of various trophic levels to the contaminant(s) and consequent exposures via the food chain may lead to multiple groups of receptors. For example, Figure 1 illustrates groups of both aquatic and terrestrial receptors which may be exposed and subsequently serve as tertiary release mechanisms to receptors which prey on them.

Although completing the checklist will not provide the user with a readymade CSM, a majority of the CSM's components can be found in the answers to the checklist. It is then up to the user to put the pieces together into a comprehensive whole. The answers from Section II of the checklist, Site Characterization, can be used to identify sources of releases. The answers to Section IV, Exposure Pathway Evaluation, will assist users in tracing the migration pathways of releases in the environment, thus helping to identify release mechanisms and sources. The results of Section III, Habitat Evaluation, can be used to both identify secondary and tertiary sources and to identify the types of receptors which may be exposed.

Once all of the components have been identified, one can begin tracing the steps between the primary releases and the potential receptors. For each potential receptor, the user should consider all possible exposure points (e.g., prey items, direct contact with contaminated soil or water, etc.), then begin eliminating pathways which are not expected to result in exposure to the contaminant at the site. Gradually, the links between the releases and receptors can be filled in, resulting in potentially complete exposure pathways.

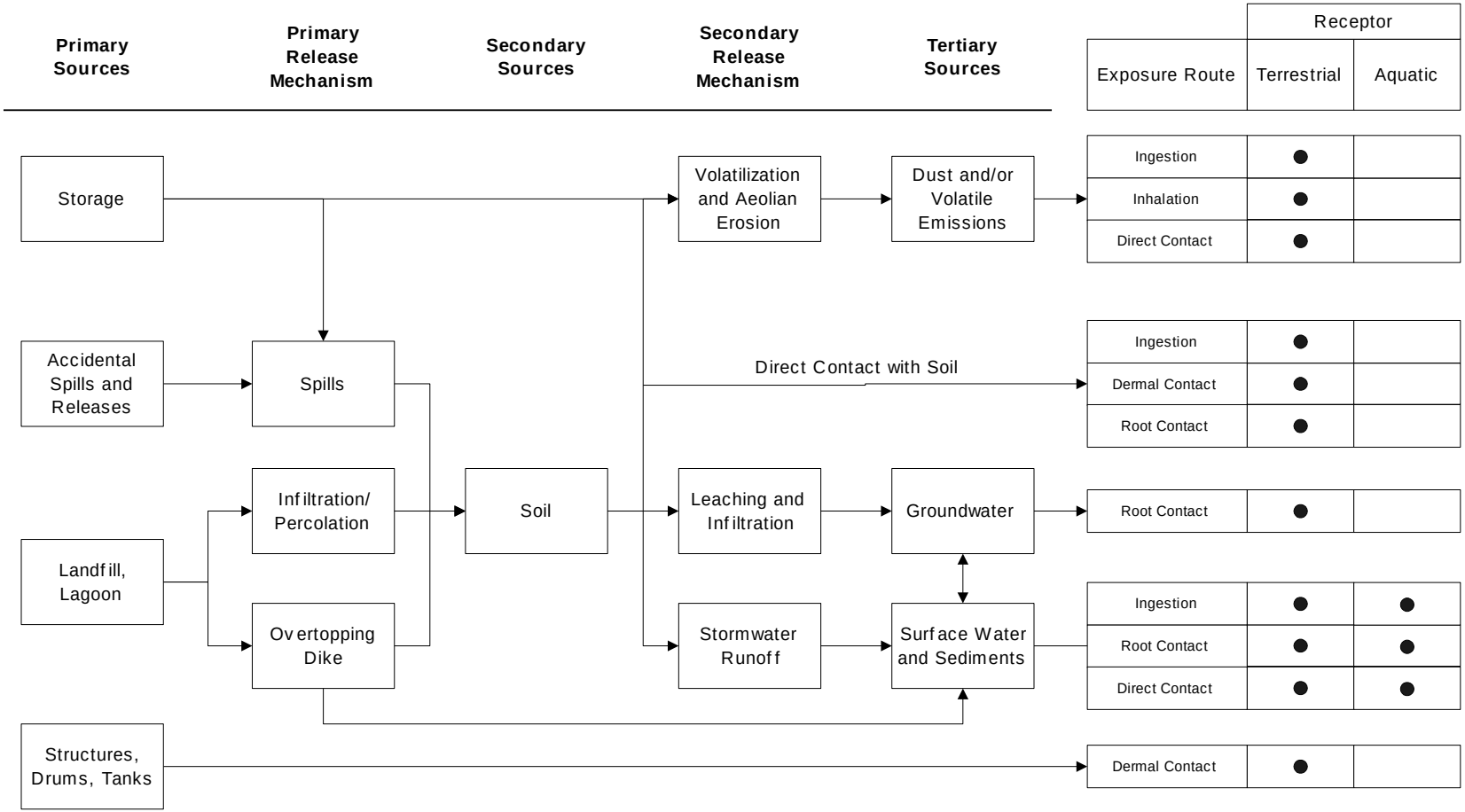

Figure 1. Example Preliminary Conceptual Site Exposure Model Diagram

CHECKLIST FOR ECOLOGICAL ASSESSMENTS/SAMPLING

I. SITE LOCATION

1. Site Name_____
   US EPA ID Number _____
   Location_____
   County_____ City_____ State_____

2. Latitude_____ Longitude_____

3. Attach site maps, including a topographical map, a diagram which illustrates the layout of the facility (e.g., site boundaries, structures, etc.), and maps showing all habitat areas identified in Section III of the checklist. Also, include maps which illustrate known and suspected release areas, sampling locations and any other important features, if available.

II. SITE CHARACTERIZATION

1. Indicate the approximate area of the site (i.e., acres or sq. ft.)

2. Is this the first site visit? □ Yes □ No
   If no, attach trip report of previous site visit(s), if available.

   Dates(s) of previous site visit(s) _____

3. Are aerial or other site photographs available? □ Yes □ No
   If yes, please attach any available photo(s) to the site map to the report.

4. Provide an approximate breakdown of the land uses on the site:

_____% Heavy Industrial	_____% Light Industrial	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
_____% Recreational[a]	_____% Undisturbed	_____% Other[c]

[a]For recreational areas, please describe the use of the area (e.g., park, playing field, etc).
_____

[b]For agricultural areas, please list the crops and/or livestock which are present.
_____

[c]For areas designated as "other," please describe the use of the area.
_____

5. Provide an approximate breakdown of the land uses in the area surrounding the site. Indicate the radius (in miles) of the area described: _____

_____% Heavy Industrial	_____% Light Industrial	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
_____% Recreational[a]	_____% Undisturbed	_____% Other [c]

[a]For recreational areas, please describe the use of the area (e.g., park, playing field, golf course, etc).

_____

[b]For agricultural areas, please list the crops and/or livestock which are present.

_____

[c]For areas designated as "other," please describe the use of the area.

_____

_____

6. Has any movement of soil taken place at the site? ☐ Yes ☐ No
If yes, indicate the likely source of the disturbance, (e.g., erosion, agricultural, mining, industrial activities, removals, etc.) degree of disturbance, and estimate when these events occurred.

_____

_____

7. Do any sensitive environmental areas exist adjacent to or in proximity to the site, (e.g. Federal and State parks, National and State monuments, wetlands)? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information. See Table 1 for a list of contacts.*

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

8. What type of facility is located at the site?

☐ Chemical	☐ Manufacturing	☐ Mixing
☐ Waste Disposal	☐ Other (specify)	

_____

_____

9. Identify the contaminants of potential concern (COPCs) at the site. If known, include the maximum contaminant levels. Please indicate the source of data cited (e.g., RFI, confirmatory sampling, etc).

_____

_____

_____

10. Check any potential routes of off-site migration of contaminants observed at the site:

□ Swales □ Depressions □ Drainage Ditches

□ Runoff □ Windblown Particulates □ Vehicular Traffic

□ Other (specify):

11. Indicate the approximate depth to groundwater (in feet below ground surface [(bgs)].

_____

12. Indicate the direction of groundwater flow (e.g., north, southeast, etc.)

_____

13. Is the direction of surface runoff apparent from site observations? □ Yes □ No
If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

□ Surface water □ Groundwater □ Sewer

□ Collection Impoundment

14. Is there a navigable water body or tributary to a navigable water body?
□ Yes □ No

15. Is there a water body anywhere on or in the vicinity of the site? If yes, also complete Section III.B.1: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section III.B.2: Aquatic Habitat Checklist -- Flowing Systems.

□ Yes (approx. distance _____) □ No

16. Is there evidence of flooding? □ Yes □ No
Wetlands and flood plains are not always obvious. Do not answer "no" without confirming information. If yes, complete Section III.C: Wetland Habitat Checklist.

17. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. (Use a blank sheet if additional space is needed for text.)

18. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? □ Yes □ No
If yes, you are required to verify this information with the U.S. Fish and Wildlife Service or other appropriate agencies (see Table 1 for a list of contacts). If species' identities are known, please list them next.

19. Record weather conditions at the site at the time of the site visit when information for completion of this checklist was prepared:

DATE _____

_____Temperature (°C/°F)

Wind (direction/speed):

Cloud Cover:

Normal daily high temperature (°C/°F):

Precipitation (rain, snow):

20. Describe reasonable and likely future land and/or water use(s) at the site.

_____
_____
_____
_____
_____

21. Describe the historical uses of the site. Include information on chemical releases that may have occurred as a result of previous land uses. For each chemical release, provide information on the form of the chemical released (i.e., solid, liquid, vapor) and the known or suspected causes or mechanism of the release (i.e., spills, leaks, material disposal, dumping, explosion, etc.).

_____
_____
_____
_____
_____

22. Identify the media (e.g., soil [surface or subsurface], surface water, air, groundwater) which are known or suspected to contain COCs.

_____
_____
_____
_____
_____

II.A. SUMMARY OF OBSERVATIONS AND SITE SETTING

Include information on significant source areas and migration pathways that are likely to constitute complete exposure pathways.

Checklist Completed by_____

Affiliation_____

Author Assisted by_____

Date_____

III. HABITAT EVALUATION

III.A Terrestrial Habitat Checklist

III.A.1 Wooded

Are any wooded areas on or adjacent to the site? □ Yes □ No

If yes, indicate the wooded area on the attached site map and answer the following questions. If more than one wooded area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual wooded area. Distinguish between wooded areas by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.2: Shrub/Scrub

Wooded Area Questions

□ On-site □ Off-site

Name or Designation:_____

1. Estimate the approximate size of the wooded area (_____% _____acres)
   Please identify what information was used to determine the wooded area of the site (e.g., direct observation, photos, etc).

2. Indicate the dominant type of vegetation in the wooded area. Provide photographs, if available.

   - ❑ Evergreen
   - ❑ Deciduous
   - ❑ Mixed

   Dominant plant species, if known:_____

3. Estimate the vegetation density of the wooded area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

4. Indicate the predominant size of the trees at the site. Use diameter at breast height.

   - ❑ 0-6 inches
   - ❑ 6-12 inches
   - ❑ >12 inches
   - ❑ No single size range is predominant

5. Specify type of understory present, if known. Provide a photograph, if available.

III.A.2 Shrub/Scrub

Are any shrub/scrub areas on or adjacent to the site? □ Yes □ No

If yes, indicate the shrub/scrub area on the attached site map and answer the following questions. If more than one shrub/scrub area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual shrub/scrub area. Distinguish between shrub/scrub areas, using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.3: Open Field

Shrub/Scrub Area Questions

□ On-site □ Off-site

Name or Designation:_____

1. Estimate the approximate size of the shrub/scrub area (_____% _____acres). Please identify what information was used to determine the shrub/scrub area of the site (e.g., direct observation, photos, etc).

2. Indicate the dominant type of shrub/scrub vegetation present, if known.
   _____
   _____
   _____
   _____

3. Estimate the vegetation density of the shrub/scrub area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

4. Indicate the approximate average height of the scrub/shrub vegetation.

   - ❑ 0-2 feet
   - ❑ 2-5 feet
   - ❑ >5 feet

5. Specify type of understory present, if known. Provide a photograph, if available.

III.A.3 Open Field

Are any open field areas on or adjacent to the site? □ Yes □ No

If yes, indicate the open field area on the attached site map and answer the following questions. If more than one open field area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual open field area. Distinguish between open field areas, using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.4: Miscellaneous

Open Field Area Questions

□ On-site □ Off-site

Name or Designation:_____

1. Estimate the approximate size of the open field area (_____% _____acres). Please identify what information was used to determine the open field area of the site.

2. Indicate the dominant type of vegetation present, if known.
   _____
   _____
   _____
   _____

3. Estimate the vegetation density of the shrub/scrub area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

4. Indicate the approximate average height of the dominant plant:

III.A.4 Miscellaneous

Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub and open field? □ Yes □ No

If yes, indicate the area on the attached site map and answer the following questions. If more than one of these areas are present on or adjacent to the site, make additional copies of the following questions and fill out for each individual area. Distinguish between areas by using names or other designations. Clearly identify each area on the site map.

If no, proceed to Section III.B: Aquatic Habitats.

Miscellaneous Area Questions

□ On-site □ Off-site

Name or Designation:_____

1. Provide a description of the terrestrial miscellaneous habitat and identify the area on the site map.

2. Estimate the approximate size of the area (_____% _____acres)

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, birds, mammals, etc.?

   _____
   _____
   _____
   _____

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

III.B Aquatic Habitats

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section III.C, Wetland Habitat Checklist.

III.B.1 Non-Flowing Systems

Are any non-flowing aquatic features (such as ponds or lakes) located at or adjacent to the site?

□ Yes □ No

If yes, indicate the aquatic feature on the attached site map and answer the following questions regarding the non-flowing aquatic features. If more than one non-flowing aquatic feature is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual aquatic feature. Distinguish between aquatic features by using names or other designations. Clearly identify each area on the site map.

If no, proceed to Section III.B.2: Flowing Systems

Non-Flowing Aquatic Feature Questions

☐ On-site ☐ Off-site

Name or Designation:_____

1. Indicate the type of aquatic feature present:

   - ❑ Natural (e.g., pond or lake)
   - ❑ Man-made (e.g., impoundment, lagoon, canal, etc.)

2. Estimate the approximate size of the water body (in acres or sq. ft.)_____

3. If known, indicate the depth of the water body (in ft. or in.)._____

4. If a water body is present, what are its known uses (e.g.: recreation, navigation, etc.)?

5. Is aquatic vegetation present? ☐ Yes ☐ No
   If yes, please identify the type of vegetation present if known.

   ☐ Emergent ☐ Submergent ☐ Floating

6. Indicate the general composition of the bottom substrate. Mark all sources that apply from the following list.

☐ Bedrock	☐ Sand	☐ Concrete
☐ Boulder (>10 in.)	☐ Silt	☐ Debris
☐ Cobble (2.5 - 10 in.)	☐ Clay	☐ Detritus
☐ Gravel (0.1 - 2.5 in.)	☐ Muck (fine/black)	

   ☐ Other (please specify):_____

7. Indicate the source(s) of the water in the aquatic feature. Mark all sources that apply from the following list.

   - ❑ River/Stream/Creek
   - ❑ Groundwater
   - ❑ Industrial Discharge
   - ❑ Surface Runoff
   - ❑ Other (please specify):_____

Non-Flowing Aquatic Feature Questions (Continued)

8. Is there a discharge from the facility to the aquatic feature? □ Yes □ No
   If yes, describe the origin of each discharge and its migration path.
   _____
   _____
   _____
   _____

9. Does the aquatic feature discharge to the surrounding environment? □ Yes □ No
   If yes, indicate the features from the following list into which the aquatic feature discharges, and indicate whether the discharge occurs onsite or offsite:

   - ❑ River/Stream/Creek □ on-site □ off-site
   - ❑ Groundwater □ on-site □ off-site
   - ❑ Wetland □ on-site □ off-site
   - ❑ Impoundment □ on-site □ off-site
   - ❑ Other (please describe)_____

10. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

    _____ Area

    _____ Depth (average)

    _____ Temperature (depth of water where the reading was taken)_____

    _____ pH

    _____ Dissolved oxygen

    _____ Salinity

    _____ Turbidity (clear, slightly turbid, turbid, opaque)
    (Secchi disk depth_____)

    _____ Other (specify)

11. Describe observed color and area of coloration.

Non-Flowing Aquatic Feature Questions (Continued)

12. Mark the open-water, non-flowing system on the site map attached to this checklist.

13. What observations, if any, were made at the water body regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc?

III.B.2 Flowing Systems

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section III.C, Wetland Habitat Checklist.

Are any flowing aquatic features (such as streams or rivers) located at or adjacent to the site?

☐ Yes ☐ No

If yes, indicate the system on the attached site map and answer the following questions regarding the flowing system. If more than one flowing system is present on or adjacent to the site, make additional copies of the following questions and complete one set for each individual aquatic feature. Distinguish between flowing systems by using names or other designation. Clearly identify each area on the site map

If no, proceed to Section III.C: Wetlands Habitats.

Flowing Aquatic Systems Questions

□ On-site □ Off-site

Name or Designation:_____

1. Indicate the type of flowing aquatic feature present.

   - ❑ River
   - ❑ Stream/Creek/Brook
   - ❑ Intermittent stream
   - ❑ Artificially created (ditch, etc.)
   - ❑ Channeling
   - ❑ Other (specify)

2. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)? □ Yes □ No
   If yes, please describe the indicators observed.

3. Indicate the general composition of the bottom substrate.

□ Bedrock	□ Sand (course)	□ Concrete
□ Boulder (>10 in.)	□ Silt (fine)	□ Debris
□ Cobble (2.5 - 10 in.)	□ Clay (slick)	□ Detritus
□ Gravel (0.1 - 2.5 in.)	□ Muck (fine/black)	□ Marl (Shells)

   □ Other (please specify):_____

4. Describe the condition of the bank (e.g., height, slope, extent of vegetative cover).
   _____
   _____
   _____
   _____

5. Is the system influenced by tides? □ Yes □ No
   What information was used to make this determination?

6. Is the flow intermittent? □ Yes □ No
   If yes, please note the information used to make this determination.

Flowing System Questions (Continued)

7. Is there a discharge from the site to the water body? □ Yes □ No
   If yes, describe the origin of each discharge and its migration path.
   _____
   _____
   _____
   _____

8. Indicate the discharge point of the water body. Specify name of the discharge, if known.
   _____
   _____

9. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

   _____ Width (ft.)

   _____ Depth (average)

   _____ Velocity (specify units):_____

   _____ Temperature (depth of water where the reading was taken)_____

   _____ pH

   _____ Dissolved oxygen

   _____ Salinity

   _____ Turbidity (clear, slightly turbid, turbid, opaque)
   (Secchi disk depth_____)

   _____ Other (specify)

10. Describe observed color and area of coloration.

11. Is any aquatic vegetation present? □ Yes □ No
    If yes, please identify the type of vegetation present, if known.

    □ Emergent □ Submergent □ Floating

Flowing System Questions (Continued)

12. Mark the flowing water system on the attached site map.

13. What observations were made at the water body regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc?

III.C Wetland Habitats

Are any wetland[2] areas such as marshes or swamps on or adjacent to the site?

☐ Yes ☐ No

If yes, indicate the wetland area on the attached site map and answer the following questions regarding the wetland area. If more than one wetland area is present on or adjacent to the site, make additional copies of the following questions and fill out one for each individual wetland area. Distinguish between wetland areas by using names or other designations (such as location). Clearly identify each area on the site map. Also, obtain and attach a National Wetlands Inventory Map (or maps) to illustrate each wetland area.

Identify the sources of the observations and information (e.g., National Wetland Inventory, Federal or State Agency, USGS topographic maps) used to make the determination whether or not wetland areas are present.

_____
_____
_____
_____
_____
_____

If no wetland areas are present, proceed to Section III.D: Sensitive Environments and Receptors.

[2]Wetlands are defined in 40 CFR §232.2 as " Areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Examples of typical wetlands plants include: cattails, cordgrass, willows and cypress trees. National wetland inventory maps may be available at http:\\nwi.fws.gov. Additional information on wetland delineation criteria is also available from the Army Corps of Engineers.

Wetland Area Questions

□ On-site □ Off-site

Name or Designation:_____

1. Indicate the approximate area of the wetland (acres or ft.^{2})_____

2. Identify the type(s) of vegetation present in the wetland.

   - ❑ Submergent (i.e., underwater) vegetation
   - ❑ Emergent (i.e., rooted in the water, but rising above it) vegetation
   - ❑ Floating vegetation
   - ❑ Scrub/shrub
   - ❑ Wooded
   - ❑ Other (Please describe):_____

3. Provide a general description of the vegetation present in and around the wetland (height, color, etc). Provide a photograph of the known or suspected wetlands, if available.

4. Estimate the vegetation density of the wetland area.

   - ❑ Dense (i.e., greater than 75% vegetation)
   - ❑ Moderate (i.e., 25% to 75% vegetation)
   - ❑ Sparse (i.e., less than 25% vegetation)

5. Is standing water present? □ Yes □ No
   If yes, is the water primarily: □ Fresh □ Brackish
   Indicate the approximate area of the standing water (ft.^{2}) _____
   Indicate the approximate depth of the standing water, if known (ft. or in.)_____

Wetland Area Questions (Continued)

6. Identify any field measurements and observations of water quality that were made. Provide the measurement and the units of measure in the appropriate space below:

_____ Area

_____ Depth (average)

_____ Temperature (depth of water where the reading was taken)_____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth_____)

_____ Other (specify)

7. Describe observed color and area of coloration.

8. If known, indicate the source of the water in the wetland.

- ❑ Stream/River/Creek/Lake/Pond
- ❑ Flooding
- ❑ Groundwater
- ❑ Surface runoff

9. Is there a discharge from the site to the wetland? ❑ Yes ❑ No

If yes, please describe:

_____
_____
_____
_____

Wetland Area Questions (Continued)

10. Is there a discharge from the wetland? ☐ Yes ☐ No
If yes, to what water body is discharge released?

- ❑ Marine (Name:_____)
- ❑ Surface stream/River (Name:_____)
- ❑ Lake/Pond (Name:_____)
- ❑ Groundwater
- ❑ Not sure

11. Does the area show evidence of flooding? ☐ Yes ☐ No
If yes, indicate which of the following are present (mark all that apply).

- ❑ Standing water
- ❑ Water-saturated soils
- ❑ Water marks
- ❑ Buttressing
- ❑ Debris lines
- ❑ Mud cracks
- ❑ Other (Please describe):_____

11. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated)_____

13. Mark the observed wetland area(s) on the attached site map.

III.D Sensitive Environments and Receptors

1. Do any other potentially sensitive environmental areas[3] exist adjacent to or within one-half mile of the site? If yes, list these areas and provide the source(s) of information used to identify sensitive areas. *Do not answer "no" without confirmation from the U.S. Fish and Wildlife Service and other appropriate agencies. See Table 1 for a list of contacts.*

2. Are any areas on or near (i.e., within one-half mile) the site owned or used by local tribes? If yes, describe.

3. Does the site serve or potentially serve as a habitat, foraging area or refuge by rare, threatened, endangered, candidate and/or proposed species (plants or animals), or any otherwise protected species? If yes, identify species. *This information should be obtained from the U.S. Fish and Wildlife Service and other appropriate agencies. See Table 1 for a list of contacts.*

4. Is the site potentially used as a breeding, roosting or feeding area by migratory bird species? If yes, identify which species.

[3] Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young and overwintering. Refer to Table 2 at the end of this document for examples of sensitive environments.

Sensitive Environments and Receptors Questions (continued)

5. Is the site used by any ecologically[4], recreationally or commercially important species? If yes, explain.

_____
_____
_____
_____

[4] Ecologically important species include populations of species which provide a critical (i.e., not replaceable) food resource for higher organisms. These species' functions would not be replaced by more tolerant species or perform a critical ecological function (such as organic matter decomposition) and will not be replaced by other species. Ecologically important species include pest and opportunistic species that populate an area if they serve as a food source for other species, but do not include domesticated animals (e.g., pets and livestock) or plants/animals whose existence is maintained by continuous human interventions (e.g., fish hatcheries, agricultural crops, etc).

IV. EXPOSURE PATHWAY EVALUATION

1. Do existing data provide sufficient information on the nature, rate and extent of contamination at the site?

   - ❑ Yes
   - ❑ No
   - ❑ Uncertain

   Please provide an explanation for your answer._____
   _____
   _____
   _____
   _____

2. Do existing data provide sufficient information on the nature, rate and extent of contamination in offsite affected areas?

   - ❑ Yes
   - ❑ No
   - ❑ Uncertain
   - ❑ No offsite contamination

   Please provide an explanation for your answer._____
   _____
   _____
   _____
   _____

3. Do existing data address potential migration pathways of contaminants at the site?

   - ❑ Yes
   - ❑ No
   - ❑ Uncertain

   Please provide an explanation for your answer._____
   _____
   _____
   _____
   _____

4. Do existing data address potential migration pathways of contaminants in offsite affected areas?

- ❑ Yes
- ❑ No
- ❑ Uncertain
- ❑ No offsite contamination

Please provide an explanation for your answer._____
_____
_____
_____
_____

5. Are there visible indications of stressed habitats or receptors on or near (i.e., within one-half mile) the site that may be the result of a chemical release? If yes, explain. Attach photographs if available.

_____
_____
_____
_____
_____
_____

6. Is the location of the contamination such that receptors might be reasonably expected to come into contact with it? For soil, this means contamination in the soil 0 to 1 foot below ground surface (bgs). If yes, explain.

_____
_____
_____
_____
_____
_____

7. Are receptors located in or using habitats where chemicals exist in air, soil, sediment or surface water? If yes, explain.

_____
_____
_____
_____

8. Could chemicals reach receptors via groundwater? Can chemicals leach or dissolve to groundwater? Are chemicals mobile in groundwater? Does groundwater discharge into receptor habitats? If yes, explain.

_____
_____
_____
_____
_____
_____

9. Could chemicals reach receptors through runoff or erosion? Answer the following questions.

What is the approximate distance from the contaminated area to the nearest watercourse?

- ❑ 0 feet (i.e., contamination has reached a watercourse)
- ❑ 1-10 feet
- ❑ 11-20 feet
- ❑ 21-50 feet
- ❑ 51-100 feet
- ❑ 101-200 feet
- ❑ > 200 feet
- ❑ > 500 feet
- ❑ > 1000 feet

What is the slope of the ground in the contaminated area?

- ❑ 0-10%
- ❑ 10-30%
- ❑ > 30%

What is the approximate amount of ground and canopy vegetative cover in the contaminated area?

- ❑ < 25%
- ❑ 25-75%
- ❑ > 75%

Is there visible evidence of erosion (e.g., a rill or gully) in or near the contaminated area?

- ❑ Yes
- ❑ No
- ❑ Do not know

Do any structures, pavement or natural drainage features direct run-on flow (i.e., surface flows originating upstream or uphill from the area of concern) into the contaminated area?

- ❑ Yes
- ❑ No
- ❑ Do not know

10. Could chemicals reach receptors through the dispersion of contaminants in air (e.g., volatilization, vapors, fugitive dust)? If yes, explain.

_____
_____
_____
_____
_____

11. Could chemicals reach receptors through migration of non-aqueous phase liquids (NAPLs)? Is a NAPL present at the site that might be migrating towards receptors or habitats? Could NAPL discharge contact receptors or their habitat?

_____
_____
_____
_____
_____
_____

TABLE 1
SENSITIVE ENVIRONMENT CONTACTS

CONTACT	TELEPHONE #	SENSITIVE ENVIRONMENT
NC Division of Parks and Recreation – National Heritage Program	(919) 733-4181 Fax: (919) 715-3085	State Parks Areas Important to Maintenance of Unique Natural Communities Sensitive Areas Identified Under The National Estuary Program Designated State Natural Areas State Seashore, Lakeshore, and River Recreational Areas Rare species (state and federal Threatened and Endangered) Sensitive Aquatic Habitat
NC Planning and Natural Resources	(919) 846-9991	State Wild & Scenic Rivers
National Park Service Public Affairs Office	(404) 562-3103	National Seashore, Lakeshore and River Recreational Areas National Parks or Monuments
Internet	www.nps.gov/rivers	Federal Designated Wild & Scenic Rivers
US Forest Service	(828) 257-4253	Designated and Proposed Federal Wilderness and Natural Areas
	(828) 257-4864	National Preserves and Forests
	(828) 257-4810	Federal Land Designated for the protection of natural ecosystems.

CONTACT	TELEPHONE #	SENSITIVE ENVIRONMENT
NC Division of Water Quality	(919) 733-6510	Critical Areas Identified Under the Clean Lakes Program
	(919) 733-5083 *Ask for Clean Water Act 305b report*	State-Designated Areas for Protection or Maintenance of Aquatic Life
NC Division of Forest Resources	(919) 733-2162 x 234	State Preserves and Forests
US Fish & Wildlife Service	(919) 856-4520 x 11	Terrestrial Areas Utilized for Breeding by Large or Dense Aggregations of Animals
NC Wildlife Resources Commission	(252) 451-2534	National or State Wildlife Refuges
NOAA	(301) 713-3145 x 173	Marine Sanctuaries
NC Department of Cultural Resources	(919) 733-4763	National and State Historical Sites
NC Division of Coastal Management	(919) 733-2293	Areas Identified Under Coastal Protection Legislation
Internet	http://dcm2.enr.state.nc.us	Coastal Barriers or Units of a Coastal Barrier Resources System
NC Wildlife Resources Commission	(919) 733-3633	Spawning Areas Critical for the Maintenance of Fish/Shellfish Species within River, Lake or Coastal Tidal Waters. Migratory Pathways and Feeding Areas Critical for Maintenance of Anadromous Fish Species within River Reaches or Areas in Lakes or Coastal Tidal Waters in Which such Fish Spend Extended Periods of Time State Lands Designated for Wildlife or Game Management
US Army Corps of Engineers	(919) 876-8441, ext. 28	Wetlands

TABLE 2
EXAMPLES OF SENSITIVE ENVIRONMENTS

National Parks and National Monuments

Designated or Administratively Proposed Federal Wilderness Areas

National Preserves

National or State Wildlife Refuges

National Lakeshore Recreational Areas

Federal land designated for protection of natural ecosystems

State land designated for wildlife or game management

State designated Natural Areas

Federal or state designated Scenic or Wild River

All areas that provide or could potentially provide critical habitat[1] for state and federally listed Threatened or Endangered Species, those species that are currently petitioned for listing, and species designated by other agencies as sensitive or species of concern.

Marine Sanctuary

Areas identified under the Coastal Zone Management Act

Sensitive areas identified under the National Estuary Program or Near Coastal Waters Program

Critical areas identified under the Clean Lakes Program

National Seashore Recreational Area

Habitat known to be used by Federal designated or proposed endangered or threatened species

1 Critical habitats are defined by the Endangered Species Act (50 CFR §424.02(d)) as:

> 1) Specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and 2) Specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary [of Interior] that such areas are essential for the conservation of the species.

Unit of Coastal Barrier Resources System

Coastal Barrier (undeveloped)

Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters

Migratory pathways and feeding areas critical for maintenance of andromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time

Terrestrial areas utilized for breeding by large or dense aggregations of animals

National river reach designated as Recreational

Habitat known to be used by state designated endangered or threatened species

Habitat known to be used by species under review as to its Federal endangered or threatened status

Coastal Barrier (partially developed)

Particular areas, relatively small in size, important to maintenance of unique biotic communities

State-designated areas for protection or maintenance of aquatic life

Wetlands

TABLE 1
CALCULATION OF DIOXIN TOXICITY EQUIVALENTS (TEQ)
SOIL

Analyte	Maximum Detected Concentration	Maximum SQL	Comparison Concentration[1]	Mammal TEF[2]	Mammal Value[3]	Fish TEF[2]	Fish Value[3]	Avian TEF[2]	Avian Value[3]
Dioxin/Furan Congener (ng/kg)									
2,3,7,8-TCDD				1		1		1	
1,2,3,7,8-PentaCDD				1		1		1	
1,2,3,4,7,8-HexaCDD				0.1		0.5		0.05	
1,2,3,6,7,8-HexaCDD				0.1		0.01		0.01	
1,2,3,7,8,9-HexaCDD				0.1		0.01		0.1	
1,2,3,4,6,7,8-HeptaCDD				0.01		0.001		0.001	
OctaCDD				0.0001		0.0001		0.0001	
2,3,7,8-TetraCDF				0.1		0.05		1	
1,2,3,7,8-PentaCDF				0.05		0.05		0.1	
2,3,4,7,8-PentaCDF				0.5		0.5		1	
1,2,3,4,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,7,8,9-HexaCDF				0.1		0.1		0.1	
2,3,4,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,4,6,7,8-HeptaCDF				0.01		0.01		0.01	
1,2,3,4,7,8,9-HeptaCDF				0.01		0.01		0.01	
OctaCDF				0.0001		0.0001		0.0001	
Toxicity Equivalents (TEQ)									

NOTES:
[1] = Enter maximum concentration. If congener was not detected, enter one half the maximum SQL.
[2] = Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife, Martin Van den Berg et al., "Environmental Health Perspectives," 106:775-792 (1998).
[3] = Mammal, Fish, and Avian Values = Comparison Concentration x Respective TEF

SQL = Sample Quantitation Limit
TEF = Toxic Equivalency Factor
TEQ = Toxic Equivalents relative to 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD)

TABLE 2
CALCULATION OF DIOXIN TOXICITY EQUIVALENTS (TEQ)
SEDIMENT

Analyte	Maximum Detected Concentration	Maximum SQL	Comparison Concentration[1]	Mammal TEF[2]	Mammal Value[3]	Fish TEF[2]	Fish Value[3]	Avian TEF[2]	Avian Value[3]
Dioxin/Furan Congener (ng/kg)									
2,3,7,8-TCDD				1		1		1	
1,2,3,7,8-PentaCDD				1		1		1	
1,2,3,4,7,8-HexaCDD				0.1		0.5		0.05	
1,2,3,6,7,8-HexaCDD				0.1		0.01		0.01	
1,2,3,7,8,9-HexaCDD				0.1		0.01		0.1	
1,2,3,4,6,7,8-HeptaCDD				0.01		0.001		0.001	
OctaCDD				0.0001		0.0001		0.0001	
2,3,7,8-TetraCDF				0.1		0.05		1	
1,2,3,7,8-PentaCDF				0.05		0.05		0.1	
2,3,4,7,8-PentaCDF				0.5		0.5		1	
1,2,3,4,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,7,8,9-HexaCDF				0.1		0.1		0.1	
2,3,4,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,4,6,7,8-HeptaCDF				0.01		0.01		0.01	
1,2,3,4,7,8,9-HeptaCDF				0.01		0.01		0.01	
OctaCDF				0.0001		0.0001		0.0001	
Toxicity Equivalents (TEQ)									

NOTES:
[1] = Enter maximum concentration. If congener was not detected, enter one half the maximum SQL.
[2] = Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife, Martin Van den Berg et al., "Environmental Health Perspectives," 106:775-792 (1998).
[3] = Mammal, Fish, and Avian Values = Comparison Concentration x Respective TEF

SQL = Sample Quantitation Limit
TEF = Toxic Equivalency Factor
TEQ = Toxic Equivalents relative to 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD)

TABLE 3
CALCULATION OF DIOXIN TOXICITY EQUIVALENTS (TEQ)
SALTWATER

Analyte	Maximum Detected Concentration	Maximum SQL	Comparison Concentration[1]	Mammal TEF[2]	Mammal Value[3]	Fish TEF[2]	Fish Value[3]	Avian TEF[2]	Avian Value[3]
Dioxin/Furan Congener (ng/kg)									
2,3,7,8-TCDD				1		1		1	
1,2,3,7,8-PentaCDD				1		1		1	
1,2,3,4,7,8-HexaCDD				0.1		0.5		0.05	
1,2,3,6,7,8-HexaCDD				0.1		0.01		0.01	
1,2,3,7,8,9-HexaCDD				0.1		0.01		0.1	
1,2,3,4,6,7,8-HeptaCDD				0.01		0.001		0.001	
OctaCDD				0.0001		0.0001		0.0001	
2,3,7,8-TetraCDF				0.1		0.05		1	
1,2,3,7,8-PentaCDF				0.05		0.05		0.1	
2,3,4,7,8-PentaCDF				0.5		0.5		1	
1,2,3,4,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,7,8,9-HexaCDF				0.1		0.1		0.1	
2,3,4,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,4,6,7,8-HeptaCDF				0.01		0.01		0.01	
1,2,3,4,7,8,9-HeptaCDF				0.01		0.01		0.01	
OctaCDF				0.0001		0.0001		0.0001	
Toxicity Equivalents (TEQ)									

NOTES:

[1] = Enter maximum concentration. If congener was not detected, enter one half the maximum SQL.

[2] = Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife, Martin Van den Berg et al., "Environmental Health Perspectives," 106:775-792 (1998).

[3] = Mammal, Fish, and Avian Values = Comparison Concentration x Respective TEF

SQL = Sample Quantitation Limit
TEF = Toxic Equivalency Factor
TEQ = Toxic Equivalents relative to 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD)

TABLE 4
CALCULATION OF DIOXIN TOXICITY EQUIVALENTS (TEQ)
FRESHWATER

Analyte	Maximum Detected Concentration	Maximum SQL	Comparison Concentration[1]	Mammal TEF[2]	Mammal Value[3]	Fish TEF[2]	Fish Value[3]	Avian TEF[2]	Avian Value[3]
Dioxin/Furan Congener (ng/kg)									
2,3,7,8-TCDD				1		1		1	
1,2,3,7,8-PentaCDD				1		1		1	
1,2,3,4,7,8-HexaCDD				0.1		0.5		0.05	
1,2,3,6,7,8-HexaCDD				0.1		0.01		0.01	
1,2,3,7,8,9-HexaCDD				0.1		0.01		0.1	
1,2,3,4,6,7,8-HeptaCDD				0.01		0.001		0.001	
OctaCDD				0.0001		0.0001		0.0001	
2,3,7,8-TetraCDF				0.1		0.05		1	
1,2,3,7,8-PentaCDF				0.05		0.05		0.1	
2,3,4,7,8-PentaCDF				0.5		0.5		1	
1,2,3,4,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,7,8,9-HexaCDF				0.1		0.1		0.1	
2,3,4,6,7,8-HexaCDF				0.1		0.1		0.1	
1,2,3,4,6,7,8-HeptaCDF				0.01		0.01		0.01	
1,2,3,4,7,8,9-HeptaCDF				0.01		0.01		0.01	
OctaCDF				0.0001		0.0001		0.0001	
Toxicity Equivalents (TEQ)									

NOTES:
[1] = Enter maximum concentration. If congener was not detected, enter one half the maximum SQL.
[2] = Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife, Martin Van den Berg et al., "Environmental Health Perspectives," 106:775-792 (1998).
[3] = Mammal, Fish, and Avian Values = Comparison Concentration x Respective TEF

SQL = Sample Quantitation Limit
TEF = Toxic Equivalency Factor
TEQ = Toxic Equivalents relative to 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD)

TABLE 5
SELECTION OF COPCs
VOCs IN SOIL

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV ESV[2]	Maximum Hazard Quotient	Soil COPC?	Contaminant Category[7]
Organics-VOCs (µg/kg)												
1,1,1-Trichloroethane[3]									100			
1,1,2,2-Tetrachloroethane[3]									100			
1,1,2-Trichloro-1,2,2-trifluoroethane[3]									100			
1,1,2-Trichloroethane[3]									100			
1,1-Dichloroethane[3]									100			
1,1-Dichloroethene[3]									100			
1,2,3-Trichlorobenzene[6]									10			
1,2,4-Trichlorobenzene[6]									10			
1,2-Dibromo-3-chloropropane[3]									100			
1,2-Dibromoethane									NA			
1,2-Dichlorobenzene[5]									10			
1,2-Dichloroethane									400			
1,2-Dichloropropane									700,000			
1,3-Dichlorobenzene[5]									10			
1,4-Dichlorobenzene[5]									10			
2-Butanone									NA			
2-Hexanone									NA			
4-Methyl-2-pentanone									NA			
Acetone									NA			
Benzene									50			
Bromochloromethane[3]									100			
Bromodichloromethane[3]									100			
Bromoform									NA			
Bromomethane									NA			
Carbon Disulfide									NA			
Carbon Tetrachloride									1,000,000			
Chlorobenzene									50			
Chloroethane[3]									100			
Chloroform									1			
Chloromethane[3]									100			
cis-1,2-Dichloroethene[3]									100			
cis-1,3-Dichloropropene[3]									100			
Cyclohexane									100			
Dibromochloromethane[3]									100			
Dichlorodifluoromethane[3]									100			
Ethylbenzene									50			
Isopropylbenzene[4]									100			
Methyl Acetate									NA			
Methyl tert-Butyl Ether									NA			
Methylcyclohexane[4]									100			
Methylene Chloride									2,000			
Styrene									100			
Tetrachloroethene									10			
Toluene									50			
trans-1,2-Dichloroethene[3]									100			
trans-1,3-Dichloropropene[3]									100			
Trichloroethene									1			
Trichlorofluoromethane[3]									100			
Vinyl Chloride									10			
Xylenes (Total)									50			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Friday, G.P. "Ecological Screening Values for Surface Water, Sediment, and Soil." Westinghouse Savannah River Company, Savannah River Technology Center, Aiken, SC. November 1998.

[3] = Aliphatic chlorinated hydrocarbon screening value used as a surrogate screening value.

[4] = Monocyclic aromatic hydrocarbon screening value used as a surrogate screening value.

[5] = Dichlorobenzene screening value used as a surrogate screening value.

[6] = Trichlorobenzene screening value used as a surrogate screening value.

[7] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern.
ESV = Ecological Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 6
SELECTION OF COPCs
SVOCs IN SOIL

Analyte	Frequency of Detection	Range of Detection				Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV ESV[2]	Maximum Hazard Quotient	Soil COPC?	Contaminant Category
		Min.	Q	Max.	Q							
Organics - SVOCs (µg/kg)												
1,1-Biphenyl									60,000			
1,2,4,5-Tetrachlorobenzene[3]									10			
2,2'-oxybis(1-chloropropane)[4]									100			
2,4,5-Trichlorophenol									4,000			
2,4,6-Trichlorophenol									10,000			
2,4-Dichlorophenol[5]									3			
2,4-Dimethylphenol[6]									500			
2,4-Dinitrophenol									20,000			
2,4-Dinitrotoluene									NA			
2,6-Dinitrotoluene									NA			
2-Chloronaphthalene[8]									1,000			
2-Methylphenol[6]									500			
2-Nitroaniline									NA			
2-Nitrophenol[11]									7,000			
3,3'-Dichlorobenzidine[9]									100			
3-Nitroaniline									NA			
4,6-Dinitro-2-methylphenol									NA			
4-Bromophenyl phenyl ether									NA			
4-Chloroaniline									NA			
4-Chlorophenyl phenyl ether[10]									10			
4-Methylphenol[6]									500			
4-Nitroaniline									NA			
4-Nitrophenol									7,000			
Acetaphenone									NA			
Atrazine									0.05			
Benzaldehyde[7]									100			
bis(2-Chloroethoxy)methane[4]									100			
bis(2-Chloroethyl)ether[4]									100			
Caprolactam									NA			
Dibenzofuran									NA			
Hexachlorobenzene									2.5			
Hexachlorobutadiene[4]									100			
Hexachlorocyclopentadiene									10,000			
Hexachloroethane[4]									100			
Isophorone									NA			
n-Nitroso-di-n-propylamine									NA			
n-Nitrosodiphenylamine									20,000			
Nitrobenzene									40,000			
Pentachlorophenol									2			
Phenol									50			
Diethylphthalate									100,000			
Dimethylphthalate									200,000			
Di-n-butylphthalate									200,000			
bis(2-Ethylhexyl)phthalate									NA			
Butyl benzyl phthalate									NA			
Di-n-octylphthalate									NA			
Total Phthalates									100			

TABLE 6
SELECTION OF COPCs
SVOCs IN SOIL
(continued)

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV ESV[2]	Maximum Hazard Quotient	Soil COPC?	Contaminant Category[12]
Organics - SVOCs (µg/kg)												
2-Chlorophenol									NA			
4-Chloro-3-methylphenol									NA			
Total Monochlorophenols									2.5			
2-Methylnaphthalene									NA			
Acenaphthene									NA			
Acenaphthylene									NA			
Anthracene									NA			
Benzo(a)anthracene									NA			
Benzo(a)pyrene									NA			
Benzo(b)fluoranthene									NA			
Benzo(g,h,i)perylene									NA			
Benzo(k)fluoranthene									NA			
Carbazole									NA			
Chrysene									NA			
Dibenz(a,h)anthracene									NA			
Fluoranthene									NA			
Fluorene									NA			
Indeno(1,2,3-cd)pyrene									NA			
Naphthalene									NA			
Phenanthrene									NA			
Pyrene									NA			
Total PAHs									1,000			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Friday, G.P. "Ecological Screening Values for Surface Water, Sediment, and Soil." Westinghouse Savannah River Company, Savannah River Technology Center, Aiken, SC. November 1998.

[3] = Tetrachlorobenzene screening value used as a surrogate screening value.

[4] = Aliphatic chlorinated hydrocarbon screening value used as a surrogate screening value.

[5] = Total dichlorophenols screening value used as a surrogate screening value.

[6] = Cresols screening value used as a surrogate screening value.

[7] = Monocyclic aromatic hydrocarbon screening value used as a surrogate screening value.

[8] = Chloronaphthalene screening value used as a surrogate screening value.

[9] = Total polycyclic chlorinated hydrocarbons screening value used as a surrogate screening value.

[10] = Chlorophenols screening value used as a surrogate screening value.

[11] = 4-nitrophenol screening value used as a surrogate screening value.

[12] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
ESV = Ecological Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 7
SELECTION OF COPCs
PESTICIDES IN SOIL

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV ESV[2]	Maximum Hazard Quotient	Soil COPC?	Contaminant Category[4]
Pesticides (µg/kg)												
p,p'-DDD									NA			
DDD									NA			
p,p'-DDE									NA			
DDE									NA			
p,p'-DDT									NA			
DDT									NA			
DDT/DDE/DDD (Total)									2.5			
Aldrin									2.5			
Alpha Chlordane[3]									100			
Gamma Chlordane[3]									100			
alpha-BHC									2.5			
beta-BHC									1			
delta-BHC[3]									100			
gamma-BHC (Lindane)									0.05			
alpha-Endosulfan[3]									100			
beta-Endosulfan[3]									100			
Endosulfan sulfate[3]									100			
Dieldrin									0.5			
Endrin aldehyde[3]									100			
Endrin ketone[3]									100			
Endrin									1			
Heptachlor[3]									100			
Heptachlor epoxide[3]									100			
Methoxychlor[3]									100			
Toxaphene[3]									100			
Dioxin TEQs (ng/kg)									NA			
Total PCBs									20			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Friday, G.P. "Ecological Screening Values for Surface Water, Sediment, and Soil." Westinghouse Savannah River Company, Savannah River Technology Center, Aiken, SC. November 1998.

[3] = Organochlorinated pesticides screening value used as a surrogate screening value.

[4] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
ESV = Ecological Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.

TABLE 8
SELECTION OF COPCs
INORGANICS IN SOIL

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV ESV[2]	Maximum Hazard Quotient	Soil COPC?	Contaminant Category[3]
Inorganics (mg/kg)												
Aluminum									50			
Antimony									3.5			
Arsenic									10			
Barium									165			
Beryllium									1.1			
Cadmium									1.6			
Calcium									NA			
Chromium									0.4			
Cobalt									20			
Copper									40			
Iron									200			
Lead									50			
Magnesium									NA			
Manganese									100			
Mercury									0.1			
Nickel									30			
Potassium									NA			
Selenium									0.81			
Silver									2			
Sodium									NA			
Thallium									1			
Vanadium									2			
Zinc									50			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Friday, G.P. "Ecological Screening Values for Surface Water, Sediment, and Soil." Westinghouse Savannah River Company, Savannah River Technology Center, Aiken, SC. November 1998.

[3] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
ESV = Ecological Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1 Contaminant is found in concentrations exceeding its screening value.
2 Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3 Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4 Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 10
SELECTION OF COPCs
SVOCs IN SEDIMENT

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[2]	EPA Region IV Effects Value[3]	CLP PQL	EPA Screening Value	Site Screening Value[4]	Maximum Hazard Quotient	Sediment COPC?	Contaminant Category
Organics - SVOCs (µg/kg)															
1,1-Biphenyl									NA	330	NA				
1,2,4,5-Tetrachlorobenzene									NA	NA	NA				
2,2'-oxybis(1-chloropropane)									NA	330	NA				
2,4,5-Trichlorophenol									NA	830	NA				
2,4,6-Trichlorophenol									NA	330	NA				
2,4-Dichlorophenol									NA	330	NA				
2,4-Dimethylphenol									NA	330	NA				
2,4-Dinitrophenol									NA	830	NA				
2,4-Dinitrotoluene									NA	330	NA				
2,6-Dinitrotoluene									NA	330	NA				
2-Chloronaphthalene									NA	330	NA				
2-Chlorophenol									NA	330	NA				
2-Methylphenol									NA	330	NA				
2-Nitroaniline									NA	830	NA				
2-Nitrophenol									NA	330	NA				
3,3'-Dichlorobenzidine									NA	330	NA				
3-Nitroaniline									NA	830	NA				
4,6-Dinitro-2-methylphenol									NA	830	NA				
4-Bromophenyl phenyl ether									NA	330	NA				
4-Chloro-3-methylphenol									NA	330	NA				
4-Chloroaniline									NA	330	NA				
4-Chlorophenyl phenyl ether									NA	330	NA				
4-Methylphenol									NA	330	NA				
4-Nitroaniline									NA	830	NA				
4-Nitrophenol									NA	830	NA				
Acetaphenone									NA	330	NA				
Atrazine									NA	330	NA				
Benzaldehyde									NA	330	NA				
bis(2-Chloroethoxy)methane									NA	330	NA				
bis(2-Chloroethyl)ether									NA	330	NA				
Caprolactam									NA	330	NA				
Dibenzofuran									NA	330	NA				
Hexachlorobenzene									NA	330	NA				
Hexachlorobutadiene									NA	330	NA				
Hexachlorocyclopentadiene									NA	330	NA				
Hexachloroethane									NA	330	NA				
Isophorone									NA	330	NA				
n-Nitroso-di-n-propylamine									NA	330	NA				
n-Nitrosodiphenylamine									NA	330	NA				
Nitrobenzene									NA	330	NA				
Pentachlorophenol									NA	830	NA				
Phenol									NA	330	NA				
Butyl benzyl phthalate									NA	330	NA				
Di-n-butylphthalate									NA	330	NA				
Di-n-octylphthalate									NA	330	NA				
Diethylphthalate									NA	330	NA				
Dimethylphthalate									NA	330	NA				
bis(2-Ethylhexyl)phthalate									182	3.6	182				
Total Phthalates[1]									182	330	182				

TABLE 10
SELECTION OF COPCs
SVOCs IN SEDIMENT
(continued)

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[2]	EPA Region IV Effects Value[3]	CLP PQL	EPA Screening Value	Site Screening Value[4]	Maximum Hazard Quotient	Sediment COPC?	Contaminant Category[5]
Organics - SVOCs (µg/kg)															
2-Methylnaphthalene									20.2	330	330				
Acenaphthene									6.71	330	330				
Acenaphthylene									5.87	330	330				
Anthracene									46.9	330	330				
Benzo(a)anthracene									74.8	330	330				
Benzo(a)pyrene									88.8	330	330				
Benzo(b)fluoranthene									NA	330	NA				
Benzo(g,h,i)perylene									NA	330	NA				
Benzo(k)fluoranthene									NA	330	NA				
Carbazole									NA	330	NA				
Chrysene									108	330	330				
Dibenz(a,h)anthracene									6.22	330	330				
Fluoranthene									113	330	330				
Fluorene									21.2	330	330				
Indeno(1,2,3-cd)pyrene									NA	330	NA				
Naphthalene									34.6	330	330				
Phenanthrene									86.7	330	330				
Pyrene									153	330	330				
Total PAHs									1,684	330	1,684				

NOTES:

[1] = Since no effects value is available, the value for bis(2-Ethylhexyl)phthalate is used as a surrogate value for total phthalates.

[2] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[3] = Values obtained from MacDonald, D.D. "Approach to the Assessment of Sediment Quality in Florida Coastal Waters." Florida Department of Environmental Protection. 1994.

[4] = When the PQL > Effects Value, Site Screening Value defaults to PQL. For contaminants whose screening value is based on the PQL, data reported below the required quantification limit (e.g., J-flagged data) should be compared to the EPA Region IV Effects Value.

[5] = Blank space means analyte eliminated as a COPC.

CLP PQL = Contract Laboratory Program Practical Quantitation Limit
COPC = Contaminant Of Potential Concern
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 11
SELECTION OF COPCs
PESTICIDES IN SEDIMENT

Analyte	Frequency of Detection	Range of Detection				Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV Effects Value	CLP PQL	EPA Screening Value	Site Screening Value[2]	Maximum Hazard Quotient	Sediment COPC?	Contaminant Category[9]
		Min.	Q	Max.	Q										
Pesticides (µg/kg)															
p,p'-DDD[3]									1.22	3.3	3.3				
DDD[4]									2	3.3	3.3				
p,p'-DDE[3]									2.07	3.3	3.3				
DDE[4]									2	3.3	3.3				
p,p'-DDT[3]									1.19	3.3	3.3				
DDT[4]									1	3.3	3.3				
DDT/DDE/DDD (Total)[5]									1.58	3.3	3.3				
Aldrin									NA	1.7	NA				
Alpha Chlordane									NA	1.7	NA				
Gamma Chlordane[4]									0.5	1.7	1.7				
Total Chlordanes[6]									1.7	1.7	1.7				
alpha-BHC									NA	1.7	NA				
beta-BHC									NA	1.7	NA				
delta-BHC									NA	1.7	NA				
gamma-BHC (Lindane)[3]									0.32	3.3	3.3				
Total BHCs[7]									0.32	3.3	3.3				
alpha-Endosulfan									NA	1.7	NA				
beta-Endosulfan									NA	3.3	NA				
Endosulfan sulfate									NA	3.3	NA				
Dieldrin[4]									0.02	3.3	3.3				
Endrin aldehyde									NA	3.3	NA				
Endrin ketone									NA	3.3	NA				
Endrin[4]									0.02	3.3	3.3				
Total Endrins[8]									0.02	3.3	3.3				
Heptachlor									NA	1.7	NA				
Heptachlor epoxide									NA	1.7	NA				
Methoxychlor									NA	17	NA				
Toxaphene									NA	170	NA				
Dioxin TEQs (ng/kg)									2.5	5	2.5				
Total PCBs									21.6	33	33				

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = When the PQL > Effects Value, Site Screening Value defaults to PQL. For contaminants whose screening value is based on the PQL, data reported below the required quantification limit (e.g., J-flagged data) should be compared to the EPA Region IV Effects Value.

[3] = Values obtained from MacDonald, D.D. "Approach to the Assessment of Sediment Quality in Florida Coastal Waters." Florida Department of Environmental Protection. 1994.

[4] = Value obtained from Long, Edward R., and Lee G. Morgan. "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program." 1991. NOAA Technical Memorandum NOS OMA 52

[5] = Values obtained from Long, Edward R., Donald D. MacDonald, Sherri L. Smith, and Fred D. Calder. "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments." Environmental Management, 19 (1):81-97.

[6] = US EPA Region 4 recommends that, since no effects value is avaliable, the CLP PQL is used as a surrogate value for total chlordane.

[7] = US EPA Region 4 recommends that, since no effects value is avaliable, the value for gamma BHC is used as a surrogate value for total BHCs.

[8] = US EPA Region 4 recommends that, since no effects value is avaliable, the value for endrin is used as a surrogate value for total endrins.

[9] = Blank space means analyte eliminated as a COPC.

CLP PQL = Contract Laboratory Program Practical Quantitation Limit
COPC = Contaminant Of Potential Concern.
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 12
SELECTION OF COPCs
INORGANICS IN SEDIMENT

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV Effects Value	CLP PQL	EPA Screening Value	Site Screening Value[2]	Maximum Hazard Quotient	Sediment COPC?	Contaminant Category[6]
Inorganics (mg/kg)															
Aluminum									NA	40	NA				
Antimony[3]									2	12	12				
Arsenic[4]									7.24	2	7.24				
Barium									NA	40	NA				
Beryllium									NA	1	NA				
Cadmium[4]									0.676	1	1				
Calcium									NA	1,000	NA				
Chromium[4]									52.3	2	52.3				
Cobalt									NA	10	NA				
Copper[4]									18.7	5	18.7				
Iron									NA	20	NA				
Lead[4]									30.2	0.6	30.2				
Magnesium									NA	1,000	NA				
Manganese									NA	3	NA				
Mercury[4]									0.13	0.02	0.13				
Nickel[5]									15.9	8	15.9				
Potassium									NA	1,000	NA				
Selenium									NA	1	NA				
Silver[4]									0.733	2	2				
Sodium									NA	1,000	NA				
Thallium									NA	2	NA				
Vanadium									NA	10	NA				
Zinc[4]									124	4	124				

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = When the PQL > Effects Value, Site Screening Value defaults to PQL. For contaminants whose screening value is based on the PQL, data reported below the required quantification limit (e.g., J-flagged data) should be compared to the EPA Region IV Effects Value.

[3] = Value obtained from Long, Edward R., and Lee G. Morgan. "The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program." 1991. NOAA Technical Memorandum NOS OMA 52

[4] = Values obtained from MacDonald, D.D. "Approach to the Assessment of Sediment Quality in Florida Coastal Waters." Florida Department of Environmental Protection. 1994.

[5] = Values obtained from Long, Edward R., Donald D. MacDonald, Sherri L. Smith, and Fred D. Calder. "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments." Environmental Management, 19 (1):81-97.

[6] = Blank space means analyte eliminated as a COPC.

CLP PQL = Contract Laboratory Program Practical Quantitation Limit
COPC = Contaminant Of Potential Concern
Maximum Hazard Quotient = Concentration Used For Screening/ESV
NA = Not Available
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1 Contaminant is found in concentrations exceeding its screening value.
2 Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3 Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4 Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.

TABLE 13
SELECTION OF COPCs
VOCs IN SALTWATER

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Saltwater COPC?	Contaminant Category[4]
Organics - VOCs (µg/L)														
1,1,1-Trichloroethane									312		NA	NA		
1,1,2,2-Tetrachloroethane									90.2		NA	NA		
1,1,2-Trichloro-1,2,2-trifluoroethane									NA		NA	NA		
1,1,2-Trichloroethane									NA		NA	NA		
1,1-Dichloroethane									NA		NA	NA		
1,1-Dichloroethene									2,240		NA	NA		
1,2,3-Trichlorobenzene									NA		NA	NA		
1,2,4-Trichlorobenzene									4.5		NA	NA		
1,2-Dibromo-3-chloropropane									NA		NA	NA		
1,2-Dibromoethane									NA		NA	NA		
1,2-Dichlorobenzene									19.7		NA	NA		
1,2-Dichloroethane									1,130		NA	NA		
1,2-Dichloropropane									2,400		NA	NA		
1,3-Dichlorobenzene									28.5		NA	NA		
1,4-Dichlorobenzene									19.9		NA	NA		
2-Butanone									NA		NA	NA		
2-Hexanone									NA		NA	NA		
4-Methyl-2-pentanone									NA		NA	NA		
Acetone									NA		NA	NA		
Benzene									109		NA	NA		
Bromochloromethane									NA		NA	NA		
Bromodichloromethane									NA		NA	NA		
Bromoform									640		NA	NA		
Bromomethane									120		NA	NA		
Carbon Disulfide									NA		NA	NA		
Carbon Tetrachloride									1,500		NA	NA		
Chlorobenzene									105		NA	NA		
Chloroethane									NA		NA	NA		
Chloroform									815		NA	NA		
Chloromethane									2,700		NA	NA		
cis-1,2-Dichloroethene									NA		NA	NA		
cis-1,3-Dichloropropene									7.9		NA	NA		
Cyclohexane									NA		NA	NA		
Dibromochloromethane									NA		NA	NA		
Dichlorodifluoromethane									NA		NA	NA		
Ethylbenzene									4.3		NA	NA		
Isopropylbenzene									NA		NA	NA		
Methyl Acetate									NA		NA	NA		
Methyl tert-Butyl Ether									NA		NA	NA		
Methylcyclohexane									NA		NA	NA		
Methylene Chloride									2,560		NA	NA		
Styrene									NA		NA	NA		
Tetrachloroethene									45		NA	NA		
Toluene									37		NA	NA		
trans-1,2-Dichloroethene									NA		NA	NA		
trans-1,3-Dichloropropene									7.9		NA	NA		
Trichloroethene									NA		NA	NA		
Trichlorofluoromethane									NA		NA	NA		
Vinyl Chloride									NA		NA	NA		
Xylenes (Total)									NA		NA	NA		

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003.
Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/CSV
NA = Not Available
NC DENR = North Carolina Department of Environment and Natural Resources
NCSWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 14
SELECTION OF COPCs
SVOCs IN SALTWATER

Analyte	Frequency of Detection	Range of Detection				Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Saltwater COPC?	Contaminant Category
		Min.	Q	Max.	Q									
Organics - SVOCs (µg/L)														
1,1-Biphenyl									NA		NA			
1,2,4,5-Tetrachlorobenzene									129		NA			
2,2'-oxybis(1-chloropropane)									NA		NA			
2,4,5-Trichlorophenol									NA		NA			
2,4,6-Trichlorophenol									NA		NA			
2,4-Dichlorophenol									NA		NA			
2,4-Dimethylphenol									NA		NA			
2,4-Dinitrophenol									48.5		NA			
2,4-Dinitrotoluene									NA		NA			
2,6-Dinitrotoluene									NA		NA			
2-Chloronaphthalene									NA		NA			
2-Chlorophenol									NA		NA			
2-Methylphenol									NA		NA			
2-Nitroaniline									NA		NA			
2-Nitrophenol									NA		NA			
3,3'-Dichlorobenzidine									NA		NA			
3-Nitroaniline									NA		NA			
4,6-Dinitro-2-methylphenol									NA		NA			
4-Bromophenyl phenyl ether									NA		NA			
4-Chloro-3-methylphenol									NA		NA			
4-Chloroaniline									NA		NA			
4-Chlorophenyl phenyl ether									NA		NA			
4-Methylphenol									NA		NA			
4-Nitroaniline									NA		NA			
4-Nitrophenol									71.7		NA			
Acetaphenone									NA		NA			
Atrazine									NA		NA			
Benzaldehyde									NA		NA			
bis(2-Chloroethoxy)methane									NA		NA			
bis(2-Chloroethyl)ether									NA		NA			
Caprolactam									NA		NA			
Dibenzofuran									NA		NA			
Hexachlorobenzene									NA		NA			
Hexachlorobutadiene									0.32		NA			
Hexachlorocyclopentadiene									0.07		NA			
Hexachloroethane									9.4		NA			
Isophorone									129		NA			
n-Nitroso-di-n-propylamine									NA		NA			
n-Nitrosodiphenylamine									33,000		NA			
Nitrobenzene									66.8		NA			
Pentachlorophenol									7.9		NA			
Phenol									58		NA			
Butyl benzyl phthalate									29.4		NA			
Di-n-butylphthalate									3.4		NA			
Di-n-octylphthalate									NA		NA			
Diethylphthalate									75.9		NA			
Dimethylphthalate									580		NA			
bis(2-Ethylhexyl)phthalate									NA		NA			
Total Phthalates[5]									3.4		NA			

TABLE 14
SELECTION OF COPCs
SVOCs IN SALTWATER
(continued)

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Saltwater COPC?	Contaminant Category[7]
Organics - SVOCs (µg/L)														
2-Methylnaphthalene									NA		NA			
Acenaphthene									9.7		NA			
Acenaphthylene									NA		NA			
Anthracene									NA		NA			
Benzo(a)anthracene									NA		NA			
Benzo(a)pyrene									NA		NA			
Benzo(b)fluoranthene									NA		NA			
Benzo(g,h,i)perylene									NA		NA			
Benzo(k)fluoranthene									NA		NA			
Carbazole									NA		NA			
Chrysene									NA		NA			
Dibenz(a,h)anthracene									NA		NA			
Fluoranthene									1.6		NA			
Fluorene									NA		NA			
Indeno(1,2,3-cd)pyrene									NA		NA			
Naphthalene									23.5		NA			
Phenanthrene									NA		NA			
Pyrene									NA		NA			
Total PAHs[6]									1.6		NA			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003.
Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = pH Dependent. See text, Section 3.5.

[5] = Since no CSV was available for di-n-octyphthalate and bis(2-ethylhexyl)phthalate, the value for di-n-butylphthalate was used as a surrogate for total phthalates.

[6] = Since no CSV exists for many PAHs, the value for fluoranthene was used as a surrogate for total PAHs.

[7] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/CSV
NA = Not Available
NCSWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 15
SELECTION OF COPCs
PESTICIDES IN SALTWATER

Analyte	Frequency of Detection	Range of Detection				Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Saltwater COPC?	Contaminant Category[7]
		Min.	Q	Max.	Q									
Pesticides (µg/L)														
p,p'-DDD									0.025		NA			
DDD									NA		NA			
p,p'-DDE									0.14		NA			
DDE									NA		NA			
p,p'-DDT									0.001		NA			
DDT									NA		NA			
DDT/DDE/DDD (Total)									NA		0.001			
Aldrin									0.13		0.003			
Alpha Chlordane									NA		NA			
Gamma Chlordane									NA		NA			
Total Chlordanes									0.004		0.004			
alpha-BHC									1.400		NA			
beta-BHC									NA		NA			
delta-BHC									NA		NA			
gamma-BHC (Lindane)									0.016		0.004			
Total BHCs[4]									0.016		NA			
alpha-Endosulfan									0.0087		NA			
beta-Endosulfan									0.0087		NA			
Endosulfan sulfate									NA		NA			
Total Endosulfans[5]									0.0087		0.009			
Dieldrin									0.0019		0.0002			
Endrin aldehyde									NA		NA			
Endrin ketone									NA		NA			
Endrin									0.0023		NA			
Total Endrins[6]									0.0023		0.002			
Heptachlor									0.0036		NA			
Heptachlor epoxide									0.0036		NA			
Total Heptachlors									NA		0.004			
Methoxychlor									0.03		0.03			
Toxaphene									0.0002		0.0002			
2,3,7,8-TCDD-Dioxin									0.00001		NA			
Total PCBs									0.21		0.001			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003. Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = Since no CSV exists for beta and delta BHC, the value for gamma BHC is used as a surrogate value for total chlordanes.

[5] = Since no CSV exists for endosulfan sulfate, the value for alpha and beta endosulfan is used as a surrogate value for total endosulfans.

[6] = Since no CSV exists for endrin aldehyde and endrin ketone, the value for endrin is used as a surrogate value for total endrins.

[7] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/CSV
NA = Not Available
NCWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 16
SELECTION OF COPCs
INORGANICS IN SALTWATER

Analyte	Frequency of Detection	Range of Detection				Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Qualtiy Standard[3]	Exceed NCWQS?	Saltwater COPC?	Contaminant Category[4]
		Min.	Q	Max.	Q									
Inorganics (ug/L)														
Aluminum (pH 6.5 - 9)									NA		NA			
Antimony									NA		NA			
Arsenic III									36		50			
Barium									NA		NA			
Beryllium									NA		NA			
Cadmium									9.3		5			
Calcium									NA		NA			
Chromium (III)									103		NA			
Chromium (VI)									50		NA			
Total Chromium									NA		20			
Cobalt									NA		NA			
Copper									2.9		3			
Iron									NA		NA			
Lead									8.5		25			
Magnesium									NA		NA			
Manganese									NA		NA			
Mercury									0.025		0.025			
Nickel									8.3		8.3			
Potassium									NA		NA			
Selenium									71		71			
Silver									0.23		0.1			
Sodium									NA		NA			
Thallium									21.3		NA			
Vanadium									NA		NA			
Zinc									86		86			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003. Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf

PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening/CSV
NA = Not Available
NCWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 18
SELECTION OF COPCs
SVOCs IN FRESHWATER
(continued)

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Freshwater COPC?	Contaminant Category[7]
Organics - SVOCs (µg/L)														
2-Methylnaphthalene									NA		NA			
Acenaphthene									17		NA			
Acenaphthylene									NA		NA			
Anthracene									NA		NA			
Benzo(a)anthracene									NA		NA			
Benzo(a)pyrene									NA		NA			
Benzo(b)fluoranthene									NA		NA			
Benzo(g,h,i)perylene									NA		NA			
Benzo(k)fluoranthene									NA		NA			
Carbazole									NA		NA			
Chrysene									NA		NA			
Dibenz(a,h)anthracene									NA		NA			
Fluoranthene									39.8		NA			
Fluorene									NA		NA			
Indeno(1,2,3-cd)pyrene									NA		NA			
Naphthalene									62		NA			
Phenanthrene									NA		NA			
Pyrene									NA		NA			
Total PAHs[6]									17		NA			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003.
Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = pH Dependent. See text, Section 3.1.3.

[5] = Since no CSV was available for di-n-octyphthalate, the CSV for bis(2-ethylhexyl)phthalate was used as a surrogate.

[6] = Since no CSV exists for many PAHs, the value for acenaphthene was used as a surrogate for total PAHs.

[7] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening / CSV
NA = Not Available
NC DENR = North Carolina Department of Environment and Natural Resources
NCSWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 19
SELECTION OF COPCs
PESTICIDES IN FRESHWATER

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Freshwater COPC?	Contaminant Category[7]
Pesticides (µg/L)														
p,p'-DDD									0.0064		NA			
DDD									NA		NA			
p,p'-DDE									10.5		NA			
DDE									NA		NA			
p,p'-DDT									0.001		NA			
DDT									NA		NA			
DDT/DDE/DDD (Total)									NA		0.001			
Aldrin									0.3		0.002			
Alpha Chlordane									NA		NA			
Gamma Chlordane									NA		NA			
Total Chlordanes									0.0043		0.004			
alpha-BHC									500		NA			
beta-BHC									5,000		NA			
delta-BHC[4]									0.08		NA			
gamma-BHC (Lindane)									0.08		0.01			
Total BHCs									NA		NA			
alpha-Endosulfan									0.056		NA			
beta-Endosulfan									0.056		NA			
Endosulfan sulfate									NA		NA			
Total Endosulfan[5]									0.056		0.05			
Dieldrin									0.0019		0.002			
Endrin aldehyde									NA		NA			
Endrin ketone									NA		NA			
Endrin									0.0023		NA			
Total Endrins[6]									0.0023		0.002			
Heptachlor									0.0038		NA			
Heptachlor epoxide									0.0038		NA			
Total Heptachlor									NA		0.004			
Methoxychlor									0.03		0.03			
Toxaphene									0.0002		0.0002			
Dioxin TEQs									0.00001		NA			
Total PCBs									0.1		0.001			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003.
Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = Since no CSV exists for delta-BHC, the value for gamma-BHC is used as a surrogate value.

[5] = Since no CSV exists for endosulfan sulfate, the value for alpha and beta endosulfan is used as a surrogate value for total endosulfans.

[6] = Since no CSV exists for endrin aldehyde and endrin ketone, the value for endrin is used as a surrogate value for total endrins.

[7] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening / CSV
NA = Not Available
NC DENR = North Carolina Department of Environment and Natural Resources
NCSWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1	Contaminant is found in concentrations exceeding its screening value.
2	Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3	Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4	Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5	Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.

TABLE 20
SELECTION OF COPCs
INORGANICS IN FRESHWATER

Analyte	Frequency of Detection	Range of Detection Min.	Q	Max.	Q	Location of Maximum Concentration	Range of Detection Limits	Concentration Used For Screening[1]	EPA Region IV CSV[2]	Maximum Hazard Quotient	NC Water Quality Standard[3]	Exceed NCWQS?	Freshwater COPC?	Contaminant Category[5]
Inorganics (ug/L)														
Aluminum (pH 6.5 - 9)									87		NA			
Antimony									160		NA			
Arsenic III									190		50			
Barium									NA		NA			
Beryllium									0.53		6.5			
Cadmium[4]									0.66		0.4			
Calcium									NA		NA			
Chromium (III)[4]									117.32		NA			
Chromium (VI)									11		NA			
Total Chromium									NA		50			
Cobalt									NA		NA			
Copper[4]									6.54		7			
Iron									1,000		1,000			
Lead[4]									1.32		25			
Magnesium									NA		NA			
Manganese									NA		NA			
Mercury									0.012		0.012			
Nickel[4]									87.71		88			
Potassium									NA		NA			
Selenium									5		5			
Silver[4]									0.012		0.06			
Sodium									NA		NA			
Thallium									4		NA			
Vanadium									NA		NA			
Zinc[4]									58.91		50			

NOTES:

[1] = Enter maximum concentration. If contaminant was not detected, enter the maximum SQL.

[2] = Based on US EPA's Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

[3] = NC DENR, "North Carolina Surface Water Quality Standard for Aquatic Life." NC Administrative Code 15A NCAC 02B .0100 & .0200. April 2003. Available on the Internet at http://h2o.enr.state.nc.us/admin/rules/rb040103.pdf
PLEASE NOTE: COPCs can only be retained, not eliminated, based on comparison to this value. COPCs can only be eliminated if the maximum concentration or detection limit is less than the EPA Screening Value. Contaminants may belong to more than one contaminant category if one of those categories is 5.

[4] = Hardness dependent. See text, Section 3.1.2.

[5] = Blank space means analyte eliminated as a COPC.

COPC = Contaminant Of Potential Concern
CSV = Chronic Screening Value
Maximum Hazard Quotient = Concentration Used For Screening / CSV
NA = Not Available
NC DENR = North Carolina Department of Environment and Natural Resources
NCSWQS = North Carolina Surface Water Quality Standard
Q = Data Qualifier
SQL = Sample Quantitation Limit

Contaminant Categories

1 Contaminant is found in concentrations exceeding its screening value.
2 Contaminant was not found in concentrations exceeding the SQL; however, the SQLs exceed its screening value.
3 Contaminant was found in concentrations exceeding its SQL; however, there is no current screening value for the contaminant.
4 Contaminant was not found in concentrations exceeding the SQL and there is no current screening value for the contaminant.
5 Contaminant's SQL or maximum concentration exceeds the NC Surface Water Quality Standard.