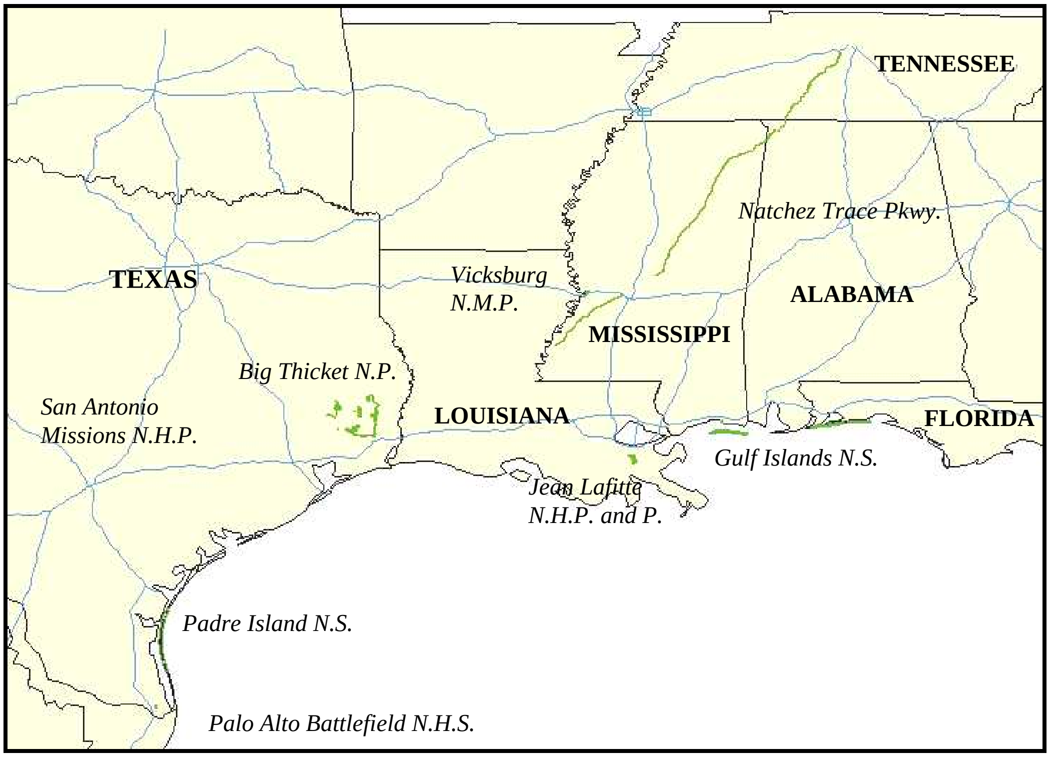
Compilation and Synthesis of Existing Persistent Organic Pollutants (POPs) and Heavy Metals Data for Gulf Coast Network National Parks



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IV. LIST OF ACRONYMS FOR RELEVANT AGENCIES, TERMS AND POLLUTANTS

BITH	Big Thicket National Preserve
EPA	United States Environmental Protection Agency
FWS	United States Fish and Wildlife Service
GUIS	Gulf Islands National Seashore
GULN	Gulf Coast Network
JELA	Jean Lafitte National Historical Park and Preserve
NATR	Natchez Trace Parkway
NOAA	United States National Oceanic and Atmospheric Administration
NPS	National Park Service
PAAL	Palo Alto Battlefield National Historic Site
PAIS	Padre Island National Seashore
POPs	Persistent Organic Pollutants
SAAN	San Antonio Missions National Historical Park
USGS	United States Geological Survey
VICK	Vicksburg National Military Park
CESU	Cooperative Ecosystem Studies Unit
EF	Atmospheric Enrichment Factor
UNEP	United Nations Environmental Programme
ppt	Parts Per Trillion
ppb	Parts Per Billion

V. ABSTRACT

As part of the National Park Service (NPS)'s Inventory and Monitoring Program, this study collected currently available data on persistent organic pollutants (POPs) and heavy metals in the eight park units which comprise the Gulf Coast Network (GULN). The results of this study include a bibliography of refereed journal articles and a searchable database containing all of the POPs and metals data that could be found. The Access database is located on a CD-ROM that accompanies this report. A synthesis and interpretation of park-specific data to identify current or potential effects that warrant long term monitoring is also provided.

VI. INTRODUCTION

The NPS recently initiated an Inventory and Monitoring program to monitor and evaluate the status of the natural resources in their parks, including water quality, air quality, and contaminants. Under the program, 270 park units have been organized into 32 networks that share funding and a core professional staff to conduct long-term ecological monitoring. The first step of the program is to determine what information is currently available concerning the status of natural resources and contaminants in the park system prior to organizing a long-term monitoring program. This study was funded through a Cooperative Agreement with the NPS and focuses on the collection and synthesis of currently available but dispersed data on POPs and heavy metals in the eight national park units that comprise the GULN. A synthesis and interpretation of park-specific data to identify current or potential effects that warrant long term monitoring is also provided. This study is limited to POPs and heavy metals data found in tissue, soil and water samples. It does not address the ambient air quality of the GULN park units.

Over 276 million people visit NPS park units annually for recreational purposes (Public Use Statistics Office, 2005). Visitors expect the NPS to preserve natural spaces, and degraded ecosystems are inconsistent with the purposes of the NPS. Knowing the condition of natural resources in national parks is fundamental to the NPS's ability to manage park resources. National Park managers across the country are confronted with increasingly complex and challenging issues that require a broad-based understanding of the status and trends of park resources as a basis for making decisions, working with other agencies, and communicating with the public to protect park natural systems and native species.

The first portion of this study focused on conducting a comprehensive search of the refereed journals for articles containing POPs and/or heavy metals data collected from sites in or near the GULN park units. The articles collected during the search were compiled into a bibliographic list for the future reference of NPS personnel (see Appendix A). This list is found as a Microsoft Excel spreadsheet on the CD-ROM located in the back cover of this report.

Following the completion of the literature review, data from various online databases managed by governmental agencies were compiled and entered into an Access database to organize them and to provide a method for efficiently searching them. The Access database created is a large portion of the product of this report. It is also available on the CD-ROM that accompanies this report.

VII. BACKGROUND ON POPS AND HEAVY METALS, DATA COMPILATION, AND THE NATIONAL PARK SERVICE (GULN Park Units)

A. POPs and Heavy Metals

1. Pollutants in the Atmosphere

Contaminants can be introduced into the atmosphere through a number of anthropogenic sources, including industrial and agricultural activities. Once these contaminants are in the atmosphere, they can be carried long distances and then deposited into either aquatic or terrestrial ecosystems.

After deposition, pollutants can concentrate in an area and eventually be re-emitted into the atmosphere (Figure 1). This report focuses on a subset of pollutants including POPs and heavy metals, rather than "traditional" pollutants like particulate matter, ozone, and sulfur dioxide. Benzene and polycyclic aromatic hydrocarbons (PAHs) are toxic organic compounds that act as direct air pollutants, while dioxin, lead, and mercury are examples of deposited toxins (Spiro and Stigliani, 1996).

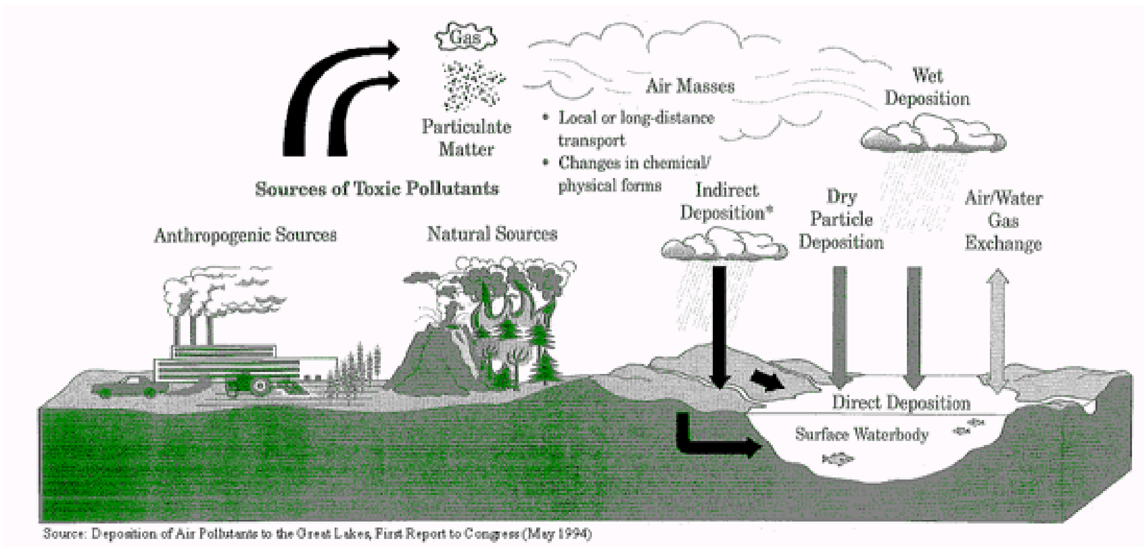

Figure 1: Diagram of atmospheric processes associated with pollutant transport in the atmosphere (USEPA, 1994).

NPS units can experience contamination from outside air and water inputs, but the NPS has no regulatory authority to control pollution sources outside of park boundaries. The NPS must rely on state agencies or the Environmental Protection Agency to monitor and control these pollution sources (T. Maniero, personal communication, March 18, 2004).

2. POPs of Concern

POPs are artificially introduced into the environment through a variety of anthropogenic sources. Some potential sources of POPs are petroleum refineries, aerial pesticide applications, pulp and paper mills, cement kilns, crematoria, motor vehicles, municipal and medical waste incinerators, sewage sludge incineration, tire combustion, and hazardous waste incinerators (National Center for Environmental Assessment [NCEA], 2003). POPs are important to natural resource managers due to their persistence in environmental systems. They also have a tendency to biomagnify in ecosystems, making them a danger to humans as well as other animals. Biomagnification occurs when small amounts of contaminants in the environment are ingested by primary consumers in the food chain, and are consequently passed up the food chain so that increasingly higher amounts are found at higher levels of the food chain.

The proliferation of POPs began during the post-WWII industrial production phase, and they are now found in almost every part of the environment including soil, water, air, and animals. The United Nations Environmental Programme (UNEP) focused on twelve priority POPs in recent years due to their persistence, toxicity, and prevalence in the environment. The "priority POPs" addressed in the global treaty include eight pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and toxaphene), two industrial chemicals (hexachlorobenzene [HCBs] and PCBs), and two unintended by-products (chlorinated dioxins and furans) (Global Programme of Action for the Protection of the Marine Environment from Land-based Activities [GPA], 2001). The U.S.A. signed the Convention on Persistent Organic Pollutants in 2001, pledging to reduce and/or eliminate the production, the use, and the release of the twelve priority POPs. The POPs on the Stockholm Convention on POPs list are generally referred to as "legacy" pollutants, because they are currently banned or tightly controlled throughout the world. To date, none of the pesticide POPs (including aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCBs, mirex, and toxaphene) are registered for sale or distribution in the U.S.A. In addition, the manufacture of PCBs was prohibited in 1978 in the U.S.A. and the use of existing stocks was severely restricted. Dioxins and furans are chemical byproducts produced unintentionally from most forms of combustion, and the United States Environmental Protection Agency (USEPA) is currently implementing methods to reduce the emission of these pollutants (USEPA, 2004a). Since these pollutants persist in the environment, they are still of concern to the NPS and any data found on them are included in this report.

3. Heavy Metals of Concern

Like POPs, most heavy metals are introduced into the environment from anthropogenic sources. Heavy metal contamination of natural systems is a pervasive environmental problem, with potentially severe toxicological consequences for all living organisms (USEPA, 1997; Major et al., 1998). High temperatures from natural and anthropogenic sources, such as forest fires, active volcanoes, coal and oil-fired power plants, non-ferrous metal production from primary and secondary smelters, solid waste and sewage sludge incinerators, and a miscellaneous category (including mining, cement kilns, etc.), release heavy metals to the atmosphere (Pirrone et al., 1996). Airborne metals have different atmospheric residence times, and could travel long distances before being removed from the atmosphere through dry and wet deposition. As a consequence, even ecosystems that are removed from centers of the above-mentioned sources accumulate metals and become contaminated through the combination of long-range atmospheric transport and deposition. The latter is controlled by meteorological conditions, mostly at local/regional scales, and by global prevailing winds at regional to global scales. Accordingly, the national parks that constitute the GULN could accumulate heavy metals via the above-described processes.

One approach used to determine the volatility, or the ability of a metal to vaporize, is to determine its atmospheric enrichment factor (EF). Metals that are highly volatile will carry further in the atmosphere, causing them to be deposited in locations far removed from their source. The EF is a contamination index that can be determined as the ratio of the element of interest's concentration normalized to a tracer element such as aluminum (Al) in the atmosphere and in a reference material (e.g. shale and the earth crust average concentrations), as illustrated by the following equation:

$$\text{EF} = \left(\frac{X}{Al}\right)_{\text{atm}} \Big/ \left(\frac{X}{Al}\right)_{rock}$$

where X and Al are the concentrations of the element of interest and Al in the sample and a reference rock material, respectively. The EF of heavy metals tends to correlate with the boiling point of their oxides (Mackenzie and Wollast, 1977). When plotted against the boiling point of the oxides, the distribution of the EF of the heavy metals shows that elements with the lowest boiling points are more enriched in the atmosphere than those with higher boiling point of oxides (see Figure 2) (Mackenzie and Wollast, 1977).

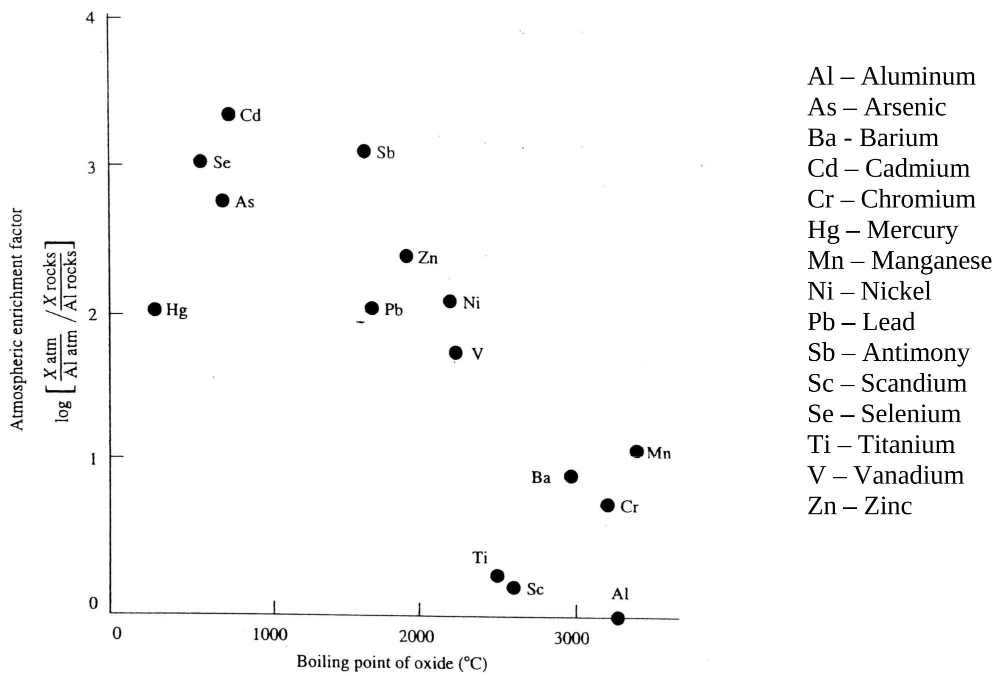

Figure 2: Atmospheric enrichment factor of metals versus the boiling temperature of their oxides.

Because of their high volatility, some heavy metals could be introduced by atmospheric deposition into national park units with no known nearby point sources. Amongst the atmospherically enriched elements plotted in Figure 2, two metalloids (Arsenic [As] and Selenium [Se]) and three metals (Cadmium [Cd], Mercury [Hg], and Lead [Pb]) are of concern to this project. Although Vanadium (V) and Scandium (Sc) also have high EFs, there is relatively no data for them available in the database and they were therefore excluded.

In addition to the EF, the EPA's list of thirteen Priority Pollutants was used to select metals of concern for analysis during this study. The EPA's Priority Pollutant list includes the following metals: Antimony (Sb), As, Beryllium (Be), Cd, Chromium (Cr), Copper (Cu), Pb, Hg, Nickel (Ni), Se, Silver (Ag), Thallium (Tl), and Zinc (Zn). Using the EF of the metals and the EPA's Priority Pollutant lists as guides, this study chose to focus on As, Cd, Cu, Pb, Hg, and Se for the metals portion of its analysis.

B. Study Area

1. Background of the National Park Service

In 1916, Woodrow Wilson signed the "Organic Act" creating the NPS under the Department of the Interior to administer a system of parks that had national, historic, scenic, and scientific importance. The mission of the NPS is "to promote and regulate the use of the…national parks…which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (16 U.S.C. 1)." To accomplish this mission, the NPS follows these guiding principles: excellent service, productive partnerships, citizen involvement, heritage education, outstanding employees, employee development, wise decisions, effective management, research and technology, and shared capabilities (NPS, 2001).

The NPS administers a total of 388 areas covering more than 83.6 million acres. There are national parks in 49 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. There are three main categories of parks: natural areas, historical areas, and recreational areas. Over 270 million people visit the nation's parks annually, making a large contribution to the surrounding economies. The creation of Yellowstone National Park by Act of March 1, 1872 began a world-wide national park movement, and there are currently national parks in over 100 countries (NPS, 2001).

2. Inventory and Monitoring Program

The NPS recently developed a framework for inventory and monitoring of the natural resources in the nation's parks, dividing the 270 parks with significant natural resources into smaller "networks" based on geography and shared natural resource characteristics (NPS, 2004a). The GULN includes eight national parks, grouped together due to the essential characteristic of being located near the Gulf of Mexico. Certain areas of the Gulf Coast region are major industrial areas, and pollutants have been historically deposited into aquatic ecosystems or emitted into the atmosphere (NPS Inventory and Monitoring Program, 2004). For this reason, the GULN has identified contaminants as an issue of potential concern in Network parks.

The primary purpose of this project was to compile and synthesize the existing data from a variety of sources on persistent organic pollutants (POPs) and heavy metals found in the eight GULN national parks. There are already a number of programs in place that monitor a variety of pollutants, such as the Clean Air Status and Trends Network of the EPA and the National Status and Trends Program of the National Oceanic and Atmospheric Administration (NOAA). However, the literature and data resulting from all these programs are not collected into one centralized database. This study was initiated to collect dispersed POPs and heavy metals data and synthesize them, with the ultimate goal of identifying and prioritizing the long-term monitoring needs of the GULN parks.

3. Gulf Coast Network (GULN)

The GULN parks include:

- Big Thicket National Preserve (BITH)
- Gulf Islands National Seashore (GUIS)
- Jean Lafitte National Historical Park and Preserve (JELA)
- Natchez Trace Parkway (NATR)
- Padre Island National Seashore (PAIS)
- Palo Alto Battlefield National Historic Site (PAAL)
- San Antonio Missions National Historical Park (SAAN)
- Vicksburg National Military Park (VICK).

These eight parks are located throughout the states of Alabama, Florida, Louisiana, Mississippi, Tennessee and Texas (NPS Inventory and Monitoring Program, 2004; Figure 3). The Gulf of Mexico region of the U.S. has historically been heavily utilized by both the military and industry. There are several military bases located near GULN park units, such as Pensacola Naval Air Station near Gulf Islands National Seashore, numerous Army and Air Force bases in the San Antonio area, and the Corpus Christi Naval Air Station near Padre Island National Seashore. There are also many military compounds that are no longer in use on the Gulf Coast. For example, Gulf Islands National Seashore includes the historic sites of Fort Pickens and Fort Barrancas, and Vicksburg National Military Park includes the site of an historic Civil War battle. Padre Island National Seashore, Big Thicket National Preserve, and Jean Lafitte National Historical Park and Preserve are all affected by the numerous oil drilling sites located along the Gulf Coast (NPCA, 2004). In addition to the effects from activities in the Gulf of Mexico, inland industrial activities can impact the parklands. Parks may experience pollutant inputs from adjacent waterways or through air deposition.

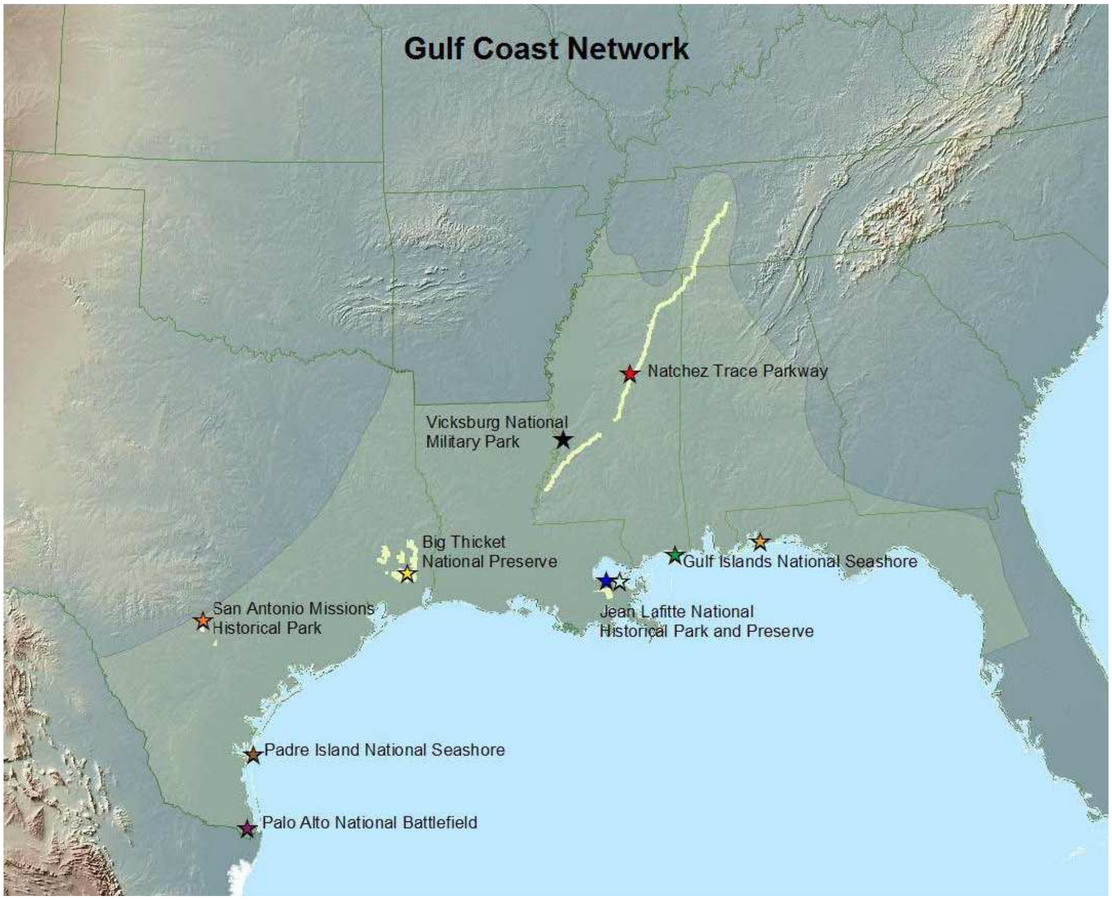

Figure 3: Map of the Southeastern U.S. showing the locations of the eight GULN parks.

a. Big Thicket National Preserve

Big Thicket National Preserve (BITH) consists of nine separate land units and six water corridors, encompassing over 97,000 acres in northeastern Texas. BITH was the nation's first preserve, designated in the National Park System on October 11, 1974. BITH was recognized as an International Biosphere Reserve by the United Nations Education, Scientific and Cultural Organization (UNESCO) Man and the Biosphere Program on December 15, 1981. BITH also received the distinction of being designated a Globally Important Bird Area by the American Bird Conservancy on July 26, 2001 (BITH, 2004).

The Preserve is rich in biodiversity due to the convergence of three ecosystems during the last Ice Age: the eastern hardwood forest, the Gulf coastal plains, and the Midwest prairies. BITH is composed of five main forest types (subcategories of the forest type are listed in parentheses): upland pine forest (pine sandhill, pine forests, pine savanna wetland), slope forest (upper slope pine oak, mid-slope oak pine, lower slope hardwood pine), floodplain forest (stream floodplain forest, river floodplain forest, and cypress-tupelo swamp), flatland forest (flatland hardwood pine, flatland hardwood), and baygalls. These habitats can be grouped in more general terms into waterbodies and forested lands (Cooper et al., 2004a).

The primary threats to BITH generally include problems such as logging, damming of rivers, and changing land uses that would not necessarily increase the levels of POPs or heavy metals in the system. However, there have been efforts to increase drilling for oil and gas in and near the park. Spilled crude petroleum from oil wells contains various POPs, such as polyaromatic hydrocarbons (PAHs), that persist in soils and water (Cram et al., 2004). Drilling agreements have already been made for six drilling wells inside of park boundaries, and another nine just outside of the park (NPCA, 2004). Harcombe and Callaway (1997) discussed the potential impacts of adjacent urban areas to the water corridors in BITH. The impact discussed that would have the greatest likelihood of increasing the presence of POPs or metals in the park would be agriculture, which has the potential to introduce pesticides into the soils and waterways of the park.

b. Gulf Islands National Seashore

Gulf Islands National Seashore (GUIS) stretches 160 miles from Cat Island, Mississippi to the eastern tip of Santa Rosa Island in Florida's Panhandle. The Mississippi section of the Seashore consists of five islands: Cat, West Ship, East Ship, Horn, and Petit Bois Islands. There is a small mainland headquarters located at Davis Bayou in Mississippi. The Florida section of the Seashore consists of two islands and two small mainland areas: the eastern portion of Perdido Key, Santa Rosa Island, Fort Barrancas, and the Naval Live Oaks Reservation. The first site designated as a park unit was Fort San Carlos de Barrancas on October 9, 1960. That designation was followed by the designation of Fort Massachusetts on June 21, 1971, Fort Pickens on May 31, 1972, and finally, the Naval Live Oaks Reservation on September 28, 1998.

Because almost 80 percent of GUIS is underwater, the primary ecosystems are aquatic ecosystems including the Gulf of Mexico, bays and sounds, intertidal surf zones, seagrass beds, and ponds and lagoons. Other ecosystem types found throughout GUIS include coastal marshes, dunes, general barrier island, upland woody, and mainland forests. GUIS is habitat to several endangered species, including the Perdido Key beach mouse, the Florida perforated cladonia, the red wolf, the leatherback sea turtle, the Kemp's Ridley sea turtle, the green sea turtle, peregrine falcons, and Red-cockaded woodpeckers. In addition, there are a number of other threatened species that rely on GUIS for their habitat (Cooper et al., 2005a).

The primary threats to GUIS that would result in increased POP or heavy metals presence include indirect human uses causing contamination, such as oil spills, coal spills, and pesticide usage. Based on an extensive literature review and data search, it does not appear that much sampling has been done in the Gulf Islands National Seashore area for POPs or heavy metals. Some studies have been done on Pensacola Bay, located adjacent to GUIS, finding that it has been contaminated in the past by various spills, pesticides, and general pollution (Cooper et al., 2005a). The Mississippi Sound is used extensively for shipping and industrial-related activities and could also be a potential source of POPs or heavy metals.

c. Jean Lafitte National Historical Park and Preserve

Jean Lafitte National Historical Park and Preserve (JELA) consists of seven physically separate sites encompassing 20,005 acres throughout southern Louisiana, with the park headquarters located in the French Quarter of New Orleans, Louisiana. JELA was established to preserve both the natural and cultural resources of Louisiana's Mississippi Delta region. The Chalmette Battlefield and National Park was first designated as a park unit on August 10, 1939, and the remaining park sites were designated into the NPS system on November 10, 1978.

JELA includes sites from across Louisiana, but the Barrataria Preserve (BP) and the Chalmette Battlefield and National Cemetery (CBNC) are the only two sites in JELA that are included in the Inventory and Monitoring Program. The other four sites of JELA include the French Quarter Visitor's Center; the Acadian Cultural Center; the Prairie Acadian Cultural Center; and the Wetlands Acadian Cultural Center. These sites are smaller in size and are located in more developed settings. Their general purpose is to provide educational outreach to the public, rather than to preserve ecosystems in a natural setting.

The BP includes six ecological zones: natural levee live oak forest; ridge and swale bottomland hardwoods; backslope transitional red maple swamp forest; baldcypress-water tupelo swamp; fresh marsh and intermediate marshes, including large expanses of floating marsh and shrub communities; and bayous, ponds and estuarine lakes. There is not a great deal of information available regarding the CBNC, the French Quarter Visitor's Center, the Acadian Cultural Center, the Prairie Acadian Cultural Center, or the Wetlands Acadian Cultural Center, possibly due to their small sizes or primarily cultural purposes (Cooper et al., 2005b).

The various locations of the six park sites subject them to a variety of threats. The BP, the CBNC, and the French Quarter Visitor's Center are all in close proximity to New Orleans, Louisiana, and the urban landscape has consequently negatively impacted the park's air and water quality in the region (Cooper et al., 2005b). The other three sites are relatively small in size and are located in more rural areas. Therefore, it is not expected that they are exposed to the same levels of contaminants as the first three sites.

d. Natchez Trace Parkway

The Natchez Trace Parkway (NATR) stretches 444 miles through the states of Alabama, Mississippi, and Tennessee. The parkway commemorates an ancient trail used by the Choctaw, the Chickasaw, and other American Indian tribes to travel between portions of the Mississippi River and salt licks located in today's central Tennessee. The trail was also used by the "Kaintuck" boatmen to transport goods down the Mississippi River to New Orleans markets. NATR first became part of the NPS system on May 18, 1939, but was officially designated as a National Scenic Byway and All American Road in 1996. The completion of the Natchez Trace Parkway was celebrated on May 21, 2005.

NATR travels through six forest types and eight watersheds throughout its length. The forest types include loblolly, shortleaf, and loblolly/shortleaf, and the watershed types include rivers, lakes, and wetlands. Because of the long, narrow shape of NATR, the majority of the data on the parkway are from the national forests, state parks and waterways adjacent to NATR. It is important to note that human influences have altered the natural ecosystems in the park through centuries of various land uses. For this reason, the forests found in NATR are primarily third or fourth growth forests (Cooper et al., 2005c).

The primary threats to NATR that could potentially involve an increased presence of POPs or metals within the park unit's boundaries include increased suburbanization of the landscape, intensive agriculture and road construction. Increasing urban and suburban landscapes put NATR at risk for degraded air and water quality. Intense farming practices that include high levels of pesticides and herbicides could increase the levels of POPs found in adjacent waterbodies. Continued construction along the parkway, as well as general traffic on the parkway, could introduce pollutants into the NATR (Cooper et al., 2005c). There are several cases of known contaminants in Natchez Trace that were remediated prior to the lands' transfers to the NPS. These include oil spilled as a result of several tanker truck accidents, pesticides found on farmland acquired by the park from the Department of Agriculture, and contaminants found on an old industrial site (B. Whitworth, personal communication, January 14, 2004).

e. Padre Island National Seashore

Padre Island National Seashore (PAIS) is the longest, undeveloped stretch of barrier island in the world and encompasses 130,434 acres of land and water. PAIS is located on the southeastern shore of Texas, along the Gulf of Mexico, and is almost 70 miles long. PAIS was designated as an official park unit on September 28, 1962, and received recognition in 1998 as a Globally Important Bird Area and in 2002 as a winner of the Blue Wave Award.

PAIS includes a variety of coastal ecosystems, including: coastal dunes and beaches; ponds and wetlands; the Spoil Islands; the Gulf-reef system; and estuaries. The Spoil Islands were created during the dredging of the Gulf Intracoastal Waterway through Laguna Madre. Laguna Madre is one of only five hypersaline estuaries in the world, and is also one of the most productive estuarine ecosystems. The pressure from the adjacent developing Texas coastline has made PAIS an important resource for many resident and migratory species. There are a number of sensitive species that rely on PAIS for their habitat, including many species that are listed by the federal government or by the state of Texas as endangered. Endangered species in PAIS include the leatherback turtle, the Kemp's Ridley sea turtle, the hawksbill sea turtle, the American Peregrine Falcon, the Interior Least Tern, the Brown Pelican, the Northern Aplomodo Falcon, and the Black-capped Vireo (Cooper et al., 2005d).

PAIS is under increasing pressure from anthropogenic contamination from petroleum drilling, agriculture, and urbanization. POPs were of significant interest to this study at Padre Island, primarily because of the oil drilling currently taking place both on park premises and offshore. Drilling is allowed to occur on park premises because "the enabling legislation stipulates that all mineral rights within the national seashore are retained by the original grantors of the property (NPS, 2004b)." Multiple studies have found extensive hydrocarbon contamination as a result of drilling activities both in PAIS and in the Gulf of Mexico. Many studies have detected DDE and PCB contamination in tissue samples, but in below toxic levels (Cooper et al., 2005d).

f. Palo Alto Battlefield National Historic Site

Palo Alto Battlefield National Historic Site (PAAL) is located near the southernmost tip of Texas. The 3,400 acre park unit commemorates the first battle of the United States-Mexico War on May

8, 1846. PAAL was first designated as a National Historic Landmark by the NPS on December 19, 1960, then re-designated as a National Historic Site on November 10, 1978, and finally designated in its current boundaries on June 23, 1992. Its purpose is to interpret the entire conflict and create a place of bi-national exchange and understanding, reflecting the perspectives of both the U.S.A. and Mexico.

PAAL incorporates brushland, salt prairie, and wetlands ecosystems within its boundaries. Brushland habitat is found in approximately 23 percent of the park, primarily in the more elevated area of PAAL. Salt prairie habitat is the primary ecosystem of the park, covering approximately 75 percent of PAAL. Wetlands are located where there are abandoned channels and tributaries of the Rio Grande River, as well as in the locations of abandoned cattle-dip tanks. The park is known to provide habitat for several federal or state-listed endangered species, including the ocelot, the Texas horned lizard, the Texas indigo snake, the Mexican tree frog, and the Aplomodo Falcon (Cooper et al., 2005e).

The most pressing concern to PAAL related to POPs and metals is the contamination of the soils in the site from previous agricultural uses. Park officials are in the process of cleaning several parcels of land that were contaminated prior to purchase by the NPS. One site housed a cattle dipping tank, where cattle were dipped in arsenic to remove insects. An investigation was conducted in March 2004 pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Hazardous Substances Pollution Contingency Plan. During this study, arsenic was found in soil samples west and south of the dipping tank and in a man-made depression near the tank. In addition, arsenic was detected in a groundwater sample southwest of the dipping tank. The next step in the remediation process is to conduct an Engineering Evaluation/Cost Analysis (EE/CA) which will analyze the cleanup options based on effectiveness, feasibility, and cost (PAAL, 2005). Other potential sources of contamination may result from the increasing urbanization of the Brownsville, Texas region (Cooper et al., 2005e).

g. San Antonio Missions National Historical Park

San Antonio Missions National Historical Park (SAAN) is a non-contiguous park that encompasses 819 acres along the San Antonio River in San Antonio, Texas. SAAN was first designated into the NPS system on November 10, 1978, with the addition of Rancho de las Cabras in 1995. SAAN preserves the remains of four Spanish missions that were part of the colonization system during the 17^{th}, 18^{th}, and 19^{th} centuries: Missions San Jose, San Juan, Espada, and Concepcion.

There are several ecosystems within the park's boundaries, including forested riparian areas, an old agricultural field, and scrubland. At the Rancho de las Cabras site, two ecosystem types were found: Upland South Texas Brush (in the upland area) and riparian (in the river terraces and stream corridors). Only two endangered species are likely to be found in SAAN: the jaguarundi (*Felis yaguarondi*) and the ocelot (*Felis pardalis*). Both of these species reach their northernmost range in Wilson County, and therefore could potentially be inhabitants or visitors at Rancho de las Cabras. There are no endangered species currently known to inhabit the Missions portions of SAAN (Cederbaum et al., 2004).

Threats to SAAN are mostly a result of the park's close proximity to the city of San Antonio. Cederbaum et al. (2004) noted several instances of environmental hazards resulting from the actions of neighboring businesses and industries. The San Antonio wastewater treatment plant, the Howell Hydrocarbons Refinery, Kelly Air Force Base, and Brooks Air Force Base are a few examples of potential pollutant sources.

h. Vicksburg National Military Park

Vicksburg National Military Park (VICK) encompasses 1,795 acres along the border between Mississippi and Louisiana. VICK was established by Congress on February 21, 1899, to commemorate one of the most decisive battles of the American Civil War, and was also listed on the National Register of Historic Places on October 15, 1966. The park is adjacent to the Yazoo River Diversion Canal, and is in close proximity to the Mississippi River.

There are four major ecosystems located in VICK: forest, stream, mowed grassland, and river. The grassland area makes up approximately thirty percent of the park, and is maintained through mowing or prescribed fire. VICK has two major stream drainages, Glass Bayou and Mint Springs Creek, which are both tributaries of the Mississippi River. The Mississippi River historically flowed past VICK, but changed courses to its current course near the southern tip of the park. The interior least tern is the only federally endangered species that has been documented in or is a possible inhabitant of the park, although there are several other threatened species and species of concern found within park boundaries. Although there are no known direct sources of pollution to VICK, Cooper et al. (2004b) suggest that several industrial manufacturers in the city of Vicksburg and in Warren County produce air pollutants that could potentially be a threat to VICK.

VIII. METHODOLOGIES

The first task associated with this study was to accumulate the names of the resource managers or the contacts for the eight network parks. These contacts, as well as an extensive internet search, provided the names of federal and state agency personnel, organizations, and researchers with knowledge of POPs and heavy metals sampling in and near the parks. A search of the refereed journals was conducted and all articles collected were cited in a comprehensive bibliography. Internet websites of both private organizations and government programs also provided publications and data relevant to the parks. Figure 4 shows a flow chart diagramming the methods utilized for this study to collect POPs and heavy metals information on the eight GULN parks.

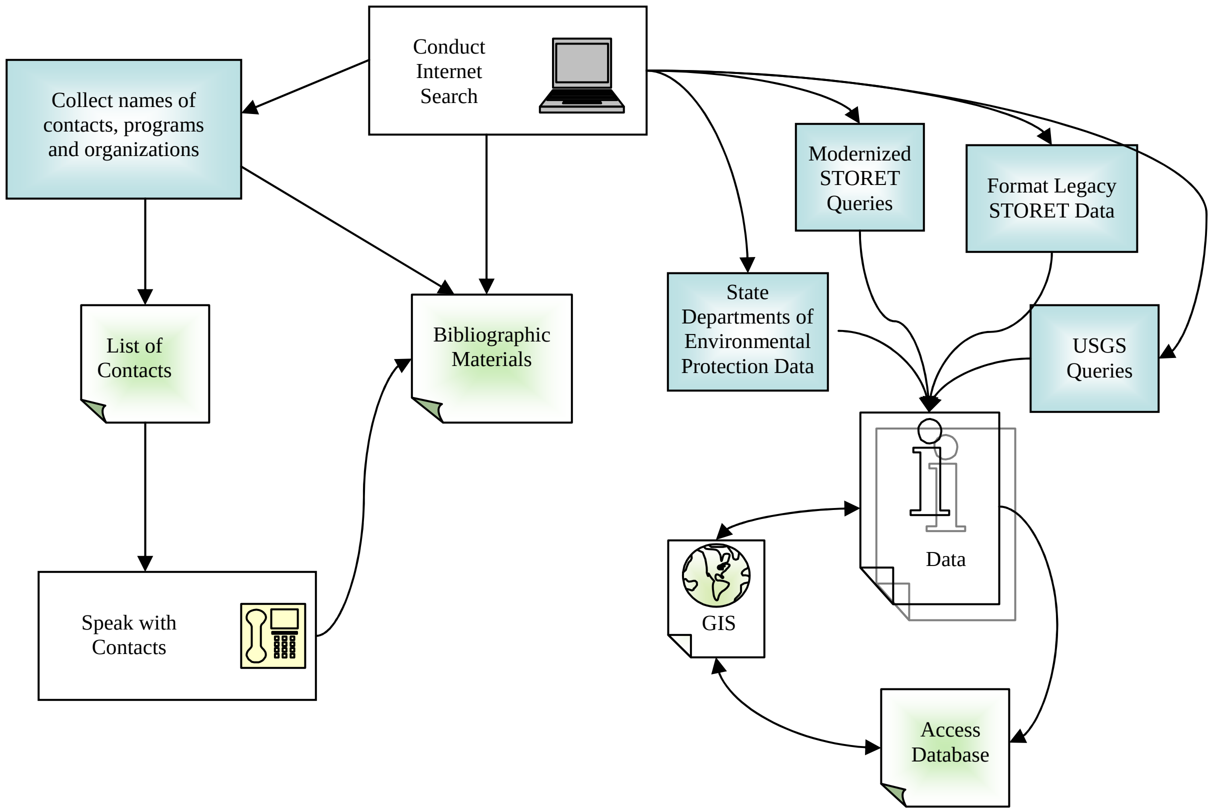

Figure 4: Flow chart diagramming the process used to collect and organize contacts, literature, and data during this study.

A. Compilation of Database

1. Data Sources

Data on POPs and heavy metals are collected by numerous government agencies, academia, and private organizations. Although academic researchers typically publish their work in refereed journals, there are many other places where information is stored. Attempts were made to locate data from journals, government publications, government agencies and internet sources.

a. Literature Search

Most universities conduct research, making professors and graduate students in academia around the country important resources for studies such as the present one. This research is generally summarized and published in refereed journals. To find journal articles relevant to the topic, a preliminary search was done on databases that include multiple journals using keywords related to the study. A list of abstracts was obtained from the preliminary search, and the abstracts were surveyed to determine which articles would be applicable to the study. These articles were then located in the University of Florida libraries or through the University's electronic journals. The journal articles were documented in a comprehensive bibliography (Appendix A; also available in digital format on the CD-ROM that accompanies this report). A review of the journal articles resulted in a limited amount of data from sites located near the GULN park units (see Table 1).

Park/Medium	Date	Contaminant(s)	Value	Units	Source #
PAIS/sediments	7/1993, 8/1993-1994	PAH	125	ng g^{-1} dry wt.	Maruya et.al.
		Butyltin	60	ng g^{-1} dry wt.	
PAIS/air-water exchange	8/20/1998 - 9/16/1999	PCB	0.034	ng/m^3	Park et.al.
		Pentachloroanisole	0.024	ng/m^3	
		Chlorpyrifos	0.032	ng/m^3	
		PAH	16.25	ng/m^3	
VICK/suspended sediment	6/2/1988	Chloradane	237	g/day	Rostad, C.E.
		Nonachlor	73	g/day	
	3/27/1989	Chloradane	658	g/day	
		Nonachlor	1114	g/day	
	6/23/1989	Chloradane	103	g/day	
		Nonachlor	109	g/day	
	3/10/1990	Chloradane	399	g/day	
		Nonachlor	443	g/day	
JELA/surface water	3/22/1999	Atrazine	0.01	µg/L	Demcheck et.al.
	5/10/1999	Atrazine	0.09	µg/L	
	6/9/1999	Atrazine	0.01	µg/L	
	8/25/1999	Atrazine	0.09	µg/L	
GUIS (Santa Rosa Sound)/surface water	7/1/1996	Atrazine	0.03	mg/L	Lewis et.al.

Author(s)	Date	Title
Demcheck et.al.	2003	Atrazine in southern Louisiana streams, 1998 – 2000.
Lewis et.al.	2002	Effects of a coastal golf complex on water quality, periphyton, and seagrass.
Maruya et.al.	1997	Organic and organometallic compounds in estuarine sediments from the Gulf of Mexico.
Park et.al.	2002	Atmospheric deposition of PAHs, PCBs and organochlorine pesticides to Corpus Christi Bay, Texas.
Rostad, C.E.	1997	Concentration and transport of chlordane and nonachlor associated with suspended sediment in the Mississippi River.

Table 1: Summary of data retrieved from refereed journal articles that referenced locations near GULN park units.

b. Governmental Agencies

Government agencies conducting research related to national parks include the Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (FWS), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), the various state environmental agencies (such as the Florida Department of Environmental Protection and the Texas Commission for Environmental Quality), and other agencies that vary from state to state (such as the Florida Water Management Districts). Most of these agencies publish documents concerning the studies they are conducting. These documents can often be found on the agency's website, but most government agencies do not provide the majority of their publications in digital format. Documents published by the NPS, as well as by other agencies that did not provide access to documents on the web, were obtained by contacting each of the GULN park units directly.

The internet is also a useful resource to investigate the many programs developed to monitor natural resources. A large amount of data is available through internet sources, making this an important source for information during this search. Many programs, such as the Coastal Bend Bay and Estuary Program, the Clean Rivers Program, and the National Atmospheric Deposition Program, provide access to their data and publications online. A list of websites containing valuable information was created, and the references to this information are included in Appendix B and on the CD-ROM in the back cover of this report.

(1.) Environmental Protection Agency (USEPA)

The EPA manages an online data "STOrage" and "RETrieval" system (STORET) that allows data to be stored by government agencies, private organizations, and academic institutions and later retrieved by the public through the internet. The repository stores water quality, biological, and physical data for both surface and ground water throughout the U.S.A.. There are two databases included in the STORET system: STORET Legacy Data Center (LDC) and Modernized STORET. In 1999, the EPA developed a more uniform system to store data and required all data submitted to the EPA after that date to conform to these standards. All data submitted prior to 1999 are found in the LDC, which has certain limitations (USEPA, 2003).

Since the LDC was first designed in the 1960s, the data found there are of "undocumented quality." The EPA no longer inputs data into the LDC, so data found there are static and will not change over time. In addition, there are no USGS data in the LDC or in modernized STORET. All data collected by the USGS were removed, and these data are currently only available from the USGS website (USEPA, 2003). Downloading data from the LDC through the STORET website is slightly more difficult than downloading from modernized STORET. The query forms for each database are different, although neither is particularly difficult to manage. However, if the data requested from the database exceed certain limitations, the user must provide an email address and retrieve the information from a website provided to the user by the system the following day. This appears to be due to certain memory limitations of the LDC processor, preventing it from running numerous large queries in a short amount of time.

Since the LDC data are static, it is also possible to obtain copies of all of the data separated by state and county. The EPA also provides LDC data on compact disc by request, or the agency can direct users to a file transfer protocol (.ftp) site where users can download the data by state. This study found it easiest to obtain all of the data for each state and then open the database (with the latitudes and longitudes of each sample location clearly labeled) in ArcGIS to eliminate data outside of the study area.

Modernized STORET includes some data from before 1999, but the data must conform to the modernized STORET database standards. Because of the strict requirements for data inputted into STORET, the number of sites represented is limited in certain geographical areas (Figure 5). The process for obtaining data from modernized STORET involves filling out a series of online forms. The following information can be obtained from the modernized STORET website:

- Station descriptions queried by a user-specified geographic location;

- STORET "regular results" (non-biological physical and chemical result data), based on a geographical location, a station, or a project;
- STORET "biological results," based on a geographical location, a station, or a project; and
- STORET "habitat results," based on a geographical location, a station, or a project.

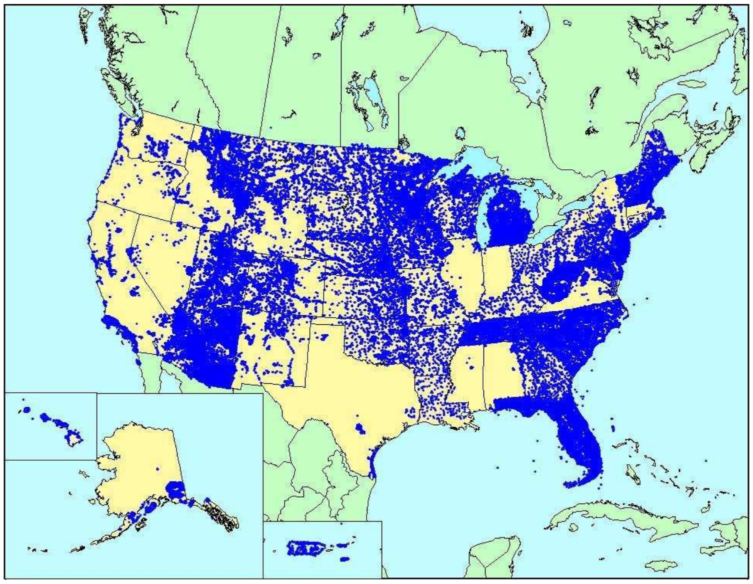

Figure 5: Sites registered with modernized STORET (USEPA, 2004b).

If the option of searching by geographical location is chosen, the user can then choose to search by state/county, by latitude/longitude, or by the drainage basin/hydrologic unit code (HUC). When searching for data based on a station, the user must know the organization managing the station as well as the station ID, the station name, or the station alias. The option of searching by project allows the user to choose from a list of organizations, and then the form provides a list of projects for that organization via a "Look Up" button. After choosing a method of searching the database, the user then inputs the date ranges of the required data, the activity medium (i.e., water, sediment, soil, air, or other), and the characteristic name. The last two options do not need to be chosen; the user may leave these options blank to acquire all data from a time range.

For this study, the simplest method of obtaining Modernized STORET data was to download the data by state and county. One problem that occurred during this process was that the amount of data retrieved often exceeded the maximum record limit of 60,000. To overcome this problem, smaller geographical areas were inputted into the query until the number of records retrieved was less than 60,000. It was also noted that the number of stations included in the Modernized STORET system increased substantially over the two year period that this study took place.

(2.) United States Geological Survey (USGS)

The United States Geological Survey manages a database similar to STORET, in which they provide the public with access to water quality data collected by their agency personnel. There are no USGS data found in modernized STORET or in the LDC, because the agency began its own site after the EPA changed from the LDC to modernized STORET in 2000. Like STORET, the user must fill out a series of search forms to obtain a tab-delimited text file containing the requested data. In the case of the USGS data, this study also found it simplest to download data for an entire state and eliminate extraneous data using ArcGIS.

(3.) State Agencies

The GULN park units are located in six states: Alabama, Mississippi, Florida, Tennessee, Louisiana, and Texas. Each state has its own agency that is charged with managing and protecting that state's natural resources. This project's staff contacted each of the state agencies to determine if there were data collected by that agency that were not already available in the EPA's STORET database or the USGS database.

The Florida Department of Environmental Protection (FDEP) provides all of its water quality data to the national EPA STORET database, making the need to contact them directly for data unnecessary. In addition, Florida data are relatively current compared to some other states, due to several regulations that the FDEP has passed. Florida's Water Resource Implementation Rule (Chapter 62-40.540(3), F.A.C.) requires government agencies to place appropriate water quality monitoring data in STORET within one year of collection (FDEP, 2005b). Another feature of the Florida Administrative Code, called the Impaired Waters Rule (IWR), requires organizations place their data in STORET if they want that data be considered in the Department's annual evaluation of waters for impairment (Section 62-303.320(2), F.A.C.; FDEP, 2005a). These regulations ensure that the water quality data for Florida in the Modernized STORET database is current and comprehensive.

The Texas Commission on Environmental Quality (TXCEQ) does not incorporate its water quality data into the Modernized STORET database for the majority of the state. There are several programs that do export data into the EPA's STORET database, with several locations near PAIS, SAAN, and BITH. This study's staff contacted the TXCEQ directly and obtained copies of the data stored in its local database, and included those data in the final database.

Alabama's Department of Environmental Management (ADEM) is tasked with protecting and improving the quality of Alabama's environment and the health of its citizens (ADEM, 2005). The ADEM was contacted to obtain data for this study, but no POPs or heavy metals data were available for the GULN park unit locations. The Tennessee Valley Authority (TVA) also conducts water quality sampling in the Tennessee River watershed, and the TVA was contacted for data as well. They were able to provide a small number of data, including data for polychlorinated biphenyls (PCBs), pesticides, and metals, which were included in the database.

The Louisiana Department of Environmental Quality (LDEQ) maintains the data from its statewide Ambient Water Quality Monitoring Program online, which samples for the following metals: arsenic, cadmium, chromium, copper, zinc, sodium, nickel, and lead. The LDEQ also conducts extensive water, soil, and fish sampling for mercury. However, the LDEQ could not provide any additional POPs data for inclusion in the database.

The Mississippi Department of Environmental Quality (MDEQ) provided some POPs and heavy metals data, collected primarily through the MDEQ statewide ambient water quality monitoring program. The MDEQ had more data for its estuaries due to a recent monitoring program, but less data exist for the remaining portions of the state.

2. The Use of GIS

The use of geographical information systems (GIS) has become an essential part of many academic disciplines, and the field of environmental studies is no exception. In this study, ArcGIS (version 9.0) software created by ESRI was utilized for a number of tasks. The boundaries of each of the GULN park units were first located using shapefiles provided on the NPS website. The buffer tool, found in the ArcToolbox under "Analysis Tools/Proximity," was used to create a five mile buffer around each of the parks. This buffer was used as the basis for eliminating data not located within five miles of a GULN park unit.

Most of the data obtained in this study were obtained on a regional scale. This created a database that was extremely large, since many of the data were not located within the specified five mile buffer of the park. Detailed instructions on removing extraneous data from the database using ArcGIS are provided in Appendix E.

3. Problems with Importing Data into Access

Under the EPA's previous LDC system, each sample was divided into the discrete measurements taken of that sample. For example, if a scientist took a quantity of water from a river and sampled that water for pH, dissolved oxygen, and mercury levels, each of those parameters would have its own row within the STORET database. However, Modernized STORET and USGS store the data that they collect differently. The inconsistencies among data storage between governmental agencies requires some additional data manipulation before the data can be compiled into one database.

Modernized STORET differs from the LDC version in data storage by adopting the name of the pollutant rather than using a number assigned to a sampling method for a specific pollutant. In the LDC, there were approximately 16,000 "parameter numbers" that could potentially be assigned to data results. These numbers were based on the method of sampling, and new numbers were often created when a previous number did not accurately represent the sampling method. The USGS system of storing data stores all of the parameters that were analyzed from a specific water sample in the same row. To conform to the LDC data, a time-consuming procedure of separating each row into the individual parameters had to be conducted.

B. Using the Database

The database for searching and managing the data collected during this study was created using Microsoft Access 2002. It was designed with a "graphic user interface," or GUI, to make searching and analyzing the data more user-friendly. Upon opening the file, the user will immediately see the "GULN POPs and Heavy Metals Database" dialog box (see Figure 6). This box provides the user with various options to limit the search of the data. The first selection requires the user to choose the pollutants for which to search. The default option is "All Organic Pollutants," but the user may change the option to "All Heavy Metals," or choose a specific pollutant in the drop-down menu. The second selection allows the user to change the parks in which to search. The default option is "All Gulf Coast Network NPS Units," but the user can choose to search in any of the eight GULN park units. Finally, the user can choose to output the data either in a spreadsheet format or in a report format. During this selection process, the user is effectively creating a query for Access to filter out unwanted data. Only the results requested will be shown, although all of the data are stored unaltered in an Access table in the database.

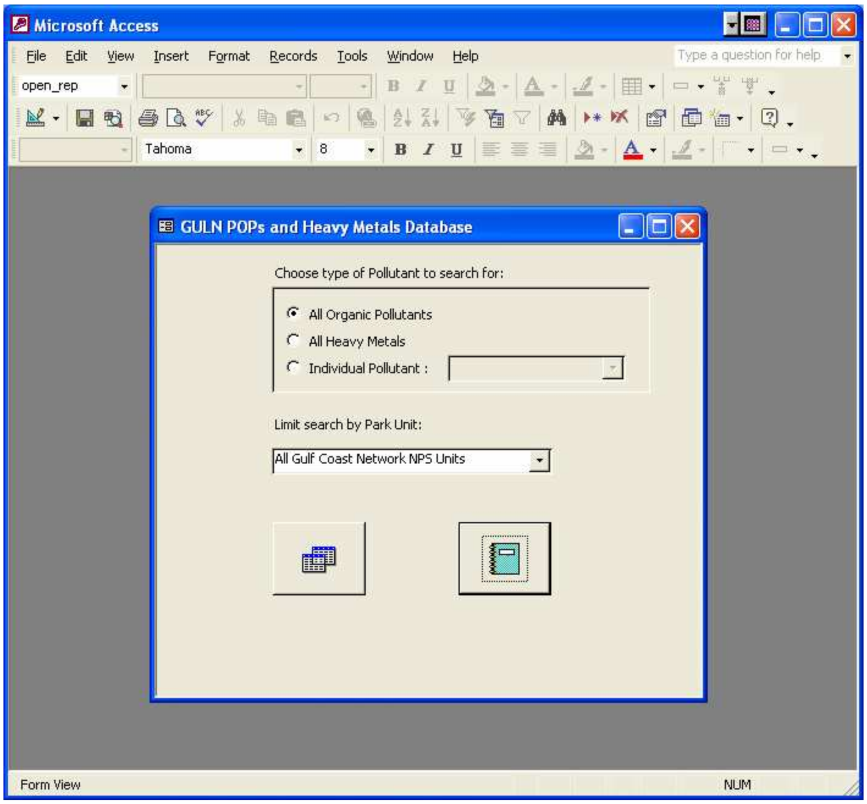

Figure 6: View of the "Main Form" dialog box of the database.

After selecting an output format, the database provides the user with the results of the query in a new window. The user can close this window to return to the Main Form and begin a new query. If the user would like to save the results, they can simply choose "File → Save As..." to save them. If the results were returned in report form, the file will be saved as a report in the Access file. To retrieve the report, the user must first "unhide" the main database window by choosing "Window → Unhide..." and clicking on the "GULN POPs and Heavy Metals Database: Database" file. In the window that appears, the user can click on "Reports" under the "Objects" column on the left side of the window, and their saved file should be found there. Alternatively, the user can choose to print the report by selecting "File → Print..." The following table (Table 2) provides a step-by-step procedure to extract useful data from the Microsoft Access database and to import the data into a spreadsheet program such as Microsoft Excel.

Table 2: Procedure to extract files from Access to a spreadsheet program:

- Open the Access file (e.g., GULN POPs and Heavy Metals Database).
- In the “GULN POPs and Heavy Metals Database” dialog box, choose <Individual Pollutant> and pick a pollutant (e.g. DDT) (you can also choose <All Heavy Metals> or <All Organic Pollutants>).
- In the “GULN POPs and Heavy Metals Database” dialog box, select site of interest (e.g. BITH).
- In the “GULN POPs and Heavy Metals Database” dialog box, select the spreadsheet icon (the icon on the left).
- Under FILE, choose <Export>.
- Select SAVE AS TYPE and choose <Microsoft Excel 97-2002>.
- Give the file a name and choose where to save the file.
- Choose <Export All>.
- Open the file with a spreadsheet program (e.g., Microsoft Excel).

Another option for saving results is to choose the spreadsheet option on the Main Form. This will return the results as a spreadsheet, which can then be copied and pasted into an Excel spreadsheet. If users are familiar with Access databases and prefer to keep the data in the same format, the results can also be saved as an Access table. To do this, the user must first select all of the rows by choosing “Edit → Select All Records.” Next, make certain that the database window is open by choosing “Window → Unhide,” and then selecting the “GULN POPs and Heavy Metals Database: Database” file. Click “Ok.” If the database window is already open, the “Unhide” option will be greyed-out. To copy the selected records into a new table, first create a table by choosing “Table” in the “Objects” toolbar on the left, and then clicking on the “New” button on the top of the window. Choose “datasheet view” in the next window and click “Ok.” When the new table opens, paste the records into the new table by choosing “Edit → Paste.” By choosing to save the results in Access, the user can filter the results or run additional queries on them without altering the original data.

In conclusion, the database created during this study includes a large amount of data that are not “actual” numbers. The LDC STORET system uses a Remark Code to identify data that required additional explanation for a number of different reasons. One example is data that were below the detection limits of the sampling method. This type of data included a “K” in the Remark Code column. Other examples of data limitations that required Remark Codes include non-detects, off-scale highs and lows, and calculated values. The only Remark Code found in the database that was included in the data analyzed was the LDC “E” code, suggesting that an extra sample was taken as a quality assurance replicate. The complete lists of Remark Codes for the LDC and the USGS are listed in Appendices C and D. A comparison of the total numbers of data and the numbers of actual data is provided in Appendix F. The “All Data” column in Appendix F lists the total numbers of data for each parameter, sorted by GULN park unit. The second column, “Actual Data,” lists the numbers of data that were kept due to the absence of a Remark Code.

IX. RESULTS BY PARK UNIT

To analyze the status of POPs and heavy metals in each of the GULN park units, the data that were not “actual” values were removed from the database. Because the database included a large number of different pollutants, this study narrowed the analysis of POPs and heavy metals for the individual park units down to a smaller number of indicative pollutants. The heavy metals reviewed included arsenic, cadmium, copper, lead, mercury, and selenium. The POPs reviewed included anthracene, benzo(a)pyrene, chlordane, DDD, DDE, DDT, fluoranthene, hexachlorobenzene, phenanthrene, and others. The selection of these particular pollutants was based on specific properties of the pollutant (such as the EF of the heavy metals), the EPA’s Priority Pollutant list (for both POPs and heavy metals), the UNEP’s Stockholm Convention on POPs, and professional experience.

When applicable, this study refers to the USEPA’s list of safe guideline values for acute and chronic toxicity in aquatic systems (USEPA, 2005; Appendix G). This information was obtained from the USEPA’s “Water Quality Criteria” webpage. The term “guideline” could be defined as “a maximum and/or a minimum value for a physical, chemical or biological characteristic of water, sediment or biota, which should not be exceeded to prevent detrimental effects from occurring under given environmental conditions.” The guidelines represent safe conditions or safe levels of a substance in a given environmental compartment, as determined by the appropriate state or federal agency. Note that there are many priority pollutants that do not have a recommended criterion specified (USEPA, 2005). These criteria are merely recommended; the states are not obligated to adopt these criteria. Each state develops its own criteria for each of the individual pollutants, and states do not always establish criteria for all pollutants. Because four of the eight parks are located in Texas, the Texas Surface Water Quality Standards Criteria in Water for Specific Toxic Materials for the protection of both aquatic organism health and human health are provided in Tables 3 and 4. In addition, Florida has established many of its own criteria for the pollutants discussed in this report (see Table 5). When available, published safe guideline values are used to assess the potential risks to aquatic organisms.

In the results sections for each GULN park unit, both levels and temporal trends of compiled POPs and heavy metal data are examined and discussed. With regard to heavy metals, it is worth noting that this analysis focuses primarily on levels and temporal trends of metals and metalloids that are characterized by a high atmospheric enrichment factor (see Section VII.A.3.) in addition to being listed in the current USEPA’s Priority Pollutant list. Based on these criteria, data on arsenic (As), cadmium (Cd), lead (Pb), mercury (Hg), and selenium (Se) are discussed. Copper (Cu), although it has a low EF, is a metal found on the USEPA Priority Pollutant list and therefore is included due to the relative abundance of Cu data in GULN park units. In addition, it is anticipated that the improvement over time in different techniques used for sample collection, handling, storage, and analysis will affect the quality of the heavy metals data discussed herein. This is particularly true for trace metals such as Hg and Pb, because the metal-free ultra clean techniques recently developed are now required to obtain accurate data.

Parameter	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
Arsenic (d)	360	190	149	78
Cadmium (d)	$e^{(1.128(\ln(\text{hardness}))-1.6774)}$	$e^{(0.7852(\ln(\text{hardness}))-3.490)}$	45.62	10.02
Chlordane	2.4	0.0043	0.09	0.004
Copper (d)	$e^{(0.9422(\ln(\text{hardness}))-1.3844)}$	$e^{(0.8545(\ln(\text{hardness}))-1.386)}$	16.27	4.37
4,4'- DDT	1.1	0.0010	0.13	0.0010
Dieldrin	2.5	0.0019	0.71	0.0019
Heptachlor	0.52	0.0038	0.053	0.0036
Lead (d)	$e^{(1.273(\ln(\text{hardness}))-1.460)}$	$e^{(1.273(\ln(\text{hardness}))-4.705)}$	140	5.6
Malathion	---	0.01	---	0.01
Mercury	2.4	1.3	2.1	1.1
Selenium	20	5	564	136

(d)	Indicates that the criteria for a specific parameter are for the dissolved portion in water. All other criteria are for total recoverable concentrations, except where noted.

Table 3: Texas Surface Water Quality Standards Criteria in Water for Specific Toxic Materials for Aquatic Life Protection. All values are listed or calculated in micrograms per liter (30 Tex. Admin. Code § 307.6).

Compound	A Water and Fish µg/L	B FW Fish Only µg/L	C SW Fish Only µg/L
4,4' – DDD	0.297	0.299	0.199
4,4' – DDE	0.0544	0.0545	0.0363
4,4' – DDT	0.0527	0.0528	0.0352
2,4 – D	70*	---	---
Dieldrin	0.0012	0.0012	0.0008
Heptachlor	0.0177	0.0181	0.0120
Heptachlor Epoxide	0.2*	7.39	4.92
Lead (d)	5.00	25.00	3.85
Mercury ‡	0.0122	0.0122	0.0250
Selenium	50*	---	---
2,4,5 – TP (Silvex)	50*	---	---

*	Based on Maximum Contaminant Levels (MCL's) specified in 30 TAC §290 (relating to Water Hygiene).
‡	Calculations based on USFDA action levels in fish tissue.
(d)	Indicates the criteria is for the dissolved fraction in water. All other criteria are for total recoverable concentrations.

Table 4: Texas Surface Water Quality Standards Criteria in Water for Specific Toxic Materials for Human Health Protection. All values are listed or calculated in micrograms per liter (30 Tex. Admin. Code § 307.6).

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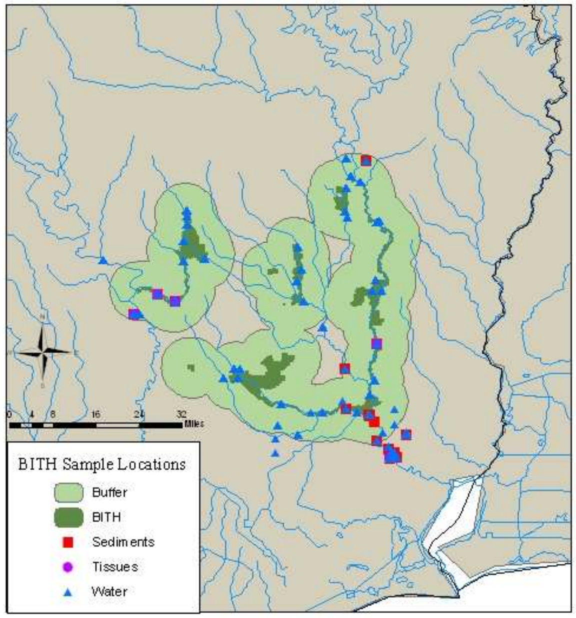
Parameter	Units	Class I: Potable Water Supply	Class II: Shellfish Propagation or Harvesting	Class III: Recreation, Propagation and Maintenanceof a Healthy, Well-Balanced Population of Fish and Wildlife		Class IV: Agricultura l Water Supplies	Class V: Navigation, Utility, and Industrial Use
				Predominantly Fresh Waters	Predominantly Marine Waters		
Arsenic (total)	Micrograms/L	≤ 50	≤ 50	≤ 50	≤ 50	≤ 50	≤ 50
Arsenic (trivalent)	Micrograms/L measured as total recoverable Arsenic		≤ 36		≤ 36		
Cadmium	Micrograms/L	Cd ≤ e(0.7852[lnH]-3.49)	≤ 9.3	Cd ≤ e(0.7852[lnH]-3.49)	≤ 9.3		
Chlordane	Micrograms/L	< 0.00058 annual avg.; 0.0043 max	< 0.00059 annual avg.; 0.004 max	< 0.00059 annual avg.; 0.0043 max	< 0.00059 annual avg.; 0.004 max		
Copper	Micrograms/L	Cu ≤ e(0.8545[lnH]-1.702)	≤ 3.7	Cu ≤ e(0.8545[lnH]-1.702)	≤ 3.7	≤ 500	≤ 500
DDT	Micrograms/L	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max		
Dieldrin	Micrograms/L	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max		
Heptachlor	Micrograms/L	≤ 0.00021 annual avg.; 0.0038 max	≤ 0.00021 annual avg.; 0.0036 max	≤ 0.00021 annual avg.; 0.0038 max	≤ 0.00021 annual avg.; 0.0036 max		
Lead	Micrograms/L	Pb ≤ e(1.273[lnH]-4.705)	≤ 8.5	Pb ≤ e(1.273 [lnH] -4.705)	≤ 8.5	≤ 50	≤ 50
Malathion	Micrograms/L	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1
Mercury	Micrograms/L	≤ 0.012	≤ 0.025	≤ 0.012	≤ 0.025	≤ 0.2	≤ 0.2
Selenium	Micrograms/L	≤ 5.0	≤ 71	≤ 5.0	≤ 71		

Table 5: Selected criteria from the Florida Administrative Code, 62-302.530, for Surface Water Quality Classifications (Florida Department of Environmental Protection, 2005).

A. Big Thicket National Preserve (BITH)



1. Persistent Organic Pollutants (POPs)

POP analyses have been performed on samples collected in and around the environs of BITH for many years. There are several parcels of the Preserve that are not contiguous, and there are two significant rivers (the Trinity River and the Neches River) that flow past separate units of the Preserve.

Significant monitoring for POPs in surface waters was apparently conducted during the period of 1968 through 1989, when up to 123 samples were collected and analyzed for POPs at different locations. Samples for which data were found to exceed the analytical detection limits were somewhat fewer than the total number collected and analyzed. Given the long history involved in sample collection at BITH, only those POPs (a total of three) for which ten or more reportable data were found are mentioned here. Other POPs data were seen so infrequently and at such low concentrations (even though reportable) that there were insufficient data upon which to base any substantive comments.

Two chlorophenoxy-acetic acid herbicides (2,4-D and 2,4,5-T) each presented slightly over 40 useful data at two locations in BITH. One location was on the Trinity River at Romayor, TX and the other was on the Neches River at Evadale, TX. The 2,4-D results, although found in reportable concentrations, were mostly in the range of results less than 0.1 μg/L. Two exceptions were a sample in 1969 (0.2 μg/L) and another in 1989 at 1.8 μg/L. The 2,4,5-T results during the same time period included data that were all less than 0.1 μg/L, showing that there was effectively no concern about these contaminants. These values were all below criteria published by the State of Texas (see Tables 3 and 4).

Dieldrin, a “legacy” chlorinated pesticide, showed 11 positive results in sediment samples collected from both rivers at the two sites mentioned above, but of those values, ten were less than 1 µg/kg (or one part per billion [ppb]) while one sample, collected in 1972, had 12 µg/kg reported. There are no criteria from the USEPA or the state of Texas available for sediments at this time.

Those POPs that are identified here appear to be related primarily to agricultural activities (chlorinated pesticides and herbicides). As a result, aside from some minor accumulation in sediments, the historically low values for the two herbicides seen several years ago are not a cause for concern. Several other POPs were randomly seen in water and sediments near the various segments of BITH (e.g. aldrin, atrazine, chlordane, DDT, DDE, DDD, endrin, heptachlor and PCP), but these observances were very infrequent and at levels that do not merit further comment at this time.

2. Heavy Metals

The collection of heavy metals samples in different environmental compartments of BITH goes back to the early 1970s, resulting in thousands of data points. The heavy metals data available in the database were obtained from three main sources: the USGS, the USEPA, and the Texas Water Commission. The following is an overview of the heavy metal data compiled for BITH.

Arsenic (As): A total of 638 samples of As were taken for BITH, including water, sediment, and a very limited number of biological samples. However, As concentrations above the detection limits of the analytical techniques used were found only in approximately 50 percent of the analyzed samples.

In the aqueous phase, total As concentrations determined on non-filtered samples ranged from 1 to 210 µg/L (*average=5.61; median=3.00; n =130*). From the early 1970s to the late 1990s, the levels of total As in surface waters remained rather constant except for a few peak values recorded in samples collected in 1981 and 1982 from locations in the Sabine River. As concentrations measured in samples collected from these impacted sites reached a maximum value of 210 µg/L in 1982. Unfortunately, no samples were collected from these same sites after 1982.

The dissolved total As concentration obtained by analysis of filtered samples gave values ranging from 1 to 10 µg/L (*average=2.77; median=2.0, n=170*). Dissolved concentrations are used in the assessment of potential impacts on ecosystem functions and aquatic biota. The average of 2.77 µg/L and the maximum value of 10 µg/L do not exceed the USEPA’s proposed safe guidelines for either acute (340 µg/L) or chronic (150 µg/L) toxicity for freshwater organisms. Also, the temporal pattern of dissolved As levels shows a succession of peaks and lows characteristic of seasonal variations without noticeable changes in the absolute values of measured concentrations over time.

Concentrations of total As in sediments averaged 9.07 mg/kg dry weight (*median 8.0, n=41*) and were determined on samples collected from a very limited number of locations in the Neches River basin. The temporal trend shows a peak in sediment As concentrations between 1980 and

1982, followed by a decrease to values less than 10 mg/kg that are characteristics of most unpolluted sedimentary environments (Adriano, 2001).

Data on As levels in tissues are scarce. Only two measurements were found for BITH during this investigation. One measurement from a fish sample collected from the Neches River was reported by USEPA Region 6 in 1980 (1 mg/kg wet weight) and the other by the USGS (2 mg/kg wet weight) on Menard Creek, near Fuqua, TX in 1992. This paucity of data does not allow further comments on As levels in biological tissues.

Selenium (Se): The monitoring of Se in BITH began in 1974. Unlike As, Se was detected in only nine percent of the 604 samples analyzed by the Texas Water Commission, the USGS, and the USEPA Region 6. In both unfiltered and filtered water samples, Se concentrations did not exceed the 5 µg/L (or ppb) safe guideline for chronic toxicity in freshwater organisms. Only one sample collected in 1994 in the Neches River measured 7.32 µg/L. Finally, the overall trend of aqueous Se concentrations shows an increase over time. Although this observed trend suggests an increase in Se, improvement in both the sensitivity and recovery efficiency of analytical techniques used in the past decade could also produce a similar trend.

In sediments and biological tissues, Se was detected only in a very limited number of samples. A total of 17 samples (14 sediment and three biological tissues) exhibited Se concentrations above the detection limits of used techniques. In sediments, Se concentrations ranged from 0.003 to 1.55 mg/kg, and this range falls far below the 5 mg/kg guideline to protect aquatic life. Se levels in two biological samples analyzed by USEPA Region 6 measured 1 and 2.1 mg/kg dry weight, while the only sample in the USGS database contained 5.1 mg/kg (wet weight).

Based on the aqueous data, Se does not seem to be an element of immediate concern in BITH. However, the very limited number of data points does not allow one to conclude one way or the other. Further monitoring is recommended for this element.

Cadmium (Cd): Cd data compiled in this study come from the analysis of 554 samples collected from 1970 to present. Cd levels in most analyzed samples were below the analytical detection limits, with only 16 percent of the samples showing measurable Cd concentrations.

In the aqueous phase, the temporal trends of Cd concentrations in non-filtered and filtered samples are characterized by high values in the the 1970s followed by a decrease in later years. Cd concentrations determined on non-filtered samples ranged from 0.3 to 20 µg/L (*average=5.30; median=1.5; n =36*). Cd concentrations in filtered samples ranged also from 0.3 to 20 µg/L (*average = 2.52; median=2.0, n=35*). Unlike As and Se, Cd samples can easily be contaminated during collection, handling, storage, and analysis. The temporal trends of both total and dissolved Cd show the highest values in the beginning of the monitoring program (average = 8.87 µg/L in pre-1986 data) and then decreasing over time (*average* = 2.16 µg/L in post-1986 data). This trend could be explained, at least partly, by recent improvements in the way samples are collected and processed. Therefore, this might not necessarily suggest a decline in pollution. However, the average dissolved Cd concentration of 2.19 µg/L obtained from samples collected after 1986 suggests that the USEPA proposed safe guidelines for both acute

(2.0 µg/L) and chronic (0.25 µg/L) toxicities may have been exceeded in some locations of the park.

In sediments, the small number of samples with Cd levels above analytical detection limits can be divided into two groups. From 1974 to 1997, the Texas Water Commission detected Cd in six sediment samples with concentrations ranging from 0.09 to 1.0 mg/kg (*average=0.5*). All six samples were collected from a single location in the Neches River. These results also show a steady decrease in Cd concentrations over time. A second set of data reported by USGS on the <63 µm fraction of sediment samples collected from 1992 to 2002 in the Neches River, Menard Creek, Trinity River, and Pine Island Bayou confirmed the above trend with values averaging 0.2 mg/kg (*n=4*) in 2002.

Biological tissues have been poorly investigated for Cd levels in BITH, and only two data points were found in the databases. These two values are reported by the USGS for fish samples collected in 1992 in the Trinity River (0.7 ng/g) and Menard Creek (2.8 ng/g). The trends described for Cd concentrations in water and sediments could be suggestive of an improvement, resulting in reduced bioaccumulation of Cd. However, additional data on Cd in biological tissues are necessary to verify this suggestion.

Copper (Cu): There were 469 Cu samples collected and analyzed over a period of nearly 30 years in BITH, but only 58 percent of the analyzed samples contained Cu in levels above analytical detection limits. The temporal trend of Cu concentrations in the filtered water fraction decreased over time, and the 9 and 13 µg/L safe guidelines for chronic and acute toxicities to aquatic life were exceeded from 1970 to about 1981 (dissolved Cu concentrations up to 100 µg/L). These numbers then decreased over time to values below the previously mentioned guidelines. In contrast, non-filtered samples showed an initial decrease in Cu concentrations, followed by a peak in late 1980s. Unfortunately, the collection of these total Cu data apparently ended at that point.

In bottom sediments, Cu was detected in 45 samples collected between 1974 and 1997 by the Texas Water Commission and the USEPA Region 6. In addition, the USGS database contained six data points with two samples collected in 1992 and four in 2002. Values listed in these two data sets are mentioned here separately because the former is based on the analysis of whole sediment samples, while the latter was determined on the <63µm sediment fraction. Cu concentrations in the first data set varied from 0.75 to 85.95 mg/kg dry weight (*n=45; average 12.77; median=8.1*) and were determined on samples collected from the Neches River. The USGS sediment data in wet weight had an average concentration of 1.2 mg/kg (*n=6*) for samples collected from Pine Island Bayou, Menard Creek, and Neches and Trinity rivers.

Similar to As, Cd, and Se, the determination of Cu in biological tissues remains limited to the analysis of a very few samples by the USEPA Region 6 in 1980 (*n=4*), and by the USGS in 1992 (*n=2*). Unfortunately, this limited number of data points cannot be used to derive conclusions with regard to the potential risks to aquatic organisms and waterfowls in the studied systems.

Lead (Pb): Pb was detected in 199 samples out of the 528 collected from different environmental compartments in BITH.

Overall, aqueous Pb concentrations averaged 8.22 µg/L (*range: 0.19 – 200; n=52*) and 63.77 µg/L (*range: 1 – 2050; n=71*) in filtered and non-filtered samples, respectively. The USEPA safe guidelines for Pb are 2.5µg/L for chronic toxicity and 65µg/L for acute toxicity, based on dissolved concentrations. Although the Pb level for acute toxicity was exceeded in only one sample, the 2.5 µg/L for chronic toxicity to aquatic life was exceeded in a large number of samples, including those collected in the 1990s.

This interpretation of the data is only relevant if the data are considered to be reliable. As discussed previously, the sampling methods for Pb and Hg have improved considerably in the past two decades. In general, data obtained prior to 1990 are not considered reliable. The lowest Pb concentrations occurred in the past two decades, while earlier measurements exhibited peak values reaching 200 µg/L (filtered) and 2050 µg/L (non-filtered). Although the decrease in environmental Pb has been observed since the ban on leaded gasoline, sampling and analytical improvements over time likely contribute to the observed decreasing trends.

Finally, Pb concentrations in sediments ranged from 1.3 to 867 mg/Kg dry weight (*average = 46.97 mg/Kg; n=43*). Similar to the other trace elements described, Pb data obtained on biological tissues were limited to only six samples.

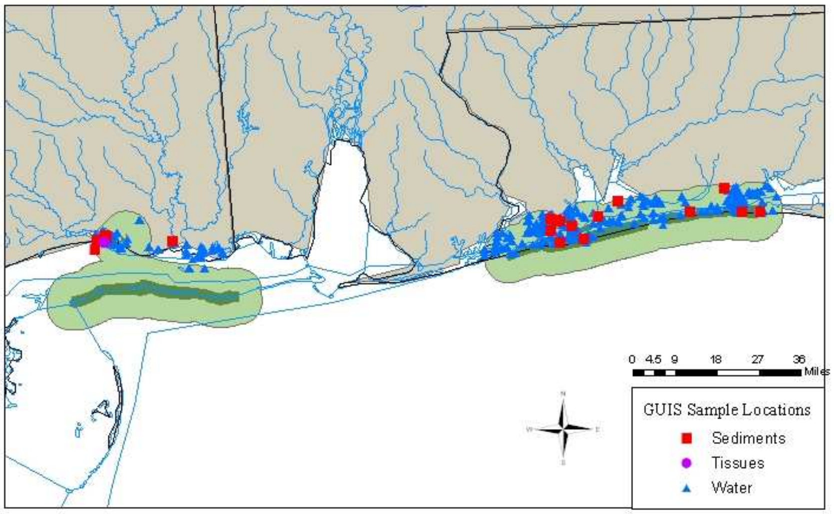
Mercury (Hg): Hg concentrations were determined in 633 samples and detected in about 29 percent of the analyzed samples. Compiled data extend from the early 1970s to the late 1990s. Total Hg concentrations averaged 1.98 µg/L (range: 0.01 – 96; n=70) in non-filtered samples and 0.38 µg/L (range: 0.02 – 2.8; n=46) in filtered samples. These values are very high and they exceed the safe guidelines for aquatic life in most cases. However, Hg is one of the metals that require extreme care in all steps of analysis. Unfortunately, most of the data on aqueous Hg reported prior to 1985 were prone to contamination and are therefore considered inaccurate. This is widely accepted within the scientific community, and the aqueous Hg data determined prior to the use of metal-free ultra clean techniques are considered unreliable. This observation suggests that "actual" numbers in the database under consideration are likely those obtained in the late 1980s and thereafter. Therefore, the decreasing trend that is observed over time with these data could be due to the progressive introduction of metal-free sampling and analytical techniques over the years.

Unlike water samples, sediments are less prone to contamination by Hg, and historic data tend to be more accurate for solid samples. Measured Hg concentrations ranged from 0.006 to 10 mg/kg (*average = 0.51; n = 32*) in BITH. A large number of analyzed samples exceed the 0.2 mg/Kg guideline criteria for sediment quality.

Only six data points were found for Hg concentrations in biological tissues, and two fish samples exhibited Hg concentration above the advised safe consumption limit of 0.5 mg/kg.

Finally, it should be noted that the Hg species of most serious concern in natural systems is methyl-Hg. This is due to methyl-Hg's ability to bio-accumulate in living cells, to bio-magnify through different trophic levels, and to impact the nervous system in biota. Unfortunately, no methyl-Hg measurements have been conducted on samples collected in BITH or in any of the other park units considered in this study. NPS should plan a more efficient monitoring of Hg in these parks, and most importantly, to collect methyl-Hg data when measuring total Hg concentrations.

B. Gulf Islands National Seashore (GUIS)



1. Persistent Organic Pollutants (POPs)

The Gulf Islands National Seashore (GUIS) extends along the Gulf of Mexico coastal zones of parts of three southern states, Florida, Alabama and Mississippi. Although much of the land surrounding GUIS is only moderately populated, the areas near the Florida units are experiencing some of the most rapid rates of urbanization in the country. Pensacola Bay and Mobile Bay are two notable bodies of water located adjacent to GUIS, and they represent potential sources of waterborne contamination to GUIS. There do not appear to be any significant air pollution sources in the region that could influence the deposition of POPs to GUIS.

Reportable results for POPs in the GUIS environs have been few and far between over the past thirty years. Very low concentrations of chlorinated pesticides such as chlordane, DDT and DDE (a metabolite of DDT) were detected in water, but the numbers of data points were too few to allow for any interpretive comments. Analyses for chlorinated pesticides in water are typically performed using a gas chromatograph in connection with one of three very sensitive detectors: electron capture, electrolytic conductivity, and mass spectrometer. These detectors allow the recording of data in the sub-ppb to parts per trillion (ppt) concentration levels. Typically, while such reports are valid from an analytical chemistry perspective, they may or may not be of concern from a toxicological or ecological perspective. Thus, the few data seen for chlorinated pesticides in water over the past quarter-century or more were in the less than 1 μg/L level in water. These are very low concentrations, but the State of Florida Surface Water Quality Criteria provides limitations for these compounds in Class III Marine waters (these include the Florida waters of GUIS) in the sub-ppb and even sub-ppt range (see Table 5). Thus, while the data were barely detectable, they would be of regulatory interest to the State of Florida.

More current monitoring would be needed to determine if such chlorinated pesticide concentrations are present at this time.

Chlordane and DDD (another metabolic degradation product of DDT) each had one relatively low value (less than 500 µg/kg or 500 ppb) recorded in bottom sediments in the GUIS environs. Chlorinated hydrocarbon compounds are hydrophobic (or, essentially insoluble in water), and therefore tend to adsorb onto particles or be taken up by organisms. Because of this tendency, they inevitably end up in bottom sediments. The very few values reported here do not indicate any immediate concerns for chlorinated hydrocarbons, but the database is far too limited to make any more definitive statement. Currently, there are no state or Federal regulatory criteria or standards in effect for POPs in sediments.

Very few additional detectable POPs data were available in the database. However, there were several very low concentrations of some polynuclear aromatic hydrocarbons (PAH) in water. Reported during the 1990's with only two sampling dates involved (not statistically significant), concentrations of anthracene, benzo(a)pyrene, and fluoranthene along with a non-PAH compound, hexachlorobenzene (listed by the Stockholm Convention on POPs), were found at concentrations near or at 1 µg/L. These values do not exceed the Florida Water Quality Criteria for individual, one-time, concentrations, but Florida's criteria on an annual average basis are somewhat lower. With minimal data points, no more definitive statements can be made at this time.

2. Heavy Metals

The levels of metals in biological tissues and, to some extent, in sediments have been poorly documented in GUIS. Most of the compiled data are related only to the metal content of surface waters.

Arsenic (As): There were 65 data points found for As concentrations in waters, less than 10 for sediments, and none for biological tissues. Aside from three isolated peak values with As concentrations less than 40 µg/L, the overall trend remained flat over time with concentrations less than 10 µg/L.

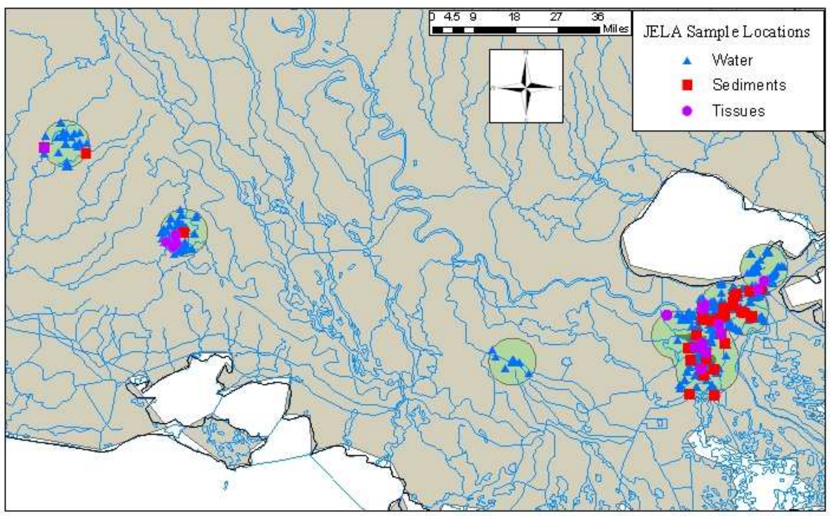
Selenium (Se): There were 110 data points compiled for Se concentrations in the aqueous phase. The numbers ranged from 1 to 60 µg/L (average=16.06 µg/L). There were almost no data obtained from the analysis of sediment samples (n=2), and none for biological tissues (n=0).

Cadmium (Cd): Cd was primarily detected in non-filtered (n=76) rather than in filtered (n=5) water samples. Therefore, only the total Cd concentrations from non-filtered water samples are mentioned for GUIS. The range of total Cd concentrations was from 0.1 to 12 µg/L. Cd concentrations increased up to 10 µg/L in 1987, and then decreased to values of less than 5 µg/L from 1988 to 1998. In recent years, Cd concentrations in total water samples in GUIS have peaked at the highest recorded values (greater than 15 µg/L). For sediments, 14 data points were identified, ranging from 0.1 to 12 mg/kg (average=2.17). No Cd data on tissues were found for GUIS.

Copper (Cu): There were no biota data for Cu found in GUIS, but Cu concentrations have been monitored in water and sediments. In filtered water samples (n=20), Cu concentrations ranged from 1 to 10 µg/L. In non-filtered samples (n=130), Cu levels ranged from 0.61 to 122 mg/kg. In sediment, a general decreasing trend is observed from about 574 mg/kg in the early 1980s to values of less than 0.3 mg/kg in the late 1990s.

Lead (Pb) and Mercury (Hg): Both Pb and Hg show increasing trends in the 1990s. Assuming that the current data collected are accurate, these trends indicate the probable addition of new Pb and Hg in the water bodies of GUIS. In sediments, the concentrations of Pb (0.36 to 2454 mg/kg) are orders of magnitude greater than the concentrations of Hg (0.1 to 1 mg/kg). Pb might be a serious problem in certain locations of this park. With regard to Hg, the lack of methyl-Hg data limits the ability to better predict the potential Hg toxicity to aquatic life.

C. Jean Lafitte National Historical Park and Preserve (JELA)



1. Persistent Organic Pollutants (POPs)

JELA is situated in six locations throughout the State of Louisiana. There were several POPs (predominantly legacy chlorinated hydrocarbon pesticides) detected within the search boundaries of this park. Most of the samples were collected either from the Mississippi River at Luling, LA (in the greater New Orleans area, located just south and slightly west of Kenner, LA), or from Bayou des Cannes near Eunice, LA (in south central LA, located north and west of Lafayette, LA). The POPs data for JELA were obtained from both the USGS and the USEPA.

In surface waters, reportable data from over 50 samples were found for two POPs, atrazine and metolachlor, used for weed and pest control, respectively. These data were collected by the USGS during the period of 1998 through 2002 from the Bayou des Cannes. Atrazine concentrations were very low, ranging from <0.01 to 1.2 µg/L or ppb, with metolachlor showing similarly low values in the 0.005 to 2.04 µg/L range. These data indicate that agricultural activities upstream of the sample collection site are the most likely sources of the chemicals.

The analytical techniques used for these two POPS (as well as most of the other POPs discussed in this report) are sufficiently sensitive to be able to detect sub–ppb or even ppt concentrations. However, the toxicological significance of such consistently low levels remains uncertain. The low levels mentioned above do not appear to be of immediate concern.

Approximately 40 sediment samples were collected during the period of 1975–1984 by the USGS from various sites in the Mississippi River near New Orleans. The analytes of interest during that monitoring program included dieldrin, DDT, DDE, and chlordane. Water in the Mississippi River represents drainage from a watershed that encompasses about two–thirds of the continental U.S. landmass, where agriculture is a major land use. It is therefore difficult to ascribe a specific point source to these pesticides, aside from indicating that their origins are chemicals applied for agricultural pest control over many decades. Finding these chemicals in Mississippi River sediments is not unusual, nor is it unexpected.

The sediment POPs data were reported in units of μg/kg (dry weight), which are also listed as ppb in the database. The results for these detected chemicals were as follows: dieldrin (mostly < 0.5 to a maximum of 3.8); DDT (mostly < 4 with a one-time maximum of 14 in 1975); DDE (mostly < 4 with a one-time maximum of 16 in 1979); and chlordane (mostly < 10 with a one-time maximum of 25 in 1978). These are relatively low values and, in the absence of any regulatory sediment quality criteria, no comments can be made of their significance. These samples were collected during the period when these pesticides were being banned or restricted. However, it is expected that trace levels such as these will continue to be detected for many more years both within the U.S.A. and globally because of their long persistence in the environment.

Essentially all of the legacy chlorinated POPs that have been banned or restricted through the Stockholm Convention on POPs agreement have minimal water solubility, earning them the technical term “hydrophobic.” The net result of this physical-chemical property is that these compounds tend to bioaccumulate through the food chain and inevitably end up at detectable levels in fin fish and shellfish. Each aquatic organism has its own particular feeding habits, and such discussion is beyond the scope of this report. Further, the USGS and the USEPA data do not indicate particular fin fish or shellfish species from which "tissue" samples were collected and analyzed. The databases simply indicate "tissue," with most results reported on a "wet" or "as is" tissue basis (meaning that the tissue was not dried in an oven prior to weighing, which is typically standard protocol for such samples; sediments, in contrast, are typically dried to constant weight at 105 degrees Celsius). The tissue data for JELA, described below, were reported either on a mg/kg or a μg/g dry weight basis (ppm) in the databases.

A group of 39 data samples in tissues from the Mississippi River near Luling, LA for a group of POPs pesticides including DDT, DDE (a degradation metabolite of DDT), dieldrin, endrin, heptachlor, and toxaphene were reported over a 17 year period from 1969 to 1986. The data values for DDT and DDE ranged from as low as 0.01 to near 0.5 ppm. Typical results, especially in later years, were reported at concentrations that fell below 0.1 or 0.2 ppm. The results for dieldrin, endrin and heptachlor were all in the range of 0.01 to <0.5 ppm, indicating exposure of aquatic organisms to low levels of these chemicals over time. There are currently no Federal regulatory standards for these POPs in tissue. Each state must determine their own consumption-based criteria, and states typically depend on state health officials to determine the human health threat from eating frequent meals based on specified contaminant levels in fin fish or shellfish. The data reported above for JELA appear to be sufficiently low as to not merit further concern.

Results for hexachlorobenzene in 15 tissue samples collected from 1977 to 1986 were similarly low, with most found to be below 0.1 ppm. Data for toxaphene during the period of 1971 to 1986 showed low values in the 0.1 ppm range. However, there were periods during the mid-1970s when tissue concentrations of toxaphene were found in the 2 to 4 ppm range, with one high outlier at almost 13 ppm. This latter value, if replicated and repeated, would normally trigger a health related fish consumption advisory, but results recorded in the early 1980s returned to typical "background" levels. Thus, there are no present concerns about these pesticide POPs concentrations in tissue samples dating back to the mid-1980s.

Polychlorinated biphenyls, or PCBs, are a group of industrial chemicals that are listed on the Stockholm Convention on POPs list. There were many millions of pounds of PCBs sold for mostly "closed' system uses (transformer dielectric fluids; hydraulic fluids; components of paint, ink and adhesives; dye solvents for carbonless copy paper; etc.) through the mid-to-late 1970s before their manufacture and use in the U.S.A. was banned pursuant to the Toxic Substances Control Act passed in 1976. These materials were viscous liquids consisting of a large number of individual compounds that were sold on the basis of their percentage of chlorine, by weight, in specially produced formulations. For example, a mixture of PCBs that contained 42 percent by weight of chlorine was labeled as PCB 1242, with the “42” representing that percentage of chlorine. Each such formulation could contain dozens of individual congeners or unique chemical compounds. The PCBs have become global pollutants through various mechanisms, including direct release from industrial facilities in wastewater effluents as well as release into the atmosphere due to the volatility of the chemicals when exposed to the air. Early in the search for the distribution of these POPs in the environment, analytical chemists used the output produced on a gas chromatographic chart, called a chromatogram, from an analyzed sample and compared this output with chromatograms produced by authentic standards of the different commercial mixtures. The chromatogram of the standard that most closely matched that from the field sample led to the assignment of the identity of the POP in the sample. There was considerable art associated with the science of PCB analyses in the early days, which included the period that many of the data points in the USEPA database were recorded.

Four different commercial mixtures of the PCBs were reported by the USEPA during the period 1973–1986 from tissues collected near Luling, LA. These included the PCB formulations identified as 1242, 1248, 1254 and 1260. In this situation, the tissue results were reported on a "dry weight" basis, which is somewhat unusual. As many as 39 tissue results were given for the 1254 formulation, while only 10 were recorded for the 1242 mixture. The results were typically in the 0.1 mg/kg or ppm range, with an outlier occasionally appearing. These included one sample of the 1260 mixture found at the 1.5 ppm level and one of the 1254 mixture recorded at 6.6 ppm in 1972. It is highly likely that the organisms from which the tissue samples were extracted accumulated these POPs from suspended and deposited sediments, as well as from other constituents of the food chain that the organisms consumed. Except for the 6.6 ppm value, all of the other data points would be considered normal background values and probably would not have attracted much attention. The 6.6 ppm value, if it had been taken from Lake Michigan, one of the five Great Lakes, would have exceeded a consumption advisory that was placed on fish caught there in the 1980s. Since the database did not have any more recent data for PCBs or for most of the other POPs discussed here, a survey of POPs in the tissue of fin fish and shellfish collected from waters in and adjacent to JELA might be advisable to determine current levels. Park managers will then have an opportunity to assess the current degree of contamination present in waters that are important to park activities.

2. Heavy Metals

Arsenic (As): JELA contained the largest number of samples analyzed for As. Approximately 74 percent of the 1,146 samples tested contained As above analytical detection limits. In the aqueous phase, both the total and dissolved As concentrations show a temporal trend characterized by peak values (up to 50 µg/L) in the early 1970s and in the mid-1980s (up to 218 µg/L). On average, however, As concentrations (3.35µg/L for filtered and 4.04 µg/L for unfiltered samples) in water bodies near or within JELA contain As in levels that are mostly below the safe guidelines for toxicity on aquatic life. A large number of solid samples (i.e., sediment and biota) was also analyzed, but As was detected only in 75 samples for sediments and 15 for fish tissues. Except for a single data point with a value of 380 mg/kg measured in 1988, As concentrations in sediments from 1975 to 1989 varied rather consistently between a narrow range of numbers with lows of about 1 mg/kg and highs of 14 mg/kg. The average value determined for sediment data after excluding the above mentioned outlier is 6.6 mg/kg (range: 1 to 14 mg/kg; n=74). The limited number of data points for biological tissues averaged 0.176 mg/kg (range: 0.05 to 0.31 mg/kg; n=15) for a monitoring period which started in 1977 and ended apparently in 1986. Based on these data, overall As levels are not of concern in JELA. Unfortunately, this study was not able to find As data in JELA for more recent years (i.e., 2000s).

Selenium (Se): A total of 394 Se samples were collected in JELA, but only 24 percent of these samples could be considered “actual” data. The majority of the actual data points were sampled in the aqueous phase, as Se was only reported in sediments for one data point. With the exception of 3 samples, the 15 fish samples with positive Se concentrations were at or just slightly above the detection limit of the analytical technique used. In water, Se was detected in about 60 samples with a concentration range of 0.2 to 2 µg/L for the dissolved fraction, and 1 to 90 µg/L for total concentrations. With regard to temporal trends, both water and fish data show peak values in the mid-1980s, but more recent values are within the range of the so-called background values.

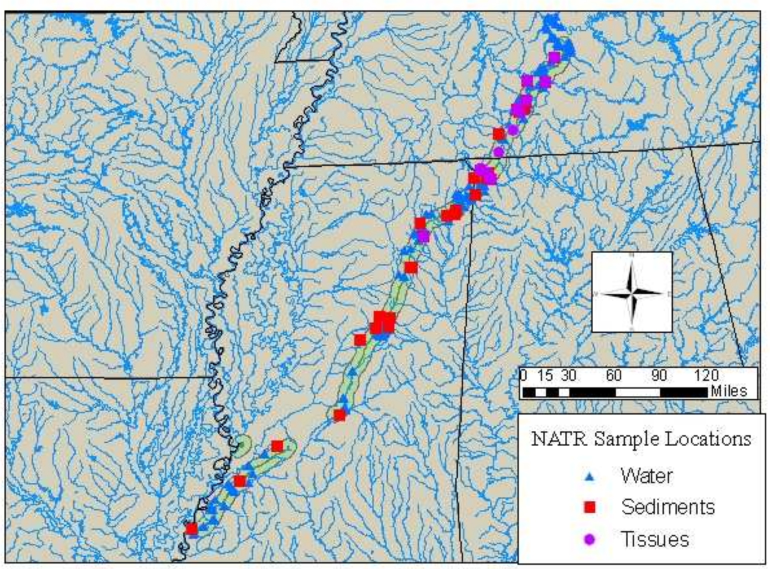
Cadmium (Cd): Cadmium data in water show a decreasing trend over time with both total and dissolved concentrations falling below 5 µg/L in the early 1990s. In sediments, Cd concentrations were rather constant from 1975 to 1982 and from 1985 to the present, with concentrations ranging between 1 and 3 mg/kg. Peak values (up to 14 mg/kg) were observed only in 1983 and 1984. The data set for fish tissues contains 15 data points, with all values below 0.5 mg/kg. Based on these data, it appears that Cd is not of concern in JELA.

Copper (Cu): Cu was detected in 369 of the 490 samples analyzed. In the aqueous phase, Cu concentrations show no consistent trend towards either a decrease or an increase. The determined levels are in the high ppb (µg/L) to ppm (mg/L) range. Total concentrations ranged from 1 to 150 µg/L, while the dissolved Cu ranged from values at the detection limit to two peak values at 285 and 1700 µg/L. The dissolved Cu concentrations often exceeded 9 and 13 µg/L, which are the USEPA proposed safe guidelines for chronic and acute toxicities to aquatic life in freshwater (see Appendix F).

Cu concentrations in both sediments and biota show a slight overall increase over time, with sediment values varying between 10 to 40 mg/kg since 1984. In biological tissues, Cu concentrations had been below 1 mg/kg from 1979 to 1985. The last data point obtained in 1986 showed a concentration of 5 mg/kg. Unfortunately, this jump cannot be confirmed as a tendency towards an increase in Cu levels in biota because there are no tissues data for Cu in JELA after 1986.

Lead (Pb) and Mercury (Hg): Lead and mercury are discussed together because of the similarity in the trends of obtained data in nearly all environmental compartments. The sediments and biota data are probably good, and they tend to show a decline over time. However, data obtained from the analysis of water samples prior to the mid-1980s remain suspicious due to obsolete sampling methods, particularly for Hg. Therefore, temporal trends that include data prior to the late 1980s are probably not accurate. The more recent data obtained since the 1990s were likely determined using ultra-clean conditions, and are therefore more reliable. Once again, there is a total lack of methyl-Hg data, an important parameter with regard to the environmental impact of Hg.

D. Natchez Trace Parkway and National Scenic Trail (NATR)



1. *Persistent Organic Pollutants (POPs)*

Covering parts of three states (Mississippi, Alabama and Tennessee), NATR proved to be a challenge for data acquisition due to its morphology, which is a long and relatively thin ribbon of a parkway/trail which crosses numerous streams and creeks. Because of this morphology, few recordable data points were found and these involved POPs in tissue samples retrieved by State of Tennessee regulatory officials from the Guntersville Reservoir along the Tennessee River.

During the period 1971 – 1973, the POPs DDT, DDE and DDD were analyzed in up to 30 tissue samples from the location mentioned above. The data, recorded as mg/kg "wet weight," showed POPs results in the range of 0.01 to near 4 ppm with the exception of one high outlier in 1973 that had a DDT content of near 10.5 ppm. The majority of the data for these three POPs during this two year sampling period were less than 1.0 ppm.

A few other results for some pesticide POPs were found but these were few and far between at a variety of sampling locations. As an example, two tissue samples in 1998 from Town Creek near Tupelo, MS, had values of DDD that were in the range of 10 to 22 ppb on a wet weight basis, while DDE levels in the same tissues were somewhat higher at about 75 and 200 ppb. One of these samples gave a DDT reading of 16 ppb. However, these data points provide an insufficient statistical basis to render an opinion about the POPs status in that waterway.

The NATR represents a diagonal bisect across the State of Mississippi through a region that has significant agricultural activity. Given the likelihood that various pesticides have been used over many decades, park managers might want to seek additional, targeted POPs data from any waterway that crosses the parkway and trail which might be used frequently by NATR visitors, especially for recreational fishing.

2. Heavy Metals

Arsenic (As): Only about 10 data points were found for As concentrations determined on filtered samples. In contrast, 173 data points were found for non-filtered samples. The range for the latter varied from 0.001 to 10µg/L, with an overall decreasing trend over time. Data sets for sediments and biota contained only a very limited number of data and are not discussed here.

Selenium (Se): From 1973 to 1993, Se concentrations have been mostly <5µg/L. After 1993, Se concentrations increased and remained >5µg/L with peak values reaching 15 to 35 µg/L. A similar trend is observed for both sediment and fish data. However, unlike the water data which extend up to the year 2000, sediments and biota data stop in the early 1990's.

Cadmium (Cd): Dissolved concentrations averaged 0.1µg/L. Total concentrations show a few peaks with values between 5 and 10 µg/L in the beginning of the monitoring program. In recent years, Cd values have decreased below the 5 µg/L level. With regard to solid matrices, only 2 data points were found for sediments and they are not discussed here. However, 36 data points obtained from the analysis of fish tissues spanned a range of 0.01 to 1 mg/kg and showed an overall increase over time, with most values being <0.2 mg/kg. No safe guideline values appear to be exceeded.

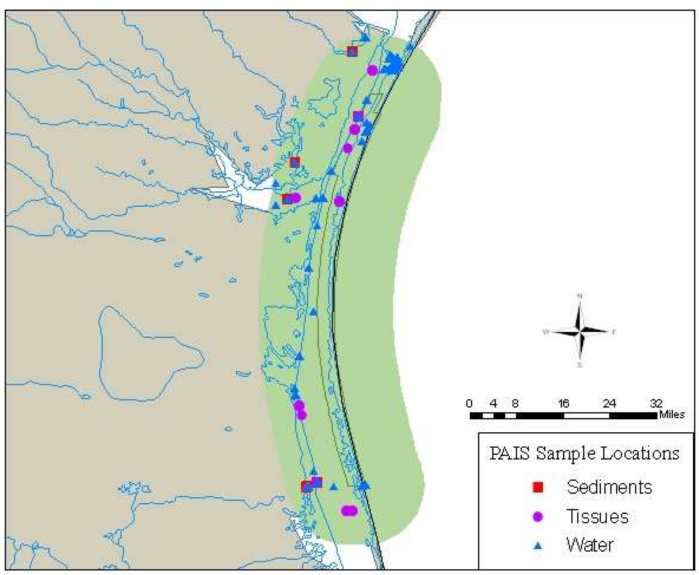
Copper (Cu): The concentrations of Cu in water samples show quite regular peaks and lows with most of the highest values recorded in the 60's and 70's, besides a 160 µg/L peak in the 90's. Current levels are < 20µg/L. In sediments, a decrease in concentration is observed over time from high of about 60 mg/kg to <5 mg/kg. Cu levels in biological tissues (n=36) are mostly <2 mg/kg with only 5 points exceeding this value.

Lead (Pb): In filtered samples, Pb concentrations ranged from 1 to 33 µg/L (average=3.4; n=30) and in non-filtered from 0.7 to 300 µg/L (average=12.89; n=182). Lead data obtained from sediment analysis show an overall decrease over time and range from 0.94 to 340 mg/kg (average=18.58; n=160). A similar trend is seen for Pb levels in biological tissues, with concentrations ranging from 0.9 to 20 mg/kg (average=1.4 and n=73).

Mercury (Hg): The range of Hg concentrations varied from 0.1 to 2.3 µg/L (average = 0.34; n=48) in filtered water samples and from 0.1 to 17 µg/L (average = 1.16; n=65) in the non-filtered fractions. These numbers show an overall decrease over time, and similar to the earlier discussion of Hg data they might not be accurate enough to be used for assessing the general trend and potential for toxicity to aquatic life.

In sediments, Hg concentrations (range: 0.02 – 20, average = 2.20; n=20) decrease from high values recorded in the beginning of the monitoring program. Hg concentrations in biological tissues vary from 0.1 to 2.7 mg/kg, with an average value of 0.36 mg/kg (n=23).

E. Padre Island National Seashore (PAIS)



1. Persistent Organic Pollutants (POPs)

There were insufficient data in the databases to warrant any substantive comments about POPs in the waters, sediments or tissues of organisms in the PAIS environs. The north and west borders of PAIS might be expected to be a potential source of POPs related to agriculture. In addition, the port activity in the Corpus Christi area might be a POPs contributor, especially since oil refining activity is present there. Further, there is considerable oil drilling activity east of PAIS in the Gulf of Mexico, and this might provide a potential source of polynuclear aromatic hydrocarbons due to periodic releases of crude oil during drilling and transport activities.

The absence of such significant and relevant data indicates that either few samples have been collected in recent years, or such data have not yet been entered into accessible databases. In any event, prudence indicates that a one-time reconnaissance sampling program be initiated for PAIS to ensure that at least some contemporary data be acquired to provide reference points for possible future sampling activity.

2. *Heavy Metals*

Similar to the POPs, the monitoring of heavy metals in PAIS has been very limited, and in most cases, data for recent years (i.e., 1990s and 2000s) are lacking.

Arsenic (As): In the aqueous phase, only a few data points corresponding to As concentrations in non-filtered samples were compiled. These data were obtained from samples collected from 1970 to the mid-1980s, and the determined concentrations ranged from 3 to 10 µg/L, averaging 6 µg/L (n= 10). In sediments, 24 data points were compiled (range: 1 to 7.8 mg/kg; average = 3.88; n=24), and there were only two data points for As in fish tissues (average = 2.1 mg/kg). These limited data sets do not allow comments on trends over time.

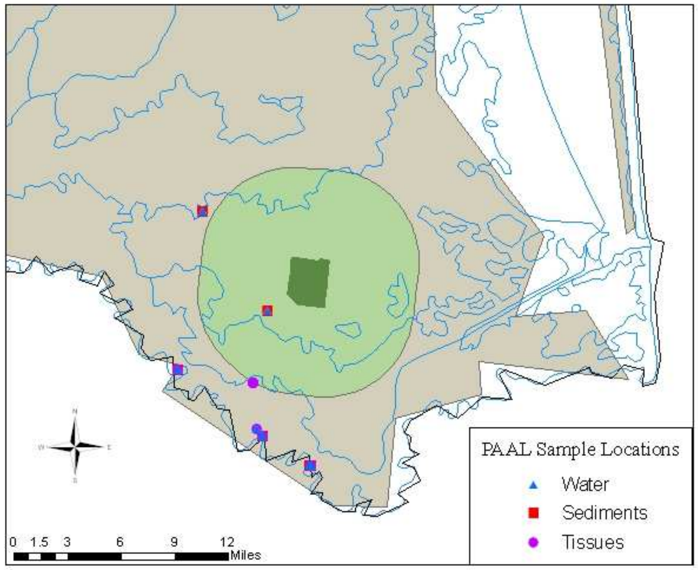
Selenium (Se): For this element, only three data points were found for the aqueous phase, seven for sediments, and five for biological tissues (fish). In addition to being very small, these data sets do not cover a wide time period. Therefore, they cannot be used to comment on either temporal trends or potential impacts on organisms. To some extent, the above observations apply to cadmium (Cd), lead (Pb), and mercury (Hg). Consequently, these elements will not be discussed further. It is recommended that a more consistent monitoring program be established for these elements in PAIS.

Copper (Cu): Starting in 1970s, 129 Cu samples were collected in PAIS and Cu concentrations above analytical detection limits were detected in 94 percent of these samples.

In the aqueous phase, Cu concentrations in non-filtered samples increased from the mid-to-late 1970s before decreasing in the 1980s. These concentrations ranged from 12 to 2500 µg/L (average=811.63; n=76). Numbers obtained from filtered samples show an overall decrease over time. Unfortunately, this observation is based on a very small data set (range: 7 to 43; average=18; n=8).

Limited data sets are also available for sediments (n=27) and biota (n=10). In the former, Cu concentrations range from 1.6 to 46 mg/Kg (average = 15.75 mg/kg), and in the latter, they range from 0.68 to 8.6 mg/kg (average = 2.88 mg/kg). Overall, it appears that a more consistent monitoring program is needed for PAIS.

F. Palo Alto Battlefield National Historic Site (PAAL)



1. Persistent Organic Pollutants (POPs)

Located in south Texas near the Rio Grande River, PAAL is a relatively new NPS unit for which very little in the way of water analysis data were recovered. In fact, only data for atrazine were found in the USGS database, originating from 33 samples collected during 1996 – 2003 in the Rio Grande River near Brownsville, TX. Since South Texas is an agricultural area, it is not surprising that the herbicide, atrazine, would be found in low levels in the river. The levels were very low, though, ranging from 0.005 to 0.306 ppb or from 5 to 30 ppt. These very low results, while indicative of the agricultural influences on the Rio Grande River above the area near PAAL, do not indicate anything of concern for PAAL at this time.

There were many recordable tissue analyses found in the USEPA database, originating from both USEPA and State of Texas agency sample collections. The inclusive period for these data was 1969–1986, although some of the individual POPs series did not cover the entire period of this particular sampling series. All of the tissue samples were collected from the Rio Grande River in the vicinity of Mission, TX which is located upstream of Brownsville, TX. The results are summarized in the table below.

Name of POP	Number	Period	Results	Units, wet wt	Comments
cis-Chlordane	20	1976-1986	0.01-0.09	ppm	
trans-Chlordane	20	1976-1986	0.01-0.05	ppm	
total DDE	48	1969-1986	0.49-8.27	ppm	0.03 ppm; 1992-94
total DDT	45	1969-1986	0.01-0.94	ppm	
Dieldrin	45	1969-1986	0.01-0.5	ppm	
Endrin	42	1970-1986	0.01-0.06	ppm	
Heptachlor	45	1969-1986	0.01-0.45	ppm	
Hexachlorobenz.	20	1976-1986	all 0.01	ppm	barely detected
Mirex	14	1980-1986	all 0.01	ppm	barely detected

Name of POP	Number	Period	Results	Units, wet wt	Comments
PCB 1242	14	1973-1978	all 0.1	ppm	barely detected
PCB 1248	20	1976-1986	0.02-0.1	ppm	barely detected
PCB 1254	45	1969-1986	0.1-0.69	ppm	9 ppm in 1973
PCB 1260	28	1969-1986	0.1-0.27	ppm	
Toxaphene	38	1971-1986	0.01-1.37	ppm	

Table 6: USEPA and TCEQ tissues data for the Rio Grande River in the vicinity of Mission, TX which is located upstream of Brownsville, TX.

The single most noteworthy data point was the 9 ppm value for the PCB 1254 mixture in 1973. This is most likely an anomaly and could either be a transcription error in the decimal place or a laboratory analytical error. A PCB result this high would have had to come from an industrial source or a municipal source that would have included industrial inputs. Atmospheric deposition would not be responsible for such a high value, which, if sustained and repeated, would have required a health advisory from the state. For example, such a value would have prompted a health advisory if the sample had been collected from a fish in Lake Michigan. However, all other PCB results were less than 1 ppm which are typical for non-industrially impacted rivers. Given the agricultural history of this part of Texas, it is not surprising to find mostly trace levels of pesticides with the exception of one data point for 8.27 ppm of total DDE – something that would also have merited a health advisory had it been repeated. Data from a Texas agency in the 1992-1994 period showed much lower results of 0.03 ppm for DDE.

Most of the pesticides listed in the table above were seen at least once in one of the other NPS GULN park units that were discussed earlier and their presence on the Stockholm Convention on POPs list was indicated. Also on the Stockholm list from the table above is mirex, another legacy chlorinated hydrocarbon pesticide. Aside from the few comments made above, these findings represent tissue data that would be expected in a river that drains a border region between the U.S.A. and Mexico. It is apparent that a considerable amount of agriculture is practiced in this region, which likely results in the considerable application of pesticides.

2. Heavy Metals

Arsenic (As): In PAAL, As was analyzed in a total of 271 water, sediment, and biota samples and detected in 97 percent of these samples. Water data include total and dissolved concentrations, determined on non-filtered and filtered samples, respectively. For most of the water samples, total and dissolved concentrations were not always determined on a single sample nor were the samples collected at/from the same time/location. In PAAL, most water samples have been analyzed only for the dissolved As fraction. Obtained data show that total As concentrations range from 2 to 7 µg/L (average = 4.03 µg/L; n=35), while the analysis of 149 samples for the dissolved As fraction gave data spanning a much wider range from 2 to 15.1 µg/L (average = 3.94 µg/L). These values are below the safe guideline for toxicity on aquatic life. Arsenic was also detected in 21 sediment samples (range: 2.3 to 7.45 mg/kg; average = 4.56 mg/kg) and 17 fish samples (range: 0.05 to 0.945 mg/kg; average = 0.33 mg/kg). These numbers are within the range of values reported for most aquatic systems with no direct source of contamination.

Selenium (Se): Similar to As, Se concentrations in non-filtered and filtered water were determined on different samples, and nearly three times more filtered than unfiltered samples were analyzed. Obtained concentrations ranged from 1 to 2 µg/L (average = 1.09 µg/L; n=11) in non-filtered samples and from 0.3 to 7.53 µg/L (average = 1.62 µg/L; n=31) in filtered samples. These numbers should not be of concern as they do fall below the 5 µg/L level for chronic toxicity to aquatic life. Se concentrations in sediments ranged from 0.42 to 1.40 mg/kg (average = 0.69 mg/kg; n=8). These values are also below the 5 mg/kg considered high enough to result in chronic toxicity to aquatic organisms. The analysis of 19 fish gave Se concentrations that ranged from 0.11 to 72 mg/kg (average = 4.27 mg/kg), with the 72 mg/kg being rather an outlier along the temporal trend.

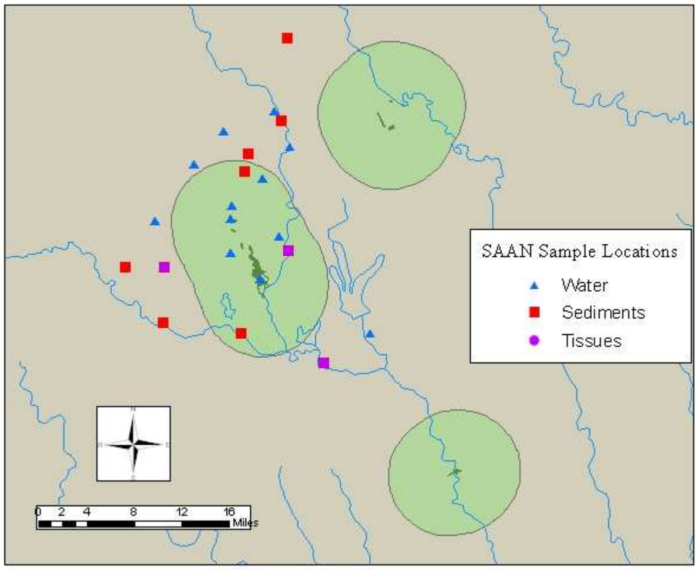
Cadmium (Cd): Cd data were obtained primarily on filtered samples in PAAL. Concentrations of dissolved Cd ranged from 0.02 to 2 µg/L (average = 1.0 µg/L; n=9), reaching values that can lead to both acute and chronic toxicities to aquatic life. Sediment data ranged from 0.009 to 0.03 mg/kg and averaged 0.014 mg/kg (n=16). Cd levels in fish tissues ranged from 0.03 to 0.9 mg/kg with an average value of 0.2 mg/kg (n=12). Overall, the data sets for Cd are rather small and will not be discussed further.

Copper (Cu): Copper was detected in 73 percent of the 225 samples collected from this park. In the aqueous phase, once again the emphasis was on the dissolved fraction with a total of 82 samples analyzed as compared to only 12 non-filtered samples. The compiled data can be summarized as follows. Cu concentrations in water ranged from 2 to 80 µg/L (average = 26.83 µg/L; n=12) in non-filtered samples and from 0.9 to 14 µg/L (average = 2.26 µg/L; n=82) for the dissolved fraction. The analysis of 21 sediment samples resulted in Cu concentrations ranging from 2.2 to 10.5 mg/kg (average = 7.03 mg/kg; n=21). Cu was also detected in fish tissues (range: 0.24 to 1.34 mg/kg; average = 0.633 mg/kg; n=18).

Lead (Pb): Dissolved Pb concentrations are the most relevant here since only 4 data points were identified for non-filtered samples. Measured dissolved Pb concentrations ranged from 0.07 to 20 µg/L and averaged 3.87 µg/L (n=23). Data from solid matrices varied from 3.4 to 44 mg/kg; (average = 11.19 mg/kg; n=23) for sediments and from 0.05 to 0.43 mg/kg (average = 0.18 mg/kg; n=17) in analyzed fish tissues. None of these values exceed most proposed guidelines for the environmental compartments under consideration.

Mercury (Hg): Hg data obtained from the analysis of water samples show very high values, but as discussed earlier, these numbers remain suspicious due to the antiquated sampling methods utilized prior to the mid-1980s. In these compiled data, Hg concentrations ranged from 0.01 to 2.26 µg/L (average = 0.37 µg/L; n=24) in non-filtered water samples, and from 0.01 to 7 µg/L (average = 0.182 µg/L; n=38) for the dissolved fraction. Once again, the sediment data tend not to support the high levels measured in water samples, in that sediment levels (range: 0.02 to 0.17 mg/kg; average = 0.066 mg/kg; n=15) are characteristics of non-contaminated systems while Hg levels in water compare to those reported for water bodies impacted by the use of Hg-amalgamation technique in gold mining. This suspicion is reinforced by the reported Hg levels in fish tissues (range: 0.027 to 0.257 mg/kg; average = 0.075 mg/kg; n=17), which are even below the targeted USEPA's goal of 0.3 mg/kg. Finally, there is a total lack of methyl-Hg data, an important parameter with regard to the environmental impact of Hg.

G. San Antonio Missions National Historical Park (SAAN)



1. Persistent Organic Pollutants

There has been considerable POPs monitoring activity conducted by the USGS in the general environs of San Antonio, TX, the focal point for several units of the San Antonio Missions National Historical Park (SAAN). Data retrieved from the USGS database represented water and sediment samples collected starting in 1968. Different time periods and different locations were found for the collection and analysis of various POPs, most of which were legacy chlorinated pesticides and herbicides. Additionally, a small number of disinfection by-products were identified that were most likely formed during the disinfection of wastewater at one or more wastewater treatment plants and then discharged in the wastewater to receiving waters.

Data for POPs in water were found in three different types of data sets, representing different inclusive sampling periods and also different combinations of field sites. To keep these data sets more or less intact, each combination will be discussed separately.

The first dataset (see Table 7) includes water samples that were collected from the surface waters in the San Antonio metropolitan area (Alazan Creek, Harlandale Creek, Leon Creek, Medina River, Olmos Creek, Salado Creek and the San Antonio River) and the San Antonio River at Elmendorf. These samples were taken at different frequencies and locations throughout the various sampling periods:

POP	No.	Period	Results	Units	Comments
2,4-D	212	1968-1995	0.01-2.6	µg/L	8.1 µg/L in 1970; most < 0.1 µg/L
2,4,5-T	292	1968-1987	0.01-2.2	µg/L	most < 0.01
Chlordane	223	1969-1999	0.1-1.9	µg/L	most = 0.1
DDD	137	1968-1986	0.01-1.3	µg/L	most < 0.05
DDE	138	1968-1986	0.01-1.1	µg/L	most were < 0.01

POP	No.	Period	Results	Units	Comments
DDT	229	1968-1986	0.01-6.6	μg/L	6.6 μg/L in 1971; most < 0.1
Dieldrin	250	1968-1986	0.01-0.14	μg/L	0.02 μg/L in 1992-1995
Heptachlor	29	1969-1985	0.01-0.04	μg/L	most = 0.01
Hep. epoxide	70	1969-1986	0.01-0.05	μg/l	most 0.01-0.03
Malathion	111	1970-1995	0.01-1.2	μg/L	most < 0.05

Table 7: Water samples collected from surface waters in the vicinity of San Antonio, TX. Data obtained from the project database, found on the CD-ROM associated with this report.

Most of the rivers and creeks involved in the monitoring program of the period shown in the table appear to have captured runoff from agricultural areas that was then flowing near, or through the San Antonio, TX area. Most of the concentrations were typical of low level values seen at those times. The few higher values noted under the "comments" section may have represented unusual conditions existing at those times or the samples may have included suspended sediment material (containing more pesticide than the water might under those conditions) that yielded extractable POP concentrations.

While these values do appear to be relatively low, comparison of the data with State of Texas water quality standards shows that some of the "higher" values in the table periodically exceeded "chronic" criteria for the protection of aquatic life. In fact, aside from 2,4-D and 2,4,5-T, there were at least one or more of the data for each of the other POPs that exceeded the chronic criteria or criteria established for the protection of humans based on consumption of water and fish or for the protection of fish. Since most of the data gathering by the USGS ended in 1986, aside from some additional data for two of the POPs that were gathered as late as 1999, it is not possible to make any definitive comment on the status of POPs in the waters that are near or adjacent to the SAAN units. Historically, some of the legacy chlorinated pesticide POPs certainly exceeded some of the State of Texas criteria but it is highly likely that much of the use of those legacy pesticides has been banned or controlled. As a result, we could expect current values for these POPs to be lower than those shown above. Only a contemporaneous monitoring effort at locations known to be in or near park boundaries will allow more definitive statements to be made as to the status of the aquatic life resources of the SAAN park units.

The second dataset (see Table 8) includes pesticide POPs that were sampled in water at a sub-set of three locations from the group listed above: Salado Creek in San Antonio, TX; Medina River near Somerset, TX; and the San Antonio River near Elmendorf, TX.

POP	No.	Period	Results	Units	Comments
Atrazine	136	1997-2003	0.005-2.28	μg/L	most <0.05
Metolachlor	61	1997-2003	0.001-0.033	μg/L	most < 0.01
Simazine	73	1997-2003	0.003-0.252	μg/L	most ≤ 0.01

Table 8: Pesticide POPs sampled in water at three locations: Salado Creek in San Antonio, TX; the Medina River near Somerset, TX; and the San Antonio River near Elmendorf, TX. Data were obtained from the project database located on the CD-ROM associated with this report.

The results in this second dataset indicate very low levels of three POPs, all related to agricultural activities. They are almost always less than 1 ppb, and none of these three POPs are listed in the State of Texas water quality standards. As a result, even though the results are fairly recent, there is no basis for concern for the concentrations indicated here.

A third dataset (see Table 9) appears to be based on a special survey of disinfection by-products (related, perhaps, to sewage treatment plant discharge) in water at two river locations: the San Antonio River at Elmendorf, Texas; and the Medina River in San Antonio, Texas. This dataset is unusual because of the combination of three traditional disinfection by-products with the pesticide malathion. The inclusion of malathion with the disinfection by-products appears to be coincidental. It is likely that there were two different monitoring programs being performed in the two rivers for different reasons, and the data were apparently combined for convenience into the same database. In any event, the results all indicate relatively low concentrations and do not appear to be of concern at this time.

POP	No.	Period	Results	Units	Comments
Bromodichloromethane	36	1992-1998	0.2-3.1	µg/L	3.1 µg/L in 1993
Bromoform	22	1992-1997	0.1-0.4	µg/l	most < 0.3
Chloroform	39	1992-1998	0.2-4.2	µg/L	4.2 µg/L in 1997
Malathion	29	1997-2002	0.005-0.107	µg/L	most < 0.01

Table 9: Data most likely from a special survey of disinfection by-products in water at two river locations: the San Antonio River at Elmendorf, TX; and the Medina River in San Antonio, TX. Data were obtained from the project database located on the CD-ROM associated with this report.

For these data, there were no exceedances of State of Texas standards except for some of the "higher" values for malathion which exceeded the chronic toxicity criteria which are set at 0.01 ppb. However, most of the malathion results were below this value. The disinfection by-products are not normally found in surface waters unless there are discharges to rivers and creeks that contain chlorinated effluents. It is likely that one or more municipal sewage treatment plants discharge to these two rivers, resulting in the observations for three trichloromethane disinfection by-products. However, there were no exceedances of State of Texas standards observed.

The last dataset (see Table 10) of significance involved the determination of POPs in sediments from the same two rivers that were involved with the data in the table just above, i.e. the San Antonio River at Elmendorf, TX and the Medina River near San Antonio, TX. The data were typically in the units of µg/kg or parts per billion (ppb).

POP	No.	Period	Results	Units	Comments
Chlordane	62	1970-1983	1-130	ppb	most < 50 ppb
DDD	58	1970-1981	0.1-61	ppb	most < 5 ppb
DDE	61	1970-1983	0.1-17	ppb	most < 5 ppb
DDT	40	1971-1979	0.1-71	ppb	most < 5 ppb
Dieldrin	55	1970-1983	0.1-53	ppb	many < 1 ppb
Heptachlor epoxide	13	1971-1983	0.1-1.3	ppb	most ≤ 0.2 ppb

Table 10: Data involving the determination of POPs in sediments from the San Antonio River at Elmendorf, TX and the Medina River near San Antonio, TX. The data are in the units of µg/kg or parts per billion (ppb). Data were obtained from the project database located on the CD-ROM associated with this report.

There are currently no regulatory standards for POPs in sediments. Therefore, the only statement that can be made about the pesticides in the sediments of these two rivers is that there appear to be typically low concentrations resulting from long term use of these pesticides in agricultural activities in the San Antonio drainage basin. In fact, since the results are in the units of ppb, these represent fairly low concentrations for the time period involved. A more current assessment of pesticide POPs in sediments in the SAAN environments would allow a final determination of the significance of the earlier results to be made. These concentrations may have declined even further due to the discontinued use of these pesticides in agricultural operations in the United States.

2. Heavy Metals

Similar to the above described POPs, intensive long-term monitoring programs have been conducted in SAAN for most of the heavy metals under consideration in this study. These compiled numbers come primarily from the USGS database.

Arsenic (As): 730 data points were compiled in SAAN for As alone. However, only 587 of these data points were above the detection limits of the analytical techniques used. Arsenic concentrations in both non-filtered (*range; 1 to 15 µg/L; average=3.01 µg/L; n=148*) and filtered (range*; 1 to 38 µg/L; average=2.16 µg/L; n=381*) water samples show quite stable temporal trends with some isolated peak values. Note that the analyses on filtered and non-filtered samples were not always conducted on samples collected at the same time and in some cases from different sampling locations. This explains the differences in reported ranges of dissolved As (filtered samples) and total concentrations. In this park, the dissolved As concentrations vary within a range of values that are far below the USEPA's proposed guidelines.

In sediments, As concentrations ranged from 1 to 13 mg/kg dry weight (average=5.13 mg/kg; n=46). Based on published data on unpolluted sediments, these numbers should not be of concern, unless high As levels are found in biota inhabiting these ecosystems. Unfortunately, data on biota are scarce and limited to 3 data points only for this park. Therefore, no conclusion can be drawn based on these data. However, this lack of data calls for the need of a well established long-term monitoring program that includes the sampling of biota.

Selenium (Se): For Se, 599 data points were compiled and only 94 samples gave numbers above the detection limits of the analytical techniques used. The sampling of the aqueous phase in this park focused primarily on the determination of Se in filtered samples. Only four data points were compiled for total Se in non-filtered samples, and they will not be discussed here. From 1976 to the present, Se concentrations the dissolved fraction remained at levels near the detection limit and averaged 1.24 µg/L (n=70). Therefore, this element is likely not of concern in SAAN.

Surprisingly, both sediments and biota were almost left out in this monitoring program, with less than 10 data points for each of these matrices. Consequently, these data are not discussed here.

Cadmium (Cd): A total of 577 samples were analyzed for Cd, with 119 data points above the detection limit. Similar to the above-described aqueous Se data, the emphasis seemed also to be on dissolved Cd. For both the non-filtered and filtered (*range 1 to 20 µg/L; average = 2.73; n=*

41) water samples, the temporal trends show little variations. Most Cd values fell between 1 and 2 µg/L in both the filtered and non-filtered samples. With regard to toxicity to aquatic life, the dissolved Cd concentrations seem to be in excess of the guidelines for both acute and chronic toxicities. While the data available for biota are once again very limited (n=5), Cd concentrations in sediments exceeded the analytical detection limit in 44 samples (range: 0.11 – 5.0 mg/Kg dry weight; average=2.23 mg/Kg). The temporal trend of Cd in sediment for available data shows peaks and lows contained primarily within a narrow band of low concentrations varying from 1 to 3 mg/kg.

Copper (Cu): 522 samples were analyzed over time and only 328 contained Cu concentrations above analytical detection limits. Cu concentrations in non-filtered samples (*range: 1 to 90 µg/L; average = 8.22 µg/L; n=170*) show an overall increasing trend over time, while a decreasing trend is noticeable in data obtained from filtered water samples (*range: 1 to 40 µg/L; average = 5.62 µg/L; n= 94*). Dissolved Cu concentrations rarely exceeded the guideline value for toxicity on aquatic life.

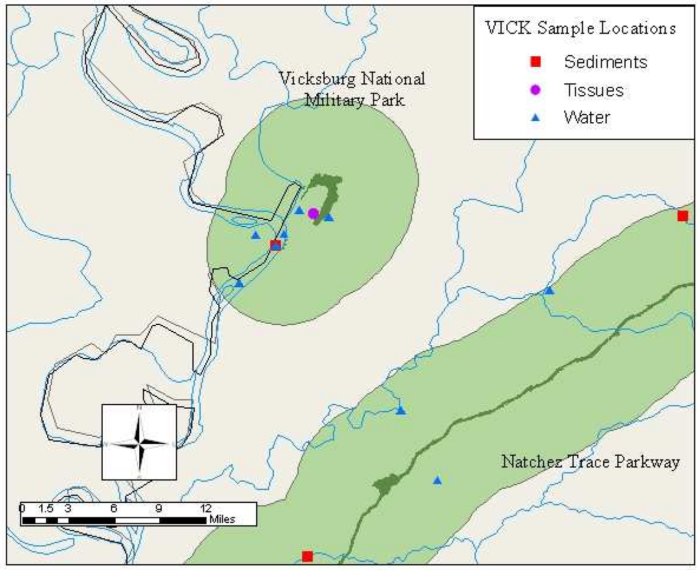
In sediments, Cu was detected in a total of 55 samples with a concentration range of 2 to 55 mg/kg (average = 13.5 mg/kg). Biological tissues (n=8) were sampled during a period of three consecutive years only, and there is therefore insufficient data to discern long-term trends.

Lead (Pb): 515 data points were compiled for Pb with 246 positive results. Pb concentrations in non-filtered (*range: 1 – 190 µg/L; average = 21.6 µg/L; n=148*) and filtered (*range 1 to 200 µg/L; average = 17.03 µg/L; n=36*) water samples show different temporal trends. Overall, total lead concentrations seem to increase over time, while the dissolved fraction remains rather stable after an initial sharp decrease in mid 1980s. However, dissolved Pb concentrations were often in excess of both the chronic toxicity guideline (2.5 µg/L) for aquatic life and the action level for drinking water (15 µg/L).

In sediments (*range: 7.4 – 30 mg/kg; average=94.3 mg/kg; n=46*), several of the analyzed samples contained Pb in excess of 100 mg/Kg. These high Pb concentrations could lead to chronic toxicity for aquatic life.

Mercury (Hg): 730 data points were compiled for Hg alone, but only 153 (21%) positive data points will be discussed here. Similar to the observations made for Hg data for PAAL and PAIS, Hg concentrations determined on water samples prior to the mid to late 1980s are likely not accurate. In addition, the fact that most of the Hg values determined on samples collected after 1985 are greater than 100 ng/L could suggest that these sites are highly contaminated with Hg. Another possibility might be that contamination associated with sample collection and processing is still a problem. However, more reasonable values are reported in sediments, ranging from 0.01 to 0.12 mg/kg (or 10 to 120 ppb). With such low values in sediments, it is hard to explain the high levels reported for samples taken from the water column. Therefore, it is likely that the Hg dataset for water in SAAN contains several data points obtained from samples collected without the use of metal-free ultra-clean techniques, resulting in contaminated samples.

H. Vicksburg National Military Park (VICK)



1. Persistent Organic Pollutants

There were a few observations for the same legacy chlorinated pesticide POPs that have been reported for the seven other Gulf Coast Network park units, but the relative paucity of results for water and tissue samples does not provide a sufficient basis for comment in this report. If feasible, the NPS should commission a study which would have as its goal the sampling and analysis of POPs in waters and on lands directly in or adjacent to the park to provide a set of current data to be used as a baseline for future reference.

2. Heavy Metals

There is nearly a total lack of metal data on both sediments and biota in VICK. For the metals under consideration in this study, no more that five data points could be found for each the metals. Therefore, the following is a brief discussion of the small amount of available water data.

Arsenic (As): A total of 134 data points were found for As concentrations in surface water samples collected near and/or within the park. These concentrations span a range of 1 to 10 µg/L for the dissolved As and 1 to 40.2 µg/L for total As concentrations. However, the general range was between 1 and 13 µg/L for As concentrations determined on non-filtered samples, with only one outlier at 40.2 µg/L.

Selenium (Se): The temporal trend of Se concentrations in filtered samples shows a decrease over time, while Se concentrations determined on whole water samples show an overall increase over time. In the latter case, Se concentrations reach values as high as 17µg/L. In general, the dissolved concentration rarely exceeds the 5 µg/L (or ppb) safe guideline for chronic toxicity in freshwater organisms. Se concentrations have remained near 1 µg/L since 1975.

Cadmium (Cd): Only three data points were identified for cadmium in non-filtered samples, and eight for the dissolved fraction. Not much can be said based on these datasets, except that temporal trends point to a decrease in concentrations over time.

Copper (Cu): Cu concentrations decreased over time in both filtered (n=22) and unfiltered (n=31) samples. For the dissolved fraction, they decrease from initial values as high as 30 µg/L in the 1970s to <5 µg/L in the 1990s. During the same time period, total Cu concentrations went from 140 µg/L to values around 10 µg/L.

Lead (Pb): Only three and four data points were found for Pb determined on unfiltered and filtered samples, respectively. These small datasets are not discussed.

Mercury (Hg): Remarks for mercury remain similar to those stated in the discussion of the data in previous park units.

X. Conclusion and Recommendations

In the past, the NPS did not have a comprehensive plan to organize and manage the data and publications pertaining to each of their park units. This study has found many publications that the various network park units did not have in their possession, although they pertained to that particular park unit. A system of coordinating data and publications, and making that information available system-wide would be beneficial to the individual park units. We understand that this need is currently being addressed by the NPS I&M program.

Some difficulties experienced during this study involved the problem of manipulating data to make them consistent. Data are collected by many different agencies, universities, and private companies and these entities do not store their data in a uniform format. Communication between the NPS and other governmental agencies, such as the USEPA and the USGS, will allow the NPS to develop a system of organizing large amounts of data in a uniform manner so that they are easily updated and available to all NPS personnel for their use.

It is clear from the results of this study that considerable analyses (often in an uncoordinated or haphazard manner) have been performed in and around the environs of most of the eight GULN park units. However, it seems that none of the sampling programs conducted by the various state and Federal agencies have had the specific interests of the park units in mind. The following summaries provide a review of the results found by this study for each of the eight GULN park units.

Big Thicket National Preserve (BITH)

POPs – There is some evidence of legacy pesticides in the waters near BITH, but, in general, there are insufficient data to draw any specific conclusions. A more thorough study of POPs in BITH is warranted.

Metals – Compared to some of the other GULN park units, the quantity of surface water data for BITH for most heavy metals is adequate for dates prior to the mid-1980s. However, more recent data for these pollutants in BITH are limited. There were several high As concentrations noted in the Sabine River in the early 1980s, and more recent data are not available to determine if this reach of the Sabine River is still impacted. A more rigorous monitoring program is needed for all heavy metal concentrations in sediments, soils, and biota. In the aqueous phase, a long-term monitoring program based on metal-free ultra clean techniques is needed, primarily for Hg and Pb. The determination of temporal trends of methyl-Hg should also be included.

Gulf Islands National Seashore (GUIS)
POPs – Existing POPs data are too old and limited to permit a current assessment of the threat to park resources.

Metals – Metals data indicate that both Pb and Hg are increasing in the park's surface waters. Pb, in particular, may be a significant problem in some locations in the park. Methyl-Hg data are needed to evaluate the impact of increasing Hg levels on biota.

Jean Lafitte National Historical Park and Preserve (JELA)
POPs – Legacy POPs, especially pesticides, were found in the waters and sediments in the JELA environs. While most of the concentrations were low, there is evidence of potential risk to JELA resources. A systematic study of POPs in JELA is recommended.

Metals – JELA contained the largest number of samples for As, with approximately 74 percent of the samples containing As above the analytical detection limits. Although the data available for As are not a cause for concern, there are limited As data for more recent years. Similarly, the data for Se and Cd show no cause for concern in JELA, but more recent data is needed to confirm this analysis. Metals data indicate that Cu levels may be a possible problem in the park. Temporal trends show declining levels of Pb and Hg, but the trends cannot be confirmed due to the lack of more recent sampling.

Natchez Trace Parkway and National Scenic Trail (NATR)
POPs – Existing POPs data for the waters intersecting NATR were few and far between. Because NATR represents a diagonal bisect through a major agricultural region, there is a significant possibility that residues from pesticide usage are present within the park's waters. A new study of POPs in the important waterways bisecting NATR is recommended.

Metals – There is a noticeable lack of dissolved As data (from filtered water samples) available for NATR. This is important because the potential negative effect on aquatic organisms is assessed using dissolved concentrations for all of the metals discussed in this study. Also, the datasets for solid matrices (sediments, soils, and tissues) are very limited and inconsistent for NATR. It is recommended that the NPS establish monitoring programs that correct these weaknesses, and begin programs for Hg and methyl-Hg based on new sampling and analytical techniques.

Padre Island National Seashore (PAIS)
POPs – There are insufficient POPs data for PAIS in recent years to draw any conclusions at this time. A well-designed study of POPs that includes monitoring for PAHs and oil industry-related contaminants is recommended.

Metals – There is a similar lack of data for metals in PAIS. The limited dataset for As showed relatively low concentrations. A comparably small dataset for Cu found high concentrations in the 1970s, but the concentrations decreased over time. However, more data are necessary to confirm these conclusions for As and Cu. The datasets for Se, Cd, Pb, and Hg were too small to allow for analysis at this time. A comprehensive monitoring plan is needed for metals at PAIS.

Palo Alto Battlefield National Historic Site (PAAL)
POPs – Legacy pesticides data through the mid-1980s indicated low levels of these POPs in waters near PAAL. Given the agricultural influences near PAAL, a more thorough evaluation of the status of POPs in and near PAAL should be completed.

Metals – Metals data for As, Se, and Pb show no cause for concern in PAAL. The dataset for Cd is too small to make conclusions at this time. Although Hg concentrations were high, the data were obtained prior to the mid-1980s. Therefore, more recent sampling should be conducted using ultra-clean sampling methods. These sampling efforts should include sampling for methyl-Hg, an important parameter in determining the environmental impact of Hg.

San Antonio Missions National Historical Park (SAAN)
POPs – POPs, in the form of legacy pesticides and disinfection by-products, were seen in waters near SAAN two decades ago. More recent data are necessary for legacy POPs in the SAAN environs.

Metals – Metals data in sediment and biota are very limited for SAAN, and they were taken in a non-regular manner. There appears to be relatively no concern for As, Se, or Cu as indicated by data obtained from water samples, but there are no sediment or biological data to confirm this analysis. There appears to be some impact from Cd and Pb based on the available data. Because the majority of Pb and Hg data were obtained prior to the adoption of ultra-clean sampling techniques, the impact of these metals in SAAN cannot be evalutated.

Vicksburg National Military Park (VICK)
POPs – A complete study of POPs in and near VICK should be completed, as there is a paucity of data presently available for this park.

Metals – The concentrations for Se and Cu seem to be decreasing in VICK, but the datasets are too small to confirm this analysis. There are not enough available data for the remaining metals to draw any conclusions about possible contamination in VICK.

This study recommends, to the greatest extent possible, that the NPS develop one-time reconnaissance monitoring programs to determine each park's monitoring needs using the data included in this report as a basis for the studies. An overview of the potential metals contamination at each park should be addressed through the use of inductively coupled plasma-atomic emission (or mass) spectrometry (ICP/AES or MS) to capture the potential presence of a large suite of trace metals in the various environmental matrices in the park units. Similarly, the potential presence of volatile or semi-volatile POPs in the various matrices can be estimated through the use of gas (or liquid) chromatography coupled with mass spectrometry.

Scientists knowledgeable in the environmental fate of POPs and metals could work with park managers to design a monitoring study for each park. The NPS could then hire a contractor to collect and analyze the waters (surface and ground), biota (selected aquatic biota), and soils and sediments in each park. After the development of park-specific databases, the NPS can use these newly acquired data as a basis for future monitoring needs. Absent any known contamination or suspected source of new contamination, future monitoring activities could be tailored for those POPs and metals that might be delivered to the parks via global and regional atmospheric sources, or some new, nearby potential sources of contamination.

XI. List of References

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XII. Appendices

Appendix A: Refereed Journal Articles

This table provides bibliographic information for all of the published and unpublished papers and reports located during the study's literature search. This information is also available in a Microsoft Excel spreadsheet on the CD-ROM that accompanies this report. If the document pertains to an individual park or group of parks, that information is listed in the column farthest to the right. Documents can then be sorted according to park using the filter options available in Excel.

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Adeshina, Femi and Elizabeth L. Todd	Organochlorine compounds in human adipose tissue from North Texas	1990	Journal of Toxicology and Environmental Health	29	147-156	BITH, SAAN
Alexander, Richard B., et.al.	Data from selected U.S.G.S. national stream water quality monitoring networks	1998	Water Resources Research	34(9)	2401-2405	General
Ansari, G.A.S. et.al.	Organochlorine residues in adipose tissue of residents of the Texas Gulf Coast	1986	Bulletin of Environmental Contamination and Toxicology	36	311-316	BITH, PAAL, PAIS
Aquaterra Engineering, LLC	Level II Envirnomental Assessment: Soil Sampling, Asbestos-Containing Materials, and Lead-Based Paint Investigation	2002	Prepared for the NPS, Natchez Trace Parkway			NATR
Atkinson, R. Dwight.	Gulf Air Deposition Materials	2003?	Environmental Protection Agency	Power Point Presentatio n	On CD	General
Atkinson, R. Dwight.	Air Deposition Modeling and the TMDL Program	2003	Briefing for Region 6 States	Power Point Presentatio n		General
Baird, Charles and Marshall Jennings	Characterization of Nonpoint Sources and Loadings to Corpus Christi Bay National Estuary Program Study Area	1996	Corpus Christi Bay National Estuary Program	CCBNEP-05	239	General
Barksdale, John D.	Preliminary Investigation of Potential Contamination for Six Sites at the Gulf Islands National Seashore	2000	The Environmental Company, Inc.	N/A	approx. 150	GUIS

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Barnes, Steven S.	Investigators Annual Report - 1993	1993	N/A	N/A	N/A	PAIS
Barnett, Rai W. et.al.	Organochlorine pesticide residues in human milk samples from women living in Northwest and Northeast Mississippi, 1973-75	1979	Pesticides Monitoring Journal	13(2)	47-51	General
Baron, Jill	Sediment lead content underneath and downstream of the Natchez Trace Parkway Bridge over the Tennessee River	1987	NPS/Water Resources Division	Colorado State University	11	NATR
Baron, Jill and Brian Newkirk	Preliminary Analysis of Water Quality of the Barataria Unit of Jean Lafitte National Historic Park	1992	Applied Research Branch, Water Resources Division, NPS	Colorado State University	16 + Figures	JELA
Bateman, Diane H. and Michael S. Brim	Environmental contaminants in loggerhead sea turtle eggs from the northern Gulf of Mexico	1995	U.S. Fish and Wildlife Service/Southeast Region/Atlanta, GA	PCFO-EC 95-05	23	GUIS
Berland, Brent D., Thomas A. Carothers, and Denise A. Lant	Metals Investigation, Former Oil and Gas Processing Facility: Yarborough Pass, Padre Island National Seashore, Texas	1998	Arcadis, Geraghty & Miller, Inc.	Project Number CC000542. 0001		PAIS
Bowles, William F., Jr.	Winter Ecology of Red-Breasted Mergansers on the Laguna Madre of Texas	1980	Corpus Christi State University, Div. of Biology	Thesis for M.S.	32	PAIS
Brin, M.S., S.K. Alam, and L.G. Jenkins	Organochlorine pesticides and heavy metals in muscle and ovaries of Gulf Coast striped bass (Morone saxatilis) from the Apalachicola River, Florida, U.S.A.	2001	Journal of Environmental Science and Health	B36(1)	15-27	GUIS
Butler, Philip A., Charles D. Kennedy, and Roy L. Schutzmann	Pesticide residues in estuarine mollusks, 1977 versus 1972 - National Pesticide Monitoring Program	1978	Pesticides Monitoring Journal	12:3	99-101	BITH, GUIS, PAIS
Carls, E.G., Dennis B. Fenn, and Scott A. Chaffey	Soil Contamination by Oil and Gas Drilling and Production Operations at Padre Island National Seashore, Texas, USA	1995	Journal of Environmental Monitoring	45(3)	273-286	PAIS
Cashio Cochran Torre/Design Consortium, Ltd.; Coastal Environments, Inc.; N-Y Associates, Inc.	Draft Environmental Impact Statement: Bayou Sauvage National Wildlife Refuge, Orleans, Parish, LA	1994	U.S. Fish and Wildlife Service		?	GUIS

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Clark, Donald R. Jr., and Alexander J. Krynitsky	Organochlorine residues in eggs of loggerhead and green sea turtles nesting at Merritt Island, Florida – July and August 1976	1980	Pesticides Monitoring Journal	14(1)	38178	
Cobb, G.P., P.D. Houlis, and T.A. Bargar	Polychlorinated biphenyl occurrence in American alligators (Alligator Mississippiensis) from Louisiana and South Carolina	2002	Environmental Pollution	118:1	1-4	BITH, GUIS, JELA
Cohen, Jonathan B., Barnett A. Rattner, and Nancy H. Golden	Use of Retrospective Data to Assess Ecotoxicological Monitoring Needs for Terrestrial Vertebrates Residing in Atlantic Coast Estuaries	2003	Ecotoxicology	118:1	365-375	GUIS, JELA
Countryman, Gary R. (Director of Operations, Vector Energy Corporation)	Laboratory Analytical Data for the Dunn-McCampbell Lease	2001	Vector Energy Corporation	L3025 PAIS	approx. 50	PAIS
Custer, Thomas W. and Christine A. Mitchell	Organochlorine contaminants and reproductive success of black skimmers in South Texas, 1984	1987	Journal of Field Ornithology	58	480-489	PAAL
Demcheck, Dennis K. and Christopher M. Swarzenski	Atrazine in Southern Louisiana Streams, 1998-2000	2003	USGS/National Water-Quality Assessment Program Fact Sheet	FS-011-03	6	JELA
Demcheck, Dennis K. and Stanley C. Skrobialowski	Fipronil and degradation products in the rice-producing areas of the Mermentau River Basin, Louisiana, February - September 2000	2003	USGS/National Water-Quality Assessment Program Fact Sheet	FS-010-03	6	GUIS, JELA, VICK
Dibble, Eric D.	A long-term (1995-2003) biological assessment and inventory of the streams in Vicksburg National Military Park	2003	National Park Service		approx. 50	VICK
Dowd, Patrick F. et.al.	Organochlorine residues in animals from three Louisiana watersheds in 1978 and 1979	1985	Bulletin of Environmental Contamination and Toxicology	34	832-841	JELA
Duke, T.W., J.I. Lowe, and A.J. Wilson, Jr.	A polychlorinated biphenyl (Aroclor 1254) in the water, sediment, and biota of Escamia Bay, Florida	1970	Bulletin of Environmental Contamination and Toxicology	5:2	171-180	GUIS
Earth Consulting Group, Inc.	Engineering Report for the Preliminary Site Assessment of the Mississippi Materials Facility	1999	Prepared for the Mississippi Dept. of Transportation			NATR

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Ensource Corporation	Site Characterization Report, Phase I: Yarborough Pass Facility Kenedy County, Texas	1996	American Exploration Company	Job No. 07423	8 + Append ices	PAIS
Fay, Roger R. and Leo W. Newland	Organochlorine insecticide residues in water, sediment, and organisms, Aransas Bay, Texas - September 1969 - June 1970	1972	Pesticides Monitoring Journal	6:2	97-102	PAIS
Ford, W.M., and E.P. Hill	Organochlorine conaminants in eggs and tissue of wood ducks from Mississippi	1990	Environmental Contamination and Toxicology	45	870-875	JELA, NATR, VICK
Ford, William M. and Edward P. Hill	Organochlorine pesticides in soil sediments and aquatic animals in the Upper Steele Bayou watershed of Mississippi	1991	Archives of Environmental Contamination and Toxicology	20	161-167	JELA, NATR, VICK
Ford, William M. and Edward P. Hill	Organochlorine residues in Mississippi raccoons	1990	Journal of Wildlife Management	54(4)	591-594	NATR, VICK
Frank, Donell S. et.al.	Persistent organochlorine pollutants in eggs of colonial waterbirds from Galveston Bay and East Texas, U.S.A.	2001	Environmental Toxicology and Chemistry	20(3)	608-617	BITH
Friedemann, Mark and Joe Hand	Typical Water Quality Values for Florida's Lakes, Streams, and Estuaries	1989	Florida Department of Environmental Regulation		23	General
Gallagher, Evan P., Timothy S. Gross, and Karen M. Sheehy	Decreased glutathione S-transferase expression and activity and altered sex steroids in Lake Apopka brown bullheads	2001	Aquatic Toxicology	55	223-237	
Gamble, Lawrence R., Gerry Jackson, and Thomas C. Maurer	Contaminants Investigation of the Aransas Bay Complex, 1985-1986	1989	U.S. Fish and Wildlife Service		42	PAIS
Garrison, Charles R.	Water Quality of the Barrataria Unit, Jean Lafitte National Historical Park, Louisiana (April 1981-March 1982)	1982	U.S.G.S.	Open-File Report 82-691	34	JELA
George, Brent	Remediation Plan for Arsenic Contaminated Soil Cleanup	2002	Discovery Environmental Resources, Ltd.	Job Number 83902	6	PAAL
Gingrich, Sarah E., Gary A. Stern, and Brian E. McCarry	Atmospherically derived organic surface films along an Urban-rural gradient	2001	Environmental Science & Technology	35	4031-4037	General

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Guillette, L.J., et.al.	Serum concentrations of various environmental contaminants and their relationship to sex steroid concentrations and phallus size in juvenile American alligators.	1999	Archives of Environmental Contamination and Toxicology	36	447-455	
Hall, Rosine W. and Kathy A. Bruce	Characterization of Water Quality in the Water Corridor Units of Big Thicket National Preserve	1996	Department of Ecology and Evolutionary Biology, Rice University		4	BITH
Heard, R. W., and J. A. McLellan	A study of intertidal and shallow water sand dwelling invertebrate populations exposed to an oil spill on Horn Island, Mississippi	1990	Gulf Coast Research Laboratory,	Ocean Springs, MS		GUIS
Henny, Charles J., Kenton E. Riddle, and Craig S. Hulse	Organochlorine Pollutants in Plasma of Spring Migrant Peregrine Falcons from Coastal Texas, 1984	1988	in T.J. Cade, J.H. Enderson, C.G. Thelander, and C.M. White, Ed. Peregrine Falcon Populations: Their Management and Recovery. The Peregrine Fund, Inc.		949	PAIS
Henny, Charles J., William S. Seeger, and Thomas L. Maechtle	DDE decreases in plasma of spring migrant peregrine falcons, 1978-94	1996	Journal of Wildlife Management	60(2	342-349	PAAL, PAIS
Hester, M.W. and I.A. Mendelssohn	Long-term recovery of a Louisiana brackish marsh plant community from oil-spill impact: vegetation response and mitigating effects of marsh surface elevation	2000	Marine Environmental Research	49	233-254	JELA, NATR, VICK
Huc, A.Y., and J.M. Hunt	Generation and Migration of Hydrocarbons in Offshore South Texas Gulf Coast Sediments	1980	Geochimica et. Cosmochimica Acta	44	1081-1089	PAIS
Huddleston, Robert L./Delta Environmental Consultants, Inc.	Environmental Remediation Work Plan for Closed Shorebase Production Facility	1994	Chevron U.S.A. Production Company	Delta Project No. F194-041-1.0001	22+Tables and Appendices	PAIS
Hughes, Jeffrey C., Mark D. Flora, and James C. Woods	Big Thicket National Preserve: Water Quality Report 1984-1986	1987	NPS/Water Resources Division		80	BITH

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Hunt, W. Grainger, Brenda S. Johnson, and F. Prescott Ward	Spring Passage of Arctic Peregrine Falcons at Padre Island: A Migration and Habitat Study using Radio Telemetry	1979	The Chihuahuan Desert Research Institute	CDRI Contribution No. 60	14	PAIS
Kannan, K., et.al.	Polychlorinated Dibenzo-p-Dioxins (PCDDs), dibenzofurans (PCDFs), biphenyls (PCBs), and organochlorine pesticides in yellow-blotched map turtle from the Pascagoula River Basin, Mississippi, U.S.A.	2000	Archives of Environmental Contamination and Toxicology	38	362-370	GUIS
Kelly, John R. (Ecosystems Research Center, Cornell University)	Fate and effects of tributyltin: Thalassia seagrass microcosms	1989	Environmental Research Laboratory, Office of Research and Development. USEPA, Gulf Breeze	EPA/600/X-89/245	17	GUIS
King, Kirke A.	Food habits and organochlorine contaminants in the diet of olivaceous cormorants in Galveston Bay, Texas	1989	The Southwestern Naturalist	34(3)	338-343	BITH
King, Kirke A. and Alexander J. Krynitsky	Population trends, reproductive success, and organochlorine chemical contaminants in waterbirds nesting in Galveston Bay, Texas	1986	Achives of Environmental Contamination and Toxicology	15	367-376	BITH
King, Kirke A., Cathy A. Lefever, and Bernard M. Mulhern	Organochlorine and metal residues in royal terns nesting on the Central Texas coast	1983	Journal of Field Ornithology	54	295-303	PAIS
King, Kirke A., Edward L. Flickinger, and Henry H. Hildebrand	Shell Thinning and Pesticide Residues in Texas Aquatic Bird Eggs, 1970	1978	Pesticides Monitoring Journal	12(1)	16-21	BITH, PAIS
King, Kirke A., Thomas W. Custer, and Daniel A. Weaver	Reproductive success of barn swallows nesting near a selenium-contaminated lake in East Texas, U.S.A.	1994	Environmental Pollution	84	53-58	BITH
King, Kirke A., Thomas W. Custer, and James S. Quinn	Effects of mercury, Selenium, and organochlorine contaminants on reproduction of Forster's terns and black skimmers nesting in a contaminated Texas bay.	1991	Archives of Environmental Contamination and Toxicology	20	32-40	PAAL, PAIS
Knight, Scott S. and Charles M. Cooper	Insecticide and metal contamination of a mixed cover agricultural watershed	1996	Water Science and Technology	33(2)	227-234	NATR
Koplitz, Lynn Vogel et.al.	Determining lead in sediments by X-ray fluorescence and the method of standard additions	1994	Environmental Science & Technology	28	538-540	JELA

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Land, Larry F.	Water-Quality Assessment of the Trinity River Basin, Texas - Data Collection, 1992-95	1995	USGS	NAWQA	FS-090-95	BITH
Lewis, Michael A., et.al.	Sediment chemical contamination and toxicity associated with a coastal golf course complex	2001	Environmental Toxicology and Chemistry	20(7)	1390-1398	GUIS
Lewis, Michael A., et.al.	Effects of a coastal golf complex on water quality, periphyton, and seagrass.	2002	Ecotoxicology and Environmental Safety	53	154-162	GUIS
Li, Y.F	Toxaphene in the United States	2001	Journal of Geophysical Research	106(D16)	17919-17927	General
Lightfoot, Teresa L.	Organochlorine disaster in Florida - Two years later.	2001	Journal of Avian Medicine and Surgery	15(2)	138-140	
Lores, E. M., J. C. Moore, J. Knight, Forester, J. Clark, and P. Moody.	Determination of fenthion residues in samples of marine biota and seawater from laboratory exposures and field applications	1985	Journal of Chromatographic Science	23	124-127	GUIS
Lower Neches Valley Authority	2002 Basin Highlights Report	2002	The Texas Clean Rivers Program		4	BITH
Lower Neches Valley Authority	2003 Lower Neches River Basin and Neches-Trinity Coastal Basin Highlights Report Draft	2003	Texas Commission on Environmental Quality/LNVA		21	BITH
Lytle, J. S., and T. F. Lytle	Pollutant transport in Mississippi Sound.	1985	Mississippi-Alabama Sea Grant Program	Ocean Springs, MS.		GUIS
Maechtle, Thomas L.	Padre Island Peregrine Falcon Survey: Report Concerning Field Data Collected During Spring and Autumn, 1988	1988	University of Texas, Science Park		30	PAIS
Maechtle, Thomas L.	Padre Island Peregrine Falcon Survey: Spring and Autumn 1990	1990	N/A			PAIS
Maechtle, Thomas L.	Padre Island Peregrine Falcon Survey: Spring and Autumn 1991	1991	N/A			PAIS
Maechtle, Thomas L.	Padre Island Peregrine Falcon Survey: Spring and Autumn 1993	1993	N/A			PAIS
Maechtle, Thomas L.	Peregrine Sojourn	1989	Texas Parks & Wildlife	November, 1989	5-11	PAIS

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Mahler, B.J. and P.C. Van Metre	A Simplified Approach for Monitoring Hydrophobic Organic Contaminants Associated with Suspended Sediment; Methodology and Applications	2003	Archives of Environmental Contamination and Toxicology	83:1	288-297	General
Marburger, J.E., et.al.	Residual organochlorine pesticides in soils and fish from wetland restoration areas in central Florida, USA	2002	Wetlands	22:4	705-711	GUIS
Marsh, Steven Lyle	Factors Affecting the Distribution, Food Habits, and Lead Toxicosis of Redhead Ducks in the Laguna Madre, Texas	1979	Texas A&M University	Thesis for M.S.	47	BITH, PAIS
Maruya, K.A., et.al.	Organic and Organometallic Compounds in Estuarine Sediments from the Gulf of Mexico (1993-1994)	1997	Estuaries	20(4)	700-709	PAIS
McDonald, J.G., and R.A. Hites	Radial Dilution Model for the Distribution of Toxaphene in the United States and Canada on the Basis of Measured Concentrations in Tree Bark	2003	Environmental Science & Technology	37:3	475-481	JELA, NATR, VICK
McLelland, Jerry A. and Richard W. Heard	Assessment of the initial impact from oil spill tar balls on the beach and near-shore macroinvertebrate communities of the barrier islands of Mississippi Gulf Islands National Seashore	1993	unpublished? But authors are affiliated with the Gulf Coast Research Laboratory	N/A	9	GUIS
McMahan, C.A.	Ecology of Principal Wintering Waterfowl in Lower Laguna Madre	1967	Parks and Wildlife Department, Texas	Federal Aid Project No. W-29-R-20	9	PAIS
Meade, Robert (Ed.)	Contaminants in the Mississippi River (1987-1992)	1995	U.S. Geological Survey	USGS Circular 1133		General
Meador, J.P., et.al.	Comparison of elements in bottlenose dolphins stranded on the beaches of Texas and Florida in the Gulf of Mexico over a one-year period.	1999	Archives of Environmental Contamination and Toxicology	36	87-98	GUIS, PAIS
Michot, T.C. et.al.	Environmental contaminants in redheads wintering in coastal Louisiana and Texas	1994	Archives of Environmental Contamination and Toxicology	26	425-434	General

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Miersma, Nick A., Christopher B. Pepper, and Todd A. Anderson	Organochlorine Pesticides in Elementary School Yards along the Texas-Mexico Border	2003	Environmental Pollution	126	65-71	General
Miller, John E., Sean W. Baker, and Darrell L. Echols	Marine Debris Point Source Investigation, 1994-1995: Padre Island National Seashore	1995	Padre Island National Seashore/Resources Management Division	9405 S.P.I.D.	40	PAIS
Mississippi Department of Environmental Quality, Office of Pollution Control	List of Water Bodies: Prepared Pursuant to Section 303(d) of the Clean Water Act.	1998	Mississippi Department of Environmental Quality		239 total	General
Monger, Pamela N.	Trophic transfer of metals from seagrass to epiphytes and grazing invertebrates	2004	unpublished.		16	GUIS
Montagna, Paul A. et.al.	Characterization of anthropogenic and natural disturbance on vegetated and unvegetated bay bottom habitats in the Corpus Christi Bay National Estuary Program study area.	1998	Coastal Bend Bay and Estuary Program	CCBNEP-25	121	BITH, PAAL, PAIS
Mora, M.A.	Organochlorines and trace elements in four colonial waterbird species nesting in the Lower Laguna Madre, Texas	1996	Archives of Environmental Contamination and Toxicology	31	533-537	PAAL, PAIS
Mora, Miguel A. et.al.	Potential effects of environmental contaminants on recovery of the aplomado falcon in South Texas	1997	Journal of Wildlife Management	61(4)	1288-1296	PAAL, PAIS
Mora, Miguel A., and Julie M. Miller	Foraging flights, reproductive success, and organochlorine contaminants in cattle egrets nesting in a residential area of Bryan, Texas	1998	Texas Journal of Science	50(3)	205-214	BITH
Mora, Miguel A., et.al.	A comparative assessment of contaminants in fish from four resacas of the Texas, U.S.A. - Tamaulipas, Mexico border region.	2001	Environmental International	27	15-20	PAAL
Moring, J. Bruce	Occurrence and distribution of organochlorine compounds in biological tissue and bed sediment from streams in the Trinity River Basin, Texas, 1992-93	1997	U.S.G.S.	Water-Resources Investigations Report 97-4057	19	BITH
Morizot, Donald C. and Tom Maechtle	Survey of Migratory Peregrine Falcons on North and South Padre Island, Texas	1987	University of Texas, Science Park			PAIS

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
National Park Service, Air Resources Division	Western Airborne Contaminants Assessment Project	2004	U.S. DOI	Project Fact Sheet	2	General
Niethammer, Kenneth R. et.al.	Presence and biomagnification of organochlorine chemical residues in oxbow lakes of Northeastern Louisiana	1984	Archives of Environmental Contamination and Toxicology	13	63-74	NATR, VICK
Nigg, H.N., et.al.	Organochlorine compounds in Florida feral pigs (Sus scofa).	2000	Bulletin of Environmental Contamination	64	347-353	
NPS, Water Resources Division	Baseline Water Quality Data Inventory and Analysis: Big Thicket National Preserve	1995	U.S. DOI, NPS	Technical Report NPS/NRW RD/NRTR-95/39	6	BITH
O'Connor, Thomas P. and Charles N. Ehler	Results from the NOAA National Status and Trends Program on Distributions and Effects of Chemical Contamination in the Coastal and Estuarine United States	1991	Environmental Monitoring and Assessment	17	33-49	General
Pacific Northwest Field Station	Peregrine Falcon Blood Plasma Samples Provide Information on DDE Burdens	1979	Patuxent Wildlife Research Center	3(3) - April/June		PAIS
Park, J.S., T.L. Wade, and S.T. Sweet	Atmospheric deposition of PAHs, PCBs, and organochlorine pesticides to Corpus Christi Bay, Texas	2002	Atmospheric Environment	36	10	PAAL, PAIS
Park, J.S., T.L. Wade, and S.T. Sweet	Atmospheric deposition of organochlorine contaminants to Galveston Bay, Texas	2001	Atmospheric Environment	35	3315-3324	BITH
Parkinson, R.W. et.al.	Distribution and migration of pesticide residues in mosquito control impoundments St. Lucie County, U.S.A.	1993	Environmental Geology	22	26-32	
Parrish, Jimmie R., David T. Rogers, Jr., and F. Prescott Ward	Identification of Natal Locales of Peregrine Falcons by Trace Element Analysis of Feathers	1983	Auk	100	560-567	PAIS
Rattner, B.A. et.al.	Exposure and effects of oilfield brine discharges on western sandpipers (Calidris mauri) in Nueces Bay, Texas	1995	Environmental Contamination and Toxicology	54	683-689	PAIS
Red Hills Mine/Mississippi Lignite Mining Company	Ground/Surface Water Monitoring Quarterly Reports - 2001 through 2003	Varies	Correspondence			NATR

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Riddle, Kenton E.	Fall 1983 and Spring 1984 Survey of Migratory Peregrines on North and South Padre Island, Texas	1984	University of Texas, System Cancer Center, Science Park			PAIS
Riddle, Kenton E.	Migration of Peregrine Falcons on North and South Padre Island, Texas: Fall 1981 Report	1981	University of Texas, System Cancer Center, Science Park			PAIS
Riddle, Kenton E.	Migration of Peregrine Falcons on North and South Padre Island, Texas: Fall 1984 Report	1984	University of Texas, System Cancer Center, Science Park			PAIS
Riddle, Kenton E.	Migration of Peregrine Falcons on North Padre Island, Texas: Spring 1981 Report	1981	University of Texas, System Cancer Center, Science Park			PAIS
Riddle, Kenton E.	Spring 1983 Survey of Migratory Peregrines on North and South Padre Island, Texas	1983	University of Texas, System Cancer Center, Science Park			PAIS
Rostad, C.E.	Concentration and transport of chlordane and nonachlor associated with suspended sediment in the Mississippi River, May 1988 to June 1990	1997	Archives of Environmental Contamination and Toxicology	33	369-377	General
Rotstein, David S. et.al.	Detection by microsatellite analysis of early embryonic mortality in an alligator population in Florida.	2002	Journal of Wildlife Diseases	38(1)	160-165	
Sabourin, T.D. et.al.	Organochlorine residue levels in Mississippi River water snakes in Southern Louisiana	1984	Bulletin of Environmental Contamination and Toxicology	32	460-468	JELA, NATR, VICK
Schmitz, Darrel W.	Fourth Quarter 2001 Ground Water Data	2001	Correspondence	Professor, Miss. State Univ.		NATR
Sharma, Virender K., et.al.	Metals in Sediments of the Upper Laguna Madre	1999	Marine Pollution Bulletin	38(12)	1221-1226	PAIS
Springer, Alan M., Wayman Walker II, Robert W. Risebrough	Origins of Organochlorines Accumulated by Peregrine Falcons Breeding in Alaska and Greenland	1982	Canadian Field-Naturalist	August, 1982	submitted for publication	PAIS
Stroud, Richard K. and Robert E. Lange, Jr.	Information Summary - Common Loon Die-off Winter and Spring of 1983	1983?	?	?	4	GUIS, NATR, VICK

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Summers, J. Kevin	The Ecological Condition of Estuaries in the Gulf of Mexico	1999	USEPA, ORD, National Health and Environmental Effects Research Laboratory (Gulf Breeze)		71	General
Swarzenski, Christopher M.	Resurvey of Quality of Surface Water and Bottom Material of the Barataria Preserve of Jean Lafitte National Historical Park and Preserve, Louisiana, 1999-2000	2004	U.S.G.S., in cooperation with the N.P.S.	Water-Resources Investigations Report 03-4038	28	JELA
Swarzenski, Christopher M., Scott V. Mize, Bruce A. Thompson, and Gary W. Peterson	Fish and Aquatic Invertebrate Communities in Waterways, and Contaminants in Fish, at the Barataria Preserve of Jean Lafitte National Historical Park and Preserve, Louisiana, 1999-2000	2004	U.S.G.S., in cooperation with the N.P.S.	Scientific Investigations Report 2004-5065	35	JELA
Terrebonne, R.P.	The economic losses from water pollution in the Pensacola Area.	1973	Florida Naturalist	October	21-26	GUIS
Tetra Tech, Inc.	Historical data review for the Sam Rayburn Reservoir, Texas	2003	Texas Commission on Environmental Quality	Contract No. 582-2-48645	300	BITH
Texas Natural Resource Conservation Commission	EPA: Brine Service Company	2004	Texas Natural Resource Conservation Commission	Webpage	N/A	PAIS
The PAZ Group, Technology Division	Report on the Bailey Farms Inventory Property	2003	Correspondence			NATR
Thies, M.L. and K.M. Thies	Organochlorine residues in bats from Eckert James River Cave, Texas	1997	Bulletin of Environmental Contamination	58	673-680	SAAN
Thompson, M.J., W.W. Schroeder, and N.W. Phillips	Ecology of Live Bottom Habitats of the Northeastern Gulf of Mexico: A Community Profile	1999	USGS, Biological Resources Division and the MMS	USGS/BRD/CR--1999-0001 or OCS Study MMS 99-0004	74	GUIS
Ulery, Randy L.	National Water-Quality Assessment Program-Pesticides in the Trinity River Basin Study Unit, Texas, 1968-91	1995	USGS	Fact Sheet, FS-088-95	2	BITH

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
Ulery, Randy L., and M.F. Brown	Water-quality assessment of the Trinity River Basin, Texas - review and analysis of available pesticide information, 1968-91	1995?	Texas USGS	?	? (long, not all of the doc was printed)	BITH
Ulery, Randy L., Peter C. Van Metre, and Allison S. Crossfield	Trinity River Basin, Texas	1992?	Trinity River Basin NAWQA			BITH
Van Metre, Peter C., and Edward Callender	Water-quality trends in White Rock Creek Basin from 1912-1994 identified using sediment cores from White Rock Lake reservoir, Dallas, Texas	1997	Journal of Paleolimnology	17	239-249	BITH, SAAN
Wade, Roy, et.al.	Assessment of DDT Bioavailability in the Little Sunflower River Sediment and Agricultural Soil	2002	US Army Corps of Engineers	ERDC TR-02-6	92	VICK
Wade, T.L., et.al.	NOAA Gulf of Mexico Status and Trends Program: Trace Organic Contaminant Distribution in Sediments and Oysters	1988	Estuaries	0.46041667	171-179	General
Ward, F. Prescott	A Prospectus for a Five-Year Study of Peregrine Falcons on Padre Island, Texas	1973?				PAIS
Ward, George H. and Neal E. Armstrong	Current status and historical trends of ambient water, sediment, fish and shellfish tissue quality in the Corpus Christi Bay National Estuary Program study area	1997	Coastal Bend Bay and Estuary Program	CCBNEP-13	231	PAAL, PAIS, SAAN
Watanabe, Mafumi et.al.	Polychlorinated byphenyls, organochlorine pesticides, tris(4-chlorophenyl)methane, and tris(4-chlorophenyl)methanol in livers of small cetaceans stranded along Florida coastal waters, U.S.A.	2000	Environmental Toxicology and Chemistry	19(6)	1566-1574	
Wauer, Ro, et.al.	The Status of Peregrine Falcons in West Texas	1976	Office of Natural Sciences, Southwest Region, National Park Service	January 19, 1976		PAIS

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
White, Donald H., Christine A. Mitchell, and Charles J. Stafford	Organochlorine concentrations, whole body weights, and lipid content of black skimmers wintering in Mexico and South Texas, 1983	1985	Bulletin of Environmental Contamination and Toxicology	34	513-517	PAAL, PAIS
White, Donald H., Christine A. Mitchell, and T. Earl Kaiser	Temporal accumulation of organochlorine pesticides in shorebirds wintering on the South Texas Coast, 1979-80	1983	Archives of Environmental Contamination and Toxicology	12	241-245	PAAL, PAIS
White, Donald H., Kirke A. King, and Richard M. Prouty	Significance of organochlorine and heavy metal residues in wintering shorebirds at Corpus Christi, Texas, 1976-77	1980	Pesticides Monitoring Journal	14(2)	58-63	PAIS
Winger, P.V. and P.J. Lasier	Toxicity of sediment collected upriver and downriver of major cities along the lower Mississippi River	1998	Archives of Environmental Contamination and Toxicology	35	213-217	JELA, NATR, VICK
Winger, Parley V. et.al.	Residues of organochlorine insecticides, polychlorinated biphenyls, and heavy metals in biota from Apalachicola River, Florida, 1978.	1984	Journal of the Association of Official Analytical Chemists	67(2)	325-333	GUIS
Wood, Catherine M. and Edward S. Van Vleet	Copper, cadmium and zinc in liver, kidney and muscle tissues of bottlenose dolphins (Tursiops truncatus) stranded in Florida	1996	Marine Pollution Bulletin	32:12	886-889	GUIS
Wood, Larry	A Narrow Squeak for the Brown Pelican	1976	Sea Frontiers, Sea Secrets	22(6)	339	PAIS
Yeager, David	Atmospheric Mercury Deposition near Mob					
Young, William T. et.al.	A special monitoring project basin survey: Biological and physicochemical assessment of Santa Rosa Sound	1987?	Florida Department of Environmental Regulation	N/A	21	GUIS
Zimmerman, C. S.	A report on nearshore beach sediment analysis relative to an oil spill affecting Horn Island, Mississippi	1990	information missing	September, 1989		GUIS
Zimmerman, L.R., E.M. Thurman, and K.C. Bastian	Detection of Persistent Organic Pollutants in the Mississippi Delta using Semipermeable Membrane Devices	2000	The Science of the Total Environment	248	169-179	
Zimmerman, L.R., E.M. Thurman, and K.C. Bastian	Detection of Persistent Organic Pollutants in the Mississippi Delta using Semipermeable Membrane Devices	2000	The Science of the Total Environment	248	169-179	NATR, VICK
	Table 1: Contaminants to test for hwen investigating various types of contamination at oil and gas sites.	2001	NPS?		1	BITH

Author	Title	Date	Publisher/Journal	Volume or ID #	Pages	Parks Influenced
	"Water Resources," from 2000 draft Oil and Gas Management Plan/Environmental Impact Statement	2000				BITH
	Oil, Laboratory Analyses of Contamination by Petroleum Hydrocarbons and/or Polycyclic Aromatic Hydrocarbons (PAHs)	1991?	?	?	?	PAIS
	Short Communications	1994	Wilson Bulletin	106(1)	138-145	PAIS
	Annual Drinking Water Quality Report - NATR Headquarters Area	2002 and 2003	Correspondence			NATR

Appendix B: Website Resources

This table provides references to webpages that provide useful information pertaining to POPs and heavy metals near the GULN park units. Some of the referenced websites provide general data, and others are more regionalized to specific park areas.

Author	Title	Web Address
Alexander, Richard B., et.al.	Data from selected U.S.G.S. National Stream Water-Quality Monitoring Networks (WQN)	http://water.usgs.gov/nasqan/progdocs/index.html
Carr, R. Scott	Sediment Porewater Toxicity Test Survey. A Phase I Sediment Toxicity Identification Evaluation Studies in Lavaca Bay, Texas - an Estuarine Superfund Site	http://www.gulfbase.org/project/view.php?pid=spttsapistiesilbtaes
Carr, R. Scott, Paul Montagna, and Mahlon C. Kennicutt, II	Impact of Storm Water Outfalls on Sediment Quality in Corpus Christi Bay, Texas	http://www.gulfbase.org/project/view.php?pid=ioswoosqiccbt
Center for Coastal Studies	Institution where study by Carr, Montagna, and Mahlon was completed.	http://www.sci.tamucc.edu/ccs/welcome.html
Clean Air Status and Trends Network	Assesses the effectiveness of air pollution control efforts.	http://www.epa.gov/castnet
Clean Rivers Program	Includes reports such as the "2003 Lower Neches River Basin and Neches-Trinity Coastal Basin Highlights Report Draft." Navigating around will lead to data taken for the Clean Rivers Program.	http://www.lnva.dst.tx.us/
GulfBase - Resource Database for Gulf of Mexico Research	Provides information on current research projects along the coast of Texas.	http://www.gulfbase.org
Gulf of Mexico Integrated Science	Geologic Division Continuing Project Work Plan	http://gulfsci.usgs.gov/missriv/proposal/index.html
Kindinger, Jack	Evaluating Basin/Shelf Effects in the Delivery of Sediment-Hosted Contaminants	http://www.gulfbase.org/project/view.php?pid=ebeitdosc
Deposition Monitoring Networks: New Monitoring (a map)	A map showing where deposition has been found to occur by the NPS monitoring network.	http://www2.nature.nps.gov/air/monitoring/images/2002_depmon_sm.gif
Mississippi Beach Monitoring Program	Provides information by county of closures and problems on Mississippi beaches.	http://www.usm.edu/gcrl/msbeach/harbmon.cgi
Mobile Bay Digital Library - USGS	Provides data pertaining primarily to SAV and wetlands.	http://gulfsci.usgs.gov/mobile/index.html

Author	Title	Web Address
Mussel Watch Project/NOAA	Part of the National Status and Trends program of NOAA. Obtained information from GulfBase. Includes both metals and POPs.	http://ccma.nos.noaa.gov/stressors
National Atmospheric Deposition Program	"Mercury Deposition Network: A NADP Network," with sites in northeast Texas, Louisiana, and Alabama.	http://nadp.sws.uiuc.edu/mdn/
National Stream Water Quality Accounting Network	"provides ongoing characterization of the concentrations and flux of sediment and chemicals in the Nation's largest rivers."	http://water.usgs.gov/nasqan/
Ray, Donald	Pensacola Bay System Agricultural Best Management Practice Modeling	http://www.coastalamerica.gov/text/regions/gm/bestmgnt.html
Simons, James D. and Brien Nicolau	National Coastal Assessment, Texas	http://www.gulfbase.org/project/view.php?pid=ncat
Texas Natural Resource Conservation Commission	"EPA: Brine Service Company" website. Provides information on a Superfund site near Corpus Christi and other TX Superfund Sites. Summary of the Corpus Christi site is in the file cabinet.	http://www.epa.gov/earth1r6/6sf/pdffiles/0605264.pdf
Trinity River Special Study in the Trinity River Basin	USGS special study that includes a small amount of pesticides data pertaining to BITH	http://tx.usgs.gov/trin/
U.S. EPA Enforcement & Compliance History Online	Lists facilities all over the country and whether or not they have complied with EPA standards for emissions and pollutants.	http://www.epa.gov/echo/
Weeks Bay Foundation Projects	Current project list for the Weeks Bay National Estuarine Research Reserve; Weeks Bay drains into Mobile Bay, north of GUIS.	http://www.weeksbay.org/current.html
Texas Commission on Environmental Quality	Texas Water Quality Inventory 2000 (SFR-050/00); three volumes	http://www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/050_00/
TNRCC Water Quality Assessment Information Viewer	Surface Water Quality Viewer; provides information on uses, standards, and water-quality assessments for Texas surface water bodies.	http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/viewer/viewer.html
Texas Commission on Environmental Quality	List of Texas Superfund Sites	http://www.tceq.state.tx.us/ remediation/superfund

Appendix C: Legacy STORET Remark Codes

These are definitions for the Legacy STORET Remark Codes, found in the "Remark" field if the data were obtained from the U.S. Environmental Protection Agency's Legacy STORET database.

Printed Output	Remark
A	Value reported is the mean of two or more determinations. (Handled as replicates with "Calculated" and "Mean" qualifiers.)
B	Results based upon colony counts outside the acceptable range. (This is covered by a valid lab remark, "CNT." Results are stored normally.)
C	Calculated. Value stored was not measured directly, but was calculated from other data available. (Handled with the "Calculated" qualifier on the result.)
D	Field measurement. Some parameter codes (e.g. 401, "Field pH") imply this condition without this remark. (Measurement activities conducted in the field are reported separately from results obtained from samples)
E	Extra sample taken in compositing process. (This is a quality assurance replicate, and reported as a separate activity.)
F	In the case of species, F indicates Female sex. (Sex is a characteristic, with several permitted values including "Female").
G	Value reported is the maximum of two or more determinations. (Handled with the "Maximum" statistic type qualifier).
H	Value based on field kit determination; results may not be accurate. (Measurement activities conducted in the field are reported separately from results obtained from samples. Procedures involving devices such as HACH kits should report specific HACH identifiers.)
I	The value reported is less than the practical quantitation limit and greater than or equal to the method detection limit. (Result is stored as "Detected Below Quantification Limit," with lower quantification limit and detection limit stored separately.)
J	Estimated. Value shown is not a result of analytical measurement. (Reported with the "Estimated" qualifier.)
K	Off-scale low. Actual value not known, but known to be less than value shown. (Result is stored as "Not Detected," with detection limit stored separately.)
L	Off-scale high. Actual value not known, but known to be greater than value shown. (Result is stored as "Detected Above Quantification Limit," with upper quantification limit stored separately.)
M	Presence of material verified, but not quantified. Indicates a positive detection, at a level too low to permit accurate quantification. In the case of temperature or oxygen reduction potential, M indicates a negative value. In the case of species, M indicates Male sex. (Result is stored as "Detected but not Quantified." Or result may be stored as "Detected Below Quantification Limit" with detection and quantification limits stored separately. Negative values are stored as negative numbers. Sex is a characteristic, with several

Printed Output	Remark
	permitted values including "Male.")
N	Presumptive evidence of presence of material. (Result is stored as "Detected but not Quantified." Comments may be added.)
O	Sampled for, but analysis lost. Accompanying value is not meaningful for analysis. (Result is left "Null," and comments supplied as appropriate.
P	Too numerous to count. (Result is stored as "Detected Above Quantification Limit," with upper quantification limit stored separately.)
Q	Sample held beyond normal holding time. (This is covered by a valid lab remark, "EHT." Sample analysis date and time should be recorded.)
R	Significant rain in the past 48 hours. (Several characteristics identify meteorological conditions at or near the time of sampling. There is a "General Observation (text)" characteristic in which detailed descriptions of weather may be supplied. In version 2.0, a photograph of the monitoring site taken during the station visit may be stored in STORET.)
S	Laboratory test.
T	Value reported is less than the criteria of detection. (Result is stored as "Not Detected," and the detection limit is stored separately.)
U	Material was analyzed for, but not detected. Value stored is the limit of detection for the process in use. In the case of species, Undetermined sex. (Value is stored as "Not detected," and the detection limit is stored separately. Sex is a characteristic, with several permitted values including "Indeterminate.")
V	Indicates the analyte was detected in both the sample and associated method blank. (Results of blanks are reported as QC sampling activities, and linked to all samples to which they apply. This is covered by a valid lab remark, "FBK.")
W	Value observed is less than the lowest value reportable under remark "T." (Result is stored as "Not detected," and the detection limit is stored separately.)
X	Value is quasi vertically-integrated sample. (Sampling activity is labeled as "Integrated Vertical Profile." Results are stored normally.)
Y	Laboratory analysis from unpreserved sample. Data may not be accurate. (This is covered by a valid lab remark, "ISP." Sample preservation, transport, and storage techniques are stored as descriptions of the activity.)
Z	Too many colonies were present to count (TNTC), the numeric value represents the filtration volume. (No such capability exists in modern STORET. What this meant in the legacy system is unclear.)
$	Calculated by retrieval software. Numerical value was neither measured nor reported to the database, but was calculated from other data available during generation of the retrieval report. (Values can be labeled as "Calculated" when entered. Retrieval software does not currently calculate values.)

Appendix D: USGS Remark Codes

The USGS uses the following remark codes for data obtained from their database.

Printed Output	Remark
E	Value is estimated.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
S	Water quality--Most probable value. Precipitation--Snowfall-affected precipitation.
M	Presence of material verified but not quantified.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count equal to or greater than 15 percent (dominant).
V	Analyte was detected in both the environmental sample and the associated blanks.
&	Biological organism estimated as dominant.
*	Biological organism present in qualitative sample.
P	Biological organism in pupal life stage.
LV	Biological organism in larval life stage.
A	Biology--Biological organism in adult life stage. Water quality--Average value.
N	Presumptive evidence of presence of material.
U	Material specifically analyzed for, but not detected.

Appendix E: Instructions for Removing Extraneous Data from Database Using ArcGIS

- Import the original data into an Access database as a new table. The data must have latitude and longitude information associated with them and the field names containing this information must clearly be labeled with the words, "latitude" and "longitude." This is required for ArcGIS to identify this information in a later step.

- Open an ArcGIS map with the boundaries and buffers of the relevant parks displayed. Under the "File" menu, choose "Add Data" and navigate to the Access database where the data are stored on your computer. Select the database and click on the "Add" button.

- In ArcMap, right-click on the database that you just added in the "Source" display and choose the "Display XY Data…" option. The X Field should say "Longitude" and the Y Field should say "Latitude." The Spatial Reference of the Input Coordinates Description box will say "Unknown Coordinate System," but that is acceptable. Click on the "Ok" button.

- A shapefile with points marking the locations of all the data will be created on your map. To remove the points not within your specified buffer area, choose "Select by Location" under the "Selection" menu at the top of the screen.

- In the dialog box, create the following expression:
  "I want to *select features from* the following layer(s): [choose the name of the layer that contains the locations of your data] that *intersect* the features in this layer: [choose the name of the layer which is the buffer of the park]."
  Alternatively, if you have not created a buffer around the park, the dialog box provides the option of choosing the layer that contains the park boundaries and applying a buffer to that layer. Click "Apply."

- The Select by Location feature selects the points located inside the buffer of the park and highlights them. To look at the attributes of these points, right-click on the layer containing the points marking the locations of all the data and choose "open attribute table."

- The Attribute Table will appear in a new dialog box with the selected events highlighted. This box shows all of the fields from the original database and provides the user with the option of viewing all of the records or only the selected records. At the bottom of the box, choose "Show: Selected."

- From this point, all of the selected records (the locations of data inside of a five mile buffer of the park) can be exported as a text file (.txt). Click on the "Options" button and choose "Export…" The Export Data dialog box will appear.

- In the Export Data dialog box, "selected records" should be chosen at the top of the box. Under "Output table:," click on the folder button to the right of the output location. This will bring up the Saving Data dialog box. In this box, browse to the location where you wish to save the data, provide the file with a descriptive name, and change the “Save as type:” to “Text File.” Click “Save.”

- In the Access database created at the beginning of these directions, choose File → Get External Data → Import… The Import dialog box will appear. Change the “Files of type:” box to “Text Files” and navigate to the location where you saved your ArcGIS exported text file. Click “Import.”

- The Import Text Wizard dialog box will appear, allowing you to choose the import specifications for the records. This file will only include the data located within five miles of the park boundary.

Appendix F: Access Table with Numbers of Data in Database

This table provides the total numbers of data found for each parameter in each park, as well as the number of those data that were considered "actual" data. "Actual" data were those data that were above the detection limit and that did not have any other characteristics that would make them discredited (discussed further in section VIII.B. of this report).

All Data	Actual Data	Park	Parameter Name	Parameter Number
6		BITH	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
11		BITH	1,1,1-TRICHLOROETHANE DRY WGTBOTUG/KG	34509
6		BITH	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516
11		BITH	1,1,2,2-TETRACHLOROETHANE DRY WGTBOTUG/KG	34519
6		BITH	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
11		BITH	1,1,2-TRICHLOROETHANE DRY WGTBOTUG/KG	34514
6		BITH	1,1-DICHLOROETHANE TOTWUG/L	34496
11		BITH	1,1-DICHLOROETHANE DRY WGTBOTUG/KG	34499
6		BITH	1,1-DICHLOROETHYLENE TOTWUG/L	34501
11		BITH	1,1-DICHLOROETHYLENE DRY WGTBOTUG/KG	34504
6		BITH	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
12		BITH	1,2,4-TRICHLOROBENZENE DRY WGTBOTUG/KG	34554
6		BITH	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
12		BITH	1,2,5,6-DIBENZANTHRACENE DRY WGTBOTUG/KG	34559
6		BITH	1,2-DICHLOROBENZENE TOTWUG/L	34536
12		BITH	1,2-DICHLOROBENZENE DRY WGTBOTUG/KG	34539
11		BITH	1,2-DICHLOROETHANE DRY WGTBOTUG/KG	34534
6		BITH	1,2-DICHLOROETHANE,WHOLE WATER,UG/L	32103
6		BITH	1,2-DICHLOROPROPANE TOTWUG/L	34541
11		BITH	1,2-DICHLOROPROPANE DRY WGTBOTUG/KG	34544
6		BITH	1,3-DICHLOROBENZENE TOTWUG/L	34566
12		BITH	1,3-DICHLOROBENZENE DRY WGTBOTUG/KG	34569
6		BITH	1,4-DICHLOROBENZENE TOTWUG/L	34571
12		BITH	1,4-DICHLOROBENZENE DRY WGTBOTUG/KG	34574
21	1	BITH	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
6		BITH	2,4,5-T IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39742
107	42	BITH	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
16		BITH	2,4,5-TP INCLUDES ACIDS & SALTS WATER SAMPL UG/L	39045
5		BITH	2,4,5-TRICHLOROPHENOL IN SEDIMENT,DRY WEIGHT,UG/KG	78401
6		BITH	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621
12		BITH	2,4,6-TRICHLOROPHENOL DRY WGTBOTUG/KG	34624
22		BITH	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
9	1	BITH	2,4-D IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39732
123	41	BITH	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730

All Data	Actual Data	Park	Parameter Name	Parameter Number
3		BITH	2,4-D METHYL ESTER,WATER,FILTERED,RECOVERABLE UG/L	50470
9		BITH	2,4-DB WATER, DISUG/L	38746
6		BITH	2,4-DICHLOROPHENOL TOTWUG/L	34601
12		BITH	2,4-DICHLOROPHENOL DRY WGTBOTUG/KG	34604
6		BITH	2,4-DIMETHYLPHENOL TOTWUG/L	34606
12		BITH	2,4-DIMETHYLPHENOL DRY WGTBOTUG/KG	34609
6		BITH	2,4-DINITROPHENOL TOTWUG/L	34616
12		BITH	2,4-DINITROPHENOL DRY WGTBOTUG/KG	34619
6		BITH	2,4-DINITROTOLUENE TOTWUG/L	34611
12		BITH	2,4-DINITROTOLUENE DRY WGTBOTUG/KG	34614
5		BITH	2,4-DP (DICHLORPROP) TOTAL UG/L	82183
6		BITH	2,6-DINITROTOLUENE TOTWUG/L	34626
12		BITH	2,6-DINITROTOLUENE DRY WGTBOTUG/KG	34629
6		BITH	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
11		BITH	2-CHLOROETHYL VINYL ETHER DRY WGTBOTUG/KG	34579
6		BITH	2-CHLORONAPHTHALENE TOTWUG/L	34581
10		BITH	2-CHLORONAPHTHALENE DRY WGTBOTUG/KG	34584
6		BITH	2-CHLOROPHENOL TOTWUG/L	34586
12		BITH	2-CHLOROPHENOL DRY WGTBOTUG/KG	34589
6		BITH	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
12		BITH	4-BROMOPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34639
6		BITH	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
12		BITH	4-CHLOROPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34644
6		BITH	ACENAPHTHENE TOTWUG/L	34205
12		BITH	ACENAPHTHENE DRY WGTBOTUG/KG	34208
5		BITH	ACENAPHTHENE WET WGTTISMG/KG	34209
5		BITH	ACENAPHTHENE,DRY WEIGHT,SED,SIEVE	49429
8		BITH	ALACHLOR (LASSO), WATER, DISSOLVED UG/L	46342
6		BITH	ALDRIN IN FISH TISSUE WET WEIGHT MG/KG	34680
98	4	BITH	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
109		BITH	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
2		BITH	ALDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49319
3		BITH	ALDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49353
7	7	BITH	ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT)	1108
272	209	BITH	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
2	2	BITH	ALUMINUM, DRY WEIGHT, TISSUE/BIOTA,RECV UG/G	49237
87	84	BITH	ALUMINUM, TOTAL (UG/L AS AL)	1105
4		BITH	ALUMINUM,TOTAL RECOVERABLE IN WATER AS AL UG/L	1104
5		BITH	ANTHRACENE DRY WGTBOTUG/KG	34223
3		BITH	ANTHRACENE, 2-METHYL-,DRY WEIGHT,SED,SEV	49435

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	1	BITH	ANTHRACENE,DRY WEIGHT,SED,SIEVE	49434
47	41	BITH	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
5	1	BITH	ARSENIC TOTAL IN FISH OR ANIMAL WET WT MG/KG	1004
279	170	BITH	ARSENIC, DISSOLVED (UG/L AS AS)	1000
2	1	BITH	ARSENIC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49247
31	21	BITH	ARSENIC, SUSPENDED (UG/L AS AS)	1001
265	130	BITH	ARSENIC, TOTAL (UG/L AS AS)	1002
5	5	BITH	ARSENIC,SED,BOT,WET SIEVE,	34800
4		BITH	ARSENIC,TOTAL RECOVERABLE IN WATER AS AS UG/L	978
8	5	BITH	ATRAZINE DISSOLVED IN WATER PPB	39632
7	7	BITH	ATRAZINE(AATREX) IN WHOLE WATER SAMPLE (UG/L)	39630
11		BITH	BENZENE DRY WGTBOTUG/KG	34237
6		BITH	BENZENE IN WTR SMPLE GC-MS, HEXADECONE EXTR.(UG/L)	34030
5		BITH	BENZENE, 1,2,4-TRICHLORO-,DRY WT,SED,SEV	49438
5		BITH	BENZENE, M-DICHLORO-,DRY WT,SED,SIEVE	49441
3		BITH	BENZENE, NITRO-,DRY WT,SED,SIEVE	49444
5		BITH	BENZENE, O-DICHLORO-,SED,SIEVE	49439
5		BITH	BENZENE, P-DICHLORO-,DRY WT,SED,SIEVE	49442
3	3	BITH	BENZENE,NITRO-,D5,DRY WT,SIEVE	49280
5		BITH	BENZENE,PENTACHLORONITRO-,DRY WT,SIEVE	49446
5		BITH	BENZO(B)FLUORANTHENE,DRY WT,SIEVE	49458
12		BITH	BENZO(B)FLUORANTHENE,SEDIMENTS,DRY WGT,UG/KG	34233
6		BITH	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
12		BITH	BENZO(GHI)PERYLENE1,12-BENZOPERYLENDRY WGTBOTUG/KG	34524
6		BITH	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521
6		BITH	BENZO-A-PYRENE TOTWUG/L	34247
12	1	BITH	BENZO-A-PYRENE DRY WGTBOTUG/KG	34250
6		BITH	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
12		BITH	BIS (2-CHLOROETHYL) ETHER DRY WGTBOTUG/KG	34276
6		BITH	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
12		BITH	BIS (2-CHLOROISOPROPYL) ETHER DRY WGTBOTUG/KG	34286
6		BITH	BIS (CHLOROMETHYL) ETHER TOTWUG/L	34268
7		BITH	BIS (CHLOROMETHYL) ETHER DRY WGTBOTUG/KG	34271
6		BITH	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
11		BITH	BROMOFORM DRY WGTBOTUG/KG	34290
6	1	BITH	BROMOFORM,WHOLE WATER,UG/L	32104
227	35	BITH	CADMIUM, DISSOLVED (UG/L AS CD)	1025
2	2	BITH	CADMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49249
24	6	BITH	CADMIUM, SUSPENDED (UG/L AS CD)	1026
243	36	BITH	CADMIUM, TOTAL (UG/L AS CD)	1027

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	5	BITH	CADMIUM,SED,BOT,	34825
44	6	BITH	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
5		BITH	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940
4		BITH	CADMIUM,TOTAL RECOVERABLE IN WATER AS CD UG/L	1113
11		BITH	CARBON TETRACHLORIDE DRY WGTBOTUG/KG	34299
6		BITH	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
5	3	BITH	CHLORDANE(TECH MIX & METABS),TISSUEWET WGTT,MG/KG	34682
80		BITH	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
98	12	BITH	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
2		BITH	CHLORDANE, CIS-,DRY WT,SEDIMENT,SIEVE	49320
3		BITH	CHLORDANE,CIS-,WET WEIGHT,TISS,WHOLE ORG,RECVUG/KG	49380
2		BITH	CHLORDANE,TRANS-,DRY WT,SEDIMENT,SIEVE	49321
3		BITH	CHLORDANE,TRANS-,WET WT,TISS,WHOLE ORG,RECV UG/KG	49379
10		BITH	CHLORDANE-CIS ISOMER BOTTOM DEPOS (UG/KG DRY SOL	39064
10		BITH	CHLORDANE-TRANS ISOMER,BOTTOM DEPOS(UG/KG DRY SL	39067
1		BITH	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
182	182	BITH	CHLORIDE, DISSOLVED IN WATER MG/L	941
4440	4432	BITH	CHLORIDE,TOTAL IN WATER MG/L	940
6		BITH	CHLOROBENZENE TOTWUG/L	34301
11		BITH	CHLOROBENZENE DRY WGTBOTUG/KG	34304
11		BITH	CHLORODIBROMOMETHANE DRY WGTBOTUG/KG	34309
11		BITH	CHLOROFORM DRY WGTBOTUG/KG	34318
6		BITH	CHLOROFORM,WHOLE WATER,UG/L	32106
4		BITH	CHROMIUM TOTAL RECOVERABLE IN WATER AS CR UG/L	1118
228	8	BITH	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
2	1	BITH	CHROMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49240
2		BITH	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
31	15	BITH	CHROMIUM, SUSPEND (UG/L AS CR)	1031
259	87	BITH	CHROMIUM, TOTAL (UG/L AS CR)	1034
5	5	BITH	CHROMIUM,SED,BOT,	34840
6	1	BITH	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS	71939
44	42	BITH	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
10		BITH	CIS-1,3-DICHLOROPROPENE SEDIMENT DRY WEIGHT UG/KG	34702
6		BITH	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
48	45	BITH	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
191	146	BITH	COPPER, DISSOLVED (UG/L AS CU)	1040
2	2	BITH	COPPER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49241
39	35	BITH	COPPER, SUSPENDED (UG/L AS CU)	1041
175	31	BITH	COPPER, TOTAL (UG/L AS CU)	1042
5	5	BITH	COPPER,SED,BOT,	34850

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	4	BITH	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937
4	3	BITH	COPPER,TOTAL RECOVERABLE IN WATER AS CU UG/L	1119
90	6	BITH	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
104	2	BITH	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
1		BITH	DDD TOTAL IN TISSUE WET WEIGHT MG/KG	81897
2		BITH	DDD,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49325
3		BITH	DDD,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49374
2		BITH	DDD,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49326
3		BITH	DDD,P,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49375
90	9	BITH	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
104	4	BITH	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
2		BITH	DDE,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49327
3		BITH	DDE,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49373
2		BITH	DDE,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49328
3	1	BITH	DDE,P,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49372
90	6	BITH	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
108	8	BITH	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
8		BITH	DDT SUM ANALOGS IN SEDIMENT UG/KG DRY WEIGHT	39359
6	3	BITH	DDT SUM ANALOGS INTISSUE WET WGT BASIS	39376
2		BITH	DDT,O,P'-,DRY WT,SEDIMENT,SIEVE	49329
3		BITH	DDT,O,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49377
2		BITH	DDT,P,P'-,DRY WT,SEDIMENT,SIEVE	49330
3		BITH	DDT,P,P',WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49376
2		BITH	DEMETON IN SEDIMENT (SYSTOX) DRY WEIGHT UG/KG	82400
1		BITH	DICOFOL (KELTHANE) SEDIMENT,DRY,WT,UG/KG	79799
98	11	BITH	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
8		BITH	DIELDRIN IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39381
5		BITH	DIELDRIN IN TISSUE WET WGT (UG/G)	39404
108	5	BITH	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
2		BITH	DIELDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49331
3		BITH	DIELDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49371
4		BITH	ENDOSULFAN SULFATE TOTWUG/L	34351
12		BITH	ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354
5		BITH	ENDOSULFAN SULFATE WET WGTTISMG/KG	34355
6		BITH	ENDRIN WET WGTTISMG/KG	34685
4		BITH	ENDRIN ALDEHYDE TOTWUG/L	34366
8		BITH	ENDRIN ALDEHYDE DRY WGTBOTUG/KG	34369
98	4	BITH	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
124		BITH	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
2		BITH	ENDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49335

All Data	Actual Data	Park	Parameter Name	Parameter Number
3		BITH	ENDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49370
6		BITH	FLUORANTHENE TOTWUG/L	34376
12	2	BITH	FLUORANTHENE DRY WGTBOTUG/KG	34379
5		BITH	FLUORANTHENE WET WGTTISMG/KG	34380
3	3	BITH	FLUORANTHENE,SED,BED MAT,WET SIEV	49466
6		BITH	FLUORENE TOTWUG/L	34381
12		BITH	FLUORENE DRY WGTBOTUG/KG	34384
5		BITH	FLUORENE WET WGTTISMG/KG	34385
5		BITH	FLUORENE,9H-,DRY WEIGHT,SIEVE	49399
3		BITH	GUTHION IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39581
6		BITH	HEPTACHLOR WET WGTTISMG/KG	34687
5		BITH	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
93	4	BITH	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
113		BITH	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
2		BITH	HEPTACHLOR EPOXIDE,DRY WT,SEDIMENT,SIEVE	49342
3		BITH	HEPTACHLOR EPOXIDE,WET WT,TISS,WHOLE ORG,RECVUG/KG	49368
98	4	BITH	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
113		BITH	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
2		BITH	HEPTACHLOR,DRY WEIGHT,SEDIMENT,SIEVE	49341
3		BITH	HEPTACHLOR,WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49369
20	1	BITH	HEXACHLOROBENZENE IN BOT DEPOS (UG/KG DRY SOLIDS)	39701
10		BITH	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
5		BITH	HEXACHLOROBENZENE,DRY WT,SEDIMENT,SIEVE	49343
3		BITH	HEXACHLOROBENZENE,WET WT,TISS,WHOLE ORG,RECV UG/KG	49367
12		BITH	HEXACHLOROBUTADIENE BOT. DEPOS.(UG/KG DRY WGT)	39705
6		BITH	HEXACHLOROBUTADIENE IN WHOLE WATER SAMPLE(UG/L)	39702
6		BITH	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
12		BITH	HEXACHLOROCYCLOPENTADIENE DRY WGTBOTUG/KG	34389
6		BITH	HEXACHLOROETHANE TOTWUG/L	34396
12		BITH	HEXACHLOROETHANE DRY WGTBOTUG/KG	34399
1		BITH	HEXACHLOROPHENE, DRY WEIGHT, SEDIMENT UG/KG	73120
6		BITH	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
12		BITH	INDENO (1,2,3-CD) PYRENE DRY WGTBOTUG/KG	34406
382	354	BITH	IRON, DISSOLVED (UG/L AS FE)	1046
2	2	BITH	IRON, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49242
33	33	BITH	IRON, SUSPENDED (UG/L AS FE)	1044
255	255	BITH	IRON, TOTAL (UG/L AS FE)	1045
5	5	BITH	IRON,SED,BOT,	34880
4	4	BITH	IRON,TOTAL RECOVERABLE IN WATER AS FE UG/L	980
47	43	BITH	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052

All Data	Actual Data	Park	Parameter Name	Parameter Number
199	52	BITH	LEAD, DISSOLVED (UG/L AS PB)	1049
2	1	BITH	LEAD, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49251
36	24	BITH	LEAD, SUSPENDED (UG/L AS PB)	1050
229	71	BITH	LEAD, TOTAL (UG/L AS PB)	1051
5	5	BITH	LEAD,SED,BOT,	34890
6	3	BITH	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936
4		BITH	LEAD,TOTAL RECOVERABLE IN WATER AS PB UG/L	1114
15		BITH	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
8	2	BITH	MALATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39532
81		BITH	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
37	37	BITH	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
343	275	BITH	MANGANESE, DISSOLVED (UG/L AS MN)	1056
2	2	BITH	MANGANESE, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49243
37	37	BITH	MANGANESE, SUSPENDED (UG/L AS MN)	1054
218	214	BITH	MANGANESE, TOTAL (UG/L AS MN)	1055
5	5	BITH	MANGANESE,SED,BOT,	34905
4	4	BITH	MANGANESE,TOTAL RECOVERABLE IN WATER AS MN UG/L	1123
261	46	BITH	MERCURY, DISSOLVED (UG/L AS HG)	71890
3	3	BITH	MERCURY, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49258
33	22	BITH	MERCURY, SUSPENDED (UG/L AS HG)	71895
272	70	BITH	MERCURY, TOTAL (UG/L AS HG)	71900
1	1	BITH	MERCURY,METHYL-,WAT,FILTERED, RECOVERABLE NG/L	50285
5	5	BITH	MERCURY,SED,BOT,	34910
48	32	BITH	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
5	4	BITH	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71930
4		BITH	MERCURY,TOTAL RECOVERABLE IN WATER AS HG UG/L	71901
1	1	BITH	MERCURY,WAT,FILTERED, RECOVERABLE NG/L	50287
25		BITH	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
1		BITH	METHOXYCHLOR IN FISH TISSUE,UG/G WET WEIGHT	81644
34		BITH	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
2		BITH	METHOXYCHLOR,O,P'-,DRY WT,SED,SIEVE	49347
3		BITH	METHOXYCHLOR,O,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49362
2		BITH	METHOXYCHLOR,P,P'-,DRY WT,SED,SIEVE	49346
3		BITH	METHOXYCHLOR,P,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49361
8	4	BITH	METOLACHLOR, WATER, DISSOLVED UG/L	39415
1		BITH	MIREX SEDIMENT,DRY,WT,UG/KG	79800
4		BITH	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
16		BITH	MIREX, TOTAL (UG/L)	39755
2		BITH	MIREX,DRY WEIGHT,SEDIMENT,SIEVE	49348
3		BITH	MIREX,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49360

All Data	Actual Data	Park	Parameter Name	Parameter Number
187	8	BITH	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
2	2	BITH	MOLYBDENUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49252
5	3	BITH	MOLYBDENUM,SED,BOT,	34915
4		BITH	MOLYBDENUM,TOTAL RECOVERABLE IN WATER AS MB UG/L	1129
6		BITH	NAPHTHALENE TOTWUG/L	34696
12		BITH	NAPHTHALENE DRY WGTBOTUG/KG	34445
5		BITH	NAPHTHALENE WET WGTTISMG/KG	34446
3		BITH	NAPHTHALENE, 1,2-DIMETHYL-,DRY WT,SIEVE	49403
3		BITH	NAPHTHALENE, 1,6-DIMETHYL-,DRY WT,SIEVE	49404
3		BITH	NAPHTHALENE, 2,3,6-TRIMETHYL-,DRY WT,SEV	49405
3	2	BITH	NAPHTHALENE, 2,6-DIMETHYL-,DRY WT,SIEVE	49406
5		BITH	NAPHTHALENE, 2-CHLORO-,DRY WT,SIEVE	49407
3		BITH	NAPHTHALENE, DRY WEIGHT, SIEVE	49402
3		BITH	NAPHTHALENE,2-ETHYL-,BEDMAT,WETSIEV,	49948
214	147	BITH	NICKEL, DISSOLVED (UG/L AS NI)	1065
2	1	BITH	NICKEL, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49253
22	11	BITH	NICKEL, SUSPENDED (UG/L AS NI)	1066
150	39	BITH	NICKEL, TOTAL (UG/L AS NI)	1067
44	40	BITH	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
5		BITH	NICKEL, TOTAL IN FISH OR ANIMALS-WET WEIGHT MG/KG	1069
5	5	BITH	NICKEL,SED,BOT,	34925
4	2	BITH	NICKEL,TOTAL RECOVERABLE IN WATER AS NI UG/L	1074
25		BITH	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
8		BITH	PARATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39542
80		BITH	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
24	2	BITH	PCP (PENTACHLOROPHENOL) IN BOT DEPOS DRY SOL UG/KG	39061
10		BITH	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
3		BITH	PENTACHLOROBENZENE IN SEDIMENT UG/KG	39118
5		BITH	PHENANTHRENE DRY WGTBOTUG/KG	34464
3	1	BITH	PHENANTHRENE,DRY WEIGHT,SIEVE	49409
6		BITH	PYRENE TOTWUG/L	34469
12	3	BITH	PYRENE DRY WGTBOTUG/KG	34472
5		BITH	PYRENE WET WGTTISMG/KG	34473
3	3	BITH	PYRENE,DRY WEIGHT,SED,SIEVE	49387
42	9	BITH	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
290	14	BITH	SELENIUM, DISSOLVED (UG/L AS SE)	1145
1	1	BITH	SELENIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49254
31	2	BITH	SELENIUM, SUSPENDED (UG/L AS SE)	1146
226	19	BITH	SELENIUM, TOTAL (UG/L AS SE)	1147
5	2	BITH	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	1149

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	5	BITH	SELENIUM,SED,BOT,	34950
4		BITH	SELENIUM,TOTAL RECOVERABLE IN WATER AS SE UG/L	981
2		BITH	SEVIN IN SEDIMENT DRY WEIGHT UG/KG	81818
8		BITH	SEVIN IN WHOLE WATER SAMPLE (UG/L)	39750
5		BITH	SILVER WET WGTTISMG/KG	34474
43	7	BITH	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	1078
255	9	BITH	SILVER, DISSOLVED (UG/L AS AG)	1075
2	1	BITH	SILVER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49255
31	4	BITH	SILVER, SUSPENDED (UG/L AS AG)	1076
173	15	BITH	SILVER, TOTAL (UG/L AS AG)	1077
5	5	BITH	SILVER,SED,BOT,	34955
4		BITH	SILVER,TOTAL RECOVERABLE IN WATER AS AG UG/L	1079
7	1	BITH	SIMAZINE IN WHOLE WATER (UG/L)	39055
8	4	BITH	SIMAZINE, DISSOLVED, WATER, TOTAL RECOVERABLE UG/L	4035
6		BITH	TETRACHLOROETHYLENE TOTWUG/L	34475
9		BITH	TETRACHLOROETHYLENE DRY WGTBOTUG/KG	34478
6		BITH	TOXAPHENE WET WGTTISMG/KG	34691
79		BITH	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
71		BITH	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
3		BITH	TOXAPHENE, WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49355
2		BITH	TOXAPHENE,DRY WEIGHT,SEDIMENT,SIEVE	49351
10		BITH	TRANS-1,3-DICHLOROPROPENE SEDIMENT DRY WGT UG/KG	34697
6		BITH	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
9		BITH	TRICHLOROETHYLENE DRY WGTBOTUG/KG	34487
6		BITH	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
11		BITH	VINYL CHLORIDE DRY WGTBOTUG/KG	34495
6		BITH	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
47	47	BITH	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
248	185	BITH	ZINC, DISSOLVED (UG/L AS ZN)	1090
2	2	BITH	ZINC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49245
32	26	BITH	ZINC, SUSPENDED (UG/L ZN)	1091
259	123	BITH	ZINC, TOTAL (UG/L AS ZN)	1092
5	5	BITH	ZINC,SED,BOT,	35020
5	5	BITH	ZINC,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71938
4	4	BITH	ZINC,TOTAL RECOVERABLE IN WATER AS ZN UG/L	1094
158		GUIS	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
158		GUIS	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516
158		GUIS	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
158		GUIS	1,1-DICHLOROETHANE TOTWUG/L	34496
158		GUIS	1,1-DICHLOROETHYLENE TOTWUG/L	34501

All Data	Actual Data	Park	Parameter Name	Parameter Number
58		GUIS	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
58		GUIS	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
20		GUIS	1,2-DIBROMOETHANE WHOLE WATER,UG/L	77651
160		GUIS	1,2-DICHLOROBENZENE TOTWUG/L	34536
158		GUIS	1,2-DICHLOROETHANE TOTWUG/L	34531
158		GUIS	1,2-DICHLOROPROPANE TOTWUG/L	34541
160		GUIS	1,3-DICHLOROBENZENE TOTWUG/L	34566
160		GUIS	1,4-DICHLOROBENZENE TOTWUG/L	34571
2		GUIS	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
4	2	GUIS	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
58		GUIS	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621
4		GUIS	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
24	1	GUIS	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
20		GUIS	2,4-DB WATER, TOTUG/L	38745
58		GUIS	2,4-DICHLOROPHENOL TOTWUG/L	34601
58		GUIS	2,4-DIMETHYLPHENOL TOTWUG/L	34606
58		GUIS	2,4-DINITROPHENOL TOTWUG/L	34616
58		GUIS	2,4-DINITROTOLUENE TOTWUG/L	34611
58		GUIS	2,6-DINITROTOLUENE TOTWUG/L	34626
158		GUIS	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
58		GUIS	2-CHLORONAPHTHALENE TOTWUG/L	34581
58		GUIS	2-CHLOROPHENOL TOTWUG/L	34586
58		GUIS	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
58		GUIS	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
58		GUIS	ACENAPHTHENE TOTWUG/L	34205
38		GUIS	ALACHLOR WHOLE WATER,UG/L	77825
9		GUIS	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
66	1	GUIS	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
2	2	GUIS	ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT)	1108
58	33	GUIS	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
4	3	GUIS	ALUMINUM, SUSPENDED (UG/L AS AL)	1107
97	85	GUIS	ALUMINUM, TOTAL (UG/L AS AL)	1105
58		GUIS	ANTHRACENE TOTWUG/L	34220
20	13	GUIS	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
20		GUIS	ARSENIC, DISSOLVED (UG/L AS AS)	1000
588	41	GUIS	ARSENIC, TOTAL (UG/L AS AS)	1002
38	1	GUIS	ATRAZINE IN WHOLE WATER SAMPLE UG/L	39033
158	1	GUIS	BENZENE IN WATER (VOLATILE ANALYSIS) UG/L	78124
58		GUIS	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
56		GUIS	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521

All Data	Actual Data	Park	Parameter Name	Parameter Number
58		GUIS	BENZO-A-PYRENE TOTWUG/L	34247
58		GUIS	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
58		GUIS	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
158		GUIS	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
158	1	GUIS	BROMOFORM,WHOLE WATER,UG/L	32104
1	1	GUIS	CADMIUM IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81634
36		GUIS	CADMIUM, DISSOLVED (UG/L AS CD)	1025
69	1	GUIS	CADMIUM, SUSPENDED (UG/L AS CD)	1026
589	47	GUIS	CADMIUM, TOTAL (UG/L AS CD)	1027
33	14	GUIS	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
158		GUIS	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
44		GUIS	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
7		GUIS	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
1	1	GUIS	CHLORDANE,GAMMA,IN BOTTOM DEPOS(UG/KG DRY SOLIDS)	39811
6	1	GUIS	CHLORDANE-CIS ISOMER BOTTOM DEPOS (UG/KG DRY SOL	39064
5		GUIS	CHLORDANE-TRANS ISOMER,BOTTOM DEPOS(UG/KG DRY SL	39067
230	195	GUIS	CHLORIDE, DISSOLVED IN WATER MG/L	941
2017	1995	GUIS	CHLORIDE,TOTAL IN WATER MG/L	940
158		GUIS	CHLOROBENZENE TOTWUG/L	34301
158		GUIS	CHLOROFORM,WHOLE WATER,UG/L	32106
76	2	GUIS	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
11		GUIS	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
1		GUIS	CHROMIUM, SUSPEND (UG/L AS CR)	1031
654	192	GUIS	CHROMIUM, TOTAL (UG/L AS CR)	1034
22	20	GUIS	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
141		GUIS	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
29	24	GUIS	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
1	1	GUIS	COPPER IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81636
145	4	GUIS	COPPER, DISSOLVED (UG/L AS CU)	1040
1	1	GUIS	COPPER, SUSPENDED (UG/L AS CU)	1041
586	104	GUIS	COPPER, TOTAL (UG/L AS CU)	1042
4	1	GUIS	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
8		GUIS	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
4		GUIS	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
8	2	GUIS	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
4		GUIS	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
8	2	GUIS	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
7	2	GUIS	DDT SUM ANALOGS IN SEDIMENT UG/KG DRY WEIGHT	39359
9		GUIS	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
66	1	GUIS	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380

All Data	Actual Data	Park	Parameter Name	Parameter Number
58		GUIS	ENDOSULFAN SULFATE TOTWUG/L	34351
5		GUIS	ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354
58		GUIS	ENDRIN ALDEHYDE TOTWUG/L	34366
5		GUIS	ENDRIN ALDEHYDE DRY WGTBOTUG/KG	34369
9		GUIS	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
46		GUIS	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
58		GUIS	FLUORANTHENE TOTWUG/L	34376
58		GUIS	FLUORENE TOTWUG/L	34381
5		GUIS	GUTHION IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39581
2		GUIS	GUTHION IN WHOLE WATER SAMPLE (UG/L)	39580
7		GUIS	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
62		GUIS	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
7		GUIS	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
62		GUIS	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
5		GUIS	HEXACHLOROBENZENE IN BOT DEPOS (UG/KG DRY SOLIDS)	39701
58		GUIS	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
58		GUIS	HEXACHLOROBUTADIENE TOTWUG/L	34391
38		GUIS	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
58		GUIS	HEXACHLOROETHANE TOTWUG/L	34396
56		GUIS	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
19	19	GUIS	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	1170
226	102	GUIS	IRON, DISSOLVED (UG/L AS FE)	1046
34	20	GUIS	IRON, SUSPENDED (UG/L AS FE)	1044
16	16	GUIS	IRON, TOTAL (MG/L AS FE)	74010
232	163	GUIS	IRON, TOTAL (UG/L AS FE)	1045
33	28	GUIS	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
1	1	GUIS	LEAD IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81633
108	3	GUIS	LEAD, DISSOLVED (UG/L AS PB)	1049
21	9	GUIS	LEAD, SUSPENDED (UG/L AS PB)	1050
654	99	GUIS	LEAD, TOTAL (UG/L AS PB)	1051
7		GUIS	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
24		GUIS	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
10	10	GUIS	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
113	77	GUIS	MANGANESE, DISSOLVED (UG/L AS MN)	1056
4	2	GUIS	MANGANESE, SUSPENDED (UG/L AS MN)	1054
296	150	GUIS	MANGANESE, TOTAL (UG/L AS MN)	1055
20	1	GUIS	MERCURY, DISSOLVED (UG/L AS HG)	71890
595	9	GUIS	MERCURY, TOTAL (UG/L AS HG)	71900
3	3	GUIS	MERCURY,TOT IN BOT DEPOS OR PULP(MG/KG,WET WGT)	71920
26	10	GUIS	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921

All Data	Actual Data	Park	Parameter Name	Parameter Number
5		GUIS	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
14		GUIS	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
6		GUIS	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
6	1	GUIS	MIREX, TOTAL (UG/L)	39755
1		GUIS	MOLYBDENUM IN BOT. DEPOSITS (MG/KG AS MO DRY WGT)	1063
56	3	GUIS	NAPHTHALENE TOTWUG/L	34696
1	1	GUIS	NICKEL IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81628
76	2	GUIS	NICKEL, DISSOLVED (UG/L AS NI)	1065
1		GUIS	NICKEL, SUSPENDED (UG/L AS NI)	1066
537	22	GUIS	NICKEL, TOTAL (UG/L AS NI)	1067
18	15	GUIS	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
7		GUIS	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
6		GUIS	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
57		GUIS	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
58		GUIS	PHENANTHRENE TOTWUG/L	34461
58		GUIS	PYRENE TOTWUG/L	34469
8	2	GUIS	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
20	1	GUIS	SELENIUM, DISSOLVED (UG/L AS SE)	1145
480	91	GUIS	SELENIUM, TOTAL (UG/L AS SE)	1147
4	4	GUIS	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	1078
1	1	GUIS	SILVER IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81635
60	2	GUIS	SILVER, DISSOLVED (UG/L AS AG)	1075
95	5	GUIS	SILVER, TOTAL (UG/L AS AG)	1077
38	1	GUIS	SIMAZINE IN WHOLE WATER (UG/L)	39055
158		GUIS	TETRACHLOROETHYLENE TOTWUG/L	34475
9		GUIS	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
85	1	GUIS	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
145		GUIS	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
158		GUIS	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
158		GUIS	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
30	29	GUIS	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
1	1	GUIS	ZINC IN SHELLFISH TISSUE DRY WEIGHT MG/KG	81627
111	23	GUIS	ZINC, DISSOLVED (UG/L AS ZN)	1090
4	1	GUIS	ZINC, SUSPENDED (UG/L ZN)	1091
585	173	GUIS	ZINC, TOTAL (UG/L AS ZN)	1092
33	2	JELA	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
33		JELA	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516
33		JELA	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
33		JELA	1,1-DICHLOROETHANE TOTWUG/L	34496
33		JELA	1,1-DICHLOROETHYLENE TOTWUG/L	34501

All Data	Actual Data	Park	Parameter Name	Parameter Number
32		JELA	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
10		JELA	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
29		JELA	1,2-DIBROMOETHANE WHOLE WATER,UG/L	77651
37		JELA	1,2-DICHLOROBENZENE TOTWUG/L	34536
35	3	JELA	1,2-DICHLOROETHANE,WHOLE WATER,UG/L	32103
33		JELA	1,2-DICHLOROPROPANE TOTWUG/L	34541
37		JELA	1,3-DICHLOROBENZENE TOTWUG/L	34566
37		JELA	1,4-DICHLOROBENZENE TOTWUG/L	34571
3		JELA	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
22		JELA	2,4,5-T IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39742
237	63	JELA	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
4		JELA	2,4,5-TP INCLUDES ACIDS & SALTS WATER SAMPL UG/L	39045
10		JELA	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621
3		JELA	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
50	6	JELA	2,4-D IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39732
241	146	JELA	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
28	1	JELA	2,4-D METHYL ESTER,WATER,FILTERED,RECOVERABLE UG/L	50470
36		JELA	2,4-DB WATER, DISUG/L	38746
10		JELA	2,4-DICHLOROPHENOL TOTWUG/L	34601
10		JELA	2,4-DIMETHYLPHENOL TOTWUG/L	34606
3		JELA	2,4-DIMETHYLPHENOL DRY WGTBOTUG/KG	34609
10		JELA	2,4-DINITROPHENOL TOTWUG/L	34616
10		JELA	2,4-DINITROTOLUENE TOTWUG/L	34611
104	4	JELA	2,4-DP (DICHLORPROP) TOTAL UG/L	82183
10		JELA	2,6-DINITROTOLUENE TOTWUG/L	34626
11		JELA	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
10		JELA	2-CHLORONAPHTHALENE TOTWUG/L	34581
10		JELA	2-CHLOROPHENOL TOTWUG/L	34586
1		JELA	4-BROMOPHENYL PHENYL ETHER DISSUG/L	34637
9		JELA	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
10		JELA	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
10		JELA	ACENAPHTHENE TOTWUG/L	34205
2		JELA	ACENAPHTHENE,DRY WEIGHT,SED,SIEVE	49429
7		JELA	ALACHLOR WHOLE WATER,UG/L	77825
76		JELA	ALACHLOR (LASSO), WATER, DISSOLVED UG/L	46342
3	3	JELA	ALDRIN IN FISH TISSUE WET WEIGHT MG/KG	34680
80	2	JELA	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
19		JELA	ALDRIN IN FILT. FRAC. OF WAT. SAMP. (UG/L)	39331
379	2	JELA	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
4		JELA	ALDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49319

All Data	Actual Data	Park	Parameter Name	Parameter Number
6		JELA	ALDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49353
29	14	JELA	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
8	2	JELA	ALUMINUM, DRY WEIGHT, TISSUE/BIOTA,RECV UG/G	49237
8	8	JELA	ALUMINUM, TOTAL (UG/L AS AL)	1105
10		JELA	ANTHRACENE TOTWUG/L	34220
2		JELA	ANTHRACENE, 2-METHYL-,DRY WEIGHT,SED,SEV	49435
2	2	JELA	ANTHRACENE,DRY WEIGHT,SED,SIEVE	49434
83	75	JELA	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
15	15	JELA	ARSENIC TOTAL IN FISH OR ANIMAL WET WT MG/KG	1004
490	387	JELA	ARSENIC, DISSOLVED (UG/L AS AS)	1000
8	5	JELA	ARSENIC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49247
189	94	JELA	ARSENIC, SUSPENDED (UG/L AS AS)	1001
359	265	JELA	ARSENIC, TOTAL (UG/L AS AS)	1002
2	2	JELA	ARSENIC,SED,BOT,WET SIEVE,	34800
76	55	JELA	ATRAZINE DISSOLVED IN WATER PPB	39632
6	3	JELA	ATRAZINE(AATREX) IN WHOLE WATER SAMPLE (UG/L)	39630
8	6	JELA	BARIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49238
2	2	JELA	BARIUM,SED,BOT,	34805
33	4	JELA	BENZENE IN WTR SMPLE GC-MS, HEXADECONE EXTR.(UG/L)	34030
2		JELA	BENZENE, 1,2,4-TRICHLORO-,DRY WT,SED,SEV	49438
2		JELA	BENZENE, M-DICHLORO-,DRY WT,SED,SIEVE	49441
2		JELA	BENZENE, NITRO-,DRY WT,SED,SIEVE	49444
2		JELA	BENZENE, O-DICHLORO-,SED,SIEVE	49439
2	1	JELA	BENZENE, P-DICHLORO-,DRY WT,SED,SIEVE	49442
2	2	JELA	BENZENE,NITRO-,D5,DRY WT,SIEVE	49280
2		JELA	BENZENE,PENTACHLORONITRO-,DRY WT,SIEVE	49446
2	2	JELA	BENZO(B)FLUORANTHENE,DRY WT,SIEVE	49458
10		JELA	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
10		JELA	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521
10		JELA	BENZO-A-PYRENE TOTWUG/L	34247
10		JELA	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
10		JELA	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
1		JELA	BIS (2-CHLOROISOPROPYL) ETHER WET WGTTISMG/KG	34287
34	1	JELA	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
33		JELA	BROMOFORM,WHOLE WATER,UG/L	32104
274	125	JELA	CADMIUM, DISSOLVED (UG/L AS CD)	1025
8	1	JELA	CADMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49249
190	45	JELA	CADMIUM, SUSPENDED (UG/L AS CD)	1026
88	14	JELA	CADMIUM, TOTAL (UG/L AS CD)	1027
2	2	JELA	CADMIUM,SED,BOT,	34825

All Data	Actual Data	Park	Parameter Name	Parameter Number
82	51	JELA	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
15	15	JELA	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940
67		JELA	CARBON TETRACHLORIDE EXTRACTABLES (MG/L)	32260
33		JELA	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
19		JELA	CHLORDANE(TECH MIX & METABS),DISSOLVED,UG/L	39352
309		JELA	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
82	48	JELA	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
1		JELA	CHLORDANE, ALPHA, IN WHOLE WATER SAMPLE (UG/L)	39348
4		JELA	CHLORDANE, CIS-,DRY WT,SEDIMENT,SIEVE	49320
6		JELA	CHLORDANE,CIS-,WET WEIGHT,TISS,WHOLE ORG,RECVUG/KG	49380
1		JELA	CHLORDANE,GAMMA,IN WHOLE WATER SAMPLE (UG/L)	39810
4		JELA	CHLORDANE,TRANS-,DRY WT,SEDIMENT,SIEVE	49321
6		JELA	CHLORDANE,TRANS-,WET WT,TISS,WHOLE ORG,RECV UG/KG	49379
15	15	JELA	CHLORDANE-CIS ISOMER,TISSUE WET WGT (UG/G)	39063
15	15	JELA	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
30084	30083	JELA	CHLORIDE,TOTAL IN WATER MG/L	940
33		JELA	CHLOROBENZENE TOTWUG/L	34301
2	1	JELA	CHLORODIBROMOMETHANE TOTWUG/L	34306
67		JELA	CHLOROFORM EXTRACTABLES TOTAL IN MG PER LITER	32270
35	5	JELA	CHLOROFORM,WHOLE WATER,UG/L	32106
239	104	JELA	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
8	2	JELA	CHROMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49240
231	3	JELA	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
20	7	JELA	CHROMIUM, SUSPEND (UG/L AS CR)	1031
241	76	JELA	CHROMIUM, TOTAL (UG/L AS CR)	1034
2	2	JELA	CHROMIUM,SED,BOT,	34840
83	78	JELA	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
33		JELA	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
13	3	JELA	COPPER AS SUSPENDED BLACK OXIDE IN WATER MG/L	1089
83	78	JELA	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
229	174	JELA	COPPER, DISSOLVED (UG/L AS CU)	1040
8	8	JELA	COPPER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49241
99	64	JELA	COPPER, SUSPENDED (UG/L AS CU)	1041
44	28	JELA	COPPER, TOTAL (UG/L AS CU)	1042
2	2	JELA	COPPER,SED,BOT,	34850
12	12	JELA	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937
81	51	JELA	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
19		JELA	DDD IN FILT. FRAC. OF WATER SMAPLE (UG/L)	39361
310	1	JELA	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
4		JELA	DDD,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49325

All Data	Actual Data	Park	Parameter Name	Parameter Number
6		JELA	DDD,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49374
3	1	JELA	DDD,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49326
6		JELA	DDD,P,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49375
82	28	JELA	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
19		JELA	DDE IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39366
310		JELA	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
39	39	JELA	DDE TOTAL IN TISSUE WET WEIGHT MG/KG	81896
4		JELA	DDE,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49327
6		JELA	DDE,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49373
4	3	JELA	DDE,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49328
6	1	JELA	DDE,P,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49372
82	30	JELA	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
19		JELA	DDT IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39371
309	24	JELA	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
39	39	JELA	DDT TOTAL IN TISSUE WET WGT BASIS (UG/G)	39290
4		JELA	DDT,O,P'-,DRY WT,SEDIMENT,SIEVE	49329
6		JELA	DDT,O,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49377
4		JELA	DDT,P,P'-,DRY WT,SEDIMENT,SIEVE	49330
6		JELA	DDT,P,P',WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49376
39	39	JELA	DIELDRIN TISMG/KG	34684
83	40	JELA	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
95	8	JELA	DIELDRIN IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39381
377	30	JELA	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
4		JELA	DIELDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49331
6		JELA	DIELDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49371
36	36	JELA	ENDRIN WET WGTTISMG/KG	34685
83	15	JELA	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
19		JELA	ENDRIN IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39391
314	6	JELA	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
4		JELA	ENDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49335
6		JELA	ENDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49370
10		JELA	FLUORANTHENE TOTWUG/L	34376
2	2	JELA	FLUORANTHENE,SED,BED MAT,WET SIEV	49466
10		JELA	FLUORENE TOTWUG/L	34381
2	1	JELA	FLUORENE,9H-,DRY WEIGHT,SIEVE	49399
39	39	JELA	HEPTACHLOR WET WGTTISMG/KG	34687
3	3	JELA	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
83	12	JELA	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
19		JELA	HEPTACHLOR EPOXIDE IN FILT. FRAC. WAT SAMP (UG/L)	39421
311		JELA	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420

All Data	Actual Data	Park	Parameter Name	Parameter Number
4		JELA	HEPTACHLOR EPOXIDE,DRY WT,SEDIMENT,SIEVE	49342
6		JELA	HEPTACHLOR EPOXIDE,WET WT,TISS,WHOLE ORG,RECVUG/KG	49368
82		JELA	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
19		JELA	HEPTACHLOR IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39411
312		JELA	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
4		JELA	HEPTACHLOR,DRY WEIGHT,SEDIMENT,SIEVE	49341
6		JELA	HEPTACHLOR,WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49369
15	15	JELA	HEXACHLOROBENZENE WET WGTTISMG/KG	34688
10		JELA	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
4		JELA	HEXACHLOROBENZENE,DRY WT,SEDIMENT,SIEVE	49343
6		JELA	HEXACHLOROBENZENE,WET WT,TISS,WHOLE ORG,RECV UG/KG	49367
1		JELA	HEXACHLOROBUTADIENE TOTWUG/L	34391
32		JELA	HEXACHLOROBUTADIENE IN WHOLE WATER SAMPLE(UG/L)	39702
10		JELA	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
32		JELA	HEXACHLOROETHANE TOTWUG/L	34396
10		JELA	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
146	117	JELA	IRON (UG/L AS FE)	71885
19	19	JELA	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	1170
551	426	JELA	IRON, DISSOLVED (UG/L AS FE)	1046
8	8	JELA	IRON, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49242
3	3	JELA	IRON, SUSPENDED (UG/L AS FE)	1044
384	263	JELA	IRON, TOTAL (UG/L AS FE)	1045
2	2	JELA	IRON,SED,BOT,	34880
83	61	JELA	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
252	85	JELA	LEAD, DISSOLVED (UG/L AS PB)	1049
8		JELA	LEAD, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49251
194	138	JELA	LEAD, SUSPENDED (UG/L AS PB)	1050
115	16	JELA	LEAD, TOTAL (UG/L AS PB)	1051
2	2	JELA	LEAD,SED,BOT,	34890
15	15	JELA	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936
62		JELA	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
95	8	JELA	MALATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39532
276	3	JELA	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
41	40	JELA	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
277	237	JELA	MANGANESE, DISSOLVED (UG/L AS MN)	1056
8	8	JELA	MANGANESE, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49243
32	32	JELA	MANGANESE, SUSPENDED (UG/L AS MN)	1054
99	82	JELA	MANGANESE, TOTAL (UG/L AS MN)	1055
2	2	JELA	MANGANESE,SED,BOT,	34905
452	44	JELA	MERCURY, DISSOLVED (UG/L AS HG)	71890

All Data	Actual Data	Park	Parameter Name	Parameter Number
8	8	JELA	MERCURY, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49258
191	39	JELA	MERCURY, SUSPENDED (UG/L AS HG)	71895
280	37	JELA	MERCURY, TOTAL (UG/L AS HG)	71900
15	15	JELA	MERCURY, TOTAL IN FISH (PPM,WET WEIGHT BASIS)	71935
2	2	JELA	MERCURY,SED,BOT,	34910
80	68	JELA	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
24		JELA	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
126	1	JELA	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
4		JELA	METHOXYCHLOR,O,P'-,DRY WT,SED,SIEVE	49347
6		JELA	METHOXYCHLOR,O,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49362
4		JELA	METHOXYCHLOR,P,P'-,DRY WT,SED,SIEVE	49346
6		JELA	METHOXYCHLOR,P,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49361
7		JELA	METOLACHLOR(DUAL) IN WHOLE WATER UG/L	39356
76	52	JELA	METOLACHLOR, WATER, DISSOLVED UG/L	39415
9	9	JELA	MIREX IN FISH TISSUE WET WEIGHT UG/G	81645
31		JELA	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
6		JELA	MIREX, DISSOLVED (UG/L)	39756
132		JELA	MIREX, TOTAL (UG/L)	39755
4		JELA	MIREX,DRY WEIGHT,SEDIMENT,SIEVE	49348
6		JELA	MIREX,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49360
26	21	JELA	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
8	2	JELA	MOLYBDENUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49252
2	2	JELA	MOLYBDENUM,SED,BOT,	34915
32		JELA	NAPHTHALENE TOTWUG/L	34696
2		JELA	NAPHTHALENE, 1,2-DIMETHYL-,DRY WT,SIEVE	49403
2		JELA	NAPHTHALENE, 1,6-DIMETHYL-,DRY WT,SIEVE	49404
2		JELA	NAPHTHALENE, 2,3,6-TRIMETHYL-,DRY WT,SEV	49405
2	1	JELA	NAPHTHALENE, 2,6-DIMETHYL-,DRY WT,SIEVE	49406
2		JELA	NAPHTHALENE, 2-CHLORO-,DRY WT,SIEVE	49407
2		JELA	NAPHTHALENE, DRY WEIGHT, SIEVE	49402
2		JELA	NAPHTHALENE,2-ETHYL-,BEDMAT,WETSIEV,	49948
217	134	JELA	NICKEL, DISSOLVED (UG/L AS NI)	1065
8	2	JELA	NICKEL, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49253
81	64	JELA	NICKEL, SUSPENDED (UG/L AS NI)	1066
23	7	JELA	NICKEL, TOTAL (UG/L AS NI)	1067
67	59	JELA	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
2	2	JELA	NICKEL,SED,BOT,	34925
73		JELA	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
95		JELA	PARATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39542
273		JELA	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540

All Data	Actual Data	Park	Parameter Name	Parameter Number
10	10	JELA	PCB-1242 TISDRYWTMG/KG	79178
15	15	JELA	PCB-1248 TISDRYWTMG/KG	79182
39	39	JELA	PCB-1254 TISDRYWTMG/KG	79179
22	22	JELA	PCB-1260 TISDRYWTMG/KG	79183
10		JELA	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
10		JELA	PHENANTHRENE TOTWUG/L	34461
2	2	JELA	PHENANTHRENE,DRY WEIGHT,SIEVE	49409
10		JELA	PYRENE TOTWUG/L	34469
2	2	JELA	PYRENE,DRY WEIGHT,SED,SIEVE	49387
23	1	JELA	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
159	26	JELA	SELENIUM, DISSOLVED (UG/L AS SE)	1145
8	8	JELA	SELENIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49254
70	9	JELA	SELENIUM, SUSPENDED (UG/L AS SE)	1146
117	23	JELA	SELENIUM, TOTAL (UG/L AS SE)	1147
15	15	JELA	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	1149
2	2	JELA	SELENIUM,SED,BOT,	34950
29		JELA	SILVER, DISSOLVED (UG/L AS AG)	1075
8		JELA	SILVER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49255
29	2	JELA	SILVER, TOTAL (UG/L AS AG)	1077
2	2	JELA	SILVER,SED,BOT,	34955
7	1	JELA	SIMAZINE IN WHOLE WATER (UG/L)	39055
75	15	JELA	SIMAZINE, DISSOLVED, WATER, TOTAL RECOVERABLE UG/L	4035
35	5	JELA	TETRACHLOROETHYLENE TOTWUG/L	34475
32	32	JELA	TOXAPHENE WET WGTTISMG/KG	34691
82		JELA	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
19		JELA	TOXAPHENE IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39401
309		JELA	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
6		JELA	TOXAPHENE, WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49355
4		JELA	TOXAPHENE,DRY WEIGHT,SEDIMENT,SIEVE	49351
33		JELA	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
3	2	JELA	TRICHLOROETHYLENE DISSUG/L	34485
33	2	JELA	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
33		JELA	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
82	80	JELA	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
241	157	JELA	ZINC, DISSOLVED (UG/L AS ZN)	1090
8	8	JELA	ZINC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49245
187	144	JELA	ZINC, SUSPENDED (UG/L ZN)	1091
289	205	JELA	ZINC, TOTAL (UG/L AS ZN)	1092
2	2	JELA	ZINC,SED,BOT,	35020
12	12	JELA	ZINC,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71938

All Data	Actual Data	Park	Parameter Name	Parameter Number
13		NATR	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
13		NATR	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516
13		NATR	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
13		NATR	1,1-DICHLOROETHANE TOTWUG/L	34496
13		NATR	1,1-DICHLOROETHYLENE TOTWUG/L	34501
5		NATR	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
1		NATR	1,2,4-TRICHLOROBENZENE DRY WGTBOTUG/KG	34554
7		NATR	1,2,4-TRICHLOROBENZENE WET WGTTISMG/KG	34555
5		NATR	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
1		NATR	1,2,5,6-DIBENZANTHRACENE DRY WGTBOTUG/KG	34559
7		NATR	1,2,5,6-DIBENZANTHRACENE WET WGTTISMG/KG	34560
10		NATR	1,2-DIBROMOETHANE WHOLE WATER,UG/L	77651
14		NATR	1,2-DICHLOROBENZENE TOTWUG/L	34536
1		NATR	1,2-DICHLOROBENZENE DRY WGTBOTUG/KG	34539
7		NATR	1,2-DICHLOROBENZENE WET WGTTISMG/KG	34540
13		NATR	1,2-DICHLOROETHANE,WHOLE WATER,UG/L	32103
13		NATR	1,2-DICHLOROPROPANE TOTWUG/L	34541
14		NATR	1,3-DICHLOROBENZENE TOTWUG/L	34566
1		NATR	1,3-DICHLOROBENZENE DRY WGTBOTUG/KG	34569
7		NATR	1,3-DICHLOROBENZENE WET WGTTISMG/KG	34570
14		NATR	1,4-DICHLOROBENZENE TOTWUG/L	34571
1		NATR	1,4-DICHLOROBENZENE DRY WGTBOTUG/KG	34574
7		NATR	1,4-DICHLOROBENZENE WET WGTTISMG/KG	34575
5		NATR	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
32	1	NATR	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
5		NATR	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621
1		NATR	2,4,6-TRICHLOROPHENOL DRY WGTBOTUG/KG	34624
7		NATR	2,4,6-TRICHLOROPHENOL WET WGTTISMG/KG	34625
4		NATR	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
32	4	NATR	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
5		NATR	2,4-DICHLOROPHENOL TOTWUG/L	34601
1		NATR	2,4-DICHLOROPHENOL DRY WGTBOTUG/KG	34604
7		NATR	2,4-DICHLOROPHENOL WET WGTTISMG/KG	34605
5		NATR	2,4-DIMETHYLPHENOL TOTWUG/L	34606
3		NATR	2,4-DIMETHYLPHENOL DRY WGTBOTUG/KG	34609
7		NATR	2,4-DIMETHYLPHENOL WET WGTTISMG/KG	34610
5		NATR	2,4-DINITROPHENOL TOTWUG/L	34616
1		NATR	2,4-DINITROPHENOL DRY WGTBOTUG/KG	34619
7		NATR	2,4-DINITROPHENOL WET WGTTISMG/KG	34620
5		NATR	2,4-DINITROTOLUENE TOTWUG/L	34611

All Data	Actual Data	Park	Parameter Name	Parameter Number
1		NATR	2,4-DINITROTOLUENE DRY WGTBOTUG/KG	34614
7		NATR	2,4-DINITROTOLUENE WET WGTTISMG/KG	34615
25		NATR	2,4-DP (DICHLORPROP) TOTAL UG/L	82183
5		NATR	2,6-DINITROTOLUENE TOTWUG/L	34626
1		NATR	2,6-DINITROTOLUENE DRY WGTBOTUG/KG	34629
7		NATR	2,6-DINITROTOLUENE WET WGTTISMG/KG	34630
12		NATR	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
5		NATR	2-CHLORONAPHTHALENE TOTWUG/L	34581
1		NATR	2-CHLORONAPHTHALENE DRY WGTBOTUG/KG	34584
7		NATR	2-CHLORONAPHTHALENE WET WGTTISMG/KG	34585
5		NATR	2-CHLOROPHENOL TOTWUG/L	34586
1		NATR	2-CHLOROPHENOL DRY WGTBOTUG/KG	34589
7		NATR	2-CHLOROPHENOL WET WGTTISMG/KG	34590
5		NATR	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
1		NATR	4-BROMOPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34639
7		NATR	4-BROMOPHENYL PHENYL ETHER WET WGTTISMG/KG	34640
6		NATR	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
7		NATR	4-CHLOROPHENYL PHENYL ETHER WET WGTTISMG/KG	34645
5		NATR	ACENAPHTHENE TOTWUG/L	34205
1		NATR	ACENAPHTHENE DRY WGTBOTUG/KG	34208
7		NATR	ACENAPHTHENE WET WGTTISMG/KG	34209
1		NATR	ALACHLOR WHOLE WATER,UG/L	77825
18	1	NATR	ALDRIN IN FISH TISSUE WET WEIGHT MG/KG	34680
29		NATR	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
1		NATR	ALDRIN IN SHELLFISH OR ANIMAL (UG/KG WET WEIGHT)	39334
47		NATR	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
1		NATR	ALDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49319
2		NATR	ALDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49353
16	16	NATR	ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT)	1108
266	42	NATR	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
2	2	NATR	ALUMINUM, DRY WEIGHT, TISSUE/BIOTA,RECV UG/G	49237
427	268	NATR	ALUMINUM, TOTAL (UG/L AS AL)	1105
5		NATR	ANTHRACENE TOTWUG/L	34220
1		NATR	ANTHRACENE DRY WGTBOTUG/KG	34223
7		NATR	ANTHRACENE WET WGTTISMG/KG	34224
93	84	NATR	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
41	5	NATR	ARSENIC TOTAL IN FISH OR ANIMAL WET WT MG/KG	1004
117	17	NATR	ARSENIC, DISSOLVED (UG/L AS AS)	1000
2	2	NATR	ARSENIC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49247
1		NATR	ARSENIC, SUSPENDED (UG/L AS AS)	1001

All Data	Actual Data	Park	Parameter Name	Parameter Number
670	168	NATR	ARSENIC, TOTAL (UG/L AS AS)	1002
1	1	NATR	ARSENIC,SED,BOT,WET SIEVE,	34800
1		NATR	ATRAZINE(AATREX) IN WHOLE WATER SAMPLE (UG/L)	39630
13		NATR	BENZENE IN WTR SMPLE GC-MS, HEXADECONE EXTR.(UG/L)	34030
1		NATR	BENZENE, 1,2,4-TRICHLORO-, SOIL, RECOVERABLE,MG/KG	30178
1		NATR	BENZO(B)FLUORANTHENE,SEDIMENTS,DRY WGT,UG/KG	34233
7		NATR	BENZO(B)FLUORANTHENE,TISSUE,WET WGT,MG/KG	34234
5		NATR	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
1		NATR	BENZO(GHI)PERYLENE1,12-BENZOPERYLENDRY WGTBOTUG/KG	34524
5		NATR	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521
7		NATR	BENZO(GHI)PERYLENE1,12-BENZOPERYLENWET WGTTISMG/KG	34525
5		NATR	BENZO-A-PYRENE TOTWUG/L	34247
1		NATR	BENZO-A-PYRENE DRY WGTBOTUG/KG	34250
7		NATR	BENZO-A-PYRENE WET WGTTISMG/KG	34251
5		NATR	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
1		NATR	BIS (2-CHLOROETHYL) ETHER DRY WGTBOTUG/KG	34276
7		NATR	BIS (2-CHLOROETHYL) ETHER WET WGTTISMG/KG	34277
5		NATR	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
1		NATR	BIS (2-CHLOROISOPROPYL) ETHER DRY WGTBOTUG/KG	34286
7		NATR	BIS (2-CHLOROISOPROPYL) ETHER WET WGTTISMG/KG	34287
2		NATR	BIS (CHLOROMETHYL) ETHER TOTWUG/L	34268
13	1	NATR	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
13		NATR	BROMOFORM,WHOLE WATER,UG/L	32104
77	77	NATR	CADMIUM IN SHELLFISH TISSUE WET WEIGHT PPM(MG/KG)	81744
207	100	NATR	CADMIUM, DISSOLVED (UG/L AS CD)	1025
2	1	NATR	CADMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49249
1		NATR	CADMIUM, SUSPENDED (UG/L AS CD)	1026
651	84	NATR	CADMIUM, TOTAL (UG/L AS CD)	1027
1	1	NATR	CADMIUM,SED,BOT,	34825
37	1	NATR	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
45	36	NATR	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940
13		NATR	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
7		NATR	CHLORDANE(TECH MIX & METABS),TISSUEWET WGTT,MG/KG	34682
44		NATR	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
27	2	NATR	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
1		NATR	CHLORDANE, CIS-,DRY WT,SEDIMENT,SIEVE	49320
2	1	NATR	CHLORDANE,CIS-,WET WEIGHT,TISS,WHOLE ORG,RECVUG/KG	49380
1		NATR	CHLORDANE,TRANS-,DRY WT,SEDIMENT,SIEVE	49321
2		NATR	CHLORDANE,TRANS-,WET WT,TISS,WHOLE ORG,RECV UG/KG	49379
10	3	NATR	CHLORDANE-CIS ISOMER,TISSUE WET WGT (UG/G)	39063

All Data	Actual Data	Park	Parameter Name	Parameter Number
11	1	NATR	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
284	129	NATR	CHLORIDE, DISSOLVED IN WATER MG/L	941
1006	958	NATR	CHLORIDE,TOTAL IN WATER MG/L	940
13		NATR	CHLOROBENZENE TOTWUG/L	34301
13	2	NATR	CHLOROFORM,WHOLE WATER,UG/L	32106
77	77	NATR	CHROMIUM TOTAL RECOVERABLE IN WATER AS CR UG/L	1118
80	3	NATR	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
2		NATR	CHROMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49240
59		NATR	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
703	151	NATR	CHROMIUM, TOTAL (UG/L AS CR)	1034
39		NATR	CHROMIUM, TRI-VAL (UG/L AS CR)	1033
1	1	NATR	CHROMIUM,SED,BOT,	34840
43	35	NATR	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS	71939
37	34	NATR	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
10		NATR	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
112	106	NATR	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
254	8	NATR	COPPER, DISSOLVED (UG/L AS CU)	1040
2	2	NATR	COPPER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49241
1	1	NATR	COPPER, SUSPENDED (UG/L AS CU)	1041
807	253	NATR	COPPER, TOTAL (UG/L AS CU)	1042
1	1	NATR	COPPER,SED,BOT,	34850
43	35	NATR	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937
15	7	NATR	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
45	1	NATR	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
30	30	NATR	DDD TOTAL IN TISSUE WET WEIGHT MG/KG	81897
1		NATR	DDD,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49325
2		NATR	DDD,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49374
1		NATR	DDD,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49326
2	2	NATR	DDD,P,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49375
15	7	NATR	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
45	2	NATR	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
30	30	NATR	DDE TOTAL IN TISSUE WET WEIGHT MG/KG	81896
1		NATR	DDE,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49327
2		NATR	DDE,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49373
1	1	NATR	DDE,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49328
2	2	NATR	DDE,P,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49372
15	6	NATR	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
45	2	NATR	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
30	30	NATR	DDT TOTAL IN TISSUE WET WGT BASIS (UG/G)	39290
1		NATR	DDT,O,P'-,DRY WT,SEDIMENT,SIEVE	49329

All Data	Actual Data	Park	Parameter Name	Parameter Number
2		NATR	DDT,O,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49377
1		NATR	DDT,P,P'-,DRY WT,SEDIMENT,SIEVE	49330
2	1	NATR	DDT,P,P',WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49376
29	2	NATR	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
48	26	NATR	DIELDRIN IN TISSUE WET WGT (UG/G)	39404
48		NATR	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
1		NATR	DIELDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49331
2	1	NATR	DIELDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49371
2		NATR	ENDOSULFAN SULFATE TOTWUG/L	34351
13		NATR	ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354
13		NATR	ENDOSULFAN SULFATE WET WGTTISMG/KG	34355
48	9	NATR	ENDRIN WET WGTTISMG/KG	34685
2		NATR	ENDRIN ALDEHYDE TOTWUG/L	34366
13		NATR	ENDRIN ALDEHYDE DRY WGTBOTUG/KG	34369
8	1	NATR	ENDRIN ALDEHYDE WET WGTTISMG/KG	34370
29		NATR	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
48		NATR	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
1		NATR	ENDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49335
2		NATR	ENDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49370
5		NATR	FLUORANTHENE TOTWUG/L	34376
1		NATR	FLUORANTHENE DRY WGTBOTUG/KG	34379
7		NATR	FLUORANTHENE WET WGTTISMG/KG	34380
5		NATR	FLUORENE TOTWUG/L	34381
1		NATR	FLUORENE DRY WGTBOTUG/KG	34384
7		NATR	FLUORENE WET WGTTISMG/KG	34385
13		NATR	HEPTACHLOR WET WGTTISMG/KG	34687
13	1	NATR	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
27		NATR	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
43		NATR	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
1		NATR	HEPTACHLOR EPOXIDE,DRY WT,SEDIMENT,SIEVE	49342
2	1	NATR	HEPTACHLOR EPOXIDE,WET WT,TISS,WHOLE ORG,RECVUG/KG	49368
27		NATR	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
43		NATR	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
1		NATR	HEPTACHLOR,DRY WEIGHT,SEDIMENT,SIEVE	49341
2		NATR	HEPTACHLOR,WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49369
7		NATR	HEXACHLOROBENZENE WET WGTTISMG/KG	34688
1		NATR	HEXACHLOROBENZENE IN BOT DEPOS (UG/KG DRY SOLIDS)	39701
6		NATR	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
1		NATR	HEXACHLOROBENZENE,DRY WT,SEDIMENT,SIEVE	49343
2		NATR	HEXACHLOROBENZENE,WET WT,TISS,WHOLE ORG,RECV UG/KG	49367

All Data	Actual Data	Park	Parameter Name	Parameter Number
2		NATR	HEXACHLOROBUTADIENE TOTWUG/L	34391
7		NATR	HEXACHLOROBUTADIENE WET WGTTISMG/KG	34395
1		NATR	HEXACHLOROBUTADIENE BOT. DEPOS.(UG/KG DRY WGT)	39705
1		NATR	HEXACHLOROBUTADIENE IN FISH OR ANIMAL WET WGT UG/K	39704
3		NATR	HEXACHLOROBUTADIENE IN WHOLE WATER SAMPLE(UG/L)	39702
5		NATR	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
1		NATR	HEXACHLOROCYCLOPENTADIENE DRY WGTBOTUG/KG	34389
7		NATR	HEXACHLOROCYCLOPENTADIENE WET WGTTISMG/KG	34390
5		NATR	HEXACHLOROETHANE TOTWUG/L	34396
1		NATR	HEXACHLOROETHANE DRY WGTBOTUG/KG	34399
7		NATR	HEXACHLOROETHANE WET WGTTISMG/KG	34400
5		NATR	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
1		NATR	INDENO (1,2,3-CD) PYRENE DRY WGTBOTUG/KG	34406
7		NATR	INDENO (1,2,3-CD) PYRENE WET WGTTISMG/KG	34407
140	115	NATR	IRON (UG/L AS FE)	71885
26	26	NATR	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	1170
636	396	NATR	IRON, DISSOLVED (UG/L AS FE)	1046
2	2	NATR	IRON, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49242
21	13	NATR	IRON, FERROUS (UG/L AS FE)	1047
33	33	NATR	IRON, SUSPENDED (UG/L AS FE)	1044
893	732	NATR	IRON, TOTAL (UG/L AS FE)	1045
1	1	NATR	IRON,SED,BOT,	34880
172	160	NATR	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
259	27	NATR	LEAD, DISSOLVED (UG/L AS PB)	1049
2		NATR	LEAD, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49251
9	6	NATR	LEAD, SUSPENDED (UG/L AS PB)	1050
671	176	NATR	LEAD, TOTAL (UG/L AS PB)	1051
1	1	NATR	LEAD,SED,BOT,	34890
45	28	NATR	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936
8		NATR	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
27	1	NATR	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
26	26	NATR	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
549	323	NATR	MANGANESE, DISSOLVED (UG/L AS MN)	1056
2	2	NATR	MANGANESE, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49243
34	25	NATR	MANGANESE, SUSPENDED (UG/L AS MN)	1054
951	679	NATR	MANGANESE, TOTAL (UG/L AS MN)	1055
2	2	NATR	MANGANESE, TOTAL ELEMENTAL (UG/L AS MN)	71883
1	1	NATR	MANGANESE,SED,BOT,	34905
98	48	NATR	MERCURY, DISSOLVED (UG/L AS HG)	71890
2	2	NATR	MERCURY, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49258

All Data	Actual Data	Park	Parameter Name	Parameter Number
9	3	NATR	MERCURY, SUSPENDED (UG/L AS HG)	71895
683	62	NATR	MERCURY, TOTAL (UG/L AS HG)	71900
1	1	NATR	MERCURY,SED,BOT,	34910
49	20	NATR	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
37	23	NATR	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71930
22		NATR	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
5		NATR	METHOXYCHLOR IN FISH TISSUE,UG/G WET WEIGHT	81644
40		NATR	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
1		NATR	METHOXYCHLOR,O,P'-,DRY WT,SED,SIEVE	49347
2		NATR	METHOXYCHLOR,O,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49362
1		NATR	METHOXYCHLOR,P,P'-,DRY WT,SED,SIEVE	49346
2		NATR	METHOXYCHLOR,P,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49361
1		NATR	METOLACHLOR, WHOLE WATER, TOTAL RECOVERABLE UG/L	82612
3		NATR	MIREX IN FISH TISSUE WET WEIGHT UG/G	81645
11		NATR	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
44		NATR	MIREX, TOTAL (UG/L)	39755
1		NATR	MIREX,DRY WEIGHT,SEDIMENT,SIEVE	49348
2	1	NATR	MIREX,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49360
9		NATR	MOLYBDENUM IN BOT. DEPOSITS (MG/KG AS MO DRY WGT)	1063
40		NATR	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
2	2	NATR	MOLYBDENUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49252
18	1	NATR	MOLYBDENUM, TOTAL (UG/L AS MO)	1062
1	1	NATR	MOLYBDENUM,SED,BOT,	34915
5		NATR	NAPHTHALENE TOTWUG/L	34696
1		NATR	NAPHTHALENE DRY WGTBOTUG/KG	34445
7		NATR	NAPHTHALENE WET WGTTISMG/KG	34446
289	72	NATR	NICKEL, DISSOLVED (UG/L AS NI)	1065
2		NATR	NICKEL, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49253
1	1	NATR	NICKEL, SUSPENDED (UG/L AS NI)	1066
534	78	NATR	NICKEL, TOTAL (UG/L AS NI)	1067
29	16	NATR	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
22	1	NATR	NICKEL, TOTAL IN FISH OR ANIMALS-WET WEIGHT MG/KG	1069
1	1	NATR	NICKEL,SED,BOT,	34925
8		NATR	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
34	7	NATR	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
1		NATR	PCP (PENTACHLOROPHENOL) IN BOT DEPOS DRY SOL UG/KG	39061
7		NATR	PCP (PENTACHLOROPHENOL) IN TISSUE WET WGT UG/G	39060
6		NATR	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
120	120	NATR	pH,	100007
5		NATR	PHENANTHRENE TOTWUG/L	34461

All Data	Actual Data	Park	Parameter Name	Parameter Number
1		NATR	PHENANTHRENE DRY WGTBOTUG/KG	34464
7		NATR	PHENANTHRENE WET WGTTISMG/KG	34465
5		NATR	PYRENE TOTWUG/L	34469
1		NATR	PYRENE DRY WGTBOTUG/KG	34472
7		NATR	PYRENE WET WGTTISMG/KG	34473
25	9	NATR	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
119	6	NATR	SELENIUM, DISSOLVED (UG/L AS SE)	1145
2	2	NATR	SELENIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49254
396	19	NATR	SELENIUM, TOTAL (UG/L AS SE)	1147
30	14	NATR	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	1149
1	1	NATR	SELENIUM,SED,BOT,	34950
1		NATR	SEVIN IN WHOLE WATER SAMPLE (UG/L)	39750
13		NATR	SILVER WET WGTTISMG/KG	34474
7		NATR	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	1078
244	2	NATR	SILVER, DISSOLVED (UG/L AS AG)	1075
2		NATR	SILVER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49255
100	1	NATR	SILVER, TOTAL (UG/L AS AG)	1077
1	1	NATR	SILVER,SED,BOT,	34955
1		NATR	SIMAZINE IN WHOLE WATER (UG/L)	39055
13		NATR	TETRACHLOROETHYLENE TOTWUG/L	34475
53	53	NATR	TOTAL ORGANIC CARBON	100005
13		NATR	TOXAPHENE WET WGTTISMG/KG	34691
29		NATR	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
65		NATR	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
2		NATR	TOXAPHENE, WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49355
1		NATR	TOXAPHENE,DRY WEIGHT,SEDIMENT,SIEVE	49351
10		NATR	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
13		NATR	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
13		NATR	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
114	112	NATR	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
261	59	NATR	ZINC, DISSOLVED (UG/L AS ZN)	1090
2	2	NATR	ZINC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49245
1	1	NATR	ZINC, SUSPENDED (UG/L ZN)	1091
829	277	NATR	ZINC, TOTAL (UG/L AS ZN)	1092
1	1	NATR	ZINC,SED,BOT,	35020
23	23	NATR	ZINC,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71938
21		PAAL	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
19		PAAL	1,1,1-TRICHLOROETHANE DRY WGTBOTUG/KG	34509
4		PAAL	1,1,1-TRICHLOROETHANE WET WGTTISMG/KG	34510
21		PAAL	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516

All Data	Actual Data	Park	Parameter Name	Parameter Number
19		PAAL	1,1,2,2-TETRACHLOROETHANE DRY WGTBOTUG/KG	34519
4		PAAL	1,1,2,2-TETRACHLOROETHANE WET WGTTISMG/KG	34520
20		PAAL	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
18		PAAL	1,1,2-TRICHLOROETHANE DRY WGTBOTUG/KG	34514
4		PAAL	1,1,2-TRICHLOROETHANE WET WGTTISMG/KG	34515
21		PAAL	1,1-DICHLOROETHANE TOTWUG/L	34496
19		PAAL	1,1-DICHLOROETHANE DRY WGTBOTUG/KG	34499
4		PAAL	1,1-DICHLOROETHANE WET WGTTISMG/KG	34500
19		PAAL	1,1-DICHLOROETHYLENE TOTWUG/L	34501
19		PAAL	1,1-DICHLOROETHYLENE DRY WGTBOTUG/KG	34504
4		PAAL	1,1-DICHLOROETHYLENE WET WGTTISMG/KG	34505
10		PAAL	1,2,4,5-TETRACHLOROBENZENE WHOLE WATER,UG/L	77734
20		PAAL	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
21		PAAL	1,2,4-TRICHLOROBENZENE DRY WGTBOTUG/KG	34554
4		PAAL	1,2,4-TRICHLOROBENZENE WET WGTTISMG/KG	34555
20		PAAL	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
22		PAAL	1,2,5,6-DIBENZANTHRACENE DRY WGTBOTUG/KG	34559
4		PAAL	1,2,5,6-DIBENZANTHRACENE WET WGTTISMG/KG	34560
13		PAAL	1,2-DIBROMOETHANE WHOLE WATER,UG/L	77651
20		PAAL	1,2-DICHLOROBENZENE TOTWUG/L	34536
22		PAAL	1,2-DICHLOROBENZENE DRY WGTBOTUG/KG	34539
4		PAAL	1,2-DICHLOROBENZENE WET WGTTISMG/KG	34540
19		PAAL	1,2-DICHLOROETHANE TOTWUG/L	34531
19		PAAL	1,2-DICHLOROETHANE DRY WGTBOTUG/KG	34534
4		PAAL	1,2-DICHLOROETHANE WET WGTTISMG/KG	34535
3		PAAL	1,2-DICHLOROETHANE,WHOLE WATER,UG/L	32103
21		PAAL	1,2-DICHLOROPROPANE TOTWUG/L	34541
18		PAAL	1,2-DICHLOROPROPANE DRY WGTBOTUG/KG	34544
4		PAAL	1,2-DICHLOROPROPANE WET WGTTISMG/KG	34545
20		PAAL	1,3-DICHLOROBENZENE TOTWUG/L	34566
22		PAAL	1,3-DICHLOROBENZENE DRY WGTBOTUG/KG	34569
4		PAAL	1,3-DICHLOROBENZENE WET WGTTISMG/KG	34570
22		PAAL	1,4-DICHLOROBENZENE TOTWUG/L	34571
22		PAAL	1,4-DICHLOROBENZENE DRY WGTBOTUG/KG	34574
4		PAAL	1,4-DICHLOROBENZENE WET WGTTISMG/KG	34575
19		PAAL	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
21		PAAL	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
10		PAAL	2,4,5-TRICHLOROPHENOL WHOLE WATER,UG/L	77687
12		PAAL	2,4,5-TRICHLOROPHENOL IN SEDIMENT,DRY WEIGHT,UG/KG	78401
20		PAAL	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621

All Data	Actual Data	Park	Parameter Name	Parameter Number
22		PAAL	2,4,6-TRICHLOROPHENOL DRY WGTBOTUG/KG	34624
4		PAAL	2,4,6-TRICHLOROPHENOL WET WGTTISMG/KG	34625
20		PAAL	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
22		PAAL	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
21	1	PAAL	2,4-DICHLOROPHENOL TOTWUG/L	34601
22		PAAL	2,4-DICHLOROPHENOL DRY WGTBOTUG/KG	34604
4		PAAL	2,4-DICHLOROPHENOL WET WGTTISMG/KG	34605
19		PAAL	2,4-DIMETHYLPHENOL TOTWUG/L	34606
22		PAAL	2,4-DIMETHYLPHENOL DRY WGTBOTUG/KG	34609
4		PAAL	2,4-DIMETHYLPHENOL WET WGTTISMG/KG	34610
20		PAAL	2,4-DINITROPHENOL TOTWUG/L	34616
22		PAAL	2,4-DINITROPHENOL DRY WGTBOTUG/KG	34619
3		PAAL	2,4-DINITROPHENOL WET WGTTISMG/KG	34620
19		PAAL	2,4-DINITROTOLUENE TOTWUG/L	34611
22		PAAL	2,4-DINITROTOLUENE DRY WGTBOTUG/KG	34614
4		PAAL	2,4-DINITROTOLUENE WET WGTTISMG/KG	34615
3		PAAL	2,4-DP (DICHLORPROP) TOTAL UG/L	82183
20		PAAL	2,6-DINITROTOLUENE TOTWUG/L	34626
22		PAAL	2,6-DINITROTOLUENE DRY WGTBOTUG/KG	34629
4		PAAL	2,6-DINITROTOLUENE WET WGTTISMG/KG	34630
17		PAAL	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
14		PAAL	2-CHLOROETHYL VINYL ETHER DRY WGTBOTUG/KG	34579
3		PAAL	2-CHLOROETHYL VINYL ETHER WET WGTTISMG/KG	34580
19		PAAL	2-CHLORONAPHTHALENE TOTWUG/L	34581
22		PAAL	2-CHLORONAPHTHALENE DRY WGTBOTUG/KG	34584
4		PAAL	2-CHLORONAPHTHALENE WET WGTTISMG/KG	34585
20		PAAL	2-CHLOROPHENOL TOTWUG/L	34586
22		PAAL	2-CHLOROPHENOL DRY WGTBOTUG/KG	34589
4		PAAL	2-CHLOROPHENOL WET WGTTISMG/KG	34590
20		PAAL	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
22		PAAL	4-BROMOPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34639
4		PAAL	4-BROMOPHENYL PHENYL ETHER WET WGTTISMG/KG	34640
20		PAAL	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
22		PAAL	4-CHLOROPHENYL PHENYL ETHER DRY WGTBOTUG/KG	34644
4		PAAL	4-CHLOROPHENYL PHENYL ETHER WET WGTTISMG/KG	34645
19		PAAL	ACENAPHTHENE TOTWUG/L	34205
22		PAAL	ACENAPHTHENE DRY WGTBOTUG/KG	34208
4		PAAL	ACENAPHTHENE WET WGTTISMG/KG	34209
34		PAAL	ALACHLOR (LASSO), WATER, DISSOLVED UG/L	46342
7	3	PAAL	ALDRIN IN FISH TISSUE WET WEIGHT MG/KG	34680

All Data	Actual Data	Park	Parameter Name	Parameter Number
24		PAAL	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
25		PAAL	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
9	9	PAAL	ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT)	1108
1		PAAL	ALUMINUM IN FISH TISSUE WET WEIGHT MG/KG	81666
150	71	PAAL	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
15	15	PAAL	ALUMINUM, SEDIMENT, SUSPENDED, PERCENT	30221
19		PAAL	ANTHRACENE TOTWUG/L	34220
19		PAAL	ANTHRACENE DRY WGTBOTUG/KG	34223
3		PAAL	ANTHRACENE WET WGTTISMG/KG	34224
23	21	PAAL	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
21	17	PAAL	ARSENIC TOTAL IN FISH OR ANIMAL WET WT MG/KG	1004
160	149	PAAL	ARSENIC, DISSOLVED (UG/L AS AS)	1000
15	15	PAAL	ARSENIC, SEDIMENT, SUSPENDED UG/G	29818
15	9	PAAL	ARSENIC, SUSPENDED (UG/L AS AS)	1001
36	35	PAAL	ARSENIC, TOTAL (UG/L AS AS)	1002
1	1	PAAL	ARSENIC,SED,BOT,DRY SIEVE,	34802
34	33	PAAL	ATRAZINE DISSOLVED IN WATER PPB	39632
1		PAAL	ATRAZINE IN BOTTOM DEPOS (UG/KG DRY SOLIDS)	39631
1		PAAL	ATRAZINE IN FISH TISSUE WET WEIGHT MG/KG	82404
1		PAAL	ATRAZINE(AATREX) IN WHOLE WATER SAMPLE (UG/L)	39630
19		PAAL	BENZENE DRY WGTBOTUG/KG	34237
4		PAAL	BENZENE WET WGTTISMG/KG	34238
22		PAAL	BENZENE IN WTR SMPLE GC-MS, HEXADECONE EXTR.(UG/L)	34030
22		PAAL	BENZO(B)FLUORANTHENE,SEDIMENTS,DRY WGT,UG/KG	34233
4		PAAL	BENZO(B)FLUORANTHENE,TISSUE,WET WGT,MG/KG	34234
20		PAAL	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
22		PAAL	BENZO(GHI)PERYLENE1,12-BENZOPERYLENDRY WGTBOTUG/KG	34524
21		PAAL	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521
4		PAAL	BENZO(GHI)PERYLENE1,12-BENZOPERYLENWET WGTTISMG/KG	34525
21		PAAL	BENZO-A-PYRENE TOTWUG/L	34247
22		PAAL	BENZO-A-PYRENE DRY WGTBOTUG/KG	34250
4		PAAL	BENZO-A-PYRENE WET WGTTISMG/KG	34251
21		PAAL	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
22		PAAL	BIS (2-CHLOROETHYL) ETHER DRY WGTBOTUG/KG	34276
4		PAAL	BIS (2-CHLOROETHYL) ETHER WET WGTTISMG/KG	34277
20		PAAL	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
22		PAAL	BIS (2-CHLOROISOPROPYL) ETHER DRY WGTBOTUG/KG	34286
4		PAAL	BIS (2-CHLOROISOPROPYL) ETHER WET WGTTISMG/KG	34287
4		PAAL	BIS (CHLOROMETHYL) ETHER TOTWUG/L	34268
2		PAAL	BIS (CHLOROMETHYL) ETHER DRY WGTBOTUG/KG	34271

All Data	Actual Data	Park	Parameter Name	Parameter Number
22	1	PAAL	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
19		PAAL	BROMOFORM DRY WGTBOTUG/KG	34290
4		PAAL	BROMOFORM WET WGTTISMG/KG	34291
22		PAAL	BROMOFORM,WHOLE WATER,UG/L	32104
134	9	PAAL	CADMIUM, DISSOLVED (UG/L AS CD)	1025
15	15	PAAL	CADMIUM, SEDIMENT, SUSPENDED UG/G	29826
8		PAAL	CADMIUM, SUSPENDED (UG/L AS CD)	1026
25		PAAL	CADMIUM, TOTAL (UG/L AS CD)	1027
1		PAAL	CADMIUM,SED,BOT,	34827
23	12	PAAL	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
21	17	PAAL	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940
19		PAAL	CARBON TETRACHLORIDE DRY WGTBOTUG/KG	34299
4		PAAL	CARBON TETRACHLORIDE WET WGTTISMG/KG	34300
22		PAAL	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
4		PAAL	CHLORDANE(TECH MIX & METABS),TISSUEWET WGTT,MG/KG	34682
21		PAAL	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
22		PAAL	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
20	20	PAAL	CHLORDANE-CIS ISOMER,TISSUE WET WGT (UG/G)	39063
20	20	PAAL	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
69	69	PAAL	CHLORIDE, DISSOLVED IN WATER MG/L	941
510	510	PAAL	CHLORIDE,TOTAL IN WATER MG/L	940
21		PAAL	CHLOROBENZENE TOTWUG/L	34301
19		PAAL	CHLOROBENZENE DRY WGTBOTUG/KG	34304
4		PAAL	CHLOROBENZENE WET WGTTISMG/KG	34305
20	1	PAAL	CHLORODIBROMOMETHANE TOTWUG/L	34306
19		PAAL	CHLORODIBROMOMETHANE DRY WGTBOTUG/KG	34309
4		PAAL	CHLORODIBROMOMETHANE WET WGTTISMG/KG	34310
19	1	PAAL	CHLOROFORM DRY WGTBOTUG/KG	34318
4		PAAL	CHLOROFORM WET WGTTISMG/KG	34319
22	2	PAAL	CHLOROFORM,WHOLE WATER,UG/L	32106
138	28	PAAL	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
1		PAAL	CHROMIUM, HEXAVALENT, DISSOLVED IN (UG/L AS CR)	1220
14	14	PAAL	CHROMIUM, SEDIMENT, SUSPENDED UG/G	29829
17	4	PAAL	CHROMIUM, SUSPEND (UG/L AS CR)	1031
31	12	PAAL	CHROMIUM, TOTAL (UG/L AS CR)	1034
1	1	PAAL	CHROMIUM,SED,BOT,	34842
4		PAAL	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS	71939
23	21	PAAL	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
4		PAAL	CIS-1,3-DICHLOROPROPENE FISH TISSUE WET WGT MG/KG	34703
18		PAAL	CIS-1,3-DICHLOROPROPENE SEDIMENT DRY WEIGHT UG/KG	34702

All Data	Actual Data	Park	Parameter Name	Parameter Number
21		PAAL	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
23	21	PAAL	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
127	82	PAAL	COPPER, DISSOLVED (UG/L AS CU)	1040
15	15	PAAL	COPPER, SEDIMENT, SUSPENDED UG/G	29832
18	15	PAAL	COPPER, SUSPENDED (UG/L AS CU)	1041
20	12	PAAL	COPPER, TOTAL (UG/L AS CU)	1042
1	1	PAAL	COPPER,SED,BOT,	34852
21	18	PAAL	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937
21		PAAL	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
21		PAAL	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
3		PAAL	DDD TOTAL IN TISSUE WET WEIGHT MG/KG	81897
20	1	PAAL	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
21	1	PAAL	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
48	48	PAAL	DDE TOTAL IN TISSUE WET WEIGHT MG/KG	81896
22		PAAL	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
21	1	PAAL	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
1		PAAL	DDT SUM ANALOGS IN SEDIMENT UG/KG DRY WEIGHT	39359
3		PAAL	DDT SUM ANALOGS INTISSUE WET WGT BASIS	39376
45	45	PAAL	DDT TOTAL IN TISSUE WET WGT BASIS (UG/G)	39290
11		PAAL	DEMETON IN SEDIMENT (SYSTOX) DRY WEIGHT UG/KG	82400
10		PAAL	DEMETON IN WHOLE WATER SAMPLE (UG/L)	39560
9		PAAL	DICOFOL (KELTHANE) SEDIMENT,DRY,WT,UG/KG	79799
45	45	PAAL	DIELDRIN TISMG/KG	34684
3		PAAL	DIELDRIN IN AQ ORGANISMS WT WGT BASIS (UG/G)	39406
23	2	PAAL	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
34		PAAL	DIELDRIN IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39381
1		PAAL	DIELDRIN IN TISSUE WET WGT (UG/G)	39404
23		PAAL	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
17		PAAL	ENDOSULFAN SULFATE TOTWUG/L	34351
20		PAAL	ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354
4		PAAL	ENDOSULFAN SULFATE WET WGTTISMG/KG	34355
46	42	PAAL	ENDRIN WET WGTTISMG/KG	34685
2		PAAL	ENDRIN ALDEHYDE TOTWUG/L	34366
2		PAAL	ENDRIN ALDEHYDE DRY WGTBOTUG/KG	34369
1		PAAL	ENDRIN ALDEHYDE WET WGTTISMG/KG	34370
23		PAAL	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
23		PAAL	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
21		PAAL	FLUORANTHENE TOTWUG/L	34376
22		PAAL	FLUORANTHENE DRY WGTBOTUG/KG	34379
4		PAAL	FLUORANTHENE WET WGTTISMG/KG	34380

All Data	Actual Data	Park	Parameter Name	Parameter Number
20		PAAL	FLUORENE TOTWUG/L	34381
22		PAAL	FLUORENE DRY WGTBOTUG/KG	34384
4		PAAL	FLUORENE WET WGTTISMG/KG	34385
13		PAAL	GUTHION IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39581
2		PAAL	GUTHION IN FISH TISSUE,WET WEIGHT MG/KG	81802
13		PAAL	GUTHION IN WHOLE WATER SAMPLE (UG/L)	39580
49	45	PAAL	HEPTACHLOR WET WGTTISMG/KG	34687
7	3	PAAL	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
24		PAAL	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
22		PAAL	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
23		PAAL	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
22		PAAL	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
22	20	PAAL	HEXACHLOROBENZENE WET WGTTISMG/KG	34688
20		PAAL	HEXACHLOROBENZENE IN BOT DEPOS (UG/KG DRY SOLIDS)	39701
19		PAAL	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
19		PAAL	HEXACHLOROBUTADIENE TOTWUG/L	34391
4		PAAL	HEXACHLOROBUTADIENE WET WGTTISMG/KG	34395
22		PAAL	HEXACHLOROBUTADIENE BOT. DEPOS.(UG/KG DRY WGT)	39705
1		PAAL	HEXACHLOROBUTADIENE IN WHOLE WATER SAMPLE(UG/L)	39702
20		PAAL	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
22		PAAL	HEXACHLOROCYCLOPENTADIENE DRY WGTBOTUG/KG	34389
4		PAAL	HEXACHLOROCYCLOPENTADIENE WET WGTTISMG/KG	34390
20		PAAL	HEXACHLOROETHANE TOTWUG/L	34396
22		PAAL	HEXACHLOROETHANE DRY WGTBOTUG/KG	34399
4		PAAL	HEXACHLOROETHANE WET WGTTISMG/KG	34400
6		PAAL	HEXACHLOROPHENE, DRY WEIGHT, SEDIMENT UG/KG	73120
21		PAAL	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
22		PAAL	INDENO (1,2,3-CD) PYRENE DRY WGTBOTUG/KG	34406
4		PAAL	INDENO (1,2,3-CD) PYRENE WET WGTTISMG/KG	34407
171	86	PAAL	IRON, DISSOLVED (UG/L AS FE)	1046
15	15	PAAL	IRON, SEDIMENT, SUSPENDED, PERCENT	30269
9	9	PAAL	IRON, SUSPENDED (UG/L AS FE)	1044
34	33	PAAL	IRON, TOTAL (UG/L AS FE)	1045
23	23	PAAL	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
121	23	PAAL	LEAD, DISSOLVED (UG/L AS PB)	1049
15	15	PAAL	LEAD, SEDIMENT, SUSPENDED UG/G	29836
17	16	PAAL	LEAD, SUSPENDED (UG/L AS PB)	1050
13	5	PAAL	LEAD, TOTAL (UG/L AS PB)	1051
1	1	PAAL	LEAD,SED,BOT,	34892
21	17	PAAL	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936

All Data	Actual Data	Park	Parameter Name	Parameter Number
18		PAAL	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
34	1	PAAL	MALATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39532
2		PAAL	MALATHION IN TISSUE WET WEIGHT MG/KG	39534
20		PAAL	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
21	21	PAAL	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
153	89	PAAL	MANGANESE, DISSOLVED (UG/L AS MN)	1056
15	15	PAAL	MANGANESE, SEDIMENT, SUSPENDED UG/G	29839
14	14	PAAL	MANGANESE, SUSPENDED (UG/L AS MN)	1054
35	35	PAAL	MANGANESE, TOTAL (UG/L AS MN)	1055
1	1	PAAL	MANGANESE,SED,BOT,	34907
121	38	PAAL	MERCURY, DISSOLVED (UG/L AS HG)	71890
14	13	PAAL	MERCURY, SEDIMENT, SUSPENDED UG/G	29841
16	11	PAAL	MERCURY, SUSPENDED (UG/L AS HG)	71895
46	24	PAAL	MERCURY, TOTAL (UG/L AS HG)	71900
17	17	PAAL	MERCURY, TOTAL IN FISH (PPM,WET WEIGHT BASIS)	71935
22	15	PAAL	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
4	1	PAAL	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71930
22		PAAL	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
4		PAAL	METHOXYCHLOR IN FISH TISSUE,UG/G WET WEIGHT	81644
22		PAAL	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
1		PAAL	METOLACHLOR (DUAL) IN BOTTOM SEDIMENT DRYWT UG/KG	38923
1		PAAL	METOLACHLOR IN TISSUES WETWTMG/KG	39346
34	5	PAAL	METOLACHLOR, WATER, DISSOLVED UG/L	39415
1		PAAL	METOLACHLOR, WHOLE WATER, TOTAL RECOVERABLE UG/L	82612
9		PAAL	MIREX SEDIMENT,DRY,WT,UG/KG	79800
16	14	PAAL	MIREX IN FISH TISSUE WET WEIGHT UG/G	81645
2		PAAL	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
11		PAAL	MIREX, TOTAL (UG/L)	39755
132	60	PAAL	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
13	1	PAAL	MOLYBDENUM, SEDIMENT, SUSPENDED UG/G	29843
1		PAAL	MOLYBDENUM,SED,BOT,	34917
20		PAAL	NAPHTHALENE TOTWUG/L	34696
22		PAAL	NAPHTHALENE DRY WGTBOTUG/KG	34445
4		PAAL	NAPHTHALENE WET WGTTISMG/KG	34446
150	91	PAAL	NICKEL, DISSOLVED (UG/L AS NI)	1065
14	14	PAAL	NICKEL, SEDIMENT, SUSPENDED UG/G	29845
11	8	PAAL	NICKEL, SUSPENDED (UG/L AS NI)	1066
7	4	PAAL	NICKEL, TOTAL (UG/L AS NI)	1067
23	22	PAAL	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
1		PAAL	NICKEL, TOTAL IN FISH OR ANIMALS-WET WEIGHT MG/KG	1069

All Data	Actual Data	Park	Parameter Name	Parameter Number
1	1	PAAL	NICKEL,SED,BOT,	34927
18		PAAL	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
34		PAAL	PARATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39542
2		PAAL	PARATHION IN FISH TISSUE WET WEIGHT MG/KG	81810
20	2	PAAL	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
14	14	PAAL	PCB-1242 TISDRYWTMG/KG	79178
20	20	PAAL	PCB-1248 TISDRYWTMG/KG	79182
45	45	PAAL	PCB-1254 TISDRYWTMG/KG	79179
28	28	PAAL	PCB-1260 TISDRYWTMG/KG	79183
22		PAAL	PCP (PENTACHLOROPHENOL) IN BOT DEPOS DRY SOL UG/KG	39061
4		PAAL	PCP (PENTACHLOROPHENOL) IN TISSUE WET WGT UG/G	39060
21		PAAL	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
9		PAAL	PENTACHLOROBENZENE WHOLE WATER,UG/L	77793
11		PAAL	PENTACHLOROBENZENE IN SEDIMENT UG/KG	39118
19		PAAL	PHENANTHRENE TOTWUG/L	34461
19		PAAL	PHENANTHRENE DRY WGTBOTUG/KG	34464
3		PAAL	PHENANTHRENE WET WGTTISMG/KG	34465
20		PAAL	PYRENE TOTWUG/L	34469
22		PAAL	PYRENE DRY WGTBOTUG/KG	34472
4		PAAL	PYRENE WET WGTTISMG/KG	34473
23	8	PAAL	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
190	31	PAAL	SELENIUM, DISSOLVED (UG/L AS SE)	1145
4	4	PAAL	SELENIUM, SEDIMENT, SUSPENDED UG/G	29847
15	1	PAAL	SELENIUM, SUSPENDED (UG/L AS SE)	1146
37	11	PAAL	SELENIUM, TOTAL (UG/L AS SE)	1147
21	19	PAAL	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	1149
1	1	PAAL	SELENIUM,SED,BOT,	34952
8		PAAL	SEVIN IN SEDIMENT DRY WEIGHT UG/KG	81818
9		PAAL	SEVIN IN WHOLE WATER SAMPLE (UG/L)	39750
1		PAAL	SILVER WET WGTTISMG/KG	34474
23	4	PAAL	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	1078
160	7	PAAL	SILVER, DISSOLVED (UG/L AS AG)	1075
8		PAAL	SILVER, SEDIMENT, SUSPENDED UG/G	29850
14	1	PAAL	SILVER, SUSPENDED (UG/L AS AG)	1076
24	1	PAAL	SILVER, TOTAL (UG/L AS AG)	1077
1		PAAL	SILVER,SED,BOT,	34957
1		PAAL	SIMAZINE IN BOTTOM DEPOS (UG/KG DRY SOLIDS)	39046
1		PAAL	SIMAZINE IN FISH TISSUE (PRINCEP)WET WEIGHT MG/KG	82406
2		PAAL	SIMAZINE IN WHOLE WATER (UG/L)	39055
34	3	PAAL	SIMAZINE, DISSOLVED, WATER, TOTAL RECOVERABLE UG/L	4035

All Data	Actual Data	Park	Parameter Name	Parameter Number
0		PAAL	SIMAZINE,COULSON CONDUCTIVITY,WATER SAMPLE(UG/L)	39025
21		PAAL	TETRACHLOROETHYLENE TOTWUG/L	34475
19		PAAL	TETRACHLOROETHYLENE DRY WGTBOTUG/KG	34478
4		PAAL	TETRACHLOROETHYLENE WET WGTTISMG/KG	34479
42	38	PAAL	TOXAPHENE WET WGTTISMG/KG	34691
23		PAAL	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
22		PAAL	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
18		PAAL	TRANS-1,3-DICHLOROPROPENE SEDIMENT DRY WGT UG/KG	34697
4		PAAL	TRANS-1,3-DICHLOROPROPENEFISH TISSUE WET WGT MG/KG	34698
21		PAAL	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
19		PAAL	TRICHLOROETHYLENE DRY WGTBOTUG/KG	34487
4		PAAL	TRICHLOROETHYLENE WET WGTTISMG/KG	34692
22	2	PAAL	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
19		PAAL	VINYL CHLORIDE DRY WGTBOTUG/KG	34495
4		PAAL	VINYL CHLORIDE WET WGTTISMG/KG	34693
21		PAAL	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
23	23	PAAL	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
135	98	PAAL	ZINC, DISSOLVED (UG/L AS ZN)	1090
15	15	PAAL	ZINC, SEDIMENT, SUSPENDED UG/G	29855
10	7	PAAL	ZINC, SUSPENDED (UG/L ZN)	1091
35	29	PAAL	ZINC, TOTAL (UG/L AS ZN)	1092
1	1	PAAL	ZINC,SED,BOT,	35022
18	18	PAAL	ZINC,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71938
2		PAIS	1,2,4-TRICHLOROBENZENE WET WGTTISMG/KG	34555
2		PAIS	1,2-DICHLOROBENZENE WET WGTTISMG/KG	34540
2		PAIS	1,3-DICHLOROBENZENE WET WGTTISMG/KG	34570
2		PAIS	1,4-DICHLOROBENZENE WET WGTTISMG/KG	34575
5		PAIS	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
2		PAIS	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
2		PAIS	2,4,6-TRICHLOROPHENOL WET WGTTISMG/KG	34625
5		PAIS	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
2		PAIS	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
2		PAIS	2,4-DICHLOROPHENOL WET WGTTISMG/KG	34605
2		PAIS	2,4-DIMETHYLPHENOL WET WGTTISMG/KG	34610
2		PAIS	2,4-DINITROPHENOL WET WGTTISMG/KG	34620
2		PAIS	2,4-DINITROTOLUENE WET WGTTISMG/KG	34615
2		PAIS	2,6-DINITROTOLUENE WET WGTTISMG/KG	34630
2		PAIS	2-CHLORONAPHTHALENE WET WGTTISMG/KG	34585
2		PAIS	4-BROMOPHENYL PHENYL ETHER WET WGTTISMG/KG	34640
2		PAIS	4-CHLOROPHENYL PHENYL ETHER WET WGTTISMG/KG	34645

All Data	Actual Data	Park	Parameter Name	Parameter Number
2		PAIS	ACENAPHTHENE WET WGTTISMG/KG	34209
7		PAIS	ALDRIN IN FISH TISSUE WET WEIGHT MG/KG	34680
16		PAIS	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
1		PAIS	ALDRIN IN SHELLFISH OR ANIMAL (UG/KG WET WEIGHT)	39334
2		PAIS	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
2		PAIS	ANTHRACENE WET WGTTISMG/KG	34224
25	24	PAIS	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
8	2	PAIS	ARSENIC TOTAL IN FISH OR ANIMAL WET WT MG/KG	1004
3		PAIS	ARSENIC, DISSOLVED (UG/L AS AS)	1000
10	10	PAIS	ARSENIC, TOTAL (UG/L AS AS)	1002
2		PAIS	BENZO(GHI)PERYLENE TISWETWTMG/KG	79041
2		PAIS	BENZO-A-PYRENE WET WGTTISMG/KG	34251
2		PAIS	BIS (2-CHLOROETHYL) ETHER WET WGTTISMG/KG	34277
2		PAIS	BIS (2-CHLOROISOPROPYL) ETHER WET WGTTISMG/KG	34287
3		PAIS	CADMIUM IN SHELLFISH TISSUE WET WEIGHT PPM(MG/KG)	81744
10	1	PAIS	CADMIUM, DISSOLVED (UG/L AS CD)	1025
10	4	PAIS	CADMIUM, TOTAL (UG/L AS CD)	1027
27	13	PAIS	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
8		PAIS	CADMIUM,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71940
1		PAIS	CHLORDANE IN SHELLFISH TISSUE WET WEIGHT UG/KG	81863
7		PAIS	CHLORDANE(TECH MIX & METABS),TISSUEWET WGTT,MG/KG	34682
1		PAIS	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
16		PAIS	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
4		PAIS	CHLORDANE-CIS ISOMER BOTTOM DEPOS (UG/KG DRY SOL	39064
5		PAIS	CHLORDANE-CIS ISOMER,TISSUE WET WGT (UG/G)	39063
4		PAIS	CHLORDANE-TRANS ISOMER,BOTTOM DEPOS(UG/KG DRY SL	39067
5		PAIS	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
106	106	PAIS	CHLORIDE, DISSOLVED IN WATER MG/L	941
791	791	PAIS	CHLORIDE,TOTAL IN WATER MG/L	940
10	1	PAIS	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
10	4	PAIS	CHROMIUM, TOTAL (UG/L AS CR)	1034
8	2	PAIS	CHROMIUM,TOT IN FISH OR ANIMALS-WET WEIGHT BASIS	71939
27	26	PAIS	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
28	27	PAIS	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
3	3	PAIS	COPPER IN SHELLFISH TISSUE WET WEIGHT PPM(MG/KG)	81746
10	8	PAIS	COPPER, DISSOLVED (UG/L AS CU)	1040
80	76	PAIS	COPPER, TOTAL (UG/L AS CU)	1042
8	7	PAIS	COPPER,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71937
15	1	PAIS	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
2		PAIS	DDD IN WHOLE WATER SAMPLE (UG/L)	39360

All Data	Actual Data	Park	Parameter Name	Parameter Number
7		PAIS	DDD TOTAL IN TISSUE WET WEIGHT MG/KG	81897
16	2	PAIS	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
2		PAIS	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
7	3	PAIS	DDE TOTAL IN TISSUE WET WEIGHT MG/KG	81896
17	1	PAIS	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
2		PAIS	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
6		PAIS	DDT SUM ANALOGS INTISSUE WET WGT BASIS	39376
7		PAIS	DIELDRIN IN AQ ORGANISMS WT WGT BASIS (UG/G)	39406
16		PAIS	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
1		PAIS	DIELDRIN IN SHELLFISH OR ANIMAL (UG/KG WET WGT)	39387
2		PAIS	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
1		PAIS	ENDOSULFAN SULFATE DRY WGTBOTUG/KG	34354
2		PAIS	ENDOSULFAN SULFATE WET WGTTISMG/KG	34355
7		PAIS	ENDRIN WET WGTTISMG/KG	34685
2		PAIS	ENDRIN ALDEHYDE WET WGTTISMG/KG	34370
16		PAIS	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
1		PAIS	ENDRIN IN SHELLFISH OR ANIMAL (UG/KG WET WEIGHT)	39397
2		PAIS	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
2		PAIS	FLUORANTHENE WET WGTTISMG/KG	34380
2		PAIS	FLUORENE WET WGTTISMG/KG	34385
7		PAIS	HEPTACHLOR WET WGTTISMG/KG	34687
7		PAIS	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
16		PAIS	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
1		PAIS	HEPTACHLOR EPOXIDE IN SHELLFISH OR ANIMAL WET WGT	39424
2		PAIS	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
16		PAIS	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
1		PAIS	HEPTACHLOR IN SHELLFISH OR ANIMAL (UG/KG WET WGT)	39414
2		PAIS	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
7		PAIS	HEXACHLOROBENZENE WET WGTTISMG/KG	34688
5		PAIS	HEXACHLOROBENZENE IN BOT DEPOS (UG/KG DRY SOLIDS)	39701
2		PAIS	HEXACHLOROBUTADIENE IN FISH OR ANIMAL WET WGT UG/K	39704
2		PAIS	HEXACHLOROCYCLOPENTADIENE WET WGTTISMG/KG	34390
2		PAIS	HEXACHLOROETHANE WET WGTTISMG/KG	34400
2		PAIS	INDENO (1,2,3-CD) PYRENE WET WGTTISMG/KG	34407
3	3	PAIS	IRON, DISSOLVED (UG/L AS FE)	1046
76	60	PAIS	IRON, TOTAL (UG/L AS FE)	1045
28	24	PAIS	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
3	3	PAIS	LEAD IN SHELLFISH TISSUE WET WEIGHT PPM(MG/KG)	81748
10	7	PAIS	LEAD, DISSOLVED (UG/L AS PB)	1049
11	11	PAIS	LEAD, TOTAL (UG/L AS PB)	1051

All Data	Actual Data	Park	Parameter Name	Parameter Number
8		PAIS	LEAD,TOTAL IN FISH OR ANIMALS-WET WEIGHT BASIS	71936
7		PAIS	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
1		PAIS	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
28	28	PAIS	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
19	1	PAIS	MANGANESE, DISSOLVED (UG/L AS MN)	1056
11	11	PAIS	MANGANESE, TOTAL (UG/L AS MN)	1055
11	11	PAIS	MERCURY IN SHELLFISH TISSUE,WET WEIGHT,(PPM)MG/KG	81770
3	3	PAIS	MERCURY, DISSOLVED (UG/L AS HG)	71890
11	4	PAIS	MERCURY, TOTAL (UG/L AS HG)	71900
28	21	PAIS	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
28	28	PAIS	MERCURY,TOTAL IN FISH OR ANIMAL-WET WEIGHT BASIS	71930
16		PAIS	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
7		PAIS	METHOXYCHLOR IN FISH TISSUE,UG/G WET WEIGHT	81644
1		PAIS	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
2		PAIS	NAPHTHALENE WET WGTTISMG/KG	34446
10	4	PAIS	NICKEL, TOTAL (UG/L AS NI)	1067
28	27	PAIS	NICKEL, TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1068
16		PAIS	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
1		PAIS	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
5		PAIS	PCP (PENTACHLOROPHENOL) IN BOT DEPOS DRY SOL UG/KG	39061
2		PAIS	PCP (PENTACHLOROPHENOL) IN TISSUE WET WGT UG/G	39060
2		PAIS	PHENANTHRENE WET WGTTISMG/KG	34465
2		PAIS	PYRENE WET WGTTISMG/KG	34473
15	7	PAIS	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
3	3	PAIS	SELENIUM, TOTAL (UG/L AS SE)	1147
6	5	PAIS	SELENIUM, TOTAL IN FISH OR ANIMALS WET WGT MG/KG	1149
27	8	PAIS	SILVER IN BOTTOM DEPOSITS (MG/KG AS AG DRY WGT)	1078
10	10	PAIS	SILVER, TOTAL (UG/L AS AG)	1077
7		PAIS	TOXAPHENE WET WGTTISMG/KG	34691
1		PAIS	TOXAPHENE IN SHELLFISH TISSUE WET WEIGHT UG/KG	81864
16		PAIS	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
1		PAIS	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
25	25	PAIS	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
3	3	PAIS	ZINC IN SHELLFISH TISSUE WET WEIGHT PPM(MG/KG)	81749
22	10	PAIS	ZINC, DISSOLVED (UG/L AS ZN)	1090
58	56	PAIS	ZINC, TOTAL (UG/L AS ZN)	1092
110	2	SAAN	1,1,1-TRICHLOROETHANE TOTWUG/L	34506
110		SAAN	1,1,2,2-TETRACHLOROETHANE TOTWUG/L	34516
110		SAAN	1,1,2-TRICHLOROETHANE TOTWUG/L	34511
110	1	SAAN	1,1-DICHLOROETHANE TOTWUG/L	34496

All Data	Actual Data	Park	Parameter Name	Parameter Number
110		SAAN	1,1-DICHLOROETHYLENE TOTWUG/L	34501
114		SAAN	1,2,4-TRICHLOROBENZENE TOTWUG/L	34551
75		SAAN	1,2,5,6-DIBENZANTHRACENE TOTWUG/L	34556
110		SAAN	1,2-DIBROMOETHANE WHOLE WATER,UG/L	77651
114		SAAN	1,2-DICHLOROBENZENE TOTWUG/L	34536
110		SAAN	1,2-DICHLOROETHANE,WHOLE WATER,UG/L	32103
110		SAAN	1,2-DICHLOROPROPANE TOTWUG/L	34541
114		SAAN	1,3-DICHLOROBENZENE TOTWUG/L	34566
114	13	SAAN	1,4-DICHLOROBENZENE TOTWUG/L	34571
5		SAAN	2,4,5-T IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39741
70		SAAN	2,4,5-T IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39742
511	292	SAAN	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
75		SAAN	2,4,6-TRICHLOROPHENOL TOTWUG/L	34621
5		SAAN	2,4-D IN BOTTOM DEPOSITS (UG/KG DRY SOLIDS)	39731
70	1	SAAN	2,4-D IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39732
511	212	SAAN	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
70		SAAN	2,4-DB WATER, DISUG/L	38746
75		SAAN	2,4-DICHLOROPHENOL TOTWUG/L	34601
75		SAAN	2,4-DIMETHYLPHENOL TOTWUG/L	34606
75		SAAN	2,4-DINITROPHENOL TOTWUG/L	34616
75		SAAN	2,4-DINITROTOLUENE TOTWUG/L	34611
116	12	SAAN	2,4-DP (DICHLORPROP) TOTAL UG/L	82183
75		SAAN	2,6-DINITROTOLUENE TOTWUG/L	34626
72		SAAN	2-CHLOROETHYL VINYL ETHER TOTWUG/L	34576
75		SAAN	2-CHLORONAPHTHALENE TOTWUG/L	34581
75		SAAN	2-CHLOROPHENOL TOTWUG/L	34586
75		SAAN	4-BROMOPHENYL PHENYL ETHER TOTWUG/L	34636
75		SAAN	4-CHLOROPHENYL PHENYL ETHER TOTWUG/L	34641
75		SAAN	ACENAPHTHENE TOTWUG/L	34205
5	1	SAAN	ACENAPHTHENE,DRY WEIGHT,SED,SIEVE	49429
137	7	SAAN	ALACHLOR (LASSO), WATER, DISSOLVED UG/L	46342
70	7	SAAN	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
655	7	SAAN	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
4		SAAN	ALDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49319
10		SAAN	ALDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49353
141	113	SAAN	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
9	6	SAAN	ALUMINUM, DRY WEIGHT, TISSUE/BIOTA,RECV UG/G	49237
51	49	SAAN	ALUMINUM, TOTAL (UG/L AS AL)	1105
75		SAAN	ANTHRACENE TOTWUG/L	34220
5	1	SAAN	ANTHRACENE, 2-METHYL-,DRY WEIGHT,SED,SEV	49435

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	2	SAAN	ANTHRACENE,DRY WEIGHT,SED,SIEVE	49434
47	47	SAAN	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
473	381	SAAN	ARSENIC, DISSOLVED (UG/L AS AS)	1000
9	3	SAAN	ARSENIC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49247
193	148	SAAN	ARSENIC, TOTAL (UG/L AS AS)	1002
8	8	SAAN	ARSENIC,SED,BOT,WET SIEVE,	34800
137	136	SAAN	ATRAZINE DISSOLVED IN WATER PPB	39632
110	9	SAAN	BENZENE IN WTR SMPLE GC-MS, HEXADECONE EXTR.(UG/L)	34030
5		SAAN	BENZENE, 1,2,4-TRICHLORO-,DRY WT,SED,SEV	49438
5		SAAN	BENZENE, M-DICHLORO-,DRY WT,SED,SIEVE	49441
5		SAAN	BENZENE, NITRO-,DRY WT,SED,SIEVE	49444
5		SAAN	BENZENE, O-DICHLORO-,SED,SIEVE	49439
5		SAAN	BENZENE, P-DICHLORO-,DRY WT,SED,SIEVE	49442
8	8	SAAN	BENZENE,NITRO-,D5,DRY WT,SIEVE	49280
5		SAAN	BENZENE,PENTACHLORONITRO-,DRY WT,SIEVE	49446
5	2	SAAN	BENZO(B)FLUORANTHENE,DRY WT,SIEVE	49458
75		SAAN	BENZO(B)FLUORANTHENE,WHOLE WATER,UG/L	34230
75		SAAN	BENZO(GHI)PERYLENE1,12-BENZOPERYLENE TOTWUG/L	34521
75		SAAN	BENZO-A-PYRENE TOTWUG/L	34247
75		SAAN	BIS (2-CHLOROETHYL) ETHER TOTWUG/L	34273
75		SAAN	BIS (2-CHLOROISOPROPYL) ETHER TOTWUG/L	34283
110	36	SAAN	BROMODICHLOROMETHANE,WHOLE WATER,UG/L	32101
110	22	SAAN	BROMOFORM,WHOLE WATER,UG/L	32104
319	41	SAAN	CADMIUM, DISSOLVED (UG/L AS CD)	1025
9	5	SAAN	CADMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49249
193	21	SAAN	CADMIUM, TOTAL (UG/L AS CD)	1027
8	8	SAAN	CADMIUM,SED,BOT,	34825
48	44	SAAN	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
110		SAAN	CARBON TETRACHLORIDE,WHOLE WATER,UG/L	32102
615	223	SAAN	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
70	62	SAAN	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
4	2	SAAN	CHLORDANE, CIS-,DRY WT,SEDIMENT,SIEVE	49320
10	7	SAAN	CHLORDANE,CIS-,WET WEIGHT,TISS,WHOLE ORG,RECVUG/KG	49380
4	2	SAAN	CHLORDANE,TRANS-,DRY WT,SEDIMENT,SIEVE	49321
10	5	SAAN	CHLORDANE,TRANS-,WET WT,TISS,WHOLE ORG,RECV UG/KG	49379
141		SAAN	CHLORDANE-CIS ISOMER,WHOLE WATER SAMPL (UG/L)	39062
141		SAAN	CHLORDANE-TRNS ISOMER,WHOLE WATER SAMPL (UG/L)	39065
1767	1767	SAAN	CHLORIDE,TOTAL IN WATER MG/L	940
110	1	SAAN	CHLOROBENZENE TOTWUG/L	34301
110	39	SAAN	CHLOROFORM,WHOLE WATER,UG/L	32106

All Data	Actual Data	Park	Parameter Name	Parameter Number
318	60	SAAN	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
9	8	SAAN	CHROMIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49240
3		SAAN	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
1	1	SAAN	CHROMIUM, SUSPEND (UG/L AS CR)	1031
197	146	SAAN	CHROMIUM, TOTAL (UG/L AS CR)	1034
8	8	SAAN	CHROMIUM,SED,BOT,	34840
48	47	SAAN	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
110		SAAN	CIS-1,3-DICHLOROPROPENE TOTAL IN WATER UG/L	34704
48	48	SAAN	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
264	94	SAAN	COPPER, DISSOLVED (UG/L AS CU)	1040
9	8	SAAN	COPPER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49241
1		SAAN	COPPER, SUSPENDED (UG/L AS CU)	1041
192	170	SAAN	COPPER, TOTAL (UG/L AS CU)	1042
8	8	SAAN	COPPER,SED,BOT,	34850
71	58	SAAN	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
513	137	SAAN	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
4	1	SAAN	DDD,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49325
10	2	SAAN	DDD,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49374
4	2	SAAN	DDD,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49326
10	8	SAAN	DDD,P,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49375
71	61	SAAN	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
514	138	SAAN	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
4		SAAN	DDE,O,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49327
10		SAAN	DDE,O,P'-,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49373
4	2	SAAN	DDE,P,P'-,DRY WEIGHT,SEDIMENT,SIEVE	49328
10	10	SAAN	DDE,P,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49372
70	40	SAAN	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
513	229	SAAN	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
4	1	SAAN	DDT,O,P'-,DRY WT,SEDIMENT,SIEVE	49329
10		SAAN	DDT,O,P',WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49377
4	2	SAAN	DDT,P,P'-,DRY WT,SEDIMENT,SIEVE	49330
10	5	SAAN	DDT,P,P',WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49376
71	55	SAAN	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
137		SAAN	DIELDRIN IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39381
656	250	SAAN	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
4		SAAN	DIELDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49331
10	5	SAAN	DIELDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49371
141		SAAN	ENDOSULFAN SULFATE TOTWUG/L	34351
141		SAAN	ENDRIN ALDEHYDE TOTWUG/L	34366
71	5	SAAN	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393

All Data	Actual Data	Park	Parameter Name	Parameter Number
654	3	SAAN	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
4		SAAN	ENDRIN,DRY WEIGHT,SEDIMENT,SIEVE	49335
10		SAAN	ENDRIN,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49370
75	1	SAAN	FLUORANTHENE TOTWUG/L	34376
5	5	SAAN	FLUORANTHENE,SED,BED MAT,WET SIEV	49466
75		SAAN	FLUORENE TOTWUG/L	34381
5	2	SAAN	FLUORENE,9H-,DRY WEIGHT,SIEVE	49399
70	13	SAAN	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
655	70	SAAN	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
4		SAAN	HEPTACHLOR EPOXIDE,DRY WT,SEDIMENT,SIEVE	49342
10	3	SAAN	HEPTACHLOR EPOXIDE,WET WT,TISS,WHOLE ORG,RECVUG/KG	49368
70	8	SAAN	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
655	29	SAAN	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
4		SAAN	HEPTACHLOR,DRY WEIGHT,SEDIMENT,SIEVE	49341
10		SAAN	HEPTACHLOR,WET WT,TISSUE,WHOLE ORG,RECV UG/KG	49369
75		SAAN	HEXACHLOROBENZENE IN WHOLE WATER SAMPLE (UG/L)	39700
5		SAAN	HEXACHLOROBENZENE,DRY WT,SEDIMENT,SIEVE	49343
10	1	SAAN	HEXACHLOROBENZENE,WET WT,TISS,WHOLE ORG,RECV UG/KG	49367
114		SAAN	HEXACHLOROBUTADIENE IN WHOLE WATER SAMPLE(UG/L)	39702
75		SAAN	HEXACHLOROCYCLOPENTADIENE TOTWUG/L	34386
110		SAAN	HEXACHLOROETHANE TOTWUG/L	34396
75		SAAN	INDENO (1,2,3-CD) PYRENE TOTWUG/L	34403
1	1	SAAN	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	1170
603	490	SAAN	IRON, DISSOLVED (UG/L AS FE)	1046
9	9	SAAN	IRON, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49242
1	1	SAAN	IRON, SUSPENDED (UG/L AS FE)	1044
52	50	SAAN	IRON, TOTAL (UG/L AS FE)	1045
8	8	SAAN	IRON,SED,BOT,	34880
48	46	SAAN	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
257	36	SAAN	LEAD, DISSOLVED (UG/L AS PB)	1049
9	7	SAAN	LEAD, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49251
1	1	SAAN	LEAD, SUSPENDED (UG/L AS PB)	1050
192	148	SAAN	LEAD, TOTAL (UG/L AS PB)	1051
8	8	SAAN	LEAD,SED,BOT,	34890
5		SAAN	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
137	23	SAAN	MALATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39532
445	111	SAAN	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
1	1	SAAN	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
558	382	SAAN	MANGANESE, DISSOLVED (UG/L AS MN)	1056
9	9	SAAN	MANGANESE, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49243

All Data	Actual Data	Park	Parameter Name	Parameter Number
1	1	SAAN	MANGANESE, SUSPENDED (UG/L AS MN)	1054
4	4	SAAN	MANGANESE, TOTAL (UG/L AS MN)	1055
8	8	SAAN	MANGANESE,SED,BOT,	34905
471	80	SAAN	MERCURY, DISSOLVED (UG/L AS HG)	71890
8	2	SAAN	MERCURY, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49258
1	1	SAAN	MERCURY, SUSPENDED (UG/L AS HG)	71895
194	16	SAAN	MERCURY, TOTAL (UG/L AS HG)	71900
8	8	SAAN	MERCURY,SED,BOT,	34910
48	46	SAAN	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
9		SAAN	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
125	2	SAAN	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
4		SAAN	METHOXYCHLOR,O,P'-,DRY WT,SED,SIEVE	49347
10		SAAN	METHOXYCHLOR,O,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49362
4		SAAN	METHOXYCHLOR,P,P'-,DRY WT,SED,SIEVE	49346
10		SAAN	METHOXYCHLOR,P,P'-,WET WT,TISS,WHOLE ORG,RECVUG/KG	49361
137	61	SAAN	METOLACHLOR, WATER, DISSOLVED UG/L	39415
7		SAAN	MIREX, BOTTOM MATERIAL (UG/KG DRY SOLIDS)	39758
166	1	SAAN	MIREX, TOTAL (UG/L)	39755
4		SAAN	MIREX,DRY WEIGHT,SEDIMENT,SIEVE	49348
10		SAAN	MIREX,WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49360
111	24	SAAN	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
9	7	SAAN	MOLYBDENUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49252
8	1	SAAN	MOLYBDENUM,SED,BOT,	34915
113	3	SAAN	NAPHTHALENE TOTWUG/L	34696
5		SAAN	NAPHTHALENE, 1,2-DIMETHYL-,DRY WT,SIEVE	49403
5		SAAN	NAPHTHALENE, 1,6-DIMETHYL-,DRY WT,SIEVE	49404
5		SAAN	NAPHTHALENE, 2,3,6-TRIMETHYL-,DRY WT,SEV	49405
5	2	SAAN	NAPHTHALENE, 2,6-DIMETHYL-,DRY WT,SIEVE	49406
5		SAAN	NAPHTHALENE, 2-CHLORO-,DRY WT,SIEVE	49407
5		SAAN	NAPHTHALENE, DRY WEIGHT, SIEVE	49402
5		SAAN	NAPHTHALENE,2-ETHYL-,BEDMAT,WETSIEV,	49948
142	24	SAAN	NICKEL, DISSOLVED (UG/L AS NI)	1065
9	7	SAAN	NICKEL, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49253
192	172	SAAN	NICKEL, TOTAL (UG/L AS NI)	1067
8	8	SAAN	NICKEL,SED,BOT,	34925
5		SAAN	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
137		SAAN	PARATHION IN FILT. FRAC. OF WATER SAMPLE (UG/L)	39542
451	11	SAAN	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
75		SAAN	PCP (PENTACHLOROPHENOL) WHOLE WATER SAMPLE UG/L	39032
74		SAAN	PHENANTHRENE TOTWUG/L	34461

All Data	Actual Data	Park	Parameter Name	Parameter Number
5	3	SAAN	PHENANTHRENE,DRY WEIGHT,SIEVE	49409
75	1	SAAN	PYRENE TOTWUG/L	34469
5	4	SAAN	PYRENE,DRY WEIGHT,SED,SIEVE	49387
47	3	SAAN	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
340	70	SAAN	SELENIUM, DISSOLVED (UG/L AS SE)	1145
9	9	SAAN	SELENIUM, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49254
1		SAAN	SELENIUM, SUSPENDED (UG/L AS SE)	1146
194	4	SAAN	SELENIUM, TOTAL (UG/L AS SE)	1147
8	8	SAAN	SELENIUM,SED,BOT,	34950
271	30	SAAN	SILVER, DISSOLVED (UG/L AS AG)	1075
9	3	SAAN	SILVER, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49255
193	5	SAAN	SILVER, TOTAL (UG/L AS AG)	1077
8	8	SAAN	SILVER,SED,BOT,	34955
137	73	SAAN	SIMAZINE, DISSOLVED, WATER, TOTAL RECOVERABLE UG/L	4035
106	14	SAAN	TETRACHLOROETHYLENE TOTWUG/L	34475
50		SAAN	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
484	1	SAAN	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
10		SAAN	TOXAPHENE, WET WEIGHT,TISSUE,WHOLE ORG,RECV UG/KG	49355
4		SAAN	TOXAPHENE,DRY WEIGHT,SEDIMENT,SIEVE	49351
110		SAAN	TRANS-1,3-DICHLOROPROPENETOTAL IN WATER UG/L	34699
110	10	SAAN	TRICHLOROETHYLENE-WHOLE WATER SAMPLE-UG/L	39180
110		SAAN	VINYL CHLORIDE-WHOLE WATER SAMPLE-UG/L	39175
3	3	SAAN	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
421	318	SAAN	ZINC, DISSOLVED (UG/L AS ZN)	1090
9	9	SAAN	ZINC, DRY WEIGHT, TISSUE/BIOTA, RECV UG/G	49245
194	141	SAAN	ZINC, TOTAL (UG/L AS ZN)	1092
8	8	SAAN	ZINC,SED,BOT,	35020
1	1	VICK	1,2,4-TRICHLOROBENZENE WET WGTTISMG/KG	34555
1	1	VICK	2,4,5-T IN WHOLE WATER SAMPLE (UG/L)	39740
1	1	VICK	2,4-D IN WHOLE WATER SAMPLE (UG/L)	39730
1		VICK	ALDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39333
86		VICK	ALDRIN IN WHOLE WATER SAMPLE (UG/L)	39330
44	37	VICK	ALUMINUM, DISSOLVED (UG/L AS AL)	1106
8	7	VICK	ALUMINUM, TOTAL (UG/L AS AL)	1105
2	2	VICK	ARSENIC IN BOTTOM DEPOSITS (MG/KG AS AS DRY WGT)	1003
75	66	VICK	ARSENIC, DISSOLVED (UG/L AS AS)	1000
35	25	VICK	ARSENIC, SUSPENDED (UG/L AS AS)	1001
71	43	VICK	ARSENIC, TOTAL (UG/L AS AS)	1002
1	1	VICK	ATRAZINE IN WHOLE WATER SAMPLE UG/L	39033
43	8	VICK	CADMIUM, DISSOLVED (UG/L AS CD)	1025

All Data	Actual Data	Park	Parameter Name	Parameter Number
37	11	VICK	CADMIUM, SUSPENDED (UG/L AS CD)	1026
39	3	VICK	CADMIUM, TOTAL (UG/L AS CD)	1027
2		VICK	CADMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1028
5		VICK	CHLORDANE(TECH MIX & METABS),WHOLE WATER,UG/L	39350
1		VICK	CHLORDANE(TECH MIX&METABS),SEDIMENTS,DRY WGT,UG/KG	39351
1		VICK	CHLORDANE-CIS ISOMER,TISSUE WET WGT (UG/G)	39063
1	1	VICK	CHLORDANE-TRANS ISOMER,TISSUE WET WGT (UG/G)	39066
166	164	VICK	CHLORIDE,TOTAL IN WATER MG/L	940
1	1	VICK	CHLOROFORM,WHOLE WATER,UG/L	32106
46	9	VICK	CHROMIUM, DISSOLVED (UG/L AS CR)	1030
4		VICK	CHROMIUM, HEXAVALENT (UG/L AS CR)	1032
35	20	VICK	CHROMIUM, SUSPEND (UG/L AS CR)	1031
66	27	VICK	CHROMIUM, TOTAL (UG/L AS CR)	1034
5	4	VICK	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	1029
2	1	VICK	COPPER IN BOTTOM DEPOSITS (MG/KG AS CU DRY WGT)	1043
26	22	VICK	COPPER, DISSOLVED (UG/L AS CU)	1040
39	37	VICK	COPPER, SUSPENDED (UG/L AS CU)	1041
58	31	VICK	COPPER, TOTAL (UG/L AS CU)	1042
1		VICK	DDD IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39363
4		VICK	DDD IN WHOLE WATER SAMPLE (UG/L)	39360
1		VICK	DDE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39368
87	4	VICK	DDE IN WHOLE WATER SAMPLE (UG/L)	39365
1		VICK	DDT IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39373
87	5	VICK	DDT IN WHOLE WATER SAMPLE (UG/L)	39370
1		VICK	DICOFOL (KELTHANE) TISSUE,WET,WT,MG/KG	85684
1		VICK	DIELDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39383
1	1	VICK	DIELDRIN IN TISSUE WET WGT (UG/G)	39404
88	3	VICK	DIELDRIN IN WHOLE WATER SAMPLE (UG/L)	39380
1		VICK	ENDRIN WET WGTTISMG/KG	34685
1		VICK	ENDRIN IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOLIDS)	39393
89	6	VICK	ENDRIN IN WHOLE WATER SAMPLE (UG/L)	39390
1		VICK	HEPTACHLOR WET WGTTISMG/KG	34687
1	1	VICK	HEPTACHLOR EPOXIDE WET WGTTISMG/KG	34686
1		VICK	HEPTACHLOR EPOXIDE IN BOT. DEP. (UG/KG DRY SOL.)	39423
40		VICK	HEPTACHLOR EPOXIDE IN WHOLE WATER SAMPLE (UG/L)	39420
1		VICK	HEPTACHLOR IN BOT. DEP. (UG/KILOGRAM DRY SOLIDS)	39413
26		VICK	HEPTACHLOR IN WHOLE WATER SAMPLE (UG/L)	39410
1		VICK	HEPTACHLOROBIPHENYL,TOT, TISSUE,WET,WT,MG/KG	39354
3		VICK	HEPTACHLORODIBENZOFURAN,1234678- ,FISH,WET WT,PG/G	30356
3		VICK	HEPTACHLORODIBENZOFURAN,1234789- ,FISH,WET WT,PG/G	30357

All Data	Actual Data	Park	Parameter Name	Parameter Number
3		VICK	HEPTACHLORODIBENZO-P-DIOXIN,1234678,TIS,WETWT,PG/G	30348
1		VICK	HEXACHLOROBENZENE WET WGTTISMG/KG	34688
1		VICK	HEXACHLOROBUTADIENE WET WGTTISMG/KG	34395
2	2	VICK	IRON (UG/L AS FE)	71885
2	2	VICK	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	1170
90	80	VICK	IRON, DISSOLVED (UG/L AS FE)	1046
14	14	VICK	IRON, SUSPENDED (UG/L AS FE)	1044
1		VICK	IRON, TOTAL (MG/L AS FE)	74010
42	42	VICK	IRON, TOTAL (UG/L AS FE)	1045
2		VICK	LEAD IN BOTTOM DEPOSITS (MG/KG AS PB DRY WGT)	1052
28	4	VICK	LEAD, DISSOLVED (UG/L AS PB)	1049
38	34	VICK	LEAD, SUSPENDED (UG/L AS PB)	1050
34	3	VICK	LEAD, TOTAL (UG/L AS PB)	1051
1		VICK	MALATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39531
1		VICK	MALATHION IN WHOLE WATER SAMPLE (UG/L)	39530
2	2	VICK	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	1053
72	49	VICK	MANGANESE, DISSOLVED (UG/L AS MN)	1056
39	39	VICK	MANGANESE, SUSPENDED (UG/L AS MN)	1054
49	49	VICK	MANGANESE, TOTAL (UG/L AS MN)	1055
70	19	VICK	MERCURY, DISSOLVED (UG/L AS HG)	71890
30	7	VICK	MERCURY, SUSPENDED (UG/L AS HG)	71895
70	10	VICK	MERCURY, TOTAL (UG/L AS HG)	71900
2	2	VICK	MERCURY, TOTAL IN FISH (PPM,WET WEIGHT BASIS)	71935
2		VICK	MERCURY,TOT. IN BOT. DEPOS. (MG/KG AS HG DRY WGT)	71921
0		VICK	METHOXYCHLOR IN BOTTOM DEPOSITS (UG/KG DRY SOL.)	39481
1	1	VICK	METHOXYCHLOR IN FISH TISSUE,UG/G WET WEIGHT	81644
5		VICK	METHOXYCHLOR IN WHOLE WATER SAMPLE (UG/L)	39480
1	1	VICK	MIREX IN FISH TISSUE WET WEIGHT UG/G	81645
45		VICK	MOLYBDENUM, DISSOLVED (UG/L AS MO)	1060
36	34	VICK	NICKEL, DISSOLVED (UG/L AS NI)	1065
11	9	VICK	NICKEL, SUSPENDED (UG/L AS NI)	1066
30	5	VICK	NICKEL, TOTAL (UG/L AS NI)	1067
1		VICK	PARATHION IN BOT. DEPOS. (UG/KILOGRAM DRY SOLIDS)	39541
2		VICK	PARATHION IN WHOLE WATER SAMPLE (UG/L)	39540
1		VICK	PENTACHLOROBENZENE TISSUE,WET,WT,MG/KG	85679
1		VICK	SELENIUM IN BOTTOM DEPOSITS (MG/KG AS SE DRY WGT)	1148
82	19	VICK	SELENIUM, DISSOLVED (UG/L AS SE)	1145
36	4	VICK	SELENIUM, SUSPENDED (UG/L AS SE)	1146
66	20	VICK	SELENIUM, TOTAL (UG/L AS SE)	1147
54	5	VICK	SILVER, DISSOLVED (UG/L AS AG)	1075

All Data	Actual Data	Park	Parameter Name	Parameter Number
15	1	VICK	SILVER, SUSPENDED (UG/L AS AG)	1076
15	1	VICK	SILVER, TOTAL (UG/L AS AG)	1077
1		VICK	TOXAPHENE IN BOTTOM DEPOS. (UG/KILOGRAM DRY SOL.)	39403
5		VICK	TOXAPHENE IN WHOLE WATER SAMPLE (UG/L)	39400
2	1	VICK	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	1093
63	44	VICK	ZINC, DISSOLVED (UG/L AS ZN)	1090
36	34	VICK	ZINC, SUSPENDED (UG/L ZN)	1091
71	50	VICK	ZINC, TOTAL (UG/L AS ZN)	1092

Appendix G: USEPA Recommended Water Quality Criteria: Priority Pollutants

This information was obtained from the USEPA's "Water Quality Criteria" webpage. These criteria are merely recommended; the states are not obligated to adopt these criteria. Each state develops its own criteria for the individual pollutants, and states do not always establish criteria for all pollutants. Note that there are many priority pollutants that do not have a recommended criterion specified (USEPA, 2005).

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
1	Antimony	7440360					5.6 B	640 B	65FR66443
2	Arsenic	7440382	340 A,D,K	150 A,D,K	69 A,D,bb	36 A,D,bb	0.018 C,M,S	0.14 C,M,S	65FR31682 57FR60848
3	Beryllium	7440417					Z		65FR31682
4	Cadmium	7440439	2.0 D,E,K,bb	0.25 D,E,K,bb	40 D,bb	8.8 D,bb	Z		EPA-822-R-01-001 65FR31682
5a	Chromium (III)	16065831	570 D,E,K	74 D,E,K			Z Total		EPA820/B-96-001 65FR31682
5b	Chromium (VI)	18540299	16 D,K	11 D,K	1,100 D,bb	50 D,bb	Z Total		65FR31682
6	Copper	7440508	13 D,E,K,cc	9.0 D,E,K,cc	4.8 D,cc,ff	3.1 D,cc,ff	1,300 U		65FR31682
7	Lead	7439921	65	2.5	210 D,bb	8.1 D,bb			65FR31682

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
			D,E,bb,gg	D,E,bb,gg					
8a	Mercury	7439976	1.4 D,K,hh	0.77 D,K,hh	1.8 D,ee,hh	0.94 D,ee,hh		0.3 mg/kg J	62FR42160 EPA823-R-01-001
8b	Methylmercury	22967926							
9	Nickel	7440020	470 D,E,K	52 D,E,K	74 D,bb	8.2 D,bb	610 B	4,600 B	65FR31682
10	Selenium	7782492	L,R,T	5.0 T	290 D,bb,dd	71 D,bb,dd	170 Z	4200	62FR42160 65FR31682 65FR66443
11	Silver	7440224	3.2 D,E,G		1.9 D,G				65FR31682
12	Thallium	7440280					0.24	0.47	68FR75510
13	Zinc	7440666	120 D,E,K	120 D,E,K	90 D,bb	81 D,bb	7,400 U	26,000 U	65FR31682 65FR66443
14	Cyanide	57125	22 K,Q	5.2 K,Q	1 Q,bb	1 Q,bb	140 jj	140 jj	EPA820/B-96-001 57FR60848 68FR75510
15	Asbestos	1332214					7 million fibers/L I		57FR60848
16	2,3,7,8-TCDD	1746016					5.0E-9 C	5.1E-9 C	65FR66443

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
	(Dioxin)								
17	Acrolein	107028					190	290	65FR66443
18	Acrylonitrile	107131					0.051 B,C	0.25 B,C	65FR66443
19	Benzene	71432					2.2 B,C	51 B,C	IRIS 01/19/00 &65FR66443
20	Bromoform	75252					4.3 B,C	140 B,C	65FR66443
21	Carbon Tetrachloride	56235					0.23 B,C	1.6 B,C	65FR66443
22	Chlorobenzene	108907					130 Z,U	1,600 U	68FR75510
23	Chlorodibromomethane	124481					0.40 B,C	13 B,C	65FR66443
24	Chloroethane	75003							
25	2-Chloroethylvinyl Ether	110758							
26	Chloroform	67663					5.7 C,P	470 C,P	62FR42160
27	Dichlorobromomethane	75274					0.55 B,C	17 B,C	65FR66443

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
28	1,1-Dichloroethane	75343							
29	1,2-Dichloroethane	107062					0.38 B,C	37 B,C	65FR66443
30	1,1-Dichloroethylene	75354					330	7,100	68FR75510
31	1,2-Dichloropropane	78875					0.50 B,C	15 B,C	65FR66443
32	1,3-Dichloropropene	542756					0.34 c	21 c	68FR75510
33	Ethylbenzene	100414					530	2,100	68FR75510
34	Methyl Bromide	74839					47 B	1,500 B	65FR66443
35	Methyl Chloride	74873							65FR31682
36	Methylene Chloride	75092					4.6 B,C	590 B,C	65FR66443
37	1,1,2,2-Tetrachloroethane	79345					0.17 B,C	4.0 B,C	65FR66443
38	Tetrachloroethylene	127184					0.69 C	3.3 C	65FR66443

Priority Pollutant		CAS Number	Freshwater CMC (acute) (µg/L)	Freshwater CCC (chronic) (µg/L)	Saltwater CMC (acute) (µg/L)	Saltwater CCC (chronic) (µg/L)	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	FR Cite/ Source
39	Toluene	108883					1,300 Z	15,000	68FR75510
40	1,2-Trans-Dichloroethylene	156605					140 Z	10,000	68FR75510
41	1,1,1-Trichloroethane	71556					Z		65FR31682
42	1,1,2-Trichloroethane	79005					0.59 B,C	16 B,C	65FR66443
43	Trichloroethylene	79016					2.5 C	30 C	65FR66443
44	Vinyl Chloride	75014					0.025 C,kk	2.4 C,kk	68FR75510
45	2-Chlorophenol	95578					81 B,U	150 B,U	65FR66443
46	2,4-Dichlorophenol	120832					77 B,U	290 B,U	65FR66443
47	2,4-Dimethylphenol	105679					380 B	850 B,U	65FR66443
48	2-Methyl-4,6-Dinitrophenol	534521					13	280	65FR66443
49	2,4-Dinitrophenol	51285					69 B	5,300 B	65FR66443

Priority Pollutant		CAS Number	Freshwater CMC (acute) (µg/L)	Freshwater CCC (chronic) (µg/L)	Saltwater CMC (acute) (µg/L)	Saltwater CCC (chronic) (µg/L)	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	FR Cite/ Source
50	2-Nitrophenol	88755							
51	4-Nitrophenol	100027							
52	3-Methyl-4-Chlorophenol	59507					U	U	
53	Pentachlorophenol	87865	19 F,K	15 F,K	13 bb	7.9 bb	0.27 B,C	3.0 B,C,H	65FR31682 65FR66443
54	Phenol	108952					21,000 B,U	1,700,000 B,U	65FR66443
55	2,4,6-Trichlorophenol	88062					1.4 B,C	2.4 B,C,U	65FR66443
56	Acenaphthene	83329					670 B,U	990 B,U	65FR66443
57	Acenaphthylene	208968							
58	Anthracene	120127					8,300 B	40,000 B	65FR66443
59	Benzidine	92875					0.000086 B,C	0.00020 B,C	65FR66443
60	Benzo(a) Anthracene	56553					0.0038 B,C	0.018 B,C	65FR66443

Priority Pollutant		CAS Number	Freshwater CMC (acute) (µg/L)	Freshwater CCC (chronic) (µg/L)	Saltwater CMC (acute) (µg/L)	Saltwater CCC (chronic) (µg/L)	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	FR Cite/ Source
61	Benzo(a) Pyrene	50328					0.0038 B,C	0.018 B,C	65FR66443
62	Benzo(b) Fluoranthene	205992					0.0038 B,C	0.018 B,C	65FR66443
63	Benzo(ghi) Perylene	191242							
64	Benzo(k) Fluoranthene	207089					0.0038 B,C	0.018 B,C	65FR66443
65	Bis(2-Chloroethoxy) Methane	111911							
66	Bis(2-Chloroethyl) Ether	111444					0.030 B,C	0.53 B,C	65FR66443
67	Bis(2-Chloroisopropyl) Ether	108601					1,400 B	65,000 B	65FR66443
68	Bis(2-Ethylhexyl) Phthalate[x]	117817					1.2 B,C	2.2 B,C	65FR66443
69	4-Bromophenyl Phenyl Ether	101553							

Priority Pollutant		CAS Number	Freshwater		Saltwater		Human Health for the consumption of		FR Cite/ Source
			CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	
70	Butylbenzyl Phthalate[W]	85687					1,500 B	1,900 B	65FR66443
71	2-Chloronaphthalene	91587					1,000 B	1,600 B	65FR66443
72	4-Chlorophenyl Phenyl Ether	7005723							
73	Chrysene	218019					0.0038 B,C	0.018 B,C	65FR66443
74	Dibenzo(a,h)Anthracene	53703					0.0038 B,C	0.018 B,C	65FR66443
75	1,2-Dichlorobenzene	95501					420	1,300	68FR75510
76	1,3-Dichlorobenzene	541731					320	960	65FR66443
77	1,4-Dichlorobenzene	106467					63	190	68FR75510
78	3,3'-Dichlorobenzidine	91941					0.021 B,C	0.028 B,C	65FR66443
79	Diethyl Phthalate[W]	84662					17,000 B	44,000 B	65FR66443

Priority Pollutant		CAS Number	Freshwater CMC (acute) (µg/L)	Freshwater CCC (chronic) (µg/L)	Saltwater CMC (acute) (µg/L)	Saltwater CCC (chronic) (µg/L)	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	FR Cite/ Source
80	Dimethyl Phthalate[W]	131113					270,000	1,100,000	65FR66443
81	Di-n-Butyl Phthalate[W]	84742					2,000 B	4,500 B	65FR66443
82	2,4-Dinitrotoluene	121142					0.11 C	3.4 C	65FR66443
83	2,6-Dinitrotoluene	606202							
84	Di-n-Octyl Phthalate	117840							
85	1,2-Diphenylhydrazine	122667					0.036 B,C	0.20 B,C	65FR66443
86	Fluoranthene	206440					130 B	140 B	65FR66443
87	Fluorene	86737					1,100 B	5,300 B	65FR66443
88	Hexachlorobenzene	118741					0.00028 B,C	0.00029 B,C	65FR66443
89	Hexachlorobutadiene	87683					0.44 B,C	18 B,C	65FR66443
90	Hexachlorocyclopentadiene	77474					40 U	1,100 U	68FR75510

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
91	Hexachloroethane	67721					1.4 B,C	3.3 B,C	65FR66443
92	Ideno(1,2,3-cd)Pyrene	193395					0.0038 B,C	0.018 B,C	65FR66443
93	Isophorone	78591					35 B,C	960 B,C	65FR66443
94	Naphthalene	91203							
95	Nitrobenzene	98953					17 B	690 B,H,U	65FR66443
96	N-Nitrosodimethylamine	62759					0.00069 B,C	3.0 B,C	65FR66443
97	N-Nitrosodi-n-Propylamine	621647					0.0050 B,C	0.51 B,C	65FR66443
98	N-Nitrosodiphenylamine	86306					3.3 B,C	6.0 B,C	65FR66443
99	Phenanthrene	85018							
100	Pyrene	129000					830 B	4,000 B	65FR66443
101	1,2,4-	120821					35	70	68FR75510

			Freshwater		Saltwater		Human Health for the consumption of		
Priority Pollutant		CAS Number	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	CMC (acute) (µg/L)	CCC (chronic) (µg/L)	Water + Organism (µg/L)	Organism Only (µg/L)	FR Cite/ Source
	Trichlorobenzene								
102	Aldrin	309002	3.0 G		1.3 G		0.000049 B,C	0.000050 B,C	65FR31682 65FR66443
103	alpha-BHC	319846					0.0026 B,C	0.0049 B,C	65FR66443
104	beta-BHC	319857					0.0091 B,C	0.017 B,C	65FR66443
105	gamma-BHC (Lindane)	58899	0.95 K		0.16 G		0.98	1.8	65FR31682 68FR75510
106	delta-BHC	319868							
107	Chlordane	57749	2.4 G	0.0043 G,aa	0.09 G	0.004 G,aa	0.00080 B,C	0.00081 B,C	65FR31682 65FR66443
108	4,4'-DDT	50293	1.1 G,ii	0.001 G,aa,ii	0.13 G,ii	0.001 G,aa,ii	0.00022 B,C	0.00022 B,C	65FR31682 65FR66443
109	4,4'-DDE	72559					0.00022 B,C	0.00022 B,C	65FR66443
110	4,4'-DDD	72548					0.00031 B,C	0.00031 B,C	65FR66443

Priority Pollutant		CAS Number	Freshwater CMC (acute) (µg/L)	Freshwater CCC (chronic) (µg/L)	Saltwater CMC (acute) (µg/L)	Saltwater CCC (chronic) (µg/L)	Human Health for the consumption of Water + Organism (µg/L)	Human Health for the consumption of Organism Only (µg/L)	FR Cite/ Source
111	Dieldrin	60571	0.24 K	0.056 K,O	0.71 G	0.0019 G,aa	0.000052 B,C	0.000054 B,C	65FR31682 65FR66443
112	alpha-Endosulfan	959988	0.22 G,Y	0.056 G,Y	0.034 G,Y	0.0087 G,Y	62 B	89 B	65FR31682 65FR66443
113	beta-Endosulfan	33213659	0.22 G,Y	0.056 G,Y	0.034 G,Y	0.0087 G,Y	62 B	89 B	65FR31682 65FR66443
114	Endosulfan Sulfate	1031078					62 B	89 B	65FR66443
115	Endrin	72208	0.086 K	0.036 K,O	0.037 G	0.0023 G,aa	0.059	0.060	65FR31682 68FR75510
116	Endrin Aldehyde	7421934					0.29 B	0.30 B,H	65FR66443
117	Heptachlor	76448	0.52 G	0.0038 G,aa	0.053 G	0.0036 G,aa	0.000079 B,C	0.000079 B,C	65FR31682 65FR66443
118	Heptachlor Epoxide	1024573	0.52 G,V	0.0038 G,V,aa	0.053 G,V	0.0036 G,V,aa	0.000039 B,C	0.000039 B,C	65FR31682 65FR66443
119	Polychlorinated Biphenyls PCBs:			0.014 N,aa		0.03 N,aa	0.000064 B,C,N	0.000064 B,C,N	65FR31682 65FR66443
120	Toxaphene	8001352	0.73	0.0002 aa	0.21	0.0002 aa	0.00028 B,C	0.00028 B,C	65FR31682 65FR66443

FOOTNOTES:

A This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (PDF, 74 pp., 3.2M) (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.

B This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

C This criterion is based on carcinogenicity of 10^{-6} risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10^{-5}, move the decimal point in the recommended criterion one place to the right).

D Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. The recommended water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria," (PDF, 49 pp., 3M) October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center and 40CFR§131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble- Conversion Factors for Dissolved Metals.

E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following: CMC (dissolved) = $\exp\{m_A [\ln(\text{hardness})]+ b_A\}$ (CF), or CCC (dissolved) = $\exp\{m_C [\ln (\text{hardness})]+ b_C\}$ (CF) and the parameters specified in Appendix B- Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent.

F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC = exp(1.005(pH)-4.869); CCC = exp(1.005(pH)-5.134). Values displayed in table correspond to a pH of 7.8.

G This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (PDF, 153 pp., 7.3M) (EPA 440/5-80-019), Chlordane (PDF, 68 pp., 3.1M) (EPA 440/5-80-027), DDT (PDF, 175 pp., 8.3M) (EPA 440/5-80-038), Endosulfan (PDF, 155 pp., 7.3M) (EPA 440/5-80-046), Endrin (PDF, 103 pp., 4.6M) (EPA 440/5-80-047), Heptachlor (PDF, 114 pp., 5.4M) (EPA 440/5-80-052), Hexachlorocyclohexane (PDF, 109 pp., 4.8M) (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines (PDF, 105 pp., 4.5M) . For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines (PDF, 105 pp., 4.5M).

H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the *1986 Quality Criteria for Water*. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.

I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).

J This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.0175 kg/day.

K This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

L The CMC = 1/[(f1/CMC1) + (f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 g/l and 12.82 g/l, respectively.

M EPA is currently reassessing the criteria for arsenic.

N This criterion applies to total pcbs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)

O The derivation of the CCC for this pollutant (Endrin) did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

P Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

Q This recommended water quality criterion is expressed as g free cyanide (as CN)/L.

R This value for selenium was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303(c) aquatic life criterion. EPA is currently working on this criterion and so this value might change substantially in the near future.

S This recommended water quality criterion for arsenic refers to the inorganic form only.

T This recommended water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996- CMC or 0.922- CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.

U The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.

V This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

W Although EPA has not published a completed criteria document for butylbenzyl phthalate it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria. It is anticipated that industry intends to publish in the peer reviewed literature draft aquatic life criteria generated in accordance with EPA Guidelines. EPA will review such criteria for possible issuance as national WQC.

X There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.

Y This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

Z A more stringent MCL has been issued by EPA. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1-800-426-4791) for values.

aa This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (PDF, 153 pp., 7.3M) (EPA 440/5-80-019), Chlordane (PDF, 68 pp., 3.1M) (EPA 440/5-80-027), DDT (PDF, 175 pp., 8.3M) (EPA 440/5-80-038), Endrin (PDF, 103 pp., 4.6M) (EPA 440/5-80-047), Heptachlor (PDF, 114 pp., 5.4M) (EPA 440/5-80-052), Polychlorinated biphenyls

(EPA 440/5-80-068), Toxaphene (EPA 440/5-86-006). This CCC is currently based on the Final Residue Value (FRV) procedure. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria. Therefore, the Agency anticipates that future revisions of this CCC will not be based on the FRV procedure.

bb This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (PDF, 105 pp., 4.5M) (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (PDF, 74 pp., 3.2M) (EPA 440/5-84-033), Cadmium (EPA-822-R-01-001), Chromium (EPA 440/5-84-029), Copper (PDF, 150 pp., 6.2M) (EPA 440/5-84-031), Cyanide (PDF, 67 pp., 2.7M) (EPA 440/5- 84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87- 003).

cc When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

dd The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 g/L in salt water because the saltwater CCC does not take into account uptake via the food chain.

ee This recommended water quality criterion was derived on page 43 of the mercury criteria document (PDF, 144 pp., 6.4M) (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 ug/L given on page 23 of the criteria document is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

ff This recommended water quality criterion was derived in *Ambient Water Quality Criteria Saltwater Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim final National Toxics Rule (60FR22228-222237, May 4, 1995).

gg EPA is actively working on this criterion and so this recommended water quality criterion may change substantially in the near future.

hh This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

ii This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

jj This recommended water quality criterion is expressed as total cyanide, even though the IRIS RFD we used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g., $Fe_4[Fe(CN)_6]_3$), this criterion may be over conservative.

kk This recommended water quality criterion was derived using the cancer slope factor of 1.4 (LMS exposure from birth).

Appendix H: README File for the GULN POPs and Heavy Metals Database

This file is also located on the CD associated with this report. It provides instructions for searching and extracting data from the GULN POPs and Heavy Metals Database.

GULN POPs and Heavy Metals Database

A Database Designed to Accompany the Report,
"Compilation and Synthesis of Existing Persistent Organic Pollutants (POPs) and Heavy Metals Data for Gulf Coast Network National Parks"

by

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Table of Contents

I. Explanation of the Database

Welcome to the GULN Persistent Organic Pollutants (POPs) and Heavy Metals Database for the Gulf Coast Network of the National Park Service! This database was made using Microsoft Access 2002 and compiles data from the following organizations:

- U.S. Environmental Protection (EPA; includes both Legacy and Modernized STORET)
- U.S. Geological Survey (USGS)
- Texas Commission on Environmental Quality (TCEQ)

To search the database more effectively, a "graphic user interface," or GUI, was created to make searching and analyzing the data more user-friendly. Upon opening the database in Access (achieved by double-clicking on the file), a window appears that provides the user with several methods of searching.

There are some important things to remember when using this database:

- When choosing the "datasheet" option, the data obtained is *filtered* data. Therefore, if the user further filters the data (by running queries or filters on the data directly) and then chooses the "remove filter" option, *all* filters will be removed. For example, the user chooses to search for mercury in BITH and chooses the datasheet display view. If the user then chooses the "remove filter" at any point while viewing this data in the datasheet view, they will obtain a datasheet that includes *all* of the data in the database. To avoid this problem, the user should copy and paste any data obtained from the initial search into a new table in order to conduct queries or filters on them.
- The data are stored in a table that is hidden when the database is first opened. To view the data in its entirety, unhide the database window (directions provided below) and open the table "TAB_all_parks." Remember, any changes made to this table will change the entire database.

II. Searching the Database

The database for searching and managing the data collected during this study was created using Microsoft Access 2002. Upon opening the file, the user will immediately see the "GULN POPs and Heavy Metals Database" dialog box (see Figure 1). This box provides the user with various options to limit the search of the data. The first selection requires the user to choose the pollutants to search for. The default option is "All Organic Pollutants," but the user may change the option to "All Heavy Metals" or choose a specific pollutant in the drop-down menu. The second selection allows the user to change the parks in which to search. The default option is "All Gulf Coast Network NPS Units," but the user can choose to search in any of the eight GULN park units. Finally, the user can choose to output the data either in a spreadsheet format or in a report format. During this selection process, the user is effectively creating a query for Access to filter out unwanted data. Only the results requested will be shown, although all of the data are stored unaltered in an Access table in the database.

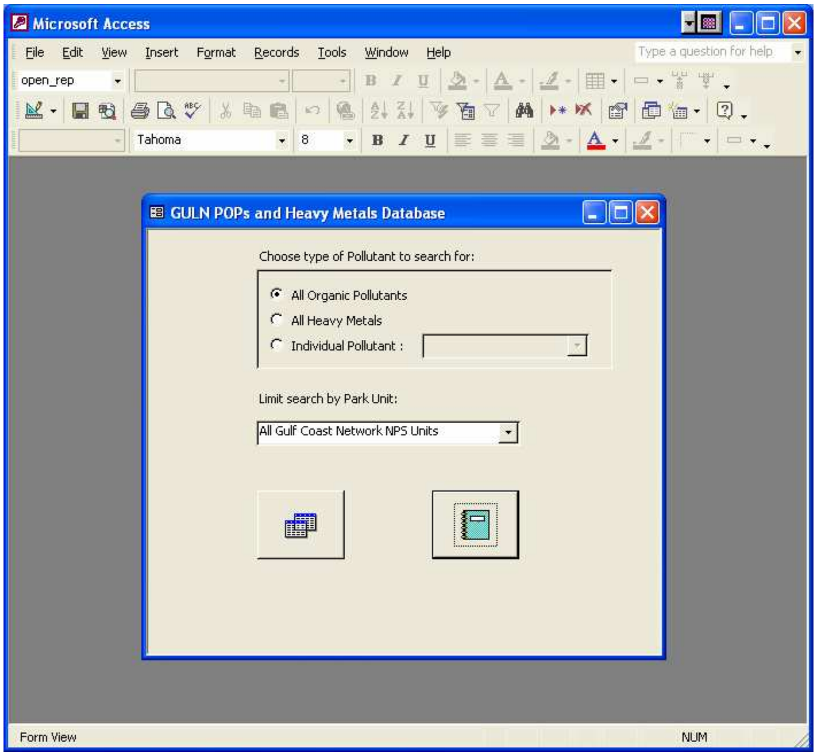

Figure 1: View of the "Main Form" dialog box of the database.

After selecting an output format, the database provides the user with the results of the query in a new window. The user can close this window to return to the Main Form and begin a new query. If the user would like to save the results, they can simply choose "File → Save As..." to save them. If the results were returned in report form, the file will be saved as a report in the Access file. To retrieve the report, the user must first "unhide" the main database window by choosing "Window → Unhide..." and clicking on the "GUI: Database" file. In the window that appears, the user can click on "Reports" under the "Objects" column on the left side of the window, and their saved file should be found there. Alternatively, the user can choose to print the report by selecting "File → Print..." The following table (Table 1) provides a step-by-step procedure to extract useful data from the Microsoft Access database and to import the data into a spreadsheet program such as Microsoft Excel.

Table 1: Procedure to extract files from Access to a spreadsheet program:

- Open the Access file (e.g., GULN POPs and Heavy Metals Database).
- In the "GULN POPs and Heavy Metals Database" dialog box ,choose <Individual Pollutant> and pick a pollutant (e.g., DDT; you can also choose <All Heavy Metals> or <All Organic Pollutants>).
- In the "GULN POPs and Heavy Metals Database" dialog box, select site of interest (e.g., BITH).
- In the "GULN POPs and Heavy Metals Database" dialog box, select the spreadsheet icon (the icon on the left).
- Under FILE, choose <Export>.
- Select SAVE AS TYPE and choose <Microsoft Excel 97-2000>.
- Give the file a name and choose where to save the file.

- Choose <Export All>.
- Open the file with a spreadsheet program (e.g., Microsoft Excel).

Another option for saving results is to choose the spreadsheet option on the Main Form. This will return the results as a spreadsheet, which can then be copied and pasted into an Excel spreadsheet. If users are familiar with Access databases and prefer to keep the data in the same format, the results can also be saved as an Access table. In order to do this, the user must first select all of the rows by choosing “Edit → Select All Records.” Next, make certain that the database window is open by choosing “Window → Unhide,” and then selecting the “GULN POPs and Heavy Metals Database: Database” file. Click “Ok.” If the database window is already open, the “Unhide” option will be greyed-out. To copy the selected records into a new table, first create a table to choosing “Table” in the “Objects” toolbar on the left, and then clicking on the “New” button on the top of the window. Choose “datasheet view” in the next window and click “Ok.” When the new table opens, paste the records into the new table by choosing “Edit → Paste.” By choosing to save the results in Access, the user can filter the results or run additional queries on them without altering the original data.

III. Remark Codes

The GULN POPs and Heavy Metals Database includes a large amount of data that are not “actual” numbers. The LDC STORET system uses a Remark Code to identify data that required additional explanation for a number of different reasons. One example is data that were below the detection limits of the sampling method. This type of data included a “K” in the Remark Code column. Other examples of data limitations that required Remark Codes include non-detects, off-scale highs and lows, and calculated values. The Legacy STORET and the USGS Remark Codes are listed below.

A. Legacy STORET Remark Codes

These are definitions for the Legacy STORET Remark Codes, found in the “Remark” field if the data were obtained from the U.S. Environmental Protection Agency’s Legacy STORET database:

Printed Output	Remark
A	Value reported is the mean of two or more determinations. (Handled as replicates with "Calculated" and "Mean" qualifiers.)
B	Results based upon colony counts outside the acceptable range. (This is covered by a valid lab remark, "CNT.” Results are stored normally.)
C	Calculated. Value stored was not measured directly, but was calculated from other data available. (Handled with the "Calculated" qualifier on the result.)
D	Field measurement. Some parameter codes (e.g. 401, "Field pH") imply this condition without this remark. (Measurement activities conducted in the field are reported separately from results obtained from samples)
E	Extra sample taken in compositing process. (This is a quality assurance

Printed Output	Remark
	replicate, and reported as a separate activity.)
F	In the case of species, F indicates Female sex. (Sex is a characteristic, with several permitted values including "Female").
G	Value reported is the maximum of two or more determinations. (Handled with the "Maximum" statistic type qualifier).
H	Value based on field kit determination; results may not be accurate. (Measurement activities conducted in the field are reported separately from results obtained from samples; procedures involving devices such as HACH kits should report specific HACH identifiers.)
I	The value reported is less than the practical quantitation limit and greater than or equal to the method detection limit. (Result is stored as "Detected Below Quantification Limit," with lower quantification limit and detection limit stored separately.)
J	Estimated. Value shown is not a result of analytical measurement. (Reported with the "Estimated" qualifier.)
K	Off-scale low. Actual value not known, but known to be less than value shown. (Result is stored as "Not Detected," with detection limit stored separately.)
L	Off-scale high. Actual value not known, but known to be greater than value shown. (Result is stored as "Detected Above Quantification Limit," with upper quantification limit stored separately.)
M	Presence of material verified, but not quantified. Indicates a positive detection, at a level too low to permit accurate quantification. In the case of temperature or oxygen reduction potential, M indicates a negative value. In the case of species, M indicates Male sex. (Result is stored as "Detected but not Quantified." Or result may be stored as "Detected Below Quantification Limit" with detection and quantification limits stored separately. Negative values are stored as negative numbers. Sex is a characteristic, with several permitted values including "Male.")
N	Presumptive evidence of presence of material. (Result is stored as "Detected but not Quantified." Comments may be added.)
O	Sampled for, but analysis lost. Accompanying value is not meaningful for analysis. (Result is left "Null," and comments supplied as appropriate.
P	Too numerous to count. (Result is stored as "Detected Above Quantification Limit," with upper quantification limit stored separately.)
Q	Sample held beyond normal holding time. (This is covered by a valid lab remark, "EHT." Sample analysis date and time should be recorded.)
R	Significant rain in the past 48 hours. (Several characteristics identify meteorological conditions at or near the time of sampling. There is a "General Observation [text]" characteristic in which detailed descriptions of weather

Printed Output	Remark
	may be supplied. In version 2.0, a photograph of the monitoring site taken during the station visit may be stored in STORET.)
S	Laboratory test.
T	Value reported is less than the criteria of detection. (Result is stored as "Not Detected," and the detection limit is stored separately.)
U	Material was analyzed for, but not detected. Value stored is the limit of detection for the process in use. In the case of species, Undetermined sex. (Value is stored as "Not detected," and the detection limit is stored separately. Sex is a characteristic, with several permitted values including "Indeterminate.")
V	Indicates the analyte was detected in both the sample and associated method blank. (Results of blanks are reported as QC sampling activities, and linked to all samples to which they apply. This is covered by a valid lab remark, "FBK.")
W	Value observed is less than the lowest value reportable under remark "T." (Result is stored as "Not detected," and the detection limit is stored separately.)
X	Value is quasi vertically-integrated sample. (Sampling activity is labeled as "Integrated Vertical Profile." Results are stored normally.)
Y	Laboratory analysis from unpreserved sample. Data may not be accurate. (This is covered by a valid lab remark, "ISP." Sample preservation, transport, and storage techniques are stored as descriptions of the activity.)
Z	Too many colonies were present to count (TNTC), the numeric value represents the filtration volume. (No such capability exists in modern STORET. What this meant in the legacy system is unclear.)
$	Calculated by retrieval software. Numerical value was neither measured nor reported to the database, but was calculated from other data available during generation of the retrieval report. (Values can be labeled as "Calculated" when entered. Retrieval software does not currently calculate values.)

B. USGS Remark Codes

These are definitions for the USGS Remark Codes, found in the "Remark" field if the data were obtained from the USGS database:

Printed Output	Remark
E	Value is estimated.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.

Printed Output	Remark
S	Water quality--Most probable value. Precipitation--Snowfall-affected precipitation.
M	Presence of material verified but not quantified.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count equal to or greater than 15 percent (dominant).
V	Analyte was detected in both the environmental sample and the associated blanks.
&	Biological organism estimated as dominant.
*	Biological organism present in qualitative sample.
P	Biological organism in pupal life stage.
LV	Biological organism in larval life stage.
A	Biology--Biological organism in adult life stage. Water quality--Average value.
N	Presumptive evidence of presence of material.
U	Material specifically analyzed for, but not detected.