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Detection of Polychlorinated Biphenyls in the Rio Grande Basin above Cochiti Dam: Sources & Significance

Anthony D. Edwards

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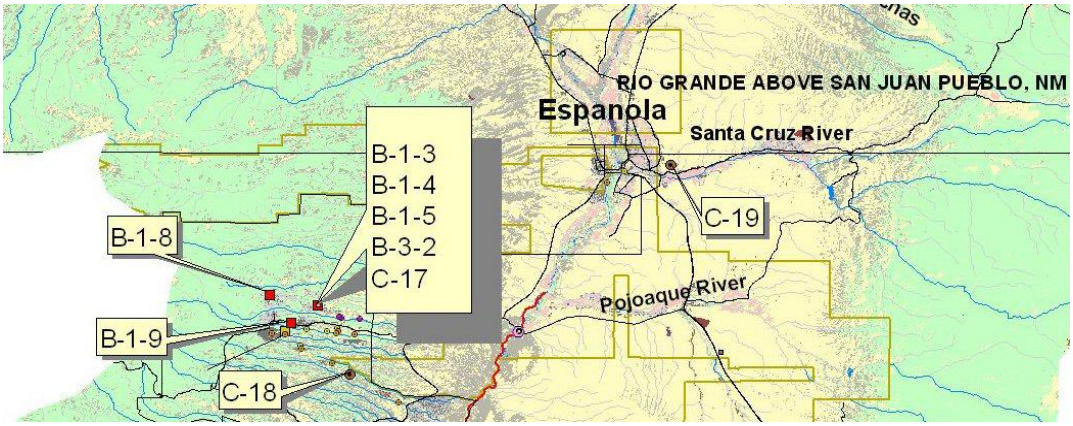

by

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Committee Approval

The Master of Water Resources Professional Project Report of **Anthony Edwards,** entitled ***Detection of Polychlorinated Biphenyls in the Rio Grande Basin above Cochiti Dam: Sources & Significance*** is approved by the committee:

Dr. Constantine Hadjilambrinos, Chair	Date 11/5/07
Dr. Douglas Eib, Co-Chair	Date 11/3/07
Dr. William Fleming	Date 11/3/07
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ABSTRACT

Polychlorinated biphenyls (PCBs) have been detected with increasing frequency in water and fish tissue samples in the Rio Grande Basin above Cochiti Dam (RGBACD), which correlates with the use of improved analytical methods for quantifying PCBs. Levels of PCBs identified in some fish have exceeded levels considered safe for human consumption, resulting in a "Fish Consumption Advisory" for Abiquiu and Cochiti Reservoirs and the Rio Grande from Pojoaque Creek to Frijoles Canyon (Bandelier National Monument). In June of 2007, the New Mexico Environment Department (NMED) listed seven water bodies in the RGBACD as impaired due to elevated concentrations of PCBs in fish tissue and water samples collected from the area. These actions, a review of PCB related research conducted within the RGBACD, and a comparison between Aroclor and congener analytical results initiated research investigating the following issues: 1) whether PCBs are more prevalent in water, sediment, and fish tissue samples now than determined in field studies prior to 1997, 2) where the most likely sources of PCB contamination in the RGBACD are located, 3) whether canyons on LANL property are contributing to PCBs in water and sediment within the Rio Grande and in fish at Cochiti Reservoir, 4) if sediment contamination poses a potential risk, and 5) the appropriate fish consumption limits for fish caught in Cochiti and Abiquiu Reservoirs. This paper describes a study that generated information related to the occurrence, distribution, and potential sources of PCBs in the RGBACD. Results from samples collected upstream and downstream of Los Alamos National Laboratory contradict previous research concluding it was not a major source of PCBs in fish tissue at Cochiti Reservoir. Concentrations in carp, catfish, rainbow trout, and walleye collected in 2006 by the NMED Surface Water Quality Bureau fall within the recommended monthly EPA fish consumption limit category. Preliminary recommendations to better characterize PCBs in the RGBACD are offered as a result of the study.

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Most important, I want to thank my family for their continual support, especially my wife Jane and son Paton whose selfless sacrifices made it possible for me to complete this project, which we hope results in an improved environment for New Mexico.

Finally, I would like to dedicate this project to James Quinn whose actions exemplified the change he wished to see in our environment.

ACRONYMS

BSAF: Biota-sediment accumulation factor
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Cs: Contaminant screening
CWA: Clean Water Act
DOE-OB: Department of Energy Oversight Bureau
EPA: U. S. Environmental Protection Agency
ERNS: Emergency Response Notification System
GC/ECD: Gas chromatography / electron capture detector
GC/MS: Gas chromatography / mass spectrometer
HWB: Hazardous Waste Bureau
ICIS: Integrated Compliance Information System
LANL: Los Alamos National Laboratory
NPDES: National Pollutant Discharge Elimination System
NAICS: North American Industrial Classification System
NSI: National Sediment Inventory
NMAC: New Mexico Annotated Code
NMED: New Mexico Environment Department
PADS: PCB Activities Database
PCB: polychlorinated biphenyls
PNM: Public Service Company of New Mexico
PPB: Parts per billion
PPM: Parts per million
PPT: Parts per trillion
RGBACD: Rio Grande Basin above Cochiti Dam
RTK: Right to Know
SIC: Standard Industrial Code
SWMU: Solid Waste Management Unit
STORET: Storage and Retrieval System
SWQB: Surface Water Quality Bureau
TBP: Theoretical bioaccumulation potential
TEF: Tetrachlorodibenzodioxin equivalency factor
TEQ: Toxicity Equivalency Quotient
TMDL: Total maximum daily load
TOC: Total organic carbon
TRI: Toxic Release Inventory
TSCA: Toxic Substance Control Act
USACE: U. S. Army Corps of Engineers
USFWS: U. S. Fish and Wildlife Service
USGS: U. S. Geological Survey
WQA: Water Quality Act (New Mexico)

DEFINITIONS

Acute toxicity: Immediate or short-term response of an organism to a chemical substance. The term refers to generalized toxic response with lethality usually being the observed endpoint.

Aroclor: A common trade name for mixtures of PCBs that includes different mixtures identified numerically (e.g. 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268, 4465, 5442, 5460, and 2555). Except for Aroclor 1016, which contains 41% chlorine by weight, the last two digits for each mixture generally represents the percentage chlorine by weight. Aroclors have been widely used as coolants and lubricants in transformers, insulators, and other electrical equipment because of their highly stable properties. Because of their stability in the environment, toxicity, and propensity to biomagnify up the food chain, Aroclor mixtures can cause severe impacts to human and ecological systems.

Apparent Effects Thresholds (AETs): Sediment chemistry screening values based on a biological effects correlation approach. The AET is the highest concentration at which statistically significant differences in observed adverse biological effects from reference conditions do not occur, provided that the concentration also is associated with observance of a statistically significant difference in adverse biological effects. These results are based on empirical data from Puget Sound. EPA defined the AET-low as the lowest AET among applicable biological indicators, and the AET-high as the highest AET among applicable biological indicators.

Assessment Unit: A waterbody whose attainment status is reported in the *Integrated Report.* An AU must be named and located based on the National Hydrography Dataset (NHD).

Attainable: Achievable by the imposition of effluent limits required under sections 301(b) and 306 of the Clean Water Act and implementation of cost-effective and reasonable best management practices for nonpoint source control.

Bioaccumulation: The net accumulation of a contaminant by an organism as a result of uptake from all routes of exposure (i.e., water, sediment, food, or air).

Bioaccumulation Factor: The ratio of the steady-state toxicant concentration in an organism, generally given on a wet weight basis, accumulated through multiple routes to the toxicant concentration in source compartment. For sediment contamination, sediment concentration on a dry weight basis is often used for the source compartment.

Biodegradation: The process by which organic substances are broken down by living organisms.

Biological Effects Correlation Approach: Method for comparing the incidence of adverse biological effects to the dry-weight sediment concentration of a specific chemical at a particular site based on evaluated field and laboratory data. Exceedence of the identified level of concern concentration is associated with a likelihood of adverse organism response, but does not establish that a particular chemical is responsible.

Biomagnification: Tendency of PCBs to accumulate to higher concentrations at higher levels in the food web through dietary accumulation.

Biota: Collection of organisms of a geographic region.

Biota-Sediment Accumulation Factor: Ratio of the steady state organism toxicant concentration normalized to organism lipid content divided by the sediment toxicant concentration normalized to the amount of organic carbon.

Chronic toxicity: Response of an organism to repeated, long-term exposure to a chemical substance. Typical observed endpoints include growth and reproduction.

Coelute/Coelution: Compounds with equal column retention times and/or molecular weights, making the identification and quantification of the individual compounds impossible.

Congener: A specifically defined chemical compound in the PCB category is referred to as a "congener" and is identified by the total number of chlorine substitutes and the position of each chlorine with a total of 209 separate combinations possible.

Contaminated sediment: Sediment to which chemical substances have adsorbed and pose a known or suspected threat to aquatic life, wildlife, or human health.

Dechlorination: Result of physical or chemical processes reducing the chlorine content of a chemical.

Designated use: A use specified in New Mexico Annotated Code (NMAC) 20.6.4.101 through 20.6.4.899.

Differential Volatilization: Independent characteristics exhibited by molecules within multi-molecular compounds relating to each constituents conversion from a solid or liquid to a gas or vapor from the application of heat, by reducing pressure, by chemical reaction or by a combination of these processes.

Effects range-median (ERM) and effects range-low (ERL) values: Sediment quality guidelines based on a biological effects empirical approach. Represent chemical concentration ranges that are rarely (i.e., below the ERL), sometimes (i.e., between ERL and ERM), and usually (i.e., above the ERM) associated with toxicity for marine and estuarine sediments. Ranges are defined by the tenth percentile and fiftieth percentile of the distribution of contaminant concentrations associated with adverse biological effects.

Ephemeral stream: A stream that flows as a response to precipitation, storm runoff, or snowmelt, where its bed is above the water table of the adjacent region.

Existing use: A use actually attained in surface waters of the state on or after November 28, 1975.

Food Web Transfer: Movement of chemicals in the tissue of prey to the tissue of the predator, repeated one or more times in the food web, where the predator of the first transfer is the prey in the next step (NRC, 2001).

GC/ECD (Gas Chromatography / Electron Capture Detector): Instrument able to distinguish Aroclor mixtures but not individual congeners. An instrument used in the analytical measurement of organic compounds. It is very powerful in analyzing chlorinated compounds, but weak in quantifying specific congeners. The electrons emitted from ECD ionize the carrier gas eluted from GC, and the ionized gas subsequently reduces the current and is expressed as a response curve.

GC/MS (Gas Chromatograph / Mass Spectrometer): An instrument used in identifying PCB congeners, consisting of a gas chromatograph coupled with a mass spectrometer to generate a 3-D dataset that is not available with traditional GC detectors . The gas chromatography separates samples into fractions, and the mass spectrometer produces characteristic spectra. GC/MS operates under scan mode or selective ion monitoring mode (SIM). The scan mode produces the maximum qualitative information of the mass data, while SIM samples at a predetermined mass value to maximize quantitative information.

Intermittent stream: A reoccurring waterbody where water is available only certain times of the year, such as when it receives flow from springs, melting snow, or precipitation.

Homologue: Subcategories of PCB congeners with equal numbers of chlorine atoms. For example, the "Tetrachlorobiphenyls" (or "Tetra-PCBs" or "Tetra-CBs" or just "Tetras") are all PCB congeners with exactly 4 chlorine atoms, regardless of position.

Hydrologic unit: Area corresponding to a watershed delineated by the U.S. Geological Survey distinguished by the units 8-digit hydrologic unit code (HUC).

Method Detection Limit: Minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero, and is determined from analysis of a sample in a given matrix containing the analyte.

National Sediment Inventory (NSI): A national compilation of sediment quality data and related biological data. Results of the evaluation of data from the NSI serve as the basis for the report to Congress on the incidence and severity of sediment contamination across the country (i.e., the National Sediment Quality Survey).

Nonpoint source pollution: Pollution from different sources without a single point of origin or pollution not introduced into a receiving stream from a specific outlet. Such pollutants are generally carried off the land by storm water runoff. Sources of nonpoint source pollution include atmospheric deposition, agriculture, silviculture, urban runoff, mining, construction, dams and channels, inappropriate land disposal of waste, and saltwater intrusion.

Point source pollution: Pollution contributed by any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

Reach: A stream segment between the consecutive confluences of a stream. Most river reaches represent simple streams and rivers, while some river reaches represent the shoreline of wide rivers, lakes, and coastlines.

Sediment quality advisory levels (SQALs): Equilibrium partitioning-based sediment quality guidelines derived for use in evaluating sediment chemistry data in the National Sediment Inventory. Derived for 35 nonionic organic compounds using the same approach used to develop sediment quality criteria; however, SQALs may be based on a limited set of aquatic toxicity data.

Sediment quality criteria (SQCs): Draft sediment quality guidelines using the equilibrium partitioning-based approach published by the U.S. EPA for the protection of aquatic life. Draft SQCs were developed by EPA for five nonionic organic chemicals: acenaphthalene, dieldrin, endrin, fluoranthene, and phenanthrene. This term has been dropped by the U.S. EPA in favor of "equilibrium partitioning sediment guidelines" (ESGs).

Semipermeable Membrane Device (SPMD): Device used to identify chemicals in a waterbody, which include a man-made membrane that mimics parts of aquatic life where bioconcentration of chemicals tend to occur. The instrument is commonly referred to as a "fatbag."

Sorption: Result of gases or liquids physically adhering to the surface of another molecule or incorporation of molecules from one state into a different state.

Theoretical bioaccumulation potential (TBP): An estimate of the equilibrium concentration of a contaminant in tissues if the sediment in question were the only source of contamination to the organism. TBP is estimated from the organic carbon content of the sediment, the lipid content of the organism, and the relative affinities of the chemical for sediment organic carbon and animal lipid content.

Total organic carbon (TOC): A measure of the organic carbon content of sediment expressed as a percent. TOC is used to normalize the dry-weight sediment concentration of a chemical to the organic carbon content of the sediment.

Total PCBs: Sum of all homologues, all isomer, all congener or all Aroclor analyses values.

Toxicity Equivalency Factors (TEF): Scaling factors that estimates the toxicity of dioxin like PCBs to that of dioxin (2,3,7,8-tetrachlorodibenzodioxin).

U.S. Environmental Protection Agency (EPA) risk levels: Levels of contaminant concentrations in an exposure medium that pose a potential carcinogenic risk (e.g., 10-5, or a 1 in 100,000 extra chance of cancer over a lifetime) and/or noncancerous hazard (i.e., exceeds a reference dose). Used in this document to estimate human health risk associated with the consumption of chemically contaminated fish tissue.

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1.0 Introduction

Polychlorinated biphenyls (PCBs) constitute a group of complex environmentally persistent organic chemical mixtures that are toxic to both humans and animals [ATSDR, 2000]. These contaminants consist of a pair of benzene rings attached by a single carbon-carbon bond, with the remaining positions on either ring substituted with one to five chlorine atoms (Figure 1-1 A). The number and position of chlorine atoms determine each PCB form, commonly referred to as a congener, where the toxicity of each can vary (See Figure 1-1 B). There are 209 different PCB congeners referenced as PCB 1 through PCB

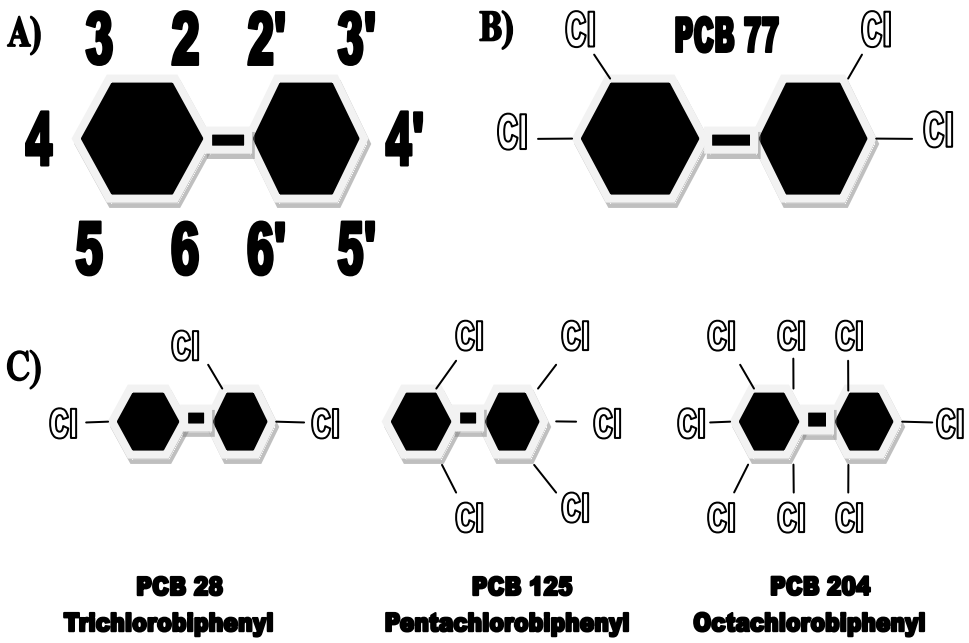


Figure 1-1 A) Biphenyl ring chlorine positions, B) (PCB 77) one of twelve dioxin-like congeners recognized as having a higher toxicity than most of the other PCB forms, C) Examples of a tri-, penta-, and octachlorobiphenyl.

209 relating to chorine position(s), or grouped based on chlorine content commonly referred to as homologues. Figure 1-1 C includes three PCBs congeners along with the

homologue family each is associated. The numerical identification of PCBs, PCB 1,…,PCB 209, is referred to as the BZ No. [Zell and Ballschmiter, 1980].

Historically, PCBs were used in dielectric fluids, flame-retardants, heat-transfer fluids, hydraulic fluids, ink carriers, organic diluents, plasticizers, sealers, and solvent extenders. PCBs were manufactured from 1929 until 1977 as mixtures designed for specific industrial applications and marketed under the trade name Aroclor, but commercially sold under many different names. Generally Aroclors, except for Aroclor 1016 which contains 41% chlorine by weight, have a four digit extension where the last two digits indicate the percentage chlorine content [USDHHS, 2000]. For example, Aroclor 1232 contains 32% chlorine by weight. Due to research indicating PCBs were toxic and persistent in the environment, the U.S. Congress enacted Section 6(e) of the Toxic Substances Control Act (TSCA) in 1976 charging the Environmental Protection Agency (EPA) with regulating the manufacturing, processing, and distribution of PCBs [TSCA § 6(e); USDHHS, 2000]. As a response to the directive, the first effluent standards for PCBs were promulgated by the agency in 1979.

The release of PCBs to the environment can occur as a result of a variety of industrial and natural processes. Industrial processes releasing PCBs into the atmosphere can include the burning of wastes in incinerators, accidental spills, or leaks from electrical transformers where evaporation of the contaminant can occur. Weather events such as wind and rainstorms can transport PCBs bound in soil and sediment remaining from accidental spills or leaked from eroded landfills into waterbodies.

PCB congeners can degrade in the environment under both aerobic and anaerobic conditions, where degradation rates depend on factors such as the congener concentration, degree of chlorination, the presence or absence of certain types of microorganisms, nutrient concentrations, and temperature [NRC, 2001; USDHHS, 2000]. PCB biodegradation in surface water primarily affects less chlorinated congeners through an aerobic process that breaks the biphenyl bond [NRC, 2001]. Anaerobic conditions can promote reductive de-chlorination in some more highly chlorinated congeners resulting in less-chlorinated forms. While degradation resulting in complete de-chlorination is desirable, some degradation intermediates exhibit increased toxicity.

PCBs can be transported through the atmosphere over long distances, but it is the tendency of most PCB congeners to strongly bind to sediment, making point source and non-point source releases into surface waters a critical issue [USDHHS, 2000]. Less chlorinated PCB congeners are generally more volatile and water soluble than the highly chlorinated congeners, which have an increased affinity for sediment and soil [NRC, 2001]. PCBs are lipid-soluble, resulting in bioaccumulation and biomagnification during food web transfers. Higher chlorinated congeners tend to have higher biomagnifications factors than lower chlorinated congeners. This difference is due to biota having different rates for metabolizing and eliminating congeners depending on congener form and the organism [Van den Berg, M. et al., 1998; Cogliano, 1998]. PCBs bioaccumulate in fish through intake of contaminated organisms, sediment, or water, changing into forms that may be more toxic than the initial commercial form released [LANL, 2006]. The

increased toxicity creates a potential health risk for humans who consume contaminated fish.

Sampling for PCBs has been conducted periodically by both research and regulatory agencies in New Mexico since 1979. The identification and quantification of specific congeners, homologues, mixtures, and total PCBs is achieved using a variety of analytical methods. The methods used for quantifying total PCBs in New Mexico have been by Aroclor (EPA Method 8082) or more recently complete congener analysis (EPA Method 1668A). The method detection limits (MDLs) for Aroclors using a Gas Chromatography/Electron Capture Detector (GC/ECD) vary in the range of 0.054 to 0.9 mg/L or parts per million (ppm) in water and 57 to 70 ng/g or parts per billion (ppb) in sediment and soils. The MDLs for congeners using a Gas Chromatograph/Mass Spectrometer (GC/MS) range from 5 to 25 ng/L or parts per trillion (ppt) in water and 160 to 800 pg/g or ppt in sediment and soils [NRC, 2001].

The most important issue relating to MDLs is that Aroclor method MDLs for PCBs in water are substantially higher than congener method MDLs, and both are higher than the State's Water Quality Standards (WQS) [NMED, 2006b]. Therefore, a waterbody may be out of compliance but remain undetected if concentrations are below the MDLs. While it may appear counterproductive to establish WQS that are unable to be measured by current analytical methods, the purpose for establishing standards is to "protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act."

[20.6.4.6 (A-B) NMAC].Therefore, the consideration of the MDLs for contaminant analysis is not required when the State establishes or revises the WQS.

In 2000, the NMED began using congener analysis to quantify total PCBs, where previously analyses were limited to Aroclor methods. The analytical techniques used for quantifying total PCBs in sediments, water, and biota by Aroclor and congener specific methods, including their differences and limitations, are well documented in Appendix F of the Risk Management Strategy for PCB-Contaminated Sediment [NRC, 2001]. The fundamental difference between these methods when quantifying total PCBs is that the congener method measures all PCB forms in a sample, whereas Aroclor analysis is an estimate derived from measuring congeners associated with original commercial mixtures. For example, EPA Method 8082 measures 19 select congeners associated with Aroclor commercial mixtures, and those values are then used in quantifying total PCBs through extrapolation [USEPA, 2007a]. The NMED Hazardous Waste Bureau (HWB) issued a position paper related to this issue in 2000 discussing the differences between the Aroclor and congener analytical methods. The paper concludes with a recommendation that congener specific analyses be used for evaluating risks to humans and the environment [NMED, 2000a]. The two primary issues identified by the HWB were 1) PCB congeners can be substantially different from the congeners present in Aroclor mixtures, and 2) weathered and altered mixtures can result in the absence of Aroclor congeners when in fact high concentrations of non-Aroclor forms are present.

In January of 2006, the New Mexico Environment Department, Department of Health, Department of Game and Fish, and State Parks issued a "Fish Consumption Advisory" for Abiquiu and Cochiti Reservoirs and the Rio Grande from Frijoles Canyon (Bandelier National Monument) to Pojoaque Creek [NMED, 2006a]. The advisory was issued in response to high concentrations of PCBs found in fish exceeding levels considered safe for human consumption by the EPA [USEPA, 1980; USEPA, 1990]. In addition, New Mexico's 2006-2008 Integrated Clean Water Act §303(d)/§305(b) Report lists several waterbodies in the Rio Grande Basin above Cochiti Dam (RGBACD) as impaired due to elevated PCB concentrations measured in surface water and fish tissue samples [NMED, 2007c]. Consumption of PCB-contaminated fish is the primary pathway for human exposure to the contaminant, and a myriad of health effects are associated with long-term exposure to PCBs [USDHHS, 2000].

The State of New Mexico has established WQS for total PCBs in surface waters for human health, wildlife habitat, and aquatic life based on numeric criteria set forth in the *New Mexico Standards for Interstate and Intrastate Surface Water* of the New Mexico Annotated Code (NMAC) [20.6.4 NMAC]. Waterbodies exceeding the numeric criteria for PCBs, associated with their designated uses, are listed as impaired on the CWA §303(d)/305(b) Integrated List [NMED, 2007c]. Designated uses include fish culture, municipal and industrial water supply, domestic water supply, irrigation and irrigation storage, recreation (including cultural, religious or ceremonial purposes), livestock watering, wildlife habitat and aquatic life. Specific designated uses for waterbodies are annotated in 20.6.4.101 through 20.6.4.899 NMAC for surface waters of the State. To

protect these uses and fulfill the requirements set forth in the United States Clean Water Act (CWA) and the New Mexico Water Quality Act (WQA), Section 303(d) of the Clean CWA requires states to develop Total Maximum Daily Loads (TMDLs) for waters identified as impaired [CWA § 303(d); NMED, 2007d]. Section 101 (a) of the CWA establishes a national goal to attain "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable." [CWA § 101(a)]. The EPA has interpreted this goal as meaning that regulations protecting aquatic communities must also provide for the protection of human health related to consumption of fish taken from those waterbodies [USEPA, 2000a].

Due to differences in the detection limits of the analytical methods used to quantify total PCBs, comparing current results with historical PCB analyses in the RGBACD is difficult. Congener method results within the RGBACD indicate total PCBs were detected in 98% of samples (n=234) (See Appendix A). A review of Aroclor results from the study area reveals detectable PCBs in 21% of the samples (n=183) analyzed. The difference in the ratio of PCBs detected between these two methods indicates that PCBs may have historically been present in the area when records indicate otherwise. Therefore, when reviewing and analyzing data it is necessary to understand that the majority of data signals where total PCBs are not detected are from Aroclor analyses.

Recent congener results from the study area indicate widespread presence of PCBs in water and sediment data from the New Mexico/Colorado border suggesting that discharges in Colorado are also a potential source of PCBs in the Rio Grande within New

Mexico. The New Mexico surface water quality criterion for human health has been exceeded in 85% of water samples (n=122), including storm water, collected from the RGBACD and analyzed with the congener method, and the aquatic life and wildlife criterion is exceeded in 68% of these samples (Appendix A).

The State of New Mexico SWQB is currently conducting a water quality survey within the project area identified in the *Sampling and Analysis Plan for the Pajarito Plateau Total Maximum Daily Load Project* [NMED, 2007e]. The study area for this project extends beyond the area of interest considered in the SWQB Pajarito Platueau survey. A comprehensive account of PCB data and contributing sources in the watershed is not currently available.

The intent of this project was to fulfill the following objectives: The first was to identify the occurrence, distribution, and possible sources of PCBs in the RGBACD. The second objective was to determine if storm water runoff from canyons within Los Alamos National Laboratory's boundary is contributing PCBs to the Rio Grande and Cochiti Reservoir. Additional objectives included determining whether any bioaccumulation has resulted in exceedence of recommended human health criteria related to contaminated sediment samples and the recommended fish consumption limits for fish taken within the RGBACD. The methods used and results provided in fulfilling these objectives make available to the public and government agencies information concerning the presence of PCBs in the RGBACD, which can assist in future planning, including the identification of sampling locations for further PCB source identification and during the ensuing Total

Maximum Daily Load (TMDL) development process. The results obtained in fulfilling the objectives provide the basis for the concluding recommendations concerning the mitigation of PCBs present in "Surface water(s) of the state" and PCB-laden fish in the RGBACD [NMED, 2006b].

2.0 Study Area Description

The RGBACD consists of the waters within the Hydrologic Units in the Rio Grande Basin located above Cochiti Dam including tributaries and ephemeral and intermittent streams. The area begins at the Rio Grande headwaters in San Juan County, Colorado, extending to Cochiti Dam in Sandoval County, New Mexico, including Mineral, Rio Grande, Conejos, Alamosa, Costilla, and Saguache Counties in Colorado and Rio Arriba, Taos, Santa Fe, and Los Alamos Counties in New Mexico. The project study area is shown in Figure 2-1. Figure 2-2 is a map of Cochiti Reservoir including tributaries.

The Santa Fe River is separated from the primary Cochiti Reservoir pool, where the river usually infiltrates into the ground, reappearing as springs below the dam in the old Santa Fe riverbed. The Cochiti Reservoir primary pool overflow channel begins at an elevation of approximately 5,341 feet and ascends on the Santa Fe River side of the channel to an elevation of approximately 5,355 feet (see red arrow in Figure 2-2). The United States Army Corps of Engineers has indicated that water now always seeps into the conveyance channel when the Santa Fe River has sufficient flow, but the water level is not measured [USACOE, 2007a]. In addition, the primary reservoir pool elevation records indicate that

the 5,355 foot threshold has been breached nine times [USACOE, 2007a]. The relationship between the two waterbodies makes it possible that the Santa Fe River influences water quality in Cochiti Reservoir and vice versa.

Areas within the golden borders in Figure 2-1 are Tribal Lands and are not within the state's jurisdiction, which includes Cochiti Reservoir. These waters are included due to their importance in assessing the sources contributing PCBs to the watershed and to those living within or who are subsequently affected by the surface water quality of the project area.

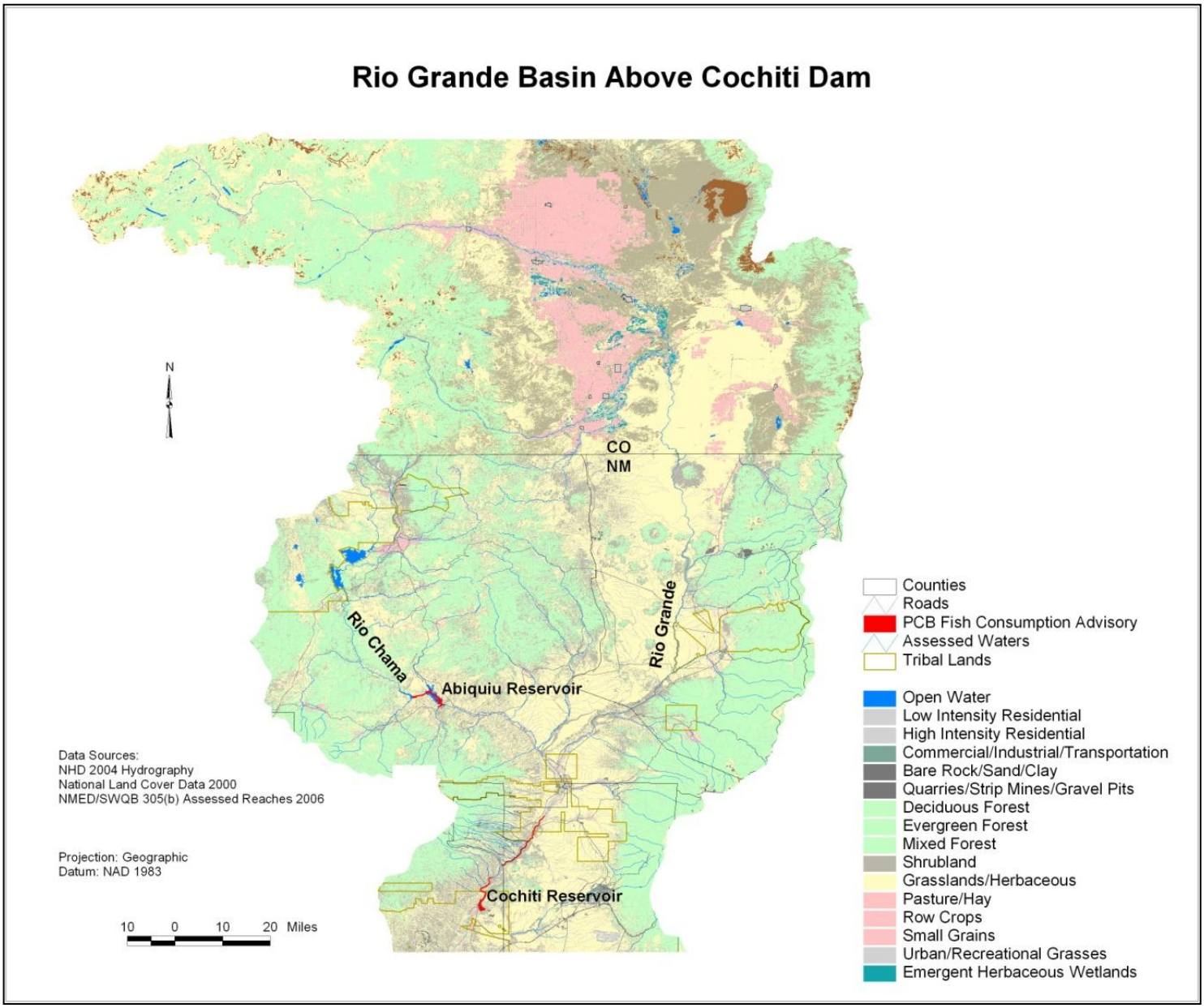


Figure 2-1 Rio Grande Basin above Cochiti Dam (NMED, 2007a)

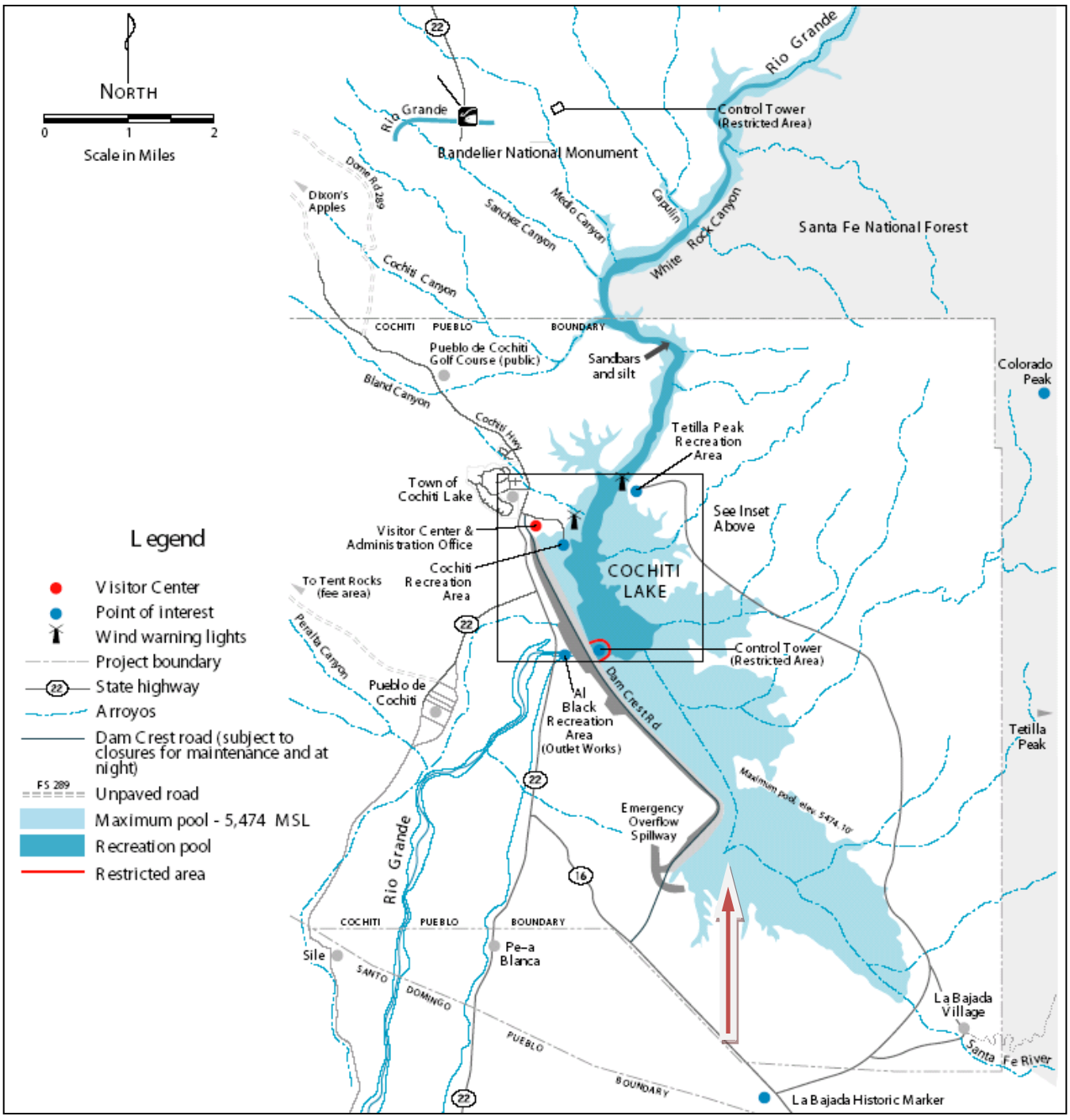


Figure 2-2 Modified United States Army Corps of Engineer Map of Cochiti Dam Primary Pool and Santa Fe River Outfall [USACOE, 2007b]

3.0 PCBs in the RGBACD: Previous Studies, Regulatory Environment, and Available Data

Research on the occurrence of PCBs in the RGBACD has been conducted over the last 30 years by both federal and state agencies. Currently, the State of New Mexico has WQS that include limits for PCBs in surface water [NMED, 2006b]. Waterbodies where total PCBs exceed the specific numeric criteria in more than one sample are listed by the State as "impaired" in accordance with assessment protocols [NMED, 2006b; NMED, 2006c]. The data used for determining impairments and for meeting the project's objectives were obtained from the sampling of biota, sediment, soil, Semipermeable Membrane Devices (SPMDs), and water quality samples collected within the project area**.** In addition, the State's WQS include criteria to protect wildlife habitat, which includes habitat for species listed as endangered [NMED, 2006b]. The review of the previous studies, regulatory environment records, and available data on PCBs in the RGBAD initiated the study on the detection of PCBs in the RGBACD. The structure for this assessment has been developed based on adaptations from the *Ohio River Total Maximum Daily Load for PCBs Ohio River Miles 40.0 to 317.1* and the *Sampling and Analysis Plan Roanoke River Basin PCB TMDL Development* [ORVWSC, 2002; Tetra Tech Inc., 2005].

3.1 Previous Studies

Research on the occurrence of PCBs in the RGBACD has been conducted by the United States Fish and Wildlife Service (USFWS), United State Geological Survey (USGS), and Los Alamos National Laboratory (LANL) [USFWS, 1992; USFWS, 2002; USGS, 1993; Gonzales and Fresquez, 2002; Gonzales and Fresquez, 2006; Gonzales and Montoya,

2005]. Sampling results from the USFWS and the USGS are provided in Tables 3-1, 3-2, and 3-3 [USFWS, 1992; USFWS, 2002; USGS, 1993]. Results of a USFWS investigation of PCBs in sediment and fish samples are summarized in Table 3-3, which were collected from caged-fish and sediment studies on the Pajarito Plateau [USFWS, 2002]. The caged-fish, fathead minnows (*Pimephales promelas*), were placed in the streams in order to evaluate their response to various chemical constituents. In addition, the USFWS identifies Solid Waste Management Unit #3-0056(c) (SWMU #3) as an area where PCB-containing electric transformers were drained, rinsed, and stored [USFWS, 2002].

The most extensive sampling program for PCBs within the RGBACD was initiated by LANL in 1985 and continues to present. Biota sampling conducted in 1995 and 1996 revealed total PCBs of up to 19,000 ppm in adipose tissue of shrews collected in wetlands downstream of the SWMU #3 [DHHS, 2005: NMED, 2007b]. Sampling results from more recent PCB studies conducted at LANL are provided in Table 3-4, Table 3-5, and Table 3-6 [Gonzales and Fresquez, 2003; Gonzales and Fresquez, 2006; Gonzales and Montoya, 2005]. LANL scientists also collected nine soil samples in Colorado and New Mexico to identify background PCB concentrations in the Rio Grande Basin [Gonzales and Fresquez, 2003]. The mean concentration in soil samples was .04537 ng/g dry weight or ppb. No samples from the study contained any of the 12 dioxin-like PCB congeners, congeners exhibiting dioxin-like characteristics and generally having a higher toxicity than most other PCB congeners [Van den Berg et al., 2006]. In addition, NMED and LANL have conducted a collaborative study that is unpublished, but results are available and provided in Appendix A listed as LANL/NMED in the Data Source column.

Table 3-1 Concentrations of PCB's in Biota from the Upper Rio Grande Basin, 1987 [USFWS, 1992]

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

[1] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample
[2] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample, N/A=Not Applicable or Not Available
[3] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.
[4] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.
[5] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.
[6] Units are expressed as a concentration for simplification.

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor	0.3	ppb	Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor	0.16	ppb	Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Rainbow Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
								Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Rainbow Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

Table 3-2 Whole-body fish samples from sites in the Rio Grande Valley [USGS, 1993]

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	Sample Collection Dates	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
USGS, 1993	Rio Grande near Creede, CO	09/1992 to 03/1993	37.822778	-106.908056	Biota	White Sucker	Aroclor			
USGS, 1993	Saguache Creek near Saguache, CO	09/1992 to 03/1993	38.163333	-106.290000	Biota	White Sucker	Aroclor			
USGS, 1993	Rio Grande near Alamosa Refuge, CO	09/1992 to 03/1993	37.390000	-105.783333	Biota	Common Carp	Aroclor			
USGS, 1993	La Jara Creek at Alamosa County Line, CO	09/1992 to 03/1993	37.356667	-105.851667	Biota	White Sucker	Aroclor			
USGS, 1993	Rio Grande below Taos Junction Bridge near Taos	09/1992 to 03/1993	36.320000	-105.753889	Biota	White Sucker	Aroclor			
USGS, 1993	Rito de los Frijoles below Frijoles Falls, NM	09/1992 to 03/1993	35.753056	-106.252778	Biota	Rainbow Trout	Aroclor			
USGS, 1993	Rio Pueblo de Taos below Los Cordovas, N.M.	11/12/1992	36.377500	-105.668056	Biota	White Sucker	Aroclor	57	ppb	

[1] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample
[2] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample, N/A=Not Applicable or Not Available
[3] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.
[4] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.
[5] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.
[6] Units are expressed as a concentration for simplification.

Table 3-3 Fish and Sediment Samples from Intermittent Streams in Los Alamos County [USFWS, 2002]

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	LATITUDE[1]	LONGITUDE[2]	ENVIRONMENTAL MEDIUM[3]	DETAIL[4]	ANALYSIS ([5])([6])	TOTAL PCBS[7]	UNITS[8]	NOTES
USFWS, 2002	Pajarito, upper site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener			Sample PUS1-P (A-C) Sample [Average]
USFWS, 2002	Pajarito, lower site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener	0.003	ppb	Sample PLS1-P
USFWS, 2002	Sandia; upper site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener	0.154	ppb	Sample SUSM1-P
USFWS, 2002	Sandia; lower site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener	0.1336	ppb	Sample SLSM1-P
USFWS, 2002	Los Alamos, upper site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener			Sample LUSM1-P
USFWS, 2002	Los Alamos, lower site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener			Sample LLSM1-P

[1] N/A=Not Applicable or Not Available

[2] N/A=Not Applicable or Not Available

[3] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample

[4] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample, N/A=Not Applicable or Not Available

[5] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.

[6] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.

[7] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.

[8] Units are expressed as a concentration for simplification.

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	LATITUDE[1]	LONGITUDE[2]	ENVIRONMENTAL MEDIUM[3]	DETAIL[4]	ANALYSIS ([5])([6])	TOTAL PCBS[7]	UNITS[8]	NOTES
USFWS, 2002	Valle, upper site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener	0.0395	ppb	Sample VUS1-P GCR(1-3) [Average]
USFWS, 2002	Valle, lower site	7/30/1997-10/1/1997	NA	NA	SED	N/A	Congener	0.0175	ppb	Sample VLS1-P
USFWS, 2002	Pajarito	9/30/1997	NA	NA	Biota	Fathead Minnows	Congener	0.2241	ppb	Caged Fish Sample F04
USFWS, 2002	Sandia	9/30/1997	NA	NA	Biota	Fathead Minnow	Congener	1.5194	ppb	Caged Fish Sample F03
USFWS, 2002	Los Alamos Canyon	9/30/1997	NA	NA	Biota	Fathead Minnow	Congener	0.3118	ppb	Caged Fish Sample F02
USFWS, 2002	Canyon de Valle	9/30/1997	NA	NA	Biota	Fathead Minnows	Congener	0.3573	ppb	Caged Fish Sample F05 GCR (1-3) [Average]

Table 3-4 Polychlorinated Biphenyls (PCBs) in Catfish and Carp Collected from the Rio Grande Upstream and Downstream of Los Alamos Laboratory [Gonzales and Fresquez, 2003]

DATA SOURCE[1]	SITE NAME, DESCRIPTION, OR ID[2]	SAMPLE COLLECTION DATES	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[3]	DETAIL[4]	ANALYSIS ([5])([6])	TOTAL PCBS[7]	UNITS[8]	NOTES
LA-14001	Upstream of LANL Sample ID#RGTRTCARP1	5/2/2002	N/A	N/A	Biota	Carp	Congener	20.2	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP2	5/2/2002	N/A	N/A	Biota	Carp	Congener	86.6	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP3	5/2/2002	N/A	N/A	Biota	Carp	Congener	13.4	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP4	5/2/2002	N/A	N/A	Biota	Carp	Congener	17.3	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #1	5/7/2002	N/A	N/A	Biota	Catfish	Congener	45.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #12	5/7/2002	N/A	N/A	Biota	Catfish	Congener	6.79	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #18	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.85	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #2	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.9	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #3	5/7/2002	N/A	N/A	Biota	Catfish	Congener	11.4	ppb	

[1] LA-14001 [Gonzales and Fresquez, 2003]

[2] Upstream of LANL is approximately 1 km up river from the Otowi Bridge to where Pojoaque Creek meets the Rio Grande; Downstream of LANL consists of the area between the confluence of Capulin Canyon and the inlet to Cochiti Reservoir

[3] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample

[4] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample

[5] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.

[6] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.

[7] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.

[8] Units are expressed as a concentration for simplification.

DATA SOURCE[1]	SITE NAME, DESCRIPTION, OR ID[2]	SAMPLE COLLECTION DATES	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[3]	DETAIL[4]	ANALYSIS ([5])([6])	TOTAL PCBS[7]	UNITS[8]	NOTES
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #4	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.67	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #5	5/7/2002	N/A	N/A	Biota	Catfish	Congener	8.5	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #6	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.86	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #7	5/7/2002	N/A	N/A	Biota	Catfish	Congener	20.6	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #8	5/7/2002	N/A	N/A	Biota	Catfish	Congener	18.2	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 1C	5/7/2002	N/A	N/A	Biota	Carp	Congener	34.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 2C	5/7/2002	N/A	N/A	Biota	Carp	Congener	31.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 3C	5/7/2002	N/A	N/A	Biota	Carp	Congener	10.5	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 4C	5/7/2002	N/A	N/A	Biota	Carp	Congener	243	ppb	
LA-14001	Upstream of LANL Sample ID#10	5/9/2002	N/A	N/A	Biota	Catfish	Congener	30.4	ppb	
LA-14001	Upstream of LANL Sample ID#18	5/9/2002	N/A	N/A	Biota	Catfish	Congener	13.6	ppb	
LA-14001	Upstream of LANL Sample ID#19	5/9/2002	N/A	N/A	Biota	Catfish	Congener	37.5	ppb	
LA-14001	Upstream of LANL Sample ID#21	5/9/2002	N/A	N/A	Biota	Catfish	Congener	27.9	ppb	
LA-14001	Upstream of LANL Sample ID#8	5/9/2002	N/A	N/A	Biota	Catfish	Congener	30.4	ppb	

Table 3-5 Polychlorinated Biphenyls (PCBs) in the Rio Grande Sampled Using Semipermeable Membrane Devices ("Fat Bags") [Gonzales and Montoya, 2005]

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[1]	DETAIL[2]	ANALYSIS ([3])([4])	TOTAL PCBS[5]	UNITS[6]	NOTES
LA-14200	Ancho Canyon	8/1/2002	N/A	N/A	SPMD's	N/A	Congener	3.98	ppb	
LA-14200	Ancho Canyon	8/1/2002	N/A	N/A	SPMD's	N/A	Congener	3.13	ppb	
LA-14200	Otowi Bridge	8/1/2002	35.874726	-106.141670	SPMD's	N/A	Congener	3.12	ppb	
LA-14200	Otowi Bridge	8/1/2002	35.874726	-106.141670	SPMD's	N/A	Congener	2.82	ppb	
LA-14200	Ancho Canyon	7/1/2003	NA	NA	SPMD's	N/A	Congener	3.15	ppb	
LA-14200	Below Albuquerque	7/1/2003	NA	NA	SPMD's	N/A	Congener	13.92	ppb	
LA-14200	Below Cochiti	7/1/2003	NA	NA	SPMD's	N/A	Congener	16.97	ppb	
LA-14200	Embudo	7/1/2003	NA	NA	SPMD's	N/A	Congener	4.02	ppb	
LA-14200	Embudo	7/1/2003	NA	NA	SPMD's	N/A	Congener	3.45	ppb	
LA-14200	Otowi Bridge	7/1/2003	35.874726	-106.141670	SPMD's	N/A	Congener	3.04	ppb	

[1] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample
[2] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample
[3] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.
[4] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.
[5] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.
[6] Units are expressed as a concentration for simplification.

Table 3-6 Polychlorinated Biphenyls (PCBs) in Predator and Bottom-Feeding Fish from Abiquiu and Cochiti Reservoirs in North Central New Mexico

DATA SOURCE[1]	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[2]	DETAIL[3]	ANALYSIS ([4])([5])	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	White Bass	Congener	3.5	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Walleye	Congener	2.2	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Pike	Congener	2.1	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	White Bass	Congener	1.8	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	White Bass	Congener	1.8	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Pike	Congener	0.9	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Carp	Congener	4.3	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Pike	Congener	0.7	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Walleye	Congener	0.6	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Catfish	Congener	1.5	ppb	

[1] LA-14289 [Gonzales and Fresquesz, 2006]
[2] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample
[3] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample
[4] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.
[5] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.
[6] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.
[7] Units are expressed as a concentration for simplification.

DATA SOURCE[1]	SITE NAME, DESCRIPTION, OR ID	SAMPLE COLLECTION DATES	LATITUDE	LONGITUDE	ENVIRONMENTAL MEDIUM[2]	DETAIL[3]	ANALYSIS ([4])([5])	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Carp	Congener	4.4	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Carp	Congener	3.1	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Catfish	Congener	1.5	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Walleye	Congener	1.4	ppb	
LA-14289 PCB Fish Tissue	Cochiti Reservoir	8/10/2005	35.674171	-106.308337	Biota	Catfish	Congener	10.7	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Carp	Congener	8.3	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Carp	Congener	4.9	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Catfish	Congener	4.2	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Catfish	Congener	3.6	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Carp	Congener	2.3	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Catfish	Congener	2	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Walleye	Congener	0.8	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Walleye	Congener	0.8	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Walleye	Congener	0.6	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.439448	Biota	Smallmouth Bass	Congener	0.5	ppb	

3.2 Regulatory Criteria for PCBs

The State of New Mexico requires that PCB concentrations meet the State's WQS [NMED, 2006b]. The numeric criteria shown in Table 3-7 apply to all non-tribal waters in the RGBACD. The State lists waterbodies as impaired if a fish tissue advisory has been established. Advisories for PCBs have been established when concentrations are equal to or greater than the no consumption levels listed in the EPA recommended fish consumption limit table [NMED, 2006a; USEPA, 2000a].

Table 3-7 State of New Mexico WQS numeric criteria for Total PCBs [NMED, 2006b]

Pollutant	CAS Number	Domestic Water Supply µg/L	Wildlife Habitat µg/L	Aquatic Life Chronic µg/L	Human Health µg/L	Cancer Causing (C) or Persistent (P)
Total PCBs	1336-36-3	0.00064	0.014	0.014	0.00064	C,P

3.3 Impairment Summary and the Total Maximum Daily Load Process

The State of New Mexico lists waterbodies as "impaired" if two or more samples collected from the same location exceed the PCB numeric criteria in the WQS in accordance with assessment protocols [NMED, 2006b; NMED, 2006c]. Waterbodies within the RGBACD exceeding the numeric criteria in Table 3-7 and currently listed as impaired include the six segments listed in Table 3-8.

Table 3-8 Waters in the RGABCD area listed as impaired from PCBs in New Mexico's Integrated 2006-2008 CWA §303(d)/§305(b) Report (NMED, 2007c)

Assessment Basin	Waterbody	Assessment Unit ID:	Size (mi or ac):	Probable Cause of Impairment
Upper Rio Grande	Los Alamos Canyon (within LANL)	NM-9000.A_006	7.37	PCBs in Water Column
Upper Rio Grande	Pueblo Canyon (NM 502 to headwaters)	NM-9000.A_043	9.17	PCBs in Water Column
Upper Rio Grande	Rio Grande (non-pueblo Santa Clara to Embudo Creek)	NM-2111_10	14.8	PCBs in Fish Tissue
Rio Chama	Abiquiu Reservoir	NM-2114_00	1038.35	PCBs in Fish Tissue
Rio Grande-Santa Fe	Rio Grande (Cochiti Reservoir to San Ildefonso bnd)	NM-2111_00	18	PCBs in Fish Tissue
Rio Grande-Santa Fe	Sandia Canyon (Sigma Canyon to NPDES outfall 001)	NM-9000.A_047	2.21	PCBs in Water Column
Rio Grande-Santa Fe	Sandia Canyon (within LANL below Sigma Canyon)	NM-128.A_11	3.43	PCBs in Water Column

Section 303(d)(1) of the Clean Water Act (CWA) requires states that are out of compliance with WQS to establish TMDLs to mitigate impairment from contributing sources. [CWA § 303(d)(1)]. TMDLs are written plans based on data analysis developed to ensure that impaired waters attain and maintain WQS [NMED, 2007d]

3.4 Data Summary

The data used in this project are included in Appendix A and were compiled from biota, sediment, soil, Semipermeable Membrane Devices (SPMDs), and water samples collected within the project area by the USEPA, USFWS, SWQB and DOE-OB, USGS, and LANL.

3.5 Polychlorinated Biphenyls and Endangered Species Concerns

In addition to human health concerns regarding exposure to PCBs from surface water and the consumption of fish, New Mexico's WQS include criteria to protect wildlife habitat. Table 3-9 identifies species listed as Endangered by the United States Fish and Wildlife Service within New Mexico counties located in the RGBACD. While no record is

available for PCBs identified in these listed species from the area, correlations between the ingestion of PCBs and negative effects to aquatic species, birds, and small mammals are well documented [USDHHS, 2000]. Monitoring of these species for PCBs may be required to determine if surface water contamination poses a risk.

Table 3-9 Species in the RGBACD with an Endangered listing status [USFWS, 2007]

Common Name	**Scientific Name**	**Species Group**	**Listing Status** (E=Endangered, EXPN=Experimental Population)
Rio Grande silvery minnow	*Hybognathus amarus*	Fishes	E
southwestern willow flycatcher	*Empidonax traillii extimus*	Birds	E
least tern	*Sterna antillarum*	Birds	E
black-footed ferret	*Mustela nigripes*	Mammals	E, EXPN

4.0 Contributing Source Assessment

A comprehensive investigation into the occurrence and distribution of PCBs and sources contributing to PCB presence in the RGBACD has not previously been conducted. The purpose for collecting total PCBs data from the RGBACD is to provide a record of the occurrence and distribution of PCBs in biota, fish, sediment, soil, and water. In addition to recording the samples collected, actual and potential sources of PCBs in the RGBACD are included. Industrial and government sources were searched using several databases, agencies, studies, and contacts to conduct this research. The methods used for identifying

sources were adapted from the *Ohio River Total Maximum Daily Load for PCBs Ohio River Miles 40.0 to 317.1* [ORVWSC, 2002].

4.1 Data Summary for PCBs and Contributing Source Investigation

Sources used for identifying sampling results are provided in Appendix A. The following databases and agencies were utilized in conducting the contributing source investigation;

- Toxic Release Inventory [USEPA, 2006; RTK, 2006]
- Right To Know Network [RTK, 2006]
- Integrated Compliance Information System [USEPA, 2006; RTK 2006]
- Emergency Response Notification System [USEPA, 2006; RTK 2006]
- Permit Compliance System [NMED, 2006d]
- U.S. EPA's Envirofacts Warehouse database [USEPA, 2006]
- Comprehensive Environmental Response, Compensation, and Liability Information System [USEPA, 2006; RTK 2006]
- PCB Transformer Transfer Database [USEPA, 2006; PADS, 2006]
- USEPA Legacy STORET [USEPA, 2007b]
- Individual federal and state agency personnel and reports

4.2 Methods for Contributing Source Assessment

Data for total PCBs from samples collected within the RGBACD were gathered to identify the occurrence and distribution of PCBs in biota, fish, sediment, soil, and water. Sites where PCB incidents have been reported are listed in Appendix B, Table B-1, and facilities required to prescreen for PCBs in their effluent during the NPDES renewal process or periodically are identified in Appendix B, Table B-2. Table B-3 in Appendix B identifies facilities that are registered in the EPA's PCB Activity Database. Appendix C lists potential sources of PCBs based on industrial operations that are historically associated with use of the substance. This should not be construed as implying that any of the companies or operations listed ever used or stored any form or mixture of PCBs,

Appendix C is provided for informational purposes only for use in source identification sampling planning.

The sites in Appendix B, Table B-1 are specific facilities where PCBs have been detected or reported related to an incident and were identified using New Mexico Environmental Department (NMED) reports, EPA's Emergency Response Notification System (ERNS), or the Integrated Compliance Information System (ICIS). Counties in the study area were queried to generate a list of facilities reporting incidental releases of PCBs and the quantities released as provided in the ERNS. In addition, cases involving non-compliance where PCBs are identified as the violation pollutant in the ICIS using the Right-To-Know Database (RTK) were identified and recorded. Furthermore, NMED records and reports were reviewed to identify facilities where PCB contamination has been documented. Additional databases, including EPA's CERCLIS, the Toxic Release Inventory (TRI), and the RTK Record of Decision, were queried to determine if PCBs were a chemical of concern at any other facilities located in the RGBACD, which yielded no additional sites. Appendix B, Table B-2 includes facilities identified by NMED as being required to prescreen for PCBs in the NPDES Permit renewal process or monitor periodically as a requirement of their NPDES Permit. Appendix B, Table B-3 was developed using the PCB Activity Database (PADS) and identifies registered PCB activities in the RGBACD. Activity or activities associated with the identified businesses are categorized as disposer, generator, and/or transporter.

Appendix C is an inventory of potential PCB sources in the RGBACD identified using both CERCLIS sites and Reference USA. The Reference USA (RefUSA) database contains detailed information on U.S. businesses where information is searchable by

Standard Industrial Classification (SIC) and North American Industrial Classification System (NAICS) codes providing each company's geographic location, associated activity, and the year the business was established. Initially, CERCLIS was queried to identify all activities listed by the New Mexico Source Water Assessment and Protection Program (NMSWAPP) as historically associated with PCB use or disposal [NMED, 2000]. Activities conducted in the RGBACD matching those listed by the NMSWAPP were recorded, and all current businesses associated with electrical power distribution and landfill activities in the RefUSA, using the related SIC and NAICS codes, were added to this list. Next, all business with SIC or NAICS codes established prior to 1978 conducting activities associated with PCB use or disposal were identified and recorded. Finally, EPA's PCB Transformer Transfer Database was queried to identify transformers containing PCBs in the study area. Appendix C consists of the sites identified in these queries with the addition of sites that were identified previously in Appendix B as having recorded an incident. Appendix C provides an inventory of potential PCB sources based on activities identified as being associated with the use of PCBs, and therefore, many of these facilities may not be actual PCB sources.

4.3 Contributing Source Assessment Results and Discussion

Using a Geographic Information System (GIS), a spatial representation of the sampling results and potential sources are provided in Figure 4-1, Figure 4-2, and Figure 4-3, which are associated with the data and information in Appendices A, B, and C. Although effort was made to obtain the most accurate and complete data and source information available, it is likely that gaps exist in the data due to the limitations and incompleteness of the databases searched.

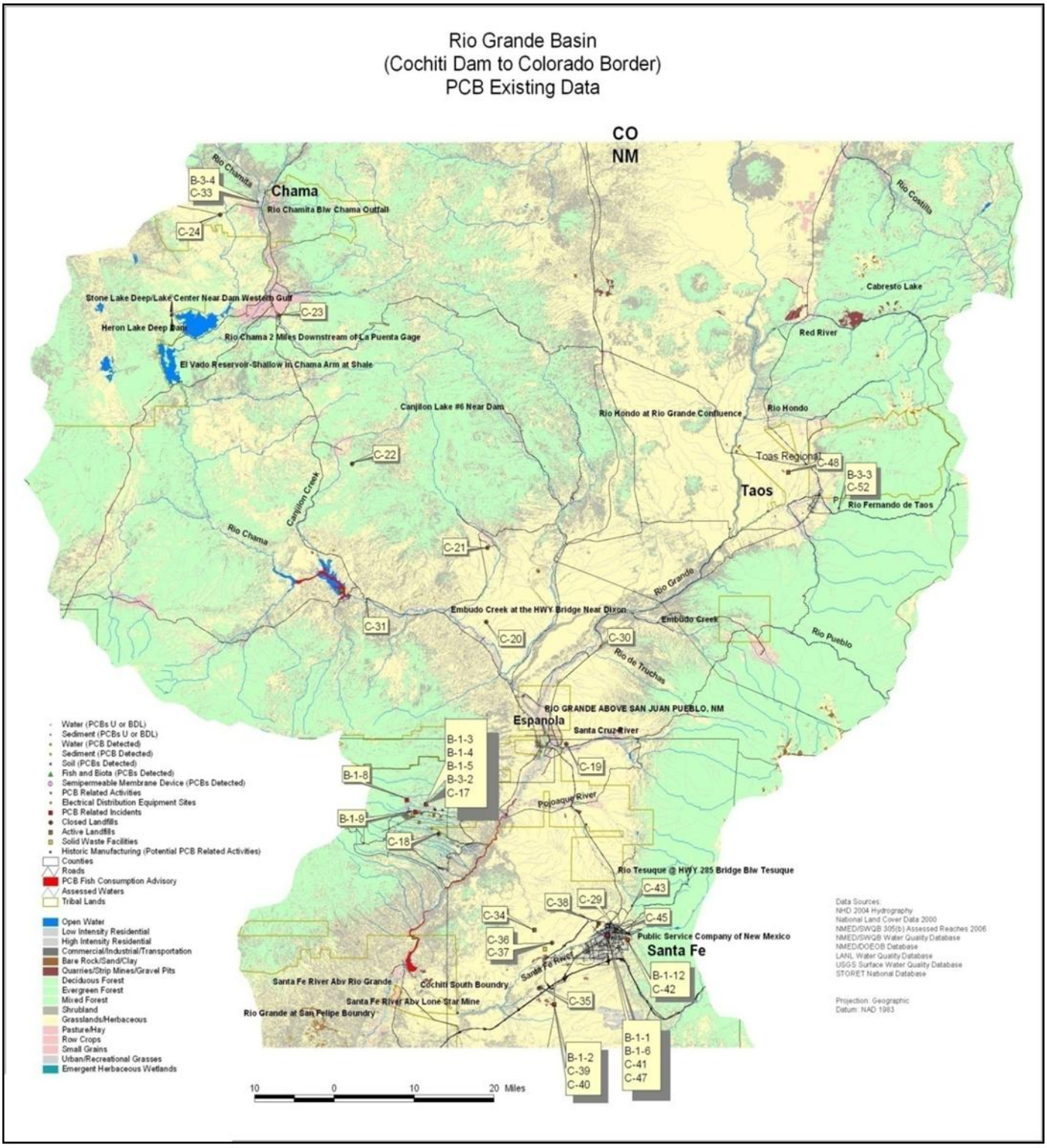


Figure 4-1 Spatial Representation of New Mexico PCB Source Assessment Data [Appendices A, B, and C]

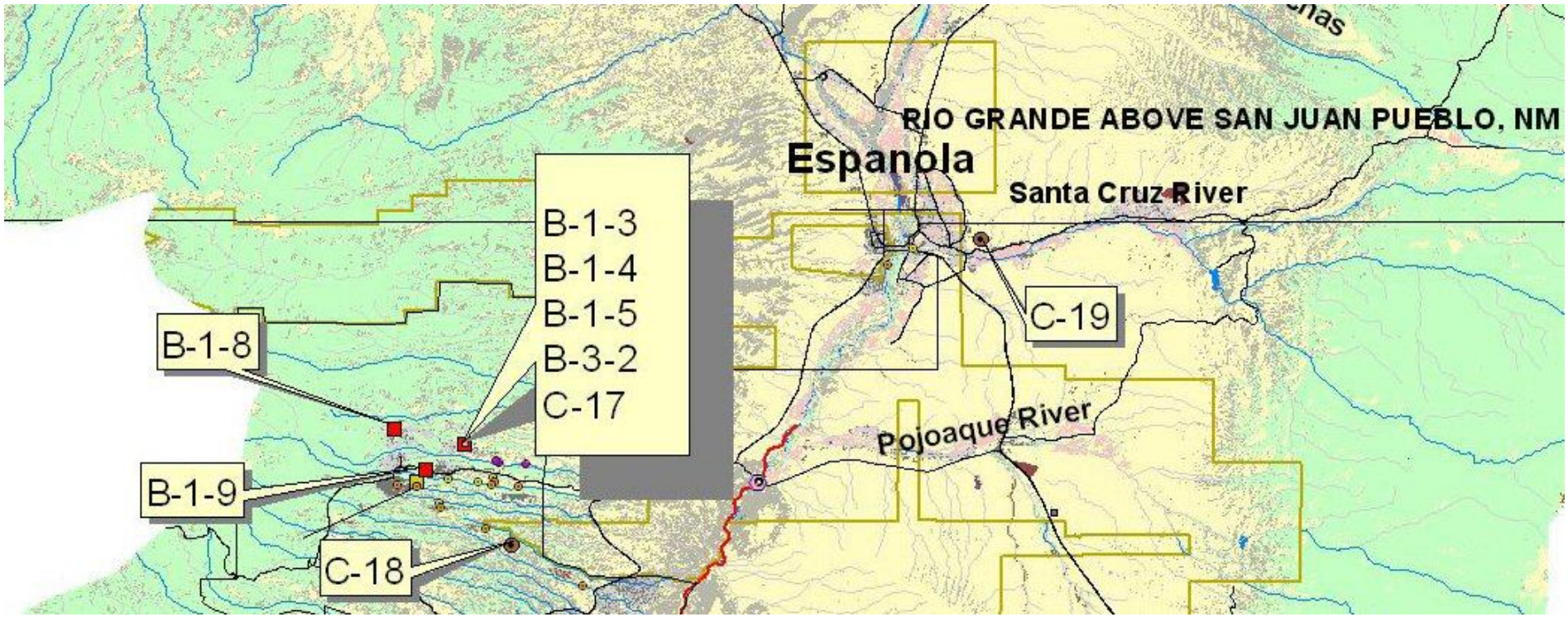


Figure 4-2 Magnified view of the LANL/Espanola area within Figure 4-1 [See Appendices B and C]

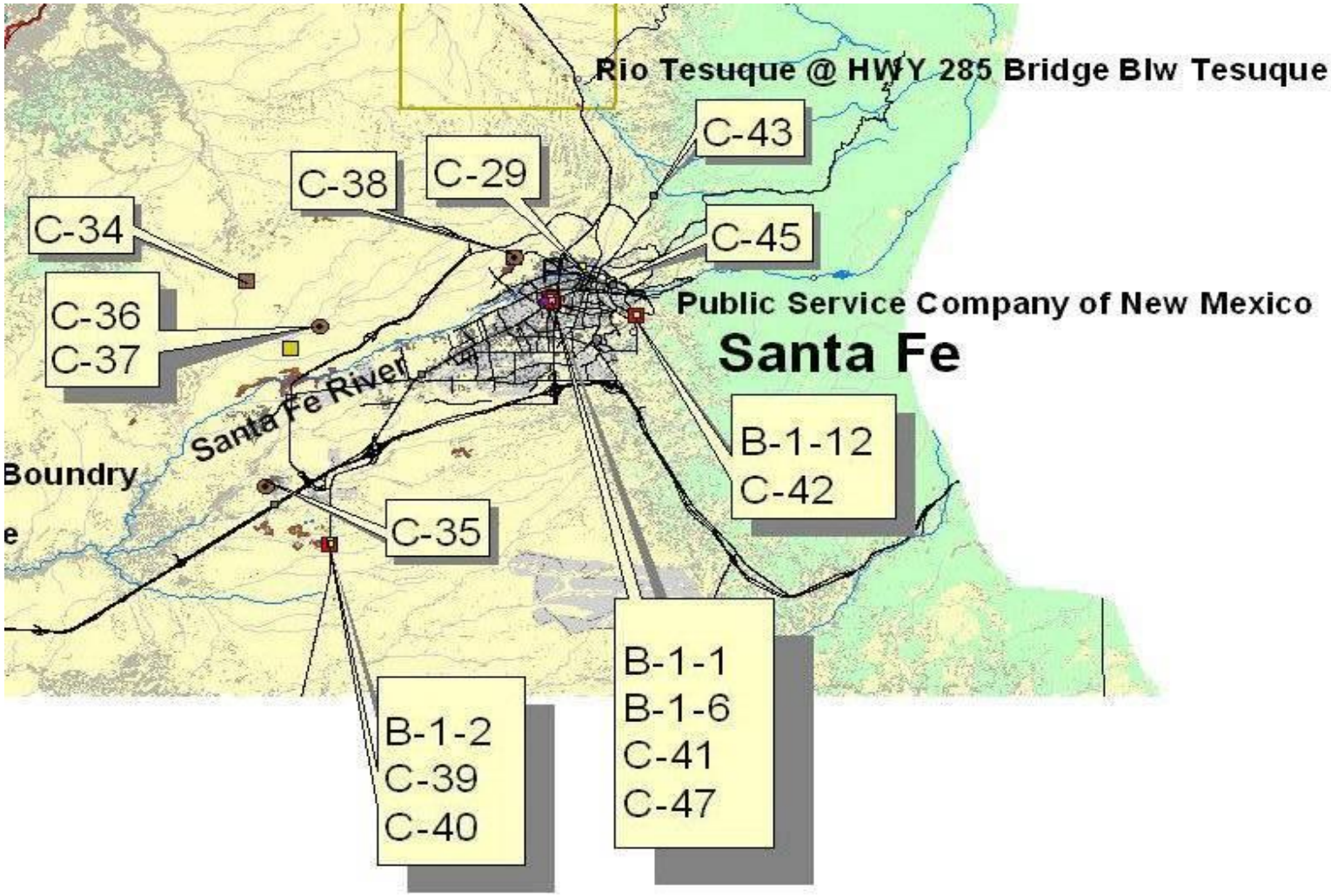


Figure 4-3 Magnified view of Santa Fe area within Figure 4-1[See Appendices B and C]

The maps in Figure 4-1, Figure 4-2, and Figure 4-3 provide spatial representations of the historic PCB sampling results in Appendix A and the facility information found using the methods outlined in *4.2 Methods for Contributing Source Assessment* provided in Appendix B and Appendix C. The facilities identified in Appendix B are either those that have confirmed past PCB contamination problems or those revealed by water sampling results for PCBs.

There are twelve officially reported incidents concerning PCB spills within the area reviewed. Companies associated with incidents where the amount released is unknown include the Penitentiary of New Mexico, Public Service Company of Colorado, Los Alamos Sales Company, Los Alamos Sewage System, New Mexico Department of Transportation (NMDOT), and Public Service Company of New Mexico (PNM). The NMDOT, Penitentiary of New Mexico, and PNM have additional information associated with their incidents, whereas information related to those attributed to Los Alamos Sales Company and the Los Alamos Sewage System is limited to the information provided in Table B-1. A PCB spill occurred at the NMDOT headquarters [PNM, 1995]. The Penitentiary of New Mexico PCB spill, reported in 1985, was not properly remediated and subsequently resulted in two fines for violation of the TSCA 16 and 6E in 1985 and 1998 respectively as filed in the EPA Docket Case List [TSCA §§ 16, 16E; RTK, 2006].

The last of the three release incidents where the quantity of PCBs released are unknown were from Public Service Company of New Mexico at the Santa Fe Electrical Generating

Site [NMED, 1990]. A screening site investigation was conducted using Aroclor analysis by the New Mexico Environmental Improvement Division, predecessor to NMED, in 1989 and 1990 to determine if CERCLA hazardous substances were present at the site in surface and ground water. The report identified 16 locations where PCB concentrations ranged between 0.04 ppm and 6.1 ppm in the soil. During this period TCSA required actions for PCB remediation where PCB concentrations were at or above 50 ppm. Therefore, no remediation was required. It is uncertain whether remediation efforts for PCBs were subsequently performed. In addition, transformer oils were disposed of onsite until about 1979 [NMED, 1990].

There are seven incidents where the total or approximate amounts of PCBs released into the environment are known. These include five at LANL, an incident at a Public Service Company of Colorado site, and another at a PNM site. All of the five incidents reported at LANL were associated with capacitor related accidents. Release amounts for LANL and the year reported include: 2 lbs (1987), 10 lbs (1987), 30 lbs at 500,000 ppm (1988), 500 gallons of fluid with PCBs (1996), and 4 oz of dielectric fluid with PCB's (2002). In addition, Public Service Company of Colorado reported a PCB-related spill of 65 gallons in 1990 near Alamosa and PNM reported an incident involving 50 gallons of transformer oil released in Santa Fe in 2004. PNM contracted for the site to be sampled using Aroclor analysis, and results indicated no presence of PCBs at or above the detection limit.

There are four facilities within the RBBACD where PCB disposal, generation and transport activities are being conducted. These facilities are required to register with the

EPA and include San Luis Valley Rural Electric in Monte Vista, CO, LANL in Los Alamos, NM, Kit Carson Electric Coop in Taos, NM, and Northern Rio Arriba Electric Coop in Chama, NM. All of the facilities are identified as generators of PCBs. The only facility associated with other PCB activities is LANL, which is listed as a disposer and transporter of PCB's.

4.4 Conclusion for Contributing Source Assessment

PCB records indicate the wide spread presence of the contaminant in water, sediment, and soil within the RGBACD, and further investigation indicates sources potentially contributing to this presence are widely dispersed. The geospatial illustration of sampling sites, PCB releases, and potential sources along with the corresponding records in Appendices A, B, and C can assist in planning future monitoring and assessment of the area and in downstream waters. In addition, this information may assist government agencies and the public during the TMDL development process.

5.0 Comparison of PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory

One of the principal questions concerning PCBs in the RGBACD is whether wastewater or storm water discharges from LANL property contribute to PCBs in the Rio Grande. LANL researchers attempted to answer this question in a March 2006 report reviewing PCBs in predator and bottom-feeding fish from Abiquiu and Cochiti Reservoirs, and analyzing PCB data gathered from the area [Gonzales and Fresquez, 2006].

Several approaches were taken by LANL scientists to compare upstream and downstream PCB results, including identifying statistical similarities of total PCBs among species and sample homologue distributions. Comparisons of total PCBs in fish species indicated that the mean total PCBs in fish from Abiquiu Reservoir were statistically similar (α=.01; P ($T \leq t$) [range = .23 -.71] to those in Cochiti Reservoir among species, where n=3 for each species collected from each reservoir. The authors concluded that the study implied that LANL is not the source of PCBs in fish in Cochiti Reservoir. In assessing trends by comparing current data with historic data, LANL concluded that a general decline existed in total PCBs in fish tissue since 2000, the year in which the researchers hypothesized that runoff from Cerro Grande Fire caused an influx of PCBs into Cochiti Reservoir [Gonzales and Fresquez, 2006]. The trend analysis included the comparison of total PCBs from catfish collected in 2002 to concentrations in SPMDs deployed for a 28-day sampling period in 2003. The reliability of such a comparison is not substantiated in any of the sources provided within the publication. The trend data ended with fish tissue data collected by LANL in 2005.

In analyzing PCBs in the Rio Grande upstream and downstream of LANL, the scientists also used a PCB fingerprinting technique, which can be conducted by summing individual congener data and analyzed to evaluate linkages between samples and likely sources. LANL's approach compared PCB homologue distributions for fish from Cochiti and Abiquiu Reservoirs with the distribution of brand name formulations of PCBs [Gonzales and Fresquez, 2006]. Based on this research, LANL researchers concluded that the laboratory is "either not the likely or not the only source" for PCBs in the Rio Grande.

In addition, LANL found that fish taken from the Rio Grande appear to contain higher levels of PCBs than those collected directly from Abiquiu and Cochiti Reservoirs.

Sampling results provided in Appendix A indicate that many of the canyons within LANL boundaries contain high concentrations of PCBs. Thus, a comparison of sampling data above and below LANL can provide an indicator of the likelihood that canyons located within LANL's boundary are contributing to PCBs in the Rio Grande and Cochiti reservoir where fish advisories are currently listed.

5.1 Data Sources for Comparison of PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory

Table 5-1 Currently Available Data for Comparing PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory (See Appendix A).

Data Source	Analysis	Agency	Period of Record	No. of Samples
LA-14001	Congener	LANL	5/2/2002 to 5/7/2002	8
LANL/NMED DOE-OB Electronic Records for Sediment	Congener	NMED DOE-OB	4/1/2003	2
LA-14200	Congener	LANL	August 2002 to August 2003	6
NMED DOE-OB and SWQB Electronic Records for Fish Tissue	Congener	NMED DOE-OB	4/1/2003	27

5.2 Comparison of PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory

To assess LANL's possible contribution of PCBs in the Rio Grande, congener patterns for downstream samples and upstream samples were compared. Data from fish tissue, sediment, and SPMD's were gathered from the data sources listed in Table 5-1 for conducting comparisons among each based on homologue and congener specific data.

First, data provided for eight common carp collected upstream (n=4) and downstream (n=4) of LANL were reviewed [Gonzales and Fresquez, 2003]. Upstream of LANL was defined as approximately 1 km up river from the Otowi Bridge to where Pojoaque Creek meets the Rio Grande. Downstream is defined as the area between the confluence of Capulin Canyon and the inlet to Cochiti Reservoir. For each set of fish tissue data, a Grubbs outlier test for total PCBs was conducted. One fish from each of the upstream and downstream datasets, identified in Appendix A as RGTRTCARP2 and RGSI 4C respectively, was identified as an outlier and removed. The test was run again on the remaining samples for each data set, n=3, to determine if the Z value $Z = \frac{|\text{mean} - \text{value}|}{\text{SD}}$ for either set exceeded $(N-1)/\sqrt{N}$ (1.155). Total PCB values for both sets of carp fell below the 1.155 threshold and homologues and select congener values (PCB 28, PCB 153, and PCB 180) for each set were averaged. These select congeners were chosen from a group of seven congeners (PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153, PCB-180) where their pattern in carp tissue correlates (r=.093) with that found in the bottom sediment of their habitat [Svobodova, et al., 2004]. PCB-28, PCB-153, and PCB-180 were the only congeners of the seven in the fish tissue that did not coelute during analysis. The mean values from each analysis were compared and results are provided in Figure 5-1 (Table 5-2) and Figure 5-2 (Table 5-3).

Second, to identify differences in PCBs in the Rio Grande, sediment samples collected at Otowi Gage and at White Rock, located upstream and downstream of LANL drainages were reviewed. Homologue distributions for each of the

sediment samples were compared in Figure 5-3 (Table 5-4). Third, SPMD homologue data from August 2002, July 2003, and August 2003, from the Rio Grande at Otowi Gage and Ancho Canyon are provided in Figure 5-4 (Table 5-5), Figure 5-5 (Table 5-6), and Figure 5-6 (Table 5-7). Fourth, comparisons of homologue PCB concentrations and ratios for homologues in carp and catfish collected by NMED SWQB in October 2006 are provided in Figure 5-7 (Table 5-8), Figure 5-8 (Table 5-9), and Figure 5-9 (Table 5-10).

5.3 Results and Discussion from Comparisons of PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory

The patterns in Figure 5-1 are similar and reveal that concentrations may be slightly higher in the average homologues reported for fish collected downstream. The patterns for the select congeners (PCB-28, PCB-153, and PCB-180) in Figure 5-2 remain similar between fish collected upstream and downstream of LANL, with concentrations appearing higher in averages calculated for fish downstream. Due to the small sample size (n=3), no definitive conclusions can be made.

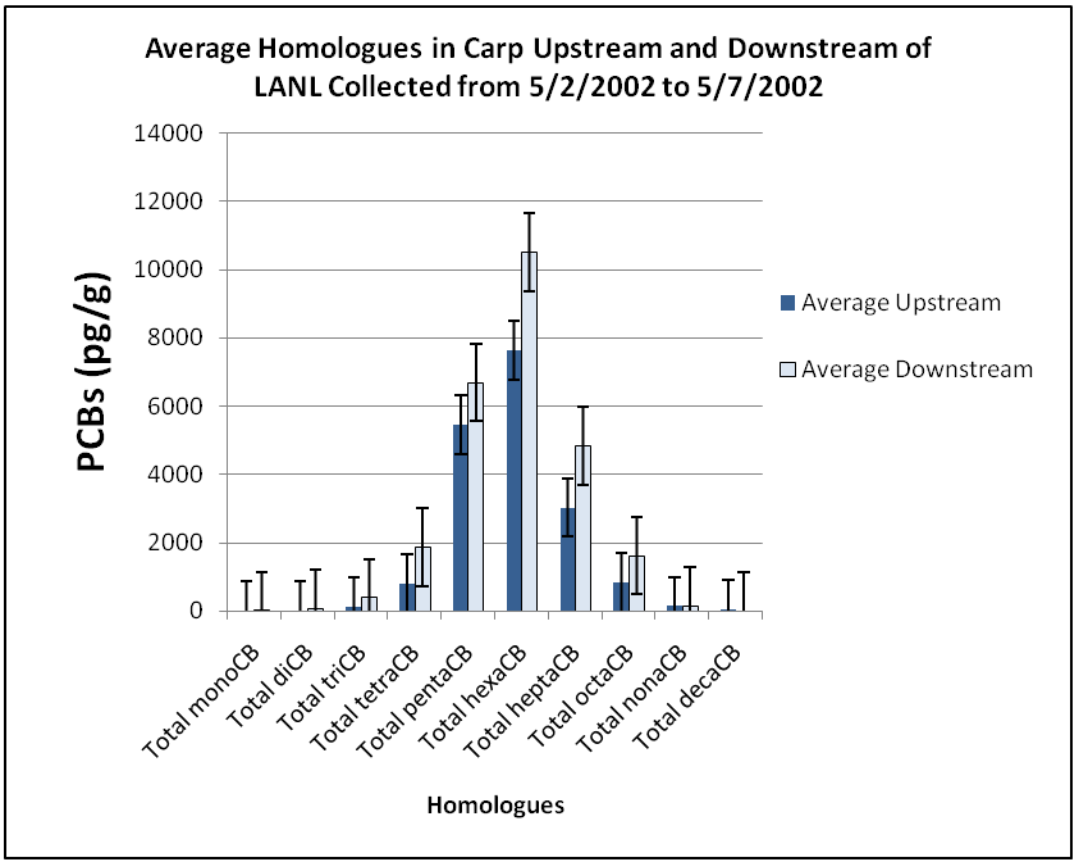


Figure 5-1 Average Homologues in Carp Upstream (n=3) and Downstream (n=3) of LANL Collected from 5/2/2002 to 5/7/2002 (Standard Error Bars) [Gonzales and Fresquez, 2003].

Table 5-2 Average Homologues in Carp Upstream (n=3) and Downstream (n=3) of LANL Collected from 5/2/2002 to 5/7/2002 [Gonzales and Fresquez, 2003].

PCBs (pg/g)	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB
Average Upstream (n=3)	0.99	0	106.53	796.33	5450	7640	3023.33	836.33	135.43	46.8
Standard Deviation	1.7	0	67.1	636.7	3196.9	1660.8	913.1	394.3	73.8	27.6
Average Downstream (n=3)	3.37	45	379.33	1866.67	6686.67	10516.67	4840	1612	138	0
Standard Deviation	5.8	20.9	191.4	1068.5	3106.4	5496.4	3455.1	1068.2	119.5	0

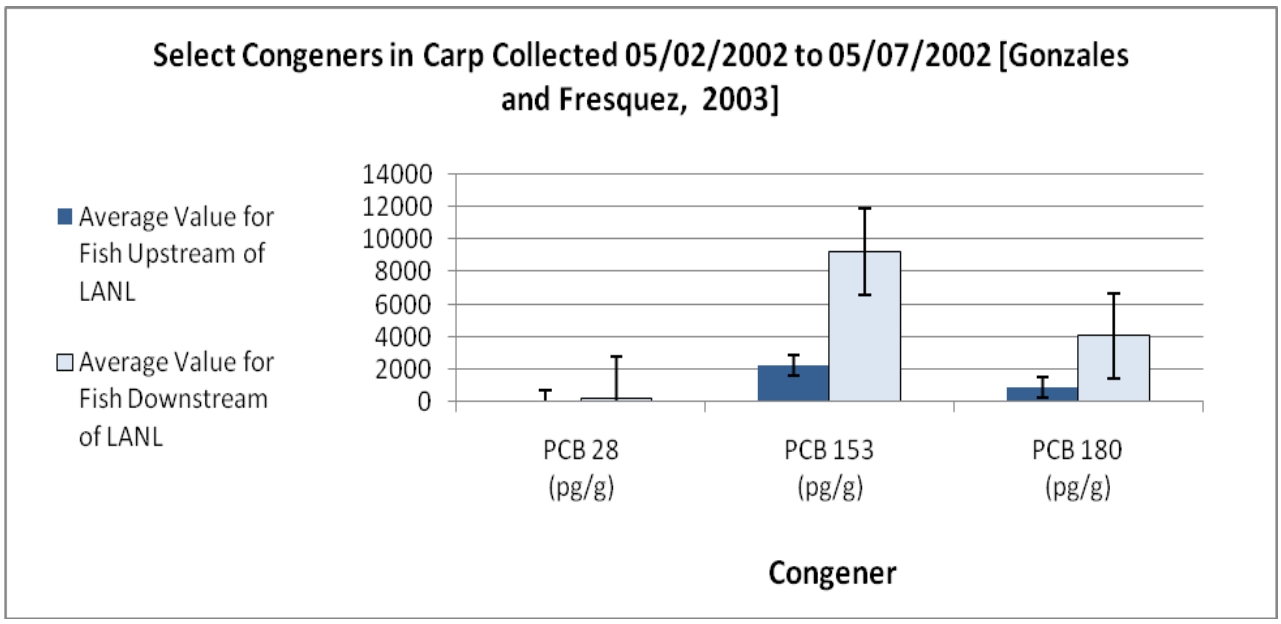


Figure 5-2 Average Carp Tissue Concentrations of Select PCBs in Carp Upstream (n=3) and Downstream (n=3) from LANL Collected 5/2/2002 to 5/7/2002 (Standard Error Bars) [Gonzales and Fresquez, 2003].

Table 5-3 Average Carp Tissue Concentrations of Select PCBs in Carp Upstream (n=3) and Downstream (n=3) from LANL Collected 5/2/2002 to 5/7/2002 [Gonzales and Fresquez, 2003].

PCBs (pg/g)	PCB 28 (pg/g)	PCB 153 (pg/g)	PCB 180 (pg/g)
Average Value for Carp Upstream of LANL (n=3)	36.5	2223.33	924.33
Standard Deviation	22.79	466.08	316.88
Average Value for Carp Downstream of LANL (n=3)	175.25	9252.5	4081.75
Standard Deviation	40.1	1814.87	1109.37

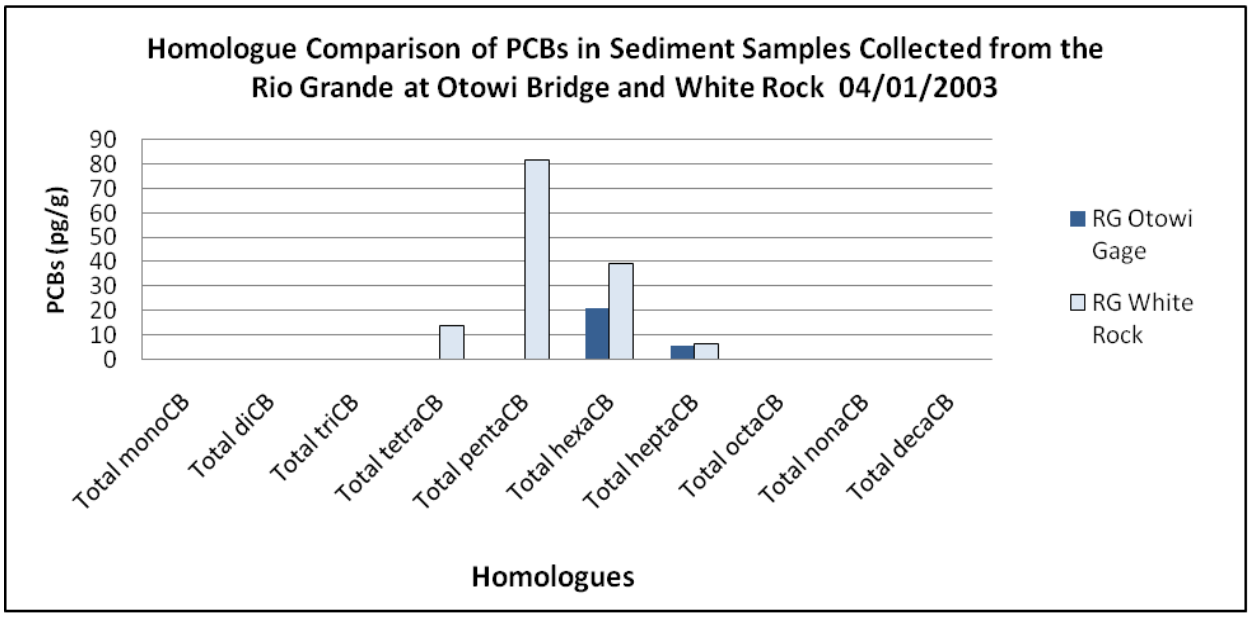


Figure 5-3 Homologue comparison of sediment samples from the Rio Grande at Otowi Gage (n=1) and White Rock (n=1) collected 04/01/2003 [See Appendix A; LANL/NMED for samples collected on 4/1/2003].

The comparison of homologue data from sediment samples collected on 4/1/2003 (Figure 5-3) suggests differences between the two samples collected, the first above (Otowi Gage) and second below (White Rock) LANL. The tetra-, penta-, and hexachlorobiphenyls appear higher in the sediment collected below LANL.

Table 5-4 Sediment sample homologue data for Rio Grande at Otowi Gage (n=1) and White Rock (n=1) collected 04/01/2003 [See Appendix A; LANL/NMED for samples collected on 4/1/2003].

PCBs (pg/g)1	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB	Total PCBs
RG Otowi Gage	< DL	< DL	< DL	< DL	< DL	21.40	5.66	< DL	< DL	< DL	27.06
RG White Rock	< DL	< DL	< DL	< DL	81.60	39.00	6.13	< DL	< DL	< DL	140.53

< DL is reported as less than detection limit.

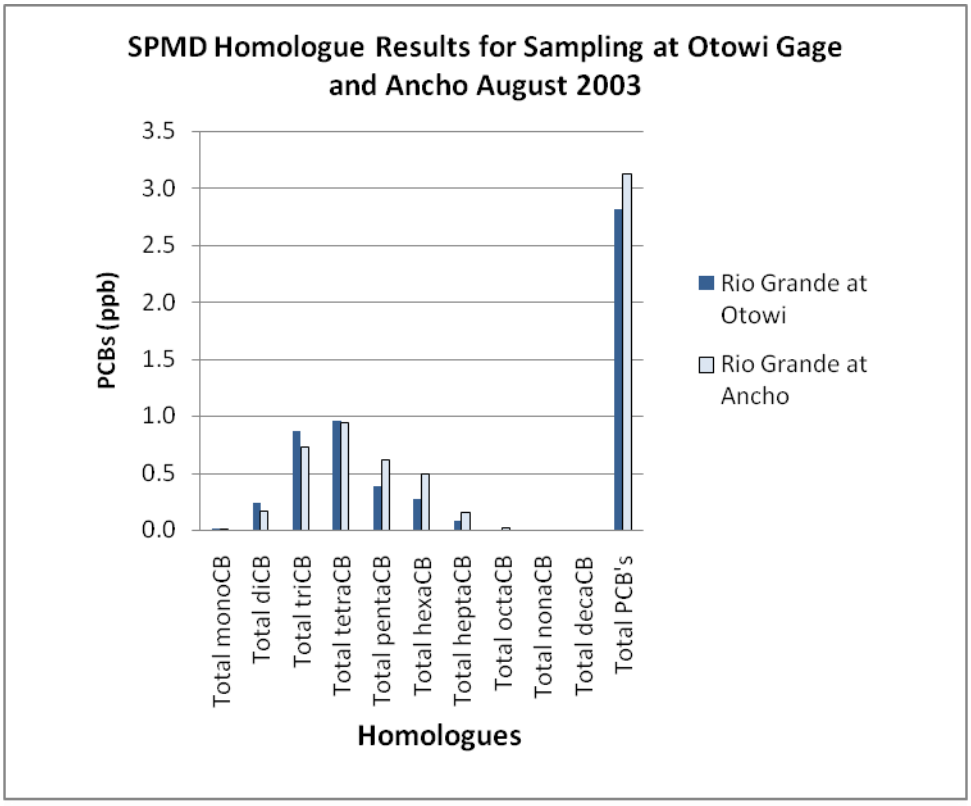


Figure 5-4 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) August 2003 [Gonzales and Montoya, 2005].

Table 5-5 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) August 2003 [Gonzales and Montoya, 2005].

PCBs (pg/g)1	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB	Total PCBs
Rio Grande at Otowi	0.014	0.237	0.872	0.956	0.387	0.266	0.084	< DL	< DL	< DL	2.82
Rio Grande at Ancho	0.009	0.17	0.728	0.939	0.622	0.489	0.153	0.016	< DL	< DL	3.13

< DL is reported as less than detection limit.

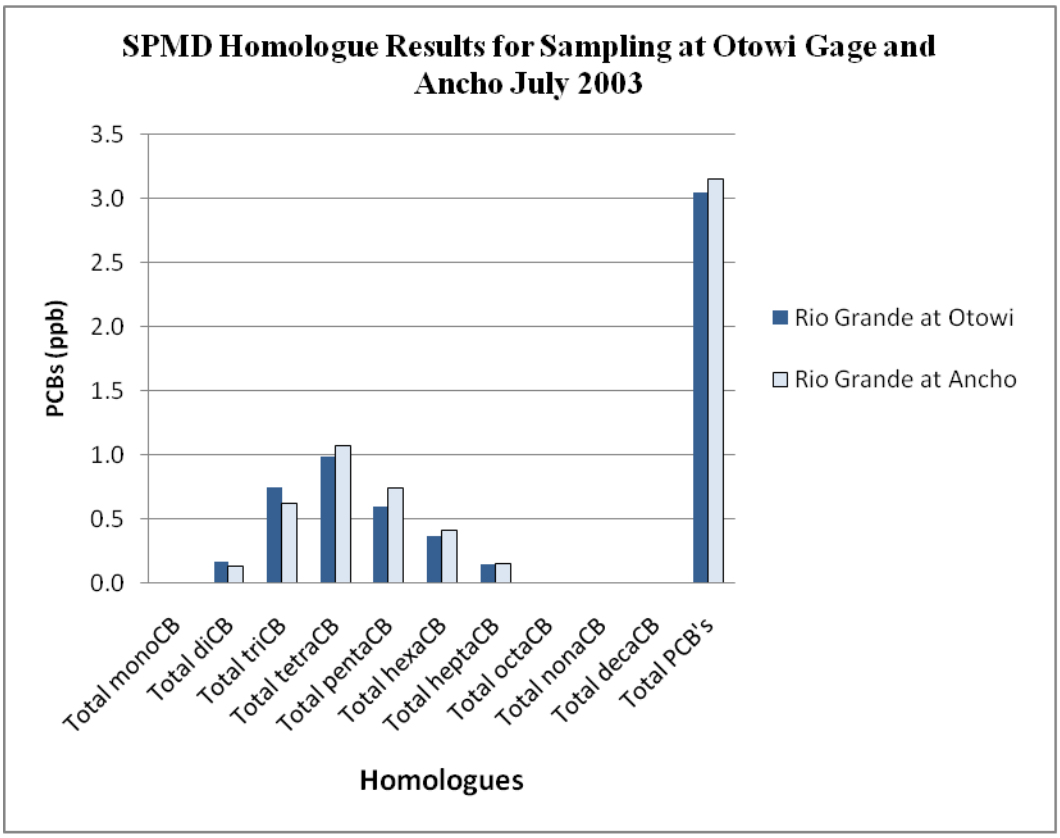


Figure 5-5 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) July 2003 [Gonzales and Montoya, 2005].

Table 5-6 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) July 2003 [Gonzales and Montoya, 2005].

PCBs (pg/g)1	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB	Total PCBs
Rio Grande at Otowi	0.012	0.171	0.75	0.983	0.6	0.368	0.151	0.009	< DL	< DL	3.04
Rio Grande at Ancho	0.007	0.133	0.628	1.072	0.744	0.414	0.154	< DL	< DL	< DL	3.15

< DL is reported as less than detection limit.

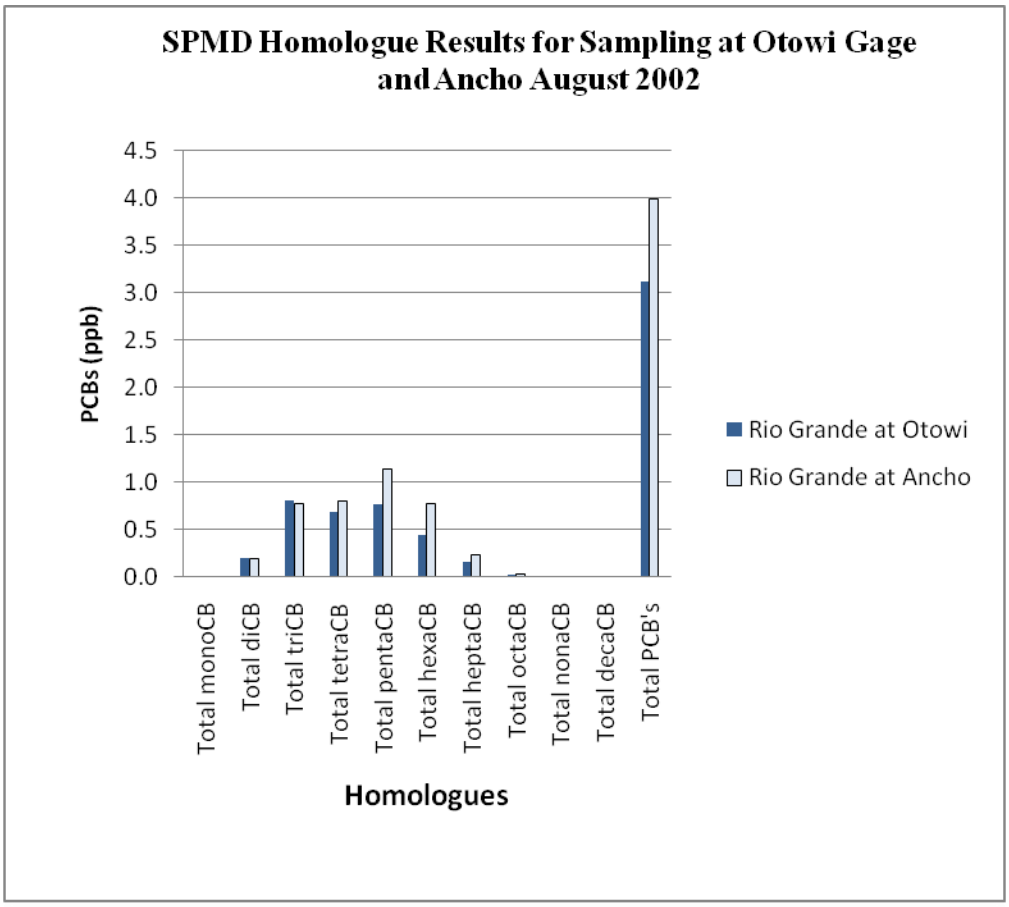


Figure 5-6 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) August 2002 [Gonzales and Montoya, 2005].

Table 5-7 SPMD Homologue Results (PCBs measured in pg/g synthetic lipid content) for Sampling at Otowi Gage (n=1) and Ancho (n=1) August 2002 [Gonzales and Montoya, 2005].

PCBs (pg/g)	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB	Total PCBs
Rio Grande at Otowi	0.012	0.206	0.806	0.694	0.767	0.44	0.162	0.032	< DL	< DL	3.12
Rio Grande at Ancho	0.008	0.194	0.778	0.8	1.144	0.783	0.244	0.03	< DL	< DL	3.98

< DL is reported as less than detection limit.

SPMDs were distributed between August of 2002 and August 2003 by LANL at five different locations; Embudo, Otowi Gage, Ancho, below Cochiti, and below Albuquerque [Gonzales and Montoya, 2005]. The distribution included two SPMDs placed in the Rio Grande during August of 2002, July of 2003, and August of 2003, the first at Otowi Gage and second at Ancho Canyon. The results from these SPMDs are compared in Figure 5-4, Figure 5-5, and Figure 5-6. While total PCB results between the Otowi gage and Ancho sites were found to be statistically similar (α=0.01 and P=.29), homologue patterns appear to be different between sites [Gonzales and Montoya, 2005.]. The tri-chlorobiphenyls appear to be higher at Otowi Gage for each sample year than at Ancho Canyon, whereas the penta- and hexachlorobiphenyls appear to be higher in SPMDs collected from downstream during each sampling period.

The NMED DOE-OB and SWQB collected fish in October of 2006 from Abiquiu and Cochiti Reservoirs. The homologue distributions for carp and catfish are provided in Figure 5-7 (Table 5-8). PCB concentrations are considerably higher in carp and catfish collected from Cochiti than those from Abiquiu. These concentrations contrast LANL's 2005 results indicating that total PCBs in fish from the same species at Abiquiu Reservoir were statistically similar to those in Cochiti Reservoir (α = .01; P (T $\leq$ t) [range = .23-.71] [Gonzales and Fresquez, 2006]. A statistical comparison for the 2006 survey is not possible since fish tissue sample results collected by NMED DOE-OB and SWQB are composite samples, where n=15 for carp and n=2 for catfish for Abiquiu Reservoir, and n=5 for carp and n=5 for catfish collected from Cochiti. Due to differences in total PCBs

in carp and catfish at each reservoir, percentage PCBs are used to compare homologue patterns within each species to assess if differences exist between reservoirs.

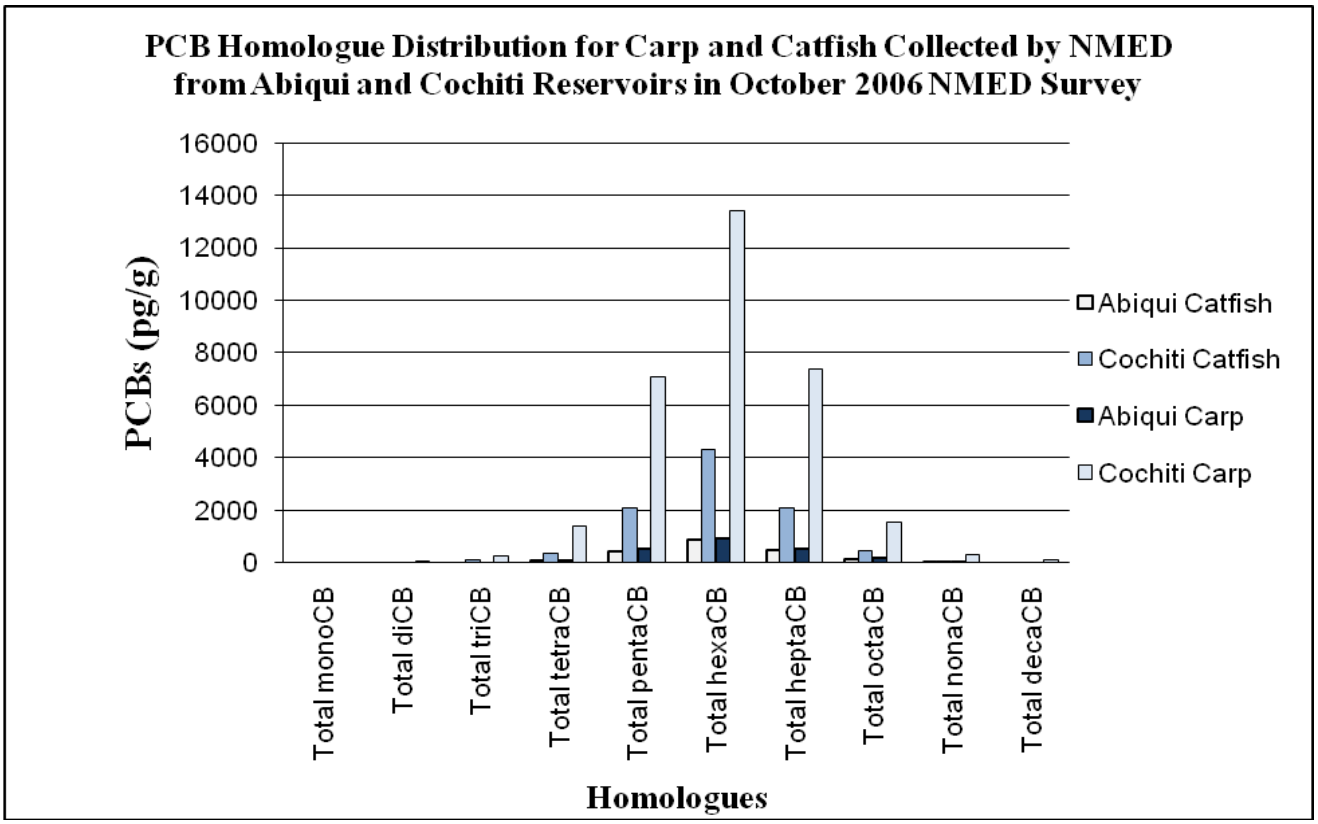


Figure 5-7 Comparison of Composite Carp and Catfish Tissue Samples Collected in October 2006 [NMED, 2007f].

Table 5-8 Comparison of Composite Carp and Catfish Tissue Samples Collected in October 2006 [NMED, 2007f].

PCBs (pg/g)	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB	Total PCBs
Abiqui Catfish	2.40	12.70	23.40	99.40	458.00	897.00	500.00	166.00	39.10	11.10	2209.10
Cochiti Catfish	2.90	22.70	80.30	356.00	2100.00	4330.00	2100.00	430.00	73.30	20.40	9515.60
Abiquiu Carp	0.90	7.05	23.72	123.16	522.37	948.26	551.92	200.39	52.19	14.74	2444.71
Cochiti Carp	1.10	37.80	232.00	1400.00	7070.00	13400.00	7360.00	1520.00	275.00	84.20	31380.10

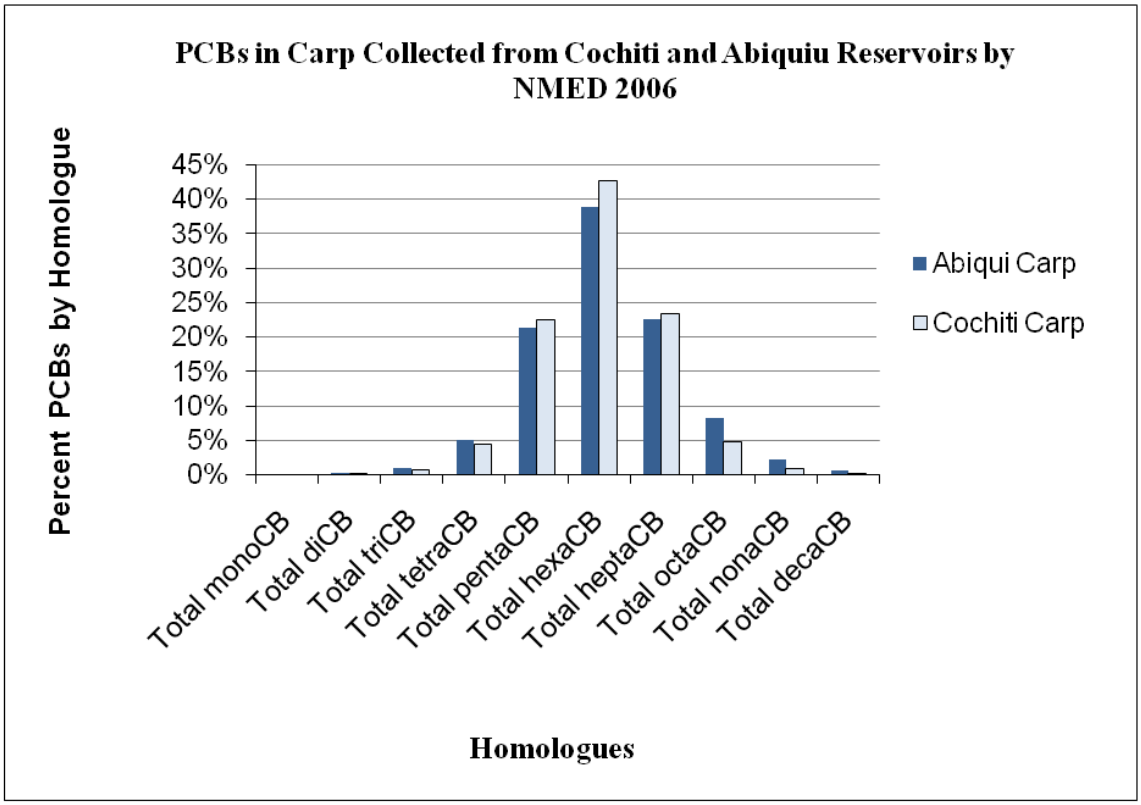


Figure 5-8 Percent PCBs by Homologue in Carp collected from Cochiti and Abiquiu Reservoirs by NMED 2006 [NMED, 2007f].

Table 5-9 Percent PCBs by Homologue in Carp collected from Cochiti and Abiquiu Reservoirs by NMED 2006 [NMED, 2007f].

Percent PCBs	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB
Abiquiu Carp	0.00	0.00	0.01	0.05	0.21	0.39	0.23	0.08	0.02	0.01
Cochiti Carp	0.00	0.00	0.01	0.04	0.23	0.43	0.23	0.05	0.01	0.00

The homologue ratios for PCBs in carp and catfish collected by NMED in October 2006 are provided in Figure 5-8 and Figure 5-9. The results suggest that carp and catfish collected from Cochiti Reservoir may have a higher ratio of penta- and hexachlorobiphenyls than those collected from Abiquiu Reservoir. Carp and catfish

collected from Abiquiu Reservoir appear to contain higher concentrations of tetra- and octachlorobiphenyls than those from Cochiti Reservoir.

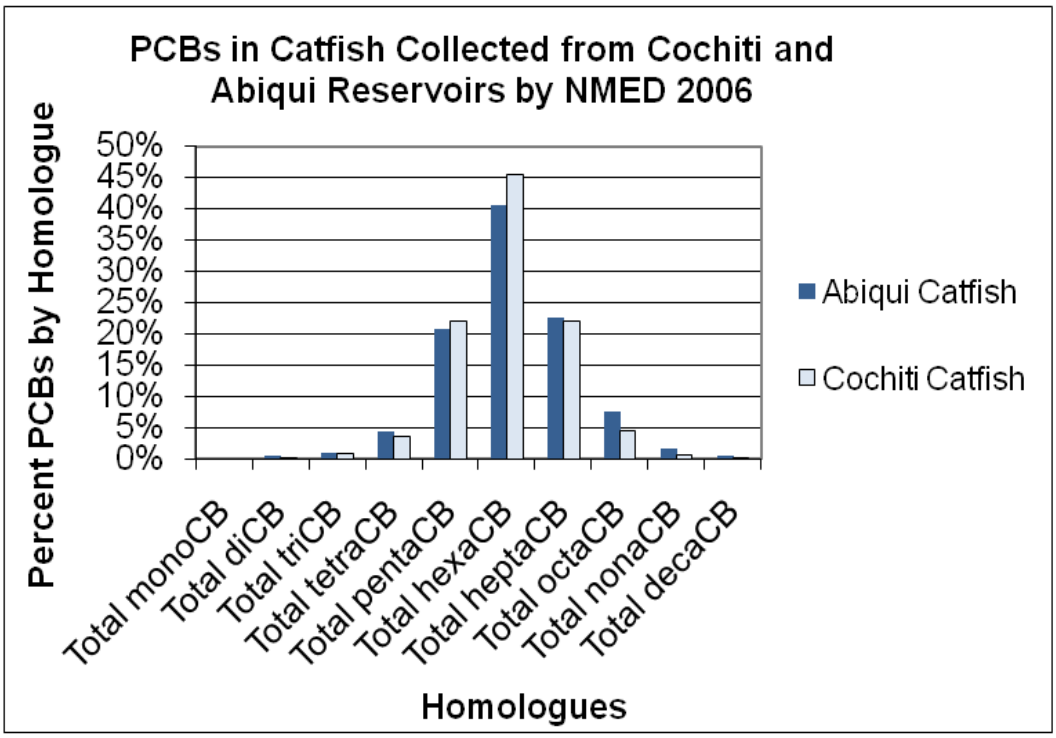


Figure 5-9 Percent PCBs by Homologue in Catfish collected from Cochiti and Abiquiu Reservoirs by NMED 2006 [NMED, 2007f].

Table 5-10 Percent PCBs by Homologue in Catfish collected from Cochiti and Abiquiu Reservoirs by NMED 2006 [NMED, 2007f].

Percent PCBs	Total monoCB	Total diCB	Total triCB	Total tetraCB	Total pentaCB	Total hexaCB	Total heptaCB	Total octaCB	Total nonaCB	Total decaCB
Abiquiu Catfish	0.00	0.01	0.01	0.04	0.21	0.41	0.23	0.08	0.02	0.01
Cochiti Catfish	0.00	0.00	0.01	0.04	0.22	0.46	0.22	0.05	0.01	0.00

The results provided in Figure 5-1, Figure 5-8, and Figure 5-9 suggest that the homologue composition found in carp and catfish collected from upstream and downstream of LANL are different. In both species there appears to be higher concentrations and ratios of pentachlorobiphenyls for fish collected downstream of Otowi Gage when compared with

fish collected upstream. This agrees with sediment (Figure 5-3) and SPMD results (Figure 5-4, Figure 5-5, and Figure 5-6) suggesting that penta- and hexachlorobiphenyl concentrations increase between Otowi Gage and downstream of LANL.

5.4 Conclusion for Comparison of PCBs in Samples Collected Upstream and Downstream of Los Alamos National Laboratory

Each of the homologue comparisons, measured both as a percentage of total PCBs and total values, suggest that penta- and hexachlorobiphenyls may be higher below LANL than in those samples collected from above. The results provided in Section 5.3, in conjunction with the historical spills previously identified in Sections 3.1 and 4.3, suggest LANL's conclusion that the canyons on its property are not contributing to PCBs in the fish at Cochiti Reservoir may have been prematurely determined.

6.0 Contaminated Sediment Screening

Although specific sediment quality criteria for total PCBs have not been established for New Mexico, the National Sediment Inventory (NSI) includes multiple PCB screening levels for the protection of humans based on an exposure path leading to consumption of contaminated fish [USEPA, 1997]. The screening levels are based on theoretical bioaccumulation potential (TBP) and cancer risk. This tool provides guidance for assessing sediment quality data only, and is not applicable as regulatory criteria. Research discussing bioaccumulation concerns related to contaminated sediment was previously discussed in section 2.1 [USFWS, 2002]. The purpose of screening sediment samples is to identify areas where elevated concentrations of PCB may pose a risk to humans consuming fish taken from these areas.

6.1 Currently Available Data Summary for Contaminant Sediment Screening

Table 6-1 Data Summary for Contaminant Sediment Screening

Data Source	Analysis Method	Agency	Period of Record	No. of Samples
USGS, 2006	Aroclor	USGS	MAY 1978 - NOV 1992	13
USFWS, 2002	Congener	USFWS	JUL 1997 - OCT 1997	8
NMED DOE-OB Records for PCBs in Sediment/Soil	Congener	NMED DOE-OB	AUG 2005	5
NMED SWQB Records for PCBs in Sediment/Soil* Provisional (See Appendix A)	Congener	NMED SWQB	NOV - DEC 2006	11

6.2 Methods for Contaminated Sediment Screening

The NSI provides the following equation for determining the potential health risk to humans consuming fish exposed to contaminated sediment:

$$C_s = F_{OC}\frac{TBP}{BSAF \times F_1}$$

Where:
C_s = Sediment Concentration Screening Level

TBP = Theoretical Bioaccumulation Potential (fish tissue concentration)
BSAF = Biota-Sediment Accumulation Factors
F_l = Fraction of lipids in fish tissue
F_{oc} = Fraction of organic carbon in sediment [USEPA, 1997].

The equation was used to indentify if contaminated sediment posed a potential health risk to humans consuming fish taken from sampling sites. A value of 5.9 ppb was chosen for the TBP, which corresponds with the minimum fish tissue concentration in which a one meal per week consumption advisory would be issued based on cancer

health endpoints for a risk factor of 1 in 100,000 [USEPA, 2007c]. A default value of 1.85 was applied for the BSAF as described by the NSI in Appendix D of *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States* [USEPA, 1997]. Analysis of fish tissue samples (Appendix A) provided an average percent lipid value of 4.8% and a value of 1.0% was used for fraction organic carbon in sediment. The value for fraction organic carbon was derived from the results of a 2000 study conducted by the USGS on the deposition and chemistry of sediments in Cochiti Lake [Wilson and Van Metre, 2000]. The screening level (C_s) for this region, based on the TBF formula, was set at .664 ppb, and all sediment samples collected in the RGBACD exceeding this value are identified in Table 6-2.

6.3 Bioaccumulation Potential of Total PCBs from Contaminated Sediment

PCBs were detected in 57% of the sediment samples (n=42) reviewed. Total PCB concentrations in sediment samples collected from the Upper Rio Grande Basin above Cochiti Dam ranged from 0 ppb to 139 ppb. The .664 ppb screening level is exceeded in 14% of sediment samples reviewed (Table 6-2).

Table 6-2 Sediment Sample Sites with Total PCBs in Exceedence of the Cs Level [Appendix A].

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID	COLLECTED	LATITUDE	LONGITUDE	MEDIUM	DETAIL	ANALYSIS	TOTAL PCBS	UNITS
NMED DOE-OB	Pueblo Canyon	6/3/2005	35.883763	-106.256557	SED	N/A	Congener	81.000	ppb
NMED DOE-OB	Pueblo Canyon	6/3/2005	35.884504	-106.269588	SED	N/A	Congener	97.700	ppb
NMED DOE-OB	Pueblo Canyon	6/3/2005	35.885092	-106.271124	SED	N/A	Congener	15.800	ppb
NMED DOE-OB	Pueblo Canyon	6/3/2005	35.885092	-106.271124	SED	N/A	Congener	139.000	ppb
NMED SWQB*	Red River below Fish Hatchery near USGS (Red River site 37) 28RedRiv005.3	11/14/2006	36.681419	-105.657307	SED	Grab	Congener	1.304	ppb

*Data are provisional.

6.4 Conclusion for Contaminated Sediment Screening

A review of sediment samples indicates that only five sites exceed the calculated contaminant screening level. Four of the samples were retrieved from Pueblo Canyon, which is located on LANL property and drains into Los Alamos Canyon, which drains into the Rio Grande below Otowi Gage. In addition, the screening level was exceeded below the fish hatchery at Red River. This raises concerns that fish at the hatchery could possibly be compromised from PCBs in the watershed. While results suggest these areas are potential areas of concern, this does not eliminate the possibility that many sites, both unknown and previously identified, may collectively represent the primary contributing source for PCBs identified in fish within the RGBACD.

7.0 Potential Monthly Fish Consumption Limits for Non-Cancerous and Cancerous Health Effects Related to Potential Toxicity from PCBs in the RGBACD

Since the consumption of PCB-laden fish is the primary pathway for human exposure to PCBs, the EPA provides risk-based fish consumption limit tables for both the direct effects of PCBs and for equivalent dioxin-like effects of certain congeners [USEPA, 2007c]. Sampling fish tissue and biota for PCBs has been conducted in the RGBACD by USFWS and LANL from 1997 to present, and by New Mexico's DOE-OB beginning in 2000 [USFWS, 1992; USFWS; 2002; Gonzales and Fresquez, 2006]. LANL reports have discussed fish consumption limits in studies conducted in 2002 and 2005, the latter stating that the mean total PCB and dioxin-like concentrations in fish tissue appear to be declining [Gonzales and Fresquez, 2003; Gonzales and Fresquez, 2006]. LANL referenced the EPA's monthly risk-based fish consumption limit tables based on the

potential toxicity from total PCBs and from dioxin-like congeners to identify consumption limits for select species sampled from both Cochiti and Abiquiu Reservoirs [Gonzales and Fresquez, 2006]. The recommended consumption limits calculated by LANL in 2006 are provided along with those calculated for fish collected by the NMED DOE-OB/SWQB in October 2006 in section 7.3 for comparison. To date, the State has only issued PCB fish consumption advisories for species with concentrations that are equal to or greater than the EPA recommended consumption criteria for a "no consumption" recommendation.

7.1 Determining Potential Health Consumption Limits

Table 7-1 includes the October 2006 samples collected by NMED DOE-OB/SWQB, which were used in determining the current risk-based fish consumption limits for Abiquiu and Cochiti Reservoirs. In addition, LANL identified what EPA fish consumption limits would be issued for 25 samples collected in August 2005, which are included for comparing with those calculated from NMED DOE-OB/SWQB's 2006 samples [Gonzales and Fresquez, 2006].

Table 7-1 Data Summary for Determining Risk-Based Fish Consumption Limits [Appendix A].

Data Source	Analysis	Agency	Period of Record	No. of Fish Collected
NMED DOE-OB/SWQB Records for total PCBs in Fish Tissue	Congener	NMED DOE-OB/SWQB	OCT 2006	48
Gonzales and Fresquez, 2006	Congener	LANL	AUG 2005	25

7.2 Methods for Determining Potential Health Risk Based Consumption Limits

The EPA recommended fish consumption limits for Cochiti and Abiquiu Reservoirs were determined using the EPA risk-based fish consumption limit tables [USEPA, 2007c]. The limits are based on both the direct effects of total PCBs and PCB dioxin toxicity-equivalency quotients (TEQ) calculated from 12 dioxin-like congeners (PCB-77, PCB-81, PCB-105, PCB-114, PCB-118, PCB-123, PCB- 126, PCB-156, PCB-157, PCB-167, PCB-169, and PCB-189). All PCB congeners were summed to determine total PCBs. For determining consumption limits based on PCB dioxin-like congener concentrations, dioxin TEQs were compared with the EPA risk-based consumption limit tables for Dioxins/Furans. TEQs for each sample are calculated by summing the results provided from the multiplication of each dioxin-like congener value with its related tetrachlorodibenzodioxin equivalency factor (TEF) [Van den Berg et al., 2006]. TEFs were developed by researchers for the World Health Organization (WHO) to facilitate risk assessment for more toxic PCB congeners exhibiting dioxin-like characteristics [Van den Berg et al., 2006]. The total PCB values and TEQs for each species at both Abiquiu and Cochiti Reservoirs were compared with the meals/month matrices for total PCBs and Dioxin/Furans provided in the EPA risk-based consumption limit tables. Duplicate samples were averaged and a weighted mean approach was utilized for determining values for composite fish tissue samples if more than one sample value for the same species collected from the same sampling area was reported.

7.3 EPA Recommended Risk-Based Fish Consumption Limits for Cochiti and Abiquiu Reservoirs

Initial review of fish tissue results (Figure 7-1) indicates differences between the samples collected by NMED DOE-OB/SWQB from Abiquiu and Cochiti Reservoirs for carp,

catfish, and walleye. Results from consulting the EPA risk-based consumption limit tables for total PCBs and Dioxin/Furans for the calculated TEQ's from the dioxin-like PCB congeners are provided in Table 7-3 and Table 7-4.

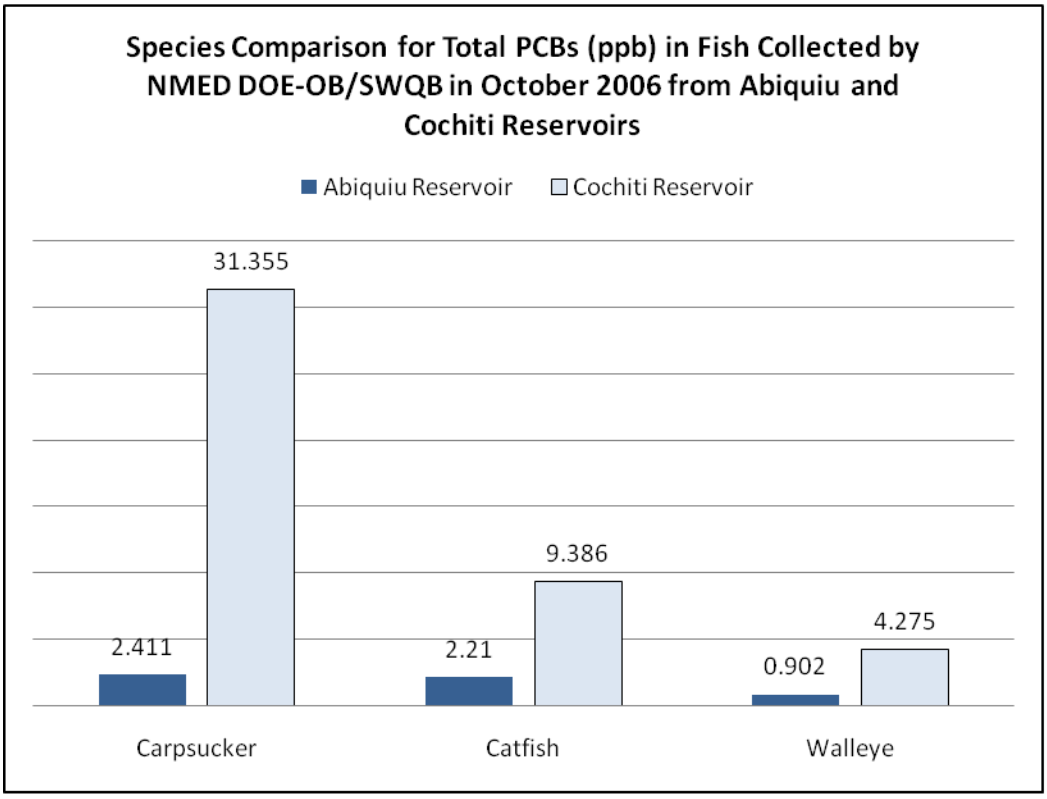


Figure 7-1 Species Comparison for Total PCBs (ppb) in Fish Collected by NMED DOE-OB/SWQB in October 2006 from Abiquiu and Cochiti Reservoirs [NMED, 2007f; Gonzales and Fresquez, 2006].

Table 7-2 Total PCBs (ppb) for Fish Collected from Abiquiu and Cochiti Reservoirs in 2005 and 2006[1][NMED, 2007f; Gonzales and Fresquez, 2006].

Collection Agency/Year	Carp		Catfish		Rainbow Trout		Smallmouth Bass		Walleye	
	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir
NMED DOE-OB/SWQB/2006	2.411	31.355	2.21	9.386	1.968	N/A	0.781	N/A	0.902	4.275
LANL/2005	5.2	3.94	3.3	4.56	N/A	N/A	0.49	N/A	0.75	1.41

[1] Mean total PCBs are used for duplicates and weighted average used for multiple composite samples

Table 7-3 EPA Recommended Monthly Fish Consumption Limits for total PCBs from Fish Collected in October 2006 from Abiquiu and Cochiti Reservoirs Compared with those Provided by LANL for Fish Collected in August 2005 [1] [NMED, 2007f; Gonzales and Fresquez, 2006].

EPA Recommended Fish Consumption Limits for Fish Collected by NMED DOE-OB/SWQB October 2006 and LANL August 2005	Carp		Catfish		Rainbow Trout		Smallmouth Bass		Walleye	
	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir
NMED DOE-OB/SWQB Total PCBs (ppm)	0.0024	0.0314	0.0022	0.0094	0.0020	N/A[5]	0.0008	N/A[5]	0.0009	0.0043
NMED DOE-OB/SWQB Maximum Number of Meals/Month[2] for Noncancerous Health Endpoints[3]	NL[4]	4	NL[4]	16	NL[4]	N/A[5]	NL[4]	N/A[5]	NL[4]	NL[4]
NMED DOE-OB/SWQB Maximum Number of Meals/Month for Cancer Health Endpoints[6]	16	1	16	4	16	N/A[5]	NL[4]	N/A[5]	NL[4]	8
Fish Consumption Limits Calculated by LANL for Fish Collected in 2005 Maximum Number of Meals/Month[2] for Noncancerous Health Endpoints[3]	N/A[5]	N/A[5]	NL[4]	NL[4]	N/A[5]	N/A[5]	NL[4]	N/A[5]	NL[4]	NL[4]
Fish Consumption Limits Calculated by LANL for Fish Collected in 2005 Maximum Number of Meals/Month for Cancer Health Endpoints[6]	N/A[5]	N/A[5]	12	8	N/A[5]	N/A[5]	NL[4]	N/A[5]	NL[4]	NL[4]

[1] USA EPA guidelines [USEPA, 2000b]

[2] Meal size is 8 oz (.227kg) calculate for an adult with a body weight of 70 kg (154 lbs).

[3] Chronic, systemic effects.

4 EPA has no limits listed for these concentrations.

5 N/A means sample not available or consumption limits not calculated for species.

6 Cancer values represent tissue concentrations at a 1 in 100,000 risk level

The mean total PCBs indicate recommended consumption limits for catfish and carp for cancerous health endpoints for both Abiquiu and Cochiti Reservoirs. The EPA's recommended meals/month limit based on total PCBs are 16 for carp, catfish, and rainbow trout, and no limits are recommended for smallmouth bass and walleye at Abiquiu Reservoir (Table 7-3). Concerning carcinogenic health endpoints for Cochiti Reservoir, the EPA's recommended meals/month limit based on total PCBs are 1 for common carp, 4 for catfish, and 8 for walleye (Table 7-3). While total PCBs in catfish

samples declined from 2005 to 2006 at Abiquiu Reservoir, there is an increase for those collected at Cochiti Reservoir (Table 7-3). In addition, no fish consumption limits were recommended for walleye collected in 2005 by LANL from Cochiti Reservoir, whereas current total PCB concentrations warrant a recommendation of 8 meals per month based on the cancer health endpoints (Table 7-3).

The EPA's recommended fish consumption limits for dioxin-like PCB congeners based on the carcinogenic health endpoints for TEQs calculated for Abiquiu Reservoir indicate meals per month should be limited to 2 for catfish, 3 for rainbow trout, and no limits for carp, smallmouth bass, or walleye (Table 7-4). Referring to carcinogenic health endpoints for Cochiti Reservoir, the EPA's recommended meals per month limit based on the dioxin-like PCB congener TEQs for the consumption of fish is 8 for carp, 1 for catfish, and 4 for walleye (Table 7-4). While the dioxin-like PCB congeners in catfish decline from 2005 to 2006 at Abiquiu Reservoir, there is an increase for those collected at Cochiti Reservoir. In addition, no fish consumption limits for walleye were identified for samples taken in 2005 by LANL from Cochiti Reservoir, whereas 4 meals per month based on the cancer health endpoints would be recommended for the 2006 walleye sample (Table 7-4). These results suggest a reversal of the declining trend LANL observed in the dioxin-like PCB congener concentrations in catfish and walleye at Cochiti Reservoir (Table 7-4).

Table 7-4 PCB Dioxin TEQ's and EPA Recommended Monthly Fish Consumption Limits for Fish Collected in October 2006 from Abiquiu and Cochiti Reservoirs Compared with those Provided by LANL for Fish Collected in August 2005 [1][NMED, 2007f; Gonzales and Fresquez, 2006].

EPA Recommended Fish Consumption Limits for Fish Collected by NMED DOE-OB/SWQB October 2006 and LANL August 2005	Carp		Catfish		Rainbow Trout		Smallmouth Bass		Walleye	
	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir	Abiquiu Reservoir	Cochiti Reservoir
NMED DOE-OB/SWQB PCB Dioxin TEQ (ppt)	.019	.071	0.205	0.311	0.187	N/A	0.012	N/A	0.002	0.098
NMED DOE-OB/SWQB Maximum Number of Meals/Month[2] for Cancer Health Endpoints[3] based on TEQ[6]	NL[4]	8	2	1	3	N/A[5]	NL[4]	N/A[5]	NL[4]	4
Fish Consumption Limits Calculated by LANL for Fish Collected in 2005 Maximum Number of Meals/Month[2] for Cancer Health Endpoints[3] based on TEQ[6]	N/A[5]	N/A[5]	2	2	N/A[5]	N/A[5]	NL[4]	N/A[5]	NL[4]	NL[4]

[1] USA EPA guidelines [USEPA, 2000b]

[2] Meal size is 8 oz (.227kg) calculate for an adult with a body weight of 70 kg (154 lbs).

[3] Chronic, systemic effects.

4 EPA has no limits listed for these concentrations.

5 N/A means sample not available or consumption limits not calculated for species.

6 Cancer values represent tissue concentrations at a 1 in 100,000 risk level.

7.4 Conclusion for Fish Consumption Limits in the RGBACD

The mean total PCB fish tissue concentrations for each species collected in 2006 at Cochiti Reservoir by the NMED are higher than those recorded by LANL in 2005. In

addition, species comparisons from fish collected between Abiquiu and Cochiti by NMED in 2006 indicate higher concentrations of total PCBs in fish collected from Cochiti Reservoir. While TEQ calculations changed between 2005 and the 2006 study, reviewing results from both formulas provided no indication that dioxin-like PCB concentrations are declining. These results do not indicate any decline in the concentrations of PCBs in fish. Furthermore, the findings provide support for expanding the fish consumption advisory notices to include notice for any recommended category.

8.0 Recommendations

Five primary recommendations are given based on the results of this study. While collectively these recommendations are not exhaustive, implementation of each can further characterize and assist in decreasing PCBs in New Mexico and the consumption of PCB-laden fish, therefore decreasing the potential health risk posed by the contaminant.

First, the State of New Mexico should coordinate with the appropriate tribal and federal entities to issue a fish consumption advisory based on the 2006 fish tissue results in Tables 7-3 and 7-4. In addition, the State should adopt advisory and consumption components for issuing PCB fish consumption advisories. Advisories should be issued based on the EPA's most recent recommended fish consumption limit tables issued by the agency, including tables for total PCBs and Dioxin/Furan for TEQ concentrations, unless or until a more detailed protocol is adopted. Consumption advisories should be issued using the most conservative limits identified. For example, if PCB TEQ limits are more stringent than total PCB limits then consumption limits should be issued based on

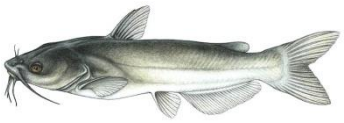
TEQ's that are compared with the Dioxin/Furan consumption limit table. The recommended advisory and consumption components should:

1. Provide easily understood meal frequencies.
2. Provide a statement on cancer risk and sensitive populations.
3. Provide a statement on benefits of fish consumption.
4. Provide a general statement about contaminant.
5. Provide preparation and cooking advice. [See USEPA, 2007d]

An example of an advisory consisting of each of the components that would be issued for the Cochiti Reservoir consumption limits (Table 7-4) is provided below (Figure 8-1). The language used has been written at a 10^{th} grade level in English to provide an easily understood notice, while also conveying steps that can be taken to minimize exposure. The example notice provided does not address the issues related to New Mexicans speaking a variety of languages, although this should be taken into consideration when issuing notices based on current state policy.

Second, future sample collection in the RGBACD for the purpose of pinpointing contributing sources should be planned in the context of existing PCB levels. Incident, PCB activity organizations, and landfill sites provide the most likely contributing sources of PCBs in the RGBACD. Since the impact from PCBs in the RGBACD is most likely derived from a multitude of sources, and the cost of each congener analysis can exceed $1,100, it will be necessary to prioritize sampling plans. Contributing source assessment sampling in the Chama River should begin with the Northern Rio Arriba Electric Coop PCB activity generator site identified in Appendix B. For the Santa Fe River, an initial sampling plan for source assessment should begin at the Public Service of New Mexico Electrical Generating Site, (35.677227,-105.958055). In the Rio Grande, the sites where sampling should initially be conducted are at the LANL closed landfill, (35.8439, -106.2633), and the Kit Carson

PCB RELATED FISH CONSUMPTION LIMITS FOR COCHITI RESERVOIR

Carp	Catfish	Walleye
1 MEAL A MONTH	1 MEAL A MONTH	4 MEALS A MONTH
		

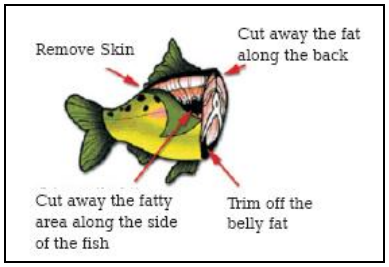
The consumption limits are based on and adult weighing 154 pounds. Women who are or may become pregnant, nursing mothers, young children, and people who regularly consume fish may need to take additional precautions.

Polychlorinated Biphenyls (PCBs) are a regulated contaminant in New Mexico. Eating fish containing PCBs is the primary way humans are exposed to the contaminant.

COOKING and PREPARATION

Eating fish can be a healthy part of a well balanced diet. Exposure to contaminants can be decreased by preparing and cooking fish in ways that reduce the amount of contaminant and by varying the type and source of fish consumed. This includes choosing smaller fish, and consuming leaner fish such as bass, trout, and walleye over fish with higher fat content such as carp and catfish. There are several methods for reducing contaminants in edible portions of fish:

- Before cooking, remove the skin from the fillet and remove fat tissue from the belly and dorsal areas.
- Allow fat to drip away when broiling, baking or grilling
- Discard fat or broth from broiled or poached fish.



Images taken from Ohio EPA Fish Advisory Program Advisory located @ http://web.epa.state.oh.us/dsw/fishadvisory/Eat%20Your%20Catch_1page.pdf

Figure 8-1 Example of Recommended Fish Consumption Advisory Notice

Coop PCB activity generator site listed in Appendix B. The suggested strategy for sampling each of these sites is to collect storm water samples along the runoff path closest to the waterbody.

Third, the State of New Mexico should develop and conduct a survey of PCBs in storm water above, below, and within the ephemeral and intermittent channels draining the canyons on LANL property with the potential to reach the Rio Grande. Sampling results would provide insight into whether storm water drainages are in compliance with WQS, In addition, homologue and congener patterns from samples taken using the recommended plan could further assist in pinpointing sources.

Fourth, the State of New Mexico should consider providing incentives for retiring PCB equipment still in use beginning with the entities identified in Appendix B, Table B-3. Generators and electric providers currently have no deadlines for phasing out remaining uses of PCBs and the high economic costs associated with decommissioning equipment inhibits the elimination of these PCB contributing sources. *The Binational Toxics Strategy Options for Reducing PCBs* discusses potential reduction opportunities for PCBs including the identification of incentives that address the issues stemming from the high economic costs associated with retiring equipment [GLBTS, 2007]. Recommendations include;

1. Targeted enforcement to encourage disposal
2. Reward facilities that conduct audits and inventories and accelerate disposal
3. Good public relations for companies that remove PCBs
4. Support innovative PCB destruction technology
5. Provide tax credits or other financial benefits for PCB removal
6. Use supplemental environmental projects (SEPs) to obtain increased PCB removal
7. Use economies of scale, e.g., larger utilities share expertise with/smaller companies (mentoring programs); smaller coops join together to reduce PCBs
8. Companies with PCB pollution prevention programs move to top of permit / licensing list
9. Reduce licensing / permitting fees for voluntary
10. PCB reduction programs

Fifth, additional sampling is needed above Abiquiu Reservoir and on the Rio Grande above the Chama confluence. In order to further identify the sources affecting Abiquiu Reservoir fish and surface waters, it will be necessary to collect samples along the Chama River from the Colorado/New Mexico border to Abiquiu Reservoir that includes samples collected above and below the Rio Chamita. In addition, the EPA National Fish Study, that included Navajo Reservoir which is located within the San Juan Basin, identified elevated levels of PCBs in fish tissue in 2000 indicating that PCBs are present in the watershed. Therefore, San Juan/Chama diversion water, which is diverted from the San Juan Basin into the Chama River, should be sampled in order to eliminate the possibility that this water is compromising water quality below the diversion outfall. Additional bracketed surface water samples collected simultaneously along the Rio Grande above and below the confluences of select tributaries and on the Colorado/New Mexico border would assist in further identifying contributing sources above the Chama confluence. These tributaries include Arroyo Hondo, Rio Pueblo de Taos, and Red River. Finally, tissue from hatchery fish transferred into waterbodies in the RGBACD should be analyzed, beginning with those at the Red River Fish Hatchery, to confirm PCB-laden fish are not being stocked inadvertently.

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APPENDIX A: Total PCB Sample Results Collected in New Mexico within the RGBACD as of 12/05/2006

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USEPA, 2007b	Public Service Company of New Mexico	3/17/1976	35.68	-105.945	W	Effluent	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	11/29/1977	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	2/1/1978	37.078611	-105.75694	W	N/A	Aroclor			

[1] Upstream of LANL is approximately 1 km up river from the Otowi Bridge to where Pojoaque Creek meets the Rio Grande; Downstream of LANL consists of the area between the confluence of Capulin Canyon and the inlet to Cochiti Reservoir

[2] W=Water Sample, SED=Sediment Sample taken from water, SPMDs=Semipermeable Membrane Devices, Biota=Tissue Sample, SO=Dry Sediment Sample

[3] Effluent=Sample taken from pipe for NPDES monitoring, SW=Storm water Sample

[4] Aroclor analysis was conducted for one or more of Aroclors 1221,1232, 1242, 1248, 1254, and 1260. Congener values are the total summation of 209 congeners.

[5] Congener analysis data for water samples where blanks were equal to or greater than 10% of the average level of total PCBs were blank corrected based on the blank+2×σ_b in order to ensure a low probability (5%) of false positives compared to subtraction of the average blank only [Ferrario et al., 1997]. Samples results for mediums other than water samples are only blank corrected if a "BC" is included in the samples Notes column.

[6] Samples with blank values represent non-detect (ND), below detection limit (BDL), undetected (U), or data not analyzed (NA), and unless specifically referenced these data points were not used in this report's data analyses.

[7] Units are expressed as a concentration for simplification.

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/11/1978	36.078611	-106.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/11/1978	37.078611	-105.75694	SED	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/9/1978	35.874722	-106.14167	SED	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/9/1978	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	8/17/1978	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	2/20/1979	36.078611	-106.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/17/1979	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/17/1979	37.078611	-105.75694	SED	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/9/1979	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/9/1979	35.874722	-106.14167	SED	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	8/23/1979	37.078611	-105.75694	W	N/A	Aroclor (1254)	0.1	ppb	
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	11/1/1979	37.078611	-105.75694	SED	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	11/7/1979	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	2/8/1980	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/28/1980	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	8/6/1980	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/6/1980	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08276300 RIO PUEBLO DE TAOS BELOW LOS CORDOVAS, NM	7/6/1981	36.379167	-105.66667	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/19/1981	35.874722	-106.14167	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	11/3/1981	37.078611	-105.75694	SED	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	3/23/1982	36.32	-105.75389	SED	N/A	Aroclor			
USGS, 2006	USGS 08266820 RED RIVER BELOW FISH HATCHERY, NEAR QUESTA, NM	3/24/1982	36.682778	-105.65389	SED	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	4/20/1982	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/24/1982	37.078611	-105.75694	W	N/A	Aroclor			
USGS, 2006	USGS 08251500 RIO GRANDE NEAR LOBATOS, CO	5/24/1982	37.078611	-105.75694	SED	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	8/18/1982	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	10/1/1982	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR	8/25/1983	36.32	-105.75389	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
	TAOS, NM									
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	10/3/1983	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	9/5/1984	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	9/17/1985	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	9/17/1985	35.874722	-106.14167	W	N/A	Aroclor			
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor	0.3	ppb	Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor	0.16	ppb	Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Brown Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Rainbow Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Rainbow Trout	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	Carp	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USFWS, 1992	Upper Reach of the Rio Grande	1987	N/A	N/A	Biota	White Sucker	Aroclor			Upper Reach is the Rio Grande Basin from the Colorado Border to Cochiti Reservoir
USGS, 2006	USGS 08281100 RIO GRANDE ABOVE SAN JUAN PUEBLO, NM	7/22/1987	36.056944	-106.08167	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	7/22/1987	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08281100 RIO GRANDE ABOVE SAN JUAN PUEBLO, NM	9/23/1987	36.056944	-106.08167	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	9/23/1987	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08281100 RIO GRANDE ABOVE SAN JUAN PUEBLO, NM	11/18/1987	36.056944	-106.08167	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/18/1987	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/31/1988	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08281100 RIO GRANDE ABOVE SAN JUAN PUEBLO, NM	9/1/1988	36.056944	-106.08167	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/3/1988	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	9/26/1989	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	3/1/1990	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/21/1990	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/27/1990	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 1993	Rio Grande near Creede, CO	09/1992 to 03/1993	37.822778	-106.90806	Biota	White Sucker	Aroclor			
USGS, 1993	Saguache Creek near Saguache, CO	09/1992 to 03/1993	38.163333	-106.29	Biota	White Sucker	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 1993	Rio Grande near Alamosa Refuge, CO	09/1992 to 03/1993	37.39	-105.78333	Biota	Common Carp	Aroclor			
USGS, 1993	La Jara Creek at Alamosa County Line, CO	09/1992 to 03/1993	37.356667	-105.85167	Biota	White Sucker	Aroclor			
USGS, 1993	Rio Grande below Taos Junction Bridge near Taos	09/1992 to 03/1993	36.32	-105.75389	Biota	White Sucker	Aroclor			
USGS, 1993	Rito de los Frijoles below Frijoles Falls, NM	09/1992 to 03/1993	35.753056	-106.25278	Biota	Rainbow Trout	Aroclor			
USEPA, 2007b	Heron Lake Deep Dam	8/14/1991	36.680833	-106.70806	W	N/A	Aroclor			
USEPA, 2007b	Canjilon Lake #6 Near Dam	8/27/1991	36.548889	-106.34111	W	N/A	Aroclor			
USGS	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/27/1991	36.072778	-106.10944	W	N/A	Aroclor			
USEPA, 2007b	Cabresto Lake	9/24/1991	36.748056	-105.49667	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/19/1991	36.072778	-106.10944	W	N/A	Aroclor			
USEPA, 2007b	Rio Hondo at Rio Grande Confluence	8/19/1992	36.535833	-105.70833	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	9/1/1992	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08317200 SANTA FE RIVER ABOVE COCHITI LAKE, NM	11/4/1992	35.547222	-106.22889	SED	N/A	Aroclor			
USGS, 1993	Rio Pueblo de Taos below Los Cordovas, N.M.	11/12/1992	36.3775	-105.66806	Biota	White Sucker	Aroclor	57	ppb	
USGS, 2006	USGS 08276300 RIO PUEBLO DE TAOS BELOW LOS CORDOVAS, NM	11/12/1992	36.379167	-105.66667	SED	N/A	Aroclor			
USGS, 2006	RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	11/13/1992	36.32	-105.75389	SED	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	11/13/1992	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/25/1992	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	RIO CHAMA NEAR CHAMITA, NM	2/24/1993	36.072778	-106.10944	SED	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	2/24/1993	36.072778	-106.10944	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/25/1993	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	8/26/1993	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/22/1993	36.072778	-106.10944	W	N/A	Aroclor			
USEPA, 2007b	Stone Lake Deep/Lake Center Near Dam Western Gulf	7/19/1994	36.715278	-106.88556	W	N/A	Aroclor			
USEPA, 2007b	Embudo Creek at the HWY Bridge Near Dixon	7/27/1994	36.210833	-105.91306	W	N/A	Aroclor			
USEPA, 2007b	Rio Grande at Otowi Bridge	8/8/1994	35.874722	-106.14167	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/9/1994	36.072778	-106.10944	W	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	8/10/1994	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	9/26/1994	36.32	-105.75389	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USEPA, 2007b	Rio Tesuque @ HWY 285 Bridge Blw Tesuque	11/2/1994	35.779722	-105.94583	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	11/15/1994	36.072778	-106.10944	W	N/A	Aroclor			
USEPA, 2007b	Cochiti Lake at the Dam	7/19/1995	35.616.667	-106.32194	W	N/A	Aroclor			
USEPA, 2007b	Cochiti Lake Near Bland Canyon	7/19/1995	35.674167	-106.30833	W	N/A	Aroclor			
USEPA, 2007b	Santa Fe River Abv Lone Star Mine	8/2/1995	35.551667	-106.2	W	N/A	Aroclor			
USEPA, 2007b	Santa Fe River Abv Rio Grande	8/2/1995	35.598056	-106.33889	W	N/A	Aroclor			
USEPA, 2007b	Rio Grande at Cochiti South Boundary	8/23/1995	35.588056	-106.30611	W	N/A	Aroclor			
USEPA, 2007b	Rio Grande at Angostura Diversion Dam	8/23/1995	35.379167	-106.49444	W	N/A	Aroclor			
USEPA, 2007b	Rio Grande at San Felipe Boundary	8/23/1995	35.548056	-106.37417	W	N/A	Aroclor			
USGS, 2006	USGS 08290000 RIO CHAMA NEAR CHAMITA, NM	8/23/1995	36.072778	-106.10944	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USGS, 2006	USGS 08276500 RIO GRANDE BLW TAOS JUNCTION BRIDGE NEAR TAOS, NM	8/24/1995	36.32	-105.75389	W	N/A	Aroclor			
USGS, 2006	USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM	8/28/1995	35.874722	-106.14167	W	N/A	Aroclor			
USFWS, 2002	Pajarito, upper site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener			Sample PUS1-P (A-C) Sample [Average]
USFWS, 2002	Pajarito, lower site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener	0.003	ppb	Sample PLS1-P
USFWS, 2002	Sandia; upper site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener	0.154	ppb	Sample SUSM1-P
USFWS, 2002	Sandia; lower site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener	0.1336	ppb	Sample SLSM1-P
USFWS, 2002	Los Alamos, upper site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener			Sample LUSM1-P
USFWS, 2002	Los Alamos, lower site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener			Sample LLSM1-P
USFWS, 2002	Valle, upper site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener	0.0395	ppb	Sample VUS1-P GCR(1-3) [Average]

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
USFWS, 2002	Valle, lower site	7/30/1997-10/1/1997	N/A	N/A	SED	N/A	Congener	0.0175	ppb	Sample VLS1-P
USFWS, 2002	Pajarito	9/30/1997	N/A	N/A	Biota	Fathead Minnows	Congener	0.2241	ppb	Caged Fish Sample F04
USFWS, 2002	Sandia	9/30/1997	N/A	N/A	Biota	Fathead Minnow	Congener	1.5194	ppb	Caged Fish Sample F03
USFWS, 2002	Los Alamos Canyon	9/30/1997	N/A	N/A	Biota	Fathead Minnow	Congener	0.3118	ppb	Caged Fish Sample F02
USFWS, 2002	Canyon de Valle	9/30/1997	N/A	N/A	Biota	Fathead Minnows	Congener	0.3573	ppb	Caged Fish Sample F05 GCR (1-3) [Average]
USEPA, 2007b	El Vado Reservoir-Shallow in Chama Arm at Shale	7/22/1998	36.63	-106.74861	W	N/A	Aroclor			
USEPA, 2007b	Rio Chama 2 Miles Downstream of La Puenta Gage	8/19/1998	36.665833	-106.65972	W	N/A	Aroclor			
USEPA, 2007b	Rio Chamita Blw Chama Outfall	8/19/1998	36.879167	-106.58694	W	N/A	Aroclor			
NMED-SWQB	Rio Chama above Abiquiu Reservoir @ USGS gage * 29RChama079.5	7/28/1999	36.327222	-106.61833	W	N/A	Aroclor			
NMED-SWQB	Rio Ojo Caliente @ Hwy 414 @ Hot Springs bridge * 29ROjoCa026.1	7/28/1999	36.305003	-106.04973	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Rio Chama nr Chamita immed ds of HWY 74 bridge -- USGS 0829000 * 29RChama004.8	7/28/1999	36.0728	-106.1094	W	N/A	Aroclor			
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	1900	ppb	O/C Pesticides & PCBs
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	270	ppb	O/C Pesticides & PCBs
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	250	ppb	O/C Pesticides & PCBs
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	210	ppb	O/C Pesticides & PCBs
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	140	ppb	O/C Pesticides & PCBs
NMED, 1990	B-11	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	110	ppb	O/C Pesticides & PCBs
NMED, 1990	B-12	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	510	ppb	O/C Pesticides & PCBs
NMED, 1990	B-12	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	460	ppb	O/C Pesticides & PCBs

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED, 1990	B-12	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	390	ppb	O/C Pesticides & PCBs
NMED, 1990	B-12	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	50	ppb	O/C Pesticides & PCBs
NMED, 1990	B-12	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	50	ppb	O/C Pesticides & PCBs
NMED, 1990	B-5	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	6100	ppb	O/C Pesticides & PCBs
NMED, 1990	B-5	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	1200	ppb	O/C Pesticides & PCBs
NMED, 1990	B-5	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	220	ppb	O/C Pesticides & PCBs
NMED, 1990	B-5	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	160	ppb	O/C Pesticides & PCBs
NMED, 1990	B-7	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	160	ppb	O/C Pesticides & PCBs
NMED, 1990	B-7	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	60	ppb	O/C Pesticides & PCBs
NMED, 1990	B-7	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	43	ppb	O/C Pesticides & PCBs

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED, 1990	B-8	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	160	ppb	O/C Pesticides & PCBs
NMED, 1990	B-8	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	150	ppb	O/C Pesticides & PCBs
NMED, 1990	B-8	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	150	ppb	O/C Pesticides & PCBs
NMED, 1990	B-8	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	100	ppb	O/C Pesticides & PCBs
NMED, 1990	B-9	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	460	ppb	O/C Pesticides & PCBs
NMED, 1990	B-9	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	150	ppb	O/C Pesticides & PCBs
NMED, 1990	B-9	9/28/1999	35.675556	-105.96028	SO	Sub-surface Soil	Aroclor	95	ppb	O/C Pesticides & PCBs
NMED, 1990	S-10	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	60	ppb	O/C Pesticides & PCBs
NMED, 1990	S-11	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	230	ppb	O/C Pesticides & PCBs
NMED, 1990	S-14	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	100	ppb	O/C Pesticides & PCBs

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED, 1990	S-23	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	130	ppb	O/C Pesticides & PCBs
NMED, 1990	S-25	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	60	ppb	O/C Pesticides & PCBs
NMED, 1990	S-28	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	3800	ppb	O/C Pesticides & PCBs
NMED, 1990	S-29	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	500	ppb	O/C Pesticides & PCBs
NMED, 1990	S-31	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	170	ppb	O/C Pesticides & PCBs
NMED, 1990	S-8	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	60	ppb	O/C Pesticides & PCBs
NMED, 1990	S-8	9/28/1999	35.675556	-105.96028	SO	Surface Soil	Aroclor	58	ppb	O/C Pesticides & PCBs
NMED-SWQB	Rio Grande nr Arroyo Hondo at John Dunne Bridge -- USGS 08268700 *28RGrand665.0	7/31/2000	36.5344	-105.7094	W	N/A	Aroclor			
NMED-SWQB	Costilla Creek above Amalia at Hwy 196 culvert bridge * 28RCosti014.7	8/2/2000	36.919167	-105.44639	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Rio Grande blw Taos Junc Bridge- - USGS 08276500 * 28RGrand647.9	8/13/2000	36.32	-105.75389	W	N/A	Aroclor			
NMED-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Carp	Congener	88.52	ppb	COCH-01 Whole Carp (with internal organs)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Catfish	Congener	34.22	ppb	COCH-02 Whole Channel Catfish (with internal organs)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Northern Pike	Congener	24.26	ppb	COCH-03 9-10 lb Northern Pike (skin-on fillet)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Walleye	Congener	6.23	ppb	COCH-04 4-6 lb Walleye Pike (skin-on fillet)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Catfish	Congener	40.62	ppb	COCH-05 31 cm Channel Catfish (whole-gutted fish)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Carp	Congener	8.715	ppb	COCH-06 (Average of Duplicate Sample)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Walleye	Congener	6.23	ppb	COCH-07 4 to 6 lb Walleye Pike (skin-on fillet)
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	White Bass	Congener	4.99	ppb	COCH-08 Two 16cm White Bass (heads and guts removed) - Composite
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Catfish	Congener	16.24	ppb	COCH-09 29 cm Channel Catfish (whole-gutted fish)

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Cochiti	8/23/2000	N/A	N/A	Biota	Carp	Congener	10.87	ppb	COCH-10 31 cm Carp (Whole-gutted fish)
NMED-SWQB	Santa Fe River at lower wilderness boundary * 30SantaF061.2	8/30/2000	35.716667	-105.80167	W	N/A	Aroclor			
NMED-SWQB	Santa Fe River above Nichols Reservoir at gage 08316000 * 30SantaF055.4	8/30/2000	35.6868	-105.843	W	N/A	Aroclor			
NMED-DOE-OB	Abiquiu Reservoir	12/20/2000	N/A	N/A	Biota	Smallmouth Bass	Congener	2.206305	ppb	Abiquiu ABQ-01Smallmouth Bass Fillets (5 fish)
NMED-DOE-OB	Abiquiu Reservoir	12/20/2000	N/A	N/A	Biota	Walleye	Congener	1.144282	ppb	Abiquiu ABQ-02 Walleye Pike Fillets (2 fish)
NMED-DOE-OB	Abiquiu Reservoir	12/20/2000	N/A	N/A	Biota	Catfish	Congener	27.528638	ppb	Abiquiu ABQ-03 Dressed Catfish (2 fish composite)
NMED-DOE-OB	Abiquiu Reservoir	12/20/2000	N/A	N/A	Biota	Carp	Congener	9.8462	ppb	Abiquiu ABQ-04 1.2 kg Carp
NMED-DOE-OB	Abiquiu Reservoir	12/20/2000	N/A	N/A	Biota	Carp	Congener	12.725695	ppb	Abiquiu ABQ-05 750 gm Carp
NMED-DOE-OB	South Fork Sandia Canyon SFSA-01	12/20/2000	N/A	N/A	Biota	Odanata	Congener	166.55706	ppb	Sandia Canyon Odonata (Sandia Canyon, LANL)
NMED-SWQB	Rito de los Frijoles above Upper Falls * 30RFrijo003.8	9/18/2001	35.7809	-106.27301	W	N/A	Aroclor			

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14001	Upstream of LANL Sample ID#RGTRTCARP 1	5/2/2002	N/A	N/A	Biota	Carp	Congener	20.2	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP 2	5/2/2002	N/A	N/A	Biota	Carp	Congener	86.6	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP 3	5/2/2002	N/A	N/A	Biota	Carp	Congener	13.4	ppb	
LA-14001	Upstream of LANL Sample ID#RGTRTCARP 4	5/2/2002	N/A	N/A	Biota	Carp	Congener	17.3	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #1	5/7/2002	N/A	N/A	Biota	Catfish	Congener	45.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #12	5/7/2002	N/A	N/A	Biota	Catfish	Congener	6.79	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #18	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.85	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #2	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.9	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #3	5/7/2002	N/A	N/A	Biota	Catfish	Congener	11.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #4	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.67	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #5	5/7/2002	N/A	N/A	Biota	Catfish	Congener	8.5	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #6	5/7/2002	N/A	N/A	Biota	Catfish	Congener	9.86	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #7	5/7/2002	N/A	N/A	Biota	Catfish	Congener	20.6	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #8	5/7/2002	N/A	N/A	Biota	Catfish	Congener	18.2	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 1C	5/7/2002	N/A	N/A	Biota	Carp	Congener	34.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 2C	5/7/2002	N/A	N/A	Biota	Carp	Congener	31.4	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 3C	5/7/2002	N/A	N/A	Biota	Carp	Congener	10.5	ppb	
LA-14001	Downstream of LANL Above Cochiti Dam Sample ID #RGSI 4C	5/7/2002	N/A	N/A	Biota	Carp	Congener	243	ppb	
LA-14001	Upstream of LANL Sample ID#10	5/9/2002	N/A	N/A	Biota	Catfish	Congener	30.4	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14001	Upstream of LANL Sample ID#18	5/9/2002	N/A	N/A	Biota	Catfish	Congener	13.6	ppb	
LA-14001	Upstream of LANL Sample ID#19	5/9/2002	N/A	N/A	Biota	Catfish	Congener	37.5	ppb	
LA-14001	Upstream of LANL Sample ID#21	5/9/2002	N/A	N/A	Biota	Catfish	Congener	27.9	ppb	
LA-14001	Upstream of LANL Sample ID#8	5/9/2002	N/A	N/A	Biota	Catfish	Congener	30.4	ppb	
LA-14200	Ancho Canyon	8/1/2002	N/A	N/A	SPMD's	N/A	Congener	3.98	ppb	
LA-14200	Ancho Canyon	8/1/2002	N/A	N/A	SPMD's	N/A	Congener	3.13	ppb	
LA-14200	Otowi Bridge	8/1/2002	35.874726	-106.14167	SPMD's	N/A	Congener	3.12	ppb	
LA-14200	Otowi Bridge	8/1/2002	35.874726	-106.14167	SPMD's	N/A	Congener	2.82	ppb	
LANL/NMED	Rio Grande below Ancho	8/6/2002	35.77	-106.219	W	N/A	Congener	0.000505	ppb	AU0207WAGRB01
LANL/NMED	Rio Grande below Ancho	8/6/2002	35.77	-106.219	W	N/A	Congener	0.000608	ppb	AU0207WAGRE01

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LANL/NMED	Rio Grande below Ancho	8/6/2002	35.77	-106.219	W	N/A	Congener	0.000525	ppb	AU0207WAGRP01
LANL/NMED	Rio Grande @ Otowi Bridge	8/7/2002	35.874726	-106.14167	W	N/A	Congener	0.00102	ppb	AU0207WUORB01
LANL/NMED	Rio Grande @ Otowi Bridge	8/7/2002	35.874726	-106.14167	W	N/A	Congener	0.000586	ppb	AU0207WUORE01
LANL/NMED	Rio Grande at Otowi Bridge	8/7/2002	35.874726	-106.14167	W	N/A	Congener	0.000486	ppb	AU0207WUORP01
LANL/NMED	Sandia below Wetlands	8/8/2002	35.8731	-106.31	W	N/A	Congener	0.22962	ppb	AU0207W123B01
LANL/NMED	Sandia below Wetlands	8/8/2002	35.8731	-106.31	W	N/A	Congener	0.210915	ppb	AU0207W123P01
LANL/NMED	Sandia below Wetlands	8/8/2002	35.8731	-106.31	W	N/A	Congener	0.251113	ppb	AU0207W123E01
NMED-DOE-OB	Rio Grande @ Otowi Bridge	8/9/2002	35.874726	-106.14167	W	N/A	Congener	0.0004	ppb	
LANL/NMED	Rio Grande below Ancho	8/19/2002	35.77	-106.219	W	N/A	Congener		ppb	AU02080WAGR01
LANL/NMED	Sandia below Wetlands	8/20/2002	35.8731	-106.31	W	N/A	Congener	0.16823	ppb	AU02080W12301

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LANL/NMED	Rio Grande @ Otowi Bridge	8/21/2002	35.874726	-106.14167	W	N/A	Congener	0.000166	ppb	AU02080WUOR01
LANL/NMED	Pajarito above SR-4	8/25/2002	35.8241	-106.228	W	N/A	Congener	0.004616	ppb	AU0208E250E01
LANL/NMED	Rio Grande @ Otowi Bridge	8/28/2002	35.874726	-106.14167	W	N/A	Congener		ppb	AU02081WUOR01
LANL/NMED	Sandia below Wetlands	8/28/2002	35.8731	-106.31	W	N/A	Congener	0.074276	ppb	AU02081W12301
LANL/NMED	Rio Grande below Ancho	9/5/2002	35.77	-106.219	W	N/A	Congener	0.000069	ppb	AU02090WAGR01
LANL/NMED	Water below SR-4	9/10/2002	35.8049	-106.242	W	N/A	Congener	0.029425	ppb	AU0209E265E01
LANL/NMED	Water below SR-4	9/10/2002	35.8049	-106.242	W	N/A	Congener	0.035662	ppb	AU0209E265E02
NMED-DOE-OB	Rio Grande at Embudo	3/11/2003	N/A	N/A	SED	N/A	Congener	0.20298	ppb	AN03070SODU01
NMED-DOE-OB	Sandia Canyon	3/11/2003	35.873921	-106.31928	W	Effluent	Congener	0.00643	ppb	
NMED-DOE-OB	Canada del Buey	3/19/2003	35.852338	-106.27648	W	Effluent	Congener	0.00368	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LANL/NMED	Rio Chama at Chamita	3/25/2003	N/A	N/A	SED	N/A	Congener	0.07246	ppb	AN03070SATI01
NMED-DOE-OB	Effluent Canyon	3/27/2003	35.862232	-106.29817	W	Effluent	Congener	0.00468	ppb	
LANL/NMED	Rio Grande at Otowi Bridge	4/1/2003	35.874722	-106.14167	SED	N/A	Congener	0.02706	ppb	AN03070SOGR01
LANL/NMED	Rio Grande near White Rock	4/1/2003	35.78086	-106.20642	SED	N/A	Congener	0.05893	ppb	AN03070SWGR02
LANL/NMED	Santa Fe River near Santa Fe	6/16/2003	N/A	N/A	SED	N/A	Congener	0.41189	ppb	AN03070SFSB01
LANL/NMED	Rio Grande near White Rock	6/20/2003	35.78086	-106.20642	SED	N/A	Congener	0.12884	ppb	AN03070SWGR01
LA-14200	Ancho Canyon	7/1/2003	N/A	N/A	SPMD's	N/A	Congener	3.15	ppb	
LA-14200	Below Cochiti	7/1/2003	N/A	N/A	SPMD's	N/A	Congener	16.97	ppb	
LA-14200	Embudo	7/1/2003	N/A	N/A	SPMD's	N/A	Congener	4.02	ppb	
LA-14200	Embudo	7/1/2003	N/A	N/A	SPMD's	N/A	Congener	3.45	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14200	Otowi Bridge	7/1/2003	35.874726	-106.14167	SPMD's	N/A	Congener	3.04	ppb	
LANL/NMED	Rio Grande at Otowi Bridge	8/9/2003	35.874726	-106.14167	W	N/A	Congener	0.000404	ppb	AU03090TOGR01
NMED-DOE-OB	Los Alamos Canyon	8/19/2003	35.874753	-106.27168	W	SW	Congener	0.803	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/23/2003	35.872626	-106.26009	W	SW	Congener	16.9	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/25/2003	35.874779	-106.2719	W	SW	Congener	14.2	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/25/2003	35.873911	-106.27323	W	SW	Congener	0.0587	ppb	
LANL/NMED	Rio Grande below Ancho	8/25/2003	35.77	-106.219	W	N/A	Congener	0.011596	ppb	AU03080TAGR01
LANL/NMED	Rio Grande at Otowi Bridge	8/25/2003	35.874726	-106.14167	W	N/A	Congener	0.009322	ppb	AU03080TOGR01
LANL/NMED	Santa Fe River above WWPT outfall	8/29/2003	N/A	N/A	W	N/A	Congener	0.923439	ppb	AU03090TOPT01
NMED-DOE-OB	Los Alamos Canyon	9/3/2003	35.872626	-106.26009	W	SW	Congener	4.07	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Pueblo Canyon	9/6/2003	35.870867	-106.217	W	SW	Congener	2.49	ppb	
LANL/NMED	Rio Grande at Otowi Bridge	9/6/2003	35.874726	-106.14167	W	N/A	Congener	0.000439	ppb	AU03090TOGR02
LANL/NMED	Rio Grande near White Rock	9/6/2003	35.78086	-106.20642	W	N/A	Congener	0.00027	ppb	AU03090TWGR01
LANL/NMED	Rio Grande below Espanola	9/6/2003	35.980837	-106.07778	W	N/A	Congener	0.000153	ppb	AU03090TEGR01
LANL/NMED	Rio Grande below Espanola	9/10/2003	35.980837	-106.07778	W	N/A	Congener	0.006816	ppb	AU03090TEGR02
LANL/NMED	Rio Chama at Chamita	9/10/2003	36.072778	-106.10944	W	N/A	Congener	0.003235	ppb	AU03090TATI01
NMED-DOE-OB	Tensite Canyon	10/3/2003	35.861679	-106.286	W	SW	Congener	0.0071	ppb	
NMED-DOE-OB	Mortandad Canyon	10/6/2003	35.864089	-106.29141	W	SW	Congener	0.131	ppb	
NMED-DOE-OB	Mortandad Canyon	10/6/2003	35.864382	-106.29421	W	SW	Congener	0.0414	ppb	
NMED-DOE-OB	Mortandad Canyon	10/6/2003	35.864632	-106.29317	W	SW	Congener	0.0114	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Mortandad Canyon	10/8/2003	35.864632	-106.29317	W	SW	Congener	0.0131	ppb	
NMED-DOE-OB	Mortandad Canyon	10/14/2003	35.864632	-106.29317	W	SW	Congener	0.00907	ppb	
NMED-SWQB	Santa Fe River above Hwy 599	4/1/2005	35.64016	-106.06408	W	SW	Congener	0.00101	ppb	
NMED-DOE-OB	Rio Grande at Otowi Upper (bank)	5/25/2005	35.875261	-106.14142	W	Snow Melt	Congener	0.000242	ppb	
NMED-DOE-OB	Rio Grande at Espanola	5/25/2005	36.008268	-106.0733	W	Snow Melt	Congener	0.000073	ppb	
NMED-SWQB	Rio Grande below Frijoles	5/25/2005	N/A	N/A	W	Snow Melt	Congener	0.000036	ppb	
NMED-DOE-OB	Rio Grande at Otowi	5/25/2005	35.750799	-105.80191	W	Snow Melt	Congener	0.000003	ppb	
NMED-SWQB	Rio Grande at Buckman	5/25/2005	35.836244	-106.16167	W	Snow Melt	Congener	0.000163	ppb	
NMED-DOE-OB	Pueblo Canyon	6/3/2005	35.883763	-106.25656	SED	Soil	Congener	81	ppb	
NMED-DOE-OB	Pueblo Canyon	6/3/2005	35.884504	-106.26959	SED	Soil	Congener	97.7	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Pueblo Canyon	6/3/2005	35.885092	-106.27112	SED	Soil	Congener	15.8	ppb	
NMED-DOE-OB	Pueblo Canyon	6/3/2005	35.885092	-106.27112	SED	Soil	Congener	139	ppb	
NMED-DOE-OB	DP Canyon	7/13/2005	35.877392	-106.27238	W	SW	Congener	2.71	ppb	
NMED-DOE-OB	Los Alamos Canyon	7/17/2005	35.883048	-106.15018	W	SW	Congener	0.0195	ppb	
NMED-DOE-OB	Los Alamos Canyon	7/18/2005	35.877099	-106.30289	W	SW	Congener	1.66	ppb	
NMED-DOE-OB	Mortandad Canyon	7/18/2005	35.864762	-106.29911	W	SW	Congener	0.233	ppb	
NMED-DOE-OB	Mortandad Canyon	7/18/2005	35.864592	-106.29426	W	SW	Congener	0.44	ppb	
NMED-DOE-OB	Los Alamos Canyon	7/18/2005	35.876673	-106.29476	W	SW	Congener	6.92	ppb	
NMED-DOE-OB	Canon de Valle	7/18/2005	35.849986	-106.33271	W	SW	Congener	0.641	ppb	
NMED-DOE-OB	Los Alamos Canyon	7/21/2005	35.876673	-106.29476	W	SW	Congener	5.93	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Los Alamos Canyon	7/21/2005	35.877099	-106.30289	W	SW	Congener	1.4	ppb	
NMED-DOE-OB	Los Alamos Canyon	7/21/2005	35.876514	-106.29691	W	SW	Congener	0.766	ppb	
NMED-DOE-OB	Mortandad Canyon	7/21/2005	35.864762	-106.29911	W	SW	Congener	0.299	ppb	
NMED-DOE-OB	Mortandad Canyon	7/21/2005	35.864592	-106.29426	W	SW	Congener	0.0737	ppb	
NMED-DOE-OB	Mortandad Canyon	7/29/2005	35.864762	-106.29911	W	SW	Congener	0.124	ppb	
NMED-DOE-OB	Canon de Valle	8/5/2005	35.849986	-106.33271	W	SW	Congener	1.43	ppb	
NMED-DOE-OB	Sandia Canyon	8/5/2005	35.866167	-106.26307	W	SW	Congener	0.111	ppb	
NMED-DOE-OB	Mortandad Canyon	8/5/2005	35.864762	-106.29911	W	SW	Congener	0.547	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/5/2005	35.877099	-106.30289	W	SW	Congener	1.23	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/5/2005	35.876514	-106.29691	W	SW	Congener	0.272	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Los Alamos Canyon	8/5/2005	35.876673	-106.29476	W	SW	Congener	13.8	ppb	
NMED-DOE-OB	Rendija Canyon	8/5/2005	35.907288	-106.29995	W	SW	Congener	0.011	ppb	
NMED-DOE-OB	DP Canyon	8/5/2005	35.877392	-106.27238	W	SW	Congener	2.51	ppb	
NMED-DOE-OB	Rendija Canyon	8/9/2005	35.907288	-106.29995	W	SW	Congener	0.0384	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	White Bass	Congener	3.5	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Walleye	Congener	2.2	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Pike	Congener	2.1	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	White Bass	Congener	1.8	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	White Bass	Congener	1.8	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Pike	Congener	0.9	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Carp	Congener	4.3	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Pike	Congener	0.7	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Walleye	Congener	0.6	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Catfish	Congener	1.5	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Carp	Congener	4.4	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Carp	Congener	3.1	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Catfish	Congener	1.5	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Walleye	Congener	1.4	ppb	
LA-14289 PCB Fish Tissue	Cochiti	8/10/2005	35.674171	-106.30834	Biota	Catfish	Congener	10.7	ppb	
NMED-DOE-OB	Sandia Canyon	8/10/2005	35.866167	-106.26307	W	SW	Congener	0.0117	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Canon de Valle	8/11/2005	35.849986	-106.33271	W	SW	Congener	0.546	ppb	
NMED-DOE-OB	Sandia Canyon	8/12/2005	35.866167	-106.26307	W	SW	Congener	1.05	ppb	
NMED-DOE-OB	Rendija Canyon	8/12/2005	35.907288	-106.29995	W	SW	Congener	0.0559	ppb	
NMED-DOE-OB	Pueblo Canyon	8/12/2005	35.884749	-106.26894	W	SW	Congener	1.43	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/12/2005	35.876514	-106.29691	W	SW	Congener	0.473	ppb	
NMED-DOE-OB	DP Canyon	8/12/2005	35.879938	-106.28884	W	SW	Congener	1.29	ppb	
NMED-DOE-OB	DP Canyon	8/12/2005	35.879938	-106.28884	W	SW	Congener	0.0658	ppb	
NMED-DOE-OB	DP Canyon	8/12/2005	35.879938	-106.28884	W	SW	Congener	0.0864	ppb	
NMED-DOE-OB	Sandia Canyon	8/12/2005	35.867647	-106.27553	W	SW	Congener	1.51	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/12/2005	35.883048	-106.15018	W	SW	Congener	0.394	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Los Alamos Canyon	8/12/2005	35.872626	-106.26009	W	SW	Congener	0.25	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/12/2005	35.872626	-106.26009	W	SW	Congener	3.81	ppb	
NMED-DOE-OB	Tensite Canyon	8/15/2005	35.862003	-106.28719	W	SW	Congener	1.02	ppb	
NMED-DOE-OB	Mortandad Canyon	8/15/2005	35.864592	-106.29426	W	SW	Congener	0.124	ppb	
NMED-DOE-OB	Mortandad Canyon	8/15/2005	35.864574	-106.29525	W	SW	Congener	0.0153	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/15/2005	35.876673	-106.29476	W	SW	Congener	70.9	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/15/2005	35.876311	-106.2893	W	SW	Congener	0.0747	ppb	
NMED-DOE-OB	DP Canyon	8/15/2005	35.877392	-106.27238	W	SW	Congener	2.16	ppb	
NMED-DOE-OB	DP Canyon	8/15/2005	35.877322	-106.27262	W	SW	Congener	0.14	ppb	
NMED-SWQB	Santa Fe River below the effluent outfall	8/16/2005	35.629444	-106.09139	W	Effluent	Congener	0.000072	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Tijeras Arroyo below 4 Hills	8/16/2005	35.060837	-106.49445	W	SW	Congener	0.000043	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/22/2005	35.872626	-106.26009	W	SW	Congener	3.07	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Carp	Congener	8.3	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Carp	Congener	4.9	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Catfish	Congener	4.2	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Catfish	Congener	3.6	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Carp	Congener	2.3	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Catfish	Congener	2	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Walleye	Congener	0.8	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Walleye	Congener	0.8	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Walleye	Congener	0.6	ppb	
LA-14289 PCB Fish Tissue	Abiquiu Reservoir	8/23/2005	36.250005	-106.43945	Biota	Smallmouth Bass	Congener	0.5	ppb	
NMED-DOE-OB	DP Canyon	8/23/2005	35.879938	-106.28884	W	SW	Congener	0.628	ppb	
NMED-DOE-OB	DP Canyon	8/23/2005	35.877392	-106.27238	W	SW	Congener	3.08	ppb	
NMED-DOE-OB	DP Canyon	8/23/2005	35.877322	-106.27262	W	SW	Congener	0.835	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/23/2005	35.876311	-106.2893	W	SW	Congener	1.01	ppb	
NMED-DOE-OB	Tensite Canyon	8/23/2005	35.862003	-106.28719	W	SW	Congener	3.04	ppb	Sampled on Pratt Tributary
NMED-DOE-OB	Mortandad Canyon	8/23/2005	35.864592	-106.29426	W	SW	Congener	0.238	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/23/2005	35.875071	-106.27998	W	SW	Congener	18.1	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/23/2005	35.873564	-106.27088	W	SW	Congener	1.1	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Los Alamos Canyon	8/24/2005	35.872626	-106.26009	W	SW	Congener	5	ppb	
NMED-DOE-OB	Pueblo Canyon	8/24/2005	35.883868	-106.2606	W	SW	Congener	2.27	ppb	
NMED-DOE-OB	Sandia Canyon	8/24/2005	35.867647	-106.27553	W	SW	Congener	2.19	ppb	
NMED-DOE-OB	Pueblo Canyon	8/24/2005	35.870867	-106.217	W	SW	Congener	0.248	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/24/2005	35.883048	-106.15018	W	SW	Congener	0.489	ppb	
NMED-DOE-OB	Tensite Canyon	8/25/2005	35.862003	-106.28719	W	SW	Congener	4.29	ppb	Sampled on Pratt Tributary
NMED-DOE-OB	Mortandad Canyon	8/25/2005	35.864574	-106.29525	W	SW	Congener	0.0115	ppb	
NMED-DOE-OB	DP Canyon	8/25/2005	35.877322	-106.27262	W	SW	Congener	0.595	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/25/2005	35.876311	-106.2893	W	SW	Congener	2.5	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/25/2005	35.875071	-106.27998	W	SW	Congener	1.97	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-DOE-OB	Los Alamos Canyon	8/25/2005	35.867069	-106.22383	W	SW	Congener	1.39	ppb	
NMED-DOE-OB	Mortandad Canyon	8/26/2005	35.864574	-106.29525	W	SW	Congener	0.0208	ppb	
NMED-DOE-OB	Los Alamos Canyon	8/26/2005	35.875071	-106.27998	W	SW	Congener	1.77	ppb	
NMED-SWQB	Santa Fe River below Saint Francis Drive	9/1/2005	35.6884	-105.955	W	SW	Congener	0.02064	ppb	
NMED-SWQB	Arroyo @ St.Francis Drive	9/1/2005	35.6886	-105.955	W	SW	Congener	0.06374	ppb	
NMED-SWQB	Santa Fe River at County Rd 68A	9/1/2005	35.6597	-106.012	W	SW	Congener	0.20367	ppb	
NMED-SWQB	Santa Fe River above Hwy 599	9/1/2005	35.64016	-106.06408	W	SW	Congener	0.6426	ppb	
NMED-SWQB	Drain @ Frenchies Field	9/1/2005	35.6731	-105.984	W	SW	Congener	0.03087	ppb	
NMED-DOE-OB	Los Alamos Canyon	9/30/2005	35.87499	-106.2785	W	SW	Congener	0.39	ppb	
NMED-DOE-OB	Los Alamos Canyon	9/30/2005	35.873564	-106.27088	W	SW	Congener	1.87	ppb	

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Walleye	Congener	0.901982	ppb	L9532-1 Composite (2); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Catfish	Congener	2.209835	ppb	L9532-2 Composite (2); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Smallmouth	Congener	0.780708	ppb	L9532-4 Composite (3); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Rainbow	Congener	1.968164	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Carp	Congener	2.374916	ppb	L9532-5 (A) Composite (9); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Carp	Congener	2.212341	ppb	WG21392-103 (Duplicate) Composite (9); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Abiquiu Reservoir	10/11/2006	N/A	N/A	Biota	Carp	Congener	2.5880901	ppb	L9532-6 Composite 6); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Cochiti Reservoir	10/17/2006	N/A	N/A	Biota	Catfish	Congener	9.520084	ppb	L9532-8 (A) Composite (5); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Cochiti Reservoir	10/17/2006	N/A	N/A	Biota	Catfish	Congener	9.25252	ppb	WG21535-103 (DUP L9532-8) Composite (5); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Cochiti Reservoir	10/17/2006	N/A	N/A	Biota	Carp	Congener	31.355418	ppb	L9532-9 Composite (5); NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Cochiti Reservoir	10/17/2006	N/A	N/A	Biota	Walleye	Congener	4.27458	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Pueblo de Taos blw Los Cordovas -- USGS 08276300 * 28RPuebT008.5	11/14/2006	36.3792	-105.6667	SED	Grab	Congener	0.321	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Embudo Creek at Hwy 68 bridge nr Dixon at USGS gage 0827900 * 28Embudo000.8	11/14/2006	36.210833	-105.91306	SED	Grab	Congener	0	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Red River below Fish Hatchery near USGS (Red River site 37) * 28RedRiv005.3	11/14/2006	36.681419	-105.6573	SED	Grab	Congener	1.304	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Hondo at Rio Grande confluence * 28RHondo000.1	11/14/2006	36.5344	-105.708	SED	Grab	Congener	0.00212	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Grande nr Arroyo Hondo at John Dunne Bridge -- USGS 08268700 *28RGrand665.0	11/14/2006	36.5344	-105.7094	SED	Grab	Congener	0.419	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Grande blw Taos Junc Bridge-- USGS 08276500 * 28RGrand647.9	11/15/2006	36.32	-105.75388	SED	Grab	Congener	0.03205	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Santa Cruz River immed upstream of HWY 68 * 28SanCru000.7	11/15/2006	35.9894	-106.0658	SED	Grab	Congener	0	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL

DATA SOURCE	SITE NAME, DESCRIPTION, OR ID[1]	COLLECTED	LATITUDE	LONGITUDE	MEDIUM[2]	DETAIL[3]	ANALYSIS (4)(5)	TOTAL PCBS[6]	UNITS[7]	NOTES
NMED-SWQB	Rio Grande at NM-CO border at USGS gage 08249200 in CO * 28RGrand734.5	11/16/2006	37.001111	-105.72222	SED	Grab	Congener	0.08255	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	SANTA FE RIVER above Cochiti AT USGS GAGE 08317200 * 30SantaF012.9	12/5/2006	35.54726	-106.22922	SED	Grab	Congener	0.295	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Grande at Otowi Bridge * 28RGrand547.2	12/5/2006	35.874726	-106.14167	SED	Grab	Congener	0.0149	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL
NMED-SWQB	Rio Chama nr Chamita immed ds of HWY 74 bridge -- USGS 0829000 * 29RChama004.8	12/5/2006	36.0728	-106.1094	SED	Grab	Congener	0.0154	ppb	NMED PROVISIONAL DATA AWAITING QUALITY ASSURANCE APPROVAL

APPENDIX B: PCB Incidents, Screening, and Activities in the RGBACD

Table B-1. PCB Incident Data by County for the Rio Grande from the Headwaters to Cochiti Dam (ERNS, 2006; NMEID, 1990; PNM, 1995)

Incident ID	Facility Name	Primary Industry/Activity	Lat	Long	Incident ID	State	County	Total Release	Year Reported
B-1-1	New Mexico Department of Transportation	Transformer	35.675429	-105.957373	NR	NM	Santa Fe	245 Gallons Askarel	1985
B-1-2	Penitentiary of New Mexico	Transformer	35.561256	-106.053673	38011	NM	Santa Fe	Unknown	1985
B-1-3	Los Alamos National Labs	Capacitator	35.893631	-106.286769	59720	NM	Los Alamos	2 lbs	1987
B-1-4	Los Alamos National Labs	Capacitator	35.893631	-106.286769	61854	NM	Los Alamos	10 lbs	1987
B-1-5	Los Alamos National Labs	Capacitator	35.893631	-106.286769	83741	NM	Los Alamos	30 lbs @ 500,000 ppm	1988
B-1-6	Public Service of New Mexico	Electrical Generating Site	35.677227	-105.958055	NR	NM	Santa Fe	Unknown	Prior to 1990
B-1-7	Public Service Co. of Colorado	Transformer	NA	NA	36273	CO	Alamosa	65 gallons	1990
B-1-8	Los Alamos Sales Co.	Waste Handler	35.900752	-106.321065	197585	NM	Los Alamos	Unknown	1993
B-1-9	Los Alamos Sewage System	Waste Management	35.881229	-106.305604	341511	NM	Los Alamos	Unknown	1996
B-1-10	U.S. Department of Energy (Technical Area 53; Los Alamos Building 3A)	Capacitator	NA	NA	322047	NM	Los Alamos	500 Gallons Dielectric Fluid with PCBs	1996
B-1-11	Los Alamos National Labs (Technical Area 55; Building PF4)	Capacitator	NA	NA	567729	NM	Los Alamos	4 Ounces of Dielectric Fluid with PCBs	2001
B-1-12	Public Service of New Mexico	Transformer	35.666235	-105.924976	742224	NM	Santa Fe	50 gallons of Transformer Oil with PCBs	2004

Table B-2 Facilities required to prescreen effluent for PCB's in the Rio Grande in NPDES Permitting Process (Headwaters to Cochiti Dam) (NMED, 2006d)

NPDES ID	Location/Facility	Facility Type	City	State	Latitude	Longitude
NM0029351	City of Espanola	Sewerage System	Espanola	NM	35.996771	-106.080954
NM0020141	Los Alamos Co.-Bayo *	Sewerage System	Los Alamos	NM	35.882177	-106.304179
NM0022306	Molycorp	Mineral Extraction	Questa	NM	36.946164	-105.191883
NM0024899	Town of Red River	Sewerage System	Red River	NM	36.708531	-105.404756
NM0022292	City of Santa Fe	Sewerage System	Santa Fe	NM	35.612329	-106.070614
NM0024066	Town of Taos	Sewerage System	Taos	NM	36.409757	-105.571932
NM0022101	Village of Taos Ski Valley	Sewerage System	Taos	NM	36.388751	-105.564678

* Required to monitor effluent periodically

Table B-3 Facilities Registered with PCB Activity Database (PADS, 2006)

PCB Activity ID	Facility Name	Facility Location	Latitude	Longitude	PADS ID	PCB Activity		
						Disposer	Generator	Transporter
B-3-1	San Luis Valley Rural Electric	3625 W US HWY 160 Monte Vista, CO 81144	37.593694	-106.189340	COD003770427		X	
B-3-2	Los Alamos National Laboratory	Los Alamos, NM	35.89363	-106.28677	NM0890010515	X	X	X
B-3-3	Kit Carson Electric Coop	118 Cruz Alta Road, Taos, NM 87571	36.383725	-105.538655	NMD986675486		X	
B-3-4	Northern Rio Arriba Electric Coop	1135 Camino Escondido Chama, NM 87520	36.892425	-106.591058	NMD002808715		X	

APPENDIX C: Potential Contributing Sources[(1)]

Site ID	State	County	City	Activity (1)	Lat	Long	Source Identifying Activity as Potential PCB Source
C-1	CO	Alamosa	Alamosa	Auto Parts and Supply Manufacturing	37.456576	-105.865369	USEPA, 1998
C-2	CO	Rio Grande	Monte Vista	Closed Landfill	37.575897	-106.146729	NMED, 2000
C-3	CO	Rio Grande	Monte Vista	Electric Power Distribution	NA	NA	NMED, 2000
C-4	CO	Rio Grande	Monte Vista	Electric Power Distribution	NA	NA	NMED, 2000
C-5	CO	Rio Grande	Monte Vista	Active Landfill	37.575897	-106.146729	NMED, 2000
C-6	CO	Rio Grande	Monte Vista	Active Landfill	NA	NA	NMED, 2000
C-7	CO	Rio Grande	Monte Vista	PCB Generator	37.587280	-106.198174	NMED, 2000
C-8	CO	Rio Grande	Monte Vista	PCB Generator	37.587280	-106.198174	NMED, 2000
C-9	CO	Rio Grande	Monte Vista	Pesticide and Agriculture Chemical Manufactures	37.58334	-106.149506	USEPA, 1998
C-10	CO	Rio Grande	Monte Vista	Pesticide and Agriculture Chemical Manufactures	37.58334	-106.149506	USEPA, 1998
C-11	CO	Saguache	Center	Electric Power Distribution	37.753369	-106.10481	NMED, 2000
C-12	CO	Saguache	Center	Electric Power Distribution	37.753369	-106.10481	NMED, 2000
C-13	CO	Saguache	Center	Electric Power Distribution	37.784771	-106.075645	NMED, 2000
C-14	CO	Saguache	Center	Electric Power Distribution	37.784771	-106.075645	NMED, 2000
C-15	CO	Saguache	Center	Farm Machinery and Equipment Manufacturers	37.753476	-106.115561	USEPA, 1998
C-16	CO	Saguache	Center	Farm Machinery and Equipment Manufacturers	37.753476	-106.115561	USEPA, 1998
C-17	NM	Los Alamos	Los Alamos	PCB Generator, Disposer, Transporter	35.893631	-106.286769	NMED, 2000
C-18	NM	Los Alamos	Los Alamos National Laboratory	Closed Landfill	35.8439	-106.2633	NMED, 2000
C-19	NM	Rio Arriba	El Llano Landfill	Closed Landfill	35.9936	-106.0322	NMED, 2000
C-20	NM	Rio Arriba	Medenales Landfill	Closed Landfill	36.1958	-106.1778	NMED, 2000
C-21	NM	Rio Arriba	El Rito Landfill	Closed Landfill	36.3192	-106.1750	NMED, 2000
C-22	NM	Rio Arriba	Canjilon Landfill	Closed Landfill	36.4583	-106.4208	NMED, 2000
C-23	NM	Rio Arriba	Tierra Amarilla Landfill	Closed Landfill	36.7042	-106.5531	NMED, 2000
C-24	NM	Rio Arriba	Chama Landfill	Closed Landfill	36.8714	-106.6600	NMED, 2000

Site ID	State	County	City	Activity (1)	Lat	Long	Source Identifying Activity as Potential PCB Source
C-25	NM	Rio Arriba	Espanola	Closed Landfill	NA	NA	NMED, 2000
C-26	NM	Rio Arriba	Espanola	Closed Landfill	35.976687	-106.04309	NMED, 2000
C-27	NM	Rio Arriba	San Juan	Closed Landfill	NA	NA	NMED, 2000
C-28	NM	Rio Arriba	San Juan Pueblo	Closed Landfill	NA	NA	NMED, 2000
C-29	NM	Rio Arriba	Espanola	Electric Power Distribution	35.69184	-105.943892	NMED, 2000
C-30	NM	Rio Arriba	Velarde	Electric Power Distribution	36.153095	-105.971588	NMED, 2000
C-31	NM	Rio Arriba	Abiquiu	Electric Power Distribution	36.234653	-106.390981	NMED, 2000
C-32	NM	Rio Arriba	Espanola	Machine Disposal	35.965456	-106.038535	NMED, 2000
C-33	NM	Rio Arriba	Chama	PCB Generator	36.892392	-106.591127	NMED, 2000
C-34	NM	Santa Fe	Caja Del Rio	Active Landfill	35.6854	-106.0896	NMED, 2000
C-35	NM	Santa Fe	Santa Fe Downs Landfill	Closed Landfill	35.5889	-106.0819	NMED, 2000
C-36	NM	Santa Fe	Agua Fria	Closed Landfill	35.6639	-106.0583	NMED, 2000
C-37	NM	Santa Fe	Plains Electric	Closed Landfill	35.6639	-106.0583	NMED, 2000
C-38	NM	Santa Fe	Santa Fe Landfill	Closed Landfill	35.6958	-105.9736	NMED, 2000
C-39	NM	Santa Fe	Santa Fe	Electric Power Distribution	35.5612556	-106.053673	NMED, 2000
C-40	NM	Santa Fe	Santa Fe	Electric Power Distribution	35.563068	-106.053634	NMED, 2000
C-41	NM	Santa Fe	Santa Fe	Electric Power Distribution	35.677227	-105.958055	NMED, 2000
C-42	NM	Santa Fe	Santa Fe	Electric Power Distribution	35.666235	-105.924976	NMED, 2001
C-43	NM	Santa Fe	Santa Fe	Foundry Steel	35.72541	-105.91219	USEPA, 1998
C-44	NM	Santa Fe	Santa Fe	Metal Goods Manufacturing	35.642015	-105.929932	USEPA, 1998
C-45	NM	Santa Fe	Santa Fe	Metal Goods Manufacturing	35.683655	-105.929932	USEPA, 1998
C-46	NM	Santa Fe	Santa Fe	Steel Structure Manufacturing	35.860433	-105.995478	USEPA, 1998
C-47	NM	Santa Fe	Santa Fe	Transformer	35.675429	-105.957373	NMED, 2000
C-48	NM	Taos	Taos Regional	Active Landfill	36.4443	-105.6299	NMED, 2000
C-49	NM	Taos	6mi E US 285 on US 64	PCB Transformer	NA	NA	NMED, 2000
C-50	NM	Taos	4mi E US 285 on US 64	PCB Transformer	NA	NA	NMED, 2000
C-51	NM	Taos	5mi E US 285 on US 64	PCB Transformer	NA	NA	NMED, 2000
C-52	NM	Taos	Taos	PCB Generator	36.383725	-105.538655	NMED, 2000

(1) Potential sources of PCBs based on industrial operations that are historically associated with use of the substance, and unless previously identified otherwise no information reviewed indicates PCBs were ever used at the sites listed in Appendix C.